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Effect of Education Sector Expenditure on Economic Growth in Arab Spring Countries: A Panel Data Analysis

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Abstract

From the second half of the twentieth century, human capital began to be added more and more, particularly to the basic factors of production considered as labor, capital, entrepreneurs and natural resources in classical economic theory. With this structural change in production, human capital development has become very important for internal growth models. Nowadays, as the strength of arms power in production is greatly reduced, brain power has increased in importance and the idea of people investing in themselves has been widely accepted. Education, which is one of the important dynamics of human capital with health, plays an important role in this context. Increasing the level of success with the higher education level, recruitment of qualified workers, better employment opportunities and increased earnings are significant contributors to growth and prosperity. The study explores the dynamics of education and economic growth expenditure in selected five major Arab countries with balanced panel data from 2000 to 2014. The results of Pedroni, Kao and Johansen Fisher 's co- integration show that there is a long- term balance between education and economic growth expenditure in all countries. The study argues that education is one of the important economic growth ingredients in all five major Arab spring countries. Education should be given priority and a handsome of the government's total expenditure on education should be made by enhancing different elementary, higher and technical education in the respective nations to have the skilled manpower for the long-term economic development.

Keywords: Expenditure on Education, Economic Growth, Panel Co- Integration Test

Introduction

Education is important for economic growth in a country. The improvement of education needs the investment. The public expenditure on education is an important part of investment in education. Therefore, public expenditure on education will influence the economic growth in Arab spring countries. However, when the economy grows, it is also possible for the government to increase public education expenditure because the government wants to improve education. Mankiw, Romer, and Weil (1992) found a positive relationship between education and economic Growth by considering the extended Solow Growth model. Barro and Lee (1993) examined the positive relationship between education and economic growth by taking 129 countries as a sample. Unlike the above positive relationship, some empirical studies explain that education and economic growth are not significantly linked. Benhabib and Spiegel (1994) found that human capital expansion was not significantly linked to the economic growth rate. Bils and Klenow (2000) considered it to be a positive correlation between education and economic growth, but the relationship between education and economic growth does not necessarily explain the educational impact on economic growth. As far as their views are concerned, both education and economic growth can be affected by total productivity factors. the relationship between public expenditure on education and GDP must, therefore, be studied. This paper will examine the relationship between education spending and GDP. Pritchett (2001) studied the role of education in economic growth, he said schooling plays a minor role in the case of economic growth. On the other hand, however, Gylfason and Zoega (2003) counteract an endogenous growth model for 87 countries. They found that gross secondary school enrolment, public education expenditure and high schooling for girls vary directly with economic growth. Podrecca and Carmeci (2002) studied the feedback relationship between education and economic growth through the use of Granger causality for the period 1960 -1990. They found that both educational investment and educational institutions had significant economic growth implications. The Jaoul* (2004) study analysed the causality between education and economic growth in France and Germany during the Second World war. He experienced that education had an impact on the gross domestic product in France, while education had no significant impact on German economic growth. Liu (2006) studied the causality and cointegration of education and domestic product in China and showed that economic growth is the cause of higher education in China. Islam, Wadud, and Islam (2007) analysed the relationship between education and economic growth in Bangladesh with multivariate causalities between 1976 and 2003. It shows the existence of bidirectional causality in Bangladesh between education and growth rate. Huang, Jin, and Sun (2009) analysed the causality of economic growth and higher education between 1972 and 2007 in China. The result shows that there is a long-term relationship among higher education and the nation's gross domestic product (GDP). Pradhan (2009) studied the relationship between higher education and economic growth by using the 1951 to 2002 error correction model in India. He found a unidirectional causality between education and economic growth. Chaudhary, Iqbal, and Mahmood Gillani (2009) analyzed the role of higher education in economic growth by using Johansson's co-integration and Toda- Yamato causality approach in the 1972 to 2005 Var analysis. Researchers ' interest in the relationship between

economic growth and educational expenditure, in particular with internal growth theories, is in line with the human capital foreground. In this study, which tries to demonstrate the effect of economic growth on educational expenditure, 5 selected countries including our country were analysed using data for the period 2000-2014.

Education and Economic Growth Relationship

The aim of economic activities that individuals set out in social life is to meet their basic needs. It is necessary to fight with the limitations encountered while fulfilling the basic needs. Looking at the economy as a whole, the aim is to increase and maintain the welfare levels of society as a fundamental economic policy.

Economic growth; is defined as the number and volume changes so that the national economy 's basic sizes are sustained per capita income growth. The realisation of economic growth depends mainly on the efficient use of human and physical capital, which the country has and at the same time depends on the increase of these capitals Afşar (2009) . Today, while the strength of arm power is significantly reduced in production, the role of brain power and machinery is growing. This structural change in production, while reducing people's physical role in the production process, gives people more time for activities like AR-GE. This can only be achieved by making necessary human capital investments.

The issue of the impact of education on economic growth started with the emergence of human capital. Until the 1960s, the concept of human capital, which was not much emphasized, gained importance with internal growth theories. Education plays an important role in human capital development, which is key to scientific and technological progress. Education is also seen as a sustainable path to economic prosperity and is of paramount importance in the fight against unemployment, social equality, solid foundations, awareness and cultural vitality Mekdad, Dahmani, and Louaj (2014)

Education and Economic Growth Relationship Literature

Many studies examine the relationship between education and economic growth. In some of these studies, the relationship between education and economic growth was positive and significant and the result was that economic growth had a positive impact on education.

Schultz (1963) found that increasing labor education was a major contribution to growth in both developing and developed countries.

Hicks (1980) analysed the social and private benefits of educational investments. As a result, human resources investment has increased the growth rate.

Another study to be mentioned is the work of Uzawa (1965) and the contribution of Lucas Jr (1988) . The output level is defined in these models as the function of human capital. long -lasting and growing have said that human capital can grow without borders. In Uzawa and Lucas ,it was suggested that quality of education could increase over time.

Romer (1990) concludes that, with the contribution to internal growth models based on research and development analysis, the stable state growth rate was partly due to human capital levels. Even if there is a sudden increase in human capital stocks, its growth rate can increase indefinitely.

Benhabib and Spiegel (1994) measure the effect of human capital investments on the economic growth rate through the function of mass production. In human capital measurements, various variables such as education, literacy rates and secondary education enrollment rates were used. The coefficients were found to have a negligible or negative effect regardless of the training variable selected.

According to Weiss (1995), those who are better educated and experience work receive higher wages. This increases employees' productivity.

Quiggin (1999) claims that education has particularly non-monetary benefits, as well as a decline in economic growth, which leads to a reduction in educational expenditure.

Devarajan, Swaroop, and Zou (1996) focused on the health, education, infrastructure, etc. Impact of Public Expenditure. On the economic growth. public expenditure on education has been negatively and not importantly linked to economic growth.

Engelbrecht (1997) also argues that human capital is not only considered a factor in the study but also an important input of new theories of growth. Effects of R&D expenditure are also estimated in the empirical model.

Barro and Lee (1993) used training data for the 25-year-old population and over. According to the results, they found that productivity increases are due to changes in the average years of education.

Psacharopoulos and Patrinos* (2004) conducted a study to analyse the impact of educational investment on society. In Africa, Asia and Latin America, investments in primary education are high, but this ratio is low in OECD countries. In addition, the regression between the school rate and per capita income is the result of the fact that the coefficient of schooling is both lower and higher in emerging economies.

According to Çoban (2004), the increase in the enrollment rate of the primary school is due to the increase in economic growth attributed to the increase in high school enrollment rates. Moreover, the increase in the college education is due to the increase in high school enrollment rates and the increase in educational expenditure is the reason for the increase in high school enrollment rates.

Blankenau, Simpson, and Tomljanovich (2007), a study was conducted using panel data from 23 developed countries and a positive relationship was established between public education spending and long-term growth when the government took into account budgetary constraints.

Şimşek and Kadılar (2010) showed that both the increase in exports and the accumulation of human capital in Turkey over the period 1960-2004 increased the long-term growth of the Turkish sample.

Mallick, Das, and Pradhan (2016) analyzed the dynamics of expenditure on education and economic growth in 14 major Asian countries by using balanced panel data from 1973 to 2012. Pedroni cointegration state the existence of long-run equilibrium relationships between expenditure on education and economic growth in all the countries. The FMOLS results revealed a positive and statistically significant impact of education expenditure on economic development of all the 14 Asian countries (Bangladesh, China, Hong Kong, India, Japan, Nepal, Pakistan, Malaysia, The Philippines, Saudi Arabia, Singapore, Sri Lanka, Thailand, and Turkey). The panel vector error correction (PVECM) The result shows unidirectional Granger causality running from economic growth to expenditure on education both in the short- as well

as in the long-run. But, expenditure on education only Granger causes economic growth in long-run in all the countries.

Eriçok and Yılanç (2013) analysed the relationship between educational and economic growth through the border test approach and found that the effects of educational expenditure on economic growth are temporary.

Methodology

Population and Sampling

The study focuses on Arab Spring Countries (ASC), ASC, including Libya, Yemen, Iraq, Egypt and Tunisia, and all of these are developing Countries. These countries face high levels of poverty, intensive labor. The objective of this study is to analyse the impact and contribution of education and the importance of education in the economic growth of the ASC region.

For this study, a sample period of 15 years has been taken from 2000 to 2014 with panel data from ASC countries. The latest possible sample period depending on the availability of data.

Data Reliability

In recent years, many studies on the different economic topic employed panel data rather than time series data to investigate economics data, due to advantages of panel data in contrast with time series data; such as: controlling for individual heterogeneity and give more informative data, more variability, less collinearity among the variables, and more efficiency. Baltagi (2014) . Therefore, this paper applied to panel data of Education expenditure and GDP of five Arab spring countries over the 2000 to 2014 years. Countries are categorized into two separate panels; one panel includes Arab economies: Libya, Yemen, Iraq, Egypt and Tunisia. The annual data for Education expenditure and GDP. Education expenditure measured as the ratio of Education expenditure to GDP and GDP measured in constant 2010 dollars.

The data of education expenditure and GDP are taken from Ministry Planning of Libya, Ministry of Finance Libya, and Central Bank of Libya (CBL), WORLD BANK and Arab monetary fund which was in constant US dollar. The study further investigates the relationship by employing both the pooled and panel data estimations to validate the results

Variables

Two variables have been indicated for the purposed study including one dependent variable economic growth and one independent as Education (GEE)

$$GDP = f(GEE) \dots \dots \dots (1)$$

Where, GDP represents overall economic growth and GEE refers to government spending on education.

We can now estimate the Eq .1 to observe the impact of education expenditure on economic growth in the following econometric model:

$$GDP_t = \alpha_1 + \beta_2 GEE_t + \varepsilon_t \dots \dots \dots (2)$$

Where:

GDP_t = Gross Domestic Product in time;

GEE_t = Public Expenditure on Education;

ε_t Error term;

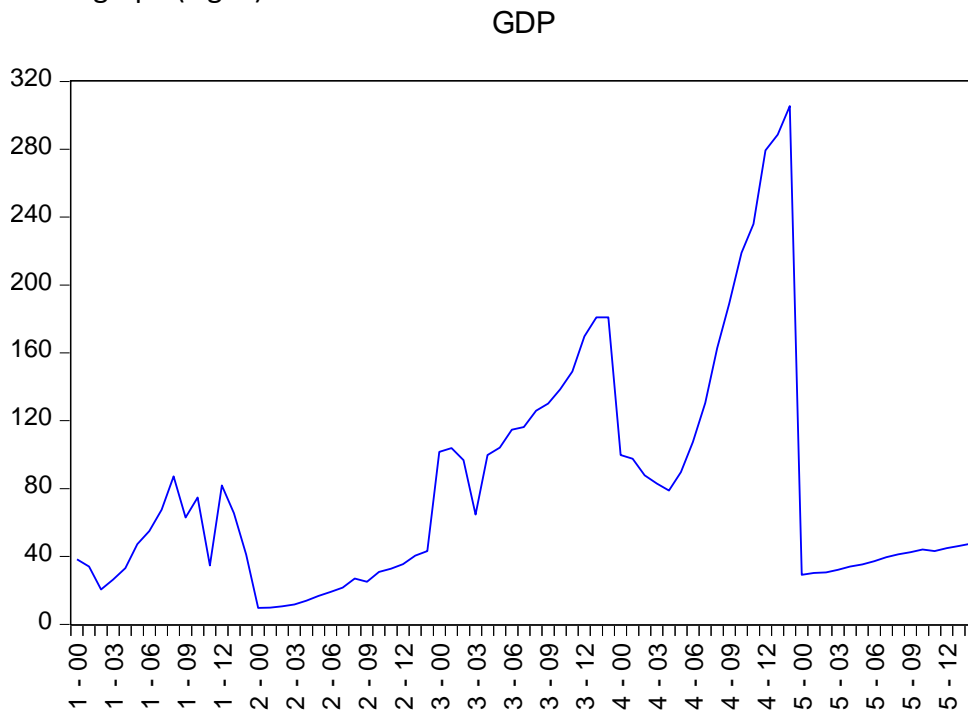
The parameter α_1 is the intercept term; and β_2 is the slope coefficients.

From (2) it is stated that government education expenditure has a positive impact on the economic growth of the respective countries. Economic growth (GDP) and education (GEE) expenditure are positively linked. We only considered public education expenditure(the public sector) because of the non- exclusive nature of the skills created by education.

In general, the public sector always aims to maximize people's welfare by capturing the positive externalities of education expenditure.

Estimation Results

In the study, the simple interaction between education expenditure and economic growth in five Arab spring countries for the years between 2000 and 2014 can be seen in the graph (Fig. 1)



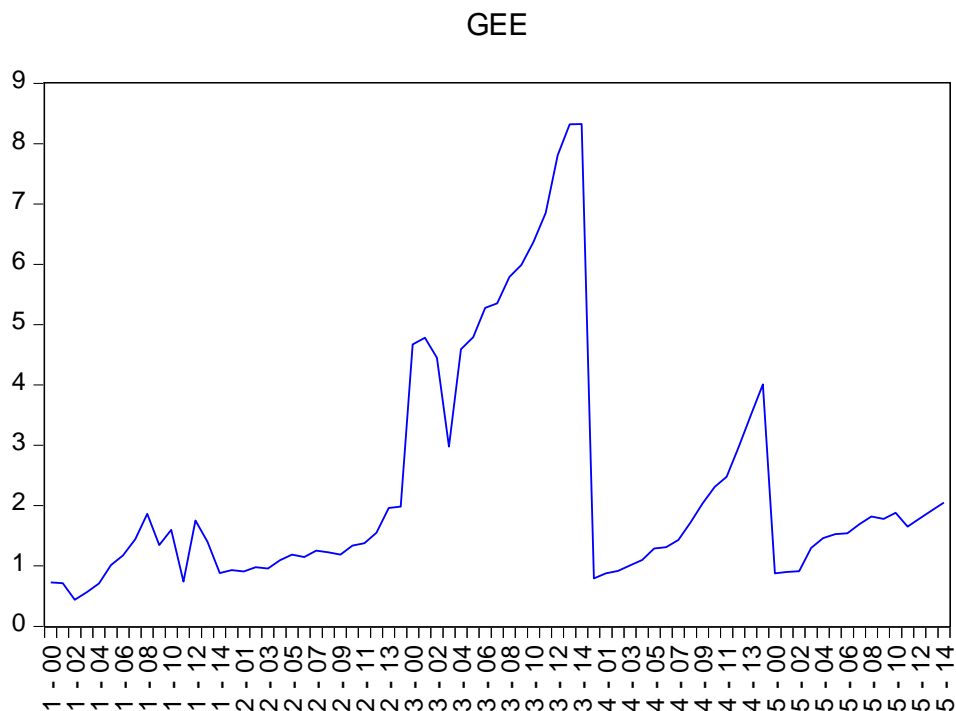


Figure 1. The course of GDP - GEE in five Arab spring countries Graph (2000-2014)
 Source: author's own.

According to Granger and Newbold (1974), a regression analysis between the variables does not provide reliable results in case non-stationary data is used. For this reason, stationarity should be checked before performing the regression analysis. The studies conducted by Levin and Lin (1993), Levin, Lin, and Chu (2002), Breitung and Meyer (1994), Quah (1994), Maddala and Wu (1999), Hadri (2000) and Im et al. (2003) suggest the use of unit root tests in panel data models. Recently, the most commonly used unit root tests in the studies performing panel data unit root tests on a sectoral basis are Levin-Lin and Im Pesaran Shin Tests. Unit root tests of Levin, Lin & Chu (LLC), Breitung, Im, Pesaran and Shin (IPS), Augmented Dickey-Fuller (ADF), PP (Phillips Peron) and Hadri were used in our study.

In any empirical research, when the data series is non-stationary, there is a risk of spurious results in time series as well as panel data. therefore, in the present research, the stationary properties of panel data were also examined to identify and transform non-stationary series into stationary. First, the data on the gross domestic product (GDP), and education expenditure (GEE) were transformed by taking natural logarithmic values to control heterogeneity bias, and then transformed series were tested for stationery through LLC test, Breitung t-stat, IPS test, ADF test, PP test and Hadri. table 1 below presents the results. The results suggest that GDP, and GEE have a unit root in the first stationary series. While unit root test results further reveal that not all series contains unit root in Level, the data is non-stationary at levels but stationary at first differences.

Table1: Panel Unit Root Test Results for GDP First deference

Method	Test Statistics	Prob
Levin, Lin & Chu t*	-7.37389	0.0000
Breitung t-stat	-3.44606	0.0003
Im, Pesaran and Shin W-stat	-4.05988	0.0000
ADF - Fisher Chi-square	38.0931	0.0000
PP - Fisher Chi-square	48.2767	0.0000
Hadri Z-stat	4.53167	0.0000
Heteroscedastic Consistent Z-stat	4.02157	0.0000

Source: author's calculations

The panel data unit root test results for foreign trade are given in Table 1. According to the unit root test results are given in Table 1, Breitung t-stat, Im, Pesaran and Shin W-stat, ADF - Fisher Chi-square, Hadri Z-stat, Heteroscedastic Consistent Z-stat, Levin, Lin & Chu, PP - Fisher Chi-square unit root tests pointed out that the GDP variable had not a unit root

As a next step, it is possible to see if the GEE variable has not a unit root with the help of the results shown in Table 2

Table 2: Panel Unit Root Test Results for GEE First deference

Method	Test Statistics	Prob
Levin, Lin & Chu t*	-6.83379	0.0000
Breitung t-stat	-3.78087	0.0001
Im, Pesaran and Shin W-stat	-4.39282	0.0000
ADF - Fisher Chi-square	34.1628	0.0002
PP - Fisher Chi-square	43.5921	0.0000
Hadri Z-stat	7.05662	0.0000
Heteroscedastic Consistent Z-stat	7.78536	0.0000

Source: author's calculations

It can be shown in Table 2, the GEE variable had not unit root to the all of the results. The existence of a unit root in both series was detected as the result of the findings obtained from unit root tests and it was concluded that the series was nonstationary at level. For this reason, Pedroni, Kao and Johansen Fisher Cointegration Tests were used in the remainder of the study. In the next step after detecting the existence of a panel unit root in the series, the presence of cointegration was investigated with the help of Table 3&4.

Table 3: Pedroni Cointegration Test Results for GDP and GEE

Method	Test Statistics	Prob
Panel v- Statistic	2.081231	0.0187
Panel rho- Statistic	-4.932418	0.0000
Panel PP- Statistic	-7.913372	0.0000
Panel ADF- Statistic	-2.612101	0.0045
Group rho- Statistic	-1.524287	0.0637
Group PP- Statistic	-8.620864	0.0000
Group ADF- Statistic	-3.261822	0.0006

Source: author's calculations

It is possible to prepare the hypothesis to be used in this analysis in such a way:

Ho: There is no cointegration between the variables.

H1: There is cointegration between the variables.

As it can be shown in Table 3, the null hypothesis was accepted in all the tests.

After confirming the cointegration through Pedroni Test, it would be possible to test the existence of cointegration also by performing the Kao Test table 4.

Table 4: KAO Cointegration Test Results for GDP and GEE

Method	Test Statistics	Prob
ADF	-3.642392	0.0001
Residual variance	69.88553	
HAC variance	142.9342	

Source: author's calculations

It is possible to prepare the hypothesis to be used in this analysis in such a way:

Ho: There is no cointegration between the variables.

H1: There is cointegration between the variables.

The null hypothesis was rejected based on the results of the Kao Cointegration Test. That is, the existence of cointegration was confirmed. In the same way, the Johansen Fisher Panel Cointegration Test, which is another technique to check the existence of cointegration, can be analyzed with the help of Table 5.

Table 5: Johansen Fisher Cointegration Test Results for GDP and GEE

Hypothesized No. of CE(s)	Fisher Stat (from trace test)	Prob	Fisher Stat (max-eigen test)	Prob
None	29.66	0.0002	27.74	0.0005
At most 1	51.83	0.0726	51.83	0.0726

Source: author's calculations

According to the Johansen Fisher Panel Cointegration Test results, the null hypothesis that there is no correlation between the two variables has been rejected and the alternative hypothesis supporting the existence of cointegration has been accepted. Of the three tests conducted to determine the existence of co-integration in the model, Pedroni, Kao and Johansen Fisher Panel Co-integration tests indicated that co-integration existed. Since most of the tests we conducted revealed the existence of cointegration in the model, it was agreed that there was a correlation between education and economic growth in the long-run in the Arab spring countries.

Policy Implication and Conclusion

The study has made an attempt to uncover the relationship between expenditure on education and economic growth in five Arab countries. We employ a comprehensive data set of five Arab countries (Libya, Iraq, Yemen, Egypt and Tunisia) spanning from 2000 to 2014. With the help of panel cointegration tests, the study finds that there is an existence of a long-run relationship between education expenditure and economic growth in all the selected countries.

We conclude that investment in the education sector in the countries concerned is a key determinant of long-term economic growth. Thus, government spending on the education sector is one of the investments that could generate skilled labor force and productivity and lead to economic growth again by improving the level of an output of the economy. It is thus shown that the various Heads of Government expenditure in the various Arab Spring countries as included in the study can be an essential factor for economic growth. Education expenditure can create better human capital, which in turn can accommodate the use of modern technology in the production process by minimizing enormous adoption costs. National policies must therefore be prioritized for improving the economic development of different institutions. Countries should adopt policies that could promote high-quality education for all, and it would only be successful if governments increase the education expenditure of their respective nations. But at the same time, educational quality should be made affordable for all by granting education. This process could increase the cost of education, but would reduce the cost of education, increasing the demand for education and increasing the stock of human capital Idrees and Siddiqi (2013). It is clear that educational investment in human resources will have a significant impact on long-term economic growth. The possible mechanism behind this observation can be investigated in future by incorporating other relevant variables into an increased production function.

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