# ANALYSIS DETERMINANTS THE VELOCITY OF MONEY IN INDONESIA

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## ABSTRACT

This study aims to analyze the effect of gross domestic product, inflation, and interest rates on the velocity of money in Indonesia for the period 2011 quarter I to 2020 quarter IV. This type of research is descriptive research with a quantitative approach. Research data was obtained from publications by the Central Bureau of Statistics (BPS) and Bank Indonesia. The data analysis technique used Multiple Linear Regression using Eviews 12. The results stated that the gross dometic product variable partially had a negative and significant effect on velocity of money, this was indicated by the value of t count > t table, which is -4.002220 > 2.021075, while the inflation variable has no effect on velocity of money with the value of t calculate < t table, which is -0.084848 < 2.021075 and the variable interest rate has a positive effect on velocity of money with the value of t calculate > t table, which is 3.200801 > 2.021075. Simultaneously (together) gross domestic product, inflation, and interest rates have a significant effect on the velocity of money in Indonesia with f calculated > f table which is 27.04354 > 2.838745.

**Keyword:** Gross Domestic Product, Inflation, Interest Rates, Velocity of Money

## INTRODUCTION

The times have progressed push civilization man so that show money plays a big role strategic in economy. By general money can be accepted as tool exchange, besides that is money unit calculating and tools for keep value. From third function accordingly, the function of money is as tool swap is that differentiate money from other assets as stocks, bonds and houses so that the function of money as tool swap in economy push development system payment. Continuous payment system experience development for reach efficiency so that lower cost transactions and needs will goods and services quick fulfilled. (Tama et al., 2021:32)

The existence of money in public has become a very important component, because money is almost always related with activity human. Besides, money has develop from time to time. Fiat money or official currency issued by the central bank such as physical money and coins. Fiat money starts used as tool valid payment started after barter system is felt no again adequate for still used. Fiat money is money that has value nominally more big than mark intrinsic and enforced as tool valid payment in transaction economy issued by the government or authority monetary. Existing fiat money in the economy own supply (*supply*) and demand (*demand*) that can be give impact positive nor negative for economy and influence velocity of money in society.

Money plays a role as tool valid payment can expedite economy, however besides that's money too become inhibitor activity economy in a way overall. This thing can happen if the amount of money circulating in society no can controlled with good so that will give rise to bad impact for economy. Velocity of money in society is the average number how many times a year (velocity) of a currency unit (eg dollars) is used for purchase the total number of goods and services produced by the economy (Mishkin, 2017:125). Simply put, the velocity of money is results from comparison aggregate nominal income (Gross Domestic Product (GDP) nominal) with amount quantity of money. The velocity of money illustrates transaction goods and services that occur between individual. Relationship between transactions and money are shown in equality quantity *(quantity equation)*.

Velocity of money in society introduced by the United States economist Irving Fisher in 1911 equality exchange *(equation of exchange)*. The velocity of money is form behavior society within utilise income or the money he has. Research conducted by (Tama et al., 2021:31) state a number of influencing things velocity of money, among others income a capita ,inflation, and interest rates. Data on GDP, inflation and interest rates in Indonesia can seen in Table 1 below:

Table 1 GDP, Inflation and Interest Rates 2017-2019

| YEAR | QUARTER | GDP | INFLATION | BI RATE |
|---|---|---|---|---|
| **2017** | I | 2378146.40 | 3.61 | 4.75 |
| | II | 2473512.90 | 4.37 | 4.75 |
| | III | 2552296.90 | 3.72 | 4.25 |
| | IV | 2508971.90 | 3.61 | 4.25 |
| **2018** | I | 2498697.50 | 3.4 | 4.25 |
| | II | 2603852.60 | 3.12 | 5.25 |
| | III | 2684332.20 | 2.88 | 5.75 |
| | IV | 2638969.60 | 3.13 | 6.00 |
| **2019** | I | 2625180.50 | 2.48 | 6.00 |
| | II | 2735414.10 | 3.28 | 6.00 |
| | III | 2828812.70 | 3.39 | 5.25 |
| | IV | 2769748.10 | 2.72 | 5.00 |

Source: BPS and BI (2023)

Growth trend the amount of velocity of money in Indonesia can be tend experience increase, while GDP, Interest Rates and Inflation tend fluctuating. If observed, progress sector measured finances through ratio between money supply with GDP can is known that development rate velocity of money in the narrow sense (M1) has fluctuating trend.

The velocity of money in Indonesia is still happen fluctuating because experience increases and decreases are not uncertain from time to time. Inflation in Indonesia in 2017 was 3.61% then experience decline until in 2019 it was 2.72%. Indonesia is GDP data also experienced fluctuating from 2017 to 2019. Indonesia is GDP in 2017 was 2,378,146.40 experience increase in 2018 amounted to 2,638,969.60 and it happened the decrease in 2019 amounted to 2,625,180.50.

Based on the explanation that has been explained, it encourages researchers to conduct research on the topic "Analysis Determinants the Velocity of Money in Indonesia (Quarter I 2011-Quarter IV 2020)".

## METHOD

Type of research this is nature research descriptive with approach quantitative. Population used in study this includes data gross domestic product, inflation, interest rates, and velocity of money in Indonesia. As for the amount sample in study this as many as 10, namely data gross domestic product, inflation, interest rates, and velocity of money in Indonesia from 2011 to 2020 in quarterly data form. Data obtained from information and reports from Bank Indonesia and the Central Statistics Agency. Study this involve one variable bound, velocity of money in Indonesia which is results comparison from Gross Domestic Product Nominal with money supply. Whereas variable free is gross domestic product, inflation, and interest rates. Gross Domestic Product comes from the Central Statistics Agency, inflation originate from rate inflation recorded and published by the Central Statistics Agency every year, temporary interest rates is mark ethnic group nominal interest recorded and published by Bank Indonesia. Data analysis method used is analysis multiple linear regression, testing hypothesis namely the t-test and F test. The level of significance used is 5%.

## RESULT AND DISCUSSION

### Result

Study This done with collect data from various source institution related for test object research in Indonesia for the period 2011 Quarter I – 2020 Quarter IV. For *time series* data, researchers use period 2011 quarter I to with 2020 fourth quarter so obtained amount observation as many as 40. Variables independent on research this is gross domestic product, inflation, and interest rates. Variable dependent from study this is money velocity *(velocity of money)*.

Following results analysis descriptive data on GDP, inflation, interest rates and velocity of money for the period 2011 Quarter I – 2020 Quarter IV processed using the Eviews 12 program .

Table 2 Statistical Results Descriptive

| | **Y** | **XI** | **X2** | **X3** |
|---|---|---|---|---|
| **Mean** | 2,697,841 | 2304355 | 4,468,250 | 5,925,000 |
| **Median** | 2,739,934 | 2292886 | 3,880,000 | 5,875,000 |
| **Maximum** | 3,159,406 | 2828813 | 8,400,000 | 7,750,000 |
| **Minimum** | 2,118,602 | 1748731 | 1,420,000 | 3,750,000 |
| **Std. Dev.** | 0.220997 | 314140.5 | 1,879,139 | 1,205,224 |
| **Skewness** | -0.504430 | -0.041760 | 0.655585 | -0.060992 |
| **Kurtosis** | 3.707642 | 1.760975 | 2.483680 | 1.803417 |

| | | | | |
|---|---|---|---|---|
| **Jarque-Bera** | 2.530928 | 2.570263 | 3.309592 | 2.411151 |
| **Probability** | 0.282108 | 0.276614 | 0.191131 | 0.299520 |
| | | | | |
| **Sum** | 107.9136 | 92174204 | 178.7300 | 237,0000 |
| **Sum Sq. Dev** | 1.904745 | 3.85E+12 | 137.7154 | 56.65000 |
| | | | | |
| **Observations** | 40 | 40 | 40 | 40 |

Source : Processed Data Results Eviews (2023)

Table 3 Coefficient Variable

| | **Mean** | **Median** | **Maximum** | **Minimum** | **Std. Deviation** |
|---|---|---|---|---|---|
| **V(Y)** | 2.697841 | 2.739934 | 3.159406 | 2.118602 | 0.220997 |
| **GDP (X1)** | 2304355 | 2292886 | 2828813 | 1748731 | 314140.5 |
| **IF(X2)** | 4.468250 | 3.880000 | 8.400000 | 1.420000 | 1.879139 |
| **BI (X3)** | 5.925000 | 5.875000 | 7.750000 | 3.750000 | 1.205224 |

Source : Processed Data Results Eviews (2023)
Based on table above _ can explained that :

1. Variable Velocity of Money
   Velocity of money (V) as variable dependent on research This own the mean value is 2.697841. Variable velocity of money has the median value is 2.739934. Temporary mark maximum velocity of money of 3.159406% occurred in Indonesia in the first quarter of 2011 , which states level velocity of money in Indonesia is fast whereas the minimum value of velocity of money is 2.118602%. The table above also shows the mean value of velocity of money is more than 2.697841 big compared to with mark standard deviation of 0.220997 which indicates level normal data distribution.
2. Variable Gross Domestic Product
   Variable gross domestic product (GDP) has the mean value is 2304355. Meanwhile median value of this variable X1 equal to 2292886. maximum value variable gross domestic product amounting to IDR 2,828,813 in period 2019 third quarter, meanwhile variable minimum value gross domestic product amounting to IDR 1,748,731 in the period 2011 quarter I. The table above also shows the mean value is 2304355 more small than mark standard deviation amounted to 314140.5, this indicated lack of data distribution good.
3. Variable Inflation (IF)
   Variable inflation (IF) has the mean value is 4.468250. Variable median value inflation amounting to 3.880000. Temporary mark maximum variable inflation amounting to 8.4% which occurred in Indonesia in the 2013 third quarter period, meanwhile variable minimum value inflation amounting to 1.42% which occurred in the third quarter of 2020 . The table above also shows the mean value is 4.468250 more big compared to with mark standard deviation namely 1.879139, this indicated normal data distribution.
4. Variable Interest Rates

Variable interest rates (BI) has the mean value is 5.925000. Temporary variable median value interest rates domestic amounting to 5.875000. Maximum value variable interest rates amounting to 7.750000 in Indonesia for the fourth quarter of 2014, which is the interest rates domestic (BI rate) was 7.75% meanwhile variable minimum value level interest rates amounting to 3.75% in the 2020 fourth quarter period. Variable mean value interest rates amounting to more than 5.925000 big compared to with mark standard deviation which is 1.205224 which states that normal data distribution.

**1. Linear Regression Analysis Multiple**

Based on calculation regression multiple between GDP, inflation, interest rates and velocity of money with use Eviews 12, results obtained writer is as following:

Table 4 Multiple Linear Regression Analysis Test Results

| Variables | Coefficient | Std. Error | t-Statistics | Prob. |
|---|---|---|---|---|
| **C** | 2.976019 | 0.274784 | 10.83038 | 0.0000 |
| **GDP (X1)** | -3.40E-07 | 8.48E-08 | -4.002220 | 0.0003 |
| **IF(X2)** | -0.001564 | 0.018429 | -0.084848 | 0.9329 |
| **BI (X3)** | 0.086291 | 0.026959 | 3.200801 | 0.0029 |

Source: Processed Data Results Eviews (2023)

Based on results estimation above, obtained equality panel data regression as following:

PU = 2.976019 - 3.40E-07GDP - 0.001564IF + 0.086291BI

Interpretation from results estimates listed in table 4, namely as following:

1. Constant (C)
   Coefficient value constant obtained amounting to 2.976019. This thing shows, if variable independent (gross domestic product, inflation, and interest rates worth constant so velocity of money will still worth 2.976019.
2. Gross domestic product (GDP)
   Coefficient value variable gross domestic product X1 is worth negative (-) is -3.40E-07, then can interpreted that if variable X1 increases so variable Y will decrease of -3.40E-07 and vice versa.
3. Inflation
   Coefficient value variable X2 inflation is worth negative (-) is -0.001564, then can interpreted that if variable X2 increases so variable Y will decrease of -0.001564, and vice versa .
4. Interest Rates
   Coefficient value variable interest rates X3 worth positive (+) is 0.086291, then can interpreted that if variable X3 increases so variable Y also follows increase equal to 0.086291, and vice versa.

**Testing Hypothesis**

Testing hypothesis done for see influence variable independent to variable dependent good in a way partial nor simultaneous. On testing hypothesis this done observation to t-statistical and probability value, F- statistical and F- Probability values, and R-Squared values. T- statistical values and their probabilities with use the t test for see influence variable independent in a way partial. F-value statistics and their probabilities with use the F test for see influence variable independent in a way simultaneous. R-Squared values are used for see how much capable variable independent explain variable dependent. Following this is results from research data processing using the Eviews program:

**1. T test (*T-test*)**

Significance test partial (t test) aims for know is variable independent (gross domestic product, inflation, and interest rates to variable dependent (velocity of money) basis partial. Significance test estimation results partial (t test) can seen in the table below:

Table 5 Significance Test Results Partial (T Test)

| Variable Independent | Coefficient | t-Statistics | Prob. | Information |
|---|---|---|---|---|
| **Constant** | 2.976019 | 10.83038 | 0.0000 | Significant |
| **GDP** | -3.40E-07 | -4.002220 | 0.0003 | Significant |
| **IF** | -0.001564 | -0.084848 | 0.9329 | Non Significant |
| **BI** | 0.086291 | 3.200801 | 0.0029 | Significant |

Source: Processed Data Results Eviews (2023)

Based on the results are listed in the table can done interpretation results the above estimate, as following:

1. Influence Gross Domestic Product (GDP) to Velocity of Money
   Based on calculated t value obtained from the Eviews output seen in table 5 and t table can seen using excel with formula Table t = tinv (0.05;40), exists t table value that is as big as 2.021075. Based on variable t test results gross product domestic (X1) against variable velocity of money (Y) is obtained mark $t_{count}$ = -4.002220 > $t_{table}$ = 2.021075. So there is influence in a way partial and significant between gross product domestic (GDP) against velocity of money in Indonesia so that H1 is accepted.
2. Influence Inflation (IF) to Velocity of Money
   Based on calculated t value obtained from the Eviews output seen in table 5 and t table can seen using excel with formula Table t = tinv (0.05;40), exists t table value that is as big as 2.021075. Based on variable t test results inflation (X2) against variable velocity of money (Y) is obtained mark $t_{count}$ = -0.084848 < $t_{table}$ = 2.021075. Hence inflation in a way partial no influential or not significant to velocity of money in Indonesia so that H0 is accepted.
3. Influence Interest Rate (BI) to Velocity of Money
   Based on calculated t value obtained from the Eviews output seen in table 5 and t table can seen using excel with formula Table t = tinv (0.05;40), exists t table value that is as big as 2.021075. Based on variable t test results interest rates (X3) against variable velocity of money (Y) is obtained mark $t_{count}$ = 3.200801 > $t_{table}$ = 2.021075. So there is influence in a way partial and significant between level interest rates to velocity of money in Indonesia so that H1 is accepted.

**2. F test (*F-test*)**

Significance test simultaneous (F test) aims for know influence variable independent that is gross domestic product, inflation, and interest rates in a way together or simultaneous. Significance test estimation results simultaneous (F test) can seen in the table under this:

Table 6 Significance Test Results Simultaneous (F Test)

| Variable Independent | Variable Dependent | F count | Sig. F | Information |
|---|---|---|---|---|
| **GDP, IF, BI** | V | 27.04354 | 0.000000 | Significant |

Source: Processed Data Results Eviews (2023)

Based on results estimate above, yes is known that calculated F value amounting to 27.04354 and value significance of 0.000000. With compare mark significance with an alpha of 5%, you can seen that probability F is more small compared to with 0.05 (0.0000 < 0.05) then can concluded that this test reject H0 and accept Ha, which means variable independent (gross domestic product, inflation, and interest rates in a way

together or simultaneous influential in a way significant to variable dependent (velocity of money) on the level 95% confidence .

3. **Coefficient Determination (*R-Squared*)**

Coefficient analysis determination done for see how much capable variable independent used in study in explain fluctuations that occur in variables dependent. If value coefficient determination *(Rsquared)* is close one so has the meaning that variable gross domestic product, inflation, and interest rates capable explain movement mark velocity of money that occurs.

Table 7 Coefficient Determination

| Variable Independent | Variable Dependent | R-Square |
|---|---|---|
| GDP, IF, BI | Turnover (V) | 0.692651 |

Source: Processed Data Results Eviews (2023)

Based on tests carried out using the Eviews program, table serve results estimation mark Coefficient Determination *(R-Squared)* equal to 0.692651, this means that in a way whole variable independent that is gross domestic product, inflation, and interest rates capable explain variable velocity of money of 69.26% and the remainder namely 30.74% is explained by other variables that are not included in research.

**Discussion**

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1. **Influence Gross Domestic Product to Velocity of Money**

Based on t test results that have been done obtained variable gross domestic pruduct (GDP) effect negative and significant to proven velocity of money with mark $t_{count} = -4.002220 > t_{table} = 2.021075$ as well mark significant as big as $0.0003 < 0.05$. So there is influence in a way partial and significant between gross domestic pruduct (GDP) against velocity of money in Indonesia so that H1 is accepted .

Growth economy a country can showed with increase mark product domestic country is gross domestic product (GDP). The size of GDP is influenced by various factors factors, including consumption House ladder (C), investment (I), expenditure government (G), and net exports (XM). One included components determine the size of GDP is Investment (I). According to draft macroeconomics, investment also influenced by GDP, revenue taxes , and exchange rates (Sukirno, 2016:4)

According to Fry (quoted from Altayee & Adam (2012:60) connection between per capita income real and velocity of money can be worth positive or negative, this depending on the stage development country is economy. In term long income national influential negative and significant to velocity of money. Influence negative this caused because authority monetary can bring change desired *output* with control money supply. When the economy currently in circumstances *global uncertainty* so authority monetary will do policy expansion monetary with lower interest rates (Barus & Sugiyanto, 2021:7).

This thing can seen in 2020, the third quarter of GDP experienced enhancement amounting to IDR 2,720,491.90 and velocity of money experienced decline as big as 2.187619005% as well interest rates experience decline by 4%. Research results this in line with research conducted by Altayee, Hatem Hataef Abdulkadhim and Mustafa Hassan Mohammad Adam (2012:62), who stated that connection between GDP and money velocity can worth negative, because depending on the economy a country. However, research conducted by Rysqi Puspita Sari, Ahmad Yunani (2019:113) that GDP has influence positive. Other research by Tuti Adi Tama, Sri Astuty, Andi Samsir (2021:37) which states that GDP has an influence positive to velocity of money in Indonesia.

2. **Influence Inflation to Money Turnover**

Based on t test results that have been done obtained variable inflation no influential or not significant to proven velocity of money with $t_{count} = -0.084848 < t_{table} = 2.021075$ as well mark significant as big as 0.9329 > 0.05. Hence inflation in a way partial no influential or not significant to velocity of money in Indonesia so that H0 is accepted.

According to Barus & Sugiyanto (2021:7) inflation no influential significant to velocity of money. This because velocity of money is considered constant because velocity of money only will changed if happen changes to institutions so that internal velocity of money period long considered stable. Absence influence period short between variable on can explained by Fisher's opinion that form institutions and technology from something economy only influence acceleration in a way slow throughout time, so acceleration usually constant in period short (Mishkin, 2008).

This thing in line with research conducted by Tuti Adi Tama, Sri Astuty, Andi Samsir (2021:37) who stated that in research, inflation no influential to velocity of money and leaving behind with results research conducted Annisa Alief Rahmaniar, Dwi Nita Aryani (2021:9) which states that variable inflation own influence positive to velocity of money.

**3. The Effect of Interest Rates on Velocity of Money**

Based on t test results that have been done obtained variable interest rates influential significant to proven velocity of money with mark $t_{count} = 3.200801 > t_{table} = 2.021075$ as well mark significant as big as 0.0029 < 0.05. So there is influence in a way partial and significant between interest rates (X3) against velocity of money (Y) in Indonesia so that H1 is accepted.

Based on results study show that variable interest rates influential positive to velocity of money in Indonesia. From the data you can seen that velocity of money in Indonesia is experiencing fluctuation every the year so that capable spur increase in interest rates (Tama et al., 2021:36). The rise interest rates cause public choose for save it banked because get more returns tall so that money is held public less and the velocity of money increases. This thing can seen in 2013 third quarter interest rates experience enhancement amounted to 7.25% and velocity of money also experienced enhancement as big as 2.870941184%.

This thing in line with research conducted by Tuti Adi Tama, Sri Astuty , Andi Samsir (2021:37) who stated that interest rates influential positive and positive behind with research conducted by Akinlo (2012:107) who states that interest rates no significant .

**4. Influence Gross Domestic Product, Inflation and Interest Rates against Velocity of Money**

Based on F test results are obtained mark $F_{count}$ amounting to 27.04354 and value significance of 0.000000. With compare mark significance with an alpha of 5%, you can seen that probability F is more small compared to with 0.05 (0.0000 < 0.05). So you can concluded that variable independent (gross product domestic, inflation, and interest rates in a way together or simultaneous influential in a way significant to variable dependent (velocity of money) on the level 95% confidence.

Based on results study show that gross product domestic, inflation, and interest rates in a way simultaneous influential in a way significant to velocity of money in Indonesia. As for influence positive this because inflation can influence price products and services circulating in Indonesia. Inflation is something incident frequent monetary happens in all countries well it is a developed country and medium countries growing. At the moment happen inflation so prices will rise, according to Keyens Theory the demand for money is influential significant positive to inflation. Enhancement excessive demand for money can push enhancement price exceed level the price has been predicted by the economy. Ascension price this will cause increase cash request for transaction, which is the end contribute to the increase GDP value.

Income in the viewed state from Gross Domestic Product (GDP) because GDP shows production from goods and services in something economy, however For can show production actual goods and services in something economy top GDP is used base price fixed (constant). This thing as proposed by Keynes (in Nopirin, 2016:117) cash request for objective transaction this depends from income . Getting higher income, increasing big desire will cash for transaction. Somebody or level society his income high, usually do more transactions lots compared to somebody or people whose income more low so that will enlarge level velocity of money in Indonesia.

This increase in GDP will impact on interest rates. According to Dornbusch et al, (in Kewal, 2010:58) interest rates is level payment on loan or other investments above agreement stated return in percentage annually. On condition this, society need more lots of money in hand for fulfil need life as a result the amount of velocity of money in hand public the more increases. Keynes argued destination money request speculation determined by interest rates. The more tall interest rates increasingly low desire public will cash for objective speculation. The reason is if interest rates, desire public will cash will the more small. On the contrary increasingly low interest rates so the more big desire public for holding cash so connection between interest rates with velocity of money has an effect positive. This thing in line with research conducted by Annisa Alief Rahmaniar, Dwi Nita Aryani (2021:8) which states that *e-money*, GDP and inflation own influence significant to velocity of money in the three countries in ASEAN. Other research conducted by Rysqi Puspita Sari, Ahmad Greece (2019:113) state that *e-money demand* , M1 and GDP have an influence in a way simultaneous to velocity .

## CONCLUSION

Based on the research results in the previous chapter, the researcher drew the following conclusions:

1. Gross domestic product variables has a negative and significant effect on velocity of money in Indonesia for the period 2011 quarter I – 2020 quarter IV because Monetary authorities can bring about desired changes *in output by controlling the money supply*.
2. The inflation variable has no effect and is not significant on the velocity of money in Indonesia for the period 2011 quarter I – 2020 quarter IV this is because the velocity of money is considered constant because the velocity of money will only change if there are changes in institutions so that the velocity of money in the long term is considered stable.
3. The interest rate variable has a positive effect and significant to the velocity of money in Indonesia for the period 2011 quarter I - 2020 quarter IV this is because the increase in interest rates causes people to choose to save it in banks because they get a higher return so that people hold less money and the velocity of money increases.
4. The independent variables (gross domestic product, inflation, and interest rates) together or simultaneously have a significant effect on the dependent variable (velocity of money) in Indonesia for the period 2011 first quarter – 2020 fourth quarter.

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