Drivers of Inflation in Bangladesh: Demand-Pull and Cost-Push Perspectives

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Abstract

This paper investigates the short-run and long-run drivers of inflation in Bangladesh using an ARDL framework. Anchored in both New Keynesian and Fiscal Theory of the Price Level perspectives, the analysis incorporates demand-pull and cost-push variables: aggregate private consumption gap, government consumption expenditure, exchange rate, wage, and real interest rates. Our study finds that the inflation in Bangladesh is highly persistent, and the cost-push factors, particularly captured by exchange rates and wage-sensitive cost index, dominate both short-run and long-run inflation dynamics. Government expenditure also exerts immediate marginal inflationary effects, while the long run effects are significant. The aggregate private consumption gap is somewhat influential, conditional on supply-side disruptions. However, the real interest rate is effective in dampening inflation in the short run, while it may not consistently serve as reliable inflation control mechanism in the long run. Additionally, the inclusion of episodic shock indicators such as flood years and global shock years improves the model fit and highlights the importance of transitory shocks in inflation transmission. Most importantly, the study finds that the cost push factors play a major role in exacerbating the inflationary impacts in Bangladesh. The paper concludes with policy implications aimed at improving macroeconomic stability and inflation control.

Keywords: ARDL Model, Cost push, Demand Pull, Inflation, ECM

JEL Classification Code: C32, E31, E32, O53

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1. Introduction

Inflation dynamics in Bangladesh have long been a subject of macroeconomic inquiry due to its' profound implications for macroeconomic stability, monetary policy, and household welfare in the country. Recent year's data[1] shows that while many countries around the world have been able to reduce the inflationary pressure, Bangladesh is one of the countries which is still fighting with this particular issue. The price pressures in Bangladesh are historically high, and the rising prices have coincided with multiple macroeconomic developments, including global supply chain disruptions, exchange rate depreciation, and rising wage and energy costs. These factors have amplified both demand-pull and cost-push pressures. In these circumstances, govuuernment has adopted stricter monetary and fiscal measures, though inflation shows little sign of expected subsiding with those measures. Recent policy statements of Bangladesh government, including the *National Budget Speech*[2] and *Medium-Term Macroeconomic Policy Statement (MTMPS)*[3] have also highlighted rising inflation as a major concern for the economy.

In the given context, policymakers in Bangladesh have increasingly sought to determine whether inflation is primarily demand-driven, caused by supply-side constraints, or influenced by other structural and macroeconomic factors. Many studies have explained the inflation dynamics of Bangladesh in different aspects and explored the impact of many macroeconomic variables. Along with many other macroeconomic variables, the output gaps, evolving fiscal stances, depreciation of currency, wage pressure, money supply and policy rates play major roles in the development of inflation dynamics. Despite its policy relevance, inflation in Bangladesh remains underexplored in terms of distinguishing the effect of demand-pull and cost-push determinants. Thus, this study

[1] Based on IMF data, while global and regional inflation rates decline- World: 8.6% (2022) to 5.7% (2024), and Emerging and Developing Asia: 3.9% (2022) to 1.96% (2024), Bangladesh's inflation rose from 6.15% to 9.73% in the respective same period.

[2] *National Budget Speech 2025–26*. Government of Bangladesh. Retrieved from https://mof.portal.gov.bd/site/page/d1ca893d-7ab0-4b43-a506-a868545de55e

[3] *Medium-Term Macroeconomic Policy Statement (MTMPS) 2025–26 to 2027-28*. Government of Bangladesh. Retrieved from https://mof.portal.gov.bd/site/page/4bf09755-4723-423f-bcb7-9ddcc631f25d

aims to investigate the relative importance of demand-pull and cost-push factors or any other factors in explaining inflation in Bangladesh, employing an Autoregressive Distributed Lag (ARDL) framework. In particular, it emphasizes the role of the output gap and assesses the contribution of selected macroeconomic variables representing both demand-side and supply-side forces. The analysis covers a sample of 48 annual observations, utilizing key variables such as the real private consumption gap as a proxy of output gap, government expenditure, exchange rate, real interest rate, and wages.

Preliminary estimation using an ARDL framework reveals that inflation in Bangladesh exhibits a robust long-run association with exchange rate- and wage-sensitive cost factors and government expenditure, while demand-side indicators such as the aggregate private consumption gap (from now on- consumption gap) display episodic influence. The cost index, composed of exchange rate and wage, maintains strong and statistically significant coefficients in both short- and long-run specifications, which finds its structural relevance in inflation persistence. The real interest rate is effective in dampening inflation in the short run, while it may not consistently serve as reliable inflation control mechanism in the long run. However, the adjustment term is negative and significant, that confirms convergence toward long-run equilibrium.

The rest of the paper is organized as follows. Section 2 introduces literature review. Section 3 presents our data and preliminary analysis. Section 4 presents the methodology used in the study. Section 5 presents empirical results. Section 6 presents overall discussion of the results and limitations of the study, and Section 7 discusses policy implications and concludes.

2. Literature Review

Inflation theory spans several paradigms, and each offers distinct mechanisms to explain price level behavior. The Quantity Theory of Money (QTM), rooted in classical monetarism, postulates that inflation results from excessive money supply growth relative to output. This phenomenon was famously summarized by Friedman (1968) as "*always*

and everywhere a monetary phenomenon." In contrast, the Fiscal Theory of the Price Level (FTPL) shifts focus from monetary aggregates to fiscal sustainability and argues that prices adjust to equate the real value of government debt with expected future fiscal surpluses (Cochrane, 2023). A third strand, the New Keynesian framework, integrates nominal rigidities and forward-looking expectations, and emphasizes the roles of interest rates, inflation targeting, and output gaps in shaping inflation dynamics (Woodford, 2003). Collectively, these perspectives illuminate both demand-driven and cost-induced inflationary pressures, and inform empirical strategies that account for monetary, fiscal, and structural influences.

A growing body of recent international literature has explored the underlying forces of inflation and often framed the analysis within the demand-supply dichotomy. Lansing (2025) examined U.S. inflation dynamics during the pandemic era and found that demand-side forces became more dominant, and that overshadows supply-side effects. Shapiro (2024) decomposes U.S. Personal Consumption Expenditures (PCE) inflation into supply-driven and demand-driven components, which is intended to help policymakers and researchers understand the relative contributions of supply and demand shocks to inflation in the U.S. economy. It found that monetary tightening significantly reduced demand-driven inflation, while food and energy shocks played a central role on the supply side. Firat and Hao (2023) emphasized that supply-driven inflation is more reactive to oil shocks, while demand-driven inflation responds more to monetary policy changes, implying varying policy effectiveness depending on the dominant inflation source.

A substantial body of empirical literature has also examined the determinants of inflation in Asian economies. These studies have also highlighted the complex interplay between demand-pull and cost-push factors. Salim et al. (2021) used panel data from ten Asian countries and emphasized the significance of money supply and interest rates in shaping inflationary trends, while money supply has emerged as the most influential variable. However, more recent findings by Wulandari and Fuddin (2024) suggest that GDP and loan interest rates play a more prominent role, while the influence of money supply appears limited and unemployment shows no significant impact. Thus, it questions the

traditional Phillips Curve framework in the Asian context. Complementing this, Sajid et al. (2024) documented that both domestic variables (such as money supply and exchange rates) and global shocks (such as oil prices) contribute to inflation in South Asian countries, while interest rates and structural adjustment programs by international financial institutions exert disinflationary effects. Duan et al. (2025) added further explanation by showing that monetary financing through expanded private credit and money supply significantly elevates inflation.

In addition to monetary and structural determinants, several studies have underscored the importance of supply-side and sector-specific factors. Jongwanich et al. (2019) distinguished between the determinants of producer and consumer price inflation, and it noted that external cost-push shocks such as oil and food prices are more relevant for producer prices, while consumer inflation remains largely influenced by domestic demand factors. By applying an open-economy Phillips Curve framework, Dua and Gaur (2010) confirmed the significance of the output gap and international competitiveness in determining inflation across both developed and developing Asian countries, though agriculture-related supply shocks were found much pertinent for the latter. Mishra (2020) contributed to a broader development perspective and showed infrastructure development and financial sector improvements tend to reduce inflation, whereas rising per capita income exerts upward pressure on the general price level. Collectively, these studies underscore that inflation in Asia is shaped by a combination of domestic, external, monetary, and structural variables, while each variable exerts varying degrees of influence across countries and time periods.

Duan et al. (2025) demonstrate that monetary financing is a key driver of inflation across the region, while increased private credit and broad money supply are the major monetary financing tools. Obaid et al. (2020) also confirm that inflation in Bangladesh and its neighbors is predominantly influenced by monetary factors such as money supply, interest rates, and exchange rates, while fiscal indicators like government expenditure and budget deficits show limited explanatory power. Islam (2021) adds that although GDP growth contributes to inflation, broader

measures of socioeconomic development, such as the Human Development Index, have no significant effect. This is important in the context of Bangladesh, where structural development is ongoing, but price-level dynamics may remain more responsive to monetary variables. Moreover, Rizvi and Pathirage (2023) highlight that Bangladesh's monetary and financial interventions during the COVID-19 pandemic were more effective in reducing inflation than fiscal transfers, which reinforces the critical role of central bank policies.

Recent empirical studies have explored the complex interplay of domestic and external factors that shape inflation in Bangladesh. Salma et al. (2025) points to the importance of political stability in lowering inflation. Meanwhile, Basnet et al. (2022) find that remittances, an important income source for Bangladesh, suppress inflation in the short run but contribute to it in the long run. Ahmed (2023) highlights the government's expansionary fiscal stance such as low interest rates, rising fiscal deficits, and increased borrowing from the Bangladesh Bank are critical contributors to prolonged inflation, even after global commodity prices declined. Furthermore, Begum (1991) identified agricultural bottlenecks, wage growth, credit expansion, and import rigidities as key inflation drivers. Similarly, Kreiter and Paul (2010), using a vector autoregression approach, found that prior inflation values and domestic borrowing by the government were key short-term inflation predictors. Collectively, these findings underscore that inflation in Bangladesh is a multifaceted phenomenon, influenced by both demand-pull and cost-push factors, and structural constraints, and these necessitate coordinated approach that spans fiscal discipline, external sector management, monetary regulation, and reforms addressing domestic supply-side inefficiencies.

3. Data and Preliminary Analysis

The analysis employs annual macroeconomic data of Bangladesh spanning from 1976 to 2024, while this data sourced primarily from BBS and Bangladesh Bank. Variables such as the consumption gap, government expenditure, exchange rate, wage rate index, and real interest rates are selected to reflect key demand-pull and cost-push channels, which are consistent with the New Keynesian emphasis on

nominal rigidity and forward-looking expectations and the Fiscal Theory of the Price Level.

Consumer Price Index:

As this study examines the influence of demand-pull and cost-push factors on inflation in Bangladesh, the dependent variable of this study is the Consumer Price Index (CPI). The CPI captures changes in the general price level of a representative basket of goods and services consumed by households, including food, housing, transportation, and utilities. In empirical modeling, the log transformation of CPI helps stabilize variance and facilitates interpretation of percentage changes. Therefore, this study has attempted to model *lcpi* to examine the determinants and propagation mechanisms of inflation in Bangladesh's economy.

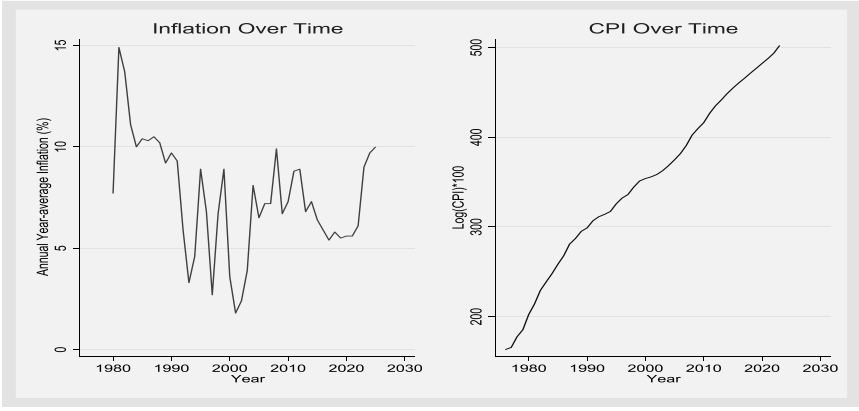

Figure 1: *Inflation and Consumer Price Index (CPI) over the years*

Consumption Gap:

One of the key objectives of this study is to assess the role of demand-pull factors in driving inflation of Bangladesh. Many studies have used the output gap as a demand-pull factor; however, estimating it remains a central challenge in macroeconomic analysis due to its unobservable nature and sensitivity to model assumptions (Orphanides and Norden, 2002; OECD, 2021). Traditional methods of measuring output gap through production function approaches are often subject to end-point bias and frequent revisions, particularly in developing economies with volatile data (Castle, 2003). In light of these limitations, several studies

have explored alternative proxies. For example, Kojima et al. 2005 found the consumption gap peroxide by electricity consumption per unit of capital is a better measure of inflation pressure than the output gap in China. Neiss and Nelson (2001) and Galí and Gertler (1999) suggest that consumption-based indicators, grounded in intertemporal optimization behavior, may better capture cyclical fluctuations than detrended output. Moreover, in consumption-driven economies, deviations in private consumption from its potential path can reflect broader macroeconomic slack.

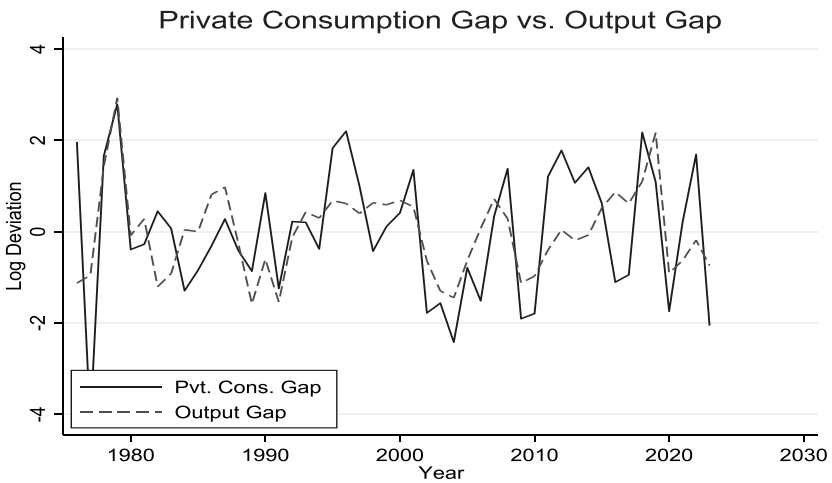

Figure 2: *Aggregate Private Consumption Gap and Output Gap over the Years*

As shown in Figure 2, the consumption gap (solid line) and the output gap (dashed line) are measured by following Hodrick–Prescott (HP) filter method. Though many studies have pointed out different shortcomings and drawbacks of the Hodrick- Prescott filter, the criticisms have not had great effects on its wide use in empirical research (Ahumada and Garegnani, 1999). However, this method is consistent with standard practice in empirical macroeconomics, especially when structural data (like capital stock or labor input) is limited.

The consumption gap shows greater volatility and sharper responsiveness than the output gap, particularly during key macroeconomic episodes such as the early 1980s shocks, the 2008-09 global financial crisis, and the COVID-19 pandemic. This heightened sensitivity suggests that the consumption gap better captures real-time changes in household behavior

and purchasing power which are key drivers of demand-pull inflation. While both gaps exhibit broadly similar cyclical patterns over the sample period, the consumption gap occasionally leads to the output gap. This indicates that changes in consumption behavior show up earlier than the broader shifts in economic activity. This supports the idea that the consumption gap not only reflects current demand conditions but also has predictive power for inflation and output dynamics.

To the best of our knowledge, this study is among the first to empirically examine the impact of the consumption gap on inflation in Bangladesh using an ARDL framework. By doing so, it provides an alternative lens for evaluating inflationary dynamics and contributes to the ongoing debate about appropriate demand-side indicators. Thus, it offers a practical tool for policy analysis in data-constrained settings. The use of the consumption gap in this study is not merely a data workaround, but a theoretically justified and empirically supported innovation. At the same time, consumption gap better aligns with the structural features and measurement challenges of the Bangladeshi economy.

Government Expenditure:

Government expenditure plays a pivotal role in shaping macroeconomic dynamics, particularly in developing economies where fiscal policy often serves as a primary tool for stabilization. In this study, government expenditure, basically the consumption expenditure, is included as an independent variable to capture its potential influence on inflationary pressures and cyclical fluctuations. Though we collected data on public investment, its inclusion was ultimately dropped from the final specification due to weak and counterintuitive empirical relationships. This has been discussed in the Limitations section. This study incorporates both the consumption gap and government expenditure as independent variables to capture the dual channels of aggregate demand that influence inflationary dynamics in Bangladesh. While the consumption gap reflects deviations in private sector demand from its potential path, government's consumption expenditure represents the public sector's contribution to overall demand pressure. Together, they provide a more comprehensive view of the demand-side inflationary forces.

This demand-pull effect is well-documented in both theoretical literature and empirical studies. For instance, Kazi Arif (2012) finds a statistically significant long-run relationship between government expenditure and inflation in Bangladesh, while recent international analyses (MIT Sloan, 2022; Bank of Canada, 2023) also identify fiscal expansion as a key driver of inflationary episodes.

Exchange Rate

The inflationary impact of exchange rate movements depends on the nature of the shock and the structure of the economy. In economies heavily reliant on imports, even modest currency depreciation can significantly raise domestic prices (Stocker and Yilmazkuday, 2020). As a trade deficit country, the exchange rate plays a critical role in shaping domestic inflation in Bangladesh through the mechanism of imported inflation. Aziz (2010) finds that in Bangladesh, exchange rate depreciation has a statistically significant effect on both import prices and consumer price inflation. Additionally, the exchange rate pass-through (ERPT) effect is well-documented in the literature. Ha, Stocker, and Yilmazkuday (2019) show that the ERPT is significantly higher in emerging markets, where monetary policy credibility and inflation expectations are less anchored. Given the openness of Bangladesh's economy and its dependence on imported essentials, incorporating the exchange rate as an independent variable allows the model to capture external cost shocks that directly influence inflation.

Wage Index

Wage dynamics are a fundamental cost-push factor in inflation modeling. Rising wages, particularly when not matched by productivity gains, increase unit labor costs, which firms often pass on to consumers in the form of higher prices. This phenomenon is especially relevant in labor-intensive economies (Suthaharan and Bleakley, 2022). In the context of Bangladesh, where the informal labor market is large and wage adjustments are often politically sensitive, wage increases in key sectors (e.g., garments, construction, agriculture) can have a disproportionate effect on inflation. This study includes the wage index as an independent variable to capture cost-push inflationary pressures arising from labor market dynamics.

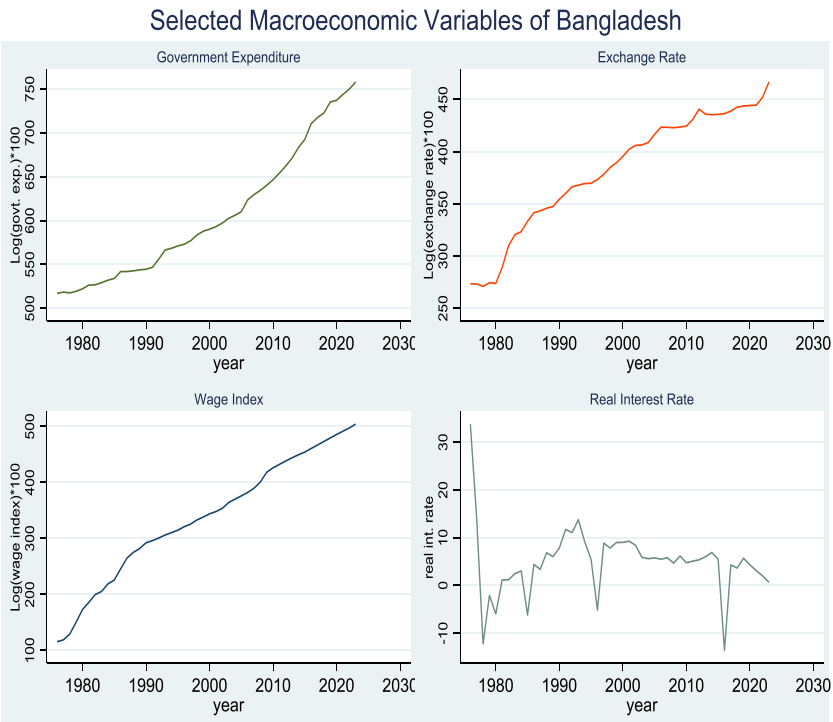

Figure 3: *Selected Macroeconomic Variables of Bangladesh over the Years*

Real Interest Rate

This study includes the real interest rate as an explanatory variable to capture both cost-side and demand-side influences on inflation. The real interest rate is defined as the nominal interest rate adjusted for inflation, and it reflects the true cost of borrowing in the economy. On the cost side, higher real rates raise the cost of capital for firms, which can be passed on to consumers in the form of higher prices. On the demand side, elevated real rates suppress borrowing and consumption, which exerts downward pressure on inflation. This dual-channel transmission mechanism aligns with the framework described by Matheson (2019), which highlights the role of real interest rates in monetary policy and inflation control strategies within both advanced and developing economies. Moreover, Hoffman and Schlagenhauf (1985) find that real interest rates are inversely related to inflation in both developed and developing countries, though the strength of the relationship varies by monetary regime.

Table 1: Definitions of the Variables

Variable	Description	Transformation	Source
cpi	Consumer Price Index with a base year of 2015-16	Converted to log value	Bangladesh Bureau of Statistics (BBS)
routput_gap	Real output gap is measured by HP filter, and that comes from the difference between real output and the potential output with a base year of 2015-16	Converted to log value	
cons_gap	Real consumption gap is also measured by HP filter, and that comes from the difference between real aggregate private consumption and potential aggregate private consumption with a base year of 2015-16	Converted to log value	
govtexp	Central government expenditure which includes the government's consumption expenditure with a base year of 2015-16	Converted to log value	
exrate	Year-average official exchange rate between Bangladeshi currency and US Dollar	Converted to log value	World Development Indicator: https://data.worldbank.org/indicator/PA.NUS.FCRF?locations=BD
wage	Wage Rate Index with the base year of 2015-16	Converted to log value	Bangladesh Bureau of Statistics (BBS)
real_int	Real Interest Rate	Original scale	World Development Indicator: https://data.worldbank.org/indicator/FR.INR.RINR?locations=BD

Summary Statistics:

Table 2 presents the summary statistics for the variables used in the analysis, based on 48 annual observations. The dependent variable, the log-transformed Consumer Price Index (*lcpi*), has a mean value of 347.34 with a standard deviation of 95.97. It ranges from 163.21 to 502.27, which gives an impression of higher variation over the sample period. The log-transformed real output gap (*lroutput_gap*) and the log-transformed consumption gap (*lcons_gap*) are both centered around zero, as expected from HP-filtered cyclical components. However, the consumption gap exhibits greater volatility (standard deviation = 1.86) compared to the output gap (standard deviation = 0.94) which suggests more pronounced fluctuations in aggregate private consumption relative to aggregate output.

Government expenditure (*lgovtexp*), expressed in logarithmic form, has a mean of 606.17 and ranges from 516.93 to 757.96. This range indicates a steady upward trend in public spending over the sample period. The exchange rate (*lexrate*) shows moderate variation with a mean of 381.87 and a standard deviation of 56.61. The lower range of deviation in exchange rates reflects administered currency management system in Bangladesh and gradual depreciation of the domestic currency. The wage index (*lwage*) has a mean of 336.97 and a relatively wide dispersion (standard deviation = 110.08). This wide dispersion is consistent with structural shifts in the labor market. The real interest rate (*real_int*) averages 4.96 percent but exhibits considerable variability (standard deviation = 7.02). It ranges from -13.64 to 33.80 percent, and the higher variability is also visible in Graph 3, which captures both accommodative and contractionary monetary policy episodes.

These statistics highlight the diversity and dynamic behavior of the macroeconomic variables included in the model, providing a robust foundation for analyzing the determinants of inflation in Bangladesh.

Table 2: Descriptive Statistics

Variable	Obs	Mean	Std. Dev.	Min	Max
Lcpi	48	347.337	95.974	163.207	502.271
lroutput gap	48	0	.941	-1.582	2.928
lcons gap	48	0	1.859	-4.058	3.521
Lgovtexp	48	606.169	74.634	516.931	757.959
Lexrate	48	381.871	56.606	270.912	466.635
Lwage	48	336.973	110.078	115.608	504.072
real int	48	4.963	7.015	-13.642	33.795

To support the selection of explanatory variables in the inflation model, a pairwise correlation analysis was conducted. The results in Table 3 reveal that among the macroeconomic indicators chosen in this study *lgovtexp* ($r = 0.9533$, $p < 0.01$), *lexrate* ($r = 0.9824$, $p < 0.01$), and *lwage* ($r = 0.9984$, $p < 0.01$) are highly and significantly correlated with the consumer price index (*lcpi*), which suggest strong empirical associations with the outcome variable. These findings align with theoretical expectations, where fiscal expansion, currency depreciation, and wage growth are known to exert upward pressure on prices. Although the consumption gap and real interest rate exhibit weak and statistically insignificant correlations with inflation, their inclusion is retained based on theoretical relevance and their potential role in capturing demand-side and monetary policy effects, respectively. Thus, the correlation matrix provides empirical support for the inclusion of both cost-push and demand-side variables in the model.

Table 3: Pairwise Correlations

Variables	(1)	(2)	(3)	(4)	(5)	(6)
(1) lcpi	1.000					
(2) lcons_gap	0.008	1.000				
	(0.956)					
(3) lgovtexp	0.953	0.017	1.000			
	(0.000)	(0.910)				
(4) lexrate	0.982	-0.030	0.897	1.000		
	(0.000)	(0.842)	(0.000)			
(5) lwage	0.998	-0.001	0.939	0.987	1.000	
	(0.000)	(0.995)	(0.000)	(0.000)		
(6) real_int	-0.091	-0.030	-0.131	-0.024	-0.081	1.000
	(0.537)	(0.839)	(0.374)	(0.874)	(0.585)	

P-values are in parentheses

However, a particular concern is the near-perfect linear association between two cost push factor variables. *lexrate* and *lwage* exhibit a correlation of 0.987 ($p < .01$). Such extreme multicollinearity can inflate standard errors, undermine the precision of coefficient estimates, and obscure the distinct effects of each variable (Gujarati & Porter, 2009). To resolve this, we applied principal component analysis (PCA) to *lexrate* and *lwage*, following the approach outlined by Jolliffe (2002). PCA transforms the original, correlated variables into orthogonal principal components, with the first component that captures the maximum shared variance. In our case, the first principal component had an *eigenvalue* well above unity and explained over 95 percent of the combined variance of *lexrate* and *lwage*. We therefore constructed a single composite variable, *cost_index*, equal to this first component's linear combination:

$$cost\_index_t = \phi_1 * lexrate_t + \phi_2 * lwage_t$$

where ϕ_1 and ϕ_2 are the normalized PCA loadings. By substituting *cost_index* for the two original series, we preserve the theoretical role of cost-push factors while multicollinearity can be eliminated. Subsequent VIF diagnostics (Table 4) confirm that, although PCA successfully eliminated the extreme collinearity between *lexrate* and *lwage*, some multicollinearity persists between the newly formed *cost_index* and *lgovtexp*. Specifically, *cost_index* and *lgovtexp* exhibit VIFs of 6.83 and 6.93, respectively. Both VIFs exceeds the common threshold of 5, beyond which multicollinearity may distort individual coefficient estimates (Gujarati & Porter, 2009). Nonetheless, Kennedy, 2008 and O'Brien, 2007 suggest a VIF of 10 as the classic cutoff for "serious" multicollinearity. Moreover, *cost_index* remains the most parsimonious proxy for wage- and exchange-rate–driven cost shocks, while *lgovtexp* captures policy-driven fiscal impulses and demand-pull factor. Thus, *cost_index* and *lgovtexp* can be used in this model with a minimum level of multicollinearity.

Table 4: Variance Inflation Factor (VIF) before and after PCA

	Before PCA		After PCA	
Variable	**VIF**	**1/VIF**	**VIF**	**1/VIF**
Lwage	92.83	0.0108	-	-
Lexrate	58.53	0.0171	-	-
Lgovtexp	11.59	0.0863	6.93	0.144
cost_index	-	-	6.83	0.146
real_int	1.14	0.8746	1.05	0.951
lcons_gap	1.04	0.9661	1.01	0.993
Mean VIF	**33.03**		**3.95**	

4. Methodology

The ARDL model is selected as the most theoretically appropriate and empirically robust framework for examining inflation dynamics in Bangladesh. Its ability to simultaneously estimate short-run and long-run effects while addressing the integration challenges provides a reliable basis for identifying the influence of demand-pull and cost-push factors on inflation over time. Moreover, the flexibility inherent in the ARDL approach allows for different lag lengths across the explanatory variables, which is a significant advantage in capturing the varying response speeds typical in macroeconomic phenomena. This feature enables the model to efficiently capture both short-run fluctuations and long-run equilibrium relationships within a single estimation process. The dual capacity of the ARDL methodology to estimate both an error correction term (ECT) for short-run adjustments and the long-run relationship over different time horizons (Pesaran et al., 2001; Narayan, 2005). The general form of the ARDL model used in this study is specified as follows:

$$lcpi_t = \alpha_0 + \sum_{\{i=1\}}^{\{p\}} \alpha_i lcpi_{\{t-i\}} + \sum_{\{j=0\}}^{\{q_1\}} \beta_j lcons\_gap_{\{t-j\}} + \sum_{\{j=0\}}^{\{q_2\}} \gamma_j\, lgovtexp_{\{t-j\}} + \sum_{\{j=0\}}^{\{q_3\}} \delta_j\, costindex_{\{t-j\}} + \sum_{\{j=0\}}^{\{q_4\}} \theta_j\, real\_int_{\{t-j\}} + \varepsilon_t$$

In this specification, t represents the current time period of observation (e.g., year), while j denotes the lag order applied to each explanatory variable, capturing their delayed effects across time.

4.1 Stationary Test

This study adopts the Auto-Regressive Distributed Lag (ARDL) modeling approach to explore the short-run and long-run effects of various inflation determinants. This framework is widely used to handle mixed-order integration of variables [I(0) and I(1)] determined by the stationarity tests (Pesaran et al., 2001). The Augmented Dickey–Fuller (ADF) unit root tests in Table 5 shows that the key variables in the model exhibit mixed orders of integration. Some of the variables are stationary at level [I(0)] while others require first differencing [I(1)].

Table 5: Augmented Dicky Fuller Unit Root Test

Variable	ADF Statistic (Level)	ADF Statistic (1st Difference)	5% Critical Value	Integration Order
Lcpi	–1.32	–2.29	–2.938	I(1) (weak)
lcons_gap	–2.87	–8.71	–2.938	I(0)
Lgovtexp	3.09	–3.11	–2.938	I(1)
cost_index	-2.84	-3.39	–2.938	I(1)
real_int	–5.31	–8.94	–2.938	I(0)

To ensure the robustness of the stationarity assessment, the Phillips-Perron (PP) test was employed as a complement to the Augmented Dickey–Fuller (ADF) test. While both tests share the same null hypothesis of a unit root, the PP test adjusts for serial correlation and heteroskedasticity in the error terms. The results confirm that the first-differenced series of *lcpi* is stationary, while it was weakly stationary in ADF test. The Phillips-Perron test also confirms that *lcpi* is non-stationary at level but becomes stationary after the first differencing.

Table 6: Phillips–Perron Unit Root Test Results (with Trend)

Variable	PP Statistic (Level)	PP Statistic (1st Difference)	5% Critical Value	Integration Order
Lcpi	–2.23	–5.04	–3.512	I(1)
lcons_gap	–6.56	–11.99	–2.938	I(0)
Lgovtexp	-0.85	-6.09	–2.938	I(1)
cost_index	-1.72	-3.83	-3.512	I(1)
real_int	–6.32	-9.26	-3.512	I(0)

4.2. Lag-Order Selection

As assessing the presence of cointegrating relationships among the I(1) variables is essential before selecting the ARDL model, Johansen's cointegration tests were also employed using both the trace and maximum eigenvalue statistics (Johansen, 1988; Nkoro & Uko, 2016). The test uses one lag and a constant trend specification while the lag is determined based on Akaike and Schwarz information criteria (Table-7).

Table 7: Lag-Order Selection Criteria

Lag	LL	LR	df	p-value	FPE	AIC	HQIC	SBIC
0	–591.957				418761	27.134	27.210	27.337
1	–326.202	531.510	25	0.000	7.4645*	16.191*	16.6421*	17.4075*
2	–305.616	41.171	25	0.022	9.549	16.392	17.219	18.622
3	–289.182	32.868	25	0.134	15.895	16.781	17.984	20.025
4	–267.290	43.785*	25	0.011	23.444	16.922	18.501	21.180

Note: Optimal lag selected by each criterion is marked with an asterisk (*). Endogenous variables: *lcpi, lcons_gap, lgovtexp, cost_index, real_int* Exogenous variable: *Constant term (cons)*

4.3 ARDL Bound Test for Cointegration

To test the existence of a long-run equilibrium relationship among inflation (*lcpi*), demand pull and cost push variables, we employed the ARDL bounds testing approach. Using a parsimonious ARDL (1,0,0,1,0) specification, the null hypothesis of no cointegration is tested against the alternative of a level relationship. We the computed F-statistic was 4.925, which exceeded the upper bound critical values of four regressors (k = 4) at 2.5% level of significance. The critical values of both F and T statistics for different levels of significance in Table 8. Higher F-statistic indicates that the null hypothesis of no cointegration can be rejected. Nonetheless, the T-statistic was -2.186, which lies above the lower bound critical value of -2.57 at the 10% level of significance. This higher T-statistic compared to the lower bound critical value makes the result less conclusive. However, following standard ARDL practice, we rely

primarily on the F-statistics for cointegration inference (Pesaran, Shin, & Smith, 2001), and the ARDL bounds test confirms the existence of a stable long-run relationship among the variables.

Table 8: F-statistics and T-statistics (Case 3) and their Critical Values

Statistics	Magnitude	Significance Level	10%	5%	2.5%	1%
		I(0) Bound	2.45	2.86	3.25	3.74
F-Statistics	4.925	I(1) Bound	3.52	4.01	4.49	5.06
		I(0) Bound	-2.57	-2.86	-3.13	-3.43
T-Statistics	2.186	I(1) Bound	-3.66	-3.99	-4.26	-4.60

4.4 Cointegration Validation and ARDL Specification

As the study has small sample sizes and variables integrated at mixed orders (I(0) and I(1)), it follows the Autoregressive Distributed Lag (ARDL) approach. Moreover, preliminary unit root tests confirmed that none of the series were integrated at order two which satisfies the key precondition for ARDL estimation. Hence, lag selection criteria including AIC, HQIC, and FPE shown in Table 7 supports a parsimonious lag structure with one lag. This does not mean that "all variables must have one lag," but rather that a lag length of one in the system performs best. Within this framework, a bounds test was conducted using a Wald restriction on the lagged level terms. The joint test for all regressors yielded an insignificant F-statistic ($F = 1.37$, $p = 0.2623$), which suggests no cointegration under that specification. However, a focused test on the lagged *cost_index* variable which was constructed via principal component analysis from exchange rate and wage data produces a statistically significant result ($F = 4.22$, $p = 0.0465$). This indicates a meaningful long-run relationship between inflation and this composite cost-push indicator. The findings of different test restrictions are presented in Table 9.

Table 9: ARDL Bounds Test Using Wald Test for Lagged Level Terms

Test Restriction	F-statistic	Degrees of Freedom	p-value
L.lcons_gap = L.lgovtexp = L.cost_index = L.real_int = 0	1.37	(4, 37)	0.2623
L.lcost_index=0	4.22	(1,40)	0.0465

The choice of only lagged *cost_index* variable is also supported by strong economic theory and correlation patterns, which also validates the use of the ARDL framework. The *cost_index* variable captures structural cost pressures consistent with Gordon (1975)'s cost-push inflation theory and reinforces its inclusion in the model. The ARDL model is therefore adopted to estimate both the short-run dynamics and long-run elasticity of inflation with respect to both demand-pull and cost-push macroeconomic drivers.

4.5 Why the ARDL framework is appropriate for the study

Conventional multivariate cointegration techniques, such as the Vector Error Correction Model (VECM), require that all variables be integrated of order one [I(1)] and exhibit at least one cointegrating relationship. These prerequisites are not satisfied in the present study, as the explanatory variables include a mixture of I(0) and I(1) series, and all I(1) variables do not display confirmed cointegration. Likewise, a standard unrestricted Vector Autoregression (VAR) model is unsuitable, as it assumes stationarity and cannot capture long-run equilibrium dynamics through an error correction term (ECT). Although VECM accommodates ECT structures, its requirement of uniform integration order and cointegration limits applicability to this dataset. In contrast, the Autoregressive Distributed Lag (ARDL) approach, as formulated by Pesaran and Shin (1999), is flexible to mixed orders of integration (excluding I(2)) and does not necessitate pre-established cointegrating relationships. This makes ARDL particularly appropriate for the current empirical context. This also ensures robust and unbiased parameter estimation while it can mitigate the risks of spurious regressions associated with level-based non-stationary series.

4.6 Model Equation

In its unrestricted form, our ARDL model captures dynamic interactions among variables without distinguishing between long-run equilibrium relationships and short-run adjustments. The model has the following form:

$$lcpi_t = \alpha_0 + \alpha_1\, lcpi_{t-1} + \beta_0\, lcons\_gap_t + \gamma_0\, lgovtexp_t + \delta_0\, cost\_index_t + \delta_1\, cost\_index_{\{t-1\}} + \theta_0\, real\_int_t + \varepsilon_t$$

To overcome this limitation and enhance interpretability, the model is re-specified using the ec1 option in Stata, which reformulates the ARDL framework into its Error Correction representation. This enriched version decomposes the estimated relationships into three analytically distinct components: the adjustment coefficient, indicating the rate at which inflation reverts to its long-run trajectory following a deviation; the long-run multipliers, reflecting the sustained influence of explanatory variables; and the short-run effects, which account for immediate, transitory impacts. Such disaggregation strengthens both the econometric robustness and the policy relevance of the findings by separating equilibrium dynamics from short-term fluctuations.

The short run form:

$$\Delta\, lcpi_t = \phi\{EC\}_{\{t-1\}} + \sum_{\{j=0\}}^{\{q_1\}} \beta_j\, \Delta\, lcons\_gap_{\{t-j\}} + \sum_{\{j=0\}}^{\{q_2\}} \gamma_j\, \Delta lgovtexp_{\{t-j\}} + \sum_{\{j=0\}}^{\{q_3\}} \delta_j \Delta cost\_index_{\{t-j\}} + \sum_{\{j=0\}}^{\{q_4\}} \theta_j \Delta realint_{\{t-j\}} + \varepsilon_t$$

The long run form:

$$lcpi_t = \alpha_0 + \beta_1 lconsgap_t + \gamma_1\, lgovtexp_t + \delta_0\, costindex_t + \delta_1 costindex_{\{t-1\}} + \theta_0 realint_t + \varepsilon_t$$

4.7. Adoption of Structural Shock Markers

A growing body of research shows that natural disasters, particularly floods, can cause severe supply-side disruptions and acute food-price spikes in developing economies (Loayza et al., 2012). Though it is always evident that flood causes price hike due to supply chain disruptions, especially for food items, there is limited or no empirical studies on the effect of flood on Bangladesh's inflation. Likewise, global commodity-price shocks and financial-market turmoil transmit rapidly to domestic price levels via import costs and exchange-rate pass-through (Rogoff, 2007). Omitting these episodic, high-magnitude disturbances risks misattributing transitory inflationary spikes to underlying macroeconomic drivers. To isolate persistent demand- and cost-push effects, we therefore introduce two binary indicators: *flood_year* (1 if the

year faced major flooding) and *global_shock_year* (1 if Bangladesh economy faced a significant global-market shock in that year). Figure 4 shows inflation over the years with structural shock markers such as floods and global shock. To differentiate the effect of structural shock markers, the first empirical Model does not include the structural shock markers while second empirical model incorporates both.

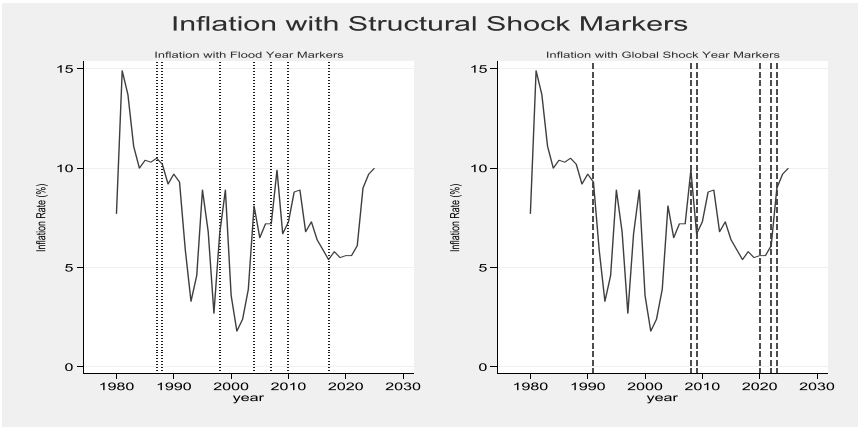

Figure 4: *Inflation with Structural Shock Markers: Flood and Global Shock*

5.0 Empirical Result

5.1 General ARDL Model Result:

Table 10 presents the results of the general ARDL model. The estimated ARDL(1,0,0,1,0) model reveals a statistically robust and well-fitted specification of inflation dynamics in Bangladesh. The lagged dependent variable, *L.lcpi*, exhibits a strong and highly significant positive coefficient across both models (0.833** and 0.843***). It indicates considerable inertia in the inflation process. Though consumption gap (*lcons_gap*), becomes significant in Model 1 (0.339, p>0.10), it becomes marginally significant in Model 2 (0.526*, p < .10) which also suggests that demand-side pressures are more salient once flood and global-shock indicators are introduced. Fiscal influence captured by government expenditure (*Lgovtexp*) remains positive and statistically stable across both models (≈0.05*) which supports the view that expansionary fiscal activity contributes to inflation. The composite index for exchange rate and wage (*cost_index)* displays a strikingly large and significant coefficient in both specifications (20.26*** and 18.21***). This reflects

the effects of cost-push factors, primarily wage growth and exchange rate depreciation, on inflation. Its lagged component (*L.cost_index*) enters with a negative sign which seems counter intuitive; however, *cost_index* is a composite index of log transformed exchange rate and wage index. Thus, the negative sign doesn't mean a real negative association between *lcpi* and *cost_index*. Real interest rates (*real_int*) exhibit a consistently negative and significant coefficient (≈ – 0.23***) which also confirms immediate dampening effect on inflation through contractionary monetary channels. The inclusion of *flood_year* and *global_shock_year* in Model 2 yields marginally significant positive coefficients (1.85* and 2.25*), which suggests that transitory supply-side shocks exert upward pressure on inflation. The constant term is both large and significant (≈30–32) and implies persistent baseline inflation even after accounting for structural and cyclical influences. Overall, the results point to a layered inflationary structure driven by entrenched cost-push dynamics, moderated demand-side impulses, and episodic exogenous shocks.

Table 10: ARDL(1,0,0,1,0) Regression

Variable	Model 1	Model 2
L.lcpi	0.833** (0.076) [0.679, 0.987]	0.843*** (0.073) [0.695, 0.991]
lcons_gap	0.339 (0.266) [-0.198 – 0.876]	0.526* (0.265) [-0.010, – 1.063]
Lgovtexp	0.053* (0.029) [-0.006, 0.111]	0.049* (0.028) [-0.007, 0.105]
cost_index	20.258*** (5.966) [8.199, 32.316]	18.209*** (5.795) [6.477, 29.941]
L.cost_index	-12.006** (5.844) [-23.818, -0.195]	-10.673* (5.698) [-22.208, 0.862]
real_int	-0.225*** (0.076) [-0.377, -0.072]	-0.226*** (0.072) [-0.373, -0.080]
flood_year		1.851*

		(1.009) [-0.191, 3.893]
global_shock_year		2.253* (1.147) [-0.068, 4.574]
_cons	31.809** (13.926) [3.663, 59.954]	30.468** (13.584) [2.969, 57.966]
R^2	0.9993	0.9994

Standard errors are in parentheses, Lower bound and Upper Bound of Confidence Interval in [ ]

*** p<.01, ** p<.05, * p<.1*

5.2 Error Correction ARDL Model Result:

Table 11 presents error-correction adjustment, short-run and long-run results. The ARDL error correction model yields a statistically significant adjustment term, and the estimated short-run and long-run coefficients also provide nuanced insights into both transitory shocks and persistent structural drivers of inflation in Bangladesh's economy.

5.2.1 Adjustment Terms:

The negative and statistically significant adjustment term confirms the presence of a long-run relationship among the variables. The error correction term *(L.lcpi*) is negative and statistically significant in both Model (1) and Model (2) (–0.167 and –0.157, respectively) which confirms a stable long-run relationship and indicates that approximately 16–17% of deviation from the long-run equilibrium is corrected each year. This finding validates the use of the ARDL error correction model and confirms that inflation responds to disequilibrium shocks in a stable and predictable manner over time.

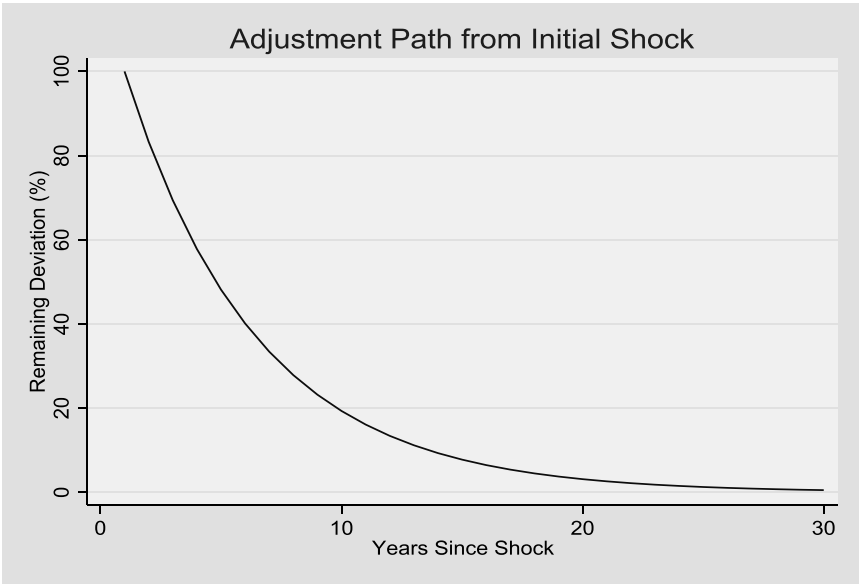

Figure 5: *Shock Absorption Dynamics in Bangladesh: A 30-Year Projection*

5.3 Long-Run Coefficients

In the long-run component, the lagged consumption gap (*L.lcons_gap*) exhibits a positive relationship with inflation. The relationship becomes stronger and statistically significant at the 10% level in Model (2) (coefficient: 3.348; $p < 0.1$), which highlights the role of demand-side pressures. This finding suggests, once the economy adjusts, a 1% increase in the consumption gap is associated with a 3.35% increase in CPI (inflation), assuming all other variables are held constant. Government expenditure (*lgovtexp*) remains consistently significant ($p < 0.01$) across both models with a coefficient of approximately 0.31, and that also implies a 1% increase in government expenditure is associated with a 0.31% increase in inflation, holding other factors constant. So, the impact of *lgovtexp* is positive and inelastic which also indicates a mild but persistent effect of government expenditure in inflation.

The *cost_index*, comprises of wage and exchange rate components, displays a remarkably large and highly significant coefficient (approximately 48-50) and underscores the magnitude of cost-push effects on the inflation trajectory. The exceptionally large coefficient associated with the composite *cost_index* (≈48–50) reflects the

compounded inflationary pressure exerted by its underlying components-exchange rate depreciation and wage growth. This magnitude appears odd relative to other regressors, but it is methodologically consistent with the use of Principal Component Analysis (PCA). Since PCA standardizes and orthogonally rotates the original variables, the resulting index captures the maximum shared variance but loses its original economic scale. Thus, a one-unit change in *cost_index* represents a significant joint structural shift in both wage and exchange rate levels, not a marginal percentage movement. Interpreting the coefficient through the lens of cost-push inflation theory (Gordon, 1985), the finding aligns with established evidence that structural supply-side pressures, including rising input costs and currency depreciation are potent inflation drivers, especially in developing economies with import dependencies and wage-price rigidities. The statistical robustness and consistency of the *cost_index* across model specifications affirm its explanatory relevance. Rather than distorting the model, its strength highlights the importance of capturing compound cost-push mechanisms through dimensional reduction techniques like PCA when there are issues of multicollinearity.

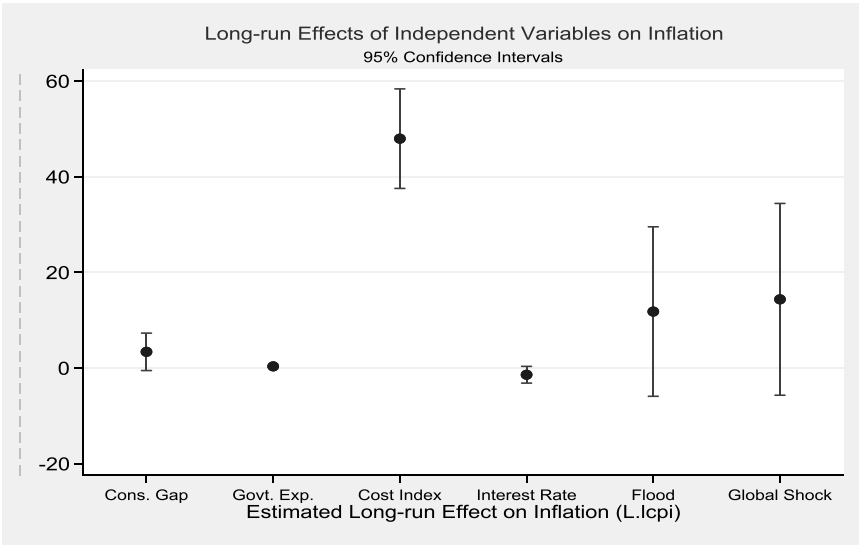

Figure 6: *Long-run Effects of Independent Variables on Inflation*

Real interest rate (*real_int*) is negatively associated with inflation in the long run, although the relationship is not statistically significant at the conventional 10% threshold level (p=0.108). This suggests that tighter

monetary conditions may not consistently translate effectively into inflation control in the long run. The two exogenous dummy variables—*flood_year* and *global_shock_year*—though positive, do not exert statistically significant effects in the long run, and this situation indicates that such shocks have more transient effects.

Table 11: ARDL (1, 0, 0, 1, 0) Regression[4]

Outcome Variable: *lcpi* (log value of Consumers Price Index)			
Variables		(1)	(2)
Adjustment Terms	*L.lcpi*	−0.167*	−0.157*
		(0.076)	(0.073)
		[−0.321, −0.013]	[−0.305, −0.009]
Log Run Coefficient	*lcons_gap(L1.)*	2.032	3.348*
		(1.566)	(1.933)
		[−1.132, 5.197]	[−0.565, 1.063]
	lgovtexp(L1.)	.316***	.311***
		(.085)	(.089)
		[0.144,0.488]	[0.131,0.491]
	cost_index(L1.)	49.477***	47.924***
		(4.786)	(5.139)
		[39.804,59.150]	[37.520, 58.329]
	real_int(L1.)	-1.346	-1.44
		(.819)	(.866)
		[-3.002,0.309]	[-3.193,0.313]
	flood_year(L1.)		11.771
			(8.753)
			[-5.949, 29.491]

[4] Stata has been used to produce the estimates, and it's ec1 option directly transforms the ARDL into ECM and reports long-run coefficients. However, estimates of this study were cross validated using both Stata and EViews.

	lobal_shock_year(L1.)		14.326
			(9.905)
			[-5.724, 34.377]
Short Run Coefficient	*D.lcons_gap*	.339	.526*
		(.266)	(.265)
		[−0.198, 0.876]	[−0.010, 1.063]
	D.lgovtexp	.053*	.049*
		(.029)	(.028)
		[−0.006, 0.111]	[−0.007, 0.105]
	D.cost_index	20.258***	18.209***
		(5.966)	(5.795)
		[8.199, 32.316]	[6.477, 29.941]
	D.real_int	-.225***	-.226***
		(.076)	(.072)
		[−0.378, −0.072]	[−0.373, −0.080]
	D.flood_year		1.851*
			(1.009)
			[−0.191, 3.893]
	D.global_shock_year		2.253*
			(1.147)
			[−0.068, 4.574]
	Consant	31.809**	30.468**
		(13.926)	(13.584)
		[3.663, 59.954]	[2.969, 57.966]
	Observations	47	47
	R-squared	.531	.595

Standard errors are in parentheses, Lower bound and Upper Bound of Confidence Interval in []

*** p<.01, ** p<.05, * p<.1

5.4 Short-run Coefficients :

The short-run dynamics reveal additional important patterns of inflation in Bangladesh. Most notably, the cost-push component (*cost_index*) exerts a strong and immediate effect, with a coefficient of approximately 18–20 and high significance levels ($p < 0.01$–0.003 across both specifications). This underscores the volatility of input costs particularly due to wage adjustments and exchange rate fluctuations as a primary short-term inflationary driver. Additionally, the real interest rate (*real_int*) consistently shows a negative and statistically robust coefficient ($\approx$ -0.22, $p < 0.01$). It implies that 1% increase in real interest rate is associated with 0.22% decrease in inflation immediately, keeping everything else constant. This suggests monetary tightening exerts a meaningful and immediate dampening effect on inflation in the short run. Government expenditure (*lgovtexp*) also plays a role, with marginal significance ($\sim$0.05, $p \approx 0.07$–0.08). A 1% increase in government expenditure is associated with 0.05% increase of inflation, indicates that fiscal injections may contribute to inflationary pressures during policy shifts or expenditure surges, though the impact is more modest compared to other shocks.

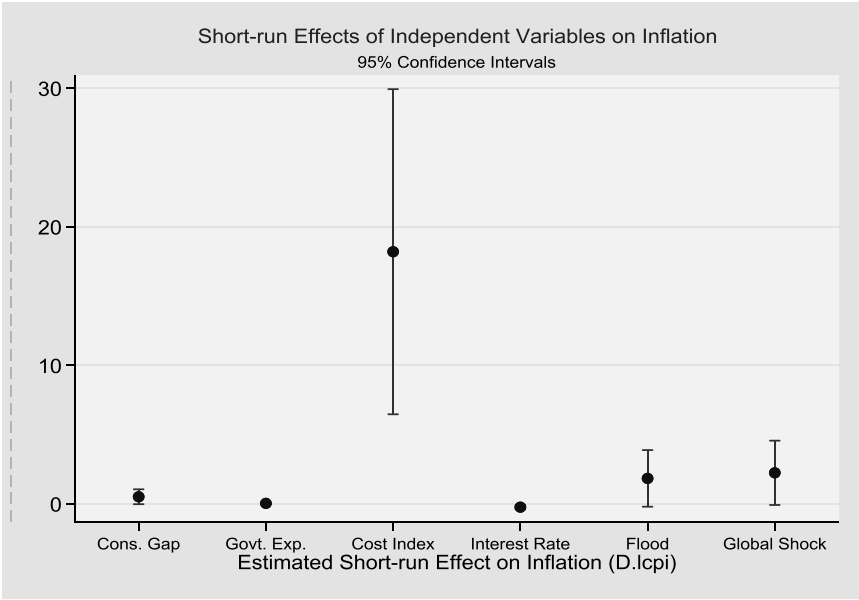

Figure 7: *Short-run Effects of Independent Variables on Inflation*

When accounting for episodic exogenous shocks, the extended ARDL model incorporating *flood_year* and *global_shock_year* captures notable transient effects. Both indicators exhibit positive coefficients (1.85 and 2.25 respectively) and hover near the conventional threshold for significance ($p \approx 0.074$ and 0.057). This implies that supply-side disruptions, whether climate-induced or externally driven, can amplify inflation in the short term. The consumption gap (*lcons_gap*), considered as a key demand-side determinant, shows inconsistent short-run significance. As the consumption gap becomes borderline significant ($p \approx 0.054$) only when exogenous shocks are included, which suggests its short-run effect may be conditional or secondary. Overall, these results point to a layered short-run inflation structure where cost shocks dominate, policy instruments exert measurable influence, and unforeseen supply-side disruptions seek much attention in the context of forecasting and policy response frameworks.

However, the constant terms in both models are also positive and statistically significant. This may indicate the presence of persistent inflationary forces not directly explained by the macroeconomic variables included. This residual pressure may also reflect structural inefficiencies such as extortion, governance shortcomings, monopolistic pricing behavior, or market rigidities within essential sectors.

5.5 Robustness and Stability Diagnostics

To ensure the reliability of the estimated ARDL model, we conducted a series of specification, stability, and variance diagnostics. First, the Ramsey RESET test was applied to detect potential functional form misspecification. The F-statistic (0.00046) and associated p-value (0.983) of the test indicate no evidence of omitted nonlinearities and confirm the adequacy of the model specification. Structural stability was further assessed using the CUSUM and CUSUM of Squares tests based on recursive residuals. In both cases, the test statistics remained within the 5% significance bounds throughout the sample period, which suggests no structural breaks or parameter instability. To test for heteroskedasticity, we also employed the Breusch-Pagan-Godfrey test. The test yielded a p-value of 0.3785, which indicates that the null hypothesis of homoskedasticity could not be rejected. The Breusch-Godfrey LM tests

for serial correlation at both one and two lags[5] were also employed and those confirm the absence of autocorrelation in the residuals These suggest that the residuals exhibit constant variance. Collectively, these diagnostic results confirm the robustness of the model and validate its use for inference.

6. Discussions and Limitations

6.1 Discussions

Our analysis reveals that Bangladesh exhibits very high inflation persistence, which is reflected by the estimated error correction term (ECT) of approximately -0.16. This coefficient implies that only about 16% of the deviation from the long-run equilibrium is corrected each year in the absence of further disturbances. This slow convergence suggests a sluggish adjustment process and underlying deep-rooted structural rigidities within the Bangladesh economy. In contrast, Rasul & Tarique (2018) report an ECT of -0.65 for India using annual data, while Chakrabarty & Varma (2015) finds the estimated ECT of -0.66 for the Wholesale Price Index (WPI). These indicate a far faster speed of adjustment toward long-run equilibrium and inflation dynamics responds more promptly to disequilibrium shocks in India compared to Bangladesh.

Results of this study also confirm that both demand-pull and cost-push factors play significant roles in driving inflation in Bangladesh. The significance of the consumption gap and government expenditure supports the relevance of domestic demand conditions and aligns with Lansing (2025) and Shapiro (2024). Meanwhile, the strong role of wages, exchange rate, and interest rate points toward cost-push mechanisms, in line with Ahmad et al. (2024), Mahmud and Mondal (2024), and international findings (e.g., Ascari et al., 2024).

The aggregate private consumption gap appears to influence inflation intermittently. The magnitude is higher in the long-run and lower in the short-run while the statistical significance is relatively better in the short-

[5] P-values of Breusch-Godfrey LM tests for serial correlation are 0.717 for one lag and 0.511 for two lags.

run specification but weaker in long-run robustness. This suggests the private consumption gap contributes more reliably to short-term inflation fluctuations than to sustained long-run momentum. The episodic nature of influence indicates that domestic consumption shocks are not a structural driver of inflation in Bangladesh. Government expenditure exhibits consistently significant long-run and marginal short-run effects on CPI with a reliable statistical significance. Thus, it has a sustained role in inflation dynamics and validates fiscal stance as a central demand-pull contributor. Increased public consumption spending potentially amplifies aggregate demand pressures, with lagged effects that persist beyond current budget cycles.

The statistical strength of cost index both in short- and long-run horizons reinforces the interpretation that inflation in Bangladesh is substantially cost-push in nature and rooted in structural wage-price mechanisms and currency-linked input shocks. This finding is consistent with Bangladesh Bank (2025), which identifies wage growth in agriculture, industry, and services as a key cost push driver of inflation. When wages rise without a commensurate increase in productivity, firms often pass on the higher labor costs to consumers through price increases, which eventually fuels inflation (Begum, 1991). This dynamic is further compounded by institutional wage-setting mechanisms in Bangladesh, where public sector pay scale revisions and statutory minimum wage hikes in key industries are implemented periodically based on political and social considerations rather than market efficiency. Moreover, Bangladesh's dependence on external commodities and supply chains, the depreciation of exchange rate intensifies local production costs and amplify the pass-through to consumer prices. Moreover, exogenous shocks such as floods and global shock show a notable increase of inflation in the short run, though the long run impact was not visible in the study.

Our study finds the real interest rate is significant in the short run, which suggests that monetary tightening can temporarily suppress inflation. However, the long-run specification indicates that interest rate policy alone may be insufficient to structurally anchor inflation. This finding emphasizes the need for coordinated macroeconomic responses that would combine monetary policy steps with supply-side interventions.

Furthermore, the statistically significant constant term in the ARDL model points to persistent inflationary forces not directly explained by the included macroeconomic variables. These residual pressures may reflect deeper institutional challenges, which include limited market transparency, price distortions, and governance-related inefficiencies. These issues were broadly acknowledged in Bangladesh's macroeconomic assessments (IMF, 2023). The Centre for Policy Dialogue (CPD) has also highlighted domestic price anomalies, cartel behavior, and weak enforcement of competition laws as contributors to inflation persistence, particularly in essential sectors like food and energy (CPD, 2024).

Additionally, market concentration in essential sectors fosters monopolistic or oligopolistic price-setting behavior, which dampens responsiveness to macroeconomic shocks and contributes to inflation persistence. Empirical studies based on developed countries have shown that concentrated industries exhibit heightened price rigidity and reduced transmission of policy effects (Wang & Werning, 2022; Philippon, 2019; Boston Fed, 2022). On the other hand, there is no strong evidence in the research literature that market concentration is a primary cause of inflation in Bangladesh, perhaps due to data constraints. In Bangladesh, industries such as poultry, edible oil are dominated by only a handful of large firms that exercise significant market power. These monopolistic or oligopolistic structures maintain elevated markups and display little incentive to adjust prices swiftly when input costs change.

6.2 Limitations

While this study provides robust insights into the long run and short run dynamics of inflation using ARDL framework, it does not incorporate all the possible drivers of inflation. Potentially influential factors such as energy price, credit growth and inflation expectations were not included due to data constraints and model parsimony considerations. For example: this study does not incorporate a global energy price index in the empirical model, despite evidence in the literature suggests that a positive relationship remains between international energy prices and domestic inflation. Inclusion of such an index was empirically unsustainable within the model and Bangladesh context. Energy prices in

Bangladesh are largely determined by administrative decisions and political considerations. There are regular practices of providing subsidies and imposing price controls rather than market mechanisms. Consequently, domestic prices for electricity, gas, diesel, and fertilizer often diverge from global energy price trends and do not respond predictably to international supply-demand shifts. The inflationary impact of these disconnects manifests indirectly through increased public expenditure, as the state absorbs fiscal pressure to maintain regulated prices. Therefore, in this model, cost-push inflation arising from energy subsidies is proxied through the government expenditure variable, rather than modeled as a separate price channel.

Similarly, this study excludes log-transformed public investment from the final specification. Though public investment is theoretically relevant variable, its coefficients across multiple specifications were statistically insignificant and exhibited counterintuitive signs. The decision of dropping this variable can avoid empirical instability; however, the modeling focus on recurrent expenditure can capture more accurately in both short-term and long-term inflation pressures in the Bangladesh context.

7. Conclusion and Policy Implications

This study offers robust empirical evidence that inflation in Bangladesh is highly persistent and primarily driven by cost-push factors, notably wage-sensitive input costs and exchange rate pressures. These cost-push factors dominate both short-run and long-run dynamics. Government expenditure also contributes to immediate inflationary spikes, while its persistent impact appears marginal. Demand-side indicators like the consumption gap exert modest influence, particularly when interacting with supply-side shocks. Importantly, episodic disruptions such as floods and global shocks amplify inflation pressures and improve model fit. This underscores the significance of transitory events in the inflationary process.

From a policy standpoint, the findings highlight the need for a multi-pronged inflation management strategy. Authorities should focus on mitigating cost-side volatility, including wage rigidities and imported inflation from exchange rate depreciation. Strengthening targeted

subsidies, improving wage-productivity alignment, and enhancing agricultural resilience may curb supply-side inflation. Additionally, short-run monetary tightening via interest rates shows effectiveness which suggests that coordination with fiscal policy is essential. Incorporating structural shock monitoring into macro-fiscal surveillance can help formulate more responsive and adaptive inflation control frameworks.

Persistent inflationary pressures in Bangladesh may be partially rooted in opaque market practices, including cartel behavior, price manipulation by syndicates, and weak regulatory oversight. Tackling these institutional distortions requires robust competition policy, transparent enforcement mechanisms, and greater accountability in market surveillance. Strengthening governance and dismantling informal pricing networks will be critical in complementing macroeconomic strategies aimed at inflation control.

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