



Impacts of Higher Education on Economic Growth of Afghanistan

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Article History:

Received: 25. 09.2024

Accepted: 30. 09.2024

Online First: 15.01.2025

Citation:

Rezaei, H. & Shahab, J. (2025). Impacts of Higher Education on Economic Growth of Afghanistan. *Kdz Uni Int J Islam Stud and Soc Sci*;2(1):43-54

e-ISSN: 3078-3895

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Abstract

Higher education serves as a fundamental driver of economic development, particularly in countries striving to rebuild and stabilize their economies. This study empirically examines the impacts of higher education on Afghanistan's economic growth from 1996 to 2022. Using an Ordinary Least Squares (OLS) econometric model, it explores the relationship between various educational indicators and GDP. The findings reveal a positive correlation between tertiary school enrollment (TSE), the Human Development Index (HDI), scientific journal articles (SJA), and GDP. Conversely, incomplete tertiary education (ITE) is found to negatively affect economic growth, highlighting the need for not just access but completion of education. These results suggest that investing in higher education is vital for Afghanistan's economic recovery, particularly in the context of ongoing reconstruction efforts. However, policies must focus on ensuring education completion and alignment with labor market needs to maximize economic benefits. The study concludes that higher education plays a pivotal role in the sustainable development and long-term prosperity of Afghanistan.

Keywords: Afghanistan, Economic Growth, Higher Education, Human Capital, Ordinal Least Square (OLS).

Introduction

Higher education is a crucial instrument for human development and social growth. It empowers the poorer classes of society to achieve a better standard of living by providing them with knowledge, skills, and an awareness of their rights and responsibilities (Tikly & Barrett, 2011). Development is a gradual process of social evolution. This social evolution can be political, economic, administrative, and educational. Education plays a pivotal role in the development of society (Ansari et al., 2012). Higher education provides an appropriate environment for the development of human capabilities and skills (Tilak, 2002). Through education, human skills are developed, preserved, and further added to the knowledge

base, which ultimately results in economic growth (Maton, 2008). Countries where higher education is available are better positioned to adjust and contribute to the emerging new order of knowledge-based economies cities/firms (Jemiluyi & Jeke, 2024).

The importance of the role of higher education in economic integration is fully accepted (Sinha et al., 2020). As a developing country with a low-income economy characterized by a high level of poverty and socio-economic insecurity, Afghanistan has isolated itself from socio-economic development for three decades (Shahraki et al., 2020). Its higher education system is crippled and needs to be revived (Hashemi, 2021). Imperative research on the impact of higher education on economic growth could help make informed decisions regarding the restoration and revitalization of higher education in Afghanistan. Education is generally recognized as a critical instrument for the economic and social development of a country. No country can have sustainable growth without a sufficient number of educated and trained personnel (Noori et al., 2022). Education broadens human horizons, raises their awareness about social rights and responsibilities, promotes creativity, and improves the quality of life (Schultz et al., 2020). Higher education has been given special emphasis at national and global levels due to its potential contribution to economic growth and social development (Habibi & Zabardast, 2020).

Although various academic and development forums have emphasized the need to improve higher education, Afghanistan, as a developing country ravaged by three decades of civil war, turmoil, and unrest, has yet to improve the human factor in promoting economic growth and social development (Hashemi, 2021). The development of a system of higher education is critical for reconstruction, rehabilitation, and revitalization activities. Globalization is characterized by the increasing interconnectedness of the globe in terms of industry, trade, economics, culture, and social foundations (Li et al., 2022). Economic growth/integration is one of the global movements in terms of trade and investment, capital, labor, industrial expansion, interconnection of global cities, and so on. In the post-1945 era, the global economy has experienced growth and prosperity; unprecedented increases in productivity, income, and reduction of poverty in many regions have made investments in education, health, etc. Higher education plays a crucial role in economic growth (Žalėnienė & Pereira, 2021).

Higher education in Afghanistan is considered the second phase of education. Higher education is the period of learning that occurs in universities, colleges, and other higher education institutions after finishing school. The aim of higher education is to provide students with specialized knowledge and skills that will prepare them for employment in specific fields (Welch & Wahidyar, 2019).

This paper intends to empirically analyze the impact of higher education on the economic growth of Afghanistan.

As a war-torn country, Afghanistan is a developing nation needing immediate growth in every sector, mainly in health, education, and the economy. The economy of Afghanistan is agriculture-based, and there is a need to shift from agriculture employment and focus on

other sectors (Noori et al., 2022). Food security is also problematic in the country. Unemployment, poverty, poor health, and low human capital are challenging issues affecting the growth of Afghanistan and decreasing the living standard of its people. Afghanistan ranks amongst the poorest countries in the world, as 54% of its population live below the poverty line. More than 30% of the population are malnourished and suffer from poor health. A high population growth rate (7.63%) and a low employment to population ratio of only 45.6% have exacerbated the situation. Overall, there are not enough jobs in the formal sector of the economy of Afghanistan (WDI, 2023).

For the growth of Afghanistan and improving the living standard of its people, the economy must be shifted from informal agriculture to other formal sectors, and there is a need to employ labor in such sectors. To focus the analysis on the economic growth of Afghanistan and avoid other growth factors, the analysis intends to investigate the impact of higher education on the economic growth. It is argued that higher education does not only create a labor force but has a more in-depth impact on employment, productivity, and the informal labor market. Many studies have been done on the effect of higher education on economic development in different cases, but unfortunately, no research has been done on this issue yet. Below we review this research:

Mankiw et al. (1992) explored the relationship between human capital and economic growth using a Solow growth model. They concluded that an increase in human capital, specifically education, contributes to long-term economic growth by boosting productivity.

Barro (2001) investigated the role of education in economic growth across countries. Using panel data, he found that higher levels of schooling, particularly at the secondary and tertiary levels, positively influence growth rates, with primary education being especially important in lower-income countries.

Aghion et al. (2009) examined the role of tertiary education in economic growth using a panel dataset from OECD countries. Their findings highlight that investments in higher education are vital for fostering innovation and accelerating economic growth, especially in more developed economies.

Pelinescu (2015) focused on human capital and its impact on economic growth in the European Union. By using panel data, the study found that tertiary education significantly boosts economic growth, while primary and secondary education levels offer diminishing returns in high-income countries.

Psacharopoulos & Patrinos (2018) conducted a meta-analysis of global returns to education. Their results revealed that private returns from tertiary education are higher than those from primary and secondary levels, with tertiary education providing the greatest boost to income and overall economic development.

Meo et al. (2018) explored the impact of higher education on economic growth in BRICS countries using an ARDL approach. Their results underscored the long-term positive effect of higher education on economic growth, highlighting the need for governments to prioritize investment in education.

Hanushek & Woessmann (2020) studied the role of cognitive skills and higher education in economic growth across countries. By using data from international student assessments, they concluded that the quality of higher education is a key driver of economic growth, particularly in advanced economies.

Raza et al. (2020) investigated the impact of higher education on economic growth in Pakistan, using time-series data from 1973 to 2018. Applying the Johansen cointegration technique, they found a long-term positive relationship between tertiary education and economic growth, emphasizing the importance of human capital for sustained growth.

Özkan and Erdal (2021) assessed the effect of higher education on economic growth in OECD countries using dynamic panel data. Their study revealed that increasing tertiary education enrollment rates significantly contributed to economic growth, especially in countries with substantial investments in research and development.

Sabra (2022) examined the role of higher education in fostering economic growth in developing countries, with a focus on the MENA region. Using an ARDL approach, the study found that tertiary education enhances innovation and labor productivity, contributing to long-term growth, especially when combined with improved institutional quality.

Li et al. (2022) analyzed the effect of higher education on economic growth in China using provincial panel data. Their results showed that regions with higher levels of tertiary education experienced faster economic growth, largely due to a more skilled workforce and enhanced innovation capacity.

Research on the impact of higher education on economic growth, particularly in both developed and developing countries, consistently demonstrates that increasing educational attainment, especially at the tertiary level, plays a crucial role in fostering innovation, productivity, and economic expansion. Studies have shown that investment in higher education leads to long-term economic benefits by enhancing human capital, driving technological advancements, and supporting sustainable development. This is particularly important for countries like Afghanistan, where developing the higher education system can significantly contribute to rebuilding the economy, reducing unemployment, and ensuring sustainable growth. Given Afghanistan's current need for economic reconstruction and capacity building, investing in higher education and conducting research in this field are vital steps toward creating a skilled workforce capable of driving long-term economic prosperity.

Material and Method

Empirical Model

To assess the impact of university on economic growth, an Ordinary Least Squares (OLS) econometric model was employed, specified as follows:

$$\gamma_t = \alpha_t + \beta X_t + \varepsilon_t \quad (1)$$

where γ_{it} is the dependent variable representing economic growth. α denotes the intercept, βX_{it} represents the independent variables, and ε_{it} is the error term. The subscript t indicates the time dimension (Das, 2019). This study utilized data from 1996 to 2022 to examine the effect of university on economic growth in Afghanistan. Similar to previous studies, a time series data analysis technique was employed.

The model used in this research is as follows:

$$GDP_t = a + \beta_1 SJA_t + \beta_2 ITE_t + \beta_3 TSE_t + \beta_4 R\&D_t + \beta_5 UC_t + \beta_6 HDI_t + \beta_7 NRR_t + \beta_8 HDI_t + \varepsilon_t \quad (2)$$

In Equation (2), GDP represents Gross Domestic Product, SJA is scientific and technical journal articles per million people, ITE is Combined - percentage of 25-64 years' adults with incomplete tertiary education, TSE tertiary school enrollment, R&D is Government expenditure on education, total (% of government expenditure), UC is no of universities in Afghanistan, and HDI indicates the Human Development Index

Equation (2) can be used to measure the factors influencing GDP. Time series data techniques were employed to estimate this model, with data spanning from 1996 to 2022. To ensure the model's goodness-of-fit and accuracy, diagnostic tests for unit root, Jarque-Bera, autocorrelation, and heteroscedasticity were conducted. The model estimation was performed using STATA V.17 software.

Data Sources

This study uses time series data from websites such as the World Bank, Our World in Data, humanitarian data exchange, and footprint network glossary to examine the impact of universities and higher education on economic growth. The study aims to comprehensively investigate all aspects of universities and higher education and their effects on GDP.

Table 1. Sources of Variables Used in the Model

Variables	Description	Expected Effect	Source
GDP	Gross Domestic Production (US\$)		WDI ¹ , OWD ²
SJA	Scientific Journal Articles (Per Million People)	+	WDI
ITE	Incomplete Tertiary Education (% of 25 to 64 Years Adults)	-	UNDP
TSE	Tertiary School Enrollment (% Gross)	+	HDX ³
R&D	Government Expenditure on Education (% of Government Expenditure)	+	OWD

¹ World Development Indicators

² Our World in Data

³ Humanitarian Data Exchange

UC	University Count (No)	+	HDX
HDI	Human Development Index	+	FNG ⁴

Due to the lack of a specific index for economic growth, based on previous studies, GDP were used (Sadiq et al., 2023). GDP represents the total monetary value of all goods and services produced within a country's borders in a specific period, usually one year (WDI, 2023).

Results

Descriptive Results

Descriptive results of the variables used in the model are presented in Table 2.

Based on the results presented in Table 2, between the years 1996 and 2022, the minimum Gross Domestic Product (GDP) was 2462 million, the maximum was 20,565 million, and the average was 11,677 million dollars. During these years, the minimum number of published scientific articles was 0, the maximum was 4.2, and the average was 1.153. The minimum ITE was 0.1, the maximum was 9.01, and the average was 4.072. The minimum TSE was 0.807, the maximum was 11, and the average was 4.527. The average R&D expenditure during the years under review was 2.6, with a maximum of 14.559 and an average of 5.461. The minimum number of universities (UC) during the years studied was 11, the maximum was 177, and the average was 71.519 universities. Lastly, the minimum Human Development Index (HDI) in the region under study was 0.31, the maximum was 0.49, and the average was 0.417.

Table 2. Descriptive Statistics of the Variables Used in The Model

Variables	Min	Max	Average	Std. Err.
GDP	2462000000.000	20564485419.168	11676983142.645	7081935058.208
SJA	0.000	4.200	1.153	1.238
ITE	0.100	9.010	4.072	3.501
TSE	0.807	11.000	4.527	3.648
R&D	2.600	14.559	5.461	3.197
UC	11.000	177.000	71.519	58.333
HDI	0.310	0.490	0.417	0.063

Source: Research Findings

Gross Domestic Production

Figure 1 illustrates Afghanistan's Gross Domestic Product (GDP) from 1996 to 2022.

⁴ Footprint Network Glossary

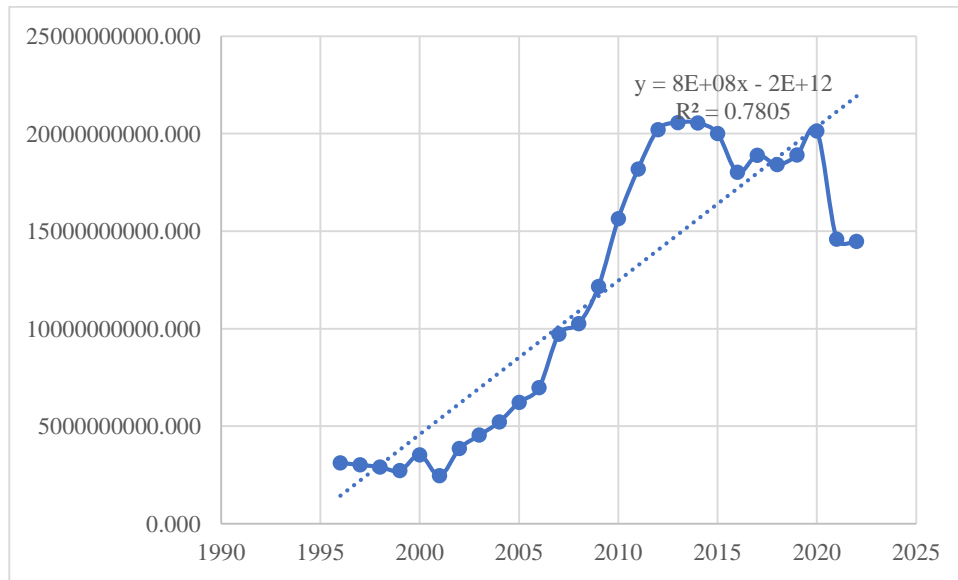


Figure 1. Afghanistan's Gross Domestic Product (GDP) from 1996 to 2022

According to Figure 1, Afghanistan's GDP experienced an upward trend until 2014, after which it has shown fluctuations. The annual GDP growth rate of Afghanistan is 7.63%.

Diagnostic Test Results

Table 3. shows the results of the unit root test for the variables used in the model. As seen in the table, the variable R&D is stationary at level I (0), while the variables GDP, SJA, ITE, TSE, UC, and HDI become stationary at first difference I (1). To address this issue, a logarithmic regression model (Log-Log) was used to estimate the effect of the variables on economic growth.

Table 3. Result of Unit Root Test

Variable	Prob.				Unit Root
	I(0)		I(1)		
	t stat.	Prob	t stat.	Prob	
GDP	-1.1525	0.6788	-3.94734	0.006	I(1)
SJA	-1.79302	0.3754	-4.3987	0.0021	I(1)
ITE	-1.27391	0.6259	-3.73368	0.0098	I(1)
TSE	-2.70769	0.0902	-4.7321	0.0009	I(1)
R&D	-3.48629	0.019	-1.47026	0.5275	I(0)
UC	1.891529	0.9996	-3.76785	0.009	I(1)
HDI	-1.92288	0.3164	-5.04666	0.0022	I(1)

Source: Research Findings

Table 4. show is the diagnostic tests of the model.

Based on the diagnostic test results, the model exhibits complete normality, with no evidence of heteroscedasticity or autocorrelation.

Regression Results

This study used the ordinary least squares method to examine the impact of universities on economic growth. Table 5 presents the results.

Table 4. Results of the Diagnostic Tests

Test Type	Test Statistics	Statistics	Prob.
LM Test	F	3.519917	0.0298
Heteroskedasticity	F	1.572416	0.2067
Jarque-Bera	-	1.192035	0.551002

Source: Research Findings

Table 5. examines the effect of universities on economic growth. The R-squared value (0.991027) indicates that the model explains approximately 99.1% of the variance in GDP, demonstrating a strong fit. The adjusted R-squared (\bar{R}^2) value of 0.9883 is also high, enhancing the model's robustness. The F-statistic of 386.1662 with a significance level of 0.0000 confirms the overall statistical significance of the model, suggesting that at least one predictor significantly correlates with the dependent variable.

According to the results of ordinary least squares regression, ITE has a significant negative effect on sustainable agricultural growth, where increases in this variable lead to a decrease in economic growth. On the other hand, SJA, TSE, and HDI show significant positive effects on economic growth. Increases in these variables result in higher levels of economic growth. Specifically, SJA, and ITE are significant at the 5% level, and TSE, and HDI is significant at the 1% significance level.

SJA, TSE, and HDI have a positive and significant impact on economic growth. Specifically, a one percent increase in SJA, TSE, and HDI leads to an increase in GDP by 0.027945%, 0.608127%, and 2.613145%, respectively. Conversely, the ITE variable has a negative and significant effect on economic growth, where a one percent increase in ITE results in a 0.125% decrease in GDP.

Table 5. Regression Results of Factors Affecting SAG

Variable	Coefficient	Std. Err.	T	Prob.
C	24.69524	0.763274	32.35434	0.0000
LOG (SJA)	0.027945	0.014497	1.927613	0.0482
LOG (ITE)	-0.125001	0.047616	-2.625184	0.0162
LOG (TSE)	0.608127	0.150085	4.051891	0.0006
LOG (RDE)	-0.06186	0.063384	-0.97598	0.3407
LOG (UC)	-0.02228	0.100804	-0.22099	0.8273
LOG (HDI)	2.613145	0.529694	4.933315	0.0001
R ²	0.991027	\bar{R}^2	0.988336	
F	386.1662	Prob.	0.0000	
DW	1.766912			

*, ** Respectively Significance in 5%, and 1%

Source: Research Findings

Conclusion and Discussion

This study sought to empirically analyze the impact of higher education on the economic growth of Afghanistan, utilizing time series data from 1996 to 2022. The findings from the ordinary least squares (OLS) regression model reveal a nuanced relationship between higher education indicators and economic growth, with some variables demonstrating significant positive effects while others exhibited negative or insignificant impacts.

One of the key findings is the positive impact of tertiary school enrollment (TSE) and the Human Development Index (HDI) on Afghanistan's economic growth. The results indicate that a one percent increase in TSE leads to a 0.6081% rise in GDP, underscoring the importance of higher education in building the human capital essential for economic development. This result aligns with the findings of Barro (2001), who highlighted the positive influence of higher levels of schooling, particularly at the secondary and tertiary levels, on growth rates in low-income countries. Psacharopoulos & Patrinos (2018) also supported this, showing that tertiary education yields the highest returns in terms of income and economic development. So, this finding shows that tertiary education is fostering innovation, improving productivity, and contributing to long-term economic growth.

Similarly, the HDI, which encompasses various dimensions of human development including education, health, and living standards, was found to have a substantial positive impact on GDP. A one percent increase in HDI resulted in a 2.6131% increase in GDP, highlighting that improvements in overall human development are crucial for sustainable economic growth in Afghanistan. This aligns with the research by Pelinescu (2015), who found that tertiary education significantly boosts economic growth, especially in high-income countries. Hanushek & Woessmann (2020) further emphasized the importance of cognitive skills and the quality of education as key drivers of economic growth.

Conversely, the study also identified a significant negative relationship between incomplete tertiary education (ITE) and economic growth. An increase in ITE was associated with a 0.125% decrease in GDP, suggesting that while higher education is vital for economic growth, incomplete education may have detrimental effects. This could be due to a mismatch between the skills acquired and the demands of the labor market, leading to underemployment or unemployment among those with incomplete tertiary education. The negative impact of ITE highlights the importance of not only increasing access to higher education but also ensuring that students complete their education and that the education provided is aligned with the needs of the economy. This finding is supported by Mankiw et al. (1992), who explored the negative effects of inadequate education on productivity and economic growth. Sabra (2022) also highlighted that incomplete education often fails to contribute positively to economic development due to a lack of alignment with labor market demands.

The study found that the publication of scientific journal articles (SJA) has a significant positive impact on economic growth. A one percent increase in SJA leads to a 0.0279%

increase in GDP. This result aligns with the findings of Aghion et al. (2009), who emphasized the role of research and innovation, often reflected through academic publications, in driving economic growth. Li et al. (2022) also supported this by showing how regions with higher levels of academic research experience faster economic growth due to a more skilled workforce and enhanced innovation capacity.

Overall, the study's findings reinforce the critical role of higher education in driving economic growth in Afghanistan. However, they also suggest that simply expanding access to higher education is not enough. There is a need for targeted policies that ensure the completion of education and alignment with labor market needs to maximize the economic benefits of higher education. Investing in education and human development is crucial for Afghanistan's economic recovery and long-term prosperity, particularly in the context of its ongoing reconstruction and development challenges.

Acknowledgment

The authors also thank the anonymous reviewers for their helpful comments and suggestions.

Data Availability Statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Conflicts of Interest

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

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