

## **Sevilay Konya**

Selçuk University

Department of Foreign Trade, Taşkent Vocational High School, Turkey, Konya

E-mail: sevilaykonya@selcuk.edu.tr

## **Zeynep Karaçor**

Selçuk University

Department of Economics, Faculty of Economics and Administrative Sciences , Turkey, Konya

E-mail: zkaracor@selcuk.edu.tr

## **Pinar Yardimci**

Selçuk University

Department of Foreign Trade, Silifke Taşucu Vocational High School, Turkey, Konya

E-mail: pinar@selcuk.edu.tr

# **THE MIDDLE INCOME TRAP: AN ASSESSMENT IN TERMS OF TURKISH ECONOMY**

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### ***Abstract***

*Middle income trap is the condition of having the per capita income in a specific level and not having any increase in this income level for many years. The concept of middle income trap is a subject that is frequently discussed in the economic literature in recent years. In this study, it is aimed to evaluate whether Turkey is in middle income trap or not. In addition, the effect of manufacturing industry's share in GDP, schooling rate in higher education and the share of domestic savings in GDP on per capita income level was examined by time series analysis in this context and arguments related with the middle income trap was made. The relationship between the variables in the study was analyzed by Engle Granger cointegration and Engle Granger causality analysis methods. According to the obtained results, a long term relationship was found between the variables which we use. The share of the manufacturing industry within GDP occurred as the cause of the per capita income level. No causality relationship was found between the other variables. According to the evaluations, it is determined that Turkey is not in the middle income trap however it has the risk of having middle income trap.*

***Keywords: Middle Income Trap, Turkish Economy, Per Capita Income***

## 1. INTRODUCTION

Middle income is an old concept in the literature of economics. Alarming economies are faced with the risk of not being able to reach their income level. These countries have had a growth adventure but these countries have not survived the growth adventure. Countries with a middle income level have emerged from a low income level with rapid growth, but have started to slow down when they reach the middle income level. The main reason for the fact that these countries have entered the middle income level has been the wages. Economies with low incomes will initially be cheap and able to work at high levels with fast steps. While this may seem advantageous, the situation at the middle income level, which means higher wages, is coming to an end and thus losing its competitive power is losing momentum. This is why it is not possible to increase productivity and raise the level of income if technology can not be developed. Countries can not escape from the middle income trap (Karahan, 2012: 96-97).

Every four years the World Bank publishes economic development studies on the economic development of East Asian countries. For the first time in the report published in 2007, "Middle Income Trap" was mentioned. The countries included in the middle income group have grown at a lower rate than the countries included in the low and high income groups. The World Bank's so-called report and the concept of the Middle Income Trap have become debatable among economists. Due to the fact that Turkey also has middle-income, the middle income trap has become one of the most controversial topics in the Turkish economy in the recent years (Alçın and Güner, 2015: 28).

This study analyzes the middle income in Turkey. In the study, firstly the conceptual framework of the middle income trap was referred and its place in the literature was expressed by national and international studies. A general assessment has been made as to understand whether the Turkish economy is in the middle income trap. A time series analysis was conducted with annual data covering the period 1971-2015 in Turkish economy. This study has been completed with policy recommendation under the light of assessment of the results and the results obtained from the analysis.

## 2. THE CONCEPTUAL FRAMEWORK OF THE MIDDLE INCOME TRAP

The middle income trap is called a state in which an economy can not rise to a higher income level for a certain period of time after reaching the middle income level (Karanfil, 2016: 220).

The concept of the Middle Income Trap was taken by Barry Eichengreen in his study of economics. According to Eichengreen and his friends, the middle income trap is evaluated according to the following criteria (Eichengreen, Park and Shin, 2011: 14):

- The level of per capita income reached \$ 16,740,
- The reason of USA having reached to 58% of per capita income level,
- And share of the employment rate within manufacturing industry has 23%.

When the middle income trap approach was first expressed, 20% of the per capita income in the USA was referred to the middle income trap in terms of the economies. According to today's approach, the per capita income in the USA is about \$ 50,000, and the 20% of it is earned at \$ 10,000, the middle income level is calculated as \$ 10,000 / year (Dündar, 2013: 6).

While the idea expressed in the background of the concept of middle income trap is technology data; to increase investment and production capacity, to transfer to the modern segments where productivity is higher than traditional sectors such as low income agriculture and crafts. In this period, high growth rates are realized during the periods of transition to economic development (Gürsel and Soybilgen, 2013: 2).

It is said that the middle income trap emerged at the middle income level when it comes to some factors that prevent it from developing. These factors include: the fact that the factors of social inequality occur at very high levels, the low share of value added goods in the international division of labor, the inability to complete some strategic transition processes and prevent progress at other stages, the emergence of a non-productive class due to the need and assistance of the poor, increasing polarization in the segments of society, conflicts arising from the change of the safety freedom balance against freedom, the increase of regulations and the difficulties of controls, deepening of the unfair competition environment, the gains of the rents obtained due to the acceleration of urbanization are realized on the gains from the productive activities, the loss of development of some regions due to regional polarization (Türkkan, 2016: 796).

The initial processes of economic growth are fast and easy. Rapid growth is achieved by passing from traditional agricultural understanding to light industrial goods. In this case it means more workforce in rural economy and unlimited resource transfer in urban economy. The high profits in the urban economy encourage capital accumulation and the growth rate for capital concentration is increasing. However, as economies approach the middle income trap, the sources of easy growth based on the high profits of capital to urban labor transfer and urbanization are losing stimulus power. The profitability of the capital is depreciating. After this process the resources of growing up have to be obtained from productivity. The process of increasing productivity should be carried out through investments in human capital education and research and institutional reforms. This process is described as a middle income trap by the economists (Yeldan, 2012: 26).

The most basic feature of low income countries is that they are made up of cheap labor. Countries in this income group have cheap technology with simple technology from abroad. These countries have a competitive edge over labor intensive industries on international markets. In countries with low income,

transition from agriculture to simple technology is very fast. Low income countries can reach middle income level. The realization of the labor force's high industrialization and the increase in the level of unemployment cause wages to increase and the competitive advantage to decrease. Countries can not reach the upper income level, even if they are at middle income, because productivity is not achieved in the capital with the current technology conditions. Countries that can not reconcile with the countries of human capital and technology are those that fall into the middle income trap (Korkmaz, 2016: 22-23).

Countries that can not raise r&d spending to a sufficient level based on technological infrastructure and can not increase production with innovative approaches are caught in the middle income trap. The concept of middle income trap is expressed by two different approaches. The first approach is the capture index. The catch up index has been raised by Woo, and it has created an index comparing the US economy with other countries. Countries with a capture index greater than 55% are high income countries, countries with a catch index between 55% and 20% are middle income countries, countries with a catch index lower than 20% are considered low income countries (Karanfil, 2016: 220-221). The second approach is categorized by the World Bank:

Table 1

## Economy Groups by World Bank Classification

Economy Groups	Average Annual Per Capita Income
Low Income Economies	Under \$ 1035
Lower Income Economies	Between \$ 1036-4085
Middle income Economies	Between \$1036-12615
Top middle income Economies	Between \$ 4086-12615
High income Economies	\$ 12616 and over

Source: World Bank, *World Development Report 2013*

There are a number of cycles that generate and nurture the concept of middle income. The cycles are as follows (Türkkan, 2016: 796-798):

Cycle 1: When the middle income level is reached in developing countries, the capacity to produce valuable goods with low added value arises. But those countries with high value added will come from developed countries. This situation will cause developed countries to abandon activities with low added value and unfair competition. As a result, they will ask for developing countries with low added value. For this reason, the developing countries will continue to produce goods with low added value, and the result will be the result of repetition.

Cycle 2: When the middle income level is reached, social inequality and polarization in the developing countries will occur at the maximum level. This will result in the emergence of a conflict environment and limited freedom. This phenomenon will lead to the emergence of unfair competition both in politics and in the economy. Ultimately, high creativity will limit the motivation of work and entrepreneurship, so that it will not be possible to complete some of the strategic transition processes, and society will face a middle income trap.

Cycle 3: Another cycle involves talking about the tendency to help and cultivate. In countries that are exposed to such a situation, the income inequalities in the middle income society are at a very high rate, and in those who are in a difficult situation, the tendency of help will be large. In such an environment, both the high income and low income segments will rise to a level of satisfaction, and consequently a solid balance of middle income levels will be the subject.

Cycle 4: There may be a loop that performs some of the other transition times that are delayed completion in the negative direction. This hypothesis is mainly due to the high political cost in some transitional periods. All these factors will support each other and cause a vicious circle.

Cycle 5: The rents obtained as a result of rapid urbanization, industrialization and outward opening cause a middle income vicious cycle to rise above potential gains. Here, it is mentioned that the rational entrepreneur obtains rent creation activities which are realized in a wide range of possibilities of differentiation of goods and services that are open to the outside, not open to external competition, and as a result the profit rates are also very high. This means that competition processes are damaged.

Cycle 6: Historical, geographical, and cultural factors underlying the process of economic development are becoming a center of life for those who live in other regions, as some regions become part of a rapid development process. For this reason, a structure is emerging in the country where underdeveloped countries have lost their dynamism and contributed to the developed regions. When the middle income level of the country is reached, the developed regions have the structural characteristics and performance of the developed countries, while the undeveloped regions maintain the basic characteristics of the underdeveloped countries. For this reason, the concept of a middle income trap based on the geographical structure emerges.

The concept of middle income trap was used historically for the first time in the report of the World Bank named East Asian Renaissance in 1960. In the report is mentioned, that in the 20th century, middle and low income countries, where middle and low income countries, which were able to innovate quickly and economically with each other, were influencing each other but were not able to follow these developments, remained at the income level and the convergence hypothesis was not valid. In other words, it is expressed that the middle income is the convergence of the countries. The middle income trap is, in its simplest terms, defined as the income level of the countries in which economic growth is financed by the accumulation of physical factors and which has not shown a structural change towards labor and capital markets, which increases productivity (Dündar, 2013: 18). After reaching the middle income level, a number of factors are emerging that explain the slowing down of the growth rate (Türkkan, 2016: 798-799):

- The fact that there is a limit to the appreciation of indigenous money, and therefore there is no income increase due to the appreciation of domestic money,

- Closer to rapid and easy productivity growth,
- Outsourcing from the market and approaching the border in foreign capital,
- Approaching the border under institutions that can be easily installed,
- Approach of the technology that is easy to transfer and obtained and
- Factors such as approaching the mentality of easily changed structures are revealed.

### 3. MIDDLE INCOME TRAP IN TURKEY

The Turkish economy remained at the lower middle income level during the period from 1950 to 2005. After 2005, Turkey has taken place in the upper middle income group.

Table 2

Selected Economies That Became Lower Middle Income After 1950 and Graduated to Upper Middle Income

Country	Area	Year country turned lower middle income	Year country turned upper middle income	No of years as lower middle income (year)	Average per capita GDP growth rate in transition period (%)
China	Asia	1992	2009	17	7,5
Malaysia	Asia	1969	1996	27	5,1
Republic of Korea	Asia	1969	1988	19	7,2
Thailand	Asia	1976	2004	28	4,7
Bulgaria	Europe	1953	2006	53	2,5
Turkey	Europe	1955	2005	50	2,6
Costa Rica	Latin America	1962	2006	54	2,4
Oman	Middle East	1968	2001	33	2,7

*Source: Felipe et al., 2012: 22, [http://www.levyinstitute.org/pubs/wp\\_715.pdf](http://www.levyinstitute.org/pubs/wp_715.pdf).*

As seen in Table 1, Bulgaria, Costa Rica and Turkey have remained fifty years in the middle income group. China has reached the upper middle income level in 2009 and has reached the highest growth rate among 10 countries. On the other hand, the Republic of Korea remained 19 years in the upper middle income group in 1998, and the growth rate realized as 7.2% in this process.

Eichengreen, Park and Shin (2011) base their middle income trap on certain criteria. According to these criteria, it is required to have per capita income level in the amount of 16,740 dollars in order to be able to speak about middle income trap in a country. Table 3 shows that the per capita income level in Turkey did not reach this level in the 1990-2016 period.

Table 3

Comparison of Turkey and USA Number of Per Capita GDP in terms of  
Middle Income

Years	Per Capita GDP in Turkey (\$)	Per Capita GDP in USA (\$)	TURKEY/USA* %100
1990	2794,4	23954,5	% 11,66544908
1991	2735,7	24405,2	% 11,20949634
1992	2842,4	25493	% 11,14972738
1993	3180,2	26464,9	% 12,01667114
1994	2270,3	27776,6	% 8,173426553
1995	2897,9	28782,2	% 10,06837559
1996	3054	30068,2	% 10,15690996
1997	3144,4	31572,7	% 9,959236936
1998	4496,5	32949,2	% 13,64676532
1999	4108,1	34620,9	% 11,8659538
2000	4316,6	36449,9	% 11,8425565
2001	3119,6	37273,6	% 8,369462569
2002	3660	38166	% 9,589687156
2003	4718,5	39677,2	% 11,89222022
2004	6040,7	41921,8	% 14,40944807
2005	7384,4	44307,9	% 16,66610243
2006	8034,9	46437,1	% 17,30276008
2007	9709,5	48061,5	% 20,20224088
2008	10850,7	48401,4	% 22,41815319
2009	9036,5	47001,6	% 19,22594124
2010	10672,1	48373,9	% 22,06169029
2011	11341,1	49790,7	% 22,77754681
2012	11720,3	51450,1	% 22,77993629
2013	12542,9	52787	% 23,76134275
2014	12127,2	54598,6	% 22,21155854
2015	10979,5	56207	% 19,5340438
2016	10787,6	57466,8	% 18,7718822

*Source: World Bank, World Development Indicators and Authors's Calculations*

The second criterion is that the per capita income level of the USA has reached 58%. When Table 3 is analyzed, it is seen that this ratio (TURKEY / USA \* 100%) realized between 8.17% and 23.76% between 1990-2016. Accordingly, Turkey is not in middle income trap.

In another definition, the per capita income level of a country in the ratio of % 20 of the per capita income in the USA shows that this country is in the middle income trap. According to Table 3, it can be said that Turkey is a country which has the risk of having middle income trap.

Table 4

## Share of Employment Rate in Manufacturing Industry

Years	Total Employment (million)	Manufacturing Industry Total Employment (million)	Manufacturing Industry Employment/Total Employment(%)
2000	21580	3638	16,86
2001	21524	3581	16,64
2002	21324	3731	17,50
2003	21147	3663	17,32
2004	19632	3727	18,98
2005	20067	3973	19,80
2006	20425	4044	19,80
2007	20738	4064	19,60
2008	21194	4214	19,88
2009	21277	3870	18,19
2010	22594	4216	18,66
2011	24110	4397	18,24
2012	24821	4420	17,81
2013	25524	4632	18,15
2014	25933	4936	19,03
2015	26621	4956	18,62
2016	27205	4915	18,07

*Source: Turkish Statistical Institute and Authors's Calculations*

The third criterion is that the share of the employment rate within manufacturing industry is 23%. When Table 4 is considered, share of the employment rate within manufacturing industry realized between 16,86% and 19,88% between 2000 and 2016. This ratio is on average 18,42% period of 1990-2016. According third criterion, Turkey is not in middle income trap.

According to the criteria expressed by Eichengreen, Park and Shin (2011), it can be stated that Turkey is not in the middle income trap.

#### 4. LITERATURE

Studies related with the middle income trap have occurred recently. Two descriptive questions occur in the literature which occurred recently. First of them is: "How is the threshold for the middle income status defined?" and the second one is "How is the trap determined?" (Im and Rosenblatt, 2013: 4). This section includes studies which are concluded for both Turkey and world countries.

Ohno (2009) based his studies on descriptive statistics. In general, he studied the East Asian and East African countries, especially the Vietnam economy. He mentioned that Vietnam is under the risk of middle income trap. As a result of the study, he suggested that dynamism must be provided to the private sector with government policies rather than the opinion of "laissez faire" in order to get rid of the middle income trap risk.



In their study, Yusuf and Nabeshima (2009) investigated whether Malaysia could escape from the middle income trap. They stated that annual growth rates in Malaysia are around 7-8% for 5-8 years.

Woo (2009) examined the escape of Malaysia from middle income trap. He mentioned that Malaysia's annual growth rate in the period of 2001-2010 was around 7.5%. Woo has expressed that the government must make many radical regulations in many fields and to apply the culture of excellence in the center of the administration in order to escape from the middle income trap. He mentioned that in this way, macroeconomic balances can be achieved and a knowledge-based economy can be used.

Kharas and Kohli (2011) analyzed the reasons of countries in having the risk of middle income trap and the politics necessary for their getting rid of the trap. They made the suggestion that specialization, total factor productivity-based growth and in-situ management in economy for Latin American and East Asian countries in order to get rid of middle income trap.

Lin and Treichel (2012) investigated the causes of middle income trap in Latin America, Caribbean and China. They expressed that it is required to provide public and private sector cooperation and the education and research and development activities must be developed in order to get rid of the middle income trap.

Jankowska, Nagengast and Perea (2012) investigated the middle income trap in Asian and Latin American countries. They used product field methodology to compare the structural transformation in Asian and Latin American countries. In the conclusion part of the study, they stated that there is a need for temporary incentive policies which are consistent with the factor commodities and the policies consistent with these policies for providing the development of the countries which are dependent to the external markets.

Aiyar et al. (2013) have examined Asian and Latin American countries which are for the period 1955-2009. They used Probit Regression, Bayesian and Weighted smallest squares model in their studies. They analyzed the relationship between income per capita and population, infrastructure, macroeconomic environment, production structure and trade structure. They expressed that gross capital flows expressed within the macroeconomical environment are significant.

Robertson and Ye (2013) analyzed the existence of a middle income trap. They performed simple time series analysis in their studies. They found that 19 countries (Bolivia, Botswana, Bulgaria, Costa Rica, El Salvador, Guatemala, Honduras, Indonesia, Iraq, Jordan, Lebanon, Mexico, Mongolia, Morocco, Peru, Panama, Turkey) are in middle income trap.

Tho (2013) examined the middle income trap in Southeast Asian countries (Indonesia, Malaysia, Philippines and Thailand). He made comparisons with Korea, which overcame the middle income trap and has reached a high level of income in the late 1990s. Tho has suggested the strengthening of research and development capacity, the emphasis on the quality and appropriateness of human resources, and the development of a dynamic private sector institutional system for sustenance in order to escape the middle income traps of Southeast Asian countries.

Zhang et al. (2013) conducted a survey on China. As a result of their study, they emphasized the importance of qualified human capital in the middle income trap.

In their studies, Bozkurt et al. (2014) conducted convergence and ARDL analysis using the data of Turkey related with 1971-2012 period. They analyzed the relation between the per capita income and the schooling rate in higher education, the domestic savings rate and the manufacturing industry. According to the results of the analysis, they found that the schooling rate in higher education and the domestic saving increased per capita income. They can not determine the income increasing effect of the manufacturing industry. They expressed that Turkey converges to countries with high income. They expressed that it is required to remove the risk of industrialization and the education system should be focused on innovation and technology in order to get rid of the middle income trap in Turkey.

Dalgiç, İyidoğan and Balıkçioğlu (2014) conducted analyzes covering the period 1990-2013 for the 56 middle income countries, including Turkey. In the study, they examined the factors that affect the possibility of a country in middle income group to transfer to an upper income group. They dealt with the factors that reflect countries' economic development levels with macroeconomic and institutional factors of the countries. As a result of the analysis, they stated that the improvement in human capital and technology for getting rid of the middle income trap, the increase in institutional capital and healthy macroeconomic indicators are significant.

Koçak and Bulut (2014) analyzed whether Turkey is in the middle income trap by using two structural refractors developed by Lee and Strazicich (2003) and five structural refractors unit root tests developed by Carrion-i Silvestre et al. (2009). According to the results of the unit root test, they reached the conclusion that Turkey is not in middle income trap. They made three different suggestions for the rapid growth of Turkish economy: First, policies should be established to strengthen the qualities of human resources in Turkey. Second, dynamic policies should be implemented to strengthen institutionalization in Turkey. Third and finally, macroeconomic stability must be ensured, moderate inflation, policies to increase fiscal sustainability should be developed.

In his study, Tuncel (2014) presented suggestions to Turkey under the light of the experiences of the countries that exceeded the middle income trap. As a result of his study, he mentioned that the most important conclusion in the experience of South Korea and Taiwan is that the state governs economic development with active innovation policies. In this respect, he expressed the necessity of establishing an industrial and innovation policy for Turkey in coordination of all factors. In addition to, he also stated that university industry cooperation should be developed in the preparation of university education programs.

In their study, Yaşar and Gezer (2014) investigated the risk of Turkey's middle income trap and the proposals to get rid of this risk. They mentioned that Turkish economy has remained in the low income and low middle income country group since 1960 and has been in the high middle income country group since 2004. They suggested that the deficiencies of infrastructure must be compensated,

educational structure, human capital, technological breakthroughs and institutional infrastructure should be changed rapidly in order to include Turkey to the country group with high income.

Yılmaz (2014) investigated the middle income trap in Turkey. As a result of his study, he has drawn attention to human capital and the ability to produce goods from a technological point of view in order not to get caught up in the middle income trap.

Alçın and Güner (2015) made assessments and predictions by analyzing the main reasons for the possibility of Turkey falling into the middle income trap and the policies required for getting rid of the trap. As a result of the study, they stated that the localization of the capital and the sectoral development should be provided qualitatively in order for the stable and rapid growth in the Turkish economy.

In his study, Atik (2015) stated that Turkey confronts a middle income trap. He suggested that innovative industrialization policies are needed for Turkey to be able to get rid of the middle income trap.

Ener and Karanfil (2015) investigated the effect of savings deficit in the Turkish economy on the middle income trap. They applied a time series analysis on their studies covering the years 1980-2013. While there is an unilateral causality relationship in the per capita income from domestic savings, they did not find a causal relationship to the savings from per capita income.

Kaya et al. (2015) have examined the middle income trap in Turkey. They mentioned that the factors that cause middle income trap in Turkey are generally structural. In the conclusion part of the study, they stated that Turkey should enter a path of sustainable growth in order to be able to get rid of the middle income trap.

Ay, Akar and Akar (2016) compared Turkey and BRICS (Brazil, Russia, India, China and South Africa) in terms of the concept of middle income trap. They have chosen the human capital, concepts of education and innovation as benchmarking criterion. In the conclusion part of their study, they concluded that Turkey had a low income group after 1950. According to the classification of World Bank, they stated that Turkey was in middle income group in 2004. When they examined the BRICS countries, they stated that China would have a middle income trap. They stated that Russia and Turkey are at high levels of income by 2012. As a result of the study, they stated that it is required to increase the investments of education, to organize the education system, to appoint individuals with high knowledge and skills to appropriate jobs and thus the middle income trap shall be avoided in Turkey.

Bal et al. (2016) have examined whether Turkey is in the middle income trap. By using the variables of GDP, inflation, share of agriculture and exports in GDP, Gini coefficient and age dependency ratio, they determined the main reasons for the middle income trap with Vector Error Correction model. In their studies covering the years 1980-2014, they stated that the variable which mostly affects the ratio of GDP in Turkey is Gini coefficient. They mentioned that Turkey is not in the middle income trap.

In his study Bayar (2016) has dealt with the education of Turkey's human resources from the perspective of a middle income trap. He compared the status of Turkey and the countries which have fallen into a trap and the countries that have survived. As a result of his work, he stated that Turkey is in the upper middle income group and is a country which is not in middle income trap yet but has a risk of falling recently

Glawe and Wagner (2016) investigated whether China is in the middle income track. In their analysis, firstly, they examined the the approaches that determine the middle income trap and secondly the factors that trigger the middle income trap. As a result of the study, they stated that the Chinese economy confronted a middle income trap risk in 2011. They added that China's economic performance depends on policy makers.

In his study covering 2000-2014, Karanfil (2016) dealt with Turkey and EU-28 (Luxembourg, Denmark, Sweden, Netherlands, Austria, Finland, Germany, Belgium, Ireland, France, England, Italy, Spain, Cyprus, Slovenia, Greece, Portugal, Malta, Czech Republic, Estonia, Slovak Republic, Lithuania, Latvia, Poland, Croatia, Hungary, Romania, Bulgaria). Using panel data analysis, he analyzed the relationship between the per capita income, R&D expenses and savings with Westernlund Bootstrap, Westerlund Dublin-Hausma cointegration and Hacker-Hatemi-J Bootstrap causality test methods. As a result of the study, he has found a long-lasting relationship between the variables. He determined that that per capita income was the reason for R&D expenses. but R&D expenses are not the reason of per capita income.

Akbulut and Yıldız (2017) investigated the concept of middle income trap in Turkey. In their study, they expressed that Turkey is in middle income trap and regional inequalities are intense. As a result of the study, they stated that different regional development policies should be applied for the development of the regions in Turkey, and Turkey will get rid of the middle income trap accordingly and shall have a higher per capita income level.

When the literature is examined in general, the reasons for middle income trap can be shown as that middle income countries cannot conform to structural reforms such as from human capital to R&D, from income distribution to sectoral and regional politics, to political regimes (Bozkurt et al., 2014: 30).

## **5. DATA SET AND ECONOMETRIC METHOD**

As different from many studies in the literature, this study includes some assessment related with the variables that may affect the income level of Turkey which confronts the risk of falling into the middle income trap by using some economical variables with a high frequency of utilization in the literature. For this reason, the share of manufacturing industry in GDP in Turkey, the schooling rate in higher education and the effect of the share of domestic savings ratio in GDP on per capita income has been investigated. The data used in the study were obtained from the data base of the World Bank and the Turkish

Statistical Institute. While our study period was being established the annual data covering the period 1971-2015 was utilized.

Our model shall be established in the form of,

$$PCI = a_0 + a_1M + a_2H + a_3S + u_t \quad (1)$$

PCI expresses the per capita income level, M expresses the share of manufacturing industry in GDP, H expresses the schooling rate in higher education, S expresses the share of domestic savings rates within GDP.

### 5.1. Empirical Results

In order to investigate the long term relationship between the per capita income in Turkey and the share of the manufacturing industry within GDP, the schooling rate in higher education, and the share of domestic savings rates in GDP, it is analyzed whether the series of the variables were stable. The results which are obtained from the ADF and Phillips Perron stability tests are shown in Table 5 and Table 6.

ADF Unit Root Test Results

Table 5

Variables	ADF (Level)	p	ADF (First Difference)	p	Result
Log(PCI)	-1.065688	0.7199	-6.065055	0.0000	I(1)
Log(M)	-2.122284	0.2372	-7.886079	0.0000	I(1)
Log(H)	1.062724	0.9966	-4.298030	0.0014	I(1)
Log(S)	-1.787042	0.3819	-6.178676	0.0000	I(1)

Source: authors's calculations

Phillips Perron (PP) Unit Root Test Results

Table 6

Variables	ADF (Level)	p	ADF (First Difference)	p	Result
Log(PCI)	-0.977028	0.7523	-6.155840	0.0000	I(1)
Log(M)	-1.988199	0.2908	-7.922304	0.0000	I(1)
Log(H)	0.693561	0.9907	-4.332428	0.0013	I(1)
Log(S)	-1.642945	0.4526	-8.056442	0.0000	I(1)

Source: authors's calculations

According to the result of ADF and PP unit root test, the series are stable in the first difference ( $p < 0.05$ ). In other words, it is observed that unit root results made for all the series are stable at level I (1).

The Engle-Granger Cointegration test was applied to the series, which were found to be stable at the same degree. In the Engle-Granger cointegration test, it has been examined whether there is a long term relationship between the same stable variables in the same degree.

Table 7

Engle Granger Cointegration Results

Variable	T statistic	p	MacKinnon Critical Values
Error Term	-6,020529	0.0000	-3.615588*
			-2.941145**
			-2.609066***

Notes: \*, \*\*, and \*\*\* indicate levels of significance of 1%, 5% and 10%, respectively.

Source: authors's calculations

The series is stable because the error term is  $p = 0.000 < 0,05$  and the test statistic is smaller than the critical value. Our variables and our model are significant. As the result, there is a long term relationship between the variables.

Table 8

Lag Length Test Results

Lag	LogL	LR	FPE	AIC	SC	HQ
0	9.497280	NA	8.51e-06	-0.323369	-0.143798	-0.262130
1	109.6314	170.8170*	6.08e-08	-5.272434	-4.374575*	-4.966239*
2	126.8290	25.29058	5.92e-08*	-5.342881*	-3.726735	-4.791729
3	136.5451	12.00225	9.58e-08	-4.973240	-2.638806	-4.177131
4	155.4454	18.90027	1.02e-07	-5.143844	-2.091123	-4.102779

Source: authors's calculations

In Table 8, the LR, SC and HQ criteria for the VAR model give 1 delay length. It is decided to have the delay level as 1 in the analyzes because LR, SC and HQ criteria for the optimal delay level indicate 1 delay.

Table 9

Granger Causality Analysis Results

	Ki-kare	p
The share of manufacturing industry in GDP is the cause of per capita income.	12.05921	0.0024
Per capita income is the cause of the share of manufacturing industry in GDP.	4.169362	0.1243
The schooling rate in higher education is the cause of per capita income.	0.982568	0.6118
Per capita income is the reason for the schooling rate in higher education.	1.234377	0.5395
The share of domestic savings in GDP are the cause of per capita income.	3.965913	0.1377
Per capita income is the cause of the share of domestic savings in GDP.	0.185580	0.9114

Source: authors's calculations

According to the results of Granger causality analysis,  $p=0.0024<0.05$ , therefore it is determined that the share of manufacturing industry within GDP is the reason of the per capita income. As seen in Table 9, there is no causality relationship between the other variables. As a result, there is an unilateral causality relationship between manufacturing industry and per capita income.

The concept of middle income trap has become a discussion in the literature of economics since 2000's. There is no consensus on whether Turkey is in middle income trap. While Robertson and Ye (2013) and Akbulut and Yildiz (2017) states that Turkey is in middle income trap, Bozkurt et al. (2014), Koçak and Bulut (2014), Yilmaz (2014), Ay, Akar and Akar (2016), Bal et al. (2016) and Bayar (2016) support that Turkey is not in the middle income trap.

## 6. CONCLUSIONS

It has been examined whether Turkey is in the middle income trap according to the approach that income level per capita can reach 16,740 dollars, 58% of USA per capita income level and share of the employment rate within manufacturing industry has 23% in order to mention about a middle income trap in a country. According to this approach expressed by Eichengreen, Park and Shin (2011), Turkey is not in middle income trap. According to another definition stating that a country having per capita income level in the amount of 20% per capita income in the United States, is a country in middle income trap, Turkey is in the position of a country having the risk of confronting middle income trap.

In the study, the middle income trap was examined by time series analysis for Turkey using annual data covering the period 1971-2015. From the middle income trap literature, the relationship between per capita income and the share of manufacturing industry in GDP, the share of schooling rate in high school and the share of domestic savings in GDP has been analyzed. As a result of the analysis, it is determined that variables affect each other in the long term. In other words, variables in long term have a significant effect on per capita income level. In the next stage, Granger causality analysis was applied. It is determined that the share of manufacturing industry within GDP is the reason for per capita income level. This result shows which variables should be given importance for a country which has a risk of falling into a middle income trap.

In the study, the variables affecting the level of income per capita are limited only with the share of the manufacturing industry within GDP, the schooling rate in higher education and the the share of domestic savings in GDP and the variables such as R&D expenditures, primary schooling rate, secondary schooling rate are not included to the scope. Time series analysis has been chosen as a method in the study and relations among variables can be tested by other analysis methods such as VAR analysis, ARDL analysis, convergence analysis, impact response analysis. A study exploring the effect of human capital, in other words primary schooling rate, secondary schooling rate and higher education

schooling rate on per capita income in terms of middle income trap or a study that demonstrates the effect of r&d expenditure on per capita income shall be beneficial. Accordingly, as the result of our study it can be suggested that policy makers should take decisions and implement them in order to improve their manufacturing industries.

As a result, Turkey's savings rates should be increased. Technological infrastructure should be developed. Policies should be established to provide cooperation between universities, public institutions and businesses. Education rates and investments should be increased and the education system should be organized. In addition, growth should be stable and rapid, policies should be pursued for the development of human capital. Industry and innovation policies should be developed.

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