

The Relationship Between Government Expenditures on Education and Economic Growth: The Case of Azerbaijan

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Abstract

This paper investigates the impact of government's education expenditures, gross capital formation and total population on economic growth in Azerbaijan during 1995-2018 using the different cointegration methods, namely, ARDLBT, DOLS, and CCR. The results from cointegration methods approve presence of long-run relationship among the variables. The estimation results show that government's expenditures on education, gross capital formation and total population have a positive and statistically significant impact on economic growth in the long-run. The paper concludes that a concerted effort should be made by policy makers to increase educational investment in order to escalate economic growth.

Keywords: Azerbaijan, cointegration, economic growth, government education expenditures

1. Introduction

Education is a significant determinant of economic growth in each country and is widely accepted as one of the main conditions to attain better social welfare. Investing in education means investing in human resources, which is one of the main important factors of the production function, that is directly related to the level of development of the country and the living standard. It increases labor efficiency and productivity, and thus creates a qualified labor force that is able to lead the economy to a path of sustainable economic development (Zaman, 2008).

Government spending on education leads more to the accumulation of human capital than to physical capital and social capital, and this contributes significantly to economic growth (Dickens et al., 2006; Loening, 2004). The expenditures on education can enhance to achieve better educational results due to they contribute to the development of human capital. An investment in human capital, particularly in education, enables each person to make a productive contribution to society. It becomes a crucial influencer of the economy's ability to attain a high level of growth with high wages, low unemployment and a strong social unity. Hence, the effect of spending on education on economic growth is one of the key issues in economic literature. There are several models, like Solow (1956), Lucas (1988) and Romer (1990), that pointed out the human capital result from spending on education as a driving force for economic growth. The social benefits of education are a powerful set of arguments in favor of public investment to attain a social optimum (Harsha, 2004). That is why government spending on education as an investment is an economic issue that is well discussed nowadays. There are many empirical researches that assess the relationship between public spending on education and economic growth. However, they found different results on the link between public expenditure of education and economic growth.

The common view is that the expenditure on education is the crucial to attain sustainable growth (Blankenau et al., 2007: 393). Economic theory provides significant foundations for this idea. Considering the studies on the importance of human capital, Nelson and Phelps (1966) reached that a better educated labor force would adopt technological developments faster and better mimic technology. Aghion and Howitt (1998) found that human capital accumulation raises the innovative capacity of the economy, thus accelerating growth. Benhabib and Spiegel (1994) indicated that education promotes economic growth, to assist the successful implementation of new technologies designed by others and dissemination of the information that is necessary for comprehending and processing new information. Mankiw, Romer and Weil (1992), Lucas (1998), underlined that the rise in the human capital of the individual can contribute to the productivity of all the factors of production except its own efficiency and thus

provide a growth-supporting process. Consequently, education makes the workforce needed by the economy more efficient. It also contributes to the development of creative thinking and advanced techniques for working with a more skilled labor force, which is more appropriated to the necessities of a changing economy, and thus formulating important foundations for sustainable economic growth as well as social cohesion (Wykstra, 1971).

Considering all the aforementioned facts, the main purpose of this study is to examine the effect of government's education expenditures, gross capital formation and total population on economic growth in Azerbaijan for the period of 1995-2018.

The contributions of the study are as follows: (a) It evaluates the government education expenditure-economic growth link for Azerbaijani case, which is a rarely examined example under education-income framework, and is a good representative for the similar economies, (b) this is the first study analyzing this link for Azerbaijan by utilizing time-series data, which allows to observe the country-specific features of this relationship.

2. Literature Review

The similar studies investigating the relationship between government education expenditures and economic growth are reviewed in this section. There are a lot of studies in economics literature examining the link between education expenditures and economic growth.

Baldacci et al. (2004) employ a system of equations and to evaluate the direct and the indirect channels between social spending, human capital and economic growth. They found a significant and positive direct impact from education and health expenditures to economic growth. Bose et al. (2007) investigated the effect of disaggregated government expenditures on growth. They found that there is a positive impact of educational government expenditures on economic growth.

Li and Kong (2012) examined relationship between education spending and economic growth for China in long-run. Their findings are very similar to Mallick and Dash (2015), where both studies concluded that there is one-way causality relationship between government education expenditures and economic growth. In addition, other research for Bangladesh, Mokit (2012) indicated that there is a positive and statistically significant long-term effect from government education expenditures to economic growth for the period of 1995-2009. Furthermore, Idrees and Siddiqi (2013) for G-7 countries, Mallick et al. (2016) for 14 Asian countries also obtained similar results. Acosta et al. (2013) investigated the impact of government expenditures on long-run growth. Their analysis revealed that only educational expenditures have statistically significant impact on economic growth. Gemmill et al. (2014) investigate the impact of total government expenditures as well as of composition of government expenditures on the long-run GDP levels employing a pooled mean group (PMG) approach. Results of study showed that increases in the share of education in GDP leads to increase in GDP per capita in the long-run. Otieno (2016) analyzed the effect of education expenditure per worker on economic growth in the case of Kenya for the data spanning from 1967 to 2010. The results showed that there is a positively and significantly impact from education expenditure per worker to economic growth in both long-term and short-term. Moreover, Sunde (2017) revealed a long-run relationship between education expenditure and economic growth using the data ranging from 1976 to 2016. In addition to above-mentioned studies, many empirical studies conducted by Landau (1983), Barro (1991), Tamang (2011), Wolff (2001), Bloom et al. (2001), Mayer (2001), Petrakis and Stamakis (2002), Blankenau et al. (2007), Erdoğan and Yıldırım (2009), Riasat et al. (2011), Asteriou and Agiomirgianakis (2011), Koc (2013), Selim et al. (2014), Mekdad et al. (2014), Owusu-Nantwi (2015) also, concluded a positive relationship between education expenditures and economic growth.

On the other hand, studies by Devarajan et al. (1996), Ndiyo (2007), Nurudeen and Usman (2010), Mariana (2015) and Eggoh et al. (2015) obtained a negative link between education expenditures and economic growth. In some studies, such as Nketiah-Amponsah (2009), Griliches (1997), Çetin and Ecevit (2010), Pamuk and Bektaş (2014), reached absence of relationship between these two variables.

In the case of Azerbaijan, several researches conducted by Aliyev and Nadirov (2016), Hasanov et al. (2016), Aliyev et al. (2016), Aliyev and Mikayilov (2016), Mukhtarov and Rustamov (2018), Hasanov et al. (2018) and Mukhtarov et al. (2018) investigated the impact of total government expenditures on economic growth and did not use government's education expenditures.

As can be seen from the literature review, no study has studied the effect of government's education expenditures on economic growth for Azerbaijani case. Hence, the purpose of this paper is to fill in this gap by employing ARDL technique and different cointegration techniques to see long-run cointegration relationship. The findings will suggest to Azerbaijani policy makers considering the role of government's education expenditures in economic growth for

macro prudential regulation and sustainable development goals and also contribute to the empirical literature for further studies in the case of oil rich developing countries.

3. Model and Data

3.1 Data

Our study uses annual data over the period 1995-2018 for empirical analysis. All data set have been taken from World Development Indicators of World Bank (WB, 2019). Government expenditure on education (EDUEX) is measured in million constant US dollars. Economic growth (GDP) is measured by real GDP (2010 US \$). Gross capital formation (K) is measured in million constant US dollars while total population (P) is proxied population between the ages 15 to 64 as a percentage of the total population. All the variables have been transformed into natural logarithmic form for consistent and reliable empirical results.

3.2 Methodology

We analyze relationship between government's expenditures on education, gross capital formation, total population and economic growth employing the different cointegration techniques. Our empirical analysis will cover the following stages. First, we will check non-stationarity characteristics of variables. The Augmented Dickey Fuller unit root test (Dickey and Fuller, 1981, ADF) will be used for this exercise.

Second, for testing the cointegration relationship the Bounds Testing approach to cointegration (Pesaran et al, 2001) is utilized. First, the Bounds Testing Approach to Autoregressive Distributed Lagged (ARDL, Pesaran and Shin, 1999; Pesaran et al, 2001) model is employed to see long-run relationship as a main tool due to it outperforms all the alternative cointegration methods in small samples, which is the case here in this research. Then the Dynamic Ordinary Least Squares (DOLS) and Canonical Cointegrating Regression (CCR) are employed for the robustness check.

The above-mentioned methods are not discussed in this study as they are extensively used in many studies, in order to save space and do not to bother readers with the econometric complications. The detailed information about these methods has been mentioned in Dickey and Fuller (1981), Phillips and Hansen (1990), Park (1992), Pesaran and Shin (1999), Pesaran et al, (2001) and others.

4. Empirical Results and Discussion

First, we should test the stationarity properties of the used variables. We use the ADF unit root test, for this purpose. Results of unit root testing are presented in Table 1. We found that the EDUEX, GDP and K are non-stationary at their levels but they are stationary at first difference, being integrated of order one, I(1), while P is stationary at its level, hence we can test them for the cointegration. If some variables are being integrated of order one I(1) and others are being integrated of order zero I(0), the first-best solution will be using The Bounds test for cointegration.

Table 1. Results of ADF unit root tests

Variable	Panel A:		Panel B:		Result
	Level		1st difference		
	<i>k</i>	Actual value	<i>k</i>	Actual value	
<i>EDUEX</i>	0	-0.8802	0	-3.9852***	I(1)
<i>GDP</i>	0	-0.8612	0	-3.4456**	I(1)
<i>K</i>	2	-1.5562	1	-3.2606**	I(1)
<i>P</i>	1	-5.7551***	1	-.8287	I(0)

Notes: Maximum lag order is set to two and optimal lag order (*k*) is selected based on Schwarz criterion in the ADF test; *, ** and *** accordingly indicates rejection of null hypothesis at 10%, 5% and 1% significance levels; critical values are taken from the table prepared by MacKinnonun (1996). Time period: 1995-2018.

The Bounds test for cointegration results are provided at the right side of Table 2. The cointegration test approved the existence of the long-run relationship among the variables. Therefore, we conclude that there is a cointegrating relationship among the variables. Finally, we use DOLS and CCR methods as a further robustness check alongside the ARDL in estimating the long-run coefficients. We bring together the estimated long-run coefficients from all

the four different methods for the comparison purpose in Table 2. The residuals of the model are tested for Gauss-Markov conditions and all the results are in line with the requirements, the model also tested for misspecification and concluded that there is no misspecification problem.

Table 2. Cointegration and long-run estimation results

	ARDL	DOLS	CCR	Cointegration Tests		
	0.44	0.45	0.45	F-stat	19.65	
<i>EDUEX</i>	(0.02)	(0.01)	(0.00)		Critical Values	
	0.13	0.24	0.23	10%	2.52	3.56
<i>K</i>	(0.03)	(0.09)	(0.00)			
				5%	3.06	4.22
	1.97	1.21	1.24			
<i>P</i>	(0.02)	(0.00)	(0.00)	1%	4.28	5.84

Residuals Diagnostics and Mis-specification tests results for ARDL:

$\chi_{SC}^2(2)=38.7 [0.10]$ $\chi_{HETR}^2(6)=0.26[0.95]$ $JB_N=0.59 [0.75]$ $F_{FF}=0.23 [0.86]$

Notes: F-stat= F-statistics for Bounds Cointegration test based; Critical values=Narayan's (2005) critical values for Bounds test; p-values are in parenthesis; χ_{SC}^2 , and χ_{HETR}^2 denote Chi-squared statistics to test the null hypotheses of no serial correlation, and no heteroscedasticity in the residuals; JB_N and F_{FF} indicate Jarque-Bera and F-statistic to test the null hypotheses of normal distribution and no functional mis-specification respectively;

We give priority to the ARDL and discuss it little bit in detail as it outperforms all the alternative cointegration methods in small samples, which is the case here in this research. Table 2 reports the impact of government's education expenditures on economic growth in long-run. We conclude that EDUEX has a positive and statistically significant effect at 5% level on economic growth. The results indicate that a 1% rise in government's education expenditures, raises economic growth by 0.44%. Our results are in line with the findings of Mukit's (2012) for 14 Asian countries, Idrees and Siddiqi (2013) for G-7 countries, Owusu-Nantwi (2015) for Ghana, Otieno (2016) for Kenya for Kenya and Sunde (2017) for Mauritius. In addition, the impact of gross capital formation on economic growth is a positive and statistically significant at the 5% level. This indicates that a 1% increase in gross capital formation results in 0.13% increase in economic growth. It implies that an increase in capital raises economic growth. We also find that, the impact of the population proxied by population between the ages 15 to 64 as a percentage of the total population is statistically significant with positive sign, which is consistent with the theory.

5. Conclusion

The study examines the relationship between government's expenditures on education, gross capital formation, total population and economic growth. For this purpose, different cointegration techniques (ARDLBT, DOLS and CCR) were employed to estimate the long-run relationship among the variables. Our empirical evidences approve that cointegration presents among the variables. This implies that there is a long-run link between economic growth, gross capital formation, total population and government's expenditures on education in Azerbaijan. Results of the estimations revealed that government's education expenditures, gross capital formation and total population have statistically significant and a positive impact on economic growth. It means that an increase in government's education expenditures, gross capital formation and total population raises economic growth.

The obtained positive effect of government's education expenditures to economic growth reveals that investment in education can increase productivity and efficiency of people, thus generates skilled labor force result in economic growth by the improvements of production in Azerbaijan. Both government's education expenditures and have a positive impact on economic growth, it gains a special importance for Azerbaijani policy makers to formulate convenient investment policies. Thus, the productive spending on education can leads to the development of human capital which can in return, to hold the use of advanced technology in the production process by eliminating costs of adoption. Considering this finding, government may increase the productive government's expenditures on education to give appropriate and sufficient financial support to education system in Azerbaijan. These should include to boost educational investment improving the quality of the labor force. Hence, policymakers in Azerbaijan and similar

countries should consider the role of government's education expenditures in economic growth for achieving sustainable development.

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Conflicts of Interest

The authors declare no conflict of interest.

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