



Analysis of the Effect of Non-cash Payment Transactions, Inflation, Interest Rate on the Money Supply in Indonesia During the Pandemic Covid-19

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Abstract. This study aims to examine and analyze the effect of non-cash payment transactions, inflation, interest rates on the money supply (M1) in Indonesia during the covid-19 pandemic. The analytical method used in this research is multiple linear regression analysis using secondary data. Data collection in this study is through monthly data obtained from Bank Indonesia. The dependent variable in this study is the amount of money supply, the independent variable used is the value of non-cash payment transactions, inflation, interest rates. The results of this study indicate that, 1) the value of non-cash payment transactions has a significant positive effect on the money supply (M1), 2) inflation has no significant effect on the money supply (M1), and 3) interest rates have a significant positive effect on the money supply (M1) during the COVID-19 pandemic. The data collection method used in this study is Literature Study where this method is used to collect the required data, namely by reading books and other literature, both required and recommended and relevant to the problems to be discussed in this study.

Keywords: Money Supply · Non-cash Payment Transactions · Inflation · Interest Rates · Covid-19 Pandemic

1 Introduction

At the beginning of 2020 there was an event that shook the world economy, namely the Covid-19 Virus outbreak which began at the end of 2019. The World Health Organization (WHO) explained that Corona viruses are viruses that infect the respiratory system. This viral infection is called Covid-19. The Covid-19 virus outbreak has caused more than 27 million confirmed cases worldwide and more than 890,000 deaths (WHO, 2020). During the first three months (first quarter) of January to March 2020, the spread of the Covid-19 Virus has spread very quickly in Indonesia and has had a considerable impact on economic activities in Indonesia. This epidemic has caused a contraction of the world economy and has had a wide impact on all sectors of the economy.

The impact on the economy is expected to be large and can cause a country's economy to slump. The Indonesian government has decided to implement a Large-Scale Social Restriction Policy (PSBB) which aims to break the chain of transmission. With the existence of large-scale social restrictions, this will have an impact on the economic condition of a country. The implementation of this policy makes people have to reduce their economic activity. Large companies are forced to enforce layoff policies because of the difficulty to bear the burden of their operational costs. As a result, people's purchasing power decreases. The decline in people's purchasing power was mainly caused by a lack of public income, so that it triggered a decrease in the demand for money. Meanwhile, the role of money is very important. There is hardly any part of human economic life that is not related to the existence of money. Experience has shown that an uncontrolled money supply can have serious consequences for the economy as a whole. The consequences of the uncontrolled development of the money supply can be seen, among others, in the uncontrolled development of the main economic variables, namely the level of production (output) and prices.

The money supply is the total value of money in the hands of the public which consists of currency and demand deposits. The money supply (M1) is money in a narrow sense consisting of currency and demand deposits, while M2 (money in a broad sense) consists of M1 plus quasi money [1]. Currency (currencies) is money issued by the government and or the central bank in the form of paper money or coins. While demand deposits (deposit money) is money issued by a commercial bank. Examples of demand deposits are cheques, bilyet giro. Quasi money includes savings accounts, time deposits, and foreign exchange accounts. The process of supply and demand for money is influenced by the behavior of commercial banks and the people of their country. Many factors can affect the rise and fall of the money supply both in a broad sense (M2) and in a narrow sense (M1), including interest rates, inflation, non-cash payments. In its development the money supply must be limited, this is done to limit consumers to be consumptive and suppress the inflation rate. The data on the money supply (M1) during the Covid-19 pandemic can be seen in Fig. 1.

Based on Fig. 1, it shows that the money supply (M1) during the Covid-19 pandemic fluctuated from March 2020 to January 2022 where the highest money supply was in December 2021 at Rp. 2,282.106.16 billion and the lowest was in April 2020, which was Rp. IDR 1,576,401.00 Billion. The amount of money in circulation must of course be a concern for the central bank, so that over time it can achieve its objectives effectively, namely achieving and maintaining money stability.

An excessive increase in the money supply can cause an increase in prices beyond the expected level so that in the long run it can disrupt economic growth. On the other hand, if the increase in the money supply is very low, a recession will occur. If this continues, the welfare of society as a whole will decline. For this reason, it is necessary to know the factors that can affect the money supply, especially during the Covid-19 pandemic so that the money supply is stable.

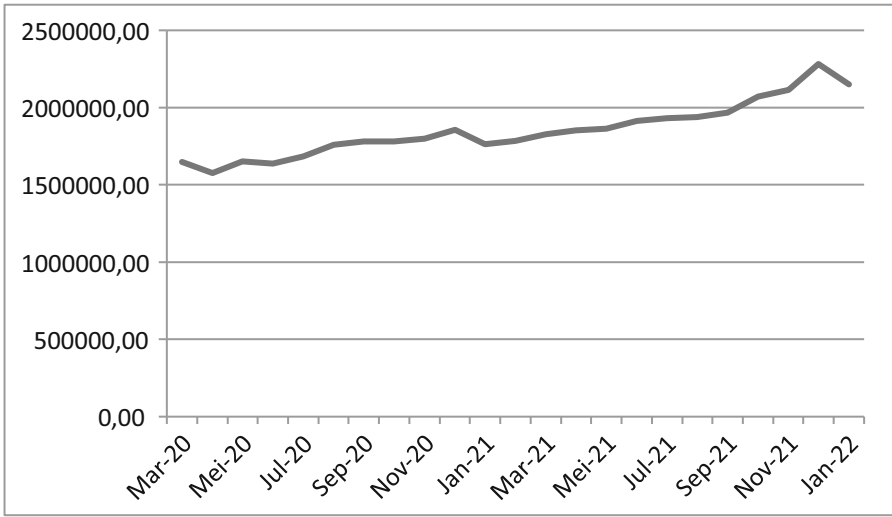


Fig. 1. Growth in the Money Supply (M1) in Indonesia During the Covid-19 Pandemic (Billion Rp). Source: Bank Indonesia, 2022

2 Literature Review

The theory of money demand aims to develop an understanding of the determinants of money demand, where money serves as a medium of exchange and optimization of the amount of money demand. According to Fisher, people want to save money because the use of money in transactions will be influenced by institutional factors such as payment habits, the tools used in paying (credit cards and ATMs) and the quality of communication. In his book entitled the Purchasing power of money, Irving Fisher introduces the theory of the demand for money with the velocity approach. According to Fisher, changes in the money supply (M) are directly proportional to changes in prices (P). That is, the function of money here is only as a medium of exchange. Fisher also revealed that the demand for money is a very liquid interest for transaction motives. so that in equation form it can be written:

$$MV = PT \tag{1}$$

where:

M = Money supply (M1)

V = Velocity circulation of money, namely the amount of money that changes hands from one hand to another.

P = General price level

T = Total production of finished and semi-finished goods (assuming V and T are constant).

Based on this equation, the national income value of P × T is greater than the value of P × Q, because T includes finished and semi-finished goods with their respective

prices. The equation can also be written: $M = PT/V$ means that if M increases by 5% then P will also increase by 5 percent, Or to reduce the price level by 5 percent, the money supply must also be reduced by 5 percent.

Cambridge theory focuses on the function of money as a common medium of exchange. This classical theory sees the demand for money from society as a need for tools for transaction purposes. According to Fisher, the demand for money is just a constant proportion of the volume of transactions that is influenced by constant institutional factors. Cambridge actually argues that behavioral factors (Consideration of profit and loss) are the relationship between individual financial needs and planned trading volume. In other words, Fisher views the velocity of money as constant while Cambridge does not. According to Cambridge theory, the demand for money is not only influenced by transaction volume and institutional factors, but is also influenced by interest and people's expectations about future conditions.

Keynes argues that the function of money not only functions as a medium of exchange but also as a store of value, which became known as the theory of Liquidity Preference. Keynes incorporates elements of uncertainty and hope as in the Cambridge approach. However, Keynes's theory focuses more on the interest rate variable, which is an important variable in the demand for money [2]. In the theory of money demand, Keynes distinguishes between transaction motives, precautionary and speculative. Transaction motives are also recognized to be more focused on speculative motives.

Non-cash payments are payments that do not use cash in circulation but use checks or demand deposits and are in the form of an electronic card payment system that can replace the role of currency. Non-cash payments in its use involve banking services. Banks as business actors in collecting public funds must provide payment transaction services that can help meet the economic needs of their customers. Non-cash transactions have shifted the role of cash, especially in wholesale trade, financial transactions with large values and in retail payments due to the increasing number of payments using transfer methods between bank accounts and the increasing use of cards such as debit, credit ATM, e-money in transactions. Increasing non-cash payments will have an impact on the demand for money and the balance of the money market as well as output and prices which will have an impact on monetary policy [3].

Inflation is a continuous increase in the price level that affects individuals, businesses and governments. Inflation is generally seen as an important issue that must be addressed given the impact on the economy, which can lead to instability, slow economic growth, and rising unemployment. Inflation is also a problem that is always faced by every economy and has even become the main agenda of politics and policy makers for the government [4].

The interest rate is the fee that must be paid by the borrower for the loan received which is a reward for the lender for his investment [5]. The interest rate is also the price that links the present with the future. Like other prices, interest rates are determined by the interaction of supply and demand. The interest rate is also the policy interest rate that reflects the monetary policy stance set by Bank Indonesia and announced to the public. In general, Bank Indonesia will increase the BI rate when future inflation is expected to exceed the predetermined target, on the other hand, Bank Indonesia will decrease the BI rate if future inflation is estimated to be below the predetermined target. The money

supply in the community can be controlled properly. This means that interest rates have a negative effect on the money supply.

3 Research Method

The scope of this study includes the money supply (M1), the value of non-cash payment transactions, inflation, interest rates in the period March 2020 to January 2022. For analysis purposes, secondary data is used in this study. The data source in the form of time series is obtained from Bank Indonesia (BI). The data taken for this study are data on the value of non-cash payment transactions, data on the money supply, data on inflation rates, data on interest rates. The data collection method used in this study is Literature Study where this method is used to collect the required data, namely by reading books and other literature, both required and recommended and relevant to the problems to be discussed in this study.

Data analysis in this study used multiple linear regression analysis. Multiple linear regression analysis is a regression to see the effect of two or more independent variables on one dependent variable. This analysis aims to determine the direction of the relationship between the independent variable and the dependent variable and to predict the value of the dependent variable if the value of the independent variables increases or decreases [6]. The model used can be formulated as follows:

$$Y = f(X_1, X_2, X_3) \quad (2)$$

Based on function (2) can be expressed in the form of multiple linear regression equations are as follows:

$$Y = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + e \quad (3)$$

Furthermore, Eq. (3) is transformed into the natural logarithm (ln) with the following equation:

$$Y = \beta_0 + \beta_1 \ln X_1 + \beta_2 X_2 + \beta_3 X_3 + e \quad (4)$$

where:

Y	= Money Supply (M1)
β_0	= Constant
$\beta_1, \beta_2, \beta_3$	= Independent Variable Regression Coefficient
X_1	= Non-Cash Payment Transaction Value
X_2	= Inflation
X_3	= Interest Rate
e	= Standard error

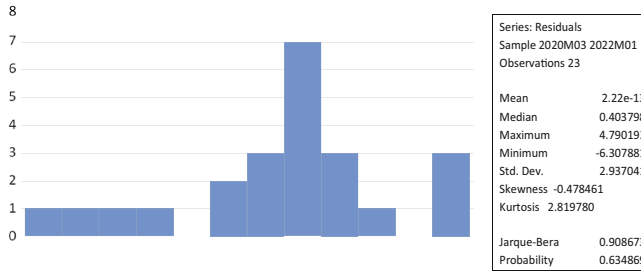


Fig. 2. Normality Test Results

Table 1. Multicollinearity Test Results

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
C	51939.67	119601.8	NA
X1	114.5752	109164.1	2.883611
X2	4.748386	34.39030	1.862595
X3	14.58700	484.8585	4.254259

4 Results

The results of the normality test (histogram-normality test) above, it is known that the probability value is 0.634869. This means that with a significance level of alpha (α) 5%, the probability value is greater than (α) 5% or not significant so that the data in the regression is normally distributed (Fig. 2 and Table 1).

The results of the multicollinearity test show that the value of the VIF (Variance Inflation Factor) of all independent variables is less than ($<$) 10. This means that this regression does not contain multicollinearity (Table 2).

From the results of the heteroscedasticity test, it shows that the probability of the non-cash payment transaction value variable is 0.5428, the inflation variable is 0.0759 and the interest rate variable is 0.4439. This means that all variables are more than alpha (α) 5% (accepting H_0) or in other words the regression in this study does not contain heteroscedasticity (Table 3).

From the regression results above, it shows that the result of the chi-squared probability is 0.3900 or greater than the alpha level (α) 5% so it is not significant. This means that the regression data in this study does not contain autocorrelation (Table 4).

The coefficient value of the X1 variable (the value of non-cash payment transactions) is 33.25174 and is positive. This means that the variable value of non-cash payment transactions has a unidirectional relationship to the money supply variable (M1). This means that for every 1% increase in the value of non-cash payment transactions, the money supply (M1) will increase by 33.25174% with the assumption that inflation (X2) and interest rates (X3) are constant.

Table 2. Heteroskedastisitas Test Result

Heteroskedasticity Test: Glejser
Null hypothesis: Homoskedasticity

F-statistic	1.408856	Prob. F(3,19)	0.2710
Obs*R-squared	4.185338	Prob. Chi-Square(3)	0.2421
Scaled explained SS	3.987343	Prob. Chi-Square(3)	0.2628

Test Equation:
Dependent Variable: ARESID
Method: Least Squares
Date: 09/07/22 Time: 10:52
Sample: 2020M03 2022M01
Included observations: 23

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	83.66490	133.4376	0.626996	0.5381
X1	-3.883472	6.267205	-0.619650	0.5428
X2	2.395056	1.275856	1.877215	0.0759
X3	-1.748341	2.236205	-0.781834	0.4439
R-squared	0.181971	Mean dependent var		2.189367
Adjusted R-squared	0.052809	S.D. dependent var		1.901316
S.E. of regression	1.850432	Akaike info criterion		4.225486
Sum squared resid	65.05789	Schwarz criterion		4.422964
Log likelihood	-44.59309	Hannan-Quinn criter.		4.275151
F-statistic	1.408856	Durbin-Watson stat		1.773974
Prob(F-statistic)	0.271024			

Table 3. Auto-Correlation Test Result

Breusch-Godfrey Serial Correlation LM Test:
Null hypothesis: No serial correlation at up to 2 lags

F-statistic	0.758130	Prob. F(2,17)	0.4837
Obs*R-squared	1.883426	Prob. Chi-Square(2)	0.3900

Table 4. Multiple Linear Regression Test Results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-709.4767	227.9028	-3.113067	0.0057
X1	33.25174	10.70398	3.106484	0.0058
X2	-1.979384	2.179079	-0.908358	0.3751
X3	10.08390	3.819294	2.640254	0.0161

$$Y = -709.4767 + 33.25174X1 - 1.979384X2 + 10.08390X3 + e$$

Table 5. T-Test Result

Variable	t-Statistic	Prob
C	-3.113.067	0.0057
X1	3.106.484	0.0058
X2	-0.908358	0.3751
X3	2.640.254	0.0161

The probability value of the X2 variable (inflation) is 0.3751 or more than = 5%. This means that inflation has no significant effect on the money supply (M1) in Indonesia during the Covid-19 pandemic.

The coefficient value of the X3 variable (interest rate) is 10,08390 and is positive. This means that the interest rate variable has a unidirectional relationship to the money supply variable (M1). This means that for every 1% increase in interest rates, the money supply (M1) will increase by 10.08390% with the assumption that the value of non-cash payment transactions (X1) and inflation (X2) are constant (Table 5).

The probability value of t-count variable value of non-cash payment transactions (X1) is 0.0058 < probability value = 0.05 so it can be said that Ha is accepted and H0 is rejected, which means that the variable value of non-cash payment transactions has a significant effect on the money supply (M1) in Indonesia during the Covid-19 pandemic.

The probability value of t-count inflation variable (X2) is 0.3751 > probability value = 0.05 so it can be said that Ha is rejected and H0 is accepted, which means that the inflation variable has no significant effect on the money supply (M1) in Indonesia during the Covid-19 pandemic. 19.

The probability value of t-count interest rate variable (X3) is 0.0161 < probability value = 0.05 so it can be said that Ha is accepted and H0 is rejected, which means that the interest rate variable has a significant effect on the money supply (M1) in Indonesia during the period. Covid-19 pandemic (Table 6).

The value of non-cash payment transactions (X1), inflation (X2), interest rates (X3) to the money supply (M1) (Y) in Indonesia obtained an R2 value of 0.239614, this indicates that variations in the independent variables can explain variations in the money supply (M1) of 23.96%. The remaining 76.04% is influenced by other variables outside of this study.

Table 6. Coefficient Determination (R-Square) Result

R- Square	0.343303
Adjusted R-Square	0.239614

The value of non-cash payment transactions has a significant effect on the money supply (M1), this happens because during the Covid-19 pandemic, transactions for consumption and for other transaction purposes, people prefer to use non-cash transactions so that the value of non-cash payment transactions affects the amount of money circulating (M1). The results of this study are in accordance with the quantity theory of money which states that the habit of non-cash payments will encourage people to make more transactions, so that the velocity will increase followed by an increase in the money supply. This study shows that the value of non-cash payment transactions has a significant effect on the money supply (M1).

Inflation has no significant effect on the money supply (M1) in Indonesia during the COVID-19 pandemic. This can happen if people do not spend their money for consumption when inflation rises and choose to spend their money for consumption when inflation has fallen or it could be when inflation rises. do not directly request money, especially during the covid-19 pandemic. The results of this study are not in accordance with the quantity theory of money which concludes that the price level is the main result of changes in the money supply. Theoretically, the money supply will affect the value of money which is implemented at the level of prices and products. If the money supply is greater than the production of goods and services, this will cause an increase in prices and a decrease in the value of money. On the other hand, if the money supply is smaller than the production of goods and services, it will cause the price level to fall. This will then affect a lot or at least the amount of money circulating in the community.

Interest rates have a significant effect on the money supply (M1) during the Covid-19 pandemic. This shows that the policy of lowering or increasing the BI Rate carried out by Bank Indonesia can affect the existing money supply. The results of this study are not in accordance with Dornbusch's theory which states that the demand for real money balances responds negatively to interest rates. An increase in interest rates will reduce the demand for money. When interest rates increase, the money supply decreases. On the other hand, when interest rates decrease, the money supply increases.

5 Conclusion and Recommendation

Based on the results of the analysis and discussion, the following conclusions can be drawn. The variable value of non-cash payment transactions has a significant positive effect on the money supply (M1) in Indonesia during the Covid-19 pandemic. This means that every time there is an increase in non-cash payment transactions, it will affect the money supply (M1). The inflation variable has no significant effect on Indonesia's money supply (M1) during the Covid-19 pandemic. Any increase in inflation will not affect the increase in the money supply (M1) in Indonesia during the Covid pandemic.

The interest rate variable has a significant positive effect on the money supply (M1) in Indonesia during the Covid-19 pandemic. This means that any increase in interest rates will affect the money supply (M1) in Indonesia during the Covid-19 pandemic.

Based on the conclusions from the results of the research above, in this section several suggestions are put forward, including:

1. Along with the increase in transactions of non-cash payment instruments, the Central Bank needs to tighten supervision of non-cash payment instruments in addition to seeing the development of transactions through electronic means that are increasingly in demand by the public, it is necessary to have a policy from the central bank to regulate electronic media payments and provide convenience for users by increasing the development of electronic payment infrastructure, especially in areas that still lack electronic media payment infrastructure.
2. The importance of money in the economy of a country. In order to maintain a stable inflation rate, the central bank, namely Bank Indonesia, needs to maintain the stability of money circulating in the community. The central bank must maintain the balance of money in accordance with the needs of the community so that there is no high inflation or deflation, especially during the Covid-19 pandemic.
3. Bank Indonesia as the holder of the monetary authority that has the authority to control the money supply in Indonesia, needs to be more careful in determining the interest rate as one of the paths of monetary policy. If the money supply does not increase within a reasonable limit, then the policy taken by the central bank is to increase bank interest rates so that people keep their money in banks.

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