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Key Drivers of Economic Growth in Developing Countries: A Comparative Study of Turkey and Bangladesh

发展中国家经济增长的关键驱动因素：土耳其与孟加拉国的比较研究

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Abstract. This study examines the dynamic relationship between gross domestic product (GDP) growth and key macroeconomic indicators in Turkey and Bangladesh using panel data from the World Bank covering the period 1981–2020. The analysis focuses on population growth, inflation, literacy rate, natural resource utilization, investment, and foreign direct investment (FDI) to uncover their causal links with GDP growth. Employing the Dumitrescu–Hurlin panel causality test, the results reveal statistically significant causal relationships between GDP growth and the selected macroeconomic variables, with population growth emerging as the most influential determinant. The findings provide important insights into the distinct economic structures of the two emerging economies and offer policy-relevant implications for fostering sustainable and inclusive growth. Overall, the study contributes to the literature on economic development by highlighting the critical role of macroeconomic fundamentals in shaping long-term growth trajectories in emerging economies such as Turkey and Bangladesh.

Keywords: Economic growth, population growth, inflation, literacy rate, natural resource, foreign direct investment

摘要： 本研究利用世界银行1981—2020年的面板数据，考察了国内生产总值（GDP）增长与关键宏观经济指标在土耳其和孟加拉国之间的动态关系。分析重点关注人口增长、通货膨胀、识字率、自然资源利用、投资以及外国直接投资（FDI），以揭示它们与GDP增长之间的因果联系。采用Dumitrescu–Hurlin 面板因果检验后，结果表明，GDP增长与所选宏观经济变量之间存在统计显著的因果关系，其中人口增长是最具影响力的决定因素。研究结果为理解这两个新兴经济体不同的经济结构提供了重要见解，并为促进可持续和包容性增长提供了具有政策意义的启示。总体而言，本研究通过强调宏观经济基本面在塑造土耳其和孟加拉国等新兴经济体长期增长轨迹中的关键作用，为经济发展相关文献作出了贡献。

关键词： 经济增长、人口增长、通货膨胀、识字率、自然资源、外国直接投资

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1. Introduction

Achieving resilient economic growth is essential for improving living standards and overall prosperity, with gross domestic product (GDP) serving as a central indicator of economic performance (Jim-Suleiman & Adeyele, 2023; Mollah et al., 2022; Semuel & Nurina, 2015). However, sustained growth depends on a complex interaction of macroeconomic factors, including inflation, interest and exchange rates, foreign direct investment (FDI), and household expenditure (Anaripour, 2011; Ingham, 2013; Jakob, 2015; Kibria et al., 2014; Mamo, 2012; Svyrydenko et al., 2023; Tapsin & Hepsag, 2014; Zayed et al., 2022). Among these, inflation plays a particularly critical role in shaping macroeconomic stability, motivating policymakers to balance price control with growth-oriented strategies (Ayyoub et al., 2011; Zhao & Brychko, 2023; UNCTAD, 2019). Nevertheless, the determinants of economic growth in developing and transitioning economies remain more complex than in advanced economies, and empirical evidence on optimal growth drivers is still limited (Attari & Javed, 2013; Ben Slimane & M'Henni, 2021; Mulska et al., 2022; Omelchuk et al., 2022; Petrova et al., 2020; Sakun et al., 2021; Semenets-Orlova et al., 2022b; UNDP, 2020).

This study addresses these gaps by examining the determinants of economic growth in two emerging economies, Bangladesh and Turkey, which differ markedly in demographic characteristics and economic structures. By analyzing how key macroeconomic variables influence per capita income growth, the study provides insights into divergent growth trajectories among middle-income countries (Akyuz, 2019; Baharumshah et al., 2016; Eichengreen et al., 2018; European Training Foundation, 2011; FDI in Turkey, 2022; Haider, 2021). Using a panel causality approach, the research investigates the relationships between macroeconomic indicators and economic growth, with particular attention to the role of foreign direct investment (FDI). In doing so, the study contributes to the literature by offering policy-relevant insights into strategies for attracting capital and fostering long-term, sustainable economic growth in developing economies.

2. Materials and Methods

The exploration of economic growth within developing nations remains a central theme in academic and policy discourse, emphasizing the interaction between macroeconomic dynamics, institutional quality, and socio-political contexts. Foundational studies by Acemoglu et al. (2005) and Kaufmann et al. (2011) highlight that economic growth is deeply influenced by governance structures and institutional effectiveness, rather than macroeconomic indicators alone (El-Gharmam, 2002; Petrova et al., 2020; World Bank, 2018). These insights underline the multifaceted nature of development and the importance of contextualizing growth processes.

Building on this foundation, recent studies argue for a more country-specific approach, as generalized growth models often fail to capture the heterogeneity across developing economies (Rodrik, 2018; Eichengreen et al., 2018). Population growth, education, investment, and institutional arrangements interact differently depending on national conditions, necessitating tailored analyses. Demographic dynamics, in particular, present localized opportunities and constraints for sustainable development, as emphasized by Bloom et al. (2014), Zeynalli and Rahimli (2022), and Bazaluk et al. (2022).

Human capital investment, especially through education, is widely recognized as a key driver of productivity and innovation (Hanushek & Woessmann, 2015; World Bank, 2018). However, disparities in education quality and access across developing countries may limit its growth-enhancing potential (Hutorov et al., 2020; Semenets-Orlova et al., 2022a). Similarly, domestic investment and foreign direct investment (FDI) are essential for capital accumulation and technological diffusion, though their effectiveness depends heavily on institutional quality and macroeconomic stability (UNCTAD, 2020; Mauro, 1998). Institutions

play a decisive role in shaping growth outcomes by influencing incentives, policy implementation, and market efficiency (North, 1991; Acemoglu & Robinson, 2005). Empirical evidence suggests that weak governance and regulatory inefficiencies can undermine the benefits of investment and innovation, particularly in developing economies (Eggoh et al., 2015; Elahi, 2021). These arguments motivate a closer examination of institutional and macroeconomic interactions in specific national contexts.

Stages and Determinants of Growth Development in Bangladesh and Turkey

Bangladesh and Turkey represent distinct development trajectories among emerging economies. Bangladesh is transitioning from an agriculture-based economy toward industrialization, driven primarily by export-oriented manufacturing, particularly textiles and apparel (Ahmed & Hossain; Rahman & Zaman, 2016). Policy efforts in Bangladesh have largely focused on strengthening human capital through education and healthcare while sustaining labor-intensive growth. In contrast, Turkey exhibits a more diversified economic structure, leveraging its strategic geographic position, industrial capacity, and integration into global value chains to attract investment and foster innovation. Infrastructure development, FDI inflows, and technological advancement are central to Turkey's growth strategy, enhancing its economic resilience and competitiveness. These contrasting pathways underscore the importance of context-specific growth determinants.

Addressing Gaps in the Literature and Research Agenda

Despite extensive research on economic growth, notable gaps persist, particularly regarding the country-specific interactions between macroeconomic variables and institutional frameworks in developing economies (Rodrik, 2018; Eichengreen et al., 2018). Much of the existing literature relies on generalized models that overlook national idiosyncrasies, leading to oversimplified conclusions (Acemoglu et al., 2005; Kaufmann et al., 2011). This study addresses these gaps by examining the causal relationships between key macroeconomic indicators—such as population growth, inflation, FDI, and education—and economic growth within the specific institutional contexts of Turkey and Bangladesh. Moreover, it moves beyond linear assumptions by employing the Dumitrescu–Hurlin panel causality test, which captures dynamic and heterogeneous causal linkages (Dumitrescu & Hurlin, 2012). By doing so, the study contributes nuanced empirical evidence to inform more context-sensitive and effective economic policy design in developing economies (Sen, 2019; Stiglitz, 2007).

Discussion of the Variables and Model

According to the World Bank income classification, Turkey is categorized as an upper-middle-income developing country, while the People's Republic of Bangladesh belongs to the lower-middle-income group. This classification is based on gross national income (GNI) per capita and is revised annually to account for inflation, exchange rate movements, and population growth. To ensure consistency across years, income thresholds are adjusted annually for inflation (Table 1).

Table 1. Economic status classifications

Group	July 1, 2020	July 1, 2019
Low-income group	Less $1036	Less$ 1026
Lower-middle-income group	$1036 to $4045	$1026 to $3995
Upper-middle-income group	$4046 to $12,535	$3996 to $12,375
High-income group	Above $12,535	Above $12,375

The selection of Turkey and Bangladesh is motivated by their differing income classifications and development stages, which provide a meaningful basis for comparing the determinants of economic growth across developing economies. Using panel data sourced from the World Bank for the period 1981–2020, this study employs panel econometric techniques to examine the causal relationships between macroeconomic variables and economic growth. The panel framework enables the analysis to capture both within-country dynamics over time and cross-country differences, thereby providing a more robust assessment of growth determinants in the two economies.

Economic growth (Y), the dependent variable, is proxied by the growth rate of GDP per capita (GROWTH), measured as the annual percentage change in real GDP per capita. This indicator captures both positive and negative growth episodes over the study period, with higher values reflecting improved economic performance.

The empirical model is specified as follows:

$$Y = f(Pop\_growth, Inf, Lit\_rate, Res, Invest, Fd\_in, Fd\_out) \quad (1)$$

where population growth (Pop_growth) represents the annual percentage change in total population, with an expected positive relationship with growth. Inflation (Inf), measured using the GDP deflator, captures price stability and is expected to exert a negative effect on growth. Literacy rate (Lit_rate), expressed as a percentage, proxies human capital development and is anticipated to positively influence economic growth.

Natural resources (Res) measure the value of resource production for domestic use or export, expressed in monetary terms. The expected sign of this variable is ambiguous due to competing effects in the literature, including growth-enhancing resource revenues versus adverse outcomes such as Dutch Disease and rent-seeking behavior. Investment (Invest), measured in monetary terms, reflects capital formation and is expected to positively affect growth.

Foreign direct investment inflows (Fd_in) capture foreign capital entering the domestic economy and are expected to positively influence growth through technology transfer and capital accumulation. Conversely, foreign direct investment outflows (Fd_out) represent domestic investments abroad and may exert either a positive or negative effect on growth, depending on their impact on domestic capital availability.

In estimable form, the model is expressed as:

$$Y_{it\,G} = \beta_i 0 + \beta_i 1\ Pop\_growth_{it} + \beta i2\ Infit + \beta i3\ Lit\_rateit + \beta i4\ Resit + \beta i5\ Investit + \beta_{i6}\ Fd\_in_{it} + Fd\_out_{it} + \varepsilon_{it} \quad (2)$$

Table 2. Details of the variables used, including their descriptions, units of measurement, and expected signs of correlation

Sign of the Variable	Variable	Name	Description	Unit of Measurement	Expected Sign of Coefficient	Source	Aim of Using the Variable
G	Growth (dependent variable)	GDP per capita growth	Annual percentage change in GDP per capita	%	–	WB	GDP per capita growth is the main indicator of economic growth and reflects changes in income levels and overall economic performance.
Pop_growth	Population growth (independent variable)	Growth of population	Annual population growth rate	%	$\beta_1 > 0$	WB	A growing population increases the labor force and market size, which can stimulate production, consumption, and economic growth.
Inf	Inflation (independent variable)	GDP deflator	Measures changes in the general price level relative to constant prices	%	$\beta_2 < 0$	WB	Inflation affects purchasing power, labor market efficiency, and investment decisions, potentially slowing economic growth.
Lit_rate	Literacy rate (independent variable)	Education level	Percentage of literate population	%	$\beta_3 > 0$	WB	Education enhances human capital, productivity, and innovation, which are essential drivers of long-term economic growth.
Res	Resource (independent variable)	Natural resource rents	Total natural resource rents (% of GDP)	$	$\beta_4 \pm$	WB	Natural resources can stimulate growth through exports and revenues but may

Sign of the Variable	Variable	Name	Description	Unit of Measurement	Expected Sign of Coefficient	Source	Aim of Using the Variable
							also hinder growth due to rent-seeking and Dutch Disease effects.
Invest	Invest (independent variable)	Net investment in nonfinancial assets	Expenditure on capital goods formation	$	$\beta_5 > 0$	WB	Investment expands productive capacity, supports infrastructure development, and promotes sustained economic growth.
Fd_in	FDI inflows (independent variable)	Foreign direct investment, net inflows	Net inflows of foreign direct investment into the domestic economy	$	$\beta_6 > 0$	WB	FDI inflows promote growth by generating employment, transferring technology, and enhancing productivity and competitiveness.
Fd_out	FDI outflows (independent variable)	Foreign direct investment, net outflows	Net outflows of foreign direct investment from the domestic economy	$	$\beta_7 \pm$	WB	FDI outflows reflect international expansion and global integration, which may either reduce domestic capital or enhance growth through foreign returns.

Model Estimation

This study conducts a cross-country growth analysis using panel data for countries categorized by income level over the period 1981–2020. The empirical strategy is designed to examine the relationship between economic growth and a set of macroeconomic indicators through a comprehensive panel econometric framework. The analysis incorporates several stages, including cross-country growth regressions, panel data econometrics, time-series and cross-sectional analysis, as well as robustness diagnostics.

To account for potential cross-sectional dependence, which commonly arises in macro-panel data due to globalization and economic interlinkages, we first apply Pesaran's (2004, 2006) cross-section dependence (CD) test. In addition, slope homogeneity tests are employed to assess whether slope coefficients are

homogeneous across countries. These preliminary diagnostics guide the selection of appropriate estimation techniques.

To examine the stationarity properties of the variables, we employ Pesaran's (2007) Cross-sectionally Augmented IPS (CIPS) unit root test, which is robust to cross-sectional dependence. The CIPS statistic is computed as the average of the cross-sectionally augmented Dickey–Fuller (CADF) statistics across individual countries. Following this, panel cointegration is assessed using methods consistent with the presence of cross-sectional dependence to determine the existence of long-run relationships among the variables.

For estimating the long-run coefficients, this study adopts the Common Correlated Effects Mean Group (CCEMG) estimator proposed by Pesaran (2006). The CCEMG approach effectively controls for unobserved common factors and cross-sectional dependence by augmenting the regression with cross-sectional averages of the variables. This method yields both panel-wide and country-specific estimates, allowing for heterogeneity across countries.

Finally, panel causality analysis is conducted to explore the direction of relationships among the variables and to complement the long-run estimation results. Overall, this multi-step econometric strategy ensures robust inference regarding the determinants of economic growth while accounting for cross-sectional dependence, heterogeneity, and dynamic interactions among the variables.

3. Result

This study analyzes a panel dataset that captures the relationship between GDP growth and several macroeconomic variables, including population growth, inflation, literacy rate, natural resource availability, net investment, foreign direct investment (FDI) inflows, and FDI outflows in Bangladesh and Turkey. The descriptive statistics summarize the key characteristics of these variables across the two countries, providing an initial overview of their economic and structural conditions. Differences in the observed values reflect variations in demographic trends, human capital development, investment patterns, and external financial engagement. These summary statistics offer a foundational understanding of the data and support further econometric analysis in examining the determinants of economic growth

Table 3. Descriptive Panel Statistics for Bangladesh and Turkey

Variable	Mean	Std. Dev	Min	Max
GDP	3,733.663	4,050.042	247.6496	12,614.78
Population growth	1.490254	0.3412319	0.780048	2.126059
Inflation	20.97126	27.35334	0.007174	105.215
Literacy rate	77.92732	17.84479	35.3193	96.74221
Natural resource	0.612612	0.3688673	0.139736	1.646285
Net investment in nonfinancial asset	1.940582	0.6231481	1.076646	4.392464
FDI inflow	0.897371	0.7787503	0.004492	3.623502
FDI outflow	0.142926	0.1683906	0	0.750837

Source: *WDI World Bank (2022)*

$$GDPit = \beta i0 + \beta i1\ Popgrowthit + \beta i2\ infit + \beta i3 Litrateit + \beta i4 Resit + \beta i5\ Investit + \beta i6\ Fdiinit + \beta i7\ Fdioutit + \varepsilon it \quad (3)$$

where t=1981,1991,…,2020t = 1981, 1991, \ldots, 2020t=1981,1991,…,2020 and i=1,2i = 1, 2i=1,2 denote Turkey and Bangladesh, respectively. The subscripts iii and ttt represent the cross-sectional (country) and time dimensions. The intercept and the error term are denoted by βi0\beta_{i0}βi0 and εit\varepsilon_{it}εit. The coefficients βi1\beta_{i1}βi1 to βi7\beta_{i7}βi7 correspond to population growth, inflation, literacy rate, natural resources, investment, FDI inflows, and FDI outflows, respectively.

Table 3 reports the descriptive panel statistics for Bangladesh and Turkey, summarizing the key variables used in the analysis. The average GDP across the two countries is 3,733.663, with a standard deviation of 4,050.042, indicating substantial variation in economic output. GDP values range from a minimum of 247.6496 to a maximum of 12,614.78. Population growth records a mean value of 1.490254 and a standard deviation of 0.3412319, with observed values ranging between 0.780048 and 2.126059, reflecting differences in demographic dynamics.

Inflation exhibits considerable volatility, with an average value of 20.97126 and a standard deviation of 27.35334. The minimum and maximum inflation rates are 2.007174 and 105.215, respectively, highlighting pronounced price instability over the study period. The literacy rate, which proxies human capital development, has a mean of 77.92732 and a standard deviation of 17.84479, ranging from 35.3193 to 96.74221. This indicates notable disparities in educational attainment between the two countries.

Natural resource availability shows an average value of 0.612612, with a standard deviation of 0.3688673, and ranges from 0.139736 to 1.646285, suggesting heterogeneity in resource endowments. Net investment in nonfinancial assets has a mean of 1.940582 and a standard deviation of 0.6231481, with values spanning from 1.076646 to 4.392464. This reflects variations in capital formation across the sample.

FDI inflows record an average value of 0.897371, accompanied by a standard deviation of 0.7787503, and range from 0.004492 to 3.623502, indicating differing levels of foreign investment attraction. Meanwhile, FDI outflows exhibit a mean of 0.142926 and a standard deviation of 0.1683906, with values between 0 and 0.750837, reflecting disparities in outward investment activities. Overall, these descriptive statistics provide an initial overview of the distributional properties of the variables and form the basis for the subsequent panel econometric analysis.

Panel Unit Root Test Results

To examine the stationarity properties of the variables, panel unit root tests were conducted using the methodology proposed by Pesaran (2007). The results, presented in Table 4, assess both cross-sectional dependence between Bangladesh and Turkey and the integration order of the variables. For most variables, the null hypothesis of a unit root cannot be rejected under both intercept and trend specifications, indicating non-stationarity and integration of order one, I(1). An exception is observed for the FDI variable, which rejects the unit root null hypothesis, suggesting stationarity.

Furthermore, the results reveal strong cross-sectional dependence for several variables, including population growth, inflation, GDP, exports, and natural resource rents, as indicated by statistically significant LM_AD statistics. These findings justify the application of panel methods that account for cross-sectional dependence in the subsequent analysis.

The results based on the intercept and intercept–trend LM_AD statistics indicate that several variables are subject to significant cross-sectional dependence, suggesting the presence of common underlying factors influencing both countries. This implies that macroeconomic dynamics in Bangladesh and Turkey are partly driven by shared shocks or regional/global influences.

Table 4. BD and Turkey cross-section dependence and panel unit root tests

Variables	CIPS intercept	CIPS intercept + trend	LM_AD intercept	LM_AD intercept + trend
Population growth	0.809	0.458	15.33***	5.15***
Inflation	−1.09	−1.8**	20.94***	10.5***
literature rate	1.12	0.96		
GDP	5.67	3.5		
Export	5.36	0.87	26.16***	10.55***
Natural resource rent	−1.42	−1.03	6.84***	8.32***
Investment	−0.12	−0.27		
FDI inflow	−0.8	−1.4	13.13***	4.38***
FDI outflow	−1.33	−2.49**	15.94***	1.51

*, **, and *** imply significance levels at 10%, 5%, and 1%, respectively

Conversely, variables such as literacy rate, investment, FDI inflows, and FDI outflows do not exhibit significant cross-sectional dependence, as evidenced by the insignificant LM_AD statistics. This finding suggests that these variables are more strongly shaped by country-specific conditions rather than common external factors. Overall, the panel unit root test results provide important insights into both the integration properties of the variables and the extent of cross-sectional dependence between Bangladesh and Turkey, thereby informing the choice of appropriate panel econometric techniques for subsequent analysis.

Dumitrescu–Hurlin Panel Causality Results

To further explore the direction of relationships among the variables, the Dumitrescu–Hurlin panel causality test was applied. The results, reported in Table 5, reveal several noteworthy causal linkages. In particular, a statistically significant unidirectional causality is found running from population growth to GDP, indicating that demographic changes play a critical role in influencing economic output. An expanding population appears to contribute positively to economic growth through increased labor supply and market size.

Moreover, population growth is also found to Granger-cause inflation, suggesting that demographic pressures may affect price levels within the economy. This relationship is particularly relevant for policymakers, as it underscores the importance of population dynamics in shaping inflationary trends and macroeconomic stability. In contrast, no significant unidirectional causality is detected from inflation to GDP, population growth, or gross national income per capita. This implies that inflation does not exert a direct causal influence on these macroeconomic variables within the context of the studied countries.

Table 5. Pairwise panel causality tests results between two countries

Direction of causality	W-Stat	Prob > chi2
GDP → pop	12.277***	0.002
GDP → inf	2.0163	0.365
GDP → gni_pc	24.087***	0.000
GDP → All	33.411***	0.000
Pop → GDP	7.3755**	0.025
Pop → inf	9.5676***	0.008

Direction of causality	W-Stat	Prob > chi2
Pop → gni_pc	7.284**	0.026
Pop → All	23.025***	0.001
Inf → GDP	1.8007	0.406
Inf → pop	2.8909	0.236
Inf → gni_pc	0.85606	0.652
Inf → All	21.345**	0.002

*, **, *** refer to the level of significance t 10%, 5%, and 1%, respectively

Overall, the Dumitrescu–Hurlin panel causality findings enhance our understanding of the complex interactions among population growth, GDP, inflation, and other macroeconomic variables. These results provide important insights into underlying macroeconomic dynamics and offer valuable guidance for policymakers in designing strategies aimed at achieving sustainable economic growth while maintaining inflationary stability.

Trend Analysis of Turkey and Bangladesh

The trend analysis illustrated in Fig. 1 presents the population patterns of Turkey and Bangladesh over time. The results indicate a general downward trend in population growth for both countries since 1990. Nevertheless, Bangladesh exhibits a notable deviation in the early 2000s, marked by a sharp decline in population growth until approximately 2010. Despite this divergence, the overall population growth trajectories of Turkey and Bangladesh display similar patterns, suggesting comparable demographic dynamics. These trends underscore the importance of examining the drivers behind population changes and their broader socio-economic implications for both countries, as further illustrated in Fig. 2.

A clear contrast is observed in the inflation trajectories of the two economies. From 1990 onward, Bangladesh maintained relatively stable inflation levels, generally below 10%. In contrast, Turkey experienced severe inflationary pressures during the same period, with inflation rates approaching 60%, indicative of a hyperinflationary episode. Over time, Turkey successfully implemented stabilization measures, gradually reducing inflation to around 50% in the early 2000s and further to approximately 10% by 2010. During this later period, Bangladesh also experienced a moderate rise in inflation, largely driven by the global financial crisis, which affected many economies worldwide.

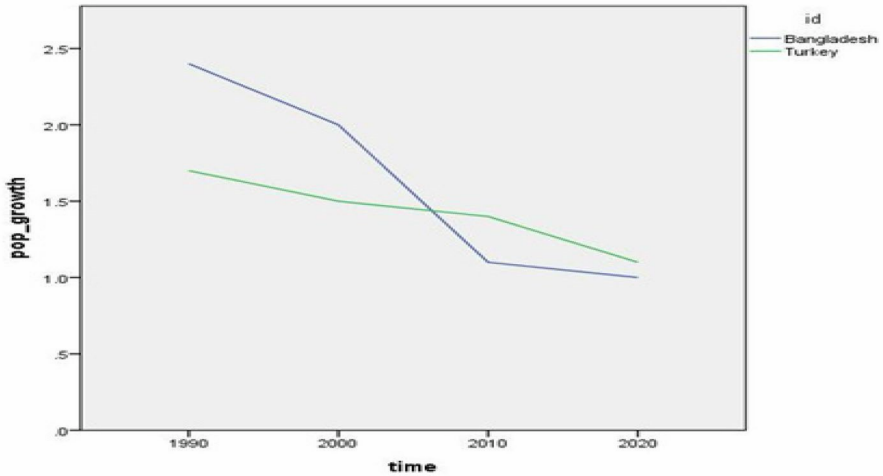

Figure 1. Trend analysis

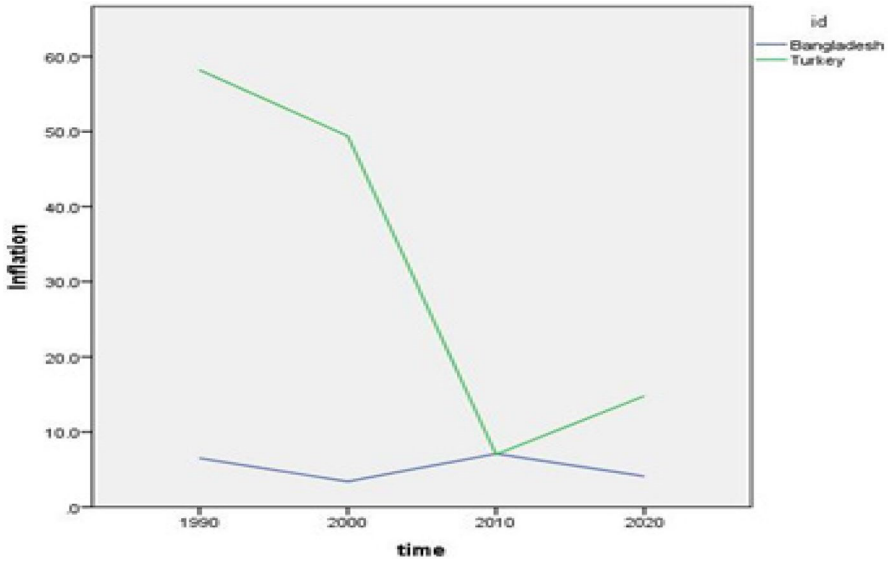

Figure 2. Difference between the inflation rates

Between 2010 and 2020, Turkey experienced a renewed upward trend in inflation, whereas Bangladesh was able to maintain relatively low and stable inflation levels. This contrast highlights the differing inflationary dynamics and policy effectiveness in the two economies. The analysis emphasizes the distinct approaches adopted by Bangladesh and Turkey in managing inflation and stabilizing their economies. Examining these inflation patterns offers valuable insights for policymakers and researchers in evaluating the success of inflation-control measures and their role in fostering macroeconomic stability (Fig. 3).

From 1990 onward, Bangladesh recorded a substantial reduction in its total debt, exhibiting a pronounced downward trend throughout the 1990s and into the early 2000s. In contrast, Turkey's total debt remained relatively stable, fluctuating within the range of USD 30–40 billion over the same period. Although Bangladesh achieved a modest reduction in total debt around 2010, a gradual increase followed thereafter, with debt levels rising slightly above USD 10 billion. This comparison reveals divergent debt trajectories between the two countries, reflecting differences in fiscal policy orientation and debt management strategies.

The contrasting debt patterns underscore the effectiveness of Bangladesh's debt reduction efforts during the 1990s and early 2000s, while Turkey maintained comparatively steady debt levels over time. Understanding these differences provides meaningful insights into the fiscal frameworks and debt sustainability approaches adopted by each country. Such evidence can inform policymakers and researchers in assessing the long-term implications of debt management strategies for sustainable economic growth (Fig. 4).

The population growth trends further indicate that Bangladesh consistently recorded higher population growth rates than Turkey throughout most of the study period. However, by 2020, Bangladesh's population growth rate declined below that of Turkey. Regarding trade performance, Turkey demonstrated stronger export capacity in 2020, as reflected by its higher export values relative to Bangladesh.

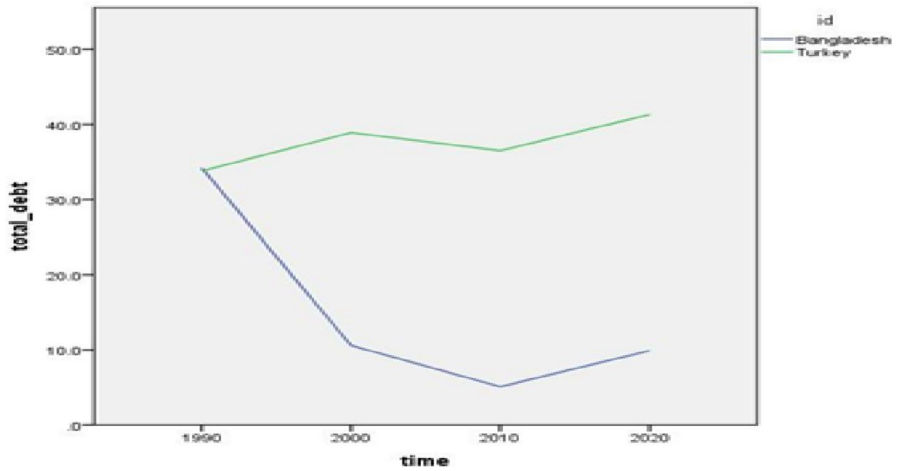

Figure 3. Difference between the total debits

These findings indicate that Turkey exhibited a stronger engagement in international trade than Bangladesh during the specified year. Bangladesh's inflation rate remained relatively stable over the study period, characterized by only modest fluctuations. In contrast, Turkey experienced a pronounced decline in inflation, resulting in lower inflation levels than those observed in Bangladesh. Regarding gross national income (GNI) per capita, Turkey recorded a lower value in 2020 compared to Bangladesh, suggesting that the average income per individual was lower in Turkey than in Bangladesh during that year.

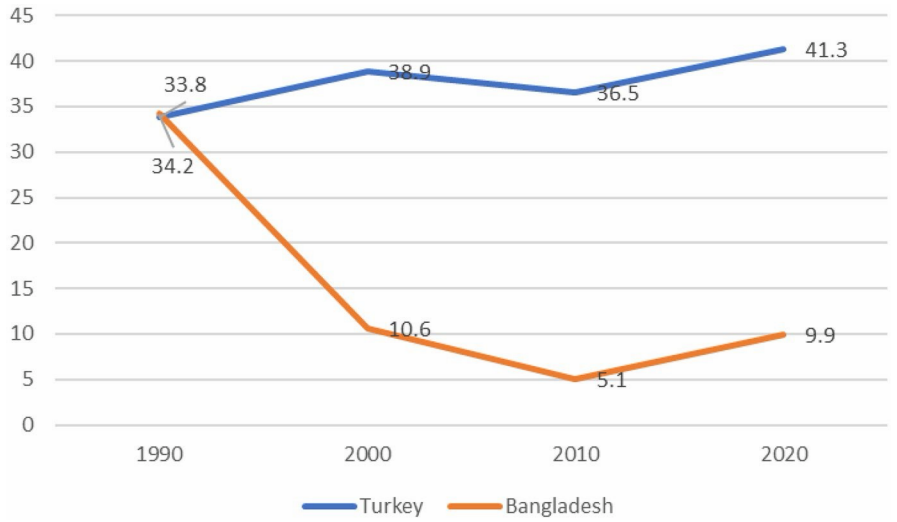

Figure 4. Trend analysis of population growth

The examination of these trends offers important insights into the demographic dynamics, trade performance, inflation behavior, and income levels of Bangladesh and Turkey. These findings can assist policymakers and researchers in assessing prevailing economic conditions and in designing targeted strategies to address country-specific challenges and foster sustainable economic development.

4. Discussion

The findings of this study reinforce prior evidence that population growth exerts a significant influence on economic output in developing economies. The identified unidirectional causality from population growth to GDP highlights the central role of demographic dynamics in shaping economic trajectories in both Bangladesh and Turkey. This underscores the importance of population-related policies—particularly in education, health, and labor-market planning—to support sustainable economic growth. In addition, the confirmed causal link between population growth and inflation aligns with established literature, suggesting that demographic pressures remain a critical factor in inflationary dynamics and macroeconomic stability.

In contrast to some earlier studies, inflation was not found to exert a direct causal effect on GDP or population growth, illustrating the complexity and context-specific nature of inflation–growth relationships. Trend analyses further reveal divergent macroeconomic paths: Bangladesh has demonstrated relative success in maintaining price stability and reducing debt, while Turkey has faced recurrent inflationary pressures despite notable efforts toward stabilization. Differences in population growth patterns, export performance, and inflation control between the two countries indicate that uniform policy prescriptions may be ineffective, reinforcing the need for country-specific economic strategies.

Beyond demographic factors, the study highlights the growth-enhancing role of investment, including domestic capital formation and foreign direct investment. A favorable investment climate, supported by sound institutions and infrastructure development, emerges as a critical driver of productivity and technological progress. The results also emphasize the importance of sustainable natural resource management, as overdependence on resource extraction may undermine long-term growth through environmental degradation and structural imbalances. Furthermore, human capital development—proxied by literacy and education—remains a cornerstone of sustained economic performance by fostering innovation, productivity, and entrepreneurial capacity.

Overall, this study contributes robust empirical evidence on the causal relationships among key macroeconomic variables in Bangladesh and Turkey. By situating the findings within broader theoretical and empirical frameworks, it enriches the literature on economic growth in developing economies and provides practical insights for policymakers. While acknowledging data and methodological limitations, the study offers a foundation for evidence-based policy formulation aimed at achieving inclusive and sustainable economic growth. Future research may extend this analysis by incorporating institutional quality, sectoral dynamics, and non-linear effects to further refine policy recommendations.

5. Conclusions and Implications

This study examined the determinants of GDP growth in Turkey and Bangladesh by analyzing the roles of population growth, literacy rate, natural resource rents, investment, foreign direct investment (FDI) inflows and outflows, and inflation. The findings reveal that population growth plays a significant role in shaping economic growth, underscoring the importance of demographic dynamics in the development process. Investment—particularly FDI inflows—exerts a positive and meaningful influence on GDP growth, highlighting the role of capital accumulation, productivity enhancement, and technological diffusion in economic expansion. Moreover, literacy rate shows a positive association with GDP growth, emphasizing the critical contribution of human capital development to long-term economic performance. In contrast, inflation does not exhibit a statistically significant effect on GDP growth in either country, suggesting that structural and real-sector factors outweigh price-level dynamics in driving economic growth within the examined contexts.

The results carry important policy implications for developing economies, particularly Turkey and Bangladesh. Policymakers should adopt sustainable population management strategies by strengthening education, healthcare, and labor market policies to ensure that demographic growth supports, rather than constrains, economic development. Enhancing the investment climate remains essential, especially through institutional strengthening, regulatory stability, and infrastructure development, to attract productive domestic and foreign investments. Furthermore, prioritizing education and skill development is crucial, as improvements in literacy and human capital are shown to directly support economic growth. While maintaining macroeconomic stability remains important, the findings suggest that development strategies should focus more on structural reforms, investment promotion, and human capital accumulation to foster inclusive and sustainable economic growth. Future research may extend this analysis by incorporating additional countries, alternative growth indicators, and institutional variables to deepen understanding of growth dynamics in developing economies.

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