Kardan Journal of Economics and Management Sciences (KJEMS)

ISSN: 2959-0493 (Online), 2616-3950 (Print). Journal homepage: https://kjems.kardan.edu.af/

Article

Fueling Afghanistan's Future: Drivers and Drag Factors of Economic Growth

Dr Haider Hassan Itoo
Dr Mohammed Ayub Soudager
John Mohammad Yatoo

To cite this article: Itoo, H. H., Soudager, M. A. & Yatoo, J. M. (2025). Fueling Afghanistan's future: Drivers and drag factors of economic growth. *Kardan Journal of Economics and Management Sciences, 8*(2), *18–35.* https://doi.org/10.31841/KJEMS.2025.187

Published Online: 07 December 2025

Submit Your Article to this Journal

Article

Fueling Afghanistan's Future: Drivers and Drag Factors of Economic Growth

Kardan Journal of Economics and Management Sciences 8 (2) 18–35
Kardan Publications
Kardan University
Kabul, Afghanistan
DOI: 10.31841/KJEMS.2025.187
https://kjems.kardan.edu.af/CurrentIssue.aspx?j=KJEMS

Dr Haider Hassan Itoo[1], Dr Mohammed Ayub Soudager[2], John Mohammad Yatoo[3]

1 Assistant Professor, Department of Economics, University of Kashmir, India.
<itoohaideramu@gmail.com> ORCID: 0000-0003-1263-7239
2 Assistant Professor, Centre of Distance and Online Education, University of Kashmir, India.
<muhammedaub@kashmiruniversity.ac.in> ORCID: 0000-0002-4078-2479
3 Research Scholar, Department of Economics, University of Kashmir, India.
<johnmohammad389@gmail.com> ORCID: 0009-0008-9698-6885

Abstract

Economic growth is paramount for enhancing living standards, alleviating poverty, and fostering overall societal well-being. It facilitates greater access to essential services, improved infrastructure, and expanded opportunities for education and employment—a necessity no less critical for Afghanistan. This study investigates the dynamic linkages between economic growth (proxied by GDP per capita) and key determinants in Afghanistan from 1990-91 to 2022-23. The analysis examines the roles of population dynamics (total population and life expectancy), employment (share of employers), international trade (imports), and technological assistance (technical cooperation grants) explicitly, recognizing their critical importance for national development. Short-run and long-run ARDL results reveal that increased life expectancy, technological advancements, employment opportunities, and trade activities positively contribute to economic growth. Conversely, while population growth stimulates short-term economic expansion, it exerts long-term pressure on resources. Imports (IMP) also exhibit a negative association, suggesting that increased imports may have a detrimental impact on the dependent variable (GDP) in the long run. To capitalize on these findings, the Afghan government should prioritize investments in health, education, and technology, foster employment opportunities, facilitate trade, and implement sustainable population policies. This study underscores the importance of such strategies in propelling Afghanistan towards sustainable economic growth and development, providing a foundation for future research endeavors.

Keywords: *ARDL Model, Afghan Economy, Economic Growth, Population Growth, Sustainable Development, Life Expectancy*

Received: 25 November 2024
Revised: 26 November 2025
Accepted: 29 November 2025
Published: 07 December 2025

1. Introduction

Afghanistan, strategically situated at the crossroads of Central and South Asia, possesses significant potential as an emerging Asian economy. Rich in natural resources, including substantial reserves of lithium, iron, zinc, and copper, the country is a major global producer of saffron and cashmere wool. However, Afghanistan faces significant challenges. Its Human Development Index (HDI) for 2022, at 0.462, places it in the low human development category, ranking 182nd out of 193 countries and territories (UNDP Report, 2024). In 2022, Afghanistan's Gross Domestic Product (GDP) stood at 14.50 billion US dollars, contributing a mere 0.01 percent to the global economy (Macrotrends, Worldometer). The Afghan economy has undergone a significant shift, with the service sector now playing a dominant role in contributing to Gross Domestic Product. Currently, the service sector constitutes the largest segment of the Afghan economy, accounting for 49% of GDP. Agriculture and manufacturing follow, contributing 26% and 25% of total output, respectively (Macrotrends, Worldometer).

1.1 The Population-Growth Conundrum in Afghanistan's Economic Recovery

The intricate link between population and economic prosperity has been a subject of debate for centuries, with renowned economists like Adam Smith and Malthus offering contrasting viewpoints. Some scholars posit a bi-directional relationship, while others favor a uni-directional one. Despite extensive research (Juan Gabriel Brida et al., 2024), a definitive consensus on whether population growth benefits, hinders, or has a neutral impact on economic growth remains elusive. The Solow model (Solow, 1956), a prominent economic growth theory, explores population dynamics through the lens of population growth rate. It suggests a negative correlation, implying that faster population growth leads to lower per capita income. However, specific endogenous growth models (Romer, 1986, 1990) propose a positive association between the two.

This study delves into the case of Afghanistan, a developing nation that has endured prolonged war and political instability. We aim to analyze the dynamic relationship between economic growth and population growth rate in this unique context. By examining Afghanistan's specific circumstances, we hope to shed light on how population growth interacts with economic recovery efforts in a post-conflict environment.

1.2 The Intertwined Threads of Health and Economic Growth in Afghanistan

The World Health Organization (WHO) defines health comprehensively as a state of complete physical, mental, and social well-being, not merely the absence of disease. Key indicators like life expectancy, infant mortality, and morbidity rates reflect a population's health status. While studies show a strong correlation between health measures (like life expectancy) and economic development, causality remains unclear. Research by Acemoglu and Johnson (2007) found no evidence that increased life expectancy directly translates to faster economic growth, challenging the notion that health is a primary driver of economic progress. However, good health is a crucial component of human capital, a key driver of economic growth (Barro & Sala-i-Martin, 1992; Barro, 1997; Acemoglu & Johnson, 2007; Madsen, 2012). Healthy individuals live longer, invest more in education, and are more productive, contributing significantly to national income and job creation (Deaton, 2001; Weil, 2005). Conversely, poor health limits learning and adaptability, hindering productivity

(Fogel, 1994; Madsen, 2012). Economic growth models, including those by Barro and Sala-i-Martin (1992), Acemoglu and Johnson (2007), and Madsen (2012), acknowledge health as a major source of income growth. These models categorize health as either a component of human capital or a central variable of economic growth. Improved health enhances labor productivity and encourages human capital investment. Increased life expectancy leads to greater long-term investments in education and knowledge accumulation. While these models highlight the positive impact of health on economic growth, indirect effects must also be considered. Neoclassical theory emphasizes the potential negative impact of public health expenditure on economic growth due to increased government spending and taxation. Keynesian theory suggests that higher savings rates resulting from increased life expectancy can negatively impact economic activity by reducing aggregate demand.

In Afghanistan, the relationship between health and economic growth is deeply intertwined. A healthy population is more productive, leading to increased economic output. Conversely, economic growth can provide resources for improved healthcare infrastructure, leading to better health outcomes. This virtuous cycle, however, is disrupted by the ongoing challenges faced by Afghanistan, including conflict, poverty, and limited access to healthcare.

1.3 The Employment-Growth Nexus: Navigating Challenges in Afghanistan

The relationship between economic growth and employment is a complex one, and its dynamics in Afghanistan are particularly challenging due to the country's history of conflict and instability. Generally, economic growth is expected to lead to job creation. However, the nature of this relationship can vary significantly depending on the type of growth, the structure of the economy, and the availability of skilled labor. In Afghanistan, where a large portion of the population relies on agriculture and informal sectors, rapid industrialization or technological advancements might not necessarily translate into immediate job creation for the existing workforce. Furthermore, issues like corruption, lack of infrastructure, and security concerns can hinder the positive impact of economic growth on employment opportunities.

Sustained economic growth hinges on robust labor force participation across all sectors of the economy, including agriculture, industry, and services. This principle applies universally, evident in the economic trajectories of both advanced and developing nations (Eludire, Abigeal, 2023). This study will investigate the specific impact of labor force participation on the economic growth of Afghanistan.

1.4 Unleashing Growth through Trade: Opportunities and Challenges in Afghanistan

Numerous studies have established a strong correlation between a nation's export activity and its overall economic growth. Research by Kilavuz and Topcu (2012) highlights this positive impact, demonstrating that export growth leads to economic expansion. Similarly, Kibria and Hossain (2020) found a uni-directional causal relationship between exports and economic growth in Bangladesh, suggesting that increasing exports directly stimulates economic progress. A multitude of studies support this connection between exports and economic growth. Balassa (1978), Heller & Porter (1978), and Michaely (1977) all found that expanding exports leads to economic expansion. Similarly, Pradhan (2010) observed a long-term stability between exports, financial development, and economic growth in India. Akram et al.

(2011) further solidified this concept by demonstrating a positive association between exports and economic growth in the developed economy of Canada.

This paper delves into the specific case of Afghanistan, exploring how exports can contribute to the country's economic development. Exports are a crucial component of GDP, and a nation's prosperity is often tied to its ability to export goods and services. By selling these surpluses abroad, Afghanistan can generate foreign exchange, which in turn fosters several positive outcomes. Increased exports create job opportunities, allow for economies of scale in production, and intensify competition on the global market (Bhagwati & Srinivasan, 1979).

By analyzing Afghanistan's specific situation, we aim to identify the nature of the relationship between exports and the country's economic growth. This analysis will shed light on how effectively exports can serve as a driver of Afghan prosperity.

1.5 Fueling Growth with Innovation: Technology's Role in Afghanistan's Economic Transformation

Technological advancement is a key driver of economic growth in any nation. In the context of Afghanistan, embracing technological innovation could unlock significant potential for economic development. By investing in areas like digital infrastructure, renewable energy, and agricultural technology, Afghanistan can increase productivity, improve efficiency, and create new economic opportunities. However, challenges such as limited access to technology, inadequate infrastructure, and a lack of skilled labor need to be addressed to fully harness the potential of technological advancement for sustainable economic growth in Afghanistan This study contributes to the existing literature by employing an Autoregressive Distributed Lag (ARDL) model to empirically examine the dynamic interplay between population growth, employment levels, life expectancy, trade, technological advancement, and economic growth in Afghanistan.

In the context of the ARDL model, "dynamic interplay" refers to the complex and evolving relationships between the variables over time, encompassing both their short-run interactions and their long-run equilibrium relationships. It is not limited to a single type of relationship like mediation or moderation, but rather describes how the variables collectively influence and respond to each other. More specifically, in an ARDL framework, "dynamic interplay" implies:

Short-run dynamics: This refers to the immediate impact of changes in the independent variables on the dependent variable, as well as the effects of past values (lags) of both the dependent and independent variables. The ARDL model explicitly captures these immediate adjustments.

Long-run cointegration relationship: This signifies that despite short-term fluctuations, the variables tend to move together in a stable, long-term equilibrium. The bound testing approach is used to establish this long-run relationship, indicating that the variables do not drift apart indefinitely.

Feedback mechanisms: The "interplay" suggests that changes in one variable can trigger responses in others, which in turn might feed back and influence the initial variable. The lagged values of the variables in the ARDL model capture this. This approach allows us to capture both short-run and long-run relationships between these variables, providing a more nuanced understanding of their impact on economic

growth in a context characterized by significant instability and limited data availability.

Furthermore, by incorporating a comprehensive set of socio-economic and demographic factors, this study offers a more holistic perspective on the determinants of economic growth in Afghanistan, going beyond traditional analyses that often focus on a limited set of variables. The remainder of this manuscript is structured as follows: Section 2 outlines the data and methodology, Section 3 presents the empirical results, and Section 4 concludes with policy recommendations.

2. Literature Review

A substantial body of literature explores the multifaceted determinants of economic growth, with scholars investigating the roles of various factors, including population growth, employment levels, life expectancy, trade, and technological advancement. While numerous studies have examined these factors individually or in smaller combinations, limited research has comprehensively analyzed their dynamic interplay in the context of a post-conflict nation like Afghanistan. Instead of going deep into the existing literature reviews, we have subsumed the recent and important literature reviews into Table 1.

Table 1
Recent Literature Reviews on Concerned Variables

Author(s)	Country/ Period	Variables	Method	Result
Sylvester Onyeoma & Blessing Ose Oligbi (2023)	Nigeria/ 1983-2001	Population growth, GDP growth, capital accumulation, Poverty rate, unemployment rate	Auto Regressive Distributed lag model	Existence of a positive nexus between population growth in the short run, but the relationship is negative in the long run.
Obobase et al. (2024)	Six populated African Countries 2001-2019	Per capita GDP, total population, life expectancy, fertility rate, crude death rate, gross fixed capital formation	Autoregressive Distributed lag model (ARDL)	There is a significant positive impact of population on economic growth in the long run; however, the relationship is negative in the short run.
Banaga et al. (2024)	MENA Countries 1965-2018	Per capita GDP, Unemployment as a percentage of total labour force, Total population,	Feasible Generalized Least Squares model (FGLS) and Panel corrected	Population shows a non-linear U-shaped relationship to economic growth across all the model

		domestic credit to private sector by banks, Inflation, trade (%of GDP)	standard errors (PCSE)	specifications. The relationship highlights that population grows, per capita income falls up to a population threshold, after which per capita income rises.
Adisu Abebaw Degu (2019)	Ethopia 1981-2018	GDP at constant 2010 prices, population,	ARDL and Toda-Yamamoto Causality tests	Cointegration is confirmed by the bounds test. The association is positive between population and economic growth, both in the short and the long run.
Abdi et al.(2024)	Somalai 1990-2020	GDP(constant 2015 prices), FDI(% of GDP), Trade openness, capital, labour force	VECM and NARDL models	The results reveal that trade openness has a short-run negative impact on economic growth; however, long-run results show that a decline in trade openness shrinks economic growth.
Imen Mohamed Sghaier(2023)	4 North African Countries 1991-2015	GDP per capita, GFCC (% GDP), FDI (%GDP), Inflation rate, Govt. spending	Generalized methods of moments (GMM)	The study revealed that trade openness, along with financial development, has a more pronounced effect on economic growth.

Mtar and Balazreg (2023)	11 European Countries 2001-2016	GDP per capita (2010 prices), gross fixed capital formation, share of domestic credit to private sector, share of total trade to GDP, Net FDI inflows (% of GDP), CPI as proxy for inflation, Higher education graduates as a proxy for human capital	Panel VAR model	The findings reveal a uni-directional relationship between trade openness and economic growth. The results also reveal a negative relationship between the two variables.
Behera et al. 2023	117 developed and developing countries 1990-2018	GDP per capita, trade openness, institutional variables like law and order, govt. policy, countries' stability	method of moments-quantile regression	The results reveal that trade openness will lead to higher economic growth in developing countries, subject to improvement in the institutional parameters.
Asongu and Odhiambo, 2020	25 sub-Saharan African countries 1980-2014	Real GDP growth, GDP per capita, FDI, mobile phone, and internet penetration as proxies for technology, population, education, and government expenditure	Generalized Method of Moments	The study finds that both internet penetration and mobile phone penetration overwhelmingly modulate FDI to induce overall positive net effects on all three economic growth dynamics.

Hewage et al. 2024	35 Asian countries 2005-2019	Real GDP growth, Financial Development, Technological advancement, human capital, and private consumption	BB two-step GMM	The findings confirm that technological advancement has a significant moderator effect in both the short and long run on economic growth.

Source: Authors' compilation

While existing literature explores the impact of individual factors like population growth, life expectancy, employment, trade, and technological advancement on economic growth, limited research has comprehensively analyzed their dynamic interrelationships within the specific context of Afghanistan. Most studies have focused on individual factors or employed cross-country analyses, neglecting the unique challenges and complexities of the Afghan economy, including decades of conflict, political instability, and limited data availability. While variables directly measuring conflict and political instability are not explicitly included in the model as standalone regressors, their profound influence is implicitly acknowledged and reflected in the specific context chosen for the study. The historical period from 1990-91 to 2022-23 inherently encompasses significant periods of conflict and instability in Afghanistan.

3. Data and Methodology

This study delves into the dynamic interplay between key economic drivers in Afghanistan from 1990-91 to 2022-23. Utilizing GDP per capita (constant 2015 US$) as the benchmark for economic growth, data for this study were sourced from the World Development Indicators. The analysis encompasses a comprehensive set of variables, including population growth, life expectancy, employment, trade, and technological advancement, all meticulously extracted from the World Development Indicators database. All time-series data underwent rigorous analysis within the E-Views 10 software environment.

3.1 Model Specification

The study investigates the relationship between economic growth (GDP) and several key drivers, including population (POP), life expectancy (LE), employment (EMP), trade (IMP), and technology (TECH). The functional form used for this analysis is specified in Equation (1):

$$GDP_t = f(POP_t, LE_t, EMP_t, IMP_t, TECH_t) \quad \text{Eq. (1)}$$

To delve deeper into these interconnections, a Cobb-Douglas production function, as outlined in Equation (2), is employed.

$$GDP_t = \beta_0 + \beta_1(POP_t) + \beta_2(LE_t) + \beta_3(EMP_t) + \beta_4(IMP_t) + \beta_5(TECH_t) + \nu_t \quad \text{Eq. (2)}$$

To ensure stationarity and improve model fit, GDP, POP, LE, EMP, IMP, and TECH are transformed into natural logarithms, representing the respective variables at time 't'. 'Vt' accounts for any residual errors or deviations from the expected relationship.

Description of Variables and Data Sources

For clarity and transparency, Table 2 presents a comprehensive summary of all variables used in the analysis, along with their corresponding proxies, descriptions, and data sources.

Table 2
Description of Variables and Data Sources

Name of Variable	Proxy	Variable Description	Data Source
Economic Growth (GDP)	GDP per capita (constant 2015 US$),	GDP per capita is gross domestic product divided by mid-year population.	World Bank national accounts data and OECD National Accounts data files.
Population (POP),	Total Population	Total population is based on the de facto definition of population, which counts all residents regardless of legal status or citizenship. The values shown are midyear estimates.	United Nations Population Division.
Life Expectancy (LE),	Life expectancy at birth, total (years)	Life expectancy at birth indicates the number of years a newborn infant would live if prevailing patterns of mortality at the time of its birth were to stay the same throughout its life.	United Nations Population Division
Employment (EMP),	Employers, total (% of total employment) (modeled ILO estimate)	Employers are self-employed individuals who hire and supervise one or more employees. Their income is primarily derived from the profits generated by their business.	International Labour Organization.
Trade (IMP),	Imports of goods and services (current LCU)	Imports of goods and services represent the value of all goods and other market services	World Bank national accounts data and OECD National

		received from the rest of the world.	Accounts data files.
Technology (TECH)	Technical cooperation grants (BoP, current US$)	Technical cooperation grants encompass both standalone assistance for general capacity building and targeted support for specific investment projects.	World Bank, International Debt Statistics, and OECD

Source: Authors' compilation

3.2 Autoregressive Distributed Lag Model (ARDL) of Cointegration

To unravel the intricate web of relationships between population growth, life expectancy, employment, trade, technology, and economic growth, a robust econometric tool was required. We opted for the Autoregressive Distributed Lag (ARDL) model, pioneered by Pesaran and Shin in 1991. This innovative approach surpasses traditional models by seamlessly integrating both endogenous and exogenous variables, enabling the simultaneous estimation of both short-run and long-run effects. A key advantage of the ARDL model lies in its flexibility, as it does not necessitate the same order of integration for all variables.

$$y_t = \beta_0 + \beta_1 y_{t-1} + \beta_1 y_{t-2} + \cdots \beta_p y_{t-p} + a_0 x_t + a_0 x_{t-1} + \cdots + a_q x_{t-q} + \varepsilon_t \quad (3)$$

Where ε_t is the white noise error term.

Equation (1) can be represented in ARDL form as:

$$\begin{aligned} GDP_t = \alpha_1 + \sum_{i=1}^{p} \alpha_2 \, GDP_{t-j} + \sum_{i=1}^{q} \alpha_3 \, POP_{t-i} + \sum_{i=1}^{r} \alpha_4 \, LE_{t-i} \\ + \sum_{i=1}^{s} \alpha_5 \, EMP_{t-i} + \sum_{i=1}^{u} \alpha_6 \, IMP_{t-i} + \sum_{i=1}^{u} \alpha_7 \, TECH_{t-i} + \rho_1 \, GDP_{t-1} \\ + \rho_2 POP_{t-1} + \rho_3 LE_{t-1} + \rho_4 EMP_{t-1} + \rho_5 IMP_{t-1} \\ + \rho_5 TECH_{t-1} \\ + v_{1t} \end{aligned} \quad (4)$$

Where p, q, r, s, and u are the suitable lag length, α1, α2, α3, α4, α5 &, α6 are the short-run coefficients, while ρ1, ρ2, ρ3, ρ4, and ρ5 show the long-run coefficients of independent variables. The error term is represented by v.

3.4 Empirical Results and Discussion

The econometric estimation of the above-mentioned model is presented in this section. To confirm the order of integration of variables, we have resorted to Philips Perron (PP) and Augmented Dickey–Fuller (ADF) unit root tests. Further, the ARDL bounds test is applied to confirm the cointegration relationship. Finally, the stability of the model is checked by various diagnostic tests.

Stationarity Test

To assess the stationarity of our variables, the Phillips-Perron (PP) and Augmented Dickey-Fuller (ADF) unit root tests were conducted, with the results summarized in Table 2.

Table 2
Unit Root Test Results

Variables	ADF-Test		PP-Test		OI
	Level	First Difference	Level	First Difference	
GDP	-0.5336	-7.6867***	-0.5896	-6.5757***	I(1)
POP	-0.4686	-5.3670***	-1.1655	-6. 7788***	I(1)
LE	-0.854**	-0.6654	-1.4567**	-4.4333***	I(0)
EMP	-0.6858	-6.5774***	-0.4543	-6.2866***	I(1)
IMP	-0.5634	-5.8898***	-1.6368	-6. 8686***	I(1)
TECH	-1.6889	-1.8888***	-1.2558	-1.6633***	I(1)

Note: OI: Order of integration; Economic Growth (GDP); Population (POP); Life Expectancy (LE); Employment (EMP); Trade (IMP); Technology (TECH). However, *** denotes the significance level of 1%.

Given that all variables, except for life expectancy (LE), which is stationary at a level, became stationary after first differencing in both ADF and PP tests, the ARDL model, as developed by Pesaran and Shin (1995), emerges as the most suitable approach. We subsequently delved into the existence of a long-run equilibrium relationship by employing the robust ARDL bounds testing procedure, with the results presented in Table 3.

Table 3
F-Bounds Test (Symmetric ARDL)

	Lower bound	**Upper bound**	**F-statistic value**	**Remark**
Sig.	I(0)	I(1)		
10%	6.33	7.43		
5%	4.65	5.46	9.7656***	Cointegration
2.5%	3.36	4.75		exists
1%	2.12	3.42		

Source: Authors' compilation; Note: *** denotes the significance level of 1%.

The F-statistic decisively surpassed the critical bounds for both I(0) and I(1) at all significance levels, unequivocally confirming the existence of a long-run equilibrium relationship among economic growth and its determinants. Building upon this confirmation, the model was further analyzed to estimate the short-run and long-run coefficients of all independent variables, the results of which are presented in Table 4.

Table 4
ARDL Long-run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	0.76852	0.001997	3.431068	0.0025
POP	-0.59032	0.034564	-1.708108	0.0004
LE	0.63570	0.029695	6.041525	0.0000
EMP	0.70343	0.001462	2.347987	0.0287
IMP	0.37632	0.018785	-4.063233	0.0006
TECH	0.74643	0.053233	2.435450	0.0046
C	6.355443	0.484785	13.10983	0.0000

Source: Authors' compilation

The ARDL model results indicate significant long-run relationships between the economic growth of Afghanistan and its several key determinants. Notably, Life Expectancy (LE), Employment (EMP), and Technological advancements (TECH) exhibit positive and statistically significant coefficients, suggesting that improvements in these areas are positively associated with the economic growth of Afghanistan. Conversely, Population (POP) demonstrates a statistically significant negative relationship, potentially indicating that population growth may exert downward pressure on the dependent variable. Similarly, Imports (IMP) also exhibit a negative association, suggesting that increased imports may have a detrimental impact on the dependent variable (GDP) in the long run. These findings underscore the complex interplay of economic, social, and demographic factors in shaping the long-term dynamics of economic growth.

Our ARDL analysis reveals that while population growth offers a short-term economic stimulus in Afghanistan, its long-run impact is negative due to the economy's limited absorptive capacity. This sustained demographic expansion strains finite resources like arable land and water, leading to diminishing returns and reduced per-capita output. Furthermore, it overburdens already stretched social services—education, healthcare, and sanitation—impeding human capital development and exacerbating poverty. In the labor market, rapid population growth, coupled with limited industrialization, creates a surplus of unskilled labor, fostering underemployment and hindering productive engagement. The increased population density also accelerates environmental degradation, undermining the long-term sustainability of economic activities in this climate-vulnerable, agrarian society.

Similarly, the long-run negative association between imports (IMP) and economic growth in Afghanistan indicates a critical structural imbalance. A sustained reliance on imports crowds out domestic production, hindering the development of nascent local industries that struggle to compete and achieve economies of scale. This import dependency also leads to a significant drain on foreign exchange reserves, weakening the national currency and limiting the government's capacity for development financing. Such economic vulnerability to external markets and supply chains creates instability, deterring long-term investment. Moreover, a high volume of consumer goods imports offers limited technology transfer or skill development, perpetuating a consumption-driven rather than a production-driven economy. Ultimately, a chronic trade deficit resulting from high imports negatively impacts the balance of payments,

leading to macroeconomic instability and a less attractive environment for foreign direct investment, thereby impeding long-term economic prosperity.

The short-run results are presented in Table 5 below.

Table 5
ARDL Short-run Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP)	0.27267	0.002297	-3.77183	0.0021
D(POP)	0.23556	0.002328	10.00301	0.0000
D(LE)	0.65567	0.025334	-7.44164	0.0000
D(EMP)	0.22688	0.044932	-2.07125	0.0573
D(IMP)	0.34320	0.001462	2.347987	0.0287
D(TECH)	-0.07632	0.018785	-4.063233	0.0006
CointEq(-1)*	-0.5578	0.221776	-2.867655	0.0000

Source: Authors' compilation

The ARDL model reveals significant short-run dynamics among the variables. The growth rate of GDP, population, life expectancy, and imports exhibits statistically significant impacts on the dependent variable in the current period. Notably, a one-unit increase in the growth rate of GDP, population, life expectancy, and imports is associated with a positive change in the dependent variable. While the growth rate of employment also shows a positive relationship, its impact is statistically significant only at the 5% level. Interestingly, the growth rate of technology does not exhibit a statistically significant short-run effect on the dependent variable.

Furthermore, the presence of a negative and statistically significant error correction term (ECT) with a coefficient of -0.55 indicates a strong tendency for the system to revert to its long-run equilibrium. This implies that approximately 55% of any deviation from the long-run equilibrium is corrected within a single period.

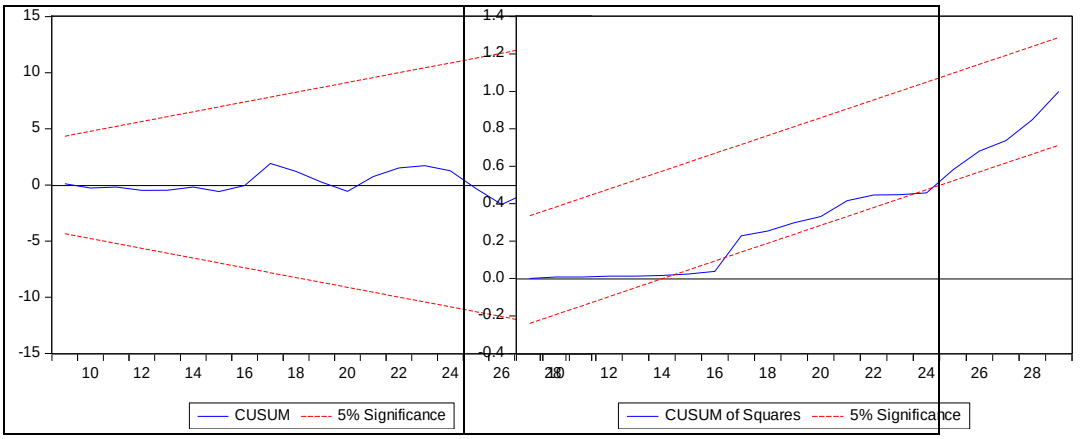
Table 11
Diagnostic Inspection

Diagnostic Test	**Problem**	**(P-value)**	**Decision**
B-G Test	Serial correlation	0.2192	No serial correlation
B-P-G Test	Heteroscedasticity	0.0278	No heteroscedasticity
J-B Test	Normality	0.6414	Residuals are normally distributed
Ramsey RESET Test	Specification error	0.365	No specification error exists
Wald Test	Parameter Stability	0.0200	Model is stable
CUSUM Test	Stability	-	Model is stable
CUSUMSQ Test	Stability	-	Model is stable

Source: Authors' compilation

Note: Significance is marked at the 1% level. Abbreviations: D-W (Durbin-Watson statistic), B-G (Breusch-Godfrey Serial Correlation F-Statistic), B-P-G (Breusch-Pagan-Godfrey Heteroscedasticity Test F-Statistic), and J-B (Jarque-Bera Residual normality test statistic).

Figure 1
Stability Tests



Diagnostic tests provide strong support for the robustness of the model. The Breusch-Godfrey test indicates the absence of serial correlation among residuals, while the Breusch-Pagan-Godfrey test confirms homoscedasticity. Furthermore, the CUSUM and CUSUMSQ tests provide evidence of model stability over time. These findings collectively reinforce the model's robustness and statistical significance, enhancing the credibility of the theoretical insights derived from this study and their potential to inform policy analysis.

4. Conclusion

This study employed an ARDL bound testing approach to investigate the long-run and short-run dynamics between economic growth and key determinants, including population growth, life expectancy, employment, trade, and technological advancements, in Afghanistan from 1990-91 to 2022-23. The results provide crucial insights into the factors shaping Afghanistan's economic trajectory. The study confirms the existence of a long-run cointegration relationship among the variables, indicating a stable long-term equilibrium. In the long run, life expectancy, employment, and technological advancements emerge as significant drivers of economic growth, while population growth exerts a negative influence. Increased imports also appear to have a detrimental impact on long-term economic growth.

In the short run, the growth rates of GDP, population, life expectancy, and imports significantly influence the dependent variable. However, the growth rate of technology exhibits no statistically significant short-run impact. The presence of a significant and negative error correction term indicates a strong tendency for the system to revert to its long-run equilibrium. Robustness checks, including tests for serial correlation and heteroscedasticity, along with stability tests, confirm the validity of the model. These findings underscore the complex interplay of various factors influencing Afghanistan's economic growth. The study has significant policy implications. Prioritizing investments in human capital through improved healthcare, education, and nutrition is crucial. Fostering employment opportunities, promoting technological advancements, and implementing sustainable population policies are equally vital. Addressing the potential negative impacts of imports through trade diversification and export promotion strategies is also essential. This study contributes to a deeper understanding of the factors driving economic growth

in Afghanistan. However, further research is warranted to investigate the impact of specific policies, incorporate regional factors, and delve deeper into the micro-level implications of these findings. This conclusion synthesizes the key findings of the study, highlights their policy implications, and emphasizes the need for further research to deepen our understanding of Afghanistan's economic growth dynamics.

The findings of this study largely align with established economic literature. The positive impact of human capital (life expectancy), employment, and technological advancements on economic growth is consistently supported by numerous studies (e.g., Barro, 1991; Lucas, 1988; Romer, 1990). Similarly, the long-term negative pressure of population growth on resources, particularly in developing economies, is a well-documented phenomenon (e.g., Malthus, 1798; Easterlin, 1980). The detrimental effect of increased imports on long-term GDP, while potentially counterintuitive in some contexts, can be consistent with theories emphasizing the importance of domestic production and export-led growth, especially in economies with nascent industries and high import dependence for consumption rather than productive investment.

4.1 Charting Afghanistan's Growth: Policy Insights and Research Frontiers

The findings of this study have significant policy implications for the Afghan economy. To foster sustainable economic growth, policymakers should prioritize initiatives that enhance human capital development, such as investing in healthcare, education, and nutrition programs to improve life expectancy. Furthermore, policies aimed at stimulating employment growth, such as supporting small and medium-sized enterprises, promoting entrepreneurship, and investing in skill development programs, are crucial. Fostering technological advancements through investments in research and development, promoting digital literacy, and facilitating access to technology are also essential for driving economic growth.

To mitigate the potential negative impacts of population growth, policies addressing population dynamics, such as family planning programs and investments in education and women's empowerment, should be considered. Additionally, strategies to optimize trade policy, such as diversifying exports, promoting local production, and negotiating favorable trade agreements, are necessary to mitigate the potential negative impacts of increased imports on the Afghan economy.

4.2 Study Constraints and Future Avenues

Despite its valuable contributions, this study has several limitations. First, the analysis is constrained by the availability and quality of data for Afghanistan, a nation that has experienced prolonged conflict and instability, which can affect the reliability and completeness of economic statistics. Second, while the model includes several key macroeconomic variables, it does not explicitly account for the direct impact of political instability, governance quality, or conflict, which are significant factors shaping Afghanistan's economic landscape. Future research could explore the integration of qualitative or quantitative measures of these factors if reliable data become available. Finally, the study's focus on macroeconomic aggregates limits insights into the micro-level dynamics and regional disparities within Afghanistan, suggesting a need for more granular analyses in subsequent investigations.

4.3 Future Research Directions

Given the complexity of the Afghan economy, further research is warranted to deepen our understanding of the determinants of economic growth. Future studies could incorporate additional variables, such as investment, government expenditure, and institutional quality, into the analysis. Conducting regional analyses to investigate the impact of regional trade agreements and cross-border cooperation on economic growth in Afghanistan is also crucial. Furthermore, employing more sophisticated econometric techniques, such as vector auto-regression (VAR) models, can provide valuable insights into the dynamic relationships between the variables. Finally, conducting micro-level studies to investigate the impact of these factors on individual households and firms can provide a more nuanced understanding of the drivers of economic growth in Afghanistan.

These findings and policy recommendations offer a valuable foundation for policymakers and researchers to develop and implement effective strategies for promoting sustainable economic growth and development in Afghanistan.

Acknowledgement

Our sincerest appreciation goes out to the World Bank, IMF, OECD, and various Afghan government data portals. Their invaluable commitment to data accessibility has been instrumental, providing us with the crucial, long-term datasets that formed the backbone of this research. Without their dedication to open data, the comprehensive analysis presented here would not have been possible.

We extend our profound gratitude to Professor Effat Yasmin, HOD Economics, University of Kashmir. Her unwavering support, insightful guidance, and tireless efforts in cultivating such a stimulating and conducive research environment have been truly invaluable. Professor Yasmin's consistent encouragement played a pivotal role in shaping this paper.

Finally, the deepest personal thanks from the first author are reserved for his father, Gh. Hassan Itoo. This paper is, in many ways, a testament to his extraordinary personal sacrifices, which created the opportunities and provided the steadfast support necessary to bring this work to fruition. His dedication is a source of immense inspiration.

Authors' Contributions: Conceptualization, H.H.I., M.A.S., and J.M.Y.; literature review, M.A.S. and J.M.Y.; data collection, H.H.I. and J.M.Y.; supervision, H.H.I.; data analysis, H.H.I. and M.A.S.; writing – original draft preparation, H.H.I., M.A.S., and J.M.Y.; writing – review and editing, H.H.I., M.A.S., and J.M.Y. All authors have read and agreed to the published version of the manuscript.

Funding: This research received no external funding.

Informed Consent Statement: Informed consent was obtained from all subjects involved in the study.

Data Availability Statement: The data presented in this study are available upon request from the corresponding author.

Conflicts of Interest: The authors declare no conflict of interest.

References

Acemoglu, D., & Johnson, S. (2007). Disease and development: The effect of life expectancy on economic growth. *Journal of Political Economy, 115*(6), 925–985. https://doi.org/10.1086/529000

Akram, M., Khan, A. J., Atif, M., & Shafique, F. (2011). Exports and economic growth: Empirical evidence from Canada. *Interdisciplinary Journal of Contemporary Research in Business, 3*(2), 849–858.

Asongu, S. A., & Odhiambo, N. M. (2020). Foreign direct investment, information technology, and economic growth dynamics in Sub-Saharan Africa. *Telecommunications Policy, 44*(1), 101838.

Balassa, B. (1978). Exports and growth: Further evidence. *Journal of Development Economics, 5*(2), 181–189.

Barro, R. J. (1991). Economic growth in a cross-section of countries. *The Quarterly Journal of Economics, 106*(2), 407–443.

Behera, S. R., Mishra, T., & Dash, D. P. (2023). Do religious freedom vis-à-vis trade openness affect economic growth? A cross-country empirical investigation. *Theoretical Economics Letters, 13*(1), 119–137.

Bhagwati, J. N., & Srinivasan, T. N. (1979). *Trade policy and development, International Economic Policy: Theory and Evidence.* Johns Hopkins University Press.

Brida, J. G., Alvarez, E., Cayssials, G., & Mednik, M. (2024). How does population growth affect economic growth and vice versa? An empirical analysis. *Review of Economics and Political Science, 9*(3), 265–297. https://doi.org/10.1108/REPS-11-2022-0093

Degu, A. A. (2019). The nexus between population and economic growth in Ethiopia: An empirical inquiry. *International Journal of Business and Economic Sciences Applied Research, 12*(3), 43–50.

Easterlin, R. A. (1980). *Birth and fortune: The impact of numbers on personal welfare.* Basic Books.

Eludire, A. (2023). The impact of labor force on economic growth: A global view.

Hassan Itoo, H., & Ali, N. (2022). Analyzing the causal nexus between CO_2 emissions and its determinants in India: Evidence from ARDL and EKC approach. *Management of Environmental Quality.*

Hewage, R. S., Pyeman, J., & Othman, N. (2024). Moderator effect of technological advancement on financial development and economic growth nexus in Asian countries. *Journal of International Studies, 20*(1), 115–147.

Kibria, M. G., & Hossain, M. S. (2020). Does export affect economic growth? An empirical investigation for Bangladesh. *American Journal of Economics and Business Management, 3*(1), 219–226.

Kilavuz, E., & Topcu, B. A. (2012). Export and economic growth in the case of the manufacturing industry: Panel data analysis of developing countries. *International Journal of Economics and Financial Issues, 2*(2), 201–215.

Lucas, R. E., Jr. (1988). On the mechanics of economic development. *Journal of Monetary Economics, 22*(1), 3–42.

Malthus, T. R. (1798). *An essay on the principle of population.* J. Johnson.

Mtar, K., & Belazreg, W. (2023). On the nexus of innovation, trade openness, financial development, and economic growth in European countries: New perspective from a GMM panel VAR approach. *International Journal of Finance & Economics, 28*(1), 766–791.

Mohamed Sghaier, I. (2023). Trade openness, financial development, and economic growth in North African countries. *International Journal of Finance & Economics, 28*(2), 1729–1740.

Ngangue, N., & Manfred, K. (2015). The impact of life expectancy on economic growth in developing countries. *Asian Economic and Financial Review, 5*(4), 653–660. https://doi.org/10.18488/journal.aefr/2015.5.4/102.4.653.660

Onyeoma, S., & Oligbi, B. O. (2023). Population and economic growth nexus: Empirical evidence from Nigeria. *Indian Journal of Finance and Economics, 4*(1), 53–72.

Romer, P. M. (1990). Endogenous technological change. *Journal of Political Economy, 98*(5, Part 2), S71–S102.