

## **Macroeconomic Dynamics in Pakistan: The Role of Inflation, GFCF, and FDI in Economic Growth**

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### **Abstract**

This study examines the nexus between inflation, Gross Fixed Capital Formation (GFCF), and Foreign Direct Investment (FDI) on economic growth in Pakistan, utilizing annual time-series data from 2010 to 2023. Employing descriptive statistics, correlation analysis, and Ordinary Least Squares (OLS) regression, the findings highlight a significant negative impact of inflation on GDP growth, whereas GFCF and FDI positively influence economic expansion. The results underscore the pivotal role of capital formation and foreign investments in fostering sustainable economic development, while emphasizing the detrimental effects of inflation on economic performance. Policy recommendations include targeted inflation control measures, enhanced investment in infrastructure, and strategies to attract FDI to achieve stable and inclusive growth. These findings contribute valuable insights to the understanding of macroeconomic dynamics in developing economies like Pakistan.

**Keywords:** Inflation, Economic Growth, Gross Fixed Capital Formation (GFCF), Foreign Direct Investment (FDI), Pakistan Economy

## **1.Introduction**

Pakistan's economy has faced numerous challenges over the past decade, including a fragile political landscape, terrorism, and macroeconomic instability. Despite these obstacles, the country has made significant progress in recent years, with GDP growth averaging around 4.5% between 2010 and 2020 (World Bank, 2022). However, this growth has been accompanied by high inflation rates, which have remained above 7% for most of the past decade (State Bank of Pakistan, 2022). The relationship between inflation and economic growth is complex and multifaceted, making it a critical area of study for economists and policymakers alike. Inflation, defined as an increase in the price of consumable goods and services over time, is a crucial variable that influences economic growth. It is widely accepted that inflationary trends impact the economy, but the nature of this impact is a subject of debate. When inflation reaches a peak, it curbs productivity and growth, whereas a low and stable inflation rate contributes positively to economic growth. High inflation rates can significantly affect the decision-making processes of consumers, producers, and investors due to uncertainty about the expected outcomes of their actions (Hussain, 2022).

Several studies have delved into the relationship between inflation and economic growth, producing varied results. Some research suggests that moderate levels of inflation can act as a stimulant for economic growth (Khan, 2020). This viewpoint posits that mild inflation can encourage spending and investment, thereby driving economic activity. However, other studies argue that high inflation rates have detrimental effects, including reduced investment, decreased purchasing power, and lower overall economic growth (Hussain, 2020).

In Pakistan, the impact of inflation on economic growth is a pressing concern for policymakers. The country's economy is heavily reliant on imports, particularly for essential goods such as food and energy products. This reliance makes Pakistan especially vulnerable to external economic shocks, such as fluctuations in global commodity prices (Malik, 2020). Moreover, Pakistan's large trade deficit and low tax revenues create additional economic pressures, complicating efforts to finance development projects and social programs effectively (Khan, 2020). Over the past fifty years, Pakistan's average growth rate has been about 5.5%. However, high inflation rates, which have averaged around 8%, have posed significant challenges to achieving a sustainable growth pattern (Acta.A , 2022).

Throughout its history, Pakistan has experienced uneven growth patterns. The economy has struggled with gaps between receipts and public expenditures, investments and savings, capital

formation and population growth. Additionally, the country has faced difficulties in establishing robust financial markets. High inflation rates have been a major obstacle in this regard. From 1970 to 1980, inflation was relatively low due to strict monetary policy and other factors. However, during the 1990s, high inflation was correlated with the depreciation of the domestic currency. In 2005, inflation escalated due to decreases in exports compared to imports, rising oil prices, decreased foreign capital investments, and poor supply of both food and non-food items. From 2005 to 2012, inflation entered double-digit territory, driven by both food and non-food items. Factors such as high oil prices, domestic currency depreciation, instability in the country, deterioration in the balance of payments, and monetary expansion were the main drivers of inflation during this period (Acta.A, 2022).

One of the main culprits identified for Pakistan's economic decline in recent years has been high inflation rates, which have remained stubbornly above 7% for most of the past decade. High inflation erodes purchasing power, increases the cost of doing business, and creates uncertainty in the market. Previous studies have highlighted that persistent inflation has negatively impacted consumer confidence and investment, further slowing down economic growth (Khan et al., 2022). Current study has also identified this problem, aiming to investigate the relationship between inflation and GDP growth in Pakistan. By understanding the impact of inflation on economic growth and development, this research seeks to provide insights that could help policymakers devise strategies to stabilize inflation and foster economic growth. The findings could contribute to the broader discourse on how developing economies can manage inflation while pursuing sustainable economic development. This divergence prompts further analysis of the link between Islamic banking and economic results in Pakistan. In this context, the central question of this study is:

*How do inflation, Gross Fixed Capital Formation (GFCF), and Foreign Direct Investment (FDI) influence economic growth in Pakistan?*

This study aims to investigate the impact of inflation on economic growth in Pakistan using a combination of theoretical and empirical approaches. The study will review the existing literature on the topic, analyze the latest data from reputable sources, and employ econometric techniques to estimate the relationship between inflation and economic growth in Pakistan. This comprehensive analysis will provide valuable insights for policymakers and contribute to the broader understanding of how inflation impacts economic growth in developing economies like Pakistan.

## **2. Literature review**

### **2.1 Theoretical Basis**

Theoretical studies about the impact of Inflation on economic growth Firstly, Classical growth theory, as pioneered by Adam Smith, posits that the accumulation of capital, labor, and land drives economic growth. According to Smith, savings generate investment, fueling economic growth. While classical theory does not explicitly address inflation, it implies a negative relationship as rising prices can reduce profit margins and inhibit investment (Gokal, V., & Hanif, S. (2004). Secondly, Keynesian economics uses the Aggregate Demand (AD) and Aggregate Supply (AS) framework to describe the short-term dynamics between inflation and growth. In the short run, an upward-sloping AS curve indicates that increased demand can raise both output and prices. However, in the long run, as the economy adjusts, this relationship stabilizes and the effects of inflation on growth diminish. This model underscores the importance of managing inflation expectations to sustain growth (See Dornbusch, et al, 1996). Besides, according to Aisen and Veiga (2020), high and volatile inflation rates are particularly detrimental to economic growth in developing economies due to their impact on uncertainty, investment, and savings. The authors argue that inflation control should be a priority for policymakers to create a stable macroeconomic environment that fosters economic growth. Their research also emphasizes the importance of credible monetary policy frameworks to anchor inflation expectations and reduce economic volatility.

### **2.2 Inflation and Economic Growth**

A comprehensive literature review on the relationship between inflation and economic growth was conducted, analysing various studies that demonstrate both positive and negative impacts of inflation on economic performance. Inflation, measured by indices such as the Consumer Price Index (CPI) or Producer Price Index (PPI), affects economic growth, which is typically assessed by the Gross Domestic Product (GDP). The study concludes that maintaining controlled inflation is crucial for achieving sustainable economic growth, as different countries face unique challenges in managing inflation effectively (Judijanto et al., 2024).

Nashrurrahman et al, (2024) Impact of Inflation Toward Economic Growth and Income Distribution, inflation, income distribution, and economic growth, this paper utilizes deductive reasoning, the relationship between inflation and economic growth is complex and can be influenced by various factors. The paper proposes several strategies to mitigate the effects of

inflation on income distribution, such as monetary policy, fiscal policy adjustments, financial inclusion initiatives, and evidence-based policymaking. It underscores the importance of income distribution in economic stability, social equity, poverty reduction, and human development.

Moodley and Pillay (2024) analyzed the relationship between inflation and economic growth in South Africa from 1970 to 2021, using an Autoregressive Distributed Lag (ARDL) model to examine both short- and long-term impacts. The study revealed that inflation, long-term interest rates, and money supply have a significant negative effect on South African economic growth, while the real effective exchange rate does not significantly impact growth.

Uddin and Ullah (2024) explored the relationship between interest rate, inflation, and economic growth in Pakistan from 1970 to 2019, using Simultaneous Equation Modeling (SEM) to assess how these macroeconomic variables interact. The study revealed that inflation, money supply, exchange rate, total investment, budget deficit, and foreign direct investment (FDI) positively affect GDP per capita, indicating their contribution to economic growth. Conversely, interest rates and unemployment negatively impact GDP per capita. The findings also suggest that higher inflation and exchange rates increase interest rates, while a larger money supply and FDI help lower them.

A study conducted in 2024 analysed the impact of inflation and economic growth on poverty in North Sumatra Province using secondary data from 2013 to 2022. The study employed regression analysis to assess the influence of these variables. The results revealed that inflation had no significant effect on the poverty rate, while economic growth had a significant positive impact on reducing poverty. (Marbun et al., 2024).

Aprilia, Hidayat, and Asngari (2024) examined the causal relationships between exchange rates, economic growth, and inflation in Indonesia from 2000 to 2019, using the Granger Causality Test to explore the direction of these interactions. The study identified a bidirectional causal relationship between economic growth and the exchange rate, as well as between inflation and the exchange rate. The results suggest that rising inflation leads to a depreciation of the exchange rate, while exchange rate fluctuations influence both inflation and economic growth.

Sipahutar (2024) examined the tradeoff between inflation and economic growth and its impact on poverty in Indonesia, utilizing a three-decade dataset from 1990 to 2021. Using a Vector Autoregressive (VAR) model, the study identified a bi-directional relationship between inflation and economic growth, indicating that changes in one variable influence the other over time.

Additionally, the study employed an Ordinary Least Squares (OLS) model to evaluate the effects of inflation and economic growth on poverty, finding that economic growth had a negative impact on poverty by reducing it, while inflation positively contributed to an increase in poverty. The research concluded that while rising economic growth can lead to higher inflation, it also reduces poverty in the short term by increasing employment and wages.

Zakhidov (2024) examined the impact of inflation on consumer behavior and economic policies in Uzbekistan, focusing on the period from 2013 to 2022. Using regression and correlation analyses, the study explored the relationship between inflation, consumer spending, and purchasing power parity. The findings revealed that as inflation increased, consumers in Uzbekistan adjusted their spending habits by prioritizing essential goods and services.

**H1.** There is a significant impact of Inflation on Economic Growth.

### **2.3. Control Variables**

#### **2.3.1. Gross Fixed Capital Formation and Economic Growth**

Trade, investment, and economic growth are closely linked in economic literature. The importance of exports is widely recognized as they bring in foreign exchange and promote industrialization. The positive relationship between export performance and economic growth is highlighted by Balassa (1978) and Feder (1983), particularly in models of export-led growth. In contrast, imports are often seen as a drain on domestic resources. However, as Grossman and Helpman (1991) demonstrate, importing capital goods and technology can significantly boost growth, especially in industries with higher skill levels.

Another critical factor is gross fixed capital formation (GFCF), which involves investments in tangible assets like machinery and infrastructure. High levels of GFCF are essential for economic expansion, supported by the banking system, ensuring sustainable growth as factories automate and increase domestic sales. Belloumi and Alshehry (2018) found a strong positive relationship between GFCF investment and GDP growth over the long term. Their ARDL model suggests that stable business cycles and long-term cointegration are necessary for stimulating GDP growth. Therefore, policymakers must implement sound economic policies, and the private sector's involvement is crucial for achieving sustainable growth.

Fattahi Rinosha and Mohamed Mustafa (2021) also view GFCF as a crucial proxy for stimulating investment, which impacts the economic strength of a nation. Countries with robust agricultural

sectors use GFCF as a tool to develop an upgraded economic strategy, particularly for boosting domestic manufacturing, scaling up exports, and curbing imports.

Rehman et al. (2021), Rinosha & Mustafa (2021), and Belloumi et al. (2021) emphasize the role of Gross Fixed Capital Formation (GFCF) in economic activity and reconstruction efforts. Several studies indicate a strong association between GFCF and other macroeconomic variables. Rehman and Hysa argue that a reformed banking system is essential for fostering more investments, which will, in turn, accelerate economic growth. Belloumi and Alshehry (2018) also explored the impact of GFCF on short-term economic performance, confirming a positive relationship consistent with their previous work. Countries with a strong pipeline of investment projects are generally those where sustained and predictable economic growth occurs.

### **2.3.2. Foreign Direct Investments and Economic Growth**

Foreign direct investment, trade openness and economic growth in BRICS countries: evidences from panel data. Foreign Direct Investment and Economic Growth in Kenya an Empirical Investigation. Based on these results, it can be concluded that the current burgeoning FDI inflows that Kenya has attracted in recent years are largely driven by the strong economic growth and prudent macroeconomic policies that the country has been pursuing in recent decades. Policy implications are discussed. (Banday, U. J., Murugan, S., & Maryam, J, 2021).

Economic freedom and financial fragility in the foreign direct investment (FDI). Foreign direct investment and economic growth in Sub-Saharan Africa. Using fully modified ordinary least squares technique. The uniqueness this study lies in the use of financial market data that accounts for financial market fragility and aggregate score of economic freedom. Using fully modified ordinary least squares technique, the study reveals that economic freedom and a well-developed financial market complement FDI in promoting economic growth in SSA. This study highlights the need to strengthen the financial system and promote economic freedom to enhance FDI's effect on economic growth. (Edmund Kwablah, Anthony Amoah, 2022).

Foreign Direct Investment (FDI), Economic growth. Impacts of Foreign Direct Investment on Economic growth in Vietnam. The VAR model through unit root test. The study finds that the impact of FDI on economic growth in the short-term and harms the growth for the long-term. Despite the increase of FDI capital over the years and its potential, the effectiveness of FDI is still limited. In this context, this study is written in parallel to provide a systematic study on the



determinants of FDI and its potential impacts on the economy of Vietnam. (Nguyen, Le Thao Huong, 2022).

Foreign direct investment and economic growth. Foreign Direct Investment and Economic Growth in Africa, New Empirical Approach on the Role of Institutional Development. Test used; Panel smooth transition regression. The results show that FDI promotes economic growth in countries where the level of institutional development is beyond a certain threshold. In countries that fall below the threshold, FDI has either a negative or null effect on economic growth. (Kouassi Yeboua, 2020).

Foreign direct investment Sustainable development goals. How does foreign direct investment contribute to Sustainable Development Goals?. However, although FDI has a positive impact in areas such as basic infrastructure, clean water, sanitation, and renewable energy, some adverse environmental consequences may occur for host countries. In fact, the relationship between FDI and the probability of achieving SDG13 (Climate action) is negative. (Viktoria Aust a, et al, 2019). Foreign direct investment Financial development Economic growth. Generalized method of moment Dynamic panel threshold model. This finding is robust to different econometric methods, various subsamples and interaction analyses, and distinct financial development indicators. (Michael J.Osei, Jaebeom Kim, 2020).

Foreign direct investment, financial sector development, economic growth. Foreign direct investment, economic growth and financial sector development in Africa. Using the GMM (generalized methods of moments) technique. Thus, the precise effect of FDI on economic growth is conditioned on the model specification. Interestingly, we notice that financial sector dampens the positive effect of FDI on economic growth. This finding holds irrespective of the indicator of financial sector and economic growth although the dampening effect of domestic credit is higher relative to private credit (Acquaha.A and Ibrahim.M, 2019).

Foreign aid, FDI, economic growth. Foreign Aid, FDI and Economic Growth in South East Asia and South Asia. Using the GMM (generalized methods of moments). Governmental financial assistance to private sector for domestic investment turns out to be important in all empirical estimations insofar as positively associated with FDI flows as well as growth. We, therefore, infer that low income SEA and SA economies should focus on channelizing governmental financial assistance to private sector for domestic investment, macroeconomic stabilization, trade openness,



and efficient utilization of aid flows, in order to attract, absorb and reap the benefits of complementing FDI flows and sustaining higher economic growth. (D. Tripathi Rao et al, 2020). Foreign direct investment FDI, financial development FD. The Impact of Foreign Direct Investment on Financial Development, New Evidence from Panel Cointegration and Causality Analysis. Panel Data Regression Analysis. Our findings indicate that FDI, trade openness, government consumption, and inflation have a statistically significant relationship with FD. FDI, trade openness, and government consumption increased FD in Asia, Europe, and Latin America but decreased in Africa. Inflation shows a negative influence on FD in all continents. Furthermore, the Dumitrescu–Harlin panel causality test confirms a two-way causality relationship among FDI, trade openness, and FD in Asia and Europe. In contrast, a unidirectional relationship exists between FDI and FD in Latin America. The income-wise results reveal that low- and middle-income countries attract more FDI than high income countries due to high factor costs. These empirical results provide new insights for policymakers, presenting several policy implications for FD competitiveness in the reference regions. (Abdul Majeed et al, 2021).

**Figure 1. Conceptual framework**



### 3.1. Data and Data sources

Annual time series data from 2010 up to 2023 was used for the analysis of the variables; for this purpose data for Inflation (Independent variable), Economic Growth (Dependent variable) and control variables were collected from the World Bank Indicators website. The analysis of data was done with E-Views version 8 software.

The research methodology is predominantly quantitative, utilizing secondary data for analysis. The study uses time series data from 2010 to 2023, sourced from reliable databases such as the World Bank Indicators. The data was analyzed through statistical techniques including descriptive

statistics, correlation analysis, and Ordinary Least Squares (OLS) regression. These techniques provide insights into the nature of the data, the strength of relationships between variables, and causal linkages. To avoid bias from omitted variables, the study incorporates additional variables to control for their potential effects on growth. Specifically, gross fixed capital formation and Foreign Direct Investment, Time series analysis is particularly suited for this research because it helps observe trends, cycles, and patterns over a specific period (Gujarati & Porter, 2009).

The population under study is the entire economy of Pakistan, focusing on its macroeconomic indicators, specifically inflation and economic growth. Pakistan was selected due to its distinctive economic landscape, marked by volatile inflation rates and fluctuating growth figures. Analyzing the interaction between these two critical factors can offer valuable insights not only for Pakistan but also for other developing economies with similar dynamics. According to the World Bank (2020), inflation has a unique impact on developing economies, making Pakistan a relevant case study for understanding broader economic trends.

### 3.2. Model Specification

In order to check the role of Inflation and Economic Growth, an Econometric model was designed

Econometric Model

$$GDP = \alpha + \beta_1 \text{ Inflation} + \beta_2 \text{ GFCF} + \beta_3 \text{ FDI} + U_t$$

Where,

(DV) Economic Growth = Gross domestic product (Economic growth)

(IV) Inflation = Consumer price index (Inflation)

Control Variables

GFCF = Gross Fixed Capital Formation.

FDI = Foreign Direct Investment

Table 3.1. Variable Description, Units and Sources

Variables	Proxy	Symbol	A Priori Expectation
Dependent			
Economic Growth	Gross Domestic Product (Leslie Kramer, 2022)	GDP	
Independent			
Inflation	Consumer Price	CPI	(-)

Index (Marbun et al., 2024).			
Control Variables			
1. Gross Fixed Capital Formation	Economic stability of a country in the long term and growth journey. (Rehman et al. 2021)	GFCF	(+)
2. Foreign Direct Investment	Investments made by foreign companies or entities into businesses located in another country (Edmund & Anthony, 2022)	FDI	(+)

### 3.3. Estimation techniques

To check the economic growth of any country there is need to check the Gross Domestic product, after studying the decline occurs in the last decade of the Pakistani economy, for that reason current study has taken its Dependent variable(GDP), next step is to check what is the relation and impact of Inflation with the study's DV, so current study has chosen the most appropriate component of Macro Economic Variable Consumer Price Index (IV), also to check the role of Control Variables i-e GFCF and FDI which helps to boost the Economic Growth To check the relationship Correlation test and for impact study has used ordinary least square (OLS) regression test.

## 4. RESULTS

### 4.1. Descriptive Statistics

Table 4.1. Descriptive Statistics

	GDP	CPI	GFCF	FDI
Mean	35.88384	34.62818	24.39580	24.13457
Median	35.79385	34.49128	24.43216	24.16551
Maximum	36.53204	35.22383	24.72504	24.39070
Minimum	35.35271	34.21293	24.05669	23.79031
Std. Dev.	0.390853	0.344705	0.203898	0.201560

**Keyword: GDP= Gross Domestic Product, CPI= Consumer Price Index (Inflation), GFCF= Gross Fixed Capital Formation and FDI= Foreign Direct Investment.**

The average GDP is 35.88 which means the typical GDP in the data set. A relatively equal distribution is observed in the case of median value of 35.79, which is close to the arithmetic mean. To indicate the exemplary nature of the fluctuation, there is a standard deviation of 0.39 and range of 35.35 to 36.53 so that the given figures concern relatively similar values of the GDP during the period of observations

CPI has a mean of approximately 34.63, with a standard deviation of 0.34, indicating moderate variability ( $M = 34.63$ ,  $SD = 0.34$ ).

The mean Gross Fixed Capital Formation (GFCF) was about 24.40, with a standard deviation of 0.20, indicating a relatively stable level of gross fixed capital formation ( $M = 24.40$ ,  $SD = 0.20$ ).

Lastly, FDI averaged around 24.13, with a standard deviation of 0.20, suggesting low variability ( $M = 24.13$ ,  $SD = 0.20$ ).

In turn, these descriptive statistics provide valuable evidence concerning central tendencies (i.e., means or medians), variability, and distributional characteristics of the studied variables. This foundational information serves as a context for the subsequent analysis and interpretation of how Pakistan's economy functions.

## 4.2. Data Normality Test

**Table 4.2. Data Normality Test**

	Skewness	Kurtosis
GDP	0.35954	1.91547
CPI	0.6512	1.9427
GFCF	-0.15191	2.04188
FDI	-0.28207	1.7256

**Keyword: GDP= Gross Domestic Product, CPI= Consumer Price Index (Inflation), GFCF= Gross Fixed Capital Formation and FDI= Foreign Direct Investment.**

Skewness is a measure of the asymmetry of a distribution. A skewness value close to zero suggests a symmetric distribution, whereas positive values indicate a right-skewed distribution, and negative values indicate a left-skewed distribution. For GDP, the skewness value of 0.35954 indicates a slight right skew, suggesting a minor asymmetry with more values concentrated on the lower end of the distribution. Similarly, CPI has a skewness value of 0.6512, which also indicates a moderate right skew. In contrast, GFCF and FDI have skewness values of -0.15191 and -0.28207, respectively, which imply slight left-skewed distributions, meaning more values are concentrated on the higher end.

Kurtosis measures the "tailedness" of a distribution. A kurtosis value close to 3 represents a normal distribution (mesokurtic), values above 3 suggest a leptokurtic distribution (heavy tails), and values below 3 indicate a platykurtic distribution (light tails). For all variables in this dataset, the kurtosis values are below 3, with GDP (1.91547), CPI (1.9427), GFCF (2.04188), and FDI (1.7256) exhibiting distributions with lighter tails compared to a normal distribution. These values suggest that extreme deviations or outliers are less likely in these variables compared to a normal distribution.

#### **4.3. Correlation**

Current study presents the Pairwise Correlation between the variable, to find out the multicollinearity exists among the executed variables or not, this test for applied, having multicollinearity among the variables the estimated coefficients and standard errors become inflated (Simon, 2004). To ensure the current study model is free from the multicollinearity the below ranges should be followed. Correlation coefficients range from -1 to +1, with weak relationships indicated by coefficients between +0.1 and 0.4. Correlations over 0.6 are considered strong, while those between +0.5 and 0.6 are moderate. A positive correlation occurs when both variables increase or decrease together, whereas a negative correlation occurs when one variable increases as the other decreases. A decrease in both  $r$  and  $p$  values signifies a strong correlation. Once the descriptive statistics of the daily data have been examined, the next step is to assess the correlation between the dependent and independent variables. Table 4.3 is about the correlation matrix of the dependent variables as well as independent variables.

**Table 4.3 Correlation**

	GDP	CPI	GFCF	FDI
GDP	1.000000			
CPI	-0.877022	1.000000		
GFCF	0.698201	0.574988	1.000000	
FDI	0.780580	0.784465	0.638701	1.000000

**Keyword: GDP= Gross Domestic Product, CPI= Consumer Price Index (Inflation), GFCF= Gross Fixed Capital Formation and FDI= Foreign Direct Investment.**

GDP and CPI have a strong negative correlation of -0.877022, suggesting that as GDP increases, CPI tends to decrease, and vice versa. In contrast, GDP exhibits positive correlations with GFCF (0.698201) and FDI (0.780580), indicating that increases in GDP are associated with increases in both GFCF and FDI.

CPI exhibits a moderate positive correlation with GFCF (0.574988) and a strong positive correlation with FDI (0.784465). This indicates that CPI movements are somewhat linked to GFCF and are more strongly related to FDI trends. Lastly, GFCF and FDI have a moderate positive correlation of 0.638701, suggesting that increases in GFCF are moderately associated with increases in FDI.

Overall, the correlation matrix highlights a notable inverse relationship between GDP and CPI, while GDP, GFCF, and FDI are positively related. These findings provide preliminary insights into the dynamics among the variables, which can inform further analyses such as regression modeling.

#### 4.4. Variance Inflation Factors (VIF)

To examine the presence of multicollinearity among independent variables, the values in the correlation indicate that there is not much multicollinearity, which also verify with VIF test. The VIF results suggest that the independent variables do not exhibit multicollinearity. According to Gujarati (2009), if the VIF values are less than 10, it implies that multicollinearity is not an issue. Ensuring that none of the independent variables are multicollinear is crucial. As all VIF values are below 10, the analysis indicates no problem with multicollinearity among the independent variables. Gujarati (2009) confirms that a VIF value less than 10 signifies that multicollinearity is not a concern.

**Table 4.4. VIF**

Variable	VIF
CPI	8.05267
GFCF	7.04727
FDI	6.27771

**Keyword: CPI= Consumer Price Index (Inflation), GFCF= Gross Fixed Capital Formation and FDI= Foreign Direct Investment.**

The Variance Inflation Factor (VIF) values for CPI, GFCF, and FDI indicate the presence of multicollinearity among the variables. VIF is a measure used to assess the degree to which the variance of an estimated regression coefficient is inflated due to multicollinearity in the model. A VIF value above 5 is generally considered indicative of moderate multicollinearity, while values exceeding 10 suggest severe multicollinearity.

In this analysis, CPI has the highest VIF value of 8.05267, followed by GFCF with a VIF of 7.04727, and FDI with a VIF of 6.27771. These values suggest that all three variables exhibit moderate multicollinearity, meaning that there is a significant degree of correlation among the independent variables. This level of multicollinearity can affect the stability and interpretability of regression coefficients, making it challenging to determine the individual contribution of each variable to the dependent variable.

#### 4.5. Philips-Perron Fisher Unit Root Test

The stationarity of a time series can be evaluated using unit root tests. A time series is considered stationary if its distributional structure remains constant over time. The presence of unit roots is one reason for a lack of stationarity. It is recognized that the statistical power of these tests is limited. The researcher has evaluated the stationarity of each variable.

**Table 4.5. Unit Root Test**

Variables	Intercept/Trend	t- Statistics	Probability	Remarks
GDP	Intercept	-3.64976	0.0289	Series is Stationary at 2nd Difference.
CPI	Intercept	-2.91912	0.00976	Series is Stationary at



				2nd Difference.
GFCF	Intercept	-3.72905	0.02933	Series is Stationary at 2 <sup>nd</sup> Difference
FDI	Trend and Intercept	-5.30945	0.01277	Series Is Stationary at level

**Keyword: GDP= Gross Domestic Product, CPI= Consumer Price Index (Inflation), GFCF= Gross Fixed Capital Formation and FDI= Foreign Direct Investment.**

For GDP, the t-statistic of -3.64976 and a probability value of 0.0289 indicate that the series becomes stationary after taking the second difference. Similarly, the CPI series, with a t-statistic of -2.91912 and a probability value of 0.00976, is stationary at the second difference. The GFCF series follows a similar pattern, showing stationarity at the second difference with a t-statistic of -3.72905 and a probability value of 0.02933. These results suggest that GDP, CPI, and GFCF are non-stationary at their levels but achieve stationarity after differencing twice.

In contrast, the FDI series, tested with both trend and intercept, exhibits a t-statistic of -5.30945 and a probability value of 0.01277, indicating that it is stationary at the level without requiring differencing. This implies that the FDI series has stable statistical properties over time.

#### 4.6. Pairwise Granger Causality Tests

Table 4.5. Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
CPI does not Granger Cause GDP	11	0.25774	0.6254
GDP does not Granger Cause CPI		1.22689	0.3002
GFCF does not Granger Cause GDP	11	2.83104	0.1310
GDP does not Granger Cause GFCF		0.01984	0.8915
FDI does not Granger Cause GDP	11	5.06072	0.0646

GDP does not Granger Cause FDI

0.07135

0.7961

**Keyword:** GDP= Gross Domestic Product, CPI= Consumer Price Index (Inflation), GFCF= Gross Fixed Capital Formation and FDI= Foreign Direct Investment.

The Granger causality test results assess whether changes in one variable statistically help predict changes in another. The null hypothesis in each case assumes that the specified variable does not Granger cause the other. The analysis considers F-statistics and corresponding p-values to determine the significance of these relationships.

For the relationship between CPI and GDP, the null hypothesis that "CPI does not Granger cause GDP" is not rejected ( $F = 0.25774$ ,  $p = 0.6254$ ), indicating no evidence that past values of CPI predict GDP. Similarly, the null hypothesis that "GDP does not Granger cause CPI" is not rejected ( $F = 1.22689$ ,  $p = 0.3002$ ), suggesting no evidence of a predictive relationship in the opposite direction.

For GFCF and GDP, the null hypothesis that "GFCF does not Granger cause GDP" is not rejected ( $F = 2.83104$ ,  $p = 0.1310$ ), meaning there is no strong evidence that past values of GFCF predict GDP. Additionally, the null hypothesis that "GDP does not Granger cause GFCF" is not rejected ( $F = 0.01984$ ,  $p = 0.8915$ ), suggesting no predictive relationship in the reverse direction.

For FDI and GDP, the null hypothesis that "FDI does not Granger cause GDP" approaches significance ( $F = 5.06072$ ,  $p = 0.0646$ ). This result suggests a potential predictive relationship, although it does not meet conventional significance levels (e.g.,  $p < 0.05$ ). On the other hand, the null hypothesis that "GDP does not Granger cause FDI" is not rejected ( $F = 0.07135$ ,  $p = 0.7961$ ), indicating no evidence of a predictive relationship in the reverse direction.

#### 4.7. Multiple Regression

**H1:** There is a significant impact of Inflation on Economic Growth.

Table 4.6. Multiple regression OLS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
$\beta$				
Constant	20.79236	0.486049	42.77831	0.0000

CPI	-1.107821	0.076424	-14.49567	0.0000
GFCF	1.338385	0.433965	3.084088	0.0116
FDI	1.707569	0.290599	5.876042	0.0002

**Keyword: CPI= Consumer Price Index (Inflation), GFCF= Gross Fixed Capital Formation and FDI= Foreign Direct Investment.**

The regression results provide insights into the relationships between the independent variables (CPI, GFCF, and FDI) and the dependent variable. The constant term has a coefficient of 20.79236, with a standard error of 0.486049 and a highly significant t-statistic of 42.77831 ( $p < .001$ ). This indicates that when all independent variables are held at zero, the dependent variable's baseline value is 20.79.

For CPI, the coefficient is -1.107821, with a standard error of 0.076424 and a t-statistic of -14.49567 ( $p < .001$ ). This significant negative relationship suggests that a one-unit increase in CPI is associated with a decrease of approximately 1.11 units in the dependent variable, holding all other variables constant.

The coefficient for GFCF is 1.338385, with a standard error of 0.433965 and a t-statistic of 3.084088 ( $p = 0.0116$ ). This indicates a statistically significant positive relationship, implying that a one-unit increase in GFCF corresponds to an increase of approximately 1.34 units in the dependent variable, controlling for other factors.

For FDI, the coefficient  $\beta$  is 1.707569, with a standard error of 0.290599 and a t-statistic of 5.876042 ( $p = 0.0002$ ). This result is also highly significant, suggesting that a one-unit increase in FDI is associated with an increase of approximately 1.71 units in the dependent variable, assuming other variables remain constant.

In summary, the regression results reveal that CPI has a significant negative effect on the dependent variable, while both GFCF and FDI have significant positive effects. These findings highlight the distinct roles of these variables in influencing the dependent variable, with FDI showing the strongest positive impact.

## 5. Discussion

This study elucidate the substantial impacts of inflation, Gross Fixed Capital Formation (GFCF), and Foreign Direct Investment (FDI) on economic growth in Pakistan, supported by several previous studies that provide a deeper understanding of these dynamics.

We found that Inflation has a pronounced negative effect on economic growth, as indicated by the regression analysis. This result aligns with Hussain (2020), who argued that high inflation introduces uncertainties in economic decision-making, reducing consumer and business spending due to decreased purchasing power. This detrimental impact of inflation is also supported by Moodley and Pillay (2024), who observed similar trends in South Africa, where high inflation rates corresponded with reduced economic growth. These findings emphasize the need for managing inflation to prevent it from reaching levels that could stifle economic activity, supporting the notion that while moderate inflation can encourage spending, excessively high rates can lead to economic stagnation.

Further, the positive relationship between GFCF and economic growth underscores the critical role of capital investments in infrastructure and industrial assets in stimulating economic development. This supports the assertions of Belloumi and Alshehry (2018), who found that investments in tangible assets like machinery and infrastructure significantly contribute to long-term GDP growth through enhanced industrial capacity and productivity improvements. The findings suggest that sustained investment in GFCF not only supports immediate economic activity but also sets the foundation for future growth by enhancing the economy's productive capabilities.

Similarly, the study's findings on the positive impact of FDI on economic growth are corroborated by the research of Edmund Kwablah and Anthony Amoah (2022), who noted that economic freedom and a well-developed financial sector can significantly enhance the effectiveness of FDI. FDI brings in not only capital but also technological advancements and managerial expertise, which are crucial for modernizing industries and improving competitiveness. The study by Nguyen, Le Thao Huong (2022) also supports this, showing how FDI in Vietnam, despite short-term volatility, has had long-term beneficial effects on economic growth. This suggests that strategic FDI inflows can be a vital component of economic policy, driving growth through improved infrastructure and direct investments in key sectors.

### 5.1 Policy Implications

The negative impact of inflation on economic growth, as demonstrated by this study, underscores the necessity for effective inflation management strategies. Policymakers should prioritize the implementation of robust monetary policies aimed at stabilizing prices, which might include adjusting interest rates or regulating money supply to prevent excessive inflation. It is crucial to maintain inflation at a moderate level to avoid the economic stagnation associated with high inflation rates. Furthermore, consistent and transparent communication from central banks regarding inflation targets could help stabilize market expectations, thereby reducing economic uncertainties and fostering a more stable environment for economic decisions.

The positive correlation between Gross Fixed Capital Formation (GFCF) and economic growth highlights the importance of sustained investment in infrastructure and capital assets. Government policies should therefore focus on creating favorable conditions for such investments. This could involve offering tax incentives for businesses to invest in machinery and infrastructure, or increasing public investment in sectors critical to economic development. Additionally, improving the efficiency of public spending and ensuring the implementation of projects that offer the highest economic returns are vital. Such measures would not only boost current economic growth but also lay the groundwork for future development by enhancing the country's industrial and technological capabilities.

Given the significant positive impact of Foreign Direct Investment (FDI) on economic growth, policies should be crafted to attract more foreign investments. This includes improving the legal and regulatory framework to ensure that it is conducive to foreign investment, protecting investor rights, and ensuring transparency and stability in the business environment. Furthermore, initiatives aimed at enhancing the skills of the labor force and upgrading infrastructure to meet international standards can make the country more attractive to foreign investors. Building strategic relationships with key global players can also open up new avenues for FDI, which is essential not just for capital but also for bringing in new technologies and business practices that can drive economic innovation and growth.

## **6. Conclusion**

This study highlights the critical relationships between inflation, Gross Fixed Capital Formation (GFCF), and Foreign Direct Investment (FDI) on Pakistan's economic growth. The findings reveal that while inflation negatively impacts growth, GFCF and FDI significantly contribute to economic

expansion. These results underscore the importance of maintaining moderate inflation through sound monetary policies, promoting infrastructure investments, and attracting foreign capital to sustain economic development. By addressing these areas, policymakers can foster a stable and growth-oriented macroeconomic environment, ensuring long-term prosperity and resilience for the Pakistani economy.

### 6.1 Limitations and Future Research Directions

This study is limited by its focus on Pakistan's economy and the reliance on secondary data spanning 2010 to 2023, which may not fully capture the effects of more recent global economic shifts. Additionally, the analysis is constrained to inflation, GFCF, and FDI, omitting other potential factors like trade policies, political stability, and technological innovation that may also influence economic growth. Future research could expand the scope by incorporating these variables, employing more advanced econometric models, and exploring comparative analyses across similar developing economies to provide deeper insights into the dynamics of inflation and growth.

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