DOES FINANCIAL DIGITALIZATION, DEBIT, CREDIT, INTEREST RATE, AND EXCHANGE RATE AFFECT MONEY SUPPLY IN INDONESIA

Feny Gusti Wijayanti
Fakultas Ekonomi dan Bisnis, Universitas Bengkulu, Bengkulu, Indonesia
c1a021004.fenygustiwijayanti@mhs.unib.ac.id

Esti Pasaribu
Fakultas Ekonomi dan Bisnis, Universitas Bengkulu, Bengkulu, Indonesia
estipasaribu@unib.ac.id

Abstract

This research aims to determine how financial digitalization, interest, and exchange rates affect the money supply in Indonesia for the long term and in the short term. The data used in this research is secondary data from the Central Bureau of Statistics (BPS) and Bank Indonesia. The analytical method used in this research is the Error Correction Model (ECM), by determining the degree of confidence of 95 percent. This research indicates that, partially, the e-money, debit, interest rate, and exchange rate variables significantly affect the money supply in the long term. In contrast, debit and exchange rates have a considerable positive effect, while e-money and interest rates have a negative significant impact. In the short term, debit and exchange rate variables positively affect the money supply.
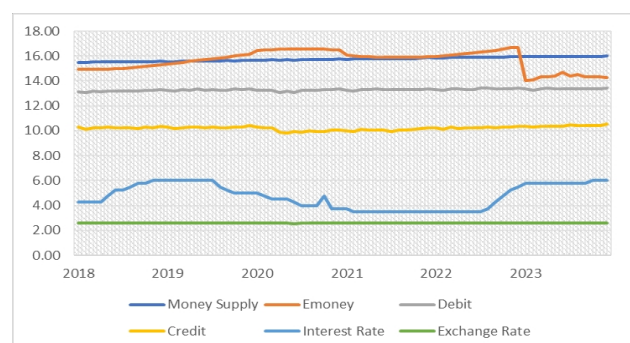
Keywords: Financial digitalization, money supply, ECM.

Introduction

Payment systems are essential in life. Every day, we use money to make payments. People use money to buy their goods, and it can show how valuable their position is. The improvement of the internet and cell phones has created the potential for transformation in the digital field in all aspects, including the financial sector (Santoso et al., 2020). Due to the digitalization of finance, payments can now not be made with cash. Payments can use debit cards, credit cards, or emoney. This can make people no longer need to use physical money as a tool to pay (Lukmanulhakim et al., 2019). This means that the role of cash is starting to be replaced by a form of bank service innovation that supports the payment system in the form of non-cash-based. This innovation has also been a concern of financial literacy in recent decades (Fiordelisi et al., 2010; Putra et al.,

2021).

As the central bank, Bank Indonesia can implement monetary policy and maintain the payment system. The authority of Bank Indonesia as the central bank to maintain and regulate the payment system in Indonesia is contained in the BI Law (Istanto & Fauzie, 2018). Banking as a service provider began to innovate through modern technology to provide the best service following the development of life patterns in today's society that prioritizes practical functions (Adiyanti, 2015; Rahmadani & Aimon, 2022). The existence of this technological development payment system can later have an impact on the amount of money circulating in the community (Maharani et al., 2023). Development The digitalization of finance is considered a fraud prevention and monetary policy enabling instrument and is claimed to harm the effectiveness of monetary policy rarely (Brodo D & Levin T, 2017; Igoni et al., 2020; Ma'rifah & Faridatussalam, 2023; Meaning et al., 2021; Rahman, 2018; Snellman et al., 2001).

With advanced technology, e-money does not have to be linked to the user's bank account. Cashless payments also provide ease of transactions and more guaranteed security (Mintarsih, 2013; Panjaitan, 2022; Ugwuanyi et al., 2020), but this is something crucial that needs to be controlled to maintain monetary objectives so as not to cause negative impacts. Therefore, Bank Indonesia implemented a cashless to consider the amount of money in circulation. Cashless payment instruments will reduce the demand for money issued by BI (Rahmadani & Aimon, 2022). Money is another important variable for central banks to control the money supply and other instruments such as interest and exchange rates (Andini & Pasaribu, 2024; Maharani et al., 2023).

Chart 1. Money supply, interest rate, exchange rate, and transaction volume of financial digitalization.

The circulation of money in society is an instrument that has a significant role in a country's economy (Istanto & Fauzie, 2018). Controlling the money supply is as important as the payment system to maintain the stability of a country's economy (Naibaho et al., 2023; Pradikta et al., 2023). In the chart shown above (Chart 1), we can observe that there has been a fluctuating change in the interest rate. From 2021 until 2022, there was a decrease in the number of interest rates and the usage of e-money, and there was a decrease in the number of people using e-money in 2023. Meanwhile, money supply, debit, credit, and exchange experienced fluctuations that were not too sharp. The use or transactions on debit, credit, and e-money in Indonesia have a considerable impact in the short term on the money supply and have a dominant effect in the long term (Azhar et al., 2020). This is supported by the research results of (Putra et al., 2021), which state that APMK significantly affects money circulation in the long-term.

Theoritical Review

Money supply is money in circulation or its existence in the hands of the public (Panjaitan, 2022). Money can also be interpreted as everything used to carry out payment activities, either receiving or giving, with various needs, such as obtaining goods or services or debt (Naibaho et al., 2023; Nopirin, 2004). The classical money supply theory was developed systematically using MV = PT (Fisher & Brown, 1911). This theory became the foundation for the development of subsequent monetary theory, the quantity of money, which is a theory that examines the demand for money and its relationship with other macroeconomic variables (Fisher & Brown, 1911). Empirical validation of Fisher's theory was then analyzed historically by (Hansen & Friedman, 1957).

Furthermore, this theory was developed using the Cambridge approach, which focused on the microeconomic aspects of money demand. The results stated that the Cambridge equation emphasized the role of money as a store of value, not just as a medium of exchange (Marshall & Alfred, 1923). A revolution in the understanding of money emerged with the introduction of three fundamental motives, namely transaction motive, precautionary motive, and speculative motive (Schumpeter & Keynes, 1936), which later expanded this analysis by integrating the theory of portfolio selection (Tobin, 1958). In the

development of monetarism, quantity theory was reconstructed using a more sophisticated approach by (Hansen & Friedman, 1957). After that came the period of new classical economics, which integrated rational expectations into monetary analysis and gave rise to the statement that only unanticipated money matters (Lucas, 1972). After several developments and reconstructions, this theory finally arrived in the modern era and has been used since 1990. The development of the theory in the modern era includes the analysis of modern monetary transmission mechanisms (Bernanke & Gertler, 1995) and the development theoretical frameworks for contemporary monetary policy analysis (Woodford, 2011).

The money supply in the economy is considered a necessity of the monetary system to the domestic private sector. This money supply can be cash, time deposits, or quasi-money (near money) In this case, the economic system will be needed to regulate the circulation of money, which will be the central bank and commercial banks (Rahmadani & Aimon, 2022; Solikin, 2002). The money supply has three definitions. In a narrow sense (M1) is defined as currency plus demand deposits; a broad sense (M2) can be referred to as economic liquidity, namely M1 plus time deposits and savings deposits; and more broadly, M2 plus quasi money (Ghalib & Maulida, 2023; Panjaitan, 2022; Rahmadani & Aimon, 2022; Rifai et al., 2017; Rosyidah et al., 2017; Umairoh & Wijaya, 2023). Bank Indonesia defines money as an object used as a medium of exchange, a means of storing value, a unit of calculation, and a postponed payment measure. The vital role of money cannot be separated from the growing payment system (Fatihah & Pasaribu, 2024; Luspita & Pasaribu, 2024).

Law Number 23 of 1999 concerning Bank Indonesia article 1 paragraph 6 explains that the payment system is an activity in which there is a complete set of rules, institutions, and mechanisms that will be utilized to implement placing funds elsewhere to fulfill obligations arising. As a result of economic activity (Bank Indonesia, 2020), the payment system generally has two groups: cash and non-cash. The difference is in the instrument used in a non-cash payment system that does not use money in circulation but cards or APMK, checks, bilyet giro, and electronic money (card- and server-based) (Subari & Ascarya, 2003). Silber's (Silber, 1983) financial innovation theory is based on the opinion that expanding the benefits of financial institutions is the main reason for financial inclusion (Xuan & Shihong, 2010). This theory explains that financial innovation is a

significant force pushing the financial system towards a competent economy and increasing economic profits, which is the impact of new changes (Sekhar, 2013).

Non-cash transactions used initially were only for moving between the same bank and transfers between different commercial banks. Still, banks developed cashless payment innovations, namely in the form of cards, including automatic teller machine (ATM) debit, ATM credit, and then electronic money (e-money) appeared (Fatmawati & Yuliana, 2019). The emergence of money in electronic form (e-money) is one of the policy reasons in the payment system, which has been regulated in BI Regulation No. 16/08/PBI/2024 (Gintting et al., 2019). Non-cash transactions positively and significantly affect the money supply (Melisa et al., 2022).

With the improvement of technology in the pay-pay system, financial digitalization emerged, which is commonly called non-cash payments. The wider community is increasingly using this payment (Rahmadani & Aimon, 2022). This payment system is believed to be faster and safer. In other words, people choose a payment system that is more efficient and practical at the micro level to use (Jiang et al., 2022; Rahayu & Nugroho, 2020). Non-cash payments also create better economic productivity (Lintangsari et al., 2018). The increase in non-cash will impact money demand and money market balance as well as output and prices, impacting monetary policy (Nirmala & Widodo, 2011). The more people who use transactions on non-cash payment systems have a significant negative impact on the amount of money in circulation, which means that the widespread use of cashless will reduce the use or shift the demand for money. E-money non-cash payment instruments are legally valid and legal to use as regulated in Bank Indonesia regulation No. 20/6/PBI/2018 concerning electronic money.

The use of e-money is done by depositing the value of money in advance to the issuer and stored electronically, which can be transferred for payment and fund transfer needs (Panjaitan, 2022; Parulian & Utami, 2024). In contrast to e-money, debit cards and credit cards are payment instruments that use cards (APMK). The difference is that debit cards help pay for obligations incurred as a result of an economic activity where the obligations holding the card are fulfilled when reducing the savings or deposits of the cardholder at a bank or authorized non-bank institution directly, for credit cards, the cardholder's payment obligations will be given first by the issuer, and then the cardholder is obliged to

pay at the agreed time either by settlement or at once (charge) or by instalments (Panjaitan, 2022).

The exchange rate is one of the essential instruments in macroeconomics (Hendayanti et al., 2017). When the rupiah exchange rate depreciates, Bank Indonesia will intervene to sell USD and reduce the money supply. The BI interest rate, often called the BI rate, is used as a reference by Bank Indonesia, the Central Bank, every month. BI rate that Bank Indonesia has set will be published to the general public as a reference for lending interest rates. Control of interest rates is carried out by the monetary authority, namely Bank Indonesia, to influence money market conditions. When interest rates rise, it impacts decreasing the money supply, where this increase will make people inclined to save their money first and vice versa (Parulian & Utami, 2024; Wijaya et al., 2021). This aligns with the research of (Ihsan & Anjum, 2013) and (Aryaningsih, 2008), who argue that an increasing money supply will undoubtedly follow a declining interest rate.

Methods

This study uses an explanatory and descriptive approach to analyze the effect of financial digitalization interest and exchange rates on money supply. The illustrative approach will explain the position of variables used in this research and how the relationship between one and another variable has been formulated (Sugiyono, 2018). The descriptive approach is used to describe the data collected as it is or, in other words, analyze it without making generalizations (Sugiyono, 2016). The variables used are secondary data with monthly periods obtained from Statistics Indonesia (BPS) and Bank Indonesia (BI) from 2018M1 to 2023M12.

Table 1. Operational Definition

No.	Variabels	Defition	Unit	Source
1	Dependent -Money Supply	Money Supply (MS)	Billions of Rupiah	BI
2	Independent			
	Financial Digitalization	Emoney (EM)	Billions of Rupiah	BI
	Debit	Debit (DC)	Billions of Rupiah	BI
	Credit	Credit (CC)	Billions of Rupiah	BI
	Interest Rate	BI rate (BR)	Percentage	BI
	Exchange Rate	Kurs (K)	Thousands of Rupiah	BI

In this research, the Error Correction Model (ECM) analysis is used to identify the long-term and short-term impacts of financial digitalization, as well as

the interest rate and exchange rate, on the money supply in Indonesia. This test aims to find whether a long-term and short-term equilibrium relationship occurs due to the cointegration of the stationarity of the variables in this study. ECM estimation has several stages, such as stationarity test (unit root test), cointegration test, long-term analysis, and short-term (Basuki, 2015). This research uses the Eviews-12 application as an analytical tool. The model parameters used in this research are as follows:

Model 1 (Long term):

$$[MS]_t = \beta_0 + \beta_1 [EM]_t + \beta_2 [DC]_t + \beta_3 [CC]_t + \beta_4 [BR]_t + \beta_5 K_t + \beta_6 [ECT]_t + e_t \ldots\ldots\ldots\ldots(1)$$

Model 2 (Short term):

$$[MS]_t = \beta_0 + \beta_1 [DEM]_t + \beta_2 [DDC]_t + \beta_3 [DCC]_t + \beta_4 [DBR]_t + \beta_5 DK_t + \beta_6 [DECT]_t + e_t \ldots(2)$$

Keterangan:

MS	: Money supply
EM	: Emoney
DC	: Debit
CC	: Credit
BR	: BI rate
K	: Kurs
ECT	: Error correction term
β_0	: Constant
$\beta_1, \beta_2, \beta_3 \beta_4, \beta_5$	: Regression coefficient
et	: Confounding variable or error term
t	: Time period 2018M1 – 2023M12

Results

1. Unit Root Test

The first step is the unit root test or stationary test. All variables used in the research model, based on the Augmented Dickey-Fuller (ADF) statistical test, are gradually tested for data stationarity. The calculation is done using eviews-12. Table 2 shows the results of the data stationarity test for the variables used to evaluate the effect of the independent variable on the dependent variable. The data

stationarity test at the first difference level shows that all variables are stationary. If the calculated value of ADF is greater than the alpha value of the table, in this case, the alpha value of 5 percent, the estimated variables can be continued with the next test, namely the cointegration test.

Table 2. Result in Unit Root Test

Variable	Probability	Description
Money supply	0.0001	Stationer
Emoney	0.0000	Stationer
Debit	0.0000	Stationer
Credit	0.0001	Stationer
BI rate	0.0000	Stationer
Kurs	0.0000	Stationer

Source: Data Processed by Author, 2024

2. Cointegrity Test

The next step after knowing that the data used is stationary is to find out whether the data is cointegrated. This test is carried out to provide the first sign stating the model used has a long-term (cointegration relation) (Basuki, 2015). Finding out whether the data included in the model is cointegrated or not can be done by forming stationary residuals at the level, which means that these residuals must be stationary at the level, in this case, named ECT. The residual results are shown in table 3 with a significant probability value at alpha 5 percent, which is 0.0000. the conclusion is that all variables used in this model have a relationship and are cointegrated.

Table 3. Result Cointegration Test

Variable	Probability	Description
ECT	0.0000	Stationer

Source: Data Processed by Author, 2024

3. Long-term Estimation Results

In the F significance test in the table below, it is known that the probability value of the F statistic is 0.000000 less than $\alpha=5$ percent, which means that together all independent variables have a significant influence on the variable money supply, the results of this study are also in line with (Melisa et al., 2022) which states that cashless transactions are simultaneously significant to the money supply. The value of Adj. R-Squared value is 0.775749. It can be concluded that the e-money, debit, credit, BI rate, and exchange rate variables can explain the

money supply by 77.57 percent, and the other 22.43 percent is explained by other variables not included in this research model.

Table 4. Result from Long-term estimation

Variable	Coefficient	Probability
C	-14.66242	0.0000
Emoney	-0.052890	0.0009
Debit	0.941697	0.0000
Credit	-0.029059	0.7620
BI rate	-0.064391	0.0000
Kurs	2.014461	0.0000
Adj. R-Squared	0.775749	
Prob(F-statistic)	0.000000	

Source: Data processed by author, 2024

Based on the results in the table above, four of the five independent variables studied significantly impact money supply. The first variable, where if other variables are constant and e-money has increased by 1 billion, the money supply will decrease by 0.052890 billion. Vice versa, if e-money is reduced, the money supply will increase. Variable debit: Every time there is an increase of 1 billion in the debit, there will be an increase in the money supply of 0.941697 billion if other variables are considered constant. Variable BI rate where if there is an increase of 1 percent in the BI rate, then the money supply will decrease by 0.064391 billion, and if the BI rate decreases by 1 percent then the money supply will be increased only if other variables are held constant. The last variable is that when the exchange rate rises by 1 thousand, there will also be an increase in the money supply figure of 2.014461 billion, and vice versa. If another variable is constant and the exchange rate has decreased, then the money supply will also be reduced, as in the case of the exchange rate.

4. Short-term estimation results

The short-term estimation results in Table 5 show that the coefficient value on the Error Correction Term (ECT) in the model used is significant and has a negative sign for the estimation of money supply. The processed results using ECM show that the variables used in this research significantly impact the money supply in the short term and long term. Independent variables in the short term have Adj. R-Squared of 0.170801 or 17 percent can explain the money supply in

the short term. The rest is explained by other variables not included in this research variable.

The table of estimation results above also shows that the Probability on the F-statistic is significant at 0.0000, meaning that together, all independent variables affect the money supply in the short term. It can be concluded from table 5 that when the Debit variable increases by 1 billion, it will affect the increase in money supply by 0.066357 billion, and vice versa. The same thing happens to the exchange rate; when the rate rises by 1 thousand, the money supply will increase by 0.230027 billion, and vice versa, only if other variables are constant.

Table 5. Result from short-term estimation

Variable	Coefficient	Probability
C	0.006209	0.0001
Emoney	0.007437	0.1098
Debit	0.066357	0.0068
Credit	0.014443	0.4842
BI rate	0.005057	0.4207
Kurs	0.230027	0.0001
ECT(-1)	-0.641413	0.0000
Adj. R-Squared	0.3554402	
Prob(F-statistic)	0.000002	

Source: Data processed by author, 2024

Discussion

From the long-term estimation results in Table 4, it can be interpreted that the regression results are as follows: debit variables and exchange rates have a significant positive effect. This result shows that the development of the use that occurs in non-cash payment instruments, in this case the debit card affects the quantity of money in circulation. This aligns with research conducted by (Ghalib & Maulida, 2023). Furthermore, the e-money variable and BI rate have a significant adverse effect, while the credit variable does not affect the money supply. This aligns with the results of research from (Lintangsari et al., 2018) and (Rahayu et al., 2023). The first variable is e-money, which negatively and significantly affects the money supply. This result aligns with (Rahayu et al., 2023) research and (Naibaho et al., 2023), who argue that increasing e-money will reduce the money supply.

Furthermore, the debit variable is also significant. It has a positive effect on the money supply, as well as research conducted by (Panjaitan, 2022) & (Wasiaturrahma et al., 2019) suggests that the use of debit cards in the short term has a significant impact on the amount of money in circulation. However, it is inversely proportional to research from (Rahayu et al., 2023). The third variable is interest rates, which significantly negatively impact the money supply. The data processing results are supported by research that states the same thing: interest rates significantly negatively affect the money supply (Ramadhani, 2022; Wijaya et al., 2021).

The last significant variable is the exchange rate, which positively affects the money supply. Ramadhani's research (2022), which has results, supports this. Meanwhile, in the short term, the Probability of the Debit and Exchange Rate variables in table 5 also shows a significant positive effect on money supply. This result indicates that transactions using debit cards in the short term also affect the quantity of money in circulation. This aligns with research by (Nursari et al., 2019; Salimah & Wahyuningsih, 2021). This result is inversely proportional to the study conducted by Yazgan & (Yilmazkuday & Yazgan, 2009), which stated a negative relationship between debit and money supply. It is also different from the opinion that the exchange rate has a negative effect on the money supply (Salsabila et al., 2023).

Conclusion

This study basically uses the Error Correction Model (ECM) as a method of analyzing phenomena in the economy in the long and short term. Several conclusions can be drawn from the results that have been processed and meet the prerequisites of the ECM method. The first is that four of the five independent variables show significance to the money supply in the long term: the Emoney, Debit, BI rate, and Exchange rate. Debit and Exchange Rate have a positive effect, while Emoney and BI rates negatively affect money supply in the long run. In the short-term calculation, two of the five variables are significant, both also show a positive influence on the money supply in the short term.

From the above conclusion, Bank Indonesia, as an authorized institution, is expected to control the money supply by considering the variables discussed in this study, namely e-money, debit, credit, interest rate, and exchange rate, for

policies that are friendly and not detrimental to the broader community. In addition, Bi and other authorities are expected to maintain security and increase speed in developing a cashless payment system, which will become a practical and easy alternative for economic transactions in the community.

Acknowledgements

References

Adiyanti, A. I. (2015). Pengaruh Pendapatan, Manfaat, Kemudahan Penggunaan, Daya Tarik Promosi, dan Kepercayaan terhadap Minat Menggunakan Layanan E-Money (Studi Kasus: Mahasiswa Universitas Brawijaya). *Jurnal Ilmiah Mahasiswa FEB*, *3*(1).

Andini, N. P., & Pasaribu, E. (2024). *Analisis Pengaruh Sektor Keuangan Terhadap Inflasi di Indonesia*. *7*(2), 154–164. https://ecoplan.ulm.ac.id/index.php/iesp/article/view/733/114

Azhar, Z., Putra, H. S., & Huljannah, M. (2020). *Implications of Using E-money and APMK on the Money Supply: The Case of Indonesia*. https://doi.org/10.2991/aebmr.k.201126.025

Bank Indonesia. (2020). *Sistem Pembayaran & Pengelolaan Uang Rupiah*. Bank Indonesia.

Bernanke, B. S., & Gertler, M. (1995). Inside the Black Box: The Credit Channel of Monetary Policy Transmission. *Journal of Economic Perspectives*, *9*(4). https://doi.org/10.1257/jep.9.4.27

Brodo D, M., & Levin T, A. (2017). Central bank digital currency and the future of monetary policy - Global Business Outlook. *NATIONAL BUREAU OF ECONOMIC RESEARCH*, *93*(I).

Fatihah, V., & Pasaribu, E. (2024). Analysis of Factors Affecting The Demand For Money in Indonesia. *JIMEA | Jurnal Ilmiah MEA (Manajemen , Ekonomi , Dan Akuntansi)*, *8*(1), 1977–1991.

Fatmawati, M. N. R., & Yuliana, I. (2019). PENGARUH TRANSAKSI NON TUNAI TERHADAP JUMLAH UANG BEREDAR DI INDONESIA TAHUN 2015- 2018 DENGAN INFLASI SEBAGAI VARIABEL

MODERASI. *Ekspansi: Jurnal Ekonomi, Keuangan, Perbankan Dan Akuntansi*, *11*(2). https://doi.org/10.35313/ekspansi.v11i2.1608

Fiordelisi, F., Molyneux, P., & Hakim, L. (2010). New Issues in Financial Institutions Management. In *New Issues in Financial Institutions Management*. https://doi.org/10.1057/9780230299153

Fisher, I., & Brown, H. G. (1911). The Purchasing Power of Money. *Journal of the Royal Statistical Society*, *74*(7). https://doi.org/10.2307/2339747

Friedman, M., & Schwartz, A. J. (2017). A Monetary History of the United States, 1867-1960. In *Modern Economic Classics-Evaluations Through Time*. https://doi.org/10.4324/9781315270548-21

Ghalib, G., & Maulida, S. (2023). Dampak Sistem Pembayaran Non Tunai terhadap JUB (M1) di Indonesia 2019-2021. *Keizai*, *4*(1). https://doi.org/10.56589/keizai.v4i1.376

Gintting, Z., Djambak, S., & Mukhlis, M. (2019). Dampak transaksi non tunai terhadap perputaran uang di Indonesia. *Jurnal Ekonomi Pembangunan*, *16*(2). https://doi.org/10.29259/jep.v16i2.8877

Hansen, B., & Friedman, M. (1957). Studies in the Quantity Theory of Money. *Ekonomisk Tidskrift*, *59*(3). https://doi.org/10.2307/3438608

Hendayanti, N. P. N., Nurhidayati, M., & Nugrahini, D. S. (2017). Analisis Pengaruh Nilai Tukar Rupiah terhadap Jumlah Uang Beredar dengan Pendekatan Error Correction Model (ECM). *Konferensi Nasional Sisten & Informatika*.

Igoni, S., Onwumere, J. U. J., & Ogiri, I. H. (2020). The Nigerian Digital Finance Environment and Its Economic Growth: Pain or Gain. *Asian Journal of Economics, Finance and Management*, *2*(1).

Ihsan, I., & Anjum, S. (2013). Impact of Money Supply (M2) on GDP of Pakistan. *Global Journal of Management and Business Research Finance*, *13*(6).

Istanto, L., & Fauzie, S. (2018). ANALISIS DAMPAK PEMBAYARAN NON TUNAI TERHADAP JUMLAH UANG BEREDAR DI INDONESIA. *Jurnal Ekonomi Dan Keuangan*, *Vol.2 No.1*.

Jiang, S., Qiu, S., & Zhou, H. (2022). Will digital financial development affect the effectiveness of monetary policy in emerging market countries? *Economic Research-Ekonomska Istrazivanja*, *35*(1).

https://doi.org/10.1080/1331677X.2021.1997619

Lintangsari, N. N., Hidayati, N., Purnamasari, Y., Carolina, H., & Ramadhan, W. F. (2018). ANALISIS PENGARUH INSTRUMEN PEMBAYARAN NON-TUNAI TERHADAP STABILITAS SISTEM KEUANGAN DI INDONESIA. *JURNAL DINAMIKA EKONOMI PEMBANGUNAN*, *1*(1). https://doi.org/10.14710/jdep.1.1.47-62

Lucas, R. E. (1972). Expectations and the neutrality of money. *Journal of Economic Theory*, *4*(2). https://doi.org/10.1016/0022-0531(72)90142-1

Lukmanulhakim, M., Djambak, S., & Yusuf, M. K. (2019). Pengaruh transaksi non tunai terhadap velositas uang di Indonesia. *Jurnal Ekonomi Pembangunan*, *14*(1). https://doi.org/10.29259/jep.v14i1.8774

Luspita, D., & Pasaribu, E. (2024). The Impact Of The Fintech Revolution On Conventional Bank Credit In Indonesia : Opportunity Or Challenge ? *BICEMBA*, 1603–1614. https://conference.unib.ac.id/index.php/BICEMBA/article/view/134/143

Ma'rifah, S. L., & Faridatussalam, S. R. (2023). An Analysis of the Effect of Debit Card Transaction Nominals, Credit Card Nominals, E-Money Nominals on the Level of the Total Money in Circulation in 2013-2022. *Medan International Conference Economics and Bussiness*, *1*.

Maharani, D. P., Romiza, N., Pasaribu, E., & Febriani, R. E. (2023). Pengaruh Digital Payment Terhadap Pertumbuhan Ekonomi Indonesia: Analisis Kawasan di Indonesia Selama Pandemi Covid-19. *Ecoplan*, *6*(2). https://doi.org/10.20527/ecoplan.v6i2.676

Marshall, & Alfred. (1923). Money, Credit and Commerce. *Journal of the Royal Statistical Society*, *86*(3). https://doi.org/10.2307/2341627

Meaning, J., Dyson, B., Barker, J., & Clayton, E. (2021). Broadening narrow money: Monetary policy with a central bank digital currency. *International Journal of Central Banking*, *17*(2). https://doi.org/10.2139/ssrn.3180720

Melisa, M., Ariffianti, I., Pratama, B. D., & Arsana, I. N. (2022). PENGARUH TRANSAKSI NON TUNAI TERHADAP JUMLAH UANG BEREDAR DI INDONESIA DENGAN INFLASI SEBAGAI VARIABEL MODERASI. *Media Bina Ilmiah*, *17*(1), 1–52. https://doi.org/10.21608/pshj.2022.250026

Mintarsih. (2013). Perlindungan Konsumen Pemegang Uang Elektronik (E-Money) Dihubungan Dengan Undang-Undang Nomor 8 Tahun 1999

Tentang Perlindungan Konsumen. *Jurnal Wawasan Hukum*, *29*(02).

Naibaho, E. S. U., Hodijah, S., & Bahri, Z. (2023). Pengaruh e-money, tingkat suku bunga dan inflasi terhadap jumlah uang beredar di Indonesia. *E-Journal Perdagangan Industri Dan Moneter*, *11*(3). https://doi.org/10.36778/jesya.v7i1.1535

Ni Nyoman Aryaningsih. (2008). PENGARUH SUKU BUNGA, INFLASI DAN JUMLAH PENGHASILAN TERHADAP PERMINTAAN KREDIT DI PT BPD CABANG PEMBANTU KEDIRI. *Jurnal Penelitian Dan Pengembangan Sains & Humaniora*, *2(1)*.

Nirmala, T., & Widodo, T. (2011). Effect of Increasing Use the Card Payment Equipment on the Indonesian Economy. *Jurnal Bisnis Dan Ekonomi*, *18*(1).

Nopirin, P. . (2004). Pengantar Teori Ekonomi Moneter. *Pustaka.Ut.*, *12*(12).

Nursari, A., Suparta, I. W., & Moelgini, Y. (2019). Pengaruh Pembayaran Non Tunai Terhadap Jumlah Uang yang Diminta Masyarakat. *Jurnal Ekonomi Pembangunan*, *8*(3). https://doi.org/10.23960/jep.v8i3.46

Panjaitan, C. (2022). Influence of the Non-Cash Payment System on the Money Supply in Indonesia. *Journal Magister Ilmu Ekonomi Universtas Palangka Raya : GROWTH*, *7*(1). https://doi.org/10.52300/grow.v7i1.4514

Parulian, T., & Utami, F. (2024). Pengaruh Inflasi , Tingkat Suku Bunga, dan E-Money Terhadap Jumlah Uang Beredar di Indonesia. *Jesya*, *7*(1), 1105–1116. https://doi.org/10.36778/jesya.v7i1.1535

Pradikta, M., Pasaribu, E., & Ekaputri, R. A. (2023). Comparison of Inflation and Economic Growth as Monetary Policy Targets in Indonesia for The Period 2002-2021. *SIJDEB*, *7*(3), 257–274. https://doi.org/10.29259/sijdeb.v7i3.257-274

Putra, H. S., Huljannah, M., Anis, A., & Azhar, Z. (2021). Debit and Credit Cards: Money Velocity Risks. *Jurnal Ekonomi & Studi Pembangunan*, *22*(2). https://doi.org/10.18196/jesp.v22i2.11208

Rahayu, S., & Nugroho, R. Y. Y. (2020). Dampak Pembayaran Non Tunai Terhadap Percepatan Perputaran Uang Di Indonesia. *BISEI: Jurnal Bisnis Dan Ekonomi Islam*, *5*(1). https://doi.org/http://ejournal.unhasy.ac.id/index.php/bisei/article/view/716/575

Rahmadani, F., & Aimon, H. (2022). Analisis Dampak Instrumen Kebijakan

Moneter Terhadap Stabilitas Perekonomian di Indonesia. *Jurnal Kajian Ekonomi Dan Pembangunan*, *4*(4). https://doi.org/10.24036/jkep.v4i4.14058

Rahman, A. J. (2018). Deflationary policy under digital and fiat currency competition. *Research in Economics*, *72*(2). https://doi.org/10.1016/j.rie.2018.04.004

Ramadhani, R. (2022). Analysis of The Effect of Exchange Rates, E-Money and Interest Rates on The Amount of Money Supply and Its Implications on The Inflation Level in Indonesia 2012-2017 Period. *International Journal of Accounting Finance in Asia Pasific*, *2*(1). https://doi.org/10.32535/ijafap.v2i1.364

Rifai, S. A., Susanti, H., & Setyaningrum, A. (2017). Analisis Pengaruh Kurs Rupiah, Laju Inflasi, Jumlah Uang Beredar dan Pertumbuhan Ekspor terhadap Total Pembiayaan Perbankan Syariah dengan Dana Pihak Ketiga sebagai Variabel Moderating. *MUQTASID Jurnal Ekonomi Dan Perbankan Syariah*, *8*(1). https://doi.org/10.18326/muqtasid.v8i1.18-39

Rosyidah, H., Rahmawati, R., & Prahutama, A. (2017). PEMODELAN VECTOR AUTOREGRESSIVE X (VARX) UNTUK MERAMALKAN JUMLAH UANG BEREDAR DI INDONESIA. *JURNAL GAUSSIAN*, *6*(3).

Salimah, S., & Wahyuningsih, D. (2021). ANALISIS PENGARUH INSTRUMEN PEMBAYARAN NON-TUNAI TERHADAP STABILITAS SISTEM KEUANGAN DI INDONESIA. *Buletin Ekonomika Pembangunan*, *1*(1). https://doi.org/10.21107/bep.v1i1.11562

Salsabila, T., Lubis, F. R. A., Putra, M. A. R. G., & Zakiyyah, N. A. A. (2023). *ANALISIS PENGARUH KURS, SUKU BUNGA DAN INFLASI TERHADAP JUMLAH UANG BEREDAR DI Indonesia*. *3*, 170–177.

Santoso, W., Trinugroho, I., & Risfandy, T. (2020). What Determine Loan Rate and Default Status in Financial Technology Online Direct Lending? Evidence from Indonesia. *Emerging Markets Finance and Trade*, *56*(2). https://doi.org/10.1080/1540496X.2019.1605595

Schumpeter, J. A., & Keynes, J. M. (1936). The General Theory of Employment, Interest and Money. *Journal of the American Statistical Association*, *31*(196). https://doi.org/10.2307/2278703

Sekhar, S. G. V. (2013). Theorems and Theories of Financial Innovation: Models and Mechanism Perspective. *Financial and Quantitative Analysis*, *1*(2), 26.

https://doi.org/10.12966/fqa.05.02.2013

Silber, W. (1983). The Process of Financial Innovation. *The American Review*, *73*(2).

Snellman, J. S., Vesala, J. M., & Humphrey, D. B. (2001). Substitution of Noncash Payment Instruments for Cash in Europe. *Journal of Financial Services Research*, *19*(2–3). https://doi.org/10.1023/A:1011151219545

Solikin, S. (2002). Uang: Pengertian, Penciptaan dan Perannya dalam Perekonomian. *E-Journal Ekonomi Pembangunan*.

Subari, S. M. T., & Ascarya. (2003). Kebijakan Sistem Pembayaran di Indonesia. In *Pusat Pendidikan dan Studi Kebansentrakan (PPSK) Bank Indonesia* (Issue 8).

Sugiyono. (2016). Metode Penelitian Kuantitatif, Kualitatif dan R &Metode Penelitian Kuantitatif, Kualitatif Dan R & D.Bandung:Alfabeta. *Bandung:Alfabeta.*

Sugiyono, P. D. (2018). Metode Penelitian Kuantitatif. *Metode Penelitian Kuantitatif.*

Tobin, J. (1958). Liquidity preference as behavior towards risk. In *Review of Economic Studies* (Vol. 25, Issue 2). https://doi.org/10.2307/2296205

Tri Rahayu, S. A., Hakim, L., & Faza, H. (2023). The Effect of Non-Cash Payments on the Money Supply in Indonesia During the Covid-19 Pandemic Period. *International Journal of Multidisciplinary: Applied Business and Education Research*, *4*(11). https://doi.org/10.11594/ijmaber.04.11.06

Ugwuanyi, G. O., Okon, U. E., & Anene, E. C. (2020). Investigating the impact of digital finance on money supply in Nigeria. *Nigerian Journal of Banking and Finance*, *12*(1).

Umairoh, N., & Wijaya, R. S. (2023). ANALYSIS OF THE EFFECT OF NON-CASH PAYMENT TRANSACTIONS ON THE MONEY SUPPLY M1 IN INDONESIA. *International Journal of Multidisciplinary Research and Literature*, *2*(6). https://doi.org/10.53067/ijomral.v2i6.174

Wasiaturrahma, W., Wahyuningtyas, Y. T., & Ajija, S. R. (2019). Non cash payment and demand for real money in Indonesia. *Journal of Economics, Business, & Accountancy Ventura*, *22*(1). https://doi.org/10.14414/jebav.v22i1.1575

Woodford, M. (2011). Interest and prices: Foundations of a theory of monetary

policy. In *Interest and Prices: Foundations of a Theory of Monetary Policy*. https://doi.org/10.1111/j.0013-0427.2005.430_2.x

Xuan, L., & Shihong, Z. (2010). Finance innovation model literature review. *Proceedings of 2010 International Conference on Regional Management Science and Engineering*.

Yilmazkuday, H., & Yazgan, M. E. (2009). Effects of credit and debit cards on the currency demand. *Applied Economics*, *41*(17). https://doi.org/10.1080/00036840701222496

Yuli Wijaya, A., Mukhlis, I., & Seprillina, L. (2021). Analisis pengaruh E-money, volume transaksi elektronik dan suku bunga terhadap jumlah uang beredar di Indonesia pada masa sebelum dan sesudah pandemi COVID-19. *Jurnal Ekonomi, Bisnis Dan Pendidikan*, *1*(2). https://doi.org/10.17977/um066v1i22021p135-145