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The Middle-Income Trap: Evidence for Fragile Five Economies

Orta Gelir Tuzağı: Kırılgan Beşli Ekonomilerinden Kanıtlar

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Öz

Genel olarak, büyüme terimi yüksek gelirle, kalkınma terimi ise düşük ve orta gelirli ülkelerle ilişkilidir. Ancak, orta gelir tuzağı kavramı, büyüme ve kalkınma literatüründe yeni tartışmalara neden olmaktadır. İktisat teorisindeki teorik ve ampirik çalışmalar, düşük gelirli ülkelerin uzun yıllar boyunca belirli bir gelir aralığında kaldığını göstermektedir. Bu çalışmada, 1968-2017 yılları arasında kırılgan beşli olarak adlandırılan Brezilya, Hindistan, Endonezya, Güney Afrika ve Türkiye ekonomilerinin, orta gelir tuzağına düşüp düşmediği birim kök testi yardımıyla araştırılmıştır. Birim kök testi sonuçları, kırılgan ekonomilerin bu süre zarfında orta gelir tuzağına düştüğünü göstermektedir.

Anahtar Kelimeler: Ekonomik Büyüme, Orta Gelir Tuzağı, Panel Birim Kök Testleri, Kırılgan Beşli Ülkeleri

Jel Sınıflandırması: O1, O47, O49

The Middle-Income Trap: Evidences from Fragile Five Economies

Abstract

In general, the term growth is associated with high income, whereas the term development is associated with low and middle income countries. However, the concept of middle income trap causes new discussions in the growth and development literature. Theoretical and empirical studies in economic theory show that the low income countries have remained in a specific income range for many years. This study was carried out to reveal whether the economies of Brasil, India, Indonesia, South Africa and Turkey, which were called the fragile five in the years between 1968-2017, had fallen into the middle income trap or not with the help of unit root test. Results of the unit root test show that the fragile economies had fallen into the middle income trap in that period.

Keywords: Economic Growth, Middle Income Trap, Panel Unit Root Tests, Fragile Five Countries

JEL Classification: O1, O47, O49

Introduction

Middle income trap means that being stuck within an income level by an economy after reaching a specific level of per income capita (Eğilmez, 2012). The risk of falling into middle income trap has become the focal point of discussions of developing countries which cherish their own hopes of economic growth and social development in the long run (Kharas & Kohli, 2011). The only way out of getting rid of the middle income trap for these countries is to provide increasing the physical capital by increasing the human capital. As is mentioned by Solow (1956), the problem of decreasing returns to scale makes the sustainability of economic growth models based on physical capital accumulation problematic. Economical literature confirms the result that there is a strong relationship between the growth and the variables which increase the human capital such as education and knowledge. Labor productivity increases by the education investments; this circumstance creates positive externalities for sustainable growth. On the other hand, the investments of the private sector for R&D provide capital accumulation by increasing the human capital. Thus, the economic growth feeds on two sources like Education and R&D capital that feed each other (Yeldan et al., 2012). We can analyze the reasons for falling into the middle income trap under two groups. With reference to the first group, the key feature of the middle income trap is that there is no structural change in countries towards the activities with high added-value within the context of international competitiveness. Therefore, the external factors in addition to the internal factors behind the middle income trap also need to be considered. According to the second group, the main characteristics of the middle income trap are the deceleration in the growth rate (Paus, 2014).

In this research, it was endeavored to determine that whether Brazil, Indonesia, South Africa, India and Turkey which are called as the Fragile Five in the middle income trap by using the data belong to the years between 1967 and 2017. First of all, a theoretical framework relating to the middle income trap was established; after then the empirical study was performed.

1. Theoretical Framework

With reference to the neo-classical economists, increasing the capital when the technology and labor level is fixed will increase the production level to a certain extent (decreasing returns to scale). Herein, the revenue of production factors, namely the revenue of the labor and capital is evaluated as the contribution of that production factor to the output. For example, the increase arising from the one-unit increase in labor is equal to the price of the labor. The same circumstance is also valid for the capital. Namely, the rate of profit is equal to the marginal product of the capital (Yeldan et al., 2012).

This equation can be shown as follows;

$$\frac{dF}{dK} = r$$

With respect to the neo-classical thought, the capital sum in the economy determined the level of the product produces; the level of product specifies the saving and the investments. The falling rate of return of the capital means that this return will be equal to zero $(\Delta k = 0)$ at a certain point. Solow (1956) pointed out that the amount of investment per worker (sy) equals to the sum of the decrease in capital per worker $(sy = (\mathrm{n}+\mathrm{d})\,\mathrm{k})$ at equilibrium because of the population growth and the depreciation in capital per worker in case of the population growth is represented by n, the capital depreciation is represented by d. This point is called as the equation of state. Level of output per worker is zero despite the fact that total product, total equity and total workforce increase in the steady state. $(n+d+\delta)\,\mathrm{k(t)}$ is the break-even investment. The amount of investment that must be invested to prevent k from falling.

Level of output amount per worker based on the Solow model is as follows;

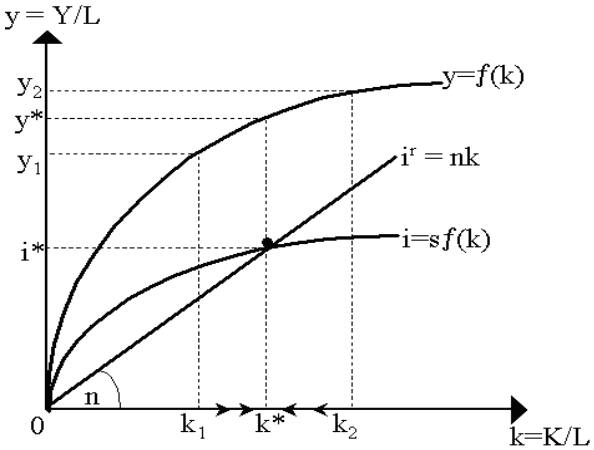
$$c = (1-s)\,y$$

However, the investment amount per workforce equals to the multiplication of the output per workforce and the saving rate (i=sy).

$$c = y - i$$

$$c = f(\mathrm{k}) - \mathrm{s}\, f(\mathrm{k})$$

Figure 1. Solow Growth Model for Steady State Model



As is seen in Figure 1, k^* point shows the investment amount per worker in steady-state balance. The current output per workforce and the investment amount per workforce increase when the savings are higher than the investments at the left of the point where the steady state emerges in.

Production per worker and the investment level per worker decrease when the savings are less than the investment need at the right side of the k^* point. The mechanism works to provide the steady-state balance in both two situations. As is understood, the models which aim to grow with capital investments steer away from the goal of sustainable growth after a certain point (k^* point) because of the falling rate of return. The only way out from the trap is to bring the economy out of the steady state balance by the investments that can increase the capital when this balance point is called as the middle income trap.

2. Literature

There are four main approaches developed to determine the middle income trap in the literature (Koçak & Bulut, 2014). The first of these approaches belongs to Eichengreen et al. (2012), who define the middle income trap as 'growth deceleration'. The second approach belongs to Felipe et al. (2012), who divided the middle income trap into two as the low middle income trap and the high middle income trap. The third approach belongs to Woo (2012), classified the countries as the low income countries, middle and high income countries and also developed and index (CUI) for this classification. The final approach is the perspective of Robertson and Ye (2013), who aimed to econometrically research the middle income trap by the help of the unit root tests. Kharas and Kohli (2011), conducted a study and endeavored to determine the reasons for falling into the middle income trap and also the strategies to get rid of this trap. With reference to the research results, there are three ways for Latin America and East Asian countries to get rid of this trap. These ways can be aligned as follows; providing to diversify the production; efficiency-oriented growth and strengthening the local administrations.

Felipe et al. (2012), conducted a study by using the data belong to the years between 1950 and 2010; they mentioned that the countries whose per capita income is $2.000 and less than $2.000 are the low income countries; the countries whose per capita income is between $2.000 and $7.250 are the low middle income countries; the countries whose per capita income is between $7.250 and $11.750 are the high middle income countries; the countries whose per capita income is higher than $11.750 are the high income countries. According to the study results, the per capita income in a country has the low middle level of income needs to increase at least 4,7% in every year; this transition process must not exceed 28 years. Per income capita in high middle income countries needs to increase at least 3,5%; this transition process should not be limited to a maximum of 14 years. Otherwise, it will be difficult for both low middle income countries and high middle income countries to escape from the trap. Eichengreen et al. (2012), performed a study to specify a threshold value for the middle income trap. With reference to their results, the economies should fulfill three conditions. Accordingly, per capita income needs to be at least $16.740; again, per capita

income needs to reach 58% of per capita income of the economically leading country; finally, the share of the employment created in manufacturing industry needs to be at least 23% in total employment.

Bozkurt et al. (2014), scrutinized the middle income trap for Turkey by convergence analysis and ARDL method by using the data belong to the years between 1971 and 2012. They expressed with regard to the convergence analysis results that the per capita income in Turkey converges to the high income countries; however, solely the income convergence is not enough. Egawa (2013), reviewed the relationship between inequality in income distribution and the middle income trap. He concluded that inequality in income distribution indirectly affects the middle income trap by affecting the rate of growth. A study that was conducted by Robertson and Ye (2013), tried to find the risk of middle income trap by the econometric models. The results that were obtained for 46 countries in 1950-2010 period show that half of the countries selected are in the middle income trap. With reference to this approach, unit root tests can survey whether the countries are in middle income trap econometrically. Taşar et al. (2016) and another study Keskingöz and Dilek (2016) endeavored to answer the question of whether Turkey is in the middle income trap by using the data of 1960-2014 period. The method that was developed by Robertson and Ye (2013), was utilized in both of research. The results obtained refer that there is no risk for Turkey to fall into the middle income trap. However, some of the authors think that this result does not eliminate the risk.

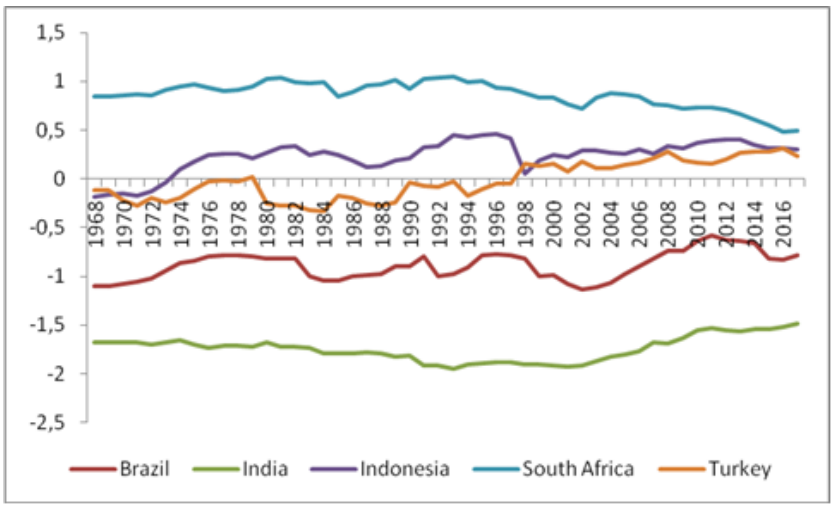
3. Empirical Findings

As is suggested in the study of Robertson and Ye (2013,) for Brazil, Indonesia, South Africa, India, and Turkey; the variable of per income capita belongs to 1968-2017 period was used to specify the middle income countries. Per income capita data that were obtained from the World Bank database were inserted in the analysis by taking their napierian logarithms The per income capita belongs to the USA was subtracted from the per income capita belongs to each of the countries whose logarithms are taken before the unit root test. The equation is as follows;

$$DGDPPC_{it} = \ln GDPPC_{it} - \ln GDPPC_{USAt}$$

If the GDP per capita is stationary at a level value at the end of the unit root tests, it is concluded that the related country is in the middle income trap. It is concluded that the related country is not in the middle income trap and it convergences to the high income group if the GDP per capita is found at the first order difference stationary.

Graphic 1. Differences for Middle Income Trap in Fragile Five



Graphics 1 shows the difference between per income capita in the USA and the per income capita in Fragile Five. It is seen when looking within the scope of convergence that India is the most distant to the per capita income of the USA; South Africa is the closest one to the per capita income of the USA. Based on the current macrocosmic conditions, the countries who cannot get rid of the middle income trap respectively are South Africa, Indonesia, Turkey, Brazil, and India. There may be socio-economic similarities between the countries establish the panel. This situation that is called cross sectional dependence in econometric theory directs unit root tests to be conducted. The null hypothesis in cross sectional dependence tests is that there is no cross sectional dependence; the alternative hypothesis is that there is cross sectional dependence.

Table 1: Cross Section Dependence Test Results

Constant	GDP	
	Statistic	p-value
CD_{lm} (BP,1980)	48.083	0.00***
CD_{lm} (Pesaran, 2004)	8.516	0.00***
CD (Pesaran, 2004)	-4.883	0.00***
LM_{adj} (PUY, 2008)	23.645	0.00***

Notes: $\Delta y_{i,t} = d_i + \delta_i y_{i,t-1} + \sum_{j=1}^{p_i} \lambda_{i,j} \Delta y_{i,t-j} + u_{i,t}$ The number of lag (pi) is taken as 1. The figures which is ***, **, * show 1 %, 5 % and 10 % levels, respectively

The alternative hypothesis is accepted when the probability values are considered. Using the second generation unit root tests will be proper in case there is the cross sectional dependence. Under this circumstances, cross-sectionally augmented Dickey-Fuller (CADF) test that can be applied when the time dimension is bigger than the lateral dimension (T>N) is conducted. This test that is one of the second generation unit root tests also determines whether the variables are stationary. The null hypothesis in CADF test is that ''the series have unit root''; alternative hypotheses is that ''the series have not a unit root''. The country series is stationary if the CADF test statistics is smaller than the critical value. The null hypothesis is accepted is the CADF test value is bigger than the critical value; it is understood that the related country series have nonstationary process characteristics.

Table 2: CADF Unit Root Test Results

	Constant		Constant and Trend	
	Lags	CADF-stat	Lags	CADF-stat
Brazil	3	-2.384	3	-3.680*
India	1	-0.529	1	0.170
Indonesia	1	-2.663	1	-2.338
South Africa	2	-0.427	2	-1.103
Turkey	1	-1.796	1	-2.944
Panel		-1.560		-1.979

Notes: The maximum lag length is 4 and the optimal lag lengths are determined according to the Schwarz information criteriaCritical values of CADF statistic in constant model -4.11 (%1), -3.36 (%5) and -2.97 (%10) (Pesaran 2007, table I(b), p:275) ; for constant and trend model -4.67 (%1), -3.87 (%5) and -3.49 (%10) (Pesaran 2007, table I(c), p:276). Panel statistic critical values with constant model -2.57 (%1), -2.33 (%5) and -2.21 (%10) (Pesaran 2007, table II(b), p:280) ; for constant and trend -3.10 (%1), -2.86 (%5) ve -2.73 (%10) (Pesaran 2007, table II(c), p:281). Panel statistics are the average of CADF statistics.

It is seen when the test statistics are compared with the critical values Peseran (2007) that all the variables except Brazil have unit root at their level values. So, fragile five economies are in the middle income trap based on the CADF panel unit test results. The fragile five economies have fallen into middle income trap because of the lack of diversification in fragile five economies, quantitatively and qualitatively insufficiency of the education system and also the low productiveness operation of the workforce (Egawa, 2013, Dewitte, 2014). With reference to Gill and Kharas (2007), since the innovation and start-up countries are not at the forefront, the developing countries which perform capital-intense exportation and insufficient R&D lose their comparative advantages for the industrial commodities. This perspective that brings a supply-side mentality to the middle income trap

suggests that the productivity growth can be provided by being supported the human capital by the low income countries (Khara and Kohli 2011, Cai, 2012). Another point of view is that the lack of the organizational structure which can support the growth policies is the reason for falling into the middle income trap for the low income countries (Kanapathy and Hazri, 2013, Luiz, 2016). Economic policies in the low income countries have a multi-headed structure bring along several problems in developing macroeconomic policies. Lack of political stability and decentralization avoid being shown an iron will to get rid of the middle income trap (Tran, 2013).

According to the political economy approach that was suggested by Hartwell (2013), Wang (2014) and Doner and Schneider (2016) to explain the middle income trap, economic and political institutions in an economy have direct and indirect effects on the economic growth. Political instability, corruption, income equality and the lack of coordination between organizations avoid sustainable growth and development in low income countries. The fundamental problems of an economy in the middle income trap are; insufficient human capital accumulation, using labor-intensive technologies in production processes, political instability, and low total factor productivity. In the test of Im, Lee, and Tieslau (2005, hereafter ILM) that considers the structural breakages, the null hypothesis is that there is no structural breakage, there is a unit root. The alternative hypothesis in the same test is that there is a structural breakage, there is no unit root. The null hypothesis is denied and the alternative hypothesis is accepted if the test statistics in the absolute value is higher than the table value in the absolute value. If the test statistics in the absolute value is lower than the table value, the alternative hypothesis is denied.

Table 3. Im, Lee and Tieslau (2005) Unit-Root Tests With Level Shifts

	One break model					
	Level shift model: Break in constant			Level and trend shift model: Break in constant and trend		
					Transformed	
	Lag	LM-stat.	Break Time	Lag	LM-stat.	Break Time
Brazil	1	-3.684	2001	1	-3.218	1994
India	1	-2.784	2000	1	-2.663	1993
Indonesia	2	-4.466**	1984	2	-3.662*	2002
South Africa	1	-4.125**	1989	2	-4.098**	1989
Turkey	1	-4.061**	1989	1	-4.693***	1987
Panel-LM		-6.904			-3.664	
p-value		0.00***			0.00***	
	Two breaks model					
Brazil	1	-5.565***	1982-1991	3	-5.290**	1982-1991

India	2	-3.917	1995-2008	3	-4.641*	1996-2007
Indonesia	1	-5.987***	1984-1997	1	-7.337***	1996-1999
South Africa	3	-4.774**	1983-1989	3	-6.904***	1983-1989
Turkey	1	-5.955***	1987-2000	1	-6.722***	1988-2001
Panel-LM		-12.153			-10.969	
p-value		0.00***			0.00***	

Notes: The figures which is ***, **, * show 1 %, 5 % and 10 % levels, respectively. Critical values for individual statistics for one break model: -4.604 (1%); -3.950 (5%); -3.635 (10%) Critical values for individual statistics for two breaks model: -5.365 (1%); -4.661 (5%); -4.338 (10%). Maximum delay length was taken as 4 and optimal delay lengths were determined by Maksimum t-stat lag approach.

Fragile economies faced with economic breakage in the early of 1980s and the late of 2000s because of the internal dynamics and the integration with the global trade system. Brazilian and South African economies that are the commodity producers want to predicate their production structure on capital-intensive technologies to be safe from ducth disease. Indeed, the breakage dates are the years when the structural changes that include significant changes in for the fragile economies. 1994 Mexican crisis is the starting point of the economic crises happened in developing countries at the end of the 2000s. Economic recovery emerged in the high-income group directed the reserve currency to the countries that have high creditworthiness and give high interest. A negative perspective was created toward countries have a current deficit in the budget. Debt problem that arose with the economic growth policy based on the short-term borrowing in the 1997-1999 period first emerged in Southeast Asian countries. The problem mentioned affected all the developing countries, notably economies of Russia and Argentina by contagion effect. Outstanding external debt, being created crowding out effect by public expenditures, the abolition of regulations in financial markets and money substitute were the fundamental problems of low income countries before the crisis (Kindleberger, 2007, Foster, 2008, Hobsbawm, 2009).

4. Conclusion

Theoretical and empirical studies in economic theory show that the low income countries have remained in a specific income range through long ages. The main motivation of this research was to reveal whether the fragile five countries (Brazil, India, Indonesia, South Africa, and Turkey economies) are in middle income trap by using the data belong to the years between 1968 and 2017. Panel unit root tests that are frequently used in testing the middle income trap were utilized in empirical analyses. First of all, the cross sectional dependence between the countries establish the panel was tested; CADF unit root test from the second generation tests was applied. CADF unit root test results confirmed that the fragile economies are in the middle

income trap. Im, Lee, and Tieslau (2005) applied a unit root test that considers the structural breakages and found that the fragile economies experienced structural breakage in the early 1980s and at the end of 2000s. It is understood at the end of the empirical analyses that the fragile economies fall into middle income trap because of the reasons for the supply side approach. According to the supply side mentality, the reason for being fallen into the middle income trap by the middle income countries is that the production factors could not contribute to the total output by the reason of the low total factor productivity. The source of the low total factor productivity is rooted in low capital intensity and makes nothing in innovation and technology in economic policies. With regard to the literature analysis results, the fragile economies should give weight to human capital investments; increase the households' marginal propensity to save; secure the justice distribution of income; provide political stability and organizational structure that support the growth policy to get rid of the middle income trap. Thus, it is seen that 49 years of empirical analysis of the convergence hypothesis that is suggested by the neo-classical approach is not valid. Therefore, the internal growth models need to be used as the base in determining the economic policies in fragile economies. The threshold value approach that was developed by Felipe et al., (2012) and catch-up index that was developed by Woo (2012) can be used in next studies to specify the middle income trap.

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