THEORETICAL AND APPLIED STUDIES ON TURKISH ECONOMY

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Edited by
SELİM ADEM HATIRLI
ŞEVKET ALPER KOÇ
ONUR DEMİREL

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INTRODUCTION

Competitiveness is accepted as one of the crucial conditions of sustaining and enhancing current level of welfare for the countries, particularly in the era of globalisation that acquires new dimensions day by day. Like any other country, Turkey should also define her economic constraints and opportunities. For this purpose, applied studies are quite important for making future projections and for developing related economic policies. Therefore, current study, entitled "Theoretical and Applied Studies on Turkish Economy, Vol. I", aims to make contributions both to academic world, namely to the literature of economics and to real world through the formation of national economic policies in various aspects. In the study, current issues are tried to be examined through state-of-the-art econometric approaches and rigorous analysis. Consequently, any academician, or practitioner who is interested in Turkish economy and its connections with global economy would benefit from the book.

With this object in mind, the study is composed of 4 sections and 29 chapters. The sections are microeconomics, macroeconomics, regional economics and international economics. In the first section, there are 8 studies on microeconomics. The fundamental topics in the section are competition, market power, and consumption and saving behaviours. These topics are discussed through various approaches such as game theory, Panzar-Rosse model, Heckman process, simultaneous models and behavioural economics.

In the second section on macroeconomics there are 15 studies. The studies focus on economic growth, financial development, labour and labour productivity, taxation, employment, incentives, and energy. In these researches emphasis on analysing conjugate interactive relationship, income convergence, deindustrialization in Turkey, decomposition of labour productivity growth, financial dynamics of economic growth, female labour supply and taxation, the impact of financial development and its components on energy consumption, the relation with financial dynamics and energy consumption, determinants of economic growth, effects of incentives on employment, the connection between informal economy and economic growth, development of human capital in education and health studies and evaluation of investment environment are made.

In the third section on regional economics there are 2 studies examining regional differences by using multi-dimensional approach and the effects of development agencies on regional economy.

In the fourth and final section the focal point is international economics. The studies examine exports and export.

Related income.

The major applications of this part are that revenues of Global Value Chains for the five regions in the world by using LM and RALS-LM tests, investigating terror attacks' effect on export behaviour by using VAR model, investigating external borrowing-investment relationship, Turkey's export product diversification via Granger Causality.

The book is designed to examine Turkish economy from different perspectives and to contribute to the enhancement of competitiveness. For this aim, 46 scholars, 3 editors and the precious employees of IJOPEC Publications came together and published this book. Like any other books, the process was toilsome and demanding but the aim is divine: to contribute to the literature and to Turkish economy. Although tiring, subsequent volumes of the examination of Turkish economy is planned to be published in the future.

All the considerations and expressions in the chapters belong to the related authors.

For their efforts we are grateful to all authors, to all reviewers, and to all contributors including the employees of IJOPEC Publications.

17 June 2020

Prof. Dr. Selim Adem HATIRLI

Prof. Dr. Şevket Alper KOÇ

Asst. Prof. Dr. Onur DEMİREL

SECTION I

MICROECONOMICS

1

A GAME THEORY ANALYSIS: LAFFER CURVE

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Introduction

Taxes, which has a special importance in meeting public expenditures, can be highly effective in the economic development of a country. Legal regulations in a country and their implementation, and attitudes and behaviours of taxpayers directly affect the total tax revenue. For this reason, there are many studies in the literature where the interaction between taxpayers and the government is considered as the main field of study and which focuses on "taxes". In this context, especially the supply-side economy has a great importance. (Allingham and Sandmo, 1972; Fukofuka, 2013; Hinrichs, 1969; Stiglitz, 1969; Mossin, 1968).

Model

The main purpose of this study is to analyse the Laffer Curve by illuminating the interaction between the government and the taxpayer. The game consists of two periods. In the first period, the taxpayer determines the rate of the willingness to pay the tax. And in the second period of the game, the government determines the optimal level of monetary penalty to be applied to counteract tax avoidance.

The variables that affect the level of government utility are the government expenditure, the tax rate, the taxpayer's rate of willingness to pay tax, the total tax base that the public needs, and the level of monetary penalties that the government will impose in order to prevent tax avoidance. The way these variables affect the level of government utility is as follows:

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1. The level of government expenditure positively affects the government utility up to a certain level, but negatively after this level. The main reason for this is that it is a difficult and complex procedure for government to meet public expenditure.

2. According to the basic assumptions of the Laffer Curve, the increase in the tax rate positively affects the government utility up to a certain level, but negatively after this level.

3. The effect of the total tax base that the public needs on government utility depends on the tax rate and the taxpayer's rate of willingness to pay tax.

4. In order to prevent tax avoidance, the level of monetary penalty to be imposed by the government positively affects the government's utility up to a certain level, but negatively after this level.

We can show the government's utility function as follows:

$$u_{government} = \left[\left(-\beta^2 + \beta\right)\nu R + \left(-\alpha^2 + \alpha\right)M + \left(-\gamma^2 + \gamma\right)G\right]^3 \quad (1)$$

***G*:** Government expenditure

ν: tax rate

M: The level of monetary penalty to be imposed by the government to avoid tax avoidance

R: Total tax base needed by the public

β, α, γ: parameters ($\beta \geq 0, \alpha \geq 0, 0 \leq \gamma \leq 1$)

The variables that affect the taxpayer's utility are the taxpayer's rate of benefiting from government expenditure, the tax rate, the taxpayer's rate of willingness to pay the tax, the total tax base that public needs, the level of public expenditure, and the level of monetary penalties to be imposed by the government to prevent tax avoidance. The ways that these variables affect the taxpayer's utility are as follows:

1. The taxpayer's utility increases as the rate of benefiting from public expenditure increases.
2. The tax rate positively affects the taxpayer's utility up to a certain level, but negatively after this level.

3. The taxpayer's rate of willingness to pay tax positively affects the taxpayer's utility up to a certain level, but negatively after that level.
4. The total tax base required by the public affects the taxpayer's utility up to a certain level, but negatively after this level. Failure to meet the tax base is a signal for potential pressure for taxpayers.
5. As the level of public expenditure increases, the taxpayer's utility increases.
6. The share of monetary penalty to be imposed by the government in order to prevent tax avoidance in the total tax base required by the public reduces the taxpayer's utility. An increase in this share cause taxpayers to resort illegal ways.

The taxpayer's utility function can be illustrated as follows:

$$u_{taxpayer} = -\left[\frac{M}{R}\right]^2 + \left[(-D^2 + D\ )\kappa\nu R + fG\right]^3 \quad (2)$$

f: Taxpayer's utilization rate from public expenditure

κ: Taxpayer's rate of willingness to pay tax [3]

D: parameter $(\beta \geq 0, \alpha \geq 0, 0 \leq \gamma \leq 1)$

The game is a 2-stage dynamic game with complete information. The sub-game perfect Nash equilibrium of the game can be determined by backwards induction method. In the second period of the game, the government determines the optimal level of monetary penalty to prevent tax avoidance. The first-order condition is as follows:

$$\frac{\partial u_{government}}{\partial M} = \frac{\partial\left[\left[(-\beta^2 + \beta\ )\nu R + (-\alpha^2 + \alpha\ )M + (-\gamma^2 + \gamma\ )G\right]^3\right]}{\partial M}$$
$$= 3(-\alpha^2 + \alpha\ )\left[(-\beta^2 + \beta\ )\nu R + (-\alpha^2 + \alpha\ )M + (-\gamma^2 + \gamma\ )G\right]^2 = 0$$

The first-order condition is satisfied under this condition as long as $\alpha \neq 1$,

$$\left[(-\beta^2 + \beta\ )\nu R + (-\alpha^2 + \alpha\ )M + (-\gamma^2 + \gamma\ )G = 0\right]$$

$$(\alpha^2 - \alpha\ )M = \left[(-\beta^2 + \beta\ )\nu R + (-\gamma^2 + \gamma\ )G\right]$$

3 $0 \leq \kappa \leq 1$. If the ratio is equal to 1, the taxpayer wants to pay tax with certainty; if the ratio is equal to 0 the taxpayer does not want to pay the tax with certainty.

$$M^* = \frac{\left[\left(-\beta^2 + \beta\right)\Re\nu + \left(-\gamma^2 + \gamma\right)G\right]}{\left(\alpha^2 - \alpha\right)} \tag{3}$$

The optimal level of monetary penalty that the government will apply to counteract tax avoidance depends on three variables. These are the level of public expenditure, the tax rate and the total tax base that is required by the public. As we can see, as the tax rate, government expenditure and the total tax base increases, the monetary penalty to be imposed by the government to avoid tax avoidance increases.

In the first period of the game, the taxpayer determines the optimal rate of willingness to pay tax. By taking the first order condition of the taxpayer's utility function, we will end up with:

$$\frac{\partial u_{taxpayer}}{\partial \kappa} = \frac{\partial\left[-\left[\frac{\left[\left(-\beta^2 + \beta\right)\nu\Re + \left(-\gamma^2 + \gamma\right)G\right]}{\left(\alpha^2 - \alpha\right)} - R\right]^2 + \left[\left(-D^2 + D\right)\kappa\nu R + fG\right]^3\right]}{\partial\kappa} = 0$$

$$3\left[\left(-D^2 + D\right)\nu R\right]\left[\left(-D^2 + D\right)\kappa\nu R + fG\right]^2 = 0$$

$$\kappa^* = \frac{fG}{\left(D^2 - D\right)\nu R} \tag{4}$$

The taxpayer's optimal rate of willingness to pay tax depends on four variables. These are the taxpayer's rate of benefiting from government expenditure, the level of government expenditure, the tax rate and the total tax base required by the public. All these variables positively affect the taxpayer's optimal rate of willingness to pay tax.

Conclusion and Evaluation of Findings

The main purpose of this study is to analyse the Laffer Curve by making use of the interaction between the government and the taxpayer. We assume that the players have symmetric and complete information. We construct a two-stage dynamic game with complete information. In the first period of the game, the taxpayer determines the rate of willingness to pay the tax. In the second period of the game, the government determines the optimal level of monetary penalty to be imposed to counteract tax avoidance.

The taxpayer's optimal rate of willingness to pay tax depends on four variables. These are the taxpayer's rate of benefiting from government expenditure, the level of government expenditure, the tax rate and the total tax base required by the public. The optimal level of monetary penalty that the government will implement to prevent tax avoidance depends on three variables. These are the level of government expenditure, the tax rate and the total tax base required by the public. Assuming that the relationship specified in the Laffer Curve is valid, which means increasing the tax rates up to a certain level increases the tax revenue but after this level increasing the tax rates decreases the tax revenue, the taxpayer's optimal rate of willingness to pay tax should increase as the tax rate increases to a certain level. And it decreases after this level. The taxpayer's optimal rate of willingness to pay function confirms this. On the other hand, as the tax rate increases, the level of optimal monetary penalty to be imposed by the government to prevent tax avoidance increases up to a certain level. It decreases after this level. This is confirmed by the government's optimal level of monetary penalty function. Therefore, the relationship specified in the Laffer Curve is valid and the players adjust their strategies accordingly.

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2

ARE INSURANCE FIRMS COMPETITIVE IN TURKISH NON-LIFE INSURANCE SECTOR? A PANZAR AND ROSSE (1987) APPROACH IN THE PERIOD OF 2010-2018

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Introduction

Traditional Industrial Economy theoretically suggests that new firms' entries to a sector will increase the level of competition in that sector. According to Bain (1951), one of the SCP approach representatives, a new firm entry to an industry will reduce the concentration ratio and this will contribute to an increase in the level of competition. However, according to Demsetz's (1973) efficient structure hypothesis, the presence of efficient firms in a sector, i.e. existence of companies that have cost lower than others, will lead these firms towards gaining higher market share. Thus, the concentration ratio of the sector will be higher. Briefly, the SCP approach suggests that, as concentration increases, competition decreases in a market (sector) and when the efficiency increases, so does the competition. In the recent studies conducted by representatives of the NEIO, it is found that competition may exist in markets even if the concentration is high. Panzar and Rosse (1987) model, which is one of the outcomes of these empirical studies, is used for estimating the level of competition in a market (sector) by using firm specific data and eliminates the time restriction, it has frequently been used in recent studies. Another important reason for preferring this approach is that it provides precise information about the market structure. Specifically, in

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traditional approach, as mentioned above, the degree of competition in a market is defined by the movement in concentration. As the concentration decreases in a sector, competition increases in that sector (including vice versa). Panzar and Rosse model, however, allows us to precisely determine the market structure as monopoly, perfect competition or monopolistic competition.

In this study, Panzar and Rosse (1987) H statistic value, which is based on the estimation of income equation in reduced form and is providing more clear information about market structure than traditional paradigm, has been estimated for insurance companies operating in the elementary field in Turkey. For this, 34 insurance companies' 2010-2018 balance-sheet data released by Turkey Insurance Association was used. With this motivation, in the first chapter of our work a brief information about the insurance sector in Turkey was given, in second chapter Panzar and Rosse (1987) model was introduced, in third chapter literature was summarized, in forth chapter the model and estimation results was given and in the fifth chapter a general evaluation was made and the study was finished.

Brief History of the Turkish Insurance Sector

The development in modern sense in Turkey of insurance sector that creates a significant added value in the economy with its risk-taking activity began with "Insurance and Inspection and Control of Insurance Companies" law introduced in 1927. After this period, the presence of foreign capital companies in the sector has gradually started to be replaced by domestic companies. In 1929, National Reassurance Turkish Anonym Company has been established and insurance business was connected to the Ministry of Trade in 1939.

The development in real terms in Turkey of insurance sector began with the accelerate of liberalization period with the decisions made after 1980. Especially since the middle of 1980s, new entries to the market started depending on to regulations in the sector. The increase in the interest of foreign companies in the sector coincides with this period. In 1987, the insurance sector was connected to Undersecretariat of Treasury and became a part of the financial structure. After May 1990, the tariff liberalization started gradually in the sector. After the Marmara earthquake in 1999, the Natural Disaster Law Insurance Institution (DASK) was put into operation. In October 2003, the personal retirement insurance activities were also allowed and in June 2005, the Agricultural Insurance Law (TARSİM)

came into force and the product range of companies operating in the sector was increased (TSRSB, 2006). In January 2014, the tariff was completely freed in the mandatory traffic insurance application. The regulations made in the sector are generally aimed at increasing competition in the sector and ensuring the companies to offer insurance premium to the real economy at a lower cost.

In recent years, despite the significant developments in the insurance sector are seen in Turkey, it is still lower than the European Union average in the subjects like total premium production size, number of the companies in sector, per capita premium production. When European Union statistics considered, in 2017, when the average per capita insurance spending was 2000 €, at the same year it was around 200 € in Turkey. Also, in 2017, when the total premium production/ gross domestic product ratio was 8% in EU, it was around 1,5% in Turkey. Although the passing of time, in Turkey, the per capita spending in insurance sector is still quite lower than EU average (IE, 2017). The reasons why there is still required level of insurance sector in Turkey are demand weakness depending on the absence of development of need and awareness of insurance in the community and the frequent economic crises in the country's economy. After the financial crisis in 2001, the total assets of the sector have decreased by almost half. After than in the Global Financial Crisis in 2008 the fluctuations in sector were happened. Since 2010 the sector have been revitalized and the sector grew by 12% compared to the previous year, has grown by 20% annually until 2013. After this year, with the general economic recession, which is seen in Turkey's economy, the sector grew only 9% in 2014 (Market Outlook, 2015). While the total premium production of sector increased by 18% in 2015, this rate reached 33% in 2016. In 2017, the positive developments in sector are replaced by recession in parallel with the developments in Turkey's economy and the increase in total premium production was limited in 15%. The total premium production of sector increased by 17.4% in 2018 (IAT, sectoral reports). When viewed from this aspect, it can be said that the Turkish insurance sector is very sensitive to the stability and international developments in the country's economy and fluctuates accordingly.

Panzar and Rosse (1987) Model and Literature

The P-R model requires the estimation of a reduced form revenue equation. The equilibrium total revenue for an individual firm is obtained by multiplying the profit-maximizing quantity and price. Since both of these variables depend

on costs, market demand and conduct, the variables that shift cost and demand functions as well as factor prices must be included in the revenue function (Panzar and Rosse 1987:445-446; Vesala 1995: 59-60):

$$lnR_i = j_0 + \sum_{k=1}^{m} h_k \, lnW_{k_i} + j_1 lnA_i + j_2 lnK_i \qquad i = 1, \ldots, n \tag{1}$$

In this equation, *W* represents the production factors, *A* represents the demand variables and *K* represents the capacity variables. When the equation number (1) is estimated as econometric method, the sum of the h_k (k = 1, …, m) parameters estimation values obtained (the sum of income elasticities by factor prices) will have given as estimate for the Panzar-Rosse H statistic value. In other words, the Panzar-Rosse H statistic value can be calculated as $H = \sum_{k=1}^{m} h_k$ by estimating the equation number (1).

The percentage change in the equilibrium revenue caused by a unit percentage rise in the price of all production factors used by the firms is denoted by H. In other words, the degree that changes in factor price are reflected in revenues measures market power in the P-R methodology. H cannot be positive for a monopoly because under these market structures an increase in input prices increases marginal costs, reduces equilibrium output and hence reduces total revenues. If firms are assumed to operate under perfect competition and at long-run equilibrium a proportional increase in input prices both marginal and average costs and least to an equi proportional rise in total revenues. That is when the value of H statistics In the case of perfect competition, and when firms operate at their long-run equilibrium, the value of H statistic is 1 resulting from an unchanged amount of output produced accompanying the same amount of increase in the output price as in the cost of producing that output. Finally, Panzar and Rosse prove that, under symmetric monopolistic competition, H is less than or equal to one. In a monopolistic competition market, revenues will increase less than proportionally in relation to changes in input prices.

The first application of the P-R methodology to USA banking sector was made by Shaffer (1982). After the Shaffer's study, the studies which apply the Panzar and Rosse method to the banking sector of different countries have started to increase rapidly. Nathan and Neave (1989) have estimated the Panzar and Rosse H index for the Canadian banking, Molyneux and et. al. (1994), Bikker and Groeveneld (2000), Casu and Girardone (2006) for European Union banking sector, Vesela (1995) for Finland, Cocrosse (2004) for Italy, Günalp and Çelik (2006),

Aydemir (2014) for Turkey, Prasad and Ghosh (2007) and Arrawatia and Misra (2014) for India, Mustafa and Toçi (2017) for central and eastern European countries banking sector.

The application of the H index estimation on the insurance sector is almost nonexistent in the literature. The first study on this issue is the H index estimation in the Australian insurance industry for 58 firms in 1998 by the Gülümser et al. (2002). Gülümser and others came to the conclusion that the Australian insurance industry showed a competitive structure in the analysis year. Immediately after, Tsutsui and Kamesaka (2005) made the H index estimation in the Japanese insurance industry for the 1983-2002 period. In the study of them, Tsutsui and Kamesaka, found the existence of a lacking competitive structure in the Japanese insurance industry. Çelik and Kaplan (2007) made the H index estimation for the non-life firms in Turkey insurance sector for 1996-2004 period and found out that the market behavior was characterized by the monopolistic competitive during the period. Coccoresse (2012) has reached the conclusion that the monopolistic behavior was the dominant in the sector in the H index estimation made for 39 Italian insurance companies in the 1998-2003 period. Todorov (2016) has reached the conclusion that the market structure in sector is very far from competitive behavior in the H index estimation made for the Bulgarian insurance in 2005-2014 period. Mogro et al. (2019), in the study covering the 2001-2016 period for Ecuador, estimated that the Panzar and Rosse H statistics estimation made the market structure competitive in the insurance industry.

Econometric Model and Estimation Results

In this study, the balance sheet data of the companies released by Turkish Insurance Association were used to estimate the market structure in Turkish Insurance sector. The market structure in Turkish insurance sector has been estimated using by panel data, considering the number of non-life insurance firms which are 34 cross sections and in the period for 2010-2018. The results obtained are presented below.

$$lnTR_{it} = \alpha_0 + \alpha_1 lnPREX_{it} + \alpha_2 lnMEX_{it} + \alpha_3 lnAEX_{it} + \alpha_4 lnPRVN_{it} + \alpha_5 lnTRVN_{it} + \alpha_6 lnFRVN_{it} + u_i \quad (2)$$

i = 1, …, 34 firms

t = 1, …, 9 years

Descriptions of the variables in the equation (2) are given below:

Dependent variable:

TR_i: i. firm t. time total revenue

Independent variables:

$PREX_i$: i. firm t. time the ratio of total personal expenditure to total expenditure

MEX_i: i. firm t. time the ratio of total management and marketing expenditure to total expenditure

AEX_i: i. firm t. time the ratio of total other expenditures to total expenditure

$PRVN_i$: i. firm t. time the ratio of total prim revenue to total revenue

$TRVN_i$: i. firm t. time the ratio of total technical revenue to total revenue

$FRVN_i$: i. firm t. time the ratio of total financial revenue to total revenue

u_i: Error Term

The first three of the variables in the equations given above, PREX, MEX and AEX are the unit price and inputs of the insurance sector. These variables constitute the elements of the vector W_k in equation (1).

Panzar and Rosse H statistic value consists of the sum ($h = \alpha_1 + \alpha_2 + \alpha_3$) of the coefficient of this variables.

Under the assumption of monopolistic market structure sum of the $\alpha_1 + \alpha_2 + \alpha_3$ are statistically less than or equal to 0. Under monopolistic competition they are greater than 0 but less than 1. And under perfect competition assumption they are equal to 1.

The insurance companies offer a certain service bundle to their customers within the scope of financial intermediation paradigm. The most important factor of this service bundle is the compensation that insurance companies promise to pay in the future. The insurance companies which are promised to pay compensation for possible losses in future, thus obtain premium income by selling their policies to their customers (Brocket et al., 2005). The labor force is the leading input

that plays a role in the provision of this service. For this reason, in the equation number (2), the unit labor force cost (PREX) is taken into account as the first input of the insurance company. The activities of management and marketing units are also important to provide insurance services and to sell more policies. Therefore, in the equation number (2), the management and marketing cost (MEX) is taken into account as the second input of the sector. And as the last input of the sector, the other costs (AEX) which are the sum of payments made for compensations fixed assets, which are required for this service to be provided, are taken into account. The Panzar and Rosse H index, which is the sum of the coefficients of these three variables in the model representing the inputs of the insurance sector, can provide us information about the market structure and competitive behavior. Theoretically, since the increase in input prices make a reducing effect on sector income, the coefficient sign of these variables is expected to be negative. If personnel, fixed assets and management expenditures increase efficiency, since the total premium production costs will decrease, the total income of companies may increase. In this case, the coefficient marks of the inputs of the sector may also be positive.

The other variables in equation number (2) are included in the model as control variables apart from the inputs and they are representing the A and K vector which is in the equation number (1). The premium income (PRVN), which constitutes the main operating income of the insurance companies, represents the demand for the company's policies. Since the increase in premium incomes of companies make a positive effect on company's total income, the coefficient sign of this variable is expected to be positive. Technical income (TRVN), the another control variable, is also an important income item in the Turkish insurance sector. Coccorese (2010) assume that technical revenues reflect the size of current risks. Since an increase in the technical income of companies will increase their total income, the expected sign of this variable is also positive. The last variable in the model is FRVN, which is sum of the income that the insurance companies receive from the financial investments they evaluate their income portfolio against the risk they assume. Similarly, assuming that an increase in the financial income of the insurance companies will create an increase in the total income, the expected coefficient sign of this variable will be positive.

The results of the income equation in the reduced form number (2), which was estimated panel data for 34 firms and 2010-2018 period in the Turkish insurance sector, are shown in Table 1 below[2].

The variables in the model have theoretically generally expected signs and are also generally statistically significant. As it can be seen in Table 1, the R^2 is 0.47. The variables which are thought to explain the total income of the insurance sector in the model, have sufficient power to explain the dependent variable. The value of Durbin-Watson statistics also shows that there is no stationary problem in the estimation. Panzar and Rosse H index value in estimation results which are our focus in terms of our subject. The H index value is 0.02 and according to Wald test results it is statistically not different from 0 and the Turkish insurance industry has a monopolistic market structure for the period 2010-2018.

Table 1: Fixed Effect Panel Data Estimation Results

Variables	**coefficients**	**t-statistics**
PREX	-0.17*	2.45
MEX	-0.09	1,13
AEX	0.24***	1,78
PRVN	0.68*	4.27
TRVN	0.27	0.97
FRVN	0.33**	1.89
diagnostic checking tests		
R^2	0.47	
Durbin-Watson	1.86	
F-statistics	18.76	
H index	**0.02**	
Wald H=0 test	0.13	Prob > 0.05
Wald H=1 test	0.02	Prob < 0.05

, **, * denote significance level at the 1%, 5%, and 10%, respectively.*
(P<0.05 H = 0 or H = 1 hypothesis is reject, P>0.05 H = 0 or H = 1 hypothesis is accept)

2 The Hausman test indicated the fixed effect model in this estimate.

In order to determine the market structure behavior in the Turkish insurance sector, H index, which shows the average structure for the whole period, was estimated by panel data analysis for the period of 2002-2004 by Çelik and Kaplan (2007) and for the period of 1996-2004 by Kasman et al. (2008). In two studies, which the studied period were not the same, these following results were obtained: Çelik and Kaplan (2007) found that there was a monopolistic structure in Turkish insurance sector in the period of 2002-2004 and Kasman et al. (2008) found that there was a monopolistic competition market structure. Çelik (2018), reached the conclusion that the market structure was monopolistic competition in between 2011-2013, was full competition in 2014 and monopoly in 2010 and 2015 in his study for the Turkish insurance sector for the 2010-2015 period.

Conclusion

The insurance companies are the institutions which have agreed to pay compensation to cover possible economic losses in the future and collect premiums from their customers and evaluate these premiums financially. The insurance sector, which plays an important role in the smooth functioning of the real economic activity and compensation of losses, will be able to offer cheaper cost policy opportunities its customers in the competitive environment that will arise with the release of the tariffs and it will be effected positively to the economic added value. From this point of view, it is expected that regulations in the sector will create competitive effects. For this reason, it can be seen that in many countries, the competition-increasing practices and regulations are frequently applied in the sector. It has been an important area of the industrial economy that the determining the regulations to what extent affect or not to competition. The traditional SCP paradigm assumes a negative relationship between concentration and competition and relates the increases and decreases in concentration rates to competition. The overall tendency about competitive behavior can be seen here, but it cannot be said exactly what the market structure is. However, the models which are developed under the NEIO paradigm, which is newer than SCP, proved that markets with high concentration also display a competitive behavior. One of these paradigms, Panzar and Rosse H index estimation, can clearly show whether the market structure in the sector is monopoly, monopolistic competition or pure competition. This paradigm is based on the use of firm specific data rather than aggregated market data used in SCP. Here in this study, fixed effect panel data

estimation result showed that the market structure in the Turkish insurance sector was characterized by collusive behavior in the period 2010-2018.

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3

THE SIGNIFICANCE OF GOVERNMENT INCENTIVES IN THE GLOBAL MARKET POWER OF TURKISH IRON & STEEL INDUSTRY[1]

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Iron and Steel Industry in the World and Turkey

It is estimated that the history of iron and ferroalloys dates back approximately to 6000 years ago. At first, iron mine was used in manufacturing products such as knives, ornaments and spears by Ancient Egypt and Sumerian civilizations and by time its area of use also expanded in other ancient civilizations such as Anatolian and Chinese civilizations (Tuncel, Arı, Yoleri & Şahiner, 2017, p. 1-2). However, it is possible to say that major breakthrough for the iron and steel industry was realized together with the Industrial Revolution. There are two main determinant factors for this. Firstly, at the beginning of 18th century with the discovery of coking coal, it became possible to obtain higher heat and energy levels compared to iron furnaces working with wood charcoal. Secondly, production capacity was significantly increased thanks to innovations and new technologies in the iron and steel industry (Easton, Carrodus, Delaney, McArthur & Smith, 2013, p. 280).

As the industrialization process spreads around the globe, production area of iron and steel industry expanded as to include all other countries. Today, the industry has become a significant field of activity not only in the central economies of the developed countries but also in the developing countries. Total global crude

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steel production and consumption increased from approximately 500 million tons to 1.7 billion tons in the half century period between 1967 and 2017. This increase shows that global steel industry has expanded more then 3-fold in this period. Today, a significant portion of steel production is realized in Asia. Total steel production of the continent is at a level of 1 billion 164 million tons. The top three steel producing countries (China 831, Japan 104 and India 101 million tons) are located in this continent. Likewise, Asia is the top steel consuming continent with 1 billion 126 million tons. The top consumers on the basis of countries are China with 767 million tons, USA with 109 million tons and India with 100 million tons (World Steel Association, 2019).

Historical process shows that the center of steel production has gradually shifted from developed economies to developing countries of emerging Asian economies such as mainly China and India. This was also reflected in the global steel trade and the ability to export of developing countries has increased by time. Today, as well as the central economies such as Japan, Germany, Italy, France and the USA, developing economies such as China, Russia, India, Turkey, Brazil and Ukraine has become significant steel exporters (Trade Map, 2019; World Steel Association, 2019).

In line with its global development, iron and steel industry in Turkey have realized a big breakthrough. Establishment of modern iron and steel industry in Turkey goes back to the founding years of the Republic. The facilities which started to operate in Kırıkkale in 1928 was the first iron and steel production area and today they are operating under the umbrella of the MKEK (Mechanical and Chemical Industry Company). It was aimed to provide the requirements of the army with the establishment of Kırıkkale facilities. A structuring period in general-purpose iron and steel production which lasted approximately forty years between 1930's and 1970's was experienced and in line with this three major iron and steel enterprises (Karabük in 1937, Ereğli in 1965 and İskenderun in 1977) was launched (Tuncel, Arı, Yoleri & Şahiner, 2017, p. 2-3).

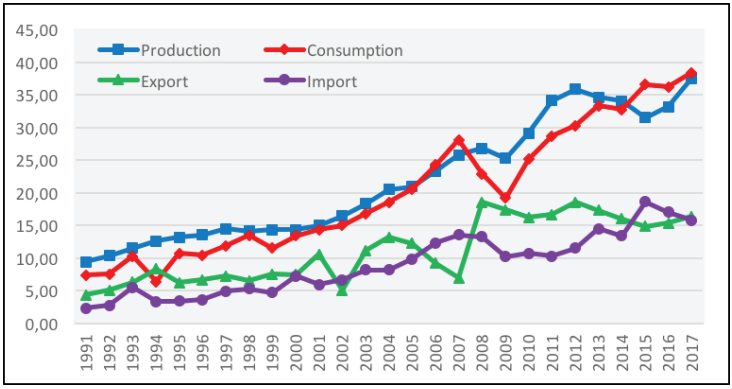
Crude steel production capacity of Turkey has reached 51.5 million tons, while the amount of production has reached 33.1 million tons. Production is mainly concentrated in four regions. The largest one of these regions is the İskenderun region which has a production capacity of 16.7 million tons and a production amount of 11.3 million tons. Marmara region ranks as number two with a capacity of 15.2

million tons and a production amount of 9.4 million tons. Capacity in İzmir region is 11.3 million tons and production amount is 5.8 million tons, whereas in Black Sea region capacity amount is 8.3 million tons and production amount is 6.6 million tons. With this production power, this industry provides an employment opportunity for more than 200 thousand people of which 39 thousand are involved directly in the field of production. (TOBB, 2017, p.7). Approximately 69.25% of iron and steel production is realized in plants having electric arc furnaces, while the share of integrated plants remains at 30.75%. The highest share on product basis belongs to billet type steel and approximately 70% of the total production consists of this steel type (Ministry of Commerce, 2018, p. [3-4]

The industry has a significant position in Turkish foreign trade. Depending on increased production and consumption, an increase is observed in both export and import figures over the years. Iron and steel industry has the highest export value after automotive, textile and chemistry and realizes 9.3% of total exports with and export amount of 15.6 billion dollars. Turkey ranks ninth in the world with 16.3 million tons of steel exports. With regard to product groups, the most significant export item is long steel, which constitutes 50% of total exports. This product is followed by flat steel (29%), pipe (10%) and billet & slab (5%) types respectively. A significant portion of exports are made to the European continent. Share of this continent in Turkey's total exports is 43.6%. The Middle East region ranks second with 17.8% and Africa ranks third with 13.5% (Steel Exporters Association, 2018). In terms of countries, for 2018 top countries exported to are Italy, Israel and the United States (respectively 1 billion 172 million dollars, 820 million dollars and 819 million US dollars). (Turkey Exporters Assembly, 2018).

Figure 1 steel production, consumption, export and import values of Turkey in the last quarter century of are included. The data reveals that iron and steel industry in Turkey is in a long-term growth trend albeit time-to-time fluctuations.

Figure 1: Turkey's Steel Production, Consumption, Export and Import Amounts (Million Tons)



Source: *World Steel Association, 2019*

Government Incentives for the Iron and Steel Industry in Turkey

Both regional and industrial based investment incentives are currently being implemented in Turkey and through these incentives it is aimed to encourage strategic areas which particularly have high added values. Accordingly, six incentive regions consisting of 1 most developed and 6 least developed regions, have been determined and as the level of underdevelopment increases the scope of the incentives which is differentiated in accordance to the industries is expanded (Önder & Şahin, 2016, p. 26- 27). According to the data of the Ministry of Industry and Technology (2019); more than 1 trillion TL incentive was granted for approximately 66 thousand investment certificates and 2.5 million people were employed between 2001 and 2018. On a sectoral basis, manufacturing industry got the biggest share in investment incentives with 35.12%. While the first region became the most investment attracting region by getting 40.42% of all investment incentives, the share of domestic capital in the investment amount realized as 71.06% and the share of foreign capital was realized as 28.94%.

Incentives granted to the iron and steel industry have gained significance particularly in the 1980s, the iron and steel industry has become one of the privileged areas of incentives along with tourism, agricultural industry, ready-to-wear

and automotive, (Akdeve & Karagöl, 2013, p. 337). This increased the number of private initiatives significantly. According to the data compiled by Yavan (2011, p. 234); 785 iron and steel industry investment incentive certificates were issued between 1980 and 2008 and an investment of 3.5 billion TL was realized in which approximately 119 thousand people were employed. Thus, with the participation of private entrepreneurs in the sector who continued their activities with public investments mostly until the 1980's, fusion capacity increased with a five-fold increase to 20 million tons in the period between 1980 and 2000 (TOBB, 2017, p. 3).

As well as this, it is possible to say that today the share of the industry in total investment incentives is relatively low. An investment incentive of ₺ 6.7 billion was given to 500 investment certificates between 2001 and 2018 and this value corresponds to 0.67% of the total incentives. 16 thousand jobs were created with the incentives. A significant portion of the investments (81.46%) was realized by domestic capital. Likewise, 78.17% of the employment related to investment incentives was provided to domestic investors. If iron and steel investment incentives are analyzed based on various criteria; it is seen that in terms of support class "general investments" ranks the first with ranks the first with 75.27 % , in terms of investment type "complete new investments" with 39.30% and in terms of the region" Region 1" with 34.79%. The years in which investments based on incentives were the highest in Turkey were 2001 and 2018 (total of domestic and foreign capital as approximately ₺ 2 billion and ₺ 1.2 billion respectively. On the other hand, despite time to time fluctuations domestic capital investments have increased since the beginning of 2010, however foreign capital investments remained relatively stable (Ministry of Industry and Technology, 2019).

Literature for the Market Power of Iron and Steel Exports

When national and international literature is reviewed; it is observed that there are many studies dealing with the industry, however, the studies are mostly concentrated on current situation of the industry and competitive power. (Development Bank of Turkey, 2006; Bağcı, 2016). In some studies analyzing the sector, the competitiveness of the Turkish iron and steel industry is examined. In these studies, the sector is analyzed with other sectors or comparatively with the European Union countries (Dolun, 2007; Yıldız, 2008; Çeştepe & Tunçel, 2018). And when the studies dealing with the market power of the industry, the topic

is not discussed in the national literature and in international literature it is examined comprehensively but incentive policies for the industry is not included in these studies (Adams & Dirlam, 1964; Grossman, 1986; Gallet, 1995; Maasoumi, Prowse & Slottje, 2002; Blonigen, Liebman & Wilson, 2007; Hidalgo & Kaminski, 2011; Lee, 2011). Some of these studies:

In a study performed by Gallet (1995), the impact of company mergers on market structure and market power was analyzed using the US steel industry data with the traditional structure-behavior-performance approach. As a result of the analysis, despite the market power in the steel industry has decreased in recent years, it is revealed that the merger of two companies that emerged in the period of study increased the market power.

In their studies, Blonigen, Liebman & Wilson (2007) analyzed the impact of tariffs and quotas implemented by US on market power using the NEIO method for 1980-2006 periods, and they concluded that, consistent with previous theoretical literature, tariffs and quotas had little effect on market power, market power of steel products has eroded by time and technology had a significant role in the market.

In the study of Sourisseau (2018) based on the opinion that the speed of development of China's urbanization and manufacturing industry, it was examined that the market structure and market power of steel industry created a shock in steel demand As a result of the analysis; it was determined that some steel producers negotiated with mine companies, a new price fixing regime was initiated as a result of the confrontation between supply and demand, a new stakeholder combination emerged in the iron and steel industry as a result of this progress and the market shifted from oligopoly to a hindered monopsony.

Research Method

There are many approaches, such as parametric and non-parametric approach in market power estimation. In this study is used Bresnahan (1982) approach which enables analysis of market power in the interaction of demand and supply. The approach estimates market power using simultaneous equation system. This system consists of the demand equation, the marginal cost equation, and the optimality equation that defines marginal revenue and marginal cost balance. The Bresnahan approach uses the change in the price-cost relationship between the two balance points to estimate the market power of an industry or a good (Baye, 1994).

The approach is assumed that a homogeneous product is produced by n firms. So the Hicksgil demand equation of the firm is $Q = \sum_{i=1}^{n} q_i$ $(q_i = q_1, q_2, \dots, q_n)$. The implicit function of the Hicksgil demand function is $Q_t = Q(P_t, Z_t)$. The Hicksgil demand function can also be expressed as the inverse demand function of the Marshalgil: $[P_t = P(Q_t, Z_t)]$. In the equation is expresses that P_t is the price of good, Z_t is other factors affecting demand except price, and t is a time factor.

The industry's total revenue function is $(TR_t = P_t{*}Q_t)$. Using the total revenue function, the marginal revenue of the sector is calculated. Perceived marginal revenue (MR) could be expressed as:

$$MR_t(\lambda) = P_t + \lambda Q_t \left[\frac{dP_t}{dQ_t}\right] \quad (1)$$

where λ indicates the degree of market power and the λ index is the difference between price and marginal cost. According to Bresnahan (1982) and Perloff (1991), the λ index takes a value between 0 and 1. It takes 0 for perfect competition and 1 for monopoly (Shaffer, 1993, p. 51; Shaffer, 2001, p. 84; More & Nagy, 2004, p. 18).

Marginal cost function (MC) is also important to measure market power, and MC could be expressed as:

$$MC_t = MC(Q_t, W_t) \quad (2)$$

W_t variable in the cost function expresses the external factors vector such as factor prices and technology. In addition, companies in the sector have no effect on the market price.

Due to the assumption that MR is equal to MC, the market equilibrium condition could be expressed as follows.

$$MR_t(\lambda) = P_t = MC_t \quad (3)$$

The profit function of the i'th company in the sector could be expressed as:

$$\pi_i = P(Q)q_i\text{-}C_i(q_i) \quad (i = 1,2, \dots, n) \quad (4)$$

In the equation is expresses that π is profit, P(Q) is output price, q is output quantitiy, and $C_i(q_i)$ is total cost function. Therefore, the total cost function is equal to $C_i(q_i) = w_i(q_i, EX_{Si})\text{-}F_i$. In the equation is expresses that w is variable cost, EX_S

is external variables that affect marginal cost but do not affect sectoral demand function, and F is fix cost.

When profit function taken the first derivative is simplified, the following equation is achieved:

$$MC = P_t + Q_t \left[\frac{dP_t}{dQ_t}\right]\lambda \quad (5)$$

The described demand and marginal cost functions are given in implicit forms. Therefore, in order to estimate the market power of an industry, the optimality equation that indicates the balance of marginal revenue and marginal cost needs to be determined. In order to the market power of iron and steel export market, export function and marginal cost function of iron and steel should be formed. Thus export function and marginal cost function of iron and steel are expressed in double logarithmic form as Equation 6 and 7:

$$\log DQ_t = \alpha_0 + \alpha_1 logPX_t + \alpha_2 logY_t + \alpha_3 logC_t + \alpha_4 \log SQ_t + \alpha_5 logDQ_{t-1} + \alpha_6 D + \varepsilon_1 \quad (6)$$

$$logMC = \beta_0 + \beta_1 logPP_t + \beta_2 logDQ_t + \beta_3 logI_t + \beta_4 T \quad (7)$$

Equality 6 refers to the export function of the sector, and Equality 7 refers to the cost function. In Equation 6, where DQ_t is the iron and steel export quantity is a function of export price of iron and steel (PX_t), per capita income (Y_t), per capita iron and steel consumption (C_t), production quantitiy of iron and steel (SQ_t), lagged value of iron and steel export quantity (DQ_{t-1}), crisis dummy variable (D), and ε_1, is the error term that is normally distributed with mean μ and variance σ^2 . In Equation 7, where MC is marginal cost is a function of iron and steel producer sales price (PP_t), investment incentive (I_t), and time trend (T_t) variables.

According to the condition of profit maximization, Equation 7 could be expressed as the optimality equation:

$$logPX_t = \beta_0 + \beta_1 logPP_t + \beta_2 logDQ_t + \beta_3 logI_t + \beta_4 T + \varepsilon_2 \quad (8)$$

The β_2 coefficient in Equation 8 is equal to $\beta_2 = -\lambda[dPX_t/d\,DQ_t]$ and ε_2 is the error term that is normally distributed with mean μ and variance σ^2. When $(dPX_t/d\,DQ_t = 1/\alpha_1)$ is reformed, The coefficient β_2 is equal to $\beta_2 = -\lambda(1/\alpha_1)$. Thus, the market power parameter, λ, is derived as follows: $(\lambda = -\beta_2 * \alpha_1)$. As a result, to estimate the market power parameter of iron and steel exports, equations 6 and 8 are estimated

simultaneously. Also, since the marginal cost is assumed to be constant in the study, there is no identification problem.

Data Set and Model

In the study annual data for 1991-2018 period is used in order to estimate the market power in Turkish iron and steel industry. The amount of per capita production and foreign income variables are weighted according to the country data of the top ten, which constitutes 51% of the total steel exports. Export price variable is calculated by dividing the total export value of iron-steel with the amount of export. Turkey' iron and steel exports and iron and steel export price are attained from the Turkish Statistical Institute (TurkStat) (2019 a,b). Iron and steel production and export quantity are attained from Steel Exporters' Union of Turkey (2019). Per capita consumption and export price variable are attained from the World Steel Association (2019). Real per capita income is obtained from the World Bank (2019). Investment incentives data[4] is obtained from the Ministry of Industry and Technology (2019). Investment incentive variable is deflated with gross national product deflator (2003 = 100). All the abbreviations, units and the descriptions of the variables are given in Table 1.

Table 1: Variables Used in the Model

Variables	**Descriptions for the variables**
DQ	Iron and Steel Exports (thousand $)
DQL	Delayed Value of Iron and Steel Exports (thousand $)
C	Consumption Per Capita (tone)
Y	Per Capita Income (constant 2010, $)
PX	Export Price (kg/$)
SQ	Iron and Steel Production ($/ton)
I	Incentive (thousand $)
PP	Manufacturer Sales Price(kg/$)
T	Time Trend
D	Crisis Dummy Variable (0 for 1994, 2002 and 2008; 1 for other years)

4 We would like to thank Assoc. Prof. Dr. Nuri Yavan, who helps in providing investment incentive data.

Empirical Results

In the study, all the variables are tested for stationarity using the Augmented Dickey Fuller (ADF) and Phillips-Perron (PP) test statistics with constant and canstant+trend firstly. The results of the unit root tests are given in Table 2. According to ADF and PP unit root test results, all variables are stationary in the first difference at 1% or 5% significance level.

Table 2. ADF and PP Unit Root Test Results

Variables	ADF Unit Root Test				PP Unit Root Test			
	Level		First Difference		Level		First Difference	
	Const.	Const+ Trends	Const.	Const+ Trends	Const.	Const+ Trends	Const.	Const+ Trends
DQ	-1.231 (0.645)	-2.677 (0.252)	-5.864 (0.000)*	-5.734 (0.000)*	-2.677 (0.2528)	-0.992 (0.741)	-6.225 (0.000)*	-6.000 (0.000)*
C	-1.814 (0.365)	-1.788 (0.682)	-5.246 (0.000)*	-5.137 (0.001)*	-1.814 (0.365)	-1.788 (0.682)	-5.246 (0.000)*	-5.138 (0.000)*
PX	-2.178 (0.218)	-2.669 (0.255)	-5.019 (0.000)*	-4.927 (0.003)*	-2.064 (0.259)	-2.689 (0.248)	-6.789 (0.000)*	-6.640 (0.000)*
SQ	-0.126 (0.936)	-2.783 (0.215)	-4.737 (0.000)*	-4.639 (0.006)*	-0.073 (0.942)	-2.251 (0.444)	-3.732 (0.009)*	-3.601 (0.049)**
Y	-1.534 (0.869)	-1.523 (0.795)	-5.221 (0.000)*	-5.188 (0.001)*	-0.470 (0.882)	-1.553 (0.784)	-5.221 (0.000)*	-5.188 (0.002)*
I	-1.892 (0.331)	-2.568 (0.296)	-5.241 (0.000)*	-5.128 (0.002)*	-2.061 (0.261)	-2.799 (0.210)	-5.247 (0.000)*	-5.131 (0.002)*
PP	-3.289 (0.025)**	-0.909 (0.940)	-3.218 (0.030)**	-4.178 (0.014)**	-3.096 (0.038)**	-0.940 (0.936)	-3.138 (0.036)**	-4.178 (0.014)**

Note: *The lag length is determined by the Schwarz Information Criterion (SIC).*
, ** and * indicate that the values are statistically significant at 1%, 5% and 10%.*

Then the simultaneity of the equation systems is tested using Hausman Model Establishment Test (Hausmann, 1976; Gujarati, 1999). According to the results of the Hausman Test, it is decided that the equation systems are simultaneous at 1% level of significance. In addition, Hausman Externality test is applied to decide whether the variables in the equation system are internal or external. The probability value of the Hausman externality test is calculated as (0.000) and it was decided that the iron and steel export (DQ_t) and export sales price (PX_t) were

internal variables. Thus, iron and steel exports market power analysis is examined simultaneously with iron and steel export (DQ_t) and export sales price (PX_t) equations. The state of determination of each equation in the simultaneous equation system is analyzed and two equations are determined over-determined. Therefore, market power of iron and steel export is analyzed with three-stage-least-squares (3SLS) and two-stage least squares (2SLS) methods. 3SLS method is preferred. Because, compared to 2SLS, the 3SLS method provides better results. The model is estimated with EViews 9.1 software packages and the results of 3SLS method are given in Table 3.

When 3SLS results are examined; it was revealed that R^2 values of the equations were 0.85 and 0.81 and the explanatory power of the explanatory variables of the model was high. Durbin-Watson (dw) statistical values for export and optimality equations were calculated as 1.699 and 1.91, respectively. It is seen that dw values of export equation are located in the unstable region. Non-parametric array test was used in order to determine whether this situation will lead to a problem in terms of autocorrelation. As a result of the test, it was concluded that autocorrelation is not a problem for the model. When parameter values of the variables were examined, it was seen that all variables are statistically significant except for crisis dummy variables and the signs were coherent with economical expectations. Also, there is no multiple linear connection problem in the models.

When the coefficient values of the variables in the models are analyzed, all variables except the crisis dummy variable are statistically significant and are also compatible with the economic expectation in terms of signs. When estimation results of the model in which dual logarithmic functional pattern is used it is seen that; (i) iron-steel export demand price elasticity is 0.37 (ii) income elasticity is 0.13 and (iii) per capita iron and steel consumption elasticity is 1.56. Iron and steel export is positively affected by iron and steel production amount and lagged value of iron and steel export, respectively at the rates of, 0.75 and 0.94.

When optimality equation is examined; it is seen that amount of exported goods and investment incentives to the industry reduces the optimality at the rates of 0.27% and 9%, respectively. Iron and steel export price variable has a positive sign and its elasticity value is approximately 0.17. This result reveals that the change in export price is greater than the change in producer price. Another variable in the optimality equation is the trend variable. This variable has a negative

sign and moves the iron and steel export price downwards. Finally, the market power of iron and steel exports ($\lambda = -\beta_2{}^*\alpha_1$) and the export market power of the iron and steel industry are calculated as 0.25. According to the results obtained; it was concluded that Turkey has a solid oligopolistic structure in iron and steel export market.

Table 3: Three Stage Least Squares (3SLS) Method Estimation Results

Export Equation			
	Coefficient	**t-statistic**	**p-value**
Constant	10.641	3.478	0.0012*
logPX	-0.372	-3.014	0.0043*
logY	0.132	1.854	0.0611***
logC	1.560	1.720	0.0927***
logSQ	0.757	2.030	0.0486**
logDQL	0.946	2.744	0.0089*
D	0.041	0.080	0.9366
R-square	0.8551		
Durbin-Watson stat	1.6970		
Optimality Equation			
Constant	-2.913	-1.746	0.0881***
logDQ	-0.673	-5.202	0.0000*
logPP	0.169	2.100	0.0418**
T	-0.082	-2.426	0.0195**
logI	-0.092	-1.968	0.0557***
R-square	0.8181		
Durbin-Watson stat	1.9174		

Note: **, ** and *** indicate that the values are statistically significant at 1%, 5% and %10.*

Conclusion

In this study, market power of iron and steel export was analysed by 3SLS method, one of the simultaneous equation systems, using the annual time series for the period 1991-2018. Elasticity values of export demand equation according to 3SLS estimation results were calculated as (0.37) for price and (0.13) for income. Therefore, as the export price decreases, the exported amount of iron and steel increases by 0.37. This elasticity value expresses that sensitivity level of iron and steel exporters' to export prices is low. This arises because of the low level of substitutability of iron and steel. The income elasticity of iron and steel exports is 0.13 and has the characteristics of necessary goods. Thus, iron and steel provides input to many industries, particularly automotive, construction, white goods, defense industry and shipbuilding industries. The reason that consumption elasticity value of this leading industry in the industrialization process is 1.56 is that the product is essential for many industries. This is also positively reflected on iron and steel production level and delayed export value. When the results of the optimality equation estimation are examined, optimality decreases as the amount of exported goods increases. This approximately corresponds to 0.63. When the result of the analysis is considered; iron and steel industry is assessed to have a decreasing return to scale. Thus, the variables of trend and investment incentives obtained from the optimization equation also yielded supportive results. Despite the estimation result of trend variable is found to be low, it is seen that iron and steel industry is unable to adapt to technological change quickly and investment incentives are insufficient to provide competitive advantage. This has the risk of having a negative impact on global competitive power of Turkish iron and steel industry and it is believed that it might be beneficial in solving the problem if public incentives acquire a structure encouraging technological developments

In the determination of the market power of the industry in exports, the approach proposed by Schroeter (1988) was used. According to the results of the 3SLS simultaneous equation system, the market power coefficient of the iron and steel industry was calculated, and the estimated value was found to be (0.25). This value indicates that Turkish iron and steel industry competitive power is close to perfect competition and has a strong bias towards oligopolistic behaviour. This finding bears similarity to many studies in the literature. (Adams & Dirlam,1964; Hone & Schoenbrod, 1966). The most crucial reason for companies operating in the sector to have strong oligopoly market power is that the

iron and steel industry has a significant place in the economy due to the reasons that iron and steel industry provides intermediate input to many industries and this supply requires continuity. As well as this some of the factors which has a negative impact on iron and still industry are; relatively insufficient R&D and innovation dimensions compared to competitor countries, the incentive policies implemented are not directly for the main sector but for the sub-industry, failure to reach incentive investments to desired targets and increase in protectionist policies implemented on the industry in line with ongoing trade wars. Iron and steel industry, in which the time factor is gaining more significance gradually, becomes more dynamic day by day.

The Turkish iron and steel sectors are facing serious competition in the domestic and foreign markets. Therefore, in order to maintain the existing market power and improve its competitiveness, the Turkish iron and steel sector should use its current capacity more effectively, revise its technology and turn to innovative products that increase its efficiency. In order for these developments to take place, firms operating in the sector should have a broad perspective and investment efforts should be supported by public policies and incentives. In line with this; it is possible to reduce energy input costs of the industry, to provide R&D and innovation support for products with high added value.

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4

WOMEN'S SAVING BEHAVIOUR IN A LESS DEVELOPED REGION: A HECKMAN PROCESS

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Introduction

The role of women is particularly important in making savings for the future in terms of household economics. Women could be effective in deciding on the choice of savings in the household budget planning. In the economics literature, households' decision whether to save or consume is a problem of choice. This issue is usually discussed together with the theories related to consumption. Savings, described as the non-consumable part of the income, were examined in the decision not to spend households' income. In recent years, household savings behaviour is seen as a very remarkable issue within the framework of Behavioural Economics.

Among the studies on the saving behaviour of the household, the gender effect has not been sufficiently studied in depth. However, several studies have stated that the saving behaviour of women in the household reveals remarkable differences. Determinants of saving behaviour were found to differ by gender. Resources under the control of women are more likely to be spent on investments for the future than resources that men control (Rubalcava, Teruel & Thomas, 2004). On the other hand, women have significantly lower earnings than men. Besides, lower savings, longer life spans and higher risk aversion presents women. But there is limited information about how the factors related to saving behaviours may differ (Fisher, 2010). The aim of the present paper was to study the saving behaviours in order to better understand in how factors are related to the behaviour of savings for women and household's characteristics. On the other hand, in this research, the most prominent theories of saving behaviour in economics literature

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are reviewed. In this framework, the consistency of the research findings of this study with these theories was examined.

In the cross-sectional data, it was observed that some women could not save, resulting in the dependent variable having a value of zero observation. The zero observation present an empirical difficulty of censored response bias (Park & Capps, 1997). Omitting zero observation causes loss of information, biased and inconsistent estimates. The models with limited dependent variables are frequently used in econometric analysis of cross-sectional studies. Heckman (1979) has proposed a simple practical solution for such situations, which treats the selection problem as an omitted variable problem. This model occurs often in empirical studies, especially in microeconometric (Puhani, 2000). In this study, women's saving behaviour examined in Heckman's two-step technique. The first step is the making decision whether to save or not. It is hypothesized that certain women are more likely to save money. The probit model is estimated for the first step. The inverse mill ratio is calculated from this model. In the second stage, the Reverse Mill ratio is used as the explanatory variable in estimating the least squares method for positive observations. In the second step of the model, considering just positive observations, the dependent variable here is the monthly savings levels of women. In this stage is the study of the degree to which women who participate in saving behaviour could be able to save. It might be revealed how socio-demographic and economic explanatory variables of household and women-specific affect women's savings trend. The field of microeconometrics particularly has been the main beneficiary of Heckman's model (1979). The early researches of this model concerned about the analysis of household decision-making, especially labor supply and consumption decisions. The ideas from Heckman's analysis still form the basis for empirical and policy-based modelling of such decisions (Blundell, 2001:191).

Theorical Background of Saving Behaviour

The concept of savings is usually included in the most economic theories of consumption. The decision to consume is regarded as the contrary to the decision to save. In this sense, savings is considered as the part of income not consumed (Aidoo-Mensah, 2018:133). Saving behaviour, on the other hand, attributes the behavioural characteristics of saving people. Saving behaviour refers to a psychology-based approach that focuses on how savers behave, rather than the form of savings, how to measure or means of saving. With the Industrial Revolution, the

perception of the source of wealth changed and the idea that capital accumulation was the most critical issue for economic growth. This has led to a focus on the savings that constitute capital accumulation. Savings in classical economics are considered to be equal to investment when used efficiently (Serim, 2019).

Fisher (1930), one of the pioneers of neoclassical economists, developed The Theory of Interest, emphasizes the role of borrowing or lending to smooth consumption over time. Fisher essentially anticipates the life-cycle theory of saving with the behavioural critiques. Fisher discussed that the individuals' impatience (time preference) depends on four characteristics of their income stream: the size, its time shape, its composition, and its risk (Fisher, 1930:71). The role of size means that the smaller the income, the higher the preference for present over future income, which is the greater the impatience, other things being equal. Fisher's analysis describes that saving rates increase sharply with permanent income, and the poor are much more impatient than the middle class (Thaler, 1997:439). The effect of risk on the time preference depends on how the individual interprets the increase in income in the near and future relatively. If the risk is constantly present for income flow, the individual tends to give importance to current income and a higher degree of impatience (Serim, 2019). Thaler (1997) indicated that the effect of income on impatience is partly rational and partly irrational and Fisher stresses the irrational component of the personal factors; the others being habit, expectation of life, bequest motive and fashion.

In the General Theory, Keynes (1936) focusing on aggregate demand function revealed the macro-view of the economy and emphasized personal saving behaviour. Keynes provided eight main factors for saving motives: Precaution, allocating a reserve for unexpected contingencies; Foresight, providing resources for possible future differences between income and expenditure such as family education, old age and the maintenance of dependents (the life-cycle motive); Calculation, benefitting the current smaller consumption by preferring larger consumption at a later date; Improvement, enjoying a better standard of living over time; Independence, the need for feeling independent and a sense of power to do things; Enterprise, leading to savings for invest business and speculating; Pride, concerning the bequest motive; and Avarice, pure miserliness (Wärneryd, 1999:125; Canova at al., 2005). Keynes explained the liquidity preference as a potentiality tendency, which fixes the quantity of money which the individuals will hold when the rate of interest is given. There are three liquidity preference motives for holding one's

resources in cash (maintaining their resources in liquid or non-liquid form): the transaction motive (maintaining liquidity linked with business operation and consumption), the precautionary motive (the amount of cash reserves held for unforeseen contingencies) and the speculative motive (uncertainty as regards the future course of the interest rate) (Appelt, 2016:4).

Duesenberry's (1949), "Income, Saving and the Theory of Consumer Behaviour", introduced psychological factors relating to social interdependencies and habit formation based on relative income concerns. This theory was replaced by Modigliani & Brumberg's (1954) life-cycle theory of consumption and Friedman's (1957) permanent income hypothesis. In the 1950s, theory of social interdependency has not been drawing attention but in the last decade, Duesenberry's theory has been focused more on the ideas about relative consumption and conspicuous consumption. Duesenberry's (1949) in relative income theory stated that the individual's desire of consumption expenditure is related to the consumption patterns with the other individuals with whom are contacted. He claimed that the household's expenditures are slow to decrease in case of income reduction and spending habits continue as in a high-income. The expenditure decisions of the household depend on relative permanent income (Palley, 2010:42-45).

Duesenberry is well-known the ideas on the importance of social influences on consumption and saving behaviour. Duesenberry argued that achieving a materially high standard of living has become a recognized social goal and a driver for self-esteem. In order to prevent the loss of this self-esteem, individuals will increase their expenditure to get high quality goods by reducing their savings to adapt to the target group's consumption pattern. Therefore, it will result in an increase in the individual's consumption expenditures due to the frequent exposure to the higher quality goods. Duesenberry has called as demonstration effect (McCormick, 1983:1126).

As stated by Chakrabarty et al., (2008), the consumption and saving behaviour of households is covered within the framework of the lifecycle theory developed by Modigliani and Brumberg's (1954) and Friedman's (1957) permanent income theory. Hybrid theoretical theories, a blended form of these two theories, have been developed to model more realistic theory for the consumption behaviour of households.

Friedman claimed that individuals distribute resources over time and therefore decide the behaviour for current consumption and saving by shifting the purchasing power from the present to the future or vice versa. The idea of the life cycle model and of the permanent income hypothesis treat the allocation of consumption or saving over time in an analogous manner. The life cycle model clarified that a change in the interest rate changes the relative price of consumption over time by saving or borrowing. The elasticity of intertemporal substitution performs a key role in determining the responsiveness of consumption and saving choices to relative price changes. This elasticity is small saving may actually fall as the interest rate increases (Attanasio & Wakefield, 2010:8-11).

According to lifecycle hypothesis, younger people tend to save more than older people. Young households save for retirement and old households consume their previously accumulated assets by this model. The rising in the rate of economic growth increase the aggregate saving rate, because of the expansions of the lifetime resources of younger- age groups compared to older-age groups (Deaton & Paxson, 2000:212).

Data, Variables and Characteristics of the Sample

The focus of this study is to find out what factors influence the woman's tendency to save. Here, it is studied to find out the possible factors affecting the saving behaviour and reveal how these factors affect. The data for this study were collected in Ardanuç district of Artvin province, in the Eastern Black Sea Region of Turkey. Artvin can be classified as moderate by the socio-economic development in Turkey. However, Ardanuç falls behind compared to other districts in terms of development level. This region is a small town with both rural and urban life features. A questionnaire was conducted by face-to-face interviews with 500 women residing in this area.

Firstly, descriptive statistics of the data are presented in Table 1. The study focuses exclusively on gender differences in saving behaviours. As a result of the survey, it was revealed that 44% of women could save money. The average monthly saving amount was about 309.3 TRY in 2019. Ardanuç is in second place in terms of total deposits in bank accounts (Berber, Genç and Yıldız, 2015:49). The total income of the household is 3850 TRY per month. 82% of the interviewed women are married. The majority of women participants are between 35 and 44

years old. 21 percent of these women work in a qualified work. 33 percent of them are stay-at-home spouses. The region where the sample is chosen is close to rural area, 36% of participants are engaged in farming. There is also a presence of illiterate women in this region. The larger number of women are high school graduates. The proportion of rural residents is 32% and urban residents is 68%. Besides, 65 percent of these women participate in employment. 38% have their own business and 16% work in regular paid jobs. There is a group of 29% who started the working between 12 and 18 years of age. In addition, the vast majority participated in employment between the ages of 18-25. The share of the total debt in the household's income is 2.62 percent. 88 percent of women have their own assets. The ratio of children in the household size is 25 percent. Average household size is 3.38. The share of agricultural income in monthly income is 0.01, the share of expenditures in monthly income is 79%. The ratio of women's income in the household monthly budget is 35%.

Table 1. Descriptive Statistics of the Variables for Heckman Model

Variables	Definition	Mean	Std. Dev.
savingtot1	1 if respondent have savings; 0 otherwise	0,44	0,50
savingtot	Monthly saving amount	309,30	527,90
lincometot	The logarithm of household's total income	3850,60	1995,01
dmarried	1 if respondent is married; 0 otherwise	0,82	0,39
dage18-24	1 if respondent is between 18-24 ages; 0 otherwise	0,06	0,23
dage25-34	1 if respondent is between 25-34 ages; 0 otherwise	0,25	0,44
dage35-44	1 if respondent is between 35-44 ages; 0 otherwise	0,30	0,46
dage45-54	1 if respondent is between 45-54 ages; 0 otherwise	0,21	0,41
dage55+	1 if respondent is between 55 or above; 0 otherwise (Reference category)	0,18	0,38
dqualwork	1 if respondent is qualified worker; 0 otherwise	0,21	0,41
dnonqualwork	1 if respondent is nonqualified work; 0 otherwise	0,09	0,29
dhousewife	1 if respondent is housewife; 0 otherwise	0,33	0,47
dfarmer	1 if respondent is farmer; 0 otherwise	0,36	0,48
dedu5	1 if respondent is illiterate; 0 otherwise	0,07	0,26
dedu1	1 if schooling ended in elementary grades; 0 otherwise	0,22	0,41
dedu2	1 if schooling ended in secondary grades; 0 otherwise	0,23	0,42

Variables	Definition	Mean	Std. Dev.
dedu3	1 if schooling ended in high school grades; 0 otherwise (Reference category)	0,26	0,44
dunv	1 if schooling ended in tertiary grades; 0 otherwise	0,22	0,41
drural	1 if respondent resides in rural area; 0 otherwise	0,32	0,47
durban	1 if respondent resides in urban area; 0 otherwise	0,68	0,47
dworking	1 if the woman is working; 0 otherwise	0,65	0,48
dworktype1	1 if respondent has a permanent long-term job; 0 otherwise	0,16	0,36
dworktype2	1 if respondent has a contracted job; 0 otherwise	0,02	0,15
dworktype3	1 if respondent has a temporary job; 0 otherwise	0,08	0,28
dworktype4	1 if respondent has an on-call job; 0 otherwise	0,02	0,48
dworktype5	1 if respondent is a self-employed; 0 otherwise (Reference category)	0,38	0,13
dworkage1	1 if respondent starts working in the ages of 12 to 17; 0 otherwise	0,29	0,45
dworkage2	1 if respondent starts working in the ages of 18 to 25; 0 otherwise	0,44	0,50
dworkage3	1 if respondent starts working in the ages of 26 to 35; 0 otherwise	0,08	0,27
dworkage4	1 if respondent starts working in the ages of 36 and above; 0 otherwise (Reference category)	0,02	0,13
wdebttot	Total household debt in the household's income (Ratio)	2,62	5,29
dassetyes	1 if having their own assets; 0 otherwise	0,88	0,33
wnkids	The number of children in the household size (Ratio)	0,25	0,22
householdsize	Household size	3,38	1,38
wmagrinc	Agricultural income in the household's income (Ratio)	0,01	0,02
wexpentot	The expenditure in the household's income (Ratio)	0,79	0,21
wfemaleinctot	Female income in the household's income (Ratio)	0,35	0,33

The means of the relevant variables of the sample on the saving behaviour are given in Table 2. According to the sub-group of saving women, the total income level and the share of the women's income in the household income is high. In addition, it is noticed that the saving group has fewer expenditures, debts, and the number of children in the household. The observations of positive savings behaviour in this women's group, examined in the outline; lower marriage rates,

higher university graduation, less rural residents, lower agricultural incomes, more working women, more qualified and permanent jobs, larger household size than the households that saving behaviour are not detected.

Table 2. Characteristics of the Sample According to the Saving Behaviour

	Saving>0		**Saving=0**	
Variables	**Mean**	**Std. Dev.**	**Mean**	**Std. Dev.**
savingtot	709.404	596.392	0	0
incometot	4260.87	2335.14	3533.44	1620.28
dmarried	0.75229	0.43267	0.86879	0.33823
dage18-24	0.09633	0.29572	0.02482	0.15586
dage25-34	0.26606	0.44291	0.24468	0.43066
dage35-44	0.18349	0.38796	0.39716	0.49018
dage45-54	0.24312	0.42995	0.18085	0.38558
dqualwork	0.26147	0.44045	0.16667	0.37334
dedu5	0.09633	0.29572	0.05319	0.22481
dedu1	0.2156	0.41218	0.21631	0.41246
dedu2	0.18807	0.39167	0.26241	0.44073
dunv	0.27523	0.44766	0.17376	0.37958
drural	0.27523	0.44766	0.35106	0.47815
dworking	0.66972	0.47139	0.6383	0.48135
dworktype1	0.22018	0.41532	0.10638	0.30888
dworktype2	0.01835	0.13452	0.02482	0.15586
dworktype3	0.05963	0.23735	0.10284	0.30429
dworkage1	0.27523	0.44766	0.29433	0.45655
dworkage2	0.50459	0.50113	0.39007	0.48863
dworkage3	0.05963	0.23735	0.0922	0.28982
wdebttot	1.47523	4.02356	3.51079	5.94233
dassetyes	0.8578	0.35006	0.89007	0.31336
wnkids	0.18566	0.21005	0.30265	0.22096
householdsize	3.02752	1.41394	3.65603	1.28727
wmagrinc	0.00863	0.01366	0.01169	0.01708
wexpentot	0.6744	0.17531	0.87422	0.19132
wfemaleinctot	0.38505	0.33619	0.32206	0.31537
Number of observations	218		282	

Heckman's Two-Step Model

In the cross-sectional study, the data such as savings with zero observations in the dependent variable makes it difficult to use for the least squares method of regression analysis. On the other hand, ignoring zero observation leads to loss of information, biased and inconsistent estimates (Maddala, 1999). The zero observations in saving variable might have been caused by several reasons for households such as not saving during the period of data collection, the household has no saving habits or preferring to consume all their earnings. Tobit model, which is one of the limited dependent variable models, was introduced by James Tobin (1959), and was the first model developed for data with zero observations in the dependent variable. Later, models with limited dependent variables are frequently used in econometric analysis of cross-sectional studies. However, the Tobit model reveals a holistic analysis of the individual's sequential decision-making process. It is considered a restrictive model that is attributable to an assumption of the Tobit model that a specific determinant showing a positive association with the likelihood of participation necessarily entails an increase in the levels of consumption (Amemiya, 1984).

This research applies the Heckman sample selection model to assess how women's make sequential saving decisions. To eliminate the restrictions of the Tobit model, Heckman introduced a two-step estimation process (Heckman, 1979). The Heckman model demonstrates the process of sequential decision-making of the individual. The first step estimates a probability model that displays the participation decision through the application of a Probit model along with all the observations as follows:

$$y_i^* = x_i\beta_i + e_i, \qquad e_i \sim N(0,\sigma^2) \qquad \begin{cases} y_i^* = 1 & if\ y_i > 0 \\ y_i^* = 0 & if\ y_i \le 0 \end{cases} \tag{1}$$

where y_i^* represents the latent variable, yi the observed variable that represents whether households are saving or not, xi the vector of explanatory variables, β_i the vector of coefficients and e_i denotes the unobservable error term. yi, variable takes the value 1 if the household has savings and 0 if no savings.

The ordinary least squares estimation with a truncated sample leads to a sample selection bias described as an omitted variable problem in the second step for studying sequential decision-making process (Heckman, 1979). To correct this selection bias problem, the inverse Mill's ratio (λ_i) is computed for each participant

while estimating Probit model in the first step. The inverse Mill's statistic is derived by a ratio between the standard normal density function and the standard normal cumulative distribution function as follows: the inverse Mill's ratio,

$$\lambda_i = \frac{\phi(x_i\beta_i)}{\Phi(x_i\beta_i)} \tag{2}$$

where ϕ is the standard normal density function and Φ is the standard normal cumulative distribution function. The inverse Mill's ratio (2) is used as an additional explanatory variable in the estimation of saving level equation by least squares method for positive observations. The truncated ordinary least squares estimation in the second step of Heckman model may be expressed as follows:

$$y_i^* = x_i\beta_i + e_i, \qquad e_i \sim N(0,\sigma^2) \qquad \begin{cases} y_i^* = y_i & if\ y_i > 0 \\ y_i^* = 0 & if\ y_i \le 0 \end{cases} \tag{3}$$

The equation (3) estimates for sub-sample containing positive observations and incorporates the inverse Mill's ratio (2). The presence of sample selection bias may mislead the statistical analysis of a sample and influence the statistical significance of the chosen statistical tests. The Mill ratio (λ_i) should be statistically significant in equation (3), it is necessary to correct the selection bias problem of the sample (Moon & Ward, 1999). Given the statistical significance of the λ_i in the model, the Heckman two-stage approach is assumed to be a proper procedure (Lyu & Noh, 2017). In this model, it is possible to choose different variables that can affect both the decision to participate in savings and how much to save. (Mutlu Çamoğlu, 2013:5).

In this study, women's saving behaviour was discussed in Heckman's two-step technique. The first step is the probability of participation in the savings decision whether to save or not. It is hypothesized that certain women are more likely to save money. The Probit model is estimated for the first step and the Inverse Mill Ratio is calculated from this model. In the second stage, the dependent variable is the monthly savings levels of women. At this stage, it might be revealed how socio-demographic and economic explanatory variables of household and women-specific that participate in saving behaviour affect women's savings.

Empirical Results

The results of the parameter estimation of two-stage Heckman model are given in Table 5. Almost half of the estimated parameters in both equations are statistically

significant. In the model, the savings decision was examined in a two-step process. In the first stage, the decision to save was analyzed within the framework of the Probit model. At this stage, the dependent variable has a value of 1 if the respondent is a saver and 0 if the respondent is not a saver. In the second stage, the decision on how much to save was estimated by the regression equation, which also includes the inverse of Mill ratio obtained from the Probit model. At this stage, the dependent variable for OLS model with a truncated sample is formed by taking the logarithm of the monthly savings of the household, which positive savings have occurred. The inverse of the Mill ratio was estimated in the second stage to reduce selection bias. This ratio demonstrates a statistically significant coefficient. This result indicates that the sub-sample consisting of positive saving was corrected for sample selection bias. In the second stage, it is examined the distinctive effects of each explanatory variable on households' decisions for the amount of savings.

Table 3. The results of Heckman model

	Probit Estimation		**Ordinary Least Squares**	
Parameter	**Estimate**	**P-value**	**Coefficient**	**P-value**
C	-0.83021	[.669]	-3.32254*	[.010]
lincometot	0.394929*	[.092]	1.37944***	[.000]
dmarried	-0.11495	[.666]	0.055762	[.689]
dage18-24	1.27154***	[.002]	0.562484	[.109]
dage25-34	0.5835**	[.042]	0.235262	[.250]
dage35-44	0.178603	[.488]	-0.03221	[.834]
dage45-54	0.54466**	[.027]	0.206226	[.237]
dqualwork	-0.64287*	[.066]	-0.42032*	[.073]
dedu5	0.606494*	[.071]	0.186729	[.408]
dedu1	-0.01827	[.940]	-0.17349	[.265]
dedu2	0.228758	[.302]	-0.03427	[.818]
dunv	0.134421	[.642]	-0.04137	[.797]
drural	-0.15271	[.376]	-0.09008	[.412]
dworking	0.562763*	[.052]	0.191684	[.352]
dworktype1	-0.41301	[.262]	-0.47951**	[.028]
dworktype2	-0.93468*	[.066]	-0.88323**	[.023]

	Probit Estimation		Ordinary Least Squares	
Parameter	**Estimate**	**P-value**	**Coefficient**	**P-value**
dworktype3	-1.34677***	[.000]	-0.91689**	[.018]
dworkage1	-0.17682	[.460]	-0.21295	[.172]
dworkage2	0.085014	[.722]	-0.10389	[.488]
dworkage3	-0.45704	[.189]	-9.68E-03	[.968]
wdebttot	-0.04255*	[.010]	-0.05053***	[.001]
dassetyes	0.294913	[.263]	0.039153	[.800]
wnkids	-0.63706	[.151]	-0.46376	[.158]
householdsize	-0.10159	[.205]	-0.13598*	[.011]
wmagrinc	-15.4761**	[.049]	-6.77435	[.234]
wexpentot	-3.29294***	[.000]	-2.41698**	[.002]
wfemaleinctot	0.365009	[.330]	0.341407*	[.087]
Mill ratio			0.789773*	[.076]

Note: **significant at 10%; **significant at 5%; ***significant at 1%.*

The results of Heckman model are shown in Table 3. When the results of the first and second stages of the Heckman model are compared, it can be seen that the variables found significant differ slightly. This indicates that the second stage decisions regarding the amount of savings were not identical to the first decision making process for participation in the savings decision.

The household's income, which is a variable that reflects household purchasing power were positively related to the likelihood of household saving in the initial stage. Consistently in the second stage, the variable of "lincometot" revealed significant positive coefficient signs, indicating that households with a greater amount of income save more money.

According to estimation of Probit model, the working women were determined particularly likely to have household saving. In the first stage. women aged 18-34 and 45-54 are more likely to have household saving than women aged more than 55. This finding is consistent with lifecycle hypothesis that the younger people tend to save more than older people. With respect to schooling, illiterate women were more likely to than the educated women in this study. Lee (2008: 90) found that individuals with higher education showed greater propensity for

household debt. This result confirms the argument of Duesenberry's (1949) in a sense that individuals increase their expenditure achieving a materially high standard of living goods by reducing their savings to adapt to the target group's consumption pattern. In this sense, the high educated group prefers to consumption rather than save.

As expected, the predictor of the expenditure in the monthly income was negatively significant. This result indicates that the women reporting the higher expenditures ratio in household's income were less likely to participate in saving behaviour. The result in the second stage indicates that the households with a greater amount of expenditure rate save less money. These individuals prefer present consumption to future consumption expenditures.

The agricultural income in the household's income disclosed significant negative sign. This finding is consistent with Fisher's views on the size of income that the smaller the income, the higher the preference for the present consumption over the future, which the saving rates increase sharply with permanent income, and the poor are much more impatient than the middle class. The agricultural producers had a smaller probability of engaging the saving behaviour compared to the other profession groups.

The variable regarding the woman's having a qualified work is negative sign and significant. The variable regarding the woman's having a qualified work is negative sign and significant. This finding reflects that the woman employing as a qualified worker, showed negative attitudes toward the savings participation than the others. Likewise, in the second stage, females having a qualified job saved less money for future consumption. This finding indicates that women working in qualified jobs are influenced by the social group mentioned in the social interdependency of Duesenberry's theory. It can be interpreted that the women spend more and decrease their savings with the effect of the social dimension of consumption.

A significant negative relationship was found between women's employment in contract or temporary jobs and their savings behaviour. The women in precarious and especially temporary employment have a negative impact on savings behaviour. The more flexible the employment, women's tendency for saving for the future decreases. Guest et al. (2006) have highlighted that there may be disadvantages and costs for those workers who are engaged in forms of atypical and flexible

employment. In the second stage, it is observed that women who have a long-term permanent job similarly reduce their savings and prefer to increase their spending.

The negative coefficient signs in the household's debts variable denoted that increase in the debts were less likely to participate in saving decision. Consistent with the first stage, the variable of the debt ratio disclosed significant negative signs, indicating that households with a greater amount of debt ratio decrease the savings. As Friedman (1957) mentioned, individuals distribute resources over time and therefore, instead of saving, they might prefer to borrow at present and decide on their present consumption behaviour. Fisher (1930) also emphasized the role of borrowing or lending to smooth consumption over time

The variables of female income and household size are found significant in the second stage and have effects on households' decisions for the amount of savings. As the share of women's income in household income increases, the saving amount of households increases. This finding indicates that the increase in women's income will be more effective in saving money in terms of the family's financial behaviour.

On the other hand, as household size grows, the savings amount of household decreases. This is because the household's expansion causes more present consumption expenditure.

Conclusion

The position of women in terms of household economics is remarkably considerable in deciding on the choice of savings and making savings for the future. The purpose of this study is to examine the saving behaviour to better understand how the characteristics of household and factors are related to the savings for women. This research applies the Heckman sample selection model to assess how women make saving decision as a sequential process. The survey data was collected from women in Ardanuç, Artvin district in the Eastern Black Sea region. In the research, the saving behaviour is summarized in the context of the perspectives and insights of economists who have researched this issue in the economics literature. The prominent saving theories in Fisher (1930), Keynes (1936), Duesenberry's (1949), Modigliani & Brumberg's (1954) and Friedman (1957) have been investigated. While some of the leading theories on saving in

the economic literature were being reviewed, many findings of this study were found to be consistent with the saving behavioural theories.

The women's saving behaviour was discussed in Heckman's two-step technique. In the first stage, the probability of participation in the savings decision was analyzed with a Probit estimate, and in the second stage, the effect of some socio-demographic and economic factors of household and women-specific that could influence the amount of women's savings were analyzed by OLS model with a truncated sample, participating in the savings behaviour.

According to the results of Heckman's model, household's income, the age groups before retirement, lacking in education, working women and women's income in household income have positive and statistically significant effects on saving behaviour.

The explanatory variables that have a negative and significant effect on saving behaviour could be stated as having a qualified job of women, working type of women, debt ratio, rate of agricultural income and share of expenditures in household income.

According to result findings, it is observed that savings have also increased with household income growth. This situation is encountered both in the possibility of participation in the saving decision and in the savings magnitude. it was noticed that households' savings did not increase in order to adapt to the consumption patterns of the social group (the woman's having a qualified work) and to improve their standard of living, consistent with Duesenberry's theory.

As mentioned by Fisher and Friedman, individuals distribute resources over time and borrow or lend to smooth consumption. Consistent to these theories, it has been found that there is a divergent effect between borrowing and saving, while deciding on participation in saving and in deciding the amount of savings.

Younger age groups, compared to the retirement age group, which is the reference group, look particularly favorably on the savings decision process of participation. This finding is consistent with lifecycle hypothesis that the younger people tend to save more than older people.

As can be determined from these results, it is seen that the households living in a region close to a small rural area also display behaviours in accordance with

the findings of theories in the sense of saving behaviour. It might be beneficial to consider the findings of research on saving behaviour in making policy decisions towards saving.

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5

SUNFLOWER SEED OIL DEMAND IN TURKEY: A SIMULTANEOUS APPROACH

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Vegetable Oils in a Nutshell

The oils attained from plants are known as vegetable oils. Although there is quite a lot of vegetable oil types, the most widespread types are palm, soybean, rape and mustard, sunflower seed[2] and palm kernel oils. The production and consumption of the oils may differ around the world. For instance, with a production quantity of around 68 million tons as of 2017 palm oil takes the lead in the world (see Table 1). Furthermore, its share in total vegetable oil production is 32.43%. Soybean, rape and mustard and sunflower oils follow palm oil with the shares of 25.70%, 11.85% and 8.76% (FAOSTAT, 2019).

On the other hand, the most consumed (as food) oil type in the world is the soybean oil (see Table 1) with a share of 28.20% in total vegetable oil consumption. Palm, sunflower, and rape and mustard oils follow soybean oil with the shares of 19.19%, 12.93% and 11.74% (FAOSTAT, 2019).

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2 For convenience, at the rest of the study, "sunflower oil" would be used instead of "sunflower seed oil".

Table 1: Top-5 Types of Vegetable Oil Production and Consumption in the World (1000 tons)

Production				
	Oil Type	2017	2010	2000
1	Palm Oil	68,144	45,078	21,718
2	Soybean Oil	54,010	40,610	25,606
3	Rape and Mustard Oil	24,902	22,913	13,561
4	Sunflower Oil	18,400	12,579	9,752
5	Oil Crops Oil, Other	17,069	4,042	9,272

Consumption as Food				
	Oil Type	2017	2010	2000
1	Soybean Oil	21,564	23,627	19,570
2	Palm Oil	14,673	13,972	9,088
3	Sunflower Oil	9,888	9,296	8,021
4	Rape and Mustard Oil	8,982	9,963	8,698
5	Oil crops Oil, Other	5,379	1,629	1,319

Source: *FAOSTAT, 2019.*

Furthermore, the intended purpose of the oils may differ across countries and regions. For example, some are mainly used by households as food (olive, groundnut, sesame seed, maize germ, cottonseed and sunflower), while others mainly in the industry (palm, palm kernel, rape and mustard) and even in cosmetics (coconut). For instance, among 4 types of oils given in Table 1, the highest consumption as food to production ratio belongs to sunflower oil, namely 53.74%. On the other hand, palm oil has the lowest ratio, 21.53% (FAOSTAT, 2019). Therefore, it may be claimed that among top-5 produced oil types, sunflower oil is consumed most by the households as food, while others are mostly used for industrial purposes.

The production and consumption (as food) of vegetable oils in Turkey are given in Table 2. In terms of production, sunflower oil takes the lead in 2017 with a production quantity of 930 thousand tons. The share of sunflower oil production in total vegetable oil production is 42.02% (FAOSTAT, 2019). The production of sunflower oil has increased by 93.35% in 2000-2017 period. Soybean, cottonseed and olive oils follow sunflower oil with production quantities of 405, 251 and 247 thousand tons, respectively.

On the consumption side palm oil takes the lead with a consumption quantity of 492 thousand tons. The share of palm oil consumption in total vegetable oil

consumption is 31.76%. However, sunflower oil consumption follows palm oil consumption closely. The production quantity and its share in total vegetable oil of sunflower oil are 473 thousand tons and 30.54%, respectively (FAOSTAT, 2019). However, palm oil is mainly used for industrial purposes (particularly in food (margarine, hazelnut spread, chocolate, frozen pizza, etc.), chemical (dye, detergent, soap) and cosmetic industries) (Kayahan, 2017, p. 58), while sunflower oil is the most preferred oil as food by the households. 50.86% of sunflower oil production is used as consumption as food by the households (FAOSTAT, 2019). Moreover, the preference of sunflower oil (along with other vegetable oils) has been increasing due to dietary and health concerns. As can be seen in Table 2, per-capita sunflower consumption has been stable since 2000 and has been around 5.6 kg and has always been above world average. As of 2017, per-capita sunflower oil consumption in Turkey (5.83 kg) is quite high compared to the world average (1.34 kg). Hence, the focus of the study is determined to be the consumption of sunflower oil.

Table 2: Annual Vegetable Oil Productions and Consumptions in Turkey

Production (1,000 tons)						
	Oil Type	2017	2015	2010	2005	2000
1	Sunflower Oil	930	817	710	531	481
2	Soybean Oil	405	406	312	200	73
3	Cottonseed Oil	251	207	217	240	250
4	Olive Oil	247	193	182	130	207
5	Oil Crops Oil, Other	185	142	27	25	10
6	Maize Germ + Sesame Seed + Palm	151	144	94	64	37

Consumption as Food*							
	Oil Type		2017	2015	2010	2005	2000
1	Palm Oil	T	492	479	377	416	198
		PC	6.07	6.1	5.22	6.14	3.13
2	Sunflower Oil	T	473	440	643	377	377
		PC	5.83	5.61	8.92	5.56	5.97
3	Cottonseed Oil	T	209	205	209	232	245
		PC	2.57	2.61	2.89	3.42	3.88
4	Olive Oil	T	169	161	144	24	71
		PC	2.08	2.04	2	0.35	1.13
5	Soybean Oil	T	100	80	60	233	155
		PC	1.23	1.02	0.84	3.44	2.46
6	Maize Germ + Oil Crops + Sesame	T	206	149	156	152	127
		PC	2.56	1.85	1.94	1.89	1.58

Source: *FAOSTAT, 2019.*

* *T: Total Consumption (1,000 tons); PC: Per-capita Consumption (kg).*

Sunflower Oil: History, Main Properties and Economics

Although the oldest vegetable oil is thought to be olive oil whose history goes back to 5,000-6,000 years ago, to the early Bronze Age (3150 to 1200 BC) (Vossen, 2007, p. 1093), sunflower oil is almost as old as olive oil. The history of sunflower oil goes back to present-day eastern North America; Arizona and New Mexico and to 3000 BC. Sunflower was cultivated by American Indians and the seeds were squeezed for attaining oil. Some archaeologists even suggest that sunflower may have been domesticated before corn (NSA, 2020). However, it is after the introduction of it to Russian Federation in the late 1800s that it became a food crop and Russian farmers made significant improvements in sunflower cultivation (Fernández-Luqueño *et al.*, 2014, p. 1; Heiser, 1955, p. 166).

Sunflower (Helianthus Annuus) belongs to the Asteraceae family. The name Helianthus is the combination of helios (the sun) and anthos (a flower). The name is given as the flowers follow the lights of sun by turning to the sun throughout the daytime (Fernández-Luqueño *et al.*, 2014, p. 2).

Sunflower seed is used for attaining oil, for cooking, for producing margarine and shortening, for making a special type of coffee, for producing purple colour for textiles, for body painting, for medical purposes (as antivenom, body ointment), as snack, as animal feed and as ornamental plant. The stalks of the plant can be used for bio-fuel production and for composted fertiliser (NSA, 2020; Fernández-Luqueño *et al.*, 2014, p. 2). The use of sunflower seed, particularly as food, is increasing due to its health-related properties. Sunflower oil is monounsaturated (MUFA)/polyunsaturated (PUFA) mixture of mostly oleic acid (omega-9)-linoleic acid (omega-6) group of oils. Therefore, the oil is also known as a source of unsaturated fat. The oil contains 20-30% protein in addition to iron, calcium, nitrogen, phosphorus and vitamins A, B (B1, B3 and B6) and E. The seeds have more iron than any other food (except for liver and egg yolk). The oil also helps humans absorb fat-soluble vitamins (A, D, E and K), and necessary for building blocks of cellular membranes. In terms of human health, the oil a powerful antioxidant which in turn protect the health of cells and organs and boost immune system. The oil also contains phytochemicals such as choline and phenolic acid, and free from trans fats that are responsible for hearth diseases and cholesterol (Arshad & Amjad, 2012, p. 99; Lybrate, 2020; Meydani *et al.*, 1991, p. 406; NewIdeafood, 2020; Topcu *et al.*, 2010, p. 240).

Due to these properties, in the last 25 years the rate of vegetable oil intake in total fat intake has increased (Pekcan & Karaağaoğlu, 2000, p. 43) and the rate of vegetable (sunflower, maize, olive and others) oils in vegetable based fat intake have increased to 67.5% (Akbay, 2018, p. 77; Grigg, 1999, p. 262; Topcu *et al.*, 2010, p. 240).

As of 2017, sunflower is cultivated on 26.53 million ha. of field in the world and 47.96 million tons of sunflower seed is attained. The most important sunflower seed producer countries are Ukraine, Russian Federation, Argentina, Romania and China, with productions of 12.24; 10.48; 3.55; 2.91 and 2.58 million tons. Ukraine and Russian Federation make 47.36% of total sunflower seed production. Turkey has a production of 1.96 million tons on 779.44 thousand ha. of field and ranks 7th among producer countries (FAOSTAT, 2019). 64.38% of the production is made in 5 provinces, namely Tekirdağ, Konya, Edirne, Adana and Kırklareli. 91.6% of the sunflower seed production is used for oil production, while 8.4% is used as snack in Turkey (ZMO, 2020, pp. 1-3).

World sunflower oil production as of 2017 is 18.4 million tons. Ukraine ranks first in terms of sunflower oil production with 5.28 million tons (28.68%). Russian Federation, Argentina, Turkey and Hungary follow Ukraine with productions of 4.67; 1.32; 0.93 and 0.71 million tons, respectively. As of 2017 Ukraine and Russian Federation make 54.07% of total sunflower oil production in the world. On the other hand, Turkey ranks 4th among top sunflower oil producer countries (FAOSTAT, 2019). As Turkey is among important sunflower seed and oil producer countries, it is quite crucial to analyse the sector and hence this causation constitute the first motivation of the study.

As of 2017 total sunflower consumption in the world is around 8 million tons which corresponds to 1.33 kg per-capita consumption. In the same year, top-5 consumer countries are Russian Federation, India, Spain, Argentina and Turkey. Turkey ranks 5th in total sunflower oil consumption with 377 thousand tons of sunflower oil consumption which corresponds to 5.97 kg per-capita consumption (FAOSTAT, 2019). This high level of sunflower oil consumption constitutes the second motivation of the study.

In terms of global sunflower oil trade, export and import quantities are 13.05 and 12.04 million tons as of 2017. Top-5 exporting countries are Ukraine, Russian Federation, Argentina, Netherlands and Hungary with export quantities of 5.77; 2.33; 0.76; 0.60 and 0.56 million tons (see Table 3). Turkey ranks 6th with

a quantity of 0.54 million tons of export. On the other hand, as of 2017, Turkey has a trade deficit of 112.3 million $ in terms of sunflower oil. Turkey imported (mostly from Russia, Ukraine and Eastern Europe) and exported (mostly to Middle East and Africa) 661.0 and 548.8 million $ worth of sunflower oil (FAOSTAT, 2019; ZMO, 2020, pp. 7-8). Having a trade deficit in terms of sunflower oil despite being the 6th largest exporter is controversial and should be analysed. This in turn constitutes the third motivation of the study.

In terms of import, top-5 countries are India, Spain, China, Turkey and Netherlands with import quantities of 2.26; 0.78; 0.76; 0.66 and 0.62 million tons. Hence Turkey ranks 4th in terms of sunflower oil import in the world. All the top-5 importer countries have trade deficits and conduct intra-industry trade in terms of sunflower oil. Turkey exports 67.69% of her total sunflower oil to only two countries in 2017, to Iraq (46.81%) and to Syria (20.88%). Other countries that Turkey exports sunflower oil are Djibouti, Lebanon, Yemen, Israel, Libya, Somali and Qatar. On the other hand, the trade partners of Turkey in terms of sunflower oil import are Russian Federation (62.29%), Ukraine (22.04%), Bosnia and Herzegovina (12.38%), Bulgaria and Romania. Just three countries account for 96.71% of Turkish sunflower oil import in 2017 (ZMO, 2020, p. 8).

Table 3: Top-5 Sunflower Oil Exporter- and Importer-Countries as of 2017 (1,000 tons)

Exporters				
	Country	Export	Import	Balance
1	Ukraine	5,766	2,573	3,193
2	Russian Federation	2,326	26	2,300
3	Argentina	758	0	758
4	Netherlands	597	616	-19
5	Hungary	560	16	544

Importers				
	Country	Import	Export	Balance
1	India	2,256	3	-2,253
2	Spain	782	239	-543
3	China	764	2	-762
4	Turkey	661	537	-124
5	Netherlands	616	560	-56

Source: *FAOSTAT, 2019.*

Previous Studies on the Economics of Sunflower Oil

In the literature there are numerous studies on oil and fat consumption. The studies usually focus on health consequences, environmental issues, genetics, economics

of production, consumption and trade, and consumer behaviours. Due to the context of the study, the literature is reviewed in terms of the determinants of vegetable, particularly sunflower, oil demand. In terms of sunflower oil, Akbay (2007) investigates the effects of socio-economic and demographic factors on consumers' cooking oil consumption. For this purpose, he employs Linear Approximated Almost Ideal Demand System (LA/AIDS) model and disaggregated data from 2003 Household Budget Survey of Turkish Statistical Institute. As a result, he determines that upper-income consumers perceive olive oil as healthier than other types while lower-income consumers perceive sunflower oil as healthier – even healthier than corn oil (but could not purchase olive oil due to high price). Therefore, low-income consumers are more price sensitive to olive oil and corn oil than higher-income consumers. In their study on the determination of significant factors related to sunflower oil attributes and the socioeconomic and demographic characteristics of the consumers, Topcu *et al.* (2010) carry out a survey with 250 households living in Erzurum, Turkey. They use factor and multiple linear regressions and as a result they find that the buying decision depends on consumer satisfaction (in terms of quality and quality-price relation) and price (and promotion/discount) while the amount bought depends on the attribute of the oil, and buying power and frequency depend on the stage of the lifecycle and job position (income, education and occupation). In their study Kızılaslan *et al.* (2014) make a survey with 271 households in Tokat, Turkey and employ Multinomial Logit (MNL) model in order to determine the factors affecting peoples' choice of shopping (among grocer, market and supermarket) to buy sunflower oil. As the result of the study, they determine that gender (being woman), age (being older) and purchase frequency (greater frequency) contribute market preference positively; while age (being younger), marital status (being single), purchase frequency (greater frequency) and advertisements (of the supermarket on any product) contribute supermarket preference positively.

Some of the studies, on the other hand, examines the consumption of edible oils. For example, Nielsen *et al.* (1998) examine the edible oil purchase motives of consumers in Denmark, England and France. By using a modified version of laddering technique, they determine that Danish consumers are careful about country of origin and eat together as a family while French consumers care for odour and hints at sunshine, summer, the south and care for protecting identity, culture and food tradition. Fang and Beghin (2002) determine the urban demand for edible (rapeseed, peanut, soybean) oils and fats in three regions of China. For

that purpose, they use 1992-1998 household data and employ Linquad incomplete demand system. For three regions oil consumption increases with age and decreases with larger household size. However, the level of education has mixed effects in different regions. The cross-price effects among oils are low for three regions. Income elasticities are positive but low for three regions. In their study on edible oil consumption in India, Pan *et al.* (2008) examine the effects of own-price, income and expenditure, and demographic characteristics (age, education, food habit, region, region – north/south, urban/rural) on the demand of edible oil. By using Linquad incomplete demand system and Probit method they examine the demand for peanut, liquid butter, rapeseed and palm oils. As a result, they determine that households in rural areas are less likely to consume liquid butter oil and more likely to consume palm oil than those in urban areas; income has positive effect on liquid butter while negative effect on rapeseed and palm oils; religion is significant in the choice of rapeseed oil; education effects liquid butter preference positively; and income has positive (on peanut oil) and negative (on liquid butter, rapeseed and palm oils) effects. In their study Govindaraj and Suryaprakash (2013) examine the determinants of edible (palm, sunflower, peanut, coconut, sesame, corn, rice bran) oil in the most urbanized state of India, namely Tamil Nadu. For that purpose, they make a survey with 1,000 households and employ MNL model. As a result of the study, they determine that increased education and presence of previous health problem increase the preference of untraditional sunflower oil (in all regions of the State). On the determination of the factors affecting edible oil consumption in the province of Faisalabad, Pakistan, Ali *et al.* (2013) make a survey with 150 consumers and predicted two regressions (OLS): oil and ghee demand. As a result of the study, the income elasticity of oil is found as 0.297; the elasticity of the share of oil in food expenditures as 0.455; and for family size as 0.422. Irmak and Ercan (2017) conduct a study on determining the factors affecting edible oil through data mining and Household Budget Surveys of Turkish Statistical Institute for 2009-2012 period. The factors that affect edible oil (maize, sunflower, cotton, soybean, peanut, walnut oils etc.) consumption are found to be household size (most effective), income and income related other socio-economic factors and location.

There are other studies on olive oil consumption that may give clues about the determinants of sunflower oil consumption. For example, Tzouvelekas *et al.* (2001) analyse the consumption of olive oil in Greece for 1969-1998 period. By utilising co-integration and error-correction modelling they determine that olive oil price

is a more significant determinant (-0.23 and -0.54 in the short- and long-run) of olive oil consumption than disposable income (0.09). In her study Şengül (2002) examines the olive oil demand in Adana, Turkey with a survey with 400 households in 1998. The Double Hurdle model reveals that own-price and the price of other oils negatively affect olive oil consumption, while the price of sunflower oil affects olive oil consumption positively. The own-price elasticity is found to be -0.83 for actual olive oil consumers and -1.10 for all consumers while cross-price elasticity between sunflower oil price and olive oil consumption is 0.73. Hatırlı and Aktaş (2003) examine the olive oil demand for 1980-2000 in Turkey with simultaneous equation (2-SLS). As a result, they find that own-price elasticity of olive oil is inelastic (-0.79) and olive oil is a luxury good (income elasticity is 1.74). Xiong *et al.* (2014) examine the demand for olive oil in the USA and determine that the income elasticity for virgin oils from EU is above one (1.20), but demand for non-virgin oils is income inelastic (0.11). Price elasticity of olive oil as a single product is less that one (-0.3). However, if olive oil is differentiated according to its characteristic and origin, different types of olive oil are highly substitutable with each other but not with other vegetable oils.

Data and Model Development for Sunflower Oil: A Simultaneous Approach

In the study, annual time series data for 1995-2017 period are utilised. The period is determined under data availability constraint. The data is collected from numerous sources; sunflower oil production, consumption, import and olive oil production data are obtained from the Food and Agriculture Organization (FAO). All nominal retail prices for sunflower and maize oil and the consumer price indices (CPIs) are gathered from Turkish Statistical Institute. In order for nominal prices to be realised CPIs (1994=100 and 2003=100) are converted into a single index (2003=100) and then nominal prices are converted to real prices. In order to calculate real per-capita income; nominal gross domestic product (GDP), GDP deflator and population data are obtained from Turkish Statistical Institute, and nominal GDP is converted to real with the GDP deflator. Then per-capita income variable is derived by dividing real GDP to population. Per-capita consumptions are calculated by dividing total consumption with the population. Sunflower oil import price is calculated by dividing total import value to total import quantity. All the variables and descriptions are given in Table 4.

Table 4. Specification of Variables

EQUATION 1: Demand Equation	
Dependent Variable	**Description**
PCSOC	Per-Capita Sunflower Oil Consumption (kg/year)
Independent Variables	**Description**
C	Constant
SOP	Sunflower Oil Price (TL/kg, real)
PCI	Per-Capita Income (annual, real GDP/population, TL)
MOP	Maize Oil Price (TL/kg, real)
PCOOC	Per-Capita Olive Oil Consumption (kg/year)

EQUATION 2: Inverse Demand Equation	
Dependent Variable	**Description**
SOP	Sunflower Oil Price (TL/kg, real)
Independent Variables	**Description**
C	Constant
PCSOC	Per-Capita Sunflower Oil Consumption (kg/year)
SOPRO	Sunflower Oil Production (1000 tons/year)
SOIMP	Sunflower Oil Import Price ($/ton)

In econometric modelling, there are several approaches to estimate a model such as single equation and simultaneous models. Single equations are the most common models in which a dependent variable (Y) is a function of exogenous variable(s) (X_i), but in such models no two-way relationship is assumed. Hence, single equation models ignore the interdependence between variables. In economics however, reciprocal effects or two-way relationships are common. In such cases reciprocal relationship could be determined with the help of a system of equations. For instance, in Equation 1 below, endogenous variable is Y_1 and exogenous variables are X_1 and X_2. However, both Equation 1 and Equation 2 represent simultaneous equation model. In fact, X_1 in Equation 2 and Y_1 in Equation 1 are both endogenous variables that is determined within the model. In other words, mutual dependency exists between Y_1 and X_1 in the system of equations, therefore, the model should not be estimated by a single equation. Otherwise, the

results of single equation model would be biased and inconsistent (Gujarati, 2006; Greene, 2012). Consequently, it is necessary to perform a test whether the model would be estimated by using single equation or simultaneous equation model.

$$Y_1 = \alpha_0 + \alpha_1 X_1 + \alpha_2 X_2 + e_1 \quad (1)$$

$$X_1 = \beta_0 + \beta_1 Y_1 + \beta_2 X_3 + e_2 \quad (2)$$

The main objective of the study is to develop and estimate a structural econometric model of sunflower oil demand in Turkey. For this purpose, an econometric model that represents simultaneity between demand and inverse demand function of sunflower oil is developed. In the model, per-capita sunflower oil consumption (PCSOC) is assumed to be a function of independent variables: sunflower oil price (SOP), per-capita income (PCI), maize oil price (MOP) and per-capita olive oil consumption (PCOOC). The inverse demand function is modelled in accordance with the sunflower oil price (endogenous variable) as a function of exogenous variables: per-capita sunflower oil consumption (PCSOC), sunflower oil production (SOPRO) and sunflower oil import price (SOIMP). The implicit demand and inverse demand functions are expressed as follows:

$$PCSOC = f(SOP, PCI, MOP, PCOOC) \quad (3)$$

$$SOP = f(PCSOC, SOPRO, SOIMP) \quad (4)$$

Empirical Results

In the study, time series data (1995-2017) are used, therefore, it is required to determine the stationarity of the data in order to avoid spurious regressions. For this purpose, Augmented-Dickey- Fuller (ADF) and Phillips-Perron tests are performed with constant and constant + trend. The test results given in Table 5 show that all the variables are non-stationary at level but stationary at the first differences.

Table 5. Augmented-Dickey-Fuller (ADF) and Phillips-Perron (PP) Test Results

Variables	ADF				PP			
	Constant		Constant + Trend		Constant		Constant + Trend	
	Level	First Difference	Level	First Difference	Level	First Difference	Level	First Difference
PCSOC	-2.77	-7.58*	-3.60	-7.38*	-2.75	-7.53*	-2.67	-7.35*
SOP	-3.92*	-5.63*	-4.26*	-5.86*	-3.79*	-10.45*	-3.81**	-11.90*
logPCSOC	-2,84	-7.40*	-2.77	-7.21*	-2.88	-7.40*	-2.81	-7.21*
logSOP	-3.96*	-5.62*	-4.28*	-6.69*	-3.91*	-10.80*	-3.93*	-12.48*
logPCI	0.06	-4.32*	-1.88	-4.30*	0.04	-4.32*	-2.00	-4.30*
logMOP	-0.52	-7.49*	-4.45*	-7.27*	-2.39	-6.53*	-3.78*	-6.14*
logPCOOC	-0.66	-6.36*	-5.89*	-6.36*	-3.23**	-16.79*	-2.81	-7.21*
logSOPRO	-1.81	-4.66*	-2.65	-4.85*	-1.88	-4.69*	-2.80	-4.60*
logSOIMP	-1.25	-4.79*	-2.19	-7.27*	-1.20	-4.81*	-2.12*	-4.66*

Critical values (Level) at 1% = -3.753 and at 5% = -2.998.
** and ** are significant at 1% and 5%.*

Since Equations 3 and 4 represent theoretically a simultaneous equations system with PCSOC and SOP endogenous variables, Hausman test is performed to determine if simultaneity exists (Gujarati, 2006; Hausman, 1978). According to Hausman test results, probabilities of demand and inverse demand functions are calculated as 8.3% and 8.8%, respectively. Therefore, the null hypothesis that there is no simultaneity is rejected at 10% significance level implying that proposed model in Equations 3 and 4 is required to be estimated jointly by the simultaneous equation system.

In order to analyse simultaneous equation system, mathematical functional forms of Equation 3 and 4 need to be specified. Among the functional forms, linear-logarithmic functional form shows better results in terms of theoretical expectations and are given in Equations 5 and 6 where e_{1t} and e_{2t} are error terms of each model.

$$\mathrm{PCSOC}_t = \alpha_0 + \alpha_1 logSOP_t + \alpha_2 logPCI_t + \alpha_3 logMOP_t + \alpha_4 logPCOOC_t + e_{1t} \quad (5)$$

$$\mathrm{SOP}_t = \beta_0 + \beta_1 logPCSOC_t + \beta_2 \mathrm{logSOPRO}_t + \beta_3 \mathrm{logSOIMP}_t + e_{2t} \quad (6)$$

For estimation purposes, three-stage-least squares (3-SLS) estimation is used, where exogenous variables are per-capita income, maize oil price, per-capita olive oil

consumption, sunflower oil production and sunflower oil import price. In addition to 3-SLS, two-stage-least squares (2-SLS) estimation procedure is also employed, but no significant improvement could be attained with 2-SLS procedure. All estimations are carried out by using Shazam 8.0 and EViews 9 software programs.

The parameter estimates of simultaneous equations in linear-logarithmic form, their t-ratios and other statistics are given in Table 6. The system R-square is 0.69, suggesting that 69% of the variation is explained by the current model. Since auto correlation is an econometric violation that is encountered frequently with time series data, auto correlation is tested with Durbin-Watson (DW) test for each equation. Based on DW test, test statistics are found to be 2.47 and 1.59 for the demand and inverse demand equations, respectively. These results suggest that we cannot decide whether autocorrelation exist since test values are in the inconclusive range. For this reason, LM test is applied to test autocorrelation in the model (Gujarati, 2006). LM test result is calculated as 2.38 for the demand equation and 5.75 for inverse demand equation. Therefore, it is concluded that there is no first order autocorrelation at the 5% confidence level in both equations.

In the demand equation, all parameters have the expected signs and all the variables, except for sunflower oil price, are statistically significant. However, sunflower oil price has negative sign as expected, that is an increase in sunflower oil price would decrease per-capita sunflower oil consumption. The positive and significant coefficient for per-capita income of sunflower oil demand is consistent with theoretical expectations. Results reveal that income elasticity of sunflower is 0.63, indicating that sunflower oil is a necessity good. This result is consistent with research findings of Akbay (2007) in which income elasticity of sunflower oil demand is estimated as 0.57 for middle income households in Turkey. The positive and significant parameter of maize oil price implies that maize oil and sunflower oil are substitutes as expected. The estimated cross price elasticity of maize oil suggests that 1% increase in maize oil price would cause a 1.76% increase in sunflower oil consumption. The per-capita olive oil consumption is included in the model in order to measure the effect of olive oil consumption on sunflower demand. The finding of the model shows that it has a positive effect on sunflower oil demand which is opposite to expected sign or intuitively expected substitution relationship. This result could be caused by data aggregation problem such as per-capita consumption data includes both at home and away from home consumption. These two vegetable oils could be substitute at home

consumption as normally expected and complementary at away from home consumption due to large assortment of food service sector (meal with refined sunflower oil such as fried potatoes and salads with olive oil). Thus, empirically obtained relationship at aggregate level can be valid if the share of away from home consumption of sunflower oil is higher than at home consumption. In this case, complementary relationship of sunflower and olive oil consumption may be justifiable. Furthermore, this result would also be attributed to the differences in consumer segments of olive oil and sunflower oil. In fact, olive oil consumption is very common in Aegean and Mediterranean Regions of Turkey in which about 70.6% of olive oil in Turkey is produced (SGB, 2020, p. 2). The high-level production levels in these regions also lead the high level per-capita consumption in these regions. In addition to these, since olive oil is more expensive and considered one of the healthiest vegetable oils, it has a special consumer class that has high income level and more concerned about their health. All these factors, in fact, might lead to conclude that olive oil and sunflower oils are consumed by different consumer segments.

For the inverse demand equation of sunflower oil, all the parameters have the expected signs and are statistically significant except for per-capita sunflower oil consumption. Although insignificant, increased per-capita sunflower consumption would increase the price of sunflower oil. Secondly, it is theoretically expected that the production of sunflower oil has direct effect on its retail price. This expectation is confirmed with the results. The findings reveal that the sunflower oil production elasticity of retail price is determined to be -0.52. Hence, although Turkey is among crucial sunflower oil importers, sunflower oil price in Turkey is sensitive to domestic production. On the other hand, as domestic production could not meet domestic demand, Turkey is net importer in terms of sunflower oil. As of 2017, the trade balance in terms of sunflower oil is -124 thousand tons, which in turn causes a trade deficit of 112.3 million $ (FAOSTAT, 2019). Correspondingly, retail price of the oil depends not only to the domestic production but also to the import price of oil. Based on model estimation results, 1% increase in import price, causes a 0.21% increase in retail price of sunflower oil revealing that the price of sunflower oil in Turkey is partially dependant on import price.

Table 6. Three-Stage Least Squares Estimation Results

Demand Equation	Coefficient	t-Ratio	Elasticity
C	14.892	1.632	
logSOP	-4.208	-1.095	-0.62
logPCI	4.276	1.784**	0.63
logMOP	11.991	3.123*	1.76
logPCOOC	1.329	1.755**	0.20
Durbin-Watson	2.47		
Inverse Demand Equation	**Coefficient**	**t-Ratio**	**Elasticity**
C	7.016	4.549	
logPCSOC	0.349	0.832	0.13
logSOPRO	-1.376	-4.059*	-0.52
logSOIMP	0.555	2.431*	0.21
Durbin-Watson	1.59		
System R-Square	0.69		

** and ** are significant at 1% and 10%.*

Discussion for Turkish Sunflower Oil Market

The preference of vegetable oils compared to animal-based fats is increasing in the world due particularly to health concerns, low prices (compared to fats), eating habits and culture of cuisine. While per-capita annual fat and sunflower oil consumptions were 1.79 kg. and 0.53 kg. in the world as of 1961, the figures for 2017 are 0.94 kg. and 1.34 kg., respectively. The same tendency also is also valid for Turkey. While the fat and sunflower oil consumptions were roughly equal in 1961, the annual per-capita sunflower consumption is 5.83 kg while it is 0.04 kg for fat (FAOSTAT, 2019). Therefore, it may be claimed that health concerns have caused steady decreases in fat consumption and steady increases in sunflower oil. On the other hand, the choice of sunflower oil among other vegetable oils mostly depends on cultivation opportunities almost all around the world, low price compared to olive oil, and taste and frying performance. In Turkish case, due to increased income, population increase, rapidly expanding food processing

industries and socioeconomic changes, the increase in sunflower oil consumption has outpaced the consumption of other vegetable oils (Topcu *et al.*, 2010, p. 240).

The increase in sunflower oil consumption however could not be met with domestic production and the gap is met through importation. According to FAOSTAT (2019) data on sunflower oil trade, it is seen that Turkey has had deficits in 1995-2017 period. The deficit was low and stable in 1996-2004 period but worsened in 2004-2013 period. After 2013, the deficit started to diminish but it persists. Therefore, it is obvious that for the demand to be satisfied with domestic production, the sunflower seed cultivation and sunflower seed oil production should be increased through government supports. If production could be increased by 10%, the price of sunflower oil in Turkey would decrease by 5.2%. The increase in production would also decrease the necessity for importation and a decrease in import price by 10% would decrease the price of sunflower oil by 2.1%. Furthermore, such price decreases would foster the competitiveness of Turkey in global sunflower oil market.

On the consumer side of sunflower oil market, the consumption of sunflower oil depends on its own price, income and price of substitutes. The consumption would increase with a decrease in own price that could be attained with production increases and import price decreases. The consumption would also increase together with per-capita income. A 10% increase in per-capita income would increase per-capita sunflower oil consumption by 6.3%. The consumption of sunflower oil would also increase by 17% with a 10% price increase in maize oil. On the other hand, although olive oil is a substitute of sunflower oil theoretically, due to the high price of it, maize oil has the potential to by-pass olive oil as a substitute. Hence, maize oil can be accepted as the best substitute of sunflower oil, and olive oil can be regarded as the *creame de la creame* substitute for sunflower oil.

If the production of maize (germ) oil - as a substitute of sunflower oil - is analysed, it is seen that it is quite lower than sunflower oil production, roughly 11% as of 2017 (FAOSTAT, 2019). As maize can be used as animal feed and an input for biofuel, maize oil production is lower than its potential. Therefore, the promotion of maize oil production may be a medium for decreasing maize oil price and hence for increasing maize oil consumption and decreasing sunflower oil consumption that in turn would reduce the import dependency for sunflower oil.

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ECONOMIC EDUCATION, FINANCIAL KNOWLEDGE AND INVESTOR'S ENDOWMENT EFFECT AND LOSS AVERSION BIASES RELATIONS

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Investment decision making is a critical process and investors are faced with many complex factors as risk and ambiguity. So the investors monetary gains depend on its ability to make efficient investment decisions. At this point the investor's decision making process becomes important. Mainstream finance theory built on some fundamental principles as Miller-Modigliani arbitrage principle, Markowitz's portfolio theory, Linter and Sharpe's capital asset pricing theory and Black-Scholes-Merton option pricing theories based on the rationality of individual investors on their financial decision making process. But normally investors are not rational. The behavioral finance as a sub branch of finance is based on this reality. So behavioral finance theory is based on the real men and investigated the influence of emotions and cognitive biases on investor's decision making processes. The emotions and cognitive biases create the systematic error of judgements which are the main determinants of irrational investment behaviors (Ateş, Coşkun, Şahin, & Demircan 2016, pp. 1-4; Awais, Laber, Rasheed, & Khursheed, 2016, p. 73). So rather than ignoring these biases, investigating how these biases affect financial decisions and how it could be decreased is important to increase the efficiency of decisions and markets.

Generally with respect to mainstream financial theories the economic and financial knowledge haven't any effect on rational investor. Whereas investor is not

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rational as mentioned by behavioral finance theories, the effect of financial and economic knowledge on investors behavioral biases could be an important topic. Because the cognitive bias leads to the financial decisions creating market anomalies. If making investors more rational along with higher economic and financial knowledge is possible, extending the formal economy and finance courses could be a good policy tool. But some studies mentioned that increasing the financial and economic knowledge is not sufficient to decrease investors behavioral biases by themselves. Starting from this different approaches inside the literature this study aims to analyse the relation between economics education, financial knowledge and investors decision making biases. This study particularly discourses the relation between economics education, financial knowledge and investor's endowment effect and loss aversion biases. In this context firstly the investors rationality is questioned and the main decision making biases are evaluated. Secondly the relation between economics education and investor behavior is investigated theoritically and studies inside the literature is reviewed. Lastly the sample, method and findings of the study are evaluated.

Do Investors Rational?

In conventional finance theories just as in neoliberal economic theories; the investors are assumed to be rational in their financial decisions. Rational investors avoid to replicate the same mistakes in their financial decisions and make the most optimum decision for themselves. In case of not to take optimum decision, investor encounters undesired conditions. Ultimately the investor either learns more rational decision making or run the risk of leaving the market. By doing this he / she is not under the influence of emotional factors, cognitive biases and social interaction. But one of the main reasons of financial crisis is the irrationality of investors and the lack of financial knowledge has an important influence on their irrationality (Rasool & Ullah, 2020). As it is known in real life investors are under the influence of social beliefs and visceral emotions as animal spirits, fear, greed, regret and rapture. The investors herding behavior or not to prefer the securities of companies which produce goods forbidden by religion as like smoke or alcohol are a few more examples of these influences. When investors are under the influence of emotional factors, cognitive biases and social interactions even in economic experiments then the behavioral finance theories get on the stage (Kuriakose, 2017, pp. 3-17). Behavioral finance theories based on the reality that human cognitive processes are not as perfect as like computer

processors. Thus during the information processing and evaluation, human brain uses shortcuts and emotional filters. Having bounded cognitive capacity prevents investors to evaluate the information from the environment more efficiently. In this condition investors use heuristics to make as good decisions as possible without more endeavour. Thus generally investors behave irrationally and make predictable errors in their estimations. This condition decreases the welfare level of individual investors as well as the efficiency of financial markets (Baker & Nofsinger, 2010, p. 3; Kalunda & Mbaluka, 2012, p. 158).

In mainstream finance theories the rational decision making process is revealed by expected utility model (Kalunda & Mbaluka, 2012, p. 158). Expected utility theory is based on the assumption that individuals are consistent in their preferences. Thus while making a selection between alternatives investors make decision by weighing gains or loses of each pereferences by their probabilities. By this way they choose the most beneficial option from different alternatives. According to this theory investors give the same value on their gains and losses and the framing effect is ignored (Sebora & Cornwall, 1995, p. 43). The most important alternative to expected utility theory is the Kahneman and Tversky's Prospect theory. Prospect theory assesses the investor behaviors under risk and uncertainty condition. In prospect theory investors put emphasis on their gains and loses rather than ultimate welfare level and value their gains more than their loses. So while investors are risk seeking in the lose condition they become risk averse in the gain condition (Kahneman & Tversky, 1979, pp. 278-279). Giving more importance to loses rather than gains creates endowment effect, status quo and loss aversion biases. Endowment effect arises when investor demands higher price to give up the financial product than willing to pay to acquire the same good. Kahneman etc. (1991) exemplified endowment effect through Bordeaux wine experience of their economist friend. A wine loving economist friend of Kahneman etc. purchased some nice Bordeaux wines 10 dolar per bottle many years ago and got a chance to sell them 200 dolar per bottle. Despite he knew that he would never give 200 dolar per bottle and selling these wines was a good chance, he prefered to drink them occasionally rather than selling them (Kahneman etc., 1991:194).

This condition is also associated with status quo bias. Thus the economist preferred keeping his current position rather than selling his Bordeaux wine or buying a new one. The status quo bias is defined as the preference for the current state or maintenance of present and past decisions. It could be given many examples

to status quo bias as using the same brand product, maintanence of the same job even finding a better opportunity and as well as Samuelson ve Zeckhauser (1988) experiment, maintanence to invest the same equities great uncle invested before when these equities inherited from great uncle (Samuelson & Zeckhauser, 1988, pp. 10-12). The investor's status quo bias is based on loss aversion bias. As mentioned in Prospect theory investor who gives more value to losses than gains, accepts his or her current status as a reference point and prefers to maintain status quo rather than meeting with a loss condition. Thaler refers to status quo bias as endowment effect (Samuelson & Zeckhauser, 1988, p. 36). The investor status quo bias is also related with regret aversion bias. In regret aversion bias investors consider the regret level they would encounter when they fail to reach optimal result. The regret level investors encounter when they alter their status quo and get in to a worse situation is higher than the regret level encountered if they maintain their staus quo. So investors prefer to maintain their status quo to minimise their future regret level (Jianbiao, Guangqian, Qiuhua, & Lüke, 2009, p. 546; Gill & Bajwa, 2018, p. 9).

In conjunction with these biases disposition effect bias is based on the mention in Prospect theory as investors are risk seeking in the lose condition and risk averse in the gain condition. Disposition effect bias emerges when the investor keep assets that lose value while selling those who have gained value. For example if an investor buys a stock at 30 dolar and than the stock value drops to 22 dolar, even the stock lose value, he or she won't sell it. He will continue to hold stock until its value gets above 30 dolar. When the value of the stock directly rise above 30 dolar from 30 dolar they will sell them without waiting anything (Kalunda & Mbaluka, 2012, p. 162). Investors have some other behavioral biases which are not detailed here as herding bias, confirmation bias, optimism bias, self control bias, availability bias, framing bias, self attribution bias, overconfidence bias, cognitive dissonance bias, hindsight bias, mental accounting, anchoring and adjustment bias, ambiguity aversion bias, representativeness bias, conservatism bias, illusion of control bias and recency bias (Gill & Bajwa, 2018, p. 8). In this section only the biases related with loss aversion bias and endowment efect bias were detailed. But all of these behavioral biases deteriorate the efficiency of stock markets and causing fragility in financial markets. So it is necessary to consider the real investor with his or her decision making biases rather than rational investor assumption. By this way the real investment behaviors could be evaluated more precisely and investment decisions could be rationalised. In this way it could be

possible to increase the efficiency of financial markets. Altman (2012) and some other behavioral economists give critical role to economic and financial education to help in making rational decisions. Thus it is necessary to evaluate how economics education and financial knowledge affects investor behavior.

How Economics Education and Financial Knowledge Affects Investor Behavior

Investors' behaviors are affected from social, cultural and demographic factors. One of the demographic factors affecting investor behavior is education. Generally the level of education is used to investigate the effect of education on investor behavior. The investors with high educational level have a greater capability to evaluate the risk and return of investment in comparison with low educational level investors. Also the investors with high educational level make investment decisions by taking many factors into considerations (Livamagi, 2016, p. 117; Grable & Lytton, 1997, p. 65; Fachrudin & Fachrudin, 2016, p. 53). With respect to decision making biases, it could be said that the decision making biases of investors decline when the educational level increases. The findings from the Nguyen and Schüsler (2012) could be an evidence for this relation. According to Nguyen and Schüsler (2012) when the educational level of investor increases, investor's anchoring, representativeness and self attribution biases decreases (Nguyen & Schüsler, 2012). Investor behavior is affected by the department of education as like level of education. Livamagi (2016) evaluated the relation in terms of the affect of department of education on the level of stock market transaction. Livamagi (2016) found that the investors graduated from the department of natural sciences make more stock market transaction than the investors who haven't received education from this department. He found that the investors graduated from the medicine department make low level of stock market transaction. Also economic education does not have any effect on investors stock market transaction (Livamagi, 2016).

The main question of this study is whether economic and finance education makes investor preferences and behavior more rational or not. According to mainstream finance theories; education has little effect on investors financial preferences. Because as it is known the investor is assumed to be rational in his or her financial decisions. But as mentioned by behavioral economists; in real life the investors have cognitive illusions and they make wrong and biased decisions. So some

interventions could be efficient to make investment behavior more rational. Economics and financial education is thought to be one of these intervention tools (Altman, 2012, p. 682). One of the main aim of economic education is to upskill students decision making capabilities. Decision making is conscious decision activity between alternatives. Economics education prepares investors to different decision making conditions (Loerwald & Stemmann, 2016, p. 26). Economics education inform students who are the potential investors, about decision making biases they are posibble to have. Also prescription about being rational and increasing the competitive power inside the competition markets is presented to students who are aware of their decision making biases. One of the main causes of behavioral biases is the investors decisions based on their emotions and instincts. Economic education gains some abilities as to make benefit-cost analysis, to define the economic motives effecting behaviors, to understand the price mechanism inside the market, to define the role of public and private institutions and to evaluate the benefits and costs of public policies (Gerek & Kurt, 2008, p. 6). These abilities gained with economic education could decrease the emotions and instincts effects on decision making process. So the rationality of investors could be increased.

Financial education gains investors the capability of controlling emotions. So investors who gain economic thinking capability with economy and financial education could make more rational decisions (Mc Kenzie, 2010, pp. 274-275; Altman, 2012, p. 682). Thus the economic experiments propounded that in their decisions economy students are more rational than the other departments students. In Kahneman, Knetsch and Thaler's (1986) ultimatom game experiment the quantity of money offered by a student to the student he / she matched is lesser in economy students than the students in other department. Carter and Irons (1991) found that in ultimatom game the economy students both sent lower money to the student he / she matched and accept the low level of money suggested from matched student even he has right to reject. If he / she rejects none could gain money so by rejectiong he / she could punish the student sent lower money (Broda, 2017, pp. 61-62). So the evidences from the ultimatom game experiment propounded that the economy students are not affected from the emotions as altruism, punishment and avenging etc. lower than the students from other departments. So the behavior of the students in economic department resemble to the rational economic man behavior assumed in economic theory. Also with financial education, students gain ability to evaluate their limits and

capacities on making financial decisions. So investors who receive economy education is expected to have relatively lower control and overconfidence biases (Loerwald & Stemmann, 2016, p. 34). Finance education is expected to increase the investors financial literacy level. With the effect of general economic education and financial education the imperfect information and low information processing problems of investors disappear. Finance education provides an investor ability to simplificate complex information and by this way ability to process information in a short period of time. By this way formal finance education increases the investors ability to realize and evaluate financial knowledge (Altman, 2012, pp. 678-689). Investors with high level of economic knowledge also have high level of financial literacy. Thus financial literacy level is related not only with finance education but also the knowledge level on the other areas of economy. When the financial literacy level increases, investors use more professional information sources as books, internet sources, journals, newspapers and financial advisors rather than families and friends. When the information sources become more professional the efficiency of investment decisions increase. Many studies about the measurement of financial literacy level have presented the lowness of the investors financial literacy level (Van Rooji, Lusardi, & Rob vd., 2011, pp. 461-462; Al Tamimi & Bin Kalli, 2009, p. 503). This evidences make economic education and financial knowledge more important to increase the efficiency of investment decisions and to increase their rationalization.

What Have Other Studies Mentioned About The Effect of Economic Education on Investors Behavioral Biases

Inside the literature we have not met many studies on the direct relationship between economic education and investors behavioral biases. Generally the studies investigated the effect of education levels on decision making biases. For example Baker et al. (2019) revealed that graduate and post graduate investors disposition effect bias, representativeness bias and mental accounting bias are lower than less educated investors (Baker, Kumar, Goyal, & Gaur, 2019, pp. 140-141). On the other hand some studies investigating the effect of economic education, financial education and financial knowledge is focused on stock market participation (Christiansen, etc. 2008). Awais et al. (2016) can be an example for these studies. They found that financial knowledge decreases the cost of obtaining and evaluating information. So it increases the level of investments in security market (Awais et al., 2016).

Generally studies measure the level of financial and economic knowledge with financial literacy. There are different approaches on the effect of financial literacy on investors behavioral biases. Some studies emphasise the effectiveness of financial literacy to increase investors rationality but on the other hand some others emphasise the opposite. In other words some of them have found that financial literacy decreases the investors behavioral biases on their financial transactions. So with respect to them financial literacy increases the rationality of investors in their financial decision making process. As an example Rasool and Ullah (2020) founded a strong negative relationship between financial literacy and investors decision making biases. So according to Rasool and Ullah (2020) the increase in the financial literacy level decreases the investors likelihood of having decision making biases (Rasool & Ullah, 2020). Similar to this study Dhar and Zhu (2006) supported the negative relations between financial literacy and disposition bias. Different from other studies they did not measure the financial literacy directly rather than they used occupational status as an indication of financial literacy (Dhar & Zhu, 2006).

On the contrary some studies revealed that the financial literacy could not affect investors behavioral biases only by itself. Studied with TEI of Western Macedonia students Katarachia and Konstantidinis (2014) found that; students taking the finance education could not get over the effect of psychological conditions, emotions and cognitive biases in their investment decisions. So with respect to their study the financial education could not increase the rationality and eliminate behavioral biases of the students alone (Katarachia & Konstantinidis, 2014, p. 151). On the other hand some other studies revealed that financial literacy could affect some of the biases positively and some of them negatively. Ateş etc. (2016) found the evidence that there is a positive relation between financial literacy level and overoptimism, confirmation and representativeness biases. On the other hand they find a negative relation between financial literacy level and overconfidence, cognitive dissonance, framing and loss aversion biases (Ateş etc., 2016:8). According to Baker et al. (2019) financial literacy level affects disposition effect and herding bias negatively and mental accounting bias positively. They did not find any significant effect of financial literacy level on overconfidence bias. Sezer and Demir (2015) split the financial literacy to two parts as fundaamental financial literacy level and advanced financial literacy level. They didn't find a significant relation between financial literacy level and anchoring bias, conservatism bias, , gambler's fallacy bias, availability bias, exposure effect. illusion of locality. But they found a

negative relation between fundamental financial literacy level and illusion of locality and the illusion of overreaction. For the advanced financial literacy level; they only found a positive relation with anchoring bias (Sezer & Demir, 2015, pp. 80-82). Generally inside the literature there are not many studies about the relation between economic education, financial knowledge and endowment effect biases. Only the Dhar and Zhu (2006) referred endowment effect through disposition effect. So it could be said that there is a a gap inside the literature on these subjects. And this study aims to make a little contribution on this gap.

The Aim And Method of The Study

This study aims to investigate whether is there any relation between economic education and investors endowment effect and loss aversion biases or not. The level of economic education is determined according to be the student of faculty of economic and administrative sciences or faculty of engineering. These two faculties are selected as a determinant of the economic education level. Because in faculty of economic and administrative sciences students have taken intensive economy and finance education, in contrast to faculty of engineering students. As mentioned by Rasool and Ullah (2020), there is expected to be a significant relation between endowment effect and loss aversion biases and the faculty in which students have received education. This study also aims to investigate the relation between financial knowledge and endowment effect and loss aversion biases. In this study taking a finance education is used as an indication of financial knowledge.

The data was collected with online survey method. The survey consists of two parts. The first part of the questionnaire contains 12 demographic questions about the students faculty and departments, stock market experience, taking an education on finance or not, financial information sources used, self assesment of their financial knowledge, getting financial consultancy service or not and basic demographic questions. The second part consists of choice tasks with hypothetical questions. The hypothetical questions consist of decision making problems each requiring a choice among a fixed number of alternatives. This method is specified as decision making experiments by Samuelson (1988). Kogler et al. (2013) compared the findings from the hypothetical and real experiment to determine whether the endowment effect could be predicted with hypothetical experiment as real experiment. They found that the endowment effect could be predicted correctly in a hypothetical experiment as real experiment (Kogler, Kühberger, &

Gilhofer, 2013, pp. 46-48; Samuelson, 1988, p. 14). Thus in the second part of the survey 6 choice tasks with hypothetical questions were used to measure endowment effect and lost aversion biases. The first two hypothetical questions are used to measure endowment effect biases. These questions are adapted from Samuelson ve Zeckhauser (1988). The second four hypothetical questions are used to measure loss aversion bias. The third and forth questions are adapted from Chira, Adams and Thornton (2008) and fifth and sixth questions are from Erev, Ert and Yechiam (2008) and Karle, Kirchsteige ve Peitz (2011). While making the choice task respondents are expected to imagine as they were in these conditions.

According to the data from Suleyman Demirel University Student Information System in April 2020; the population of this study constituted of 15586 students; 6845of them from the faculty of engineering and 8741 of them from the faculty of economic and administrative sciences students. From 15586 students 778 of them are participated this study. 541 of them are from faculty of economic and administrative sciences and 237 of them are from faculty of engineering. Büyüköztürk et al. (2014) mentioned that 375 sample size is sufficient in 5% sampling error and 95% confidence level (Büyüköztürk, Kılıç &Akgün, 2014, pp. 93-98). Thus 778 sample size is well above the 375 sample size. The faculty of economic and administrative sciences and the faculty of engineering are selected by extreme or deviant case sampling method taking inside the purposive sampling method. Than the online questionnaire was delivered to students by watts up groups and e mail. To analyse the responses from the participants the SPSS statistics program was used. The descriptive statistics were obtained. The crosstabs and chi square analyses were made to determinate whether is there a relation or not.

Analyses, Results and Discussion

As mentioned; the data were obtained from the 778 Süleyman Demirel University students in faculty of economic and administrative sciences and faculty of engineering. The demographic characteristics of the sample is shown in Table 1.

Table 1. Demographics of the Sample

N (778)		Number of Respondents	Percentage (%)
Gender	Female	514	66,1
	Male	264	33,9
Faculty	Economic and Administrative Sciences	541	69,8
	Engineering	237	30,2
Class Number	1	83	10,7
	2	137	17,6
	3	238	30,6
	4	229	29,4
	Prep	2	0,3
	Other	89	11,4
Marital Status	Married	34	4,3
	Single	744	95,7
Age	18	8	1,0
	19	33	4,2
	20	96	12,3
	21	178	22,8
	22	200	25,7
	23	117	15,0
	24	40	5,1
	25	34	4,4
	26	17	2,2
	27	9	1,2
	28 and Over	46	5,9

As summarized in Table 1; the sample is mostly composed of females (%66,1). Even though there is not too much difference on the student number of the two faculty; the response rate is greater from the faculty of economic and administrative students than the faculty of engineering students. Because of this reason the great majority of the sample is from the faculty of economic and administrative sciences (%69,8). %71,4 of the students are from third class and above

classes. The response as "other" to the class number question is corresponding to the students who have been in their department for five or over years. According to students age distribution; it could be said that the majority of the participants are between 18-24 interval as it is expected.

The questions as stock market experience, taking finance course or not, financial information sources used, self assesment of their financial knowledge, getting financial consultancy service or not are also asked based on the literature. The distribution of the responses is shown in Table 2.

Table. 2. Financial Experience, Knowledge, Consultancy and Capability

N(778)		Number of Respondents	Percentage (%)
Sources of Financial Information	Journal and Newspaper	10	1,3
	Internet and social media	655	84,2
	Television	78	10,0
	Other	35	4,5
Taking Finance Course	Yes	176	22,6
	No	602	77,4
Financial Consultancy	Yes	46	5,9
	No	732	94,1
Stock Market Experience	Yes	246	31,6
	No	532	68,4
Sufficient Financial Knowledge	Yes	293	37,7
	No	485	62,3

As summarized in Table 2; the majority of the students (%84,2) use internet and social media as a source of financial information. Secondly they use television (%10) and lastly they read journal and newspaper (%1,3). Students were asked whether have they taken finance course or not. The %77,4 of them have not taken finance course and %5,9 of them have taken financial consultancy on their financial decision. Also the responses showed that %31,6 of the students have stock market experience and %37,7 of them make their financial decisions based on the sufficient financial knowledge.

As mentioned above one of the aim of the study is to investigate whether is there any relation between the economic education and students endowment effect bias. In this study the economic education variable is represented by the faculty of the students. To investigate this relation cross tabs and chi square test were made. To make chi square test, the first and second questions were computed by SPSS program and the new variable was obtained. Then the responses to the computed variable were grouped as students who have endowment effect bias, who are endowment neutral and who don't have endowment effect biases. The cross tab on the distribution of students who have endowment effect bias, who are endowment neutral and who don't have endowment effect biases with respect to their faculty is shown in Table 3.

As summarized in Table 3; the smallest percentage (%3,6) of the students inside the faculty of economic and administrative sciences have endowment effect bias. Nearly the one third of them (%33,6) are endowment neutral and %63,3 of them don't have endowment bias with respect to responses on choice task hypothetical questions. Also the smallest percentage (%2,39) of the students in faculty of engineering have endowment effect bias, % 38,3 of them are endowment neutral and %59,2 of them don't have endowment effect bias. According to these percentages it could be said that in both of the two faculty the large part of the students don't have endowment effect bias. As a result of the chi square test; the p value (0, 372) of the pearson chi-square is higher than 0,05. So the null hypothesis as; students' endowment effect bias isn't associated with their faculty is supported. Therefore based on this finding it could be said that the students endowment effect bias isn't associated with economic education. Because the faculty of economic and administrative sciences students take economy education more than one semester but majority of the faculty of engineering students take only one semester. Also the content of the economic education taken by engineering students is not as intensive as the engineering students. But as shown in Table 3; the percentage of the student who have endowment effect biases is higher in faculty of economic and administrative sciences than faculty of engineering. Based on this finding it could be said that economic education could not be sufficient alone to explain the students rationality or endowment effect bias.

Table 3. Stundents Distribution With Respect to Faculty and Endowment Effect Bias

	Faculty of the Students		Total
	Economic and Administrative Sciences	**Engineering**	
Have Endowment Bias	22 (3.6%)	4 (2.39%)	26 (5.99%)
Endowment Neutral	202 (33.06%)	64 (38.3%)	266 (34.1%)
Don't have Endowment Bias	387 (63.3%)	99 (59.2%)	486 (62.4%)
Total	611 (78.5%)	167 (21.5%)	778 (100%)

Connected with economics education; relation between financial knowledge and endowment effect is evaluated by using chi square test method. The cross tab on the distribution of students who have endowment effect bias, who are endowment neutral and who don't have endowment effect biases with respect to take a finance education is shown in Table 4.

Table 4. Students Distribution With Respect to Finance Education and Endowment Effect Biases

	Finance Education		Total
	Yes	**No**	
Have Endowment Bias	3 (1.7%)	23 (3.8%)	26
Endowment Neutral	72 (41%)	194 (32.1%)	266
Don'thave Endowment Bias	100 (57%)	386 (64%)	486
Total	175 (22.5%)	603 (77.5%)	778

As shown in Table 4, %22,5 of the students have taken finance education conversely % 77,5 of them haven't taken. Among the students taken finance education the %1,7 have endowment effect bias, % 41 of them are endowment neutral and %57 of them don't have endowment effect bias. The endowment effect

bias also does not prevail among students who haven't taken finance education. So only %3,8 of them have endowment bias. %32,1 of them are endowment neutral and %64 don't have endowment bias.. To investigate whether is there any relation between finance education and endowment effect bias the chi squared test was made. As a result of the chi square test the p value of the pearson chi-square is equal to 0,05. So based on this value the clear judgement on the existence of the relation between finance education and endowment effect could not be reached. This study also investigated the relations between economics education and loss aversion and finance education and loss aversion. Rather than other behavioral biases the loss aversion bias is preferred to evaluate. Because, based on the prospect theory it could be said that the loss aversion bias is one of the main determinant of endowment effect bias (Jianbiao et al, 2009, pp. 545-546). So based on this judgement this study firstly investigate the relation between two biases. The cross tab on the distribution of students with respect to endowment effect and loss aversion biases is shown in Table 5.

Table 5. Students Distribution With Respect to Loss Aversion and Endowment Effect Biases

	Loss Aversion			**Total**
	Have Loss Aversion Bias	**Loss Neutral**	**Don't Have Loss Aversion Bias**	
Have Endowment Bias	26	0	0	26
Endowment Neutral	0	266	0	266
Don't HaveEndowment Bias	0	0	486	486
Total	26	266	486	778

As shown in Table 5. there is an equal number of students who have endowment effect bias and loss aversion bias. Also the number of students who are neutral and who don't have bias are equal in both of the two bias. The result of the chi square test supports the findings from the cross tabs as the p value is smaller than p= 0,05. This finding is similar to the relation mentioned in prospect theory. To evaluate the relation between the faculty of students and the loss aversion bias the chi square test was made. The cross tab on the distribution of students who have loss aversion bias, who loss neutral and who don't have loss aversion bias with respect to their faculty is shown in Table 6.

Table 6. Students Distribution With Respect to Faculty and Loss Aversion Bias

	Faculty of the Students		Total
	Economic and Administrative Sciences	**Engineering**	
Have Loss Aversion Bias	431 (70.5%)	120 (72%)	551 (71%)
Don't Have Loss Aversion Bias	180 (29.5%)	47 (28%)	227 (29%)
Total	611	167	778

According to Table 6 ; %71 (551) of the students have loss aversion bias. The 431 of them are from faculty of economic and administrative sciences and 120 of them are from faculty of engineering. The survey response rates and accordingly the number of students are not equal in these faculties. So the percentage of students having loss aversion bias were evaluated separately for both faculties. Accordingly the %70,5 (431) of the students from faculty of economic and administrative sciences and %72 of the students from faculty of engineering have loss aversion bias. Based on these percentage values, it could be said that for this sample the frequency of the loss aversion bias is nearly the same for two faculties.

So the proportion of the students who have loss aversion may be independent from its faculty. Based on the findings from chi square test (p=0,74); it could be said that loss aversion is independent from its faculty. In other words there is not any relation between the students faculty and loss aversion bias. Finally the cross tab on the distribution of students who have loss aversion bias and who don't have loss aversion bias with respect to take finance education is shown in Table 7.

Table 7. Students Distribution With Respect to Finance Education and Loss Aversion Biases

	Finance Education		Total
	Yes	**No**	
Have Loss Aversion Bias	112 (64%)	439 (72%)	551
Don't Have Loss Aversion Bias	63 (36%)	164 (28%)	227
Total	175	603	778

According to the numbers in Table 7; 175 students have taken and 603 students haven't taken finance education. %64 of the students who have taken and %72 of them who haven't taken finance education have loss aversion bias. Based on these percentage values; it could be said that for this sample the frequency of the loss aversion bias is higher among the students who have not taken finance education than the students have taken finance education. So the proportion of the students who have loss aversion may be associated with taking finance education. Based on the result of chi square test (p=0,024); the association is founded. As mentioned before the finance education is used as an indication of financial knowledge. So based on the finding from chi square test the relation between financial knowledge and loss aversion bias could be mentioned.

Discussion

Investors have to make their investment decisions under risk and ambiguity conditions. The fundamental principles of mainstream finance theory is based on the investor's rationality assumption. Due to this assumption the economic education and financial knowledge don't have any relation with decision making biases. But in real life the investors investment behaviors are not rational and being under the influence of their emotions and cognitive biases. These influences decrease the efficiency of investment behaviors and consequently market transactions. Behavioral finance theories mention the importance of considering the investors decision making biases and incorporating them into financial decision theories. Behavioral economists also mention the importance of economic and financial knowledge to make more rational finacial decisions. According to them the economy and finance education gain students the capability to control their emotions and instincts in their financial decisions and to think economically. The studies inside the literature have different findings about the importance of economic education and financial knowledge to make investors more rational. Some of them revealed that it could be possible to decrease decision making biases with economic education and financial knowledge. On the other hand some studies revealed the insufficiency of economic education and financial knowledge by theirself. According to the findings from this study, loss aversion could be decreased with finance education and implicitly with financial knowledge. Because the percentage of students having loss aversion bias is smaller among the students who have taken finance education than the students haven't taken finance education. Also the result of the chi square test shows the availability of the relation between

loss aversion and financial knowledge. This result could support implicitly the findings of the studies mentioned the negative effect of the financial knowledge on behavioral biases. On the other hand the study could not find any relation between financial knowledge and endowment effect bias. And also the relation between economics education - loss aversion and economic education- endowment effect biases could not be found . So the frequency of loss aversion and endowment effect biases are nearly the same for the faculty of engineering and faculty of economic and administrative sciences even the intensity of the economic education is different between two faculties. This supports the studies mentioned the economic education doesn't have sufficient effect on investors behavioral biases by itself. In this study the faculty variable was used as an indication of economic education and taking a finance course or not was used as an indication of financial knowledge. This may be the constraint of the study. On the following studies the financial knowledge and economic education could be measured by financial and economic knowledge questions. So by this way not only the quantity but also the quality of the education could be incorporated to the relation and the variables could be objectified.

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7

TESTING THE VALIDITY OF ABSOLUTE INCOME HYPOTHESIS THROUGH AVERAGE PROPENSITY TO CONSUME FOR TURKISH ECONOMY

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Introduction

Consumption expenditures are the most important element of aggregate demand in terms of utility maximization of individuals from the point of view of microeconomics and are one of the determinants of employment and national income from the point of view of macroeconomics (Tarı & Çalışkan, 2005, p. 1). The mechanisms that shape preferences behind consumption expenditures have been studied for a long time because understanding the nature of consumption expenditures is particularly important to predict the economic direction and to shape it. For example, if the absolute income hypothesis (AIH) is valid for an economy, the average propensity to consume (APC) will decrease while income is increasing. But if predictions of any of the relative income hypothesis (RIH), permanent income hypothesis (PIH), or life-cycle income hypothesis (LCH) are valid, then APC will remain constant and converge to a constant (Arı & Özcan, 2015; Tarı & Çalışkan, 2005). The practical consequence of that prediction related to APC will reveal itself in economic policies. If APC is not constant as Keynes claims, consumption and saving propensities could be shaped through economic policies. If APC is constant in the long term, economic policies will not have any influences on consumption expenditures in the long term (Arı & Özcan, 2015, p. 25). With the study of Kuznet (1946) being in the first place, some studies that

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tested the claim that APC is not constant concluded that APC reacts to increases in income in the short term but is constant in the long term.

Especially in the post-World War II period, the invalidity of Keynesian consumption function in the long term was demonstrated empirically in studies in which time-series analyses were performed. These results brought up important questions about the validity of the Keynesian consumption function. From that time, the contradiction between short- and long-term consumption functions has been an important issue that needed to be solved (Tarı & Çalışkan, 2005, p. 2). This contradiction is called a consumption puzzle. The consumption theories put forward after Keynes basically tended to solve this puzzle. RIH, PIH, and LCH are the theories that try to explain why APC does not change in the long term.

This study aims to test this unreconciled prediction for Turkey's economy by addressing the period between the years 2006 and 2019. Indeed, it is quite normal that a consensus cannot be reached. As shown in Campell & Mankiw (1987), the predictions of both AIH and PIH can be supported simultaneously in an economy. Because while some consumers consider their continuous income, some may be considering their current income (Campell & Mankiw, 1987, p. 4). While more than one consumption theory may be valid even in the same economy, it is quite normal that there are many differences in different economies and there is no consensus on which theory explains consumption expenditures better. This study aims to test that prediction by addressing the period between the years of 2006 and 2019. In the second part of the study, some brief information will be given about the consumption theories mentioned above. The next section contains the literature summary, while the fourth section presents the results of the application. The last section is devoted to the conclusion and discussion.

Consumption Theories

In the following sections, estimations for APC from the point of view of AIH, RIH, PIH, and LIH will be explained. After these, empirical literature will be argued shortly and passed on the application phase.

Absolute Income Hypothesis

John Maynard Keynes was the first to examine consumption expenditures from a macroeconomic standpoint. Aggregate demand had not been examined until

Keynes, so any theoretical approach had not yet been developed for consumption and investment, which are the factors of aggregate demand (Paya, 2007, p. 61). As a result, the term "Consumption Function" was used by Keynes for the first time in his famous book *The General Theory of Employment, Interest and Money* (Ahmed et. al., 2017, p. 26). According to Keynes, consumption expenditures are the function of disposable income. So, there is a positive relationship between consumption expenditures and disposable income. Disposable income is explained by Keynes as follows (Uysal, 2017, p. 185):

$$Y_d = Y + TR - T \quad (1)$$

In the equation, Y_d = disposable income, Y = income, TR = transfer expenditures, and T = taxes. According to Keynes, as an increase occurs in disposable income, it creates an increase in consumption expenditures. The mathematical explanation of the phrase is

$$C = C_0 + cY_d,\ c < 1 \quad (2)$$

In the equation, C = consumption, C_0 = autonomous consumption, c = marginal propensity of consumption (MPC), and Y_d = disposable income. According to Keynes, the MPC, which indicates the respond to change of income, is a value between 0 and 1. On the other hand, APC decreases while income increases (Keynes, 1936, p. 86–90). As a summary, consumption expenditure is only affected by current income. Individuals are independent from other individuals while making consumption expenditures. When an increase in income, marginal propensity of consumption is stable, average propensity of consumption decreases.

Relative Income Hypothesis

The basic claim of RIH developed by James Duesenberry is that the expenditure consumption is dependent not only on current income but also on the income of the environment in which the individuals are. The consumption expenditures of people are affected by the behaviors of people in their environment. So, people observe their environment while creating their consumption expenditures. In that case, consumption expenditures will depend not only on income but also on the relative condition of the people around. Duesenberry expressed this argument mathematically as follows:

$$y = a\log x + b \quad (3)$$

In the equation, *y* expresses the share of consumption expenditures from income, and x expresses the percentile position in the local income distribution (Duesenberry, 1967, p. 53).

According to Duesenberry, consumption expenditures depend on one more factor. The highest income earned in the past also affects today's consumption expenditures because people's consumption behaviors do not change easily. In particular, they do not want to change their consumption behavior in a negative way. In this case, today's consumption will be affected by the highest income level they have reached in the past (Ünsal, 2017, pp. 507–508). Based on this, Duesenberry described the APC as follows (Duesenberry, 1967, p. 89):

$$C_t/Y_\tau = \alpha + \beta(Y_t/Y_0) + u_t \quad (4)$$

In the equation, C_t/Y_τ is average consumption, Y_t is current income, and Y_0 is the highest income reached before. According to RIH, APC remains stable in time, unlike Keynes's claim.

Life-cycle Income Hypothesis

The main point of LCH is that people will retire around the age of 65 and will not want to lower their life standards after retirement. With this basic instinct, individuals save their income before retiring. This savings should be at a level where they can maintain their consumption level after retirement. Therefore, people want to consume at the same level throughout their lives. This situation is referred to in the literature as "consumption smoothing." Since people want to smooth their consumption, they make their consumption expenditures not according to their current income but according to the income they hope to earn during their employment. According to this assumption, the individual consumption function is as follows:

$$C = (W + RY)/T \quad (5)$$

$$C = (1/T)W + (R/T)Y \quad (6)$$

In this equation, C = consumption, W = wealth, R = how many years to work after the current time, Y = the income that is expected to be earned until retirement

from the current time, and T = the number of years planned to be experienced from the current date. What the equation implies is that personal consumption expenditures are a function of both the wealth assets owned and the total income calculated to earn during the work period. If the consumption function of all individuals in an economy can be expressed in this way, in other words, if individuals make consumption expenditures according to LCH, the consumption function of the whole economy can be expressed as follows:

$$C = \alpha W + \beta Y, \tag{7}$$

In this equation, α = the marginal propensity to consume in terms of wealth elements, and β = the marginal propensity to consume in terms of the total income planned to be earned throughout life (Mankiw, 2001, pp. 447–448). Therefore, LCH suggests that APC will remain stable over time.

Permanent Income Hypothesis

The PIH put forward by Milton Friedman in 1957 is based on the basic argument that people want to smooth their consumption level. Accordingly, people want to maintain a certain consumption level throughout their lives, and they do not want this consumption level to fluctuate because people make their consumption according to the income they think they will earn throughout their lives. The basic point where the theory, which takes its foundation from Fisher's intertemporal choice model, differs from LCH is that it separates income as permanent income and temporary income (Meghir, 2004). According to this, the income from which people determine their consumption levels is permanent income. Permanent income was defined by Friedman as "*On a theoretical level, income is generally defined as the amount a consumer unit could consume (or believes that it could) while maintaining its wealth intact.*" and Friedman built his consumption function on this definition (Friedman, 1957, p. 10). In addition to income, consumption is also divided to permanent and temporary consumption. Accordingly, Friedman described the consumption function as follows:

$$c_p = k(i,w,u)y_p, \tag{8}$$

$$y = y_p + y_t, \tag{9}$$

$$c = c_p + c_t \tag{10}$$

In the first equation, c_p = permanent consumption, i = interest rate, w = wealth, and u = private factors that affect consumption. In the second equation, y = income, y_p = permanent income, and y_t = temporary income. In the third equation, c = consumption, c_p = permanent consumption, and c_t = temporary consumption.

According to Friedman, there is no relationship between temporary elements and permanent elements (Friedman, 1957, p. 26). Consumption changes depending on permanent income, and permanent income is income that will be earned throughout life. Therefore, consumption in each period is a function of the same amount of income. As a result, MPC is equal to APC. Also, APC does not change depending on income level in the long term (Mankiw, 2001, p. 453).

As can be seen, theories other than AIH claim that APC will not change over time. However, when the literature is examined, it is seen that different empirical results have been reached. The next chapter presents the relevant literature in terms of Turkey's economy.

Literature

There are many studies examining the abovementioned consumption theories for Turkey's economy. Among these, there are studies that have reached conclusions in support of AIH, as well as those that have concluded against it. For example, Tarı and Çalışkan (2005) investigated the which theory explains better the consumption expenditures in Turkey at micro level. With this aim, they collected data through surveys from household in Kocaeli. According to the results obtained by the authors, who set models to test RIH and PIH, the most compatible results with the available data were obtained from the models that tested AIH. These findings are consistent with Bakırcı (1999) and Özer (2001) whose analysis methods and data collection methods are very similar. They also reached conclusions supporting AIH. These three studies analyzed cross-sectional data and found results that supported AIH in terms of short-term results. There is already a consensus regarding the short-term estimates of AIH. The main difference between AIH and the predictions of other theories is about the course of APC in the long run. However, in the studies analyzing Turkey's economy, the obtained results showed that AIH is valid in the long term too. For example, Sağlam (2006) estimated the Keynesian consumption function with data from 1982 to 2003. According to the results, the sum of the marginal propensity to consume and

marginal propensity to save is equal to one. At the same time, the sum of average propensity to consume and average propensity to save equals one. Based on these results, the author concluded that the AIH is valid for Turkey's economy. Bağlıtaş (2013) analyzed the period between 1998 and 2012 with quarterly data. It added dummy variables for the crises in 2001 and 2008 to its models, where it uses the variables of income, consumption expenditures, inflation and interest rates. In this study, rational expectations permanent income hypothesis (REPIH), PIH and random walk hypothesis (RWH) validity for Turkey's economy have been investigated. According to the results that author obtained, AIH is more suitable than the other theories for Turkey's economy. However, the results obtained by Unat (2018) were against AIH. This study, using cross-sectional data, the consumption function including the years 2005 to 2016 was estimated for Turkey. In the study, using the quantile regression method, consumption expenditure levels constituted the quantiles. According to the results the study in which AIH's theoretical infrastructure was used for analysis, the marginal Propensity to consume seems stable, according to the years and expenditure groups. However, APC appears unstable in both time dimension and cross section. Based on this, the author concluded that there are deficiencies in the approaches focusing only on income and consumption expenditures in the current period. The validity of the other mentioned theories for Turkey's economy was also tested. Pehlivan (2006) tested the life-cycle income hypothesis in Turkey's economy with quarterly data for the years between 1987 and 2005. The results obtained through the partial cointegration analyses supported the validity of PIH for Turkey's economy. The validity of PIH, which is similar to LCH, has been tested by Kargı (2014). Kargı (2014) tested PIH with quarterly data for the 2004 to 2012 period. For this purpose, he included the variables of GDP, inflation, GDP per capita, consumption expenditures, and economic situation expectations in the econometric model he established. According to Granger causality analyses, consumption is the Granger reason for GDP per capita, and expectations are the Granger reason for consumption. These results have been presented as conclusions in favor for PIH. On the other hand, there are studies with contradictory results. For example, Altunöz (2014) concluded that there is no significant relationship between consumption and income in his study based on the AIH. According to the results of variance decomposition analyses of the study in which the period between 1987 and 2012 was analyzed, 97% of the variance of the consumption is explained by itself, which means that it is explained by its past values. From this perspective, the study offers support for RWH. However, the results obtained by

Aras (2014) contradict the results of Altunöz (2014). Aras (2014) tested RWH, PIH, and inter-period consumption delay hypothesis. For this purpose, quarterly data between 1998 and 2010 were used. According to the results obtained by the author, PIH and RWH are not valid for Turkey's economy. However, inter-period consumption delay explains consumption expenditures in Turkey. The results of Sivri and Eryüzlü (2010) are similar to those of Aras (2014). Sivri and Eryüzlü (2010) tested Hall's rational expectations-life-cycle permanent income hypothesis for three subitems of expenditure in Turkey: food-drink, semi-durable and non-durable consumer goods, and service expenditures. In their study reached the conclusion that relate to income and expenditure items did not support the hypothesis of validity for Turkey.

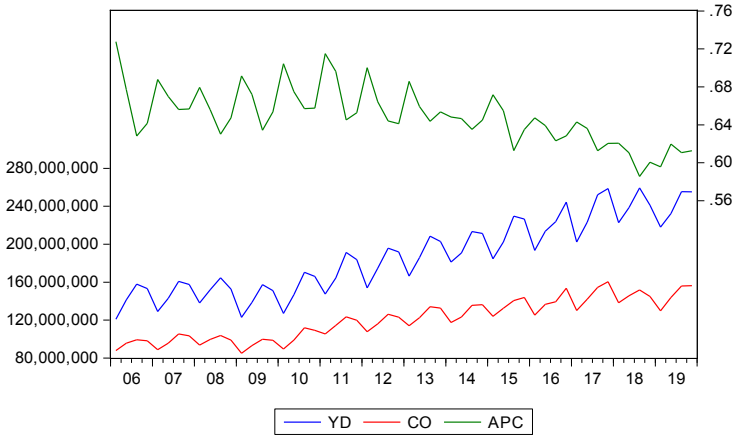
In this study, the validity of AIH will be tested through testing the stationary of the APC in time. With this approach, other studies have also tested the validity of AIH. While Sivri and Seven (2017) and Ceylan and Karaağaç (2019) have reached conclusions against AIH, Arı and Özcan (2015) have reached conclusions in favor of AIH. Sivri and Seven (2017) analyzed the stationarity of the APC series with quarterly data between 1987 and 2017. In that study, whether the APC contains a unit root or not has been investigated through seven kinds of unit root tests, with one of them taking into account structural break. The results achieved mostly indicated the stationary of the APC series. Therefore, the results the authors obtained do not support the AIH for Turkey in the period they addressed. Ceylan and Karaağaç (2019) investigated the validity of PIH for Turkey through APC. The authors reached the conclusion that the APC is stationary in the period between 1950 and 2014 as a result of the nonlinear unit root tests. It means APC does not get influenced by the economic shocks in the period considered. The results reached by Arı and Özcan (2015) support AIH. Arı and Özcan (2015) tested the stability of APC through seven kinds of unit root tests, with two of them not taking into account the structural break, four of them with structural break, and one of them nonlinear. The results that support the AIH were reached in that study, which addressed the period between 1955 and 2010.

Data and Method

The data used in this study covered the period between the first quarter of 2006 and the last quarter of 2019 and were gathered from an electronic data delivery system (EDDS). The frequencies of the data were quarterly. The reason for

beginning the analyses period from 2006 is the unavailability of some data related to the calculation of disposable income before this year. Essential series to calculate disposable income were also obtained from EDDS. Based on the definition of the theory, direct and indirect taxes were deducted from national income, and transfer expenditures were added to national income. APC was calculated using the consumption and disposable income series deflated with the 2003-based consumer price index (CPI) series. The charts of all series are shown below.

Figure 1: Consumption Expenditures, Disposable Income, and the Course of APC Against Time



In the chart, Yd represents disposable income, Co consumption expenditures, and APC the average propensity to consume. As can be easily seen from the chart, the series exhibit seasonality. In the study, AIH was tested through the stationarity of APC. For this reason, only the APC series was seasonally adjusted and unit root tests were performed to APC. The APC series was seasonally adjusted using the X-13 method.

Firstly, unit root tests that did not consider structural breaks were performed. ADF (Augmented Dickey-Fuller), Phillips-Perron, KPSS (Kwiatkowski-Phillips-Schmidt-Shin), ERS Point Optimal (Elliott-Rothenberg-Stock Point Optimal), and Ng-Perron unit root tests were performed, respectively. Later, following the literature (Sivri & Seven, 2017; Arı & Özcan, 2015), Zivot-Andrew and Lee Strazicich LM unit root tests were performed to consider possible structural breaks.

Unit root tests were applied with all their specifications in terms of whether they involve intercept and trend. The tests mentioned were frequently used in the literature. Therefore, mathematical and statistical procedures of the tests were not included in the content of this study. The results of the relevant tests are presented in the tables below. All results are interpreted by considering the %95 confidence interval.

Table 1: Results of ADF Unit Root Test

	Level*					
	Trend &Intercept		Intercept		None	
	Test Statistic	Critical Values	Test Statistic	Critical Values	Test Statistic	Critical Values
APC	-3.281948	%1 -4.133838 %5 -3.493692 %10 -3.175693	-1.462356	%1 -3.557472 %5 -2.916566 %10 -2.596116	-0.857185	%1 -2.608490 %5 -1.946996 %10 -1.612934
Null Hypothesis: APC has a unit root						

** The lag length is based on Akaike Information Criterion (AIC).*

According to the ADF test results, the APC series contains unit root at the level. Therefore, the ADF test results support the validity of the AIH.

Table 2: Results of Phillips-Perron Unit Root Test

	Level*					
	Trend &Intercept		Intercept		None	
	Test Statistic	Critical Values	Test Statistic	Critical Values	Test Statistic	Critical Values
APC	-3.421937	%1 -4.133838 %5 -3.493692 %10 -3.175693	-2.115606	%1 -3.555023 %5 -2.915522 %10 -2.595565	-1.376528	%1 -2.607686 %5 -1.946878 %10 -1.612999
Null Hypothesis: APC has a unit root						

** Spectral Estimation Method is Bartlett Kernel. Bandwidth is based on Newey-West.*

According to the Phillip-Perron test results, the APC series contains unit root at the level. Therefore, the Phillip-Perron test results also support the validity of the AIH.

Table 3: Results of KPSS Unit Root Test

	Level*			
	Trend &Intercept		Intercept	
	LM Statistic	Critical Values	LM Statistic	Critical Values
APC	0.197866	%1 0.216000 %5 0.146000 %10 0.119000	0.825363	%1 0.739000 %5 0.463000 %10 0.347000
Null Hypothesis: APC is stationary				

** Spectral Estimation Method is Bartlett Kernel. Bandwidth is based on Newey-West.*

KPSS unit root test results also support the AIH. Because it contains a unit root in terms of level values.

Table 4: Results of ERS Point Optimal Unit Root Test

	Level*			
	Trend &Intercept		Intercept	
	LM Statistic	Critical Values	LM Statistic	Critical Values
APC	7.105128	%1 4.224800 %5 5.710400 %10 6.772400	20.03016	%1 1.879600 %5 2.986800 %10 3.941200
Null Hypothesis: APC has a unit root				

** Spectral Estimation Method is AR Spectral OLS. The lag length is based on AIC.*

ERS Point Optimal unit root test results also support the AIH. Because, according to the results, APC series contains unit root in terms of level values.

Table 5: Results of Ng-Perron Unit Root Test

		Trend & Intercept					Intercept			
		MZa	MZt	MSB	MPT		MZa	MZt	MSB	MPT
Ng-Perron test statistics		-13.7684	-2.62242	0.19047	6.62627		-1.22400	-0.52279	0.42711	12.7436
Asymptotic critical values	1%	-23.8000	-3.42000	0.14300	4.03000	1%	-13.8000	-2.58000	0.17400	1.78000
	5%	-17.3000	-2.91000	0.16800	5.48000	5%	-8.10000	-1.98000	0.23300	3.17000
	10%	-14.2000	-2.62000	0.18500	6.67000	10%	-5.70000	-1.62000	0.27500	4.45000
Null Hypothesis: APC has a unit root										

** Spectral Estimation Method is AR Spectral OLS. The lag length is based on AIC.*

Ng-Perron unit root test results show that, like other tests, the APC series contains unit root with level values. With this result, the results of unit root tests which do not take into account structural break, supported the AIH. Below are the results of Zivot-Andrews, which takes into account one structural break, and then Lee Strazicich LM unit root tests, which take into account two structural breaks.

Table 6: Results of Zivot-Andrews Unit Root Test

		Model A	Model B	Model C
Zivot-Andrews Test Statistic		-5.331118	-6.038188	-5.897378
Critical Values	%1	-5.34	-4.80	-5.57
	%5	-4.93	-4.42	-5.08
	%10	-4.58	-4.11	-4.82
Break Date		2009Q4	2011Q2	2010Q3

In Zivot-Andrews Unit Root Test, Model A assumes break on the intercept, Model B on the trend, Model C on both. According to the results of the test, there is no unit root for all three models. So, the series is stationary. With these results, the existence of the Absolute Income Hypothesis is not supported. This result supports the Relative Income Hypothesis, Life-cycle Income Hypothesis and Permanent Income Hypothesis, which claims that the APC series will not change over time.

Table 7: Result of Lee Strazicich Unit Root Test

		APC (one break)	APC (two breaks)
Model A	Test Statistic	**-2.478717**	**-2.671768**
	Lag Length	4	4
	Break Dates	2010Q4	2010Q2, 2011Q1
	Critical Values (%1, %5, %10)	-4.084000, -3.487000, -3.185000	-4.073000, -3.563000, -3.296000
Model C	Test Statistic	**-2.364173**	**-5.428941**
	Lag Length	4	3
	Break Dates	2018Q2	2008Q3, 2011Q1
	Critical Values (%1, %5, %10)	-4.702426, -4.130553, -3.841809	-6.750000, -6.108000, -5.779000

Lee Strazicich LM unit root test was performed with A and C models that allow breaking at both intercept and trend. In both models, one and two breaks were allowed, respectively. As can be seen from the results, null hypotheses that stated that there is a unit root under structural break in all four models could not be rejected. Therefore, APC is not stationary in terms of level values. This result provides support for AIH.

According to the unit root test results, all tests that do not take into account structural break support the validity of AIH. While the results of Zivor-Andrews are against AIH, the results of the Lee Strazicich LM test are in favor of AIH.

Based on five of six kinds of unit root tests, it can be said the APC is not stationary. Hence, it can be said that this study obtained the results that support the validity of the AIH.

Conclusion

The validity of consumption theories continues to be discussed in the relevant literature. There are ongoing efforts to clarify the issue because of the importance of consumption expenditures for the economy.

In this study, the validity of the AIH was analyzed through the APC series. The obtained results support the validity of AIH. This means that APC can involve permanent shocks. From this point of view, it can be said that APC can be guided

by economic policies. Contrary to the theories that do not associate consumption to current income, the APC is not converging to a certain constant in Turkey's economy. Therefore, external shocks can change the direction of the APC. Supporting the validity of AIH means that consumers also have myopic features. Based on that, it can be claimed that when consumers make consumption expenditure in Turkey, they do not or cannot take into account their future income. Actually, as other theories claim, it is quite rational to expect people to make their current consumption expenditure considering their future income. If consumers have myopic characteristics, it may be because they are sure that their future economic situation will be better than today or they do not have enough income to calculate the future: maybe they are in an uncertainty. Investigating this possibility could be one of the topics of future studies.

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8

INTERGENERATION ANALYSIS OF THE RELATIONSHIP BETWEEN COMPULSIVE BUYING BEHAVIOR AND HEDONIC CONSUMPTION: A COMPARISON BETWEEN Y AND Z GENERATIONS

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Introduction

Changes in economic and social life cause significant and permanent changes in the behavior of individuals in the society. In this day and age when digitalization is rapidly progressing, changes in consumption preferences have started to show clearly both in the social and economic fields. In traditional consumer behavior models, consumers would buy products that need to reduce or eliminate the physiological or psychological tensions arising from the impulses activated by various reasons. In this purchasing process, consumers acted as rational decision makers and purchased products and services that provided them with the most benefit (satisfaction) with the least cost. In other words, these individuals were assumed to be "rational decision makers" (Altunışık & Çallı, 2004). However, many economic and social situations have shown that this assumption is not always valid. According to a situation based theoretically on behavioral economics, people are under the influence of many factors such as emotion, belief, and feeling at the decision stage. Therefore, contrary to the assumptions of the rational choice theory, people cannot always make consistent, level-headed, and accurate decisions. According to Tversky and Kahneman (1973), even the most important decisions are made on the basis of unpredictable possibilities. How consumers

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evaluate their shopping experience differs because of this. In other words, defining shopping only as an "effort to get products" will not be sufficient to explain the total value of the experience (Babin, Darden & Griffin, 1994). To fully understand the shopping activity of individuals, we need to consider both material costs and emotional costs. This is because besides utilitarian functions focused on traditional economics, they can also have symbolic meanings, such as joy, sociability, and elegance (Holbrook & Hirschman, 1982). According to Bloch and Bruce (1984), the shopping experience is both a task and the sum of the emotions that act with this experience. In addition, it is emphasized that individuals evaluate things both emotionally and beneficially during shopping (Batra & Ahtola, 1990).

Today, both the emotional and functional dimensions of the consumption phenomenon are handled frequently. When the literature is analyzed, it shows that consumers shop in different ways and styles during the purchasing process (Faber et al., 1987; Rook, 1987; Okutan et al., 2013). Many factors cause this difference. The consumption preferences reaching a different dimension with changing time and factors cause disproportional and negative deviations in consumption behavior. Because of this situation, it is seen that many people worldwide suffer from excessive shopping and are in financial/moral damage (Eren et al., 2012). Specifically, factors such as technological changes, Internet addiction, and celebrities seen as role models in social media positively affect these consumption habits (Yakın & Aytekin, 2019; Karahan & Söylemez, 2019). Two of the abovementioned types of shopping are compulsive and hedonic consumption. According to Levy (1959), "people buy things not only for what they can do, but also for what they mean." In the buying action, what the product represents refers to hedonic consumption rather than what it is (Batra & Athola, 1991). Compulsive buying represents an individual's unstoppable, sudden, and chronic impulse for buying action to escape from negative emotions (Valence et al., 1988; O'Guinn & Faber, 1989). Many recent studies show the effect of hedonist and compulsive emotions on consumption. This effect is thought to become intertwined day by day because of reasons such as developing online shopping systems and convenience in payment systems (Park & Burns, 2005; Horvath & Adıgüzel, 2018). The basis of this idea is that the hedonic and compulsive values of the Z generation, also called the digital generation, are higher than the previous generation Y in terms of consumption satisfaction (Orel & Kaçmaz, 2019; Karahan & Söylemez, 2019). People belonging to generation Z are seen as more social, skeptical, and knowledgeable and having excessive consumer characteristics in intergenerational

evaluations (Altuntuğ, 2012). On the other hand, people belonging to generation Y conduct detailed research both in the store and online before deciding to buy a product or service. Moreover, this group decides to make a purchase by reading the brands' websites as well as other people's comments on blogs and asking their friends' opinions (Sarı et al., 2016). Because of these features, there are differences in perception of consumption among generations. This study explores the theoretical frameworks of hedonic and compulsive consumption behavior. In addition, this study focuses on the differentiation of the relationship between these two consumption behaviors intergeneration.

Conceptual Framework

To better understand the hypotheses of the study, it would be useful to consider the framework of compulsive buying and hedonic consumption. For this reason, these consumption behaviors are initially explained.

- **Hedonic Consumption**

While there was controversy about the symbolic aspects of products throughout the 1950s, the focus was on the relationship between consumers' lifestyles and the products they bought in the 1960s. In the 1970s, researchers began to conduct studies on the aesthetic, intangible and subjective aspects of consumption. These factors are called hedonic consumption. They are emotional stimuli that direct consumers to hedonic consumption (Hirschman & Holbrook, 1982; Levy 1959; Babin & Attaway, 2000). In other words, the success of a product means going in the same direction as the aesthetic in its nature (Holbrook & Hirschman, 1982). Although hedonic consumption is going in the same direction with utilitarian consumption motive, "task" is "fun" in hedonic consumption. Hedonic consumption is also related to hedonic satisfaction, such as sensory stimulation and fantasy experiences (Babin, Darden & Griffin, 1994). Hedonic consumption is carried out with motivations such as seeking adventure, socializing and connecting with other people, blowing off steam, keeping up with new trends and fashion, making others happy and being happy with discounts and bargains (Arnold & Raynolds, 2003). In addition to these motivations, competition of social status among individuals, the desire to look like someone else, self-acceptance in society, and the feeling of being admired are also important (Eken & Yazıcı, 2015). It is said that the concept of hedonic consumption was first mentioned in the book *"The Romantic Ethic and the Spirit of Modern Consumerism"* published by

Colin Campbell in 1987. Campbell stated that in the 18th century, people were influenced by love novels and turned to consumption under the influence of romantic emotions and motivations (Fırat & Aydın, 2016).

- **Compulsive Buying**

The first publication about "compulsion" was made by Esquirol in 1838. However, a clearer definition was first introduced by Schneider in 1925 (Carr, 1974). Afterward, many researchers have expanded this definition and developed new approaches. However, when the literature is analyzed, Faber, O'Guinn, and Krych (1987) conducted the first study to identify compulsive buying and to reveal its initial findings and address the different aspects of individuals suffering from this disorder. The primary studies (Faber & O'Guinn, 1988; O'Guinn & Faber 1989; Valence, d'Astous & Fourtier, 1988; d'Astous & Tremblay 1989; Hirschman, 1992) on this area have been shaped by these findings. In its most general definition, compulsive buying behavior is defined as over-purchasing that is often irresistible, chronic, and impulsive, and causes personal and family problems as well as financial damage (Faber & O'Guinn, 1992; McElroy et al, 1994; Lejoyeux et al., 1996). The reasons that trigger compulsive buying behavior are low self-esteem, anxiety disorder, the desire to draw attention, psychological tension, physical appearance disorders, escape from negative emotions, and impulse control disorders. In addition, compulsive buyers are in debt because of these uncontrollable behaviors, and this causes significant diseases, especially depression (Krueger, 1988, Valence et al., 1988, O'Guinn & Faber 1989; Edwards, 1993; Yurchisin & Johnson, 2004). However, compulsive buyers often feel regret after shopping because they buy products they do not need (McElroy et al., 1994; Cho et al., 1994). Compulsive buying behavior may differ from country to country; however, its prevalence is generally known to be between 1.1% and 16% (Lejoyeux et al., 1996; Koran et al., 2006). It is especially more common in women (Black, 2001; Park & Burns, 2005; Dittmar, 2005).

Literature View

Consumers who often shop obsessively and with hedonic values have led many consumer behavior researchers to investigate compulsive buying behavior. The increasing trend of digitalization has especially brought the "consumption" phenomenon to different dimensions. The fact that the new generation, called Z generation, identify themselves with post-modern marketing practices, the development

of online shopping platforms and the products and brands used by celebrities seen as role models in social media, cause these developments (Karahan & Söylemez, 2019: 1964). In addition, the concept of "materialism" has started to show itself more and increased the attractiveness of compulsive buying and hedonic consumption. Materialism occurs when individuals put their own assets at the center of their lives and turn them into a symbol of status and happiness. This concept is related to both hedonic consumption and compulsive buying behavior (Yurchisin & Johnson, 2004; Dittmar, 2005; Chan & Prendergast, 2007). In addition, according to Wolfinbarger and Gilly (2001), consumers shop for both hedonic and utilitarian reasons. Hedonic consumers, however, are more prone to compulsive buying behavior (Bridges & Florsheim, 2007). Nowadays, buying behavior is shifting toward hedonic products that are increasingly psychologically motivating rather than utilitarian products. However, since hedonic consumption has a positive effect on compulsive buying behavior (Tokgöz, 2018), it is expected that compulsive buying behavior will be triggered more by hedonic consumption.

Research

This study, based on the theoretical framework and literature, is aimed at detecting intergenerational consumption differences. The questionnaires used in the study were obtained online. In line with the literature, those born between 1980 and 1994 were included in the research to represent generation Y while those born in 1995 and after to represent generation Z (Zemke et al., 2000; Levickaitė, 2010; Seemiller & Grace, 2017; Cilliers, 2017; Mohr & Mohr, 2017). The scales used to determine the hedonic consumption and compulsive consumption trends were from the scales developed by Babin, Darden, and Griffin (1994) and Edwards (1993) and translated into Turkish. The hedonic purchasing scale consists of 11 items, and the compulsive purchasing scale consists of 13 items. Power analysis was done to determine the number of observations of which the sample consists. As a result of the analysis with the GPower program, it was observed that the number of observations should be 172, consisting of 86 observations in both groups at a level of 95% confidence, 90% power and moderate effect size (d = 0.5). The observations that were expected to reflect the expected properties of the Y and Z generations were selected from the 172 surveys. For this purpose, 86 observations included in generation Y consisted of the first 86 observations closest to 1980 as of their birth dates. The 86 observations constituting the Z generation consisted

of 86 observations closest to 2004, which was the extreme birth date based on our observations. The basic hypotheses of the study are as follows:

H_1: There is a significant relationship between hedonic consumption tendency and compulsive consumption tendency.

H_2: The relationship between hedonic consumption tendency and compulsive consumption tendency is stronger in generation Z than generation Y.

To make an accurate analysis with the scales used in the study, the internal consistency of the scales should be tested first. To measure the internal consistency of the scales, Cronbach's alpha statistics were calculated and presented in Table 1.

Table 1: Reliability Analysis Results Related to Scale and Sub-Dimensions

Scales	**Cronbach's Alpha**
Hedonic Shopping Scale	0,9
Compulsive Buying Scale	0,795

As can be seen from Table 1, Cronbach's alpha statistics of both scales are above 0.7, which is generally accepted as reliable (Kılıç, 2016). Of the observations in the sample, 57.6% are women, and 42.4% are men. While the birth dates of the observations that make up the Y generation are between 1980 and 1988, the birth dates of the observations forming the Z generation are between 1999 and 2004. Descriptive statistics are presented in Table 2.

Table 2: Descriptive Statistics on the Demographic Features of the Participants in the Research

Variables		**Frequency (n)**	**Per. (%)**
Gender	Female	99	57.6
	Male	73	42.4
Generation	Y Gen.	86	50
	Z Gen.	86	50

In the study, Hedonic Shopping Scale and Compulsive Buying Scale were used. Average and standard deviation information of the items in the scales used in the study are given in Table 3.

Table 3: Descriptive Statistics of the Items in the Scales

	Mean	**Sd.**
Hedonic Shopping Scale	2.990	.814
1. This shopping trip was truly a joy.	3.366	1.232
2. I continued to shop, not because I had to, but because I wanted you.	3.116	1.163
3. This shopping trip truly felt like an escape.	2.755	1.107
4. Compared to other things I could have done, the time spent shopping was truly enjoyable.	2.546	1.171
5. I enjoyed being immersed in exciting new products.	3.686	.982
6. I enjoyed this shopping trip for its own sake, not just for the items I may have purchased.	3.087	1.208
7. I had a good time because I was able to act on the "spur-of-the- moment".	2.912	1.123
8. During the trip, I felt the excitement of the hunt.	3.215	1.142
9. While shopping, I was able to forget my problems.	2.715	1.226
10. While shopping, I felt a sense of adventure.	2.383	1.061
11. This shopping trip was not a very nice time out.	3.110	1.239
Compulsive Buying Scale	2.568	.594
12. I feel driven to shop and spend, even when I don't have the time or the money.	1.936	1.060
13. R I get little or no pleasure from shopping.	3.255	1.215
14. R I hate to go shopping.	3.767	1.181
15. I go on buying binges.	1.965	.966
16. I feel "high" when I go on a buying spree.	3.093	1.195
17. I buy things even when I don't need anything.	2.366	1.134
18. I go on a buying binge when I'm upset, disappointed, depressed, or angry.	2.348	1.131
19. I worry about my spending habits but still go out and shop and spend money.	2.220	1.064
20. I feel anxious after I go on a buying binge.	3.238	1.106
21. I buy things even though I cannot afford them.	1.726	.892
22. I feel guilty or ashamed after I go on a buying binge.	3.087	1.183
23. I buy things I don't need or won't use.	2.098	1.052
24. I sometimes feel compelled to go shopping.	2.284	1.131

Before proceeding to the testing of the hypotheses, it is necessary to determine whether the series to be analyzed follow a normal distribution. If the series are

normally distributed, parametric tests will be used, but if not normally distributed, non-parametric tests will be used. The results of the Kolmogorov-Smirnov and Shapiro-Wilk tests related to the normal distribution are given in Table 4.

Table 4: Results of the Kolmogorov-Smirnov Shapiro-Wilk Tests

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df.	Sig.	Statistic	df.	Sig.
Hedonic Shopping Scale	0.055	172	0.200	0.987	172	0.112
Compulsive Buying Scale	0.060	172	0.200	0.988	172	0.168

Table 5 shows that the values of both scales have normal distribution. According to the results of both tests, empty hypotheses stating that the series have normal distribution cannot be rejected. Therefore, it is concluded that the series have normal distribution. After this point, the H_1 and H_2 hypotheses of the study can be tested. Table 5 shows the Pearson correlation test results performed for testing the hypotheses.

Table 5: Pearson Correlation Test Results for the Relationship Between Hedonic and Compulsive Buying Behaviors

		Hedonic Consumption	Compulsive Buying
Y Gen.	**Hedonic Consumption le**		0.698*
	Compulsive Buying		
		Hedonic Consumption	Compulsive Buying
Z Gen.	**Hedonic Consumption le**		0.757*
	Compulsive Buying		

** Significant at the 0.01 level.*

According to the results presented in Table 5, there is a significant relationship between hedonic consumption and compulsive buying behaviors in both Y and Z generations, with a 99% confidence level. In this case, the H1 hypothesis is supported. In addition, while that relationship in the Y generation has a positive direction and is at the level of 69.8%, in Z generation that relationship again has a positive direction and is at the level of 75.7%. The correlation coefficient between 0 and 0.30 is not related, between 0.31 and 0.49 is a weak relationship,

between 0.50 and 0.69 is a medium relationship, and between 0.70 and 1.00 high (strong) indicates the existence of a relationship (Gürbüz & Şahin, 2017). According to this result, while there is a positive and medium but close to a strong level of relationship at the level of 69.8% between compulsive buying behavior and hedonic consumption in the Y generation, this rate raises to 75.7%, which means a strong relationship in the Z generation.

In this way, the H_2 hypothesis is also supported.

Conclusion

Today, changes in consumption habits have begun to show more clearly because of the development of technology, extensive use of the Internet, and strengthening perception of materialism. Generation Z, which is called the digital belt, is more intertwined with technology than previous generations, causing excessive consumption in this group. Therefore, many academic studies have tended to try to explain this abnormal consumption behavior. Compulsive buying and hedonic consumption behaviors that are the subject of the study are just two of these consumption models. In the hypotheses based on the consumption characteristics of the Y and Z generations, it was concluded that the relationship between compulsive buying behavior and hedonic consumption showed itself differently between generations. The relationship between compulsive buying behavior and hedonic consumption is stronger in generation Z (75.7%) than generation Y (69.8%). This indicates that generations have different motivations when making buying decisions. In addition, this study may shed light on other studies that investigate whether this relationship between generations will change according to factors such as gender and income. Depending on the results of the study, the relationship between hedonic consumption and compulsive buying behavior seems to be getting stronger as we come to the present day. Thanks to this result, it can be said that it is important to prevent the negative aspects that may arise from the reflection of this strengthening relationship in the next generation.

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SECTION II

MACROECONOMICS

9

CONFIDENCE BASED ECONOMY OR ECONOMY BASED CONFIDENCE: TURKEY 2004-2017

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Confidence in Economics

Apart from situation assessment in economic activities, future projections and decision-making mechanisms of economic authorities are substantially important in terms of explaining economic fluctuations because future expectations of economic authorities determine the trend of economic activities while current situation of economic activities shapes expectations of economic authorities.

In this regard, the literature utilizes from various indexes based on macroeconomic data exhibiting certain covariance. Since these indexes degrade multiple indicators from different economic activity branches into a single variable, they illustrate precious pre-insight about economic activities. Among these indexes, Composite Leading Indicators (CLI), Consumer Confidence Index (CCI) and Business Confidence Index (BCI) are included.

In the economic literature, confidence is an under-recognized concept due to the associated diffulty in measuring. In this sense, analysis studies on business cycles employ data acquired from business and consumer surveys as a proxy for confidence. "Confidence" and "expectations" are referred by indexes compiled from manufacturing projections maintained by economic agents before any commercial activity as well as new employment records, revisions on orders and purchases.

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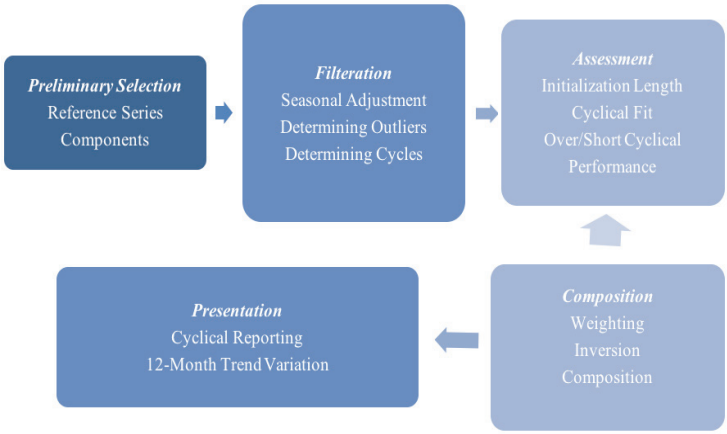
Composite Leading Indicators (CLI) indicating the potential variation of economic activities around its long-term potential is an index created for determining leading signals of business cycles. This leading indicator reflects short term economic activities in quantitative form rather than qualitative. The joint work between the OECD and Central Bank of The Republic of Turkey (CBRT) was launched in 2002 in order to determine the fluctuations in Turkish economy. The OECD Cyclical analysis and composite indicators system (Figure 1) are fundamentally consists of five stages (Atabek and Coşar, 2012; Demirhan, 2014).

Figure 1. OECD Cyclical Analysis and Composite Indicators System



Source: *Atabek and Coşar (2012), Demirhan (2014).*

These stages:

- The first stage (pre-selection stage) includes selection of the variable that would be used as the indicator of economic activity reference series. This variable is usually chosen as the Industrial Production Index.
- Within the scope of the second stage, called filtration, short term monthly indicators are chosen to represent different activity branches of the economy.
- The third stage is the assessment phase in which short term indicators' information content and cyclical performances of the reference series are investigated through various statistical tools as well as the series that need to be

included in the composite index. These variables include electricity production and sales, weighted government bond interest rate, intermediate goods imports, inventories of finished goods, overall labor force, new orders from the domestic and foreign market contained by the CBRT Economical Direction Survey.

- The composition stage includes determination of weights of variables to be contained within the Composite Leading Indicators.
- The final stage includes presentation of the created Composite Leading Indicators within various cyclical forms.

The Consumer Confidence Index is an indicator of future changes in household consumption and savings with respect to the expectations with the financial circumstances, general economy status, unemployment rates and saving capacities. The index value over 100 is regarded as an indicator of elevated consumer confidence level about future economic status. This situation urges consumers to make fewer saving and to tend to make more spending for large purchases along the next 12-month period. On the other hand, the index value below 100 refers pessimistic consumer approach toward economy as a result of the recent developments; and probably consumers would tend to make greater saving and less spending. In sum, the Consumer Confidence Index is the one reflecting household expectations under three subjects of financial status, general economy and spending-saving tendencies.

The Business Confidence Index is the one designated to estimate the direction of economic activities; and provides an insight about future developments based on industry-wide surveys on manufacturing, order, and final good inventories. The index is utilized to monitor output growth and to estimate significant milestones in economic activities. The index value over 100 is considered an increase in business confidence level soon while the opposite implies the pessimism with the business performance.

According to the analyses on consumer and business confidence indicators, it is possible to present factors effective on covariance that may arise between economic activities and confidence as below:

- Unexpected significant variations in macroeconomic indicators such as interest rates, currencies and inflation rates,

- Variations in levels of employment, unemployment, and business investment tendencies,
- Variations in relative prices of nondiscretionary goods and services (oil, health, education, and public services),
- Significant economic and/or financial shocks like the 2008/2009 Financial crisis and 2010-2011 Eurozone debt crisis, and
- Major deviations from monetary and financial policies (substantial structural spending cuts, significant increase or cuts at tax rates, and evident increase or decrease at central bank interest rates, etc.).

The present study aims to investigate the conjugate interactive relationship between the Composite Leading Indicators Index, the precursor of business cycles in Turkish economy, and confidence indicator indexes (Business Confidence Index and Consumer Confidence Index) reflecting future expectations of the economic agents?. Further sections of this study were structured as follows: the second chapter draws the significance of the study as the third summarizes the relevant literature and their prominent findings. The fourth chapter explains econometric method and findings. Finally, the result section interprets the findings obtained in the light of current economic circumstance of Turkey.

A Theoretical Background for Confidence and Real Activity Relationship

According the review of the relevant literature, it could be realized that these studies are predominantly concentrated on how to create Composite Leading Indicators, their sub-indicator components, their performance in interpreting variations with the GDPs as well as their correlation with the equity prices such as stocks etc.

Santero and Westerlund (1996), for some selected countries (the US, Japan, Germany, France, Italy, the GB, Canada, Belgium, Denmark, Holland and Spain), investigate whether business and consumer confidence indicators could be used in estimation of business cycles and output amounts through of the correlation and Granger causality analyses. In this scope, relationships between the Business Confidence Index (BCI) and the Consumer Confidence Index (CCI), GDP, Industrial Production Index, private industry consumption and investment spendings, two major components of overall demand, are investigated. The researchers report that even though confidence indexes vary from one country to another,

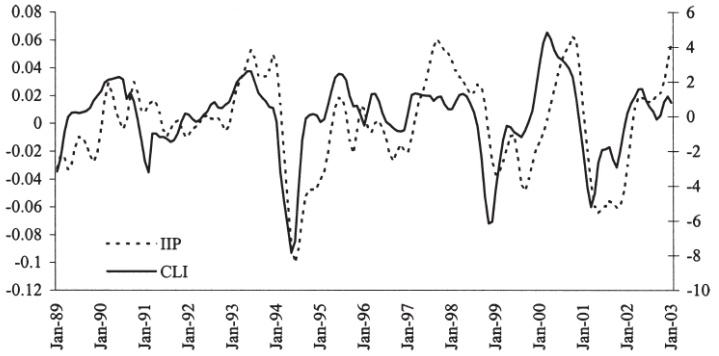
they bear significant information for estimation of their respective economic status. The authors also conclude that consumer confidence indicators are less useful in economic analysis with respect to real industry confidence indicators since its relationship with the production operations is relatively insignificant.

In order to reveal the relationship between the confidence indicators, a determinant of business cycles, and composite indicators, Nilsson (2000) studies the relationship between the EU's Economic Sentiment Indicators (ESI) and OECD's Composite Leading Indicators (CLI). In this study, Industrial Production Index, Manufacturing Industry Confidence Index, Consumer Confidence Index and Stock Price Index are employed as Economic Sentiment Indicator. Except Germany, for all EU countries included into the study, a strong correlation is reported between the Economic Sentiment Indicators and the Composite Leading Indicators; and these Economic Sentiment Indicators are found to be a significant leading indicator.

Utaka (2003) studies whether the consumer confidence is effective on the Japanese economy using the VAR analysis method in an empirical approach. The researcher utilizes from the Consumer Confidence Index to represent the consumer confidence while the real economy is represented by various indicators such as GDP, Composite Leading Indicator, and Industrial Production Index. It is reported that consumer confidence is not found to be significantly effective on GDP based on the analyses on quarterly and monthly data series, while no any relationship is found with the annual data. The author concludes that consumer confidence is only effective on short term economic variations.

Atabek, Coşar and Şahinöz (2005) created a composite leading indicator (CLI) in order to yield precursor signals for milestone points of economic activities in Turkey in terms of their narrowing or expansion. To that end, the authors selected the Industrial Production Index (IIP) and some relevant supply-side indicators (capacity utilization ratio, production rate of certain industrial goods, import, supply-sided expectations etc.), demand-sided indicators (consumer price index, export, sales rates of certain industry goods, living expenses of employees, demand-sided expectations etc.), and policy indicators (currencies, real interest rate, and some monetary data etc.). It is reported by the study that created CLI, shown in Figure 2, is found to be representing Turkey's economic activities significantly successful.

Figure 2. Cyclical Pattern of IIP and Composite Leading Indicator (CLI)



Source: *Atabek, Coşar and Şahinöz (2005)*

In their study focused on the performance of leading indicators in estimation of business cycles solely for Germany, Christian and Schumacher (2005) employ the causality analysis and report the significant correlation between leading indicators and business cycles (Christian and Schumacher, 2005).

Karl Taylor and Robert McNabb (2007) investigate the performance of consumer and real industry confidence indicators in estimation of economic activity for four European countries (the GB, France, Italy and Holland) from 1983 to 1998 based on quarterly data. In the study, the authors use the cross-correlation analysis to investigate whether there is significant relationship between confidence indicators and business cycles. Following determination of the significant correlation, the authors employ the Probit method in order to find out the performance of confidence indicators in estimation of break points in output. Afterwards, the VAR method is utilized for investigation of impulse-response function of GDP on confidence indicators to determine the performance of confidence indicators in estimation of output. According to the reported results based on single countries, both consumer and real industry confidence indicators are found to be strong estimators of business cycles' break points. However, when obtained findings are considered inclusively for all studied countries, especially the Consumer Confidence Index is reported as more useful in estimation of business cycles.

Yamada, Nagata and Honda (2010) compare composite leading indicator maintained by the Japanese Government with the Composite Leading Indicator maintained by the OECD for the member countries from 1973 through 2007 so as to determine the break points of business cycles utiled in estimation of business cycles in Japan. The researchers conclude in their study that the break points of business cycles in Japan are almost identical in both indexes.

Hacıhasanoğlu and Soytaş (2011), in their study on Turkey for 2001:07 - 2010:02, investigate the relationship between the composite leading indicators and stock index of 6 different sub-industries. The authors report that positive changes in CLIs result in positive and significant change in all sub-industry classes in the long run except defense and service industries. Additionally, short-term macroeconomic shocks result in positive impact on all stock indexes of related industries, but this impact disappear along the following year.

Arısoy (2012) studies Turkey for the period of 2005:1-2012:1 by employing the VAR method. The researcher investigates confidence indexes that reflect expectations of consumers and manufacturers about the future of the economy (Consumer Confidence Index, Real Industry Confidence Index, respectively) and general economic indicators such as stock market, consumer spendings and employment. In this study, it is reported that Consumer Confidence Index is found to be effective on consumer spendings, while Real Industry Confidence Index is effective on both Industrial Production Index and stock index. Accordingly, it is concluded that Consumer Confidence Index is steering people's consumption whereas real industry confidence index steers manufacturers' production and investment behaviors and their expectations.

Gülhan, Kaya and Güngör (2012), in the study employing time series, panel data, panel co-integration analyses for 18 countries (the GB, Spain, Holland, Italy, Germany, France, Belgium, Austria, Turkey, Korea, Japan, Indonesia, India, China, the US, Canada, Mexico, Brasil) for the period of 2000:01–2010:12, investigate the relationship between the Composite Leading Indicators and stock index. In their conclusion, the authors report that except Germany, Composite Leading Indicators are found to be effective on stock index; and these two variables are correlated on the long term for all countries.

Hyeon-seung H. (2012) employs nonlinear Granger causality test for Austuralia, Canada, France, Germany, Italy, Japan, South Korea, New Zealand, the GB and

the US in order to measure the performance of Composite Leading Index (CLI) used future variations in economic activities in as an estimator of the GDP. Obtained results reveal that conventional linear causality test results differ significantly; and CLI is suggested as an appropriate estimator for GDP growth.

Tule, Ajilore and Ebuh (2015) employ composite leading indicators method in order to create a composite index by the leading indicators of Nigerian unemployment rate. The authors, first determined variables that could be correlated with unemployment and could include various dimensions of economic activities by means of cross-correlation structures and Granger Causality analysis. After the variables are determined, based on the results of cross-correlation and Granger Causality estimations, a Composite Leading Indicators is proposed. Obtained results from both cross-corelation and Granger causality-based composite index analyses reveal that break points of the unemployment in Nigeria could be traced for 7 years (2008–14) accurately.

Kılıç and Çankaya (2016) apply the FAVAR method to the US for the period of 1994:01-2013:07 in order to analyze effects of consumer confidence on economic activity. In their study, the authors consider the Consumer Confidence Index (CCI) and an index composed of 72 macroeconomic variables that represent economic activities in the US. Especially, in terms of industry manufacturing and consumption spendings, a significant correlation is reported between consumer confidence and economic activities.

Empirical Analysis of the Relationship Between Confidence Indices and Real Activity in Turkey

From the point of Hatemi'j (2008), Gregory and Hansen (1996a, 1996b) developed a new co-integration method allowing two structural breaks in macroeconomic time series. In macroeconomic variables, there are numbers of factors causing structural breaks when the concerned period is relatively extensive. These factors are introduced as policy changes, changes in preferences of economic actors, technological advancements, changes in demographical structures, natural disasters, wars, and economic crises (Hatemi'j, 2008).

The two-structural break co-integration method suggested by Hatemi'j (2008) is explained by the standard co-integration regression equation below:

$$y_t = \alpha + \beta' x_t + u_t, \qquad t = 1,2,\dots,n. \tag{1}$$

Whereas, y_t denotes dependent variable; x_t denotes independent variable vector; α constant term; β denotes slope vector indicating coefficient of independent variable; and t denotes time. According to Engle and Granger (1987), error term $I(0)$ is required to be $y(t) \sim I(1) and\ x(t) \sim I(1)$ so that Equation (1) to allow co-integration relationship. From this point, standard ADF unit root test, constant term, trend term, and unit root test applied for constant and trend could be employed for analyses. However, Gregory and Hansen (1996a), in case there is single structural break with the considered co-integration equation, propound that conventional co-integration methods would not be adequate. Gregory and Hansen (1996a) developed conventional co-integration test statistics under existence of a single shift regime which would allow a structural break with the assessed data set on an unknown date. Besides, in case of two structural breaks occurs with the co-integration equation examined for the studied sampling period, Gregory-Hansen's single-structural break co-integration method may not be appropriate. Hence, Hatemi'j (2008) suggested two-structural break co-integration method against the circumstances with no single structural break. The co-integration equation taken into calculation when there are two structural breaks in both constant term and in slope is given below:

$$y_t = \alpha_0 + \alpha_1 D_{1t} + \alpha_2 D_{2t} + \beta_0 x_{1t} + \beta_1 D_{1t} x_{1t} + \beta_2 D_{2t} x_{1t} + \gamma_0 x_{2t} + \gamma_1 D_{1t} x_{2t} + \gamma_2 D_{2t} x_{2t} + u_t \tag{2}$$

Where, $\propto_0$ denotes constant term when there is no structural break; $\propto_1 \ and \ \propto_2$ denote the effect of the first and second structural break points on constant term; β_0 and γ_0 denote slopes when there is no structural break; $\beta_1, \beta_2, \gamma_1 \ and \ \gamma_2$ denote the effect of the first and second structural break points on slope coefficient. $D_{1t} and\ D_{2t}$ are dummy variables and described as below:

$$D_{1t} = \begin{cases} 0 \ if\ t \le [n\tau_1] \\ 1 \ if\ t > [n\tau_1] \end{cases} \tag{3}$$

And

$$D_{2t} = \begin{cases} 0 \ if\ t \le [n\tau_2] \\ 1 \ if\ t > [n\tau_2] \end{cases} \tag{4}$$

Where, unknown parameters are given as $\tau_1 \epsilon (0,1) and\ \tau_2 \epsilon (0,1)$ which represent time of regime change points. The null hypothesis indicating unexistence of co-integration relationship is tested by the ADF-type $Z_\alpha \ and \ Z_t$ test statistics. It is conducted

by applying unit root test to the error terms obtained from the ADF test model. Where, $Z_\alpha = n(\hat{\rho}^* - 1)$; and $\rho^{\wedge *}$ parameter is estimator of the first degree bias-corrected auto-correlation coefficient. Hatemi'j (2008) suggests that the aforesaid parameter could be estimated as follows:

$$\hat{\rho}^* = \frac{\sum_{t=1}^{n-1}(\hat{u}_t \hat{u}_{t+1} \cdot \sum_{j=1}^{B} w\left(\frac{j}{B}\right)\hat{\gamma}(j}{\sum_{t=1}^{n-1}\hat{u}_t^2} \tag{5}$$

Where, $\gamma(j)$ is described as auto-correlation function;

$$\hat{\gamma}(j) = \frac{1}{n}\sum_{t=j+1}^{T}(\hat{u}_{t\cdot j} - \hat{\rho}\hat{u}_{t\cdot j-1})(\hat{u}_t - \hat{\rho}\hat{u}_{t-1}). \tag{6}$$

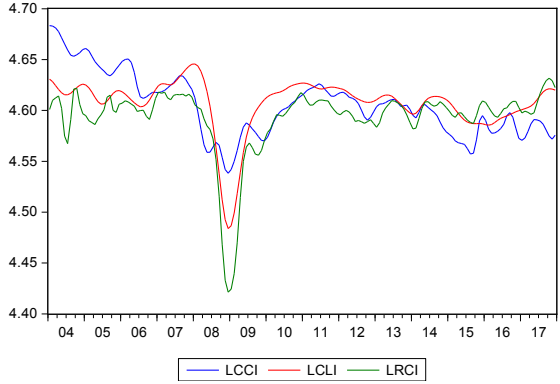
On the other hand, Z_t statistics is given by the equation below:

$$Z_t = \frac{(\hat{\rho}^* - 1)}{(\hat{\gamma}(0) + 2\sum_{j=1}^{B} w(\frac{j}{B})\hat{\gamma}(j))/\sum_{t=1}^{n-1}\hat{u}_t^2} \tag{7}$$

Critical values of the relevant statistics are estimated by Hatemi'j (2008).

In the present study, monthly data from the period 2004:1-2017:2 was studied. Variables taken into consideration in the analysis were the Consumer Confidence Index (CCI), the Business Confidence Index (BCI) and the Composite Leading Indicators (CLI). All variables were run in natural logarithmic form in order to downsize sampling scale as well as to assess obtained coefficients as flexibility. Figure 3 exhibited the graphs of the variables employed in the model.

Figure 3. The Series of LCCI, LCLI and LBCI Variables



From Figure 3, it was observed that all variables exhibit similar movement along the sampling period. It was also notable that all three indexes were downward in the 2008 global economic crisis.

Empirical Results

In our study, unit root test was conducted before investigation of co-integration relationship among variables. Since co-integration method with structural break was to be employed, unit root test was conducted based on Zivot-Andrews (1992) method allowing single structural break. Since all variables were found to be stationary at their first difference (Table 1), it was considered that the co-integration method with structural break was appropriate for further analysis.

Table 1. Unit Root Test Results

Variable	Level (Constant term)	Difference (Constant term)	Decision
LCCI	-3.7801	-7.1350*** (2008:11)	I(1)
LCLI	-4.2749	-5.3844*** (2008:11)	I(1)
LBCI	-3.8783	-7.0850*** (2009:2)	I(1)

Note: **** refers 1% significance level; dates in parentheses.*

Hansen (1992) instability test is required in order to conduct co-integration methods to structural break for each model. Co-integration methods with structural break are deemed to be appropriate for analysis provided that the instability hypothesis is accepted. Table 2 exhibits instability test results for three models employed in this study.

Table 2. Hansen (1992) Instability Test Results

Dependent variable: LCCI			
M	Lc	MeanF	SupF
11.989	2.5821***	79.2426***	235.461***
Dependent variable: LCLI			
M	Lc	MeanF	SupF
7,1662	1.771***	33.2379***	67.3435***
Dependent variable: LBCI			
M	Lc	MeanF	SupF
11.5385	0.2682	6.417**	51.4043***

Note: **** refers 1% significance level.*

According to the presented test results, Hansen instability hypotheses relevant with each of the models were accepted. This result implied that co-integration model estimations with two-structural breaks suggested by Hatemi'j (2008) were appropriate for further analysis.

Table 3 exhibits co-integration estimation results with two structural breaks, which belong to regime change model. According to these results, it was inferred that Consumer Confidence Index was dependent variable while Composite Leading Indicators and Business Confidence Index were independent variables. Additionally, in the Model 1 at 1% significance level, co-integration relationship was determined with two structural breaks on dates of 2006:7 and 2012:1. In the Model 2 in which Composite Leading Indicators were dependent variable while the Consumer Confidence Index and the Business Confidence Index were independent variables, no co-integration relationship was determined, but structural breaks were found on the dates of 2010:12 and 2014:3 at 1% significance level. Finally, in the Model 3 in which the Business Confidence Index was dependent variable whereas the Consumer Confidence Index and Composite Leading Indicators were independent variables, co-integration relationship was determined with two structural breaks in 2008: 7 and 2010:9 at 1% significance level.

Table 3. Hatemi'j (2008) Two Structural Break Co-Integration Results

Model	Test Statistics	Structural Break Dates
LCCI=F(LCLI,LBCI)	-7.375***	2006: 7; 2012:1
LCLI=F(LCCI,LBCI)	-6.931***	2010: 12; 2014:3
LBCI=F(LCCI,LCLI)	-9.413***	2008: 7; 2010:9

Note: **** refers 1% significance level.*

Table 4 exhibits long-term coefficients of estimated co-integration models. In the Model 1 in which the first and second structural break dates were 2006:7 and 2012:1, it was seen with the constant term that the first structural break date was significant while the second structural break date was insignificant. Estimated coefficient of Composite Leading Indicators Index was found significant when there was no structural break. The first structural break date was insignificant whereas the second structural break date was significant. Estimated coefficient of Business Confidence Index was found significant with no structural break, at the first and second structural break dates. Hence, 1% increase in Composite Leading Indicators led 2.442% increase in Consumer Confidence Index when there was no structural break. One percent increase in Composite Leading Indicators after the second structural break resulted in 2.494% decrease in Consumer Confidence Index. On the other hand, in the model with no structural break, 1% increase in Business Confidence Index resulted in 0.730% increase in the Consumer Confidence Index, as this result occurred as 0.624% increase and 0.544% decrease after the first and second structural breaks, respectively.

Table 4. Hatemi'j (2008) Long-Run Co-Integration Coefficients

MODEL	α_0	α_1	α_2	β_0	$\beta_1 d_1$	$\beta_2 d_2$	γ_0	$\gamma_1 d_1$	$\gamma_2 d_2$
Model 1 LCCI=F(LCLI,LBCI)	-2.212**	3.526***	-0.168	2.442***	-0.032	-2.494***	0.730 **	0.624**	-0.544**
Model 2 LCLI=F(LBCI,LCCI)	0.546***	-0.131	-0.425	0.761***	-0.30	-0.423 *	0.486*	1.001***	-0.789**
Model 3 LBCI=F(LCLI,LCCI)	0.625***	-1.973***	2.042***	0.593***	0.092**	0.355***	0.631***	-0.326***	-0.692***

Note: **, ** and *** denote 1%, 5% and 10% significance levels, respectively.*

For the Model 2 containing the Composite Leading Indicators as dependent variable, the first and second structural break dates were determined on 2010:12 and 2014:3. In this model, structural break dates were insignificant for the constant

term. While only the second structural break date was found significant for the Business Confidence Index, both structural break dates were found significant for the Consumer Confidence Index. One percent increase in the Business Confidence Index resulted in 0.761% increase in Composite Leading Indicators Index when there was no structural break. After the second structural break date, 1% increase in the Business Confidence Index resulted in 0.423% decrease in the Composite Leading Indicators Index. On the other hand, 1% increase in the Consumer Confidence Index resulted in 0.486% increase, 1.001% increase and 0.789% decrease in the Composite Leading Indicators when there was no structural break, after the first and second structural breaks, respectively.

According to the Model 3 in which the Business Confidence Index was dependent variable, structural break dates were 2008:7 and 2010:9. In this model, the first and second structural break dates were found significant for the constant term. The first and second structural break dates were found significant for the Composite Leading Indicators Index. Similarly with the Consumer Confidence Index, the first and second structural break dates were found significant. Hence, 1% increase in the Composite Leading Indicators Index increased the Business Confidence Index by 0.593% in the absence of structural break; by 0.092% after the first structural break; and by 0.355% after the second structural break. It was found that 1% increase in the Consumer Confidence Index resulted in 0.631% increase in the Business Confidence Index when there was no structural break. After the first and second structural breaks, the Business Confidence Index decreased by 0.326% and 0.692% against 1% increase in the Consumer Confidence Index, respectively.

Discussion for Economic Confidence in Turkey

Within the scope of the attempts of economic authorities to determine the direction of future economic trends or confidence in the economy, authorities have taken current economic conditions into consideration besides the relevant expectations. Accordingly, since correlation between confidence-based behavioral models and economic activity levels are contained leading information about the trend of economic fluctuations, they were regarded at the first place in terms of maintaining economic policy by the authorities. This leading information regarded as a warning for economic recession when aforesaid fluctuations start to

display the respective trend might make certain contribution into precautionary policy making process.

In this regard, the present study analyzed the correlation between economic activity levels and expectations of or economic confidence of Turkish economic authorities based on monthly data covering the period of 2004:1-2017:2. The expectations or economic confidence of Turkish economic authorities was represented by the Consumer Confidence Index (CCI) and the Business Confidence Index (BCI) whereas economic activity level was represented by the Composite Leading Indicators (CLI) in parallel with the available literature.

The fact that the analysis period of 2004-2017 has contained various factors such as global and domestic economic crises, policy changes, terror incidents, wars and etc. influent on economy played significant role on emergence of structural breaks with the macroeconomic variables of the concerned period. It was evident that the models estimated regardless of these structural breaks would yield biased results. Therefore, two structural break cointegration method suggested by Hatemi'j (2008) was employed in our study.

According to the analysis results, structural breaks were determined in the Model 1 in which CCI was dependent variable on the dates of 2006:7 and 2012:1; in the Model 2 in which CLI was dependent variable on the dates of 2010:12 and 2014:3; and in the Model 3 in which BCI was dependent variable on the dates of 2008:7 and 2010:9. Coinciding structural break dates with the policy shift, economic crisis and election periods in Turkey was found explanatory quality of the break points in variables. It is possible to suggest that results of the analysis attempts ignoring these breaks would be biased and away from reflecting the whole economic scene. Thus, it was concluded with all of three models estimated by considering structural breaks that there was cointegration among the variables at 1% significance level.

In consideration of the long term coefficients of the estimated cointegration models, it was seen with the Model 1 (where CCI was dependent variable) that 1% increase in the CLI resulted in 2.442% increase in the CCI when there was no structural break. On the other hand, it resulted in 2.494% decrease in the CCI after the second structural break. The date of the first structural break was not found statistically significant. One percent increase in the BCI resulted in 0.730% increase, 0.624% increase and 0.544% decrease in the CCI when there was no

structural break, after the first break, and after the second structural break, respectively. Accordingly, it is possible suggest that increase in the BCI after 2006 was the reason for the increase seen with the CCI; as well as the decreases in leading indicators and the BCI after 2012.

In Model 2 (where CLI was dependent variable), 1% increase in BCI resulted in 0.761% increase and 0.423% decrease in the CLI when there was no structural break and after the second break date, respectively. The first break was found insignificant. The effect of 1% increase in the CCI on the CLI was 0.486% increase, 1.01% increase and 0.789% decrease, respectively when no structural break, after the first break, and the second break. From these findings, it was concluded that consumer confidence played substantial role in elevated CLI afterwards of 2010, but decreases in both consumer confidence and business confidence played role in decreasing CLI after 2014.

In Model 3 (where the BCI was dependent variable), 1% increase in the CLI resulted in 0.593% increase, 0.092% increase, and 0.355% increase in BCI when there was no structural break, after the first structural break, and after the second structural break, respectively. Additionally, 1 % increase in the CCI resulted in 0.631% increase, 0.326% decrease and 0.692% increase in the BCI when there was no structural break, after the first structural break, and after the second structural break, respectively. Briefly, elevated business confidence experienced after 2008 was the result of the intensifying economic activities whereas the consumer confidence casted negative impact. On the other hand, it was seen after 2010 that the BCI was positively influenced by both composite leading indicator and the consumer confidence.

Consequently, it was possible to conclude that the direction of the relationship between confidence indexes and economic activities vary with respect to the characteristics of the analysis period. It was natural to experience variations among findings with respect to their break periods since analyzed sampling period contained economic crises, domestic and international terror incidents, elections, structural change programs and adverse international relations which cause instability with macroeconomic indicators. However, when our findings were considered in general, they were found important in terms of reflecting the fact that a confidence-based domestic economy was not been established in Turkey; and a confidence athmosphere relying more heavily on economic activitiese was existed.

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10

STRUCTURAL CHANGE AND AGGREGATE LABOUR PRODUCTIVITY IN THE TURKISH NON-FARM BUSINESS INDUSTRIES

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Economic development may be defined as the transition of a country from traditional society employing primitive low-productivity production methods into a modern high-productivity industrial economy. This transformation involves a replacement of low productivity labour intensive primitive production techniques with capital intensive, innovative high productivity methods of production. Moreover, development is a multidimensional process that involves a movement out of agriculture into manufacturing and then towards services. Also, it entails urbanization and integration with the global markets. The neoclassical models of growth and development usually focused on functioning of the markets, institutions, resource allocations and income distribution. In these models, economic growth depends on technological improvements, physical and human capital accumulation. This strand of growth and development literature does not take into consideration or somehow neglects the role of structural transformation. On the other hand, in the structuralists' development perspective, long run structural change is a key characteristic of the development process. In other words, the effects of the changing industry composition of output and employment were usually ignored by the traditional growth models. However, many development economists believe that underdeveloped countries are those failed to transform their economies from a primitive agrarian economy into a modern diversified one.

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These early development (Structuralist) economists, namely Lewis, Nurske, Rosenstein-Rodan, Gerschenkron and Hirschman were concerned with the long run driving forces of this transition from agrarian into industrial modern economy. Structural change is a central tenet of robust economic growth and development. The implicit axiom here is that productivity growth in agriculture is lower than that in manufacturing. So, transfer of labour from low-productivity agriculture into high-productivity manufacturing results in an increase in aggregate productivity and per capita income. Historically, starting from the Industrial Revolution, manufacturing has been considered to be the main engine of economic development. Britain was the first country that industrialized and became the technological leader. Other European countries that followed Britain were Belgium, Switzerland, France and the US. In the 20th Century Germany, Russia and Japan were the latecomers for industrialization. In other words, development is a process that entails change in structure of the traditional economy into industry and then services. Each country has its own path of development depending on their initial conditions. In addition, the empirical evidence points to a close correlation between industrialization and economic development.

Likewise, in the last four decades the share of manufacturing sector in newly industrializing countries like China, Indonesia, the Republic of Korea, Malaysia and Thailand, for instance, has been increased from around 14 percent in the 1950's to around 25 percent at the beginning of the 21st Century. Developing countries witnessed a decreasing agriculture's share of GDP from around 40 percent in the 1950's to 15 percent at the turn of the century; but a temporally increase in manufacturing's share of GDP from 12 percent in 1950 to about 17 percent in the early 1980s (UNIDO, 2013, p.17). The Turkish economy followed similar patterns. For instance, the GDP share of agriculture fell from 50 percent in 1950 to around 6 percent in 2018 and in turn, the manufacturing's share of GDP increased from 11 percent in 1950 to 19 percent in 2018.

In this respect, the rest of the study is structured as follows. After brief review of the theoretical and empirical studies, we focus on the patterns of structural change in Turkey relying on relevant data. Then a traditional shift share analysis was employed to decompose aggregate productivity growth into "within sector growth", "between growth" and "covariance" effects. The last section is about evaluating the results and conclusion.

Theoretical Background for Structural Change at Glance

Structural change has been used in many different meanings, but in the growth and development literatures frequently used in terms of transforming the society from a rural agrarian to an urban industrial society. Early studies are mostly descriptive in nature and simply make a description of development patterns that followed by most of the *now developed countries*. For instance, Kuznets (1966) and Chenery and Syrquin (1975) postulated that production shifts from the primary sectors namely agriculture and mining to secondary sectors (industry) and then to tertiary sectors (services) during the development process. Another striking study in this strand of literature is Rostow's stages of development model. In his model, Rostow asserts that the economy passes through five stages in the development process. These stages are the traditional society; precondition for takeoff; the take-off; maturity and mass consumption. This stages approach of Rostow has been criticized on two fronts; first, it assumes a unique path of development for all countries, and second about the prerequisites for the takeoff stage.

Alexander Gerschenkron on the other hand, focused on the positive role of relative backwardness in the fulfillment of the supposed prerequisites for the takeoff and process of economic development. According to Gerschenkron (1962), between backward and leading countries there exists a productive knowledge gap. If economically backward countries are able to close this gap, they can achieve more rapid growth rates. Some institutions like the state and/or the banking system can play significant role in closing this knowledge gap. By the same token, backward nations are experiencing a "tension" between economic development they deserved and the experienced stagnation. This "tension" stimulates institutional innovation and leads to locally appropriate solutions in closing the knowledge gap and launching self-sustained growth. Myrdal (1957) instead of focusing on the prerequisites of the takeoff for a backward country, he argues that if a country gets a head-start, this lead will be self-reinforcing. Myrdal described this process by the term "cumulative causation". Once an economy takes the lead in economic development, because of the external economies, this region will become more attractive for both entrepreneurs and labour. Another development economist who focused on this self-reinforcing nature of development is Albert O. Hirschman (1958). Similar to Rosenstein-Rodan and Myrdal, Hirschman makes use of the scale economies stemmed from backward and forward linkages among firms and/or industries to explain the development process.

The above-mentioned growth models had some difficulty in integrating heterogeneous sectors. Alternative approaches such as the dual-economy models (Lewis, 1954) and 'big-push' theories had been developed in order to describe the process of structural change that occurs in the first stages of economic development. These approaches emphasized the dichotomy between economic sectors in order to explain the overall progress of the economy. Lewis's model claims that increasing total output and pushing the economy forward require transforming the surplus labour from the traditional sectors to the modern ones until the modern sector absorbs all reserves of labour in the subsistence sector. The works of Rosenstein-Rodan (1961) also emphasized the importance of the sectoral variations for a balanced economic growth. The complementarities generated among various industries, similarly to those between production and consumption structures, lead to make the big push that brings economic growth.

The Solow-Swan type, neo-classical growth models emphasizing capital accumulation and technological progress as the sources of short run per capita output growth. Since capital accumulation is subject to diminishing returns, technological progress is the sole source of sustained long run growth rate of per capita output. Technological progress is assumed as exogenous, so that output per worker ultimately left unexplained. The short run high growth rates are explained with transitional dynamics because the implicit assumption is that all countries have access to the same technology and, they have similar structural and institutional characteristics. This only enables a very weak relation between structural change and growth in the context of the neo-classical growth model. In this respect, neoclassical growth model highlights its own shortcoming: although technology is a central component of the neoclassical growth model, it is left un-modelled. In the mid-1980s, starting with the seminal contribution of Romer (1986) and Lucas (1988) new growth models, namely endogenous growth models, were developed and modelled technology as endogenous. With these models, technical progress is stemmed from R&D efforts of profit seeking firms. Early models of endogenous growth have focused on the positive externalities of physical and human capital accumulations while some others rely on external economies of R&D activities that bring increasing returns. Some other models based on non-rivalrous and partially excludable nature of new ideas that leads to increasing returns (Jones and Volrath, 2013).

Moreover, a variety of innovation-based models developed by Aghion and Howitt (1992) focused on quality-improved innovations that render old products obsolete. Since these models involve the notion of Schumpeterian creative destruction, they are referred to as Schumpeterian growth theory. The implication of this line of research is that faster growth implies a higher rate of firm turnover, because this process of creative destruction generates entry of new innovators and exit of former innovators. These models have focused on individual industries and are very useful in analysing the relationship between economic growth of the individual country and its proximity to the technology frontier, however, the assumption that all industries are symmetric proved them *useless* in analysing structural change (Aghion and Howitt, 2009, pp. 15-18).

Unlike classical economic thinking, Keynesians focused on the demand side of the picture and assert that shifts in composition of demand affect the direction of structural change and determine the sectors that grow (or shrink) faster than others. Spending on goods and services is the primary driver that stimulating the process of structural change. In other words, Keynesians encourage the government to reinforce aggregate demand in order to increase consumer spending leads to more investment in the business community resulting in greater job opportunities. The creation of new jobs creates multiplier effect that further generates more jobs, higher wages, and stronger consumption, which then results in fast growth.

Recently, an eclectic and empirically oriented theory inspired from heterodox economic thought has been bringing back the Neo-Schumpeterian evolutionary arguments to the fore. In this evolutionary theory, economic development stated as a dynamic, cumulative process that is subject to historical contingencies which cause the process to be path-dependent and irreversible. Their contribution is based on Schumpeterian creative forces of technological competition. In an economy with surplus labour, firms are capable of producing generic products. However, the competitive advantage of a country hinges on the capability to produce products and technologies that are difficult for others to make. So, firms bid for and compete to perform economic activities with a high degree of tacit knowledge, in order to capture the accrued economic rents and profits stemmed from the monopoly power. Over time, this high rent attracts others to imitate and use it as well. The knowledge diffuses and becomes common which reduces the associated rents downward. Even when scarce knowledge cannot be perfectly replicated, similar and competing knowledge is often created via reverse engineering

and/or imitation. Productive firms should reinvest their profits in adopting the new and more productive technology. The firms that succeed in achieving more profits grow faster and increase their market shares. In turn, the firms that fail to make profit will ultimately go out of business (Nelson & Winter, 1982).

In conclusion, the common characteristic of theories that provide groundwork for empirical studies of structural change is *sector specificity*. The traditional growth models are activity or sector neutral. There is no difference between a unit of value added created in different sectors. Some activities or sectors vary widely in terms of their degree of technological capabilities, learning characteristics, strength of backward and forward linkages, scope for cumulative causation and increasing returns (Tregenna, 2014). Heterodox economists, namely the structuralists and Kaldorians rely on relative productivity differences and they attached a higher value to the same value added created in the manufacturing industries. Countries with different sectoral composition of output and employment will provide different outcomes. Therefore, structural change is a potential source of productivity growth especially for developing countries.

Empirical Studies of Structural Change

The empirical literature concerned with the effects of reallocation among industries and firms on aggregate productivity. There exist many decomposition techniques that measure the contribution of structural change to aggregate productivity growth. The pioneer study to our knowledge is Salter (1960). According to this comprehensive work, the scope for productivity improvements varies across industries. Reallocation of resources across industries can have significant productivity increases in a flexible production structure. From analysis of the UK data, he reached the conclusion that structural change had significant contribution to productivity growth in the first half of the 20th Century (Fagerberg, 2000).

Fagerberg (2000) investigates the impact of structural change on productivity growth in manufacturing, using a sample of 39 countries and 24 industries between 1973 and 1990. The results indicate that in most countries the within effect dominates and structural change is small, but structural change matters in a different way. The main difference that he mentioned is the role played by new technologies in generating structural change in the last decades. Peneder (2003) executed a similar study for a sample of European Union countries' manufacturing

industries at the three-digit level of dis-aggregation. The results indicate trivial impact of structural change on labour productivity growth.

Timmer and Szirmai (2000) investigates the impact of structural change on aggregate productivity growth in the manufacturing industries of four Asian countries over the period 1963–1993. By relying on the shift-share analysis, they try to measure the effect of labour and capital reallocation on productivity. The results do not support the structural-bonus Hypothesis, they suggest two explanations: First, in rapid growing developing countries manufacturing-wide effects are more important than industry-specific effects. Second, initial productivity level in a branch relative to the level in the technology leader (the US) was highly significant and negatively related to subsequent productivity growth.

A closer inspection of the link between total factor productivity growth and changes in the real value added shares within the U.S. manufacturing industries for the period of 1958-1996 revealed that technological progress has a strong and lasting effect on the transition law of the value added shares on one hand and on the other one, the demand side shapes the direction of the structural change across heterogeneous industries which shrink (grow) due to their low (high) productivity (Krüger, 2008b).

Disney et al. (2003) considered the technological progress as an 'internal' determinant of productivity growth in UK manufacturing during the period of 1980-1992. They examine the importance of both internal and external restructuring to the aggregate productivity growth. The results show that around 50% of labour productivity growth and 90% of total factor productivity growth can be attributed to the external restructuring effect arises from entry of more productive multi-establishment firms and exit of less productive ones. Furthermore, these impacts of external restructuring on productivity growth take a behavioral dimension by generating a competitive pressure on the existing establishments to raise their productivity (Disney, Haske, & Heden, 2003).

In the Turkish manufacturing industries, the structural change contributes positively to the aggregate productivity growth during the inward oriented era (till 1980). However, in the post-1980 known as the outward oriented era, it contributes negatively to the aggregate productivity growth. The positive contribution of the structural changes in the inward oriented era can be attributed to the considerable structural changes that decrease the share of primary production

concurrently with increasing capital accumulation and primary schooling (Akkemik, 2006). Rodrik (2010) and Atiyas and Bakış (2013) are two seminal work about structural change and productivity growth in the Turkish economy. They find positive and significant effect of structural change on aggregate productivity growth for the 1990s and early 2000s.

Tuncer and Altıok (2011) examined the impact of structural change on labour productivity growth of the manufacturing industries, in the Province of Mersin, the Mediterranean Region of the country and the Turkish economy for the period between 1980 and 2008. They found -using the methodology of shift-share analysis- that, structural changes can only explain a small portion of the productivity growth. In another similar study Tuncer and Moalla (2020) finds positive but relatively small contribution of structural change to aggregate productivity growth in the Turkish economy and manufacturing (Two-digit 24 industry) industries during the period between 2003 and 2017.

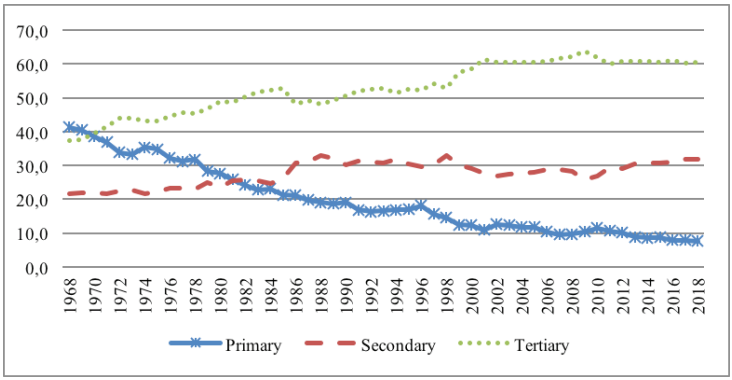
Stylized Facts and Patterns of Structural Change in Turkey

Fourastié's theory of economic development provides an explanation to the three sectors hypothesis about successive dominance of the primary, secondary and tertiary sectors in terms of employment and output shares. In a market with sufficient competition, these sectors have different levels of labour productivity. The changes in labour productivity driven by the technological progress affects the prices and the real labour costs that in turn affect rents and profits. The speed and direction of the changing rents and profits can be regarded as the variant that accelerates or decelerates the economic growth resulting from the structural change. On the demand side, as income increases, the consumption will shift from the primary to the secondary sector till it reaches the saturation limit. However, the demand in the tertiary sector will not be affected by the productivity increase driven by the technological progress and as a result it will never be saturated. In other words, the technological progress stimulates the process of the structural change, but the demand side determines the direction of it (Kruger, 2008a).

Although different theories and models provide different explanations to the evolution of employment and GDP share of main sectors of the economy, overtime there exist some stylized facts that the share of the primary sector declines and

the share of the secondary industries increases, then in subsequent stages of economic development the tertiary sector increases its share.

Figure 1: Sector Shares of GDP in the Turkish Economy (%) 1968-2018

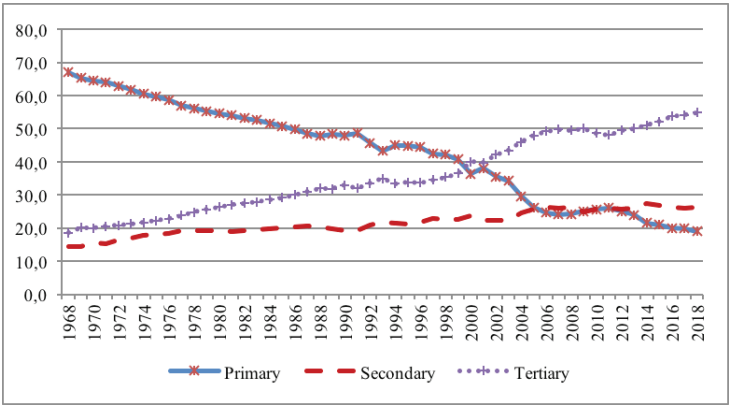


Source: *Turkish Statistical Institute (TSI) National Accounts Database (www.tuik.gov.tr).*

Overtime the structure of the economy is expected to change. The relative size of the main sectors has been changing in response to the changes in the supply and demand conditions. In this study, the *primary* sector refers to agriculture, forestry, fishing and, mining and quarrying industries. The *secondary* sector consists of manufacturing, electricity, gas, steam and air conditioning supply, water supply, waste management and construction industries. The *tertiary* sector consists of transportation and public utilities (including communications services), wholesale and retail trade, finance, insurance and real estate and other services. In Turkey, during the period between 1968 and 2018, the primary sector's share of GDP decreased from 41.2% in 1968 to 7.6% in 2018. The share of the secondary sectors (industry, utilities and construction) increased from 21.5% in 1968 to 31.8% in 2018. The share of the services on the other hand increased from 37.2% in 1968 to 60.6% in 2018 (Figure 1). Thus, the Turkish economy follows a similar pattern of structural change to both industrialized and newly industrialized countries. However, the output share of the secondary sector seems to follow a decline in growth rate before reaching a considerable plateau of industrial production.

Obviously, employment has been influenced from the changing patterns in output and shall follow similar movements during the period between 1968 and 2018. The employment share of the primary sectors has declined from 67.0% in 1968 to 19.0% in 2018. On the contrary, the employment share in the secondary sector increased from 14.4% in 1968 to 26.2% in 2018 concurrently with increase in the employment share in the tertiary sectors from 18.5% to 54.9% (See Figure 2). The figures reveal that the evolution of employment and GDP shares follow; a sharp decline in the primary sector's with subsequent increase in those of the secondary and tertiary sectors. Moreover, in last decade there is a movement of labour from rural areas directly to services in the urban areas of the country. The pattern of structural change that has been taken place in the Turkish economy is similar, to patterns of other developed and developing countries. The tertiary sector now has a larger share of output and employment compared to other main sectors.

Figure 2: Sector Shares of Employment in the Turkish Economy (%), 1968-2018.



Source: *Bulutay (1995) and TSI, Employment, Unemployment and Wages data (www.tuik.gov.tr).*

The implication of these changes on productivity is crucial, since in the long run the sole source of increase in per capita output is the productivity growth. If the secondary sector is more productive compare to tertiary sector, the increase in the share of services and a decline in manufacturing share might results in low aggregate productivity and income for the country. In other words, if the tertiary sector is stagnant in terms of technology cost disease or middle-income trap would be the most likely outcome.[3]

3 Baumol (1967) asserts that the shift from manufacturing to services is not because of increase

Table 1 gives a brief summary of the growth rates of real value added (VA), labour productivity and employment for the non-farm business broad industries of the whole economy between 2003 and 2017. In the non-farm business industries (include mining), the annual average growth in real value added was 7.02% between 2003 and 2017. But growth of labour productivity is only 0.31% on annual basis and it is negative between 2003 and 2008. These figures provide clues about misallocation of resources and with these low productivity figures, sustaining growth and providing decent jobs in the future seems to be quite challenging. Although the manufacturing industry experienced negative labour productivity growth between 2003 and 2008, during 2010 and 2017 and in the whole period (2003-2017) relatively has higher labour productivity growth. Services in the same period follow similar patterns of growth in real value added but negative productivity growth. As we mentioned before most probably growth of the labour force and the participation rates along with the labour released from agriculture and rural areas could only find jobs in low productivity service industries of the urban areas. Growth of real value added mainly comes from employment growth in the period of 2003 and 2017.

Table 1: Annual Average Growth Rates (%) of Basic Indicators

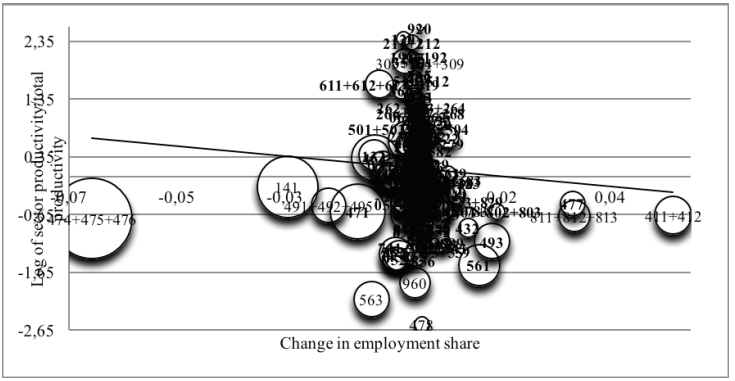
	Industry	Real Value Added	Labour Productivity	Employment
2003-2008	Non-Farm Business (185 sector)*	4.28	-3.98	8.26
2010-2017		8.74	2.99	5.75
2003-2017		7.02	0.31	6.72
2003-2008	Manufacturing (83 sector)	2.93	-2.52	5.45
2010-2017		9.66	4.47	5.19
2003-2017		7.07	1.78	5.29
2003-2008	Services (95 sector)	4.95	-4.60	9.55
2010-2017		8.28	2.28	6.00
2003-2017		7.00	-0.37	7.37

* *The 7 sub industries of the mining and quarrying industry are included in this broad sector.*
Source: *Authors calculations with data from Turkish Statistical Institute.*

of demand to services but from productivity growth differentials among industries. To this "cost disease" argument, compared to manufacturing, services are stagnant in terms of productivity growth, but in the economy a uniform trends of labour costs realized. So, the rise of service shares in nominal prices is pure price effect.

In order to dig deeper and gain further insight about structural change and the productivity relationships, Figure 3 depicts the change in employment shares against the end year (2017) relative productivity of 3-digit sub industries (185 industry) that classified according to NACE Rev.2. In the industry and services database of the Turkish Statistical Institute (TSI) some industries have not been covered and the data originated from the national accounts and the employment, unemployment and wages databases are not compatible.[4]

Figure 3: Correlation Between Relative Labour Productivity and Change in Employment Shares in the Turkish Economy, 2003-2017 (NACE Rev. 2, 3-digit industries)



***Note:** *Size of the circles reflects the sectoral shares of the industries at the initial period (2003).*
Source: *Authors calculations with GDP and employment data from Turkish Statistical Institute.*

In Figure 3, the size of the circles represents the employment share of the sector in the initial year (2003). The correlation between (end year) relative labour productivity (log of sector productivity divided by average labour productivity) and change in employment share of the sector is negative and the regression line has a small but negative slope. That means structural change is not growth enhancing and might bring some drag on growth. The striking clue of the figure is that,

4 Therefore, the focus of the study is on the non-farm business industries that composed of mining, industry and services except agriculture (A), financial and insurance activities (K), public administration, social security and defence (O), households activities for own use (T), activities of extraterritorial organizations/bodies and, activities of membership organizations (a division of S).

industries with above average productivity had small labour share at the initial year and they did not increase their labour shares over the period too. Conversely, industries with below average productivity has larger labour share and some of them increase their labour shares. All these should have a considerable drag on growth of at least the non-farm total value added and employment growth between 2003 and 2017. Some other studies, for instance Rodrik (2010) and Atiyas and Bakış (2012) at the more aggregated level of industry classification, they find a positive and ample contribution of structural change to aggregate productivity growth especially for the 1990s and initial years of 2000s. However, these studies in order to analyze and compare different time periods before and after the year 2000, they aggregated the data to 9 broad sectors because of data limitations. Working with highly aggregated data seems to provide inconsistent results with the micro level (establishments) or highly dis-aggregated industry studies of 2 or 3 digits. Atiyas and Bakış (2012) reach the conclusion that, "decomposition of the increase in labour productivity using aggregate data shows that the structural change component, that is, the reallocation of labour from low productivity (agriculture) to high productivity (industry and services) sectors has made a significant positive contribution to aggregate productivity change. However, for the micro level data, they refer to various data problems and the awkwardness between the size distribution and employment of firms in the 2000s. In that period the output and employment shares of large firms have declined. Tuncer and Moalla (2020) work with the aggregate data of NACE Rev.2 classification and 16 industries of the whole economy and finds positive aggregate productivity growth and positive but small contribution from labour reallocation for the period between 2004 and 2017. Therefore, working with highly aggregated data may mask the different effects of heterogenous establishments and sub industries on aggregate productivity.[5]

The Decomposition of Aggregate productivity Growth

All decomposition studies use some sort of share weighted measure of aggregate productivity growth. Small differences between alternative decomposition techniques may be illuminating for different purposes. The most common methodology for measuring the aggregate labour productivity is decomposing the productivity

5 The data of the Annual Industry and Services Statistics of TSI do not cover some sectors (as its mentioned in footnote 2) and these uncovered industries accounts almost 15 to 17 percent of real GDP (in 2017), this might be another source for different results.

change into inter- and intra-industry effects. This study uses the Baily et al. (1996)'s decomposition that based on the share-weighted average labour productivity level $\bar{a}_{it} = \sum_{i=1}^{N} s_{it} a_{it}$. where, subscript *i* denotes the industry (*i=1, …, N),* s_i^tdenotes the share of industry *i* in total employment in period *t* and a_{i_t} denotes the productivity level of the branch *i* in period *t.* The growth rate of aggregate productivity between periods *t* and *t + 1* is calculated as $(\bar{a}_{t+1}\text{-}\bar{a}_t)/\bar{a}_{it} = \Delta\bar{a}_{t+1}/\bar{a}_t$. The aggregate productivity growth rate has been decomposed into three terms (Baily, Bartelsman, & Haltiwanger, 1996) as follows:

$$\frac{\Delta\bar{a}_{t+1}}{\bar{a}_t} = \frac{\sum_{i=1}^{N} s_{it}\Delta a_{it+1}}{\bar{a}_t} + \frac{\sum_{i=1}^{N} s_{it+1}(a_{it}\text{-}\bar{a}_t)}{\bar{a}_t} + \frac{\sum_{i=1}^{N} \Delta s_{it+1}\Delta a_{it+1}}{\bar{a}_t}$$

(1) (2) (3)

The first term on the right-hand side of the equation represents the within effect. It reflects the sum of labour productivity changes originated from the capital accumulation and/or technological capabilities within the same industry. It will contribute positively to the aggregate productivity growth rate if $\Delta a_{it+1} > 0$. The second term represents the between effect. It contributes positively to the aggregate productivity growth if the relative productivity of the industry increases over the time period. The third term is the covariance effect of structural change that reflects outcome of the interaction between changes in employment shares and productivity improvements of industry on aggregate productivity growth. It contributes positively to the aggregate productivity growth if labour force moves towards industries with increasing productivity. The structural change effect is the sum of both the between and the covariance effect.[6]

This study employs the Turkish Statistical Institute (TSI) 3-digit sub industries (185 industry) data that classified according to the Statistical Classification of Economic Activities in the European Community (NACE Rev.2) for the period of 2003–2017. We compile and use the annual industry and services statistics and producer prices of the TSI in the analysis. Two main variables from the database are utilized, namely value-added in factor prices (VA) and the number of persons engaged. The value-added figures are deflated by the relevant industrial

6 Various modifications and extensions of aggregate productivity decomposition have been used in the related literature. Depending on the purpose of the study these small modifications might be illuminating especially for studies at the firms or establishments levels that take into consideration entering and exiting firms.

producer price indices (PPI) and/or sectoral GDP deflators. This study decomposes the aggregate productivity growth into three terms: the within growth effect the between growth effect and the covariance effect for the period between 2003 and 2017. The results are summarized in Table 2.

Growth of the aggregate labour productivity in the Turkish 3-digit industry and services (non-farm business industries) was negative (-18.06 %) for the period between 2003 and 2008. All the effects were negative and in relative terms the within effect is dominant in this period. In the second part of the period (2010-2017) productivity growth is positive and growth rate was 27.9% for the whole period. Around 30.6% originated from the within effect, the between and covariance effects are negative and only account for -2.76% for the whole 2010-2017 period. For the period of 2003-2017 the aggregate productivity growth is very low, it was only 0.25% for the whole period. The major key of the aggregate productivity growth during this period is the within growth effect. The impact of the structural change is negative and a growth reducing structural change has been experienced, in the whole as well as the sub periods.

Table 2: Decomposition of Labour Productivity Growth of Industry and Services in the Turkish Economy (NACE Rev.2 and 3-digit 185 industries)

	Productivity Growth	Within Effect	Between Effect	Covariance Effect	Total
2003-2008	-0.1806	-0.0826	-0.0500	-0.0479	-0.1806
%		0.46	0.28	0.27	1.00
2010-2017	0.2790	0.3064	-0.0137	-0.0137	0.2789
%		1.10	-0.05	-0.05	1.00
2003-2017	0.0025	0.1788	-0.0293	-0.1470	0.0025
%		70.83	-11.60	-58.23	1.00

Note: *The numbers are the growth of the variable for whole related period not annual growth rates.*
Source: *Authors calculations with data from Turkish Statistical Institute.*

Combining the decomposition results and the previous clues derived from Table 1 and Figure 1 to 3, the following conclusions can be grasped: In the period of 2003-2017 the real value added average annual growth of the nonfarm industries was 7.02% and most of this real value-added growth, stemmed from employment growth (6.72%) only 0.31% comes from labour productivity growth on annual

basis. Figure 3 prove that sectors with above average productivity growth do not increase their employment shares. That means, labour released from the agricultural sector employed in sectors with below average productivity and that seems to bring a drag on productivity growth.

What might be the possible explanation for this growth reducing structural change in the Turkish industry and services for the period between 2003 and 2017? In the literature some explanations are suggested. If the labour markets have some rigidities, the reallocation of labour between industries would be slow and experiencing rapid structural change would be difficult and costly. Similarly, if an economy is resource rich and have comparative advantages in the primary industries, exploiting the bonus of structural change on productivity growth will also be difficult. Another explanation is that as the economy catches up and gets close to the frontier optimal structure the impact of structural change on growth would be trivial. Lastly, the micro and macro policies may have adverse effect and leads to reallocation of resources to activities with low value-added (Rodrik, 2010). For the case of the Turkish economy the explanation about side effects of micro policies or the non-selective macro policies deserve attention and we will discuss that below.

Discussion for Turkish Non-Farm Business Industries

The structural change is a significant contributor to the countries' economic growth. This is important especially for developing countries. In Turkey, the decomposition of labour productivity growth shows that the structural change of the 3-digit industry and service (185 industry) sectors, is not growth enhancing but growth reducing. Thus, labour was not reallocated to the high productive sectors effectively. Most of the productivity growth arises from the within growth effect. The sources of the within growth effect originated from research activities, innovations, better physical and human capital. In a developing country like Turkey, with low saving rates, to benefit from structural change as a bonus is certainly crucial.

The macro and micro economic policies seem to be crucial for explaining this growth reducing structural change. For growth enhancing structural change, a competitive or undervalued real exchange rate is proven to be crucial in many empirical studies. However, the IMF (2015) report and other empirical studies indicate a 10 to 20% stronger real effective exchange rate compared to the level that can be explained by medium term fundamentals of the Turkish economy for the first

decade of 2000s. Misalignments of exchange rate accompanied with intensive import competition during the period leads to especially below average productivity manufacturing firms to exit. At the initial stage, the impact seems to be productivity enhancing for manufacturing but as mentioned elsewhere (Rodrik, 2010) the released labour from exiting firms could only find new works in some lower productivity service industries. This inverse structural change increases productivity differentials across industries, reduces productivity on average and brings a drag on growth. Further micro-level case studies would be illuminating in this area.

The nature of the incentive system and gov't policies in Turkey was non-selective in nature in the whole decade of the 2000s. After 2010, the incentive system has started to be provided on the bases of regions, sectors and size of the investment. Subsequently, the gov't tries to integrate some strategic investment dimensions to the criteria of the supports (Atiyas and Bakış, 2013). Shortly, non-selective nature of the incentive system combined with active employment policies that used in order to combat the severe unemployment problems of the country should have side effect that impacted as a drag on aggregate productivity. From our empirical results and review studies of the relationship between structural change and productivity these conclusions can be deduced. First, for most countries the within effect dominates average labour productivity improvements, whereas the structural change components are quantitatively small if not negative. The results for different industry groups are very heterogeneous and many effects cancel out in the highly aggregated level studies. Lastly, in the light of other empirical studies can be concluded that it is not labour productivity but *total factor productivity* proved to be better tool for the analysis of the relation between structural change and productivity growth. Further studies using total factor productivity for the Turkish economy at different aggregation levels will be clarifying.

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11

DEINDUSTRIALIZATION AND TURKISH ECONOMY: A DETAILED ANALYSIS[1]

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Introduction

Industrialization was recognized as an important key to economic growth for the most advanced economies. These advanced economies increased their income within the progress of the manufacturing sector but after the 1970s economic growth for most of the advanced economies is slowing and this stagnation attracted the attention of many of the researchers. On the other hand, the last three decades witnessed a dramatic decrease in the share of employment of the manufacturing sector in total employment with an expansion of the service sector in the economy for both developed and developing countries. This phenomenon is called deindustrialization and effected both developed and developing economies. Deindustrialization has evident for the US and EU economies as well as the Asian economies. This trend becomes an important debate because of the crucial effect on unemployment with widening income inequality.

In their seminal study, Rowthorn and Ramaswamy (1997) stated that employment in manufacturing declined from 1970 to 1994 while the share of employment of the service sector in total employment has increased and these changes

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followed different patterns in different countries. Also, they assessed that the declining share of employment is a mirror of the decline in the share of manufacturing value-added in GDP and this is the main evidence of the deindustrialization. Besides, the share of the employment and share of the value-added in the service sector has increased over time (Rowthorn and Ramaswamy, 1997).

Likewise, Rodrik (2015) presented similar evidence for the US and UK that supported the deindustrialization. Moreover, Rodrik focused on the deindustrialization in developed economies and assessed that this is the main issue for developing economies and debate for economists. According to Rowthorn and Ramaswamy (1997), deindustrialization is a very important debate topic and very essential to understand the future of both developed and developing economies. They presented the explanation and evidence for the deindustrialization in their seminal paper. Palma (2014) showed evidence of the deindustrialization process in OECD and EU countries from the late 1960s. Palma stated that the share of the manufacturing sector in the total economy has declined regularly from the late 1960s that is affecting economic growth (Palma, 2014). Besides, many of the researchers emphasized the same findings in their paper and put forward the evidence with the effect of deindustrialization.

Deindustrialization is also a problem for the developing economies and Dasgupta and Singh (2006) named this phenomenon as "premature" deindustrialization. They stated that the jobless growth of manufacturing in the formal sector with faster growth of services is the evidence for the "premature" industrialization (Dasgupta and Singh, 2006).

Deindustrialization is a major discussion for both developed and developing countries due to the important consequences such that loss of jobs that leads to inequality. Besides, consequences of "premature" deindustrialization for developing countries are different as well as indicators of deindustrialization, and Rodrik (2015) stated that these consequences can be both economic and political (Rodrik, 2015). For instance, deindustrialization may reduce economic growth while making democracy more fragile with weak political institutions.

In sum, deindustrialization is one of the most important issues in the discussion of economic growth for both developed and developing economies. Causes may be similar or close for both economies but consequences must be analyzed in detail. Rodrik expressed the importance of premature deindustrialization as *"…this is not good news for developing countries…"* while unfolding the evidence for Latin

America, Asia, and sub-Saharan Africa (Rodrik, 2015). Developing countries that already have many problems should pay attention to premature deindustrialization.

Therefore, it is very essential to understand the causes of deindustrialization and consequences for all economies. This is the main rationale that lies behind this study and the main aim is to investigate the causes and consequences of deindustrialization and analyzing the Turkish economy in terms of deindustrialization measures. The deindustrialization process and its effect on the Turkish economy are a very complicated issue for economists and policymakers. It is very important to understand the implications of the Turkish Economy.

This paper will present the deindustrialization literature for the world economy, analyze the Turkish Economy in terms of the measure of the deindustrialization, and define possible consequences within the difference of "premature" deindustrialization.

Deindustrialization and "Premature" Deindustrialization

The impact of the manufacturing sector on economic growth is a widely discussed issue and many of the researches assessed the importance of the manufacturing sector by inducing capital accumulation with productivity growth. In his seminal book Kaldor (1966), emphasized the association between the growth of manufacturing output and the rate of growth of the economy. Besides, he assessed that the expansion of the manufacturing sector has an enhancing effect on the rate of growth in real incomes.

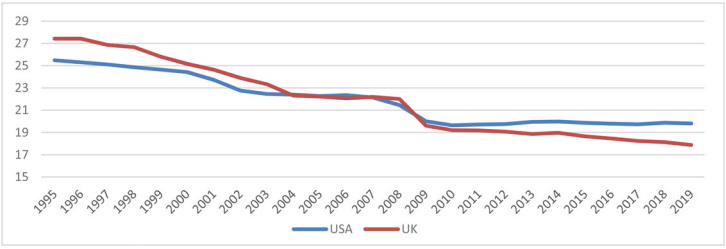
Many of the studies in the literature proved this Kaldorian framework but after the late 1960s slowing growth rates of the developed economies attracted the attention of the researchers. After the early 1980s, the decline in the share of value-added in GDP and employment in the manufacturing sector for the UK and US induced debates about the phenomenon of "deindustrialization".

Many researchers defined deindustrialization but Bluestone (1988) has a very compact definition of this phenomenon as *"…a systematic decline in the industrial base…"*. Deindustrialization is the decline of the share of manufacturing sector activity in total economic activity for developed countries and two measures of deindustrialization can be used withstanding to this definition. Deindustrialization can be measured with these two measures: decline in the share of manufacturing output in total output and decline in the share of employment of the manufacturing sector in the total employment. Despite the simple definition and

measurement of deindustrialization, it has very important consequences for both developing and developed countries.

By using these measures, as seen in figure 1, for the UK and US, the number of employees in the manufacturing sector is decreasing and this is causing a decline in the share of employment in the manufacturing sector which is the main measure of deindustrialization (OECD, 2018).

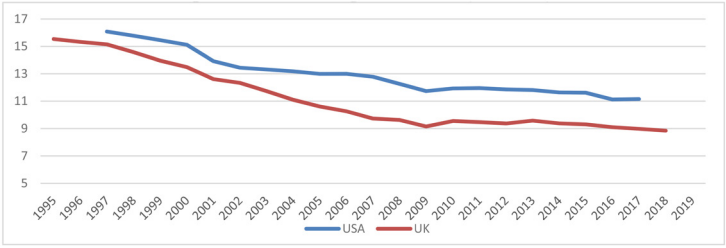
Figure 1: Employment in Industry (% of total employment)



Source: *World Development Indicators, 2020*

At the same time, the share of value-added of the manufacturing sector in GDP is decreasing by time for both US and UK as seen in figure 2. In the Kaldorian framework, maintaining the size of the manufacturing sector is very important for sustaining economic growth, and the main debate started with these two indicators. Although similar causes can be found for each country, the consequences can be different. For instance, according to Rowthorn and Ramaswamy (1997), deindustrialization in Japan started later than the US and has been less dramatic. Therefore, patterns of both cause and consequence of every economy must be analyzed in detail.

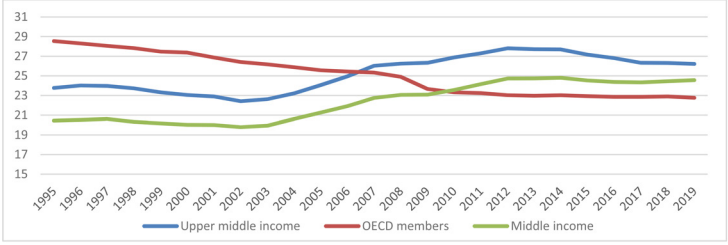
Figure 2: Manufacturing, Value Added (% of GDP)



Source: *World Development Indicators, 2020*

Besides, this situation is not different for many developing countries as well as developed countries. Dasgupta and Singh (2006) analyzed the case of developing countries and named deindustrialization for developing countries as "premature" deindustrialization. Deindustrialization became one of the major problems for the developed countries that is increasing the inequality while declining growth rates but Rodrik (2015) assessed that deindustrialization of the developing economies –called premature deindustrialization- has much more consequences. As seen in Figure 3, employment in the industry declined for OECD member countries and decline started after 2014 for the middle-income countries. According to Rodrik (2015), developing countries have other evidence for deindustrialization and stated that the cause of deindustrialization may be found in trade and globalization for developing countries. Basically, by increased trade of the developing countries, because of globalization, they converted their economies as net importers of manufacturing. Through this channel, the decline in the relative price of manufacturing affected especially developing countries with slower technological progress and reduced the employment as well as output (Rodrik, 2015).

Figure 3: Employment in Industry (% of total employment)



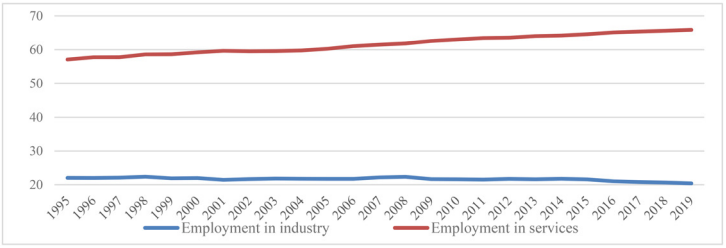
Source: *World Development Indicators, 2020*

Although deindustrialization is well discussed in the literature, the causes and consequences of premature industrialization have not been understood adequately. Especially, premature deindustrialization has a variety of consequences and they are not clear enough. Many studies depending on Rodrik's seminal paper emphasized the economic, social, and political consequences for the developing countries. Tragenna (2015) stated a well-defined explanation of deindustrialization and premature deindustrialization for economies. Similar to Rodrik (2015), Tragenna (2015) assessed that the difference in premature deindustrialization is a growing service sector that drives economic growth (Tragenna, 2015). Especially, Tragenna

(2015) emphasized the importance of the structural change and deindustrialization for developing countries with an assessment for the "premature" deindustrialization. She assessed that deindustrialization at a lower level of GDP is the "premature" deindustrialization. This is a very important distinction for assessing the consequences of deindustrialization for an economy as well as causes and measures. Besides, Tragenna (2015) assessed that characterizing the deindustrialization should be regarded as indicative (Tragenna, 2015). It is quite difficult to distinguish deindustrialization whether premature or not because of the structural difference between economies and precision of the measures.

In sum, the share of employment in total employment and share of value-added in GDP for the manufacturing sector are the two indicative measure for assessing the deindustrialization. Besides, in her seminal paper Tragenna (2015) stated that premature deindustrialization can be identified by when the share of employment of the manufacturing sector in total employment is lower than expected at economies' level of income per capita. According to Rodrik (2015), these developing economies are also service economies *"…without having had a proper experience of industrialization."* (Rodrik, 2015). Increasing share of employment of the service sector with decreasing share of employment of the manufacturing sector may be the indicator for premature. Figure 3 is showing the share of employment in industry and service for Latin America & the Caribbean. According to Castillo and Martins (2016), there is evidence of premature deindustrialization for Argentina, Brazil, and Chile and Figure 3 is also reflecting clear evidence. Shares of employment in industry and increasing services are decreasing and increasing respectively. As mentioned earlier, this should be evaluated as an indicative measure, not a precise one but, this figure is reflecting the evidence of premature deindustrialization.

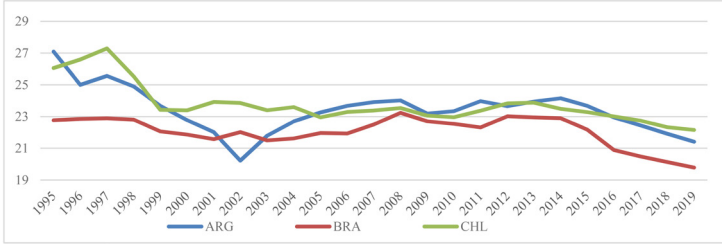
Figure 3: % of Total employment in Industry and Services of Latin America & Caribbean



Source: *World Development Indicators, 2020*

As seen in Figure 4, for the last 25 years, share of the employment in the industry of Argentina, Brazil, and Chile is decreasing and this is the main indicator for deindustrialization.

Figure 4: Employment in industry (% of total employment)



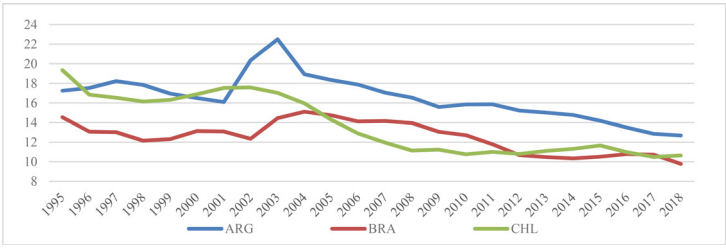
Source: *World Development Indicators, 2020*

As seen in figure 5, the value-added of the manufacturing sector of these three countries is decreasing also. Castillo and Martins (2016) provided empirical evidence for deindustrialization with detailed analysis for these three countries. Moreover, they stated that these three countries are facing premature deindustrialization. Additionally, Palma (2014) stated that Latin American countries began to deindustrialize after radical reforms, and lower levels of income caused premature deindustrialization.

The pattern of the share of value-added of the service sector that is supporting the evidence of premature deindustrialization can be seen in figure 6. Many researchers in the literature evaluated the economy of different countries or regions and found similar evidence. Silva (2019), analyzed the deindustrialization of the Brazilian economy from a regional perspective and found the evidence of deindustrialization (Silva, 2019). Kirsch (2018), analyzed countries that are in the middle-income trap for premature deindustrialization and found that they experienced decreasing manufacturing labor productivity. Tragenna (2015), analyzed the data of various countries and found evidence. Especially, her study can be assessed as a cornerstone of the empirical literature. Kunst (2019), analyzed the data of 148 countries and discussed premature deindustrialization with the empirical findings. Bernard, Smeets, and Warzynski (2016) analyzed the deindustrialization by using the data of Denmark and they documented a new set of facts. Many empirical research is analyzing the deindustrialization and premature deindustrialization by

using different methods for many regions, countries, or country groups for the last decade and found strong evidence of validity.

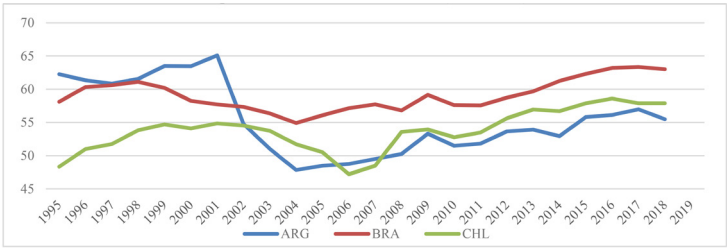
Figure 5: Manufacturing, Value Added (% of GDP)



Source: *World Development Indicators, 2020*

As seen in figure 6, there is an upward trend for the service sector for these countries as well as employment.

Figure 6: Services, Value Added (% of GDP)



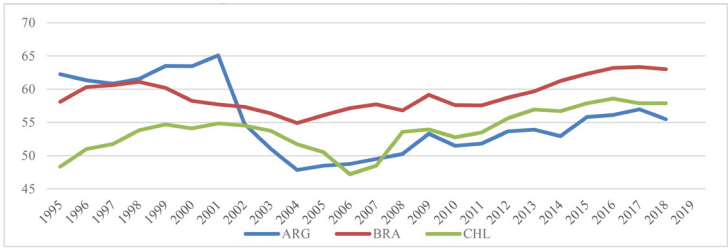
Source: *World Development Indicators, 2020*

Dasgupta and Singh (2006) emphasized that - in line with the Kaldorian framework- the manufacturing sector is the engine of economic growth but it is not possible to replace it with the service sector. Besides, higher productivity growth in the manufacturing sector caused slower employment growth while the growing service sector has low productivity growth increased employment levels (Dasgupta and Singh 2006).

Deindustrialization in Turkey

The share of the employment in total employment and the share of value-added in GDP of the manufacturing sector are the two important indicators of deindustrialization. Besides, these indicators must be evaluated for the service sector for determining whether deindustrialization is premature or not. Especially, understanding the patterns of manufacturing and service sector are very important for analyzing the Turkish economy. According to figure 7, although there has been a temporary increase in some years, the share of the value-added of the manufacturing sector in GDP decreased over time. This is a very important indicator for analyzing the Turkish economy and showed the pattern of deindustrialization. Doğruel (2013), focused on the deindustrialization and evaluated for both country and regional level than stated the same finding. Tekay (2018), stated the same finding for Turkey and emphasized the low productivity level for Turkey's manufacturing sector. Besides, Tekay (2018) concluded that Turkey's declining share of value-added manufacturing sector in GDP is showing the presence of premature deindustrialization.

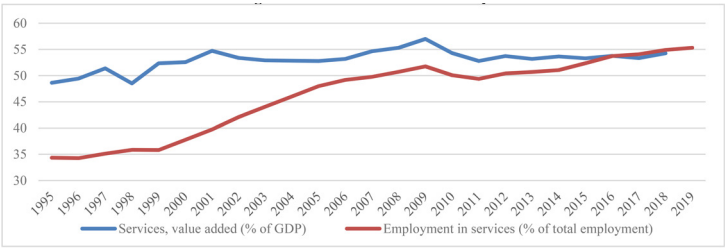
Figure 7: Manufacturing Sector in Turkey



Source: *World Development Indicators, 2020*

As seen in figure 8, the share of the service sector in the economy is increasing in terms of employment and value-added in GDP. This increases can be regarded as evidence for premature deindustrialization.

Figure 8: Service Sector in Turkey



Source: *World Development Indicators, 2020*

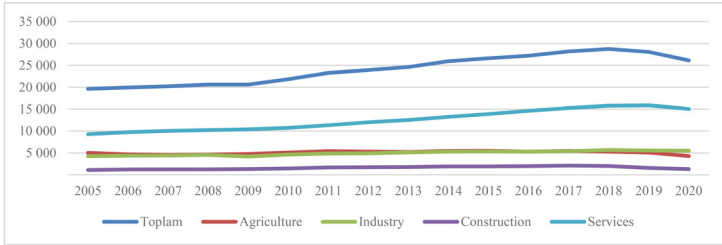
Besides, as seen in figure 9, according to the Turkish Statistical Institute National Database, there is no dramatic change in the share of employment in the industry, construction, and agriculture but the share of the service sector has increased. Depending on the discussion in the previous section, evidence in this study is in line with the literature of premature deindustrialization. Determination of this issue is very important for the Turkish economy to understand the consequences for the economy as well as the causes and policies should be designed with this framework. Especially, determining and understanding the causes that led to premature deindustrialization is very important for designing policies as well as the consequences. The difference between the Turkish economy from the Latin American economies is the dramatic increase in the service sector in Turkey. This is also clear evidence for the premature industrialization for the Turkish economy but the productivity of new sectors that replaced the manufacturing sector must be evaluated.

Figure 9: Distribution of the Employment by Sectors

Source: *Turkish Statistics Institute, 2020*

As seen in figure 10, it is very clear that the number of total employment is depending on the service sector in the Turkish economy. This is clear evidence of the premature deindustrialization and may be the cause of the low growth rates. This the key point to analyze the Turkish economy for understanding the growth path. Tragenna (2016) concluded that the effect of the service sector on economic growth depends on the characteristics of the service. Therefore, the regional and overall economic effect will be different.

Figure 10: Number of Employment by Sectors



Source: *Turkish Statistics Institute, 2020*

On the other hand, another issue for the Turkish economy is the level of income per capita when deindustrialization started. Developing countries may face higher negative effects than developed countries depending on their level of income.

Future Research Directions

This study is a limited study that only presented as a framework for deindustrialization discussions for the Turkish economy. Four issues are recommended for future researches. Firstly, the preliminary findings showed that premature deindustrialization can be considered for the Turkish economy, and causes and consequences should be analyzed in future researches. Second, deindustrialization should be analyzed in regional dimensions. Although it is important to evaluate the deindustrialization nationally, it is necessary to analyze it regionally to design proper policies. The Turkish economy has been faced with premature deindustrialization because of the structural changes and policymakers should evaluate the economic growth policies in this framework. Third, researchers may conduct different empirical models to increase the power of findings.

The fourth issue may be the most important recommendation for the future research direction. As most of the authors emphasized that developing countries faced with premature deindustrialization. However, future studies should place more emphasis on policy proposals. Especially, this is very essential for studies that will analyze the Turkish economy. Besides, coping with deindustrialization is an important research topic and very essential to determine the long-term policies for sustaining economic growth for the Turkish economy. One of the future research directions should be the country-specific consequences and policies to cope with these country-specific consequences. For instance, Teimouri and Zietz (2020) stated that economic growth can slow because of the reallocation of resources away from the manufacturing sector to less productive service sector or vice versa (Teimouri and Zietz, 2020). Depending on this finding with understanding the structure of the economy it will be possible to design suitable policies for coping with negative effects.

Conclusion

Economic growth is the main issue for economists and Kaldor's view on economic growth is still the main basis for the debates after many decades. An important part of the literature is in-line with this view and emphasized the doubt about the effect of the service sector on economic growth. This is issue is very important for the Turkish economy because of the structural changes. Especially, the noticeable increase in employment in the service sector with a decrease in value-added of the manufacturing sector in GDP in the last decade is the evidence of this structural change and premature industrialization. Due to this importance and evidences, the main aim of this study is to research the deindustrialization pattern in the Turkish economy. The preliminary findings of the paper are supporting the premature deindustrialization and in-line with the researches about many developing countries' literature. This conclusion is very important for the Turkish economy due to the high share of the service sector in the economy and the pattern of premature deindustrialization has a high potential to stall economic growth. On the other hand, Rodrik (2015) stated the social and political consequences of deindustrialization are remarkable.

Especially the weakness of the employment growth in the Turkish economy put forward the premature deindustrialization as an important debate. For instance, Dasgupta and Singh (2005) analyzed the role of the informal sector in economic

development for India and found that both the manufacturing and service sectors are related to the growth of GDP. Moreover, their analysis showed that the growth of the service sector on GDP depends on the manufacturing sector and by this channel, the service sector contributed to the economy (Dasgupta and Singh, 2005). This is a very remarkable finding for policymakers for designing policies to promote economic growth and this must be analyzed for the Turkish economy.

In conclusion, the Turkish economy is facing low growth rates that are below the potential, doubts about the employment level, and changes in income of the middle class (Lawrence and Edwards, 2013) while the service sector is dominating the whole economy. Indicators are showing the evidence of premature industrialization and policymakers should design new policies that will promote economic growth.

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12

EFFECTS OF REGIONAL INVESTMENT INCENTIVES ON ECONOMIC DEVELOPMENT PATHS OF PROVINCES: THE CASE OF TURKEY (2004-2017)

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Introduction

The differences in terms of economic development performances of regions are one of the chronic problems that underdeveloped and developing countries are struggling with. In order to solve this problem, various policies are frequently implemented to stimulate investments in selected sectors, increase economic growth rate and employment opportunities on a regional basis in relatively less developed regions to catch faster development rates than others (Eser, 2011: 1). Financial and non-financial support, aid and incentives provided by the public through various methods are called "incentives". In cases where these incentives are applied for the rapid development of certain regions, the concept of "regional incentive" comes to the fore. In recent years, incentives focus on general issues such as increasing production, employment and exports, as well as developing new products with high value added by increasing the R&D capacity, increasing the competitiveness of companies on an international scale and implementing environmental protection measures (Eser, 2011: 11).

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The issue as to whether investment incentives applied at the regional level contribute to the faster development of less developed regions and improve income distribution is one of the important issues discussed in the academic community. Some scientists argue that incentives do not have or have very weak effects on investment decisions, while others state that they have serious effects (Dağ et al. 2017: 768). Although there is no general consensus on this issue, it can be said that the natural and human resources of the regions and the geographical, climatic, political, socio-cultural, economic and demographic structures are directly effective in the success of the incentives. In addition, the types of incentives and the levels of implementation have an impact on investment decisions.

From the viewpoint of Turkey, it is clear that provinces located in the same regions have disparities in income amongst them. In particular, obvious economic disparities between the East and West exist. Marmara, Aegean and Mediterranean regions are more developed than the Eastern and Southeastern Anatolian Regions which are quite behind economically. It can be said that geographical and climatic factors, transportation opportunities and domestic political problems have significant effects rather than economic factors in the formation of this differences in economic development (Dağ et al. 2017: 768). Many regional development policies have been implemented since the Turkey became a Republic. These policies have enabled the economic development of some provinces, but failed to correct regional development disparities.

The aim of this study is to investigate whether there is regional and provincial convergence in income in Turkey and also whether some of the less developed regions that are benefited from investment incentive applications for many years differed from other places with a significant degree in terms of economic development. For this purpose, convergence analyzes is made with per capita Gross Domestic Product (per capita GDP) data for the 2004-2017 period involving 26 regions forming Level-2 and 81 provinces forming Level-3 according to the Nomenclature of Territorial Units for Statistics (NUTS). This geographical classification was established by European Commission and adapted to Turkey by TURKSTAT in 2002 (TÜİK, 2002).

Significant Investment Incentive Policies in Turkey

In Turkey until the 1990s, investment incentive policies helped to ensure industrialization as a whole; after this period, these policies tended to reduce regional disparities. Since 2000s, besides regional policies, incentives for high technology and R&D investments that help increase competitiveness and environmental protection have started to gain weight.

The first legal arrangement on incentive policies can be mentioned in the law titled "Industrial Incentive Conservation", which was enacted in 1913 during the Ottoman Empire. In the Izmir Economic Congress, which was held on February 17, 1923 and has the feature of being the first economic congress, principles were introduced for the development of the economy with the contribution of Turkish entrepreneurs (Urhan, 2015: 31). The regulations made with the law enacted in 1913 were revised in 1927 with the law enacted under the name "Industry Incentive Law". The Industry Incentive Law was aimed to increase domestic capital and to develop the domestic industry (Akdeve and Karagöl, 2013: 337).

As a result of the impact of the Great Depression that occurred in 1929 in the world together with the lack of capital accumulation in Turkey, it was already understood that it was not possible to reach desirable economic development by favour of private enterprises. In this sense, the Industry Incentive Law was not able to provide the expected contribution. The Second Economic Congress was convened on 22/04/1930 and the decision to move on to a mixed economic order involving the public and private sector was adopted by abandoning the private enterprise-based development strategy (Eser, 2011: 74). After this date, statism dominated; state-owned institutions such as Sümerbank, Etibank, MKEK (Mechanical and Chemical Industry Company) and the MTA (Mineral Research & Exploration General Directorate) pioneered the development of Turkey. The Industry Incentive Law was repealed in 1942 and no new legal regulation was made to incentivize the private sector until the 1950s.

The period of 1950-1960 was the period in which a relatively liberal economic policy was followed both in terms of supporting domestic investors and bringing foreign capital to the country (Kutbay and Aslan, 2017: 458). While infrastructure investments were prioritized, the understanding of increasing capital accumulation and developing the industry in general was dominant in the pre-planning period. In order to ensure the balanced development of the industry between

regions, **Public Economic Enterprises (PEE)** were aimed to distribute Anatolia's different places as far as possible (Urhan, 2015: 32).

Following the establishment of the State Planning Organization on September 30, 1960, the first five-year development plan was put into effect in 1963 and thus, the planned period was initiated. Investment incentive policies were implemented within the framework of five-year development plans and annual programs. In 1968, which coincided with the second five-year plan period, 22 provinces were designated as "**Regions with Development Priority (RDP)**". Facilities such as tax exemption, favorable loan facilities, and exemption from some transaction taxes were provided for the investments in the RPDs. RPD implementation has been continuing for more than 50 years. The number of settlements within the scope of the RPD reached 40 in 1973, and with the latest arrangement in 2003, 49 provinces and 2 districts are currently within the scope of RPD (Ministry of Development of Turkey, 2019).

Import substitution policy was implemented in the early 1970s. For importations, quotas and high tariffs were put into effect. The fact that the world conjuncture is appropriate and the increase in the remittances made this policy to be applicable/prevalent for a while. However, with the global oil shock in the late 1970s, Keynesian policies began to be questioned and the free market economy gained popularity again in the world. Balance of payments deteriorated and together with the effect of insufficient domestic markets, import substitution policies became unsustainable in Turkey (Eser, 2011: 76).

With the 24 January Decisions taken in 1980, the import substitution industrialization policy was abandoned and export-oriented industrialization policy was adopted instead. Besides instead of the fixed foreign exchange policy, the flexible foreign exchange policy was adopted and loan rates were increased at the inflation rate. Domestic markets were forced to confront the foreign market competition in this way. Turkey has been using the real exchange rate, interest rate and pricing policies since that time. Quantity restrictions on imports have been removed. State's role in the market was aimed to reduce by the privatization of PEE's. In this period, export loans gained weight and efforts were made to increase exports. In addition, 10 provinces with first degree priority and 17 provinces with second degree priority were identified within the scope of the RDP implementation, and these provinces benefited from incentives at the provincial level.

With the Council of Ministers Decision dated 12/05/1988 and numbered 88/12944 Resource Utilization Support Fund (RUSF) has been launched in order to support investments and reduce credit costs. This is an incentive element in the form of grant or cash support. The implementation of grant aids up to 60% of the investment cost within the scope of the RUSF led to significant increases in investments for certain manufacturing industries as well as some sectors of particular importance such as tourism, transportation, education and health. By means of cash supports provided under RUSF, while some provinces such as Denizli, Kahramanmaraş and Gaziantep made a breakthrough in the manufacturing industry, some other provinces such as Muğla and Antalya came to the forefront in terms of tourism sector (Eser, 2011: 103).

In the 1990s, there happened a financial difficulty in public finance. The amount of resources allocated from the budget by the government to support investments remained incapable. For this reason, the RUSF application was canceled in 1991 and the application of "Fund Based Loan" was implemented instead. Fund based loan application was an incentive policy that provided low interest rate loans up to 60% of the fixed investment amounts to the investment projects which were given priority according to sectoral and regional preferences (Yardımcı, 2009: 6).

With the **State Aid in Investments Decision** No. 94/6411 dated 26/12/1994, the practice of sectoral selectivity was abandoned in incentives. While the developed provinces such as Istanbul, Ankara, Izmir, Kocaeli, Bursa and Adana were called "**Developed Regions**", all regions outside these and the places within the scope of the RPD were named as "**industrial zone**". Also, organized industrial zones (OIZs) in developed provinces were considered within the industrial zone. Thus, a new grouping has been made as "**Developed Regions, Industrial Zone and RPD**" in terms of settlements since 1995 (Kutbay and Aslan, 2017: 462). Within the scope of this Decision, it is aimed to support small and medium sized enterprises (SME) together with investments in R&D, environmental protection, quality and standard development and development of local handicrafts, as well as production of goods and services. The investments made within the industrial zone and the expansion, modernization, renewal, quality correction and bottleneck investments in the developed regions are termed as "**sector investments with special importance**".

In 1995 Turkey became a member of World Trade Organization (WTO), signed the Customs Union agreement with the EU on January 1, 1996, and also Turkey's EU candidacy was accepted at the summit of European Council on 10-11 December 1999 in Helsinki. These developments have increased Turkey's liabilities to international organizations. Accordingly, restrictions were imposed on incentive practices such that subsidies based on direct cash supports and export performance and favoring local goods were repealed. Tax incentives started to gain weight in incentive practices.

The **Law No. 5084 on Promoting Investments and Employment and Amending Some Laws** divided the regions into two groups in terms of incentive policies in 2004. The **first group** stated in article 2/a of the Law; involved provinces of which per capita GDP $1.500 or less in 2001 according to TURKSTAT and provinces of which socio-economic development index were negative in 2003 according to State Planning Organization. The first group provinces were benefited from incentives such as income tax withholding, employer's national insurance contribution and energy support. The **second group** was defined in the article 2/b of the Law, consisted of the first group provinces together with other provinces within RPD. The provinces in the second group benefited from free investment allocation.

With the Law No. 5449 on the Foundation, Coordination and Duties of Development Agencies in 2006, development agencies were established in 26 regions forming the NUTS level 2 in order to accelerate regional development, ensure its sustainability and reduce inter-regional and intra-regional development disparities. The State Planning Organization was held responsible for the coordination of Development Agencies. Currently, Development Agencies carry out their activities under the Ministry of Industry and Technology.

In framework of the law numbered 5838 **Amendments of Certain Laws** and 2009/15199 **State Aid in Investment Decision** in 2009, NUTS-2 regions were graded as four regions according to their per capita GDP and socio-economic development level (see Table 1).

Thus, all 81 provinces were included in the scope of incentive system. For each incentive region, the scope of incentives has been created by determining the minimum investment amounts according to different sectors by considering the investment potential and competitiveness of that region. Therefore, for the first

time, **the element of regional and sectoral selectivity** was handled together (Tatar, Candan and Yurdadoğ, 2017: 169). From this point of view, it can be said that there has been a paradigm shift in incentive system practices since 2009.

Table 1: Incentive Regions Created within the Scope of 2009/15199 Decision

1st Region	TR10-İstanbul	**2nd Region**	TR22-Balıkesir, Çanakkale
	TR21-Tekirdağ, Edirne, Kırklareli		(excluding Bozcaada ve Gökçeada)
	TR31-İzmir		TR32-Aydın, Denizli, Muğla
	TR41-Bursa, Eskişehir, Bilecik		TR61-Antalya, Isparta, Burdur
	TR42-Kocaeli, Sakarya, Düzce, Bolu, Yalova		TR62-Adana, Mersin
	TR51-Ankara		
3rd Region	TR33-Manisa, Afyonkarahisar, Kütahya, Uşak	**4th Region**	TR22-Bozcaada and Gökçeada counties of Çanakkale
	TR52-Konya, Karaman		TR82-Kastamonu, Çankırı, Sinop
	TR63-Hatay, Kahramanmaraş, Osmaniye		TR90-Trabzon, Ordu, Giresun, Rize, Artvin, Gümüşhane
	TR71-Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir		TRA1-Erzurum, Erzincan, Bayburt
	TR72-Kayseri, Sivas, Yozgat		TRA2-Ağrı, Kars, Iğdır, Ardahan
	TR81-Zonguldak, Karabük, Bartın		TRB1-Malatya, Elazığ, Bingöl, Tunceli
	TR83-Samsun, Tokat, Çorum, Amasya		TRB2-Van, Muş, Bitlis, Hakkari
	TRC1-Gaziantep, Adıyaman, Kilis		TRC2-Şanlıurfa, Diyarbakır
			TRC3-Mardin, Batman, Şırnak, Siirt

A new regulation has been made in the incentive system since 2012 with the Cabinet Decision numbered 2012/3305 on **State Aids in Investments**. The incentive system of 2012 has 4 main regimes. These are defined as general investment, regional investment, large-scale investment and strategic investment. This incentive system includes regional and sectorial selectivity just like the 2009 implementation. Apart from this, large investments and strategic investments are also supported without any distinction. One of the most important innovations introduced in 2012 is that 81 provinces, which were divided into 4 incentive regions in the previous incentive system, are now divided into 6 incentive regions. Settlements that fall within the scope of the new incentive regions are shown in Table 2.

Table 2: Incentive Regions According to the Incentive System Implemented in 2012

Region 1	**Region 2**	**Region 3**	**Region 4**	**Region 5**	**Region 6**
Ankara	Adana	Balıkesir	Afyonkarahisar	Adıyaman	Ağrı
Antalya	Aydın	Bilecik	Amasya	Aksaray	Ardahan
Bursa	Bolu	Burdur	Artvin	Bayburt	Batman
Eskişehir	Çanakkale	Gaziantep	Bartın	Çankırı	Bingöl
İstanbul	(excluding	Karabük	Çorum	Erzurum	Bitlis
İzmir	Bozcaada &	Karaman	Düzce	Giresun	Diyarbakır
Kocaeli	Gökçeada)	Manisa	Elazığ	Gümüşhane	Hakkari
Muğla	Denizli	Mersin	Erzincan	Kahramanmaraş	Iğdır
	Edirne	Samsun	Hatay	Kilis	Kars
	Isparta	Trabzon	Kastamonu	Niğde	Mardin
	Kayseri	Uşak	Kırıkkale	Ordu	Muş
	Kırklareli	Zonguldak	Kırşehir	Osmaniye	Siirt
	Konya		Kütahya	Sinop	Şanlıurfa
	Sakarya		Malatya	Tokat	Şırnak
	Tekirdağ		Nevşehir	Tunceli	Van
	Yalova		Rize	Yozgat	Bozcaada &
			Sivas		Gökçeada

Source*: Investment Office, 2019.*

According to this incentive system, while the labor-intensive sectors are supported in regions with low level of development, the sectors to be supported in the developed regions are determined by taking into account the potential of each region.

In 2016, Council Decision No. 2016/9596 on **Procedures and Principles Regarding the Implementation of the Attraction Centers Program**, an incentive application has been put into effect in parallel with the ongoing incentive practices called "Attraction Centers Program". This program is materialized on the purpose of revive the investment climate in relatively underdeveloped regions and reduce regional development disparities by increasing production, employment and exports. There are 23 provinces within the scope of Attraction Centers Program, the majority of which are Eastern and Southeastern provinces.

Literature Review

One of the predictions of the neoclassical growth model is the **convergence hypothesis**. According to the convergence hypothesis, relatively poor countries achieve faster economic growth than rich countries and thus catch the income levels of rich countries. In this way, the gap in terms of per capita income level between rich and poor countries closes in time. The neoclassical theory predicts that international capital flow will be directed to relatively poorer countries because of the low marginal product of capital initially in these countries, thereby poor countries will grow faster and approach rich countries. There are many studies in the literature examining whether there is convergence between countries, regions or provinces with different income levels. The study on the USA by Barro and Sala-i Martin (1992) is one of the first studies on this subject. Barro and Sala-i Martin (1992) determined the existence of convergence in terms of personal income in the 48 states of the USA between the years 1840-1963 with β and σ convergence analysis. Yin, Zestos & Michelis (2003) examined whether there was convergence in terms of per capita income in the 15 EU countries between 1960-1995 with the analysis of σ-convergence and β-convergence, and the existence of convergence in general was confirmed except for the 1980-1985 period of weak divergence. Arbia and Piras (2005) examined the existence of convergence in terms of per capita income in 125 regions from 10 European countries with spatial panel data models in which cross-sectional error autocorrelations were taken into consideration and as a result they confirmed the convergence. Gaspar (2009) examined the convergence hypothesis in terms of per capita GDP for 159 countries and different country groups for the period of 1992-2008. As a result, although there is a general convergence in the countries of the world, the convergence rate of low-income countries has been found to be very low. Demirbaş and Kabananıye (2011) examined the convergence in terms of per capita income between East African countries (5 countries) in 1980-2007 period by using cointegration methods and found that there was convergence among related countries. Tıraşoğlu (2013) examined the validity of the convergence hypothesis in terms of real income per capita in the G20 countries in the period 1969-2011 with panel unit root tests. As a result, it was found that real income per capita of G20 countries converged neither to G20 and EU average nor to the per capita income of the USA. Borsi and Metiu (2015) examined the convergence hypothesis from the point of per capita income in the EU countries between 1970-2010 years by using the framework of the non-linear latent factor methodology.

In the study, it was concluded that there was no holistic convergence in the EU but there was club convergence in some geographical areas, old and new EU members diverged in terms of per capita income, and there was a distinction between southeast and northwest Europe. Ağazade (2017) examined the existence of convergence between Azerbaijan's 9 economic regions and Baku in terms of per capita industrial production in the period of 2005-2015 by means of panel unit root tests. Test results showed that convergence hypothesis is not valid in the economic regions of Azerbaijan. Qin, Ye & Lui (2017) investigated the existence of spatial club convergence in the Zhongyuan region of China between 1993-2009. As a result of the study, the existence of spatial club convergence at the rate of 2% and 1% was confirmed in the 56 sub-regions of Zhongyuan between 1993-1999 and 1993-2009, respectively.

There are many studies examining the convergence hypothesis on Turkey at regional or provincial levels. Filiztekin (1998), examined provinces in Turkey in the period from 1975 to 1995. In conclusion, the existence of β-convergence was confirmed but not an absolute β-convergence. Kalyoncu (2001) examined the existence of convergence in terms of per capita income in 67 provinces between the years of 1979-1997. It was found that there was no convergence considering all provinces. In addition, the analysis results on the basis of sub-regions, no convergence was observed at the level of provinces in the Aegean, Southeast Anatolia and Eastern Anatolia regions. When provinces were divided into three groups according to per capita income, sorted from large to small, the results showed that while the first and second groups converge in the provinces, the third group with the lowest income was diverged. Karaca (2004), investigated the existence of convergence at the provincial level in Turkey by using β-convergence and σ-convergence analysis. Consequently, there was no decrease in income differences between provinces in the period between the years of 1975-2000, on the contrary there was an increase in income divergence. Ersungur and Polat (2006) examined the existence of α and β-convergence with regards to per capita income levels in 12 regions according to the NUTS-1 between the years of 1987-2001. As a result, with the effect of the crises faced in that period, a strong convergence was determined among regions' per capita income levels. Zeren and Yılancı (2011) were tested the convergence hypothesis within 26 NUTS-2 regions of Turkey at the period of 1991-2000. Panel data analysis results confirmed that there was an absolute and conditional convergence within 26 regions in terms of income levels. Abdioğlu and Uysal (2013), examined the convergence hypothesis between

general and sectoral gross value added of 26 regions covered by the NUTS-2 in Turkey between the years of 2004-2008. According to the results of the non-linear panel regression analysis applied in the study, convergence was determined in the total gross value added of the regions. In addition, it was found that the regions' agriculture, industry and service sectors converged. Gerni et al. (2015) investigated the existence of convergence in terms of per capita income in Turkey between the years of 2004-2012 at the level of 26 regions in NUTS-2 and 81 provinces in NUTS-3. According to the findings of the study, convergence was observed among the income levels of 26 regions and regional imbalances decreased during the analyzed period. On the other hand, conditional convergence analysis showed that investment incentives did not positively affect income convergence between regions. According to the analysis made at the provincial level, the incentives implemented in 2009-2012 rather than in 2004-2008 had a corrective effect on the income distribution between the provinces and brought about convergence. Gömleksiz, Şahbaz and Mercan (2017), used the convergence analysis to analyze the impact of fixed investment and public investment incentives in Turkey at NUTS-2 level for the period of 2004-2014. Empirical results have shown that the convergence hypothesis is valid at the regional level. Gündem (2017) examined the existence of income convergence between the periods of 1987-2001 and 2004-2011 in Turkey's NUTS-2 regions by using the classic and spatial (SAR and SEM) convergence analysis. As a result, while regional income convergence was observed between regions in 1987-2001 and 2004-2011 at high speeds with regards to the classical convergence analysis; spatial convergence analysis indicated that the convergence was either too slow or non-existing at all. Furthermore, it was found that public investment incentives did not have a positive effect on regional income convergence.

Data and Methodology

In this study, GDP per capita (base year 2009, at current prices, TRY) which is published by Turkish Statistical Institute (TURKSTAT) in 26 regions (NUTS-2) and 81 provinces (NUTS-3) for the period of 2004-2017 were used. With these data, β-convergence and σ-convergence analyzes were performed to investigate whether there is convergence in terms of per capita income among regions and provinces. As part of regional analysis, beside holistic assessment of all 26 NUTS-2 regions, 7 regions (TRA1, TRA2, TRB1, TRB2, TRC1, TRC2 and TRC3) that have relatively low income and are located in East and Southeast of

Turkey have also been privately examined. At the provincial level, differences in income in 49 provinces (2 districts are excluded) that make up the scope of the RDP are examined. Thus, this study investigates whether there has been a significant difference in increase of per capita income in regions and provinces that have benefited from incentive practices for many years.

One of the most important predictions of the Neoclassical growth model developed by Solow (1956) is the "convergence" hypothesis. This hypothesis assumes that relatively poor countries will grow faster in economic terms than rich countries, and that poor countries will reach the income levels of rich countries, thereby equalizing the income distribution between rich and poor countries. The poor capital per capita countries are low in capital per labor. Therefore, the marginal product of capital is initially high in these countries. International capital turns from rich countries to poor countries, where capital is relatively scarce and can generate high profits. In addition, international capital that comes to low income countries carries high technology. As a result of attaining the ready technology and information with low labor cost, poor countries grow faster than rich countries and catch the income levels of them. On the other hand, according to the internal growth models developed by Romer (1986) the convergence hypothesis is invalid, poor countries cannot reach the income levels of rich countries.

In the test of convergence hypothesis, β (beta) convergence and σ (sigma) convergence tests are frequently used. Barro and Sala-i Martin (1992: 230) developed the following panel regression equation for β-convergence testing:

$$\frac{1}{T}\log\left(\frac{y_{i,t_0+T}}{y_{i,t_0}}\right) = B - \left(\frac{1-e^{-\beta T}}{T}\right)\log\left(y_{i,t_0}\right) + u_{i,t_0,t_0+T} \quad (1)$$

Here; the dependent variable is the growth rate of per capita GDP between t_0 and T times, B is the constant term, $\log(y_{i,t_0})$ is countries' per capita GDP at time t_0 and u_{i,t_0,t_0+T}, expresses error term. According to this equation, if there is a negative relationship between the growth rate of per capita income and the level of income at the beginning, the presence of β convergence is mentioned. For this, the value of the coefficient β estimated by panel regression should be positive and significant.

There are two types: β convergence, absolute (unconditional) β convergence and conditional β convergence. In the absolute β convergence test, technology, saving rate, capital, etc. among the countries/regions studied. It is assumed that there is no structural difference. Equation (1) represents absolute convergence. In the

conditional β convergence test, structural differences between countries/regions are taken into account. Variables representing the structural differences to be analyzed are determined and included in the regression equation. The conditional convergence equation can be illustrated as follows:

$$\frac{1}{T}\log\left(\frac{y_{i,t_0+T}}{y_{i,t_0}}\right) = B - \left(\frac{1-e^{-\beta T}}{T}\right)\log\left(y_{i,t_0}\right) + cX_{i,t} + u_{i,t_0,t_0+T} \quad (2)$$

Here X_i is the vector of structural variables. As can be seen, the convergence panel regression equations (1) and (2) are nonlinear equations. These equations can be estimated by non-linear panel regression analysis or can be solved by converting them into a linear form. In this study, the method applied in the study of Zeren and Yılancı (2011) was followed and the linear panel regression equation solution was made. The predicted linear β convergence panel regression models are as follows:

$$\log\left(\frac{y_{i,t}}{y_{i,t-1}}\right) = a + b\log\left(y_{i,t-1}\right) + u_{i,t} \quad (3)$$

$$\log\left(\frac{y_{i,t}}{y_{i,t-1}}\right) = a + b\log\left(y_{i,t-1}\right) + cX_{i,t} + u_{i,t} \quad (4)$$

Here, $\log\left(\frac{y_{i,t}}{y_{i,t-1}}\right)$ is the per capita GDP growth rate for region i in period t, while $\log(y_{i,t-1})$ shows the per capita GDP in the t-1 period. If the value of the estimated *b* coefficient in these models is found to be negative and statistically significant, the existence of convergence will be verified. In order to obtain information about the convergence rate, the coefficient β must be calculated from the coefficient *b*. In this study, only the convergence tests were performed with the linear panel regression equations (3) and (4), and the convergence rate was not calculated.

Results

Before convergence analyzes were made at the regional and provincial levels, it was examined whether the natural logarithms of the series were stationary using the panel unit root tests. Panel unit root test results are shown in Table 3.

Table 3: Panel Unit Root Test Results

		ln(Yt/Yt-1) (level)		ln(Yt) (level)		d1-ln(Yt) (first difference)	
REGIONS	Panel Unit Root Test	Test Stat.	Prob.	Test Stat.	Prob.	Test Stat.	Prob.
	Levin, Lin & Chu t*	-14.4126	0***	1.66957	0.9525	-14.4126	0***
	Im, Pesaran and Shin W-stat	-10.7818	0***	8.36367	1	-10.7818	0***
	ADF - Fisher Chi-square	198.987	0***	2.91463	1	198.987	0***
	PP - Fisher Chi-square	266.878	0***	3.02829	1	266.878	0***
	Hadri Z-stat	-0.18715	0.5742	14.148	0***	-0.18715	0.5742
		ln(Yt/Yt-1) (level)		ln(Yt) (level)		d1-ln(Yt) (first difference)	
PROVINCES	Panel Unit Root Test	Test Stat.	Prob.	Test Stat.	Prob.	Test Stat.	Prob.
	Levin, Lin & Chu t*	-26.7953	0***	2.00868	0.9777	-26.7953	0***
	Im, Pesaran and Shin W-stat	-20.2395	0***	13.5308	1	-20.2395	0***
	ADF - Fisher Chi-square	656.157	0***	15.8116	1	656.157	0***
	PP - Fisher Chi-square	931.872	0***	19.0329	1	931.872	0***
	Hadri Z-stat	0.97463	0.1649	24.9157	0***	0.97463	0.1649

In unit root tests, fixed model and Akaike Information criterion (AIC) are used. In the Hadri unit root test, the H_0 hypothesis is that, unlike other tests, the series does not contain a unit root. *** 1%, ** 5% and * 10% express significance at the level of statistical significance.

According to Table 3, while the per capita GDP growth rate data was stationary at the level, the first difference of the per capita GDP data was stationary. Therefore, the first differences of per capita GDP data were taken. According to the results of Hausman test, fixed effects models were created because the H_0 hypothesis was rejected.

Absolute and conditional β convergence test results based on NUTS Level-2 regions are shown in Table 4. In the conditional convergence test, the dummy variable is assigned a value of 1 for the 7 Level-2 regions in the East and Southeast of Turkey.

Table 4: Convergence Test Results of NUTS Level-2 Regions

Unconditional β convergence				**Conditional β convergence**		
	Coefficient	Probability			Coefficient	Probability
b	-0.144579	0.0156**		*b*	-0.121649	0.0393**
a	0.131498	0***		*a*	0.126664	0***
				dummy	0.008263	0.1783

*** 1%, ** 5% and * 10% express significance at the level of statistical significance.*

According to Table 4, the fact that *b* coefficient has a negative value in both tests and that the coefficient is significant at the 5% significance level confirms the existence of convergence in terms of regional per capita income. However, although the coefficient of the dummy variable was positive in the conditional convergence test, it was not statistically significant. It is understood from this result that there is no significant increase in income in the eastern and southeastern regions, where investment incentive policies have been intensely applied for many years, unlike other regions.

Convergence test results at provincial level are shown in Table 5. In conditional convergence tests conducted at the provincial level, the value 1 was assigned to the RDPs as dummy variable.

Table 5: β Convergence Test Results of Provinces

Unconditional β convergence				**Conditional β convergence**		
	Coefficient	Probability			Coefficient	Probability
b	-0.179777	0***		*b*	-0.154998	0***
a	0.136981	0***		*a*	0.128955	0***
				dummy	0.008537	0.0134**

*** 1%, ** 5% and * 10% express significance at the level of statistical significance.*

According to Table 5, unconditional as well as convergence test results show that per capita incomes of the provinces converged at 1% significance level. The fact that the dummy variable has a positive value at the 5% significance level shows that the income raises of the provinces within the scope of the RPD are positively separated.

The σ-convergence hypothesis is based on the examination of the change over time in the dispersion of per capita incomes of the economies under consideration

(Karaca, 2004: 3). Although the existence of β-convergence is not sufficient for σ-convergence, it is a necessary condition (Sala-i Martin, 1996: 1021). Therefore, it is not sufficient to say that there is convergence in a panel data with only σ-convergence test without performing β-convergence test. As the measure of dispersion, standard deviation can be used, but mostly coefficient of variation is used. The coefficient of variation is obtained by dividing the standard deviation at any time by the mean. The decrease in the coefficient of variation depending on time indicates the existence of σ-convergence, and the increase indicates that there is divergence between revenues.

The results of σ convergence analysis made on the natural logarithms of per capita GDP data for 26 regions and 81 provinces are shown in Table 6.

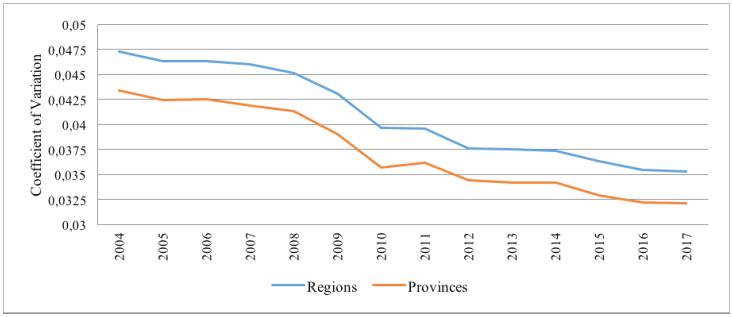
According to Table 6, it is seen that the coefficient of variation decreased from 0.047 to 0.035 in the regions and from 0.043 to 0.032 in the provinces. Therefore, there was convergence in terms of per capita GDP at both regional and provincial levels. However, it is striking that the coefficient of variation of the regions is higher than the provinces.

Table 6: Results of σ-Convergence Analysis

Year	Level 2: Regions			Level 3: Provinces		
	Mean	Standard Dev.	Coefficient of Variation	Mean	Standard Dev.	Coefficient of Variation
2004	8.774636	0.414775	0.047269774	8.682481	0.376866	0.043405306
2005	8.916517	0.413237	0.046345132	8.826056	0.374591	0.042441533
2006	9.053381	0.419652	0.046353118	8.960873	0.380605	0.042474096
2007	9.147161	0.420567	0.045977894	9.057209	0.378981	0.041843025
2008	9.258435	0.418154	0.04516466	9.172632	0.379165	0.041336516
2009	9.263232	0.398813	0.043053335	9.186873	0.358176	0.038987802
2010	9.417779	0.373772	0.039687956	9.34799	0.333657	0.035692956
2011	9.583074	0.378934	0.039542039	9.508887	0.343519	0.036126053
2012	9.692683	0.364705	0.037626826	9.62348	0.331302	0.034426373
2013	9.816337	0.36841	0.037530317	9.745467	0.332749	0.034143952
2014	9.92605	0.370442	0.037320218	9.853047	0.33656	0.034157953
2015	10.0445	0.3648	0.036318368	9.975138	0.328289	0.03291071
2016	10.14008	0.359755	0.035478485	10.06835	0.323821	0.032162242
2017	10.29707	0.363177	0.035269953	10.22068	0.328581	0.032148641

The trend of the variation coefficients arranged by years in Table 6 is summarized in Figure 1.

Figure 1: Variation Coefficients for Regions and Provinces



According to Figure 1, it is understood that the biggest progress of income convergence between regions and provinces coincides with the global crisis period which affected all countries in the world in 2008-2009.

Conclusion

One of the most important predictions of the Neoclassical growth theory developed by Solow (1956) is the convergence hypothesis. According to the convergence hypothesis, relatively poor countries achieve faster economic growth compared to rich countries and reach the income levels of rich countries over time. Neoclassical theory attributes this to the low marginal product of capital initially in poor countries. Therefore, poor countries reach higher growth rates with the contribution of ready-made technology and knowledge that migrate from rich countries to poor countries. Romer (1986), on the other hand, criticized this theory and, on the contrary, claimed that there was divergence in terms of income between developed and less developed countries.

The aim of this study is to investigate whether there is income convergence in Turkey at regional and provincial level and also some of the less developed regions that benefited from investment incentive policies for many years differs distinctively compared to other regions in terms of economic development performance. For this purpose, convergence analyzes is made with per capita GDP data

for the 2004-2017 period involving 26 regions forming Level-2 and 81 provinces forming Level-3 according to the NUTS. It is also examined whether the income convergence of the provinces that constitute RPD and the regions that are situated Eastern and Southeastern of Turkey is significant.

When all the findings are evaluated together, there is income convergence in terms of per capita GDP at both regional and provincial level between the years of 2004-2017. The higher coefficient of variation calculated at the regional level indicates that the income convergence at the regional level is weak and the imbalance in income distribution continues at the regional level. Therefore, it is concluded that investment incentive policies cannot provide sufficient contribution to the economic development of less developed regions.

The convergence of the Provincial-level and the regions in Turkey are examined by Filiztekin (1998), among the provinces in the period from 1975 to 1995; Zeren and Yılancı (2011) among the NUTS Level 2 regions in 1991-2000; Abdioğlu and Uysal (2013), between 2004-2008 focusing between the general and sectoral gross value added of 26 regions and Gömleksiz et al. (2017) found that there was convergence between 26 regions between 2004-2014. For all the periods studied, the results of Abdioğlu and Uysal (2013) and Gömleksiz et al. (2017) especially are in line with the results of this study. Gerni et al. (2015), while confirming the existence of convergence between revenues of 26 regions in the period of 2004-2012, showed that investment incentives have no effect on convergence. At the provincial level, it has been shown that the incentives applied in 2009-2012 have a corrective effect on income distribution between provinces and lead to convergence. These results are similar to the findings of this study.

Kalyoncu (2001) found that there was no convergence especially in underdeveloped provinces and in the East and Southeast region between 1979-1997. The weak convergence at the regional level in this study is similar to the results of Kalyoncu (2001). Karaca (2004) did not find convergence between the provinces in the period between 1975-2000. While Gündem (2017) found convergence between 26 regions between 1987-2001 and 2004-2011 periods, it was found that income convergence was either very slow or not at all with spatial analysis. These results do not match the findings of this study. Ersungur and Polat (2006) found convergence between 12 regions between 1987 and 2001 according to NUTS Level-1 and linked this to the impact of the crises experienced. Similar to the

findings of Ersungur and Polat (2006), the results of the σ-convergence analysis of this study showed that convergence accelerated in times of economic recession.

The contributions of this study to the existing literature are that the most recent per capita GDP data between the years of 2004-2017 are used and the East-Southeast regions and the provinces within RPD are privately examined. However, the effect of incentives on convergence has not been directly studied with the help of a variable. Also, spatial tests used in the measurement of convergence in recent years were not used in this study. These are some of the limitations of the study.

In further studies, the effects of incentive policies on convergence can be examined with a variable representing the incentives utilized. In addition, micro-analysis of the relationship between data and incentive amounts and income growth at firm level will be very useful for understanding the effectiveness of incentive policies.

Although the effects of incentives on investments seem very weak on a macro scale, some large or innovative investments need to be supported in terms of regional development. It is clear that investment incentive practices are not sufficient but necessary for regional development. As Tatar Candan and Yurdadoğ (2017: 172) stated, it is very important to create a healthy incentive database to simplify the incentive management and incentive system and conduct efficiency/productivity analyzes. Apart from this, it will be beneficial to give priority to the logistics infrastructure investments in underdeveloped regions, to prevent qualified labor emigration by making employment intensive investments by government.

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13

FINANCIAL DYNAMICS AND ECONOMIC GROWTH: THE CASE OF TURKEY

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Within the globalization process, competition around the world has been sharpened and, the economic growth of countries has become influenced by each other. In this process, which accelerated after 1980, the developments in the financial field made the effect of globalization on national economies much more rapid and deep. Due to this critical importance, the relationship between financial development and economic growth has been frequently questioned in recent years.

Economic growth is among the primary policy tools for people, societies, and governments to meet the needs and provide opportunities. Stable economic growth allows for increased welfare, poverty reduction, and better quality of service in areas such as defense, education, and health. Therefore, the origin and nature of growth have been questioned since the early periods of modern economics (Türkoğlu, 2016: 84). Here, economic growth can be considered as an increase in real GDP per capita, or with a more analytical approach, production possibilities frontier's shift to the right due to the increase in factors of production and the technology involved (Acar, 2004: 177-179). Savings and investments should be directed in the economy in order to raise the standard of living. The increase in investments, directly and indirectly, affects macroeconomic variables, especially the national income level. In modern societies, investments and savings that will finance investments are separated. The interaction between the two segments is carried out by the financial system (Bozoklu and Yılancı, 2013: 166-167). The

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relationship between financial development and economic growth occurs at this point. Financial development is defined as an increasing variety of tools used in the financial market and making these tools more widely available (Erim and Türk, 2005: 23-24). The financial system, on the other hand, is a whole formed by the economic actors, markets, tools, and organizations coming together to perform various functions together in an economy. The function of transferring savings to investments is realized through the financial system. Therefore, the financial system is the determinant of the micro and macro performance of the economy. The financial system consists of lenders, borrowers, financial intermediaries (institutions), financial instruments, and legal-institutional arrangements (Afşar, 2007: 189-190).

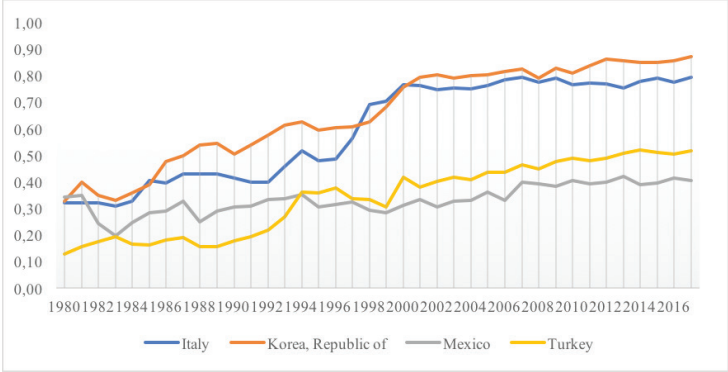
The main function of the financial system is to transfer funds from units that have excess funds in the economy to units that need funds. The financial system fulfills this function through financial instruments, intermediaries, and legal regulations that shape the behavior of these units. The increase and development of financial intermediaries occur by creating new financial instruments and making new legal arrangements. Thus, it is possible for the financial system to have a stable structure, to develop and to feed the real economy. The development of the financial sector includes both financial expansion and financial deepening. Financial expansion is associated with the spread of financial services and the growth of financial institutions, while financial deepening can be expressed as per capita financial services and an increase in the ratio of income in institutions or financial assets. The development of the financial sector through the expansion or diversification of financial markets enables a better allocation of resources (Aslan and Korap, 2006: 2). Financial systems emerge as an important factor in the economic growth process, as they undertake the function of providing funds to spread new technologies and realize capital accumulation. Financial systems, which are developed and fulfill their functions effectively, can direct small-value deposits in the hands of individuals to large investments. By making investment diversification possible, it reduces the risks of savers. It can increase efficiency and consequently economic growth by undertaking functions such as reducing the costs of collecting and evaluating the information on projects to be implemented and monitoring the management of resources through its specialized institutions (Aslan and Küçükaksoy, 2006: 26). It is very important for the economic growth that the financial sector mediates between savings and investments (Contuk ve Güngör, 2016: 90). In the financial system, especially in the

banking system, besides supporting investments, they also affect the real economy through consumer loans. Banking system developments reduce consumer loan costs and increase their volume. This increases total demand and supports economic growth (Ağayev, 2012: 157; Demirdöğen and Kaplan, 2020: 37-38).

Since the financial development level can affect foreign capital, it is very determining for developing countries that need to eliminate the capital shortage. These countries generally try to attract capital to their countries by increasing the interest rate. It is possible to reach potential economic growth if that foreign capital used in more productive areas, but this relationship is controversial (Özdemir, 2020: 42). It is generally accepted that the existence of a developed financial system is important for directing the savings to the economy. However, there is no consensus on how to measure financial development. Different studies and different institutions can use different criteria to measure financial development. (Kandır et. al., 2007: 312). One of the most widely used of these criteria is the Financial Development Index prepared by Svirydzenka (2016) and published by the IMF.

Chart 1 shows the development of selected countries' Financial Development Index series. Accordingly, there is an increase in Turkey's financial development index after 1980. In 1980, while Korea, Mexico, and Italy were almost at the same level, Mexico weakened at the beginning of the period. Its seen that Turkey caught Mexico in 1994 while Italy and South Korea act almost together.

Chart 1: Financial Development Index, 1980-2017



Source: *IMF Financial Development Index Database*

As a result of developments such as regulation, deregulation, and exchange arrangements between countries after 1980, financial globalization started to be achieved and the interaction between countries accelerated. In this process, while developed countries searched for markets, underdeveloped and developing countries also sought resources. This situation, which means demanding more funds, has been a driving factor for international capital to seek high-yield financial markets (Erim and Türk, 2005: 25). In this process, Turkey has taken financial liberalization steps to attract foreign capital. Thus, Turkey aimed to implement growth-development policies faster. During this painful period, there were major economic crises in 1994 and 2001. Especially after the 2001 Banking crisis, the financial system has changed in Turkey (Akkay, 2010: 56). As a result of these developments, the interest of foreign capital increased and so the country's economic growth performance has been positively affected.

It is very important for all countries, especially developing countries, to reveal the direction of the causality relationship between financial development and economic growth, and to determine a policy to increase economic growth (Bozoklu and Yılancı: 2013: 165). In the studies conducted, it is theoretically accepted that financial development has an important contribution to the economic growth process, but a common result has not been reached regarding the direction of causality relationship (Contuk and Güngör, 2016: 90-91). In the study, the relationship between financial development and economic growth index for Turkey is examined as symmetrical and asymmetrical. Thus, the effects of positive and negative developments in financial dynamics on economic growth will be examined. Accordingly, the theoretical framework and the results of the literature review are given in the following section. Then applied econometric models are introduced and findings are presented. In the last section, the findings are evaluated.

Theory & Literature

The discussions on the relationship between financial development and economic growth have been going on since the first periods when the nature of economic growth has been questioned. A. Smith, the architect of classical economic thought, pointed out the importance of financial development by stating that the most important reason for the increase in trade volume in England is banking activities that can finance the necessary investments (Öztürk et. al., 2011: 54). In parallel with Smith, Bagehot and Hicks examined the role of financial development

in the industrialization process in England. Schumpeter (1911) points out that banks will support investments with new technologies as they have to offer their investors the highest probability of earnings, therefore financial development will trigger economic growth by affecting new investments. Following the Keynesian approach, Robinson (1952: 86) objected to this approach. By saying "where enterprise leads finance follows", Robinson states that the relationship is opposite, and that economic growth affects financial development. Lucas (1988: 6) defines finance-growth relationship as "badly over-stress" and states that there is no relationship between variables (Levine, 1997: 688; Erim and Türk, 2005: 22, İnançlı et.al., 2016: 37). Although Schumpeter's suggestion seems reasonable at first glance, the results of empirical studies could not confirm this. According to most researchers, the relationship between financial development and economic growth is not the same in all circumstances and in every country (Kandır et. al., 2007: 323).

In the main classification, the relationship between financial development and economic growth can be in four different ways. The first of these is the supply leading representing Schumpeterian (1912) understanding. F The Supply leading hypothesis states that financial development has causality towards economic growth through savings rates and capital accumulation. On the other hand, there is the demand following the hypothesis that Robinson emphasizes and indicates that economic growth affects finance. There is also a feedback hypothesis, which indicates that the two variables are in a causal relationship with each other, and finally, a neutral hypothesis expressed by Lucas (1988) that indicates that there is no causal relationship (Patrick, 1966: 175; Kandır et. al., 2007: 312; Bozoklu and Yılancı, 2013: 165; Ağazade and Karakaya, 2019:474). In addition, there is another view that Patrick (1966: 179) calls the "development stage hypothesis" and states that the relationship between the variables has changed over time.

Although the effect of financial development on economic growth process is accepted, especially in developing countries, there are different opinions about which one occurred before because the structural characteristics of the countries differentiate the results (Öztürk et. al., 2011: 58). In the related literature, it is seen that applied studies started with Gurley and Shaw (1967). After this study, which concluded that the supply leading approach proposed by Schumpeter is valid, studies have been conducted for many countries and regions.

The finance-growth relationship started to be discussed intensely after the global financial crisis that started in the USA in 2008 which effected all economies (Işık and Bilgin, 2016: 1760). Studies conducted by Danışoğlu (2004), Atamtürk et al. (2004), Aslan and Küçükaksoy (2006), Altıntaş and Ayrıcay (2010), Ince (2011), Kaya et.al. (2012), Ağayev (2012), Bozoklu and Yılancı (2013), Aydın et.al. (2014), İnançlı et.el. (2016), Aydın and Malcıoğlu (2016) and Şen and Pehlivan (2018) reached that supply leading hypothesis is valid for Turkey. Kandır et.al, (2007), Güngör and Yılmaz (2008), Keskin and Karşıyakalı (2010), Özcan and Arı (2011), Yıldırım et.al. (2013), Kar et.al. (2014) and Korap (2019) found that demand following hypothesis is valid. Feedback hypothesis found in the studies conducted by Ünalmış (2002), Altunç (2008), Kakilli-Acaravci et. al. (2009), Türkoğlu (2016), Ağazade and Karakaya (2019) and Kılıç et. al. (2019). Lastly Soytaş and Küçükkaya (2011) and Güneş (2013) confirmed neutrality hypothesis for finance-growth is valid for Turkey.

Besides these; Aslan and Korap (2006), Altunç (2008), Işık and Bilgin (2016), Manga et al. (2016) and Bolaman Avcı (2017) stated that the relations can change according to the series dealt with in terms of financial development. Akkay (2010) and Ergeç (2004) stated that causal relationships may change over time. Contuk and Güngör (2016) emphasized that there is a feedback relationship between the variables, but the results can change when examined asymmetrically. The fact that the results of the applied literature contradict each other indicates the need to consider the relationship between variables within the framework of certain standards and take into account in asymmetrical relationships.

Methodology

In order to analyze the relationship between financial development components and economic growth, structural fracture unit root test and causality tests are used.

Zivot-Andrews (1992) Unit Root Test with Single Structural Break

Zivot and Andrews (1992) mentioned that Structural breaks may have an important role in unit root researches, and they developed a unit root test that calculates endogenous breaks in series in intercept, trend, and both. In models, DU and DTindicates breaks in intercept and trend, $t = 1,2,\dots,T$ timeline $T_B$indicates breaks and $\varphi = T_B/T$ is break date,

Model A: $y_t = \mu + \alpha y_{t\text{-}1} + \beta t + \theta_1 DU(\varphi) + \sum_{i=1}^{k} d_i \Delta y_{t\text{-}j} + e_t$

Model B: $y_t = \mu + \alpha y_{t\text{-}1} + \beta t + \theta_2 DT(\varphi) + \sum_{i=1}^{k} d_i \Delta y_{t\text{-}j} + e_t$

Model C: $y_t = \mu + \alpha y_{t\text{-}1} + \beta t + \theta_1 DU(\varphi) + \theta_2 DT(\varphi) + \sum_{i=1}^{k} d_i \Delta y_{t\text{-}j} + e_t$

The situation where α takes the lowest *t* value is considered as a structural break date and the statistical value is tested against ZA critical values. If it is smaller in absolute value, the null hypothesis that the series contains unit root with structural breaks cannot be rejected (Yılancı, 2009: 327-328).

Hatemi J and E. Roca (2014) Asymmetric Causality Test

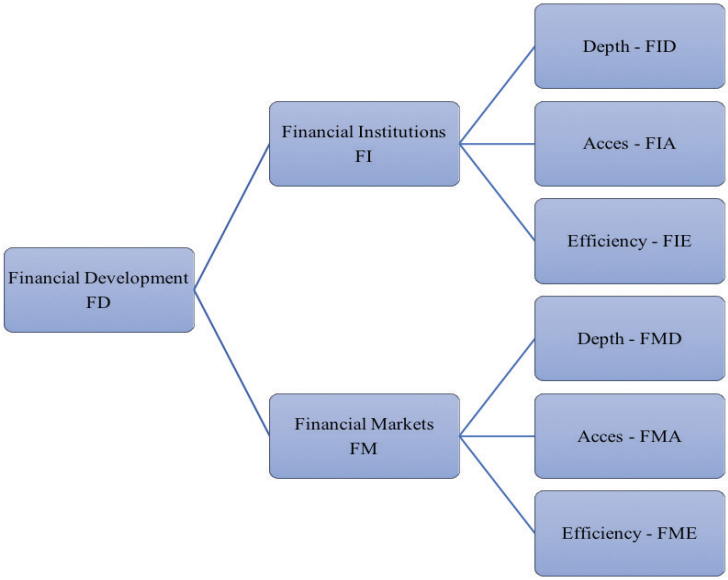
Granger and Yoon (2002), with their approach, have seen that they can detect hidden relationships by separating the series into positive and negative shocks. Moving from this point, Hatemi-J (2012) separated the series into positive and negative shocks and examined the causality relationship between the new series with Toda-Yamamoto (1995) causality test. Hatemi J and E. Roca (2014) developed this study by strengthening it with the bootstrap approach developed by Efron (1979). The test consists of the stages of shock decomposition, the determination of lag length, the addition of additional lags, and the comparison of the MWALD test statistics (Yılancı and Bozoklu, 2014: 214). Series can separate into the shocks as $\varepsilon_{1i}^{+} = max(\varepsilon_{1i}, 0)$, $\varepsilon_{2i}^{+} = max(\varepsilon_{2i}, 0)$, $\varepsilon_{1i}^{-} = max(\varepsilon_{1i}, 0)$ and $\varepsilon_{2i}^{-} = max(\varepsilon_{2i}, 0)$. And VAR(p) model $P_t^{+} = v + A_1 P_{t\text{-}1}^{+} + A_2 P_{t\text{-}2}^{+} + \ldots + A_L P_{t\text{-}k}^{+} + u_t^{+}$ shows the relationship between positive shocks $P_t^{+} = (P_{1t}^{+}, P_{2t}^{+})$ (Adıgüzel et. al., 2016: 245). Here u_t^{+} vector of error terms in positive shocks, A_r is the parameter matrix. The same equations set up for other shocks (Hatemi J and Roca, 2014: 8). If the MWALD test statistic is smaller than the selected information criterion values, the null hypothesis that no causality exists is accepted, otherwise, it is rejected.

Data and Empirical Findings

Within the scope of the study, the relationship between the financial development index, its subcomponents, and economic growth is examined. By means of

financial dynamics discourse, it is meant to address positive and negative shocks in financial developments. Data obtained from the IMF database and covers 1980-2017. Financial development index (FD) consists of subtitles Financial Institutions (FI) and Financial Markets (FM). These two titles are divided into depth (FID and FMD), access (FIA and FMA), and efficiency (FIE and FME) indices, as shown below.

Figure 1: Financial Development index (FD) and its Subcomponents

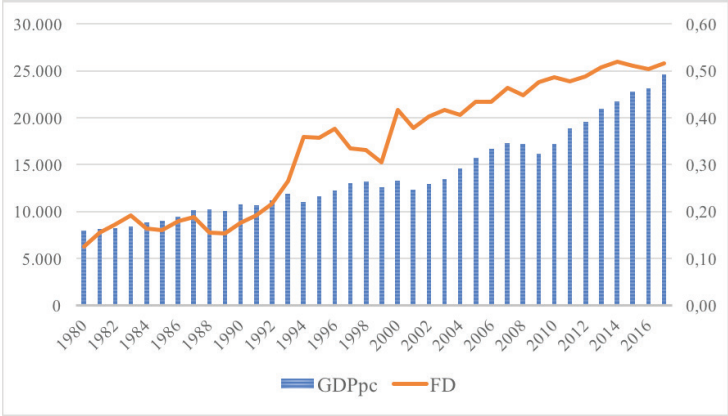


Source: *Svirydzenka, 2016*

For detailed information: https://data.imf.org/?sk=F8032E80-B36C-43B1-AC26-493C5B1CD33B

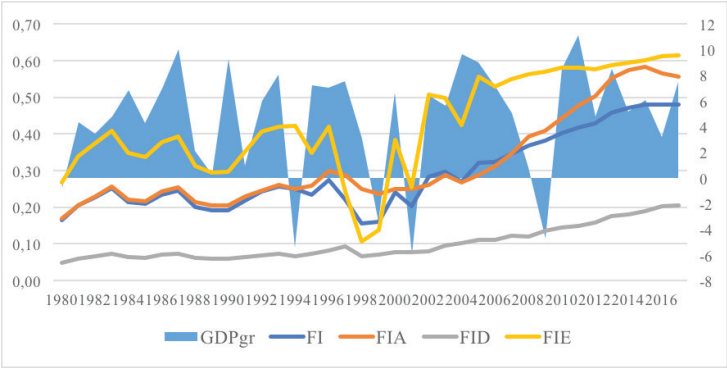
The development of GDP per capita (GDPpc) and FD and other indices shown below. As it is seen, during the economic crisis, financial development, and GDP per capita are contracting. After 1980, the FD remained almost horizontal until 1989, and then started and continued its fluctuating increase. The effects of the crises experienced in 2000-2001 are observed.

Chart 2: Development of GDP per capita and Financial Development Index for Turkey



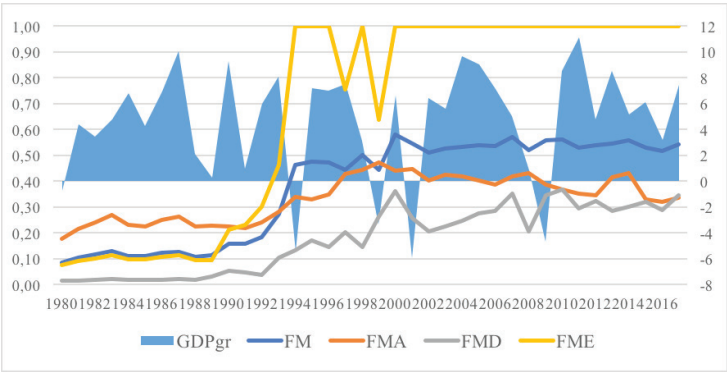
When Chart 3 is read on the right vertical axis, the development of economic growth rates is monitored. It is observed that economic growth turned negative in 1994, 2001, and 2009, when economic crises were experienced. Financial Institutions Indices can be viewed on the left vertical axis. It is seen that the Financial Institutions Index started to break in 1996 and continued at the lowest level until 1999. This situation can be interpreted that the Asian crisis - experienced in this period - has seriously affected the country's economy. A similar trend is valid for FIA and FIE. The FID series, on the other hand, suffered relatively little breakage.

Chart 3: Economic Growth Rate and Development of Financial Institutions Indices



In Graph 4, where the change in Financial Markets Indices is analyzed, it is seen that FM leaps forward in 1992. Here, FME has a significant effect. FME fluctuated between 1998 and 2000, suggesting that the series could be considered as an indicator of the pre-economic crises. Although FMA has improved until 2000, it decreased afterwards. FMD fluctuated at its level in 2000 and failed to improve.

Chart 4: Economic Growth Rate and Development of Financial Market Indices



Descriptive statistics for the data consisting of 38 observations are as follows. It is remarkable that the average growth rate is 4.6% during the period, it is skewed to the left and kurtosis more than 3. Kurtosis statistics of financial development indices are less than 3.

Table 1: Descriptive Statistics

	Mean	Median	Skewness	Kurtosis	Observations
GR	4.611	5.387	-0.962	3.119	38
FD	0.339	0.370	-0.211	1.496	38
FI	0.289	0.250	0.711	2.200	38
FIA	0.317	0.260	1.098	2.761	38
FID	0.099	0.080	1.084	2.885	38
FIE	0.426	0.415	-0.332	2.340	38
FM	0.379	0.485	-0.527	1.423	38
FMA	0.335	0.345	-0.165	1.603	38
FMD	0.178	0.200	-0.056	1.449	38
FME	0.673	1.000	-0.543	1.409	38
Obtained with Eviews 9.0					

ZA Unit root test results show that the series are I(0) and I (1). For this reason, the Toda-Yamamoto type causality test developed by Hatemi-J and E. Roca, which can make causality examination between the variables at different stationary levels, was used. The fact that the significant structural break dates found coincide with 1994, 1998 and 2002 when the economic crises were experienced enables the change in the series to be analyzed in multiple dimensions.

Table 2: Zivot-Andrews (1992) Unit Root Test with Structural Break Test Results.

	Intercept		Trend		Intercept & Trend	
	t-stat.	Break D.	t-stat.	Break D.	t-stat.	Break D.
GR	-6.9666[a]	2003	-6.6352[a]	2000	-6.8801[a]	2003
FD	-4.6877[c]	1993	-2.8955	2008	-5.3458[b]	1993
FI	-2.9516	2005	-4.9393[b]	2000	-5.8673[a]	1998
FIA	-3.1372	2007	-3.7109	2003	-3.9760	1998
FID	-0.6989	1998	-3.3591	2003	-3.4357	1998
FIE	-4.7199[c]	2002	-3.9827	1999	-5.3267[b]	2002
FM	-6.2876[a]	1994	-3.0363	2001	-6.6426[a]	1994
FMA	-3.7039	1994	-2.8045	2000	-4.2675	1997
FMD	-5.2012[b]	1995	-4.6980[b]	2008	-5.8208[a]	1999
FME	-7.0364[a]	1994	-3.6379	2001	-7.8720[a]	1994

- Critical Values for 1%. 5% and 10%:
Intercept: -4.58 | -4.93 | -5.34 Trend: -4.11 | -4.42 | -4.80 Intercept & Trend: -4.82 | -5.08 | -5.57
- [a]. [b] and [c] represent 1%. 5% and 10% significance levels. respectively.
- Obtained with Eviews 9.0

The results of the Hatemi J and E. Roca (2014) asymmetric causality test are as follows. Accordingly, there is a causality relationship from positive shocks in economic growth to positive shocks in the financial institution's index. Similarly, there is causality from the economic growth to the Financial Institutions Access index (FIA) and Financial Institutions Efficiency index (FIE).

Table 3: Asymmetric Causality Test Results

Causality	A. p-val	MWALD	1%	5%	10%	Result
$(GR)^{+}\rightarrow(FI)^{+}$	0.000[a]	34.332	10.610*	5.043	3.192	✓
$(GR)^{+}\rightarrow(FIA)^{+}$	0.000[a]	36.962	11.326*	4.914	3.254	✓
$(GR)^{+}\rightarrow(FIE)^{+}$	0.000[a]	19.376	11.548*	5.134	3.345	✓
$(GR)^{+}\rightarrow(FMD)^{-}$	0.005[a]	7.968	9.961	4.965*	3.180	✓
$(FD)^{+}\rightarrow(GR)^{+}$	0.021[b]	5.366	13.344	5.382	3.434*	✓
$(FM)^{+}\rightarrow(GR)^{+}$	0.015[b]	5.913	12.314	5.337*	3.383	✓
$(FMD)^{-}\rightarrow(GR)^{+}$	0.000[a]	25.694	17.847*	9.044	6.289	✓
$(FMD)^{-}\rightarrow(GR)^{-}$	0.003[a]	11.941	20.417	10.379*	7.059	✓
$(FI)^{+}\rightarrow(FM)^{+}$	0.059[c]	3.554	11.109	5.237	3.431*	✓

- AICC Information criterion used; only significant results are given because of space.
- Obtained with Gauss 10

On the other hand, there is a causal relationship ($p < 0,1$) from financial development to economic growth. Positive shocks in the financial markets cause positive shocks in economic growth. In addition, negative shocks in the financial markets depth index can have positive ($p < 0.01$) and/or negative ($p < 0.05$) effects on the economic growth rate. Another important relationship is that positive shocks in financial institutions affect financial markets positively ($p < 0,1$).

Discussion and Conclusion

Despite its importance and priority, the concept of economic growth still maintains its intricate structure in terms of ontology, etymology, epistemology, and methodology. Moreover, the fact that the theories and policies, assumptions and consistency of economic growth can vary from period to period and from society to society also makes the concept controversial. From these multiple dilemmas, the question "why growth?" comes first among the questions that economists are trying to answer, and from this point on, a controversial universe emerges from

the conceptualization of growth to its classification and measurement. Actually, Adam Smith's famous book 'A Study on the Nature and Causes of the Wealth of Nations, was also trying to answer this question and solve this dilemma named dynamics of economic growth (Yeldan, 2010: 3-4).

In addition to many definitions, economic growth can be summarized as shifting the production possibilities frontier to the right as a result of changes in factors of production. Here, the problem of full and effective use of resources arises and as other systems, the financial system operates to overcome this problem (at least that is what expected from the financial system). Due to this expectation, there is the idea that there is a relationship between financial developments and economic growth. Theoretically, with a broad abstraction, the existence and effectiveness of the financial system are discussed directly and indirectly in the discussions on how to achieve resource optimization and maintain economic growth, from A. Smith until today. In these discussions, four hypotheses stand out as supply leading (finance → growth), demand following (finance ← growth), feedback (finance↔growth) and neutrality (finance⇎growth). The fact that the applied literature offers very different results shows the need for detailed studies. In line with this need, in this study, the relationship between financial dynamics and economic growth has been questioned in a multi-dimensional and asymmetrical way.

According to the findings, in general, the supply leading hypothesis is valid in Turkey. In detail, the supply leading hypothesis is also valid from financial markets to economic growth, positively. And negative shocks in the financial market depth index may cause multidimensional effects on economic growth. On the other hand, demand following hypothesis is valid for economic growth to the financial institution index, financial institution access index, and financial institution efficiency index. These results confirm the studies in supply leading side and partially confirm Contuk and Güngör's (2016) results which mentioned asymmetric relations may differ in series. And lastly, the positive and significant relationship from financial institutions index to financial markets index found and this show that there is a cycle between series, like, financial markets positively affects economic growth, economic growth positively affects financial institution and financial institutions positively affects financial markets (FM+→GR+→FI+→FM+…).

As a result, it is important to use resources fully and effectively so that economic growth, which is a very complex process, can be stable, inclusive, and sustainable.

Here, the effectiveness of the financial system is decisive in ensuring resource optimization. So financial dynamics and their relationship with economic growth should be closely monitored for the effectiveness of the financial system. In subsequent studies, it is thought that it is useful to question the relationship between variables in a time dimension.

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14

TAXATION AND WOMEN'S LABOUR SUPPLY IN TURKEY: EVIDENCES FROM THE ILCS

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Introduction

Women have entered the market economy in increasing numbers over the past 30 years. They play an important role in working life and sustainable human development. They become a vital force in promoting economic development as well. Many studies in the literature show that women are capable and, when given the opportunity, they can do what men can do. Especially since the 1970's, women have been recognized as an important actor in development and sustainable economic performance. The continuing surge of women in the workplace is one of the driving factor for increasing economic growth that also helps to reduce the risk of poverty (Buvinic & Gupta, 1997; UNDP, 2015, World Economic Forum, 2014; World Economic Forum, 2020).Thus, policymakers should launch more policies that promote the greater integration of women in society as well as awareness of their importance in the social life in order to achieve these goals. If the role of women in labour market is increased by ensuring them equal opportunities with men, this will have a positive impact on human development and economic growth. Women in work force attempt to reconcile family and work, so they contribute to economy more than men. Therefore, they will bring more benefit to both families and society (Olivetti, 2013; Bayanpourtehrani & Sylwester, 2013; Gaddis & Klasen, 2014). However, many women unfortunately are unable to get into the labour market due to gender discrimination, limiting access to workforce, social stigma, low education levels, the effect of

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urbanization, the unequal division of household labour, the global financial crisis, social and economic risks, the U-shaped female labour force participation curve and the lack of childcare services not provided enough by the governments (Boserup, 1970; Pampel & Tanaka, 1986; Cagatay & Ozler, 1995; Goldin, 1995; Dayioglu, 2000; Baslevent & Onaran, 2002; Dedeoğlu, 2010).

Table 1: Comparison of the Female Labour Force (% of total labour force) (2006 – 2019)

Years	Turkey	EU	OECD	World
2006	26.33	44.45	43.01	39.41
2007	26.39	44.58	43.09	39.37
2008	26.98	44.72	43.24	39.26
2009	28.13	44.97	43.50	39.22
2010	29.19	45.15	43.60	39.10
2011	29.89	45.34	43.68	39.00
2012	30.51	45.51	43.79	38.91
2013	31.21	45.65	43.91	38.88
2014	31.03	45.73	43.94	38.86
2015	31.73	45.74	43.98	38.87
2016	32.26	45.81	44.08	38.88
2017	32.76	45.83	44.19	38.90
2018	33.01	45.85	44.30	38.92
2019	32.98	45.87	44.30	38.85

Note: *Female labour force as a percentage of the total displays that women have an active role in the labour market. Labour force comprises people ages that supply labour (15 +) for the production of goods and services during a period. This dataset is derived from World Bank Development (WDI) indicator, World Bank (WB).*

In Turkey, female labour force participation rates are low in comparison to the developed countries in the European Union (EU) and most of the members of OECD. There is a considerable gap in numbers between Turkey and these group of countries. However, there has been a decreasing trend in this gap during the past years. As it can be seen on Table 1, the female labour force has decreased in the world whereas it has increased in Turkey since 2006. There is also another measure called Global Gender Gap Index showing the women's position in

different areas including labour market that shows the disparity between men and women in the labour force. The relevant statistics of Global Gender Gap Index, which has been published from World Economic Forum, Geneva, Switzerland, is shown on Table 2. Turkey ranks between 105th and 131th in this index during the period of 2006 – 2020. The main goal of this index is to provide a method of measurement of the gap between men and women and a compass to track progress in the gender gap since 2006. Turkey has an extremely low ranking in the gender gap index among the 153 countries during this period (The Global Gender Gap Report, 2020).

Table 2: Global Gender Gap Index of Turkey (2006 – 2020)

Years	Number of countries	Rank	Score
2006	115	105	0.585
2007	128	121	0.577
2008	130	123	0.585
2009	134	129	0.583
2010	134	126	0.588
2011	135	122	0.595
2012	135	124	0.601
2013	136	120	0.608
2014	142	125	0.624
2015	145	130	0.624
2016	144	130	0.623
2017	144	131	0.625
2018	149	130	0.628
2019	153	130	0.640
2020	153	130	0.635

Source: *The Global Gender Gap Report – World Economic Forum (2010, 2014, 2020)*

Recent research has shown that there are dynamic determinants of the female labour supply such as health, age, education, human capital, marital status, fertility (number of children), timing of the childbirth, family structure, social and cultural factors, social policies like public spending on family benefits and the taxation.

Some of these determinants have led to the increase in the unemployment rate for women. Taxation is one of the key factors that affect the female labour supply and, hence, an important determinant of labour market activity. Specifically, household taxes (e.g. motor vehicle and property taxes) are a very important part of an optimal tax design for each household (Stephens & Ward-Batts, 2004) and Daveri *et al.* (2000) find that there is a notable difference between countries in the Europe and the other developed/industrial countries. While there is a high positive correlation between tax rates on labour income and unemployment rates in Europe, tax rates do not have an effect in neither Anglo-Saxon nor Nordic countries. Moreover, there has been no robust study investigating so far, the relationship between taxation and female labour supply in Turkey. Therefore, our study is the first attempt to reveal the determinants of labour force participation and the effects of household taxation on female labour participation in Turkey. The paper consists of several parts. Next section provides a theoretical framework and presents the model analysed. Section 3 provides an overview of the related literature on female labour supply. Section 4 discusses the data and the methodology, while empirical results are presented in section 5. Finally, we conclude the paper.

Theoretical Framework

In this section, we describe the theoretical framework of modelling the labour supply decisions. The theoretical framework of the standard female labour participation model is built following the neoclassical labour supply model, which has an allocation of time or the model of labour leisure choice. The whole specifications of the model are developed by Hicks (1946), Sprague (1994) and Blundell & MaCurdy (1999) based on the simple neo-classical model for labour supply. According to model, a person can allocate his/her time for "working" or "leisure". In other words, the person would like to maximize his/her utility by consuming goods and services (C) or spending leisure time (L). Therefore, following utility function (U) can be written as a function of C and L;

$$U = f(C, L) \tag{1}$$

The amount consumed is based on individual's wage (labour income), and non-labour income. On the other hand, individual must allocate his/her discretionary time or ability in the form of his/her block time (T) for work or leisure. In other words, T is allocated into two separate segments: hours worked for pay (H) and

leisure (L) (Blundell and MaCurdy, 1999; Blundell, MaCurdy and Meghir, 2007; Borjas, 2016). Thus, we can write the constraint as the following:

$$T = H + L \tag{2}$$

While the amount consumed depends on labour income/wage (W) and non-labour income (V) we can present the consumption equation as C = (W*H) +V, where (W*H) represents labour wages and V is the non-labour income sources of individual. This is also called as the individual's budget constraint which indicates that the consumption expenditures cannot exceed income. Using equation (2) and plugging it into the budget constraint, we can rewrite individual's budget constraint as C = W * (T – L) + V. We can expand this model to test the effect of taxation (such as motor vehicle tax and property tax) on the household on the female labour supply. In order to do that, we can modify individual's budget constraint as, C = W (1 + *tax*) * (T – L) + V. In this equation *tax* is the *household taxation* and it is assumed that households are obliged to pay these taxes that will affect the budget constraint and hence the consumption amount. The basic specification of the labour supply model without taxation is presented below:

$$wh_{i.t} = \alpha_i + \beta_1 l_{i.t} + \beta_2 nl_{i.t} + \varepsilon_{i.t} \tag{3}$$

where wh is number of hours worked per week, l is the labour income and nl is the non-labour income. If wages are increased in the labour market then it is assumed that there is an increase in the working as well (Borjas, 2016). After these formulations, we can build a base model for female labour supply which is determined by various variables such as wages (labour income) and non-labour income. It is expected and also supported by the existing literature that the effect of an increase in the wage level on labour supply is positive. In contrast, non-labour income is expected to have a negative effect on labour force participation. This model could be expanded by adding other explanatory variables such as demographic variables (marital status, age, level of education, ownership of house) and taxation that may have an impact on the female labour supply as well. According to previous literature, education has an important role on the labour force which may have a positive or negative effect on the labour supply. Age is also an important factor of the labour supply for women. The existing studies show that women aged between 30 and 40 years old have the highest probability to be in the working life. Moreover, it is shown that the relationship between age and female supply has a reversed U shape. Marital status is also mentioned as an important

factor determining the labour force participation of women which may have a positive or negative effect on the female labour supply in the labour market (Mincer, 1962; Cain, 1966;Becker, 1973;Mincer, 1974;Grossbard- Shechtman, 1984**;** Killingsworth and Heckman, 1986;Joll et al, 1993;Sprague, 1994;Glick and Sahn, 1997;Lam and Duryea, 1999;Angrist, 2001; Bignebat, 2003).

Empirical Literature

Many studies test the relationship between labour force participation (i.e. labour supply) and the demographic factors like, age, marital status, the number of children (fertility), education, taxation, labour income and non-labour income. For instance, Michael (1985) has examined the relationship between the participation rate of females and the socio-economic variables using bivariate autoregressive structures. Psacharopoulos & Tzannatos (1993) has investigated the determinants of the female labour supply in 15 Latin American countries and has found an increasing trend in female participation over time in spite of adverse economic situations. Furthermore, their results indicate a negative relationship between the labour participation and marriage. There are also empirical studies in the labour market literature which analyse the effect of taxation on the labour supply behaviour. Boskin & Sheshinski (1983) has investigated the theory of the optimal tax treatment of the family and the appropriate part of income tax's account for married couples which have change different earning capacity. This paper focuses on a specific issue of the tax treatment of these families which differ in terms of income and tests the different models. Their results have shown that the income distribution of the United States with the condition of equal marginal tax rates for husbands and wives have not been optimal. Hausman & Poterba (1987) suggested that the Tax Reform Act (TRA) in 1986 would lead to a small change in household labour supply while female labour supply rise less than 1%. They suggest that the effect of tax reform have a very small incentive. After the Economic Recovery Tax Act (ERTA) in 1981 and TRA in 1986, the US income tax structure has changed, and the marginal personal income tax rates are reduced significantly. Bosworth & Burtless (1992) have examined the effects of 1981 and 1986 tax reforms on the labour markets and capital formation. In addition to these reforms, they have analysed the effect of the payroll taxes and the equalization of the the lower income taxes in the labour market. Overall, they have found that the working hours have declined for men but have increased for women in the last 20 years. Regarding the effects of the TRA of 1986, Eissa (1995)

has also examined the elasticity of the married women labour supply for US using 1984 to 1986 and 1990 to 1992 dataset obtained from current population survey (CPS) and has found that the labour supply of the married women is increased with the reduction of marginal tax rates. According to Albanesi & Olivetti (2007), traditional theories believe that women spent more time for nursing, servicing and nearly 60% of their working life. Since women have started to have an advantage of improved medical knowledge and technology, they use this advantage in infant care and reduced their comparative advantage with the introduction of infant formula. Their results show that some advancement in medical technologies diminish pregnancy, childbirth, childcaring in women's life and thus, there has been a rise in the labour force participation of young women in the 1920-1960 period. Kaygusuz (2010) examined the rise in labour force participation of married women and focused upon whether it can be explained by tax changes over the period 1980-1990 for the US. He used a heterogeneous model of married households which differ by age, education levels. He has found that the rise in married female labour supply can be explained by the change in income taxation. Alesina *et al.* (2011) investigated the effects of gender-based taxation for two cases in the organization on a family as potential tax policy. According to their study, although men take a great responsibility as a bread winner in the labour market while take a less role than women in the housework, they have lower elasticities of labour than women in the labour market. There are different empirical evidences on the effect of payroll taxation in various countries, but the results are mixed. The results change from one country-case study to the other in terms of the effect of taxation on labour market indicators. The detailed analysis of this topic can be found in Gruber & Krueger (1991) and Gruber (1994)'s studies. They have focused on the small increases in payroll taxation in the US where it could be passed on the lower wages.

Data and Methodology

Our paper aims at examining the determinants of female labour supply and specifically discuss the taxation effect on labour market indicators in Turkey. We use "Income and Living Conditions Dataset (2006-2014)" for the entire analysis that is obtained from Turkish Statistical Institute (TURKSTAT). TURKSTAT constructed this dataset on a yearly basis for determining the income distribution, measuring the living conditions, wages, poverty, and understanding the social structure of Turkish households. The aim of this survey is to produce some datasets

about the income distribution and living conditions comparable with European Union countries. Questions in surveys include topics related to living conditions such as housing, economic situation, social exclusion, education, wages, employment status and income status (Turkish Statistical Institute, 2014). We analyzed the determinants of female labour supply for Turkey using pseudo-panel fixed/random effects models, which is based on the repeated cross-sectional dataset. The major limitation of repeated cross-sectional data is that the identical individuals has not been followed over time (Verbeek, 2008). The pseudo-panel method developed by Deaton (1985) has an alternative way to tackle with the data limitation and synthetic observation. For this topic, Moffitt (1993), and Collado (1997) advanced the Deaton's (1985) model to the dynamic and nonlinear models, and Girma (2000), Verbeek & Vella (2005) contribute by using some alternative estimators for this model. Our model is presented as below:

$$\overline{wh}_{i,t} = \bar{\alpha}_i + \beta_1 \bar{l}_{i,t} + \beta_2 \overline{nl}_{i,t} + \beta_3 \bar{x}_{i,t} + \varepsilon_{i,t} \quad (4)$$

where the individual index, i, has been replaced by a cohort index, c(t), that is time-dependent. Based on the ILCS dataset, this cohort is established based on the gender, age group and location area.

$$wh_{i,t} = \alpha_i + \beta_1 l_{i,t} + \beta_2 nl_{i,t} + + \beta_3 x_{i,t} + \varepsilon_{i,t} \quad (5)$$

where wh is the number of hours worked per week, l is the labour income in the last month, nl is the non-labour income in the last month. The X matrix is a control variable matrix that includes age, marital status, and education level. The subscripts i and t indicate the individual and time, respectively. Error term $\varepsilon_{i,t}$ is independent and identically distributed with zero mean and finite variance. The individual specific effects $\alpha_1, \ldots, \alpha_N$ take into account the unobserved heterogeneity, which is possibly correlated with the regressors, $x_{i,t}$, and β's are $Kx1$ vectors. In our model, the challenge for the estimation is coming from the N individual specific effects that rise when N goes to infinity. On the other hand, we take an eager interest in the K slope parameters β that give the marginal effect of modulate in regressors (Cameron & Trivedi, 2005). But, the individual-specific effects are random variable that is uncorrelated with the explanatory variables in the random effect models. The random effects models assume that the error term is not correlated with the explanatory variables and allow us to estimate coefficients of the time-invariant variables. These are the advantages of random effects models. This model specifies those individual features and the main

issues regarding to this model cannot be available guidance to the omitted variable (Torres-Reyna, 2007). To decide the right model between the fixed and the random effects, we run a Hausman test that the random effects estimator is consistent under the null hypothesis. The alternative hypothesis indicates that fixed effects estimator is preferable.

The definitions and the symbols of the variables employed in this analysis are reported in Table 3. The descriptive statistics for the hours worked per week and for the other variables during the period 2006-2014 are reported in Table 4. The mean (median) of hours worked in our sample is 46.48121 (45) with a range between 1 and 99 that are the minimum and maximum values respectively. The mean (median) of the "labour income" variable in our sample is 12028.77 (8923.5) which ranges between a maximum value of 171,800 TL, and the minimum value of 20 TL. The mean (median) value for the non-labour income is 354.7164 (0), with a range between 0 and 119,700. Average age the mean (median) variable is 33.45096 (32), with a minimum of 15 and a maximum of 65.

The correlations matrix is reported in Table 5. There are statistically significant correlations between all the variables. More specifically, non-labour income, age and taxation are negatively and significantly correlated with dependent variable (Lnhours). The correlation coefficient between Lnhours and labour income is positive and statistically significant. The maximum sample correlation value is 0.40, indicating that there is not a multi collinearity problem among the regressors.

Empirical Results

In the empirical analysis; we have examined the effects of labour income, non-labour income, marital situation, age, ownership of a house, education level and taxation on the female labour supply. We report the results of the main model of female labour supply showing the effects of income, marital status, age and education on the female labour supply in Table 6 and Table 7. These results display the OLS regressions with individual random effects (RE)[3].

As shown in the first column of Table 6, we find that the effect of labour income on the hours worked is positive while the non-labour income's impact on the hours worked is negative. These coefficients are strongly significant. The related literature also provides some evidence that labour income affects positively the working hours. On the other hand, if the leisure time is considered as a consumption

3 Hausman test results have shown that the appropriate estimator is a random effect estimator.

good, our finding about the negative effect of non-labour income on hours worked is also consistent with the related theory (Sprague, 1994; Borjas, 2016).

In the second column of Table 6, we present the effect of marital status on female labour supply. Marital status is a categorical variable consists of 5 categories as the married, unmarried (single), widowed, separated and divorced. The effect of each categorical marital status variable is addressed individually. Therefore, the second column is actually a combined state of 5 separate regression estimates. The estimated coefficients of marital status for the married, separated and divorced categories are positive showing an increasing effect on female labour labour supply. The coefficients for unmarried and widowed on the female labour supply have a negative effect and they are statistically significant in the model. The marital status has an important effect on the female labour supply, especially in the case of married, women participate to labour market more than other options. Age has also a negative effect on the female labour supply as we expected (see Table 6 and 7).

Table 3: Definition of the Variables in the Analysis

Name of Variables	Symbol	Description
Panel A: Dependent variable		
Hours worked	LNHOURS	Number of hours worked per week
Panel B: Independent variables		
Labour income	LABOUR INCOME	Labour income
Non-labour income	NONLABOUR INCOME	Total income minus labour income
Age	LNAGE	Age at the date of interview
Taxation	TAXATION	Property tax, motor vehicle tax, and wealth tax paid for regular by household
Tenure	TENURE	Ownership status
Marital status	MARITAL	Marital status
Panel C: Dummy variables		
Marital status (married)	MARRIED	Dummy variable that takes the value of 1 if the person is married, 0 otherwise
Marital status (never married)	UNMARRIED	Dummy variable that takes the value of 1 if the person is unmarried, 0 otherwise
Marital status (widowed)	WIDOWED	Dummy variable that takes the value of 1 if the person is widowed, 0 otherwise

Name of Variables	Symbol	Description
Marital status (divorced)	DIVORCED	Dummy variable that takes the value of 1 if the person is divorced, 0 otherwise
Marital status (separated)	SEPARATED	Dummy variable that takes the value of 1 if the person is separated, 0 otherwise
Education (illiterate)	ILLITERATE	Dummy variable that takes the value of 1 if the person is illiterate, 0 otherwise
Education (literate)	LITERATE	Dummy variable that takes the value of 1 if the person is literate, 0 otherwise
Education (primary)	PRIMARY	Dummy variable that takes the value of 1 if the person graduated from primary school, 0 otherwise
Education (secondary)	SECONDARY	Dummy variable that takes the value of 1 if the person graduated from secondary school, 0 otherwise
Education (high school)	HIGH SCHOOL	Dummy variable that takes the value of 1 if the person graduated from high school 0 otherwise
Education (vocational)	VOCATIONAL	Dummy variable that takes the value of 1 if the person graduated from vocational school, 0 otherwise
Education (faculty)	FACULTY	Dummy variable that takes the value of 1 if the person graduated from faculty and over, 0 otherwise
Age	AGE	We made a dummy variable that takes the value of 1 if age < 18, 18-24, 25-34, 35-44, 45-54, 55-65.
Tenure (owned house)	OWNED	Dummy variable that takes the value of 1 if the person house owner, 0 otherwise
Tenure (rented house)	RENTED	Dummy variable that takes the value of 1 if the person is tenant, 0 otherwise

Table 4: Descriptive Statistics for Variables

Name of Variables	Mean	Median	Std. Dev.	Min	Max	N
Hours worked	46.48121	45	15.05907	1	99	21124
Labour income	12028.77	8923.5	11552.6	20	171800	21124
Non-labour income	354.7164	0	2135.576	0	119700	21124
Age	33.45096	32	9.955671	15	65	21124
Taxation	288.6942	130	455.7361	0	12082	16771

Notes: *Variables are presented in this table and see Table 3 for definition of the rest of the variables.*

Table 5: Correlation Coefficients for Variables

Name of Variables	Lnhours	Labour Income	Non-labour Income	Lnage	Taxation
Lnhours	1				
Labour Income	0.016**	1			
Non-labour Income	-0.054**	0.039**	1		
Lnage	-0.119**	0.150**	0.186**	1	
Taxation	-0.060**	0.400**	0.021**	0.079**	1

Notes*: Correlation coefficients of variables are significant at the 5% confidence level or better.*

In the third column of Table 6, the effect of range in age on female labour supply is reported. This points out that people who has under age 18 do not want to enter labour market less than others, and we can see same situation in people who are older age (over 55). The coefficients for a person between the age of 18 and 25, 25 and 35 are positive and statistically significant. For the age of 35 and 45, 45 and 55, 55 and 65 have a negative effect on the female labour supply in this model.

The effect of ownership of a house is shown in the fourth column of Table 6. The effect of ownership of a house on the female labour supply is positive, but the effect of being tenant of house is negative as we expected. The coefficient of ownership of a house is statistically significant both the tenant and the owner.

For education results, we have examined the effects of various education levels in this study and test the effects of education on the female labour supply. So, we classified them "illiterate", "literate", "primary", "secondary", "high school", "vocational" and "faculty" to examine the impacts on labour supply. The effect of each education level as a categorical variable is evaluated individually. Therefore, the first column of Table 7 is actually a combined state of 7 separate regression estimates. According to test results in the first column of Table 7, we can say that the respondents who have a higher degree of education want to enter labour market. The coefficient of high degree is positive and statistically significant for "secondary", "high school" and "vocational", and the another for "illiterate", "literate", "primary", and "faculty" have a negative sign. They have strong statistically significant except literate in this model.

We added to our model to test the effect of household taxes, such as motor vehicle tax, property tax, and wealth tax on the female labour supply in this model. Test results show that there is a negative relationship between taxation and the labour hours for women (Second column of Table 7). The average rate of taxation of the household has an income effect on the female labour supply. This effect shows that the low household average tax rate increases the female labour supply. Most countries have some problem for women are heavily than men and unmarried women, and this issues effect to married women's decision to work in a labour market. The household taxes go into the proportion of the female earnings and the changing of the household taxes is important for the participation of female labour. The findings of this study related to taxation are consistent with Smith *et al.* (2003) and Jaumotte (2003).

Table 6: The Main Model and The Effects of Marital Status, Age and the Ownership of a House on the Female Labour Supply

	(1)	(2)	(3)	(4)
Labour Income	0.0000126***	0.0000120***	0.0000121***	0.0000129***
	(0.00000149)	(0.00000149)	(0.00000148)	(0.00000150)
Non-labour Income	-0.00000833***	-0.00000794***	-0.00000748***	-0.00000852***
	(0.00000147)	(0.00000147)	(0.00000146)	(0.00000148)
Lnage	-0.149***	-0.138***		-0.176***
	(0.0108)	(0.0109)		(0.0106)
Married		0.0347***		
		(0.0057)		
Unmarried (Single)	-0.0433**	-0.0464***	-0.0567***	-0.0411***
	(0.0058)	(0.0056)	(0.0057)	(0.0058)
Widowed	-0.0099	-0.162***	-0.066***	-.0.0048
	(0.0320)	(0.0203)	(0.0316)	(0.0319)

	(1)	(2)	(3)	(4)
Separated	0.0176	0.0808***	-0.0140**	0.0249*
	(0.0140)	(0.0296)	(0.0140)	(0.0140)
Divorced	0.0600*	0.0395***	0.0480*	0.0869***
	(0.0288)	(0.0135)	(0.0287)	(0.0283)
15 < Age < 18			0.169***	
			(0.016)	
18 ≤ Age < 25			0.146***	
			(0.008)	
25 ≤ Age < 35			0.004***	
			(0.006)	
35 ≤ Age < 45			-0.025***	
			(0.007)	
45 ≤ Age < 55			-0.0436***	
			(0.00976)	
55 ≤ Age < 65			-0.112***	
			(0.0181)	
Tenant				-0.0198***
				(0.0640)
Owner				0.0374***
				(0.00568)

Notes: *All regression coefficient estimates include labour income, non-labour income and control variables such as age, marital status and education level. It is not reported because of limited number of paper pages. Some details such as regression model constant, sample size, R^2 and Hausman test statistics which vary among the regressions are not reported. These are available from the corresponding author on reasonable request. Random effects (RE) with robust standard errors clustered by person. Standard errors in parentheses. *, **, *** indicate significance 10%, 5% and 1% levels, respectively.*

Conclusion

In this paper, we investigate the factors affecting the female labour supply and to what extent taxation play a role in the labour market for the period of 2006-2014 for Turkey. We found that the effects of labour income on the hours worked is positive, the non-labour income's impact on the hours worked is negative. These coefficients are statistically significant. The coefficients for unmarried and widowed on the female labour supply have a negative effect and they are strongly statistically significant in the model. The marital status has an important effect on the female labour supply as well, specifically, married women participate to labour market more. The effect of ownership of a house on the female labour supply is positive, and the effect of being a tenant of a house is negative as expected. The coefficient of ownership of a house is statistically significant while being a tenant is not statistically significant. The coefficient of high education degree is positive and statistically significant for "secondary", "high school" and "vocational", and the another for "illiterate", "literate", "primary", and "faculty" have a negative sign and they have strong statistically significance except "literate" in this model. Our results are consistent with the theory that has already been proposed. We added taxation to our model to test the effect of household taxes such as motor vehicle tax and property tax on the female labour supply. Our results indicate a negative relation between taxation and the labour hours for women. The average rate of taxation of the household has an income effect on the participation of the female labour. This effect shows that the low levels of household average tax rate increases the participation of the female labour supply in the labour market. An implication of these results is that reductions in taxation will help to boost the demand for female labour supply. Generally, the results demonstrate that this study is consistent with the previous papers and it is useful for policymakers, researchers, who aim to develop a new unemployment policy in Turkey.

Table 7: The Effects of Education and Taxation on the Female Labour Supply

	(1)	(2)
Labour Income	0.0000118***	0.0000124***
	(0.00000149)	(0.00000149)
Non-labour Income	-0.00000801***	-0.00000770***
	(0.00000147)	(0.00000149)
Lnage	-0.153***	-0.177***
	(0.0106)	(0.0128)
Taxation		-0.0000402***
		(0.00000708)
Illiterate	-0.0940***	
	(0.0121)	
Literate	-0.0173	-0.0588**
	(0.0163)	(0.0287)
Primary	-0.0226***	-0.0211
	(0.00812)	(0.0193)
Secondary	0.115***	-0.0357*
	(0.0117)	(0.0212)
High School	0.151***	-0.0050
	(0.00947)	(0.0196)
Vocational	0.0970***	-0.0395**
	(0.00982)	(0.0194)
Faculty	-0.118***	-0.198***
	(0.00932)	(0.0190)

Notes: *All regression coefficient estimates include labour income, non-labour income and control variables such as age, marital status and education level. It is not reported because of limited number of paper pages. Some details such as regression model constant, sample size, R^2 and Hausman test statistics which vary among the regressions are not reported. These are available from the corresponding author on reasonable request. Random effects (RE) with robust standard errors clustered by person. Standard errors in parentheses. *, **, *** indicate significance 10%, 5% and 1% levels, respectively.*

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15

THE COMPARISON OF THE SHARES OF LABOUR AND CAPITAL INCOME IN VALUE-ADDED IN TURKEY AFTER THE PERIOD OF GLOBAL CRISIS (2008-2018)

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Introduction

By the nature of capitalist societies, value is created as a result of the mandatory coexistence of labour and capital. The sharing of the value, which called gross value-added with today's terminology, is an essential subject of the political economy. Therefore, the analysis of labour and capital income is at the heart of the political economy, because political economy follows the accumulation of capital. Surplus-value is the source of capital accumulation. The surplus-value is the part left to the capital after the payment of labour's share from production is paid. Increasing the share of capital within the value-added created accelerates the accumulation of capital. On the contrary, the increase in the share of labour income in parallel with the rise in the working class's union organization level slows down capital accumulation. Also, capital accumulation begins to be difficult during periods of a significant economic and financial crisis.

The net value-added consists of the sum of the four-factor income. These are wages, profits, interest, and rental income. While profit, interest, and rent generate capital income, wages, and salaries form labour income.

The subject of this study, the share of labour and capital income in the gross value added in Turkey, is to analyzed between 2008 and 2018. This study investigates

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the effects of political-economic and social developments over the past twelve years on labour and capital revenues as a whole. In this context, it is to reveal the general tendency of these two variables in this period. Calculate the relative change between the beginning of the period and the end of the period and reveal the relationships between the annual percentage changes of these variables. The study consists of four chapters. In the second section, after the introduction, the formation of gross value added is explained, and the calculation of the share of labour and capital income in value-added is included. In the third section, based on macroeconomic indicators, between 2007 and 2018, the developments in Turkey's political economy and its impact on labour and capital income were assessed. In the fourth section, the model and analysis results are explained with the help of tables and graphics. In the conclusion section, the study ends with a general evaluation.

Formation of Gross Value-Added and Share of Labour and Capital Income

The total value-added created in an economy; is equal to subtracting the payments made to all intermediate inputs used in the production process from the total sales revenues of the products obtained as a result of production. Intermediate inputs are the total amount paid for inputs such as raw materials, auxiliary materials, operating materials, and energy used in production. At the same time, the total value-added refers to the sum of payments to essential production factors. In the Marxist political economy approach, the remainder is surplus-value after the wage payments, which are the share of labour, are subtracted from created-value at the end of the production process. After deducting various taxes paid to the government from surplus-value, the remainder constitutes capital income. These are shared among various capital groups as profit, interest, and rent.

Many factors affect the size of the gross value-added and its sharing among the labour and capital groups. The most important of these factors are the effects of the socio-economic-political atmosphere in the country and the international conjuncture on the country's economy. The others are the level of unionization of the workers, the unions' determination to defend workers' rights, the labour law in the country, and whether government policies favor labour or capital.

After the 1980s, the neo-liberal policies implemented in many countries, including Turkey, both macroeconomic equilibrium in the national economy, but also profoundly influenced the balance of labour and capital income. In the neo-liberal period, the union organization level in all countries decreased, and the labour struggle of the unions suffered weakness. In this context, the 2008/2009 crisis was, in a sense, a crisis of financialized capitalism as a result of neo-liberal policies. Unfortunately, there was no return from neo-liberal policies after the global crisis.

In the literature, personal income distribution studies weighing the inequality between lower-income and upper-income groups of society with the Gini coefficient are dominant. Studies that deal with the shares of labour and capital from total income are called functional or class income distribution. Unfortunately, exceptionally functional or class income distribution studies in our country are wholly insufficient. The main problem here is data shortage.

In the neoliberal globalization process, as a result of the financial liberalization and the acceleration of capital movements among countries, the increase in the financial income obtained by the capital class, and the decrease in the bargaining power of labour, the share of capital, increased while the share of labour decreased (Harrison, 2005); (Jayadev, 2007).

The residual method is mostly used in obtaining capital revenues in value-added. According to this method, firstly, labour income is calculated, and as a result of subtracting labour income from the net value-added, capital income is obtained. Therefore, although different methods are often used in the literature, the focus is on calculating the share of labour income. The most discussed topic in calculating the share of labour here is whether self-employment income will be within labour income or capital income. In the literature, different calculation methods are proposed in this regard (Guerriero, 2012); (Gomme and Rupert, 2004); (Guscina, 2006); (Harrison, 2005); (Jayadev, 2007); (Krueger, 1999).

After this section, we will evaluate Turkey's political economy in light of the macroeconomic indicators between 2007 and 2018.

In Light of the Macroeconomic Indicators between 2007 and 2018

Turkey's economy entered 2020 with very important macro-economic issues. First of all, growth rates have been in a downward trend since 2011 (Figure 1).

Unemployment tends to increase (Figure 2). Inflation rates have also increased in recent years. An increasing trend is observed in foreign debt and budget deficit as the ratio of gross domestic product. Macroeconomic instability caused by all these factors adversely affects capital accumulation and the growth rate (Fischer, 1993; Bleaney, 1996).

Growth Rate

In terms of growth rate, which is the most important macroeconomic indicator, a high growth rate of 11.1% was achieved in 2011 after the -4.7% collapse in the global crisis year (2009). Unfortunately, there has been a steady decline in the growth rate in the coming years. Although the annual trend growth in the 2007-2019 period was 0.04, it was -0.85 between 2011-2019. Therefore, it is seen that a downward trend occurred in the growth path after 2011. The factors that are effective in the formation of this downward trend should be researched and tested econometrically. However, within the framework of the theory of economics, these factors can be listed as follows: Insufficiency of domestic and foreign investments, making public investments in inefficient areas, especially in construction; Wrong, and inadequacies economic policies; The effect of instability and chaotic atmosphere after the July 15 coup attempt in 2016 in the country; The volatility in the burden, inflation-exchange rate and interest rates added by the frequent elections to the public budget in recent years. The downward trend in the growth rate in recent years also affects unemployment, labour, and capital income.

The share of sub-sectors within total sectors indicates the sectoral preferences in that country. When examined in this context; when the sub-sectors of agriculture-forestry and fisheries, construction, and manufacturing industries were compared between 2002 and 2019, the sector that declined continuously in this period was the agriculture-forestry and fisheries sub-sector. In the seventeen years, the annual trend growth of the share of the agriculture sector within the sectors' total was -0.27. So it decreased at this rate every year. This rate was 0.06 in the manufacturing industry and 0.19 in the construction industry. The increase in the share of construction is more than three times the manufacturing industry. Turkey's economy in the period ahead must take radical decisions is very important to enter into a healthy growth track because the main source of growth is the right investment decisions to be made in strategic areas. There is a need for

an investment strategy that prioritizes high value-added products that meet the requirements of the age. Otherwise, the construction and infrastructure-oriented investment strategy, which will not be possible, will not be possible by drawing Turkey's growth trend of falling back to trend growth. This can create serious problems for Turkey economy in the long term.

The strategic importance of the agriculture and livestock industry was better understood globally during the Covit-19 Pandemic we live in. In the future, in food, agriculture, and livestock, "self-sufficiency" if the concept is further expected to gain importance, Turkey needs to pay attention to this sector. Urgent measures should be taken immediately to increase its share in GDP. Thus, in terms of Turkey's future, including high value-added products and technological innovations, as well as agriculture, animal husbandry, and increase domestic production in the food sector is very important for the creation of a healthy and sustainable economy.

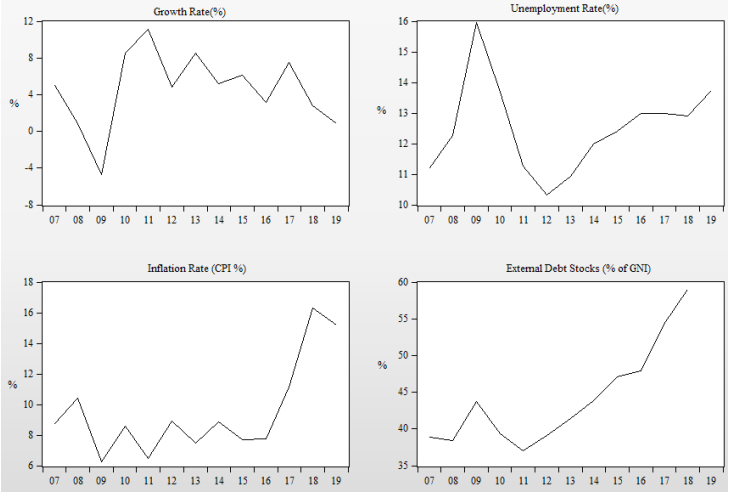
Unemployment

After 2007, unemployment in Turkey stands at the beginning of the priority issues of the economy. From 2007 to 2019, there is an annual trend growth of the unemployment rate of 0.05. Although the unemployment rate reached the highest level of 16 % in 2009, it fell to 10% in 2012, but it tended to increase again. The unemployment rate is about to reach the level of 2009 again in 2020. It is even possible to exceed that level. Unemployment continues to increase as the economy slows down, but unfortunately, there is no severe decline in unemployment rates in years of growth. As explained in the growth rate section, the lack of industrial investments that create large-scale employment continues to affect unemployment negatively. The move from the industry sector that creates qualified employment to the service and construction sector that creates temporary employment is another factor that increases unemployment.

Besides, the transfer of most public enterprises to the private sector due to privatizations, and the pursuit of capacity and efficiency policies instead of employment increases by these private enterprises due to the uncertain and fragile structure of the economy further increase the unemployment problem. Due to the country's demographic structure, the weight of the young population causes hundreds of thousands of young people from universities to enter the labour market every year. The lack of an economic structure that will create employment for

these young people makes unemployment a top priority. In Turkey Economy recent years already while the unemployment growing trend in the 2020 first quarter, Covit-19 closing of the economy as a result of drift into the Pandemic Crisis, unemployment rates increase the likelihood of reaching a much larger size. Unfortunately, there is no positive expectation that Turkey will solve the unemployment problem soon in the current atmosphere. The most significant factor is the low saving rates in the country and the inadequate investment atmosphere. In recent years, it has not been successful in attracting foreign fixed capital investments. Only the public sector remains. As the primary investment choice of the public sector is construction and infrastructure, so there is no radical positive expectation for employment shortly. After the global crisis, the ongoing macroeconomic instabilities have been a significant obstacle to labour's getting more than the value-added. Because, in the negotiations for determining salaries and wages, the country's economic problems were put forward by the authorities as a necessary 'excuse'.

Figure 1: Turkey's Macroeconomic Indicators



Source: *http://www.sbb.gov.tr/temel-ekonomik-gostergeler/*

Data Set and Methodology

In this study, two basic data sets were used. First, Turkey Statistical Institute (TSI), published by "The gross domestic product (GDP)- Income approach" is the data set. Labour and capital share in total value-added, Turkey Statistical Institute (TSI), published by "The gross domestic product, income approach" is based on data. In this study, labour income, "Compensation of employees"; Capital revenues are "Gross operating surplus / Mixed-income" data. Explanations about these variables are taken from the Metadata section of TSI (2020). The GDP by income approach: to estimate the gross domestic product involves adding up the wages and salaries and the operating surplus of all producing units plus net tax revenues of government in an economy. It is the total value of all the payments to the production factors, in all kinds of economic activities, by all producing units in the country. Compensation of employees is defined as total provisions paid in kind and cash, in return for the work done by the enterprise during the accounting period. It consists of salaries and wages paid in cash or in-kind and social security contributions paid by employers on behalf of employees. Operating surplus is defined as a residually. As net value-added minus compensation of employees payable, minus taxes on production payable, plus subsidies receivable. It refers to the share of capital in value-added (TSI, 2020).

In an economy, gross value-added is the sum of indirect taxes, free from subsidy and depreciation, to the sum of payments (wages and salaries) and payments to capital (interestrent and profit) (Gomme and Rupert, 2004). Gross value-added is calculated as standard as follows: Payments to Basic Production Factors + Amortizations + Indirect Taxes - Subsidies.

The second data set used in this study is the ISO1000 data set[2]. All calculations were made using this data set. "Turkey's Top 500 Industrial Enterprises Survey" for the first time in 1968 as "Turkey's Top 100 Industrial Enterprises Survey" was published. Since 1998, the necessary data of 1000 Enterprises, including Top 500 and Second 500, are published regularly every year. According to 2018

2 The data used in this study were obtained as follows: Istanbul Chamber of Industry published by the Chamber, 2008 and 2018 among "Turkey's Top 500 Industrial Enterprises" and "Turkey's Top Second 500 Industrial Enterprises" from the data obtained from magazines, 'ISO1000 data set' has been created by the author. I would like to thank the employees of the "Istanbul Chamber of Industry-Corporate Communication and Member Services Branch" who provided the ISO Magazines in the relevant years.

data, the share of firms of ISO 1000 in Turkey Economy, are as follows: The share of gross value added of ISO1000 Enterprises' in the industrial value-added of Turkey is 21%. Its share in GDP is 7.2%. Besides, 48.2% of Turkey's total exports and 50.1% of industrial export was made by İSO1000 Firms. A total of 919017 people are employed in these companies. This rate is approximately 16% of industrial employment. There are foreign capital shares in 176 companies in ISO1000 (ISO, 2019a, p.10; ISO, 2019b, p. 10). Therefore, ISO1000 Enterprises take an essential place in the national economy in terms of value-added, production, employment, and export.

The Methodology of ISO 1000 Enterprises Survey

In the ISO 500 and Second 500 surveys, a value-added calculation is used that is compatible with the GDP-income approach. However, unlike the GDP-income approach, the payments made to the primary production factors are tried to be obtained directly, not through the residue. Annual amortization amount, indirect taxes paid are added to the net value-added, and gross value-added is achieved when subsidies are deducted (ISO, 2019, p. 151).

Gross value-added = Salary and wage payments + Interest payments + Rent payments + Profit payments (in the meaning of national income) + Depreciations + Other indirect taxes - subsidies

Capital income (Business surplus) = Gross value-added - Salaries and wages - (Taxes-subsidies on production). Social security premiums paid by the employer are also included in the salaries and wages paid here.

Profit in terms of national income = Pre-tax profit (loss) - Non-operating income + Provisions for profit.

Nonproduction income (Financial income[3]) = Dividend income + participation income + interest income + net foreign exchange profits + Securities sales + Fixed asset sales (ISO, 2019, p. 119).

3 This part becomes essential in the financialization period because it shows the earnings of Non-Financial Companies (NFC) from financial markets.

The Model

Here, gross value-added is shown by equation (1). Labour income in equation (2), capital income in equation (3) are shown. Equations (4) and (5) show the share of labour and capital revenues in gross value-added.

$$GVA = L + GC + InT - Sub \quad (1)$$

$$L = GVA - InT + Sub - GC \quad (2)$$

$$GC = GVA - InT + Sub - L \quad (3)$$

$$SL1 = L / GVA * 100 \quad (4)$$

$$SGC = GC / GVA * 100 \quad (5)$$

$$NVA = GVA - Dep - InT + Sub \quad (6)$$

$$SL2 = L / NVA * 100 \quad (7)$$

$$SNC = NT / NVA * 100 \quad (8)$$

Here (GVA), gross value-added; (NVA), net value-added; (L): labour income; (SL1), the share of labour income in gross value-added; (SL2), the share of labour income in net value-added; (InT), indirect tax; (Sub), substitution; (Dep), depreciation; (GC), gross capital income; (NC), net capital income; (SGC), the share of the gross capital income in gross value-added; (SNC), the share of the net capital income in net value-added.

The Share of Labour and Capital in the Light of TSI Data

The descriptive statistics of these two variables are shown in Table 1. The probability value of the Jarque-Bera Test for both variables is higher than 0.05 indicates that both variables have a normal distribution.

In Table 2, a negative relationship and a very high correlation coefficient were found between labour and capital variables (gross values, SL1, and SGC), parallel to our expectations. The same relationship also exists between net values (SL2 and SNC).

Table 1: Descriptive Statistics for Labour and Capital Variables (TSI Data)

	SL1	SL2	SGC	SNC
Mean	32.20716	38.74532	67.97610	61.25468
Median	31.94037	38.21482	67.73109	61.78518
Maximum	36.54819	43.71541	71.07773	65.32802
Minimum	29.02622	34.67198	64.14300	56.28459
Std. Dev.	2.343504	2.816495	2.009173	2.816495
Skewness	0.274657	0.259379	-0.048981	-0.259379
Kurtosis	2.068337	2.100275	2.430771	2.100275
Jarque-Bera	0.633610	0.584250	0.180710	0.584250
Probability	0.728473	0.746675	0.913607	0.746675
Sum	418.6930	503.6891	883.6892	796.3109
Sum Sq. Dev.	65.90413	95.19171	48.44130	95.19171
Observations	13	13	13	13

Figure 2 shows the labour and capital shares in GVA. Between 2008 and 2019, it is seen that while the share of capital has a negative slope, the share of labour has a positive trend. The trend growth of the share of capital revenues is 0.45%, while the share of labour is 0.56%.

Table 2: Pearson Correlation Matrix of Labour and Capital Variables (TSI data)

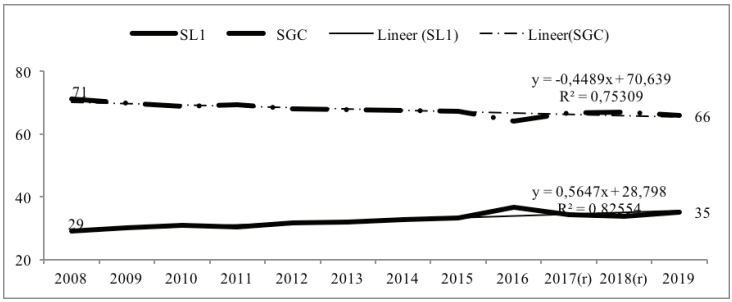
	SL1	SL2	SGC	SNC
SL1	1.000000	0.993334	-0.986442	-0.993334
SL2	0.993334	1.000000	-0.977614	-1.000000
SGC	-0.986442	-0.977614	1.000000	0.977614
SNC	-0.993334	-1.000000	0.977614	1.000000

At the beginning of the global crisis (2008), the share of labour income in GVA was 29.0%. At the end of the period (2019), it increased by 6.1% to 35.1%. In the same years, the share of capital revenues in GVA decreased from 71.1% to 65.8% and decreased by -5.3 points. Besides, while the ratio of capital income share to labour income share was 2.1 at the beginning of the period, it decreased to 1.9 in 2019.

The ratio of end-of-period value to value per period: GVA increased by 4.4 times, Labour income increased by 5.3 times, and capital income increased by 4.0 times.

When evaluated in terms of annual % change; The annual average of 2008-2019 is 14.4% in GVA, 16.1% in labour income, and 13.7% in capital income. In GVA; the fastest increase in this period by 21% in 2018 and the lowest increase in 2008 by 0.6. The highest increase in labour income was 22.9% in 2016 and the lowest in 2009 in 4.6. While the fastest increase in capital revenues was 24.4% in 2017, there was a decrease of -1.3% in 2009.

Figure 2: The Share of Labour and Capital in Gross Value-Added in Turkey (%)



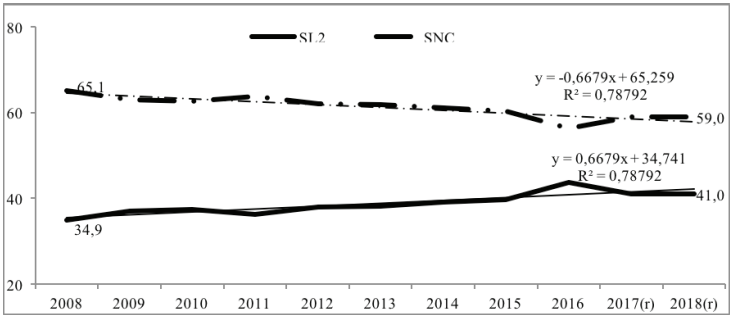
Source: TSI

In Figure 3, labour and capital shares in NVA are shown. Between 2008 and 2019, it is seen that the share of capital has a negative slope, while the share of labour has a positive trend. While the share of capital revenues is trending growth 0.67%, the share of labour is, unfortunately -0.67%. In other words, while the share of capital increased, the share of labour decreased.

While the share of labour income in NVA at the beginning of the global crisis (2008) was 34.9%, it increased by 6.1% at the end of the period (2019) to 41%. In the same years, the share of capital revenues in NVA decreased from 65.1% to 59% and decreased by 6.1%. In addition, while the ratio of capital income to labour income was 1.86 at the beginning of the period, it decreased to 1.43 in 2019.

The ratio of end-of-period value to beginning-of-period value: NVA increased 4.3 times, labour income increased 5.3 times and net capital income increased 3.8 times.

Figure 3: The Share of Labour and Capital in Net Value Added (%)



Source: TSI

In the Light of ISO1000 Data Set, The Share of Labour and Capital in Value-Added

In this section, descriptive statistics of the variables in the data set used in the study are shown first. Then, the correlation matrix between the variables representing labour and capital is given. Finally, between 2008 and 2018, the shares of labour and capital in value-added are evaluated by making a trend analysis on the graph.

Table 3: Descriptive Statistics for Labour and Capital Variables (ISO1000)

	SL1	SL2	SGC	SNC
Mean	43.24186	55.08688	55.68838	45.54196
Median	43.62284	56.23208	55.09747	44.36193
Maximum	48.23026	63.09808	61.16869	52.91199
Minimum	38.39472	47.60276	50.34940	37.55861
Std. Dev.	2.447863	3.867836	2.751005	3.826974
Skewness	0.006449	0.066648	0.105847	-0.100751
Kurtosis	3.368485	3.354951	3.108967	3.373621
Jarque-Bera	0.067974	0.071879	0.028344	0.090098
Probability	0.966584	0.964699	0.985928	0.955951
Sum	518.9023	661.0426	668.2605	546.5035
Sum Sq. Dev.	65.91237	164.5617	83.24832	161.1031
Observations	12	12	12	12

The descriptive statistics of these two variables are shown in Table 3. The probability value of the Jarque-Bera Test for both variables is higher than 0.05 indicates that both variables have a normal distribution.

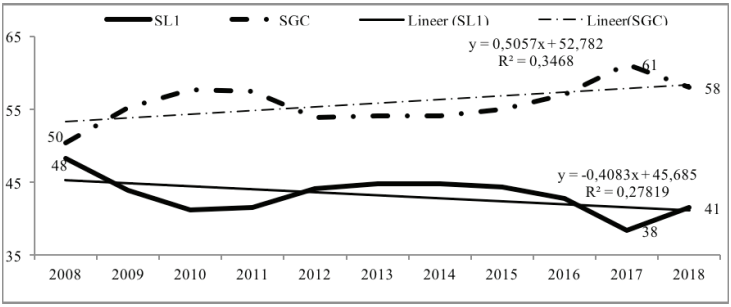
In Table 4, a negative relationship and a very high correlation coefficient were found between labour and capital variables (gross values, SL1, and SGC), parallel to our expectations. The same relationship also exists between net values (SL2 and SNC).

Table 4: Pearson Correlation Matrix of Labour and Capital Variables (ISO1000)

	SL1	**SL2**	**SGC**	**SNC**
SL1	1.000000	0.992068	-0.977347	-0.989060
SL2	0.992068	1.000000	-0.979553	-0.998936
SGC	-0.977347	-0.979553	1.000000	0.982537
SNC	-0.989060	-0.998936	0.982537	1.000000

Figure 4 shows the shares of labour and capital in GVA. Between 2008 and 2018, the share of capital had a positive slope, while that of labour had a negative slope. While the share of capital revenues is trending growth 0.51%, the trend of labour share is, unfortunately -0.41%. In other words, while the share of capital tends to increase, the share of labour tends to decrease. At the beginning of the global crisis (2008), the share of labour income in GVA was 48%. At the end of the period (2018), it decreased by 7% to 41%. In the same years, the share of capital revenues in GVA increased from 50% to 58% and 8 points. Besides, while the ratio of capital income to labour income was 1.04 in 2008, it increased to 1.4 in 2018. The ratio of end-of-period value to beginning-of-period value: GVA 3.5 times, labour income 3.0 times, and capital income increased by 4.0 times.

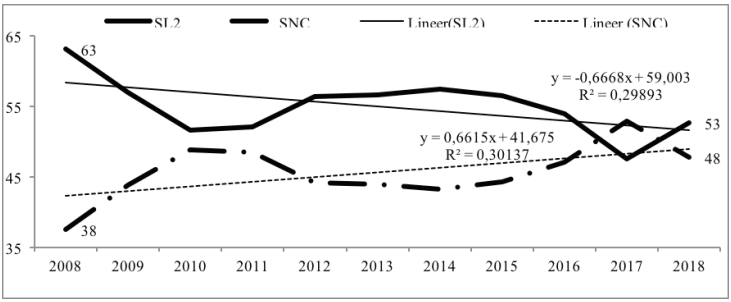
Figure 4: The Share of Labour and Capital in Gross Value-Added in ISO 1000 Firms (%)



Source: Istanbul Chamber of Industry

When evaluated in terms of annual change; the average annual change in 2008-2018 is 12.2% in GVA, 11.6% in labour income, and 13.3% in capital income. GVA realized the fastest increase in this period in 2017, with a rate of 27.2%. In 2008, it decreased by -1.4%. Labour income, on the other hand, increased most rapidly in 2018 with a rate of 19.1%, while it decreased by -0.9% in 2009. Capital revenues increased by 36.4% in 2017, the fastest, and decreased by -8.6% in 2008.

Figure 5: The Share of Labour and Capital in Net Value-Added in (ISO 1000)

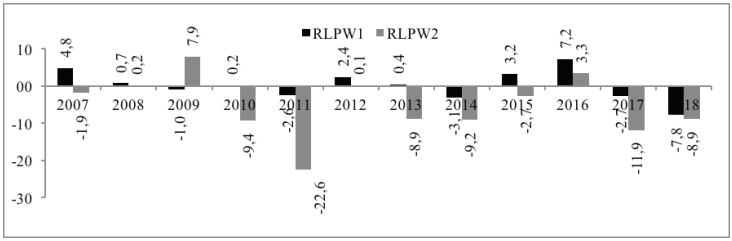


Source: Istanbul Chamber of Industry

Figure 5 shows labour and capital shares in NVA. When we look at the general trend of these two variables in the eleven years between 2008 and 2018, the capital variable has a positive slope, while that of labour has a negative slope. During

this period, while the share of capital revenues was trending growth 0.66%, the trend of labour share was, unfortunately -0.67%. In other words, while the share of capital tends to increase, the share of labour tends to decrease. At the beginning of the global crisis (2008), the share of labour income in NVA was 63%. At the end of the period (2018), it decreased by 10% to 53%. In the same years, the share of capital revenues in NVA increased from 38% to 48% and increased by 10 points. Besides, while the ratio of net capital income to labour income was 0.59 at the beginning of the period, it increased to 0.91 in 2018.

Figure 6: Real Labour Income per Employee at ISO 1000 Firms (Annual Change %)



Source: Istanbul Chamber of Industry

The ratio of end-of-period (2018) value to beginning-of-period (2008) value: NVA 3.6 times, labour income 3.0 times, and net capital income increased by 4.6 times. Real labour income per employee is calculated as follows:

First, the total annual labour income of ISO 1000 enterprises is divided by the total number of employees, and labour income per employee is calculated. Then, labour income per employee, a nominal value, has been turned into real value by deflating with the industry's GDP deflator. This value is real labour income per employee (RLPW1).

In Figure 6, the variable RLPW1, the real increase in 7 of 12 years, and the real decrease in 5 years. The cumulative increase in this period is only 1.7% in real terms. Whereas, in the variable of RLPW2 (where the growth rate is added to the real annual change), there was a real increase in only three years of 12 years and a decrease in 9 years. There was a cumulative 64% decline in real labour incomes throughout this period.

Conclusion

According to the Marxist political economy approach, two primary classes form the core of capitalist society. The first is labour as the creator of value, and the second is the capitalist class as the owner of the means of production. The main dynamics of capitalist society, that is, where it will evolve in the long run, is determined by the unity and contradiction of these two classes. Besides, the government policies in the country, the state of the national and international conjuncture, and developments in the macro-economic structure of the country's economy are highly influential. Developments in all these variables constitute the subject of political economics. Since the class struggle between labour and capital is multidimensional, it exceeds the scope of this study. For this reason, the scope of the subject has been narrowed. In this context, developments in the macro-economic structure in the country in the post-global crisis period (2008-2019) were evaluated. Then, the shares obtained by the labour and capital from the total value-added created under the influence of the conditions as mentioned earlier were analyzed.

In this study, the 12 years after the 2008/2009 global economic crisis, Turkey's economy, when considered in the context of general trends in the macro-economic indicators, it is possible to reach the following conclusions:

Especially in recent years, the downward trend in growth rates has become evident. There is an upward trend in both unemployment and inflation. For the last three or four years, inflation has been far from the annual 5% target. Unfortunately, the ratio of both foreign debt and budget deficits to GDP is in an increasing trend. As seen in Figure 2 in the second section, macroeconomic indicators of Turkey's economy has deteriorated in the last twelve year. This deterioration poses a threat to economic stability in the country. This trend of deterioration in macro-economic stability negatively affected the production, sales, value-added, and profits of existing industrial enterprises, as well as new industrial investments. In particular, it has affected foreign capital investments that the country needs.

Unfortunately, with the advent of the Covit-19 Pandemic crisis in the first quarter of 2020, many unexpected new problems were added. Therefore, it is not difficult to predict that macro-economic indicators will deteriorate in the coming period.

When looking at the general trend of the shares of labour and capital in value-added, which constitute the main subject of this study, the following results are obtained:

According to TSI Data; in the 2008-2018 period, the share of gross capital income decreased by 0.45 percent annually while the share of labour income increased by 0.56 percent. Although the share of capital has decreased slightly, its share in GVA is still very high. In the eleven years, while the share of net capital incomes decreased by an average of 0.67 percent annually, the share of labour income increased by the same rate.

According to ISO 1000 dataset; while the share of gross capital, revenues increased by 0.52 percent annually between 2008 and 2018, and the share of labour income decreased by 0.41 percent. In these eleven years, while net capital revenues increased by an average of 0.66% annually, the share of labour decreased by 0.67%. Real labour income per employee at ISO 1000 firms increased in seven years of 12 years and decreased in 5 years between 2007 and 2018. The cumulative real increase in this period is only 1.7%. However, when the manufacturing industry's annual growth rate is included in the real value, the real increase in only three years of 12 years and a decrease in 9 years occurred. There was a cumulative 64% decline in real labour incomes throughout this period.

As seen, while the share of labour income decreased only slightly in these eleven years according to the ISO research, which includes only the manufacturing industry, there was a slight increase in labour income compared to TSI data covering the whole economy. This difference is estimated to arise from different calculation methods (ISO, 2019, p.151).

The fairer share of labour and capital from production is essential for the healthy development of society. In order to achieve this balance, macro-economic stability in the country, sustainable economic growth, and social policies followed by the government against social classes are very important. Apart from this, the power of labour organizations, especially unions and organized struggle experiences are also an essential factor affecting the share of labour. Considering from the perspective of the class contradiction between labour and capital; In the neoliberal financialization period, the proportion of workers exercising the right to bargain collectively within total employment has declined steadily. According to the OECD data set, this rate is 26% in Turkey in 1986, 7.3 in 2008, while in 2016 has dropped to 7%. Besides, as a result of the class unions increasingly

losing power, subcontracting, flexible-precarious employment, and the de-unionization policies, the advocating of the rights of labour has weakened. Unfortunately, this situation causes pessimism about the shares that labour will receive from value-added soon.

The effects of the pandemic crisis are likely to play a critical role in economic, social, and political developments in our country, as in the world in the coming period. It is not difficult to predict that there will be severe declines in labour income in the coming years, especially since unemployment will increase severe pressure on wages. Moreover, in the coming period, digitalization in production, which will accelerate much more in all societies, will affect labour in production and the share of labour in value-added. Therefore, scientific studies on technological-economic-social and political transformations will continue to be the main agenda of social scientists in the upcoming period.

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16

THE IMPACT OF FINANCIAL DEVELOPMENT AND ITS COMPONENTS ON ENERGY CONSUMPTION: ARDL ANALYSIS FOR TURKEY

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Introduction

In the last half-century, great transformations have been experienced with the effect of globalization and technological developments. As a result of these transformations, the borders between countries have begun to disappear. In this way, as in many things, individuals' lives have also changed significantly. It is seen that the most serious effect of the mentioned change is in terms of energy consumption. Because the energy previously consumed in the field of production and transportation has become the biggest variable of daily life even though it is still. In this framework, personal energy consumption is increasing day by day in the city and the rural area. The main reason and result of this is the urbanization and the development of urban opportunities towards rural areas. This increases integration of accelerates interaction and exacerbates the global competitive environment. The dynamics of energy consumption is becoming more crucial in this trend, while the global competitive race between countries is sharpening. This triggers the search for energy diversity on the one hand, and on the other hand, it reinforces the need to investigate the factors that determine and affect energy consumption. Energy, which is the main impulse of the development process of the world's history, maintains its importance as it did yesterday. It is important

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that energy, which has a critical role to achieve sustainable and inclusive economic growth, can activate the capital factor, be a multidimensional consumer good and be one of the public goods. From a global economic-political perspective in a country, as Turkey between the East and the West in terms of cultural development and between the North and the South in terms of economic development, it is essential to identify the factors that affect energy consumption. After a vast literature on energy-growth, with Karanfil's (2009) study, which was titled by the question of 'how much the energy-growth relationship will be questioned', the factors that affect energy consumption started to analyze with a multidimensional way. According to the actual literature (Lebe and Akbaş, 2015; Sekantsi and Timuno, 2017; Sbia et al., 2017; Ouyang and Li, 2018; Bakırtas and Akpolat, 2018; Zheng and Walsh, 2019; Gumus and Altıntas, 2019) financial development, economic growth, and urbanization data are generally used as endogenous and/or exogenous (as Shahbaz and Lean, 2012 stresses) in energy consumption analyses.

In this study, two main models used. In the first model the effect of financial development, economic growth and urbanization on energy consumption analyzed. In the second model, as an important contribution to the relevant literature, instead of financial development index, banking sector development index and stock market development index used, to analyze and compare which type of financial activity affects energy consumption at most. Additionally, the relationship type (nonlinearity) in energy-growth nexus checked with the Kuznets curve approach. Urbanization data are taken exogenously in both models to include population dynamics in the models.

In line with this objective, the following chapters are data, methodology and empirical findings, discussion, conclusion and policy recommendation, respectively.

Data, Methodology and Empirical Findings

To analyze long-term relationship in models, Autoregressive Distributed Lag Models (ARDL) used and causal relationship is questioned with the ECM-Based Granger Causality test.

Data

Financial development indicators were taken from the IMF and others from the World Bank's database. All data is annual and covers the 1980-2016 period. The financial development index and its components, which presented by IMF - Svirydzenka (2016), used to increase the ability to explain financial development as Ayadi et al. (2019), Katircioglu and Zabalotnov (2019), Naceur et al. (2019) and Uzar and Eyuboglu (2019). All data taken into the analysis are in natural logarithmic form to get better results as Shahbaz and Lean (2012) mentioned.

Table 1. Data, Description and Source

Indicator	Unit of measurement	Source
LFIN	Financial development index	IMF
LBANK	Financial institution index – Banking sector development	IMF
LMARK	Financial market index -Stock market development	IMF
LEN	Energy Consumption - Oil equivalent (Kg -per capita)	WDI
LPGDP	Real GDP - Per capita (constant 2010 USD)	WDI
LURB	Urbanization - Urban population rate	WDI

Autoregressive Distributed Lag Model (ARDL)

Engle-Granger (1987) and Johansen (1988) tests are applied to analyze the cointegration relations under the assumption that the variables are I(1). This requirement for cointegration analysis was eliminated with the Bounds Test approach introduced by Pesaran and Pesaran (1997) and Pesaran et al. (2001). In this study, due to the advantages and sampling suitability, the models showed below were carried out with the ARDL bounds test approach. The β values in the models represent the coefficient matrix of the independent variables. *k, l, m, n,* and *o* indicate the different numbers of delays that variables can take. *i* indicates the number of delays, while e_t refers to the residual term of these models. The Akaike Information Criteria (AIC) determined the delay counts in the model (LPGDP)[2] added to models to check nonlinearity in growth- energy nexus.

$$LEN_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i} LEN_{t-i} + \sum_{i=0}^{l} \beta_{2i} FIN_{t-i} + \sum_{i=0}^{m} \beta_{3i} LPGDP_{t-i} + \sum_{i=0}^{n} \beta_{4i} (LPGDP)^2_{t-i} + \sum_{i=0}^{o} \beta_{5i} LURB_{t-i} + e_{1t} \quad (1)$$

$$LEN_t = \beta_0 + \sum_{i=1}^{k} \beta_{1i} LEN_{t-i} + \sum_{i=0}^{l_1} \beta_{2i} LMARK_{t-i} + \sum_{i=0}^{l_2} \beta_{3i} LBANK_{t-i} + \sum_{i=0}^{m} \beta_{4i} LPGDP_{t-i} + \sum_{i=0}^{n} \beta_{5i} (LPGDP)^2_{t-i} + \sum_{i=0}^{o} \beta_{6i} LURB_{t-i} + e_{1t} \quad (2)$$

For the first model, the ARDL model was found to be a suitable model by using the Akaike Information Criteria (AIC). Model specification tests were performed to examine whether there were any statistical errors in the ARDL model. After the determination of the ARDL model, the equations for the models extended with the first difference (Δ) of variables and the coefficient matrixes (β) for each variable to reach bound test equations. of the independent variables for each to be used in the border test should be established. Here if any of β is equivalent to zero, null hypothesis ($H_0 : b_p = 0$) that says there is no cointegration in the model is valid. Otherwise if at least one of the β is not equivalent to zero ($H_1 : \beta_p \neq 0$), the null hypothesis will be rejected.

The bound test statistics were obtained by applying a Wald F test that tests whether the coefficients are equal to zero. As a result of the constraint test, Wald F statistics are obtained and the calculated Wald F statistical value is compared with the lower and upper limit (I(0), I(1)) values obtained from Pesaran, Shin and Smith (2001, p.300). H_0 is rejected when the calculated Wald F statistical value is greater than I(1) and so the long-term relationship between the variables is accepted.

ECM-Based Granger Causality Test

After the ARDL bound test, to question the causal relation Error Correction Model (ECM) based Granger Causality test used as Narayan and Narayan (2005: 429) advised to have better and more reliable statistical results especially in small samples. To function the EC Model, parameters in the equations of Model 1 and Model 2 have modified with their first difference (Δ) and βecm_{t-1}coefficient added to models. Null hypothesis ($H_0 : \beta = 0$) for all β coefficients shows that there

is causality for short term, and alternative is $H_1: \beta \neq 0$. Long-term causality relationship was determined by testing the ecm_{t-1} coefficient and whether it is equal to zero, where these hypotheses were tested by applying the constraint F test.

Empirical Findings

In the time series analysis, it is determined whether there is a relationship between the variables, and if any, the direction of the relationship, stability tests of variables should be performed before determining this analysis. When the graphs of the variables are examined, it is seen that there is a break in the series. For this reason, Augmented Dickey-Fuller (ADF) unit root tests with a single break (1979-1981) are preferred in the stationarity analyses. While the test was carried out, an innovation outlier was used as the break type, the maximum F statistical value was used to determine the structural break date, modified Akaike information criterion was used for lag length and the null hypothesis of the test is series has a unit root. According to the test results, LBANK, which is the variable showing the development of the banking system, is stationary, and all other variables were stationary in the first difference, I(1) as shown in table 2 below.

Table 2: ADF Test Results with Single Break

Variable	Calculated t-statistic	Break Date
LEN	-4.2699	2000
LFIN	-0.1702	1996
LMARK	-0.6044	1996
LBANK	-5.2739*	1996
LPGDP	-4.3059	1998
LURB	-2.3374	1994
ΔLEN	-5.8285*	-
ΔLFIN	-5.9130*	-
ΔLMARK	-5.5902*	-
ΔLBANK	-	-
ΔLPGDP	-5.8559*	-
ΔLURB	-6.2645*	-

Note: **Stable at 5% significance level. Unit root analysis was performed for Fixed-Trend Model*

According to the ADF unit root test results, it is seen that energy consumption, as a multidimensional variable, is affected by socio-economic and political developments in different perspectives. As break dates -which stuck for only 7 years- are examined, they generally indicated economic and political crises. It was not accidental that there was a concentration in the period between 1994-2000. The first and perhaps most important dates in January 1994 in Turkey, the dollar has gained 14 percent daily value. Between January and April, when a series of economic measures were taken, the Turkish Lira depreciated more than 160 percent against the dollar. On 5 April 1994, the government announced a package of economic measures and devaluated national currency under these decisions. It was not a coincidence that a break in the context of urbanization was observed in this period. The banking sector and stock market development variables have a break in 1996. When the Far East Asian financial crisis happened and Turkey had changed her income and expenses tradition and started *the only pooled system, which* has a crucial effect on the financial system. In the following period, the country's economy experienced economic crises. In 1997, the so-called post-modern coup, and the February 28 process was experienced and the negative rupture in 1998 GDP data can be evaluated within this framework. The break date 2000 shows the effects of the Marmara Earthquake which is located mostly in the energy stations of Turkey. This date may be evaluated as the precursor of the 2001 crisis in the energy-related break in 2000. Additionally, it may be stated that the privatization of the state institutions based on the economic support of rural areas also caused a breakdown (Üçer, 2018: 2).

After the evaluation of break dates, the ARDL model established for both Model 1 and Model 2. As shown in appendix 1, ARDL estimation for Model 1 is (2,2,4,4) and (2,2,4,4,4) for Model 2. Diagnostic test results of models presented in table 3. Autocorrelation and changing variance problems were not encountered in the models, and it is found that the error terms were distributed normally. Moreover, it is seen that there is not any problem in the functional form.

Table 3: Diagnostic Test of ARDL Models

Model 1			**Model 2**		
Test	**Calculated Statistics**	**Prob.**	**Test**	**Calculated Statistics**	**Prob.**
Breusch-Godfrey Autocorrelation	2.041	0.166	Breusch-Godfrey Autocorrelation	1.795	0.220
Harvey Heteroscedasticity	1.668	0.158	Harvey Heteroscedasticity	0.729	0.743
Jarque-Bera Normality	0.583	0.746	Jarque-Bera Normality	1.745	0.417
Ramsey	0.503	0.622	Ramsey	0.443	0.667

Null hypotheses of all tests for the specification tests were considered on absence, and the probability values of test statistics obtained from tests were found to be greater than 5%, indicating the significance level. So, the null hypothesis was not rejected. In addition, CUSUM and CUSUM Q test results (appendix 2) show that models encounter stability conditions.

Table 4: ARDL Bound Test Results

Model 1 ARDL Results				**Model 2 ARDL Results**			
K	**F-Stat**	**%5 Critical Values**		**K**	**F-Stat**	**%5 Critical Values**	
1	7.16	I(0)	I(1)	1	7.26	I(0)	I(1)
		2.79	3.67			2.56	3.49

Table 4 shows that the F-statistical value for models are higher than the upper critical bounds. In this context, the existence of cointegration relationship for models were confirmed. After ARDL bound test, ECM based models are as follows.

Table 5: Short-term Coefficients of Models

Model 1					**Model 2**				
Short-term Coefficients and EC Model					**Short-term Coefficients and EC Model**				
Variable	Coefficient	Standard Error	t-statistic	Prob.	Variable	Coefficient	Standard Error	t-statistic	Prob.
D(LEN(-1))	0.367	0.134	2.731	0.015	D(LEN(-1))	0.345	0.125	2.753	0.019
D(LFIN)	0.006	0.028	0.220	0.829	D(LMARK)	-0.015	0.019	-0.813	0.434
D(LFIN(-1))	-0.093	0.029	-3.216	0.005	D(LMARK(-1))	-0.065	0.019	-3.428	0.006
D(LPGDP)	6.681	2.937	2.275	0.037	D(LBANK)	0.014	0.023	0.607	0.556
D(LPGDP(-1))	-4.898	3.006	-1.629	0.123	D(LBANK(-1))	-0.093	0.025	-3.652	0.004
D(LPGDP(-2))	1.618	3.005	0.538	0.598	D(LBANK(-2))	-0.091	0.023	-3.961	0.002
D(LPGDP(-3))	7.788	3.108	2.505	0.023	D(LBANK(-3))	-0.063	0.021	-3.053	0.011
D(LPGDPP)	-0.328	0.162	-2.021	0.060	D(LPGDP)	3.646	2.717	1.342	0.207
D(LPGDPP(-1))	0.231	0.165	1.404	0.179	D(LPGDP(-1))	-6.452	2.802	-2.302	0.042
D(LPGDPP(-2))	-0.110	0.166	-0.663	0.517	D(LPGDP(-2))	-0.704	2.926	-0.241	0.814
D(LPGDPP(-3))	-0.445	0.173	-2.572	0.021	D(LPGDP(-3))	8.116	3.043	2.667	0.022
D(LURB)	-0.426	0.195	-2.182	0.044	D(LPGDPP)	-0.170	0.150	-1.131	0.282
CointEq(-1)	-1.068	0.160	-6.694	0.000	D(LPGDPP(-1))	0.322	0.154	2.098	0.060
					D(LPGDPP(-2))	0.023	0.162	0.145	0.887
					D(LPGDPP(-3))	-0.460	0.169	-2.730	0.020
					D(LURB)	-0.215	0.180	-1.199	0.256
					CointEq(-1)	-1.150	0.144	-7.963	0.000

Considering table 5, when the short-term coefficients are considered for both models, it is seen that the independent variables were significantly effective on the energy consumption.

Table 6: Long-term Coefficients of Models

Model 1					**Model 2**				
Long-term Coefficients					**Long-term Coefficients**				
Variable	Coefficient	Standard Error	t-statistic	Prob.	Variable	Coefficient	Standard Error	t-statistic	Prob.
LFIN	0.029	0.020	1.457	0.164	LMARK	0.019	0.010	1.910	0.083
LPGDP	10.301	2.022	5.095	0.000	LBANK	0.092	0.039	2.379	0.037
LPGDPP	-0.502	0.106	-4.713	0.000	LPGDP	9.130	2.350	3.886	0.003
LURB	-0.407	0.149	-2.734	0.015	LPGDPP	-0.454	0.121	-3.751	0.003
C	-37.836	7.391	-5.119	0.000	LURB	-0.188	0.182	-1.034	0.324
					C	-34.857	8.475	-4.113	0.002

Table 6 shows the coefficients that were examined in the long term. When financial development is considered as a whole in the first model, the effect on energy consumption was seen as positive but statistically insignificant. However, it is seen that economic growth increased energy consumption at the first stage and then decreased it. Urbanization has a negative and significant effect on energy consumption. In model 2, it was concluded that a 1% increase in the banking sector development increased energy consumption by 0.09%, whereas a 1% increase in stock market development increased energy consumption by approximately 0.02%. As in the first model, energy-growth nexus has nonlinear characteristics. Urbanization affects energy consumption negatively and it is statistically insignificant.

Table 7: ECM-Based Granger Causality Test Results for Model 1 and Model 2

Model 1							
Causality		**Short term**					**Long term**
		ΔLEN	ΔLFIN	ΔLPGDP	ΔLPGDP²	ΔLURB	ECM(-1)
ΔLEN		-	7.692* (0.0214)	13.334* (0.0040)	116.859 *(0.0001)	3.726** (0.0672)	-1.008* (0,0001)
Model 2							
Causality		**Short term**					**Long term**
	ΔLEN	ΔLMARK	ΔLBANK	ΔLPGDP	ΔLPGDP²	ΔLURB	ECM(-1)
ΔLEN	-	12.993* (0.0015)	27.450* (0.0001)	16.070* (0.0029)	14.959* (0.0048)	1.6654 (0.1969)	69.394* (0.0001)

Note: ** Significant causality relationship according to 5% significance level.*
Values in parenthesis represent probability values.

According to the results of the first model in table 7, there is causality from all variables to energy consumption only in the short and long-term. Causal relationships in the second model show that variables except urbanization cause energy consumption in the short term and all variables -including urbanization- affecting energy consumption in the long term.

Discussion

Today, a large proportion of Turkey's population lives in urban areas. Turkey is now a country that has experienced the process of urbanization compared to western countries. When evaluated in this context, the migration process from

the village to the city has a history of more than 100 years in the modern sense. In addition, the problems caused by the rapid migration especially after 1950 have had different results compared to the west. This situation has led Turkey in terms of its unique history and culture of urbanization. Looking at the period between 1990 and 2000, when this rapid migration was particularly concentrated, it is seen that both the economic instability in the country and the conditions of urban life are very problematic. With the effect of the populist policies implemented in this framework, it is seen that the energy supply occurs in some way even though the energy demand is not regular. From this perspective, it is obvious that econometric analysis will be better understood. When econometric findings are evaluated, according to Model 1, the financial development index influences energy consumption and it is positive, but this effect is statistically insignificant. In Model 2 banking sector and stock market development induces taken into account and seen that both the induces increase energy consumption. In addition, it is revealed that the banking sector development has four times more effective than the stock market. It appears that GDP and GDP square have significant effects on energy consumption, and this indicates a non-linear characteristic in energy-growth nexus. This result shows that energy consumption increases at the first stages of economic growth, and then decreases. Urbanization reduces energy consumption significantly in model 1, while it is insignificant in model 2. There is a short-term causality from all variables to energy consumption in the first model, while it is the same -except urbanization- in the second one.

Especially considering studies where both banking and stock market developments are used separately or at least together, it can be problematic in terms of representation considering only one or more of the many indicators showing the development of the financial system. In this study, it was concluded that indices reflecting both the banking sector and stock market developments shed light on reliable results. Banking sector development has a positive effect on energy consumption, like a 10% increase in banking sector development triggers energy demand by 0.9%, ceteris paribus. Accessing easily to credit affects both consumers' and investors' saving, investment and consumption behaviors -such as the tendency to purchase larger durable consumer goods-, thus increasing energy consumption. Shahbaz and Lean (2012) concluded that the variable used as a representation in the development of the banking sector for Tunisia increased the energy demand of the variable. Indeed, this positive relationship was consistent

with many studies (Aslan et al., 2014; Chang, 2015; Komal and Abbas, 2015; Mahalik et al. 2017).

On the other point of view, a 10% increase in stock market development is expected to increase energy demand by 0.19%, ceteris paribus. This result confirms the theoretical effects of the stock market development on energy demand put forward by Sadorsky (2010). The first of these effects is the level effect. Stock market development increases the demand of investors to the stock market, which has become more reliable. The second is the productivity effect, which reflects that exchanges provide higher returns, higher liquidity and additional funds for risky investments. Thus, the demand for energy increases through economic growth. The results of the analysis support these theories and confirm related empirical studies (Sadorsky, 2010; Sadorsky, 2011; Zhang et al., 2011; Ulusoy and Demiralay, 2017).

As Lee and Chiu (2013) warned and suggested, nonlinearity and structural breaks should be checked in studies focusing on energy and income relationship to do a fair discussion. In this context, linear and nonlinear models were discussed in this study, and it was seen that the model, which was found to be suitable, supported the nonlinear -inverted U shaped- model on energy-growth nexus. An increase in economic growth will result in more energy consumption (Mudakkar et al., 2013) in short term, however, the opposite is valid in the long term (a very low coefficient compared to the first stage). It is probably due to the decline in the importance of energy in the long term. This result was in parallel with those in some studies in the literature that economic growth negatively affects energy consumption (Mahalik et al. 2017; Sbia et al. 2017). When the per capita income level exceeds threshold income level, environmentally friendly policies become more preferential. An important component of this effort emerges as low energy density products and technologies (Mahmood and Ahmad, 2018). Gradual decrease in energy density in the data on the Turkish economy supports this process. The long-term coefficient of urbanization variable included in the model as a determinant of energy consumption appears to be negative. However, in the second model, the negative relationship was insignificant. Both the positive and negative effects of urbanization on energy demand are visible in the theoretical and applied literature, and no clear results can be put forward for this relationship (Jones, 1989; Dhal and Erdogan 1994; Imai 1997; Hossain, 2011; Poumanyvong et al., 2012). The negative impact of this analysis confirms Sadorsky's

(2014) account of the fact that urbanization increases energy consumption by moving goods, food, and people to or from the city, reducing energy use through economies of scale in production.

Conclusion and Policy Recommendation

It is agreed that the determinants of energy demand should be properly evaluated, especially in countries with high-energy dependence and in the context of global warming, which aim to implement policies of reducing energy consumption. To do so, two models set up in this research and the efficiency of these models questioned, analyzed and compared. ARDL bounds test and ECM based Granger causality tests were implemented with the longest data available 1980-2016 for Turkey. Although there is a consensus on the data used in the literature on economic growth and urbanization, there is a wide range of reports for financial development. Banking sector and stock market developments, which are two important pillars of financial development, are measured in terms of both depth and access. These components are also represented by separate indicators. As a matter of fact, the majority of these studies are excluded, which may leave the results obtained doubtful. In order to eliminate this problem, the financial development index created by Svirydzenka (2016) was preferred in this study. At the same time, this index has a high representation capability and has been added to the model separately for both the banking sector and stock markets developments.

Thus, the impact of financial development on energy consumption was evaluated in terms of both financial institutions and financial markets. In determining the energy demand correctly, the relationships with the independent variables were also considered in terms of whether or not they are linear. At this point, there is an inverted U-shaped relationship between economic growth and energy demand, which means that economic growth first increases energy consumption and then decreases it. While the per capita income is above a certain level, more efforts are being made to ensure that the technology and product mix is environmentally friendly, and the energy consumption is reduced. While the variables of banking sector development and stock market development increase energy consumption, this situation may be shown as encouraging consumption, investment, and energy demand by facilitating borrowing among consumers and investors from banks. Stock market development leads to an increase in stock market activity, which reflects the wealth effect that promotes energy consumption.

On the other hand, urbanization has a negative impact on energy consumption. This indicates that economies of scale are being utilized. Among the variables whose cointegration was determined, causality towards energy consumption in both the short and long term was determined. This situation for Turkey's economy shows that growth is not dependent on energy. This suggests that conservative policies will not adversely affect economic growth

A country with energy-related current account deficit problems, such as Turkey, developments in the banking and stock markets, increasing demand for energy is a critical situation. It is an obstacle to solving problems. In this context, this situation should be questioned as a cost of the expected positive effect of the development of financial systems on economic growth. However, it should not be overlooked in the policies of energy demand equations that financial developments in both the banking and stock market dimensions have different weights. Otherwise, energy policy, which focuses solely on the relationship between energy demand and income, will provide an incorrect estimate of energy demand, which may have inadequate consequences for the policies produced. Considering that all these issues take a share of Turkey's economy in terms of energy savings from increasing prosperity in the business of promoting the use of renewable energy, advanced technologies, the energy density of individuals who use goods should be less.

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Appendix 1:

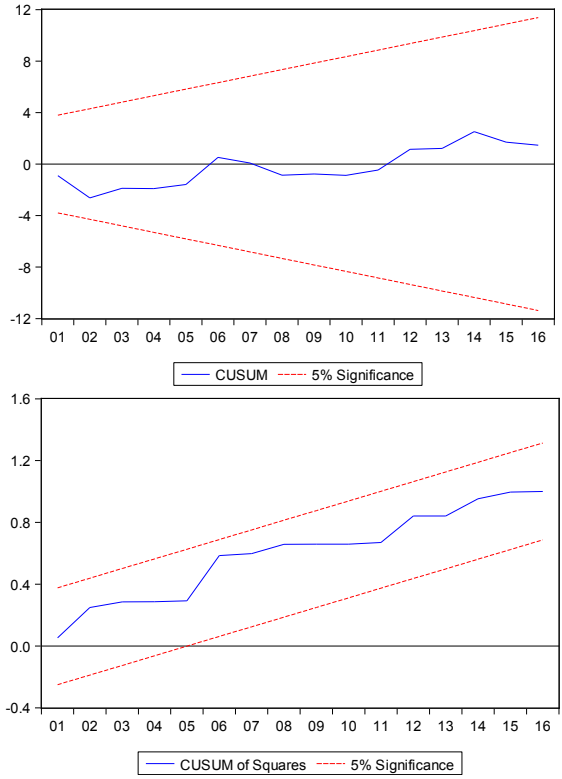
Estimation of ARDL Models

Model 1 - ARDL (2,2,4,4) model estimation					**Model 2 - ARDL (2,2,4,4,4) model estimation**				
LEN(-1)	0.299	0.179	1.667	0.115	LEN(-1)	0.196	0.149	1.310	0.217
LEN(-2)	-0.367	0.188	-1.953	0.069	LEN(-2)	-0.345	0.184	-1.881	0.087
LFIN	0.006	0.033	0.187	0.854	LMARK	-0.015	0.019	-0.827	0.426
LFIN(-1)	-0.068	0.031	-2.206	0.042	LMARK(-1)	-0.028	0.030	-0.921	0.377
LFIN(-2)	0.093	0.028	3.340	0.004	LMARK(-2)	0.065	0.028	2.326	0.040
LPGDP	6.698	3.750	1.786	0.093	LBANK	0.014	0.025	0.553	0.591
LPGDP(-1)	-0.560	4.881	-0.115	0.910	LBANK(-1)	-0.001	0.034	-0.033	0.974
LPGDP(-2)	6.519	4.625	1.410	0.178	LBANK(-2)	0.001	0.034	0.038	0.971
LPGDP(-3)	6.140	5.042	1.218	0.241	LBANK(-3)	0.029	0.038	0.744	0.473
LPGDP(-4)	-7.795	4.773	-1.633	0.122	LBANK(-4)	0.063	0.043	1.458	0.173
LPGDPP	-0.328	0.206	-1.593	0.131	LPGDP	3.647	5.181	0.704	0.496
LPGDPP(-1)	0.022	0.271	0.082	0.936	LPGDP(-1)	0.398	5.241	0.076	0.941
LPGDPP(-2)	-0.342	0.258	-1.323	0.204	LPGDP(-2)	5.749	5.323	1.080	0.303
LPGDPP(-3)	-0.333	0.281	-1.185	0.254	LPGDP(-3)	8.818	5.967	1.478	0.168
LPGDPP(-4)	0.445	0.264	1.688	0.111	LPGDP(-4)	-8.117	4.226	-1.921	0.081
LURB	-0.435	0.197	-2.211	0.042	LPGDPP	-0.170	0.285	-0.596	0.563
C	-40.408	13.762	-2.936	0.010	LPGDPP(-1)	-0.030	0.296	-0.103	0.920
					LPGDPP(-2)	-0.299	0.298	-1.004	0.337
					LPGDPP(-3)	-0.483	0.331	-1.461	0.172
					LPGDPP(-4)	0.460	0.234	1.965	0.075
					LURB	-0.216	0.220	-0.980	0.348
					C	-40.073	12.753	-3.142	0.009

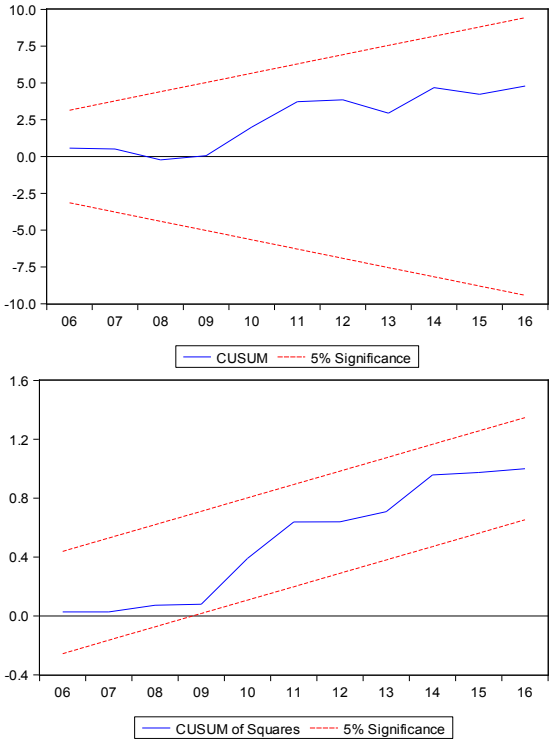
Appendix 2:

Graph 1. Model 1 and Model 2 Stability tests

Model 1



Model 2


10.0
7.5
5.0
2.5
0.0
-2.5
-5.0
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06
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14
15
16
CUSUM
5% Significance
1.6
1.2
0.8
0.4
0.0
-0.4
06
07
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09
10
11
12
13
14
15
16
CUSUM of Squares
5% Significance

17

THE NEXUS BETWEEN FINANCIAL DEVELOPMENT AND ENERGY CONSUMPTION IN TURKEY: COINTEGRATION AND CAUSALITY ANALYSIS

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Introduction

Previous studies have found out that main factors for the increasing energy consumption are population and economic growth (Islam, Shahbaz, Ahmed, & Alam, 2013). Energy demand in Turkey also increases due to population and economic growth. Turkey is among the leading countries regarding increases in the energy demand among OECD countries. The installed power in Turkey have tripled and surpassed 80 GW in the last 15 years. Two main principles are at the forefront in Turkish energy market. The first one is high energy demand while the second is external dependence in energy resources. In recent years, Turkey has been developing policies in order to decrease external dependence in energy (Republic of Turkey Ministry of Foreign Affairs, 2020). Accordingly, the need to detect energy consumption dynamics in Turkey as well as providing important doctrines regarding the future of this energy demand during the process are of the utmost importance.

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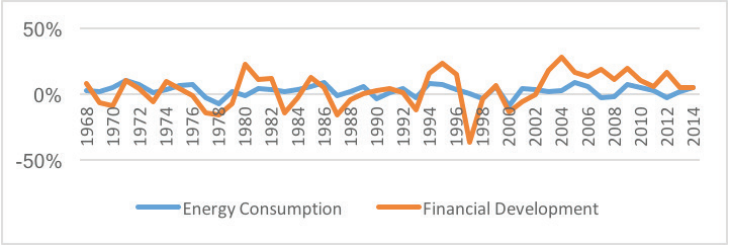
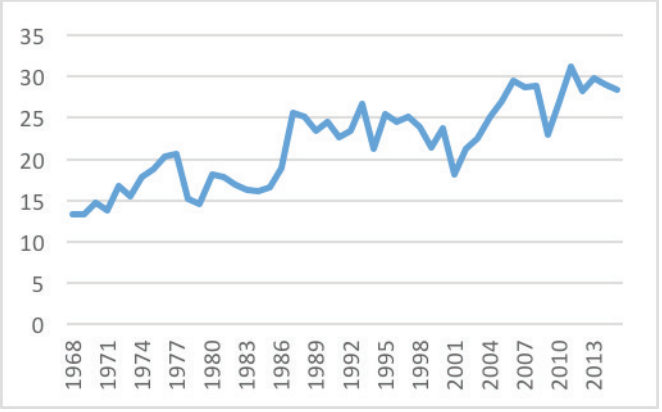
Figure 1: Growth of Energy Consumption and Financial Development in Turkey



Source: *GlobalEconomy (2020).*

Turkey's growth of financial development and energy consumption towards to previous year in the period of the present study has a matching movement in the graph. The economic crises periods of 1994, 1998 and 2001 in Turkey are the same period with negative financial development indices periods for Turkey. Last decade, Turkey's energy consumption approximately has increased by 33%. In the same period, Turkey's financial development index has increased by 212%. According to financial development and energy consumption data growth of financial development has been over the energy consumption last decade in Turkey (GlobalEconomy, 2020).

Figure 2: Capital Investment as percent of GDP in Turkey



Source: *GlobalEconomy (2020).*

In 2015, Turkey's share of GDP is 28.25 of capital investment is almost the same with the 2007 value. In the eight years, Turkey's capital investment rate of GDP has been fluctuated period however, got the same value in 2015 as 2007. Turkey After 1968, he met with the various political and economic crisis. After 1980, with the financial liberalization policy, Turkey has become economically more open to the world. Financial liberalization policies have been implemented as part of the stabilization programs proposed by international financial institutions such as the IMF in many developing countries since the mid-1970s. In Turkey, the implementation of financial liberalization was initiated in 1980 with the January 24 Decisions enacted. With the liberalization of foreign trade first, then the restrictions in the domestic financial sector began to be lifted, the infrastructure of capital markets was established, and finally, the liberalization of capital movements in 1989, the period of complete integration with the outside world was experienced (Onur, 2005). During this period, increased production created more energy needs than before. Turkey is a country with limited fossil energy sources. On the other hand, Turkey is a rich country in environmental energy sources.

There are several ways in which financial development may have an impact on energy consumption. The most effective and direct of them is that it facilitates purchasing BTI (big-ticket items), that is known goods, as well as reducing their prices. These goods called BTI are goods requiring high energy in the production process. An increase in the consumption of these goods will in turn result in increasing the energy demand as well as the average energy consumption in the country (Sadorsky, 2011). Financial development is expected to facilitate allocating capital to potential investments and reducing the prices. The business world provides an easier and cheaper way of raising capital along with financial development. Moreover, developments in the stock market will enable the business world to create additional funds. Therefore, this will provide an opportunity for the business world to broaden their investments and create new ones. Energy is one of the key inputs in goods and service production (Islam et al., 2013). An increase in initiatives or in existing capacities will also lead to an increase in the demand for energy consumption. With an increase in energy consumption, national economies will grow. All the inputs should be met, and continuity should be provided in order to render this growth stable. A solid financial structure is required fort his continuity (Keskingöz & İnançlı, 2016; Sadorsky, 2011). Moreover, developments in the stock market will increase confidence in terms of the

consumer and business and this increased confidence will provide an increase in the energy demand by boosting economic activities.

Literature Review

Sadorsky (2010) is one of the advance authors who analyses the direct relationship that exists between financial development and energy consumption. He examined the impact that financial development exerted on energy consumption in a total of 22 emerging countries for the period 1990–2006 by using panel data approaches. In this paper, foreign direct investment, the ratio of deposit money bank assets to GDP, the ratio of stock market capitalization to GDP, the ratio of stock market total value traded to GDP, and the stock market turnover ratio are used for the financial development variable. According to empirical results, with three financial development variables determined the positive relationship between energy consumption. These financial development variables are stock market capitalization to GDP, stock market value traded to GDP, and stock market turnover ratio.

In the past few years, the number of empirical studies that analyzed the relationship between financial development and energy consumption has increased. Shahbaz and Lean (2012) in their study found bidirectional causality between financial development and energy consumption in Tunisia. According to their empirical results, Islam et al. (2013) suggested that financial development and economic growth had a positive impact on energy consumption both in the short and long run. Furuoka (2015) determined a long-run relationship between finance and energy consumption in Asia according to the empirical results of the study. Moreover, a unidirectional causality from energy consumption to financial development was found in the study. Kakar (2016), in his study examined the relationship between energy consumption and financial development in the samples of Pakistan and Malaysia. In the case of Pakistan, a unidirectional causality was determined between financial development and energy consumption. In the case of Malaysia, in the light of the empirical results, bidirectional causality between money supply and energy consumption was determined. Keskingöz and İnançlı (2016) determined a bidirectional causal relationship between financial development variable using bank deposits data and energy consumption.

As shown in Table 1, the results of the previous studies were inconclusive. Baloch, Danish, and Meng (2019), Keskingöz and İnançlı (2016), Shahzad, Kumar,

Zakaria, and Hurr (2017) and, Tang and Tan (2014) determined a bidirectional causal relationship between financial development and energy consumption in their studies. In some studies, Mukhtarov, Mikayilov, Mammadov, and Mammadov (2018); Sadorsky (2010, 2011), Eren, Taspınar, and Gökmenoğlu (2019) determined a positive impact of financial development on energy consumption. Mielnik and Goldemberg (2002) found a negative relationship between financial development and energy consumption. Al-mulali and Lee (2013); Bekhet, Matar, and Yasmin (2017); Danish, Saud, Baloch, and Lodhi (2018); Kakar (2016) found a one way causality from financial development towards energy consumption. Bekhet et al. (2017); Farhani and Ozturk (2015); Furuoka (2015) have reached opposite causality relationship in their studies compared to previous studies mentioned above. They determined the causality relationship from energy consumption to financial development. Some of studies conducted by Cetin, Ecevit, and Yucel (2018); Doğan and Değer (2016); Lu (2018); Shahbaz, Hye, Tiwari, and Leitao (2013); Shahbaz, Khan, and Tahir (2013) did not observe a causality relationship between financial development and energy consumption.

Table 1: Summary of similar empirical studies in the literature

Author(s)	Period	Region/Country	Method(s)	Results
Bekhet et al. (2017)	1980-2011	Gulf Cooperation Council	ARDL Bounds Test/ Granger Causality	FD->EC (Bahrain and UAE), EC->FD (Oman)
Cetin et al. (2018)	1960-2013	Türkiye	ARDL Bounds Test/ Granger Causality	Cointegrated and no Causality
Dogan and Turkekul (2016)	1960-2010	Türkiye	ARDL Bounds Test/ Granger Causality	Cointegrated FD->EC
Farhani and Ozturk (2015)	1971-2012	Tunisia	ARDL Bounds Test/ Granger Causality	EC->FD
Islam et al. (2013)	1971-2018	Malaysia	ARDL Bounds Test/ Granger Causality	Cointegrated FD->EC (short-run) FD<->EC (long-run)
Kahouli (2017)	1995-2015	South Mediterranean Countries	ARDL Bounds Test/ Granger Causality	In Israel, Morocco, Lebanon and Tunisia have causality relationship between financial development and energy consumption.
Keskingöz and İnançlı (2016)	1960-2011	Türkiye	Johansen Cointegration/ Granger Causality	EC<->FD (bank deposits)

Author(s)	Period	Region/Country	Method(s)	Results
Mahalik, Babu, Loganathan, and Shahbaz (2017)	1971-2011	Saudi Arabia	Bayer Hanck's and ARDL Bounds Cointegration tests/	Cointegrated and non-linear and inverted U-shaped relationship between financial development and energy demand.
Mukhtarov et al. (2018)	1992-2015	Azerbaijan	Johansen Cointegration/ Gregory–Hansen Cointegration	Cointegrated and financial development has positive impact on energy consumption.
Shahbaz, Hye, et al. (2013)	1975-2011	Indonesia	ARDL Bounds Test/ Granger Causality	Energy consumption contributes to financial development due to innovative shocks. Long run relationship between variables which the energy consumption is dependent variable.
Shahbaz, Khan, et al. (2013)	1971-2011	China	ARDL Bounds Test/ Johansen Cointegration/ Granger Causality	FD≠EC
Shahbaz and Lean (2012)	1971-2008	Tunisia	ARDL Bounds Test/ Johansen Cointegration/ Granger Causality	Cointegrated FD<->EC
Shahzad et al. (2017)	1971-2011	Pakistan	ARDL Bounds Test/ Granger Causality	Cointegrated FD<->EC
Tang and Tan (2014)	1972-2009	Malaysia	ARDL Bounds Test/ Johansen Cointegration/ Granger Causality	Cointegrated FD<->EC

Econometric Method and Data

In the present study, energy consumption (EC), financial development (FD), capital (CA), openness (OP) and Dummy (D) variables regarding the period of 1968-2015 in Turkey are used. The model used in the study is indicated in Eq1. below.

$$EC = \alpha_0 + \alpha_1 FD + \alpha_2 CA + \alpha_3 OP + \alpha_1 D + \varepsilon_t \quad (1)$$

In this section, ARDL bounds test developed by Pesaran, Shin and Smith (2001) and NARDL bounds test developed by Shin, Yu, and Greenwood-Nimmo (2014) will present. These tests are enabled to examine the cointegration relationship

among variables when stationary at different levels. These tests enable examination of the cointegration relationship between variables at various stationary levels, but none of the series should be stationary at the second level. Then, symmetric causality test developed by Hacker and Hatemi J (2006), and asymmetric causality test by developed d Hatemi J (2012) will present in the study.

The unlimited error correction model (UECM) should be applied first for the ARDL bounds test and the version of UECM modified for the present study is given in Eq.2 below.

$$\Delta EC_t = \alpha_0 + \rho EC_{t-1} + \theta_1 FD_{t-1} + \theta_2 CA_{t-1} + \theta_3 OP_{t-1} + \sum_{i=1}^{p} \beta_1 EC_{t-1} + \sum_{i=1}^{q} \beta_2 FD_{t-1} + \sum_{i=1}^{q} \beta_3 CA_{t-1} + \sum_{i=1}^{q} \beta_4 OP_{t-1} + \pi D_t + \varepsilon_t \quad (2)$$

The NARDL model proposed by Shin et al. (2014) represents the asymmetric error correction model as follows:

$$\Delta EC_t = \alpha_0 + \rho EC_{t-1} + \theta_1^+ FD_{t-1}^+ + \theta_2^- FD_{t-1}^- + \theta_3^+ CA_{t-1}^+ + \theta_4^- CA_{t-1}^- + \theta_5^+ OP_{t-1}^+ + \theta_6^- OP_{t-1}^- + \sum_{i=1}^{p} \alpha_1 \Delta EC_{t-i} + \sum_{i=1}^{q} \alpha_2 FD_{t-i}^+ + \sum_{i=1}^{q} \alpha_3 FD_{t-i}^- + \sum_{i=1}^{q} \alpha_4 CA_{t-i}^+ + \sum_{i=1}^{q} \alpha_5 CA_{t-i}^- + \sum_{i=1}^{q} \alpha_6 OP_{t-i}^+ + \sum_{i=1}^{q} \alpha_7 OP_{t-i}^- + \pi D_t + \varepsilon_t \quad (3)$$

The long and short term asymmetric relationships are sought to be determined with the help of model 3. The independent variables are decomposed into their positive and negative partial sums for increases and decreases as given below:

$$FD_t^+ = \sum_{j=1}^{t} FD_j^t = \sum_{j=1}^{t} \max(\Delta FD_j, 0) \text{ and } FD_t^- = \sum_{j=1}^{t} FD_j^- = \sum_{j=1}^{t} \max(\Delta FD_j, 0) \quad (4)$$

$$CA_t^+ = \sum_{j=1}^{t} CA_j^t = \sum_{j=1}^{t} \max(\Delta CA_j, 0) \text{ and } CA_t^- = \sum_{j=1}^{t} CA_j^- = \sum_{j=1}^{t} \max(\Delta CA_j, 0) \quad (5)$$

$$OP_t^+ = \sum_{j=1}^{t} OP_j^t = \sum_{j=1}^{t} \max(\Delta OP_j, 0) \text{ and } OP_t^- = \sum_{j=1}^{t} OP_j^- = \sum_{j=1}^{t} \max(\Delta OP_j, 0) \quad (6)$$

In the study, causality relationships between variables first examined by the Hacker and Hatemi-J (2006) causality test. In Hacker and Hatemi-J (2006) test that based on the procedure of Toda-Yamamoto (1995), the causality relationship between the variables was analysed by applying VAR(p+d) (Hacker and Hatemi-J 2006).

$$y_t = \hat{v} + \hat{A}_1 y_{t-1} + \cdots + \hat{A}_p y_{t-p} + \cdots + \hat{A}_{p+d} y_{t-p-d} + \hat{\varepsilon}_t \quad (7)$$

In the study, causality relationships between variables examined by the Hatemi-J (2012) causality test after causality relationship analysed by Hacker and Hatemi-J test(2006) which enables the examination of the different causality relationship of asymmetric shocks. This test does not require any previous test in terms of a

unit root or cointegration test; however, we do need to determine the maximum integration level of variables for dmax value in the estimation equation. Hatemi-J (2012) causality test allows for examining the nonlinear impacts and various causality relationships of asymmetric shocks (Hatemi-J 2012).

y_{1t} and y_{2t} are described with the random progression of two integrated variables as follows (Hatemi-J, 2012):

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_0 + \sum_{i=1}^{t} \varepsilon_{1i}\,, \tag{8}$$

and

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_0 + \sum_{i=1}^{t} \varepsilon_{2i}\,, \tag{9}$$

Here, t = 1, 2, …, T, the constant terms $y_{1,0} and y_{2,0}$ indicate the initial values, and ε_{1i} and ε_{2i} indicate the white noise terms. Positive shocks are defined as $\varepsilon_{1i}^{+} = \max(\varepsilon_{1i}, 0)\,, \varepsilon_{2i}^{+} = \max(\varepsilon_{2i}, 0),$ while negative shocks are defined as $\varepsilon_{1i}^{-} = \min(\varepsilon_{1i}, 0)\,, \varepsilon_{2i}^{-} = \min(\varepsilon_{2i}, 0).$

Hatemi-j (2012) defined the sum of positive and negative shocks as follows: $\varepsilon_{1i} = \varepsilon_{1i}^{+} + \varepsilon_{1i}^{-}$ and $\varepsilon_{2i} = \varepsilon_{2i}^{+} + \varepsilon_{2i}^{-}$. And then, variables were defined by Hatemi-J (2012) as follows:

$$y_{1t} = y_{1t-1} + \varepsilon_{1t} = y_{1,0} + \sum_{i=1}^{t} \varepsilon_{1i}^{+} + \sum_{i=1}^{t} \varepsilon_{1i}^{-}, \tag{10}$$

Similarly,

$$y_{2t} = y_{2t-1} + \varepsilon_{2t} = y_{2,0} + \sum_{i=1}^{t} \varepsilon_{2i}^{+} + \sum_{i=1}^{t} \varepsilon_{2i}^{-} \tag{11}$$

As a final point, the positive and negative shocks of each series were determined in the study by using cumulatively expressed as follows (Hatemi-J 2012):

$$EC_{1t}^{+} = \sum_{i=1}^{t} \varepsilon_{1i}^{+}, EC_{1t}^{-} = \sum_{i=1}^{t} \varepsilon_{1i}^{-}\,,\ FD_{2t}^{+} = \sum_{i=1}^{t} \varepsilon_{2i}^{+}, FD_{2t}^{-} = \sum_{i=1}^{t} \varepsilon_{2i}^{-}, CA_{1t}^{+} = \sum_{i=1}^{t} \varepsilon_{1i}^{+}, CA_{1t}^{-} = \sum_{i=1}^{t} \varepsilon_{1i}^{-}\,,\ OP_{2t}^{+} = \sum_{i=1}^{t} \varepsilon_{2i}^{+}, OP_{1t}^{-} = \sum_{i=1}^{t} \varepsilon_{1i}^{-} \tag{12}$$

As the following step, causality relationship among the variables is tested. The test can be estimated by the vector autoregressive (VAR) model with an order p (Hatemi-J 2012). Hatemi-J (2003) information criteria are used to decide the optimal lag length criteria for the VAR model.

Empirical Results

The stationarity analysis of variables in the study is conducted by means of ADF and PP unit root tests. The stationarity analysis demonstrates that variables are stationary at first difference. Results from Unit Root tests are given below in Table 2.

Table 2: Unit root analysis without structural break

	ADF					
	Level			**1st Diff.**		
	t stats	**p values**	**Lag**	**t stats**	**p values**	**Lag**
CA	-1.48265	0.533594	0	-6.3831	0.0000*	0
EC	0.407038	0.981233	0	-6.7476	0.0000*	0
FD	3.06208	0.999997	0	-4.3807	0.0000*	0
OP	-2.08382	0.251896	0	-5.9717	0.0000*	0
	PP					
	Level			**1st Diff.**		
	t stats	**p values**	**Lag**	**t stats**	**p values**	**Lag**
CA	-1.42433	0.562496	4	-6.5688	0.0000*	6
EC	1.404502	0.998776	11	-7.2312	0.0000*	8
FD	2.708816	0.999986	1	-4.3323	0.0000*	2
OP	-2.13372	0.232865	2	-5.9717	0.0000*	0

Note: ** indicates significance at 1% level, ** at 5% level, and *** at 10% level.*

After the stationarity test, long-term relationship between variables was analyzed using ARDL and NARDL bounds tests. The stationarity level for variables should not be level 2 for neither of these tests. Results from ARDL and NARDL bounds tests are given in Table 3.

Table 3: ARDL and NARDL Bounds Test Results

	ARDL		**NARDL**	
t_BDM	-4.70**		-0.25	
F_PSS	6.12**		2.58	
	Critical Values			
	I(0)		**I(I)**	
Sign.	F_PSS	t_BDM	F_PSS	t_BDM
1%	6.05	-3.96	7.45	-4.78
5%	4.45	-3.41	5.56	-4.16
10%	3.74	-3.13	4.78	-3.84
	Model Diagnostic Tests			
Serial Correlation	0.24		0.12	
Hetero.	0.71		0.48	
Ramsey Reset	0.37		0.77	
J.B. Normality	0.27		0.66	

Note: ** indicates significance at 1% level, ** at 5% level, and *** at 10% level.*

In Table 3, ARDL bounds test F-statistics value calculated was found to be 6.12; since this is higher than the upper limit of 5.56 at 5% significance level, H0 hypothesis was rejected. Thus, it was determined that a symmetric cointegration relationship exists between the variables. NARDL bounds test F-statistics value calculated was found to be 2.58; since this is lower than the bottom limit of 5.56 at 5% significance level, H0 hypothesis was accepted. Thus, it was determined that an asymmetric cointegration relationship is not present between the variables.

In Table 4, the long-term coefficients calculated based on the estimations of ARDL model are presented.

Table 4: Long-term Estimation Results of ARDL

Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
FD	4.919071	0.967721	5.083148	0.0000
OP	-0.397479	0.382846	-1.038222	0.3069
CA	4.726465	3.468264	1.362776	0.1825

In the light of the analysis of long-term coefficients, it was concluded that the Financial Development coefficient was significant, and that an increase in financial

development would also lead to an increase energy consumption. This result supports the empirical results of studies by Mukhtarov, Mikayilov, Mammadov, and Mammadov (2018); Sadorsky (2010, 2011); Eren, Taspinar, and Gokmenoglu (2019); thus revealing a positive impact of financial development on energy consumption.

Table 5: Results of Error Correction Model Estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	236.8782	44.95614	5.269096	0.0000
@TREND	12.33008	2.269386	5.433222	0.0000
D(EC(-1))	0.260665	0.118341	2.202654	0.0349
D(OP)	0.339218	0.270071	1.256035	0.2182
D1	31.28922	32.55435	0.961138	0.3437
D2	59.61180	32.00019	1.862858	0.0717
D3	-81.39507	33.56331	-2.425121	0.0211
CointEq(-1)	-0.647467	0.124363	-5.206278	0.0000

As required, it was found that the error term coefficient was negative and statistically significant. This shows that the error correction model is functioning and that it has corrected approximately %64.7 of deviations from short-term after a period of time.

Table 6: Results of Hacker-Hatemi Causality Test (2006)

Direction of Causality	Test Statistics	Bootstrap Critical Values		
		1%	5%	10%
EC ⇒ FD	4.143**	7.482	4.102	2.482
FD ⇒ EC	0.001	7.863	4.108	2.875
EC ⇒ OP	1.208	7.530	4.133	2.797
OP ⇒ EC	0.280	7.012	4.003	2.813
EC ⇒ CA	0.298	7.354	4.143	2.286
CA ⇒ EC	0.938	7.200	4.052	2.799
OP ⇒ CA	0.739	7.730	4.287	2.949
CA ⇒ OP	1.240	7.485	4.255	2.938
FD ⇒ CA	2.440	7.647	4.204	2.862
CA ⇒ FD	3.614***	7.400	4.039	2.755
OP ⇒ FD	0.045	7.702	4.109	2.886
FD ⇒ OP	0.302	7.588	4.266	2.872

*Note: * indicates significance at 1% level, ** at 5% level, and *** at 10% level.*

As it is seen in Table 6, there is a unidirectional causality between financial development and energy consumption, and the direction of this causality relationship is from energy consumption to financial development. Bekhet et al. (2017); Farhani and Ozturk (2015); Furuoka (2015) have reached same causality relationship in their studies. However, even when there is not a causality relationship between variables, it is possible to study whether there is a causality between positive and negative shocks of variables. Therefore, studying the asymmetric (hidden) causality relationship between energy consumption and financial development is the next subject of this study. Hatemi-J's (2012) test and findings related to the asymmetric causality relationship are given in Table 7.

Table 7: Results of Hatemi-J Asymmetric Causality Test (2012)

Direction of Causality	Test Statistics	Bootstrap Critical Values		
		1%	5%	10%
$EC^- \Rightarrow FD^-$	1.093	12.249	5.705	3.446
$EC^- \Rightarrow FD^+$	0.007	8.920	4.565	3.157
$EC^+ \Rightarrow FD^+$	2.748	10.280	5.176	3.506
$EC^+ \Rightarrow FD^-$	1.923	10.203	5.016	3.294
$FD^- \Rightarrow EC^-$	5.758	84.043	34.659	22.149
$FD^+ \Rightarrow EC^-$	0.044	12.133	7.074	5.102
$FD^+ \Rightarrow EC^+$	0.353	8.641	4.706	3.213
$FD^- \Rightarrow EC^+$	10.162**	15.950	8.500	6.016
$EC^- \Rightarrow CA^-$	2.621	16.420	5.862	3.255
$EC^- \Rightarrow CA^+$	20.121***	68.293	30.608	19.956
$EC^+ \Rightarrow CA^+$	0.133	8.179	4.460	3.013
$EC^+ \Rightarrow CA^-$	9.571	90.110	36.838	23.571
$CA^- \Rightarrow EC^-$	0.320	10.618	4.748	3.045
$CA^+ \Rightarrow EC^-$	0.016	18.901	6.159	3.412
$CA^+ \Rightarrow EC^+$	1.247	10.728	5.502	3.717
$CA^- \Rightarrow EC^+$	0.094	14.378	5.190	2.984
$EC^+ \Rightarrow OP^+$	0.133	8.179	4.460	3.013

Direction of Causality	Test Statistics	Bootstrap Critical Values		
		1%	5%	10%
$EC^{+} \Rightarrow OP^{-}$	9.839**	15.581	8.419	6.062
$EC^{-} \Rightarrow OP^{-}$	2.621	15.770	5.852	3.385
$EC^{-} \Rightarrow OP^{+}$	3.252	12.422	7.444	5.318
$OP^{+} \Rightarrow EC^{+}$	1.247	10.728	5.502	3.717
$OP^{+} \Rightarrow EC^{+}$	0.016	18.901	6.159	3.412
$OP^{+} \Rightarrow EC^{-}$	0.320	10.618	4.748	3.045
$OP^{-} \Rightarrow EC^{+}$	0.094	14.378	5.190	2.984
$FD^{+} \Rightarrow CA^{+}$	1.115	10.167	4.938	3.226
$FD^{+} \Rightarrow CA^{-}$	2.764	17.977	10.412	7.493
$FD^{-} \Rightarrow CA^{-}$	0.186	8.656	4.454	3.061
$FD^{-} \Rightarrow CA^{+}$	9.368***	22.069	12.198	8.808
$CA^{+} \Rightarrow FD^{+}$	0.475	12.711	6.079	3.914
$CA^{+} \Rightarrow FD^{-}$	4.312***	9.935	4.909	3.238
$CA^{-} \Rightarrow FD^{-}$	8.438**	10.953	5.141	3.213
$CA^{-} \Rightarrow FD^{+}$	0.011	9.876	4.822	3.142
$OP^{+} \Rightarrow FD^{+}$	0.066	8.705	4.551	3.125
$OP^{+} \Rightarrow FD^{-}$	0.001	11.292	4.977	3.224
$OP^{-} \Rightarrow FD^{-}$	0.508	9.389	5.001	3.309
$OP^{-} \Rightarrow FD^{+}$	2.255	10.703	4.920	3.107
$FD^{+} \Rightarrow OP^{+}$	0.078	9.915	4.909	3.224
$FD^{+} \Rightarrow OP^{-}$	0.331	9.705	4.964	3.238
$FD^{-} \Rightarrow OP^{-}$	0.010	9.212	4.707	3.104
$FD^{-} \Rightarrow OP^{+}$	0.333	8.823	4.644	3.049
$CA^{+} \Rightarrow OP^{+}$	0.022	16.653	5.607	3.149
$CA^{+} \Rightarrow OP^{-}$	6.346	93.166	38.817	25.648
$CA^{-} \Rightarrow OP^{-}$	11.262***	31.085	15.370	10.842

Direction of Causality	Test Statistics	Bootstrap Critical Values		
		1%	5%	10%
$CA^{+} \Rightarrow OP^{-}$	50.166**	120.003	44.626	27.983
$OP^{+} \Rightarrow CA^{+}$	0.543	17.758	5.775	3.169
$OP^{+} \Rightarrow CA^{-}$	0.104	14.570	5.463	3.134
$OP^{-} \Rightarrow CA^{-}$	12.692	34.363	19.159	13.688
$OP^{-} \Rightarrow CA^{+}$	4.900***	16.234	5.597	3.070

Note: ** indicates significance at 1% level, ** at 5% level, and *** at 10% level.*

According to these results, the null hypothesis which assumes that negative financial development shocks do not cause positive shocks in energy consumption can be clearly rejected at the 5% significance level. I analyzed another relationship which is statistically significant between the capital and the openness. The asymmetric causality test results showed that the null hypothesis assuming negative and positive capital shocks do not lead to a negative shock in the openness can be rejected at the 10% significance level. Moreover, the assumption that negative openness shocks do not trigger a positive shock in the capital can be rejected at the 5% significance level.

Conclusion

In this study, the relationship between financial development and energy consumption in Turkey was analyzed through annual data covering the period of 1968-2015 as well as linear and non-linear ARDL bounds test approaches and symmetric and asymmetric causality tests. According to empirical results obtained by this study, increases in financial development cause increases in energy consumption. This supports the direct nexus between financial development and energy consumption, developed by Sadorsky (2011). Turkey went through important financial developments and changes in the period that was studied. Even though the expected and desired financial deepening could not be achieved with financial liberalization, Turkey became more integrated to the global world. The accessibility to financial resources is important in terms of financing investments in developing countries with saving gap such as Turkey. Moreover, Turkey went through unstable economic financial periods due to financial crises in the aforementioned period. This is demonstrated using asymmetric causality analysis, and

negative shocks in financial developments are found to be causality of positive shocks in energy consumption. When analyzing these results, it is important to bear in mind that Turkey often received financial aid from international organizations during financial crises in this period and that she went through some economic and financial regulations at the time. The symmetric causality test results demonstrated that a causality from energy consumption to financial development was present.

Establishing determiners of energy consumption in Turkey is rather important in terms of developing energy policies which are vital to the national economy. Besides focusing on nuclear energy consumption, Turkey has recently inclined towards several renewable energy sources such as wind and solar energy. Providing accessibility to resources for financing necessary investments by creating financial and economic stability is among the primary subjects regarding economic growth.

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18

THE DETERMINANTS OF ECONOMIC GROWTH IN TURKEY: AN EMPIRICAL ANALYSIS OF ENDOGENOUS GROWTH THEORY

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In today's world where economic processes are complex, we observe many factors affecting economic growth and considerable theoretical and empirical literature trying to explain economic growth. The impact of globalization and technological progress around the world lead to be added some new variables into the production function such as technological level, human capital, trade and government expenditures besides the classical production inputs. Theories trying to introduce these variables endogenously within the form of production function have been aggregated by new growth perspective and the economists designated these theories as endogenous growth theory. Initially, with the contributions of Romer in the early of 1990's, technology has included in the production process as an endogenous factor and it has considered as a driving force in terms of economic growth. In this case, technological development leads to efficiency in the production process; and then an increasing in efficiency accelerates the increasing in production level. However, if a country intends to reach technological development, that country also needs to invest in human capital, accelerate R&D activities and should be increase capital stock formation. This new approach to economic growth has examined by some other economist such as Grossman and Helpman, Aghion and Howit, Lucas, Barro and Arrow. Their contributions to endogenous growth theory emphasize the significance of R&D, innovation, human capital and foreign trade etc.

The study consists of four parts; the first part introduces the theoretical framework about economic growth and related theories. In the second part, the tables

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and graphs about R&D investments, patents applications and trade volume will be assessed in terms of Turkish economy. The third section contains brief introduction about the method will be used and empirical results, and finally we will assess the concluding remarks around the empirical findings.

Theoretical Framework

There have been some changes and transformations in economic, social and political regards in the process of globalization experienced as a result of the technological development and communication revolution. The industrial society has started to be replaced by the information society and a postmodern perspective has started to predominate. In fact, the change in the economy has become the basic dynamic of all other transformations (Altan, 1993: 9).

Economic preferences have also changed during the globalization process, which has accelerated with the influence of technological development. Technical progress, processing and storage of information, improvement of transportation and communication networks, advances in biotechnology have led to redefining the preferences of actors in economy. This change has been felt in all other markets as well as in the goods and services markets. The preference of qualified workforce over the unskilled workforce in the labor market can be given as an example (Kozlu et al., 1994: 7).

As a result of the changes, economic growth has become more important due to the determination and influence of the living standards in countries. The high per capita income also offers individuals a better life opportunity in countries with high economic growth. The individuals live in better conditions, but better education, health, etc. services are also received in countries with better living conditions. The focus of countries for providing such services is to ensure economic growth and to be sustainable under these conditions. Countries are developing and implementing policies in line with their conditions in order to ensure sustainable economic growth.

Primarily theoretical information about economic growth is given in this part of the study. In this context, the definition of economic growth, its determinants, the analysis results will be included after giving information about the overall progress of technology and commerce in Turkey, after explaining the theory of economic growth.

Concept of Economic Growth

The economic growth is simply the ability of a country to produce demanded goods and services. In addition, expansion of the current production capacity in an economy is defined as economic growth (Peterson, 1976: 387). Economic growth is an increase in production factors over the years, increasing the per capita income according to another definition (Ulgener, 1991: 410).

Economic growth occurs in two ways. The first is the increase in production based on business cycles if the economy has underemployment; the second is medium and long-term economic growth with the addition of new production factors or the development of technology while the economy is at full employment. Especially in recent years, economic policy focused on increasing the efficiency of capital accumulation and ensure economic growth (Turkey Economic Association, 2003: 4).

In addition to basic production factors, technology is needed to increase the output in an economy as per the aforementioned changes. Technology plays an important role especially in increasing productivity and improving product quality. Technology becomes concrete as a result of R&D and innovation activities (Gkotsis and Vezzani, 2016: 5).

Determinants of Economic Growth

There are three main factors affecting economic growth: (1) human capital, physical capital and capital accumulation covering all investments in the land, (2) increasing labour force thanks to population growth, and (3) technological development (Todaro, 1997: 152).

The factors that affect the economic growth process of each country may differ from each other. The country's geopolitical location, climate, natural resources, educational status of people in the country, disposition tendency and entrepreneurship activities, R&D investments, innovation, trade volume can be counted. Especially in recent years, R&D, technology and innovation have played an important role in achieving economic growth (Stel et al., 2005: 311).

The impact of economic and non-economic factors on economic growth continues to be tested in the economic literature. Accordingly, trade, technology,

education, R&D, such as economic factors as well as the climate, demography, democracy, the uneconomic factors such as religious beliefs have been found to affect economic growth (Turkey Economic Association, 2003: 8).

Labour, which is one of the determinants of economic growth, is divided into physical and human labour as a result of the changes and developments. While it is accepted that physical labour increases economic growth in classical growth models, it is argued that human labour increases economic growth in modern growth models. As a result of knowledge and skill of labour arising from education and technological development, productivity increases and economic growth is provided (Seyidoglu, 2017: 2). According to Romer, the accumulation of knowledge resulting from population growth is an important determinant of economic growth. Labour also increases as a result of the increase in the population; The increase in the amount of labour will also increase the available knowledge and this will lead to positive externality and economic growth will be achieved (Romer, 1986: 1015).

Capital is considered as a driving force even though it is a determinant of economic growth. Capital accumulation has always been included in traditional and modern growth models. A. Smith argues that K. Marx's capital accumulation is the key to economic growth. Accordingly, the increase in savings stimulates investments, and as a result, accumulation of capital increases (Samuelson and Nordhaus, 1989: 855; Berber, 2019: 50).

According to A. Smith, capital accumulation is the locomotive of economic growth and the source of capital accumulation is the rate of savings and profit. As a result of the increase in savings and profit rate, capital stock increases, which affects economic growth. However, the size of the market is also influential in the increase of capital accumulation in economic growth. In summary, economic growth will be achieved if the capital accumulation acquired can purchase technology that will affect labour productivity, and if the market size is also large enough to increase production. Market size will also increase the trade volume, which is another determinant of growth, and will positively affect economic growth (Berber, 2019: 50). Although technological development is shown as one of the main determinants of economic growth in modern growth models, capital accumulation is important for sustainable economic growth (Kazgan, 1980: 387). R&D activities in the production of new goods and services, using innovation and human

capital, in innovation and production of knowledge; it plays an important role in ensuring economic growth (Avcıoglu, 2019: 2).

The determinants of economic growth are education, technological development, R&D, innovation and human capital according to modern growth theories. In our present age, especially in the information age, traditional growth theories have been insufficient to explain economic growth and modern growth theories have emerged in which technological development is included in the model.

Economic Growth Theories

Although economic growth theories are referred to as traditional and modern growth theories, they are also referred to as endogenous and exogenous growth theories in most sources. In traditional growth theories, it is accepted as an exogenous variable since technology is not affected by production factors. However, it is considered intrinsic that technology emerged in response to production factors, as technology is an evolving process within the economic system in the recent studies (Seyidoglu, 2006: 844).

Although economic growth theories have been systematically addressed by the classics for the first time, Physiocrats and Mercantilist have also addressed the economic growth. Precious metals are the source of wealth in the Mercantilist thought system. Free trade is also the most effective way to increase the precious metals in the treasury. Accordingly, when the goods produced in the country are exported, valuable mine stocks will increase. Precious mineral stocks in the treasury were increased with applications such as overseas expeditions, colonialism and import restrictions. In the 1750s, the Physiocrat thought system emerged in response to Mercantilist thought. It can be considered that the seeds of liberal thought were planted with the physiocrat thought system. According to physiocrats, the source of wealth is agricultural production. It is relatively superior to the agricultural industry and the market mechanism to interventionism. The physiocrats could not rule for a long time due to the conditions they were in. But they played an important role in creating favourable conditions for classical economics.

Growth theories are systematically addressed by the classics for the first time. T. R. Malthus (1766- 1834), D. Ricardo (1772-1823), A. Smith (1723-1790) are economists who have contributed significantly to classical growth theories (None, 1994: 14). According to A. Smith, the source of economic growth is division of

labour and specialization. Another way to increase wealth is to increase labour productivity according to A. Smith. The increase in labour productivity causes an increase in capital accumulation and stimulates investments and savings, resulting in economic growth (Erim, 2007: 42-44). According to Smith, technology and information stock play an important role in ensuring economic growth. In addition, free trade also increases economic growth and eliminates income inequality among countries. While emphasizing that technology is important for growth, A. Smith did not include it in the model (Smith, 1776: 272).

According to D. Ricardo's theory of growth, the source of economic growth is industrialization. Technological developments in the model is the only industry that causes an increase in productivity. In the agricultural sector, productivity can be increased by mechanization, but the industry sector is more efficient than the agricultural sector since the law of decreasing yields in the agricultural sector is valid (Yılmaz, 2010: 24).

According to T. Malthus's relationship between the population and the wage, if the wages increase, the income of the population increases. Therefore, the population will increase as a result of the increase in wages. But marriages or wage growth are not the only reason for population growth. With the Industrial Revolution, the death rate decreased, life expectancy increased, developments in medicine, improvement of living conditions caused an increase in natural population. Even with the increase in industrialization and urban population, the income level increased, birth rates decreased (Berber, 2011: 59).

According to the Harrod-Domar model, which is one of the modern growth models, the source of economic growth is savings and investments. The effect of investment and employment on the increase of economic growth was analysed in the study titled Capital Spread, Growth Rate and Employment published by E. D. Domar in 1946. In this analysis, the general level of prices is fixed and there is no time lag between events, the economy has productive capacity, the savings and investments in the model depend on the income of the same period, there are assumptions such as investment, savings and income is net size (Domar, 1946: 137).

According to the Solow Model, capital accumulation is an endogenous variable and unpredictable changes in capital accumulation are called Solow Residual. The productivity in the Solow model is due to the increase in capital accumulation. It is not possible to achieve a very different economic growth from the current

technological development due to the diminishing returns on capital accumulation (Tang, Hu and Lin, 2005: 3; Solow, 1956: 70).

According to the Schumpeter growth model, the source of economic growth is innovation. Schumpeter was the first to introduce the concept of innovation to the economic literature. Innovations also accelerate global competition. Schumpeter has listed the benefits of innovation as follows: (a) introducing new products to the market, (b) learning new production techniques, (c) offering new markets, (d) discovering new procurement methods, (e) creating new market structures. Schumpeter explained innovations with the concept of creative demolition because the emerging new technologies replaced old technologies over time (Schumpeter, 1934: 66).

Since many factors are not included in the model, endogenous growth models have emerged when the economic growth is provided by the dynamics coming from the system in the classical growth models. P. M. Romer (1986) and R. E. Lucas (1988) made significant contributions to endogenous growth models. The basic assumptions of endogenous growth models are based on A. Smith and J. A. Schumpeter models (Ercan, 2000; 129, Gurak, 2006: 16).

Economic growth and per capita income increased in many countries with the industrial revolution, but this has not been the case in other countries. The importance of technology is emphasized to overcome the differences in growth between countries. Endogenous growth models that analyse with consideration of efficiency and R&D complement traditional growth models (Romer, 1994: 3).

According to Romer, technology plays an important role in ensuring economic growth. It can be considered that Romer Model is the form of technology included in the Solow model. The increase in capital accumulation as a result of technological development will increase the amount of output according to the Romer Model. The increase in capital accumulation caused by technological development allows new production techniques to emerge, thereby reducing costs and producing high quality goods. The increase in physical capital stock also increases the stock of information. In addition, technological development in the economy is important in terms of encouraging entrepreneurs (Romer, 1990: 72, Barro and Martin, 2004: 232).

Economic growth was associated with foreign trade in the Grossman and Helpman Model. Accordingly, countries that are not sufficiently developed technologically will not only import products in high-tech product imports, but also import the technique of the product. As a result of high R&D incentives to be made in these countries, these technologies will be imitated, and the openness of the country will be increased. At this stage, multinational companies operating in the country play a big role (Grossman and Helpman, 1991: 43).

Literature Review

Altın and Kaya (2009) analysed the relationship between R&D spending and economic growth in Turkey with VEC model. It was determined that there is a long-term relationship between the variables and there is a causal relationship from R&D expenditures to economic growth according to the obtained results.

Korkmaz (2010) analysed the relationship between R&D spending and economic growth in Turkey between 1990 and 2008 with cointegration and causality tests. According to the results, there is a long-term relationship between the variables and causality relationship from R&D expenditures to economic growth.

Gocer (2013) analysed the relationship between R&D expenditures and economic growth, high-tech product exports and science and communication technologies trade in 11 Asian countries between 1996 and 2012. According to the results obtained, it was determined that there is a causal relationship between R&D expenditures and high-tech product export, science communication technology trade and economic growth.

Tas et al (2017) analysed the relationship between economic growth and R&D in Turkey between 2005 and 2015 with causality analysis. According to the results obtained from the analysis made by using the industrial variables and the share variables allocated to R&D in GDP, it has been determined that there is a causality relationship from R&D to economic growth.

Genc et al (2010) analysed the relationship between exports, economic growth and human capital in Turkey's economy between 1980 and 2007 with the Toda-Yamamoto causality test. There is a one-way causality relationship from exports to human capital according to the findings obtained as a result of the analysis.

Sımsek and Kadılar (2010) analysed the relationship between human capital, exports and economic growth in Turkey between 1960 and 2004 with causality test. It has been determined the existence of the relationship to economic growth according to the obtained results, human capital and export in Turkey's economy.

Aktas (2009) analysed the impact of exports and imports on economic growth in Turkey between 1996 and 2006 with cointegration test. It is determined that there is a bilateral relationship between exports, imports and economic growth in the short term. In the long term, it has been determined that there is a one-way relationship between exports and imports, and one-way relations from growth to imports and exports.

Taban ve Kar (2006) analysed the relationship between economic growth and human capital for Turkey's economy between 1969 and 2001. According to the results obtained from the analysis of the human capital economic growth relationship calculated through different indices, the bidirectional causality relationship between the human capital index and the education index and economic growth; it has been determined that there is a one-way causality relationship between compound enrolment rate and economic growth.

Yaylalı et al (2010) analysed the relationship between R&D spending and economic growth between 1990 and 2009 with cointegration test and causality analysis. One-way causality relationship from R&D expenditures to economic growth was found in long term according to the results obtained.

Ay and Yardımcı (2008) analysed the impact on the physical and human capital to economic growth in Turkey between 1950 and 2000 with VAR model. It has been determined that there is a positive relationship towards economic growth according to the results obtained from the study of the physical and human capital in the long term in Turkey's economy.

Erdogan and Canbay (2016) emphasized the importance of R&D activities in increasing economic growth in the study, on which the relationship between R&D activities and economic growth is discussed theoretically. In the study, it is shown that the technological development resulting from the increase in R&D activities has spread to the entire economy, thereby increasing economic growth.

Isık (2014) analysed the patent spending and economic growth quarterly in Turkey between 1990 and 2010 with causality analysis. It was found with patent expenditures in Turkey unidirectional causal relationship between economic growth according to the results obtained from the analysis result.

Duman and Aydın (2018) analysed the relationship between R&D spending and GDP in Turkey's economy between 1998 and 2015 with causality analysis. It was found with patent expenditures in Turkey unidirectional causal relationship between economic growth according to the results obtained from the analysis result.

Kose and Senturk (2017) analysed the impact of R&D and number of patent and technological advancement on economic growth in Turkey's economy between 1989 and 2012 with causality analysis. While a positive correlation was determined between R&D expenditures and technological development and economic growth, it was determined that there was no causal relationship between patent expenditures and economic growth according to the results obtained as a result of the analysis.

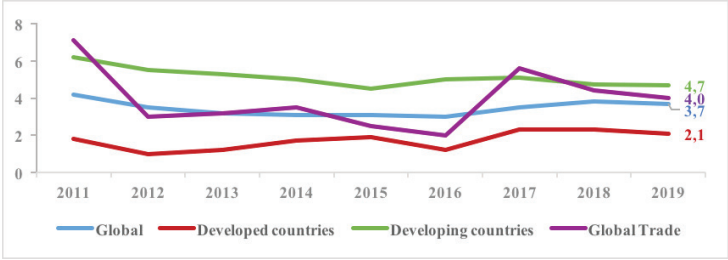
Kose and Yıldırım (2015) analysed the impact of R&D and number of patent on exports in Turkey between 1989 and 2013 with causality analysis. It was found that R&D and patent expenditures affect exports positively according to the results of Granger causality analysis.

Overview of Economic Growth, R&D, Patent and Trade in Turkey

With the increase in production, investment and global trade in 2017, the world economy has achieved a strong economic growth. The recovery in countries exporting commodities caused an increase in economic growth due to the high economic growth in the first half of 2018, especially in the USA, India and China (Ministry of Treasury and Finance, 2018: 16).

The main sources of economic growth in Turkey's economy are domestic demand, investment and exports. In Turkish economy a negative growth was seen in 2009 and the lowest economic growth in 2012 and 2016. It should be noted that these dates are the years following the economic crisis. Turkey has become the fastest growing G20 country with 7.4% growth in 2017 (Ministry of Finance and Treasury, 2018: 15).

Figure 1. Global Economic Growth and Global Trade

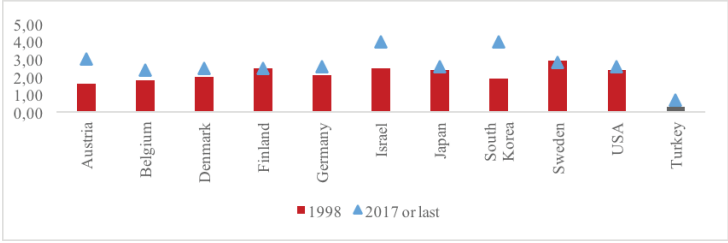


Source: Ministry of Finance and Treasury

The figure contains the economic growth in the world and the change in trade volume between 2011 and 2019. It is observed that global economic growth and trade volume lost momentum after 2018 especially due to tensions between the USA and China. While economic growth in the USA is increasing, the momentum in the Euro Area is lost.

The changes and developments in science technology in recent years have provided new opportunities for economic growth. Access to information has become easier and the cost of sharing information has decreased. economic activities have also changed With the use of information as a production factor. Both countries and companies have started to give more importance to innovation in the process of transforming information into commercial goods due to changing consumer demands, products with shorter lifespan, and increased competition (Avcıoğlu, 2019: 2).

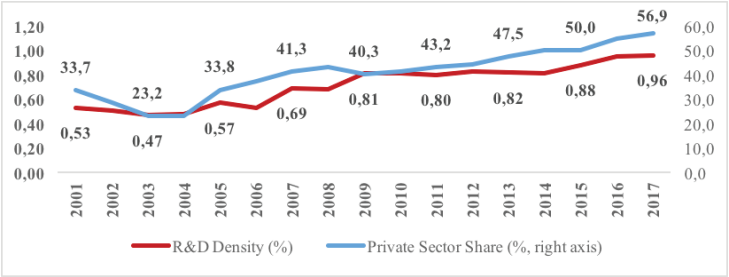
Figure 2. Innovative Country and R & D intensity in Turkey (%)



Source: TUIK

The figure shows the countries with the most R&D activities after 1988-2017. Accordingly, R&D investments increased by an average of 0.7% over the years. In addition, the countries with the highest R&D intensity in 1998 were Sweden, Israel, Finland, Japan and the USA, respectively; After 2017, the highest density ranking is Israel, South Korea and Austria. With the investments made, Turkey is making an effort to keep up with the intense competitive environment.

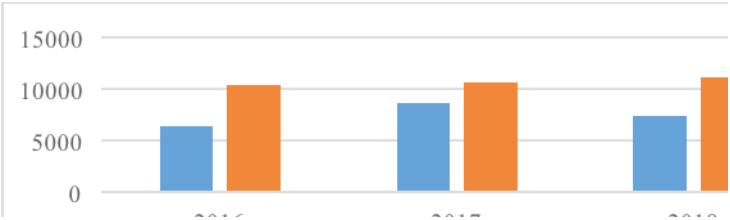
Figure 3. R&D Development



Source: *TUIK*

This figure shows the R&D intensity and R&D share of private sector in Turkey between 2001 and 2017. The analysis of the figure indicates that both the R&D intensity and the private sector's R&D share have increased over the years and the private sector has a higher share. Turkey's R&D intensity is about 0.96 percent.

Figure 4. Number of Patent Applications



Source: *Turkish Patent and Brand Authority*

The Figure shows the patent applications made in Turkey in 2018. Accordingly, 7,349 out of 18504 patents issued to the Turkish Patent and Trademark

institution are domestic and 11155 are also foreign patents in 2018. There was a 4% decrease in total patent applications in 2018 (Turkish Patent and Trademark Office, 2019: 30).

Table 1. High Tech Product Export

	2019		**2020**		
Technology Density	**Value (Million $)**	**Share (%)**	**Value (Million $)**	**Share (%)**	**Change (%)**
	EXPORT (FOB)				
Total Manufacturing Industry	42.126	100.0	40.433	100.0	-4.0
High Tech Products	1.436	3.4	1.337	3.3	-6.9
	IMPORT(CIF)				
Total Manufacturing Industry	37.995	100.0	43.402	100.0	14.2
High Tech Products	5.207	13.7	5.895	13.6	13.2

Source: *TUIK, 2020.*

The chart shows the export values of the manufacturing industry products according to their technology densities. Accordingly, 94.7% of the total exports in the first quarter of 2020 consists of products of manufacturing industry. The share of high-tech product exports in the manufacturing industry is 3.6%. In the same period, 80.3% of the total imports consist of manufacturing industry products. 14.7% of total industry imports to manufacturing is high technology product (TUIK, 2020).

Table 2. Export Indicators in Turkey

	2016	**2017**	**2018**
Export (Billion $)	142.6	157.0	168.1
Increase in Trade of Goods (%)	-0.9	10.2	7.1

Source: *Ministry of Customs and Trade, 2020.*

The chart shows the growth of Turkey's exports and merchandise trade between 2016 and 2019. Accordingly, export performance accompanied the increase in the trade of goods in the specified date range. Accordingly, Turkey's share in total world merchandise exports for 2018 is 0.90%.

Table 3. Most Exported Sectors

Sector	2017 (Billion $)	2018 (Billion $)	Value (%)
Automotive	28.5	31.6	10.7
Garment and Confectionary	17	17.6	3.6
Chemistry	16	15.6	8.3
Steel	11.4	15.6	36.1
Electric/Electronic	10.5	11.3	7.9

Source: TIM, 2019.

The chart shows the most exporting sectors of Turkey in 2018. Accordingly, Turkey's most export sectors which respectively the automotive industry, garment and apparel, chemical industry, steel, electrical and electronics industries are. It made the highest export in the history of the Republic, especially in the automotive industry in 2018 with an export of 31.6 billion dollars in the automotive industry (Chart 3). In addition, the sectors seeing the highest increase in exports in 2018 are steel ($ 15.6 billion), jewellery ($ 4.4 billion) and olive / olive oil ($ 400 million) respectively (Chart 4). Moreover, Turkey exports mostly to Germany ($ 16.2 billion), UK ($ 11.1 billion), Italy ($ 9.6 billion), Iraq ($ 8.4 billion) and the US ($ 8.3 billion) (TIM, 2019).

Table 4. The Sector with the Most Export Increase

Sectors	2017	2018	Value (%)
Steel	11.4 (Billion $)	15.6 (Billion $)	36.1
Jewel	3.3 (Billion $)	4.4 (Billion $)	34.5
Olives and Olive Oil	323 (Billion $)	400 (Billion $)	23.7

Source: *TIM, 2019.*

Table 5. Most Exported Countries

Countries	2017	2018	Rate (%)
Germany	15.1 (Billion $)	16.2 (Billion $)	7.0
United States	9.6 (Billion $)	11.1 (Billion $)	15.8
Italy	8.5 (Billion $)	9.6 (Billion $)	12.9
Iraq	9.1 (Billion $)	8.4 (Billion $)	-7.7
USA	8.7 (Billion $)	8.3 (Billion $)	-3.9

Source: *TIM, 2019.*

Method and Application Results

The relationship between R&D investments, patent applications for technology products, high-tech product export, population and economic growth between 1988 and 2018 in Turkey's economy, were analysed with causality method. The data of the variables used in the model were compiled from the World Bank (WB) official database. Stability testing of the variables used in the study was tested using ADF unit root test and Ziwot-Andrews Unit Root Test, which are the first- and second-generation unit root tests. After the stability test, the relationship between variables was tested with Toda-Yamamoto Causality Analysis.

Table 6. ADF Unit Root Test

Variables		**I(0)**			**I(1)**		
		Intercept	**Intercept+ Trend**		**Intercept**	**Intercept+ Trend**	RESULT
gdp	*t sta.*	-5.898 (0.0000)*	-5.940 (0.0002)*	*t sta.*	-9.672 (0.0000)*	-9.508 (0.0000)*	
	%1	-3.670	-4.296	*%1*	-3.679	-4.309	I(1)
	%5	-2.963	-3.568	*%5*	-2.967	-3.574	
	%10	-2.621	-3.218	*%10*	-2.622	-3.221	
lnexport	*t sta.*	-2.711 (0.0838)*	-1.067 (0.9181)*	*t sta.*	-3.777 (0.0079)*	-4.199 (0.0129)*	
	%1	-3.670	-4.296	*%1*	-3.679	-4.309	I(1)
	%5	-2.963	-3.568	*%5*	-2.967	-3.574	
	%10	-2.621	-3.218	*%10*	-2.622	-3.221	
lnpop	*t sta.*	0.226 (0.9693)*	-2.746 (0.2274)*	*t sta.*	-2.192 (0.2135)*	-1.204 (0.889)*	
	%1	-3.699	-4.339	*%1*	-3.699	-4.339	I(1)
	%5	-2.976	-3.587	*%5*	-2.976	-3.587	
	%10	-2.627	-3.219	*%10*	-2.627	-3.229	
lnrd	*t sta.*	-0.476 (0.8824)*	-3.313 (0.0833)*	*t sta.*	-5.538 (0.0001)*	-5.431 (0.0007)*	
	%1	-3.670	-4.296	*%1*	-3.679	-4.309	I(1)
	%5	-2.963	-3.568	*%5*	-2.967	-3.574	
	%10	-2.621	-3.218	*%10*	-2.622	-3.221	
Patent	*t sta.*	-2.854 (1.0000)*	-2.496 (1.0000)*	*t sta.*	-2.026 (0.0274)*	-6.772 (0.0000)*	
	%1	-3.689	-4.416	*%1*	-3.699	-4.323	I(1)
	%5	-2.971	-3.622	*%5*	-2.976	-3.580	
	%10	-2.625	-3.248	*%10*	-2.627	-3.225	

In the ADF unit root test results, variables were analysed in both fixed and trending +fixed models. Accordingly, it is concluded that the variables are stationary in the first order difference.

Table 7. Ziwot- Andrews Unit Root Test

Variable	Model	(k)	Lamda	(Tb)	T st. (ð)	Kritik Değer %10	Sonuç
d(gdp)	Model A	1	0.67	2008	-8.11	-3.51	Stable
	Model C	1	0.87	2014	-6.87	-3.46	Stable
d(lnexp)	Model A	0	0.90	2015	-4.54	-3.38	Stable
	Model C	2	0.51	2003	-6.80	-3.96	Stable
lnpop	Model A	0	0.61	2006	-11.61	-3.47	Stable
	Model C	0	0.83	2013	-16.42	-3.69	Stable
d(lnrd)	Model A	0	0.48	2002	-5.49	-3.44	Stable
	Model C	0	0.48	2002	-4.27	-3.95	Stable
d(pat)	Model A	0	0.83	2013	-6.17	-3.46	Stable
	Model C	0	0.83	2013	-4.53	-3.50	Stable

Note: *k denotes the optimal number of lags. the predicted break date of TB. test. the test statistic of the ZA unit root test. Critical values for test statistics are taken from Zivot-Andrews (1992). In addition. it was evaluated according to 10% significance level.*

The chart shows the results of the Zivot-Andrews unit root test. which incorporates structural fractions into the model. The variables in the model are estimated separately for Model A and Model C. It was determined that the variables were stationary in the first order difference according to the results obtained. In addition. it is observed that the variables generally experience different fractions in different periods. The consideration of fraction periods indicates that there were fractions in the years following the crisis periods of 2001. 2007. 2011.

Table 8. Diagnostic Tests

R^2	0.8112
Breusch-Godfrey LM	0.2294
Jarque- Bera	0.6018
ARCH	0.2714
Ramsey Reset	0.0454

In the study where the relationship between R&D investments. patent applications for technology products. high-tech product export. population and economic growth between 1988 and 2018 in Turkey's economy was analysed. a

number of diagnostic tests were applied before model prediction. In this context. Breusch-Godfrey LM test. Jarque-Bera test. ARCH test. Ramsey Reset Test were performed. Accordingly. it was concluded that variance varying in the model is not an autocorrelation problem. that the model setup is correct. and that the error term is normally distributed.

Table 9. Toda-Yamamoto Causality Test

Variables	χ^2	Prob.
lnexport- lngdp	19.82	0.0000
lngdp- lnexport	6.83	0.0328
lnrd- lngdp	5.40	0.0670
lnexport-lnrd	25.09	0.0000
lnpop-lnrd	27.53	0.0000
patent-lnrd	9.92	0.0000
lngdp-patent	6.93	0.0312
lnpop-patent	5.01	0.0815

It was found that there is a mutual causality between economic growth in Turkey's economy with exports of high-tech products during the period between 1988 and 2018 according to the Toda-Yamamoto causality test results. This situation can be evaluated as a positive development in terms of developing countries. and especially when considered in the implementation of export-led growth strategy in Turkey. R&D. qualified workforce and education are of great importance in increasing the export of high-tech products. The causality relationship from ICT exports determined as a result of the analysis towards R&D investments also supports the results obtained earlier. Countries realize foreign trade to achieve economic growth. But. the traded goods are more important than the trading volume. In this sense. it is possible to make more investments with the profit obtained from high technology product exports. Therefore. the bilateral causality relationship from R&D investments to economic growth supports the previous findings. It can be said that the R&D-based growth theory is valid for Turkey's economy. It has been determined that there is a causal relationship between population variable and R&D investments and patent applications. This can be explained by the fact that the population whose causality relationship has increased brings more innovative ideas along with it. and more R&D investments

are made in order to realize its increasing ideas. The existence of a causality relationship between patent expenditures and R&D investments validates this situation. The causality from economic growth to patent applications in the analysis have been identified for Turkey's economy. As the level of economic development of a country increases. intellectual property rights are more assured in that country. In this context. it can be said that the number of patent applications is an indicator of development.

General Evaluation

One of the duties of the government is to ensure the prosperous lives for individuals. The way to increase the level of welfare is possible by ensuring economic growth and sustainability. Production factors must be used effectively and efficiently to ensure economic growth. Technology also plays an important role in the efficient use of the factors. For technological development. it is necessary to accelerate R&D activities. increase the investments of education. secure new inventions and ideas. and increase the trade of high value-added goods and services.

In this study. which analysed the relationship between economic growth. R&D investments. technological product patent applications. high technology product exports and population between 1988 and 2018 in Turkey's economy. the results were obtained in accordance with the theory. Accordingly. it has been determined that there is a causal relationship between R&D. patent applications and high technology product exports in ensuring economic growth in Turkey. No causality relationship was found between the population. one of the variables included in the model. and economic growth. The reason for this is the increasing labour force due to population growth on economic growth in Turkey's economy can be said that due to the lack of direct effect.

In particular. increasing the R&D activities in terms of boosting economic growth has great importance for developing countries such as Turkey. As a result of the R&D activities. with the increasing technology. efficiency can be achieved in production and cost advantage can be achieved and product variety and quality can be increased. However. more profits may be made from trade by exporting the produced high technology products. Although it is obvious that foreign trade has a positive effect on growth. it is also important what goods are traded. It is also very important to produce and export goods with high added value. In summary.

first of all. R&D activities should be increased. intellectual property rights should be secured for emerging inventions. and high technology product trade should be increased in order to achieve economic growth in a country. Given the sustainability of economic growth and economic development. it will be possible to compete with other countries by meeting the requirements of the information age. In this context. policy makers should pay special attention to science technology policies. In addition. issues such as increasing education investments and improving human capital are also important.

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Development can be seen . . . as a process of expanding the real freedoms that people enjoy
Amartya Sen, Nobel laureate in economics

19

DO THE INCENTIVES INCREASE EMPLOYMENT? ECONOMETRIC EVIDENCES FROM TURKEY'S ECONOMY

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Introduction

Employment, politics and the economy have been the focus of attention in almost every period, and policy makers have made continuous efforts to increase employment. Therefore, in terms of economic and social policies, affecting employment and unemployment positively are among the primary targets. Although failure to create productive areas for the growing workforce is a more common problem after global crises, this problem is more comprehensive for underdeveloped and developing countries. Following the global crisis of 2007-2008, unemployment rates followed an upward trend in developed countries. Excessive appreciation of real estate and other assets before the global crisis caused sectoral shifts. This rapid change has caused a huge structural unemployment. Turkey's economy, especially after the 2001 crisis, despite the instability in the global economy, has achieved good economic growth and a relatively stable process. However, despite the continuous decline in the labor force participation rate in Turkey in the before-mentioned process, and the implementation of employment promotion programs, the unemployment rate could not return to the level before 2001 crisis. While the unemployment rate increased from 8.4% in 1996 to 8.4% in 2001, it was 10.8% at the end of 2017. Therefore, to understand how the employment variable of Turkey's economy was affected has a greater significance than previous processes. It is thought that incentives may affect employment along with some structural improvements.

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DO THE INCENTIVES INCREASE EMPLOYMENT? ECONOMETRIC EVIDENCES FROM TURKEY'S ECONOMY

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Incentives, in the framework of employment, economic growth and development, are the tools that governments and policy makers have been using for many years. Especially developing countries, by using this tool, aim to increase the level of welfare by increasing the amount of investment, employment and therefore economic growth in the country. The difference in socioeconomic development between the regions in our country is seen as an important obstacle in the realization of welfare and development. The public sector, which has difficulty in investing in every area and every region with its own resources, facilitates private sector investment by transferring its own resources to the private sector through incentives.

As a matter of fact, incentives and public investments create new employment areas and opportunities. In addition to creating employment during the activities carried out with public investment and incentives, employment growth continues in various ways after these activities (Harrison & Kanter, 1978: 429; Şahin, 2014: 30). Increasing employment due to incentives and investment contributes to the solution of many problems such as poverty, deprivation, migration and unrest by making the society look to the future with confidence.

Providing full employment is one of the main objectives of policy makers. Especially governments founded as a result of political elections are more sensitive about having a job for the people to continue their power. The government's incentives for the private sector to create more employment are very important, as there is a certain limit of public employment in the public sector.

Incentives have been one of the most important and also the most controversial policy tools used by the government to reduce the problem of interregional imbalances and ensure regional development for nearly 60 years (Daly, Gorman, Lenjosek, MacNevin, & Phiriyapreunt, 1993: pp. 559-560; Martin, 1998: 527; Armstrong & Taylor, 2000: 241; Wunder, 2000: 465; Liard-Muriente, 2007: 186; Schwartz, Pelzman, & Keren, 2008: 167; Kankaanpää, 2010: 319). Firms and households response to economic incentives in various ways, this also have an impact. Because their actions are based on other goals and motives. Incentives will be of little or no benefit if the desired behavior is not in line with the individual and firms' own goals, and there is also asymmetric information between the government and firms (Wren, 2003: 331; Kankaanpää, 2010: 321).

Asymmetric information between government and investing companies can pose a serious problem for the effectiveness of incentives. If governments implement

a uniform incentive system, these problems may further increase in case of the differences of the factor density and efficiency of companies (Wren, 2003: 332; Schwartz *et al.,* 2008: 169). Such problems experienced in the fair distribution and efficiency of the incentives provided, and failure to allocate resources effectively and to achieve desired results from time to time has been criticized by both the public and politicians.

In the context of all support and criticism, incentives have increased in importance with the general liberalization of international trade, the spread of the free market economy and globalization. Governments, today, want to assume duties that monitor and regulate the markets rather than directly involve in production activities. This makes the markets' self-regulation processes effective. However, in this process, governments did not reduce interference in the market, but turned towards incentive practices (Markusen & Nesse, 2007: 1). The reason for frequent use of incentives is to provide a regulatory environment to the markets, to protect the rights of property and to eliminate the problems arising in the market (Eberts, 2005: 87). Such problems prevent the distribution of resources effectively, but also cause deterioration of competition conditions. Therefore, governments aim to use resources effectively through incentives and ensure a fair competitive environment. Some of the regional disruptions that are aimed to be eliminated with incentives can be listed as follows (Bartik, 2003: pp. 12-13):

- Insufficient information to increase efficiency,
- Externalities revealed by R&D activities,
- Problems regarding financing,
- Insufficient programs related to personnel training,
- Inadequate public infrastructure.

The employment and incentive relationship has become one of the important issues discussed in the economic literature in recent years. It is seen that the studies in this context are predominantly focused on the economies of developed countries and panel data analyzes are generally used. The studies issuing Turkey, which is among the developing countries, is relatively limited. Some important studies, which argue that there has been an increase in employment with the effect of various economic incentives and reaching empirical findings in this direction are: Loh (1993), Schalk & Untiedt (2000), Kaynar (2001), Gerfin, Lechner, &

Steiger, (2005), Bondonio & Greenbaum (2006), Kangasharju (2007), Girma, Görg, Strobl, & Walsh, (2008), Sianesi (2008), Akan & Arslan (2008), Betcherman, Daysal & Pages, (2010), Rotger & Arendt (2010), Becker, Egger, & Von Ehrlich, (2010), Lima & Lima (2010), Gülmez & Yalman (2010), Yavuz (2010), Crichton & Maré (2013), Simay-Karaalp (2014), Aydıner (2015), Kaiser & Kuhn (2016), Bruhn (2016), Gaggl & Wright (2017), Öz & Buyrukoğlu (2017), Roman, Millán, Millán, & Van Stel, (2017), Kluve *et al.,* (2019). Because of such reasons as asymmetric information between the state and companies, and inefficiency in allocating resources, studies revealing the findings that incentives do not increase employment or increase insignificantly are relatively rare; however, they can be stated as follows: Faini & Schiantarelli (1985), Folmer & Nijkamp (1987), Daly *et al.,* (1993), Hujer, Caliendo, & Radic, (2002), Wren (2003), Bartik (2005), Dahlberg & Forslund (2005), Schwartz *et al.,* (2008), Ebrahim, Leibbrandt, & Ranchhod, (2017), Lima, Yoshitake & Andrade, (2018).

Development of Incentives in Turkey and the World

Incentives are one of the most important implementation tools of economic policies and aims to direct economic decision units. In this context, the incentives are frequently used by both developed and developing countries to increase employment and production by increasing the total investment volume for purposes of sectoral and regional development.

The experiences in incentives in developed countries are older and more than developing countries. This situation creates some advantages for developing countries. Because it is easier for developing countries to produce more constructive and effective policies by analyzing the right and wrong policies of developed countries on incentives (Blackman & Harrington, 2000: 6). In this context, it is very important to offer incentives towards the private sector, especially for developing countries to create employment, and provide technological development, increase human resources and ensure national economic development (Galli, 2017: 1). Therefore, many developing countries give priority to fixed capital investments and R&D based incentives, especially in order to support competitiveness in national industries (Kaggwa, Steyn & Pouris, 2017: 1).

Many developed and developing countries in different parts of the world provide various incentives for national and international companies to develop their

production activities and increase employment within the scope of their own country's growth and development strategies. It is thought that an economical positive impact and spread will occur due to the use of sector-based incentives in these countries (Galli, 2017: 42). As a matter of fact, since the 1960s, the number of incentive programs has increased in the USA states. As a result of the examination of USA states within the scope of incentives, it is seen that between 1969-2004, approximately 40% of these states offered tax credits to support fixed capital investments and this loan amount increased from 0.5% to 6% in this process (Chirinko & Wilson, 2007: pp. 1-2).

A similar situation is observed in EU countries. To attract the capital coming from developed western European countries to their countries recently, generous incentive programs implemented by eastern European countries such as Bulgaria, Ireland and Poland attract attention (Sorsa, 2003: 2).

Similar to the economic incentive developments in the USA and EU, it is observed that the role of incentive mechanisms in industrial policies has increased in developing countries such as Brazil, China and India (Markusen & Nesse, 2007: pp. 6-7). For example, although the reduction of state taxes is prohibited by law to attract foreign investment in Brazil, fiscal competition was expanded and provided to four neighboring states with large industry incentive packages (Rodriguez-Pose & Arbix, 2001; Varsano, Ferriera & Afonso, 2002).

In South Korea, indirect and direct tax incentives were increased to rise up R&D activities after 1980, emphasis was placed on labor training programs, loan facilities were extended to support technological developments and venture capital companies were supported. Incentives were implemented functionally, not sectoral (Lee, 2000: 277).

In Turkey, one of the G-20 countries, instead of regional development, national development program was followed between 1920 and 1960. The determination of the national development program resulted from the need for a holistic recovery movement as a result of the economic difficulties and wars. The development plans in the post 1960 period were implemented by the State Planning Organization (SPO) for five-year periods. In these development programs, distribution of public investments across the country and efficient use of available resources are determined as the main targets (Akdeve & Karagöl, 2013: 335).

The certificate of investment incentives was started to be given in Turkey in 1968; however, the main development and system was established in the 1980s. After 1980, important changes such as sectoral and regional selectivity and radical steps were taken within the scope of investment incentives (Eser, 2011: 83).

With the effect of globalization that emerged after 1990, incentives began to gain more importance in Turkey. Incentive types and main areas of activity have undergone some changes since they started to be implemented. Previously, in one hand such incentive tools as low interest loans, land allocations, energy discounts, grant supports, tax exemptions, public guarantees and purchases; on the other hand, in addition to these, such types as export, investment, employment, attracting foreign investments, R&D activities, development of SME (small and medium sized enterprises) and environmental protection have been added (Narin, 2012: 5).

To sum up, supportive incentives to integrate into foreign markets was applied until 1980 in Turkey. While emphasis was given to the practices to liberalize foreign trade with the Decisions of 24 January, policies reducing the regional disparities were adopted in the 1990s. In the beginning of 2000s, the incentive system was renewed and the trend towards high-yield technology production began, and then, the incentive fields was expanded with the incentive system that was implemented immediately after the 2008 global crisis. The New Incentive System, which came into force in 2012, is the widest and most comprehensive incentive system ever built. Today, incentives are still provided under the New Incentive System.

Employment Outlook in Turkey

Employment can be thought as the working part of the workforce and it means to employ somebody. It can be explained as the working and employing of production factors to meet the needs. In other words, employment is the use of the existing labor factor in production (Unay, 2001, 342; Heatfield, 2019). Employment includes a material allowance for a job usually done under the contract between the employer and the employee. Working as a volunteer is not covered by employment (Jahoda, 1982: pp. 8-9; Cooley, 1963; Kopp, 2019).

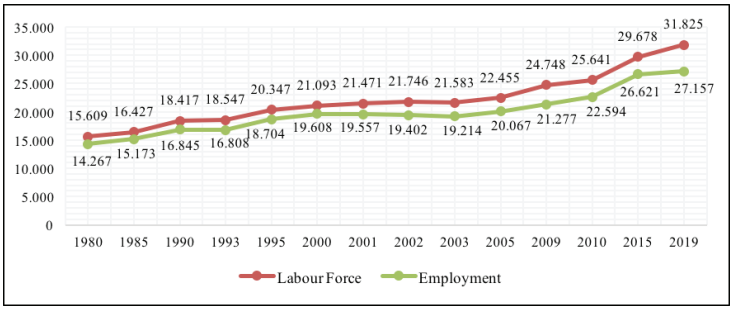
Employment is an essential dimension of people's social ability, but also an important determinant of their living standards (Brandolini, & Viviano, 2016: 659). Because contraction in employment significantly affects living standards

and income distribution by reducing consumption in goods and services (Beşer & Güllü, 2019: 344).

The incentive system, which is one of the most effective ways to reduce unemployment by increasing employment, has been applied by Turkey for decades. When examining the sectoral distribution of incentives in Turkey, it is observed that the largest share is reserved for the manufacturing industry, which is an important determinant of production and exports. Another big share is allocated to tourism within the service sector. These two sectors play an important role in increasing employment and thus national income.

In spite of all these efforts in Turkey which is a developing country, it has not reached the desired levels on employment and unemployment for years. The main reasons for this can be stated as structural economic problems, regional conflicts, political instability, global crises, major natural disasters, PKK (Partiya Karkeran Kurdistan), FETÖ (Parallel State Structure) and many other marginal terrorist organizations.

Figure 1. Basic Employment Indicators (1980-2019) (Thousand Person)



Source: *Turkish Statistical Institute and Strategy and Budget Department of the Presidency of the Republic of Turkey*

In the figure above, labor and employment data for important years are presented periodically 1980 in Turkey. Employment, which increased continuously until 1993, was decreased the first time in this year. While the labor force and employment data remained close to each other between 1980 and 1990, it was observed that this gap widened especially in 2001 in the following years. While

approximately 3 million new employments were increased between 1993 and 2000, there was a period of stagnation in employment between 2000-2005 with the effect of the February 2001 crisis. Despite the 2008 global crisis, while 6.5 million employments were increased in the period of 2005-2015, FETÖ coup attempt and some national and international political problems are thought to be effective in the limited increase in employment between 2015-2019.

An Empirical Study on the Effects of Economic Incentives on Employment in Turkey

Purpose, Scope and Methodology of the Study

In this study, after examining theoretically the development of economic incentives, it is aimed to identify empirically. The effect of incentives on employment in Turkey between 2003: Q1-2017: Q4 periods. In this aspect, in the study, a prediction is made within the scope of time series analysis on the existence and effects of the relations between employment and economic incentives, exports and tourism between 2003: Q1-2017: Q4 periods in Turkey. In this prediction one main and two similar supporting models were used.

Model 1. $LEMP = \beta_{0t} + \beta_1 LINC + \beta_2 LEXP + \beta_3 LTOU + u_t$ (1)

Model 2. $LEMP = \beta_{0t} + \beta_1 LINC + \beta_2 LEXP + u_t$ (2)

Model 3. $LEMP = \beta_{0t} + \beta_1 LINC + u_t$ (3)

In the study, the models described above are analyzed in three main stages within the scope of time series analysis in order to analyze the relations between employment and economic incentives. In this context, since the stationarity of the variables in the time series analyzes closely concerns the methodology to be used in the model, the stationarity of the variables used in the models is firstly determined by traditional unit root tests. In the second stage, the coefficients of long-term relationships are estimated by FMOLS (Full Modified Ordinary Least Square) and DOLS (Dynamic Ordinary Least Square) methods, since all variables are stationary at their own level. In the third and last stage, Toda-Yamamoto test is applied to determine the direction of short-term causality relationships between variables. In Table 1 below, the variables used in the models and their sources are specified.

Table 1. Variables and Their Resources

Variables	Definition of Variables	Data Resources
LEMP	Number of Employee	Turkish Statistical Institute (TSI)
LINC	*Economic Incentives ($)*	*Ministry of Industry and Technology of Turkish Republic*
LEXP	Export ($)	Turkish Statistical Institute (TSI)
LTOU	*Number of Tourist*	*Turkish Statistical Institute (TSI)*

All data used in the models are at the logarithmic level. Data on economic incentives were provided from the Ministry of Industry and Technology of Turkish Republic. Data on employment, exports and tourism were provided from Turkey Statistical Institute (TSI). After receiving the data on incentives in the currency of Turkish Lira, they were exchanged to US Dollars according to the exchange rate of Central Bank of the Republic of Turkey (CBRT). The export data is taken directly in US dollars.

Table 2. Descriptive Statistics

Types of Statistics	LEMP	LINC	LEXP	LTOU
Mean	16.96415	8.527546	24.04532	15.58808
Median	16.94507	8.499341	24.20065	15.63236
Maximum	17.17578	10.21560	24.45967	16.51441
Minimum	16.75700	7.159077	23.06174	14.10492
Standard Deviation	0.118917	0.696164	0.370760	0.555419
Observations	60	60	60	60

When Table 2, which includes 60 observations, is examined, the average of the dependent variable **LEMP** between 2003: Q1-2017: Q4 is approximately 16.97. The average of the main independent variable, **LNIC**, is about 8.53. The mean values of other independent variables are approximately 24.05 of the **LEXP** and 15.59 of the **LTOU**, respectively. Standard deviations are 0.12, 0.70, 0.37 and 0.56, respectively.

Econometric Methods and Findings

Unit Root Test, Results and Evaluation

In the studies conducted with the time series data, the variables included in the model are assumed to be stationary. If the series used in a model are not stationary, it carries up or down permanent movements (trends), the observed high R^2 and significant t-statistics will result from this trend rather than the real relationship between the series (Gujarati, 2009: 709). For this reason, in order not to make such a mistake in the model to be established, the stationarity of the series was first examined with PP (Phillips-Perron) and KPSS (Kwiatkowski, Phillips, Schmidt and Shin) Unit Root Tests and the results are given in Table 3.

Table 3. Results of PP and KPSS Unit Root Tests

	PP		KPSS	
Variables	**Intercept**	**Intercept and Trend**	**Intercept**	**Intercept and Trend**
Level				
LEMP	-2.94**	-3.61**	0.361***	0.140***
LINC	-3.39**	-5.62*	0.560**	0.122***
LEXP	-3.99*	-4.59*	0.355***	0.140***
LTOU	-6.55*	-8.07*	0.461***	0.133***
Critical Values				
1%	*-3.65*	*-4.26*	0.739	0.216
5%	*-2.95*	*-3.55*	0.463	0.146
10%	*-2.62*	*-3.21*	0.347	0.119

Note: *In PP and KPSS tests, Newey-West Bandwidth criterion was used to determine the appropriate bandwidth. In addition, (*, ** and ***) signs indicate that the variables are stationary at 1%, 5% and 10% significance levels, respectively.*

When Table 3 above is examined, it is seen that all variables are stationary at their levels according to both tests. Although the results of the PP unit root test are sensitive to delays, the KPSS test removes the weak point of the PP test, producing more reliable results.

Long Term Coefficient Estimation, Results and Evaluation

In long term parameter estimation, FMOLS developed by Phillips and Hansen (1990) and DOLS developed by Stock and Watson (1993) are used as reliable and alternative methods.

In the FMOLS method, the ordinary least squares (OLS) method has been modified in order to find solutions to serial correlation and internality problems that may occur in the long term in variables (Mehmood & Shahid, 2014: 60; Bashier & Siam, 2014: 89; Priyankara, 2018: 83). In DOLS method, delay and precursors are added to the differentiated series to eliminate the problem of internality of the variables and the serial correlation problem between error terms can be resolved (Narayan & Narayan, 2004: 103; Inagaki, 2010: 117; Uddin, Alam, & Gow, 2016: 26). Due to these advantages, FMOLS and DOLS methods were used in the analysis and the results are presented in Table 4 below.

Table 4. Long Term Coefficient Estimation, FMOLS and DOLS Results

MODELS	FMOLS		DOLS	
	Variables	Coefficient / Standart Error	Variables	Coefficient / Standart Error
MODEL I	C	13.440* (0.80)	C	13.290* (0.83)
	LINC	0.070* (0.02)	LINC	0.065* (0.02)
	LEXP	0.075*** (0.04)	LEXP	0.082*** (0.04)
	TOU	0.072* (0.02)	TOU	0.073* (0.02)
MODEL II	C	12.864* (0.83)	C	12.69* (0.85)
	LINC	0.055* (0.02)	LINC	0.050** (0.02)
	LEXP	0.151* (0.04)	LEXP	0.160* (0.04)
MODEL III	C	15.62* (0.23)	C	16.01* (0.22)
	LINC	0.157* (0.03)	LINC	0.111* (0.03)

Note: *The signs (*, ** and ***) indicate the significance of the coefficients of the variables according to the significance levels of 1%, 5% and 10%, respectively. The numbers in the "()" parenthesis next to the coefficients in the table show the standard error values.*

When looking at Table 4 above in general, coefficients were found to be positive and statistically significant in both three models and two methods as expected. According to the FMOLS method, a 1% increase in the main independent variable **LINC** (incentives) causes 0.070% increase in **LEMP** (employment) model

I, 0.055% in model II and 0.157% increases in model III. Likewise, according to the DOLS method, a 1% increase in **LINC** increases **LEMP** by 0.065% in model I, 0.050% in model II and 0.111% in model III. According to both methods, it is seen that **LEXP** (export) has the most impact among the variables and for all that, incentives are seen to be most effective in model III.

Toda-Yamamato Causality Test, Results and Evaluation

In the Granger causality test, there is a condition that the series are required to be stationary. In addition, if there is a co-integration relationship between the non-stationary series, Granger causality test is used on Vector Error Correction Model (VECM) models, not Vector Autoregressive (VAR). In the Toda-Yamamoto (1995) causality test, these two situations are not important. What is important in the Toda-Yamamoto causality test is the VAR model's lag length (k) and the greatest stationary degree of the series studied (d_{max}). After determining these two values, a VAR model ($k + d_{max}$) size can be built and the Toda-Yamamoto test can be performed. In the Toda-Yamamoto causality test, the following VAR model is taken into account (Seabra & Flach, 2005: pp. 1-2):

$$Y_t = \sum_{i=1}^{k+d} \alpha_{1i} Y_{t-i} + \sum_{i=1}^{k+d} \beta_{1i} X_{t-i} + u_{1t} \quad (4)$$

$$X_t = \sum_{i=1}^{k+d} \alpha_{2i} X_{t-i} + \sum_{i=1}^{k+d} \beta_{2i} Y_{t-i} + u_{2t} \quad (5)$$

The basic hypothesis, X is not the cause of Y's Granger, in the first model, $\alpha_{1i}= 0$ hypothesis is tested by Wald test. Similar things are valid for the second model. The Wald Test is suitable for the k degrees of freedom Chi-square distribution.

In the study, as the first step of the Toda-Yamamoto causality test, standard VAR models were created using all variables for each model. While creating the VAR model for each model, information criteria were used to select the delay length.

Table 5. Lag Length Test Results

	Lag	LogL	LR	FPE	AIC	SC	HQ
Model I	**0**	-21.33138	NA	2.81e-05	0.873496	1.015595	0.928846
	1	130.8420	278.1099	2.58e-07	-3.822138	-3.111640	-3.545385
	2	205.9349	126.8811*	3.39e-08*	-5.859824*	-4.580929*	-5.361669*
Model II	**0**	9.132136	NA	0.000162	-0.211453	-0.104878	-0.169940
	1	132.8158	230.3075*	3.12e-06*	-4.166063*	-3.739764*	-4.000011*
	2	139.4382	11.64634	3.39e-06	-4.084077	-3.338055	-3.793486
Model III	**0**	-3.364983	NA	0.004125	0.184999	0.256049	0.212675
	1	55.78303	112.1773*	0.000616	-1.716656	-1.503507*	-1.633630*
	2	60.84551	9.252124	0.000594*	-1.753293*	-1.398045	-1.614917

Note: *(*), indicates the optimal lag length for each model selection criterion.*

Majority principle was taken into account in determining lag lengths. According to Table 5 above, the lag length is chosen as 2 for model I, and 1 for model II and III. In order to avoid confusion below, only Toda-Yamamoto causality test results between the dependent variable and the main independent variable will be shown for all models.

Table 6. Toda-Yamamoto Causality Test Results

Models	Null Hypothesis	k+ d_{max}	Chi-square	p-value	Conclusion
Model I	***LEMP*** does not Granger cause ***LINC***	**2**	3.99	0.0459*	**H_0 Reject**
	LINC does not Granger cause **LEMP**		0.02	0.8731	H_0 Accept
Model II	***LEMP*** does not Granger cause ***LINC***	**1**	4.41	0.0357*	**H_0 Reject**
	LINC does not Granger cause **LEMP**		4.00	0.0454*	**H_0 Reject**
Model III	***LEMP*** does not Granger cause ***LINC***	**1**	5.93	0.0149*	**H_0 Reject**
	LINC does not Granger cause **LEMP**		10.94	0.0009*	**H_0 Reject**

Note: *The sign (*) indicates the significance of the variables according to 5% significance level.*

When the Toda-Yamamoto causality test results in Table 6 above are analyzed, it is seen that there is one-way causality between employment and incentives in model I, and bilateral causality between employment and incentives according to model II and model III. As a result of the analysis, it was revealed that both

incentives cause employment and employment cause incentives. These results can be interpreted that the incentives provided in Turkey are of great importance by indicating its impacts on employment.

Results and Discussion

With globalization, there are continuous changes in the field of economics, as in every field. Increasing international competition necessitates countries to improve themselves continuously. In this process of development and change, countries are pursuing a number of ways for a sound economic structure with strong employment. One of the most important of these ways is incentives. Recently, countries frequently implement incentive policies to increase their welfare and development levels. Incentives and employment policies implemented in Turkey are influenced by each other as in the whole world.

In this study, after examining the theoretical development of economic incentives, effects of incentives on employment between 2003: Q1-2017: Q4 period in Turkey are empirically tested. The reason why this period is taken into account that the quarterly incentive data is available until the end of 2017 and only one political party has been continuously ruling the government since November 2002. Moreover, the excessive fluctuations in the effects of the 2001 economic crisis have started to decline since 2003 and the relative economic recovery has started to take place in this process again.

Thus, the conclusion drawn from the theoretical and empirical parts of the study is on the tendency that there is a significant relationship between incentives provided by the government and employment in Turkey. In addition to having a causal relationship between employment and incentives in the short term, it has been determined that incentives affect employment positively in the long term and these results are also statistically significant. Therefore, in order to realize economic development together with a solid economic structure, first of all, incentives to increase employment should be provided to various institutions and organizations on the basis of efficiency and productivity. It is thought that the existence of a strong employment will have a positive impact on the economic growth and development process and will increase the level of welfare rapidly.

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20

THE RELATIONSHIP BETWEEN INFORMAL ECONOMY AND ECONOMIC GROWTH

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Introduction

The new duties imposed on the state after the 1929 Economic Depression were effective in the development of the concept of functional finance. Countries have adopted certain goals not only in basic services such as justice and defense, but also in economic growth, income distribution and resource allocation, and implemented policies in line with these goals. Although the interventionist understanding of the state has been replaced by the regulatory state over time, today, states either provide direct services and intervene the economy or introduce laws and rules to regulate the factors that have a disruptive effect in the markets. Undoubtedly, this structure of states creates a number of costs and reveals a segment that tries to avoid these regulations and costs. In its simplest terms, the sector that tries to escape from this order is the informal economy.

The concept of informal economy is generally used to refer to illegal markets that are out of the control of the state and cannot be recorded. However, although there is no absolute and general definition about the informal economy, there are many definitions and concepts used to express it in the literature. These concepts include terms such as "underground economy", "black economy", "informal economy", "second economy", "parallel economy", "hidden economy", "informal economy", "unobserved economy" (Yılmaz, 2004: 16). To make a general definition, the informal economy is taking economic activities that have never

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been documented or documented with content does not reflect the truth out of state knowledge (Kıldiş, 2000: 1). One of the common definitions is the activities that cannot be included, but are considered to be included, in the gross national product accounts although they create added value (Schneider, 2005: 4). When we look at the general causes of the informal economy, along with the financial and economic issues such as high tax rates, heavy tax burden, unfair income distribution, economic instability, and high costs (Kök & Sapci, 2006: 6); there are also social, political and legal reasons such as dense, complex and very frequent shifting legislation, inadequate control and punishment, weak trust against the state (Kıldiş, 2000: 3), poor tax awareness, social value judgements, environmental pressure, ethic degeneration (Aslanoğlu, 2008: 201). All of these show that economic units want to keep their activities out of audit because of increasing share of the state from economy by taxes. Also, the fact that the economic regulations are strict and numerous increases the informal economy. (Akalın & Kesikoglu, 2007: 74).

As it can be seen, there are many economic, financial, political and social reasons in the emergence of the informal economy, and these reasons differ from country to country. Just as countries have different social, political and economic structures; informality emerges in different structures according to country profiles. The common point is countries' efforts to reduce the informal economy. As a matter of fact, the informal economy primarily reduces the tax income of the states (Sarılı, 2002: 43), leads to distancing from efficiency in resource distribution and disruptive effects in income distribution (Bozkurt, 2014: 42), causes deviations in the economic indicators of countries and decreases the effectiveness of country policies, leads to unfair competition (Çiftçi, 2018: 11). In addition, today, participation in some international organizations or associations is made through official statistics. The informal economy causes deviations in these statistics, damaging the international prestige of the countries (Tanzi, 1999: 12).

One of the important effects of the informal economy is seen as having a slowing effect on countries' capability of achieving their economic growth targets. One of the important debates about the issue emerges at this point. In the early years when the informal economy started to be perceived as a problem, it was thought that this problem would disappear with economic development and growth, but the fact that the informal economy still exists even in developed countries refutes this claim (Ergen, 2011: 143). Countries are aware that the informal economy

can no longer be eliminated. However, the level of development of countries is thought to be important in solving this problem or at least reducing its size and effects. The informal economy and the development level of the countries have a special importance in that they are two interdependent variables. On the other hand, the presence of the informal economy in a country, or rather the high level of informal economy, both deflects the country's national income calculations and increases the size of its non-taxable income. In this case, states resort to either tax increase or borrowing, which triggers the informal economy as a factor that increases tax burden and costs. Therefore, this emerging cycle causes the informal economy to become chronic in countries that have not yet completed its development. However, despite all these negativities, the number of people who argue that the informal economy has positive effects is increasing day by day. It is thought to have positive effects especially on economic growth. Namely, at least two thirds of the income earned in the informal economy is used immediately in the official economy, which has a significant (positive) stimulating effect on the official economy (Schneider & Enste, 1999: 4). In other words, the income recorded in the spending phase can increase the growth levels by creating added value (Sarılı, 2002: 44). The important question here is whether the countries will be content with the existing growth or will they want to contribute to growth with a registered economy from the beginning.

Turkey is also one of the countries experiencing the informal economy problems as a developing country. It is also possible to list the reasons of informal economy fiscal, economic, social and political reasons. The existence of informal economy is a known fact in Turkey, but to measure it and to determine the extent of the impacts on the economy is quite difficult because the studies on the dimensions of the informal economy always give different results. However, it is still important to estimate the extent of informality in terms of determining the measures to be taken towards informality. In addition, studies in this field are increasingly important in terms of determining in what direction and to what extent the informality affects macroeconomic goals such as economic growth, efficiency in resource distribution, and justice in income distribution.

The aim of this study is to measure and to evaluate the impact of the informal economy on the economic growth in Turkey. In this context, firstly, a literature review will be made on the subject and then the methods of estimating the informal economy will be explained in general terms. Then the size of the informal

economy in Turkey will be estimated using simple monetary approach and the connection between economic growth and the informal economy will be tested by Tom Yamamoto causality analysis. Finally, regression analysis will be carried out to determine the direction and strength of the connection between the informal economy and economic growth.

Literature Review

Künü (2019), has addressed the relationship among the informal economy and growth in Turkey between the years of 1988-2016 with the scope of the neo-classical growth model. In the study, the relationship between the informal economy and growth was investigated by using extended Dickey-Fuller (ADF) unit root test, Phillips-Perron (PP) unit root test, Johansen cointegration test and causality tests. As a result, it is revealed that there is a bidirectional causality relationship between the variables.

Inal (2019), has examined relationship between the informal employment and economic growth in Turkey between the years of 2005-2018. Unit root tests, cointegration test, ARDL border tests, Dolado-Lütkepohl causality tests were used in the study. As a result of the tests, there is a cointegration between informal employment and economic growth, but no significant relationship is found between the variables. In addition, one-way causality has been determined from economic growth to informal employment.

Kaya (2019), examined the relationship between informal employment, income tax and economic growth by using multiple regression analysis. According to the results of analysis carried out on the basis of monthly data for the 1996-2017 period, it has been identified that the industrial production index (taken as a determinant of economic growth) has a positive relationship with the informal employment but a negative relationship with the income tax.

Borlea, Achim & Miron (2017), by revealing the relationship between corruption and informal economy among European Union countries, examined the effect of these two variables on economic growth. According to the results of the empirical tests conducted between the years of 2005-2014, it is determined that corruption and the informal economy had a high and negative impact on economic growth.

Goel, Saunoris & Schneider (2017) examined the impact of the informal economy on economic growth in the USA in a long-term perspective between the years of 1870-2014. The analysis is based on the neo-classical growth model and time series tests are conducted. As a result, it is revealed in the study that informal economy had a negative impact on economic growth in pre-World War II period and positive impact in post-World War II period.

Yelwa & Adam (2017) examined the relationship between the informal economy and economic growth in Nigeria between the years of 1980-2014. Stability and causality tests were carried out within the framework of the endogenous growth model and as a result, it was determined that the informal economy did not contribute to economic growth.

Ucan & Kacar (2016), examined both the informal economy's rate on GDP and its relationship between economic growth in Turkey. According to the results of the Johansen cointegration test used in the growth relationship, there was a long-term cointegration between the variables, and according to the Granger causality test, there was no causality relationship between the variables.

Zaman & Goschin (2015) examined the effect of the synthetic index of the informal economy on economic growth between the years of 1999-2012 in Romania. In the study, it was revealed that the informal economy does not have a significant impact on growth, but there is still a relationship between GDP and the informal economy.

Duarte (2014) examined the relationship between GDP and the size of the informal economy in Spain between the years of 1980-2008. According to the Granger causality test, it was determined that the size of GDP causes informality, but informality does not cause GDP growth.

Elgin & Öztunalı (2014) examined the relationship between the informal economy and economic development by using panel data estimation methods for 141 countries between the years of 1984-2009. The study also revealed that institutional quality interacts strongly with this relationship.

Akalın & Kesikoğlu (2007), examined the relationship between the informal economy and growth based on the period between the years of 1970-2005 in Turkey. In the study using Granger causality test, a causality relationship from

unregistered economy to growth was determined and it was observed that the informal economy had a positive effect on growth.

Measurement Methods of Informal Economy

The methods used in measuring the informal economy are classified as direct, indirect and mixed methods. The basis of direct measurement methods is to estimate the size of the informal economy with surveys. In this method, direct inquiries are managed and relevant information is tried to be obtained with the various surveys prepared to collect data about the dimensions of the informal economy. (http://www.sbb.gov.tr/wp-content/uploads/2018/11/08_RegistrationEkonomioik614.pdf, Accessed Date: 10.12.2019). However, as a result of the informal economy being an illegal action, the respondents tend to hide information. This prevents the method from giving correct results (Yazıcı, 2009: 111).

Indirect measurement methods are more diverse. To reveal the differences between national income calculations, to observe the official workforce decreases, to determine non-tax activities through examinations, and to evaluate the statistical results used on monetary data are among the indirect measurement methods (Yurdakul, 2008: 207). While different income estimates between income, production and expenditure methods used in calculating GNP provide information about the size of the informal economy (Işık & Acar, 2003: 123), estimations are made by looking at the change in labor force participation rates under the assumption of ceteris parabus (Yazıcı, 2009: 112). In other words; if the rate of increase in labor supply is not equal with the rate of increase in employment, and even if the rate of participation in the workforce decreases, this has two consequences. The first result is interpreted as the increase in unemployment and the second result as the presence of the informal economy (Akalın & Kesikoğlu, 2007: 75). In tax methods, the tax base differences arising after the audits are used to estimate the size of the informal economy (Yurdakul, 2008: 211). Although these investigations are mostly done to reveal tax losses and leakage, tax-free activities are considered as part of the informal economy.

One of the indirect measurement methods is the monetarist approach. The money demand approach was first used by Cagan (1959) to estimate the dimensions of the informal economy by measuring the relationship between money demand and tax pressure in the USA. The method was developed and reused by Gutmann

(1977) about twenty years later (Schneider, 2017: 8). According to Guttmann, the increase in cash preference rate is related to the extra cash used in the informal system. In this method, the income circulation rate of money is considered equal for the formal and informal economy. Since the increases in cash preference rate exceed the cash preference rate in the period when there is no informality, the difference between these two rates shows the level of the informal economy (Transmitter: Yılmaz, 2019: 470). The monetarist approach was later developed and used by many economists, primarily Feige and Tanzi.

In this approach, the size of the informal economy is measured mainly by taking into account the monetary data followed by the central bank. There are three different measurement methods of this practice which reveals the size of the informal economy by above-mentioned data being used: flat rate, transaction volume and econometric method (Kankılıç, 2015: 6). The Flat Rate Approach is based on the assumption that payments will generally be made with cash in informal economic activities. It is considered that the emission volume, which is the amount of money in circulation, will be equal to the sum of the amount of money used in the formal and informal economy. Accordingly, when the circulation rate of money is assumed constant, the increase in the ratio of emission volume to total deposits is accepted as a sign that informal economic activities are increasing (Us, 2004: 21). The transaction volume approach based on Fisher's quantity theory equation was developed by Feige (1979). Based on the equation based on the equation based on M*V = P*T (M: money supply, V: circulation rate of money, P: general price level, T: total transaction volume), the assumption is that there is a constant relationship between transaction volume and GNP (Schneider & Enste, 1999: 30). In fact, the method uses PT / py (PT: total transaction volume in formal and informal economy, py: GNP observed in formal economy). Assuming a period in which this ratio remains constant over time and without informality, a nominal income estimate is made for any period. Thus, the difference between the estimated total nominal income and the observed total income gives information about the size of the informal economy (Yılmaz, 2019: 470). In the third method of the monetarist approach, the demand for cash is estimated by econometric methods, depending on a number of determining factors, and the results obtained are used to estimate the informal economy by making some assumptions. As in other approaches, it is based on the assumption that cash is used in informal activities and that the circulation rate of money is the same in formal and informal economies (Işık & Acar, 2003:

125). In the method, firstly, the demand for cash is estimated by regression analysis, which takes into account the variables that cash depends on (per capita national income, tax rate, deposit interest rate, inflation rate etc.). Then, a second cash demand is estimated by taking the tax variable as zero. The basis of this estimate is the idea that informal activities are mostly caused by the tax variable. The difference between the two currency estimates gives the level of cash related to the informal economy. At the last stage, the size of the informal economy is calculated by referring the circulation speed of money and using the cash level of the informal economy (Us, 2004: 22).

In mixed methods, the size of the informal economy are measured by establishing links between; electricity usage and productions, developments in the construction industry and cement production, export and production. In addition, the size of informal economy is tried to be reached by measuring the income from the second job (www.sbb.gov.tr). The measurement methods we have seen so far are described as macro-based measurement methods. Micro-based representative approaches are generally used to obtain micro information about the size of the informal economy and informal labor markets. These approaches are based on representative research designed to investigate the public's perceptions of the informal economy, their actual involvement in informal economic activities and their views on informal activities (Medina & Schneider, 2018: 10). Apart from all these methods, more technical model approaches are also used in nowadays. In these approaches, not only one of the traces left by the informal economy in the money, labor and production markets, but all of the variables used simultaneously. In this context, data such as indirect taxes, GDP per capita, unemployment, inflation, money supply, growth, public spendings and trade volume are taken into account. The most frequently used model approaches are the MIMIC (Multiple Indicators-Multiple Causes) method and DYMIMIC (Dynamic Multiple Indicators-Multiple Causes) method (Kankılıç, 2015: 6-7). Accurate estimation of the informal economy volume will ensure that the real value of macroeconomic variables such as GDP, unemployment and inflation will be known, and the reliability and feasibility of the policies to be implemented by looking at these real values will increase. This will ensure that the policies implemented give successful results (Sandalcı & Sandalcı, 2017: 81).

In this study, while making an estimate of the informal economy, the simple monetary rate method developed by Fiege (1979), which is one of the methods

we explained above, is used. The explanations of the variables to be used in the method are as follows;

C: Total amount of money in circulation

Cr: The amount of cash used in the formal (recorded) economy

Cu: The amount of cash used in the informal (underground) economy

D: Total Demand Deposits

Dr: Demand deposit amount used in formal economy

Du: Total demand deposits used in the informal economy

kr: Cash / demand deposit rate in the formal economy

ku: Cash / demand deposit rate in the informal economy

Yr: Formal (official) national income level

Yu: Informal income level

vr: Income circulation rate of money in the formal economy

vu: Income circulation rate of money in the informal economy

β: Formal economy circulation speed / informal economy circulation speed

The assumptions of this method are listed as follows:

• Transactions in the informal economy are made only with cash. Payment instruments such as checks, debit cards, etc. are not used in the informal economy, and payment is not made from deposit accounts. Thus, Du = 0, ku = ∞ and D = Dr (Kök & Sapci, 2006: 11).

• Circulation rates are the same in informal and formal economies. Thus (vr = vu) and accordingly β = 1.

• The C/D ratio is only affected by changes in the size of the informal economy. So the rate of kr = Cr / Dr is fixed for all periods. There is a period when there is no informal economy. For this period, Yu = 0 (Kök & Sapçı, 2006: 11-12).

The equation created according to the simple ratio approach within the framework of these assumptions is below.

$$Yu = Yr(C-krD) / (kr+1)D \quad (1)$$

Firstly, the C/D ratio is calculated in the equation and the cash/demand deposit rate (kr) is reached in the registered economy. Multiplying the demand deposit amount with the cash / demand deposit ratio (kr) gives the total amount of money used in the formal economy. Subtracting the amount of money used in the formal economy from the total amount of money in circulation provides the total amount of money returned in the informal economy. So Cu = C-Cr (Akalın & Kesikoğlu, 2007: 77).

Informal economy estimated by the simple monetary ratios method in Turkey are given in Table 1. When the data given in Table 1 are analyzed, 2019: Q4 period (0,571049), which has the lowest rate of circulating money and demand deposits, is counted as the base year. Other transactions are calculated based on this data. As can be seen from Table 1, the ratio of the informal economy to GDP is high between 2002 and 2012. It started to be below 10% after 2016. Informality increases especially in the periods following the crisis years.

Table 1: Estimation of the Informal Economy with Simple Monetary Ratio Approach

	Money in Circulation	Demand deposit	C/D	Cash amount used in the registered economy	GDP (Yr)	Circulation Speed of Money	Informal economy	Informal Economy / GDP
Year	C	D=DR	kr	Cr=kr.Dr kr=0.571049	GSYİH (Yr)	Vr=Yr/ (Cr+Dr)	Yu=Yr*(C-kr*D)/ ((Kr+1)*D)	Yu/ Yr*100
1998-Q1	711520	874067	0.81403	499135.086	13451238.68	9.796	2080422.248	15.466
1998-Q2	806380	1104693	0.72996	630833.8326	16462902.74	9.486	1665200.114	10.115
1998-Q3	908493	1430047	0.63529	816626.9088	20719541.77	9.222	847218.3282	4.089
1998-Q4	1057864	1504615	0.70308	859208.8906	21259215.13	8.994	1786618.59	8.404
1999-Q1	1676601	1411636	1.18770	806113.3257	19486724.92	8.787	7648724.614	39.251
1999-Q2	1249621	1641031	0.76149	937109.111	24507260.4	9.506	2970672.622	12.122
1999-Q3	1512903	1845857	0.81962	1054074.793	30127478.16	10.389	4766779.965	15.822
1999-Q4	1887153	2794042	0.67542	1595534.889	33042881.62	7.528	2195178.023	6.643
2000-Q1	1951389	2957141	0.65989	1688672.41	33286731.63	7.165	1882334.88	5.655
2000-Q2	2287779	3439481	0.66515	1964112.184	40322453.49	7.462	2415252.161	5.990
2000-Q3	2670065	3777746	0.70679	2157278.074	48048960.87	8.096	4151437.065	8.640
2000-Q4	3196942	4352301	0.73454	2485377.132	49008568.85	7.167	5100090.284	10.407
2001-Q1	3057713	5115811	0.59770	2921378.754	44785578.6	5.572	759694.4049	1.696
2001-Q2	3835182	5801403	0.66108	3312885.38	57482257.28	6.307	3294035.414	5.731

	Money in Circulation	Demand deposit	C/D	Cash amount used in the registered economy	GDP (Yr)	Circulation Speed of Money	Informal economy	Informal Economy / GDP
Year	C	D=DR	kr	Cr=kr.Dr kr=0.571049	GSYİH (Yr)	Vr=Yr/ (Cr+Dr)	Yu=Yr*(C-kr*D)/ ((Kr+1)*D)	Yu/ Yr*100
2001-Q3	4467366	5759932	0.77559	3289203.407	70199342.75	7.758	9139684.177	13.020
2001-Q4	4462913	6905869	0.64625	3943589.584	72961580.93	6.725	3492400.761	4.787
2002-Q1	4922485	6155924	0.79963	3515334.242	69108200.11	7.146	10055119.38	14.550
2002-Q2	5911345	6861900	0.86147	3918481.131	83561899.67	7.751	15447273.03	18.486
2002-Q3	6131837	8144924	0.75284	4651150.703	101675779.7	7.946	11765321.58	11.571
2002-Q4	6899360	8928269	0.77275	5098479.081	105012991.9	7.487	13482518.7	12.839
2003-Q1	7496072	7577268	0.98928	4326991.312	96288944.7	8.089	25633466.74	26.621
2003-Q2	8204918	9310018	0.88130	5316476.466	111329662.4	7.612	21985392.44	19.748
2003-Q3	9149591	10754215	0.85079	6141183.718	129995984.4	7.694	23147181.82	17.806
2003-Q4	9775116	13239221	0.73835	7560243.909	130400554.9	6.269	13885960.58	10.649
2004-Q1	10861571	12182654	0.89156	6956892.38	118274224	6.180	24129246.56	20.401
2004-Q2	12025936	13952404	0.86193	7967506.347	137567375.8	6.276	25470337.61	18.515
2004-Q3	12853445	14944747	0.86006	8534182.825	159874958.8	6.809	29411130.2	18.396
2004-Q4	12443528	16349864	0.76108	9336573.482	161306938.8	6.280	19511204.02	12.096
2005-Q1	13473621	16046985	0.83964	9163614.732	141042563.4	5.595	24112648.59	17.096
2005-Q2	15171903	18482050	0.82090	10554156.16	161871869.5	5.575	25743146.65	15.903
2005-Q3	17284665	19199530	0.90027	10963872.4	185021847.6	6.134	38771644.83	20.955
2005-Q4	18193450	25275958.1	0.71979	14433810.59	185766662.3	4.678	17588007.78	9.468
2006-Q1	18872607	22960462.9	0.82196	13111549.37	161135992.5	4.467	25735013.5	15.971
2006-Q2	21620534	25631056.3	0.84353	14636589.06	193081372.7	4.795	33487672.83	17.344
2006-Q3	21934191	24541591.3	0.89376	14014451.16	217039426.5	5.629	44581749.73	20.541
2006-Q4	24439416	24522090.4	0.99663	14003315.19	217970763.5	5.658	59045836.39	27.089
2007-Q1	20704686	21938407.3	0.94376	12527905.54	189593408	5.501	44979096.65	23.724
2007-Q2	23180863	25034929.3	0.92594	14296171.33	212565694.6	5.405	48017488.61	22.589
2007-Q3	24610290	25179400.4	0.97740	14378671.41	237359324.5	6.000	61392528.56	25.865
2007-Q4	25008370	29725334.3	0.84131	16974622.42	240942452	5.159	41449090.25	17.203
2008-Q1	26125712	29914256.8	0.87335	17082506.42	217948233.8	4.638	41938010.03	19.242
2008-Q2	27070287	31098573.4	0.87047	17758809.23	249483189.2	5.106	47547722.46	19.058
2008-Q3	32077854	33236931.5	0.96513	18979916.49	268726652.4	5.146	67406689.3	25.084
2008-Q4	29271922	33062653	0.88535	18880394.92	258624783	4.979	51739484.81	20.006
2009-Q1	30963737	32888016.7	0.94149	18780669.04	211255559.3	4.089	49812390.53	23.579
2009-Q2	31118635	35204079.7	0.88395	20103254.5	241220604.6	4.361	48043118.17	19.917
2009-Q3	32964325	39329841	0.83815	22459266.36	271840902.5	4.399	46216959.55	17.001
2009-Q4	34233281	44691868.5	0.76598	25521246.8	274874781.7	3.915	34106426.71	12.408

	Money in Circulation	Demand deposit	C/D	Cash amount used in the registered economy	GDP (Yr)	Circulation Speed of Money	Informal economy	Informal Economy / GDP
Year	C	D=DR	kr	Cr=kr.Dr kr=0.571049	GSYİH (Yr)	Vr=Yr/ (Cr+Dr)	Yu=Yr*(C-kr*D)/ ((Kr+1)*D)	Yu/ Yr*100
2010-Q1	35647349	43741789.5	0.81495	24978705.14	240272871.7	3.496	37301618.49	15.525
2010-Q2	39233861	48879756.5	0.80266	27912736.05	278647853.1	3.629	41079629.02	14.742
2010-Q3	41503968	49746649.2	0.83431	28407774.26	318732806.1	4.078	53409471.48	16.757
2010-Q4	44346900	59558426.6	0.74459	34010779.93	322360447.4	3.445	35609540.17	11.046
2011-Q1	45813721	57133868.8	0.80187	32626238.63	290610290.5	3.238	42696227.83	14.692
2011-Q2	49395541	64718209.5	0.76324	36957268.8	336234140	3.307	41132550.61	12.233
2011-Q3	51830780	62912542.8	0.82385	35926144.63	381898595.4	3.864	61453241.37	16.092
2011-Q4	49505735	65369351.8	0.75732	37329102.95	385734139.7	3.756	45735280.25	11.857
2012-Q1	47790460	58924226.5	0.81105	33648620.6	333164005.5	3.599	50895612.2	15.276
2012-Q2	51249904	66488948.6	0.77080	37968447.59	382070001.7	3.658	48579098.62	12.715
2012-Q3	54908107	69998244.7	0.78442	39972427.61	424705390.3	3.862	57681410.96	13.582
2012-Q4	53069688	73827984	0.71883	42159396.41	429732717.4	3.705	40422581.14	9.406
2013-Q1	54768865	74946959	0.73077	42798385.97	385824643.4	3.277	39224530.23	10.166
2013-Q2	61674440	88841407	0.69421	50732796.6	441539542.9	3.163	34613617.17	7.839
2013-Q3	66785914	91481345	0.73005	52240330.55	491263793.9	3.418	49719143.48	10.121
2013-Q4	66225434	99549029	0.66525	56847373.43	491085106.5	3.140	29447133.1	5.996
2014-Q1	69016894	90526848	0.76239	51695265.99	451269184.2	3.173	54961331.86	12.179
2014-Q2	71491008	98210329.37	0.72794	56082910.34	487151068.3	3.157	48648089.47	9.986
2014-Q3	80068296	105705138	0.75747	60362813.32	548625834.7	3.304	65099476.67	11.866
2014-Q4	75393478	110106635	0.68473	62876283.77	557419788.6	3.222	40335380.31	7.236
2015-Q1	81100442	110427241	0.73442	63059365.51	497687043.2	2.869	51755061.35	10.399
2015-Q2	86433626	114410617.9	0.75547	65334068.9	562947770.7	3.132	66082336.07	11.739
2015-Q3	97889497	122387118	0.79983	69889041.31	631512354.7	3.284	91964775.55	14.563
2015-Q4	91851928	125256620	0.73331	71527667.55	646500325.1	3.285	66771798.48	10.328
2016-Q1	93300860	122608424.5	0.76097	70015418.16	563890602	2.927	68166233.71	12.089
2016-Q2	104841258	141617631.8	0.74031	80870607	631232693.2	2.837	68008353.42	10.774
2016-Q3	111811907	144247775	0.77514	82372547.62	666176429.5	2.940	86540372.43	12.991
2016-Q4	111277230	158817141	0.70066	90692369.5	747226024.6	2.995	61647121.49	8.250
2017-Q1	112394613	161877824	0.69432	92440169.46	649434601.9	2.554	50956307.83	7.846
2017-Q2	117527115	164814467	0.71309	94117136.51	735280547.7	2.840	66476635.13	9.041
2017-Q3	118478383	173041015	0.68468	98814898.52	833706740.9	3.067	60302456.79	7.233
2017-Q4	118492020	178930453	0.66222	102178056.2	892228264.5	3.174	51779932.11	5.803
2018-Q1	120001619	180931422	0.66324	103320707.5	790113059.5	2.780	46366603.38	5.868
2018-Q2	134632499	192010756.3	0.70117	109647550.3	890435944.7	2.952	73750651.79	8.283

	Money in Circulation	Demand deposit	C/D	Cash amount used in the registered economy	GDP (Yr)	Circulation Speed of Money	Informal economy	Informal Economy / GDP
Year	C	D=DR	kr	Cr=kr.Dr kr=0.571049	GSYİH (Yr)	Vr=Yr/ (Cr+Dr)	Yu=Yr*(C-kr*D)/ ((Kr+1)*D)	Yu/ Yr*100
2018-Q3	139263039	182979805.2	0.76108	104490434.7	1026648923	3.571	124184182.6	12.096
2018-Q4	119106732	171040863.8	0.69636	97672714.16	1017190009	3.785	81136461.19	7.977
2019-Q1	120666696	183259601	0.65845	104650211.8	922000418.2	3.202	51291078.65	5.563
2019-Q2	129611446	189373459.6	0.68442	108141524.7	1022645667	3.437	73798372.79	7.216
2019-Q3	138003287	211051376.4	0.65388	120520677.4	1145879647	3.456	60418138.39	5.273
2019-Q4	143656977	251566813.9	**0.57105**	143656977.4	1189855413	3.011	6816.064387	0.001

Source: *TCMB, Electronic Data Delivery System, https://evds2.tcmb.gov.tr/ .(Date of Access: 25.03.2020).*

Data Set and Method

In the study, firstly, the size of the informal economy was determined between 1998: Q1-2019: Q4 with the monetary ratio method. The results are given in Table 1. Then, the relationship between the informal economy(IE) and economic growth(GDP) was analyzed. Data for the variables used in the study were obtained from the Central Bank of the Republic of Turkey (CBRT) data distribution system. The results of the analysis were tested with the E-views 8 package program by making logarithmic transformations of the data included in the analysis.

In the study, 3-month data consisting of 88 observations from the 1998: Q1-2019: Q4 period were used. Before the unit root tests of the series were performed, it was checked whether there was any seasonal effect. Seasonality effect was observed in GDP variable. Census X-13 method was used to differentiate GDP variable from seasonal effect. Since there was no seasonal effect in the IE variable, no separation process was performed. Then, ADF (Augmented Dickey-Fuller) unit root research was carried out to determine whether the series were stationary. Causality relationship between variables tested with Toda-Yamamoto causality analysis. Then, regression analysis was applied with the Least Squares method to determine the direction and strength of the relationship between the variables.

Unit Root Test and Results

Augmented Dickey-Fuller (ADF) unit root test is a test used to determine whether the time series are stationary. Two hypotheses are used to test the existence of the unit root (Yıldız & Aksoy, 2014, p. 8). These:

H0: $\gamma = 0$ There is a unit root in the series (Series is not stationary)

H1: $\gamma < 0$ There is no unit root in the series (Series is stationary)

In the ADF test, the absolute value of the t statistic found for the coefficient γ is compared with the table critical value calculated by MacKinnon (1991). If the absolute value of the calculated t statistic is greater than the table critical value of McKinnon (1991), the Ho hypothesis is rejected and the series is determined to be stationary (Türedi & Berber, 2010, p. 308).

In the study, firstly, it should be decided whether the variables are stationary or not. In the Toda-Yamamoto causality test, it does not matter whether the variables contain a unit root. However, the unit root test is used to determine the maximum constant degree (dmax). For this purpose, the stationarity of the variables was investigated according to ADF unit root test. ADF unit root test results of the variables are given in Table 2. Fixed and trending model were taken into consideration in the tests.

Table 2: ADF Unit Root Test Results

	Level	**1st Difference**
Variables	**Trend and intercept**	**Trend and intercept**
	t-Stat	**t-Stat**
GDP	-3.4959**	-
IE	0.3013	-4.9969***
Critical Values		
1%	-4.069631	-4.069631
5%	-3.463547	-3.463547
10%	-3.158207	-3.158207

Notes: *In the ADF test, the maximum delay length was taken as 5, the optimal delay length was determined according to the Akaike information criterion. ***, **, and * indicate that the null hypothesis was rejected respectively at the 1%, 5% and 10% significance level.*

According to ADF unit root test results; It is determined that the GDP variable is stationary in the level value and the IE variable is stationary in the first difference value. After determining the stationarity of the variables, Akaike Information Criterion (AIC) and Schwarz Information Criterion (SC) values were examined to determine the appropriate delay length. L-M (Lagrange multiplier) test was carried out to eliminate the autocorrelation problem that may occur in the VAR model at the appropriate delay numbers determined according to the criteria. Since quarterly data were used in the study, the appropriate delay length was taken as 5. After determining the appropriate number of lags, auto-correlation test was performed. The information criteria (AIC and SC) values and auto-correlation test results used for determining the number of delays are given in Table 3. As a result of the LM test, the auto-correlation problem disappeared in the 3rd delay in the IE-GDP model. It is seen in Figure 1 that the tests performed provide the stability condition.

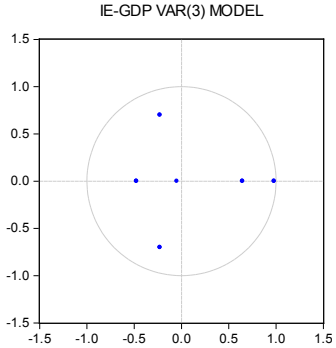
Table 3: Information Criteria and Autocorrelation Test Results

IE- GDP Model

			VAR (1) Model Assumptions Test		
Lag	AIC	SC	Lags	LM-Stat	Prob
1	-4.543588	**-4.367487***	1	9.695745	**0.0459**
2	-4.576461	-4.282959	2	1.516515	**0.0044**
3	**-4.630441***	-4.219538	3	4.849584	0.3031
4	-4.554666	-4.026362	4	3.001421	0.5576
5	-4.505482	-3.859777	5	8.376259	**0.0787**
			VAR (3) Model Assumptions Test		
			Lags	LM-Stat	Prob
			1	3.984550	0.4081
			2	2.858882	0.5817
			3	4.084462	0.3947
			4	2.382351	0.6658
			5	6.579627	0.1598

As seen in Table 3, according to the AIC and SC information criteria, the appropriate delay length for the IE-GDP Model seems different. As a result of the L-M autocorrelation test, the problem of autocorrelation disappeared in the 3rd delay. In Figure 1, we can see that the values found satisfy the stability condition. As a result, the roots obtained are located in the unit circle and the stability condition is provided.

Figure 1: Stability Condition: Roots are located in the unit circle



Note: When we look at the IE-GDP model, we see that the roots are in the unit circle and provide the stability condition.

Toda-Yamamoto Granger Causality Analysis and Results

The Toda and Yamamoto (1995) approach extends the VAR (p) model with the maximum degree of integration (d) of the series, so it predicts a VAR model. The unconstrained VAR (p + d) model estimated in the Toda-Yamamoto approach:

$$y_t = \alpha_0 + \alpha_1 y_{t-1} + \ldots + \alpha_p y_{t-p} + \alpha_{p+d} y_{t-(p+d)} + \beta_1 x_{t-1} + \ldots + \beta_p x_{t-p} + \beta_{p+d} x_{t-(p+d)} + \varepsilon_t \quad (2)$$

In the Toda-Yamamoto approach, zero constraint is applied on the first p factor for Granger causality analysis. Granger causality from variable x_t to y_t zero hypothesis is tested against alternative $H_0 : \beta_1 = \beta_2 = \ldots = \beta_p = 0$, $H_0 : \beta_i \neq 0$ (for at least one) hypothesis. In Toda-Yamamoto approach, Wald test is applied for hypothesis testing. The resulting Wald statistic is called the "transformed Wald test (MWALD)" and has an χ^2_p asymptotic distribution.

Hacker and Hatemi-J (2006) analyzed MWALD statistics for small sample properties and stated that the asymptotic chi-square distribution MWALD test would not be a strong basis when the sample was small. In addition, it has been demonstrated that the asymptotic properties of MWALD statistics of ARCH effect decrease performance in small samples. In such a case, Hacker and Hatemi-J (2006) showed that using leveraged bootstrap simulation increases the power of the test in small samples instead of the asymptotic chi-square critical value of Toda-Yamamoto MWALD statistics.

In the study, first of all, the VAR model was created in Toda Yamamoto causality analysis and appropriate delay numbers were determined. After determining the appropriate number of lags in the VAR model, the VAR (p) model was expanded with the maximum integration degree (d) of the series. In other words, causality analysis was made within the framework of a VAR (p + d) model. The results of the analysis are presented in Table 4.

Table 4. Toda-Yamamoto Granger Causality Test Results

H_o Hypothesis	**VAR(p+d)**	**Test Statistics**	**Possibility**	**Decision**
No causality from GDP to IE	(3+1)	0,653693	0,4188	H_o Accept
No causality from IE to GDP		7,763720	0,0053***	H_o Reject

****, **, and * respectively indicate that the null hypothesis was rejected at the 1%, 5% and 10% significance level.*

As a result of the causality analysis in Table 4, it is seen that there is a one-way causality relationship from the informal economy to economic growth.

Regression Analysis

Regression analysis was carried out with the least squares method to determine how the informal economy affects economic growth. The established regression model is as follows:

$$GDP = c + \beta_1 IE + \varepsilon \quad (3)$$

Accordingly, the results of the regression analysis are given in table 5.

Table 5: Regression Analysis Results

Dependent Variable: GDP				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	4.865342	0.471573	10.317260	0.0000
IE	0.470823	0.063818	7.377635	0.0000
R-squared	0.387593			
F-statistic	54.429500			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	0.354535			

In the analysis made with the Least Squares Method, the coefficients and signs of the variables are shown in Table 5. As can be seen, economic growth has a positive relationship with the informal economy. According to the parameters obtained from the model; it has been determined that 1% change in the informal economy will cause a 47% change on economic growth provided that other variables remain constant. It is understood from the probability value of the model's F statistics that the model is meaningful at 1% level of significance. When the probability of the t statistic of the variable is analyzed, it is understood that it is meaningful in explaining the economic growth at 1% level of significance. Therefore, it is concluded that there is a significant relationship between economic growth and informal economy.

Conclusion

Different economic, social, political and cultural characteristics of the countries are seen among the factors affecting the size of the informal economy. Especially the development level of countries is one of the main factors in the emergence of the informal economy. Undoubtedly, the size of the informal economy also affects many socio-economic indicators in countries such as growth rate, unemployment, income distribution and inflation. This situation leads to distancing from efficiency in resource allocation and disruptive effects in income distribution, as well as loss of welfare, deterioration of equality in competition, and shaking public trust in the existence of the state.

It is important to determine the effects of the informal economy on growth due to it's negative effects on the economies of countries. For this purpose, the size of

the informal economy between 1998: Q1-2019: Q4 periods was estimated with the simple monetary rate method developed by Fiege (1979). The ratio of the informal economy to GDP was estimated to be between 4% and 39% within the analyzed period. In addition, it has been determined that this rate has decreased gradually in recent years. Then, the data obtained were tested with Toda Yamamoto causality analysis in order to test the relation of the informal economy with economic growth. As a result of the analysis, it was determined that there is a one-way causality relationship from the informal economy to economic growth. Regression analysis was conducted to determine the direction and strength of the relationship between the informal economy and economic growth. As a result, it was seen that the informal economy had a positive effect on growth. This result supports the theoretical framework that the informal economy has a positive effect on growth.

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21

ECONOMIC GROWTH, DEVELOPMENT AND HUMAN CAPITAL: A REVIEW OF EDUCATION AND HEALTH STUDIES

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Economic Growth, Development and Human Capital

Economic growth and development are often used incorrectly interchangeably. They are related to each other but actually very differrent. Growth is a quantitative term while development is related to qualitative subjects. Growth, increase in real income, is necessary for development but not enough alone. For the finance of structural and social problems growth is needed. Development is related with welfare of the society. Şenses (2004) defines development as self-sustainable growth, structural change in production style, technological, social, political, institutional innovation, and widespread improvement in people's living conditions. So, development is a long-term matter.

While growth is measured by national income measures, development is assessed by different measures indicated in Human Development Reports (HDR) published by United Nations of Development Programme (UNDP) annually since 1990. Human Development Index (HDI) is one of the most important indexes and includes important education criterias. HDR2019b states that "The HDI is a summary measure for assessing long-term progress in three basic dimensions of human development: a long and healthy life, access to knowledge and a decent standart of living." These are summarized in Table 1 for Turkey. Because of some

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revisions made to the HDI component indicators in HDR2019, the values and ranks in these 2019 reports are not comparable with past reports.

Table 1. Turkey's HDI Components' Trends

	Life expectancy at birth	Expected years of schooling	Mean years of schooling	GNI per capita (2011 PPP$)	HDI value
1990	64.3	8.9	4.5	11214	0.579
1995	67.0	9.6	4.8	12089	0.607
2000	70.0	11.1	5.5	13656	0.655
2005	72.4	11.9	6.1	16129	0.691
2010	74.5	13.8	7.2	17804	0.743
2015	76.5	16.2	8.0	23048	0.800
2016	76.9	16.4	7.6	23409	0.800
2017	77.2	16.4	7.7	24702	0.805
2018	77.4	16.4	7.7	24905	0.806

Source: *Human Development Report Turkey, 2019; UNDP, 2019b*

Within last 28 years it can easily be seen that all components for Turkey moved upwards; which is good in terms of development. According to HDI 2018 values, Turkey has 0.806 HDI value and is at rank 59 out of 189 countries, having place in the very high human development category.

Human capital concept was first introduced by Schultz, and then by Becker in the 1960s. Human capital was defined as total investments in activities such as education, health etc. that will increase the productivity of the individual in labor market.

Then the concept has been started to be investigated in details by Lucas, Rebelo and others, around late 20th century by rise of endogenous growth theories. In the endegeneous growth models, two basic and new views of economic growth are emphasized. The first is "knowledge accumulation" and the second is "human capital". Studies of endogenous growth theories, have shown that human capital accelerates growth by increasing productivity.

Eser (2009) states that endogeneous growth theories made great contributions to economics literature by changing the assumptions of neoclassical approach

and giving priority to technology. Human capital has been accepted as one of the most important factors determining economic growth and this rising importance caused revision of development policies. Sources of human capital accumulation include talent, knowledge, school education, in-service training, learning by doing, observation and social interaction. A well-educated and healthy society is needed to develop human capital and for the continuity of economic development. Atik (2006), defines human capital as; positive values of individuals in the production process, such as knowledge, skill, experience and dynamism. OECD defines human capital as the knowledge, skills, competencies and attributes embodied in individuals that facilitate the creation of personal, social and economic well-being. According to Eser (2009), investments in human capital, such as education and health expenditures, differently from physical capital, are oriented to improve life qualities of individuals as well as production process. So education is not only related with growth, but development. According to Altay (2007), the biggest obstacle of economic development in developing countries is the disqualification and inadequacy of the human power rather than the lack of physical capital.

Education and Development

Şen (2018), defines education as learning and training process by which an individual acquires skills and knowledge. Education effects on development has been one of the most favor subjects that economists have visited for many long years. For a long time, classical growth theories looked for the sources of growth within external factors. But those theories were not good at explaining the different growth paths that different countries faced to. The difference between different growth paths of different countries leaded researchers to turn their glances to productivity of labor. When the subject is productivity, education is one of the most important factors. It is the human capital theory, proposed by Schultz in 1968, that is accepted as the first and most important theoretical approach that explains the role of education in the economy. Education increases productivity so the production and growth. If this growth increase reflects itself as development, education conditions get better. So as seen, the relation between education and development is not one sided. According to Van Den Berg (2001), the high level of education accelerates economic growth, while the accelerated growth increases efficiency and economic growth by supplying people more education. So a positive loop occurs. Education positively affects, not only the efficiency of the

individuals, but also the efficiency of their colleagues and interactions. Yardımcıoğlu (2012) also emphasizes that education has positive effects on growth through positive externalities. As a result of higher education, technological progress accelerates, democratic awareness and participation, and the importance given to environmental awareness and social security increase, crime rates and population growth rate decrease. As education level of society increases the willingness to have less children with higher education increases. Families can make more investments for health and education of their children, so human capital accumulation is affected positively. In addition, women's labor force participation rate and productivity will increase and positive contributions will be made to growth. By education also labor mobility increases and optimal distribution of labor effects economic growth positively. Atik (2006) states that since education is the most important source of knowledge and talents that individual has, human capital is usually represented by education indicators.

These education indicators are expected years of schooling, mean years of schooling, inequality in education, population with at least some secondary education and education expenditures. According to Table.2. it can be easily seen that Turkey's values are approximately near the selected countries values but the inequality between genders for all indicators is higher. For other countries in the table the values for female (F) and male (M) are close to each other but for Turkey the differences are higher for all indicators. This shows that economical progress is not enough for development, also social transformation is needed.

For also social progress, education is one of the strongest means.

Table 2. Human Development Indice and Selected Education Variables

	HDI value		**Expected years of schooling**		**Mean years of schooling**		**Inequality in Education**	**Population with at least some secondary education (%)**	
	F	**M**	**F**	**M**	**F**	**M**		**F**	**M**
Turkey	0.771	0.834	15.9	16.9	6.9	8.4	16.5	44.3	66.0
Azarbaijan	0.728	0.774	12.4	12.5	10.2	10.8	5.3	93.9	97.5
Europe and Central Asia	0.757	0.794	14.4	14.7	9.9	10.5	8.3	78.1	85.8
Very high HDI	0.880	0.898	16.7	16.1	12.0	12.1	7.0	87.0	88.7

Source: *Human Development Report Turkey,2019; UNDP,2019b*

Health and Development

As well as education is the main source of human capital, health level of societies is also a very important factor that feeds and contributes to human capital. Yardımcıoğlu (2012) emphasizes that education and health, the major factors of human capital, are interacting each other. With higher education levels individual is more conscious about health issues and the individual with higher health levels has more opportunities to have better education. If the individual is not healthy, it won't possible for him to produce any benefits. Unfortunately the COVID-19 pandemic has reminded this to the whole World.

Atik (2006) indicates that Schultz, one of the pioneers of the human capital approach, accepts the facilities for health care as an investment in human capital because health care increases working efficiency by protecting and improving the human's ability to work. Physical investments in health sector support technological progress which will stimulate growth and growth again will cause increase in health expenditures. The same positive loop exists for health, as in education-growth. Of course this is a general finding which must be tested and there are studies which resulted with negative effects of health expenditures on growth for Turkey. The empirical studies and findings will be given as tables. It seems more appropriate to tabulate all empirical studies later, since the subject is generally handled with education and the effects of the two are tested together. It should not be forgotten that the main effect of health on the country's economy is through human capital, before deciding on health expenditures due to negative consequences on the relationship between health expenditures and growth. Akar (2014) states that healthy individuals effect human capital more positive since they have longer lives and are more productive. Health expenditures, which play a key role in ensuring economic development get bigger shares from budget in developed countries compared with developing countries. Increasing health expenditures affects life time and quality positively, so the human capital.

As social health level increases this will be reflected to productivity and so economic development will be stimulated. Social health level is generally evaluated with these indicators; baby mortality rates, adequate nutrition, average life, type/number of diseases and various indicators related to health system.

Table 3. General Health Statistics, 2018

	Turkey	World	OECD	EU
Life Expectancy At Birth (years)	78.3	72.7	80.9	80.0
Mortality Rate of Babies (death number/1000 birth)	9.2	28.9	5.5	3.3

Source: *HDR2019a, UNDP2019*

For life expectancy at birth, Turkey is at a good value compared with World, OECD and EU values. But mortality rate for babies is still high compared with OECD and EU.

Table 4. Health Expenditure Statistics for Turkey, 2018

Total Health Expenditure (Million TL)	165,234
Proportion of Health Expenditure to GDP (%)	4.4
Governmental Current Health Exp. (Million TL)	119,941
Private Current Health Exp.(Million TL)	35,057
Governmental Health Inv.(Million TL)	8,080
Private Health Inv.(Million TL)	2,156

Source: T.C. Sağlık Bakanlığı, 2018 Report

The ratio of health expenditure to GDP was higher before, it is unfortunately decreasing and lower then EU and OECD approximations. For development quality of life is very important, so the ratio of health in budget.

In HDR 2019, for each indicator countries are divided into three groups of approximately equal size as the top third, the middle third and the bottom third. And all tables are coloured according to this three-colour code. Turkey is in the middle third group for the indicators in Table.5., except PISA scores. For PISA scores unfortunately Turkey is in the bottom third. But according to OECD's 2018 PISA Report, Turkey is the only country that increased PISA scores between 2003-2018 although the number of students at 15 age group is increased. This shows that the quality of education in Turkey has increased.

Lost health expectancy is defined as "the relative difference between life expectancy and healthy life expectancy, expressed as a percentage of life expectancy at birth" in HDR.

Table 5. Quality of Human Development, 2018

		Turkey	World	OECD
Quality of Health	**Lost Health Expectancy (%)**	13.9	13.2	14.0
	Physicians per 10.000 people	17.6	14.9	28.9
	Hospital beds per 10.000 people	27	28	50
Quality of Education	**Pupil–teacher ratio, primary school**	18	23	15
	PISA Mathematics	420	490	489
	PISA Reading	428	493	487
	PISA Science	425	493	489

Source: *Human Development Report Turkey, 2019; UNDP,2019b*

Empirical Studies on Education, Health and Growth and Development

In this study, we classified the studies examining the effects of education and health on growth and development separately. Table 6 shows the studies examining the effects of education and health on just growth. Also Table 7 shows the studies examining the effects of education and health on just economic development.

Table 6. Empirical Studies on Education, Health and Growth

Study/ Authors	Sample	Variables	Approach/ Method	Key Findings
Kılıç & Özbek (2018)	1995-2013 32 OECD countries and Turkey	Health and education expenditures, growth rates	FMOLS DOLS	Health expenditures, education expenditures and growth rates affect each other positively.
Şen & others (2018)	1995-2012 8 developing countrries (one is Turkey)	Education expenditures, health expenditures, growth rates	Bootstrap Panel Granger Test	For Brazil and Mexico positive significant causality from education and health expenditures to growth. For Indonesia negative causality, for others none.
Çalışkan & others (2018)	1998-2016 Turkey	Education expenditures, health expenditures, GDP	Cointegration tests	Both education and health expenditures are related with growth positively and meaningfully, in long-term.

Table 6. Empirical Studies on Education, Health and Growth

Study/ Authors	**Sample**	**Variables**	**Approach/ Method**	**Key Findings**
Bozkurt (2015)	1998-2014 Turkey	Education and health ecpenditures, growth rates	Johansen-Juselius Cointegration Tests	Education and health expenditures has positive relation with growth in long-run
Akar (2014)	2004-2013 Turkey	Relative price of health expenditure-growth rates	Cointegration and VECM	Positive two-way relation between variables, in long-term. But no meaningful relation in short-term
Selim & others (2014a)	2000-2011 G20 Countries & Turkey	Education expenditures and growth rates	Panel Cointegration PMGE	Positive and meaningful relations between education expenditures and growth, both in short and long-run.
Selim & others (2014b)	2001-2011 27 EU Country and Turkey	Health expenditure, growth rates	Panel Cointegration and VECM	Positive two-way relation between variables, both in short and long-term
Yardımcıoğlu (2012)	1975-2008 25 OECD Countries	Life expectancy rates, growth rates	Panel Data Regression	Positive two-way relation between variables, statistically meaningful in long-term
Pradhan (2011)	1961-2007 11 OECD Countries	Health expenditure-growth rates	Panel Data Regression	Positive two-way causality both in short-term and long-term
Çetin &Ecevit (2010)	1990-2006 15 OECD Countries	Health expenditure-growth rates	Panel Data Regression	Poor positive relation between variables, statistically not meaningful
Afşar (2009)	1963-2005 Turkey	Education investments-growth rates	Granger Causality	One-way relation from education investments to growth rates.
Erdoğan& Yıldırım (2009)	1983-2005 Turkey	Schooling rates, education expenditures, growth rates	ARDL	positive relationship between education expenditures and economic growth.
Bloom& others (2004)	1960-1990 104 countries	Life expectancy rates-growth rates	Panel Data Regression	Life expectancy rate has positive and meaningful effect on growth

As seen from the table above, the empirical studies have taken this health and education subject generally from the perspective of economic growth.

After now, the papers which examines the subject from development perspective will be introduced since the aim of this study is to review development subject related with human capital.

Özyakışır (2011), provides a theoretical framework about the role of human capital for economic development. At the end it emphasizes that for human capital to contribute economic development it is not enough to invest in education and health alone. At the same time brain drain must be prevented by proper policies.

Eser (2009), is making observations for Turkey after reviewing the subject in theoritical and empirical literature circumstances. According to these, it seems that it is difficult for Turkey to reach information society level since Turkey is a consumer of science and technology rather than being producer, expenditures for R&D and education are inadequate and society is not open-minded for social and mental transformation.

Vaduva (2017), investigated the relationship between economic development and human capital through the role of education and eco-innovation activities in 28 EU countries, using multiple linear regression models. School expectancy, training and eco-innovation have significant impact on GDP per capita.

Erdem (2019), took the subject directly from development perspective so investigated HDI values beside education and health expenditures and GDP values for 33 selected African countries. According to long-run ARDL the relationship between human development and income variables was negative and significant. And again in long-run the relationship between human development with both education and health variables were found positive and significant. Due to the results of the study, it can be said that not only income but also education and health variables should be considered in explaining economic growth for African countries. Policy makers should implement policies about income in short-run and about education in long-run.

Şaşmaz (2019), investigated the relationship between health and deveopment by panel data analysis, for 34 OECD countries for the period 2000-2015. A positive long-run two-way causality relationship is found between health expenditures

and economic development, HDI. To contribute development process, greater attention will be given to health issues.

From the beginning of 21th century the empirical studies started to give more importance to economic development, so HDI. Selected empirical literature can be summarized as in the following table:

Table 7. Empirical Studies on Education, Health and Development

Study/ Authors	**Sample**	**Variables**	**Approach/ Method**	**Key Findings**
Şaşmaz (2019)	2000-2015 34 OECD Countries	Health expenditures, HDI	Panel Data	A positive long-run two-way causality relationship is found between health expenditures and development.
Erdem (2019)	1995-2014 33 African countries	HDI, education expenditures, health expenditures, GDP	Panel ARDL	In long-run positive and significant relation between human development with both education and health expenditures.
Sharifi-Renani & others (2012)	1980-2010 MENA Countries	Literacy, education indexes, HDI, growth rate	Panel Data Regression based on Cobb-Douglas production function	HDI contributes growth rate positively
Ng'habi (2012)	2011 40 Countries	GDP, HDI, life expectancy, schooling rates, gender inequality index	Multivariate multiple regression model	Strong relation between growth and human development
Suri & others (2010)	1960-2001 99 Countries	GDP, birth rate, life expectancy, education variables, education health expenditures	Panel data	Two- way relation between human development and economic growth
Gürlük (2009)	1970-2006 15 Countries	Biochemical Oxygen Demand, GDP, HDI	EKC (Environmental Kuznets Curve) Regression	Human develeopment has an important role on sustainable economic growth.

In this study, we classified the studies examining the effects of education and health on growth and development separately. On the other hand, the COVID19 pandemic shows that the entire world economy and country economies will undergo serious transformations. While all countries' economies have received serious blows, it is important to remember that while trying to stimulate growth, the event should be handled not only quantitatively but also qualitatively. The COVID19 pandemic reminded us once and again the importance of health care and education. Health and education investments should be re-planned according to the requirements of the age and changing production structures. After this review, education and health investments will be seen not only as expenditure items, but also as real earnings in the long term, affecting labor productivity and quality of life positively.

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22

RURAL DEVELOPMENT POLICIES IN TURKEY AND IN THE EU

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Rural Area

Many definitions are made on the rural area. In general, we can define rural areas as the places where people live based on agriculture and natural resources. (Wood, 2005:95-96). The communities living in rural areas have decreased over time in comparison with the communities living in the city.

Today, 55% of our world lives in urban areas. It is estimated that this rate will last up to 68% by the year 2050. The urban population of the world is 4.2 billion people today. The most urbanization rate in the world is Asia Continent with the rate of 54%. As an urban area, the North America region ranks first with approximately 84%. Rural population also increases like urban population. Rural population in the world is 3.4 billion people today. This figure is expected to be 3.1 billion people in 2050 (www.un.org).

Rural areas have found their place in the employment policies of countries. Rural areas also play an active role in combating unemployment, although cities are often prioritized by countries. The developments in the world have been effective in people's choice of place of residence. For example, people have started to live in cities with the globalization phenomenon in the world. Cities have become an attraction over time. People living here have entered the process of creating added value by generating new ideas and projects. The phenomenon of globalization has also changed the demographic structure of the countries. In rural areas, mostly elderly population and urban areas remain young population. (HABİTAT, 2001: 6)

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Basic Concepts in Rural Development

Rural Population: It is a concept used to define the number of people living outside the city life in the world. People live in rural areas for various reasons. Today, people living in rural areas are less than those living in urban areas.

Rural Region: Rural areas, where an efficient market mechanism is almost not seen in the country, have a covered economic structure. Industrialization is not common in rural areas. People living in rural areas provide their vital activities with the wages they earn from labour-intensive production. With these earned wages, people living in this region companse their personal needs (Tolunay and Akyol, 2006: 121).

Rural Development: Rural development is the activity of increasing the economic and social welfare of people living in rural areas within the country. People living in rural areas may experience an increase in welfare when they are disadvantaged compared to those living in urban areas, as they become involved in the public sector (Gıda Tarım ve Hayvancılık Bakanlığı, 2015: 10).

Policy Instruments of Rural Development: Many policies are implemented by countries in carrying out rural development activities. We can list these policies as follows; public finance management, providing money and credit facilities, exchange rate regulations, providing direct controls, ensuring changes in the institutional framework.

- **Public Finance Management**: Public finance is included in the central government budget. Central governments can find various payment items in order to achieve some necessary economic targets by looking at income and expense balances.
- **Providing Money and Credit Facilities:** Through these tools, individuals and organizations are provided with opportunities to borrow in convenient facilities. These instruments are put into practice through various government guarantees at the credit rates determined by the state.
- **Exchange Rate Regulations:** This economical tool has three main features. First, this policy affects the country's economy through imports and exports. Secondly, the fact that the emotional feeling that occurs with the depreciation of the country currency against other countries' currencies occurs and the defeat phenomenon occurs, finally, the depreciation occurring in the national

currency in relation to the second article will decrease the trust against the country currency.

- **Providing Direct Controls:** Direct controls by institutions located in the public sector appear in the field of foreign trade. With this tool, it is aimed to revive the economy by giving economic incentives in the short term.
- **Ensuring Changes in the Institutional Framework:** Due to some economic structures occurring in the institutional structure, long-term targets may not reach the desired level. For example, it is seen that the law does not allow this immediately in the process of lending money to individuals. With this tool, it is ensured that the desired targets are achieved by providing comfort in the transactions (Singh, 2009:160-175).

Rural Development Goals and Principle

Rural development moves differ in terms of countries since countries are in different regions in the world. Each country prepares its own development plan according to its own economic structure. These economic plans prepared act in coordination with the dynamics in the country, thereby realizing national development moves. In general, we can list the development goals as follows:

- Economic development
- Increasing the capacity of human resources
- Physical infrastructure improvements
- Environmental protection and development (Pezikoğlu, 2012:88)

People living in rural areas act in accordance with economic development moves. These moves are helping the country achieve its overall development goals. People living in rural areas play an active role in meeting the general development goals with rural development tools. (Daniels 1991:7) If we look at the goals of rural development in general, it is to eliminate or reduce the economic imbalance between the same region or different regions within the same country with various economic supports.

Rural Development Principles

Countries struggle to achieve macro targets set throughout the year. Countries attach importance to increasing production capacity in order to meet the determined

growth targets and other macro targets. It is not a desirable situation for countries to cluster and produce in only one place in activities aimed at increasing production capacity. It is important in the distribution of the unemployment phenomenon within the country as much as the production is done everywhere in the country. In this context, countries can enter into the direction of rural development targets in line with their general development targets. Although the countries have different economic characteristics in different geographies, the general rural development principle is as follows.

- Ensuring economic and social participation
- While evaluating market conditions in agricultural privileges, to evaluate the agricultural sector as a whole.
- Taking necessary protection measures in the field of agriculture and forestry and developing these sectors (Gülçubuk and Karabıyık, 2002:473).

Rural Development Strategies

Rural development programs are programs for people living in rural areas within the country. These implemented programs are the plans to increase the level of social welfare within the country. Rural development plans are based on everyone who is within the scope of implementation. Necessary supports are received from national or international stakeholders in achieving these goals. In line with the targets, rural areas are expected to solve their problems. In this context, these regions use various methods and strategies to develop necessary development moves (Steele, 1987:104-105). We can list the rural development strategies put forward in implementation as follows:

- **The ideas put forward for rural areas should not be rejected immediately**: A strategy put forward in any way and successful in one place can show its effect in another rural area.
- **Development anytime and anywhere:** Countries do not have any magic wands for rural development. Work in any situation and carry out the development phase
- **Careful analysis of each local dynamic in itself:** These strategies should be done in order to prepare the local region more effectively for the future (Sears and Reid, 1992:301).

Community Dynamics in Rural Development

It plays an important role in local governments as well as central governments in maintaining rural development activities. Central governments apply various economic arguments to support rural development activities. With these economic supports, it is aimed for the producers to continue their production activities more comfortably. Local governments use various ways to support the economic activities of the producers. Local governments assist the producer sector in selling more manufactured products. With the introduction of local administrations, manufacturers become easier to sell their products. Cooperation in different parts of the world has different applications and different effects. Cooperatives are economic organizations established on a certain cooperation in order to protect the economic interests of the partners established by real or legal persons. There are many types of cooperatives in Turkey. We can group these cooperatives in three categories in general. These cooperatives;

- **Agricultural cooperatives**
- **Livestock cooperatives**
- **Credit / surety cooperatives**

Thanks to these cooperatives, producers become more resistant to the market's oligopolistic structure (due to the large number of producers) (Doğan, 2018: 51).

The European Union produces various policies with its member states and institutions in order to encourage economic development. The European Union supports five basic structures of development for sustainable development, based on the United Nations development Goals. If we list these sources of finance;

- **Human:** Ending poverty and ensuring equality among people
- **Planet:** Leaving a liveable world to future generations
- **Welfare:** Providing a good level of welfare to people
- **Peace:** Building peaceful societies
- **Partnership:** Increasing partnership levels globally

The European Union provides various financial assistance to countries by contacting non-governmental organizations of 150 countries around the world. In this context, the European Union has supported various development and rural

development activities (www.europa.eu). Cooperatives have an important place in the U.S. as well as in other states. In the U.S., cooperatives are divided into many branches. Agricultural cooperatives help farmers in the preparation and marketing of their products, such as food, construction etc. It helps in meeting other needs of the people in cooperatives. Various supports are provided to many cooperatives in the U.S. through USDA (United States Department of Agriculture) cooperative programs. Along with USDA, various technical assistance is provided to cooperatives in the U.S. along with various programs. With the USDA program, people living in the U.S. in rural areas; Information is given on how people will set up a cooperative and how the cooperatives will benefit from the supports. With USDA, various technical supports are provided to agricultural economists, rural sociologists and rural residents (www.rd.usda.gov).

Agricultural Perspectives in Turkey

Within the scope of agricultural approaches, it is aimed to increase agricultural production. As a result of increased agricultural production, both the GNP of the countries increases, and the unemployment rate decreases. In order to increase agricultural production, it is aimed to alleviate the burden on the producer sector by giving various subsidies to the producers by the states. In this respect, as in many other countries also implemented various agricultural support policies in Turkey. According to Kıymaz (2000), these approaches are divided into three as price policy approach, subsidies and agricultural trade policy.

- **Price Support Policies:** It comes with the manufacturer's support policies in Turkey by prices fall below a certain level, aimed generative growth. With this policy, it is aimed to keep the income level of the producer at the top. The first application of support prices for agricultural products in Turkey has been out of wheat in 1932. In later years, the agricultural sector in Turkey has carried out various price support policies. In the support provided by the states, the following criteria come to the fore: How much cost the manufactured product is produced, the price of the product in foreign markets and change in the price of the product compared to last year
- **Subsidies:** The scope of subsidies in Turkey; Within the scope of various innovations in the technological field, it is given to increase the production in the rural area. In agriculture by applying the agricultural applications of the new invention in this context it is also made Turkey intended to increase products.

- **Agricultural Trade Policy:** Turkey's foreign trade due to changes in the structure of the productive sectors in order to prevent negative effects from foreign markets agricultural trade policy is enforced. With agricultural trade policies, it is also aimed to provide self-sufficiency and price stability in agriculture (Kıymaz, 2000: 60-64).

Some vehicles in Turkey for the implementation of these policies are put into operation. Agricultural support tools used in agricultural support policies are as follows;

Some vehicles in Turkey for the implementation of these policies are put into operation. According to Yavuz (2005) the agricultural support tools used in the implementation of agricultural support policies consist of the following." Direct Income Support (DIS) Payments, Difference Payments, Livestock Supports, Protection of Environmentally Agricultural Areas Program Supports, Compensatory Payments, Product Insurance Payments, Rural Development Supports and Other Supports".

- **Direct Income Support (DIS) Payments**: These are payments made by the state on my agricultural land units. With these payments, it is aimed to increase the agricultural production.
- **Difference Payments**: These are the payments made so that the producer does not lose revenue due to the decrease in supply in production.
- **Livestock Supports:** These are payments made to the producer sector to increase animal production.
- **Support for the Program for the Protection of Agricultural Areas for Environmental Purposes:** It covers the payments made for the recovery of the lands that have been damaged due to various reasons.
- **Compensatory Payments:** It covers the payments made to prevent the producers from being negatively affected by the excess production caused by overproduction. With these payments, manufacturers are directed to another product group.
- **Product Insurance Payments:** It covers the payments made to cover the loss that may occur in agricultural production.
- **Rural Development Supports**: It covers the payments made to educate the young population and to ensure rural development.
- **Other supports**: Innovation to the producer sector (R&D) includes supports such as export and credit supports (Yavuz, 2005:62-63).

Applied Rural Development Policies in Turkey

Rural development approach continued in Turkey, starting from the planned period. Policies for the country's development and various applications for the implementation of these policies have been made in the development plans. Rural development plans have taken an important place in the planned period, as well as general development plans. The "Community Development" program has been put into practice within the scope of rural development in the 1st Five-Year Development Plan (BYKP). With the community development program, it is aimed to identify the needs of the societies and search for the necessary solutions to them. Within the scope of this program, activities such as cooperative activities and innovation activities are handled and evaluated separately. In this program, the main goal is to identify the problems of the rural people in development activities and to make the resources more active in solving these problems. Again, within this program, more efficiency increase is targeted by making people living in the chiral places more conscious (I. BYKP, 1963:103-104). In II. BYKP, the problems of the rural areas were handled as in the first plan. Within the scope of the plan, it is aimed to ensure that village people have access to resources, increase their living levels, increase agricultural production, and benefit from the education and health facilities at the highest level (II. BYKP, 1968-1972:235-236). It was aimed to provide the development activities of the village people in the III. BYKP, to ensure the integration of the rural people at the national level, to reduce the imbalance in the agricultural area and to increase the welfare levels of the people living in the rural areas (III. BYKP 1973-1977: 857). In order to reduce the income gap among the people in the community in IV. These tools are; land reform, state support, cooperatives and the establishment of villages (IV. BYKP, 1979: 288). V. BYKP aims to increase the welfare level of the people living in the villages, to increase the agricultural production by solving the infrastructure problems in the villages and to increase the income of the farmers by supporting the domestic production goods. Again, within this plan, 'Integrated Rural Development Models' will be put into practice to increase the social interaction of people living in rural areas both socially and culturally (V. BYKP, 1985-1989: 158). Priority Regions in Development were implemented in VI. Development Priority Regions in the application with the eastern and south-eastern Anatolia regions within Turkey of other aspiring aimed at closing the deficit. In this context, it is aimed to develop opportunities for private sector to invest in these regions (VI. BYKP, 1990-1994: 318-319). It is aimed to follow

a balanced and sustainable agricultural policy in VII. BYKP. In this context, studies have been carried out to improve irrigation opportunities in agricultural lands. Within the scope of this study, providing water savings is also discussed. Supporting all kinds of new ideas that will emerge in the agricultural sector has been handled within this plan. Supporting these emerging ideas by state institutions was also kept within the scope of the plan (VII. BYKP, 1996-2000: 159-160). In VIII. BYKP, it has been handled to make the people living in the rural area more qualified and to find the solution of the employment problem. It is aimed to create an industrial model based on agriculture by providing various infrastructure investments in rural areas. Within the scope of this plan, the opportunities of the people who remain within the scope of expropriation of goods for various reasons have been developed (VIII. BYKP, 2001-2005: 71). The preparation of the legal basis for the rapid development of rural development activities in the IX. In this context, efforts to establish a rural payment unit have been accelerated so that the payments to be made depending on rural development activities will be rapid. IX. Turkey's European development plan, the National Rural Development Strategy in 2006, the scope of work was put into effect (IX. Development Plan, 2007-2013: 48-49). Rural development activities in the X. Development Plan are now tried to be continued with non-agricultural sectors (tourism, food industry, etc.). It is aimed to provide the support to the people living in the rural areas from European Union and country resources. Within the scope of this plan, considering the demographic structure of rural areas, it is aimed to follow a more social policy by the state in the villages where the elderly population is generally settled (X. Development Plan, 2013: 135-136).

Agricultural Approaches in the European Union

European Union agricultural approaches are an application for the economic development of people living in rural areas within the Union. While the European Union is addressing agricultural supports, the European Union Common Agricultural Policy appears as an implementing actor. The European Union Common Agricultural Policy is a major agricultural policy instrument of the union. The common agricultural policy is not only about agriculture, but also about forestry activities. The European Union Common Agricultural policy aims to ensure rural development within the European Union by providing various supports in the fields of agriculture and forestry (OECD, 2017: 12).

The European Common Agricultural policy has three dimensions. These;

• **Market Support:** It is used to make the disadvantageous situation arising due to the changes in agricultural activities advantageous with various financial supports.

• **Income Support:** It addresses the direct payments made to the producers operating in the agricultural field.

• **Rural Development:** It is used to eliminate the problems occurring in the rural area and to ensure sustainable regional development (www.ikv.org.tr).

The European Common Agricultural policy has three basic principles. These principles are;

• **"Single Market" Principle:** It deals with the free movement of the goods of the member states of the Union among the member states. With this principle, the producers in the union will be free from any financial dangers that may come from foreign markets.

• **"Community Preference" Principle:** With this application, the products of the union member countries will be preferred, and the producers will be protected against imports.

• **"Joint Financial Responsibility" Principle:** All expenditures within the Union will be covered by the member countries. Activities carried out in the Union will be carried out together economically (www.ikv.org.tr).

Rural Development Policies Implemented in the European Union

The most important study on rural accommodation in the European Union was done with the Gündem 2000 structural reform. With this reform, necessary regulations were made in the agricultural field and various regulations were made to ensure rural development. In this framework, 22 measures were taken for the agricultural sector. In the future, various targets have been determined in environmental, areal and economic areas related to rural areas in 2005, 2007 and 2013. The European Union aims to make rural areas more harmonious with the rural development policies it implements. Rural development practices of the European Union are regulated by the Rural Development European Agricultural Fund (Doğan and Akşahin, 2011: 9-10). With the European Union Council Regulation No. 1257/99 issued with the Agenda 2000, it launched three funds for rural development. These funds are; "The European Rural Development Fund (ERDF)", "The European Structural Fund (ESF)", "The European Agricultural Guidance

and Guarantee Fund (EAGGF)" Consists of. (Yılmaz and Tolunay, 2007: 109). According to the envoy, these funds have emerged for various purposes. If we look at these funds in detail;

- **The European Rural Development Fund (ERDF)**: It is a fund with the most important structure among the development funds. It addresses key objectives such as improving infrastructure facilities, improving production and ensuring rural development.
- **The European Agricultural Guidance and Guarantee Fund (EAGGF):** A fund for agricultural structure. The fund was divided into two as Guarantee and Guidance in 1964. Guarantee fund has a high share (90%). The financing of the guarantee fund is provided by the member countries. The steering fund deals with the measures taken to ensure rural development. This fund, which was initially a small shareholder, has been increasing in proportion as it reaches today.
- **The European Structural Fund (ESF)**: This fund, organized in 1999, addresses a number of objectives such as increasing employment, reducing unemployment, increasing innovation and ensuring stability (Elçi, 2007: 43-52).

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23

THE EVALUATION OF THE INVESTMENT ENVIRONMENT WITH COPRAS METHOD: THE CASE OF ORGANIZED INDUSTRIAL ZONES IN TR61 REGION

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Introduction

When the development level of the regions in Turkey are compared, the regions in the east are disadvantageous and have unfavorable conditions. The unfavorable circumstances existing in the eastern part causes migration to the regions in the west and causes an increase in population there, which, by extension, brings about unplanned urbanization, a decrease in welfare and environmental problems. From the 60s onward, a variety of policies have been implemented in order to eliminate these problems and minimize the differences between the regions. To that end, The State Planning Organization was established first and Five-Year Development Plans were made. As in many developing countries, one of the most significant policies for Turkey's economic development targets and programs is to promote and develop industry. For this purpose, it was proposed that an Organized Industrial Zone (OIZ) be established in Bursa in accordance with a report written up in 1961. Subsequently, Bursa Organized Industrial Zone was established in 1962 with the loan taken from the World Bank. Subsequent to this Organized Industrial Zone (OIZ) experience, a loan fund was created within the Ministry of Industry and Trade to be exclusively used for IOSs. By transferring funds from the budget to this fund, the construction of OIS was launched (Özden, 2017, p. 107).

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Organized Industrial Zones are spatial incentives to encourage existing investments, direct private sector investments to certain regions and meet the plot of land needed by new investments Generally speaking, these areas are manufacture and settlement sites which provide their users with public services and facilities such as electricity, water, telephone, internet access, transportation, natural gas, and sewage (Cansız, 2010, p. 12). OIZs can buy inputs such as electricity and water cheaper thanks to their collective purchasing power and sell them to the companies located at the site at cheaper prices. Besides this, OIZs facilitate investments by giving permits and licenses in a shorter time (Çağlar, 2006, p. 314).

If they are viewed from theoretical and practical points, organized Industrial Zones can be considered as an industrial policy instrument which belongs to the Fordist period. Although technology parks and clusters have come to prominence in the post-Fordist period, OIZs continue to be functional in regional development with the employment opportunity they provide, incentives they grant and externalities they create (Arslan, 2018, p. 170).

Consequently, it is possible to conclude that we are in a period in which OIZs will be of more importance in providing the convenient local environment for industrial investments (Çağlar, 2006, p. 314). When five-year development plans are examined, it strikes the eye that the importance and functions of the OIZs are included starting with the first development plan, and they are one of the basic instruments of the industrial policy. OIZs were also mentioned in the 11th Development Plan and targets were set to increase the ratio of industrial areas (OIZ, Industrial District, Small Industrial Area) to the surface of the country so that they would occupy 20% in 2023 and to prepare feasibility reports to determine the locations of specialized OIZs if requested by the automotive supply industry, thereby increasing the number of OIZs specialized in automotive (Presidency of Turkey, Presidency of Strategy and Budget, 2019, pp. 69, 88).

OIZs rise to the prominence as a convenient site for investors due to the advantageous investments they offer and the significance they have in the industrial strategy. However, these OIZs differ from each other due to the different investment environments they offer investors. They offer different investment environments owing to facts such as their distance to main transportation routes, how much of the infrastructure is completed and incentives.

In this study, TR61 (Antalya, Burdur and Isparta) Region OIZs were evaluated in terms of investment environment with Complex Proportional Assessment (COPRAS), which is one of the Multi-Criteria Decision Making (MCDA) methods, using 14 criteria weighted by the Entropy method.

Literature Review

MCDA methods are frequently used in many areas for evaluation or determining the ideal choice. Some of these studies are summarized in Table 1.

Table 1. Literature

Entropy Method	
Turkish Banking Sector Performance Analysis	Akgül, 2019
Financial Performance Analysis of Businesses Traded on Borsa Istanbul Trade Index	Ayçin & Güçlü, 2020
Organized Industrial Zone Investment Climate Assessment	Yalçınkaya, Dulupçu, & Baykul, 2018
Assessment of Quality of Life	Ömürbek, Eren, & Dağ, 2017
R&D Performance Measurement	Çakır & Perçin, 2013
Trade Relation Analysis	Acarer & Dinçer, 2019
Investment Decision Making	Hsu, 2013
COPRAS Method	
Financial Performance of Football Clubs Listed in BIST	Erdoğan, Altınırmak, Şahin, & Karamaşa, 2020
Individual Pension Scheme Selection	Ertuğrul & Öztaş, 2016
Determination of Renewable Energy Source	Karaca, Ulutaş, & Eşgünoğlu, 2017
Evaluating the Performance of Turkish Coal Enterprises	Aksoy, Ömürbek, & Karaatlı, 2015
Trade Relation Analysis	Acarer & Dinçer, 2019

Evaluation of Investment Environment and Investment Environment

Following the global crisis which had a deep impact on the world economy in 2008, countries launched a recovery process but unfortunately, they were not able to reach the growth figures they had targeted in the beginning. Countries better

understood the importance of sustainable growth and development after the crisis they underwent. In order for this aim to be achieved, investments aimed at increasing production and the employment provided as a result of this became important. It is of great importance for Turkey to attract savings from abroad considering the fact that Turkey has a low savings rate. In order for these savings to be attracted to our country, providing a good investment environment for investors is of great significance. The investment environments countries offer are very important to both domestic and foreign investors and have an effect on their investment decisions. It is possible to comment that factors which affect investment decisions of both foreign and domestic investors are similar. To put it another way, if an investment is regarded as profitable by a foreign investor, the same applies to a domestic investor. Besides, international direct investments provide an opportunity for promotion of countries and thus are a reference for new investors (Gelir, 2017, pp. 1-2). Especially, foreign investors aim to obtain utility maximization by choosing the optimum among the alternatives during the investment decision process. There is a direct relationship between the convenience of the investment climate and investment decisions (Kangal, Eroğlu, & Çoban, 2018, p. 24).

The investment environment can be defined as a concept that includes the political, institutional and behavioral environment. The investment environment consists of the following three factor sets (Asian Development Bank, 2005, p. 8):

- Macro fundamental: Macroeconomic stability, economic openness and social-political stability.
- Management and institutions: transparency and transparency of regulations, taxation, legal system, flexibility of the labor market, skilled workforce.
- Infrastructure: Transport (roads and ports), communication, energy and water supply.

United Nations Conference on Trade and Development (UNCTAD), World Bank (WB) and International Monetary Fund (IMF) report on the business and investment environment are intertwined identified as a concept. Investment environment in addition to the micro and macro political factors in the country, providing ease of doing business to the investors in the cultural and geographical conditions are appropriate, and profits can be expressed in an environment where they can maximize (Polat, 2018, p. 86).

Indices such as competition index and/or business/investment index are used to evaluate and compare the status of countries' investment environment. These indices contribute to the evaluation of the investment environment and also constitute an indicator for the foreign capital attractiveness of countries (Özcan & Kavaklıdere, 2017, p. 819). Investment Climate Assessment is a tool to determine what needs to be done in areas that affect private sector investments and development of companies in the country or region (The Economic Policy Research Foundation of Turkey, 2016, p. 21). Doing Business Index, which has been published by the World Bank since 2003, is one of them. This index provides an evaluation to the countries by taking into account the criteria such as tax policies, company establishment, licensing process (Çalışkan, 2019, p. 107).

Organized Industrial Zones and Investment Environments

As of 2020, there are 340 OIZs in Turkey. There are 54,519 business organizations and 1,607,758 employees in these OIZs. There is productive activity now on 31.137 of a total of 54.126 industrial plots in these OIZs. In terms of the number of employees, while Istanbul İkitelli OIZ ranks first with its 250.000 employees, Gaziantep OIZ with its 120.000 employees comes second and Ankara İvedik with its 60.000 takes the third place. In terms of number of business organizations, Istanbul İkitelli is on the top with 22.416 followed by Ankara İvedik (6.980) and Ankara OSTİM (5000) OIZs (Sanayi Gazetesi, 2020).

According to the 2017 data collected from 280 OIZs across Turkey, the ratio of OIZs which completed the natural gas infrastructure construction was 43%, the rate of those which completed the electrical infrastructure was 75.9%, the rate of those completing the sewage infrastructure construction was 74%, the rate of those completing the water infrastructure construction was 74%, the rate of those completing the telecommunication infrastructure was 62.7% and the rate of the OIZs which completed their road infrastructure and superstructure was 62.7%. Again, according to the data obtained from the same study, in Turkey, the average distance of the OIZs to the main high ways is 3.1 km and 78% of the OIZs are below the average. The average distance of the OIZs to the airport is 64 km and 55.4% of them are below the average. The average distance to the nearest railway is 33.1 km and 68.6% of the Organized Industrial Zones are below the average. Their average distance to the port is 151.6 km and 61.2% of the OIZs are below the average (Yalçınkaya, 2017, pp. 208-210). If an evaluation is

conducted with reference to the incentives; it is seen that investment contribution rates and social security premium support periods and rates vary depending on the incentive rate of the province in question. It is a fact that such differences affect and change investment decisions of domestic and especially foreign firms. Therefore, domestic and foreign investors who are to make an investment decision find themselves in a complicated situation.

When OIZs are compared to other industrial sites, it strikes the eye that public utility services such as electricity, water and telephone are connected to business organizations in a 50% shorter time on the average. For example, while having electricity connected takes an average of 20 days for businesses outside OIZs, it takes an average of 11 days for companies located in OIZs. While companies outside OIZs have to wait for a period of 14 days to get water connected, those located in OIZs have to wait for 5 days only. This advantage on the part of OIZs holds true for building permits, too. While companies established in OIZs can obtain a building license or building occupancy permit in a period of 40 days on the average, business organizations outside of OIZ have to wait for an average of 80 days. It is possible to comment that granting the authority to give permits to these areas in 2000 significantly facilitated doing business for firms located there (Çağlar, 2006, pp. 313-314).

In order to improve the investment climate of OIZs, a set of steps were determined to be taken in the 11th development plan. These can be listed as construction of connection lines on a variety of industrial sites, 38 of which are OIZs, constructing natural gas infrastructure on OIZs which has the required conditions and facilitating access to energy, developing long-term land and building rental models, improving the services provided by OIZs, fast data communication for vertical integration and supporting sites for efficient energy use and etc. (Presidency of Turkey, Presidency of Strategy and Budget, 2019, pp. 66, 67, 72, 75).

Entropy Method

The concept of Entropy, which is widely used in mathematics and engineering sciences, especially in physics, is adapted to the information theory by Shannon (Ömürbek, Eren, & Dağ, 2017, p. 31). The entropy method is a suitable scale which can be used to conduct evaluations of different decision-making processes. Entropy method is generally used to calculate index weights in social sciences.

When we have a look at the literature of multi-criteria decision-making model, it is seen that the number of studies using this method has increased over the recent years (Çakır & Perçin, 2018, p. 82). The steps of the entropy method are as follows (Ömürbek, Eren, & Dağ, 2017, p. 31):

Step 1: Normalization is done to calculate P_{ij} value in order to eliminate contradictions in different measurement units. P_{ij} is calculated with the help of Equation 1.

$$P_{ij} = \frac{r_{ij}}{\sum_{i=1}^{m} r_{ij}}; \forall_j \quad (1)$$

In the equation;

i: alternatives,

j: criteria,

P_{ij}: normalized values,

r_{ij}: refers to given benefit values.

Step 2: In this step, the entropy of Ej is calculated by Equation 2.

$$E_j = -k \sum_{i=1}^{m} (P_{ij} \ln (P_{ij})); \forall_j \quad (2)$$

k: $(\ln n)^{-1}$

In the equation;

k: entropy coefficient,

E_j: entropy value,

P_{ij}: refers to normalized values.

Step 3: In this step, the uncertainty d_j is calculated by Equation 3.

$$d_j = 1 - E_{j;}; \forall_j \quad (3)$$

Step 4: With the help of Equation 4, w_j weights are calculated as the significance degree of j criterion.

$$w_j = \frac{d_j}{\sum_{j=1}^{n} d_j}; \forall_j \quad (4)$$

As a result, it is concluded that the criterion with a greater Entropy weight is more important for decision making or evaluation.

COPRAS Method

In 1996, a method called complex proportional assessment (COPRAS) was discovered by Zavadskas and Kaklauskas, one of the researchers of Vilnius Gediminas Technical University. The method is applied to rank and evaluate alternatives in terms of the importance and usefulness of the criteria. The steps of the COPRAS method are given below (Aksoy, Ömürbek & Karaatlı, 2015, pp. 11-14). Variables in the model;

A_j= i. alternative, i=1,2,…..,m

C_j= j. evaluation criterion, j=1,2,…..,n

W_j= i. significance level of the evaluation criterion, j=1,2,…..,n

X_{ij}= value of i. alternative in terms of j. evaluation criteria.

Step 1: In the COPRAS method, the decision matrix is first created and shown as in Equation 5.

$$D = \begin{matrix} A_1 \\ A_2 \\ A_3 \\ . \\ A_m \end{matrix} \begin{bmatrix} x_{11} & x_{12} & x_{13} & . & x_{1n} \\ x_{21} & x_{22} & x_{23} & . & x_{2n} \\ x_{31} & x_{31} & x_{33} & . & x_{3n} \\ . & . & . & . & . \\ x_{m1} & x_{m2} & x_{m3} & . & x_{mn} \end{bmatrix} \quad (5)$$

Step 2: The normalized decision matrix is obtained by Equation 6.

$$x_{ij}^{*} = \frac{x_{ij}}{\sum_{i=n}^{m} x_{ij}} \; \forall_j = 1,2,\dots,n \quad (6)$$

Step 3: Weighted decision matrix is obtained by Equation 7 by using w_j weight values.

$$D^{'} = d_{ij} = x_{ij}^{*}.w_j \quad (7)$$

Step 4: S_i^+ value is obtained by using Equation 8 for useful criteria. For useless criteria, S_i^- value is obtained by using Equation 9.

$$S_i^+ = \sum_j^k d_{ij} \qquad j = 1,2,\dots,k \text{ useful criteria} \quad (8)$$

$$S_i^- = \sum_{j=k+1}^{n} d_{ij} \quad j = k+1, k+2, \dots, n \text{ useless criteria} \quad (9)$$

Step 5: Relative significance values are obtained with Equation 10.

$$Q_i = S_i^+ + \frac{\sum_{i=m}^{m} S_i^-}{S_i^- \cdot \sum_{i=1}^{m} \frac{1}{S_i^-}} \tag{10}$$

Step 6: The highest relative priority value is obtained by Equation 11.

$$Q_{max} = max\{Q_i\} \forall_i = 1,2, \dots m \tag{11}$$

Step 7: Performance index for alternatives is obtained by Equation 12.

$$P_i = \frac{Q_i}{Q_{max}} . 100_{\%} \tag{12}$$

The alternative with the Pi performance value index 100 is the best alternative. Preference order of the alternatives is obtained by ordering the performance index values from large to small.

Evaluation of Investment Environment of TR61 Organized Industrial Zones

In the study, six Organized Industrial Zones in the TR61 Region were analyzed in terms of investment environment. 14 criteria were used to evaluate the investment climate. The nearest highway distance, the nearest airport distance, the nearest railway distance, the closest port distance attained from portal.sanayigazetesi.com.tr (n.d). Completion rate of water distribution network construction, completion rate of sewerage construction, completion rate of natural gas distribution network construction, completion rate of electric network construction, telecommunication construction completion rate, road infrastructure and superstructure construction completion rate, large scale investment incentive rate, regional scale investment incentive rate and number of empty parcels attained from Organized Industrial Zones Top Agency Database of www.osbuk.org (n.d). Data for SEDR-2017 was obtained from the website https://www.bakkakutuphane.org/ (n.d). In the present study, the COPRAS method which was developed by Zavadskas and Kaklauskas (1996) was picked to determine the OIZ with the most optimal investment climate among a variety of alternatives. The COPRAS method was picked because it was easier and more effective to obtain results with it than other multi-criteria decision making models such as Technique for Order Preference by Similarity to Ideal Solution (TOPSIS), A New Additive Ratio Assessment (ARAS) and Vise Kriterijumska Optimizacija I Kompromisno Resenje (VIKOR) (Karaca, Ulutaş, & Eşgünoğlu, 2017, p. 121). Entropy method in weighting criteria; COPRAS

method was used to evaluate alternatives. The criteria and criteria codes used in the evaluation are shown in Table 2.

Table 2. Evaluation Criteria and Criterion Code

Evaluation Criteria	**Criterion Code**
The Nearest Road Distance (km)	C1
The Nearest Airport Distance (km)	C2
The Nearest Railroad Distance (km)	C3
The Nearest Port Distance (km)	C4
Completion Rate of Water Distribution Network Construction (%)	C5
Sewerage Construction Completion Rate (%)	C6
Natural Gas Distribution Network Construction Completion Rate (%)	C7
Electricity Network Construction Completion Rate (%)	C8
Telecommunications Construction Completion Rate (%)	C9
Road Infrastructure and Superstructure Construction Completion Rate (%)	C10
Socio-Economic Development Ranking (SEDR) 2017 (Score)	C11
Large Scale Investment Incentive Rate (%)	C12
Regional Scale Investment Incentive Rate (%)	C13
Number of Empty Parcels	C14

The decision matrix used in the study is given in Table 3. This decision matrix will be used both in the determination of weights by the Entropy method and in the COPRAS method.

Table 3. Decision Matrix

	Min	**Min**	**Min**	**Min**	**Max**	**Max**	**Max**	**Max**	**Max**	**Max**	**Min**	**Max**	**Max**	**Max**
OIZ	**C1**	**C2**	**C3**	**C4**	**C5**	**C6**	**C7**	**C8**	**C9**	**C10**	**C11**	**C12**	**C13**	**C14**
Isparta -Yalvaç OIZ	0.01	130	50	250	0.01	0.01	0.01	0.01	0.01	0.01	16	35	25	104
Isparta Süleyman Demirel OIZ	0.01	4	1.1	135	100	100	100	100	100	100	16	35	25	7
Burdur 1. OIZ	0.01	30	5	120	0.01	100	100	100	100	100	32	40	30	3
Burdur - Bucak OIZ	15	70	40	65	100	100	100	100	100	75	32	40	30	1
Burdur 2. OIZ	0.01	10	15	140	100	100	100	100	100	75	32	40	30	9
Antalya OIZ	0.01	40	99	35	100	100	100	100	100	100	5	30	20	3

Firstly, criterion weights were calculated with Entropy method. The calculated criterion weights will be used to determine the alternatives by the COPRAS method. Criterion weights are determined as follows using Equality 1, 2, 3 and 4.

Step 1: Normalized decision matrix (P_{ij}) is obtained with Equation 1 (Table 4).

Table 4. P_{ij} Values

OIZ	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
Isparta -Yalvaç OIZ	0.000664	0.457746	0.237982	0.33557	2.49988E-05	2E-05	2E-05	2E-05	2E-05	2.22E-05	0.120301	0.159091	0.15625	0.818898
Isparta Süleyman Demirel OIZ	0.000664	0.014085	0.005236	0.181208	0.249987501	0.199996	0.199996	0.199996	0.199996	0.222217	0.120301	0.159091	0.15625	0.055118
Burdur 1. OIZ	0.000664	0.105634	0.023798	0.161074	2.49988E-05	0.199996	0.199996	0.199996	0.199996	0.222217	0.240602	0.181818	0.1875	0.023622
Burdur - Bucak OIZ	0.996678	0.246479	0.190386	0.087248	0.249987501	0.199996	0.199996	0.199996	0.199996	0.166663	0.240602	0.181818	0.1875	0.007874
Burdur 2. OIZ	0.000664	0.035211	0.071395	0.187919	0.249987501	0.199996	0.199996	0.199996	0.199996	0.166663	0.240602	0.181818	0.1875	0.070866
Antalya OIZ	0.000664	0.140845	0.471204	0.04698	0.249987501	0.199996	0.199996	0.199996	0.199996	0.222217	0.037594	0.136364	0.125	0.023622

Step 2: E_j values are calculated with Equation 2 (Table 5).

Table 5. E_j Values

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
E_j	0.0154	0.7781	0.7349	0.9156	0.7739	0.8983	0.8983	0.8983	0.8983	0.8930	0.9271	0.9970	0.9943	0.4052

Step 3: d_j values are calculated with Equation 3 (Table 6).

Table 6. d_j Values

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
d_j	0.9845	0.2218	0.2650	0.0843	0.2260	0.1016	0.1016	0.1016	0.1016	0.1069	0.0728	0.0029	0.0056	0.5947

Step 4: The w_j values are calculated with Equation 4 (Table 7).

Table 7. w_j Values

	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
w_j	0.3313	0.0746	0.0891	0.0283	0.0760	0.0342	0.0342	0.0342	0.0342	0.0359	0.0245	0.0009	0.0019	0.2001

According to Table 7, the three most important criteria were calculated as C1 (The Nearest Highway Distance), C14 (The Number of Empty Parcels) and C3 (The Nearest Railway Distance).

There are two types of criteria in the COPRAS method: benefit and cost. Beneficial directional criteria are high; cost-oriented criteria values are desired to be

low. The nearest highway distance, the nearest airport distance, the nearest railway distance, the closest port distance and SEDR-2017 are cost-oriented. Completion rate of water distribution network construction, completion rate of sewerage construction, completion rate of natural gas distribution network construction, completion rate of electric network construction, telecommunication construction completion rate, road infrastructure and superstructure construction completion rate, large scale investment incentive rate, regional scale investment incentive rate and number of empty parcels are benefit-oriented criteria. The investment environment assessment was made as follows using the Equality 5, 6, 7, 8, 9, 10, 11 and 12 by COPRAS method.

Step 1: In this step, the decision matrix in Table 3 is used.

Step 2: With the help of Equation 6, the normalized decision matrix (x^*_{ij}) was obtained (Table 8).

Table 8. x^*_{ij} *Values*

OIZ	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
Isparta -Yalvaç OIZ	0.000664	0.457746	0.237982	0.33557	2.49988E-05	2E-05	2E-05	2E-05	2E-05	2.22E-05	0.120301	0.159091	0.156025	0.818898
Isparta Süleyman Demirel OIZ	0.000664	0.014085	0.005236	0.181208	0.249987501	0.199996	0.199996	0.199996	0.199996	0.222217	0.120301	0.159091	0.156025	0.055118
Burdur 1. OIZ	0.000664	0.105634	0.023798	0.161074	2.49988E-05	0.199996	0.199996	0.199996	0.199996	0.222217	0.240602	0.181818	0.1875	0.023622
Burdur - Bucak OIZ	0.996678	0.246479	0.190386	0.087248	0.249987501	0.199996	0.199996	0.199996	0.199996	0.166663	0.240602	0.181818	0.1875	0.007874
Burdur 2. OIZ	0.000664	0.035211	0.071395	0.187919	0.249987501	0.199996	0.199996	0.199996	0.199996	0.166663	0.240602	0.181818	0.1875	0.070866
Antalya OIZ	0.000664	0.140845	0.471204	0.04698	0.249987501	0.199996	0.199996	0.199996	0.199996	0.222217	0.037594	0.136364	0.125	0.023622

Step 3: With the help of Equation 7, the weighted decision matrix (d_{ij}) was obtained (Table 9).

Table 9. d_{ij} *Values*

OIZ	C1	C2	C3	C4	C5	C6	C7	C8	C9	C10	C11	C12	C13	C14
Isparta -Yalvaç OIZ	0.00022	0.034174	0.021225	0.00923	1.9E-06	6.84E-07	6.84E-07	6.84E-07	6.84E-07	8E-07	0.002951	0.000158	0.000297	0.163912
Isparta Süleyman Demirel OIZ	0.00022	0.001051	0.000467	0.005143	0.019014	0.006841	0.006841	0.006841	0.006841	0.007995	0.002951	0.000158	0.000297	0.011033
Burdur 1. OIZ	0.00022	0.007886	0.002122	0.004571	1.9E-06	0.006841	0.006841	0.006841	0.006841	0.007995	0.005903	0.000158	0.000297	0.004724
Burdur - Bucak OIZ	0.330236	0.018401	0.016988	0.002476	0.019014	0.006841	0.006841	0.006841	0.006841	0.005996	0.005903	0.000158	0.000297	0.001575
Burdur 2. OIZ	0.00022	0.002629	0.006367	0.005333	0.019014	0.006841	0.006841	0.006841	0.006841	0.005996	0.005903	0.000158	0.000297	0.014173
Antalya OIZ	0.00022	0.010515	0.042025	0.001333	0.019014	0.006841	0.006841	0.006841	0.006841	0.007995	0.000947	0.000158	0.000297	0.004724

Step 4: With the help of Equation 8, S_i^+ values were calculated for the benefit-oriented criteria and with the help of Equation 9, the S_i^- values for the cost-oriented criteria (Table 10).

Table 10. S_i^+ *and* S_i^- *Values*

OIZ	S_i^+	S_i^-
Isparta -Yalvaç OIZ	0.164373	0.068092
Isparta Süleyman Demirel OIZ	0.06586	0.009832
Burdur 1. OIZ	0.040626	0.020701
Burdur - Bucak OIZ	0.054487	0.373994
Burdur 2. OIZ	0.067095	0.020451
Antalya OIZ	0.059474	0.055016

Step 5: $Q_i$values are calculated with the help of Equation 10 (Table 11).

Table 11. Q_i *Values*

OIZ	Q_i
Isparta -Yalvaç OIZ	0.044628
Isparta Süleyman Demirel OIZ	0.266345
Burdur 1. OIZ	0.121297
Burdur - Bucak OIZ	0.006872
Burdur 2. OIZ	0.128305
Antalya OIZ	0.047103

Step 6: With the help of Equation 11, the value of Q_{max} is calculated. Then P_i values were calculated with the help of Equation 12 (Table 12).

Table 12. P_i *Values and Ranking*

OIZ	P_i	Ranking
Isparta -Yalvaç OIZ	16.75563	5
Isparta Süleyman Demirel OIZ	100	1
Burdur 1. OIZ	45.54147	3
Burdur - Bucak OIZ	2.580139	6
Burdur 2. OIZ	48.17233	2
Antalya OIZ	17.68488	4

Isparta Süleyman Demirel OIZ, which has a 100% performance index according to the calculated Pi values, has the best investment environment. Burdur-Bucak OIZ, which has a 2.58% performance index, is the organized industrial zone with the worst investment environment.

Discussion

Organized Industrial Zones play an important role in distributing investments in the country and creating employment. While performing these duties, they offer investors different investment environments. These differences occur due to factors such as distance to transportation routes, incentives and infrastructure. The fact that investment environments are different confronts domestic and foreign investors who will make an investment decision with a decision-making situation.

In the study, 6 Organized Industrial Zones in Antalya, Burdur and Isparta provinces were evaluated in terms of investment environment. While making this evaluation, 14 evaluation criteria were used. These evaluation criteria were first weighted by the Entropy method. According to the calculation results, C1 (The Nearest Highway Distance), C14 (The Number of Empty Parcels) and C3 (The Nearest Railway Distance) were the three most important criteria in terms of investment environment. Weighted criteria were used in the COPRAS method to evaluate the investment climate. According to the results of COPRAS method, the best alternative to the worst ranking in terms of investment environment is as follows: Isparta Süleyman Demirel OIZ, Burdur 2. OIZ, Burdur 1. OIZ, Antalya OIZ, Isparta -Yalvaç OIZ and Burdur - Bucak OIZ.

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SECTION III

REGIONAL ECONOMICS

24

MULTI-DIMENSIONAL APPROACH TO DEVELOPMENT AND ANALYSIS OF REGIONAL DIFFERENCES IN TURKEY: AN APPLICATION ON THE NUTS 2 REGIONS

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Introduction

Looking at today's economies, it is noticeable that even in the most developed countries, there are differences of development between regions. Policies aimed at reducing regional development differences, particularly after World War II, have led scientists to take a closer look at the issue. After this date, regional economy and regional development efforts have accelerated. The academic literature on the inverted-U hypothesis and the growth pole policies of the 1950s has evolved from 1990s on to the discussions between the new convergence school and the new economic geography (NEG) theory (Zang et al., 2018).

Regional disparity, which is generally described by macro indicators such as the height of unemployment rates and relative low income, leads to a significant difference in quality of life among those living in different parts of the same country. Although regional imbalances vary from country to country, it is generally possible to gather them in three classes. The first factor that leads to regional imbalances is natural or geographical reasons. Such imbalances occur in a way that results in favour of some natural resources and against some others. The second factor is economic and functional imbalances. Some regions have progressed and improved due to their access to the market and infrastructure facilities, while

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others have been left behind economically. The third imbalance is social and cultural imbalance. This type of imbalance, which includes differences between people's behaviour and value judgments, occurs depending on the level of education. The social positions, values, behaviour and clothes of cultivated people are different from others. Examples of the third type of imbalances are slum areas, border districts and wealthy districts around them in metropolitan cities (Kaplan, 2019; Zhang et al., 2018).

Regional Disparities

Regional disparities are defined by the OECD (2002, 2003) as differences in economic performance and prosperity between the two countries/regions. Regional inequalities are one of the most common issues of regional development theories. Like regional development theories, approaches to regional inequalities are different from each other. Regional development theories and appropriate approaches to regional inequalities with them have been influenced by social-economic paradigms for certain periods. The literature on international development and inequality is based on Kuznets hypothesis. According to this hypothesis, income inequality of a country increases in the first stage of its economic development and decreases when the economy matures (Kuznets 1955; Williamson 1965).

Neoclassical convergence theories are one of the most important theories about regional disparity. They argue that regional disparities are temporary. In the Solow-Swan model put forward in neoclassical theory, poor countries grow faster than rich countries and long-term inequality between countries will decrease. Long-term convergence is also consistent with theme of the growth pole (Scholars such as Perroux, Hirchman and Friedmann) and the reverse-U thesis of regional inequality. Numerous empirical studies were conducted between 1960 and 1970 to test neoclassical convergence theories. Some support convergence and reversible U theories, while others do not support it. Therefore, the theory has received serious criticism. Cumulative causation, dependency and neo-Marxism schools have become popular alternatives. Myrdal (1957) argued that the distinction between rich and poor deepened, according to the theory of the cumulative causation of Hirschman (1958). Because increasing returns on scale, agglomeration economies and specialization cause divergence in regional development. According to the theory, production factors in the free market economy are shifting towards regions with high returns. At the same time, the initial high returns of investments attract more investments, and agglomeration economies and scale-to-scale

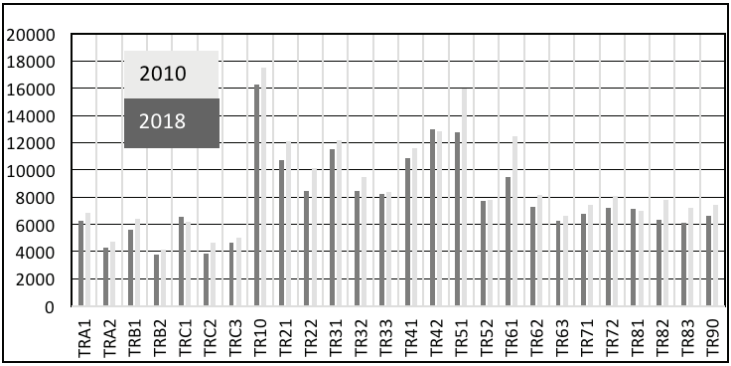
returns strengthen regional advantages (Karadağ et al., 2004; Önder et al., 2007). Thus, this region attracts capital and effective workforce, while other regions lose capital and effective workforce (Brakman et al., 2001). The transition of young, qualified and entrepreneurial population and capital into the developing region is damaging the underdeveloped region (Pardo, 2005). The theories put forward during the period 1950-1980, dominated by Keynesian economic policies, are the model of growth poles put forward by Perroux (1950), the cumulative causality model developed by Myrdal (1957) and the export-based growth model by Hirschman (1958) (Kaldor, 1970).

With the effects of globalization and liberalization, interest in regional disparity increased again in the late 1980s. Institutional economics and new economic geography (NEG) approaches have become popular. The NEG model (Krugman, 1991; Fujita et al., 1999; Fujita and Krugman, 2004), first introduced by Krugman, highlights the role of agglomeration economies, externalities and transportation costs. NEG theory addresses disparity in terms of industries (industrial clusters) rather than population. The NEG theory describes the geographical formation of economic development with centrist forces that lead to industrial intensification between countries/regions and centrifugal forces that lead to the dissolution of the industry. Centrist forces increase the geographical density of economic activities, while centrifugal forces are the opposite. Regional inequalities emerge because economic activity is geographically concentrated in certain regions, especially in large cities and metropolitan areas, due to agglomeration and external economies. In the long term, it is much more likely that divergence will occur rather than a regional convergence (Hassink & Gong, 2019).

Regional Disparities in Turkey

Development differences at the regional level in Turkey are particularly evident between the eastern and western regions. In eastern regions, per capita income, unemployment and poverty rates are high. Geographical factors are one of the major underlying reasons of the regional differences. The region is mountainous and has a very harsh climate. Health, education and some infrastructure investments and investments in social services remain low in the region compared to other regions. Migrations are experienced from this region where job opportunities are inadequate, to regions with high quality of life and high standards. In particular, the occurrence of terrorist activities has caused investments to shift to other regions. Education and cultural activities are also limited in these regions.

Figure 1: GDP Per Capita ($) in Turkey



Source: *FAO, 2019 and Turkish Statistical Institute, 2019.*

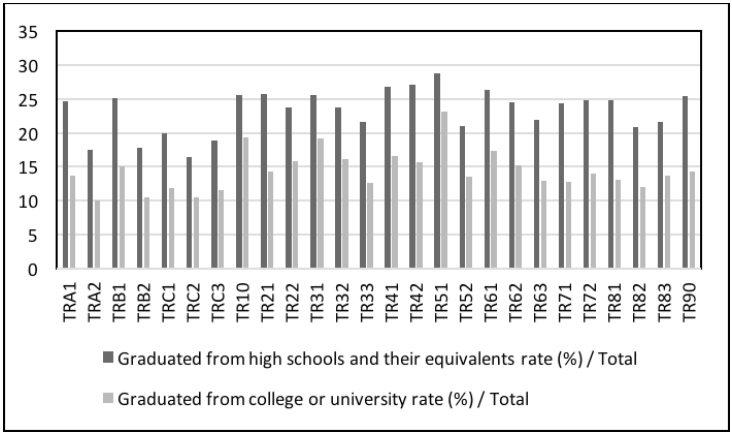
Figure 1 shows GDP per capita values for NUTS II regions in 2010 and 2018. The first 3 regions with high income are TR10 (Istanbul), TR42 Kocaeli, Sakarya, Düzce, Bolu, Yalova) and TR51 (Ankara). The regions with the lowest GDP per capita values are TRB2 (Van, Muş, Bitlis, Hakkari), TRC2 (Şanlıurfa, Diyarbakır) and TRA2 (Ağrı, Kars, Iğdır, Ardahan).

Figure 2: Employment in Turkey (2019)

Source: *Turkish Statistical Institute, 2019*

Figure 2. TRC3 (Mardin, Batman, Şırnak, Siirt) is the region with the highest unemployment rate for NUTS 2 region in 2019, TR82 (Kastamonu, Çankırı, Sinop) is the region with the lowest. As to employment rate, the lowest region is TRC3 (Mardin, Batman, Şırnak, Siirt) and the highest region is TR21 (Tekirdağ, Edirne, Kırklareli). Employment participation rate in the TRC3 region is also low.

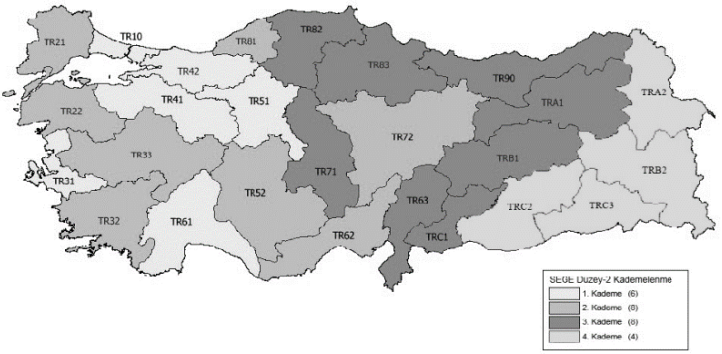
Figure 3: Qualified workforce in Turkey (2018)



Source: *Turkish Statistical Institute, 2019*

In Figure 3, the highest value in NUTS 2 region Graduated from high schools and their equivalents rate (%) / Total and Graduated from college or university rate (%) / Total is TR51 (Ankara). Graduated from high schools and their equivalents rate (%) / The lowest region according to the total rate is TRC2 (Şanlıurfa, Diyarbakır) and TRA2 (Ağrı, Kars, Iğdır, Ardahan) according to the rate of Graduated from college or university rate (%) / Total. One of the indicators that can reveal the difference in development between regions is living standards in the region. According to the "Socio-Economic Development Ranking Survey of Provinces and Regions" report with data from SEGE (2017), 2014 and 2013, 52 variable essential components were analysed in demography, employment, education, health, competitive and innovative capacity, financial, accessibility and quality of life. As seen in Figure 4, the Eastern regions of Turkey are in the 3rd and 4th level in terms of socio-economic development.

Figure 4: NUTS 2 Region 4 Stage Socio-Economic Development Level



Source: *T.C. Kalkınma Bakanlığı, İllerin ve Bölgelerin Sosyo-ekonomik Gelişmişlik Sıralaması Araştırması (SEGE 2017); https://www.bakkakutuphane.org/upload/dokumandosya/l_sege-2017.pdf*

Practices aimed at reducing inter-regional development differences in Turkey were implemented especially in the planned period after 1960, but did not give the desired result, and even made the imbalance even more pronounced according to the general opinion. Regional policies shaped according to the incentive practices of the private sector together with public infrastructure investments have failed, deepened in the 1980s as a result of the public abandoning economic activities in terms of production (Kadioglu, 2007).

Studies on regional inequality in Turkey are generally on the hypothesis of convergence. Academic studies on regional imbalances have increased especially after 1990. Some studies on regional convergence: Filiztekin, (1998); Altınbas, Doğruel & Güneş, (2002); Dogruel & Dogruel, (2003); Karaca, (2004); Erlat, (2005); Erlat & Özkan, (2006); Kirdar & Saracoglu, (2006); Yildirim & Ocal, (2006); Yamanoğlu (2008); Abdioğlu & Uysal (2013); Karahasan, (2014); Özgül & Karadağ, (2015); Nas & Değirmen (2018). It is not possible to say that a clear conclusion has been reached for convergence and divergence for these studies carried out at different years and regional levels in Turkey. Dedeoğlu&Beyazlı (2018) has proposed a data set of 27 variables selected under 9 indicators that can be used in regional level of development studies.

Successful policies to minimize development level differences are only possible by determining the national / regional level of development correctly. For this reason, many studies have been conducted in the literature to reveal the differences in development at the country/region level, and criteria selected from economic, social and cultural indicators are often used in these studies.

Methodology:

It is not possible to say that there is a set of data that has a consensus on determining the level of development regionally. In this study, the index method -which enables the development of a multi-dimensional and abstract concept into a one-dimensional, measurable and concrete form- was used. Based on 2018 data, NUTS 2 regions consist of 16 indicators of four dimensions: demographics, social, labour and economic. The variables used are given in Table 1. Selection of variables are based on the work of Meyer & de Jongh (2018). In the study, a criterion was created to demonstrate and compare the level of development of regions. In this context, the values of the sophistication index were calculated primarily for 4 sub-indicators, and then the overall score and activity scores were calculated according to the results obtained from these index values. Index values of the original data were found by normalization method. In the Minimum-Maximum method, new values are formulated with the equality shown below.

$$x' = \frac{x_i - x_{min}}{x_{max} - x_{min}}$$

In this equation;

x'= Normalized data,

x_i = Input value,

x_{min} = The smallest number in the data set,

x_{maks} = The largest number in the data set.

The data value range obtained according to this formula is between 0 and 1. Even if there are negative marked values in the data set, these marks become positive by eliminating the result of normalization. The above equality between 1 and 4 within the scope of 4 main subcomponents has been revised as follows. This formula indicates that the region with the highest value will be valued as 4, the

region with the lowest will be valued as 1, and all other regions from 1 to 4. No weighting is used in the calculations.

$$x^{'} = 3 * \frac{x_i - x_{min}}{x_{max} - x_{min}} + 1$$

Table 1: Indicators Used in The Study

Variables Type	Variables name	Variables
DEMOGRAPHICS	Population growth	POP
	Household size	HS
	Population density	POPD
	Urbanization	URB
SOCIAL DEVELOPMENT	Poverty rate	POV
	Gini coefficient	GINI
	Provincial and state roads length	ROAD
	Qualified workforce	EDU
	Informal housing / TOTAL	HOU
	Crime rate	CRM
LABOUR FORCE	Employment participation rate	EPR
	Unemployment rate	UR
	Employment by Education Level (higher education / Total)	EEMP
ECONOMICS	GDP Per Capita ($)	GDPP
	Net Exports	NX
	Consumer Price Index (%)	CPI

Demographics:

Population growth: Discussions between the positive and negative aspects of population growth continue. Due to limited resources at the regional level, population growth reduces long-term potential growth. (Dao, 2012; South, 2017; Yao, Kinugasa, and Hamori, 2013; Banerjee, 2012; Huang and Xie, 2013) In the calculated index, provinces with low population growth rates were given higher scores.

Household size: There is also no consensus on the average household size and economic development relationship. However, empirical studies have shown that the world is experiencing a reduction in average family size with higher economic development. (Adams, 2010; Bongaarts, 2001) Because the study was at a regional level, regions with high variable value were given low scores on the grounds that they were associated with low levels of economic development.

Population density: Population density is an important factor affecting economic activity. Since the settlements with high population density are attraction centers, there is an intense migration from outside the city, which naturally increases the rate of urbanization. (Ahrend & Schumann, 2014; Veneri and Ruiz, 2016)

Urbanization (The proportion of the population of provincial and county centres in the total population (%): Urbanization cannot be explained only as the increase in population. It also creates social, cultural, economic and political transformations in society. When looking at the whole population in Turkey, it is seen that urbanization levels increase as the population density of the provinces/regions increases. Therefore, both variables are rated with high values. (Xu, 2018; Bayraktutan & Alancıoğlu, 2019; Öztürk & Çalışkan, 2019).

Social Development:

Poverty rate: In the poverty classification available to households made by median revenues, TURKSTAT considers 60% of the median value to be a relative poverty limit. Higher poverty percentages are associated with lower levels of economic development. According to the general level of society, individuals with income below a certain limit are considered relatively poor. (Evcim et.al, 2019; Engle, 2008)

Gini Coefficient: This is a measure of income distribution inequality and it measures whether the distribution of national income in a country is evenly distributed. As the Gini coefficient approaches to zero, it refers to equality in income distribution and as it approaches to 1, it refers to deterioration in income distribution. The highest relative value is given. (ILO, IMF, OECD & World Bank, 2015)

Provincial and state roads length: the length of the provincial and state road relates to the transport infrastructure of the region. Transportation infrastructure can affect the cost of investment of firms as transport costs will be reduced in developed regions. The reduction in investment costs will increase the revenue forecast. It

will also lead to increased trade relations between regions and decreased cost of sellers to access different markets. (Kara & Taş, 2012; Yurttançıkmaz et al., 2015)

Qualified Workforce: Human capital facilitates the adoption of new technology, increases the rate of innovation and affects the productivity of labor. Therefore, human capital is seen as an important factor of economic growth today (Sieng & Yussof, 2017; Gebrehiwot, 2016; Manga et al., 2015; Elma, 2016). School or faculty graduate rate (%) was used as the human capital variable in the regions.

Informal housing: The majority of the world's population is headed for cities due to population growth, social development, high level of prosperity and job opportunities. As a measure of social sophistication, the number of buildings for residential purposes has been used.

Crime rate: There are positive correlations in empirical literature between crime rate and income/poverty. (Hasyim et al., 2019; Goulas & Zervoyianni , 2013; Goulas & Zervoyianni, 2015) Pratt and Cullen (2005) used the number of convicts who entered the penal institution for the crime variable taken from the Turkish Statistical Institute database, taking the province and type of crime into account.

Labour Force:

Employment participation rate: Employment participation rates are one of the factors that determine unemployment rates. Those who do not participate in the workforce are not considered unemployed. In order to analyse unemployment rates, it is also necessary to monitor labour force participation rates. For this reason, labour force participation rates are important for the development and economic growth of the labour market. (Keskin &Aksor, 2019)

Unemployment: Unemployment rate value is used in regions with regard to 15-year-olds and above. In the study, high scores were given to areas with low unemployment.

Employment by Education Level (Higher education / Total): The number of people with higher education degrees has been used. High scores were given to regions with high number of people. Qualified workforce stimulates productivity, innovation, and therefore a region's economic growth. (Buch et al., 2017; Wang and Han, 2013; Yılmaz &Ünver, 2019)

Economics

GDP Per Capita: GDP Per capita data was used as the most important indicator of economic development.

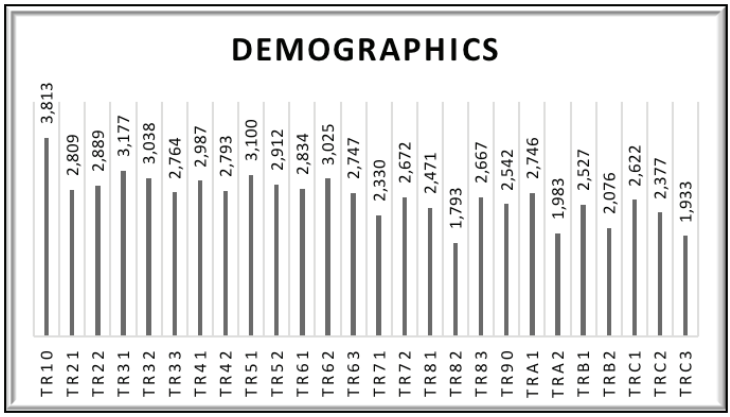
Net exports (export minus import): The positive contribution of net exports while pushing up GDP growth rate, its negative contribution has an effect lowering the growth rate. In the study, high scores were given to regions with high net export value. (Awokuse 2007; Ramos 2001, Çetintaş & Barişik 2009; Hye, 2012)

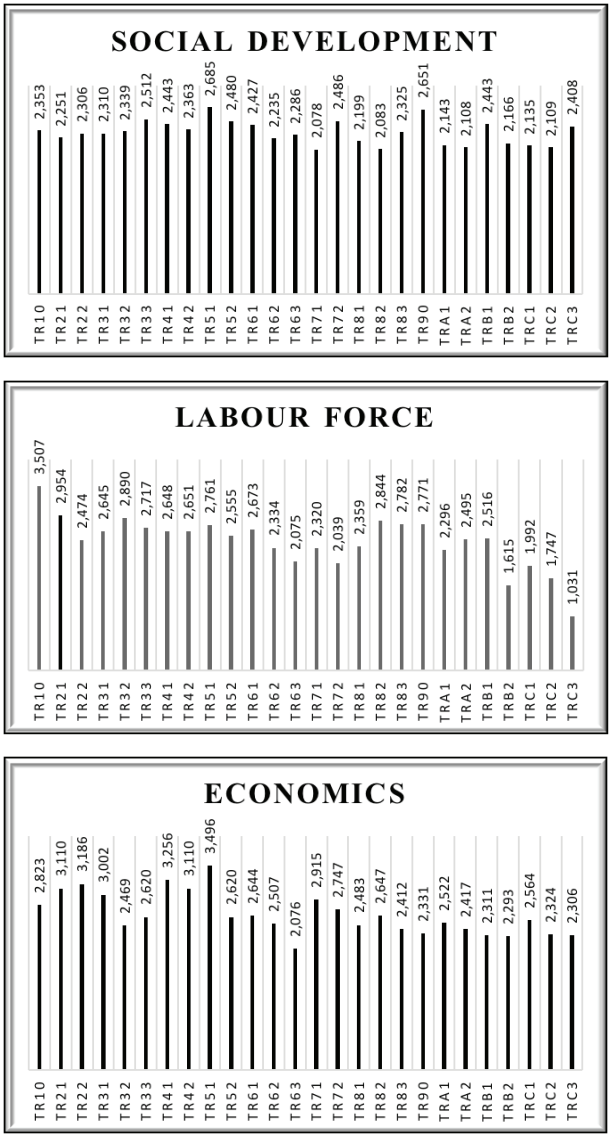
Consumer Price Index (CPI) (%): Another indicator of economic development is the rate of inflation. At the regional level, the region with the lowest CPI change was given the highest value.

Empirical Results

In the study carried out on NUTS 2 regions, the result of the analysis using demographic variables is shown in Figure 5.

Figure 5: Demographics, Social Development, Labour Force, Economics (2018)

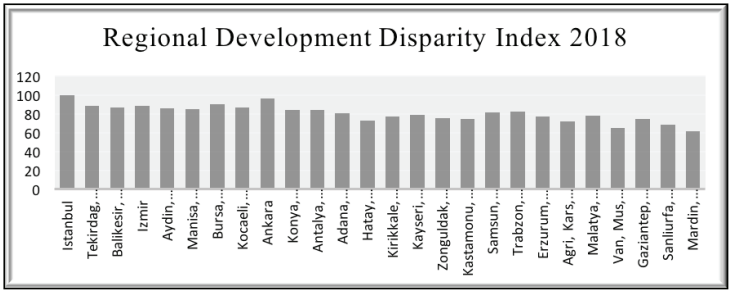



SOCIAL DEVELOPMENT
TR10 2,353
TR21 2,251
TR22 2,306
TR31 2,310
TR32 2,339
TR33 2,512
TR41 2,443
TR42 2,363
TR51 2,685
TR52 2,480
TR61 2,427
TR62 2,235
TR63 2,286
TR71 2,078
TR72 2,486
TR81 2,199
TR82 2,083
TR83 2,325
TR90 2,651
TRA1 2,143
TRA2 2,108
TRB1 2,443
TRB2 2,166
TRC1 2,135
TRC2 2,109
TRC3 2,408
LABOUR FORCE
TR10 3,507
TR21 2,954
TR22 2,474
TR31 2,645
TR32 2,890
TR33 2,717
TR41 2,648
TR42 2,651
TR51 2,761
TR52 2,555
TR61 2,673
TR62 2,334
TR63 2,075
TR71 2,320
TR72 2,039
TR81 2,359
TR82 2,844
TR83 2,782
TR90 2,771
TRA1 2,296
TRA2 2,495
TRB1 2,516
TRB2 1,615
TRC1 1,992
TRC2 1,747
TRC3 1,031
ECONOMICS
TR10 2,823
TR21 3,110
TR22 3,186
TR31 3,002
TR32 2,469
TR33 2,620
TR41 3,256
TR42 3,110
TR51 3,496
TR52 2,620
TR61 2,644
TR62 2,507
TR63 2,076
TR71 2,915
TR72 2,747
TR81 2,483
TR82 2,647
TR83 2,412
TR90 2,331
TRA1 2,522
TRA2 2,417
TRB1 2,311
TRB2 2,293
TRC1 2,564
TRC2 2,324
TRC3 2,306

According to the results of the analysis with the normalization method, the region with the highest score according to demographic variables is TR10 (Istanbul) and the lowest region is TR82 (Kastamonu, Çankırı, Sinop) region. The region with the highest score according to the Social Development dimension is TR51 (Ankara) and the region with the lowest score is TR71 (Kırıkkale, Aksaray, Niğde, Nevşehir, Kırşehir). The province with the highest score according to labor force aspect of the index is TR10 (Istanbul) region, while the lowest value is TRC3 (Mardin, Batman, Şırnak, Siirt) region. According to the economics dimension, the region with the highest score is TR51 (Ankara) and the lowest score is the TR63 (Hatay, Kahramanmaraş, Osmaniye) region.

When the index consisting of four dimensions is aggregated, the most developed region is TR10 (Istanbul), the most underdeveloped region is TRC3 (Mardin, Batman, Şırnak, Siirt). According to this index, regional development differences are evident between the east-west regions.

Figure 6: Regional Development Disparities in TURKEY



Discussion:

Regional disparities are seen with different extents around the world. The degree of inequality in aspects such as demographic, socio-economic development and labour force varies from country to country, according to different levels (NUTS I-NUTS II-NUTS-III) within the country. The study contains 16 quantitative variables consisting of 4 sub-indexes that can be used at regional levels. The index is formulated by taking into account the best practice recommendations by scanning the literature. All the variables used generally consist of data that can be accessed in all countries. These reasons are an appropriate index for comparisons.

This can be used as an indicator in the determination of policies to be implemented to monitor changes in the level of development in turkey and to reduce regional imbalances in future analyses.

According to the results of the analysis conducted with Turkey data; differences between the east-west regions of the country have been revealed. Although many projects, incentives, etc. to develop the backward regions with Priority Provinces in Development (PPDs) -applied to reduce these differences- have been developed, there is no significant change. In this sense, the effectiveness of Turkey's policies on regional development is controversial.

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THE IMPACT OF DEVELOPMENT AGENCIES ON REGIONAL ECONOMY IN TURKEY

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Process of Development Agencies in the World and Turkey

While development agencies first appeared in the world as an economic development agency (EDA), local autonomous structures formed with globalization and governance trends led the economic development agency to evolve towards the development agency (Işık, et al., 2010: 10). The first example of the development agencies in the world, which was established in 1933 in the Tennesse Valley of the United States (USA) near Mexico, and has a basin-based regional planning feature (Ultan & Saygin, 2016: 77). Development agencies were established in Western Europe after the USA in order to eliminate the difference between regions, revive regional economies and ensure sustainable development. The use of Structural Funds with the European Union's adoption of regional development agencies has led to an increase in the number, fields of activity and responsibilities of development agencies. Development agencies first operated in Austria, Belgium, France and Ireland in 1950s in Europe. The abandonment of the traditional regional approach and the adoption of the new regional development approach led the development agencies to be established in other European countries. Development agencies were established in Germany, Italy, England and Netherlands in the 1970s, Spain, Greece, Finland and Denmark in the 1980s (Türkoğlu, 2015: 186). Although the development agency first appeared in the USA, its development as an alternative institution and its transfer to other countries was through the European Union. In line with the demands of the European Union, Bulgaria, Czech Republic, Estonia, Hungary, Lithuania, Poland, Portugal, Slovakia, Sweden and Ukraine met with the development agency of in the 1990s. The experts

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sent by the European Union played an important role in the establishment of development agencies in these countries and their financing needs were met by the European Union (Oskay & Kubar, 2007: 209). As a result of the development efforts carried out with central planning to overcome the environment of chaos and uncertainty that occurred after the Second World War, the industry concentrated in certain cities and the imbalance between regions occurred during the period to be unsustainable is main reasons of development agencies to start operating in Europe after the USA and to spread among the European Union countries. In other words, instead of the traditional regional development approach where central dynamics are at the forefront, the regional development approach shaped in line with the development plans prepared by considering central and regional dynamics has gained importance (Ansell, 2000: 311).

A variety of policies and instruments for the elimination of inequalities between regions and accelerating regional development was carried out in Turkey from the 1960s to the 2000s. The task and responsibility for carrying out regional policies and instruments were assigned to the State Planning Organization (DPT), which was established in 1960. Regional policies were prominently adressed for the first time in the second five year development plan (1968-1972) which was prepared by the DPT. Regional policies continued to be included in the nine development plans in the following periods (Toy & Çalışkan, 2016: 107).

The development plans prepared by DPT intended to close the development gap between western and eastern regions of Turkey, however, implemented policies and tools did not eliminate the difference in regional development. On the contrary these policies and tools led to open the difference. The lack of autonomy of local institutions and limited role of the provincial offices of central instutions led to the loss of effectiveness of the regional policies and plans (Berber & Çelepci, 2005: 151). Other regional policies and tools as well as regional development plans are as follows: Investment incentives, priority regions for development, organized industrial zones, corporate social responsibility and rural development projects. The targets foreseen in these policies and instruments have not been achieved. As a result, Turkey gave up their traditional development policies based on the incentive system implemented since the 1960s in the process of harmonization with the European Union. Then Turkey passed to new implementation phase which prioritizes the capital, private sector and regional competition, the Eupean Union is trying to transfer to candidate countries. The main

institution of this new regional implementation phase is development agencies (Akiş, 2011: 249).

The DAs enter the agenda of Turkey was the first time in the 1990s. Internal and external factors play an important role in the development agendas. While the internal factors are listed as the failure of the development plans carried out since the 1960s to reach the foreseen targets, the difference in development between the regions cannot be eliminated; external factors are listed as the developments in the harmonization process with the European Union and the abandonment of the traditional regional policies in the worldwide and the adoption of the new regional policies (Özmen, 2008: 333-334). The first meeting with development agencies in Turkey has been with the Helsinki summit, Turkey won the European Union candidate country in 1999. After this summit, the proliferation of development agencies acceraleted in Turkey and context of the accession partnership document signed between the European Union and Turkey agreed the creation of development agencies and legal arrangements for the process of the executions started (Ultan & Saygın, 2016: 85).

Pre-Development economic programs (KÖEK) were prepared by Turkey in 2002 within the framework of legal regulations regarding the harmonization process with the European Union. The establishment of development agencies is stated that the statistical regional unit classification for the establishment of development agencies and with the development units in classification in KÖEK . Following the certification of the statistical regional unit classification identified in KÖEK by the European Union authorities, three hierarchical units (NUTS) were determined by the Council of Ministers in 2002. Due to the proximity of the average population of province in Turkey to the NUTS-3 population in the European Union, provinces are defined as NUTS-3. After defining NUTS-3, neighbouring provinces with economic, social and geographical similarities are grouped as NUTS-2 by taking into account regional development plans and population sizes (Övgün, 2007: 244). As a result of the grouping of neighbouring provinces defined as NUTS-3, 26 NUTS-2 statistical regional units were created. As a result of classification of 26 NUTS-2 statistical region units, 12 NUTS-1 statistical region units were classified. It is decided that the centers of NUTS-2 statistical region units are the places where the development agencies will be established (Hasanoğlu & Aliyev, 2009: 86). Within the scope of the harmonization process with the European Union, after the adoption of the NUTS system in order to

harmonize the regional policies, the process of establishing development agencies started. In the first stage of this process, within the mutual signing of the accession partnership document between Turkey and European Union, the law on the establishment, coordination and role of development agencies was accepted by Turkish Grand National Assembly (TBMM) on 25.01.2006 and became effective on 08.02.2006 in order to benefit from European Union funds. Following the validity of the law, Çukurova and İzmir development agencies were initially established, and the remaining development agencies were completed within the period until 25 July 2009 (Engin, 2011: 73).

The responsibility of the coordination at the national level of the development agencies whose establishment phase has been completed has been given to the DPT, which also prepared the development plans (Cankorkmaz, 2011: 125). However, the fact that DPT, which plans at the national level and has a strong and separate position within the bureaucracy, handles the planning activities at the central level rather than at the local level, showed that a new institution is needed for the coordination of development agencies. In line with this need, the government has established the Ministry of Development, which is based on the new regional development approach. In addition to coordination of development agencies, the ministry of development has served as a bridge in the development agencies' relations with central government (Övgün, 2011: 264-265).

Definitions and Goals of Development Agencies

Although there are various definitions in the literature related to development agencies, there is no consensus on a common definition yet. The reasons for the establishment and the services provided by development agencies differ from country to country, making it difficult to make a generally accepted definition (Tamer, 2008: 10). Therefore, there are different definitions in the literature regarding development agencies. Some of these definitions are given below.

According to the European Development Agency Association (EURADA, 1999), development agencies are institutions that identify sectoral and general development problems and support projects that develop opportunities and solutions to overcome these problems. According to the DPT (2000), development agencies are public and private sector-financed institutions which contribute to economic development by developing and revitalizing the entrepreneurial potential

of a region with an administrative structure independent of central governments. Koçberber (2006: 37) defined development agencies as structures established under legal reasons for realizing the economic development of the region by strengthening cooperation between local government units, NGOs, private and public companies within a certain geography region. According to the Ministry of Development (2015: 10), regional development agencies are development units that operate as non-implementing promoters, coordinators and catalysts with high technical capacity, bringing together private and non-governmental organizations with unique technical and budget within the ministry, which has a rapid non-profit decision making mechanism.

In line with these definitions, it can be said that development agencies have basic features such as covering a geographical region, targeting regional economic development and public financing (Eren & Cidecigiller, 2011: 393). Development agencies established under the control of the central goverment pushed them as public institutions acting in an administrative structure independent of central goverment, in order to get rid of the cumbersome of central development, to use the resources of the regions effectively, to adapt to changing economic conditions (Eryılmaz & Tuncer, 2013: 170). The main existence reason of these institutions, which have gained autonomy from central governments, are summarized as the implementation of regional policies, supporting local and regional entrepreneurship, helping the development and delivery of infrastructure services, and offering financial facilities to the private sector for the production of new products and services to meet regional demands (Apan, 2004: 48).

The goals of regional development agencies are generally listed as providing support to the planning activities of local governments, providing resources for activities and projects for improving the socio-economic level of the region, following and evaluating the projects for the development of the region, strengthening cooperation between different community segments residing in the region, contributing to the renewal of the image of the region with the resources provided by the European Union and other international funds, and activating local potential, reducing the level of in-region and intra-regional socio-economic development, supporting the private sector's R&D activities in order to produce innovative products (Tamer, 2008: 46-52; Oskay & Kubar, 2007: 206; Künye, 2014: 48; Eren & Cidecigiller, 2011: 397). In addition to these goals, development agencies also have goals such as creating innovation in the region, increasing productivity

and competition in the business life, encouraging and supporting the private sector to invest, raising a world-class workforce by preparing and presenting projects for the development of employees talents and improving the environment and health (Cankorkmaz, 2011: 120; Hasanoğlu & Aliyev, 2009: 85). To ensure the preparation of reports for photographing the socio-economic level of the region through collaborations with educational institutions and to offer policies for developing the weakness of the region identifies in line with these reports are the other aims of development agencies (Arslan, 2005 : 287).

Adequate population, entrepreneurial culture and entrepreneurship infrastructure, qualified manpower, consensus on regional development strategies, sectors suitable for development, competitive environment in business life are required to achieve the above mentioned objectives for development agencies (Berber & Çelepçi, 2005: 147; Turan, 2005: 193; Kayasü & Yaşar, 2004: 349). There are factors that affect the success of the development agencies as well as the factors that are necessary for its success. The first one is financial resources that determine the effectiveness of development agencies in planning, management and execution processes of regional resources. The second is the presence of qualitatively and quantitatively rich personnel, which are thought to play an active role in the development of the region. The third factor is the vision that highlights the strategic planning process. The fourth factor is legitimacy and authority, which states that development agencies should be supported by central governments from ceiling to floor and on a regional scale from floor to ceiling. The fifth factor is the roles of the development agency that expresses the researches on the sectors that make up the driving force of the regional economy. The sixth factor is the link between development agencies and private sector representatives operating in the region. The last is that development agencies adopt the common goals of the region. Development agencies that adopt the common goals of the region will increase their effectiveness by receiving the support of residents in the region (Maude & Beer, 2000: 14-15).

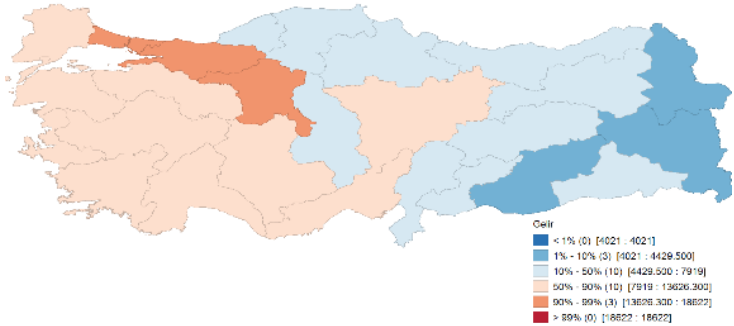
Impacts on The Regional Economy of Development Agencies in Turkey

To compare the indicator which reflects the socio-economic level of NUTS-2 regions in 2008 when developement agencies established and 2018 for determining the impacts of development agencies on region economics in Turkey. Per capita

income, Gini coefficients reflecting income inequality, unemployment rates, per capita export values, per capita enterprises numbers and net migration rate were preferred as the indicator that reflect the economic level of the NUTS-2 regions, frequently used in the literature (Dinler, 2014: 249-281; Gündüz, 2006: 105-113; Ersungur, 2016: 200-208). Prefferred of these indicators appear on the map of Turkey in 2008 and 2018 benefited from the Geo-Da programs.

An important criterion used in determining the development differences between the regions is the comparison of the per capita income levels of the regions. The success of development agencies in eliminating per capita income level gap between regions will be clarified to compare and evaluate the maps which reflects the per capita income levels of NUTS-2 regions between 2008 and 2018 years. Per capita income levels between NUTS II regions of Turkey are presented in Figure 1.

Figure 1. Per Capita Incomes of NUTS II Regions in 2008



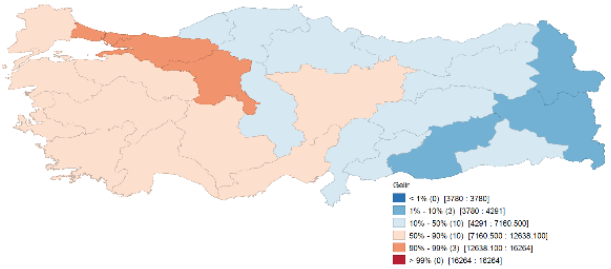
Source: TUİK

According to Figure 1, there were significant diffences between the western and eastern Turkey. According to Figure 1, the most developed NUTS-2 regions are the metropalities such as İstanbul and Ankara, while the least developed NUTS-2 regions are East and South Easth Anatolia regions in terms of per capita incomes of NUTS-2 regions in 2008. Whether this difference in per capita income levels

of the regions has been eliminated from 2008 to 2018 will be determined with the help of Figure 2.

The difference in per capita income level between the NUTS-2 regions of 2018 mapped in Figure 2 is in line with Figure 1. In addition, Figure 2 shows that per capita income differences of NUTS-2 regions did not change during the period from 2008 to 2018. In line with these findings, it can be stated that development agencies have failed to overcome the differences in per capita income between NUTS-2 regions.

Figure 2. Per Capita Incomes of NUTS II Regions in 2018

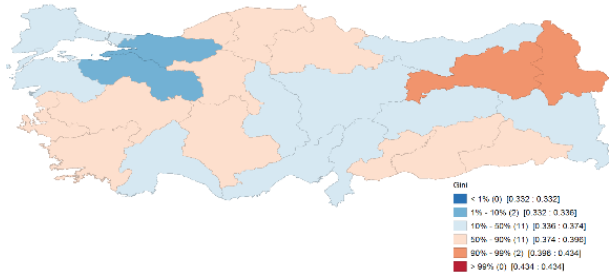


Source: TUİK

Another criterion used in determining the difference in socio-economic development between the regions is the comparison of the Gini coefficients which reflects the income inequality of the regions.

What extent income inequalities between NUTS-2 regions vary with the policies of development agencies will be determined by comparing Figure 3 and Figure 4. The income inequality of NUTS-2 regions in 2008 is presented in Figure 3.

Figure 3. Income Inequality of NUTS II in 2008

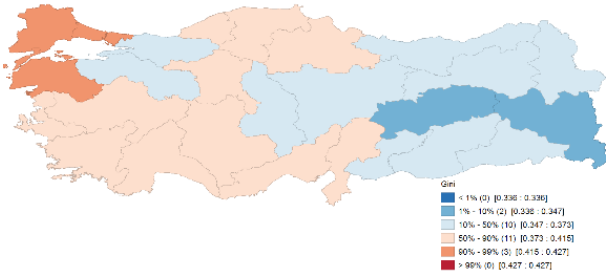


Source: TUİK

According to Figure 3, the most income inequality regions in 2008 is TRA1 (Erzurum, Bayburt and Erzincan) and TRA2 (Kars, Ağrı, Ardahan, Iğdır) where located in the East of Turkey, while the least income inequality regions in 2008 is TR41 (Bursa, Bilecik, Eskisehir) and TR42 (Kocaeli, Bolu, Düzce, Sakarya, Yalova) where located in the North-West of Turkey. Unlike the per capita income, there is no difference significantly between the western and eastern Turkey in income inequality. As a result of the development agency policies, the change of income inequality between the NUTS-2 regions will be determined with the help of the map in Figure-4.

According to Figure 4, income inequality of 2018 is high in TR21 (Tekirdağ, Edirne, Kırklareli) and TR22 (Balıkesir, Çanakkale) regions where located the North Western Turkey, while the income inequality of 2018 is low in TRB1 (Malatya, Elazığ, Bingöl and Tunceli) and TRB2 (Van, Bitlis, Hakkari, Muş) regions where located in Eastern Turkey. There is no income inequality between the Eastern and Western Turkey in 2018 which parallel to 2008. Income inequality level has decreased to the range of 0.374-0.396 range from 0.415-0.427 in South Eastern regions of Turkey. The income inequality of TRA1 and TRA2 regions decreased from 0.396-0.434 to 0.347-0.373. However, there were two regions between 0.415-0.427 range in 2008 across the Turkey, while there were two regions in the same range in 2018. As a result of development agencies policies, regional improvements were observed in income inequality during the 2008-2018 period, while there were no improvements across the Turkey.

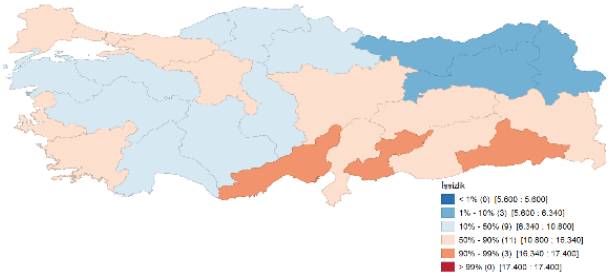
Figure 4. Income Inequality of NUTS II in 2018



Source: TUİK

Unemployment rates are also an indicator used to determine the development difference between regions. There is an inverse relationship between unemployment rates and development levels of regions. As a result of development agencies policies, the change in the unemployment difference between NUTS-2 regions during the 2008-2018 period is presented in Figure 5 and Figure 6.

Figure 5. Unemployment Rate of NUTS II Regions in 2008



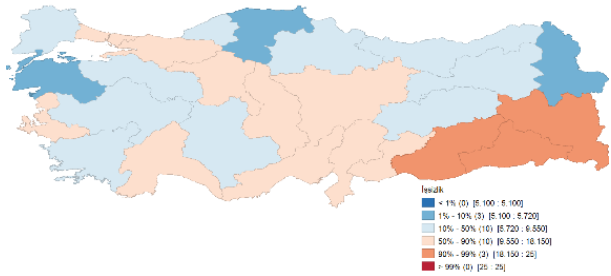
Source: TUİK

According to Figure 5, unemployment rate of 2008 is high in TR62 (Adana, Mersin), TRC1 (Gaziantep, Adıyaman, Kilis) and TRC3 (Mardin, Batman, Siirt,

Şırnak) regions where located in Southern Turkey, while unemployment rate of 2008 is low in North Eastern Turkey regions. There was no significant distinction between the Eastern and Westen Turkey in terms of unemployment rate of 2008. What extent development agency policies have changed unemployment rates of NUTS-2 regions during the 2008-2018 period is presented in Figure 6.

According to Figure 6, the unemployment rate of 2018 is the highest in South Eastern regions of Turkey, while the unemployment rate of 2018 is the lowest in TRA2 (Kars, Ağrı, Ardahan, Iğdır), TR22A (Balıkesir, Çanakkale) and TR82 (Kastamonu, Çankırı, Sinop) regions. In addition, it is observed a rise in the unemployment rate across the Turkey during 2008-2018 period. It is said that development agencies policies did not reduce the difference of unemployment rates between regions, unlike it leads to increase the gap of unemployment rate between the Western and Eastern regions of Turkey.

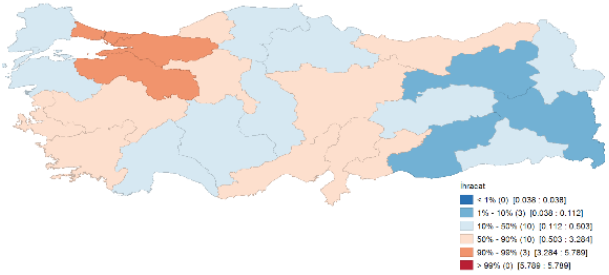
Figure 6. Unemployment Rate of NUTS II Regions in 2018



Source: TUİK

Another indicator used to determine the development difference between regions is the per capita export values. The per capita export, which is obtained by dividing the export level of the region into the total population of the region, is expected to be high in developed regions and to be low in underdeveloped regions. The extent to which the development agency policies eliminate the difference between per capita export of the regions will be determined by comparing the Figure 7 and Figure 8. The per capita export of NUTS- 2 regions in 2008 is given in Figure 7.

Figure 7. Per Capita Export of NUTS II Regions in 2008

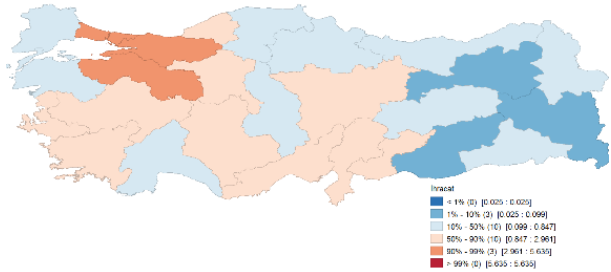


Source: TUİK

According to Figure 7, the per capita export of 2008 is highest in TR41(Bursa, Bilecik, Eskişehir) and TR42 (Kocaeli, Bolu, Düzce, Sakarya, Yalova) regions, while the per capita export of 2008 is lowest in TRA1 (Erzurum, Bayburt and Erzincan), TRB2 (Van, Bitlis, Hakkari, Muş) and TRC2 (Diyarbakır, Şanlıurfa) regions where located the Eastern Turkey. There are significant differences of per capita export between the Eastern and Western NUTS-2 regions of Turkey. Per capita export of the Eastern regions of Turkey is under the average of Turkey, while per capita export of the Western regions of Turkey is generally above the average of Turkey. As a result of the development agency policies, the extent to which the difference between the export values and per capita of the regions has changed from 2008 to 2018 will be determined by comparing and evaluating Figure 8 and Figure 7.

Figure 8 shows that there is no significant change in per capita export values of NUTS-2 regions during the 2008 to 2018 period. NUTS-2 regions, where the per capita exports are the highest and lowest, do not differ between 2008 and 2018. Based on these findings, it is concluded that regional development agencies policies are not effective in closing the gap between per capita exports of NUTS-2 regions in Turkey.

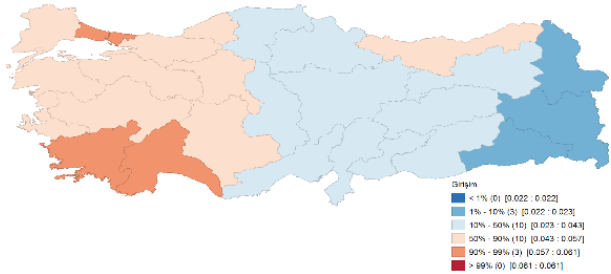
Figure 8. Per Capita Export of NUTS II Regions in 2018



Source: TUİK

Another economic indicator used in determining the difference between regions is the number of enterprises per person. There is a positive relationship between the number of per capita enterprises and the degree of development of the regions. Whether the difference between the per capita enterprises of regions is closed as a result of the development agency policies will be revealed by comparing the maps presented in Figure 9 and Figure 10.

Figure 9. Per Capita Entrepreneurship of NUTS II Regions in 2008

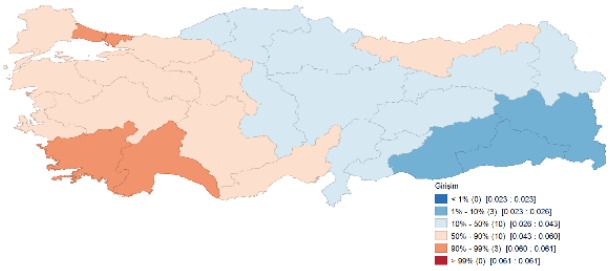


Source: TUİK

Significant differences of per capita entrepreneurship between the Eastern and Western regions of Turkey in 2008 is observed in Figure 9. According to Figure 9, the per capita export of Western regions in Turkey is higher than the average of Turkey, unlike the per capita export of Eastern regions in Turkey is lower than the average of Turkey. The extent to which development agency policies helped to bridge the gap between the per capita export in the 2008-2018 period will be revealed by comparing Figure 9 with Figure 10.

Figure 10 shows parallel to Figure 9. According to Figure 10, there are significant differences between the per capita entrepreneurship of Eastern and Western regions in Turkey. The main difference of Figure 10 from Figure 9 is the NUTS-2 regions where the per capita entrepreneurship is the lowest. The lowest per capita entrepneurship is observed in the Eastern regions of Turkey in Figure 9, while the lowest per capita entrepneurship is observed in the South Eastern regions of Turkey in Figure 10. In the context of these findings, it is concluded that development agency practices are not successful in eliminating the difference between the per capita enterprises number.

Figure 10. Per Capita Entrepreneurship of NUTS II Regions in 2018

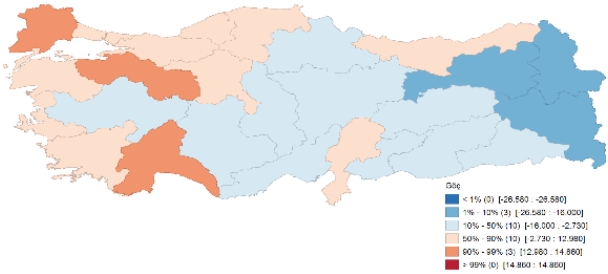


Source: TUİK

Demographic indicators are preferred as well as economic indicators to determine the difference between the regions. Net migration rate, one of the demographic indicators, explains the migration movement between regions due to socio-economic factors. The fact that the region's net migration rate is positive indicates that the region receives migration, while the negative value indicates that the region

gives migration. While the net migration rates of developed regions take positive value due to being economically attractive center, net migration rates of underdeveloped regions take negative value due to economic factors such as insufficient number of entrepreneurships and high unemployment rates. The extent to which development agencies slowed down the migration movement from underdeveloped regions to developed regions in Turkey during the 2008-2018 period will be the result of the comparison and evaluation of Figure 11 and Figure 12.

Figure 11. Net Migration Rate of NUTS II Regions in 2008



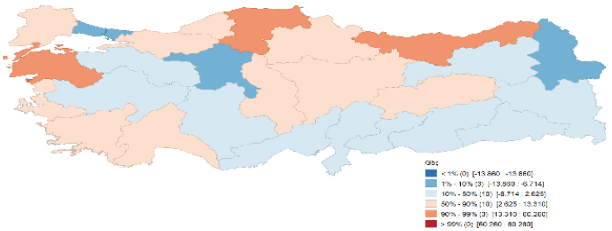
Source: TUİK

According to Figure 11, the net migration rate of Eastern NUTS-2 regions of Turkey is above the average of Turkey, while the net migration rate of Western NUTS-2 regions of Turkey is under the average of Turkey. Figure 11, reveals the distinction between the net migrate of Eastern and Western in Turkey. In line with these findings, it is said that the populations of Western regions in Turkey rises and the populations of Eastern regions in Turkey fall due to migration movement. According to Figure 11, the net migration rate of 2008 is highest in TR21 (Tekirdağ, Edirne, Kırklareli), TR41 (Bursa, Bilecik, Eskişehir) and TR61 (Antalya, Burdur, Isparta) regions, while the net migration rate of 2008 is the lowest in the Eastern regions of Turkey. The extent to which development agencies slow down the migration movement between regions will be the result of comparing and evaluating Figure 11 and Figure 12.

According to Figure 12, TR22 (Balıkesir, Çanakkale), TR82 (Kastamonu, Çankırı, Sinop) and TR90 (Trabzon, Ordu, Rize, Giresun, Artvin, Gumushane) have the

highest net migrate rate regions, while TR10 (Istanbul), TR51 (Ankara) and TRA2 (Ağrı, Kars, Iğdır, Ardahan) have the lowest net migrate regions in Turkey. Migration of two metropalitian and slowing the net migration rate of Eastern regions in Turkey shows the success of the development agencies that slowing the migration movements less developed regions to developed regions during the 2008-2018 period.

Figure 12. Net Migration Rate of NUTS II Regions in 2018



Source: TUİK

Conclusion

Whether the development agencies have been the effective to the elimination of disparities between regions in Turkey is aimed in this research. In line with this aim, the socio-economic indicators of the NUTS-2 regions in 2008 and the socio-economic indicators of the NUTS-2 regions in 2018 are compared and evaluated. Per capita income, income inequality, per capita income inequality, unemployment rates, per capita export, per capita enterprise and net migration rare is the socio-economic indicators which are also widely used in the literature.

It is observed that the development agencies policies are not succesfull to eliminate the difference between per capita income,unemployment rate, per capita export and per capita entrepneurship of NUTS-2 regions in Turkey during the period 2008-2018. Similar to 2008, per capita income of Western regions in Turkey is above the averege of Turkey, while per capita income of Eastern regions in Turkey is under the average of Turkey. The difference of unemployment rate between the Eastern and Western regions in Turkey is not closed unlike the difference gap is

opened as well as per capita income of regions. As a result of development agencies policies, the per capita export of the Eastern regions of Turkey can not catch the per capita export of the Western regions of Turkey. Unlike the difference of per capita export of Western and Eastern regions of Turkey is increased. The difference of per capita entrepneurship between the Western and Eastern regions in Turkey is not eliminated during the 2008-2018 period because development agencies established in less developed regions cannot attract foreign capital and cannot cooperate between the private sector and the public.

Another indicator of the significant differences between the west and east of Turkey is a net migration rate. Net migration of metropolitan and slowing down the net migration rate of the Eastern regions of Turkey in 2018 shows the development agencies success of eliminating the difference between NUTS-2 regions. Unlike other indicators, there is no significant difference between the income inequality of Western and Eastern regions of Turkey. The improvement of income inequality across the Eastern regions of Turkey is observed as a result of development agencies policies.

Based on the findings, it is concluded that development agencies are not able to eliminate the difference in developments between regions. The main reasons why development agencies are not able to achieve their main establishment goals are listed as the lack of sufficient autonomy for regional development agencies due to terrorism, confused with other institutions in the region, adoption by the local community, inadequate publicity of the region in the internation arena and attracting foreign investment to the region.

As a result of the research, it is recommended to policy makers to enact and enforce regulations for regional actors and private sector to play a more effective role. In addition, the restructuring of development agencies is offered as a result of realizing the curent situation of development agencies is insufficient to overcome the regional disparities. It is suggested to researchers who intend to examine this issue in the future to investigate the impact of development agencies on innovation investments in the regions.

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SECTION IV

INTERNATIONAL ECONOMICS

26

MEAN REVERSION IN THE WORLD GVC INCOME FOR ALL MANUFACTURES: EVIDENCE FROM LM AND RALS-LM UNIT ROOT TESTS WITH BREAKS

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Introduction

The "global value chains" (GVCs) driven by transnational corporations (TNCs) have changed the global organization of production since the mid-1990s. The proliferation of global value chains changed not only production geography but also its complexity (Lopez-Gonzalez et al., 2015). In this context, Baldwin and Gonzalez (2013) explain "technological asymmetry" within GVCs, claiming that global production is divided. According to the authors, global production is fragmented into central economies in the USA, Europe andJapan, and "factory" economies in Asia and Eastern Europe. Particularly East Asia has had an important role in GVCs of consumed products in Western markets. GVCs, which are common in more advanced industries such as electronics, automobiles, and machines as well as low-tech production such as textiles and clothing, have been the focus of development studies.

GVC is a trade model rising with globalization. In the nineteenth century, with the development of international transportation, production opportunities using imported inputs became more likely. Baldwin (2016: 4) called the process "globalization' first unbundling". The acceleration of globalization and the improvements of information and communication technologies in the 1990s made the

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international division of commodity production more possible, which is called "globalization's second unbundling" (Baldwin, 2016: 5). In this production model, countries specialize in specific stages in the production process instead of specializing in the production of the entire final product. In countries that are part of the GVC, labor is divided vertically according to the comparative advantages it has at different stages, therefore what is traded between countries is tasks (Grossman and Rossi-Hansberg, 2008: 1978).

The value chain refers to the various activities, processes and actors that are linked together to produce a particular commodity or service, from initial inputs of raw materials to manufacturing, transportation, distribution, marketing, retail, consumption and final use (Pietrobelli ve Saliola, 2008: 950). Global value chains are the new way for developing countries to take part in international markets (World Bank, 2003: 45). Approximately 58.4% of the added value created within GVCs is only 21 high-income countries in 1998. These countries are the USA, Canada, Japan, South Korea, Taiwan, Australia, and 15 European Union member countries that were pre-2004 members. The share of value-added in capital in these countries is quite high (Timmer et al., 2014: 20). Also, the collapse of international trade during the great recession of 2008-2009 brought about the role of international transmission of business cycle shocks in global value chains. World trade has fallen more than 30% in the first quarter of 2008 compared to the previous year (Baldwin, 2009). From 2011 through 2013, world trade volume realized 3% annual growth. This is less than half of the growth rate of 1985-2007, which is 7%. The reasons for this slowdown have been aggravated by the debate that Europe may have structural changes in the weak demand conditions and trade-income relationship. Among the other reasons for this slowdown are the reorganization of the Chinese economy production towards the domestic market, the slowing trade liberalization process, increasing non-tariff barriers, stagnating transportation costs, and the increasing relative demand for non-commercial goods. (Gaulier et al., 2020: 2-3).

The slowdown in trade volume is felt in all regions in 2012, with the biggest slowdown becoming more evident in developed countries, particularly in the Euro Area. The slowdown in investment and private consumption led to a total decrease in demand. Boz et al. (2015) suggest that the drop in demand may constitute about half of the slowing of trade in this period. If the slowdown in trading is a result of cycle fluctuations, there may be growth in trade as well as

growth in world production. On the other hand, if there are structural problems in production within global value chains (GVCs), the slowdown in trade may be permanent. In the discussions on the structural nature of the slowing of world trade in the literature, particularly in the late 20th century, the role of GVCs was found to be significantly sensitive to trade. Gangnes et al. (2014) didn't find evidence that trade in GVCs has a higher income elasticity than traditional trade, as in the case of the Chinese case. Athukorala and Kohpaiboon (2011), Park et al. (2011) and Pula and Peltonen (2011) argue that East Asian economies deepening their activities in GVCs are becoming more vulnerable to business cycles movements in Europe and the USA.

The main aim of this study is to analyze whether the shocks to the GVC incomes of the manufacturing industry during the 1995-2011 period for the five major regions of the world (East Asia, BRIIAT, EU27 and NAFTA)[3]. Regarding whether GVC incomes are a trend-stationary process or a differentiation process, rejection of unit root null hypothesis indicates that the series is stationary. If shocks against GVC incomes are temporary, it will return to a natural rate in the long run. In this case, the shocks of GVC incomes can be expressed as the reason for the cyclical fluctuations rather than structural problems. On the other hand, if GVC incomes follow a stochastic trend, real shocks will have permanent effects on the economy and the long-term path of GVC incomes may be uncertain. According to our findings, shocks to GVC incomes have a transitory effect on EU27 and East Asia countries.

The study is organized as follows: In Section II, we document empirical studies on the growing role of GVCs in the literature. In Section III, the empirical methodology applied in the study is explained. In Section IV we present the data used and results of our empirical analysis. Finally, Section V provides concluding remarks.

Literature

Business cycles and structural changes came to the fore as the reasons behind the trade slowdown as of Great Recession; it is tried to be understood which is the more substantial. In their study, which covers the 2012-2014 time period, Boz

3 EU27 are all European countries that joined the European Union by 2011. NAFTA countries consist of Mexico, Canada and the USA. The East Asian region includes Japan, South Korea, and Taiwan. BRIIAT acronym for Brazil, Russia, India, Indonesia, Australia and Turkey represents.

et al. (2015) stated that approximately half of the trade slowdown was caused by cyclical factors. On the other hand, although the GVCs and business cycles act together in time, the direction of causality cannot be determined precisely due to lack of data.

Changes in income elasticity over time help to explain trade slowdown. Nakajima et al. (2016) obtained evidence that the decline in potential output growth and the decrease in long-term income elasticity are accounted for about 70% of the global trade slowdown. The reasons for these two structural factors are the change in the global demand structure, the increase in in-house production in China, the decrease in GVC expansion, and the stagnation in trade liberalization. According to the authors, if these changes are irreversible, the long-term income elasticity of trade cannot reach the level of the pre-crisis period. Marcato et al. (2018) found that the income elasticity of trade in Brazil decreased along with the 2000s; analyzed this decline in the context of global vertical specialization (GVS). Accordingly, GVS is a factor that increases the income elasticity of trade. To gain resistance against shocks, the income elasticity of trade should be increased and for this, GVS in the economy should be deepened. Constantinescu et al.'s (2020) findings are that the increasing production fragmentation during the 1990s increased the income elasticity of trade. However, the income elasticity of trade in the 2000s gave an inverted-u appearance. The slowdown in GVC participation explains this trend more precisely than the declining share of investments in GDP and changes in trade policies.

Some studies state that GVCs make countries more vulnerable to external shocks. The trade of complicated products organized by GVCs may be more sensitive to global downturns than the trade of simple goods (Ferrantino and Taglioni, 2014). In their study focused on firms in Sweden, Quoreshi and Stone (2019) found that firms that were more open to trade during the crisis experienced more severe declines in export sales and added value growth. Concerning the growth of export sales, the impact of the crisis on firms that are more dependent on export sales is higher than the industries that are more dependent on imported goods. In other words, industries that are closer to final demand are experiencing a bigger decline in export sales and added value growth in the face of external shocks. Vandenbussche et al. (2019) show that in case the UK implements protective foreign trade policies after Brexit, the value-added losses and decrease in employment it will experience may be up to three times more than the trade partners in the

EU through GVCs. Gagnes et al. (2020) examined whether the trade slowdown after the Great Recession caused a decline for GVCs by focusing on the share of parts and components in the manufacturing industry in terms of trade volume. According to the findings, the volume of parts and components trade has an upward trend, and global business cycles have no significant effect on this positive trend. Also, the positive trend of parts and components does not result from the sectoral composition effect. Because the trade shares of electronics, transport equipment, machinery and electrical machinery, which are the four main branches of parts and components, remain relatively stable over time.

At this time when we are writing this paper, the COVID 19 outbreak is the main agenda item in the world. It seems that the pandemic creates a shock effect for international trade as well as for all economic activities. Although there is insufficient data to analyze the impact of the pandemic on international trade, recent studies provide clues as to how and to what extent the impacts will be. The countries decided to take quarantine measures upon the realization of the rapid spread of COVID 19 in the world. As a result, total demand and total supply declined. According to Baldwin (2020: 59-60), this process will cause supply chain contagion. Because China, South Korea, Italy, Japan, the USA, and Germany, where the cases are increasing rapidly, are also an important part of world production, supply and demand, and these countries are important GVC centers. These countries supply an important portion of industrial inputs to each other and third countries. If these countries reduce their exports, the supply shocks will occur even in countries less affected by the pandemic. Supply shocks will deepen when countries find imported industry inputs more difficult or more expensive.

The four basic mechanisms that play the most important role in the supply and demand shocks in the context of GVCs are as follows: First, the cancellation of passenger transport has adversely affected air transport. The need for urgent shipping of some important goods caused firms to face cost pressure by increasing the prices of air transportation and extending the delivery time. Second, there are some restrictions on the movement of containers in ports, especially in China. These constraints were reflected in container prices. Third, due to protective measures, the amount of labor reduced to unload ships. Additional health and safety measures for labor affected supply chains both in terms of time and cost (OECD, 2020: 3). Fourth, while consumers postpone delay and wait for

delays, firms postpone their investments with the pressure of the uncertain environment and recession (Baldwin, 2020: 61).

All these negative conditions started the discussion of the re-nationalization of GVCs (OECD, 2020: 9). Re-nationalization might enable firms to rely on local intermediate use from foreign intermediate goods, thus protecting them from the risks of global shocks. However, Bodadio et al. (2020) state that caution should be taken in this regard. First of all, the pandemic causes the supply of local sectors to be reduced as it requires quarantine measures to be taken within the country. Re-nationalization can have positive results in countries where loose measures have been taken compared to trade partners who have taken strict measures for the pandemic. In countries that have taken strict measures, the labor supply will decline further, which means that the supply of local intermediate goods inputs will drop more than foreign ones. Therefore, GDP decline might be greater in countries where the measures are strictly implemented.

Data and Methodology

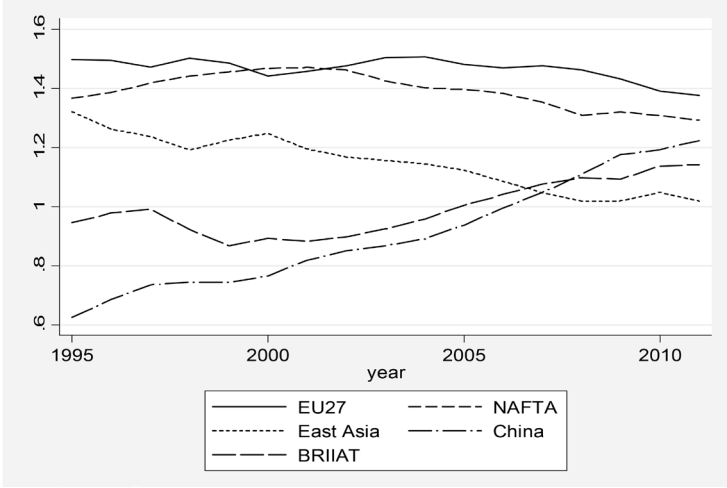
Data

The data used in the analysis are annually GVC incomes[4] of the manufacturing industry from World Input-Output Database (WIOD) during the 1995-2011 period for the five major regions of the world: East Asia, BRIIAT, EU27 and NAFTA.During this period, the NAFTA agreement entered into force in 1994, China joined the WTO in 2001 and joined ten new member states to the EU in 2004. All seriesare expressed in natural logarithms. Figure 1 presents the regional shares in world GVC income for all manufactures (%)[5]. As seen in the figüre that all of the regions report a decline in GVC incomes due to the financial crisis in 2008-2009,except for China and BRIIAT. Inotherregions in the world, this decrease is more pronounced. Seemingly, this effect of the global crisis has caused more permanent effectsin most of the regions.

4 GVC income approach developed by Timmer et al. (2013) is based on factor incomes along the all GVC process, purposing to calculate the value-added including both domestic and foreign final demand and therefore competitiveness of countries, particularly the ones with large domestic markets.

5 "Manufactures" concept which was introduced by Timmer (2014) descibes global value chains of final manufacturing products and "*…do not only contain activities in the manufacturing sector, but also in other sectors such as agriculture, utilites, and business services that provide input at any stage of the production process of manufactures.*" (Timmer, 2014, 101).

Figure 1. *Regional shares in world GVC income for all manufactures (%)*



Source: *WIOD database (http://www.wiod.org/gvc)*

Table 1 shows descriptive statistics, namely means, standard errors, minimums, maximums and Jarque-Bera tests for all of the GVC income series, respectively. Accordingly, the highest mean GVC income and the highest maximum GVC income belong toEU-27 and NAFTA, while the lowest mean and minimum GVC income was noted for China.

Table 1. Descriptive statistics

Series	Mean	Standard Error	Minimum	Maximum	Jarque-Bera
EU-27	1.47	0.04	1.38	1.51	4.19
NAFTA	1.39	0.06	1.29	1.47	1.15
East Asia	1.15	0.09	1.02	1.32	0.93
China	0.91	0.19	0.62	1.22	1.23
BRIIAT	0.99	0.09	0.87	1.14	1.37

Source: *Authors' calculation*

Methodology

In this part of the study, we used the LM (Lagrange Multiplier) based unit root test procedure based on a two-step procedure of Schmidt and Phillips (1990). In addition, we used the RALS-LM (Residual Augmented Least Squares Lagrange Multiplier) unit root test, which is the unit root test that takes into account the non-normal errors extended by Meng et al. (2013) and where structural breaks are determined endogenously. In these tests, trend-changes are expanded to include structural changes.The most important advantage of the new approach is to test independently of the nuisance parameters showing the locations of structural breaks using all possible information to increase the robustness of the test. The new test is not the subject of a false rejection problem that assumes structural breaks under the null hypothesis (Meng et al., 2016).

The RALS methodology was developed by Im and Schmidt (2008). Meng et al. (2014) propose a very robust test in some nonlinear forms by developing a stronger test with non-normal errors with the RALS-LM test. Lee et al. (2012) and Meng et al. (2013) 's proposed test procedure, LM unit root test based on the non-observable component representation includes a data creation process such as:

$$y_t = \delta' Z_t + e_t, \qquad e_t = \beta e_{t-1} + \varepsilon_t \tag{1}$$

where Z_t contains exogenous variables. ε_t, refers to the residuals that show $iidN(0, \sigma^2)$ properties.Most general equilibrium models defined as $Z_t = [1, t, D_t, DT_t^*]$ are obtained by breaking at the level and trend. To take into multiple breaks, T_{Bi} can be included in more than one dummy variable model during each break time (Meng et al., 2013):

$$Z_t = [1, t, D_{1t}^*, \dots., D_{Rt}^*, DT_{1,t}^*, \dots, DT_{Rt}^*]' \tag{2}$$

where $D_{it}^* = 1$ for $t \geq T_{Bi} + 1, i = 1, \dots, R$, and zero otherwise. While the process of creating data involves breaks under the basic hypothesis ($\beta = 1$), the alternative hypothesis is $\beta < 1$. For the RALS-LM test based on the LM principle, the following regression is taken into account at the first stage:

$$\Delta y_t = \delta' \Delta Z_t + u_t, \tag{3}$$

where $\delta = [\delta_1, \delta_2, \delta_{3i}', \delta_{4i}']'$, $i = 1, \dots, R$.Thenunit root test statistics are obtained with the help of the following regression:

$$\Delta \boldsymbol{y_t} = \boldsymbol{\delta}^{'} \Delta \boldsymbol{Z_t} + \boldsymbol{\varphi} \tilde{\boldsymbol{S}}_{\boldsymbol{t-1}} + \boldsymbol{e_t}, \tag{4}$$

where $\tilde{S}_t$ define the de-trend series.

$$\tilde{S}_t = y_t - \tilde{\psi} - Z_t \tilde{\delta}, \tag{5}$$

Here, it is obtained by establishing the regression on ΔZ_t of Δy_t in equation (3). $\tilde{\psi} = y_1 - Z_1$is obtained with $\tilde{\boldsymbol{\delta}}$. $y_1$andZ_1 denotes the first elements of the relevant variables. Thus, using the estimated coefficient expressed by $\tilde{\delta}$, the series is de-trend. However, the de-trend procedure does not eliminate the dependence on nuisance parameter in the crash model. Lee et al. (2012) state that the asymptotic distribution of test statistics in the crash model depends on nuisance parameter (λ_i^*). Here λ_i^* shows the fraction of the sub-sample in each regime. $\lambda_1^* = \frac{TB_1}{T}$, and $\lambda_2^* = (T_{B2} - T_{B1})/T$. Thus, the test statistics that depend on the noise parameter are eliminated by transforming as suggested by Lee et al. (2012). Transformed LM tests are not dependent on the noise parameter and allow trend breaks under the basic hypothesis (Meng et al. 2013). For $t \leq T_{B1}$ is $\tilde{S}_t^* = (1/\lambda_1^*)\tilde{S}_t$; for $T_{B1} < t \leq T_{B2}$ is $\tilde{S}_t^* = (1/\lambda_2^*)\tilde{S}_t$; or for $T_{B2} < t \leq T$ is $\tilde{S}_t^* = (1/(1-\lambda_2^*))\tilde{S}_t$.Therefore, $\tilde{S}_{t-1}$ in equation (4) is replaced with $\tilde{\boldsymbol{S}}_{\boldsymbol{t-1}}^*$by following such that:

$$\Delta y_t = \delta^{'} \Delta Z_t + \varphi \tilde{S}_{t-1}^* + \sum_{j=1}^{k} d_j \Delta \tilde{S}_{t-j} + e_t, \tag{6}$$

where the hypothesis $\varphi = 0$ for the unit root null hypothesis is tested by t-statistics. Following the transformation unit root test statistics, $\tilde{\tau}_{LM}^*$, in trend breaks model $\lambda_i$is not depends on nuisance parameter.

When considering one trend-break (R=1), the distribution of $\tilde{\tau}_{LM}^*$ is similar to the untransformed test using $\boldsymbol{\lambda}_1$=1/2. In addition, given with two-trend-breaks (R=2), the distribution of $\tilde{\tau}_{LM}^*$ is the same as that of the untransformated test using $\boldsymbol{\lambda}_1$=1/3 and $\boldsymbol{\lambda}_2$=2/3 (Meng et al., 2013: 538). Thus, the simulation of new critical values will be unnecessary in all possible break point combinations. Important and necessary are the critical values corresponding to the number of breaks. Critical values of $\tilde{\tau}_{LM}^*$ are taken from Lee et al. (2012).

The second test included in this study is the RALS-LM unit root test recommended by Meng and Lee (2012). In this test, the "residual augmented least squares" (RALS) is used the non-normal errors and to further improve the power

of the LM statistics (see Im et al., 2010; Meng et al., 2014). The RALS procedure augments by adding the following term $\widehat{w}_t$to test the regression equation (6):

$$\widehat{\boldsymbol{w}}_{\boldsymbol{t}} = \boldsymbol{h}(\hat{\boldsymbol{e}}_{\boldsymbol{t}})\text{-}\widehat{\boldsymbol{K}}\text{-}\hat{\boldsymbol{e}}_{\boldsymbol{t}}\widehat{\boldsymbol{D}}_{\boldsymbol{2}} \tag{7}$$

where $\boldsymbol{h}(\hat{\boldsymbol{e}}_{\boldsymbol{t}}) = [\hat{\boldsymbol{e}}_{\boldsymbol{t}}^{\boldsymbol{2}}, \hat{\boldsymbol{e}}_{\boldsymbol{t}}^{\boldsymbol{3}}]$, $\widehat{\boldsymbol{K}}=\frac{\boldsymbol{1}}{\boldsymbol{T}}\sum_{\boldsymbol{t=1}}^{\boldsymbol{T}}\boldsymbol{h}(\hat{\boldsymbol{e}}_{\boldsymbol{t}}), \boldsymbol{and}\widehat{\boldsymbol{D}} = (\boldsymbol{1}/\boldsymbol{T})\sum_{\boldsymbol{t=1}}^{\boldsymbol{T}}\boldsymbol{h}^{'}(\hat{\boldsymbol{e}}_{\boldsymbol{t}})$. To detect of non-normal errors, $\boldsymbol{h}(\hat{\boldsymbol{e}}_{\boldsymbol{t}}) = [\hat{\boldsymbol{e}}_{\boldsymbol{t}}^{\boldsymbol{2}}, \hat{\boldsymbol{e}}_{\boldsymbol{t}}^{\boldsymbol{3}}]$, which includes the second and third moments of $\hat{\boldsymbol{e}}_{\boldsymbol{t}}$. Then, $\widehat{\boldsymbol{m}}_{\boldsymbol{j}} = \boldsymbol{T}^{\boldsymbol{-1}}\sum_{\boldsymbol{t=1}}^{\boldsymbol{T}}\hat{\boldsymbol{e}}_{\boldsymbol{t}}^{\boldsymbol{j}}$, the augmented term is described following equation:

$$\widehat{w}_t = [\hat{e}_t^2\text{-}\widehat{m}_2, \hat{e}_t^3\text{-}\widehat{m}_3\text{-}3\widehat{m}_2\hat{e}_t] \tag{8}$$

These terms are acquired from the redundancy condition in that knowledge of higher moments m_{j+1} are uninformative if $m_{j+1} = j\sigma^2 m_{j-1}$ (Meng et al., 2013). The statistical redundancy condition is only coherent with the normal distribution. In the case of non-normally distributed error terms, this condition is not satisfied and augmented the testing regression (6) by $\widehat{w}_t$ increases efficiency. The transformed RALS-LM test statistics are then obtained in the following regression:

$$\Delta y_t = \delta^{'}\Delta Z_t + \phi\tilde{S}_{t-1}^{*} + \sum_{j=1}^{p} d_j\,\Delta\tilde{S}_{t-j} + \widehat{w}_t^{'}\gamma + u_t, \tag{9}$$

Thanks to the term $\widehat{\boldsymbol{w}}_{\boldsymbol{t}}^{'}$ in this statement, the high moments of the residues can be included in the model. RALS-LM estimator is acquired by estimating the regression equation (9) with the usual least squares estimation method. The t-statistic for the transformed RALS-LM test is expressed as $\boldsymbol{\tau}_{\boldsymbol{RALS\text{-}LM}}^{*}$ for ϕ. There is no need to simulate new critical values for all possible structural breakpoint compositions (Meng et al., 2013:539).

Results

In order to determine the integration order, unit root tests were applied to GVC incomes. Table 2 shows the results of the ADF and PP unit root test. The null hypothesis of unit root could not be rejected for all regions at 5% level of significance in levels. But only EU27, East Asia and China are stationary in first differences at 10%, %1 and 5% level of significance, respectively.Thus they are stationary in second difference at 1%, 5% and 10% level of significance.

Table 2. Unit Root Test Without Structural Breaks

Level	**ADF**	**PP**
EU-27	-0.976	-1.065
NAFTA	-2.501	-2.829
East Asia	-3.326*	-2.655
China	-1.108	-1.325
BRIIAT	-1.308	-1.331
1st DIF.	**ADF**	**PP**
EU-27	-3.561*	-3.366*
NAFTA	-2.485	-2.460
East Asia	-3.339*	-4.902***
China	-4.634**	-2.834
BRIIAT	-1.071	-3.031
2nd DIF.	**ADF**	**PP**
EU-27	-5.122***	-8.082***
NAFTA	-3.912**	-9.494***
East Asia	-3.812*	-6.875***
China	-3.784**	-3.668*
BRIIAT	-4.082**	-5.501***

Note: **, **, *** denotes significance at the 10%, 5% and 1% level, respectively. The model includesintercept and trend. The lag length is determined by the Schwarz Info Criterion.*

However, the presence of structural breaks that are not taken into account in unit root tests may have misleading results. Therefore, LM test and LM-RALS test were applied for one and two structural breaks.Table 3 shows the results obtained from the application of the LM test with one structural break.The results show evidence that all regions have unit root in levels. In the case of the RALS-LM test, the EU27 and BRIIAT are stationary in levels.

Table 3. One-Break LM and RALS-LM Unit Root Test

Series	LM					Critical Values		
	τ^*_{LM}	$\tau^*_{RALS\text{-}LM}$	$\hat{\rho}^2$	$\hat{T}_B$	$\hat{k}$	1%	5%	10%
EU27	-1.863	-4.227***	0.293	2002	0	-3.622	-2.951	-2.609
NAFTA	-0.956	-1.735	0.644	2008	1	-4.128	-3.489	-3.168
East Asia	-2.010	-1.463	0.947	2009	0	-4.483	-3.811	-3.485
China	-1.131	-0.784	0.868	2009	3	-4.403	-3.736	-3.410
BRIIAT	-2.456	-3.532**	0.453	2009	3	-3.859	-3.226	-2.899

Note: *$\hat{k}$ is the optimal number of lags for the first difference term. τ^*_{LM} and $\tau^*_{RALS\text{-}LM}$, are LM and RALS-LM test statistics.$\hat{T}_B$ shows breaking dates. The critical values of RALS-LM test statistics are shown in the last three columns. Since converted tests are applied, test statistics do not change for trend breakpoints.LM and RALS-LM tests have been reported once to save space, as they share the same procedure when looking for breakpoints and corresponding optimal delays. The critical values for LM test statistics are –4.531, -3.859 and -3.534 for 1%, 5% and 10%, respectively. **, *** denote rejection of the null hypothesis at the 5% and 1% levels, respectively.*

Applying the LM test, all regionshave unit root in levels with two structural breaks, while for RALS-LM test rejects the null hypothesis of a unit root in 2 out of 5 regions (Table 4).In addition, these results indicate that shocks to GVC incomes in all regions, with the exception of EU27 and East Asian region, relative to averageGVC incomes should only yield persistent effects.

Table 4.Two-Break LM and RALS-LM Unit Root Test Results

Series	LM						Critical Values		
	τ^*_{LM}	$\tau^*_{RALS\text{-}LM}$	$\hat{\rho}^2$	$\hat{T}_B$	$\hat{T}_B$	$\hat{k}$	1%	5%	10%
EU27	-3.485	-4.584***	0.209	1999	2006	2	-3.705	-3.042	-2.700
NAFTA	-2.225	-2.592	0.811	2003	2008	1	-4.915	-4.228	-3.908
East Asia	-2.915	-4.141**	0.582	1999	2009	0	-4.518	-3.875	-3.548
China	-2.065	-2.453	0.196	2000	2009	3	-3.665	-3.001	-2.658
BRIIAT	-2.242	-1.207	0.478	2000	2009	2	-4.332	-3.680	-3.350

Note:*$\hat{k}$is the optimal number of lags for the first difference term. $\tau^*_{LM}$and $\tau^*_{RALS\text{-}LM}$, are LM and RALS-LM test statistics.$\hat{T}_B$is shows breaking dates. The critical values of RALS-LM test statistics are shown in the last three columns. Since converted tests are applied, test statistics do not change for trend breakpoints.LM and RALS-LM tests have been reported once to save space, as they share the same procedure when looking for breakpoints and corresponding optimal delays. The critical values for LM test statistics are –5.184, -4.484 and -4.144 for 1%, 5% and 10%, respectively. **, *** denote rejection of the null hypothesis at the 5% and 1% levels, respectively.*

These findings indicate the presence of persistent shocks in GVC incomes in China, NAFTA and BRIIAT regions. Half of the global trade consists of value chains and the persistence of shocks in GVC incomes represents problems. The major suppliers of intermediates are China and the USA- each has about 11% of global intermediate exports; Germany is in third place with 8% and the share of Japan is 5% (Baldwin and Lopez-Gonzalez, 2013:19).Thus, the findings of this study have proven that shocks in global value chains and trade have slowed down since the 2008 global crisis, and shocks are not cyclical in regions such as NAFTA, China and BRIIAT.OECD (2013:242) states that GVCs are an important shock transmitter: "*The emergence of global value chains (GVCs) has increased the connectivity and the interdependencies of countries. Global links and geographically concentrated production due to increasing specialization allow a local event to become a global disruption. National economies have therefore become more vulnerable to so-called systemic risk, i.e. the risk of the breakdown of an entire system.…Growing cross-border interconnectivity also increases the risk of shocks spreading quickly worldwide".*On the other hand, the East Asia region and EU27 are still among the important actors in the global value chains.Our empirical findings indicated that shocks to these regions are cyclical.

Conclusion

Unit root tests' usage is found to have a large literature in time series and panel data analysis. If any structural breaks are being depicted in time series, low power is highly predicted in unit root tests. In this study, we apply LM and the recently developed RALS-LM test to the GVC income series for the five regions of the world, which have a significant share in the GVC between 1995-2011. Trend shifts' number excluding the extra noise parameters that are relevant to the break location solely has a dependency on the LM test. LM test is detected to have more effectiveness in the case of the errors that are non-normal which have connection with the RALS-LM test (Payne et al., 2017). The RALS-LM unit root test incorporates the moments of non-normal error terms into the model, reducing volatility, adding the dummy variable to the breaking effect in this particular archetype. Thus, the particular part of the GVC incomes that has a link with the crucial elements of the time series data is allowed to be controlled by the LM and RALS-LM tests. Through the appliance of ADF or PP tests, rejection is depicted in the conventional unit root tests which have not the acquiescence for structural breaks. However, the unit root in two (EU27 and East Asia) out of

five regions' null hypothesis is being declined by the conclusion of the two-break RALS-LM tests, which is yielding support for the presence of cyclical fluctuations rather than the structural problems in GVCs incomes. For EU27 and BRIIAT regions, unit root's null hypothesis in GVCs income is declined, in relevance with the one break unit root tests. These outcomes signify that shocks to GVCs incomes in all regions, with the exception of China, NAFTA and BRIIAT, relative to average GVC incomes should only yield temporary effects.

The results of this study can be evaluated in several ways. First, the rise of GVCs incomes reflects an increase in trade in intermediate products. But, supply and demand shocks primarily slow down trade between economies, leading to a decrease in GVC incomes. Also, it mean a shortage of some critical goods and services, and hence, inflation.At the time of writing this article, while the first effect of COVID-19 a pandemic, which affects the whole world, is expressed on production and income, the second effect will be on the global supply chains (Baura, 2020). The world is now getting ready to enter the biggest recession after the Second World War due to the COVID-19 pandemic. Second, Timmer et al., (2016) reported that the rise of GVCs has already stopped.

Our results have important policy implications for these regions under study when considering a single structural break. Consequently, it can be said that world trade and economic growth are in the process of recovery because of the temporary effects of the shocks in the global value chains for the EU27, NAFTA and China. But for the East Asia and BRIIAT, the shocks on GVC's incomes are permanent. For this reason, significant risks to future trade and investment prospects remain.

At the time of writing this article, while the first effect of COVID-19 a pandemic, which affects the whole world, is expressed on production and income, the second effect will be on the global supply chains (Baura, 2020).The world is now getting ready to enter the biggest recession after the Second World War due to the COVID-19 pandemic.However, it is unclear whether the pandemic is the new normal or not. If the pandemic is new normal, then we can expect a transformation in economic activity. First, we can discuss the sources for the pandemic and how we can deal with it. There are some opinions that what makes viruses a part of our lives is that manufacturers are more compelled to intervene in natural life as a result of increased consumption. If we agree on the correctness of this, we need to prepare the solutions accordingly. To prevent humanity

from future pandemics, which may contain more powerful viruses, degrowth appears as one of the solutions. Degrowth is a measure that will create an ecological improvement as well as a decline in both production and consumption. It is inevitable that this measure will affect global trade. First of all, when incomes fall in economies, consumers are expected to decrease their demand for imported final goods so that exporters will be negatively affected. On the other hand, one may expect that the average costs of large producers may increase as they decrease their production. Besides all these, it is uncertain how GVCs will be affected by the process when we take into account the measures taken for the pandemic as a cost item. Regions, where permanent shocks are more likely to occur, are more likely to suffer from pandemics. Countries that have comparative advantages at a particular stage of production might face the risk of losing their advantage. May be a new paradigm will emerge as an answer to these ambiguities of production and trade processes.

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27

DO TERROR ATTACKS AFFECT EXPORT BEHAVIOUR: A VAR MODEL FOR TURKEY

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The Economics of Geopolitical Risk

Increasing geographical tensions globally affect the markets in various ways. Global relations are experiencing a devastating transitional period due to the growth of emerging economies and security threats, the polarisation of international relations and an upturn in the flow of trade and investment. The world is evolving towards a new economic order, and this change shows us that geopolitical risks affect economies. The globalization process is one of hegemony in an effort to provide economic and bio-security tries to turn developing countries into modern versions of colonies that are under the control of strong central capitals. This new version of the former center-periphery relationship presents geopolitical risk as an important factor that determines economic activity. This restructuring, which reproduces hegemony through a process of otherization, does this by dragging the object countries of this process into regional, ethnic, sectarian internal conflicts, as the "other" civilizations do not oppose them as a whole. Discrimination in this sense is an economic gain which is returned to the sovereign powers.

Geopolitical risks are seen by economic agents, such as Central Bank officials and entrepreneurs, as investment determinants and employment. Geopolitical risks, which are defined as the potential international tensions that threaten the financial and operational stability of businesses in general (Behrendt and Khanna, 2003), become more important than political risks as they increase economic uncertainty. Current geopolitical risk factors are military tensions, terrorist threats, energy wars, nuclear tensions and biopolitical elements within or between countries.

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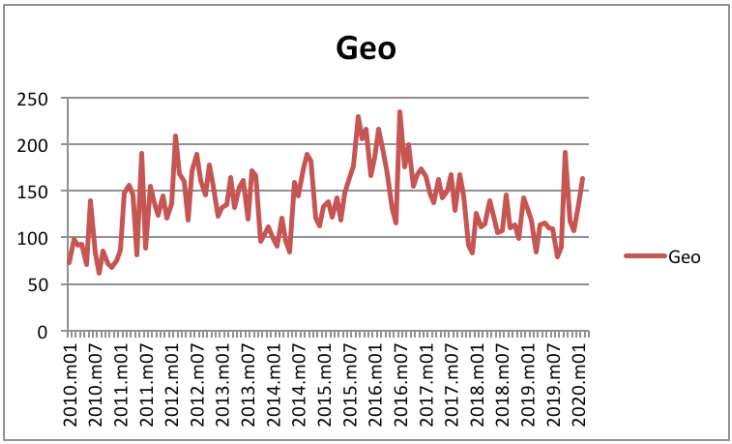
A successful investment policy requires a simultaneous prediction of economic trends and geopolitical shocks.

However, increasing globalization makes it difficult to predict geopolitical changes, and so a more in-depth analysis of geopolitical risks is required. The measuring of geopolitical risks depends on a complete consideration of the relevant variables (such as war, climate change, etc.). To achieve this, Caldara and Iacovello (2018) developed the Geopolitical Risk (GPR) Index which takes into account events that increase geopolitical uncertainty. GPR indices for different countries were subsequently developed.

In countries where geopolitical tensions are strong, the impact of geopolitical risks on investment decisions becomes more important. In terms of geopolitical tensions such as conflicts and terrorism, the Middle East region is one of the most troubled regions of the world. Turkey, due to its geopolitical position, is a country adversely affected by geopolitical risks, especially from neighboring countries of the Middle East.

Figure.1 shows that geopolitical risk index has risen since July 2015, after which the index values have mainly been above 150. One of the variables that is undoubtedly most affected by geopolitical risk is export behavior, and the purpose of our study is to investigate the effect of geopolitical risks and real sector confidence on exports. The evolution of, as well as the relation of exports with geopolitical risk versus real sector confidence index, has been analyzed with a var model.

Figure. 1: Turkey's Geopolitical Risk Index



A Consideration of the Theoretical Perspective

Geopolitics has emerged as a sub-discipline that is being used to create theoretical frameworks that will be of maximum benefit to European and American thinkers who want to protect their world power. The fact that both European and American perspectives produce different theories of domination is due to their need to protect their own particular geopolitical positions. The founders of critical geopolitics, Tuathail and Dalby, described the arguments of critical geopolitics in his book "Rethinking Geopolitics" (Tuathail and Dalby, 2002: 469-472). It is crucial to consider this strategy when comparing classical and critical geopolitics (Taban,2013:21). While the aim of classical geopolitics is to gain power, critical geopolitics argues that a multi-actor and multi-problem consideration is required to understand the plurality of the world. Critical geopolitics, which questions political and geographical traditional understanding, is based on differences and diversity through an application of new forms of political geography. The reason for this is that traditional answers to the question of how the world works, and geopolitical understanding in general, which divides the world into spatial blocks and is created according to geographical location and fixed identities, is no longer sufficient. This is because the world now includes factors such as economic globalization, global media streaming, internet, transnational crime networks, and a bewildering universe of stored knowledge (Tuathail and Dalby, 2002; Dodds, 2001).

Balcılar et al. (2013), has found that real effective exchange rate affects exports in the long run. While Demirer et al. (2018) have measured the relationship between geopolitical risk and oil prices, Balcılar et al. (2018); Bilgin et al (2018); Apergis et al (2018); Aysan et al, (2019); Gupta et al (2018) have analyzed the relationship of geopolitical risks in terms of stocks and bonds.

Geopolitical risks are seen as an important determinant of economic activity by governments, entrepreneurs, investors, company executives and determinants of fiscal policy. The majority of the studies, such as Abdel-Latif and El-Gamal (2018), Gupta, Gozgor, Kaya and Demir (2018), Labidi et al. (2018), Kollias and Papadamou (2017), have examined the impact of the geopolitical risk index on oil or stock prices and trade. In other study, Şimşek (2018) analysed the relationship between the unemployment rate and geopolitical index with asymmetric causality. The study found that there are some real constraints and adverse affects on the production of Turkey's economy and geopolitical activities due to weakness in

external demand, tightening policies and political uncertainty. In non-parametric quantile causality test results, it has been shown that geopolitical risks affect volatility, rather than return, in the Islamic stock markets, while it can be used to predict both return and volatility in the Islamic Bond market.

Methodology

It is generally insufficient to only consider one economic variable as a dependent variable in a single- equation model when there are other independent variables that are believed to affect it. It can therefore be concluded that simultaneous systems of equations, which consist of more than one equation, should be examined instead of single-equation models. Consequently, the Var model has been developed to replace simultaneous equation systems. Vector autoregressive models, brought into the literature by Sims, are generalized versions of autoregressive models of more than one variable. Var is an extension of the univariate autoregressive model for the dynamic multivariate time series. It has proven to be useful in describing the dynamic behaviour of economic and financial time series, as well as for forecasting.

In a sense, the var is a simplified form of the arima model. The variables in the var model are independent. Each variable is defined as being a function of other variables with its own lagged values. Therefore, a var model is a model in which the lagged values of all variables, consisting of k equations and a k time series, one for each variable, are included as independent variables in all equations. The var model for three variables is shown below:

$$y_t = v + A_1 y_{t-1} + \ldots + A_p y_{t-p} + \mu_t,\ t=0,\pm1,\pm2,\ldots, \quad (1)$$

Where $y_t = (y_{1t},\ldots,y_{kt})$ is a (K×1) random vector, the A_i are fixed (K×K) coefficient matrices, $v=(v_1,\ldots,v_k)$ is a fixed (K×1) vector of intercept terms allowing for the possibility of a non-zero mean $E(y_t)$. Finally, $\mu_t=\mu_{1t},\ldots,\mu_{kt})$ is a K dimensional white noise process (Lutkepohl,2005). In order to examine the process described in equation (1), we have to see the var (1) model.

$$y_t = v + A_1 y_{t-1} + \mu_t \quad (2)$$

This mechanism starts at t=1 and produces,

$$y_1 = v + A_1 y_0 + \mu_1$$

$$y_2=\nu+A_1y_1+\mu_2=\nu+A_1y_0+\mu_1+\mu_2$$

$$=(I_K+A_1)\nu+A_1^2y_0+A_1+\mu_1+\mu_2 \quad (3)$$

$$y_t=(I_K+A_1+\cdots+A_1^{t-1})\nu+A_1^ty_0+\sum_{i=0}^{t-1}A_1^i\mu_{t-1}$$

So, the vectors $y_1,\ldots,y_t$ are uniquely determined by $y_0,\mu_1,\ldots,\mu_0$

Suppose, that a certain process started in the infinite past. In this case, the question to be asked is what kind of a process is consistent with this mechanism. Let's consider the Var (1) process from equation (3).

$$y_t=\nu+A_1y_{t-1}+\mu_t$$

$$=(I_K+A_1+\cdots+A_1^j)\nu+A_1^{j+1}y_{t-j-1}+\sum_{i=0}^{j}A_1^i\mu_{t-i} \quad (4)$$

If all eigenvalues of A1 are less than 1 y_t is the var(1) process or the well-defined stochastic process.

Data and Findings

The variables we selected for our study are the export, geopolitical risk index and the real sector confidence index. This set of data provided the advantage of using two different variables in terms of risk measurement, one is geopolitical risk index, and the other is real sector confidence index. The variable export refers to the export orders for the next 3 months; while the geo variable shows the geopolitical risk index developed by Dario Caldara and Matteo Iacoviello at the Federal Reserve Boardin. The variable rsci refers to the real sector confidence index 2010M01-2020M02 which is the period following the 11 September incident. The three variable var (1) model is shown in equations 1, 2 and 3.

$$Ex_t=\sigma+\sum_{i=1}^{k}\beta_i\,Ex_{t-i}+\sum_{j=1}^{k}\emptyset_j\,Geo_{t-j}+\sum_{m=1}^{k}\varphi_m\,rsci_{t-m}\mu_{1t} \quad (5)$$

$$Geo_t=a+\sum_{i=1}^{k}\beta_i\,Ex_{t-i}+\sum_{j=1}^{k}\emptyset_j\,Geo_{t-j}+\sum_{m=1}^{k}\varphi_m\,rsci_{t-m}\mu_{2t} \quad (6)$$

$$Rsci_t=b+\sum_{i=1}^{k}\beta_i\,Ex_{t-i}+\sum_{j=1}^{k}\emptyset_j\,Geo_{t-j}+\sum_{m=1}^{k}\varphi_m\,rsci_{t-m}\mu_{3t} \quad (7)$$

The μs are stochastic error terms, often called impulses or shocks. The dependent variable export is a function of its lagged values, and the lagged values of other variables in the model. Since all the variables are stationary at their levels, var model can be used. The data and descriptive statistics are shown below.

Table 1. Data

Variable	**Definition**
Ex	The total amount of export orders (next 3 months) -Tüik
Geo	Geopolitical risk index - (Iacovielli et all. calculations)
Rsci	Real sector confidence index - Tüik

Table 2. Descriptive Statistics

	EX	GEO	RSCI
Mean	118.6852	135.9491	105.5598
Median	119.1500	136.1923	106.0500
Maximum	126.7000	234.2810	115.1000
Minimum	106.6000	61.89449	90.40000
Std. Dev.	3.997906	37.68057	4.518587
Jarque-Bera	17.55103	2.164241	17.55705
Probability	0.000154	0.338876	0.000154
Observations	122	122	122

According to the unit root test results, the series do not contain the unit root since the test statistics obtained from constant and constant plus trend forms are greater than the critical values. This means that the series are stationary at their levels and the var model can be used in this case.

Table 3. Unit Root Test Results

		Level		**First Difference**	
	Variable	**ADF**	**PP**	**ADF**	**PP**
Constant	Ex	-6.443 (0.000)	-6.443 (0.000)	-16.275 (0.000)	-46.587 (0.000)
	Geo	-6.105 (0.000)	-6.461 (0.000)	-9.719 (0.000)	-26.027 (0.000)
	Rsci	-3.513 (0.009)	-3.456 (0.010)	-13.627 (0.000)	-13.650 (0.000)
Constant+trend	Ex	-6.691 (0.000)	-6.732 (0.000)	-16.219 (0.000)	-50.743 (0.000)
	Geo	-6.104 (0.000)	-6.487 (0.000)	-9.692 (0.000)	-26.425 (0.000)
	Rsci	-4.179 (0.006)	-4.245 (0.005)	-13.570 (0.000)	-13.592 (0.000)

The parenthesis are probability values. 6 (Newey-West automatic) using Bartlett kernel

In a var (p) process, p is assumed as an upper bound for the model itself. If a large value of p is chosen, the forecast precision will be reduced.

$$y_t = v + A_1 y_{t-1} + \ldots + A_p y_{t-p} + A_{p+1} y_{t-p-1} + \mu_t,\ t=0,\pm1,\pm2,\ldots, \quad (8)$$

with $A_{p+1}=0$, the above process y_t can be defined as a var(p) process if $A_p \neq 0$ and $A_i=0$ for i>p. This means that p has the smallest possible order, in our case var(1).

Table 4. Lag Selection

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1203.937	NA	315119.6	21.17434	21.24634	21.20356
1	-1111.363	178.6516*	72735.28*	19.70813*	19.99615*	19.82502*
2	-1104.838	12.24939	75991.28	19.75154	20.25558	19.95610
3	-1100.479	7.952356	82511.73	19.83297	20.55302	20.12520
4	-1093.103	13.06967	85035.23	19.86146	20.79753	20.24136
5	-1084.985	13.95854	86585.53	19.87692	21.02901	20.34449

** indicates lag order selected by the criterion*

Table 5. Coefficients of the Export Equation

	Coefficient	Std. Error	t-statistic	Prob.
D(Ex)	0.404719	0.093691	4.319732	0.0000
D(Geo)	-0.000858	0.008485	-0.101071	0.9196
D(Rsci)	0.134611	0.082894	1.623904	0.1053
Constant	56.54052	9.985309	5.662371	0.0000

$Ex = 56.54+0.40\ ex_{t-1}-0.0008geo_{t-1}+0.134rsci_{t-1}$

Table 6. Coefficients of the Geo Equation

	Coefficient	**Std.Error**	**t-statistic**	**Prob.**
D(Ex)	-0.083208	0.851403	-0.097730	0.9222
D(Geo)	0.532387	0.077108	6.904435	0.0000
D(Rsci)	-0.286128	0.753287	-0.379839	0.7043
Constant	104.2894	90.74031	1.149317	0.2512

$GEO = 104.2+-0.08\ ex_{t-1}+0.53geo_{t-1}-0.28rsci_{t-1}$

Table 7. Coefficients of the Rsci Equation

	Coefficient	**Std.Error**	**t-statistic**	**Prob.**
D(Ex)	0.005386	0.071491	0.075345	0.9400
D(Geo)	-0.001981	0.006475	-0.305918	0.7598
D(Rsci)	0.809544	0.063252	12.79869	0.0000
Constant	19.75378	7.619291	2.592601	0.0099

$RSCI = 19.75+0.005\ ex_{t-1}-0.001geo_{t-1}+0.80rsci_{t-1}$

The coefficients of each equation are statistically significant in its own case, and we can not say that all the variables are statistically significant. However, the var(1) model estimation requires the diagnostic checking process for residuals and the stability of the model itself. Residuals do not contain serial correlation, which is normally distributed and has constant variance. The stability of the VAR system was evaluated using the lag specification, relative to the roots of the characteristic polynomial with emp, geo and rsci variables. The model is stable, as all the roots are in the unit circle. In addition, the ACF of residuals are also presented in the table.

Diagnostic Tests and Stability of the Var(1) Model

$$y_t = \pi y_{t-1} + \varepsilon_t$$

$$\begin{pmatrix} y_{1t} \\ y_{2t} \end{pmatrix} = \begin{pmatrix} \pi_{11} & \pi_{12} \\ \pi_{21} & \pi_{22} \end{pmatrix} \begin{pmatrix} y_{1t-1} \\ y_{2t-1} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix}$$

Then det(I_n-π_z)=0 becomes

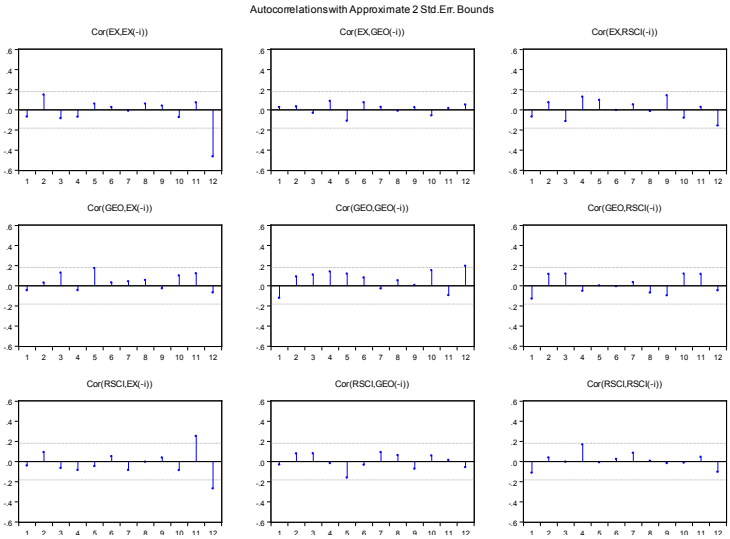
$$(1 - \pi_{11z})\text{-}(1 - \pi_{22z})\text{-}\pi_{12}\pi_{21}z^2\text{=}0$$

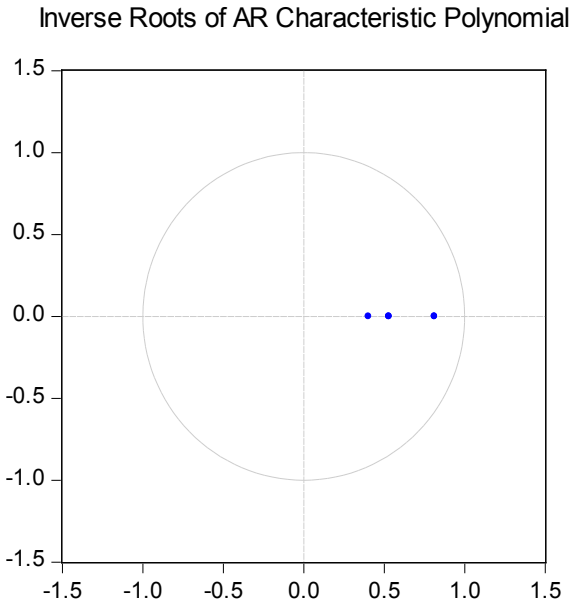
Stability condition involves cross terms π_{12} and π_{21}

If π_{12} = π_{21}=0 (diagonal var), then the bivariate stability condition reduces the univariate stability conditions for each equation (https://faculty.washington.edu/ezivot/econ584/584notes.htm).

Table 8. Residual Diagnostic Tests

Serial corrleation test	F=1.635	P=0.105
Normality test	J-B=2.466	P=0.291
Heteroscedasticity	Chi square(1)=49.246	P=0.069





Granger Causality

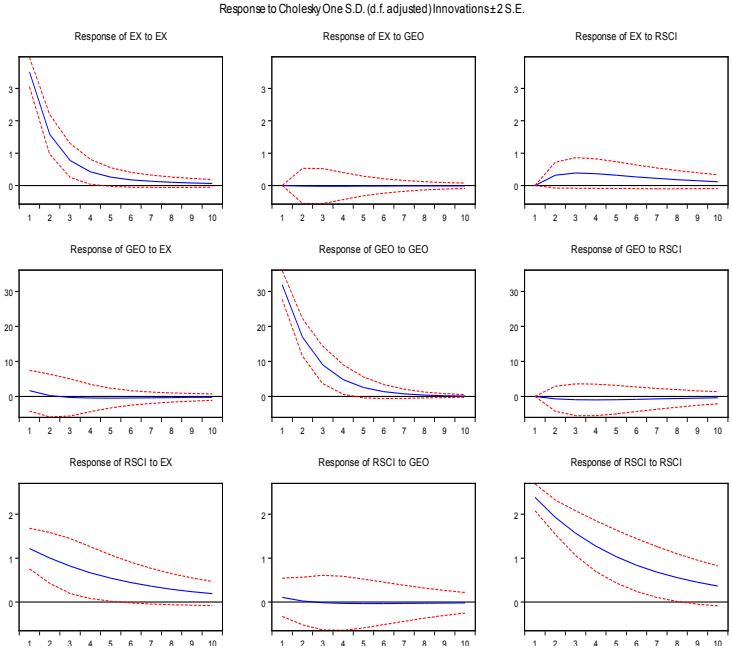
In order to determine, estimate and test the relationship between the economic variables, it is necessary to distinguish between the internal (external variable) and external variables. However, it may not always be known whether the variables are internal or external, and so VAR models are used for forecasting. The intuitive notion of a variable's forecasting ability is due to Granger (1969). If a variable, or group of variables, y1 is found to be helpful for predicting another variable, or a group of variables, y2, and then y1, is said to confirm Granger-cause y2; otherwise it is said to fail to Granger-cause y2. According to the causality results, there is no causal relation between the variables.

Table 9. Var Granger Causality

Dependent Variable: Ex			
Excluded	**Chi-sq**	**df**	**Prob.**
Geo	0.010215	1	0.9195
Rsci	2.637063	1	0.1044
All	2.653385	2	0.2654
Dependent variable: Geo			
Ex	0.009551	1	0.9221
Rsci	0.144277	1	0.7041
All	0.265543	2	0.8757
Dependent variable: Rsci			
Ex	0.005677	1	0.9399
Geo	0.093586	1	0.7597
All	0.098674	2	0.9519

Impulse Response Functions

The impulse response function measures the response of endogenous variables to the shocks in stochastic error terms. One important condition here is that the variables in the system must be stationary. If the variables are stationary, then the effect of a shock to the system will disappear in a certain period of time. However, if the variables are not stationary, then the effect of the shocks to the system will continue for infinity. This is a kind of incorrect measurement. The figure shows the combined graph of the impulse response functions of each variable. As we can see from the chart, one standard deviation shock to the geopolitical risk index causes an increase in exports until the end of the second period, which then decreases towards zero. This means that shocks to geopolitical risk initially has a positive impact on exports and then it starts to decline. The same effect is more definitive for real sector confidence index and exports. One standard deviation shock to rsci causes an initial increase in exports which then starts to decline.



Variance Decomposition

A shock to exports will explain almost 100% fluctuation in export variable itself. However, a shock to the variable export explains 26% of the fluctuation in geopolitical risk. If the target variable is the real sector confidence index, then a shock to exports will be explained approximately 21% in rsci. In the long run, the real sector confidence index is more effective than geopolitical risk on export variables.

Table 10. Variance Decomposition of Export

Period	S.E.	EX	GEO	RSCI
1	3.508816	100.0000	0.000000	0.000000
2	3.862542	99.30971	0.001088	0.689201
3	3.958823	98.37091	0.002744	1.626347
4	3.998589	97.54902	0.004329	2.446648
5	4.020039	96.93518	0.005597	3.059219
6	4.033098	96.50665	0.006529	3.486820
7	4.041438	96.21634	0.007185	3.776471
8	4.046869	96.02232	0.007635	3.970041
9	4.050435	95.89344	0.007939	4.098622
10	4.052786	95.80804	0.008144	4.183814

Conclusion

In this study, we tried to analyse the exports, geopolitical risks and real sector confidence index through a multivariate vtime series model. We applied the var model to examine the dynamics of the variables. Our findings show that the var model is stable and satisfactory model for exports, geopolitical risks and the real sector confidence index. The impulse response functions indicate that risk indicators cause first an increase in exports until the end of second period, and then a decrease. In addition, these risk factors do not explain the change in exports behaviour for Turkey very well. A further study, with more variable or arch and garch models, may provide a better explanation in this respect.

The globalization paradigm triggers “Ethnicization” with its “Regionalisation” policy, while its factionalization weakens national solidarity and leads to regional / ethnic / sectarian colonization with different incentives. While trying to shrink the weakened nation states, it seems that an epidemic disease has caused all attention to evolve into a period of self-preservation. This result of a period when the borders between states are no longer significant has had an influence on all countries, from the most to the least developed. This shows that the health factor should be taken into consideration in defining the risk and uncertainty for the expansion of the geopolitical risk concept, or indeed for any study to be carried out thereafter.

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THE EMPIRICAL INVESTIGATION OF EXTERNAL BORROWING – INVESTMENT RELATIONSHIP IN TURKEY

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Introduction

The rapid expansion of Turkey's external debt burden, especially after 2015, starting from the 2008 global financial crisis, has revitalized the debates regarding the debt sustainability of the country and possible forthcoming debt stress. According to the World Bank's International Debt Statistics (2020), the external debt stock of Turkey reached about $445 billion (increased from $260 billion in 2007) in 2018 corresponding to 194 percent of exports which was about 156 percent in 2008, and 59 percent of GNI (up from 38 percent in 2008). Figure 1 plots the evolution of Turkey's external debt (percent of GNI) between 1980 and 2018. Although there are fluctuations, one can easily see the upward trend of external debt over time. For the same period, investment growth rates also dropped. Although the gross fixed capital formation contracting 27 percent in 2001 and 20 percent in 2009 recovered in the following years, the figures stayed low, especially after the global financial crisis. The growth rate was about 15.3 percent on average during the period 2002-2008, while the 2010-2018 period witnessed lower rates with 9.7 percent on average (the major increases were in 2010 and 2011 with 22.5 and 24 percent growth rates, respectively) (World Development Indicators database, the World Bank).

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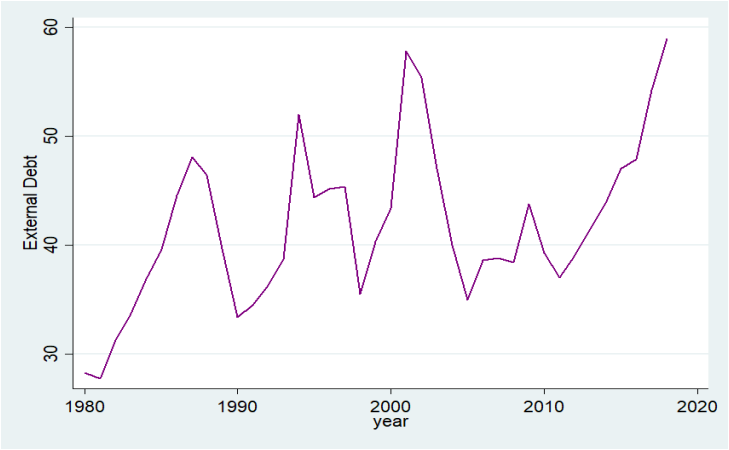
Figure 1: External Debt of Turkey (% of GNI)



Source: *WDI, the World Bank*

From the theoretical perspective, a reasonable level of external borrowing may raise the level of investment by creating financial liquidity, sourcing capital formation, and stimulating productivity growth, especially in countries with inadequate domestic resources to maintain sustainable economic development (Chowdhury, 2001; Benli, 2020). In contrast, a high level of external debt burden may have a detrimental effect on economic growth by creating a so-called 'debt overhang effect' as it potentially may discourage and overhang savings and investment, especially those of the private sector. This is due to the argument that a high level of foreign debt lowers the returns to investments as it acts as a tax on future production and leads the returns on investments to be 'taxed away' by foreign lenders in the form of higher-level debt servicing (Krugman, 1988; Serven, 1999; Clements *et al.*, 2003). However, the Ricardian equivalence theorem revised by Barro (1989) suggests that external borrowing reduces current consumption levels and increases the savings in the current period by increasing the future tax burdens and therefore does not change the levels of savings and investment overall. Finally, the so-called 'debt Laffer curve theory' (Sachs, 1989) proposes that foreign debt raises investment levels and stimulates economic growth up to a certain level of debt, and beyond that, raising levels of external borrowing hampers economic growth.

In contrast to the total debt stock, external debt service crowds out private investment as it creates a liquidity constraint and stimulates internal borrowing,

which raises long term interest rates in the debtor country. The external debt service payments can also hamper productivity and long-run economic growth by obliging governments to reduce spending on human capital, infrastructure, and R&D (Clements, Bhattacharya & Nguyen, 2003; Wamboye, 2012; Agenor & Montiel, 2015).

In sum, the theoretical literature provides at best a controversial and inconclusive discussion on whether and what extent external borrowing affects investment and, thus, economic growth. The similar ambiguity is also present in the empirical literature (Geiger, 1990; Warner, 1992; Savvides, 1992; Levy & Chowdhury, 1993; Serven & Solimano, 1993; Rockerbie, 1994; Fosu, 1999; Hansen, 2001; Clements, Bhattacharya & Nguyen 2003; Imbs & Ranciere, 2005).

Although there exists a bunch of international studies investigating the relationship between external debt and investment, there are a few studies for the Turkish economy. Also, it should be noted that the underlying variables used in these studies are somewhat different and mostly focus on public borrowing – domestic investment nexus. Regarding the case of Turkey, one of the studies evaluating the effects of external debt on private investments is Karagöl (2005). Employing a cointegration analysis of multivariate equations and impulse response functions to uncover the effects of shocks, he finds that external debt service and public investment cause a negative "crowding-out" effect on private investment. It is argued that increasing foreign debts will lead the future foreign debt payments to rise, and this will generate an expectation that taxes will be higher in the future, thus negatively affecting the efficient investments planned by the private sector. Similarly, Taban and Kara (2006) show that the government's domestic borrowing and public investment have a crowding-out effect on private investment in Turkey.

Karagöz (2010) investigates the factors that determine private investments in Turkey for the period 1970-2005. The empirical results obtained from the ARDL estimation method reveal that private external debt is one of the factors affecting private investment and some other macroeconomic variables. This finding is also supported by Demir (2017) investigating the impact of public debt on private investment in Turkey between 1983 and 2013. The empirical findings obtained from Autoregressive Distributed Lag (ARDL) model suggest that a 1% increase in public borrowing reduces private investments by %0.5, which confirms the presence of a crowding-out effect of public borrowing in the long term. Altunöz (2013) examines the Turkish economy for the period 1989:Q1 - 2004:Q4 and investigates whether public debt crowds out private sector investment. He finds

the presence of a significant mitigating effect on private sector investment in the same period. In other words, public domestic borrowing crowds out private investment in Turkey. From the results obtained from the ARDL approach, it is argued that the crowding-out effect of public domestic borrowing was created by transferring private funds to the public sector rather than interests. İyidiker and Özuğurlu (2003), analyzed how domestic borrowing affects the real sector in Turkey. In line with statistical data, they point out that there exists a complementary relationship between public and private investments, and priorities for economic policy have shifted from private sector investments to speculative areas due to the high interest rates caused by domestic borrowing.

From a broad perspective, it is observed that Turkey mainly relies on external imbalances to reach its potential growth rate and sustain its growth through investment. The investments driven by the budget deficit and public debt until the 2000s were mainly realized through the current account deficit and borrowings of the private sector since then. In both cases, the process resulted in a rise in the borrowing level of either the public or the private sector.

In light of these facts and the research gap in the Turkey-related-literature, it is of obvious importance to determine the link between debt and investment levels in Turkey. The inadequate level of domestic resources due to low savings rates and lack of significant increases in productivity promotes the importance of this task. Therefore, in this study, we attempt to investigate the linear and possibly nonlinear effect of external borrowing on investments in Turkey. We believe that the findings of this study will yield significant ramifications for policymakers.

Data and Methodology

In this study, we investigate the dynamic effect of external borrowing on investment in Turkey for the period 1980-2018. The measure of the external debt accumulation is added into the model to capture the debt overhang effect, while the crowding out effect is detected through the addition of the variable of debt service into the analysis. The squared external debt stock variable is also included in the model to capture the nonlinearity in the external debt-investment relationship. All the variables are measured in natural logs except the inflation rate, and the data on the variables subject to the empirical analysis are extracted from the WDI database provided by the World Bank. The summary of the descriptive statistics of the variables is displayed in Table 1.

For our purpose, we specifically adopt a multivariate model as follows:

$$inv_t = \beta_0 + \beta_1 y_t + \beta_2 tot_t + \beta_3 inf_t + \beta_4 credit_t + \beta_5 dservice_t + \beta_6 exdstock_t + \beta_7 exdstock_t^2 + \varepsilon_t \quad (1)$$

where inv_t is the total domestic investment (public+private) and measured by gross fixed capital formation (% of GDP); y_t represents per capita income (constant 2010 US$); tot_t is net barter terms of trade index (2000=100); inf_t represents the inflation rate based on consumer prices (annual %); $credit_t$ denotes the domestic credit to the private sector (% of GDP); $dservice_t$ represents the total debt service on external debt (% of GDP); the external debt burden is denoted by $exdstock_t$ and measured by external debt stock (% of GDP), and ε_t is an i.i.d. stochastic error term. The subscript *t* denotes the time period from 1980 to 2018.

Table 1: Descriptive Statistics

Statistic	inv	y	credit	tot	inf	dservice	exdstock
Mean	23.467	8757.103	29.097	101.983	40.374	7.021	41.077
Median	24.459	8003.454	18.486	98.842	37.615	6.844	39.434
Maximum	30.079	15068.980	70.854	120.408	105.215	2.336	57.709
Minimum	14.396	4986.681	13.588	88.898	6.251	11.651	27.077
Standard deviation	4.812	2920.815	18.727	8.506	30.603	1.999	7.268
Skewness	-0.541	0.700	1.253	0.319	0.403	0.296	0.387
Kurtosis	2.168	2.412	2.994	2.023	1.868	3.283	2.889

Note*: Author's Calculations*

To begin with, we employ the bounds testing ARDL approach to cointegration (Pesaran & Shin, 1998; Pesaran, Shin & Smith, 2001) to test the existence of a cointegrating (log-run) relationship between the variables. The major advantages of the ARDL approach over the existing conventional cointegration techniques can be listed as follows: i) the procedure of bounds testing is based on a modified F-test (denoted as F_{PSS}), which remains valid regardless of whether the underlying variables are stationary at level (or I(0)), first difference stationary (or I(1)), or mutually cointegrated; ii) the test is also relatively more efficient in finite and small sample data sizes and enables one to have unbiased estimates of the long-run model. The ARDL model specification of the functional relationship between the variables is given as follows:

$$\Delta inv_t = \tau_0 + \tau_1 inv_{t-1} + \tau_2 y_{t-1} + \tau_3 tot_{t-1} + \tau_4 inf_{t-1} + \tau_5 credit_{t-1} + \tau_6 dservice_{t-1} + \tau_7 exdstock_{t-1} + \tau_8 exdstock^2_{t-1} + \sum_{i=1}^{p} \tau_{9i} \Delta inv_{t-i} + \sum_{i=0}^{p} \tau_{10i} \Delta y_{t-i} + \sum_{i=0}^{p} \tau_{11i} \Delta tot_{t-i} + \sum_{i=0}^{p} \tau_{12i} \Delta inf_{t-i} + \sum_{i=0}^{p} \tau_{13i} \Delta credit_{t-i} + \sum_{i=0}^{p} \tau_{14i} \Delta dservice_{t-i} + \sum_{i=0}^{p} \tau_{15i} \Delta exdstock_{t-i} + \sum_{i=0}^{p} \tau_{16i} \Delta exdstock^2{}_{t-i} + u_t \quad (2)$$

where α_0 is the constant term, and u_t represents the error term. τ_1 - τ_8 are the long-run, and τ_9 - τ_{16} are the short-run parameters.

In the first stage, the significance of the lagged level relationships given in Eq. 2 is tested by computing F-statistics (Wald test) where the null hypothesis is H_0: $\tau_1 = \tau_2 = \tau_3 = \tau_4 = \tau_5 = \tau_6 = \tau_7 = \tau_8 = 0$ (no cointegration) and the alternative one is H_A: $\tau_1 = \tau_2 = \tau_3 = \tau_4 = \tau_5 = \tau_6 = \tau_7 = \tau_8 \neq 0$ (cointegration). However, since the critical values of the bounds test do not correspond to the asymptotic distribution of F-statistic, Pesaran *et al.* (2001) created two asymptotic critical value tables according to the extreme cases where all the variables are I(0) or I(1). The null hypothesis of no cointegration cannot be rejected if the relevant F-stat is below the lower bound, and if the stat is above the upper bound, the null hypothesis is rejected. Finally, the test is inconclusive if the F-stat lies within the critical value band, However, P. Narayan & S. Narayan (2005) argue that the critical values of Pesaran *et al.* (2001) might be misleading if the sample size is small. Therefore, we rely on the critical values of Narayan (2005) to determine the presence of cointegration between the variables as we have a short data span ranging from 1980 to 2018 (39 observations).

Once the presence of a cointegrating relationship is established, the long-run parameters in Eq. 2 are estimated using the optimal lag length based on the Akaike or Schwarz information criteria (AIC and SIC). Then, the lagged error correction term (lagged value of the residuals obtained from the cointegration model, ECT) and the short-run coefficients are estimated using error correction model (ECM) which can be specified as follows:

$$\Delta inv_t = c_0 + \sum_{i=1}^{p} c_{1i} \Delta inv_{t-i} + \sum_{i=0}^{p} c_{2i} \Delta y_{t-i} + \sum_{i=0}^{p} c_{3i} \Delta tot_{t-i} + \sum_{i=0}^{p} c_{4i} \Delta inf_{t-i} + \sum_{i=0}^{p} c_{5i} \Delta credit_{t-i} \sum_{i=0}^{p} c_{6i} \Delta dservice_{t-i} + \sum_{i=0}^{p} c_{7i} \Delta exdstock_{t-i} + \sum_{i=0}^{p} c_{8i} exdstock^2_{t-i} + \lambda ECT_{t-1} + \mu_t \quad (3)$$

where λ is the speed-of–adjustment parameter, which measures how much of the effect of a shock arising in the short run would disappear in the long term.

Empirical Findings

As we mentioned earlier, the ARDL bounds test can be applied to variables with different orders of integration. However, it must be ensured that none of the variables are I(2) to avoid the problem of spurious regression. Therefore the analysis in this section starts with the unit root tests. The results of the unit roots of the time series on our variables based on Augmented Dickey-Fuller (ADF) and Kwiatkowski–Phillips–Schmidt–Shin (KPSS) tests are presented in Table 2. The findings from the unit root tests confirm that none of the variables are I(2). Specifically, the debt service on external debt is I(0), while the rest of the variables are first difference stationary.

Table 2: ADF and KPSS Unit Root Tests

	ADF		KPSS	
Variable	**Constant**	**Constant/Trend**	**Constant**	**Constant/Trend**
inv_t	-1.698(0)	-2.355(0)	0.626(4)**	0.093(4)***
Δinv_t	-5.615(0)***	-5.563(0)***	0.081(5)	0.069(5)
y_t	0.209(0)	-2.258(0)	0.756(5)***	0.153(4)**
Δy_t	-6.535(0)***	-6.508(0)***	0.124(4)	0.065(4)
$credit_t$	0.029(0)	-1.058(0)	0.556(5)**	0.168(5)**
$\Delta credit_t$	-4.746(0)***	-4.869(0)***	0.190(1)	0.088(1)
tot_t	-2.104(0)	-2.668(0)	0.457(5)*	0.128(4)*
Δtot_t	-6.757(0)***	-4.829(2)***	0.189(16)	0.189(16)
inf_t	-1.946(0)	-1.994(0)	0.437(5)*	0.123(5)*
Δinf_t	-7.189(0)***	-7.056(0)***	0.105(2)	0.096(1)
$dservice_t$	-3.701(0)***	-4.015(0)**	0.614(4)**	0.110(3)
$\Delta dservice_t$	-6.364(0)***	-6.280(0)***	0.154(1)	0.089(1)
$exdstock_t$	-2.275(0)	-2.578(0)	0.441(3)*	0.098(2)
$\Delta exdstock_t$	-5.331(3)***	-5.198(3)***	0.095(4)	0.095(4)
$exdstock_t^2$	-2.219(0)	-2.543(0)	0.434(3)*	0.096(3)
$\Delta exdstock_t^2$	-5.274(3)***	-5.143(3)***	0.118(5)	0.119(5)

Note: *The values in parentheses are the appropriate bandwidths determined by the Newey-West Bandwidth criteria for the KPSS test and the lag lengths determined by SIC for the ADF test. The null hypothesis of ADF is "the variable under consideration has a unit root whereas the null hypothesis for KPSS is "the variable under consideration is stationary). *, **, *** denote the significance levels at %10, %5, and %1, respectively.*

The estimated results of the bounds test are displayed in Table 3. The results confirm the presence of a long-run relationship between the underlying variables. This finding also indicates that the estimated relationships are not spurious.

Table 3: Bounds Test Results

Model	Optimal Lagged Length	F-stat
F(inv_t/ y_t, tot_t, inf_t, $credit_t$, $dservice_t$, $exdstock_t$, $exdstock_t^2$)	(3, 1, 3, 3, 2, 3, 3, 3)	6.64***
	Critical Values	
Significance Level	**Lower Bound**	**Upper Bound**
%1	3.64	5.46
%5	2.68	4.13
%10	2.26	3.53

Note: *Optimal lagged length is chosen based on AIC. *** shows the presence of cointegration at the %1 significance level. The critical values for the bounds test are extracted from Narayan (2005), Case III: Unrestricted Intercept and No Trend*

Therefore, we can now proceed to the estimation of short- and long-run dynamics. Specifically, Table 4 provides the results of the ECM of the ARDL cointegration test, whereas the long-run coefficients of the variables are presented in Table 5.

Table 4: Error Correction Model

Dep. Var.: Δinv_t

Var.	**Coeff.**	**Std. Error**	**t-stat**
Δinv_{t-1}	0.039	0.059	0.657
Δinv_{t-2}	0.145***	0.042	3.456
Δy_t	1.111***	0.147	7.542
Δtot_t	-0.071	0.074	-0.956
Δtot_{t-1}	-0.924***	0.196	-4.709
Δtot_{t-2}	-0.2160**	0.103	-2.519
Δinf_t	-0.000	0.000	-1.013
Δinf_{t-1}	-0.001	0.001	-1.847
Δinf_{t-2}	-0.001**	0.000	-2.488
$\Delta credit_t$	0.171***	0.036	4.795
$\Delta credit_{t-1}$	0.163**	0.051	3.173
$\Delta dservice_{t-1}$	-0.239***	0.042	-5.682
$\Delta dservice_{t-2}$	-0.377***	0.046	-8.169
$\Delta dservice_{t-3}$	-0.1635*	0.049	-3.363
$\Delta exdstock_t$	6.674***	1.195	5.584
$\Delta exdstock_{t-1}$	-6.702***	0.922	-7.268
$\Delta exdstock_{t-2}$	-4.766***	1.257	-3.800
$\Delta exdstock_t^2$	-0.870***	0.161	-5.396
$\Delta exdstock_{t-1}^2$	0.935***	0.124	7.552
$\Delta exdstock_{t-2}^2$	0.671***	0.174	3.856
ECT_{t-1}	-0.787***	0.076	-10.304
Constant	-23.405***	2.269	-10.317

Note: **, **, *** denote the significance levels at %10, %5, and %1, respectively.*

The statistically significant and coefficient of ECT (-0.79) confirms the presence a long-run relationship between the variables and indicates that the deviation of domestic investment from its long-run equilibrium vanishes in about one and a quarter years.

Moreover, the empirical findings from the long-run analysis indicate that terms of trade and external debt are the main determinants of long-run domestic investment. The results also show that real per capita income promotes domestic investment in the long run, while inflation has a detrimental but a minimal effect on long-run investment. More importantly, the results suggest no evidence of the crowding out effect of external debt as the coefficient of total debt service on external debt is negative but statistically insignificant. The external debt, on the other hand, supports the debt Laffer curve theory in Turkey for the study period as the coefficient of external debt stock is positive and statistically significant, whereas the coefficient of $exdstock_t^2$ is statistically significantly negative. This implies that external debt stimulates domestic investment up to a certain level, but higher external borrowing reduces domestic investment in the long run.

Table 5: Long-Run Analysis

Dep. Var.: Δinv_t

Var.	Coeff.	Std. Error	t-stat
y_t	0.466**	0.170	2.749
tot_t	2.436***	0.619	3.935
inf_t	-0.004*	0.002	-2.040
$credit_t$	0.030	0.084	0.353
$dservice_t$	-0.170	0.173	-0.985
$exdstock_t$	9.202*	4.388	2.097
$exdstock_t^2$	-1.188*	0.576	-2.062

Note: **, ** and *** represent the significance levels at %10, %5 and %1, respectively.*

Lastly, we finalize this section with residual and stability diagnostics to determine the fitness and stability of our model, and the findings are displayed in Table 6. The findings suggest that the model has no problems related to heteroscedasticity, omitted variable, and instability; and has a normal distribution.

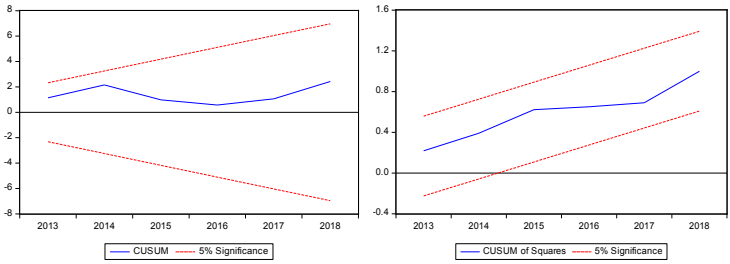
Table 6: Diagnostic Tests

Diagnostic Tests	**Statistics**
R^2	0.997
Adjusted R^2	0.984
F Statistic	77.795 (0.000)
BPG Heteroscedasticity Test	29.034 (0.411)
JB Normality Test	0.031 (0.984)
Ramsey RESET test	2.444 (0.169)

Note: *Probability values are given in parentheses.*

Besides, in order to investigate the stability of long-run coefficients of the variables, we perform the CUSUM (cumulative sum of recursive residuals) and CUSUM of Squares tests and display them in Figure 2. The obtained graphs indicate the stability of long-run coefficients as the curves extend inside the confidence bands in the plot.

Figure 2: CUSUM and CUSUMSQ Tests



Conclusion

In this study, we investigate the effect of the rising levels of foreign debt burden in Turkey over the last decades on domestic investment in the long run. For this purpose, we employ data over the period 1980-2018 and ARDL methodology. As a starting point, the empirical evidence does not appear to suggest the presence of the crowding-out effect of foreign debt in Turkey for the study period. However, the findings support the hypothesis of the debt Laffer curve, meaning that foreign debt increases investment levels and stimulates economic growth up to a certain threshold level. After that, raising levels of external borrowing reduces

investments and, hence, impedes economic growth. In other words, external debt appears to have a nonlinear effect on investment. The theoretical background of this result is based on the fact that future taxation which is necessary to repay the debt deteriorates the investment climate due to uncertainty and causes agents to invest in short-term projects rather than choosing long-run projects which might be more profitable. (Pattillo, Poirson & Ricci, 2011).

Some policy recommendations could be withdrawn from our findings. The debt overhang effect seems to be valid in Turkey beyond a certain point of external debt; therefore, external debt to GDP ratio should be followed closely by policy-makers and should be hindered this ratio to pass the optimal level to refrain debt burden to reduce investments in the economy. Inflation also must be kept under control; otherwise, high inflation rates will negatively affect investment decisions by increasing the opportunity cost of money. Countries look to external borrowing for two major reasons, the first is to close the budget deficits that have become permanent, and the other is to finance the long-term investments. If an external debt is to be borrowed, it should be borrowed at low levels and fungible interest rates. Turkey still relies on external sources to finance domestic investments and support its long-run economic growth because of low savings rates and domestic resources. Hence, last but not least, in order to reduce external debt dependency in the long term and rely on domestic funds through the increase in productivity, and thus tax revenues, the canalization of foreign loans towards most efficient projects must be ensured.

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29

THE EFFECT OF OUTWARD ORIENTED ECONOMY POLICY ON TURKEY'S EXPORT PRODUCT DIVERSIFICATION: GRANGER CAUSALITY ANALYSIS

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Introduction

Since the end of the 1970s, there have been drastic changes in the economies of countries due to the globalization. The policy of free market economy started to gain importance after globalization effect. As a result of free market policy, countries competed with others to get maximum share from global economy which had flourished rapidly. That progress forced especially developing countries to integrate into global economy. But it didn't occur in the same way for all countries. Especially developed countries adapted easily into free market economy which became popular with globalization. Those countries set their exportation product carts successfully and got a lot of profit. But that process was different for developing countries. It took time for developing countries to adapt to free market economy policy due to the fact that those developing countries didn't have adequate capital stock, qualified labour force and technology for production. Some countries caused a delay in other countries to adapt in global economy, hence they would seek to their own markets and their economy would become more fragile. As a result of forcing developing countries to adapt in globalization, they had to switch into free trade oriented policy. Some events showed us that outward oriented economy policy is highly important especially for developing. It

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2 The analysis section of this study has been derived from PhD thesis called "The Effect of Foreign Direct Investments on Export Product Diversifications in Turkey" which was accepted in Süleyman Demirel University, Institute of Social Sciences.

was seen that the countries having difficulty in the process of adapting into free market economy policy had trouble in maintaining macroeconomic balance.

After 1980s, the concept of free market came into prominence as a highly important political tool. One of the most significant parameters to adapt in globalization is free market idea. Free market policy is important political tool for countries desiring maximum income globally. It can be seen that developed countries adopting the policy of free trade economy set their economical foundations strong. So; these countries own strong economy by getting more proportion from global market. It takes more time to adopt free trade oriented economy policy for developing countries. The productions of those countries are affected negatively by the lack of capital, qualified labour force and sufficient technological advancements, hence there occur economical troubles. There are two alternatives for developing countries to solve the economical troubles. First one is trying to manufacture by importing intermediate products which are necessary for production. However; desired consequences cannot be fulfilled due to the fact that developing countries don't generally have sufficient knowledge, experience and technological advancements for production. The other alternative is adopting free market policy. After adopting free trade-oriented policy, those countries generally try to solve that problem by meeting the requirements of knowledge, experience and technological infrastructure for production via foreign direct investment and they try to form their production.

Exportation has become important for countries after the free market-oriented policy. Exportation came to prominence by globalization effect and it has become vital for countries in order to get economic growth. As it is crucial option for maintaining macroeconomic balance. There are a lot of factors which affect export revenue. After adopting free trade policy in 1980 and so on, export product diversification which was come across in literature frequently has risen to prominence. It can be noticed that export product diversification is attached more importance by developed countries in terms of economy. It is known that those countries have more product range than developing countries. Only export revenue is not solution for economies of the countries. Yet, it is expected that increasing foreign exchange earnings by product diversification contribute to maintain macroeconomic balance of the country so they grow economically and have more stable economic structure.

The process of adapting into free trade-oriented policy occurred in parallel with global advancements in Turkey which is a developing country. In 1970s, import substitution policy was dominant in the country. Desired economical goal couldn't be done because of the two big oil shocks occurring in that time and increasing external national debt. As a consequence of those events, outward oriented economy was adopted by shifting into free trade at the beginning of 1980s. Until the beginning of the 2000s, desired economic achievement could not be fulfilled because of the national and international adverse events, economic shocks, malfunctions in economical politics and instabilities. 2001 economic shock which happened harshly in Turkey was the turning point for the country. After the shock, the economical regulations encouraging privatization was the turning point for foreign investments in 2003. The gross national product per capita increased about ten thousand dollars thanks to macroeconomic stability. Turkey generated large amount of income especially after the 2004 by adopting outward oriented economy policy.

Export revenues are essential for keeping macroeconomic balances and providing economic growth. One of the most important factors which influence export revenues is exportation product diversification. In this regard, it has been aimed to research about outward oriented economy affecting exportation product diversification which has become popular in literature reviews recently. Turkey has been chosen as a sample data. Because; after the literature review it has been noticed that Turkey has never been used as the sample data in this topic, besides Turkey is a developing country. The aim of the research is to define how much free trade market affects the export product diversification when Turkey is used as a sample data. The research, different from other researches, is based on a single sample and it was carried out by Granger Causality Analysis based on Vector Autoregressive Method. As a result of analysis, it was determined that outward oriented trade affects exportation product diversification profoundly. Those results were evaluated by comparing with other researches in literature.

Trade Openness

It was impossible for countries to remain unresponsive to economic progresses caused by globalization which started at the beginning of 1980s. That period forced countries to be integrated into globalization process. In the process of that time, the value of trade openness increased and it became as the significant

parameter for the countries in terms of economy. There are many factors in the concept of outward oriented trade policy. Among those factors, difference between foreign currency inflow and outflow, applied tariff, limits, non-tariff barriers, portion of the exportation compared with general income are the most important ones (Şahbaz etal., 2016: 1107). Outward oriented trade concept varies depending on some factors. They are classified as; financial openness, commercial openness and the openness of labour force. In common, financial openness expresses the size of the countries' economy on financial transactions (Eren etal., 2019; 81-93). Commercial openness varies depending on market share of the exported country and competitiveness. In this study, considered trade openness type is commercial one (OPEN) representing globalization.

Trade openness is highly important parameter especially for countries to keep macroeconomic balance. The essence of that notion is activities that occur as an exportation and importation. In order to define how much the trade openness is effective for the economies of countries, the index of openness must be examined. The dimension of the trade openness is the rate of the countries' restrictions on exportation and importation (Candemir, 2006: 22). The dimension of the trade openness can be calculated by the proportion of countries total amount of exportation and importation with gross national product per capita. When deciding whether to invest or not, companies/countries pay most attention on trade openness. The more country has trade openness, the more they attract foreign investment to country (Chakrabarti, 2001: 99-100). The other reason for investor companies/countries to carry on business at open economies is that spillover effect can be carried out easily. Investor companies/countries would rather more productive investment fields. Countries adopted outward trade-oriented concept are preferred due the fact that spillover effect can be seen more clearly, host country has a higher competitive power, there are many promotions and proper regulations for investors. Thereby, the production is expected to be increased by the fact that host country supplies proper circumstances for production and local companies keep step with competitiveness (Lesher ve Miroudot, 2008: 16). So, it is likely to achieve economic goals of both host country and investor country/company.

There are a lot of researches about trade openness in literature. In those researches it can be clearly seen that trade openness affects economic growth positively. It was observed that export incomes increased by trade openness contribute to national income quite a lot. When calculating national income, the increase in exportation

revenue has positive effects on gross national product per capita meanwhile decrease in importation has negative effect on gross national product per capita. Hereby, trade openness is quite significant for the individual and society because of its effect revenue increase (Güngör and Kurt, 2007: 198).

Those countries adopting outward oriented economy policy have basic aim of manufacturing products that they want to export, so they can keep the macroeconomic balance and have more strong economy. In this step, developing countries aim to supply necessary capital, knowledge, experience and technological devices for production and to advance production phase. Thus, the first aim of those countries is to attract foreign investments by adopting outward oriented economy policy. In the study made by Yapraklı (2007), it is emphasised that trade openness contributes to economy of the country quite a lot as a result of globalization. With the increase of exportation, it is possible to raise foreign exchange revenue, to lower restrictions on foreign exchange, to raise the revenues by importing capital goods, so it is likely possible to keep balance between exportation and importation and to supply essential technological devices. Thus, it is expected to get efficient production by ensuring required conditions. Moreover, it is likely possible to get quite much income by manufacturing desired products and reaching international markets (Yapraklı, 2007: 68-69).

Diversification of Export Products and Conceptual Framework

In 1980s, the word of export products diversification was seen in literature frequently. Adopted outward oriented policy along with free market economy led to export product diversification. Export product diversification, mentioned especially at foreign trade is known as the variances at the countries' export product carts (Gozgor and Can, 2016a: 21594-21603). Countries set their export product carts by forming their own production as much as they can. Countries try to contribute to product diversification by changing share of the products and adding new kinds of products. Because of the globalization, diversification of the export product has become crucial for the economy of countries. Exportation is vital especially for maintaining macroeconomic balance. Hence, it is necessary to focus on export product diversification so as to maintain macroeconomic balance and to grow economically (Can and Gozgor, 2017: 1-5).

Gürkan CUNDA

Most of the countries turn their face into exportation and diversification of export product in order to keep macroeconomic balance. Nevertheless, not all the countries are able to achieve desired goals of export product diversification. Those countries adopting outward oriented economy policy can contribute to economic growth by getting huge amount of income when they are able to achieve diversification of the export product (Gozgor and Can, 2016c: 1-5). For instance; Countries like Chile, Costa Rica, Malaysia and Thailand achieved diversification of the export products successfully and acquired significant economic growth. The most important reason of the success is that those countries adopt outward oriented economy policy. Costa Rica which applied product diversification successfully adopted outward oriented economy gradually. They acted in unison by integrating government with private sector. Private sector was supported efficiently. Tariff was reduced for the policy of export product diversification. Faced economic problems were solved swiftly. Unemployment rate decreased thanks to acquired success. Rodrigues (2002) points out that Costa Rica carried out outward oriented economy policy quite successfully by encouraging integration of both local and international collaboration, resolving contraction problems in domestic markets, low unemployment rate and diversification of the export products (Rodrigues, 2002: 107–128). On the other hand, the common traits of the countries achieving meaningful growth by applying export product diversification successfully were emphasised in literature many times. Applying decision taken for export product diversification, adopting product diversification policy by everyone including private sector and giving necessary promotions for foreign investments are common prominent traits so as to be successful.

Export product diversification has positive contribution to economy of the countries. Production efficiency is increased by providing information transfer as a result of product diversification. Besides, it aids to deflate by providing domestic rivalry. As a consequence of trade openness, new production techniques provide efficiency in production by using technology more efficiently (Misztal, 2011: 56). It is possible to acquire new production techniques, more functional management and entrepreneurism by providing product diversification. Thus, the capital stock of the country can be used more efficiently and new industry kinds can be opened by extending available ones. So, the economy of the country is expected to grow significantly (Al-Marhubi, 2000: 559). As a result of export product diversification, increased number of exportation companies provides reinforcement in relationship among sectors and overcoming production deficiencies. Thereby it is

likely to increase efficiency (Nicet-Chenaf and Rougier, 2008: 8). The other benefit of the export product diversification is that it provides maximum profit by using same intermediate product at more than one production through enhancing economy of scope (Yokoyama and Alemu, 2009: 65). Furthermore, with product diversification, it is possible to contact with other countries at international market and to get economic cooperation with them (Gouvea etal., 2013: 48). Product diversification let the countries benefit from many factors affecting production such as; qualified labour force and different business lines (Cabral and Veiga, 2010: 7). Product diversification also contributes to the fact that increased exportation income lead to economic growth and economic stability (Al-Marhubi, 2000: 559). Likewise, negative adverse in exportation affect investment decisions negatively (Dawe, 1996: 1912).

As it can be seen, export product diversification has a lot of positive effects on economy of the countries. Hence, it is especially crucial for developing countries to provide export product diversification.

Literature Reviews about Export Product Diversification

After conducting literature review, it was noticed that there is no study about trade openness and export product diversification. The studies are generally about economic growth and export product diversification. After conducting national literature review, it was realized that there is no study about economic growth and export product diversification. Therefore, literature review was conducted by examining studies about direct foreign investments and export product diversification.

The most essential condition for providing export product diversification is that countries must adopt outward oriented economy policy. Developing countries adopting outward oriented economy policy aims to attract direct foreign investments to their country. By this way, it is possible for them to provide required capital, essential information and technology, qualified labour force and to overcome infrastructure deficiencies. So those countries are expected to form their export product carts by increasing their own production. For this reason, we conducted literature review by focusing on direct foreign investments, export product diversification and economic growth. On those related literature reviews;

It was determined that direct foreign investments have no effect on export product diversification as regard to study made by Bebczuk and Berretton (2006). In

this study, 56 different countries were used as an example data. Also Fixed Effect and Random Effect Method was used in this study which includes the years of 1962-2002.

In reference to study made by Banga (2006), it was detected that investments made by American companies to India affected export product diversification positively but investments made by Japanese companies couldn't contribute to export product diversification adequately. India was used as an example data by utilizing Panel Least Square Techniques, Fixed Effect and Random Effect Method at this study which includes the years of 1994-2000.

As a result of analyzing study made by Kurt and Berber (2008), it was identified that there is reciprocal causality relationship between growth and importation and there is single-acting causality relationship from importation to exportation and same from exportation to growth. Turkey was used as an example data by utilizing Vector Auto Regressive Analysis Method at this study which includes the years 1989-2003 as period of 3 months.

According to study made by Al-Kawaz (2008), it was found out that direct foreign investment and qualified companies increases diversification, trade gaps encourage diversification. But high inflation does not support diversification. Oil rich Countries, such as Indonesia, Iran, Kuwait, Oman and Venezuela, were used as an example data by utilizing Panel Data Analysis Method at this study which includes the years of 1991-2001.

It was concluded that there is positive correlation between growth and product diversification as regard to study made by Doğruel ve Tekce'nin (2011). In this study, Oil exporting countries in Middle East and North Africa were used as an example data. Also Panel Data random method was used in this study which includes the years of 1992-2000.

It was found that has direct foreign investment has contribution to export product diversification according to study made by Tadesse and Shukralla (2013). In this study, 131 different countries were used as an example data. Also Parametric and Half-Parametric Method was used in this study which includes the years of 1984-2004.

The study made by Longmore etal. (2014), reveals that direct foreign investment contributes to product diversification. Trinidad and Tobago were used as an example data at this study which includes the years 1980-2011.

In reference to study made by Fonchamnyo (2015), it was concluded that direct foreign investment does not contribute to all countries equally but it generally encourages product diversification. Chad, Gabon, Ecuador Guinea and Congo, the members of Economic Community of Central African States, were used as an example data at this study.

It was concluded that direct foreign investment increases export product diversification according to study made by Can and Kösekahyaoğlu (2016). In this study, 16 developing countries were used as an example data by utilizing Least Square Dummy Variable Approach.

In reference to study made by Mubeen and Ahmad (2016), it was detected that direct foreign investment, global total capital return and foreign exchange rate increases the export product diversification. It was also deduced that trade gap causes concentration rather than product diversification. Pakistan was used as an example data by utilizing Vector Auto Regressive method at this study which includes the years of 1980-2015.

It was concluded that export product diversification has positive effect on growth only in the example of Sierra Leone as regard to study made by Buysse etal. (2018). 11 Sub-Saharan African Countries were used as an example data at this study which includes the years of 1970-2010.

Materials and Econometric Model

After conducting literature reviews, it was realized that there are limited number of studies about trade openness and export product diversification. Besides no study using Turkey as the example data has been seen. Therefore, the effect of trade openness on export product diversification was examined at this study by using Turkey as the example data. As there is no study using Turkey as the example data, it is expected that this study fills the gap in literature and it will be distinctive study. Moreover, only one country was used as an example data rather than multiple countries and Turkey was examined specifically. The aim of the study is to analyze the effect of trade openness on export product diversification.

In this study, (THEIL) index represents export product diversification and trade openness variable (OPEN) represents globalization. The required data were provided by those ways; Theil index was elicited from IMF database and trade openness (OPEN) was elicited from UNCTAD database. THEIL variable, representing export product diversification, was included to model by conducting logarithmic transformation. Trade openness variable (OPEN), represents globalization, was included to model directly as it was written as percentage (%). Being different from other studies in literature, this study has been based on single example and Vector Auto Regressive method was used. The period of 1970 to 2010 years were used as data in the study. It contains information until the year of 2010 because of the data restriction. Despite limited data, Theil index value containing wider range of time period, 40 years, was preferred in the study. Wide range of time period was preferred so as to avoid econometric and statistical problems while analyzing model. Besides sample size is quite enough.

Econometric Method

The effect of trade openness on export product diversification is analyzed by using Vector Auto Regressive Method while Turkey is being used as example data. This method is very efficient in identifying causes and effects of long and short period variables. This method is one of efficient methods that is used when analyzing time series related with each other and analyzing improper shocks occurring at variables. According to results of the research made by Sims in 1980, it was expected to examine the correlation among variables by Vector Auto Regressive method. On the other hand, the result of the analysis is affected by the fact that there is multidirectional relationship between parameters based on economy and there occur problems while detecting dependent and independent variables. So when faced with those problems, it is obligatory to restrain some part of the model in order to solve them (Darnell, 1990: 114-116). Therefore, those mentioned problems were solved by Auto Regressive Method which has been developed for solving the problems of the equations systems containing parameter variable. The other strong feature of the VAR method is that the dependent part of the deferred value is added to model. That provides opportunity to estimate accurately (Kumar, etal., 1995:365).

In the research that time series of 1970-2010 were used, it was analyzed whether the first added variables to model were constant or not. If variables were constant,

the scale of constancy of them was analyzed by utilizing unit root tests. Then lag length of them was measured by using different kind of information criterion. So as to understand whether the model is stationary or not, it was examined whether AR characteristic polynomial reverse roots are inside of the unit circle. Before proceeding to analyze, whether VAR method which was used for analyzing has constructional problem or not (whether it has normal distribution with autocorrelation, variance and multiple linear regression problem) was analyzed by using LM, White and Normality Tests respectively. In the next step, the long-term relationship among the variables in the study and the aspect of this relationship were analyzed by Granger Causality Test. In the last part of the study, the relationship among variables was examined by impulse response functions and variation decomposition method.

Phillips-Perron Unit Root Test

Variables must be constant in order to get better results in applied model. For this reason, the variables that would be used in the study must be constant series in other words they shouldn't contain unit root term (Erk, etal., 1999: 5). During the analyzing process, it is usually important whether the time series are constant or not. If the time series were not constant, you can get different results. For instance; analysis results conducted with in constant series can bring regression problems, furthermore the results with inconstant variance can be suspicious (Granger and Newbold, 1974, 111-120).So the constancy must be determined first in the study that is planned to use VAR analysis. Therefore variables must be put into unit root test. In this study, Phillips-Perron (PP) Unit Root Test, commonly preferred test, was used for determining the constancy of the series.

As the series used in the study contain trend, trend constant model was chosen in analyzing unit root test. Whether time series used in the study contain unit root or not was analyzed by PP Unit Root test and results of the that analysis is shown in Table1.

Table 1: The Results of Phillips-Perron Unit Root Test

	level**		1. Difference	
	With Trend & Constant		With Trend & Constant	
	Test Statistics	Critical Values	Test Statistics	Critical Values
Logtheil	-1.928635	-4.205004 -3.526609 -3.194611	-4.856699*	-4.211868 -3.529758 -3.196411
Open	-2.608291		-6.650016*	

** It expresses the series which is in the %1 significance level*
*** It was chosen automatically according to Bandwidth Newey-West approach.*

After scanning Table 1, it can be noticed that not all the series are constant in level I(0) and they are constant in consequence of differentiation process I(1). As mentioned above, zero hypothesis dosen't fulfil the conditions at first difference level of all variables but the alternative does.

Determining Proper Lag Length According to Different Information Criterions

Proper delay count must be defined firstly so as to construct VAR model (VAR (p), p represents delay count). There are a lot of information criterions developed for defining proper delay count (Mucuk and Alptekin, 2008: 165-166). In this study, those information criterions were used so as to define proper delay count; Ratio (LR), Final Prediction Error (FPE), Akaike (AIC), Schwarz (SC) and Hannan Quinn (HQ). Owing to the fact that annual data was used and the number of the observation is low, the maximum lag length is defined as 2 in the study and lag length which makes the criterion value of Ratio (LR), Final Prediction Error (FPE), Akaike (AIC), Schwarz (SC) and Hannan Quinn (HQ) lowest was determined. The results of the that analysis is shown in Table 2.

Table 2: Proper Lag Length According to Different Information Criterions

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-87.73260	NA	7.28e-05	7.498608	7.791138*	7.579743*
1	-50.05642	54.25369*	6.98e-5*	7.364514*	9.412225	7.932462
2	-26.49826	22.61583	0.000338	8.359861	12.16275	9.414622

**It shows lag length chosen by criterion.*

When examining Table 2, it can be spotted that the proper delay number of the model is 1. Thereby model used in the study was analyzed by VAR(1).

Before proceeding to analysis of VAR(1) model, whether the model has constant stance or not must be examined. Whether reverse root of AR characteristic polynomial is inside of the unit circle root must be analyzed. Whether the model has constant or steady stance is formed according to value of coefficient matrix. As a result of test, it can be said that acquired coefficient series has steady stance. In the exact opposite situation, at least one of the acquired eigenvalue is not inside of the unit circle, it is stated that the model has steady stance in other words not constant one (Batmaz and Tunca, 2007: 218). Namely those values must be lower than "1".

AR characteristic polynomial for VAR(1) model was analyzed by reverse unit root test and result of the that analysis is shown in Table 3.

Table 3: Reverse Root Values of AR Characteristic Polynomial

Root	**Module**
-0.587604	0.587604
0.457830	0.457830
0.403636	0.403636
0.092749 - 0.383099i	0.394166
0.092749 + 0.383099i	0.394166
0.054065	0.054065

As it can be seen from the Table 3, reverse roots are inside of the unit circle. Reverse roots are lower than 1and VAR model provides appropriate conditions for steady. In order to test whether VAR model has any structural problem or not, the problem of autocorrelation, heteroscedasticity and multicollinearity in the model that used in study was checked. Autocorrelation problem was analyzed by using LM Test and result of that analysis is shown in Table 4.

Table 4: Autocorrelation- LM Test Results

Delay	LM-Test Statistics	Probability Level
1	27.22595	0.8536

Note: *H_0 hypothesis means "There is no autocorrelation problem in series"*

When examining Chart 4.4, it has been defined that error term which belongs to VAR model doesn't have any autocorrelation problem.

Whether error terms have heteroscedasticity problem or not was analyzed by using White Test and result of that analysis is shown in Table 5.

Table 5: White Heteroscedasticity Test Result

X-Square Test İstatistiği	Degree of Freedom	Probability
257.7722	252	0.3879

Note*: H_0 hypothesis refers "series are distributed by constant variance"*

When examining White Test results in Table 5, it was concluded that the zero hypothesis is accepted, error terms belonging to VAR(1) model doesn't have heteroscedasticity problem and the model has constant variance structure.

Whether analyzed model shows normal distribution or not was analyzed by using Jarque-Bera Test and result of that analysis is shown in Table 6.

Table 6: Normality Test Results

	Skewness	Kurtosis	Jarque-Bera
X Square Value (Joint)	4.958744	4.256958	9.215702
Probability Value (Joint)	0.5491	0.6419	0.6844

When examining Table 6, it is distinguished that error terms show normal distribution in regard to Skewness, Kurosis and Jarque-Bera Test results. According to results of description statistics, it has been confirmed that VAR(1) model used in study meets the expected requirements and it was proceeded to Granger Causality Analysis which was planned to implement on VAR model.

Granger Causality Analysis

After studying description statistics about VAR model, whether variables in the model has relationship among each other in short term was analyzed by utilizing Granger Causality Test. The result of Granger Causality Tests is shown in Table 7.

Table 7: Result of Granger Causality Test Analysis

Hypothesis	X-Square	Probability
DOPEN variable is not cause of the DTHEIL variable	2.835256	**0.0922***

** It refers that there is causality relationship at 0.01 significance level*

When examining Granger Causality Test results in Table 7, it was determined that there is unidirectional causality relationship from trade openness (OPEN) variable to export product diversification (THEIL) variable at 0.01 significance level.

It was realized that trade openness (OPEN) has more impact on export product diversification variable when comparing with other variables. After conducting literature review, it has been determined that we have acquired similar analyse results with Mubeen and Ahmad (2016) and Agosin and others (2012). Consequently, trade openness has effect on export product diversification.

Conclusion

Outward oriented economy policy has become political tool for countries as a result of globalization. In the process of globalization, those countries having enough capital stock, necessary infrastructure and technological advancements for production has been integrated to process easily. They could acquire significant amount of income during that period. However, the process was not same for developing countries. Some of the developing countries formed their production and adapted into globalization even if it happened slowly. Some of them had troubles during adaptation process and faced with serious economic problems. Developing countries adapting to globalization process slowly adopted outward oriented economy policy in order to deal with the problems of required capital and technological infrastructure. As an obligation to outward oriented economy policy, they tried to attract direct foreign investment to their countries. Successful countries supplied needed capital, technological infrastructure, information and experience by investments to those countries then they began to shape their own

production. So they began to create their own export product cards as a result of trade openness. After conducting literature review, it has been noticed that those countries adopting outward oriented economy policy achieved fair enough success and showed significant economic progress.

Turkey, developing country, went through same process. With the regulations done on 24 January 1980, free market economy policy was adopted and many economic decisions were performed so as to attract foreign investments. However, expected success couldn't be achieved until the beginning of 2000s. International and national incidents played important role in that failure. As required direct foreign investments couldn't be attracted during that period, the needs couldn't be supplied like needed capital...etc. Therefore, economic stabilization couldn't be provided. 2003 was turning point for Turkey. A lot of direct foreign investments came to Turkey in 2003 thanks to Privatization regulation of law no 4971. The gross national product per capita increased to 10 thousand dollars level with the impact of investments to Turkey. It didn't increase above that level despite all regulations and precautions. During that period, Turkey was trapped in middle income. When evaluated roughly, Turkey is one of three countries which have been trapped in middle income in longest period of time since 1950s. Therefore, it can be clearly seen that export revenues are crucial for Turkey when considering direct foreign investments' contributions to country after 2003. So it is beneficial for Turkey to focus on exportation and export product diversification. In this regard, it is important for Turkey to manufacture high value productions and increase export revenues in order to provide stabilization in economy.

When carrying out literature review, no study about researching trade openness' impact on export product diversification has been seen. Thus the research has been done after making plan about this topic. Turkey has been chosen as sample data owing to the fact that it is developing country and it is one of three countries which have been trapped in middle income in longest period of time. In study, Granger Causality Analysis, related with VAR method was conducted. This study is different from other studies because of the fact that the research was analyzed VAR method by choosing one sample data. The years from 1970-2010 have been chosen for examining on account of data restriction. As a result of all those analyses, it has been determined that trade openness affects export product diversification at 0.01 significance level. It has been also determined that there is unidirectional causality relationship from trade openness to export product

diversification. When evaluating those acquired results, it has been noticed that trade openness affects export product diversification drastically. When compared with other studies, it has similar results with other results in those studies made by Mubeen and Ahmad (2016) and Agosin, etal. (2012).

Those acquired results have meaningful and important messages especially to Turkey which is developing country. In order to get off middle income trap and become one of the prosperous countries, Turkey has to increase export revenues. On the other hand, it is significant for Turkey to provide new industry fields and employment area because of the fact that Turkey has young population ratio, the population is increasing year by year and about 750.000 people try to be employed every year. Therefore, Turkey has to increase export revenues and widen export product carts by manufacturing high value products. It is possible to provide stabilization in economy by creating different industrial production fields, increasing export revenues and lowering unemployment rate.

The results obtained from study were expected to be parallel with other results of studies in literature. As expected, analysis results show that trade openness has impact on Turkey's export product diversification at 0.01 significance level. It was expected that there were more interaction owing to the fact that Turkey has many advantages in terms of direct foreign investments. Yet there happened lower rate of interaction than expected although it was concluded that trade openness has impact on export product diversification. The cause of that situation can be explained that both local companies and foreign companies investing on Turkey focused on domestic markets. In as much as Turkeys' having young population rate and high potential market makes domestic market more attractive. It can be stated that expected outcome couldn't be taken because of the fact that the productions of foreign investors and local manufacturers were adjusted for domestic markets. Hence, it is essential that politicians should enact proper legislations and regulations aiming encouraging local and foreign investors to manufacture export products. On the other hand, it is anticipated that convincing investor companies which are eager to manufacture value added products and seek for qualified and cheap labour force contributes to export product diversification. When evaluating briefly, the authorities of countries had better prepare strategic plans according to outward oriented economy policy and perform it so as to increase export product diversification. Otherwise the anticipated positive contribution of outward oriented economy to export product diversification never happens.

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THEORETICAL AND APPLIED STUDIES ON TURKISH ECONOMY

The book, entitled "Theoretical and Applied Studies on Turkish Economy, Vol I", aims to make contributions both to academic world, namely to the literature of economics and to real world through the formation of national economic policies in various aspects. The book is designed to examine Turkish economy from different perspectives and to contribute to the enhancement of competitiveness. For this aim, 46 scholars, 3 editors and the precious employees of IJOPEC Publications came together and published this book. In all chapters, current issues are tried to be examined through state-of-the-art econometric approaches and rigorous analysis. Like any other books, the process was toilsome and demanding but the aim is divine: to contribute to the literature and to Turkish economy. Although tiring, subsequent volumes of the examination of Turkish economy is planned to be published in the future.Consequently, any academician, or practitioner who is interested in Turkish economy and its connections with global economy would benefit from the book.

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