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Socioeconomic Determinants of Per Capita GDP Growth in Pakistan: An Econometric Analysis

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ABSTRACT

Purpose: This study explores the socioeconomic factors influencing per capita GDP in Pakistan by employing an econometrics analysis technique and an ARDL bounds testing methodology. The main goal of this research is to explore and measure both long-term and short-term relationships between per capita GDP and selected socioeconomic indicators.

Design/Methodology/Approach: The analysis incorporates the ADF unit root test, a correlation matrix, and the ARDL bounds test. The sample consists of annual data from 2002 to 2022.

Findings: The long-term analysis indicates that GDP growth rate and control of corruption have a significant positive impact on per capita GDP. On the other hand, government effectiveness, industry, military expenditure, and total debt are found to have negative effects on per capita GDP. In the short term, changes in GDP growth rate, government effectiveness, and unemployment rate are shown to have immediate effects on per capita GDP. The error correction term suggests a significant speed of adjustment back to the long-run equilibrium after a shock. The finding highlighted the critical role of macroeconomic stability and institutional quality in fostering economic growth. Policies aimed at improving government effectiveness, reducing military expenditure, and managing total debt are essential for improving per capita GDP. Strict control over corruption and steady GDP growth are crucial for achieving long-term economic prosperity and sustainability.

Originality: This study provides a comprehensive analysis of the socioeconomic determinants of per capita GDP in Pakistan. It highlights both short-term and long-term impacts of macroeconomic stability and institutional quality, offering insights that can guide policymakers in promoting sustainable economic growth.

KEYWORDS

Government effectiveness, Industrial contribution, Military expenditure, Total debt, Unemployment rate, Fertility rate,

JEL CLASSIFICATION

C32, E23, E62, H56, O40, O47

I. Introduction

The economic development of Pakistan has been a topic of considerable interest and scrutiny over the past few decades. As a developing nation, Pakistan's economic landscape presents numerous challenges and opportunities that profoundly impact its GDP per capita, a key indicator of economic prosperity, well-being, and quality of life. GDP per capita represents the average economic output per individual and is essential for comprehending the distribution of wealth and economic benefits within the country. As the period of this study from 2002 to 2022, During this period, Pakistan experienced various phases of economic growth, political instability, military conflicts, and policy reforms. These events collectively impacted the socio-economic fabric of the nation and, particularly, its GDP per capita, Periods of robust economic growth frequently aligned with significant enhancements in industrial value addition and government effectiveness. In contrast, political instability and elevated military expenditure often corresponded with stagnation or a decline in per capita GDP (Khan, 2017; Malik, 2013). Pakistan's economy is based on the agricultural sector,

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yet the industrial and service sectors have grown in importance over the years. The shift from an agriculture-based economy to one more diversified with significant industrial and service sectors has had varied impacts on GDP per capita. Industrial value addition, which contributes to higher productivity and economic diversification, has been a critical driver of GDP per capita growth in Pakistan (Amjad & Din, 2010). The effectiveness of government institutions in implementing policies and managing resources has played an important role in shaping economic outcomes (Jalil & Feridun, 2011).

Economic progress has not been the same across all sectors or regions in Pakistan. The country's total debt service has posed significant challenges, often consuming substantial portions of national revenue that could otherwise be invested in developmental projects (Ahmed, 2010). High military expenditure, necessitated by regional security concerns, has diverted resources from critical social and economic development areas (Nasir et al., 2012). Unemployment and fertility rates are also key factors that impact GDP per capita. High unemployment rates constrain economic productivity and individual earning potential, thereby decreasing GDP per capita (Zafar & Sulaiman, 2010). Conversely, although high fertility rates contribute to a growing labor force in the long run, they can initially strain resources and lower per capita economic output (Sathar & Casterline, 1998). Additionally, the control of corruption is a critical determinant, as corruption undermines economic efficiency and the equitable distribution of resources, negatively affecting GDP per capita (Uroos et al., 2021).

Understanding the determinants of GDP per capita is vital for policymakers, economists, and stakeholders in Pakistan. By identifying and analyzing the factors that significantly impact GDP per capita, this research provides valuable insights into the economic mechanisms at play. These insights can help in formulating targeted policies aimed at enhancing economic growth and improving the quality of life for the population. Effective control of corruption and improved government effectiveness could create a more favorable environment for economic activities, leading to higher GDP per capita (Moiseev et al., 2020). This research highlights the importance of balancing military expenditure with developmental needs. By reallocating resources towards education, healthcare, and infrastructure, Pakistan could potentially achieve more sustainable economic growth and higher GDP per capita (Shaukat et al., 2023.

The research aims to investigate the influence of various socio-economic factors on GDP per capita growth in Pakistan from 2002 to 2022, providing a comprehensive understanding of the relationships at play. Specifically, it examines impact of GDP growth rate on per capita GDP growth, as macroeconomic stability shown to significantly boost individual income levels. The study also evaluates government effectiveness, noting that while this variable shows inconsistent impact in the short term, it has a pronounced negative effect in the long term, pointing to inefficiencies in public sector management and governance that may hinder sustainable growth. Additionally, this research explores the effect of military expenditure, revealing that high defense spending exerts a substantial negative influence on per capita GDP, likely due to the diversion of resources from productive economic sectors. Another key area of focus is total debt service, where findings suggest a constraining effect on GDP per capita growth, as large debt obligations reduce the funds available for investments that could stimulate economic progress.

In the context of Pakistan's evolving industrial landscape, research further investigates industrial value addition and finds that while industrial output positively affects GDP per capita in the short term, structural inefficiencies within the sector may limit its long-term contributions. The study also considers demographic variables,

notably fertility rates and unemployment. Fertility rates appear to have a mixed effect on GDP per capita, suggesting that initial demographic expansion could stimulate demand in the short term, though long-term outcomes remain complex and context-dependent. Unemployment, conversely, shows an unexpected positive correlation with per capita GDP growth, prompting further examination of Pakistan's labor market conditions to understand potential structural anomalies. Finally, research assesses the role of corruption control, highlighting that anti-corruption measures positively influence GDP per capita growth by fostering an environment conducive to economic activities and growth. Through these objectives, the study seeks to provide a nuanced, data-driven perspective on the socio-economic determinants of GDP per capita growth, offering actionable insights for policy initiatives aimed to enhancing economic well-being in Pakistan.

II. Literature Review

Theoretical Framework

This study integrates several economic theories classical economic growth models, institutional economics, Keynesian economics, development economics, and debt overhang hypothesis to examine factors influencing GDP per capita growth in Pakistan from 2002 to 2022. The Theoretical framework seeks to provide a nuanced understanding of the complex dynamics driving Pakistan's economic performance during this period. At the core of this study is classical economic growth theory, with particular emphasis on Solow Swan model. This model posits that long-term economic growth is primarily driven by capital accumulation, labor force expansion, and technological progress. According to Solow-Swan framework, increases in physical capital, labor productivity, and technological innovations are fundamental determinants of GDP per capita growth. The Model also underscores the role of savings and investment in fostering capital accumulation, which ultimately enhances economic output and living standards (Solow, 1956; Swan, 1956). Building on these insights, the study hypothesizes that higher levels of capital investment and technological advancement, along with improvements in labor productivity, will contribute positively to GDP per capita growth in Pakistan. This hypothesis is grounded on existing empirical studies that demonstrate the crucial role of capital and technological progress in driving economic performance. Incorporating Keynesian economics, this study acknowledges the role of aggregate demand in stimulating short-term economic growth. Keynesian theory emphasizes that government interventions—through fiscal and monetary policies can significantly influence economic performance by affecting aggregate demand (Keynes, 1936). This perspective is particularly relevant for understanding how government effectiveness, military expenditure, and public debt impact GDP per capita growth in the short run. The hypothesis derived from this theory suggests that increases in government spending, particularly in areas that stimulate aggregate demand, will have a positive effect on short-term GDP per capita growth. Additionally, the impact of fiscal deficits and public debt servicing on economic performance will be analyzed, taking into account the trade-offs involved in public expenditure and debt accumulation.

Institutional economics plays a critical role by emphasizing the importance of institutions such as governance quality, control of corruption, and institutional integrity in shaping economic outcomes. North (1990) argued that institutions, defined as the formal and informal rules governing economic interactions, reduce uncertainty and transaction costs, which are essential for fostering sustainable economic growth. The study hypothesizes that improvements in institutional quality, particularly enhanced governance and reduction in corruption, will significantly promote GDP per capita growth. Empirical research supports the view that

strong, effective institutions are associated with higher levels of economic development and better economic performance. field of development economics provides valuable insights into the role of demographic factors, like fertility rates and unemployment, in shaping economic growth. Endogenous growth theory, particularly the work of Romer (1990), underscores the importance of human capital and innovation as key drivers of long-term economic growth. The relationship between human capital development and GDP growth is thus integral to understanding the dynamics of economic performance in developing countries. study hypothesizes that changes in demographic variables such as reductions in fertility rates and improvements in labor market conditions will have positive effects on GDP per capita growth. Furthermore, the development of human capital is expected to enhance labor productivity, thereby contributing to long-term economic growth. The debt overhang hypothesis is particularly relevant for examining the effects of public debt on economic growth. According to Krugman (1988), high levels of debt can create "debt overhang," where the prospect of future debt repayments discourages investment and economic activity. study will explore how debt servicing obligations affect Pakistan's GDP per capita growth, considering the possibility that excessive debt can undermine growth by reducing available resources for productive investment. The hypothesis drawn from this theory is that high levels of external and domestic debt, coupled with significant debt servicing obligations, will negatively impact GDP per capita growth. This underscores the importance of prudent debt management strategies for sustaining long-term economic performance. This study integrates these various theoretical perspectives into a comprehensive framework for analyzing determinants of GDP per capita growth. integration of classical growth theory, Keynesian economics, institutional economics, development economics, and the debt overhang hypothesis allows for a holistic examination of factors shaping economic performance in Pakistan. By utilizing the ARDL model, the study will assess both short-term and long-term relationships between the key variables, providing a comprehensive understanding of the dynamics that influence Pakistan's economic growth.

The Keynesian and institutional economics perspectives guided analysis of short-term impacts, such as the immediate effects of government policies, military expenditure, and aggregate demand on GDP per capita growth. Classical growth theory, institutional economics, and development economics provide the foundation for examining long-term relationships. These theories help explain the role of capital accumulation, institutional quality, and demographic changes in sustaining economic growth over time.

Hypotheses:

The study develops hypotheses for each independent variable based on existing empirical findings:

1. **Government Effectiveness and Public Sector Efficiency**

H_1: Improvements in government effectiveness enhance GDP per capita growth in Pakistan in the short term but may have mixed or negative effects in the long term due to persistent bureaucratic inefficiencies and governance challenges.

2. **Industrial Value Addition**

H_2: Industrial value addition positively impacts GDP per capita in the short term, but its long-term effects may be constrained by structural inefficiencies in Pakistan's industrial sector.

3. **Military Expenditure and Economic Growth**

H_3: Higher military expenditure has a negative impact on GDP per capita growth in Pakistan by diverting resources from productive sectors like education, healthcare, and infrastructure.

4. **Debt Overhang**

H_4: Elevated levels of public debt and significant debt servicing obligations hinder GDP per capita growth in Pakistan, consistent with the debt overhang hypothesis.

5. **Unemployment and Labor Market Dynamics**

H_5: Unemployment exhibits a complex relationship with GDP per capita growth in Pakistan, where short-term positive effects may reflect labor market anomalies, while long-term unemployment generally reduces economic productivity.

6. **Demographic Variables – Fertility Rates**

H_6: Higher fertility rates initially contribute positively to GDP per capita growth through increased demand but lack sustained long-term effects without corresponding investments in human capital and labor market development.

7. **Control of Corruption**

H_7: Enhanced control of corruption fosters GDP per capita growth in Pakistan by improving economic efficiency and creating a conducive environment for investment.

By developing these hypotheses, this study aims to provide a robust framework for understanding the factors that have driven Pakistan's economic performance over the past two decades and to offer policy recommendations for sustainable growth.

Empirical Review

This study focused on modeling the corruption perception index in relation to GDP per capita. Using a logistic function within a panel data framework to address bounded variable issues, the study concluded that GDP per capita is a significant predictor of corruption, with wealthier societies exhibiting less corruption (Moiseev et al., 2020). This research examined the relationship between macroeconomic variables such as economic growth, corruption, and external debt in Pakistan. By Using time-series models, ADF and Phillips-Perron tests, and the ARDL model for short- and long-term relationships, the study found that corruption and interest rates positively affect economic growth in the long term (Ghauri et al., 2022). This research investigated how corruption affects GDP per capita, by using panel data from 1996 to 2010 for 94 countries. The study found that corruption reduces GDP per capita via migration, although the macroeconomic impact was not significant (Ahmad & Arjumand, 2016).

This research investigated the effects of corruption on poverty in Pakistan using Johanson Cointegration and VECM on secondary data from 1997 to 2019. The findings showed that corruption and inflation are positively associated with poverty, while the employed labor force shows a negative relationship (Bukhari et al., 2022). .

This research explored the relationship between corruption, development, and income disparity in Pakistan, analyzing corruption and income disparity data to assess their impact on sustainable growth. The study concluded that corruption correlates positively with income disparity and negatively impacts sustainable growth (Sakib, 2021).

This research examined the impact of government expenditure on Pakistan's economic growth using annual time series data from 1980 to 2020. Utilizing the ADF Unit-Root Test and OLS technique, the study found that government expenditure and GDP per capita positively and significantly affect GDP, whereas inflation negatively impacts it. This indicates that expansionary fiscal policy may be advantageous during economic downturns (Shaukat et al., 2023).

This research sought to investigate the long-term relationship between military expenditures, the size of the military personnel, and economic growth in Pakistan. Methodology: Using the ARDL approach for annual time series data from 1990 to 2015, the study analyzed the relationships among these variables. Findings: The results

indicated that military expenditures were statistically insignificant in the long run, while the number of military personnel was positively and significantly related to GDP growth. In the short run, both military expenditure and the number of military personnel positively impacted GDP growth (Ajmair et al, 2018).

This research aimed to explore the long-term relationship between military expenditures and economic growth in Pakistan and India, while accounting for structural breaks. The study employed the ARDL bounds testing approach and the Clemente–Montanes Reye's method for unit root analysis, incorporating structural breaks into the time series data. The findings revealed that military expenditures initially had a positive impact on economic growth, but this relationship became negative after reaching a certain threshold. In the short term, military expenditures were found to influence per capita GDP, with causality flowing from military expenditures to GDP (Jalil et al., 2016).

This research aimed to analyze the trend, pattern, and impact of military expenditure in South Asian countries, including Pakistan. Methodology: The study used secondary data from the World Bank database and other sources to analyze military expenditure trends and their impact on economic growth. Findings: Military spending as a percentage of GDP was highest in Pakistan among South Asian countries. The study found a positive correlation between military personnel and per capita GDP, except in Pakistan where the correlation was not positive (Patra, 2018).

This research aimed to analyze the impacts of military spending on economic growth and the ecological footprint in Pakistan. Methodology: The study used the combined cointegration test and the bootstrap causality test. Findings: Military spending had a positive impact on the ecological footprint and a negative impact on economic growth. The results suggested a need to reduce military spending to improve economic growth and environmental outcomes (Ahmed et al., 2020).

This research aimed to explore the determinants of employment in Pakistan using time series data from 1990 to 2013. Methodology: The study applied multiple linear regression models to analyze the relationship between various factors and unemployment. Findings: The relationship between literacy rate and population growth rate was positive and highly significant with the unemployment rate, while GDP had a positive but insignificant impact on unemployment. Inflation had a negative and significant impact on unemployment (Sabir, 2015).

This research aimed to evaluate how growth in various sectors affects carbon emissions in Pakistan and its subsequent implications for GDP per capita. Methodology: The study used ARDL bound testing and simple VAR techniques, analyzing data from 1971 to 2020. Findings: Sectoral growth, including value addition in agriculture, industry, and services, affected carbon emissions negatively and significantly. The study implied that sustainable industrial practices could support economic growth while mitigating environmental degradation (Khan et al., 2022).

This research aimed to empirically estimate the impact of various economic factors on GDP in Pakistan from 1985 to 2011. Methodology: The study employed stepwise regression on GDP, considering household consumption, FDI, international trade, and value addition in industry, agriculture, and services sectors as independent variables. Findings: The results suggested that value addition in the industry, agriculture, and services sectors significantly explained changes in GDP. Household final consumption expenditure emerged as a major determinant of GDP, highlighting the importance of these sectors in economic growth (Shaikh et al., 2015).

This research aimed to analyze the influence of the agriculture sector on economic growth

in Pakistan from 1961 to 2018. The study utilized the ARDL bounds test and the Error Correction Model (ECM) to conduct its analysis. Findings: Real agricultural value added had a significant positive impact on real GDP per capita in the long run. The study advocated for investment in the agriculture sector to achieve long-term economic growth (Zaman et al., 2021).

This research aimed to investigate the impact of fiscal deficit and government debt on the interest rate and GDP per capita in Pakistan from 1990 to 2012. Methodology: The study used the Augmented Dickey-Fuller test for data stationarity and the Ordinary Least Square (OLS) model to check relationships among variables. Findings: Total debt servicing and volume of trade showed a significant relationship with fiscal deficit, while government debt and fiscal deficit significantly influenced the interest rate. The study recommended focusing on increasing GDP per capita and export volume to stabilize the economy (Shakir, 2019).

This research aimed to examine the influence of trade deficit and external debt on Pakistan's economic performance from 1980 to 2017. Methodology: The study used vector error correction technique and Johansen co-integration test. Findings: Total external debt negatively impacted GDP, while gross capital formation and manufacturing value added positively influenced GDP. The study recommended diversifying economic activities and reducing reliance on external borrowings (Safdar et al., 2021).

This research aimed to investigate various socio-economic and demographic determinants of fertility across districts in Punjab, Pakistan. Methodology: Cross-sectional regression analysis was used to identify determinants, findings: The study found that GDP per capita and population density have a negative and insignificant association with fertility, whereas female literacy rate has a negative and significant association. Employment rate and child mortality were positively associated with fertility. The study suggested that increasing female education and reducing child mortality can help reduce fertility rates in Punjab (Qasim et al., 2016).

This research aimed to examine the association between workers' remittances and the fertility rate in Pakistan. Methodology: The study used time series data from 1975 to 2015 and applied the ordinary least squares technique. Findings: The results indicated a negative association between remittances and fertility rate. Additionally, GDP per capita, female literacy rate, and female labor force participation were found to negatively affect fertility rates, while the average host fertility rate and percent of the population in rural areas were positively associated with fertility (Paul et al., 2019). This research aimed to explore how official development assistance impacted GDP per capita in Pakistan from 1991 to 2017. Methodology: ADF was used to examine data integration, followed by ARDL to discover short and long-run relationships. Findings: The study found that the fertility rate was negatively significant in the short and long run, indicating that higher fertility rates can adversely affect GDP per capita (Tariq et al., 2019).

III. Data and Methodology

Data Description

This section outlines the variables and indicators, and data sources used in the study.

Table 1. Variables and indicators of the study

Variables	Indicators	Source
GDP per capita	GDP per capita growth	WDI
Military Expenditure	Military expenditure (% of GDP).	WDI

Fertility rate	Fertility rate, total (births per woman)	WDI
Industry	Industry (including construction), value added (% of GDP)	WDI
Unemployment	Unemployment, total (% of total labour force ILO est.)	WDI
GDP growth Rate	GDP growth (annual %).	WDI
Total Debt Service	Total debt service (% of GNI)	WDI
Corruption control	Control of Corruption: Estimate	WDI
Govt. Effectiveness	Government Effectiveness: Estimate	WDI

Table I describes the key variables and indicators along with their respective data sources.

This study investigates the determinants of GDP per capita growth in Pakistan from 2002 to 2022 using annual data sourced from the World Development Indicators (WDI) database. The choice of data period ensures a comprehensive analysis covering various economic cycles and policy changes.

Research Design

The research employs a quantitative design, utilizing the ARDL bounds testing approach to assess both short- and long-term effects of socioeconomic determinants on GDP per capita growth. The analysis proceeds through several key stages. First, descriptive statistics are computed as a preliminary step to summarize the essential features of the dataset. Next, unit root tests, specifically the Augmented Dickey-Fuller (ADF) test, are performed to examine the stationarity of variables. The results indicate that most variables are integrated of order 1, I (1), except for fertility rate, which is found to be I (0). Following this, the ARDL model is estimated, with the selection of the optimal model guided by the Akaike Information Criterion (AIC). To test the presence of a long-term relationship among the variables, ARDL bounds testing is conducted, based on the methodology outlined by Pesaran et al. (2001). Finally, post-estimation diagnostic tests are carried out to ensure the robustness of the model, including the Breusch-Godfrey Serial Correlation LM Test, Breusch-Pagan-Godfrey Heteroskedasticity Test, cointegration graph, and the CUSUM and CUSUM of squares tests. These steps collectively ensure the reliability and validity of the findings.

Model Specification

This study uses an Autoregressive Distributed Lag (ARDL) model to examine the socioeconomic determinants of GDP per capita growth in Pakistan. The ARDL model is particularly appropriate given its capacity to analyze both stationary and non-stationary data, handle small sample sizes, and differentiate between short-run and long-run relationships (Pesaran & Shin, 1999).

The ARDL model employed can be represented as follows, where XXX denotes the vector of independent variables, which include GDP growth rate, government effectiveness, industrial value added, military expenditure, total debt service, unemployment rate, fertility rate, and control of corruption.

The general ARDL model can be expressed as follows:

$$GDP\_CPTA_t = \alpha + \sum_{i=1}^{p} \beta_i\, GDP\_CPTA_{t-i} + \sum_{j=0}^{q} \gamma_j X_{1,t-j} + \sum_{k=0}^{r} \delta k\; X_{2,t-k} + \cdots + \sum_{m=0}^{s} \theta_m X_{n,t-m} + \epsilon_t$$

For the specific model Long-Run Model

The long-run relationship in this ARDL framework can be expressed as:

$$GDP\_CPTA_t = \alpha + \beta_1\, GDP\_RATE_t + \beta_2\, GOVT\_EFFECT_t + \beta_3 INDUSTRY_t + \beta_4\, MILITARY_t + \beta_5 T\_DEBT_t + \beta_6$$

$UNEMPLOY_t + \beta_t FERTILITY\_RATE_t + \beta_8 CTRL\_OF\_CORRUP_t + \mu_t$

To capture the short-term dynamics, the error correction model (ECM) is derived from the long-run equation and can be specified as:

$$\Delta GDP\_CPTA_t = \alpha + \sum_{i=1}^{p-1}\delta_i \Delta GDP\_CPTA_{t-i} + \sum_{j=0}^{q-1}\theta_j \Delta X_{1,t-j} + \cdots + \sum_{m=0}^{s-1}\phi_m \Delta X_{n,t-m} + \lambda ECM_{t-1} + \epsilon_t$$

The error correction term (ECM) reflects the speed at which the system adjusts back to equilibrium after a short-term shock. This component is crucial for understanding the dynamics and stability of the model.

ECM_{t-1} is the lagged error correction term, calculated as

$$ECM_{t-1} = GDP\_CPTA_{t-1} - (\alpha + \sum_{i=1}^{n} \beta_I X_{i,t-1})$$

To ensure the robustness of the results, several diagnostic tests were conducted. Augmented Dickey-Fuller (ADF) unit root test was employed to assess the stationarity of each variable and confirm that none of the variables are integrated of order two, I (2), which would violate assumptions of the ARDL model. Post-estimation diagnostics include the Breusch-Godfrey Serial Correlation LM Test to detect any serial correlation in residuals, which, if present, could lead to biased estimations. The breusch-Pagan-Godfrey test for heteroskedasticity was selected due to its effectiveness in identifying variance instability in residuals, which can affect the reliability of coefficient estimates. Additionally, stability tests, such as CUSUM and CUSUM of squares tests, were applied to confirm the stability of ARDL model coefficients over the sample period.

Table 2. Descriptive Statistics

Variables & Statistics	G. CPTA	G. GRTH	GOVT. EFF	IND	MILT	DEBT	UNE	CRPTN	FERTL
Mean	2.293	4.22	-0.646	19.658	3.387	2.342	2.394	-0.921	4.149
Median	2.742	4.366	-0.666	19.933	3.423	2.006	1.830	-0.879	4.169
Maximum	5.447	7.831	-0.383	21.958	4.091	4.505	6.340	-0.801	5.008
Minimum	-2.970	-1.274	-0.833	17.158	2.630	1.327	0.400	-1.178	3.410
Std. Dev	2.194	2.167	0.133	1.335	0.395	0.929	2.082	0.122	0.474
Skewness	-0.502	-0.480	0.385	-0.251	0.167	0.753	0.636	-0.676	0.097
Obs	21	21	21	21	21	21	21	21	21

Source: Author's compilation from EViews output

From 2002 to 2022, Pakistan's socio-economic landscape exhibited notable fluctuations in factors affecting GDP per capita growth. During this period, the average growth rate of GDP per capita was 2.293%, while overall GDP growth averaged 4.22%, indicating consistent economic expansion despite periodic downturns. Government effectiveness was consistently low (-0.646), and industrial value addition remained substantial (19.658%). Military expenditure was consistently prioritized (3.387% of GDP), and total debt service showed notable fluctuations (2.342%). The unemployment rate varied greatly (2.394%), and control of corruption was a persistent issue (-0.921). The fertility rate averaged 4.149 children per woman, indicating demographic pressures. These statistics highlight the complex dynamics impacting Pakistan's GDP per capita growth.

Graphical Representation

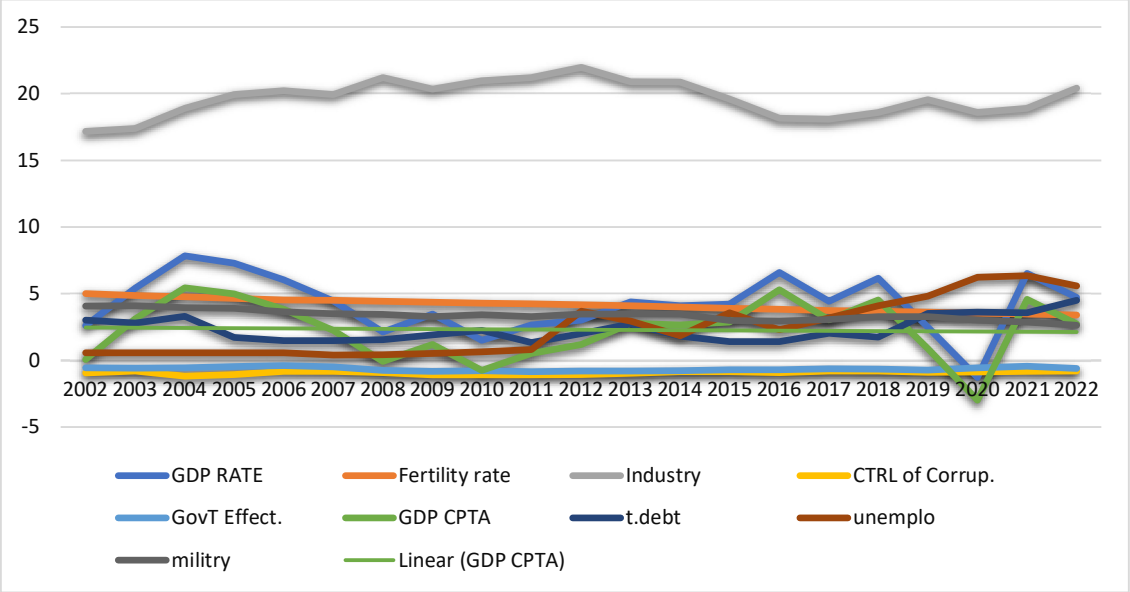

Figure 1. Graphical Representation of Data

Source: Author's own compilation by Excel

Figure No. 1 presents a time series analysis of various economic and social indicators from 2002 to 2022, showing that while the GDP growth rate and unemployment rate have experienced significant volatility, particularly during global economic crises like the 2008 financial crisis and the COVID-19 pandemic, other indicators such as GDP per capita, industry output, government effectiveness, control of corruption, fertility rates, total debt, and military expenditure have remained relatively stable. The stability of these indicators suggests resilience in the country's economic and institutional framework despite external shocks.

IV. Analysis, Results and Discussion

Correlation Matrix

Table 3. Results of the correlation matrix of socio-economic factors affecting GDP per capita growth

variables	Gdpc	Gdpg	eff	indst	mltry	debt	unem	fertl	corru
Gdpc	1								
Gdpg	0.984	1							
Eff	0.371	0.435	1						
Inds	-0.229	-0.225	-0.474	1					
Mltry	0.064	0.176	0.230	-0.145	1				
Debt	-0.142	-0.124	0.218	-0.268	-0.160	1			
Unem	-0.061	-0.167	0.023	-0.107	-0.719	0.571	1		
fertl	0.020	0.152	0.184	-0.066	0.908	-0.305	-0.884	1	
corrup	0.112	0.032	0.324	-0.362	-0.379	0.097	0.446	-0.451	1

Source: Author's compilation from EViews output

The results of the correlation matrix of socio-economic factors affecting GDP per capita growth in Pakistan from 2002 to 2022 revealed that, A strong positive correlation of 0.9842 between GDP growth and GDP per capita growth supports the

hypothesis that broader economic expansion directly boosts individual income levels (World Bank, 2023). Additionally, there is a moderate positive correlation between government effectiveness and GDP per capita growth (0.3717) suggests that improvements in governance can lead to better economic outcomes, aligning with findings from Kaufmann et al. (2010) on governance and development. Interestingly, industrial value addition negatively correlates with GDP per capita growth (-0.229), possibly indicating inefficiencies or structural issues within the industrial sector that impede economic benefits (State Bank of Pakistan, 2022). Military expenditure displays a negligible correlation (0.0644), reflecting its limited direct impact on economic growth, consistent with Dunne and Tian's (2015) assessment of military spending and growth. Total debt service has a slight negative correlation (-0.142), highlighting its potential to hinder economic progress by diverting resources from productive investments (IMF, 2021). The unemployment and fertility rates have minimal correlations with GDP per capita growth (-0.061 and 0.0201, respectively), indicating that their impacts are more complex and may require targeted policy interventions (Pakistan Bureau of Statistics, 2023). Finally, the small positive correlation between control of corruption and GDP per capita growth (0.1126) underscores the importance of anti-corruption measures for economic development (Transparency International, 2022). These correlations illustrate the multifaceted nature of economic growth, emphasizing the critical role of macroeconomic stability and effective governance in enhancing GDP per capita in Pakistan.

ADF Unit Root Test

Table 4. ADF Unit Root Test results

Variables	Probability value At level	Probability value 1st Difference	Level of integration
GDP C	0.0628	0.0000	1(1)
EFF	0.6119	0.0005	1(1)
GDP rate	0.2341	0.0000	1(1)
INDUSTRY	0.8497	0.0012	1(1)
MILITIRY	0.0517	0.0016	1(1)
T. DEBT	0.6859	0.0001	1(1)
UNEMPLOYMENT	0.7980	0.0000	1(1)
FERTILITY	0.0001		1(0)
C. CORRUPTION	0.4677	0.0000	1(1)

Source: Author's compilation from EViews output

The ADF Unit Root Test results show that most socio-economic independent variables and GDP per capita growth in Pakistan from 2002 to 2022 are non-stationary at their levels but become stationary at their first differences, indicating they are integrated of order one, I (1). This includes variables such as GDP per capita, government effectiveness, GDP growth rate, and industrial value addition, military expenditure, total debt service, unemployment rate, and control of

corruption are all I (1), . In contrast, the fertility rate is stationary at level, I (0). These findings are crucial for ensuring the correct application of econometric models in further analysis to avoid spurious results.

(Source: Author's compilation from EViews output)

ARDL MODEL

Dependent Variable: GDP_CPTA. Method: ARDL

Table 5. ARDL model results

*Note: p-values and any subsequent tests do not account for model selection

Variables / statistics	Coefficient	Std. Error	t-Statistic	Prob.*
GDP_CPTA (-1)	0.541152	0.146257	3.700006	0.0343**
GDP_RATE	0.983278	0.012752	77.10533	0.0000**
GDP_RATE (-1)	-0.483220	0.150451	-3.211813	0.0489**
GOVT_EFFECT_	-0.184675	0.232653	-0.793782	0.4853
GOVT_EFFECT_ (-1)	-2.613290	0.572342	-4.565959	0.0197**
INDUSTRY	0.138904	0.052577	2.641934	0.0775*
INDUSTRY (-1)	-0.214290	0.074071	-2.893055	0.0629*
MILITRY	-0.939187	0.265629	-3.535710	0.0385**
MILITRY (-1)	0.397193	0.213055	1.864269	0.1592
T_DEBT	-0.283211	0.065962	-4.293563	0.0232**
T_DEBT (-1)	-0.106417	0.043473	-2.447915	0.0918*
UNEMPLO	0.135475	0.028055	4.828876	0.0169***
UNEMPLO (-1)	0.303556	0.065220	4.654356	0.0187**
FERTILITY_RATE	4.638570	1.628678	2.848057	0.0652*
FERTILITY_RATE (-1)	-2.624876	1.383910	-1.896709	0.1541
CTRL_OF_CORRUP_	0.983148	0.251919	3.902638	0.0299**
C	-6.873966	1.027718	-6.688575	0.0068*
R-squared	0.999890		Mean dependent var	2.406040
Adjusted R-squared	0.999301		S.D. dependent var	2.188799
S.E. of regression	0.057859		Akaike info criterion	-3.058744
Sum squared resid	0.010043		Schwarz criterion	-2.212371
Log likelihood	47.58744		Hannan-Quinn criter.	-2.893523
F-statistic	1699.258		Durbin-Watson stat	3.183695
Prob(F-statistic)	0.000021			

*** denotes 1% significance level
** denotes 5% significance level
* Denotes 10% significance level

Source: Author's compilation from EViews output

The ARDL model results showed valuable insights into the determinants of GDP per capita growth in Pakistan from 2003 to 2022. With an impressive R-squared value of 0.999890, the model demonstrates an excellent fit. The analysis reveals that the GDP growth rate has a significant positive impact on GDP per capita growth (coefficient = 0.983278, p = 0.0000), supporting the hypothesis that economic

growth enhances individual income levels. Government effectiveness shows a mixed impact, with the current value being insignificant but the lagged value significantly negative (coefficient = -2.613290, p = 0.0197), suggesting delayed adverse effects. Industrial value addition is initially positive but turns negative in the lagged term, indicating potential inefficiencies over time. Military expenditure has a significant negative impact (coefficient = -0.939187, p = 0.0385), supporting the hypothesis of its detrimental effect on economic growth. Total debt service is negatively related to GDP per capita growth (coefficient = -0.283211, p = 0.0232), indicating financial strain. Interestingly, unemployment has a positive effect on GDP per capita growth, suggesting potential labor market anomalies. The fertility rate exhibits a significant positive effect in the short term but a negative effect in the lagged period, reflecting complex demographic influences. Additionally, the control of corruption positively impacts GDP per capita growth (coefficient = 0.983148, p = 0.0299), reinforcing the importance of anti-corruption measures. These findings highlight the multifaceted nature of economic growth determinants and the crucial roles of GDP growth, government effectiveness, military expenditure, debt service, and corruption control in shaping GDP per capita in Pakistan.

ARDL Long Run Form and Bounds Test
Dependent Variable: D(GDP_CPTA)

Table 6. ARDL long-run form and bounds test results

Conditional Error Correction Regression				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-6.873966	1.027718	-6.688575	0.0068 ***
GDP_CPTA (-1) *	-0.458848	0.146257	-3.137275	0.0518 *
GDP_RATE (-1)	0.500058	0.153037	3.267574	0.0469 **
GOVT_EFFECT (-1)	-2.797965	0.491743	-5.689899	0.0108 ***
INDUSTRY (-1)	-0.075386	0.033420	-2.255746	0.1094
MILITRY (-1)	-0.541994	0.184415	-2.938992	0.0606 *
T_DEBT (-1)	-0.389628	0.094474	-4.124191	0.0258 **
UNEMPLO (-1)	0.439031	0.079716	5.507465	0.0118 ***
FERTILITY_RATE (-1)	2.013694	0.417362	4.824814	0.0170 **
CTRL_OF_CORRUP_ **	0.983148	0.251919	3.902638	0.0299 **
D(GDP_RATE)	0.983278	0.012752	77.10533	0.0000 ***
D(GOVT_EFFECT_)	-0.184675	0.232653	-0.793782	0.4853

D(INDUSTRY)	0.138904	0.052577	2.641934	0.0775 *
D(MILITRY)	-0.939187	0.265629	-3.535710	0.0385 **
D(T_DEBT)	-0.283211	0.065962	-4.293563	0.0232 **
D(UNEMPLO)	0.135475	0.028055	4.828876	0.0169 **
D(FERTILITY_RATE)	4.638570	1.628678	2.848057	0.0652 *
*** p-value incompatible with t-Bounds distribution. ** Variable interpreted as Z = Z (-1) + D(Z).**				
Levels Equation **Case 2: Restricted Constant and No Tr**			end	
Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP_RATE	1.089812	0.033922	32.12692	0.0001 ***
GOVT_EFFECT_	-6.097800	1.829115	-3.333743	0.0446 **
INDUSTRY	-0.164295	0.063491	-2.587667	0.0812 *
MILITRY	-1.181205	0.619562	-1.906516	0.1526
T_DEBT	-0.849143	0.256190	-3.314502	0.0452 **
UNEMPLO	0.956810	0.324297	2.950409	0.0600 *
FERTILITY_RATE	4.388583	1.836974	2.389028	0.0968 *
CTRL_OF_CORRUP_	2.142642	0.803318	2.667238	0.0759 *
C	-14.98091	5.767624	-2.597415	0.0806 *

Source: Author's compilation from EViews output

*** *denotes 1% significance level (p ≤ 0.01)*

** *denotes 5% significance level (0.01 < p ≤ 0.05)*

* *Denotes 10% significance level (0.05 < p ≤ 0.10)*

EC = GDP_CPTA - (1.0898*GDP_RATE -6.0978*GOVT_EFFECT_ -0.1643 *INDUSTRY -1.1812*MILITRY -0.8491*T_DEBT + 0.9568*UNEMPLO + 4.3886*FERTILITY_RATE + 2.1426*CTRL_OF_CORRUP_ - 14.9809)

The ARDL long-run form and bounds test results for Pakistan (2002-2022) reveal several key insights into the factors influencing GDP per capita. The GDP growth rate has a strong positive effect on GDP per capita (coefficient = 1.089812), indicating that overall economic growth significantly boosts per capita income. In contrast, government effectiveness has a substantial negative impact (-6.097800), suggesting that ineffective governance severely hampers economic performance.

Both industrial value addition and military expenditure also negatively affect GDP per capita (-0.164295 and -1.181205, respectively), with high military spending potentially diverting resources from productive investments. Total debt service further exacerbates this issue, negatively impacting GDP per capita (-0.849143) by imposing economic strain. Unemployment and fertility rates show positive effects on GDP per capita (0.956810 and 4.388583, respectively), which may reflect the influence of demographic dynamics and labor market conditions on economic growth. Finally, control of corruption has a positive impact on GDP per capita (2.142642), underscoring the role of effective governance in promoting economic prosperity. The error correction term suggests a moderate adjustment speed towards long-term equilibrium, indicating the model's ability to correct deviations from the equilibrium state.

F-Bounds Test. Null Hypothesis: No levels relationship

Table 7. F-Bounds test results

	Value	**Signif.**	**I (0)**	**I (1)**
		Asymptotic: n=1000		
F-statistic	10.18484	10%	1.85	2.85
K	8	5%	2.11	3.15
		2.5%	2.33	3.42
		1%	2.62	3.77

Source: Author's compilation from EViews output

The F-Bounds test results indicate whether a long-run relationship exists between GDP per capita and the selected explanatory variables. The calculated F-statistic of 10.18484 exceeds the critical values for both the I (0) and I (1) bounds at all significance levels (10%, 5%, 2.5%, and 1%). Specifically, it surpasses the upper critical values of 1.85 (10%), 2.11 (5%), 2.33 (2.5%), and 2.62 (1%) for the I (0) bound, and 2.85 (10%), 3.15 (5%), 3.42 (2.5%), and 3.77 (1%) for the I (1) bound. This indicates that the null hypothesis of no long-run relationship is rejected, confirming the presence of a significant long-run relationship between GDP per capita and the explanatory variables in the model.

ARDL Error Correction Regression

Dependent Variable: D(GDP_CPTA)

Table 8. ARDL error correction model analysis

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(GDP_RATE)	0.983278	0.002719	361.6942	0.0000 ***
D(GOVT_EFFECT_)	-0.184675	0.080745	-2.287142	0.1062
D(INDUSTRY)	0.138904	0.012724	10.91670	0.0016 ***
D(MILITRY)	-0.939187	0.070481	-13.32534	0.0009 ***
D(T_DEBT)	-0.283211	0.015538	-18.22695	0.0004 ***
D(UNEMPLO)	0.135475	0.009625	14.07467	0.0008 ***
D(FERTILITY_RATE)	4.638570	0.283639	16.35376	0.0005 ***
CointEq (-1) *	-0.458848	0.022733	-20.18399	0.0003 ***

R-squared	0.999926	Mean dependent var	0.134462
Adjusted R-squared	0.999883	S.D. dependent var	2.671728
S.E. of regression	0.028929	Akaike info criterion	-3.958744
Sum squared resid	0.010043	Schwarz criterion	-3.560451
Log likelihood	47.58744	Hannan-Quinn criter.	-3.880993
Durbin-Watson stat	3.183695		

**** denotes 1% significance level ($p \leq 0.01$)*

Source: Author's compilation from EViews output

The ARDL error correction model analysis for GDP per capita growth from 2002 to 2022 highlights several key dynamics. The coefficient for the first difference of GDP growth rate (D(GDP_RATE)) is significantly positive (0.983278), indicating that short-term increases in GDP growth substantially enhance GDP per capita. In contrast, the coefficient for the first difference of government effectiveness (D(GOVT_EFFECT_)) is negative (-0.184675) and not statistically significant, suggesting that short-term fluctuations in government effectiveness do not have a clear impact on GDP per capita growth. Industrial value addition (D(INDUSTRY)) positively affects GDP per capita (0.138904), signifying that increases in industrial output contribute to economic growth in the short run. Conversely, military expenditure (D(MILITRY)) has a large negative impact (-0.939187), reflecting that higher military spending can hinder GDP per capita growth by diverting resources away from productive uses. Total debt service (D(T_DEBT)) also negatively impacts GDP per capita (-0.283211), highlighting the adverse effects of debt servicing on economic growth. Unemployment (D(UNEMPLO)) and fertility rate (D(FERTILITY_RATE)) have positive coefficients (0.135475 and 4.638570, respectively), indicating that, despite their counterintuitive nature, higher unemployment and fertility rates may be associated with higher short-term GDP per

capita growth, possibly reflecting complex demographic and labor market dynamics. The error correction term (CointEq (-1)) has a negative and significant coefficient (-0.458848), suggesting a significant and rapid adjustment towards the long-term equilibrium. This indicates that any short-term deviations from the long-run relationship are corrected at a relatively high speed. Overall, the model shows a high R-squared (0.999926) and adjusted R-squared (0.999883), indicating that the model explains almost all of the variation in GDP per capita, and the Durbin-Watson statistic (3.183695) suggests no significant autocorrelation in the residuals.

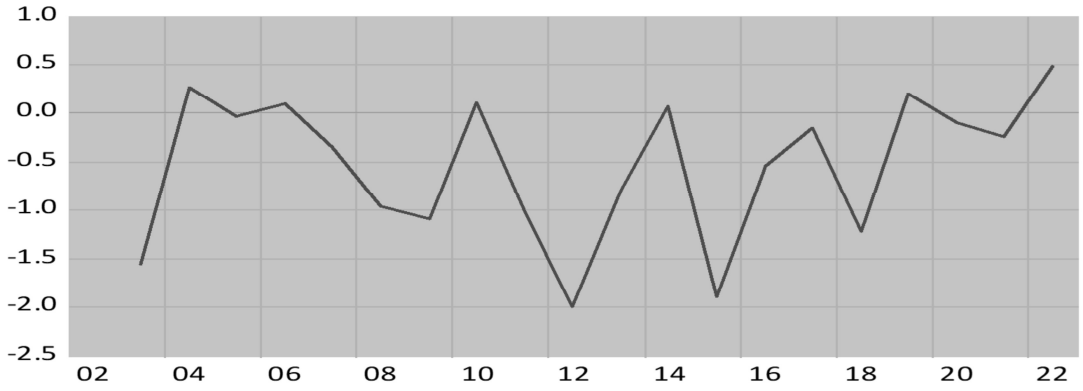

Figure 2. Cointegration Graph

Source: Author's compilation from EViews output

This graph shows the presence of a stable long-run equilibrium among the variables in the ARDL model. The stability of the residuals reinforces the validity of the cointegration relationship, suggesting that the model appropriately captures the dynamics between the variables. Consequently, the conclusions drawn from this model are robust and reliable, providing a solid foundation for the analysis presented in this research (Zaman et al., 2021).

Diagnostic Tests

Breusch-Godfrey Serial Correlation LM Test: Null hypothesis: No serial correlation at up to 1 lag

Table 9. Diagnostic tests for the ARDL model

F-statistic	**57.62126**	**Prob. F (1,2)**	**0.0169****
Obs*R-squared	19.32910	Prob. Chi-Square (1)	0.0000 ***
Heteroskedasticity Test: Breusch-Pagan-Godfrey		***Null hypothesis: Homoskedasticity***	
F-statistic	**0.278202**	**Prob. F (16,3)**	0.9630
Obs*R-squared	**11.94763**	**Prob. Chi-Square (16)**	0.7476
Scaled explained SS	**0.333470**	**Prob. Chi-Square (16)**	1.0000

*** denotes 1% significance level ($p \leq 0.01$)*
** denotes 5% significance level ($0.01 < p \leq 0.05$)*
Source: Author's compilation from EViews output

The diagnostic tests for the ARDL model reveal that while there is no evidence of heteroskedasticity, as indicated by the Breusch-Pagan-Godfrey test (F-statistic = 0.278202, p-value = 0.9630), suggesting that residuals exhibit constant variance, there is significant serial correlation in the residuals (F-statistic = 57.62126, p-value = 0.0169), as shown by the Breusch-Godfrey Serial Correlation LM Test. This implies that the model may require adjustments to address the autocorrelation issues to enhance its reliability and accuracy.

CUSUM TEST

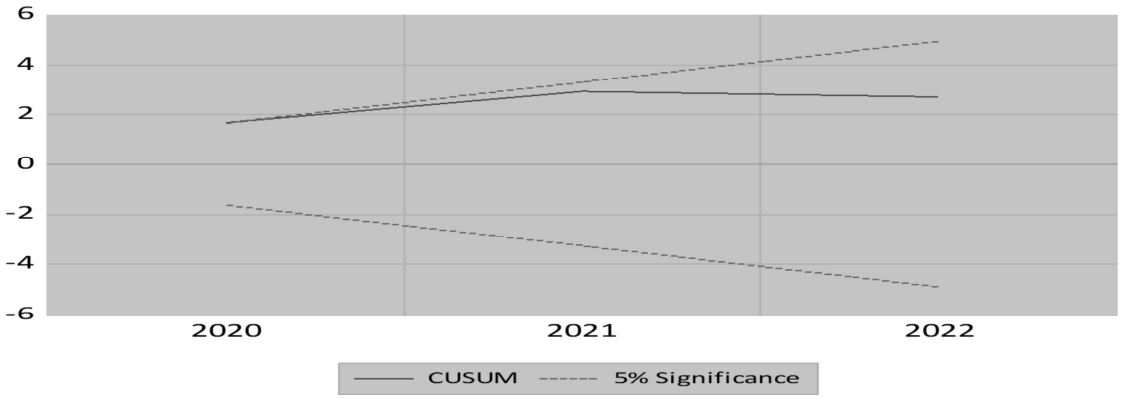

Figure 3. CUMSUM

Source: Author's compilation from EViews output

CUSUM Residuals

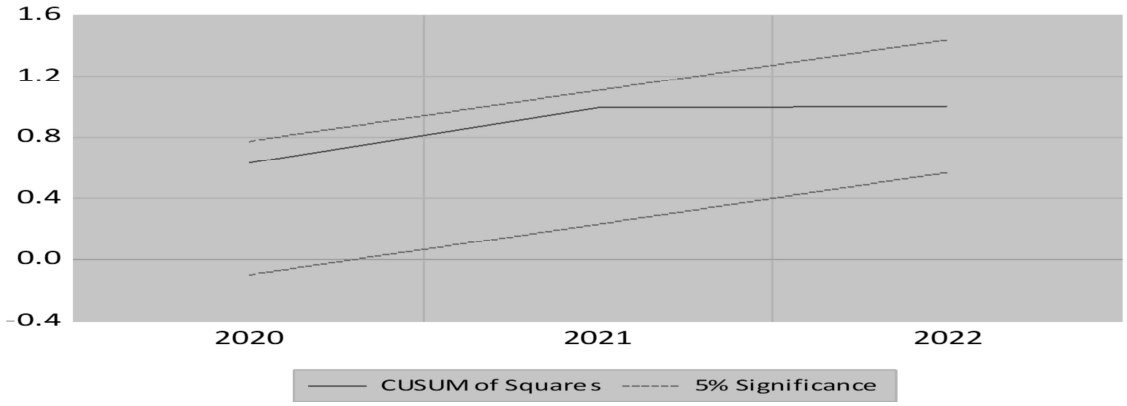

Figure 4. CUMSUM of Squares

Source: Author's compilation from EViews output

Figure No. III and IV present CUSUM and CUSUM of squares, both tests provide strong evidence that the model parameters are stable over the sample period used. The fact that neither test indicates a breach of the 5% significance bounds reinforces the reliability of the model's results and suggests that the relationships captured by the model have remained consistent throughout the study period. This stability enhances the confidence in the conclusions drawn from the analysis, ensuring that the model's underlying assumptions hold true across the time frame considered.

Discussion

The empirical investigation into the determinants of GDP per capita growth in Pakistan from 2002 to 2022 provides a comprehensive analysis of the short-term and long-term dynamics influencing economic development. This study employs a multifaceted approach, including unit root tests, correlation analysis, and the Autoregressive Distributed Lag (ARDL) model, to explore the relationships between key economic variables.

The unit root tests confirm the stationarity of the data, ensuring the reliability of the subsequent econometric analyses. The correlation analysis reveals significant relationships among the variables, providing preliminary insights into their potential impacts on GDP per capita growth. a high positive correlation between the GDP growth rate and GDP per capita growth indicates a direct and strong relationship, underscoring the importance of macroeconomic stability for economic prosperity. In contrast, government effectiveness and military expenditure exhibit negative correlations with GDP per capita growth, suggesting potential adverse effects on economic performance. The ARDL model, used to capture both short-term and long-term relationships, offers nuanced insights into how various factors influence GDP per capita growth over different time horizons.

The analysis reveals several key insights into the socio-economic determinants of GDP per capita growth in Pakistan, employing the ARDL model to capture both short- and long-term relationships. The model's structure effectively distinguishes immediate effects from enduring impacts, enhancing our understanding of how each variable contributes to economic growth dynamics. As expected, the GDP growth rate demonstrates a strong positive relationship with GDP per capita in both short and long terms. This finding aligns with classical growth theory, suggesting that aggregate economic growth directly elevates individual income levels. and consistent with Mauro (1995), who highlights that corruption control is vital for economic development. The strong impact of GDP growth rate on per capita income underscores the importance of macroeconomic stability for sustainable individual economic prosperity. The analysis reveals, government effectiveness has a mixed effect. While immediate impact in the short term is insignificant, in the long term, government effectiveness shows a significant negative relationship with GDP per capita. This counterintuitive long-term result may indicate that inefficiencies, bureaucratic hurdles, or mismanagement in government institutions persist over time, potentially negating the intended positive impact on economic growth. Such findings highlight the necessity for deeper structural reforms in public sector governance to improve long-

term economic outcomes, as supported by institutional economics theory (North, 1990). And aligning with (Javid, A., & Arif, U, 2009). Military spending appears to have a significant negative effect on per capita GDP growth in both the short and long terms. This relationship suggests, that high levels of defense spending potentially crowd out productive investments in key sectors like education, health, and infrastructure, essential for economic development. The results align with the debt-overhang hypothesis, as substantial military expenditure may contribute to fiscal constraints, hindering resources available for growth-promoting activities (Deger & Smith, 1983) (Khilji, N., & Mahmood, A. ,1997). Total debt service is shown to have a persistent negative impact on GDP per capita. Research consistently shows that debt servicing negatively impacts Pakistan's GDP per capita by diverting resources from productive investments, in line with the debt overhang hypothesis. High debt burdens reduce productivity and hinder economic growth, as evidenced in studies by Jadoon et al. (2014) and Shah et al. (2016). These findings highlight the need for debt reduction strategies and policies that prioritize investments in exports and foreign direct investment (FDI) to lessen dependency on external debt and foster sustainable growth (Jadoon et al., 2014), (Shah et al., 2016). The industrial sector's contribution to GDP per capita shows a positive effect in the short term but a weaker, even slightly negative, effect in the long term. This pattern might reflect initial productivity boosts associated with industrial expansion, followed by diminishing returns due to structural inefficiencies or outdated industrial practices. Addressing these structural issues through technological upgrades and improved management could potentially strengthen the sector's long-term contribution to economic growth, supporting the Solow-Swan model's emphasis on capital and productivity (Solow, 1956). In Pakistan, the industrial sector initially boosts GDP per capita through productivity gains. However, over the long term, this impact weakens or becomes negative due to inefficiencies and outdated practices. Studies suggest that sustained growth would require structural improvements, such as technological upgrades and enhanced management, to maintain the sector's contribution to economic growth (Ajmair et al., 2022). The long-term positive and less significance may indicate structural changes in the labor market, where productivity improvements among the employed offset the negative impacts of unemployment. An unexpected positive relationship between unemployment and GDP per capita growth is observed in the short run. This counterintuitive result may reflect structural changes in the labor market or increased productivity among the employed population, potentially indicating that those who remain employed are more productive, thereby contributing more significantly to economic growth. This finding necessitates a deeper examination of labor market dynamics in Pakistan to understand the underlying causes and implications of this relationship. In Pakistan, short-term increases in GDP per capita despite rising unemployment may reflect productivity gains among employed workers offsetting unemployment's usual negative impact. This trend suggests structural changes in the labour market, where those remaining employed contribute more significantly to GDP. Over the long term, however, higher

unemployment generally correlates with lower economic growth, as confirmed in studies by Shamshir et al. (2019). Fertility rate shows a positive effect on GDP per capita, in short-term impact and long-term effect. The positive short-term association might be due to demographic pressures creating a larger consumer base, thus boosting demand. However, the absence of a long-term effect suggests that the initial economic gains associated with higher fertility rates may dissipate without corresponding improvements in human capital development and employment opportunities for a growing labor force. This highlights the importance of complementary policies in education and healthcare to leverage demographic changes for sustained economic growth. For instance, Bloom and Canning (2004) argue that while demographic changes, such as fertility declines, have initially positive effects on per capita income, the long-term impact is contingent on policies that enhance the productivity of the growing labor force through investments in education, healthcare, and job creation. For example, the study by Lee and Mason (2011) emphasized that demographic dividends, derived from lower dependency ratios and a larger working-age population, can significantly contribute to economic growth. a study by Lee and Mason (2011) emphasized demographic dividends, derived from lower dependency ratios and a larger working-age population, can significantly contribute to economic growth. The analysis indicates that effective control of corruption positively impacts GDP per capita growth in both the short and long terms. findings underscore the importance of institutional quality and transparency for fostering economic efficiency and equitable distribution of resources. By reducing transaction costs and fostering a favorable environment for investment, anti-corruption measures have a direct and beneficial impact on economic growth, aligning with institutional economic theory (North, 1990). Findings are consistent with Mauro (1995), who highlights that corruption control is vital for economic development.

The ARDL model's dual focus on short-term and long-term effects enhances coherence in understanding the dynamics of Pakistan's economic growth. The immediate impacts of variables like industrial output and GDP growth rate are seen to stimulate short-term economic gains, while the long-term analysis captures more structural aspects, such as the persistent negative impact of government effectiveness and military expenditure. This integrated approach highlights that while short-term gains are achievable through sectoral expansion and macroeconomic stability, long-term growth requires institutional reforms, prudent fiscal management, and sustained investment in human capital.

Overall, findings align well with existing literature on economic growth in developing countries, while also revealing unique insights specific to Pakistan's socio-economic context. By distinguishing between short- and long-term effects, the study provides a comprehensive framework for understanding the multi-faceted nature of GDP per capita growth. This approach also serves to caution policymakers against overgeneralizing short-term economic gains and emphasizes the importance of sustained structural reforms to achieve stable and inclusive growth.

V. Conclusion

This study elucidates the complex interplay of socio-economic factors influencing GDP per capita growth in Pakistan, offering significant policy insights and aligning with existing literature. The positive impacts of GDP growth rate and control of corruption on GDP per capita growth emphasize the need for sustained economic growth and strong governance frameworks. These findings corroborate the theoretical and empirical work of Barro (1991) and Mauro (1995), who underscore the importance of macroeconomic stability and institutional quality. The negative effects of government effectiveness, military expenditure, and total debt service on GDP per capita growth highlight critical areas for policy intervention. Improving public sector efficiency, reducing military spending, and implementing prudent debt management practices are essential for fostering sustainable economic development. These insights are consistent with the findings of Deger and Smith (1983) and Reinhart and Rogoff (2010). The study's unexpected positive relationship between unemployment and GDP per capita growth calls for a deeper exploration of labour market dynamics in Pakistan. Understanding the structural changes and productivity factors at play can provide valuable guidance for policymakers to address unemployment while promoting economic growth. While this study makes a valuable contribution to understanding the determinants of GDP per capita growth in Pakistan, it is not without limitations. The analysis primarily relies on macroeconomic data, which may obscure important regional or sectoral disparities within Pakistan. Additionally, the study's scope does not incorporate external economic shocks, such as global financial crises and fluctuations in international trade, which could influence Pakistan's GDP per capita growth trajectory. Future research could benefit from a more granular approach, examining regional differences in economic growth drivers or analyzing sector-specific impacts, such as those within agriculture, manufacturing, and services. Furthermore, exploring the effects of external factors, including trade dynamics and geopolitical events, could offer additional insights into the resilience of Pakistan's economic growth.

These findings reinforce the need for targeted policies to sustain economic expansion and strengthen governance frameworks, which are vital for equitable and sustained economic progress. The study suggests that strengthening government effectiveness and reducing corruption will significantly enhance long-term GDP per capita growth. Public sector reforms aimed at improving resource allocation, transparency, and accountability are critical to overcoming observed inefficiencies. Streamlining bureaucratic processes and reducing red tape can foster a more conducive environment for investment and economic activities. Another critical area is the adverse impact of military expenditure on GDP per capita growth. Redirecting funds from defense to key developmental sectors such as education, healthcare, and infrastructure can stimulate human capital development and improve productivity. This shift in resource allocation is essential to addressing Pakistan's long-term economic challenges and fostering inclusive growth. The negative influence of high public debt and debt servicing obligations on GDP per capita growth highlights the importance of prudent debt management strategies. Policymakers should focus on diversifying the economy, enhancing exports, and attracting foreign direct investment to reduce reliance on external borrowing. Such measures can alleviate fiscal pressures and free up resources for growth-oriented investments. Demographic dynamics, particularly fertility rates and unemployment, present unique challenges and opportunities. While higher fertility rates show short-term positive effects through increased demand, their long-term sustainability requires parallel investments in education, healthcare, and employment opportunities to harness the potential of a growing labour force. Similarly, a counterintuitive positive correlation between unemployment and GDP per capita growth

calls for labor market reforms. Initiatives that focus on skill development, entrepreneurship promotion, and support for small and medium enterprises can address structural inefficiencies and unlock Pakistan's workforce potential.

The study's integrated theoretical framework represents a novel contribution to the literature by combining classical economic growth theory, institutional economics, and Keynesian perspectives to analyze Pakistan's unique economic landscape. This framework allows for a holistic understanding of socioeconomic factors driving GDP per capita growth, capturing both short-term and long-term influences. By incorporating diverse economic theories, the study effectively contextualizes Pakistan's economic conditions within broader growth paradigms, demonstrating the relevance of each theoretical perspective to the country's socio-economic realities. This integration not only enhances the robustness of the analysis but also provides a comprehensive basis for understanding how institutional quality, macroeconomic stability, and demographic dynamics jointly impact economic growth in Pakistan.

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