Economic Influences on the Velocity of Money in Algeria: A FMOLS Approach (1980-2023)

Dr. Youcef Filali [1],
[1]Oran Graduate School of Economics (Algeria),
youcef.filali@ese-oran.dz
Dr. Mohamed Saidi [2],
[2]Oran Graduate School of Economics (Algeria),
mohammed.saidi@ese-oran.dz
Dr. Faiza Otmani [3]
[3]University of Abou Bekr Belkaid Tlemcen (Algeria),
faiza.otmani@univ-tlemcen.dz

ABSTRACT:
This study examines the factors influencing the velocity of money in Algeria from 1980 to 2023. We aim to measure the impact of various economic variables on money velocity using the Fully Modified Ordinary Least Squares (FMOLS) method. Our findings reveal an inverse relationship between the velocity of money and factors such as inflation, the ratio of loans to the private sector to GDP, per capita GDP, and the exchange rate. Specifically, inflation did not have a significant impact, while the ratio of loans to the private sectorto GDP, the exchange rate, and per capita GDP were significant at the 5% level. Conversely, there is a positive and significant relationship between the interest rate and money velocity.

Keywords: velocity of money, FMOLS, Inflation.
JEL Classification Codes: E4, C4, E31.

Introduction:
The velocity of money, a key concept in economics, has attracted significant attention from economists and theorists alike. It refers to the rate at which money circulates within an economy, moving from one transaction to another. This concept is crucial in determining the aggregate supply and the effectiveness of monetary policy. Understanding the velocity of money helps identify the factors that influence its rate, which can pose particular challenges for policymakers. Various factors can increase or decrease the velocity of money, including real gross output, exchange rates, and inflation, among others.

Research Question:
What are the factors affecting the velocity of money in Algeria during the period 1980-2023?

Study Objective:
The objective of this study is to identify and measure the factors influencing the velocity of money in Algeria through various economic variables over the period 1980-2023.

Scope of the Study:
This study is focused on Algeria, a country that has experienced significant fluctuations in economic variables. The analysis covers annual data from 1980 to 2023.

Study Methodology:
The study employs a descriptive-analytical approach to examine the theoretical framework of the velocity of money and its influencing factors. Additionally, the econometric method of Fully Modified Ordinary Least Squares (FMOLS) is used to identify the specific factors affecting the velocity of money in Algeria.

1-   Previous Studies
-Study by Short (1973): This study aimed to test the relationship between the velocity of money and per capita income in the economies of West Malaysia and Singapore during the period 1951-1966. The researcher tested the hypothesis of a negative inverse relationship between the velocity of money and per capita real GDP, considering various forms of money. The study concluded that there is a negative relationship between the velocity of money and per capita income. Additionally, a positive relationship was found between the velocity of money and the number of commercial bank branches, interest rates, and the rate of price changes.

-**Study by Chowdhury (1994):** This study sought to determine the impact of various factors on the velocity of money in 23 developing countries during the period 1955-1988, using an ARIMA model. It concluded that inflation rates increase the velocity of money in both narrow and broad definitions in the agricultural sector, while real income does not affect the velocity of money in the agricultural sector.

-**Study by Suleiman (2002):** This study aimed to identify the determinants of the velocity of money in Sudan during the period 1970-2000. It concluded that 98% of the total changes in the velocity of money are explained by changes in per capita national income, inflation rate, the proportion of currency outside the banking system, the number of bank branches, and cash balances, while 2% of the changes are due to other factors. There was a positive relationship between the velocity of money and the number of commercial bank branches, the proportion of currency outside the banking system, the inflation rate, and per capita national income. There was a negative relationship between the velocity of money and cash balances.

-**Study by Al-Muaijel (2004):** This study attempted to analyze the behavior of the velocity of money in Saudi Arabia and identify the influencing factors during the period 1986-2002. It found an inverse relationship between the velocity of money (V1 and V2) and real income, and stock trading value. There was a positive relationship between the velocity of money and interest rates, financial innovations, and a lack of alignment of V3 with economic theory. V1 and V2 were more indicative of the velocity of money in Saudi Arabia.

-**Study by Al-Amar (2011):** This study aimed to identify the factors influencing the velocity of money in Saudi Arabia during the period 1979-2010. It found a negative relationship between the velocity of money in both its definitions and the inflation rate, and the average real per capita income. The broad definition was more explanatory than the narrow definition of the velocity of money.

-**Study by Syrotian (2012):** This study aimed to identify the determinants of changes in the velocity of money in Ukraine during the period 2001-2012, using four models to measure the velocity of money (M0, M1, M2, M3). Using Granger causality tests and cointegration, the study concluded that wealth has a negative impact on the velocity of money, and there is no causal relationship between the velocity of money and inflation.

-**Study by Okafor & Others (2013):** The researchers aimed to identify the determinants of the velocity of money in Nigeria during the period 1985-2012, using Granger causality and Vector Autoregression (VAR). The study found, through variance analysis and response, that inflation is the most significant variable affecting the velocity of money. There was a positive relationship between income growth and the velocity of money, as well as between interest rates and the velocity of money. There was also a relationship between holding local currency and the velocity of money, while inflation and exchange rates negatively affected the velocity of money.

-**Study by Arewa & Nwakanma (2013):** This study conducted an empirical test of the Polak model, based on annual data for the period 1985-2011, using cointegration tests to verify the long-term relationship between money supply and macroeconomic variables. The study concluded that there is a bidirectional relationship between the velocity of money and key macroeconomic variables such as national income, net foreign and domestic credit, and exports in Nigeria. The marginal propensity to import was 20%, and the marginal velocity of money circulation was very high, close to 30%, indicating that the Nigerian economy was experiencing inflation.

-**Study by Abdullah (2014):** This study aimed to investigate the determinants of money demand in the Jordanian economy during the period 1976-2011, using a VAR model. The study concluded that financial liberalization has a positive effect on the velocity of money.

-**Study by Ghafour (2015):** This study focused on explaining and measuring the impact of changes in money supply and its velocity on inflation rates in Iraq during the period 1990-2010. It concluded that there is a long-term integrative relationship between the variables, with a positive relationship between inflation rate, money supply, and its velocity.

Study by Hussein (2017): The study found a positive relationship between real GDP and the velocity of money in both definitions. There was a negative relationship between inflation, issued currency, money supply (M2), financial development, and the velocity of money in its broad definition.

-**Study by Al-Jawijati & Al-Mashhadani (2018):** The researchers investigated the factors influencing the velocity of money in its narrow and broad definitions (V1 and V2) in Jordan during the period 1980-2015, using the Autoregressive Distributed Lag (ARDL) model. The study concluded that 91% of the changes in the narrow definition of the velocity of money (V1) are due to inflation, income, financial development, and the number of banks, while 75% of the changes in the broad definition of the velocity of money (V2) are due to financial.

-Study (Prasetyo, 2018): The objectives of this study are to test and analyze some factors influencing the demand for money and the velocity of money circulation in Indonesia during the period (2000-2017). The study uses the ARDL model. The dependent variable is represented by M2 growth, and the independent variables are economic growth, the growth rate of the rupiah/dollar exchange rate, the real interest rate (%), and household consumption growth. The analysis results showed that economic growth and the growth rate of the exchange rate have a significant impact on M2 in both the long and short term, and the study showed that the velocity of money circulation in Indonesia is on the rise.

-Study (Akhtaruzzaman, 2008): This study aims to identify the factors influencing the velocity of money in Bangladesh during the period (1993-2007) and to determine the impact of the stage of economic development on the value of the velocity of money historically. The study used cointegration techniques and vector autoregression (VAR) models to determine the factors influencing the velocity of money (VM) in Bangladesh, analyzing both narrow money (M1) and broad money (M2). The variables used were: the velocity of narrow money (VM1), the velocity of broad money (VM2), real GDP (Y), interest rate (i), the ratio of current deposits to time deposits (DD/TD), the cash to deposits ratio (C/D), and inflation expectations (pexpt).The study concluded the following results: a negative relationship between the velocity of money and economic growth, a negative impact of financial development on the velocity of money, a strong impact of inflation expectations on the velocity of money. The VAR model showed that real GDP growth and financial development together explain about half of the variation in the velocity of money, while inflation expectations have a strong impact on the velocity of money. Consequently, the study shows that the velocity of money in Bangladesh is significantly affected by the stages of economic and financial development, and monetary authorities should consider these factors when forecasting the velocity of money and designing effective monetary policy. It is important to include inflation expectations in models predicting the velocity of money.).

2- Velocity of Money
2-1- Definition of the Velocity of Money:
The velocity of money is defined as "the movement of a monetary unit from one hand to another to settle commercial and economic exchanges within a certain period" (Ali, 2004, p. 11).

Higgins (1978) defines the velocity of money as "the rate at which money is spent in a given economy. It represents the extent to which individuals are willing to spend money or hold onto it" (Al-Jawijati & Al-Mashhadani, 2018, p. 299).

It refers to "the average number of times a single monetary unit is spent to complete cash payments during a certain period, such as a year. It reflects the rate at which a unit of currency moves from one hand to another as a medium of exchange" (Al-Naqah, 1998, p. 57).

The velocity of money is "the factor that links the flow of money with the quantity of money, as well as the volume of money with the flow of goods and services through the process of price determination in the market" (Ghafour, 2015, p. 231).

It measures "the speed at which money moves from one hand to another or circulates through the economy. When the quantity of money is large relative to the amount of spending, the velocity is low, and when money circulates quickly, the velocity is high" (Ali Abdel Moneim, 1970, p. 108).

2-2- Measuring the Velocity of Money
There are two commonly used formulas to measure the velocity of money: transaction velocity and income velocity.

2-2-1- Transaction Velocity:
The transaction velocity refers to the average number of times a monetary unit is exchanged for final goods, intermediate goods, productive goods, and financial assets. It is measured by dividing the volume or number of transactions, represented by (PY), by the quantity of money in circulation, represented by (M) (Atta, 1999, p. 16).

$$V = \frac{PY}{M}$$

2-2-2 Income Velocity:
Income velocity is the number of times a monetary unit is exchanged as income to finance the final output during a certain period, typically a year. It is related to the final production of goods and services during the year. It measures the rate at which income is spent or flows (GDP) and the quantity of money (M) (Jameel Janabi & Yasa Arslan, 2009, p. 77):

$$V = \frac{PIB}{M}$$

Transaction velocity is greater than income velocity because it includes payments for intermediate, productive, and final goods, as well as financial assets, whereas income velocity only includes payments for final goods (Jameel Janabi & Yasa Arslan, 2009, pp. 78-79).

2-3- Factors Affecting the Velocity of Money

Several economic variables influence the velocity of money, either increasing or decreasing it:

2-3-1- Income:

Income is one of the most important factors affecting the velocity of money, and nearly every study emphasizes this variable. However, there is disagreement among economists on the optimal measure for this variable and its relationship with the velocity of money. Friedman (1956) posits an inverse relationship between income and the velocity of money, arguing that individuals increase their money holdings as income rises, thus decreasing the velocity of money due to increased demand. Friedman refers to this as the luxury goods effect. Recent studies on developing and developed countries suggest that as real income increases, the demand for money decreases, and the velocity of money rises (Boukreeta, 2012).

2-3-2- Interest Rate:

Changes in interest rates are typically associated with business activity cycles and have an impact on the velocity of money. The interest rate represents the cost of holding cash balances and interest-bearing assets. An increase in the interest rate on money substitutes (such as time deposits and government bonds) reduces cash holdings and increases the velocity of money (Moussa Hussein, 2017, p. 21).

2-3-3-General Price Level:

The general price level is one of the most important factors affecting the velocity of money in both the short and long term due to its impact on the cost of holding money. Rising prices lead to a decrease in the real value of money, prompting individuals to purchase goods, real estate, and gold, which are less affected by inflation, thereby increasing the velocity of money.

2-3-4-Exchange Rate:

The relationship between the exchange rate of a local currency and its velocity is generally inverse, especially in situations where there is a high degree of substitution between different currencies. An increase in the exchange rate makes holding the local currency more desirable for individuals and institutions, leading to higher demand and a lower velocity. Conversely, a decrease in the exchange rate leads to reduced holdings and increased circulation of the currency (Ali Al-Anizi, 2015, p. 27).

2-3-5-Money Supply:

An increase in the money supply growth rate can lead to changes in the interest rate, increasing the risks of holding bonds and raising the demand for money, thereby decreasing its velocity. Including money supply as a variable affects the velocity of money (McMillin, 1991, pp. 635-636).

2-3-6- Financial System Development:

The development of the financial system is directly related to the velocity of money. The latter is a behavioral function largely dependent on the behavior of individuals and financial institutions. The more advanced and widespread the banking system is, and the more common interactions with it become, the better the financial intermediary institutions can gather and reallocate savings in suitable quantities and conditions, convert them into cash quickly, and at the lowest cost (Suleiman, 2002, pp. 33-34). Increased credit and check usage raise the velocity of money, enhancing time deposits and savings deposits, allowing banks to offer loans and investments. This means that idle and frozen money is circulated to other users, increasing spending and the velocity of money. Banks also facilitate the transfer of money across different regions, allowing for the retention of large amounts of money (Sobhi, 1984, p. 179).

2-3-7- Economic Cycles:

The velocity of money is affected by changes in the level of economic activity, tending to rise during economic booms characterized by optimistic expectations about profits and prices, thereby reducing the idle cash balances held by economic units. Conversely, the velocity of money tends to fall during recessions, marked by increased demand for money due to pessimistic expectations about profits and the demand for goods and services (Al-Dulaimi, 1989, p. 135).

2-3-8-Individuals' Income Expectations9:

Individuals' expectations of rising and regular income lead to holding smaller cash balances, thus increasing the velocity of money. Conversely, irregular income leads individuals to hold larger cash balances, reducing the velocity of money (Al-Bayani & Miral, 2013, p. 75).

3-   Econometric Study of Variables Affecting the Velocity of Money in Algeria (1980-2023)

Numerous previous studies have investigated the factors influencing the velocity of money, varying in their identification of the most significant economic variables. Based on these studies, we will conduct an econometric analysis by creating a model to study the variables affecting the velocity of money in Algeria during the period 1980-2023, using data from the World Bank.

3-1-Definition of Variables

- **Inflation (INF)**: A continuous and noticeable rise in the general price level in any country, expressed as a percentage. It is calculated by the change in the Consumer Price Index (CPI), which measures the general price level of a fixed basket of goods and services.
- **Per Capita GDP (RGDP)**: This represents the market size, meaning the actual demand in the local market (purchasing power of individuals), expressed in current US dollars.
- **Exchange Rate (TC)**: The number of units of the national currency that must be paid for one unit of foreign currency. Alternatively, it can be viewed as the number of units of foreign currency paid for one unit of the national currency.
- **Velocity of Money (V2)**: Calculated as the ratio of gross domestic product to the broad money supply (M2). This variable represents the broad definition of the velocity of money.
- **Private Sector Credit to GDP (CF)**: This indicator measures the extent to which local banks contribute to granting loans and facilities to the private sector compared to the public sector, according to the model developed by R. McKinnon and E. Shaw. This indicator represents financial development and is expressed as a percentage. It has been used in studies by Ous Fakhreddine and Diaa Idris (2018), Ismail and Hussein (2018), and Wissam Hussein (2015).
- **Interest Rate (i)**: The rate paid by the central bank on deposits from commercial banks, whether for overnight investments or longer periods. This rate serves as an indicator of the interest rates at commercial banks, which should not be lower than the central bank's rate. The interest rate helps the central bank control the money supply in circulation by adjusting this rate up or down in the medium term.

$$V_2 = \mathcal{F}(INF, I, TC, RGDP, CF)$$
$$LnV_2 = \beta_0 + \beta_1\, LnINF + \beta_2\, Lni + \beta_3\, LnTC + \beta_4\, LnRGDP + \beta_5\, LnCF + \mu_i$$

3-2- Time Series Stability Test

It is essential to conduct a stability test for the time series to determine whether the regression results are genuine, spurious, or influenced by seasonal fluctuations. If the time series data includes a variable with a general trend or seasonal fluctuations, indicating instability, the regression results may be spurious, and the series may be non-stationary. Two common tests used in such cases are the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests, which account for different types of trends (constant and general trend, respectively).

Table 1: Results of the Stability of Time Series for Study Variables at the Level:

the variable	TEST Dickey and Fuller		TEST Phillip-Perron	
	With Constant	With Constant & Trend	With Constant	With Constant & Trend
LnV_2	-1.15 (0.68)	-1.2 (0.87)	-1.32 (0.60)	-1.29 (0.87)
LnINF	-2.57 (0.106)	-3.08 (0.12)	--2.55 (0.11)	-3.14 (0.1110)
LnTC	-1.77 (0.38)	-0.59 (0.97)	-1.50 (0.52)	-1.07 (0.92)
LnRGDP	-0.72 (0.82)	-1.32 (0.86)	-1.01 (0.73)	-1.61 (0.76)
Lni	-3.32 (0.0214)	-2.88 (0.17)	-1.80 (0.11)	-1.35 (0.8583)
lnCF	-1.32 (0.60)	-0.91 (0.94)	-1.52 (0.51)	-1.18 (0.90)

Source:Author's computation using EViews software

Table 2: Results of the Stability of Time Series for Study Variables at the First Level:

the variable	TEST Dickey and Fuller		TEST Phillip-Perron	
	With Constant	**With Constant & Trend**	**With Constant**	**With Constant & Trend**
LnV$_2$	--4.93 (0.00) ***	-4.89 (0.00)***	-4.88 (0.00) ***	-4.82 (0.00) ***
LnINF	-8.55 (0.00) ***	-8.43 (0.00)***	-5.01 (0.00)***	-5.08 (0.0) ***
LnTC	-4.02 (0.00)***	-4.20 (0.01) **	-4.199 (0.0) ***	-4.33 (0.00)
LnRGDP	-5.33 (0.00)	-5.28 (0.00***)	-5.48 (0.0) ***	-5.43 (0.00) ***
Lni	-3.69 (0.00)***	-3.93 (0.02) **	-3.67 (0.00) ***	-3.59 (0.04)**
lnCF	-5.05 (0.00)***	-5.17 (0.00)***	-5.10 (0.000)***	-5.171 (0.00) ***

Source:Author's computation using EViews software

From Table 1 and Table 2, the first values in the table represent the statistic (Statistic), while the second values in parentheses (Prob*) represent the probability value for each statistic. We observe from the results obtained that:

- **ADF Test**: Indicates the stability of all variables (LnV2, LnINF, LnTC, LnRGDP, LnCF, LnI) at the first difference level, with a constant and a general trend. Therefore, it can be said that all the variables under study are integrated of order I(1) at the 1%, 5%, and 10% significance levels.
- **PP Test**: Indicates the stability of all variables (LnV2, LnINF, LnTC, LnRGDP, LnCF, LnI) at the first difference level, with a constant and a general trend. Therefore, it can be said that all the variables under study are integrated of order I(1) at the 1%, 5%, and 10% significance levels.

3-3- Optimal Lag Length Determination for Cointegration Analysis:

An essential prerequisite for conducting cointegration tests is determining the appropriate number of lag periods (lag length). This step aims to eliminate autocorrelation in the error term and establish the optimal lag structure for the analysis.

Table 3: Lag Periods

Lag	AIC	SC	HQ
0	5.280658	5.541888	5.372753
1	-5.667272	-3.838662*	-5.022601
2	-6.286281*	-2.890292	-5.089036*
3	-6.078495	-1.115126	-4.328675

Source:Author's computation using EViews software

The results from Table 3 suggest that the optimal lag length is 2, determined by the AIC criterion.

3-4- Johansen Cointegration Test:

This step utilizes the Johansen test, which includes two tests: the Trace test and the Max-Eigenvalue test, to ascertain the number of cointegrating vectors and prevent spurious regression. Following the cointegration test, the results indicate no cointegration.

Table 4: Johansen Cointegration Test (Trace Test)

H$_0$	H$_1$	Trace Statistic	Eigenvalue	Critical Value	prob
r =0	r =0	175.3436	0.792746	95.75366	0.0000
r ≤ 1	r=1	118.6863	0.744413	69.81889	0.0000

r ≤ 2	r=2	69.57542	0.657047	47.85613	0.0001
r ≤ 3	r=3	31.04960	0.408708	29.79707	0.0357
r ≤ 4	r=4	12.13359	0.256417	15.49471	0.1506
r ≤ 5	r=5	1.467678	0.039949	3.841466	0.2257

Source:Author's computation using EViews software

The results of the test presented in Table 4 indicate evidence of a cointegrating relationship. This conclusion is drawn from the fact that the computed value of the Trace Statistic exceeds the critical value at a 5% significance level. Specifically, the test suggests the presence of a cointegrating relationship with a rank of R=4.

Table 5: Johansen Cointegration Test (Max-Eigenvalue Test)

H₀	H₁	Max EigenStatisti	Eigenvalue	Critical Value	prob
r =0	r =0	56.65721	0.792746	40.07757	0.0000
r ≤ 1	r=1	49.11092	0.744413	33.87687	0.0003
r ≤ 2	r=2	38.52582	0.657047	27.58434	0.0004
r ≤ 3	r=3	18.91601	0.408708	21.13162	0.0013
r ≤ 4	r=4	10.66591	0.256417	14.26460	0.0993
r ≤ 5	r=5	1.467678	0.039949	3.841466	0.1718

Source:Author's computation using EViews software

Results from Table 5 further corroborate the findings of the Max-Eigenvalue test, confirming the presence of a cointegrating relationship. This supports the existence of a long-term equilibrium relationship among the variables under study.

3-5- Residual Model Stability:
To investigate the possibility of a long-term equilibrium relationship using the Johansen cointegration test among the studied variables, the initial step involves examining the residuals. Ensuring their stability is crucial. To achieve this, we analyzed the residuals of the estimated equation and subsequently conducted augmented Dickey-Fuller and Phillips-Perron tests to reinforce the obtained results.

Table 6: Residual Model Stability Study

	Dickey and Fuller		Phillip-Perron	
	With Constant	**With Constant & Trend**	**With Constant**	**With Constant & Trend**
Residual	-6.09 (0.00)***	-6.01 (0.00)***	-6.09 (0.00)***	-6.01 (0.00)***

Source:Author's computation using EViews software

According to the results obtained from Table 6, the residuals of the time series are stable at a 5% significance level. Therefore, the model can be estimated using the Fully Modified OLS (FMOLS) method because there exists cointegration.

3-6- Fully Modified OLS (FMOLS) Methodology:
Since the proposed model is a multivariate linear model, its estimation will rely on the Fully Modified Ordinary Least Squares (FMOLS) method. FMOLS corrects for violations of the regular OLS assumptions, particularly addressing issues like autocorrelation. Developed by Phillips and Hansen (1990), FMOLS is recognized for its superiority in estimating cointegrating regressions (Jeon and Moon, 2005).

This method is esteemed for its capability to handle autocorrelation and mitigate parameter bias by incorporating estimated parameters from initial regressions (OLS), aiming for optimal estimation efficiency. FMOLS is especially suitable for large samples and necessitates verifying cointegration conditions among the study variables during the estimation process.

Table 7: Fully Modified OLS Model

V ariable	Coefficient	t-Statistic	Prob
LNINF	-0.024	-1.221	0.2304

LNTC	- 0.169	-4.691	0.0000
LNRGDP	- 0.114	-2.068	0.0465
LNCF	- 0.234	-6.945	0.0000
LNi	0.220	2.890	0.0068
C	-0.113	-4.330	0.0000
R^2=0.8613	Adj- R^2=0.8403		

Source:Author's computation using EViews software

From Table 7, the following observations can be made:

- The adjusted coefficient of determination (R^2) is 86.13%, indicating that the independent variables explain 86.13% of the variance in the dependent variable. The remaining 13.87% is attributed to factors outside the model.
- There is an inverse and significant relationship at the 5% level between the exchange rate (dinars per dollar) and the velocity of money. Specifically, a 1% increase in the exchange rate leads to a 0.169% decrease in the velocity of money. This aligns with economic theory, where a stronger dollar encourages currency hoarding, thus reducing its circulation velocity.
- There is an inverse and significant relationship at the 5% level between an individual's share of GDP and the velocity of money. A 1% increase in per capita GDP share results in a 0.114% decrease in the velocity of money. This corresponds to Friedman's theory (1956) that suggests an inverse relationship between money velocity and income, indicating that individuals tend to hold a significant portion of their income in cash.
- there is an inverse but insignificant relationship at the 5% level between inflation and the velocity of money. A 1% increase in inflation results in a 0.024% decrease in the velocity of money. This finding does not fully align with economic theory, as an increase in money supply does not always lead to decreased money velocity and increased desire for savings.
- There is an inverse and significant relationship at the 5% level between the ratio of loans directed to the private sector to GDP and the velocity of money. A 1% increase in this ratio leads to a 0.234% decrease in the velocity of money. This finding contradicts economic theory, suggesting that delayed loan repayments compel consumers and institutions to hold onto money, reducing the rate of money circulation or diverting loans to imports rather than domestic investment.
- There is a positive and significant relationship at the 5% level between the interest rate and the velocity of money. A 1% increase in the interest rate leads to a 0.220% increase in the velocity of money. This aligns with economic theory, where higher interest rates on financial assets incentivize increased turnover of money.

Conclusion:

The velocity of money is considered an important variable in formulating a balanced monetary policy to make sound strategic economic decisions. Its importance is particularly evident when it is stable; instability complicates the central bank's control over the money supply. The inability to estimate and predict it can lead to the adoption of monetary policies that do not align with economic policy objectives. Overestimating the velocity of money can lead the central bank to pursue excessively expansionary or contractionary monetary policies. The study reached the following conclusions:

The results of the time series stability tests for the study variables indicated that they are not stable at the level (levels) but become stable after taking the first difference, indicating that they are integrated of the first order.

-The model test results highlighted that the optimal lag length for this period is one, which corresponds to the lowest value.
-Regarding the cointegration test using the Johansen test, it was found that there is a long-term equilibrium relationship between the study variables.
-The value of the coefficient of determination was 86.13%, meaning that the independent variables explain 86.13% of the changes in the dependent variable, with the remaining 13.87% attributable to factors or variables outside the model.
-There is an inverse relationship between inflation, the ratio of private sector loans to GDP, per capita GDP, and the exchange rate on the velocity of money. Inflation was not significant, while the ratio of private sector loans to GDP, the exchange rate, and per capita GDP were significant at the 5% level.
-There is a positive and significant relationship between the interest rate and the velocity of money at the 5% level.

References:

1. **Abdur R. Chowdhury**,(1994),Factors determining the income velocity of money in a developing economy,Applied Economics Letters1(4), 58-62.
2. **Abdullah T.M. H**, (2014), Determinants of the Velocity of Money in the Jordanian Economy, A Magistère Thesis in Financial and Banking Sciences, Yarmouk University, Jordan.

3. **Ajibola Arewa,P. C Nwakanm** ,(2013),Money Supply and Velocity of Money in Nigeria:A Test of Polak Model,Journal of Management and Sustainability, 3(4).136-150.

4. **Al-Amar ,K. A. M**, (2011), Factors Affecting the Velocity of Money in Saudi Arabia, A Magistère Thesis in Economics, Mu'tah University, Jordan.

5. **Al-Naqqa Ahmed**, (1998), Theory of Money, Banks, and Financial Markets, Shabab University Foundation, Alexandria, Egypt.

6. **Ali Abdel-Monem**, (1970), Studies in Money and Monetary Theory, Al-Ani Printing Press, Baghdad, Iraq.

7. **Al-Jawijat A .F, Al-Mashhadani D.I**, (2018), Factors Affecting the Velocity of Money: An Applied Study on the Hashemite Kingdom of Jordan 1980-2015, Tikrit Journal of Administrative and Economic Sciences, 2(42), Tikrit University, Iraq.

8. **Ali Al-Anizi ,W.H**, (2015), Determinants of the Velocity of Money in Iraq: An Applied Study for the Period (1980-2013), Anbar University Journal of Economic and Administrative Sciences, Iraq.

9. **Al-Bayati ,T. F, Miral,R.S**, (2013), Money, Banks, and Contemporary Economic Variables, Wael Publishing House, Amman, Jordan.

10. **Al-Muaigil M**, (2004), Determinants of the Velocity of Money in Saudi Arabia, King Saud University, Saudi Arabia.

11. **Al-Dulaimi A**, (1989), Money and Banks, Al-Hikma Printing House, Iraq.

12. **Atta Abdelwahab**, (1999), Money Circulation Velocity: Between Economic Theory and Practical Application, Arab Foundation for Studies and Publishing, Beirut, Lebanon

13. **Ben Ali Belazouz**, (2004), Lectures on Monetary Theories and Policies, University Publications Bureau, Algeria.

14. **Boukrata, A**, (2012), Determinants of the Velocity of Money in Algeria during the Period (1964-2009), A Master's Thesis in Statistics and Applied Economics, National School of Statistics and Applied Economics

15. **Brock K. Short**,(1973),The velocity of money and per capita income in developing economies Malasia and **Singapore** ,The Journal of Development Studies,9(2) .291- 300.

16. **Diaa Majid**, (2005), Economics of Money and Banks, Shabab University Foundation, Egypt.

17. **Jamil Janabi H. A , Yassin Arslan R.Y**, (2009), Money, Banks, and Monetary Theory, Wael Publishing House, Jordan.

18. **Ghafour N. M**, (2015), The Effect of Changes in Money Supply and its Velocity on Inflation Rates in Iraq during the Period (1991-2013), Dananeer Journal, 1(7), The Iraqi University, Iraq.

19. **Hussein O**, (2017), Determinants of the Velocity of Money in Sudan during the Period (1990-2015), Magistère Thesis Sudan University.

20. **Peter N. Okafor and Others**,(2013),Determinants of income velocity of money in Negiria,Central bank of Negiria economic and financial review.51(1). 29-59.

21. **Roman syrotian**,(2012),The velocity of money determinants in ukranie, A thesis submitted in partial fulfillement of the requirements for the drgree of MA in financial economics.

22. **Samuelson, Paul A., Nordhaus, William D**. (1995), Economics, translated by Hesham Abdullah and Osama Dabbagh, 2nd edition, National Publishing House, 2006, Amman, Jordan.

23. **Sobhi T. Q**, (1984), Money and Banks, Arab Renaissance House, Beirut, Lebanon.

24. **Suleiman H.M**, (2002), Determinants of the Velocity of Money: An Applied Study on Sudan (1970-2000), Magistère Thesis in University of Khartoum Sudan.

25. **W. Douglas McMillin**,(1991) , The Velocity of M1 in the 1980s: Evidence from a Multivariate, Louisiana State University, Southern Economic Journal, 57(3), 634-648.