# Impact of Consumer Price Index (CPI) and Inflation on GDP: Evidence from Bangladesh

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***Abstract*: The study examines the impact of the Consumer Price Index (CPI) and Inflation on the Gross Domestic Product (GDP) of Bangladesh during 2006-2007 to 2021-2022. The research investigates the connection between GDP and these economic indicators using multiple linear regression analysis. The results reveals that the CPI significantly boosts GDP, suggesting that shifts in consumer prices over time have a big impact on the nation's overall economic development. In contrast, there appears to be a modest negative correlation between the GDP and the inflation rate. The study emphasizes the CPI's crucial influence on Bangladesh's GDP and highlights its significance as a major factor influencing the country's economic growth. These findings have important ramifications for stakeholders and policymakers, emphasizing the necessity of taking calculated risks to control inflation and the CPI in order to promote Bangladesh's sustainable economic progress and enhance excellence of life for its populace.**

***Keywords: Gross Domestic Product (GDP), Consumer Price Index (CPI), Inflation, Multiple Linear Regression.***

## I. INTRODUCTION

Over the past several eras, Bangladesh's GDP has increased significantly, turning the country from an agricultural economy to among those with the quickest global growth. The quantity of products and services generated inside a nation's boundaries in a given year is recognized as its gross domestic product, or GDP (Akber *et al.*, 2023). GDP is one vital measure of a country's pecuniary progress. GDP may be computed using two methods: adding up all of the goods and services that the nation's citizens purchase, or using the method of production ( Hasan *et al.*, 2022). One often used measure of a nation's economic output is its gross domestic product, or GDP (Bwamick *et al.*, 2023). More than any other macroeconomic measure, GDP is the total statistic of every monetary transaction and provides the most comprehensive picture of the economy (Voumik *et al.*, 2019). Over the years, several researches have been conducted on GDP, its measurement, and its impact on different aspects of a country's economy. The GDP growth level and the Consumer Price Index (CPI) are two important economic indicators that impact Bangladesh's economy as a whole.

Most nations use the consumer pricing index (CPI) and the gross domestic product (GDP) to assess inflation because it occurs when the volume of currency and credit in an economy rises relative to the products and services that are available (Salma 2021). In financial research, the Consumer Price Index (CPI) is the supreme commonly used inflation indicator and the typical change in values over period for consumer goods and services that families purchase for daily needs is measured by the consumer price index, or CPI (Mia *et al*,. 2019). The percentage of the middling modification in prices that consumers pay for a variety of marketplace goods and amenities over time is known as the consumer price index, or CPI (Islam *et al.*, 2022). The CPI is primarily used in Bangladesh to determine inflation rates for both food and non-food products. It is easy to keep track of average price indices like the Wholesale Price Index, which monitors the pricing of commodities sold in wholesale marketplaces, because there is a wealth of price information accessible. The prices that the typical consumer pays for different goods and services are tracked by other indexes, such as the Customer Price Index.

Bangladesh is a developing country where inflation has come to be a multifaceted portent caused by cyclical variables such as fluctuations in goods values and fluctuations in element manufacture (Biswas 2023). Inflation is designated as a continued escalation in the general level of prices that lowers consumers' buying power in an economy. It also raises the cost of products and services and has a significant effect on other economic indicators. Typically, a rise in economic growth causes an increase in inflation (Talha *et al.*, 2021). In Bangladesh, inflation has become a well-established phenomenon and it sometimes seems as though the general price level can only increase, suggesting that society as a whole has an inflationary bias (Ferdous *et al.*, 2013).Both a rise in total demand (also referred to as demand-pull inflation) and a decline in total supply (also called as cost push inflation) can lead to inflation. (Bilgrami *et al.*, 2022). Policymakers and economists can't agree on what drives inflation: supply-side factors (a drop in resources available) or demand-side factors (an increase in economic activity). (Das *et al.*, 2007).

Inflation in Bangladesh directly affects export competitiveness, corporate investments, and consumer purchasing power—all of which are essential for GDP development. High inflation may destabilize the economy, lower real incomes, and restrict the efficacy of growth, whereas moderate inflation can promote economic expansion by promoting spending and investment. Policymakers must comprehend the connection between GDP growth, inflation, and CPI in order to guarantee Bangladesh's sustained economic development.

## II. LITERATURE REVIEW

In a research paper titled "Does exchange rate volatility increase the consumer price index? Evidence from Bangladesh." Islam et al. (2022) raised this question. With import and export taken into account, the resolve of this study was to inspect how interchange percentage instability affected the consumer price index (CPI). The main data sources for this study are the International Financial Statistics (IFS) and global development indicators. Exchange rate volatility significantly affects Bangladesh's consumer price index, according to estimate results using quantile and dynamic regression analysis.

A paper titled "Modelling and Forecasting the Consumer Price Index in Bangladesh Through Econometric Models" was published in 2019 by Mia et al. The researcher outlined the main goal of economic theory as being consistent economic expansion accompanied by great Consumer Price Index (CPI) and little inflation. In order to determine the most accurate econometric period sequences model for anticipating the CPI in Bangladesh, this study examines yearly period sequence facts on CPI from the years 1986 to 2018. The study's findings indicate that the CPI in Bangladesh will continue to rise over time.

An article by Ferdous et al. (2013) was titled "Study on nature of inflation and its relationship with GDP growth rate: a Case Study on Bangladesh." Researchers concentrated on how declining buying power and rising production costs signify an elevated rate of inflation. High inflation can occasionally harm growth in a number of different means. It will make investments and withdrawals of savings intended to boost consumption more unpredictable. Due to a shortage of supplies following a natural catastrophe, food prices saw a quick increase, and regression analysis revealed a strong correlation between inflation and GDP. Because of changes in the money supply, inflation is constantly in flux.

In 2007, Hossain et al. carried out studies on the "Impact of inflation on economic growth in Bangladesh." The study's aim is to examine the link between Bangladesh's GDP growth rate and inflation utilizing data from 1984–1985 to 2003–2004. The ADF test statistic was applied by researchers to demonstrate that GDP growth rate and inflation data are stable in first difference forms but non-stationary in level form. To determine the enduring linkage amid inflation and GDP progress rate, the Johansen co-integration test is then utilized. These findings provide a crucial policy lesson that, in the circumstance of Bangladesh, moderate inflation promotes GDP progression.

In 2015, Rahman, M. M., published a paper titled "Food Price Hike in Bangladesh: A Supply Side Approach to its Determinants and Solutions." He added that Bangladesh is one of the countries in Asia that is being impacted by the current inflation wave the worst. In this piece of writing, an effort has been made to evaluate the crucial supply-side market variables that, throughout time, have contributed significantly to food inflation in Bangladesh. Additionally, this research looks into how the use of superfluous intermediaries and brokers undermines proficiency and equality in the food industry's supply line, which eventually puts more pressure on price increases for retail consumers. The research is ended by suggesting some strategic choices for adaptation at the conclusion.

In a paper titled "Consequences and Causes of Inflation: A Study in the Context of Bangladesh" published by Abdullah et al. in 2012, it was discovered that Bangladesh has one of the highest correlations between per capita income and food weight in the overall Consumer Price Index (CPI), and that this makes the country's economy particularly susceptible to sharp increases in the price of commodities, both fuel and non-fuel. The paper looks at the causes of inflation and how it affects Bangladesh's economy. According to researchers, the recent rise in food prices worldwide, the rise in oil prices as a result of upheaval in the Middle East, as well as the strong negotiating position of political middlemen in Bangladesh, are mostly to blame. The researchers present various potential strategies for lowering inflation at the conclusion of their article, including strengthening trade corporations, stringent regulation of imports by Bangladesh banks, dismantling syndicates, and others.

In 2015, Mahmoud, L. O. M., published a research paper titled "Consumer price index and economic growth: a case study of Mauritania 1990-2013." In his research, he looks into the affiliation amongst Mauritania's GDP and Consumer Price Index (CPI). According to the researcher, the Consumer Price Index (CPI) was utilized as an autonomous variable whereas the Gross Domestic Product (GDP) was employed as a reliant variable. The outcomes of the investigation indicate a one-way causal liaison among inflation and economic evolution. The most important recommendation for policy arising from this finding is that the Mauritanian government must exert significant effort to address the problems that contribute to the rise in price levels (inflation), including the food and fuel crises, altercation percentage fluctuations, an expansion of the cash supply, the faintness of the agricultural sector, and others.

In a work titled "Determinants of inflation in Bangladesh: An econometric investigation" by Uddin et al. (2014), it is said that in an economy identical Bangladesh, the escalation and descent of the increase proportion (common amount level) are both like two sides of a sharpened razor. Additionally, in this regard, the Autoregressive Distributed Lagged (ARDL) Model, a well-known econometric method, has been used. According to the researchers, Bangladesh's existing time's gross domestic product (GDP), currency resource and interest rate (IR), as fine as the actual interchange rate and interest frequency from the preceding year, everything helped to drive up inflation in Bangladesh.

Gimenez et al. (2014) published a study titled "Inflation for the Poor in Bangladesh: A Comparison of CPI and Household Survey Data." According to him, there is now a significant gap between inflation in Bangladesh as dignified by the CPI and the rising charge of basic necessities as determined by variations in countrywide deficiency levels as period goes by. This study applied the nationally representative Household Income and Expenditure Survey (HIES) to determine which of the two metrics is more informative in the instance of Bangladesh.

A piece of writing titled "Determinants of inflation in Bangladesh: An empirical investigation" was published by Arif et al. in 2012. The authors state that utilizing data spanning the years 1978 to 2010, the investigation examined the fundamental issues inducing inflation in Bangladesh. The Johansen-Juselius cointegration approach was used in the investigation to govern if the variables had an enduring connection. The research's authors came to the conclusion that longstanding inflation is confidently affected by the GDP, expansive currency, government expenditure, and imports. The country's short-term inflation has been proven to be significantly influenced by the money supply.

## III. CONCEPTUAL FRAMEWORK:

The Consumer Price Index (CPI) tracks the typical variation in values paid by consumers for a marketplace basket of things and facilities across time. On the other hand, inflation describes the overall escalation in the overall trajectory of values of items and offerings in a nation's economy over time. This conceptual framework looks at the intricate link that exists in Bangladesh between GDP, inflation, and the Consumer Price Index (CPI).

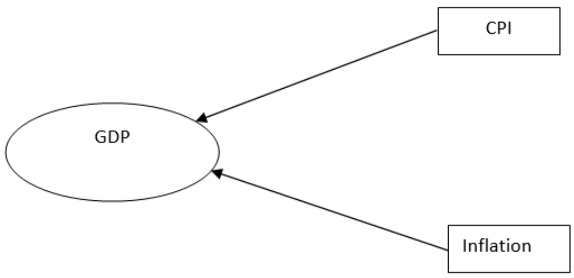


Fig. 1. Relationship among CPI, Inflation and GDP

Figure1 highlights the direct influence of inflation and CPI on GDP, which is explained below:

- **CPI → Inflation**: A rise in the CPI is indicative of increasing prices, contributing to inflation.
- **Inflation → GDP**: GDP is influenced by inflation in a number of ways, including via expenditures associated with investment, consumption, and production.

## IV. OBJECTIVES OF THE STUDY

The following are the study's objectives:

1. To examine the influence of consumer price index on GDP of Bangladesh.

2. To assess the impression of inflation on GDP of Bangladesh.

## V. METHODOLOGY OF THE STUDY

The research study is empirical in nature. Secondary data have been used to attain the objectives of the study. Different published materials have been used to gather secondary data. The Bangladesh Bureau of Statistics (BBS), Monthly Economic Trends, World Development Indicators, publications, books, newspapers, magazines, and websites are the major sources of data. The data on the GDP has been obtained from the World Bank and the Bangladesh Economic Review. Multiple regression model has been used to test the hypotheses.

The Multiple Regression model is specified as following:

$$Y\ (GDP) = \alpha + \beta 1\ (CPI) + \beta 2\ (Inflation) + e$$

## VI. HYPOTHESES DEVELOPMENT:

### A. *Impact of Consumer Price index on GDP of Bangladesh*

Bangladesh's GDP growth rate is significantly impacted by the Consumer Price Index (CPI).

According to this, the economy's ultimatum for goods and services is rising, which is reflected in the rising consumer price index. This eventually results in increased supply and production of goods and a service, which raises the GDP growth rate (Akber et al., 2023). The Consumer Price Index has the potential to affect Bangladesh's GDP growth rate via influencing trade balance, interest rates, investment choices, and consumer expenditure. In order to comprehend its possible influence on the economy as a whole, experts and policymakers regularly watch this crucial economic indicator (Mia et al., 2019). The CPI can affect investment choices, consumer behavior, and overall economic performance, all of which can have a direct bearing on Bangladesh's GDP growth rate. The CPI developments and their possible impact on GDP growth should be actively observed by analysts and policymakers (Rigas et al., 2017). The CPI has a major effect on Bangladesh's GDP growth rate. Consumers may have less purchasing power as a result of growing living expenses, which is indicated by rising CPI values. Consequently, consumers may have a smaller amount of currency available to them to spend on products and amenities, which might have an impact on consumer expenditure (Abdullah et al., 2012). Bangladesh's GDP growth rate may be significantly impacted by the Consumer Price Index. Consumers may have less purchasing power if the CPI is high, as this suggests that living expenses are rising. This can therefore result in lower consumer expenditure, which accounts for a significant portion of GDP (Rahman 2015). Based on the above literature the following hypothesis has been developed for the study:

Null Hypothesis:

H0: Consumer Price Index has no significant impact on GDP growth in Bangladesh

Alternative Hypothesis:

H1: Consumer Price Index has significant impact on GDP growth in Bangladesh

### B. *Impact of inflation on GDP of Bangladesh*

A crucial factor of Bangladesh's economic diminuendos is how inflation touches GDP. The presented material states that there is an adverse link amid GDP and inflation. This suggests that the GDP growth rate tends to decline as inflation rises. Numerous economies have seen this unfavorable association on a regular basis (Biswas, 2023). The GDP and inflation rate are inversely correlated. Accordingly, the GDP growth rate tends to decline as the rate of inflation rises. The paper also indicates the severity of the damage by stating that a particular number of units can be lost in GDP for every unit rise in the inflation rate (Hasan et al., 2022). In Bangladesh, inflation has a detrimental effect on GDP growth. Stated differently, a decrease in the GDP growth rate is linked to elevated levels of inflation. In evaluating Bangladesh's overall economic success and stability, policymakers and economists should take this link into account (Mia et al., 2019). Both favorable and unfavorable impacts of inflation on GDP are possible. Inflation is often the result of rising prices in an expanding economy. Increased economic activity and consumer demand may be the cause of this, which might lead to GDP growth. Conversely, a high or excessive rate of inflation might impair customers' buying capacity and ability to spend. This may result in lower consumer expenditure, which accounts for a sizeable portion of GDP (Bwamick et al., 2023). High or unexpected inflation can have a detrimental impact on

Bangladesh's GDP growth rate, but moderate inflation can boost economic activity and contribute to GDP growth (Voumik et al., 2019). Increased consumer spending power, corporate uncertainty, interest rate fluctuations, and a decline in export competitiveness is all ways that high inflation may impede GDP development. Consequently, maintaining a healthy GDP growth rate in Bangladesh depends on controlling inflation (Shaha 2013). From the above literature the following hypothesis has been formulated to attain the objective of the study:

Null Hypothesis:

H0: Inflation rate has no significant impact on GDP growth in Bangladesh

Alternative Hypothesis:

H2: Inflation has significant impact on GDP growth in Bangladesh

## VII. DATA ANALYSIS AND INTERPRETATION:

TABLE I. YEAR-WISE CPI, INFLATION RATE, AND GDP

| Year | CPI | Inflation Rate | GDP (Tk Million) |
|---|---|---|---|
| 2006-2007 | 109.39 | 9.39 | 79.61188821 |
| 2007-2008 | 122.84 | 12.3 | 91.63127824 |
| 2008-2009 | 132.17 | 7.6 | 102.4777796 |
| 2009-2010 | 141.18 | 6.82 | 115.2790775 |
| 2010-2011 | 156.59 | 10.92 | 128.6379839 |
| 2011-2012 | 170.19 | 8.69 | 133.3558203 |
| 2012-2013 | 181.73 | 6.78 | 149.9905298 |
| 2013-2014 | 195.08 | 7.35 | 172.8854327 |
| 2014-2015 | 207.58 | 6.41 | 195.0785733 |
| 2015-2016 | 219.86 | 5.92 | 265.2363903 |
| 2016-2017 | 231.82 | 5.44 | 293.7547813 |
| 2017-2018 | 245.22 | 5.78 | 321.3791279 |
| 2018-2019 | 258.65 | 5.48 | 351.238399 |
| 2019-2020 | 273.26 | 5.65 | 373.9021979 |
| 2020-2021 | 288.44 | 5.56 | 416.2648005 |
| 2021-2022 | 306.18 | 6.15 | 460.2012655 |

*Source: BBS (2023) & https://www.macrotrends.net/globalmetrics/countries/BGD/bangladesh/gdp-gross-domestic-product.*

### A. Model validity:

TABLE II. ANOVA[A]

| Model | | Sum of Squares | Df | Mean Square | F | Sig. |
|---|---|---|---|---|---|---|
| 1 | Regression | 229433.968 | 2 | 114716.984 | 166.700 | .000[b] |
| | Residual | 8946.154 | 13 | 688.166 | | |
| | Total | 238380.122 | 15 | | | |

a. Dependent Variable: GDP
b. Predictors: (Constant), Inflation, CPI

**Source:** *Authors' calculation*

This p-value represents the probability that the F-statistic is the result of coincidence. In this instance, the p-value is exceedingly low (0.000), indicating that the regression model is statistically significant. This suggests a substantial correlation between at least one of the predictors (CPI or inflation) and GDP. The predictors (CPI and inflation) account for a substantial portion of the variation in GDP. The high F-statistic further supports the model's significance.

TABLE III. MODEL SUMMARY[B]

| Model | R | R Square | Adjusted R Square | Std. Error of the Estimate | Change Statistics | | | | |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | R Square Change | F Change | df1 | df2 | Sig. F Change |
| 1 | .981[a] | .962 | .957 | 26.23291 | .962 | 166.700 | 2 | 13 | .000 |

a. Predictors: (Constant), Inflation, CPI

b. Dependent Variable: GDP

**Source:** *Authors' calculation*

The high F change and extremely low p-value (.00) suggest that the predictors (CPI and inflation) make a substantial contribution to the explanation of GDP. Adjusted R Square (.957): This value revises the R square value to justification for the quantity of forecasters in the model. It is slightly lower than R Square to account for the possibility that adding additional predictors could artificially inflate it. The adjusted R square is beneficial for comparing models with varying numbers of predictors. When we adjust the number of predictors, the model explains 95.7% of the variance in GDP.

TABLE IV. CORRELATIONS RESULT

| | | GDP | CPI | Inflation |
|---|---|---|---|---|
| Pearson Correlation | GDP | 1.000 | .981 | -.711 |
| | CPI | .981 | 1.000 | -.747 |
| | Inflation | -.711 | -.747 | 1.000 |
| Sig. (1-tailed) | GDP | . | .000 | .001 |
| | CPI | .000 | . | .000 |
| | Inflation | .001 | .000 | . |
| N | GDP | 16 | 16 | 16 |
| | CPI | 16 | 16 | 16 |
| | Inflation | 16 | 16 | 16 |

**Source:** *Authors' calculation*

Interpretation of the Correlation Coefficients: Pearson correlation Coefficients quantify the magnitude and orientation of the linear correlation among two variables. The values span from -1 to 1. The Pearson correlation coefficient amongst GDP and CPI is 0.981 (Table 4), indicating a highly significant positive association between the dual variables. As the Consumer Price Index (CPI) rises, there is a corresponding tendency for the Gross Domestic Product (GDP) to also increase. Conversely, the Pearson correlation coefficient between GDP and inflation is -.711, indicating a significant negative association between the two variables.

As the rate of inflation rises, there is typically a corresponding fall in the Gross Domestic Product (GDP).

### *B. Hypotheses testing:*

**Sig. (1-tailed)**: The p-value shows the statistical implication of the observed correlation. A p-value below the threshold of 0.05 shows a statistically significant correlation. According to the data in Table 4, the P-value for the connection amid GDP and CPI is.000, this is lesser than the consequence level of 0.05. This shows that there is a statistically substantial relationship amongst GDP and CPI. Therefore, we discard the worthless hypothesis and receive the substitute hypothesis. Furthermore, the P-value for the correlation between GDP and inflation rate is fewer than 0.05, representing that the connection is statistically significant. This implies the rejection of the null hypothesis and acceptance of the alternative hypothesis.

## VIII. CONCLUSION AND RECOMMENDATION

Bangladesh's economic development and stability depend heavily on managing inflation and the CPI. The implementation of proactive policies by the government and central bank, such as inflation targeting, social protection, and balanced fiscal policies, can effectively alleviate the adverse effects of inflation on GDP and promote sustainable economic growth. Bangladesh may enhance its ability to control the effects of inflation and CPI on GDP and stimulate sustainable expansion of the economy by implementing the following suggestions:

The government should continue to pursue a balanced monetary policy in order to control inflation. This can entail raising interest rates to rein in uncontrollably high inflation while maintaining enough market liquidity to support the expansion of businesses. Maintain stable inflation expectations by means of open government policy. Clear guidance on monetary policy or targeted fiscal expenditure, for example, might improve corporate planning and promote investment. Expanding social safety nets or implementing targeted subsidies for necessities are two ways the government might shield vulnerable groups from excessive inflation. By sustaining consumer demand, this will boost GDP. It is advisable for the Bangladesh Bank to keep improving its inflation-targeting strategies. It should maintain consistent economic development by routinely observing changes in the CPI and modifying reserve requirements and interest rates to keep inflation within the desired range. Policymakers may get important insights for making well-informed choices by improving data openness and analysis pertaining to inflation and the CPI. To effectively manage inflation and its influence on GDP, strategies may be formulated with the use of timely and accurate data. Encouraging a healthy level of competition in the market can aid in price management and deter monopolistic activities that could result in inflation. This can assist GDP growth and maintain a steady CPI.

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