The Relationship between Economic Growth and School Enrollment Rates: Time Series Evidence from Turkey

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Abstract
It has long been argued that there is a close relationship between education and economic development at both individual and societal levels. Economists have found that the level of educational infrastructure is an important indicator of economic development. Similarly, economic variables have been found to be strongly related to school enrollment in many studies. Hence, we investigate the relationship between GDP per capita and school enrollment rates at the primary, secondary, and tertiary levels during the period 1980–2008 in Turkey. To this end, we employed Toda-Yamamoto's (1995) causality test. Findings of our analyses suggest that there is a statistically significant relationship between GDP per capita and the school enrollment rate at the primary level bi-directionally. A significant relationship between these two variables at the secondary level was also indicated in the study, but this relationship was only significant in one direction: from the GDP per capita to the secondary school enrollment rate. For the tertiary level, no casual relationship was found between changes in GDP per capita and the school enrollment rate.

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Introduction

It has long been argued in the literature that there is a close relationship between education and economic development at both individual and societal levels. Many economists and educators believe that education plays a key role in forming the necessary human resources for improving both individual earnings and national economic growth. From this perspective, education is considered to be a strong tool that generates both macro- and micro-level economic development by increasing the stock of human capital (Wigley & Akkoyunlu-Wigley, 2008). This viewpoint relates to the human capital theory, which describes education and training as two of the main components of economic growth (Gedik, Sahin, & Suer, 2002). The human capital theory also views education as an important investment for future individual earnings (Becker, 1962; Blundell, Dearden, Meghir, & Sianesi, 1999).

In terms of individual earnings, there is a common belief that expanding education promotes significant economic benefits for individuals. A positive relationship between one's wages and level of education is also empirically verifiable (Blundell et al., 1999; Oxaal, 1997). According to Acemoglu and Angrist (1999), many empirical studies have shown that an additional year of schooling increases individual earnings by 6–10%. Similarly, in their review of existing literature, Psacarapolus and Patrinos (2002) suggest that "the average rate of return to another year of schooling is 10 percent" for 42 countries across the world. In addition, it has been found that level of education is an important indicator not only for current well-being but also for future income increases (Tansel & Gungor, 2000).

Aside from the individual benefits of education, it is also argued that there are significant returns to education at the national level because of its benefits such as increasing the growth and productivity of the economy (Hanusek, 2002). It is often observed that the level of school enrollment is highly correlated with national productivity (Oxaal, 1997). This is not only because educated people are more productive, but also that they may positively affect productivity of others whom they work with (Blundell et al., 1999). Several empirical studies have also indicated a strong relationship between level of education and the economic growth of countries (Barro & Lee, 2000; de la Fuenta & Domenech, 2000; Hanushek & Kimko, 2000).

There is also some evidence to suggest that the effect of education on growth is more explicit among less developed countries. Barro and Sala-i Martin (1995) showed that the growth rate is more sensitive to human capital when the initial income is low. Krueger and Lindahl (2001) also found results that support Barro and Sala-i Martin (1995). They examined countries within three groups, categorized according to education level. They concluded that education is positively correlated with economic growth in the third group, which consists of the lowest level of education. Similarly, it was found that rate of return to schooling was higher for low and middle-income countries than it was for higher income countries (Psacharopoulos & Patrinos, 2002).

Overall, the findings of previous empirical studies support the idea that education, as an important component of human capital, is a significant determinant of economic well-being at both the individual and national levels. Similarly, both national- and household-level economic factors are known to be important indicators of individuals' educational attainment. It has been observed that poor countries or poor regions within countries generally experience low school enrollment rates, and children in poor families attain less education (Oxaal, 1997).

From this perspective, it can be argued that the income of a family and the economic growth of a country affect the schooling probability of children who live in that family or country.

In Turkey, there have been many changes in educational structure and the level of education attained by individuals, beginning with the establishment of the modern Turkish Republic in 1923. In the last three decades in particular, school enrollment rates at all three levels—primary, secondary, and tertiary—have significantly increased. Meanwhile, regional and gender inequalities have been diminished, although such inequalities still exist. Some structural changes, such as increasing compulsory education from five to eight years and changing the long-held national curriculum, were also initiated. In addition to changes in the Turkish educational system and an increase in the education level of Turkish citizens, the Turkish economy also showed important changes in this period.

After the 1980s, Turkey experienced many structural changes in its economy and witnessed several economical crises and fluctuations. The ruling government in 1980 declared its intention to liberalize the economy and pursue an export-led growth policy (Ertugrul and Selcuk, 2001). Although the problem of high inflation appeared during these years, the Turkish economy started to grow rapidly; however, it was unstable, especially during the 1980s and 1990s. In this context, it is important to investigate how changes in the economic growth of Turkey and school enrollment patterns at different levels are related to each other. Hence, this study aims to explore the causal relationship between GDP per capita and school enrollment rates at the primary, secondary, and tertiary levels in Turkey during the period between 1980 and 2008. With this aim, the Toda-Yamamoto (1995) causality test was employed in this study. This test not only enables researchers to investigate whether there is a significant relationship between school enrollment rates at different levels and economic growth or not, but also makes it possible to see the causal relationship between these variables.

In the following section, the educational and economic background of Turkey is summarized. In the third section, the data used in empirical analysis is presented and the results of the empirical analysis are identified. In the last section of the paper, the results are summarized and discussed.

The Economic and Educational Background of Turkey

After the Ottoman Empire collapsed, the Turkish Republic was established under the leadership of M. Kemal Ataturk in 1923 with the aim of attaining western modernization. The new government viewed education as an important tool for creating a secular and modern state (Jayawardena, 1986; Moghadan, 1993, as cited in Smits & Gunduz-Hosgor, 2006). Thus, religion-based schools (madrasas) were closed down, and different types of schools were integrated in order to create a new secular educational system in the very early years of the republic. In the meantime, primary education was made compulsory for every child and the Roman alphabet was used in educational and other social areas instead of Arabic letters (MoNE, 2002). Since that time, many structural changes have been made in the Turkish educational system, and the level of the educational attainment of the Turkish people has dramatically increased. For example, while literacy ratios were only 10% for females and 29% for males in 1935, they increased to 55% for females and 80% for males in the 1980s. These literacy ratios reached 87% and 97% respectively in 2008 (Koc, Eryurt, Adali, & Seckiner, 2010).

Formal education in Turkey consists of pre-primary, primary, secondary, and higher education institutions. Even though there has been much emphasis on the importance of pre-primary education, and the Ministry of National Education (MoNE) decided to gradually make it compulsory beginning with the 2009/2010 academic year, attending pre-primary school is still a privilege in Turkey. For example, the pre-primary school enrollment rate was only around 30% in 2010. Hence, it can be argued that primary education is the starting point of formal education for most children in Turkey. According to the 42nd clause of the Turkish Constitution, primary education is compulsory and free of charge in public schools for all girls and boys in the country. Primary education was originally compulsory for five years, but it was extended to eight years in 1997. Secondary education consisted of high schools with a three-year educational program until 2005. During the 2005/2006 academic year, a project for increasing the education period of the high schools to four years was initiated and was gradually implemented over the following years. Even though secondary education is not compulsory, it is also free for all at public schools (MoNE, 2010).

Higher education in Turkey consists of universities that provide at least four years of education and vocational schools that provide at least two years of education. There are many public and foundation (non-profit) universities across the country, and national university entrance examinations exist. Public higher-education institutions are financed by the government, but students still have to pay tuition (a relatively low amount) in order to study in these institutions. In the last several years, many new public and foundation universities have been established. The number of universities increased to 165 (103 public and 62 foundation) in 2011 (YOK, 2011) from it was only 78 in 2005. Also, statistics from the Ministry of National Education (MoNE) indicate that there has been a considerable increase in school enrollment rates at all levels in Turkey during the last decade. School enrolment patterns in Turkey for the last decade are displayed in Table 1, which shows the net enrollment rates at the primary, secondary, and tertiary levels (MoNE, 2010).

Table 1. Net Enrollment Rates

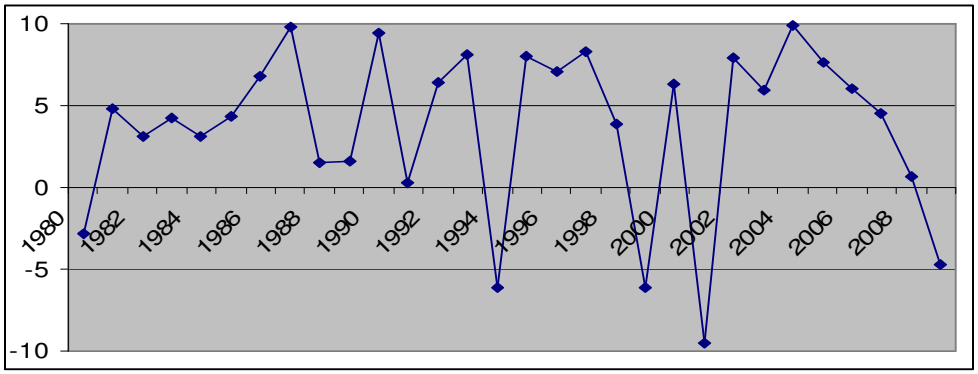
Year	Primary Education	Secondary Education	Higher Education
2000/'01	95.28	43.95	12.27
2001/'02	92.40	48.11	12.98
2002/'03	90.98	50.57	14.65
2003/'04	90.21	53.37	15.31
2004/'05	89.66	54.87	16.60
2005/'06	89.77	56.63	18.85
2006/'07	90.13	56.51	20.14
2007/'08	97.37	58.56	21.06
2008/'09	96.49	58.52	27.69
2009/'10	98.17	64.95	-

Source: Ministry of National Education (2010)

Similarly to the changes and developments in educational system, the Turkish economy has also undergone significant transitions, especially during the last three decades. Turkey had chosen the import substitution strategy for industrialization before 1980. At the end of the 1970s, the outlook for the Turkish economy was bad; by 1979, the balance of payments deficit was growing and inflation was getting higher. The import-led manufacturing industry was nearly toppled because of the absence of raw materials. The Turkish economy, however, experienced a big structural change as a result of the January 24, 1980 decisions to solve such problems of the economy. The main purpose of these decisions was the liberalization of the economy and the opening of the Turkish economy into the international market. In addition, it was aimed to encourage economic growth by supporting the export industry. In the context of these new policies, the export-led growth strategy was implemented in 1980. Thereafter, foreign exchange was freed from any limitations, and the use of foreign exchange in the banking system was permitted.

Beginning in 1980, the Turkish economy became a player in the international market. Import and export amounts started to increase dramatically by the end of 1980s. The financial system was liberalized. But during the 1980s and 1990s, the economy lived through both economic and financial crises; 1994, 1998, and 2001 were years of crisis. All these crises affected the whole economy, which contracted in those years. Despite all the economic and financial crises, the economy grew dramatically. The growth rate of GDP per year is shown in the following graphic. In the last thirty years, GDP per capita markedly increased. It was only 1.539 USD in 1980. It exceeded 5.000 USD at the end of 2005, and it rose to more than 7.000 USD in 2008.

Figure 1. GDP Growth Rate 1980–2010



Source: Turkish Statistic Institute (Date: 25.12.2010).

Methodology

Data Sources

In this study we built a model including the variables of GDP per capita and gross school enrollment ratios at the primary, secondary, and tertiary levels. We also used data belonging to the Turkish economic and educational systems for this study. Annual data covers the period between 1980 and 2008. GDP per capita data was measured in U.S. dollars and was obtained from the OECD library database. School enrollment ratio data for each level of schooling was obtained from the National Education Statistics, Formal Education 2009–2010.

Data reflecting the GDP per capita was transformed into a natural logarithm to obtain stationary time series.

Table 2. The Data Set

Variables	Explanations	Source
GDPP	Gross Domestic Product Per Capita USD (Base Year=2000)	OECD Factbook 2010
PRM	Gross School Enrollment Ratio Primary Level (%)	National Education Statistics
SEC	Gross School Enrollment Ratio Secondary Level (%)	National Education Statistics
TER	Gross School Enrollment Ratio Tertiary Level (%)	National Education Statistics

Empirical Specifications

To test the casual relationship between variables, we used Toda-Yamamoto's (1995) causality test. It is the modified Wald (MWALD) test developed by Toda and Yamamoto. The Toda and Yamamoto (1995) procedure represents an improvement over the standard Granger causality test by ensuring that the latter's test statistic follows a standard asymptotic distribution (Squalli, 2007). This technique has the advantage that it is applicable irrespective of the integration and cointegration properties of the system. In this approach, VAR $(k + d_{\max})$ has to be estimated to use the modified Wald test for linear restrictions on the parameters of a VAR(k), which has an asymptotic distribution. All we needed was to determine the maximal order of integration $d_{\max}$, which we suspect might occur in the model, and then to intentionally over-fit a level VAR with additional lags (Toda and Yamamoto, 1995). In the first step of the Toda and Yamamoto causality test, the lag length of the variables (k) can be set according to the Akaike Information criterion (AIC) and then stationary tests can be used to identify the integration of variables ($d_{\max}$).

In the last step of the test, a modified Wald test was employed to estimate following VAR system, including the primary school enrollment ratio and logarithm of GDP per capita where the null hypothesis of no causality is not rejected when $\beta_{1i} = 0$ and $\lambda_{1j} = 0$.

$$prm_t = a_0 + \sum_{i=1}^{k} a_{1i}\, prm_{t-i} + \sum_{j=k+1}^{d} a_{2j}\, prm_{t-j} + \sum_{i=1}^{k} \beta_{1i} \lg dpp_{t-i} + \sum_{j=k+1}^{d} \beta_{2j} \lg dpp_{t-j} + \varepsilon_{1t} \quad (1)$$

$$\lg dpp_t = \gamma_0 + \sum_{i=1}^{k} \gamma_{1i} \lg dpp_{t-i} + \sum_{j=k+1}^{d} \gamma_{2j} \lg dpp_{t-j} + \sum_{i=1}^{k} \lambda_{1i}\, prm_{t-i} + \sum_{j=k+1}^{d} \lambda_{2j}\, prm_{t-j} + \varepsilon_{2t} \quad (2)$$

The same procedure was employed for the secondary and tertiary levels to estimate the relationship between the enrollment ratios of both education levels. The null hypothesis of no causality was tested in the same way by using following equation systems.

$$\sec_t = a_0 + \sum_{i=1}^{k} a_{1i} \sec_{t-i} + \sum_{j=k+1}^{d} a_{2j} \sec_{t-j} + \sum_{i=1}^{k} \beta_{1i} \lg dpp_{t-i} + \sum_{j=k+1}^{d} \beta_{2j} \lg dpp_{t-j} + \varepsilon_{1t} \quad (3)$$

$$\lg dpp_t = \gamma_0 + \sum_{i=1}^{k} \gamma_{1i} \lg dpp_{t-i} + \sum_{j=k+1}^{d} \gamma_{2j} \lg dpp_{t-j} + \sum_{i=1}^{k} \lambda_{1i} \sec_{t-i} + \sum_{j=k+1}^{d} \lambda_{2j} \sec_{t-j} + \varepsilon_{2t} \quad (4)$$

$$ter_t = a_0 + \sum_{i=1}^{k} a_{1i} ter_{t-i} + \sum_{j=k+1}^{d} a_{2j} ter_{t-j} + \sum_{i=1}^{k} \beta_{1i} \lg dpp_{t-i} + \sum_{j=k+1}^{d} \beta_{2j} \lg dpp_{t-j} + \varepsilon_{1t}$$

(5)

$$\lg dpp_t = \gamma_0 + \sum_{i=1}^{k} \gamma_{1i} \lg dpp_{t-i} + \sum_{j=k+1}^{d} \gamma_{2j} \lg dpp_{t-j} + \sum_{i=1}^{k} \lambda_{1i} ter_{t-i} + \sum_{j=k+1}^{d} \lambda_{2j} ter_{t-j} + \varepsilon_{2t} \quad (6)$$

Results

To employ the Toda-Yamamoto test, it is important to identify the integration number ($d_{\max}$) of the time series of each variable. To this end, we used the Dickey Fuller-GLS stationary test developed by Eliot, Rothenberg, and Stock (1996) and found that the maximum integration of each time series is one. According to these results, the logarithm of GDP per capita and the enrollment ratios at the primary, secondary, and tertiary levels were stationary at %1 level of significance. Results are compiled in the following table.

Table 3. Results of the DF-GLS Unit Root Test

	Levels		First Differences	
	Without Trend*	With Trend**	Without Trend*	With Trend**
LGDPP	0.8404 [0]	-2.248 [0]	**-5.073 [0]**	**-5.479 [0]**
PRM	-1.290 [0]	-3.238 [0]	**-5.660 [0]**	**-5.681 [0]**
SEC	-0.776 [1]	-2.001 [0]	**-2.982 [0]**	**-3.173 [0]**
TER	1.722 [0]	-1.252 [1]	**-6.080 [0]**	**-6.619 [0]**

* The asymtotic critical values for without trend -2.591, -1.944 at the %1 and %5 levels.

** The asymtotic critical values for with trend -3.602, -3.1772 at the %1 and %5 levels. The figures in parenthesis denote the number of lags in the tests that ensure white noise residuals. They were estimated through the Schwarz criterion.

We tested causality between the enrollment ratio of each level and GDP per capita. For this reason, we built three different VAR models, numbered 1, 2, and 3. We used Akaike information criterion to determine the lag length of these VAR systems and found lag length

as three, four, and two, respectively. The results of the bivariate VAR models for equations 1, 2, 3, 4, 5, and 6 are presented in tables 4, 5, and 6.

Table 4. Results of Estimated VAR Model 1

	LGDPP		**PRM**	
	Coefficient	**Prob val.**	**Coefficient**	**Prob val.**
Constant	0.097	0.822	26.007	0.139
$\lg dpp_{t-1}$	1.051	0.002	-7.005	0.416
$\lg dpp_{t-2}$	-0.047	0.862	11.262	0.301
$\lg dpp_{t-3}$	-0.048	0.858	31.118	0.009
prm_{t-1}	-0.002	0.687	0.303	0.147
prm_{t-2}	0.006	0.261	-0.171	0.433
prm_{t-3}	-0.013	0.027	-0.183	0.403
R^2	0.98		0.81	
S.S.R.	0.041		62.89	

Table 5. Results of Estimated VAR Model 2

	LGDPP		**SEC**	
	Coefficient	**Prob val.**	**Coefficient**	**Prob val.**
Constant	2.116	0.033	12.44	0.83
$\lg dpp_{t-1}$	0.580	0.048	-24.41	0.176
$\lg dpp_{t-2}$	0.066	0.830	-6.883	0.733
$\lg dpp_{t-3}$	0.136	0.677	-25.49	0.235
$\lg dpp_{t-4}$	-0.244	0.415	2.274	0.904
sec_{t-1}	-0.006	0.183	0.609	0.056
sec_{t-2}	0.013	0.038	-0.257	0.493
sec_{t-3}	-0.005	0.344	0.027	0.944
sec_{t-4}	0.006	0.289	0.345	0.391
R^2	0.99		0.98	
S.S.R.	0.034		140.16	

Table 6. Results of Estimated VAR Model 3

	LGDPP		**TER**	
	Coefficient	**Prob val.**	**Coefficient**	**Prob val.**
Constant	2.307	0.021	34.44	0.418
$\lg dpp_{t-1}$	0.723	0.011	0.637	0.024
$\lg dpp_{t-2}$	-0.066	0.826	0.307	0.346
ter_{t-1}	-0.003	0.532	-2.405	0.838
ter_{t-2}	0.012	0.094	2.330	0.866
R^2	0.98		0.96	
S.S.R.	0.045		94.17	

We employed a modified Wald test for VAR (4), VAR(5), and VAR(3) respectively to get the results of the Toda-Yamamoto causality test. Table 7 shows the results of the causal relationship between primary school enrollment and GDP per capita.

Table 7. MWald Test Result of Model 1

Hypothesis	Wald Statistics	Probability Value	Decision
LGDPP is not Granger cause of PRM	6.51	0.004	Causality from LGDPP to PRM
PRM is not Granger cause of LGDPP	5.87	0.017	Causality from PRM to LGDPP

According to the results represented in the table, there is a two-way causal relationship between variables. Causality from GDP per capita to primary school enrollment ratio is significant at the 1% confidence level. Causality from the primary school enrollment ratio to GDP per capita is also significant, but at the 2% confidence level. That means the first type of causality is stronger than the latter.

Table 8. MWald Test Result of Model 2

Hypothesis	Wald Statistics	Probability Value	Decision
LGDPP is not Granger cause of SEC	2.91	0.020	Causality from LGDPP to SEC
SEC is not Granger cause of LGDPP	1.71	0.197	No Causality from SEC to LGDPP

Test results also show that although there is causality running from GDP per capita to the secondary school enrollment ratio at the 2% confidence level, there is no causal relationship from the secondary school enrollment ratio to GDP per capita.

Table 9. MWald Test Results of Model 3

Hypothesis	Wald Statistics	Probability Value	Decision
LGDPP is not Granger cause of TER	0.02	0.977	No Causality from LGDPP to TER
TER is not Granger cause of LGDPP	1.65	0.217	No Causality from TER to LGDPP

According to the results in Table 9, there is no causal relationship between the tertiary school enrollment ratio and GDP per capita in either direction.

Discussions and Conclusion

This study aims to explore the relationship between economic growth and educational attainment in Turkey. We examined the causal relationship between the GDP per capita and gross school enrollment rates of the Turkish education system at the primary, secondary, and tertiary levels for the period of 1980–2008. We found that there is a statistically significant relationship between GDP per capita and the school enrollment rate at the primary level bi-directionally. We also found a significant relationship between these two variables at the secondary level, but this relationship was only significant in one direction, from the GDP per capita to the secondary school enrollment rate. For the tertiary level, no causal relationship

was found between the changes in GDP per capita and the school enrollment rate for the given time period.

These results are consistent with those produced by Ozsoy (2010), who investigated the relationship between school enrollment rates and economic growth during the period of 1923–2005 in Turkey. She found that there was a bi-directional relationship between the variables at the primary level, but there was no relationship at the tertiary level. Erdogan and Yildirim (2009) also found a positive relationship between economic growth and primary schooling, but it was uni-directional, running from economic growth to primary schooling. Yaylalar and Lebe (2010) found the same relationship but the direction of causality is running from primary schooling to economic growth. Also, they presented results similar to ours on the relationship between economic growth and schooling at the tertiary level. Duman (2008) implied that there were positive relationships between economic growth and schooling in Turkey at both the primary and secondary levels between 1987 and 2005. The direction of causality ran from schooling to growth. Our results also correspond to those of Sari and Soytas (2006), but they found that causality was running from the enrollment rate to economic growth at both the primary and secondary levels.

Although we found no causal relationship between the enrollment rate and economic growth at the tertiary level, some studies, such as Turkmen (2002) and Ay and Yardimci (2008), found a causal relationship running from the tertiary enrollment rate to economic growth. On the other hand, Erdogan and Yildirim (2009) found a negative relationship between economic growth and schooling at both the secondary and higher education levels.

The causal direction from economic growth to enrollments at the primary and secondary levels of education suggests that economic development positively affects educational attainment at these two levels in Turkey. It can be interpreted that families would be more reluctant to send their children to school at both levels when there are economic recessions or crises. Hence, the current positive trends in economic growth can be thought of as a good sign for educational attainment for the coming generations. Furthermore, our results also implied that increases in primary school enrollment rates positively influenced the economic growth of the country. However, finding no causal relationship between economic development and enrollment in higher education suggests that acquiring higher-education degrees may not directly result in higher productivity and economic growth, at least in a short term. In addition, results showed that the changes in the GDP per capita were not directly associated with higher education enrollment in Turkey.

Our results, in terms of the relationship between enrollment in higher education and economic growth, could be interpreted in several ways. It is easy to interpret the lack of causal relationship running from the GDP per capita to enrollment rates in higher education in the context of Turkish educational system, as enrollment rates are directly related to the pre-determined enrollment quotas. In Turkey, there is a national university entrance examination and millions of young people have been in line to enter a higher-education institution because a centralized system controls enrollment quotas for all public and private universities. Whatever the economic situation might be, it is expected that all quotas are easily filled since there is much higher demand than all the space available at the institutions. Thus, economic conditions may not directly affect enrollment in higher education. It is relatively harder, however, to explain the lack of causal relationship running from enrollment in higher education to GDP per capita. This result may be explained by the quality of higher education graduates and their impact on the country's economic growth. Increases in the enrollment rate

in higher education from the 1980s to 2008 were mostly caused by new universities and programs. In this regard, it can be argued that these new universities and programs may not necessarily produce high-quality graduates who can positively influence economic growth. In addition, increases in higher education quotas in the last three decades may not cover the programs that are primarily related to economic development in today's world. However, our analysis did not allow us to find out if there are certain kinds of higher education programs that do influence economic growth. There is a need for further investigations about the relationship between enrollment (or graduation) rates in different kinds of higher education programs and economic growth.

Overall, the findings of this study indicate that there is a closer relationship between educational attainment and economic growth at the primary school level as compared to the secondary and higher levels of education. This interpretation also aligns with Psacharopolous's (1994) findings about social returns to different levels of education in developing countries. His research indicates that the social return to primary education (27%) in the developing countries is significantly higher when compared with the returns to secondary (16%) and higher education (13%). These results may imply that pushing everyone into higher education would not directly results in economic well-being at the national level, while having more people receive at least a basic education supports economic development. However, this interpretation is open for the discussion and should be taken with caution, as we think that there is need for more detailed analyses of the effects of higher education on the economic growth of nations, with special attention paid to the impact of particular programs and quality of graduates. In terms of the findings of our study, we suggest that policymakers pay special attention to primary school attainment and take the necessary actions to provide opportunities for every child in Turkey to attend primary school without ignoring other educational levels.

Lastly, our study has some limitations. In Turkey, there have been some significant policy changes in both the economic and educational sectors, particularly during the last decade. These policy changes, as well as international economic trends, may have impacted both economic growth and school enrollment patterns over this period. Our data, however, does not make it possible to take these factors into account. Future studies, therefore, may try to account for these factors when investigating the relationship between economic growth and educational attainment.

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