

## DYNAMIC RATIONAL EXPECTATIONS MODEL AND COVID-19 ON MONEY DEMAND IN CARISI COUNTRIES

RUSIADI<sup>1\*</sup>, SUHENDI<sup>2</sup>, ADE NOVALINA<sup>3</sup>, LIA NAZLIANA NST<sup>4</sup>, BAKHTIAR EFENDI<sup>5</sup> and DIWAYANA PUTRI NST<sup>6</sup>

<sup>1, 2, 3, 4, 5, 6</sup> Universitas Pembangunan Panca Budi, Medan, Indonesia.

\*Corresponding author Email: rusiadi@dosen.pancabudi.ac.id

### Abstract

This study analyzes the impact of the dynamic rational expectations model and covid-19 on financial system stability in China, America, Russia, Italy, Spain, and Indonesia. This study uses the VAR analysis method with testing using Eviews 10. The results of the VAR analysis show that there is a change in the effect of each standard deviation of each variable from being favorable to negative and vice versa, from being harmful to being positive in the medium term and the long time. These results explain different responses from the money supply variable and the inflation variable, both positive and negative reactions. This condition shows that all the variables studied are correlated with each other in the medium and long term.

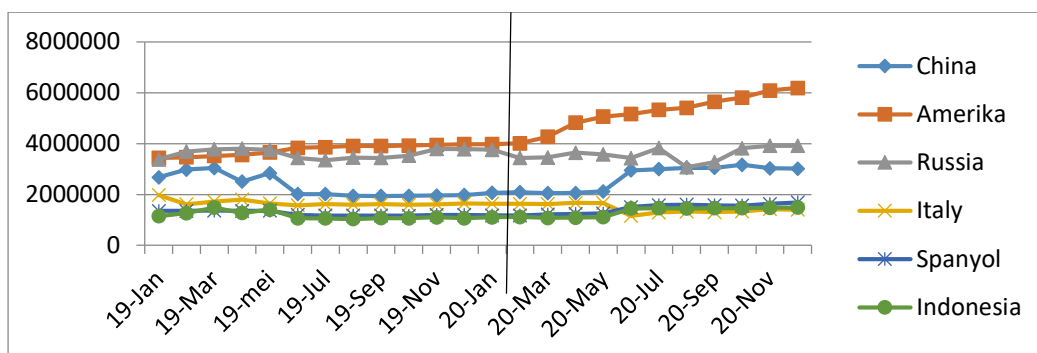
**Keywords:** Dynamic rational expectations model and Covid-19.

### I. INTRODUCTION

The importance of monetary policy in maintaining the stability of money circulation. The development of the money supply reflects the development of the economy. The growing and developing economy causes the money supply also to increase. If the economy is more advanced, the portion of the use of currency (paper money and coins) is decreasing, replaced by demand deposits. (Rahardja and Manurung, 2008:324) (Andre et al, 2021) (Altig et al, 2020)

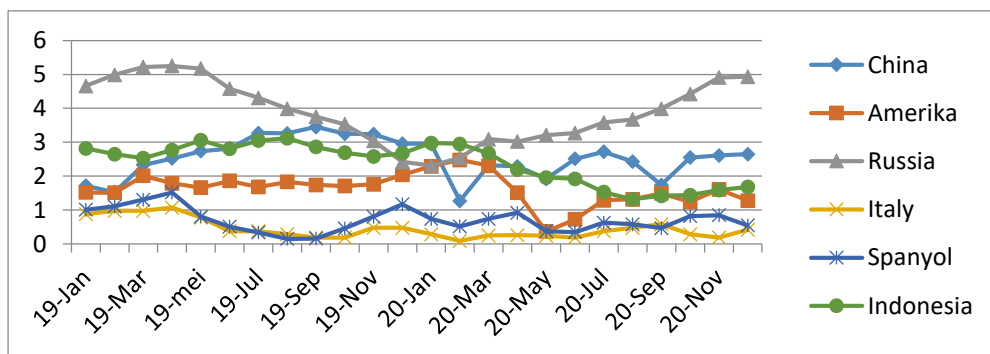
Tambunan (2011: 257) states that too much money circulating in the community will impact causing a lot of demand. Conversely, too little money is held by the community, resulting in low order in the community resulting in quiet production activities, leading to an economic recession (Armantier et al., 2011). 2020) (Auclert et al, 2020) (Baker et al, 2020). So the stability of the money supply means financial stability for high and sustainable economic growth (Balleer et al. 1, 2020) (Bayer et al. 1, 2020) (Miescu et al. 1, 2021).

Several large countries have been in the spotlight of other countries due to rapidly developing economic developments (Coibion et al., 2020). And a concern because the economy is in an unstable condition. Financial problems such as low economic growth, investment, exchange rates, and high inflation rates will arise. Ten countries have the most increased money supply, according to tradingeconomics.com. Including (1) China, (2) America, (3) Russia, (4) Italy, (5) Spain, and (6) Indonesia.



**Figure 1: Money Demand Carisi Countries Sebelum dan Setelah Covid-19**

Based on the graph above, it is known that JUB fluctuations occurred in CARISI Countries from 2019-to 2020. Before the covid-19 outbreak, JUB levels were stable in almost all CARISI Countries. However, during the COVID-19 pandemic, JUB levels tended to increase. America, 2020/05 JUB increased by US\$ 3,653,200 from the previous year of US\$ 3,558,300, and the highest JUB occurred in 2020/11, which was US\$ 6,086,100. Then in China, there was a decrease in JUB in 2019/07 of US\$2,017,961, then increased in 2020/07 by US\$2,998,861. While in Russia, the highest JUB occurred in 2020/07 at US\$ 3,829,763.



**Figure 2: Inflation development before and after covid19**

In China, the highest inflation occurred in 2019/09 at 3.45% and then decreased in 2020/03 by 2.32%. Then in America, the highest inflation occurred in 2020/03 at 2.31% and then reduced again in 2020/05 by 0.37%. While in Russia, the highest inflation occurred in 2019/05 at 5.17% and then, decreased again in 2020/01 by 2.31% and then increased again in 2020/11 by 4.91%.

Inflation is a measure of the economy in Indonesia; therefore, the government must be able to control inflation from the variables that influence it, such as interest rates, the money supply, and the exchange rate of the rupiah against the US dollar (Larsen et al. 1, 2021) (Meyer et al. 1, 2021) (Carroll et al., 2020). The money and growth literature analyzes the impact of inflation on growth, focusing on the effect of inflation on the steady-state balance of per capita capital and output (e.g., Orphanides and Solow, 1990) (Cavallo, A., 2020) (Cavallo et al., 2017).

There are three possible outcomes regarding the impact of inflation on output and growth: i) none; ii) positive, and iii) negative. Sidrauski (1967) established the first result, showing that money is neutral and super-neutral 1 in an optimal control framework considering the utility function's accurate money balances (M/P). Tobin (1965), who thinks money as a substitute for capital, determines the positive impact of inflation on growth; the result is the Tobin effect. The adverse effects of inflation on growth, also known as the anti-Tobin effect, are attributed mainly to cash in advance models (e.g., Stockman, 1981), which consider money as a complement to capital 2. in an optimal control framework considering accurate money balances (M/P ) in the utility function.

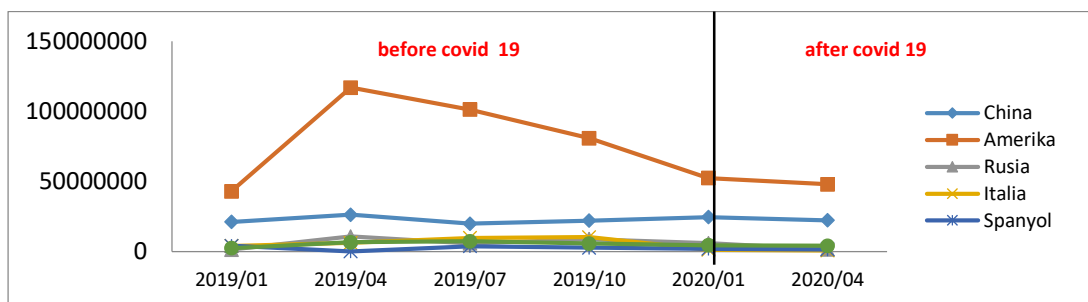


Figure 3: Investment development before and after covid19

Based on the table and graphic above. It is also known that the investment rate has different fluctuations in CARISI countries from 2019-to 2020. Before the Covid-19 pandemic, there was a relatively high increase in investment in Amerika in 2019/04, which was US\$ 11,693,800 from the previous year of US\$ 4,307,300. Meanwhile, during the COVID-19 pandemic, the investment pace showed no investment movement in almost all CARIS Countries.

Kewal (2012) examined the effect of inflation, interest rates, exchange rates, and GDP on the JCI. The results found that only the exchange rate significantly affected the JCI, while the inflation rate, SBI, and GDP growth did not affect the JCI.

## II. LITERATURE REVIEW

### Dynamic Rational Expectation Analysis

Changes in the supply of gold and demand for the stock of gold coins will change the price of the balance of PG/P. It is easier to use rational expectations in the dynamic gold standard model if the gold standard model is in linear form. For example, inflation expectations  $[E_t p_{t+1} - p_t]$ , gold money stock  $[\ln(G_{mt}) = m_t]$ , general price level  $[\ln(P_t) = p_t]$ , and nonmonetary gold-stock  $[\ln(G_n) = q_t]$ . The demand model for the stock of gold and nonmonetary money is:

$$m_t - p_t = \alpha_0 + \alpha_1(E_t p_{t+1} - p_t) + e_t$$

$$q_t = \beta_0 + \beta_1 \pi_t + \beta_2(E_t p_{t+1} - p_t) + v_t$$

$$\alpha_0 > 0, \alpha_1, \beta_1, \beta_2 < 0$$

If  $\Delta G$  is the change in the total stock of gold, then the difference is estimated at  $\theta m_t + (1-\theta) q_t$ , if  $\theta$  is the fraction of the actual gold held in gold coins. Relative price [ $P_G/P = p_t$ ] and gold depreciation are a certain fraction of the period's nonmonetary gold demand [ $t - 1$ ],  $q_{t-1}$ . Therefore equation can be written in linear form as follows:

$$\theta \Delta m_t + (1-\theta)\Delta q_t = \rho_0 + \rho_1 p_t + \rho_2 q_{t-1}$$

$$\Delta m_t + \omega_3 \Delta q_t = \omega_0 + \omega_1 p_t + \omega_2 q_{t-1}$$

$$m_t + \omega_3 q_t = \omega_0 + \omega_1 p_t + (\omega_2 + \omega_3) q_{t-1} + m_{t-1}$$

Parameter value  $\omega$  is  $\rho_1, \rho_2 < 0, \omega_3 = (1-\theta)/\theta$  and  $\omega_i = \rho_i/\theta$ . Equation is used to find dynamic solutions of  $p_t, m_t$ , and  $q_t$ . Equations show two grace time variables [ $m_{t-1}$  and  $q_{t-1}$ ] plus two shocks [ $e_t$  and  $v_t$ ]. The solutions to the three equations can be written in reduced-form equations, where all endogenous variables are functions of all exogenous variables:

$$p_t = \phi_{10} + \phi_{11} q_{t-1} + \phi_{12} m_{t-1} + \phi_{13} e_t + \phi_{14} v_t$$

$$m_t = \phi_{20} + \phi_{21} q_{t-1} + \phi_{22} m_{t-1} + \phi_{23} e_t + \phi_{24} v_t$$

$$q_t = \phi_{30} + \phi_{31} q_{t-1} + \phi_{32} m_{t-1} + \phi_{33} e_t + \phi_{34} v_t$$

Evaluate the coefficient value  $\phi_{it}$  can be done by defining price expectations in the period [ $t + 1$ ] as follows :

$$E_t p_{t+1} = \phi_{10} + \phi_{11} q_t + \phi_{12} m_t$$

$$= \phi_{10} + \phi_{11} [\phi_{30} + \phi_{31} q_{t-1} + \phi_{32} m_{t-1} + \phi_{33} e_t + \phi_{34} v_t]$$

$$+ \phi_{12} [\phi_{20} + \phi_{21} q_{t-1} + \phi_{22} m_{t-1} + \phi_{23} e_t + \phi_{24} v_t]$$

Substitution to replace  $[E_t p_{t+1}]$  and the model used includes but is replaced by the gold accumulation relationship, i.e.:

$$m_t + \omega_3 q_t = k$$

This means that the total gold stock is constant at  $k$ . To analyze the behavior of the price level in terms of and the substitution of:

$$p_t + \alpha_0 + \alpha_1 (E_t p_{t+1} - p_t) + e_t$$

$$+ \omega_3 [\beta_0 + \beta_1 p_t + \beta_2 (E_t p_{t+1} - p_t) + v_t] = k$$

The bootstrap-free solution is that the price level is determined by random shocks  $[e_t]$  and  $[v_t]$ . The bootstrap-free solution is

$$p_t = \phi_0 + \phi_1 e_t + \phi_2 v_t$$

Value  $E_t p_{t+1} = \phi_0$  Substitution gives the equation:

$$\begin{aligned} (1-\alpha_1)[\phi_0 + \phi_1 e_t + \phi_2 v_t] + \alpha_0 + \alpha_1 \phi_0 + e_t \\ + \omega_3[\beta_0 + (\beta_1 - \beta_2)(\phi_0 + \phi_1 e_t + \phi_2 v_t) + \beta_2 \phi_0 + v_t] = k \\ (1-\alpha_1)\phi_1 e_t + e_t + (1-\alpha_1)\phi_2 v_t + \alpha_0 + \phi_0 + \omega_3 \beta_0 + \omega_3 \beta_1 \phi_0 \\ + \omega_3(\beta_1 - \beta_2)[\phi_1 e_t + \phi_2 v_t] + \omega_3 v_t = k \end{aligned}$$

The equation is fulfilled with three parameters or coefficients, namely:

1.  $\phi_0 + \alpha_0 + \omega_3 \beta_0 + \omega_3 \phi_0 \beta_1 = k$  or  $\phi_0 = [k - \alpha_0 - \omega_3 \beta_0] / [1 + \omega_3 \beta_1]$ ,
2.  $(1-\alpha_1)\phi_1 + 1 + \omega_3(\beta_1 - \beta_2)\phi_1 = 0$  or  $\phi_1 = -1 / [1 - \alpha_1 + \omega_3(\beta_1 - \beta_2)]$ , dan
3.  $(1-\alpha_1)\phi_2 + \omega_3(\beta_1 - \beta_2)\phi_2 + \omega_3 = 0$  or  $\phi_2 = -\omega_3 / [1 - \alpha_1 + \omega_3(\beta_1 - \beta_2)]$ .

Known value  $\beta_1 > 0$  and  $\beta_2, \alpha_1 < 0$  so that the value  $\phi_1, \phi_2 < 0$ . Therefore a positive surprise in demand for gold money  $[e_t \geq 0]$  and a positive surprise in the market for nonmonetary gold  $[v_t > 0]$  will temporarily lower the general price level. Therefore, increasing the demand for nonmonetary gold and gold coins will reduce the general price. The variance of the general price level with the average general price level  $[\phi_0]$  :

$$Var(p_t) = \frac{\sigma_e^2 + \omega_3^2 \sigma_v^2}{[1 - \alpha_1 + \omega_3(\beta_1 - \beta_2)]^2}$$

Equation  $E(e_t, v_t) = 0$  as the effect of each parameter value resulting in variations in the general price level, to obtain dynamic demand for gold  $[m_t]$  and non-monetary gold  $[q_t]$ , namely:

$$m_t = \alpha_0 + \alpha_1 \phi_0 - (1 + \alpha_1) p_t + e_t \quad m_t = -[\phi_1 + \alpha_1 \phi_1 - 1] e_t - (\alpha_1 + \alpha_1 \phi_2) v_t$$

(1.39A)

$$q_t = \beta_0 + (\beta_1 - \beta_2) p_t + \beta_2 \phi_0 + v_t$$

$$q_t = \beta_0 + \beta_1 \phi_0 + (\beta_1 - \beta_2) \phi_1 e_t + [(\beta_1 - \beta_2) \phi_2 + 1] v_t$$

So that a positive surprise in demand for gold  $[e_t > 0]$  and request for nonmonetary gold  $[v_t > 0]$  will temporarily increase the demand for gold and nonmonetary gold. On the other hand, a

negative shock to demand for gold [ $\epsilon_t > 0$ ] and request for nonmonetary gold [ $\epsilon_t < 0$ ] will temporarily reduce demand for gold and demand for nonmonetary gold.

### III. METODE PENELITIAN

The data collection technique used in this study uses a documentation study, namely collecting and processing data from previous information related to the problem under study. -2020. The data analysis model uses VAR analysis.

VAR Analysis Model with the formula:

$$JUB_t = B_{10} + B_{11}INF_{t-p} + B_{12}INV_{t-p} + B_{13}PDB_{t-p} + B_{14}SB_{t-p} + B_{15}IHK_{t-p} + B_{16}CADEV_{t-p} + B_{17}KURS_{t-p}\beta + E_{11}$$

$$INF_t = B_{18} + B_{19}INV_{t-p} + B_{20}PDB_{t-p} + B_{21}SB_{t-p} + B_{22}IHK_{t-p} + B_{23}CADEV_{t-p} + B_{24}KURS_{t-p} + B_{25}JUB_{t-p}\beta + E_{12}$$

$$INV_t = B_{25} + B_{26}PDB_{t-p} + B_{27}SB_{t-p} + B_{28}IHK_{t-p} + B_{29}CADEV_{t-p} + B_{30}KURS_{t-p} + B_{31}JUB_{t-p} + B_{32}INF_{t-p}\beta + E_{13}$$

$$PDB_t = B_{32} + B_{33}SB_{t-p} + B_{34}IHK_{t-p} + B_{35}CADEV_{t-p} + B_{36}KURS_{t-p} + B_{37}JUB_{t-p} + B_{38}INF_{t-p}\beta + B_{39}INV_{t-p} + E_{14}$$

$$SB_t = B_{40} + B_{41}IHK_{t-p} + B_{42}CADEV_{t-p} + B_{43}KURS_{t-p} + B_{44}JUB_{t-p} + B_{45}INF_{t-p} + B_{46}INV_{t-p}\beta + B_{48}PDB_{t-p} + E_{15}$$

$$IHK_t = B_{49} + B_{50}CADEV_{t-p} + B_{51}KURS_{t-p} + B_{52}JUB_{t-p} + B_{53}INF_{t-p} + B_{54}INV_{t-p}\beta + B_{55}PDB_{t-p} + B_{56}SB_{t-p} + E_{16}$$

$$CADEV_t = B_{57} + B_{58}KURS_{t-p} + B_{59}JUB_{t-p} + B_{60}INF_{t-p} + B_{61}INV_{t-p}\beta + B_{62}PDB_{t-p} + B_{63}SB_{t-p} + B_{64}IHK_{t-p} + E_{17}$$

$$KURS_t = B_{57} + B_{58}JUB_{t-p} + B_{59}INF_{t-p} + B_{60}INV_{t-p} + B_{61}PDB_{t-p}\beta + B_{62}SB_{t-p} + B_{63}IHK_{t-p} + B_{64}CADEV_{t-p} + E_{18}$$

#### Description:

JUB	: Money demand (Billion US\$)
INV	: Investation (Billion US\$)
INF	: Inflation (%)
PDB	: GDP (Billion US\$)
SB	: Interest Rate (%)
IHK	: Commodity Price Index (Point)
Cadev	: Foreign exchange reserves (US\$)
KURS	: Exchange rate (Billion US\$)
$\epsilon_t$	: random disturbance
p	: lag

IV. DISCUSSION

Table 1. Result Dynamic Rational Expectations Model

Vector Auto regression Estimates								
	LOGJUB	INF	LOGINV	LOGPDB	SB	LOGIHK	LOGCADEV	LOGKURS
LOGJUB(-1)	0.879380 (0.16005) [ 5.49443]	-0.326225 (1.09765) [-0.29720]	0.554442 (0.21588) [ 2.56832]	0.037324 (0.12207) [ 0.30576]	-3.318581 (1.65306) [-2.00754]	0.002001 (0.03886) [ 0.05150]	-0.032684 (0.09155) [-0.35699]	0.032743 (0.02284) [ 1.43352]
INF(-1)	-0.002174 (0.02049) [-0.10607]	0.563920 (0.14054) [ 4.01246]	-0.060114 (0.02764) [-2.17481]	0.016321 (0.01563) [ 1.04421]	0.127792 (0.21166) [ 0.60377]	0.003947 (0.00498) [ 0.79322]	0.013857 (0.01172) [ 1.18211]	-0.001132 (0.00292) [-0.38692]
LOGINV(-1)	-0.070399 (0.12743) [-0.55246]	-2.105377 (0.87393) [-2.40909]	0.774521 (0.17188) [ 4.50623]	0.101133 (0.09719) [ 1.04058]	-1.609503 (1.31613) [-1.22290]	-0.021968 (0.03094) [-0.71001]	0.052399 (0.07289) [ 0.71883]	0.037474 (0.01819) [ 2.06064]
LOGPDB(-1)	0.161367 (0.16974) [ 0.95068]	1.054616 (1.16410) [ 0.90595]	-0.008503 (0.22895) [-0.03714]	0.593553 (0.12946) [ 4.58488]	3.345859 (1.75313) [ 1.90851]	-0.001663 (0.04121) [-0.04035]	-0.021433 (0.09710) [-0.22073]	-0.006704 (0.02422) [-0.27675]
SB(-1)	0.003231 (0.01585) [ 0.20384]	0.182762 (0.10870) [ 1.68129]	-0.012150 (0.02138) [-0.56832]	-0.007183 (0.01209) [-0.59419]	0.135633 (0.16371) [ 0.82851]	0.001784 (0.00385) [ 0.46368]	-0.001759 (0.00907) [-0.19404]	0.001988 (0.00226) [ 0.87876]
LOGIHK(-1)	-0.416127 (0.83039) [-0.50112]	-10.38970 (5.69495) [-1.82437]	-2.959979 (1.12004) [-2.64274]	-0.202172 (0.63333) [-0.31922]	17.99365 (8.57658) [ 2.09800]	0.564636 (0.20162) [ 2.80050]	-0.162143 (0.47501) [-0.34134]	-0.082989 (0.11851) [-0.70030]
LOGCADEV(-1)	0.094461 (0.36769) [ 0.25691]	4.521494 (2.52167) [ 1.79306]	1.347239 (0.49594) [ 2.71652]	-0.192892 (0.28043) [-0.68783]	-2.327586 (3.79763) [-0.61291]	0.032392 (0.08928) [ 0.36284]	0.722541 (0.21033) [ 3.43526]	0.018691 (0.05247) [ 0.35619]
LOGKURS(-1)	-0.253967 (1.20287) [-0.21113]	9.348227 (8.24951) [ 1.13319]	-4.130694 (1.62245) [-2.54595]	-1.313160 (0.91742) [-1.43135]	29.16117 (12.4237) [ 2.34721]	-0.009259 (0.29206) [-0.03170]	0.188622 (0.68809) [ 0.27413]	0.454624 (0.17166) [ 2.64835]
C	1.095449 (3.14364) [ 0.34847]	-5.992963 (21.5597) [-0.27797]	10.73253 (4.24020) [ 2.53114]	4.195006 (2.39764) [ 1.74964]	-86.49937 (32.4688) [-2.66407]	0.861125 (0.76328) [ 1.12819]	0.620077 (1.79828) [ 0.34482]	1.104633 (0.44863) [ 2.46222]

The effectiveness of monetary policy is significant because it is used to determine which variables are the most dominant in the economy to be used as a basis for formulating monetary policy strategies (Coibion et al. 1, 2022) (Fetzer et al. 1, 2021) (Guerrieri et al. 1, 2020). Also, to find out how firm and long the deadlines for each transmission line work (Candia et al. 1, 2020) (Bordalo et al. 1, 2020) (Candia et al. 1, 2020). It is essential to determine which economic and financial variables are the most vital leading indicators of the movement of the money supply and which variables are indicators for determining the operational targets of monetary policy (Warjiyo, 2004) (Gornemann et al. 1, 2021) (D'Acunto et al., 2021) (Carroll et al., 2020). The relationship between monetary control instruments and the ultimate goal of monetary policy is indirect and complex. It requires a relatively long time (Binder et al. 1, 2020) (Andre et al. 1 2021) (Christelis et al. 1, 2020). Therefore, experts and practitioners in monetary add indicators are called operational targets. Following are the leading in monetary transmission policy:

**Table 2: Leading Indicators Result in Dynamic Rational Expectations Model**

Variable	Leading Indicator		
	1	5	10
JUB	JUB	JUB PDB	JUB PDB
INF	INF JUB	INF SB	INF JUB
INV	INV INF	INV KURS	INV KURS
PDB	PDB INF	PDB INF	PDB INF
SB	SB INV	SB INV	SB INV
IHK	IHK JUB	IHK JUB	IHK JUB
CADEV	CADEV IHK	CADEV INF	CADEV INF
KURS	KURS INV	KURS INV	KURS INV

1 = short-term

5 = middle-term

10 = long-term

The Leading Indicators are as follows:

- 1) The leading indicator to control JUB is JUB, both in the short term, medium-term and long term.
- 2) The leading indicator to control INF is JUB in the short and long term, while the SB is in the medium term.
- 3) The leading indicator to control INF is the exchange rate in the medium and long term, while INF is in the short term
- 4) The leading indicator to control GDP is INF, both short, medium, and long term.
- 5) The leading indicator to control SB is INV, both in the short, medium, and long term.
- 6) The leading indicator to control the CPI is JUB, both short, medium, and long.
- 7) The leading indicator to control CADEV is the CPI in the short term while the INF in the medium and long term.
- 8) The leading indicator to control the EXCHANGE is INV, both in the short term, medium-term and long term



		Mean	N	Std. Deviation	Std. Error Mean
Pair 1	Money demand before sebelum covid19	1170.3747	12	151.56879	43.75414
	Money demand before after covid19	1313.5248	12	188.32933	54.36600
Pair 2	Inflation before covid19	2.8008	12	.19313	.05575
	Inflation after covid19	1.9708	12	.59920	.17298

		N	Correlation	Sig.
Pair 1	Money demand before and after covid19	12	-.855	.000
Pair 2	Inflation before and after covid19	12	-.390	.210

		Paired Differences					t	df	Sig. (2-tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Money demand before sebelum covid19	-143.15017	327.48549	94.53692	-351.22452	64.92419	-1.514	11	.158
Pair 2	Money demand before after covid19	.83000	.69763	.20139	.38675	1.27325	4.121	11	.002

Sumber: output reviews 2022

The average rate of money demand before the COVID-19 pandemic was US\$ 1170.37, and after the emergence of this pandemic, the JUB rate increased by US\$ 1313.52. The value of sig (2-tailed) for the money demand variable is 1.58, which means  $> = 0.05$ . Thus, based on the criteria for accepting and rejecting the hypothesis above, from the results table, it can be seen that the t count at sig (2-tailed) =  $1.58 > 0.05$ , the value of sig is greater than the error level of 5% so that,  $H_0$  is accepted.  $H_a$  is rejected. . This shows no significant difference in money demand before and after the COVID-19 pandemic. The average inflation rate before the COVID-19 pandemic was 2.80%, and after the emergence of this pandemic, the inflation rate decreased to 1.97%. The value of sig (2-tailed) for the inflation variable is 0.02, which means  $< = 0.05$ . Thus, based on the acceptance and rejection criteria for the hypothesis above, from the results table, it can be seen that the t count at sig (2-tailed) =  $0.02 < = 0.05$ , the value of sig is smaller than the error level of 5% so,  $H_a$  is accepted and  $H_0$  is rejected. This shows a significant difference in inflation before and after the COVID-19 pandemic.

## V. Conclusion

Dynamic Rational Expectations Model and Covid-19 on Money Demand in Carisi Countries showed that these results explain different responses from the money supply and inflation variables, both positive and negative reactions. This condition indicates that all the variables studied are correlated with each other in the medium and long term. During the Covid-19 period, all the countries studied experienced an economic recession and decreased demand for money due to reduced investment, fell GDP, and increased interest rates, thereby raising prices. The money supply after Covid-19 has changed due to changes in people's inflation expectations in the Carisi country. At the same time, the economic recession occurs due to macroeconomic instability from the impact of the absence of the economic downturn.

## REFERENCE

- 1) Alatiqi, S., &Fazel, S. (2008). Can Money Supply Predict Stock Prices? *Journal for Economic Educators*, 8(2), 54–59.
- 2) Altig, D., Baker, S., Barrero, J.M., Bloom, N., Bunn, P., Chen, S., Davis, S.J., Leather, J., Meyer, B., Mihaylov, E., Mizen, P., Parker, N., Renault, T., Smietanka, P., Thwaites, G., 2020. Economic uncertainty before and during the COVID-19 pandemic. *J Public Econ* 191.
- 3) Amassoma, D., Sunday, K., &Onyedikachi, E.-E. (2018). the influence of money supply on inflation in Nigeria. *Journal of Economics and Management*, 31(1), 5–23. <https://doi.org/10.22367/jem.2018.31.01>
- 4) Andre, P., Pizzinelli, C., Roth, C., Wohlfart, J., 2021. Subjective models of the macroeconomy: evidence from experts and representative samples. *Review of Economic Studies*. Forthcoming.
- 5) Armantier, O., Kosar, G., Pomerantz, R., Skandalis, D., Smith, K., Topa, G., van der Klaauw, W., 2020. How Economic Crises Affect Inflation Beliefs: Evidence from the COVID-19 Pandemic. *Staff Report*. Federal Reserve Bank of New York. 949.
- 6) Arquíe, A., Héricourt, J., &Tripier, F. (2020).Covid-19: Has the Time Come for Mainstream Macroeconomics to Rehabilitate Money Printing? 31.
- 7) Auclert, A., Rognlie, M., Straub, L., 2020. Micro Jumps, Macro Humps: Monetary Policy and Business Cycles in an Estimated HANK Model. *Working Paper*. National Bureau of Economic Research. 26647 DOI: 10.3386/w26647.
- 8) Bahmani-oskooee, M., &Bahmani, S. (2014). Monetary Uncertainty and Demand for Money in Korea. *Asian Economic and Financial Review*, 4(3), 317–324.
- 9) Baker, S.R., Bloom, N., Davis, S.J., Terry, S.J., 2020. COVID-Induced Economic Uncertainty. *Working Paper*. National Bureau of Economic Research. Twenty-six thousand nine hundred eighty-three doi: 10.3386/w26983.
- 10) Baker, S.R., McElroy, T.S., Sheng, X.S., 2020. Expectation formation following large, unexpected shocks. *Review of Economics and Statistics* 102 (2), 287–303. doi:10.1162/rest\_a\_00826.
- 11) Balleer, A., Link, S., Menkhoff, M., Zorn, P., 2020. Demand or Supply? Price Adjustment during the Covid-19 Pandemic, 31, pp. 59–102. *Covid Economics: Vetted and Real-Time Papers*.
- 12) Bashier, A.-A., &Dahlan, A. (2011). The Money Demand Function for Jordan: An Empirical Investigation. *International Journal of Business and Social Science*, 2(5), 77–86.
- 13) Bayer, C., Born, B., Lueticke, R., Müller, G. J., 2020. The Coronavirus Stimulus Package: How Large is the Transfer Multiplier?CEPR Discussion paper 14600.

- 14) Ben-Bassat, A. (1980). The optimal composition of foreign exchange reserves. *Journal of International Economics*, 10(2), 285–295. [https://doi.org/10.1016/0022-1996\(80\)90059-8](https://doi.org/10.1016/0022-1996(80)90059-8)
- 15) Beta Instability when Interest Rate Levels Change Author (s): John S. Bildersee and Gordon S. Roberts Source : *The Journal of Financial and Quantitative Analysis*, Vol. 16, No. 3 (Sep., 1981), pp. Published by : Cambridge University Press on being. (2020). 16(3), 375–380.
- 16) Bevan, A. A., & Estrin, S. (2004). The determinants of foreign direct investment into European transition economies. *Journal of Comparative Economics*, 32(4), 775–787. <https://doi.org/10.1016/j.jce.2004.08.006>
- 17) Binder, C., 2020. Coronavirus fears and macroeconomic expectations. *Review of Economics and Statistics* 102 (4), 721–730. doi:10.1162/rest\_a\_00931.
- 18) Blejer, M. I., & Cheasty, A. (1988). High inflation, heterodox stabilization, and fiscal policy. *World Development*, 16(8), 867–881. [https://doi.org/10.1016/0305-750X\(88\)90019-8](https://doi.org/10.1016/0305-750X(88)90019-8)
- 19) Bordalo, P., Gennaioli, N., Ma, Y., Shleifer, A., 2020. Overreaction in macroeconomic expectations. *American Economic Review* 110 (9), 2748–2782. doi:10.1257/aer.20181219.
- 20) Born, B., Enders, Z., Menkhoff, M., Müller, G., Niemann, K., 2021. How Economic Expectations React to News: Evidence from German Firms.
- 21) Broer, T., Kohl has, A., 2021. Forecaster (mis-)behavior. *Review of Economics and Statistics*. Forthcoming.
- 22) Bryson, J. R., & Vanchan, V. (2020). COVID-19 and Alternative Conceptualisations of Value and Risk in GPN Research. *Tijdschrift Voor Economische En Sociale Geografie*, 111(3), 530–542. <https://doi.org/10.1111/tesg.12425>
- 23) Cagan, P. (1958). The Demand for Currency Relative to the Total Money Supply. In *Journal of Political Economy* (Vol. 66, Issue 4). <https://doi.org/10.1086/258056>
- 24) Candia, B., Coibion, O., Gorodnichenko, Y., 2020. Communication and the Beliefs of Economic Agents. *Economic Policy Symposium (Jackson Hole, WY) Proceedings*.
- 25) Carlstrom, C. T., & Fuerst, T. S. (2008). Explaining apparent changes in the Phillips curve: trend inflation isn't constant. *Economic Commentary*, Jan. <http://ideas.repec.org/a/fip/fedcec/y2008ijan.html>
- 26) Carroll, C.D., Crawley, E., Slacalek, J., Tokuoka, K., White, M.N., 2020. Sticky expectations and consumption dynamics. *American Economic Journal: Macroeconomics* 12 (3), 40–76. doi:10.1257/mac.20180286.
- 27) Case, B., Pollakowski, H. O., & Wachter, S. M. (1991). On Choosing Among House Price Index Methodologies. In *Real Estate Economics* (Vol. 19, Issue 3, pp. 286–307). <https://doi.org/10.1111/1540-6229.00554>
- 28) Cavallo, A., 2020. Inflation with Covid Consumption Baskets. Working Paper. National Bureau of Economic Research. Twenty-seven thousand three hundred fifty-two doi: 10.3386/w27352.
- 29) Cavallo, A., Cruces, G., Perez-Truglia, R., 2017. Inflation expectations, learning, and supermarket prices: evidence from survey experiments. *American Economic Journal: Macroeconomics* 9 (3), 1–35. doi:10.1257/mac.20150147.
- 30) Chang, C. H., Chan, K. C., & Fung, H. G. (2009). Effect of money supply on actual output and price in China. *China and World Economy*, 17(2), 35–44. <https://doi.org/10.1111/j.1749-124X.2009.01140.x>
- 31) Christelis, D., Georgarakos, D., Jappelli, T., Kenny, G., 2020. The Covid-19 Crisis and Consumption: Survey Evidence from Six EU Countries. Working Paper Series. European Central Bank. 2507.

- 32) Coibion, O., Georgarakos, D., Gorodnichenko, Y., Kenny, G., Weber, M., 2021. The Effect of Macroeconomic Uncertainty on Household Spending. Working Paper. National Bureau of Economic Research. Twenty-eight thousand six hundred twenty-five doi: 10.3386/w28625.
- 33) Coibion, O., Gorodnichenko, Y., Knotek, E.S., Schoenle, R., 2020. Average Inflation Targeting and Household Expectations. Working Paper. National Bureau of Economic Research. Twenty-seven thousand eight hundred thirty-six doi: 10.3386/w27836.
- 34) Coibion, O., Gorodnichenko, Y., Weber, M., 2020. The Cost of the Covid-19 Crisis: Lockdowns, Macroeconomic Expectations, and Consumer Spending. Working Paper. National Bureau of Economic Research. 27141 doi: 10.3386/w27141.
- 35) Coibion, O., Gorodnichenko, Y., Weber, M., 2022. Monetary Policy Communications and their Effects on Household Inflation Expectations. *Journal of Political Economy*, forthcoming.
- 36) Cuthbertson, K., & Bredin, D. (2001). Money demand in the Czech Republic since transition. *The Journal of Policy Reform*, 4(4), 271–290. <https://doi.org/10.1080/13841280108523422>
- 37) D’Acunto, F., Malmendier, U., Weber, M., 2021. Gender roles produce divergent economic expectations. *Proceedings of the National Academy of Sciences* 118(21). doi:10.1073/pnas.2008534118.
- 38) Dietrich, A., Knotek, E. S., Myrseth, K. O. R., Rich, R. W., Schoenle, R. S., Weber, M., 2022. Inflation Expectations: Category Beliefs and Spending Plans.
- 39) Egger, P., & Pfaffermayr, M. (2004). The impact of bilateral investment treaties on foreign direct investment. *Journal of Comparative Economics*, 32(4), 788–804. <https://doi.org/10.1016/j.jce.2004.07.001>
- 40) Ekonomika, F., Bisnis, D. A. N., & Diponegoro, U. (2018). Indonesia Tahun 2006. Q1-2017 .Q2 Model Vecm.
- 41) Fernandes, N. (2020). Economic effects of coronavirus outbreak (COVID-19) on the world economy Nuno Fernandes Full Professor of Finance IESE Business School Spain. *SSRN Electronic Journal*, ISSN 1556-5068, Elsevier BV, 0–29.
- 42) Fernández-Villaverde, J., Guerrón-Quintana, P.A., 2020. Uncertainty shocks and business cycle research. *Rev Econ Dyn* 37, 118–146. doi:10.1016/j.red.2020.06.005.
- 43) Fetzer, T., Hensel, L., Hermle, J., Roth, C., 2021. Coronavirus perceptions and economic anxiety. *Rev Econ Stat*. Forthcoming. Fornaro, L., Wolf, M., 2020. Covid-19 Coronavirus and Macroeconomic Policy. Working Paper. Barcelona Graduate School of Economics. 1168.
- 44) For, N. (2002). HONG KONG INSTITUTE FOR MONETARY RESEARCH PRICE SETTING AND EXCHANGE RATE PASS-THROUGH :22.
- 45) Fry, M. J. (1980). Saving, investment, growth and the cost of financial repression. *World Development*, 8(4), 317–327. [https://doi.org/10.1016/0305-750X\(80\)90030-3](https://doi.org/10.1016/0305-750X(80)90030-3)
- 46) Gauger, J. (1998). Economic impacts on the money supply process. *Journal of Macroeconomics*, 20(3), 553–577. [https://doi.org/10.1016/S0164-0704\(98\)00072-X](https://doi.org/10.1016/S0164-0704(98)00072-X)
- 47) Gong, H., Hassink, R., Tan, J., & Huang, D. (2020). Regional Resilience in Times of a Pandemic Crisis: The Case of COVID-19 in China. *Tijdschrift Voor Economische En Sociale Geografie*, 111(3), 497–512. <https://doi.org/10.1111/tesg.12447>
- 48) Gornemann, N., Kuester, K., Nakajima, M., 2021. Doves for the Rich, Hawks for the Poor? Distributional Consequences of Systematic Monetary Policy. Opportunity and Inclusive Growth Institute Working Papers. Federal Reserve Bank of Minneapolis doi:10.21034/iwp.50. 50.
- 49) Green, R., & Torgeson, T. (2007). Are high foreign exchange reserves in emerging markets a blessing or a burden? *Occasional Paper*, 6(March), 12.

<http://www.bestmindsinc.com/documents/DollarReserves.EmergingMarkets.USTreasury.2007.pdf>

- 50) Guerrieri, V. (2020).W26918.Pdf.
- 51) Guerrieri, V., Lorenzoni, G., Straub, L., Werning, I., 2020. Macroeconomic Implications of COVID-19: Can Negative Supply Shocks Cause Demand Shortages? Working Paper. National Bureau of Economic Research. 26918 doi: 10.3386/w26918.
- 52) Hambleton, R. K., & Murray, L. (1983). Book Reviews: Book Reviews. *Applied Psychological Measurement*, 7(2), 243–245. <https://doi.org/10.1177/014662168300700213>
- 53) Hanspal, T., Weber, A., Wohlfart, J., 2021. Exposure to the COVID-19 stock market crash and its effect on household expectations. *Review of Economics and Statistics*. Forthcoming.
- 54) HAVRILESKY, T. (1972).The Money Supply Theory of J. S. Mill.South African Journal of Economics, 40(1), 49–51. <https://doi.org/10.1111/j.1813-6982.1972.tb00308.x>
- 55) Hayati, B. (2006). Analisis Stabilitas Permintaan Uang Dan Stabilitas Harga Di Indonesia Tahun 1989-2002 (Analysis of Money Demand and Price Stability. <http://eprints.undip.ac.id/16712/>
- 56) Hevia, C., &Neumeyer, A. (2020). A Conceptual Framework for Analyzing the Economic Impact of COVID-19 and its Policy Implications.COVID19 Policy Document Series, 1, 1–18. [https://www.undp.org/content/dam/rblac/Policy Papers COVID 19/UNDP-RBLAC-CD19-PDS-Number1-EN-F2.pdf](https://www.undp.org/content/dam/rblac/Policy%20Papers%20COVID%2019/UNDP-RBLAC-CD19-PDS-Number1-EN-F2.pdf)
- 57) Kira, A. R. (2013). The Factors Affecting Gross Domestic Product (GDP) in Developing Countries : The Case of Tanzania. 5(4), 148–158.
- 58) KisuSimwaka. (2012). Money supply and inflation in Malawi: An econometric investigation. *Journal of Economics and International Finance*, 4(2), 36–48. <https://doi.org/10.5897/jeif11.138>
- 59) Larsen, V.H., Thorsrud, L.A., Zhulanova, J., 2021. News-driven inflation expectations and information rigidities. *J Monet Econ* 117, 507–520. doi:10.1016/j.jmoneco.2020.03.004.
- 60) Loayza, N. V., &Pennings, S. (2020). Macroeconomic Policy in the Time of COVID-19.Macroeconomic Policy in the Time of COVID-19. <https://doi.org/10.1596/33540>
- 61) Meyer, B.H., Prescott, B., Sheng, X.S., 2021. The impact of the COVID-19 pandemic on business expectations. *Int J Forecast*. In press.
- 62) Miescu, M., Rossi, R., 2021. COVID-19-Induced shocks and uncertainty. *Eur Econ Rev* 139, 103893. doi:10.1016/j.eurocorev.2021.103893.
- 63) Mohsen Bahmani-Oskooee, &YongqingWnag. (2007). How Stable is the Demand for Money in China? *Journal of Economic Development*, 32(1), 21–34. <https://doi.org/10.35866/caujed.2007.32.1.002>
- 64) Naved, A., & Ahmed, F. (2006).The Long run and Short run Endogeneity of Money Supply in Pakistan : An Empirical Investigation. 2(1), 118–126.
- 65) Nielsen, R. W. (2015). Unified Growth Theory Contradicted by the GDP/cap Data.1–16. <http://arxiv.org/abs/1511.09323>
- 66) Otorima, M., &Kesuma, A. (2016).Pengaruh Nilai Tukar, Suku Bunga, Inflasi, Jumlah Uang Beredar Dan Pdb Terhadap Indeks Harga Saham Gabungan (Ihsg) Periode 2005-2015. *Jurnal Terapan Manajemen Dan Bisnis*, 53(9), 12–24.
- 67) Palley, T. I. (1994). Competing Views of the Money Supply Process: Theory and Evidence.*Metroeconomica*, 45(1), 67–88. <https://doi.org/10.1111/j.1467-999X.1994.tb00013.x>

- 68) Patalinghug, J. (2017). An Investigation into the Sensitivity of Money Demand to Interest Rates in the Philippines. *Journal of Applied Business and Economics*, 19(1), 82–88.
- 69) Pollin, R. (1991). Two Theories of Money Supply Endogeneity: Some Empirical Evidence. *Journal of Post Keynesian Economics*, 13(3), 366–396. <https://doi.org/10.1080/01603477.1991.11489855>
- 70) Polterovich, Victor and Popov, V. (2010). Munich Personal RePEc Archive Accumulation of Foreign Exchange Reserves and Long Term Growth.20069. Interest Rates and the Demand for Money in Bangladesh: An Empirical Investigation with Quarterly Data, 1997Q4-2006Q4 Akhand Akhtar Hossain Sayera Younus \*. (n.d.).1979, 1–10.
- 71) Ramelli, S., & Wagner, A. F. (2020).Feverish stock price reactions to COVID-19.Review of Corporate Finance Studies, 9(3), 622–655. <https://doi.org/10.1093/rcfs/cfaa012>
- 72) Rochon, L. P. (2007). The state of Post Keynesian interest rate policy: Where are we and where are we going? *Journal of Post Keynesian Economics*, 30(1), 3–11. <https://doi.org/10.2753/PKE0160-3477300100>
- 73) Sidiq, S. (2005).Stabilitas Permintaan Uang di Indonesia: Sebelum dan Sesudah Perubahan Sistem Nilai Tukar. *Journal Ekonomi Pembangunan*, 10(1), 31–41.
- 74) Susilawati, S., Falefi, R., &Purwoko, A. (2020).Impact of COVID-19's Pandemic on the Economy of Indonesia.Budapest International Research and Critics Institute (BIRCI-Journal): Humanities and Social Sciences, 3(2), 1147–1156. <https://doi.org/10.33258/birci.v3i2.954>
- 75) Tjio, T. (2010).Analisis Faktor-Faktor Yang Mempengaruhi Permintaan Kredit Investasi Pada Bank Umum Di Kota Ambon (2000-2009). *Cita Ekonomika Jurnal Ekonomi Unpatti*, IV(2), 51–63.
- 76) Universitas, P., Semarang, N., & Setiadi, I. O. (2013). Analisis Faktor-Faktor Yang Mempengaruhi Permintaan Uang Di Indonesia Tahun 1999 : Q1 - 2010 : Q4 Dengan Pendekatan Error Corection Models (Ecm). In *Economics Development Analysis Journal* (Vol. 2, Issue 1). <https://doi.org/10.15294/edaj.v2i1.999>
- 77) Untuk, D., Salah, M., Syarat, S., &Meraih, G. (2015).PERMINTAAN UANG DI SULAWESI SELATAN SkripsiOleh :
- 78) Valadkhani, A. (2008). Long-and short-run determinants of the demand for money in the asian-pacific countries: An empirical panel investigation. *Annals of Economics and Finance*, 9(1), 77–90.
- 79) Visokavičiene, B. (2008). Money supply and assets value.*Business: Theory and Practice*, 9(3), 210–214. <https://doi.org/10.3846/1648-0627.2008.9.210-214>
- 80) Widodo, A. (2014). Faktor-Faktor Makro ekonomi Yang Mempengaruhi Permintaan Uang di Indonesia. *Jurnal Bisnis Dan Ekonomi*, 16(1), 610–621. <https://www.neliti.com/publications/14817/analisis-dampak-pembayaran-non-tunai-terhadap-jumlah-uang-beredar-di-indonesia>
- 81) Yazici, M. (2020).The impact of Covid-19 on payment systems in Turkey.*International Journal of Information Research and Review*, 07(5), 6911–6917.
- 82) Zaman, S. (2013).Improving Inflation Forecasts in the Medium to Long Term.*Economic Commentary* (Federal Reserve Bank of Cleveland), 1–6. <https://doi.org/10.26509/frbc-ec-201316>