



**CAUSALITY ANALYSIS OF MONEY AND
INFLATION IN THE PHILIPPINE ECONOMY:
EVIDENCE FROM THE PERIOD 1960 TO 2020**

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Abstract:

This work aimed to investigate the causal relationship between money and inflation (proxy by CPI) in the Philippines using Vector Autoregressive (VAR) Analysis and the Granger Causality Test. The results showed that both series are stationary in levels; hence, VAR in levels was utilized. The results of VAR(2) show a link between the two variables. The current inflation rate in the Philippines is affected by a one-year lag in money supply. The Granger causality test revealed the unidirectional connection between inflation and money. Furthermore, past levels of price stability can be used to forecast monetary stability in the Philippines. Technically, CPI Granger causes M2.

JEL: E31, E52, C32, C53, C58

Keywords: causality analysis, money, inflation, Philippine economy

1. Introduction

Money and inflation are two of the most important concepts in economics, and they significantly impact Filipinos' lives. Money is the medium of exchange, the unit of account, and the store of value. Inflation is the rate at which the general price level of goods and services rises over time (Otani, K. 1975).

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The Philippines has a long and complex history of money and inflation. The Spanish conquistadors introduced the country's first currency, the peso, in the 16th century. Over the centuries, the peso has been subject to several devaluations, contributing to inflation (Lim, G.C., 1987).

In the 19th century, the Philippines became a colony of the United States. The Americans introduced a new currency system, which pegged the peso to the US dollar at a ratio of 2:1. This helped to stabilize the peso and reduce inflation. In recent years, the Philippine economy has experienced relatively low inflation. However, inflation has risen recently due to several factors, including supply chain disruptions, the war in Ukraine, and the depreciation of the peso (Neri, J., 2022).

In addition, Bangko Sentral ng Pilipinas (2022), in a report, stated that after gaining independence from the United States in 1946, the Philippines continued to use the peso as its currency. However, the peso was devalued several times in the following decades due to economic problems. In the 1970s and 1980s, the Philippines experienced high inflation. This was due to several factors: oil price shocks, government spending, and money supply growth. In the 1990s and 2000s, the Philippine government and central bank implemented several reforms to reduce inflation. These reforms included fiscal discipline, monetary tightening, and structural reforms.

Certainly, inflation can harm economic growth. High inflation can lead to uncertainty and instability, discouraging investment and economic activity. Inflation can also harm income distribution. This is because inflation can erode the purchasing power of low-income households, while high-income households are more able to hedge against inflation (National Economic and Development Authority (NEDA), 2022). Inflation can also harm financial markets. This is because high inflation can lead to higher interest rates, which can make it more expensive for businesses to borrow money and invest (International Monetary Fund (IMF), 2022).

Moreover, money and inflation are two of the most important concepts in economics, and they significantly impact Filipinos' lives. It is important to understand the history of money and inflation in the Philippines and the implications of money and inflation for the Philippine economy. Thus, studying a causal relationship between money and inflation has received greater attention and interest. The changes between money supply and aggregate prices have a strong positive correlation; however, the direction of causality has long been a matter of controversy among researchers and has been an important area of investigation in economics. Due to this concern, many studies and research in different countries have been conducted to determine the causal relationship between money and inflation. Although increasing interest has been in investigating the relationship between the abovementioned variables in other developing countries, the Philippines receives only attention. The motivation of this study is the need for further empirical work analyzing the relationship between money and inflation in the Philippines for a better understanding of the causality between the two variables.

1.1 Objective of the Study

The study's general objective is to determine whether causality exists between money and inflation in the Philippine economy. Specifically, the study aims to achieve the following objectives:

- 1) To present the annual trend of money (M2) and inflation (CPI) in the Philippines from 1960 to 2020, and
- 2) Using the Granger causality criterion, provide empirical evidence of the relationship between money and inflation and test statistically whether causality exists between money and inflation.

1.2 Significant of the Study

This study's result may provide empirical evidence to help policymakers evaluate and forecast plans for price stability, the single objective of the Bangko Sentral ng Pilipinas. This will also significantly contribute to a better understanding of the relationship between money and inflation. Furthermore, the result of the study is an important addition to the literature on studies involving money and inflation.

1.3 Literature Review

A lot of studies and research in the past examined the relationship between money and inflation. However, the theories of some researchers needed to find a clear causal direction between the two variables.

Using three econometric methods to examine the causality between money and inflation in the USA during the period 1953-1984, Jones and Uri (1987) concluded that the broad money stock does not determine inflation. Anderson et al. (1988) reexamined Cagan's model for two hyperinflation cases in Greece (1943-1944) and Hungary (1945-1946) and found evidence in favor of a one-way causality from inflation to money growth. A similar study by Makinen and Woodward (1989) in Taiwan studied hyperinflation; their empirical findings show that while causality from money growth to inflation is countered, causation in the opposite direction cannot be ruled out. This implies a unidirectional causality from inflation to money.

Lahiri (1991) studied causality in Yugoslavia and concluded that there is a bidirectional causal relationship between money and inflation. Another study that exhibits the same result is Choudhry's (1995) study, which examined a causality test between money stock and inflation in Argentina from 1935-1962. The study concluded that bidirectional causality exists in the long and short periods.

Using the Granger causality test, Belts and Jones (1993) investigated the causality between money using M1 and M2 and inflation in Algeria from 1970 to 1988. Their conclusion was a unidirectional causality from money to inflation. Cointegration techniques were also used by Ahumada (1995) to reexamine a monetary model on monthly data for Argentina over the period 1978-1991. His results suggest a long-run relationship between money and inflation.

The study of Masih and Masih (1998) investigated the causality between money (M1 and M2) and prices in four Southeast Asian developing countries, including the Philippines, from January 1961 to April 1990 and found that money supply led prices. Thus, unidirectional causality exists in money and inflation.

On the other hand, Pinga and Nelson (2001) examined the relationship between money supply and aggregate prices for 26 countries worldwide. They found no causal relationship between prices and money (M1 and M2) in Malaysia. They also found that aggregate prices cause money supply in Chile and Sri Lanka, which agrees with the structuralist view.

Another study by Benbouziane and Benamar (2004) on the three Maghreb countries (namely Algeria, Morocco, and Tunisia) found a unidirectional causation between money and inflation in the case of Morocco and Tunisia. This result supports Darrat's (1986) finding that money causes inflation in Morocco and Tunisia, which aligns with the monetarist's view that money precedes and causes inflation.

Hossain (2005) used annual data for the period 1952-2002 to investigate the inflationary process in Indonesia within the cointegration and error-correction modeling framework. The empirical results suggest that the consumer price index (CPI), the stock of narrow (M1) or broad money (M2), and real permanent income form a (weakly) integral relationship for the complete sample period. This relationship remains broadly stable for several sub-samples, especially when the model is estimated with a narrow definition of money. A general-to-specific error-correction modeling framework investigates the dynamic relationship between money, output, prices, and the exchange rate. A significant error-correction term implies that, given economic growth, a long-run causal relationship existed between money supply growth and inflation.

Mostafavi (2007) investigated the causality between money and inflation in the Iranian economy from 1970-2005. To detect the causality between money and inflation, he used the Granger causality test via Akaike's final prediction error (FPE) criterion and concluded that money and inflation in the Iranian economy share a bidirectional causal relationship. Johansen procedures were then used for a three-time series of data, namely M1, M2, and inflation, to test weak homogeneity for taking results on whether money affects inflation or vice versa. The results of his study show that in the short run, money causes inflation, but in the long run, money cannot affect inflation. Mostafavi (2007) concluded that monetary policy is effective in the short run and can change prices, whereas money stock is only passive in the long run.

Ghazali et al. (2008) empirically examined the relationship between money and prices in Malaysia by considering monthly data of money supply M1, M2, and M3 and the Consumer Price Index from January 1974 to September 2006. They applied cointegration using the Johansen approach and application of the Toda-Yamamoto causality approach to study the money and prices interaction. Using Johansen's cointegration approach, the results show a long-run association between prices and money, in line with previous research in other countries (see, for example, Benbouziane and Benamar (2004)), implying that prices and money move together in the long run.

Using the powerful causality test procedure developed by Toda and Yamamoto (1995), they found evidence of unidirectional causation that runs from money and inflation, and this supports the quantity theorists' or monetarists' views.

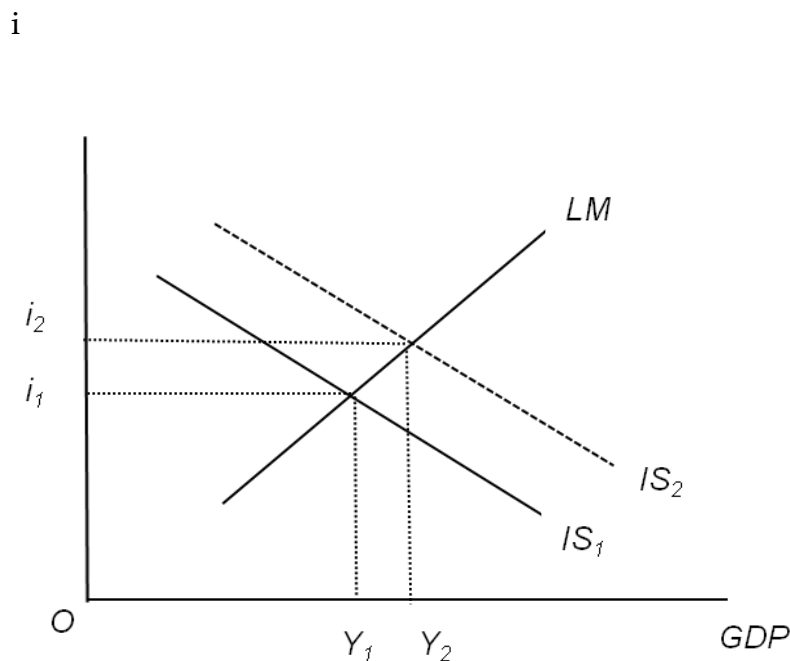
Chimobi and Uche (2010) investigated the relationship between money, inflation, and output in Nigeria using the cointegration and Granger causality test and annual data. The Johansen multivariate cointegration test indicates no cointegration or long-run relationship between money and inflation. The Granger causality test results suggest that monetary stability can contribute to the Nigerian economy's price stability since the money supply mainly causes price level variation. They also concluded that inflation in Nigeria is, to a bigger extent, a monetary phenomenon. Moreover, M2 has a strong causal effect on the prices and real output.

2. Methodology

2.1 Theoretical Framework

Two different theories explain the direction of causation between money and inflation. The widely accepted quantity theory of money says that inflation is caused by exogenous changes in the money supply (Pinga and Nelson, 2001). If all of the changes occur in price (P), then there is a proportional relationship between changes in money supply and changes in price level. In this case, inflation (an increase in P) is always a monetary phenomenon (Case and Fair, 2002). The price level will not change if the money supply does not change.

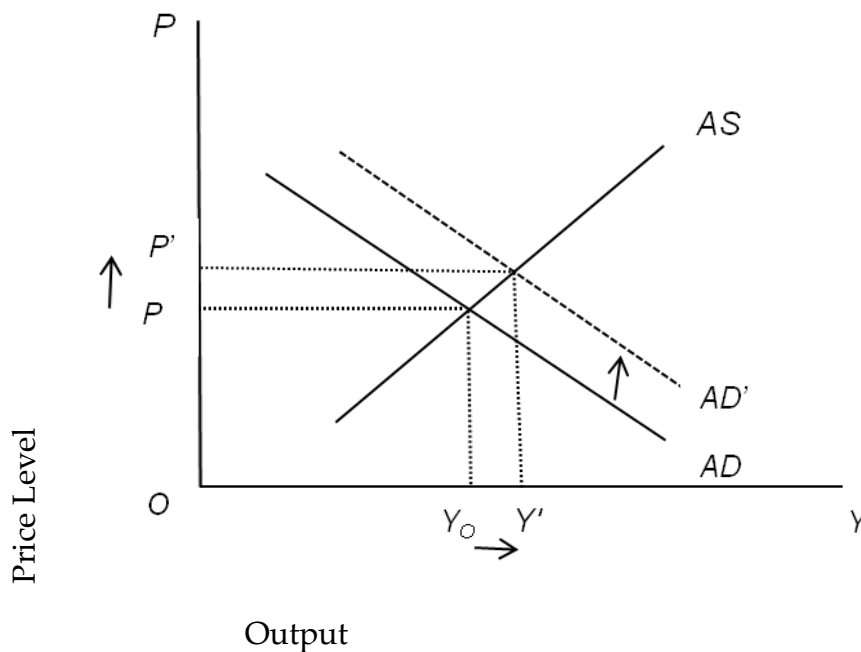
Figure 1: Investment and saving/ liquidity preference and money supply (IS-LM) model



Source: Dornbusch (2001).

The IS/LM model, as shown in Figure 1, allows for the role of monetary policy. If the money supply is increased, that shifts the LM curve downward, lowering interest rates and raising the equilibrium national income. A further exogenous decrease in liquidity preference, perhaps due to improved transaction technologies, leads to a downward shift of the LM curve and, thus, increases in income and decreases in interest rates. Furthermore, if the IS curve shifts to the right, it will cause higher interest rates and an expansion in the 'real' economy (Dornbusch, 2001).

Figure 2: Relationship between price level and output



Source: Dornbusch (2001)

In addition, the aggregate demand curve concerning the price level is devoted to developing the IS-LM model, as shown in Figure 2. The aggregate demand curve shows the combination of the price level and output at which the goods and money markets are simultaneously in equilibrium. The expansionary policies, such as increased government spending, tax cuts, and money supply increases, move the aggregate demand curve to the right.

The aggregate demand depends on the real money supply. The real money supply is the value of the money provided by the Central Bank and the banking system. If we write the money supply (the nominal money supply) as M and the price level as P , we can write the real money supply as M/P . When M/P rises, interest rates fall while investment and consumption increase, leading overall aggregate demand (AD) to rise and increasing the effect price level (Figure 2). For a given level of the nominal money supply, M , high prices mean a low real money supply, M/P (Dornbusch, 2001). Therefore, high prices mean that the value of the number of available pesos in the Philippines could be higher. This is called the "strict monetarist" view, where money plays an active role

and leads to changes in price (say, inflation). Hence, the direction of causality runs from money to inflation (changes in money (M) affect P). Moreover, the quantity theory of money tells us that the Central Bank, which controls the money supply, has ultimate control over the inflation rate; if the Central Bank keeps the money supply stable, the price level will be regular (Case and Fair, 2002).

On the other hand, Keynesians argue that money does not play a significant role in changing prices. Structural factors mainly cause changes in prices. This view is called the "minority structuralist," which holds that inflation develops from pressures arising in economic growth in economies with institutional rigidities, particularly in international transactions and agriculture. Monetary and fiscal authorities choose to expand the money supply, ratifying the inflationary pressures, rather than face unemployment or consumption and investment disruptions. Underdeveloped financial markets and a weakly independent Central Bank can contribute to the likelihood of money supply growth. Under this view, money supply is a consequence of, and therefore caused by, structural inflation (Pinga and Nelson, 2001). This study considers both theories.

2.2 Conceptual Framework

Figure 1 shows the study's conceptual framework following the theories outlined above. M2 will represent the money variable, while the Consumer Price Index (CPI) will represent inflation.

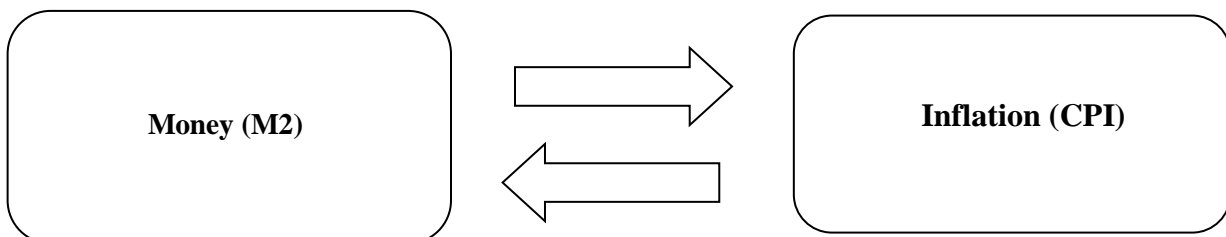


Figure 3: Possible direction of Money and Inflation Causality in the Philippines

2.3 Data Source

This study made use of annual secondary data from 1960 to 2020. Data sources for M2 (in million pesos) as a proxy for money supply and consumer price index (base year=2000) as a proxy for inflation were obtained from the *World Bank Data indicator*. Additional data were taken from other financial databases of the country, available on the internet.

2.4 Statistical Tools

The main tool used in the study is time series analysis. The time series analysis involves methods that aim to understand the underlying theory on the sequence of observations ordered in time or to make forecasts on the identified pattern based on past events (www.statsoft.com). In dealing with time series analysis, it is necessary to know whether the variables are stationary or not to avoid spurious results, such as a very high R^2 , but insignificant estimates are obtained (Warr, 2009).

To perform the estimation process, it is necessary to conduct a standard unit root test on each variable as the first step. The Augmented Dickey-Fuller (ADF) was used in testing for the presence of unit root and will be applied to the data series of this study. If the ADF test rejects the null hypothesis, then the series is stationary and does not contain a unit root. Suppose the ADF test fails to reject the null hypothesis and indicates the presence of a unit root. In that case, the series is non-stationary, in which case "smoothing" of data is necessary, and one way to do this is through differencing.

This study found that the data are stationary; hence, cointegration is not possible. This implies a long-run relationship between money supply and inflation cannot be established. However, the Vector Autoregressive (VAR) Analysis shows a short-run relationship between the variables.

According to Sims (1980) and Litterman (1976, 1986), Vector Autoregressive (VAR) models have been proven to forecast better than any simultaneous equation models. It is an econometric model used to capture the evolution and the interdependencies between multiple series, generalizing the univariate autoregressive (AR) models. In the VAR model, all variables are treated symmetrically, in which each variable is explained by its own lagged values plus the current and past values of the remaining variables in the model (Sims, 1980).

A VAR model describes the evolution of a set of k variables over the same sample period ($t = 1, \dots, T$) as a linear function of only their past evolution (Watson, 1994). Using matrix notation, the bivariate VAR model in this study is represented as:

$$\begin{pmatrix} M_t \\ CPI_t \end{pmatrix} = \begin{pmatrix} A_{10} \\ A_{20} \end{pmatrix} + \begin{pmatrix} A_{11}^{(1)} & A_{12}^{(1)} \\ A_{21}^{(1)} & A_{22}^{(1)} \end{pmatrix} \begin{pmatrix} M_{t-1} \\ CPI_{t-1} \end{pmatrix} + \dots \\ + \begin{pmatrix} A_{11}^{(p)} & A_{12}^{(p)} \\ A_{21}^{(p)} & A_{22}^{(p)} \end{pmatrix} \begin{pmatrix} M_{t-p} \\ CPI_{t-p} \end{pmatrix} + \begin{pmatrix} \varepsilon_{1t} \\ \varepsilon_{2t} \end{pmatrix}$$

Where:

t = time subscript;

M_t = money supply observed over time period t ;

CPI_t = consumer price index observed over time period t ;

A_{i0} = the parameters representing intercept terms;

A_{ij} = the polynomial in the lag operator;

p = lag length;

ε_t = the white noise or disturbance term.

In modeling VAR, it is necessary to determine the appropriate lag length for an appropriate set of variables to be included in the model. The appropriate lags for the ADF test are selected using the Akaike Information Criterion (AIC) and Schwartz Bayesian

Criterion (SBC), while we follow Greene (2003, p.267) in using the smallest integer greater than or equal to T to the power of $\frac{1}{4}$ (where T is the sample size) in choosing the truncation point for the Newey-West adjustment required for calculating the PP statistic.

In economic analysis, it is important to know whether changes in a variable will impact changes in other variables. To find out this phenomenon, this study used the Granger causality test.

The standard Granger causality test developed by Granger (1969 & 1980) is popularly used to test whether past changes in one variable help explain current changes in other variables. The basic principle of this test is that if X causes Y , then changes in X happen first, followed by changes in Y . More specifically, if X Granger causes Y , then X 's past values can help predict Y , but the reverse may not be true. The Granger Causality test is different from the common use of the term since it measures precedence and information provided by X , explaining the current value of Y . Y is said to be Granger-caused by X if X helps in the prediction of Y , or if the coefficients on the lagged X s are statistically significant. Note that two-way causation is frequently the case: X Granger causes Y , and Y Granger causes X (www.scholarpedia.org). It is essential to note that the statement “ X Granger causes Y ” does not imply that Y is the result of X .

3. Results and Discussion

This section presents the study's findings and discussion. This includes graphical plots and variable trends, stationary tests, lag length determination, VAR estimation, and Granger test results.

The annual trends of the variables, money supply (M2) and consumer price index (CPI) in the Philippines are shown in Figures 4 and 5.

3.1 The trend of the Inflation Rate (CPI) in the Philippines

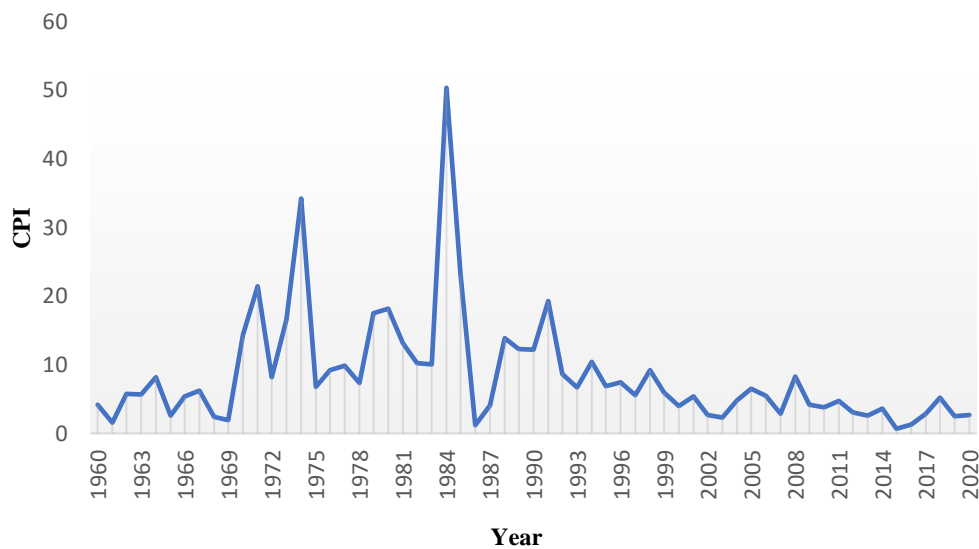
Figure 4 depicts the Philippines' inflation rate from 1960 to 2020. The trend exhibits varying behavior throughout time, related to various economic movements in the Philippines. In the 1960s, inflation was quite moderate. A major surge occurred in the early 1970s, peaking in 1974. This period saw global economic turmoil, most notably the 1973 oil crisis, which resulted in a spike in oil prices. The consequent cost-push inflation had a significant impact on overall prices. In the 1980s, inflation was high, particularly in 1984, when it reached an alarming 50.34%. Various reasons drove this, including tight monetary policy to control inflation and geopolitical developments that affected oil prices. Inflation remained high in the late 1980s and early 1990s due to fiscal policy decisions, economic imbalances, and geopolitical concerns.

In the mid-1990s, inflation fell, presumably due to increased economic stability, monetary policy, and global economic conditions. In the early 2000s, the Philippines saw generally low and stable inflation, partly attributable to efficient monetary policy and globalization trends. The financial crisis of 2008 had a deflationary influence at first. Still,

as governments worldwide pursued expansionary monetary policies, fears about inflation arose, resulting in a mild increase in future years.

Furthermore, in 2010, inflation rates were mild. The global economic recovery from the financial crisis and low oil prices for a while contributed to this stability. 2020 inflation is expected to be mild, with the COVID-19 pandemic posing new concerns. Supply chain disruptions, shifts in consumer behavior, and fiscal and monetary reactions to the crisis all impacted inflation dynamics during this period.

Figure 4: Inflation Rate (CPI) in the Philippines from 1960 to 2020



Source: World Bank Database.

3.2 The trend of the Money Supply (M2) in the Philippines

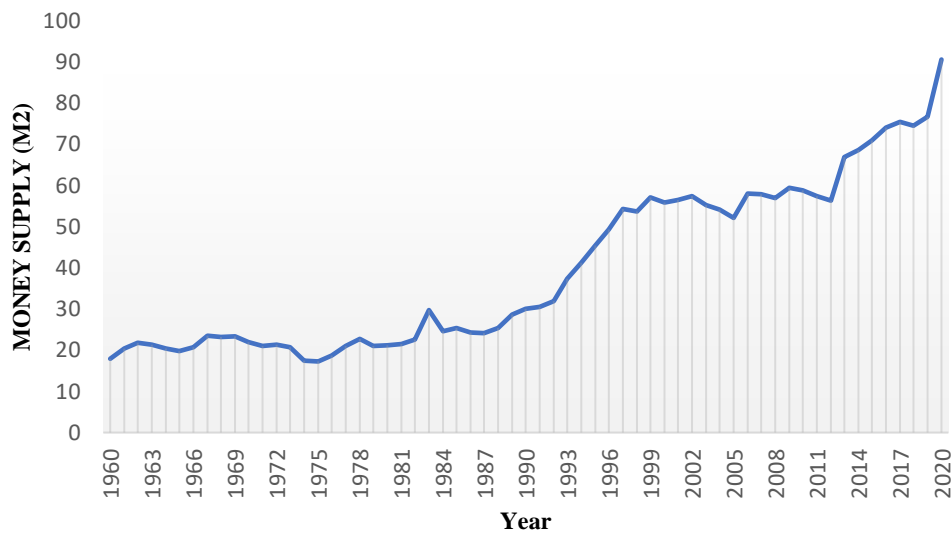
The Money Supply (M2) data trend over the years shows a general upward trajectory with some fluctuations.

During the 1960s and 1970s, M2 grew moderately, reflecting the economy's overall steadiness. M2 increased significantly in the early 1980s, which may have been impacted by monetary policy actions aimed at containing inflation and stabilizing the economy. M2 increased steadily in the 1980s and early 1990s, owing to economic expansion and financial innovation.

In the late 1990s and early 2000s, M2 rose steadily, indicating broad economic development and stability. The 2008 financial crisis increased M2 as a monetary policy response to revive the economy. The ensuing years show swings, which changes in interest rates, economic policy, and global economic conditions may impact.

The sharp growth in M2 in 2013 could be attributed to the introduction of expansionary monetary policies in response to economic problems, including in the aftermath of the financial crisis and deflation fears. The ensuing years show an upward trend, with M2 reaching its peak in 2020.

Figure 5: Money Supply (M2) in the Philippines from 1960 to 2020



Source: World Bank Database

3.3 Augmented Dickey-Fuller (ADF) Test for Unit Root

It is critical to remember that time series stationary is an important assumption in VAR analysis. To avoid spurious results and conclusions when analyzing individual data on bidirectional causality, it is necessary to test whether or not the variables are stationary (in this case, unit root). According to the University of Washington (2005), if the data is non-stationary, these time series variables exhibit trend behavior, complicating making inferences from the time-series data. Rufino (2008) also emphasized this feature of time-series data, stating that they typically move together "...as certain common overriding forces of growth and decline impact their behavior" (p. 17). As a result, unit root tests are also required to apply the correct Granger Causality Test - whether to use (1) unrestricted VAR Granger or (2) Error Correction VAR Granger. The null hypothesis in the ADF Test is that the variables contain a unit root.

Table 1: Summary of Results of Augmented Dickey-Fuller (ADF) Unit Root Test

Summary of Results of Augmented Dickey-Fuller (ADF) Unit Root Test		
Variables	Log (level)	Log First-Difference
Money (M2)	0.0379227	-0.3049936*
CPI	-0.6740258	0.086604*

Note: *statistically significant at 5%

Table 1 above revealed the results of the Augmented Dickey-Fuller (ADF) that was used to test and check the stationarity of the series technically. This study used $\alpha=5\%$, rather than the 10%. Table 1 is a summary of the results of the ADF test. Results indicated that money supply (M2) and consumer price index (CPI) are significant under the log First-Difference. Furthermore, rejecting the null hypothesis revealed that these variables do not contain unit roots. Hence, both series are stationary.

3.4 Lag Length Determination

The appropriate lag length specification in VAR modeling is an important thing to consider since choosing inappropriate lag length p reduces the accuracy of estimated coefficients in the VAR (p) model. VAR order selection was done using the StataMP Package, and outputs are presented in Table 2.

Table 2: VAR Lag Order Selection Criteria

Lag	LR	FPE	AIC
0		23105	15.7236
1	231.17*	0.000	526.077*
2	7.7174	0.102	528.941

Notes: * indicates lag order selected by the criterion.

LR: sequential modified LR test statistic (each test at 5% level), FPE: Final Prediction error, AIC: Akaike information criterion

The results in Table 2 show that the Likelihood Ratio (LR) and the Akaike Information Criterion (AIC) all chose VAR of order 1. It was decided that lag at 1 would maximize information from available data sets based on the LR and AIC tests.

3.5 VAR Analysis

This framework treats money supply (M2) and CPI symmetrically, where there is no more distinction between exogenous and endogenous variables.

Table 3 reports VAR estimation outputs indicating estimates and the standard errors of the estimates. In this study, it is essential to note that annual data observations of the variables were used. Thus, from the estimates of these economic variables, the model can be used to explain the effect of each variable on the effect of the immediate past one-year values of another variable. That is, the expected effect of a variable on another is felt one year later. Results are given using a level of significance of 5 percent.

According to the VAR(2) results, there is a relationship between money supply (M2) and consumer price index (CPI), and estimates of the unrestricted VAR(2) model yielded empirically significant results, implying that the value of CPI one year ago has a direct effect on the current value of M2. Conversely, the value of M2 one year ago influences the current value of CPI. This study's conclusions are congruent with those of Mostafavi (2007), who found that money promotes inflation in the short run but does not affect inflation in the long term. Monetary policy is effective in changing prices in the short run, but in the long run, money stock is ineffective. Furthermore, as the general price level rises, each money unit buys less products and services. When inflation happens, it reduces the purchasing power of money by lowering its real worth in the economy. In contrast, Keynesian economic theory says that changes in the money supply have no direct effect on prices and that observable inflation is the product of economic pressures manifesting themselves in prices (Pinga and Nelson, 2001).

Inflationary pressures can have a wide range of effects on an economy, both positive and bad. Inflation's negative effects, such as a gradual reduction in the actual

worth of money and other monetary commodities, may discourage investments and savings. High inflation may cause shortages of items if people begin stockpiling due to concerns about future price increases. Positive impacts include guaranteeing that Central Banks can change nominal interest rates, and borrowers and creditors will gain (Stiglitz, 1996). According to the findings of this study, the money supply leads to the CPI. As a result, changes in the relative growth of the money supply can impact consumers' purchasing power; a larger money supply is associated with more spending, and more spending is facilitated by having more money. Second, because CPI leads to money supply, policies such as inflation targeting may aid in stabilizing changes in the money supply. Finally, monetary and fiscal policy that reduces inflation helps to stimulate the Philippine economy (Dwyer and Hafer, 1999).

Table 3: Estimates of coefficients for the unrestricted VAR(2) model

Variable	R-sq	F	P>0.05
M2	0.9774	2423.511	0.0000*
CPI	0.3734	33.37188	0.0002*

*indicates lag order selected by the criterion.

Money supply is important in governing the price level and inflation rate. In conjunction with the real side of our theoretical economy, the quantity theory states that higher money growth is associated with higher inflation and nominal interest rates. This complete separation between real variables and inflation is overly strong, especially in the short run. Monetary policy is a string you can pull on but can't push. In other words, you can use it to start a recession but not to stop it (<http://www.economicshelp.org>).

Likewise, price stability is also desirable because a rise in price level (inflation) creates uncertainty in the economy, which may hamper economic growth. Public opinion surveys indicate that the public is very hostile to inflation, and a growing body of evidence suggests that inflation can lead to lower economic growth (Fisher, 1993).

3.6 Granger Causality Test

The relationship of the variables was examined by performing causality tests. The results revealed that causality tests are significant at 5% (see Table 4).

Table 4: Granger Causality Test Results

Null Hypothesis	Chi-square	Probability	Inference
M2 does not cause CPI	2.369	0.968	Accept
CPI does not cost M2	14.82	0.053*	Reject
No inference - means no "freedom" to vary, no way to affirm or reject the model.			

*significant at 5% level

Based on the Granger causality Wald test results, it can be concluded that there is evidence to support a unidirectional causal relationship running from CPI to Money2. This suggests that changes in the CPI can cause changes in Money2, while the reverse is not true. In this case, the null hypotheses CPI does not Granger cause M2 are rejected,

implying that consumer price index (CPI) in the prediction of money supply (M2) in the Philippines (i.e., the past one-year value of inflation (CPI) affects the country's current annual money supply (M2)). Therefore, Granger's concept of causality posits a unidirectional in this study, which is consistent with the study of Hossen et al. (2022). This implies that inflation can help regulate the money supply. Thus, the monetary authorities can consider control of the money supply to influence and control inflation or inflation targeting itself. This is a well-known objective of BSP monetary policy: to maintain price stability in the form of low inflation to create a stable environment for sustainable economic growth (www.bsp.gov.ph). Additionally, it is important to consider other factors that may affect the relationship between CPI and Money2, such as government policies and other economic indicators.

4. Conclusions and Recommendation

4.1 Conclusions

The causality analysis between Inflation (CPI) and money supply (M2) in the Philippines was examined in this paper. Annual data from 1960 to 2020 were used in the study. To avoid spurious regression problems, standard time series measures were performed first to statistically test the properties of the data series using StataMP 14.0. Under the VAR model, the unrestricted Vector Autoregression (VAR-2) analysis was used to examine the relationships between economic variables and estimate the important parameters of the VAR equation. The Granger causality test was performed using the VAR 2 model at the 5% significance level to determine the direction of causality of the variables.

The Granger Causality test results revealed that the relationship between variables CPI and M2 is unidirectional. The study's findings indicated that inflation (CPI) Granger-causes money supply (M2) in the Philippines. The empirical result of unidirectional causality between inflation (CPI) to the money supply (M2) suggests that the past one-year value of monetary stability can contribute towards price stability in the Philippine economy, as well as past one-year price stability can contribute to monetary stability.

The study draws the following conclusions: first, the reasons driving inflation have primarily come from the supply side, and such pressures are also visible in other nations. Second, inflation can be linked to fluctuations in real demand for goods and services, changes in available supplies during scarcity periods, and growth in the money supply. Third, inflation can have an impact not only on the store of value of money but also on the stock market, investment, exchange rates, interest rates, and trades since the purchasing power of money is reduced.

Finally, if monetary and fiscal policies are well coordinated, we can attain price stability while maintaining strong and sustained economic growth in the Philippines. The findings support both the "strict monetarist" and the "minority structuralist" views.

4.2 Recommendation

High or unpredictable inflation is considered damaging to the whole economy. It introduces inefficiencies to the market and can lower production. As a result, the study's suggestions for the directional link between money supply and inflation are as follows:

Both monetary policy and price stability can assist policymakers in developing better policies; therefore, both should be handled cautiously. Tight monetary and price policies are also expected to weaken the economy.

A high interest rate and gradual expansion in the money supply can assist in fighting or preventing inflation and keep the relative worth of money stable.

The duty of maintaining low and steady inflation is allocated to monetary authorities or the Central Bank, which must balance price stability and high economic growth to avoid overheating and dampening the Philippine economy.

The government may also have a role in the economy by implementing restrictive economic policies (such as government expenditure and taxes) to control inflation. Noninflationary measures can result in full employment.

Conflict of Interest Statement

The authors declare no conflicts of interest.

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