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Econometric Insights into South Asia's Monetary, Output, and Price Dynamics: A Simultaneous Equation Modeling Approach

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ABSTRACT

This study focuses on investigating the simultaneous relationship among money supply, inflation, and output of emerging South Asian countries. Data from seven countries in the South Asian region, spanning from 2000 to 2022, is collected for the analysis. Three variables are considered endogenous: Money Supply, Output, and Inflation. Following the fulfillment of assumptions, we employed the Panel Two-Stage Least Squares (Panel 2SLS) method to examine the relationship between money, output, and prices. The results indicated a significant bidirectional relationship between output and money supply, meaning that a higher money supply is associated with increased output and vice versa. Additionally, a unidirectional empirical relationship is observed between inflation and money supply. As the money supply does impact the output, so neutrality of money does not hold. The study recommends South Asian countries establish a policy framework that cautiously adjusts the money supply, balancing the need to prevent excessive inflation or deflation to maintain sufficient liquidity to support optimal economic output.

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1. Introduction

The effects of inflation are detrimental to economic progress, the advancement of financial markets, and the needy, particularly the poor. Since inflation has the effect of lowering real incomes in the economy, even moderate amounts of it can be detrimental to growth. Now, the primary focus of central banks and other major financial institutions around the world should be on achieving low inflation while maintaining price stability. Studies have shown that inflation has a negative impact on economic growth, which is supported by the widespread consensus among economists that there is a close connection between the amount of money in circulation and inflation. Studies based on empirical evidence have demonstrated that the quantity of money has both a short-term and a long-term impact on the cost of goods and services. Some people believe that output initially has an effect on the money supply, but that it ultimately has a long-term effect on pricing. The monetarist and Keynesian schools of thought both have strong opinions regarding the link between money, output, and prices. The quantity theory of money (QTM) proposes that when the money supply rises, there will be a commensurate rise in the price level by an equal amount. Monetarists are of the opinion that money plays a significant role in setting both prices and incomes in the economy. Keynesians place an emphasis on the demand side of the economy, with the belief that a shift in income will cause a corresponding shift in the money supply because of the overall demand in the economy. They are of the opinion that demand, as opposed to monetary measures, is the most effective tool for economic management because monetary actions take some time to bear fruit. There is also less leeway in the pricing.

Table 1: Region Wise Inflation Ranking (2021)

Country Name	Inflation Rate (%)
South Asia	5.55%
Sub-Saharan Africa	4.26%
North America	4.05%
Latin America & Caribbean	3.88%
World	3.50%
OECD members	2.82%
European Union	2.55%
East Asia & Pacific	2.48%
Euro Area	2.45%

Source: Retrieved data from World Development Indicators (WDI), database

South Asia has the highest inflation rate in 2021, continuing a pattern that has made it a hub of inflation for the region as a whole. In Southeast Asian countries, (Masnan, Shaari, & Hussain, 2013) discovered a long-term association between the amount of money in circulation, the level of output, and inflation. Inflation is caused by economic development in Malaysia, Indonesia, and Singapore; nevertheless, Malaysia's money supply is not responsible for inflation in Malaysia. In both Malaysia and Singapore, the relationship between the amount of money in circulation and inflation is unidirectional, with economic growth taking the place of output. The monetarist school of thought holds that inflation is detrimental to economic growth, while the structuralist school of thought maintains that it is necessary for economic progress. According to an estimate by M. S. Khan and Ssnhadji (2001), the critical level of inflation for industrial countries is between 1 and 3 percent, whereas the critical level for developing countries is between 11 and 12 percent. When inflation falls below this threshold, it has a direct impact on economic growth.

Every nation often succeeds in maintaining price stability while simultaneously expanding its economy. When a country is experiencing a recession, one tool that can help it recover is its monetary policy. Although the government is using the money supply as a tool for recovery, officials are still debating how best to approach this issue. The expansion of the money supply will result in higher economic growth, but it will also bring about the problem of inflation. According to Ziotis and Papadas (2011), inflation is caused by an increase in the money supply. Because the amount of money in circulation has a direct bearing on the rate of economic expansion, it is of the utmost importance to devise an appropriate strategy for managing the money supply if one wishes to attain a state of equilibrium between expansion and inflation. The connection between money supply and economic growth, as found by Ogunmuyiwa and Ekone (2010) as well as M. A. Khan, Qayyum, Sheikh, and Siddique (2005), is to be explained. This connection is independent of inflation.

Controversies are found among different schools of thought regarding the relationship between money, growth, and prices. A lot of work has been done by countries around the world on these variables because they are considered important. Monetary policy and other important implications can be devised with the help of these variables. Evidence is needed to support the relationship between price, money, and income because the previous studies provide ambiguous results. The significance of the study is Money, output, and prices are important variables of financial stability and economic development. Without price stability, optimal money supply, and economic growth it would be impossible for a country to achieve long-term progress and development goals and compete with the rest of the world economies. Hence this study aims to provide insight for policymakers to provide weight on developing policies that will stimulate output in keeping in view monetary policy, fiscal policy, and financial regulation and supervision. This study applies a more efficient technique of estimation i.e. Panel 2SLS which provides more efficient and consistent results. The purpose of the study is to conduct an investigation through the use of empirical methods into the simultaneous link that exists between money, output, and prices in a balanced panel of South Asian economies. The research was broken down into seven pieces. After the introduction comes the second section, which is all about the literature, both theoretical and empirical. The conceptual structure of the theory is discussed in the third section. The discussion of data, models, and technique takes place in the fourth section. The fifth segment will initially focus on the findings and subsequent conversations. In the sixth section, both the conclusion and the recommendations for public policy are discussed.

2. Literature Review

Extensive theoretical and empirical research has examined the relationship between money, inflation, and economic growth. Most literature has used the single equation model and lesser efforts are directed to develop simultaneous models. Some of the theoretical and empirical literature on subject matter is reviewed in this section.

The monetary function, which is a function of demand-pull inflation, is the primary emphasis of the monetarist theoretical framework. Inflation is analysed through the lens of the quantity theory of money, which views it as a monetary phenomenon that results from expansionary monetary policy. Fisher's exchange equation is what determines the connection between the amount of money in circulation and the price level. The money supply has no effect on the level of real production. In contrast to the monetarist perspective, that of John Maynard Keynes holds that an increase in aggregate demand results in an increase in demand-pull inflation. Keynes held the belief that changes in the amount of money available in the economy would have an effect on the demand in the economy, which would then influence both production and pricing. Nevertheless, this can lead to an increase in prices if supply and demand are not balanced. In order to provide an explanation for inflation in developing nations, structuralists such as Myrdal and Straiten generalise structuralist theory. They say that money supply is not the main determinant of the link between money, output, and growth, and that the increase in inflation is due to structural imbalances and imperfection in the markets of emerging nations, which cannot be rectified by monetary policy. In addition, they claim that the relationship between money, production, and growth is not linear.

Using the existing body of empirical research, Parikh and Starmer (1988) explore the link between the money supply and prices in Bangladesh between the years 1973 and 1986. Granger causality is utilized here for empirical estimate purposes. The structuralist position, which comes to the conclusion that the rigorous exogeneity of money is denied, is supported by this study.Using the VAR technique of estimation, Chowdhury, Dao, and Wahid (1995) examines a dynamic relationship in Bangladesh between monetary policy, output, and inflation from 1974 to 1992. The time period covered is from Bangladesh. According to the findings of the study, monetarists and structuralists are unable to provide an adequate explanation for the inflationary process in Bangladesh. The stance of the central bank with regard to monetary policy has a large and unidirectional bearing on real production. There is a significant impact that monetary shocks have on inflation in the short run.

In their study from 2007, Veni and Choudhury investigated the inflation and growth conundrum facing the Indian economy. Between the years 1981 and 2004, the Granger causality test and the empirical causality model (ECM) were utilised for empirical estimation. The outcome of the study is that the causality test demonstrates that economic expansion and inflation are not causally related to one another. The co-integration test demonstrated that inflation and growth are not linked throughout the course of a full economic cycle. The empirical study on inflation and economic growth in Bangladesh from 1988 to 2008 that M. S. Ahmed (2010) conducted is subjected to some experiments. For its estimation, the study makes use of the Granger causality test, the ARDL, and the bound co-integration technique. In the end, it is stated that the two series do, in fact, co-integrate with one another. There is evidence of a statistically significant association between the variables in the short run, but there is no evidence of such a relationship in the long run. There appears to be a single-track chain of causation leading from inflation to expansion of the economy.

Ayubu (2013) examines the significance of monetary policies in inflation movements. This study inspects how much the price scale changes due to changes in monetary policies in Tanzania. The elements of inflation used in the study are the exchange rate, real GDP, and money supply. It is found that all variables play an important role in sustaining inflation. Therefore, money supply is not the only variable that affects inflation, but GDP is effective more than other elements both in the long run and short run. Korkmaz (2015) analyzes the impacts of bank credits on economic growth and inflation in ten European countries[1] for 2006-2012 using OLS regression. The result of panel data analysis declared that economic growth is affected by the domestic credits created by banks but it did not affect inflation.

[1] 10 European countries are Finland, Greece, Hungary, Spain, Italy, Poland, France, Germany, Turkey and United Kingdom

In his study, Majumder (2016) analyses data covering the years 1975 to 2013 to determine how inflation affected the rate of economic expansion in Bangladesh. The methods of estimate that are utilised are the co-integration approach developed by Johnson, ECM, and VAR. According to the findings, there is a considerable positive correlation that occurs over the long run between expansion of the economy and inflation. Khan and Khan (2018) provide evidence that there is a correlation between rising prices and expanding economies in five different Asian nations from 1973 to 2016. Both simple regression and fixed and random effect regression demonstrate that there is a significant negative link between inflation and economic growth. Both types of regression show that there is a negative association between the two variables. The authors of the aforementioned study, Sultana, Koli, and Firoj (2019), analyse the causal relationship that exists between money supply and inflation. In this work, the estimation of monthly time series data for the span of time from May 2010 to December 2017 is performed using co-integration and VECM methodologies. According to the findings of the study, there is a long-run co-integration between the variables. According to the findings of the study, inflation and money supply have a causative relationship that is both bidirectional and unidirectional in the long run. On the other hand, a unidirectional causal relation can be established between inflation and narrow and broad money in the short run.

Both Van (2020) and Nasir, Waheed, and Nasir (2021) did research on the connection between the money supply and inflation, with a particular emphasis on Vietnam between the years 2012 and 2016. Van came to the conclusion that monetary policy has a beneficial effect on economic growth, whereas the expansion of the money supply is the primary factor that contributes to inflation. Nasir et al. (2021) brought attention to the function that the central bank plays in price regulation through the provision of money, noting that there is a considerable connection between cash supply and prices. Inflation and economic growth were examined by Muzib (2022) in six South Asian nations from the years 2000 to 2019. They found a direct association between the two variables in Bangladesh, Sri Lanka, and Nepal, but an inverse relationship in India, Bhutan, and Pakistan. According to the findings of the study, there is a threshold level of inflation at 5.80 percent or higher, which indicates that inflation has a negative influence on economic growth. It is essential to keep a close eye on the expansion of the money supply in order to keep inflation under control.

Iliyasu, Mamman, and Ahmed (2023) examine the impact of climate change on output and inflation in Africa's largest economies[2] from 2002-M01 to 2020-M12 using the Structural Auto-Regression Model. The study concludes that if climate change rises, output is reduced while prices increase across the countries. It has more effect in Nigeria and South Africa while less effect in Egypt. After reviewing the theoretical and empirical literature it is established that the literature provides mixed pieces of evidence. The results of the studies can be categorized as making one of three possible predictions. The first of these is that there is a positive relationship while some show a negative relationship between inflation and money supply. The third is that inflation and money supply do not affect economic growth. However, to gain deeper insights we need to develop a simultaneous equation model rather than looking into a single equation model. In recent decades, substantial theoretical and empirical research has investigated the inflation-growth and money-growth nexus. The results of existing studies have been mixed and most of the previous studies have used time series data on the regional level. Very few studies are found with panel data simultaneous equations. The lack of well-researched and published papers regarding the money, output, and price linkages, creates a research gap in this field of study. The present study aims to check the association among money, prices, and output by using panel data making simultaneous equations in the case of South Asian countries.

3. Theoretical Framework

3.1. Formulation of Price Equation

We use the Quantity Theory of Money (QTM) equation to measure the country's general price level, which reflects monetarists' view that a rise in money supply affects prices. The equation of QTM can be stated as:

$$Mt\,Vit = Pit\,Yit \quad (1)$$

[2] Egypt, Nigeria, South Africa

Where, M_{it} is Total dimensions of money supply (M1, M_2, or M3), V_{it} is velocity of money, P_{it} is Price level, Y_{it} is Output and 't' is time subscript. The equation for price level can be written as:

$$Pit = Mit\,Vit / Yit \quad (2)$$

According to equation (2), the price level is determined by the amount of money in circulation, the rate at which money is changing hands, and the level of production in that country. After applying a natural log to both sides of the equation, the final equation can be found:

$$LnPit = LnMit + LnVit - LnYit \quad (3)$$

According to the equation that describes the level of prices over the long term, money supply has a positive influence on prices, whereas aggregate output has a negative influence on prices. Although the quantity theory of money predicts that velocity and output would remain constant over the course of a lengthy period of time, this assumption does not hold true for developing economies, in which output frequently varies from its potential level. In addition, we need to abandon the implausible premise that the velocity of money would remain the same because the velocity of money has a tendency to increase as a result of variables such as the rapid expansion of economic activities, the monetization of the economy, and changes in the architecture of financial institutions.

3.2. Formulation of Money Supply Equation

The money supply equation can be derived by applying the money market equilibrium condition which states that S_M (Money Supply) equals D_M (Demand of Money). The equation that represents the demand for money, considering both transitive and speculative motives, is as follows:

$$DM = K(Yit, Rit) \quad (4) \qquad \text{Where } K_y > 0,\ K_R < 0$$

We know that the money supply is:

$$SM = Mit / Pit \quad (5)$$

Where, Y_{it} is level of income, R_{it} is rate of interest, K_y is parameter of money demand to income or output, K_R is parameter of money demand to interest rate, M_{it} is money supply, P_{it} is general price level and 't' is time subscript. As the market of money requires equilibrium in the long run, we equate equations (d) and (e) we get;

$$Mit / Pit = K(Yit, Rit) \quad (6)$$

The following equation is the nominal money stock which is the transformed form of the connection between money balances and real money supply

$$Mit = P * K(Yit, Rit) \quad (7)$$

Finally, the multiplicative form of the money supply equation can be obtained as

$$Mit = Pit\lambda 0 * Yit\lambda 1 * Rit\lambda 2 \quad (8)$$

The above equation (h) can be written in a logarithmic form as

$$LnMit = \lambda 0 LnPit + \lambda 1 LnYit + \lambda 2\, LnRit \quad (9)$$

The above equation declares that in the long run money supply is the function of price, interest rate, and output. Although this model shows the interest rate in a log if we take the interest rate in percentages, we cannot take the log.

3.3. Formulation of Output Equation

The output function employed in this study incorporates capital, labor, government expenditure, governance, money supply, financial development, prices, lagged capital, and globalization as additional factors.

$$Yit = \delta 0 + \delta 1Kit + \delta 2Lit + \delta 3GEit + \delta 4GOVit + \delta 5\, M2it + \delta 6\, FDit + \delta 7Pit + \delta 8Kit - 1\, \delta 9Git$$

In the above equation, Y_{it} is output level, P_{it} is general price level, K_{it} is capital, K_{it-1} is lag of capital, L_{it} is labor, G_{it} is globalization, GOV_{it} is governance, GE_{it} is government expenditure, M_{2it} is money supply and FD_{it} is financial development.

4. Data, Model and Methodology

This study focuses on the South Asian region, as it is an emerging area where understanding the dynamics of money, output, and prices is crucial for informing policy decisions and reducing business cycle fluctuations. Moreover, a high level of inflation has been recorded in this region over history.

4.1. Data and Sample Size

In order to investigate the connection that exists between money, prices, and output in South Asian countries between the years 2000 and 2022, the research makes use of balanced panel data. The Maldives, Pakistan, India, Bhutan, Nepal, Bangladesh, and Sri Lanka are all included in this group of countries. The World Development Indicators (WDI), the KOF Swiss Economic Institute and Freedom House database, the International Monetary Fund (IMF), World Governance Indicators (WGI), the Asian Development Bank, and the ministries of cross-sectional units all contributed annual observations of all the variables.

Table 2: Description of Variables

Variables	Proxy	Unit of Measurement	Symbol	Source
Dependent Variables				
Prices	GDP Deflator	Index	Ln P_{it}	WDI
Money Supply	Broad Money	Millions LCU	Ln M_{2it}	WDI
Economic Growth	Real GDP	Millions LCU	Ln Y_{it}	WDI
Independent Variables				
Velocity of money	Broad money / Nominal GDP	Millions LCU	Ln V_{it}	WDI
Interest rate	Lending interest rate	%	R_{it}	WDI, Ministries
Capital	Gross Capital Formation	Millions LCU	Ln K_{it}	WDI, Asian Development Bank, Finance Ministries of cross-sectional units
Labor	Labor Force Participation	Millions	Ln L_{it}	WDI
Globalization	Dreher's Globalization[3]	Index	G_{it}	KOF Swiss Economic Institute and Freedom House database
Governance	Governance Indicators[4]	Average	GOV_{it}	WGI
Financial Development	Financial Development Index	Index	FD_{it}	IMF
Government expenditure	General government final consumption expenditure	Millions LCU	Ln GE_{it}	WDI

The selection of these variables in this study is driven by their paramount importance in understanding the intricate dynamics of economic systems. Money, prices, and output are fundamental indicators of economic health, and their simultaneous relationships are crucial for policy formulation and economic stability assessment. Moreover, the inclusion of globalization, governance, government expenditure, financial expenditure, labor, capital, and lag of capital reflects a comprehensive theoretical framework supported by existing literature, allowing for a holistic analysis of the factors influencing these core economic variables. The data is reported on an annual basis. Additionally, the availability of reliable data on these variables makes them

[3] It includes Political Globalization, Economic Globalization, and Social Globalization.
[4] Voice and Accountability, Absence of Violence/Terrorism, Political Stability, Regulatory Quality, Control of Corruption, Rule of Law, Government Effectiveness and Governance.

practical choices for empirical investigation, ensuring the study's feasibility and relevance to real-world economic scenarios.

4.2. Simultaneous Model (Money Prices and Output)

$$LnPit = \underset{(+)}{\alpha 0 LnM2\,it} + \underset{(-)}{\alpha 1 LnVit} - \underset{(-)}{\alpha 2 LnYit} \quad (10)$$

$$LnM2it = \underset{(+)}{\lambda 0 LnPit} + \underset{(+)}{\lambda 1 LnYit} + \underset{(-)}{\lambda 2 Rit} \quad (11)$$

$$LnYit = \underset{(-)}{\delta 0} + \underset{(+)}{\delta 1 Pit} + \underset{(+)}{\delta 2 Git} + \underset{(+)}{\delta 3 LnGEit} + \underset{(+)}{\delta 4 GOVit} + \underset{(-)}{\delta 5 LnM2it} + \underset{(+)}{\delta 6 FDit} + \underset{(-)}{\delta 7 LnKit} + \underset{(+)}{\delta 8 LnKit - 1} + \delta 9 LnLit \quad (12)$$

Since this is a simultaneous equation framework, prices, money supply, and growth are the dependent variables and also work as explanatory variables on the right-hand side of the equations. In the present study, the dependent variables are money, prices, and output. They have a simultaneous relationship with each other. The equation of price depends on money supply, velocity, and output. The equation of money supply depends on prices, output, and interest rates. Whereas the equation of output depends on prices, money supply, globalization, governance, government expenditure, financial expenditure, labor, capital, and lag of capital.

4.3. Methodology

Panel OLS is an inappropriate technique for estimation due to the presence of simultaneity bias, it leads to biased and inconsistent results. As OLS assumes that the explanatory variables are uncorrelated and exogenous to the error terms. To address the problem of simultaneity Panel 2SLS is used as an estimation technique.

4.3.1. Simultaneity Bias

It is also called endogeneity bias or reverse bias. Simultaneity bias is a bias that arises when a two-way connection is established between a dependent variable and one or more independent variables. In a regression estimation. It arises when the variable of interest is determined jointly but the relationship is bidirectional.

4.4. Assumptions of Panel 2SLS

4.4.1. Endogeneity

When there is a correlation between the independent variable and the error term in any regression model, then the problem of endogeneity arises. It violates the assumption that independent variables are exogenous. Endogeneity gives biased and inconsistent estimated coefficients. Instruments are introduced to address the problem of endogeneity. Panel 2SLS is the estimation technique that can be used in the presence of endogeneity.

4.4.2. Identification Problem

Any structural equation whose coefficients are estimated by the fitted reduced form coefficients is an identified equation. If it is not possible to meet this condition, the equation is classified as under-identified. An identified equation can fall into one of two categories: over-identified or exactly identified. If a single numerical value of the structural parameters is obtained, then the equation is exactly identified. If multiple values are acquired, then an equation is over-identified. To apply Panel 2SLS the equation must be over-identified. Two rules are used to check identification i.e. Order condition and Rank condition.

4.4.3. Heteroscedasticity

Another assumption of Panel 2SLS is that disturbance terms are homoscedastic. To assess the presence of heteroscedasticity, the test of heteroscedasticity will be examined with the command "*ivhottest*" in Stata. This command was proposed by Davidson and MacKinnon (1981), which shows the score of heteroscedasticity. The test statistic and corresponding p-value are used to assess the existence of heteroscedasticity in a regression model.

4.4.4. Stages of Panel 2SLS

Stage 1

During the initial stage, we need to estimate each dependent variable in the model by regressing it against all independent or exogenous variables. By obtaining these estimates, we can consider the resulting fitted values of the dependent variables as their instrumented values.

$$y1 = f(x1, x2, \ldots\ldots\ldots\ldots\ldots\ldots\ldots, xm)$$
$$y2 = f(x1, x2, \ldots\ldots\ldots\ldots\ldots\ldots\ldots, xm)$$
$$yn = f(x1, x2, \ldots\ldots\ldots\ldots\ldots\ldots\ldots, xn)$$

From the above-mentioned reduced equation fitted values of dependent variables will be obtained.

$$\hat{Y}1, \hat{Y}2, \ldots\ldots \hat{Y}N$$

Stage 2

During this stage, we substitute the actual values of the dependent variables with their estimated values obtained from the previous step. Subsequently, we utilize Ordinary Least Squares (OLS) regression to derive estimates for all the structural parameters within the system, which are referred to as Panel 2SLS estimates. Furthermore, during this stage, we estimate the covariance and variance between equations by utilizing the residuals from each equation.

5. Results and Discussions

In this section, we are going to report and discuss the empirical results of a simultaneous model on Money, Output, and Prices using panel data for South Asian economies during 2000-2022.

5.1. Results on Pre-Assumptions

As in Table 3, the p-values of Durbin chi-square and Wu-Hausman are significant therefore we reject H_0, which shows that there is endogeneity in the model.

Table 3: Endogeneity Test Results

Tests	P- value
H_0: Variables are exogenous	
Durbin chi-square	0.0685
Wu-Hausman	0.0724

Source: estimations using Stata 2016

The identification status is checked through the order condition and rank condition. All the equations are over-identified. In table 4, the p-values of all equations are more than 10%, therefore we accept H_0 (H_0 = Residuals are Homoskedastic). The result of the weak identification test is satisfactory. The variables are not weak. To conserve the space detailed results have not been reported however, results can be provided on request.

Table 4: Heteroscedasticity Test Result

	P	M_2	Y
Chi-square	8.327	11.511	13.023
p-value	0.1391	0.1178	0.1616

Source: estimations using Stata 2016

5.2. Simultaneous Model Panel 2SLS

The simultaneous model is estimated with the Panel 2SLS, and there are three equations in the model. Each equation is reported with the respective coefficient and probability value. Given this equation, we found a bidirectional relationship between the money supply and output. It supports the results of Galadima and Ngada (2017) in Nigeria, Gnawali (2019) in Nepal, and Alkhuzaim (2014) in Qatar. However, a one-way relationship between prices and money which supports the findings of A. E. M. Ahmed and Suliman (2011) in the case of Sudan and Masnan et al. (2013) in Southeast Asian countries including Malaysia, Indonesia, and Singapore.

Table 5: Simultaneous Results and Summary Statistics

Dependent Variables	Equation 1 (P_{it})	Equation 2 (M_{2it})	Equation 3 (Y_{it})
P_{it}	----------	0.3379* (.0255) [0.000]	-0.2806* (0.0202) [0.000]
M_{2it}	-0.0001 (0.0001) [0.428]	----------	0.5453* (0.0773) [0.000]
Y_{it}	0.0001 (0.0002) [0.456]	1.0219* (0.0053) [0.000]	----------
Independent Variables			
V_{it}	-0.9999* (0.0001) [0.000]		----------
R_{it}	----------	-0.2335* (0.0610) [0.000]	----------
K_{it}	----------	----------	0.2263* (0.0445) [0.000]
K_{it-1}	----------	----------	-0.0014 (0.0083) [0.867]
L_{it}	----------	----------	-0.0802* (0.0317) [0.011]
G_{it}	----------	----------	-0.0013 (0.0029) [0.638]
GOV_{it}	----------	----------	-0.0015 (0.0011) [0.173]
FD_{it}	----------	----------	-1.0399* (0.2470) [0.000]
GE_{it}	----------	----------	0.3599* (0.0359) [0.000]

Note: *indicate the level of significance. The first value is the coefficient of the variable, followed by a standard error in parenthesis and the p-value is in the square bracket.

The outcome shows that the money supply is negative and insignificant at a p-value of 0.428. This supports the work of Amassoma, Sunday, and Onyedikachi (2018), which explains that inflation has no impact on the money supply in these countries. Instead, a government should trigger other measures to overcome inflation like high exchange rates, high interest rates, etc. Given the insignificance, no valid policy inferences can be found. Output is insignificant at a p-value of 0.456 with a positive sign. The results are consistent with Ijaz (2021) whose conclusion suggests that there exists a positive and statistically significant relationship between inflation and output. Moreover, Ayyoub, Chaudhry, and Farooq (2011) analyzed that inflation below 7% has a positive effect on economic growth. Given the insignificance, no valid policy inferences can be found.

At the level of significance denoted by a p-value of 0.000, the price variable carries a substantial positive sign. During the period 2000-2022, each increase in price of one unit led to an increase in the money supply of 0.3379 units on average. The findings are in line with those found by Mbongo, Mutasa, and Msigwa (2014), who discovered that the amount of money in circulation has a considerable and beneficial impact on the rate of inflation. Because individuals will need a higher quantity of money to make equal purchases if prices continue to rise, there will be an increase in the demand for money if prices continue to rise. At the 0.000 level of significance, a positive relationship between economic growth and the money supply is found to exist. A one-unit rise in economic growth has been associated with a 1.0219-unit increase in the money supply, on average. The findings lend credence to the findings of Uwineza and Waśkiewicz (2020), who draw the inference that the expansion of the money supply contributes

favorably to the expansion of the economy. In the long run, an increase in the money supply has led to an increase in growth. The increase in output will lead to an increase in economic activity as well as an increase in the demand for money in order to complete transactions.

The result shows that prices have an inverse and significant effect on economic growth. On average, a unit change in prices corresponds to a 0.2806 units decrease in output. This study supports the work of Chaudhry, Akhtar, Mahmood, and Faridi (2011), who conclude that inflation influences economic growth negatively and inflation below 7% exerts a beneficial effect on output. When prices rise due to an increase in production cost or aggregate demand it will harm output. The impact of money supply on economic growth is positive and significant at a 1 percent level of significance. A unit change in money supply, on average, leads to an increase in economic growth by 0.5453 units. The outcome follows the monetarist view, which found a positive linkage between money on output. Chaitip, Chokethaworn, Chaiboonsri, and Khounkhalax (2015) examined in their study the positive correlation between money and output. An increase in the money supply has enhanced the availability of credit in the economy. Banks and financial institutions have more funds to lend, which will result in more output.

The equation of prices contains three independent variables out of which one is significant. The independent variable velocity of money is significant. The money velocity is significant with a positive sign. On average one-unit increase in the money velocity has decreased price by 0.999 units. The second equation is about the money supply. It consists of three independent variables namely prices, economic growth, and interest rate. All the variables are statistically significant. The third equation contains eight independent variables i.e. prices, globalization, governance, financial development, government expenditure, money supply, capital, lag of capital, and labor. In this equation prices, money supply, capital, labor, financial development, and government expenditure are significant.

6. Conclusion and Policy Suggestions

The research conducted an empirical analysis to examine the interconnectedness of money supply, output, and prices in seven South Asian countries. The study is conducted over the time of 2000-2022 using annual observation and balanced panel data for empirical investigation. The log of Broad money (millions) is used as a proxy for the money supply, the log of real GDP (millions) is used for economic growth, and the log of GDP deflator for inflation. In Table 1 the highest inflation is recorded in South Asia. This study discusses South Asia because it has been the hub of inflation over history. Every country tends to achieve price stability and economic growth. A country uses monetary policy as a tool to recover in times of recession. The government uses money supply to recover but this issue is still under discussion among policymakers. An increase in money supply will raise economic growth but cause a problem of inflation. A simultaneous model has been developed to analyze the relationship between money, output, and prices. The model consists of three equations, where money, output, and prices are considered the endogenous variables. The panel 2SLS approach is used as an estimation strategy. The study's findings suggest that there exists a two-way relationship between output and money supply, meaning they mutually influence each other. Conversely, there is a one-way relationship between prices and money supply, indicating that changes in the money supply affect prices but not the other way around.

In the equation of price, money supply and velocity of money have negative effects but only the velocity of money is significant. While the impact of economic growth is positive and insignificant. In the equation of money supply, prices, and economic growth have positive and significant effects. While interest rates affect negatively and significantly. The analysis reveals that prices have a noteworthy inverse influence on economic growth, whereas the money supply demonstrates a notable beneficial impact on economic growth. Domestic capital and government expenditures are significant and have positive effects. While the effect of lag of capital, labor, globalization, governance, and financial development is negative only labor and financial development are statistically significant. On the basis of above findings, it may be suggested that;

1. South Asian countries should establish a policy framework that cautiously adjusts the money supply, balancing the need to prevent excessive inflation or deflation to maintain sufficient liquidity to support optimal economic output. This can be achieved through

effective monetary management, such as setting appropriate interest rates and managing the money supply growth to avoid excessive inflation or deflation.

2. It is recommended that South Asian countries should implement targeted financial inclusion initiatives to ensure that underserved populations have access to financial services, enabling them to participate in economic activities and contribute to output growth. To improve financial inclusion in South Asian countries, it is essential to expand digital financial services, enhance financial literacy, simplify account opening procedures, develop agent banking, and promote microfinance programs tailored to the needs of underserved populations.
3. South Asian countries should implement financial sector reforms to enhance the efficiency and stability of their financial systems. This includes strengthening regulatory frameworks, improving supervision of financial institutions, and promoting financial inclusion.
4. South Asian countries should increase the number of skilled labor and improve technology to increase labor productivity and enhance output. To increase the number of skilled laborers, invest in vocational training programs, apprenticeships, and education, while fostering collaboration between educational institutions and industries to align skills with market demands.

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