

Are Savings the Determinant of Economic Growth in the D8 Countries?

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Abstract

Domestic savings play a fundamental role in the economic development of a country as they are the main financing source of domestic investments. Shortage of savings arising out of low level of income especially in underdeveloped countries lead to a few number of investments and inadequate level of employment, production, national revenue and savings. This vicious cycle causes the problem of savings gap for the countries which try to develop economically. Countries having an inadequate level of savings appeal to foreign savings in short term and try to develop policies in order to increase their savings in the long term. This study has been carried out in order to analyze the impact of savings on the economic growth of developing countries. Using the methods of panel data analysis, this study has concluded that domestic savings have a significant and positive impact on economic growth in D-8 sample. This finding indicates that D8 countries should focus on policies that increase their savings rates for high and sustainable growth.

Keywords

Saving
Economic Growth
Life-cycle hypothesis
Panel data analysis

About Article

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D8 Ülkelerinde Tasarruflar Ekonomik Büyümenin Belirleyicisi mi?

Özet

Yurtiçi tasarruflar yurtiçi yatırımların temel finansman kaynağı olması nedeniyle bir ülkenin ekonomik kalkınmasında önemli bir rol oynamaktadır. Özellikle az gelişmiş ülkelerde düşük gelir düzeyinin yol açtığı tasarruf azlığı, yatırımların az olmasına ve devamında istihdamın, üretimin, milli gelirin ve tekrar tasarruf düzeyinin yetersizliğine yol açmaktadır. Bu kısır döngü, ülkelerin ekonomik kalkınmalarını gerçekleştirme noktasında tasarruf açığı sorunu yaşamalarına neden olmaktadır. Tasarrufları yetersiz olan ülkeler kısa vadede yurtdışı tasarruflara başvururken, uzun vadede tasarrufları artıracak politikalar geliştirme çabası içine girerler. Bu çalışmada gelişmekte olan ülkelerin ekonomik büyümesinde tasarrufların etkisini araştırmak amacıyla yapılmıştır. Panel veri analiz yöntemlerinin kullanıldığı çalışmada D-8 örnekleminde yurtiçi tasarrufların ekonomik büyüme üzerinde anlamlı ve pozitif etkisi olduğu sonucuna ulaşılmıştır. Bu bulgu, D8 ülkelerinin yüksek ve sürdürülebilir büyüme için tasarruf oranlarını yükseltici politikalara odaklanmaları gerektiğini işaret etmektedir.

Anahtar Kelimeler

Tasarruf
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Makale Hakkında

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Introduction

Domestic savings play an important role in the economic development of underdeveloped countries with limited revenues to finance their investments. Because these countries are in a vicious circle of what Nurkse calls "the vicious cycle of poverty" and is briefly described as "low income - low saving - low investment - insufficient capital accumulation". These countries, where capital markets are also weak, require domestic savings intensively for the financing of development projects.

The economic development and growth of an country is closely related to the sum of the net real active investments made in that country at a time. The financing source of these active investments is composed of domestic savings and external capital funds procured at that period. In the last 50-60 years, studies which are carried out regarding saving-investment-economic growth have been looking for answers to two questions (Mason, 1988: 114):

- a) How important are high rates of savings for being able to sustain rapid economic growth?
- b) Does rapid population growth hinder the effort of increasing saving rates?

It is too difficult to answer these questions. Because the process is complex and the circumstances are different depending on the countries. However, a high rate of savings is necessary to sustain the level of investment required for rapid economic growth. Saving contributes to economic growth by releasing the resources which can be used for increasing the productive capacity of the economy by increasing the amount of capital (Mason, 1988: 114). In this sense, it can be said that saving rate can determine the rate of economic growth that a country can achieve (Summers, 1985: 2).

The relationship between saving and growth started to be investigated remarkably after Lewis' (1954) study. According to Lewis, the main problem in the theory of economic development is low rates of savings. In all, it is necessary to carry the share of savings in GDP from 4-5 % to 12-15 % or even higher. Development can only be achieved through rapid capital accumulation.

In the literature, the relation between saving and economic growth is handled in consumption and growth models. Studies which are carried out regarding savings are mostly based on the hypothesis of life income and recurring revenue. Life-cycle hypothesis suggests that per capita income is an important determinant of saving rates because people's decisions of consumption and saving depend on their life income. Any increase in per capita income has a positive effect on private savings. This hypothesis puts forward that a consumer has a low level of income in the first and last years of his life. His income increases during his working life and rises to the top in his middle age. Savings of individuals increase when their income increases while they decrease in the other years. The high growth rate will lead to higher savings as the high rate of growth will increase the incomes of employees with a high level of saving tendency compared to the retirees with higher consumption tendencies. Modigliani (1970) argues that there is a positive relationship between income and savings in poor countries, and that saving rates tend to increase with income while there is no meaningful and systematic relationship in wealthy countries.

The hypothesis of recurring revenue suggests that rational individuals will increase their savings today (Campbell, 1987) with the anticipation that their future incomes will decrease,

and vice versa. On the other hand, given the growth, it is assumed that the saving rates will decrease under the assumption that the present growth rate will increase the future growth rate. Because the expectation that growth will accelerate today and tomorrow raises the idea that individuals will have a continuous increase in their incomes and creates a tendency to reduce savings.

According to Harrod's (1939) and Domar's (1946) growth models, saving is the determinant of economic growth and the relationship between these two variables is positive. The model suggests that while the capital-to-revenue ratio (v) is the data, the higher the saving rate (s), the higher the growth rate of the revenue. According to the model, countries need to increase their saving rates and thus their investment rates in order to be able to develop. The relationship between savings and economic growth can also be handled in the context of the Solow (1956) and Romer (1986) models. In Solow's model, any increase in savings rates led to a temporary increase in per capita income in transition to the new steady state. Therefore, an increase in saving rates has a positive effect on short-term growth. However, saving rates will have no impact on the growth rate of the gross equilibrium in the long run. On the other hand, Romer (1986) suggests that any increase in saving rates does not only increase the per capita income in the steady state but also increases the growth rate of the income which leads to growth. For this reason, governments can permanently accelerate the growth by pursuing a policy that promotes saving and thus raises the saving rate. As a result, growth models both agree that savings affect economic growth positively.

The question which may arise here is whether high savings actually promote economic growth or not in newly developing economies. The financial crisis witnessed by Southeast Asian countries (the 1997 Asian crisis) has raised more doubts about the validity of the traditional view which supports the idea that savings lead to growth. However; countries in the region used to have very high savings rates before the crisis. Although East Asian countries have impressive savings rates, their economies have collapsed with the crisis and have not relieved their dependence on foreign capital. Thus, the World Bank's proposal that savings promote the growth has been proven wrong for Asian countries (Anoruo and Ahmad, 2001: 239-240). But Southeast Asian countries may be an exception as well. Today, however, it is widely acknowledged that savings are important in the economic growth of developing countries. This study examines the impacts of savings on the economic growth of D-8 countries, which are called as eight developing countries, in order question this view. Empirical literature is explained following the introduction and then method and analysis findings are introduced in the study.

Literature Review

It is observed that there is an intensive debate about the dimension of the relationship between domestic savings, domestic investments and economic growth especially after the studies of Feldstein and Horioka (1980). As a result of the analysis of OECD countries, where capital mobility is known to be high, the authors have determined that most of the changes in domestic investments are explained through domestic savings. This result, which is contrary to the theoretical expectations, is called as "Feldstein and Horioka paradox".

Following this study, different results were obtained in different studies which were conducted to investigate the validity of the theoretical and strong empirical explanations explained in the introduction part. Regardless of different results, it is extremely important for

a policy maker to know the correct relationship between savings and economic growth in his country. For example, in a study conducted by the World Bank that explores the role of savings in economic development, countries with high savings rates have emerged to grow faster than those with low savings rates. For this reason; policy makers, including the World Bank, have indicated that policies that promote savings must be implemented in developing countries for higher economic growth quite a long time (World Bank, 1993). Morande (1998), Sinha and Sinha (1999), Vujonovic (1999), Kriekhaus (2002), Alguacil et al. (2004), Irandoust and Ericsson (2005), Katircioğlu and Naraliyeva (2006), Kortela et al. (2007) Lean and Song (2009), Çiftçioğlu and Begovic (2010), Oladipo (2010), Budha (2012), Jagadeesh (2015) and Kaya and Efe have concluded that savings increase economic growth, similarly to the results of the World Bank.

The relationship between saving and growth is also discussed in the context of "miracles of growth". Many authors have argued that high savings follow rapid growth (Aghion et al., 2016). Carroll and Weil (1994), Gavin et al. (1997), Sinha and Sinha (1998), Saltz (1999), Loayza et al. (2000), Agrawal (2001), Narayan and Narayan (2006), Mohan (2006), Çağlayan (2006), Odhiambo (2008), Yentürk et al. (2009), Mphuka (2010), Alomar (2013) were suspicious of the traditional view that savings were the pioneer of economic growth. Carroll and Weil (1994), the pioneers of these studies, have examined the relationship between savings and economic growth at both the international (multi-country) and household levels. They conclude that economic growth lead to savings but the contrary is not valid in multi-country model. They also find out that households with a higher increase of income had more savings than those with lower increase of income in household level. The authors suggest that the standard hypothesis of recurring revenue does not explain these results, but there may be a new consumption model related to habit formation.

Unlike these studies, Sinha (1996), Baharumshah (2003), Özcan et al. (2003), Konya (2005), Düzgün (2009), Özlale and Karakurt (2012) and Sothan (2014) have put forward that there is no relationship between savings and economic growth. For example, Sinha (1996) stated that there is no relationship between savings and economic growth in the case of India in any way. The author explains this result as follows: "If the savings in the country are not directed towards productive investments, the link between savings and GDP may be weak when we consider the causal relationships. However, investment data are much less reliable in developing countries such as India. "

In fact; the relationship between savings and economic growth is composed of two macroeconomic variables that have the consequences of "which came first: the chicken or the egg?" as Waitima (2008) points out. Andersson (1999), Mavrotas and Kelly (2001), Rom (2003), Agrawal and Sahoo (2009), Tang and Chua (2012), Gülmez ve Yardımcıoğlu (2013) put forward that there is a reciprocal (bilateral) relationship between savings and economic growth.

Apart from the studies mentioned here, Aghion et al. (2016) argues that the lagged value of savings affects the productivity growth far beyond directly affecting the economic growth. However; it is noted that this applies to poor countries while there is no such relationship in rich countries. Thus, the effect of savings on economic growth can be indirect through productivity growth.

Although the literature has made a great contribution to explain the relationship between saving and economic growth, it also involves some deficiencies. Oladipo (2010) suggests that these deficiencies can be listed as the reliability of horizontal cross-sectional data of the countries, the preference of the wrong econometric method, the focus on the use of bivariate (saving, growth) causality test, and possibly neglecting some variables which are required to be included in the model.

Data and Method

Data

The main objective of the study is to examine the impact of savings on economic growth in developing countries. For this purpose, examples of cooperation between developing countries within the framework of the South-South Dialogue as well as D-8 countries, an Islamic union, were selected as samples. D-8 countries established as an official union in 1997 are composed of Pakistan, Bangladesh, Iran, Malaysia, Indonesia, Egypt and Nigeria including Turkey. The main objective of D-8 is to improve the position of developing countries in the world economy, to diversify their commercial ties, to create new opportunities for member countries in the field of trade, to strengthen their participation in decision-making mechanisms in international level and to raise the living standards of their public.

Time dimension of the study covers the period of 1993-2015 of these 8 countries. The period studied has been determined by the availability of data for selected countries. In this study which assumes that savings will positively influence economic growth in developing countries, total GDP of the country in US Dollar was used as a dependent variable to represent economic growth. Independent variable is domestic savings in US Dollar, too. Fixed capital investments and population data, which are considered to have an effect on economic growth in the literature, were used as control variables. Logarithm of the complete data used in the analysis was taken, and the symbols and the data source are listed in Table 1.

Table 1. Variables Used in the nalysis

Variables	Symbol	Unit	Source
Gayri safi yurtiçi hasıla	Lgdp	USD	
Yurtiçi tasarruflar	Lsav	USD	WDI
Sabit sermaye oluşumu	Lgfc	USD	
Toplam nüfus	Lpop	Million people	

Method

Panel data analysis was used as an econometric method in the study where annual data set is used. Panel data analysis is a method of estimating relationships between variables by using cross-sectional (horizontal or vertical) data having a time dimension. Both time series and cross-section data are jointly used in this method to form a data set containing both dimensions. For this reason, panel data have frequently been preferred in empirical studies in recent years as they have some advantages¹ compared to pure time series or pure cross-section data.

The econometric model used in the study can be expressed as follows:

$$Lgdp_{it} = \beta_0 + \beta_1 Lsav_{it} + \beta_2 Lgfc_{it} + \beta_3 Lpop_{it} + u_{it}$$

$Lgdp_{it}$, used as a dependent variable in the model indicates GDP of "i" country in "t" year. Among the independent variables, the relationship of which with economic growth was analyzed, $Lsav_{it}$ indicates domestic savings of "i" country in "t" year; $Lgfc_{it}$ indicates fixed capital level of "i" country in "t" year and $Lpop_{it}$ indicates total population of "i" country in "t" year while u_{it} is the error term.

Estimations have been made for this model and findings of the research have been included in the ongoing part of the study. Stata 14.0 and Eviews 9 programs were used in order to perform econometric analyses. Descriptive statistical values of the variables are shown in Table 2.

Table 2. Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min.	Max.
Lgdp	184	25.78203	0.90008	23.48258	27.58035
Lsav	184	24.26767	1.16145	20.1881	26.48624
Lgfc	184	24.19666	1.10557	21.42491	26.42813
Lpop	184	18.34499	0.65349	16.78567	19.3691

Findings

The first step of panel data analyses is to determine whether the model is homogeneous or not. This is because the estimation method varies depending on whether the panel models are homogeneous or heterogeneous. Anova F test (Table 4) recommended by Moulton and Randolph (1989) was conducted to test the availability of individual effects. It has been concluded that unit effect and time effect are both available and thus, the classical model is invalid. Hausman test was applied for the estimator selection (Table 4). H_0 hypothesis suggesting that "difference in coefficients not systematic" was not rejected and it was agreed that the correct estimator was the estimator of random effects.

Since the panel data set contains time series, unit root tests have been applied in order to determine whether the series are steady or not. In this context, Maddala and Wu (1999), Fisher-ADF and Fisher-PP unit root tests were applied. Maddala and Wu panel unit root test is a test which is calculated by utilizing the p probability values of ADF unit root test statistics which are applied for each cross-sectional unit. Test is known as the Fisher ADF test in the literature as it is based on the studies carried out by Fisher (1932) (Şak, 2015: 216). Test hypotheses are as follows:

$H_0: \delta_i = 0$ The panel has a unit root.

$H_a: \delta_i < 0$ The panel has'nt a unit root.

Table 3. Panel Unit Root Tests

Variables	ADF Test Statistic	PP Test Statistic
Level		
Lgdp	3.763 (0.999)	2.966 (0.999)
Lsav	5.555 (0.992)	6.567 (0.980)
Lgfc	4.913 (0.996)	3.912 (0.999)
Lpop	9.648 (0.884)	11.685(0.765)
First Differences		
Δ Lgdp	45.634 (0.000)	80.746 (0.000)
Δ Lsav	6.771 (0.000)	295.635 (0.000)
Δ Lgfc	47.542 (0.000)	72.616 (0.000)
Δ Lpop	81.781 (0.000)	108.943 (0.000)

Note: Figures in brackets indicate Probability values.

Unit root is available in the level for all the series as a result of the panel unit root tests. However; the series become steady when their first difference is taken. For this reason, the first differences of steady series were used in the analysis.

Since the method applied is an econometric model, it is necessary to test the econometric assumptions. So, heteroskedasticity and autocorrelation problems are required to be tested. Levene, Brown and Forsythe tests were applied in order to test heteroskedasticity in the model. Test hypotheses are expressed as follows:

H₀: The model has a homoscedastic variance.

H_a: The model has a heterogeneous variance.

Sum of the number of units for test statistic and a subtraction of the frequencies of each unit is evaluated by F distribution with the degree of freedom (Ün, 2015: 73). At the end of the test (W_0 , W_{50} and W_{10}), when it is compared with Snedecor F table with (7, 176) degree-of-freedom, the hypothesis H_0 suggesting that "variances of the units are homoscedastic" is rejected. This result points out the existence of heteroskedasticity problem in the model.

$$W_0 = 4.1398134 \quad df(7, 176) \quad Pr > F = 0.0003$$

$$W_{50} = 3.3634166 \quad df(7, 176) \quad Pr > F = 0.0021$$

$$W_{10} = 3.8909125 \quad df(7, 176) \quad Pr > F = 0.0005$$

The assumption of nonexistence of autocorrelation in error terms is a very restrictive assumption, especially in economic studies. When estimations are made by ignoring autocorrelation which is frequently seen in error items compared to time in random effects model, the parameters are consistent but not effective which may lead to the deviation of standard errors (Yerdelen Tatoğlu, 2016: 236). Bhargava, Franzini and Narendranathan's (1982) Durbin-Watson and Baltagi-Wu tests were applied in order to test the availability of autocorrelation. Since the results specified in Table 4 (below the result table) are close to the critical value of 2, there is no autocorrelation.

Furthermore; when a specific shock is included in the series in panel data model analyses, it is necessary to investigate whether all horizontal cross-sectional units in the panel are affected by the related shock at the same level. It is known as the determination of horizontal cross-sectional dependence (Ün, 2015: 77). Failure of providing the assumption of horizontal cross-sectional dependency results in consistent but ineffective standard, fixed and random estimations as well as deviation of standard errors. Therefore, there is a need for a different estimation in case of horizontal cross-sectional dependence (Nargeleçekenler, 2011: 170). LM test developed by Breusch-Pagan (1980) was used as the panel's time dimension (T) was larger than its horizontal cross-section size (N). H_0 hypothesis suggesting that "there is no horizontal cross-sectional dependence" was rejected at the end of the test. It means that there is a problem of horizontal cross-sectional dependence in the model as well.

As a result of the tests applied for examining econometric assumptions, it is understood that the model has the problems of heteroscedasticity and horizontal cross-sectional dependency. For this reason, White correction was made in the estimation of the model in order to be able to obtain resistant standard errors in the presence of heteroscedasticity.

Table 4 indicates the results of the analyses performed by obtaining resistant standard errors. In accordance with these results, domestic savings (Lsav) have significant and positive impacts on economic growth (Lgdp) in D8 countries. These results are overlapped with such studies as Sinha and Sinha (1999), Kriekhaus (2002), Alguacil et al. (2004), Katircioğlu and Naraliyeva (2006), Kortela et al. (2007), Oladipo (2010), Çiftçioğlu and Begovic (2010), Budha (2012) and Jagadeesh (2015).

The fixed capital formation (Lgfc), which is the independent variable of the study, also has a significant and strong positive impact on economic growth while the population (Lpop) has no effect on economic growth. In many economic analyses which are based on a neutral approach which explains that population growth has neither positive nor negative effect on economic growth (*neutralism*), it has been concluded that population growth has no significant and important effect on economic growth. It is seen that *neutralist* theory is effective regarding the impacts of population on economic growth especially in developing countries (Günsoy ve Tekeli, 2015: 39).

Table 4. Panel regression prediction results (dependent variable Lgdp)

D.Lgdp	Coef.	Std. Er.	z	P> z
Lsav	.1139093	.0156269	7.29	0.0000
Lgfc	.5236633	.0595497	8.79	0.0000
Lpop	1.372953	.9214136	1.49	0.136
_cons	.007954	.016361	0.49	0.627
Test Statistics				
Anova F	36.31			0.0000
Hausman	23.20			0.0000
LM	686.76			0.0000
ALM	549.90			0.0000
Durbin-Watson	2.1139			
Baltagi-Wu	2.1786			
R ²	0.7490			
Chi ²	116.50			0.0000
Obs	176			

Conclusion

Whether or not there is a relationship between domestic savings and economic growth and the direction of this relationship is so important that it will lead to the emergence of different theorems concerning the practices of economic policy. If the growth is determined by the savings in this relationship, the aim of the development policies of the countries should be to promote and increase the savings. In cases where savings determine economic growth, a growth policy based on technological innovation, human capital and exports should be promoted.

This study has analyzed whether the savings have an effect on economic growth or not in D8 countries composed of 8 developing Islamic countries. This relationship was examined using data from 1993-2015 period and panel data analysis. The most basic finding of the study is that savings have a significant and positive effect on economic growth in D8 countries. It is also found out that fixed capital formation has a positive effect on the economic growth of these countries. However, population has no significant effect on economic growth. Therefore, one of the main objectives of the economic development policy in these countries should be the incentive and promotion of domestic savings. For this purpose, each country may choose methods which are appropriate for its socio-economic and cultural structure.

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