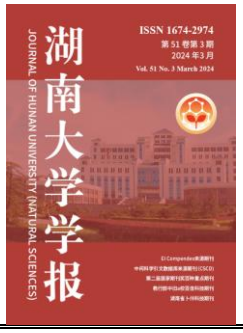

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Effect of Contractionary Monetary Policy on Inflation in Bangladesh: A VECM Approach

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Abstract: This study examines the impact of contractionary monetary policy on inflation in Bangladesh using time series data for 1987–2022. Money supply, interest rate, and exchange rate are taken as independent variables to show their effect on inflation. The ADF test is used to test the stationarity of the variables in the model, and all the variables are stationary at the first difference. As a result, Johansen's co-integration techniques are used, revealing a co-integrated equation in the model. Therefore, the vector error correction model (VECM) is used for the estimation. The VECM estimation shows that the coefficient of error correction with the inflation rate as a dependent variable is negative and statistically significant at 5%, implying a robust long-run relationship between money supply, interest rate, exchange rate, and inflation rate. In the short run, bidirectional causality exists between the money supply and inflation only at the first lag. Moreover, the study found no overall short-run significant causality between the money supply, interest rate, exchange rate, and inflation. The novel approach of this study lies in its comprehensive analysis of the intricate relationship between monetary policy instruments and inflation dynamics in Bangladesh.

Keywords: contractionary monetary policy, inflation, vector error correction model.

孟加拉国紧缩货币政策对通货膨胀的影响：VECM方法

摘要：本研究使用1987年至2022年的时间序列数据考察了紧缩货币政策对孟加拉国通货膨胀的影响。将货币供应量、利率和汇率作为自变量来显示它们对通货膨胀的影响。自动送纸器检验用于检验模型中变量的平稳性，所有变量在一阶差分时都是平稳的。因此，使用了约翰森的协整技术，揭示了模型中的协整方程。因此，采用矢量误差修正模型（VECM）进行估计。VECM估计显示，以通货膨胀率作为因变量的误差修正系数为负，且统计显着性为5%，这意味着货币供应量、利率、汇率和通货膨胀率之间存在稳健的长期关系。短期内，货币供应量与通货膨胀之间仅在第一滞后时存在双向因果关系。此外，研究发现货币供应量、利率、汇率和通货膨胀之间不存在总体短期显着因果关系。这项研究的新颖方法在于对孟加拉国货币政策工具与通胀动态之间错综复杂的关系进行了全面分析。

关键词：紧缩货币政策，通货膨胀，矢量误差修正模型。

1. Introduction

Over the years, monetary policy has consistently been viewed as a crucial tool for achieving macroeconomic goals. One of the most fundamental macroeconomic objectives is price stability. Managers of monetary policy have frequently established targets on intermediate variables, such as the short-term interest rate, money supply growth, and exchange rate, in pursuit of macroeconomic stability. It is said that the money supply, among these monetary intermediate variables, has a bigger impact on the economy because of its impact on inflation, where inflation is a burning issue for consumers. Therefore, it is one of the main concerns of monetary policy to target inflation level. Particularly broad money growth, money expansion has a substantial short-term effect on inflation [1].

According to the Bangladesh Bank [2], the average monthly inflation rate for December 2023 was 9.48%, a significant increase from the previous year. The government made a valiant effort to rein back inflation. The government hopes to keep the average annual inflation rate in the upcoming fiscal year 2024–25 within 6%, according to a statement made by Finance Minister AHM Mustafa Kamal in his budget address for the fiscal year 2023–2024 [3]. One of the key objectives of the monetary policy during the first half of FY24 was to bring inflation down to the targeted level mentioned in the national budget. Four significant reforms were brought about by the new monetary policy in this regard: (i) the creation of a lending reference interest rate; (ii) the creation of a policy interest rate corridor; (iii) the unification of the exchange rate; (iv) a revised gross international reserve calculation methodology that was compliant with the Balance of Payment and International Investment Position Manual (BPM6).

This study examines the effects of contractionary monetary policy on inflation in Bangladesh over 35 years. This work uses the vector error correction model (VECM) technique to empirically investigate this relationship. This method is used because of the stationarity of all variables after differencing once and the presence of a cointegrated equation in the model.

The decision to examine the impact of contractionary monetary policy on inflation in Bangladesh is motivated by its significance within the country's economic context. To achieve Bangladesh's goals of long-term economic stability and progress, it is crucial to comprehend the impact of monetary policy tools on inflation. The research findings provide policymakers, economists, and financial analysts with useful insights into developing successful strategies for monetary policy to achieve price stability.

2. Literature Review

Several studies have investigated the relationship between monetary policy and inflation.

Daniel and Nuhu [4] analyzed Nigeria's monetary policy to control inflation. The researchers used quarterly data spanning from 1980Q1 to 2012Q4 and applied co-integration and error correction methodologies. Their research demonstrated a substantial positive correlation between the money supply and inflation in the short and long term.

Hossain [5] aimed to elucidate the impact of money on inflation in Australia by analyzing annual data from 1970 to 2017 and quarterly data from 1970Q1 to 2015Q1. The results obtained using the Johansen co-integration approach and ARDL bounds-test indicated a long-term link between money, actual production, prices, interest rates, and exchange rates. Moreover, compelling evidence was discovered indicating a cause-and-effect relationship in the short term between the expansion of the money supply and inflation.

Nguyen et al. [1] determined the impact of fiscal and monetary policy on inflation in Vietnam from 1997 to 2020. They determined that inflation in Vietnam is positively correlated with the money supply, fiscal deficit, interest rate, and government expenditure by using the VAR methodology. It has been determined that government expenditure exerts the most significant influence on inflation among these variables. In contrast, trade openness has a negligible and adverse effect on inflation.

Ahiabor [6] examined the effects of monetary policy on inflation in Ghana from 1985 to 2009. His results showed long-run positive relationships between money supply and inflation and between exchange rate and inflation and a negative relationship between interest rate and inflation.

Tran [7] analyzed the effectiveness of monetary policy transmission channels in preventing inflation in Vietnam from 2001 to 2015. Using the VECM model, he found credit growth to be a critical determinant of inflation. He also found a long-term positive relationship between the inflation and interest rates, where there is a significant short-term causal relationship between credit growth and interest in inflation. However, his study failed to confirm a relationship between the exchange rate and inflation in the short and long run.

Agarwal and Shah [8] evaluated the objectives of monetary policy and its effect on inflation and growth. Using a panel of developing countries that have adopted inflation targeting, their findings suggested that the adoption of inflation targeting reduces inflation, increases growth rates, and reduces external debt. However, in lowering inflation, targeting inflation has only sometimes been successful.

Islam and Uddin [9] estimated an error correction model to examine the effectiveness of the interest rate on inflation in Bangladesh using the 1980–2010 data. Their result found that by changing the interest rate, deviations in inflation from the target can be corrected. They recommended inflation targeting as a monetary policy strategy for Bangladesh.

The majority of studies have identified a notable positive correlation between money supply and inflation. However, there was a complex link between inflation, interest rates, and currency rates. There is potential to explore the connection between monetary intermediaries, such as interest and exchange rates, and inflation. No study has identified a correlation between money supply, interest rate, exchange rate, and inflation in a unified framework. This study demonstrates the impact of contractionary monetary policy on inflation using these variables with the same methodology.

3. Data and Methodology

The research was conducted using secondary data for 1987-2022. Secondary sources include the World Bank's World Development Indicators and the Bangladesh Economic Review published by the Ministry of Finance, the government of the People's Republic of Bangladesh. This study uses INF, MS, INT, and EXG variables as inflation, money supply, interest rate, and exchange rate, respectively. The Consumer Price Index (CPI) is used as a proxy for inflation (INF), broad money (% of GDP) is used as a proxy for money supply (MS), lending interest rate is used as a proxy for interest rate (INT), and weighted average exchange rate is used as a proxy for exchange rate (EXG).

The initial stage utilizes the augmented Dickey-Fuller (ADF) test to assess the stationarity of the data series. *Null hypothesis:* The variable being studied possesses a unit root and is being compared against the alternative hypothesis that it does not. The lag duration of each data series was determined using the Akaike information criteria (AIC). The Johansen-Juselius [10] co-integration technique analyzes the long-term connection between the chosen variables. Johansen and Juselius [10] and Johansen [11] provide two test statistics for determining the quantity of co-integrating vectors. This method compares the option of having r + 1 co-integrating vectors with the null hypothesis of having r co-integrating vectors. Subsequently, the alternative choices r = 1 and r = 2 are compared with the null hypothesis r = 0, and the process continues. Granger [12] asserts that a co-integrating vector requires causation between the variables in at least one direction. Hence, to determine the causal connection between the variables, we calculate the VECM. Here are the model specifications:

$$\Delta \mathrm{INF_t} = \alpha + \sum_{i=1}^{k-1} \eta_i \, \Delta \mathrm{INF}_{t-i} + \sum_{j=1}^{k-1} \theta_j \Delta \mathrm{MS}_{t-j} + \sum_{m=1}^{k-1} \emptyset_m \, \Delta \mathrm{INT}_{t-m} + \sum_{n=1}^{k-1} \psi_n \Delta EXG_{t-n} + \lambda_1 ECT_{t-1} + \varepsilon_{1t} \ldots\ldots\ldots \quad (1)$$

$$\Delta \mathrm{MS_t} = \beta + \sum_{i=1}^{k-1} \eta_i \, \Delta \mathrm{INF}_{t-i} + \sum_{j=1}^{k-1} \theta_j \Delta \mathrm{MS}_{t-j} + \sum_{m=1}^{k-1} \emptyset_m \, \Delta \mathrm{INT}_{t-m} + \sum_{n=1}^{k-1} \psi_n \Delta EXG_{t-n} + \lambda_2 ECT_{t-1} + \varepsilon_{2t} \ldots\ldots\ldots \quad (2)$$

$$\Delta \mathrm{INT_t} = \gamma + \sum_{i=1}^{k-1} \eta_i \, \Delta \mathrm{INF}_{t-i} + \sum_{j=1}^{k-1} \theta_j \Delta \mathrm{MS}_{t-j} + \sum_{m=1}^{k-1} \emptyset_m \, \Delta \mathrm{INT}_{t-m} + \sum_{n=1}^{k-1} \psi_n \Delta EXG_{t-n} + \lambda_3 ECT_{t-1} + \varepsilon_{3t} \ldots\ldots\ldots \quad (3)$$

$$\Delta \mathrm{EXG_t} = \delta + \sum_{i=1}^{k-1} \eta_i \, \Delta \mathrm{INF}_{t-i} + \sum_{j=1}^{k-1} \theta_j \Delta \mathrm{MS}_{t-j} + \sum_{m=1}^{k-1} \emptyset_m \, \Delta \mathrm{INT}_{t-m} + \sum_{n=1}^{k-1} \psi_n \Delta EXG_{t-n} + \lambda_4 ECT_{t-1} + \varepsilon_{4t} \ldots\ldots\ldots \quad (4)$$

Transforming all variables of Equations 1-4 into log form, the model is rewritten as follows:

$$\Delta \mathrm{LNINF_t} = \alpha + \sum_{i=1}^{k-1} \eta_i \, \Delta \mathrm{LNINF}_{t-i} + \sum_{j=1}^{k-1} \theta_j \Delta \mathrm{LNMS}_{t-j} + \sum_{m=1}^{k-1} \emptyset_m \, \Delta \mathrm{LNINT}_{t-m} + \sum_{n=1}^{k-1} \psi_n \, \Delta \mathrm{LN}EXG_{t-n} + \lambda_1 ECT_{t-1} + \varepsilon_{1t} \ldots\ldots\ldots \quad (5)$$

$$\Delta \mathrm{LNMS_t} = \beta + \sum_{i=1}^{k-1} \eta_i \, \Delta \mathrm{LNINF}_{t-i} + \sum_{j=1}^{k-1} \theta_j \Delta \mathrm{LNMS}_{t-j} + \sum_{m=1}^{k-1} \emptyset_m \, \Delta \mathrm{LNINT}_{t-m} + \sum_{n=1}^{k-1} \psi_n \, \Delta \mathrm{LN}EXG_{t-n} + \lambda_2 ECT_{t-1} + \varepsilon_{2t} \ldots\ldots\ldots \quad (6)$$

$$\Delta \mathrm{LNINT_t} = \gamma + \sum_{i=1}^{k-1} \eta_i \, \Delta \mathrm{LNINF}_{t-i} + \sum_{j=1}^{k-1} \theta_j \Delta \mathrm{LNMS}_{t-j} + \sum_{m=1}^{k-1} \emptyset_m \, \Delta \mathrm{LNINT}_{t-m} + \sum_{n=1}^{k-1} \psi_n \, \Delta \mathrm{LN}EXG_{t-n} + \lambda_3 ECT_{t-1} + \varepsilon_{3t} \ldots\ldots\ldots \quad (7)$$

$$\Delta \mathrm{LNEXG_t} = \delta + \sum_{i=1}^{k-1} \eta_i \, \Delta \mathrm{LNINF}_{t-i} + \sum_{j=1}^{k-1} \theta_j \Delta \mathrm{LNMS}_{t-j} + \sum_{m=1}^{k-1} \emptyset_m \, \Delta \mathrm{LNINT}_{t-m} + \sum_{n=1}^{k-1} \psi_n \, \Delta \mathrm{LN}EXG_{t-n} + \lambda_4 ECT_{t-1} + \varepsilon_{4t} \ldots\ldots\ldots \quad (8)$$

where:

α, β, γ, and δ - the vectors of constant terms;

η_i, θ_j, $\emptyset_m$, and ψ_n - the short-run dynamic coefficients of the model adjustment long-run equilibrium;

k-1 - the lag length reduced by 1;

λ_i - speed of the adjustment parameter with a negative sign;

ECT_{t-1} - the error correction term, the lagged value of the residuals obtained from the co-integrating regression of the dependent variable on the regressors, which contains long-run information derived from the long-run co-integrating relationship;

ε_i - random error term;

LNINF - log of inflation;

LNMS - log of money supply;

LNINT - log of interest rate;

LNEXG - log of exchange rate, which is measured as taka per US dollar;

t - time trend.

4. Results and Discussion

4.1. Empirical Analysis

4.1.1. Unit Root Test

From Table 1, we can see that except inflation, all the variables have a unit root at level, but all variables have no unit root at the 1st difference.

Table 1 Results of the ADF test (The author's computation using Stata 12)

Variables	Level		1st Difference	
	Intercept	Trend	Intercept	Trend
LNINF	-3.889***	-4.142**	-5.185***	-5.132***
LNMS	-1.447	-0.869	-3.280***	-3.511*
LNINT	0.270	-0.916	-3.748***	-3.956**
LNEXG	-1.253	-1.332	-3.430***	-3.330*

***, **, and * indicate that variables are stationary at 1%, 5%, and 10% significance levels, respectively.

4.1.2. Optimal Lag Selection

The AIC, Schwarz information criteria (SC), Hannan-Quinn information criterion (HQ), and final prediction error (FPE) are used to determine the maximum lag where the AIC and FPE exhibit superior performance compared with the alternative criteria examined when applied to small samples of 60 observations or fewer [13].

Table 2 Summary of lag selection criterion results (The author's computation using Stata 12)

Lag	LL	LR	FPE	AIC	HQIC	SBIC
0	30.0444		2.3e-06	-1.62778	-1.56705	-1.44456
1	154.376	248.66	2.7e-09	-8.39851	-8.09485*	-7.48242*
2	171.895	35.039	2.6e-09*	-8.49347	-7.94688	-6.84451
3	188.857	33.923	2.8e-09	-8.55357	-7.76407	-6.17175
4	208.581	39.447*	2.9e-09	-8.78629*	-7.75386	-5.6716

* indicates the lag order selected by the respective criterion.

In accordance with the Akaike information criterion, the chosen order is Lag 4, as the FPE and AIC propose varying lengths of optimal latency.

4.1.3. Johansen's Co-Integration Test

Since all variables are stationary at the 1st difference, Johanson's co-integration approach can be used to determine whether the variables are co-integrated. Johansen and Juselius's [10] co-integration tests based on ECM using an optimum lag length. We employed Akaike's final prediction error criterion to choose the appropriate lag length, which supported an optimum lag length of 4.

Table 3 presents the results of the Johansen cointegration test at the trace and maximum eigenvalue. Here, the trace and maximum eigenvalue indicate one possible co-integration relationship between LNINF, LNMS, LNINT, and LNEXG at a 5% significance level. However, it does not indicate the direction of long-run and short-run causality between the variables. Therefore, we employ the VECM estimation to determine the direction of causality.

Table 3 Results of the Johansen co-integration test (The author's computation using Stata 12)

Co-integrating Rank (*r*)	Eigenvalue	Trace Statistic	Critical Value at 5%	Max Statistic	Critical Value at 5%
$r = 0$	-	59.9952	47.21	39.3100	27.07
$r \leq 1$	0.70725	20.6851	29.68	13.0274	20.97
$r \leq 2$	0.33443	7.6578	15.41	7.0645	14.07

4.1.4. VECM

When co-integration exists within the system of variables, the VECM is estimated. This makes it possible to assess both long- and short-term coefficients. We can investigate short-term departures from equilibrium and long-term equilibrium relationships among variables by employing VECM estimation. Furthermore, the adjustment coefficients illustrate correcting the disequilibrium or short-run aberrations.

The long-run relationship between inflation, money supply, interest rate, and exchange rate for one co-integrating vector for Bangladesh in the period of 1987-2022 is revealed below (standard errors and p-vales are displayed in parenthesis):

ECT_{t-1} = [$LNINF_{t-1}$ – 5.049 $LNMS_{t-1}$ + 1.516 $LNINT_{t-1}$ + 5.757 $LNEXG_{t-1}$ – 10.199]

(0.617, 0.000) (0.475, 0.001) (0.815, 0.000)

So, $LNINF_{t-1}$ = 10.199+5.049 $LNMS_{t-1}$ – 1.516 $LNINT_{t-1}$ – 5.757 $LNEXG_{t-1}$ + ECT_{t-1}

At the 1% level of significance, every coefficient is significant. The coefficients can be understood as long-run elasticities when the variables are logarithms and only one co-integrating vector is calculated. Therefore, a 1% increase in money supply is expected to result in a 5.049% increase in inflation; this estimate is noteworthy. It is well accepted because the money supply eventually proves to be harmful to fluctuating inflation [14, 15]. The inflation rate decreases by 1.516% for every 1% interest rate increase, and the 1% depreciation in the exchange rate reduces inflation by 5.757%. In general, the INF mentioned above equation result is satisfactory because money supply has a correct positive sign with the inflation rate and the interest rate has a correct negative sign with inflation.

Table 4 demonstrates the presence of both long-run and short-term causality between independent variables and their corresponding dependent variables. The coefficient of ECT (error correction term), also referred to as the speed of adjustment term, indicates long-run causality, while LD (first-lag difference), L2D (second-lag difference), and L3D (third-lag difference) indicate short-run causality.

Table 4 The VECM result summary (The author's computation using Stata 12)

Dependent variable	Independent variable				ECT
		LD	L2D	L3D	
ΔLNINF	LNINF	.0048857	-.2570317	-.2229996	-.9195191**

	Continuation of Table 4			
	LNMS	-2.953988*	-2.227882	-.6864055	
	LNINT	.8920942	2.414078	-1.364679	
	LNEXG	5.73571	1.071676	2.775245	
ΔLNMS	LNINF	-.0787581**	-.0202975	-.0103458	.0231506
	LNMS	.2053542	.0577315	-.021332	
	LNINT	-.1257918	.3121231	-.1444753	
	LNEXG	1.295892*	-.9180698	1.267582**	
ΔLNINT	LNINF	.0750562*	.0558935	.0492172*	-.1001941*
	LNMS	-.311651	-.1115003	-.6117186**	
	LNINT	.2818514	.3616252	.0534309	
	LNEXG	1.991489***	.0168551	.7095946	
ΔLNEXG	LNINF	-.0087883	-.0123744	.0207529	.0403494
	LNMS	.0390474	.2741802**	.052343	
	LNINT	-.3508776***	-.0043273	-.0363833	
	LNEXG	.3356877	-.3696699	-.1707998	

***, **, and * indicate that variables are stationary at 1%, 5%, and 10% significance levels, respectively.

The coefficient of the error correction term for inflation as the dependent variable is negative and statistically significant at a significance threshold of 5%. This suggests a robust long-term relationship between money supply, interest rate, exchange rate, and inflation. The coefficient for the error correction term of the interest rate, when it is the dependent variable, is negative and statistically significant at the 10% level. This indicates a strong and enduring relationship between inflation, money supply, exchange rate, and interest rate.

In the short run, at first-lag difference, LD, there exists bidirectional causality between the inflation and money supply. The same directional relationship at the same lag difference also exists between the exchange and interest rates. Unidirectional causality exists between the exchange rate and money supply because LD and L3D of the exchange rate influence the money supply, whereas only L2D of the money supply affects the exchange rate. Unidirectional causality between the inflation and interest rates also exists where LD and L3D of the inflation impact the interest rate, but there is no significant relationship between the interest and inflation rates.

Table 5 shows that we cannot reject the null hypothesis in all cases because the p-value > 0.05. Therefore, there is no overall short-run causality between the money supply, interest and exchange rates, and inflation.

Table 5 Summary of the overall short-run causality between the money supply, interest and exchange rates, and inflation (The author's computation using Stata 12)

Null and alternative hypotheses	P-value
Ho: There is no overall short-run causality between the money supply and inflation.	0.2934
Ha: There is an overall short-run causality between the money supply and inflation.	
Ho: There is no overall short-run causality between the interest rate and inflation.	0.4796
Ha: There is an overall short-run causality between the interest rate and inflation.	
Ho: There is no overall short-run causality between the exchange rate and inflation.	0.6581
Ha: There is an overall short-run causality between the exchange rate and inflation.	

4.2. Diagnostic Test

4.2.1. Autocorrelation Test

The Breusch-Godfrey serial correlation LM test is used to test serial correlation between residuals of the model. The null and alternative hypotheses are as follows:

Ho: There is no serial correlation of any order.

H1: There is serial correlation in the residual.

According to Table 6, we cannot reject the null hypothesis because p-value > 0.05. Therefore, there is no autocorrelation among the residual terms.

Table 6 LM test result summary (The author's computation using Stata 12)

Lag	P-value
1	0.79895
2	0.45751

4.2.2. Normality Test

The VECM model's error terms should have a normal distribution. The parameter estimates will only be efficient if the error terms are normally distributed, but the outcomes will still be reliable. The Jarque Bera, Skewness, and Kurtosis tests are used to verify that the error terms are normally distributed. Here, the null and alternative hypotheses are as follows:

Ho: The error terms are normally distributed.

H1: The error terms are not normally distributed.

Table 7 shows that we cannot reject the null hypothesis because the p-value > 0.05. Therefore, the error terms are normally distributed.

Table 7 Results of the normality tests (The author's computation using Stata 12)

Equation	The Jarque-Bera test (P-value)	Skewness test (P-value)	Kurtosis test (P-value)
D(LNINF)	0.85191	0.62220	0.78035
D(LNMS)	0.98676	0.89355	0.92551
D(LNINT)	0.94875	0.76173	0.90822
D(LNEXG)	0.54959	0.45798	0.42143
All	0.98994	0.92406	0.94552

4.2.3. Stability Test

According to the VECM stability criterion, the model's unit moduli will be *K*-*r*. In this case, *r* denotes the number of co-integrating vectors, and *K* is the number of endogenous variables in the model. In this study, the number of endogenous variables, $K = 4$, and the co-integrating vector, $r = 1$. If the study found *K*-*r* = 4-1, which means 3 unit moduli, we can say that the model is stable.

According to Table 8, the stability results of the studied VECM model with four lagged differences revealed three unit moduli, which satisfies the stability condition of the VECM model. This indicates that the number of co-integrating vectors has been specified correctly.

Table 8 The VECM stability test result summary (The author's computation using Stata 12)

Eigenvalue			Modulus
1			1
1			1
1			1
.4530996	+	.7267297*i*	.856408
.4530996	-	.7267297*i*	.856408
.08626562	+	.8293938*i*	.833868
.08626562	-	.8293938*i*	.833868
.	.	.	.
.	.	.	.
.	.	.	.
.3832726	+	.4294131*i*	.575581
.3832726	-	.4294131*i*	.575581

5. Conclusion

This study analyzed the impact of contractionary monetary policy on inflation in Bangladesh from 1987 to 2022. In this study, broad money is used as a proxy for money supply, lending interest rates are used as a proxy for interest rates, and weighted average exchange rates are used as a proxy for exchange rates. The ADF test is used to check the stationarity of the variables. The result of ADF showed that all variables are stationary at the 1st difference. As a result, Johansen's co-integration techniques were used, revealing a co-integrated equation in the model. Therefore, the VECM is used for the estimation. The VECM estimation shows that the coefficient of error correction with inflation rate as a dependent variable is negative and statistically significant at 5%, implying a robust long-run relationship between money supply, interest rate, exchange rate, and inflation rate. In the short run, bidirectional causality exists between the money supply and inflation only at the first lag. However, there is no overall short-run significant causality between the money supply, interest rate, exchange rate, and inflation.

This article provides a valuable academic contribution by combining and expanding current literature on the connection between monetary policy and inflation, specifically in Bangladesh. By utilizing sophisticated econometric methods like VECM, it offers a detailed comprehension of the immediate and prolonged interactions between monetary factors and inflation. Moreover, the discovery of a reciprocal relationship between the money supply and inflation in the near term enhances the existing knowledge, questions established beliefs, and encourages additional investigation in this field.

The findings emphasize the necessity for policymakers to adopt a sophisticated approach that considers both immediate and long-lasting connections between monetary variables and inflation. The recommendations arising from this research involve optimizing monetary policy instruments to tackle particular inflationary patterns, improving data gathering and analysis capabilities to make more knowledgeable decisions, and promoting ongoing research collaboration between academia and policymakers to refine monetary policy frameworks in accordance with changing economic circumstances. In addition, the study emphasizes the need for continuous monitoring and assessment of the efficacy of monetary policy tools in attaining the intended inflation results, with the aim of promoting long-term economic growth in Bangladesh.

References

[1] NGUYEN T. T., PHAN, T. D., and TRAN N. A. Impact of fiscal and monetary policy on inflation in Vietnam. *Investment Management and Financial Innovations*, 2022, 19(1): 201-209. http://dx.doi.org/10.21511/imfi.19(1).2022.15

[2] BANGLADESH BANK. *Current inflation*, 2024. https://www.bb.org.bd/en/index.php/econdata/inflation

[3] ZAMAN M. A. Govt aims to keep average inflation within 6%. *The Daily Star*, 2023. https://www.thedailystar.net/special-events/national-budget-2023-24/news/govt-aims-keep-average-inflation-within-6-3335206

[4] DANIEL G. A., & NUHU M. Monetary Policy and Inflation Control in Nigeria. *Journal of Economics and Sustainable Development*, 2015, 6(8): 108-115. https://iiste.org/Journals/index.php/JEDS/article/view/21911

[5] HOSSAIN A. A. Does money have a role in the inflation process? Evidence from Australia. *Australian Economic Papers*, 2019, 58(2): 113-129. https://doi.org/10.1111/1467-8454.12143

[6] AHIABOR G. The Effects of Monetary Policy on Inflation in Ghana. *Developing Country Studies*, 2013, 3(12): 82-90. https://iiste.org/Journals/index.php/DCS/article/view/8678

[7] TRAN N. The long-run analysis of monetary policy transmission channels on inflation: a VECM approach. *Journal of the Asia Pacific Economy*, 2018, 23(1): 17-30. https://doi.org/10.1080/13547860.2018.1429199

[8] AGARWAL M., & SHAH I. A. *Monetary Policy Effect on Inflation and Growth*. Research and Information System for Developing Countries, New Delhi, 2019. https://www.ris.org.in/sites/default/files/Publication/DP___239%20Manmohan%20Agarwal%20and%20Irfan%20Ahmed%20Shah_0.pdf

[9] ISLAM M. S., & UDDIN M. T. Inflation Targeting as the Monetary Policy Framework: Bangladesh Perspective.

Economia. Seria Management, 2011, 14(1): 106-119. https://management.ase.ro/reveconomia/2011-1/10.pdf
[10] JOHANSEN S., & JUSELIUS K. Maximum Likelihood Estimation and Inference on Cointegration – with Applications to the Demand for Money. *Oxford Bulletin of Economics and Statistics*, 1990, 52(2): 169-210. https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x
[11] JOHANSEN S. Statistical Analysis of Cointegration Vectors. *Journal of Economic Dynamics and Control*, 1988, 12(2-3): 231-254. http://dx.doi.org/10.1016/0165-1889(88)90041-3
[12] GRANGER C. W. J. Causality, cointegration, and control. *Journal of Economic Dynamics and Control*, 1988, 12(2-3): 551-559. http://dx.doi.org/10.1016/0165-1889(88)90055-3
[13] LIEW V. K. S. Which lag length selection criteria should we employ? *Economics Bulletin*, 2004, 3(33): 1-9. http://www.accessecon.com/pubs/EB/2004/Volume3/EB-04C20021A.pdf
[14] DEKKICHE D. Impact of Money Supply on Inflation Rate in Egypt: A VECM Approach. *Economics and Business*, 2022, 36: 134-148. https://doi.org/10.2478/eb-2022-0009
[15] LIU L., BASHIR T., ABDALLA A. A., SALMAN A., RAMOS-MEZA C. S., JAIN V., and SHABBIR M. S. Can money supply endogeneity influence bank stock returns? A case study of South Asian economies. *Environment, Development and Sustainability*, 2022, 26(2): 2775-2787. https://doi.org/10.1007/s10668-022-02867-6

参考文:

[1] NGUYEN T. T.、PHAN、T. D. 和 TRAN N. A. 财政和货币政策对越南通货膨胀的影响。投资管理与金融创新，2022，19(1)：201-209。http://dx.doi.org/10.21511/imfi.19(1).2022.15
[2]孟加拉国银行。当前通货膨胀，2024年。https://www.bb.org.bd/en/index.php/econdata/inflation
[3] ZAMAN M.A. 政府的目标是将平均通胀率控制在6%以内。《每日星报》，2023年。https://www.thedailystar.net/special-events/national-budget-2023-24/news/govt-aims-keep-average-inflation-within-6-3335206
[4] DANIEL G. A., & NUHU M. 尼日利亚的货币政策和通货膨胀控制。经济与可持续发展，2015，6(8)：108-115。https://iiste.org/Journals/index.php/JEDS/article/view/21911
[5] HOSSAIN A.A. 货币在通货膨胀过程中发挥作用吗？来自澳大利亚的证据。澳大利亚经济论文，2019，58(2)：113-129。https://doi.org/10.1111/1467-8454.12143
[6] AHIABOR G. 货币政策对加纳通货膨胀的影响。发展中国家研究，2013，3(12)：82-90。https://iiste.org/Journals/index.php/DCS/article/view/8678
[7] TRAN N. 货币政策传导渠道对通货膨胀的长期分析：VECM方法。亚太经济杂志，2018，23(1)：17-30。https://doi.org/10.1080/13547860.2018.1429199
[8] AGARWAL M., & SHAH I.A. 货币政策对通货膨胀和增长的影响。发展中国家研究和信息系统，新德里，2019年。https://www.ris.org.in/sites/default/files/Publication/DP___239%20Manmohan%20Agarwal%20and%20Irfan%20Ahmed%20Shah_0.pdf
[9] ISLAM M. S., & UDDIN M. T. 将通货膨胀目标作为货币政策框架：孟加拉国的视角。经济。赛瑞亚管理，2011，14(1)：106-119。https://management.ase.ro/reveconomia/2011-1/10.pdf
[10] JOHANSEN S., & JUSELIUS K. 协整的最大似然估计和推断-及其在货币需求中的应用。牛津经济与统计公报，1990年，52(2)：169-210。https://doi.org/10.1111/j.1468-0084.1990.mp52002003.x
[11] JOHANSEN S. 协整向量的统计分析。经济动态与控制杂志，1988，12（2-3）：231-254。http://dx.doi.org/10.1016/0165-1889(88)90041-3
[12] GRANGER C. W. J. 因果关系、协整和控制。经济动态与控制杂志，1988，12（2-3）：551-559。http://dx.doi.org/10.1016/0165-1889(88)90055-3
[13] LIEW V. K. S. 我们应该采用哪种滞后长度选择标准？经济通报，2004，3(33)：1-9。http://www.accessecon.com/pubs/EB/2004/Volume3/EB-04C20021A.pdf
[14] DEKKICHE D. 货币供应对埃及通货膨胀率的影响：VECM方法。经济与商业，2022，36：134-148。https://doi.org/10.2478/eb-2022-0009
[15] LIU L., BASHIR T., ABDALLA A. A., SALMAN A., RAMOS-MEZA C. S., JAIN V., 和 SHABBIR M. S. 货币供给内生性能否影响银行股票收益？南亚经济体的案例研究。环境、发展与可持续发展，2022, 26(2): 2775-2787。https://doi.org/10.1007/s10668-022-02867-6