

Determinants of money supply in Algeria during the period 1987-2017

محددات عرض النقود في الجزائر خلال الفترة 1987-2017

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Abstract:

The Purpose of this study is to identify the determinants of money supply in Algeria during the period (1987-2017), and to reach this goal we used economic measurement through the model (ARDL) through which we were able to determine the relationship between the independent variables of the study (inflation rate, interest rate and exchange rate) We found that all the independent variables affect the money supply in Algeria during the period (1987-2017), that is, the monetary authority in Algeria must control these variables and benefit from their relationship with the money supply .

keyword: money supply ; inflation rate ; interest rate ; exchange rate ; Gross domestic product

JEL classification code : E51, C50

ملخص:

جاءت هذه الدراسة للتعرف على محددات عرض النقود في الجزائر خلال الفترة (1987-2017)، وللوصول إلى هذا الهدف استخدمنا القياس الاقتصادي من خلال نموذج (ARDL) استطعنا من خلاله التوصل إلى العلاقة بين المتغيرات المستقلة للدراسة (معدل التضخم وسعر الفائدة وسعر الصرف والنتائج المحلي الإجمالي) والمتغير التابع (العرض النقدي) ، فوجدنا أن كل المتغيرات المستقلة تؤثر في عرض النقود في الجزائر خلال الفترة (1987-2017)، أي أن على السلطة النقدية في الجزائر للتحكم في العرض النقدي مراقبة هذه المتغيرات والاستفادة من علاقتها مع العرض النقدي.

الكلمات المفتاحية : العرض النقدي ؛ معدل التضخم؛ سعر الفائدة ؛ سعر الصرف؛ الناتج المحلي الإجمالي

تصنيف JEL : E51 ، C50

1. Introduction :

The money supply is momentous thing for countries to achieve their goals, therefore Algeria has laid down its objectives that achieve monetary stability and attached great importance to regulating the issuance of money supply in line with its macroeconomic objectives such as economic growth, which results in several positive results such as realizing the welfare of the population of the community and get rid of the problem of Unemployment. It also helps in bringing the value of the dinar to its real level and many other positives that any country dreams of owning, which made us go into this study so as to deepen further and try to identify the most important macro economic variables that affect the money supply in the world.

Through the above we can ask the following question:

• **What are the determinants of money supply in Algeria during the period (1987 - 2017)?**

Hypotheses: To answer the main question, we formulated the following hypothesis:

The determinants of money supply in Algeria during the study period are; Inflation, Gross domestic product, Interest rate, Exchange rate,

Research Objectives: This study aims to achieve several objectives, including:

1. Analysis of the evolution of money supply in Algeria
2. Analysis of the relationship between macroeconomic variables and money supply and knowledge of the variables that affect money supply in Algeria during the study period.

Previous studies:

(He, 2017), In this study, the researcher spell out the importance of money supply for macroeconomic variables, namely real gross domestic product, inflation rate and interest rate, during the period 2000-2016 using the variant self-regression (var) in China, and concluded that increasing real gross domestic product will increase the money supply and the same is true for the inflation rate. As for the interest rate, its increase will lead to a decrease in the money supply, so by adjusting these variables, the money supply can be better controlled.

(Ebiringa, 2012) In this study, the researcher explains the effect of the interest index on money supply during the period (1990-2007) .It aims to ensure stability in money supply through the sustainable management of interest rate. The results showed that the minimum discount rate and the savings rate had a very positive effect on money supply. On the other hand, the interest rate had little negative impact on money supply

(Augustine, Suleiman, & Philips, 2018)The study showed the determinants of money supply in Nigeria during the period 1981-2015, and used five independent variables, CPI, GDP, interest rate, exchange rate and foreign direct investment, using the ARDL approach; the result showed a long-term relationship between the variables under study, the money supply is determined internally

(Naveed & D.K, 2016).This study aimed to examine the determinants of money supply in India. The paper assesses in detail the main determinants of the cash supply and how the nature of the determinants has changed during the time period of the study, the paper found the two major determinants one is proximate and the other is policy oriented, however latter one has upper hand in determining the money supply. The most important point out here comes that the nature and composition of both the determinants have changed, and these must have implication from policy perspective

2. Study Methodology And data:

1.2. Methodology:

We used the auto regressive distributed lag approach (ARDL) in this study so as to answer the problem presented about the determinants of the money supply during the period (1987-2017).

2.1.1An ARDL Approach:

It is used in determining the long run relationship between series with different order of integration (Pesaran and Shin, 1999, and Pesaran et al. 2001). The reparameterized result gives the short-run dynamics and long run relationship of the considered variables (Nkoro & Uko, 2016, p. 68). This method has definite advantages in contrast to other cointegration procedures since it can be used regardless of whether the underlying variables are $I(0)$, $I(1)$ or fractionally integrated. Therefore, the bounds test excludes the uncertainty associated with pre-testing the order of integration. Secondly, it can be used in small sample sizes, whereas the Engle–Granger and the Johansen procedures are not

reliable for relatively small samples. Taking into account that our sample size is limited with a total of 38 observations only, conducting bounds test will be appropriate. (Ali, 2017, p. 10)

2.1.2. Variables of Study:

Dependence in the proposed model on macroeconomic variables that have an impact on money supply in Algeria during the period between (1987-2017). As well as it branched between dependent variable and independent variables:

2.1.2.1. The dependent variable (internal variable):

money supply, represented by the expanded mass of money as a percentage of GDP, symbolized by M2, a measure of the volume of money circulating in society and the banking system.

2.1.2.2. Independent variables (external variables):

In this model, we used four independent variables:

- **Inflation:** symbolized by (Inf), inflation is a persistent and appreciable rise in the general level of prices (Bayo, 2011, p.262), and which is one of the most important variables that affect monetary policy, which in turn determines the money supply. It is linked to a direct relationship with money supply.

- **Exchange rate against the US dollar:** symbolized by (Ex) The exchange rate is very important in determining the money supply, because it belongs to monetary policy of the Central Bank, it depends on foreign currencies in exchange for the issuance of money, so an increase or decrease in the price of a currency greatly affects the size of the money supply, especially that money supply is directly correlated with the exchange rate.

- **Interest rate on loans:** symbolized by (r), The interest rate is one of the determinants of money and financial asset flows among actors in the market (Timini., 2014, p49), it is considered an important variable and major because it affects the money supply as a result of monetary policy, used by the monetary authority as a means of controlling the amount of money offered, and has an inverse relationship to money supply.

- **Gross domestic product:** symbolized by (gdp) as an important indicator in the impact on the economic level, (Onuoha, Ibe, Njoku, & Onuoha, 2015) because it affects and is affected by money supply through monetary policy and is associated with it a

direct relationship so that any increase gdp would lead to an increase in money supply.

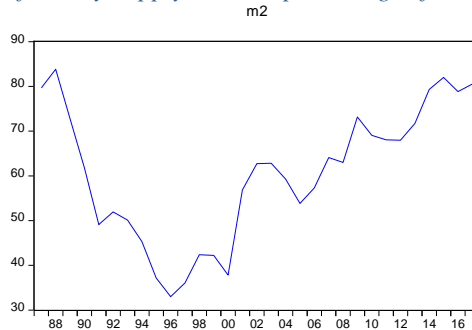
2.2 Data:

This study use annual time series covering the period from 1980 to 2017. The data and statistics were obtained from the World Bank statistics and data, the evolution of these variables during the study period as follows:

2.2.1 The evolution of money supply as a percentage of GDP during the period 1987-2017:

We note through the figure the continuous decline of money supply from 1987 to 1997, and this is due to the low liquidity of the economy as a result of the credit agreement signed with the International Monetary Fund, where the liquidity of the economy has been significantly reduced as a result of Algeria's austerity policy by locking up the wages of workers, reducing the value of the dinar and reducing the budget deficit. In addition, the strict policy through banking reforms and raising the interest rate on deposits allowed the adjustment of the structure of the monetary mass and slowing the growth of the money supply (M2). Therefore, this led to a decrease in the money supply ratio in relation to the GDP, from more than 80% to less than 40%, and this indicates a contraction in the Algerian economy. The money supply M2 returned to growth again in 1998 and thereafter due to the improvement in oil prices, which led to an increase in exchange reserves in addition to the launch of development programs known to Algeria at the turn of the millennium, as well as the increase in the value of net foreign assets and deposits of the National Hydrocarbons Company which benefited at the end of 2017 from paying part of its dues by the Treasury, which led to an increase in the money supply ratio of GDP from less than 40% to more than 70%, indicating the recovery of the Algerian economy and its gradual tendency to balance.

Fig.1 :Evolution of Money Supply M2 as a percentage of GDP 1987-2017.

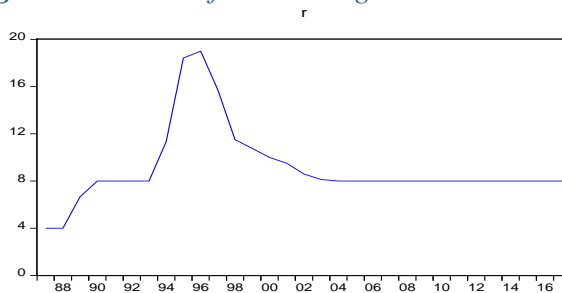


Source: Software Outputs 10 Eviews.

2.2.2. The evolution of the interest rate on lending 1987-2017:

The figure below shows the evolution of the interest rate during the period 1987-2017, where from 1987 to 1989 was characterized by a slight rise, and then increased significantly from 1990 to reach the highest rate in 1996 estimated 19 %, and this increase is due to several reasons, one of these reasons is giving the savings the best compensation for the purpose of moving and directing it towards the financing of investments, and from 1998 to 2003 we note the gradual decline where the interest rate on lending moved from 10% to 8%, which embodies the law of private investment development in 2001. From 2004 to the present, interest rates on loans have been stable, and they were 8% during this period, this is due to the stabilization of the monetary situation of Algeria as a prerequisite for the growth of private investment.

Fig.2 : Evolution of the lending rate 1987-2017



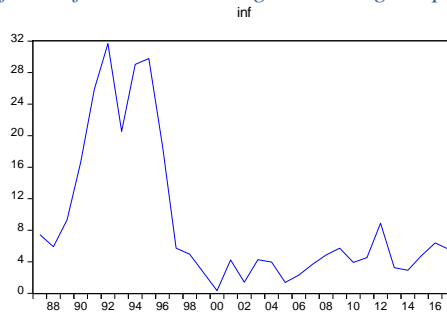
Source: Software Outputs 10 Eviews.

2.2.3. The evolution of the inflation rate in Algeria during the period 1987-2017:

The inflation rate in 1986 recorded a remarkable rise of 12.30% due to the oil crisis that led to the collapse of oil prices, and then returned to decline in the following years, reaching 7.4% in 1987 and Inflation rate reached 5.9% in 1988. The rate of inflation increased during the nineties, reaching its maximum at the end of 1992 by 31.6%. This is due, among other things, to the measures taken by the monetary authorities under the first and second credit readiness program. At the beginning of this period the national currency devaluation led to the growth of the inflation, in addition to the high cost of imports and the cost of servicing foreign debts, resulted in an increase in the budget deficit. This deficit was financed through cash issuance, which led to high inflation, as it is the case during 1994 and 1995, but it is less high. During the period (1996-2000), inflation rates have decreased significantly compared to previous years. This is due to several reasons, including the management of the government in the face of inflation based on the structural adjustment program, in addition to the decline in the level of aggregate demand due to the increase in unemployment rates, which reached 25.4% in 1997, in addition to the adoption of market mechanisms and price liberalization. Furthermore, the authorities resorted to indirect instruments that explain the increase in interest rates starting in 1993, in addition to the imposition of a mandatory reserve applied to the total deposits in the national currency of any nature. After 2001 and until 2007, we note the stabilization of inflation rates in Algeria due to the tight application. The inflation rate rose to the highest rate since 2000 to reach 4.8% and 5.7% in 2008 and 2009 compared to the target inflation rate of 3%. This is due to the increase in imported inflation, especially in the emerging countries due to the high prices of basic materials, and energy products in various places over the world. However, this rate declined in the following years thanks to the intervention of the State in regulating and strengthening prices to reach 3.9% in 2010 and 4.5% in 2011, and then the inflation rate peaked in 2012 to reach 8.8%, a rate not previously recorded, This historical peak is mainly due to the increase in the prices of some fresh products in the first quarter of 2012. In order to reduce the inflationary pressures that have emerged since 2011, especially related to the world prices of basic products, the public authorities have taken

appropriate support measures that have had a total impact on 2011 and 2012 at approximately 10 %. However, in the years that followed, the inflation rate declined as the government managed to contain inflation. The budget deficit and the depreciation of the national currency led to an increase in the inflation rate in 2015, which reached 4.8%, and with the entry into force of the Finance Act 2016, it included significant increases in some Consumer goods. Most importantly, the fuel that reflected on the prices of goods and services to the inflation rate in 2016 reached 6.4%, then the average annual pace of growth of the CPI in 2017 slowed down to 5.6% for the Greater Algeria Index and 5.9% for the National Index which is considered high and the reason for its rise is the rise in food prices.

Fig.3 : Evolution of the inflation rate in Algeria during the period 1987-2017.



Source: Software Outputs 10 Eveiws.

2.2.4. Development of the exchange rate against the US dollar in Algeria during the period (1987-2017).

The period (1987-1992) made minor adjustments in the method of calculating the exchange rate of the dinar based on the measurements taken by the monetary authorities in order to devalue the national currency, where the rate of exchange of dinar from 4.84 dinars to the dollar in 1987 to 8.95 in 1990 to become this reduction Officially, starting in 1991, this is in parallel with the issuance of the structural adjustment program supported by the International Monetary Fund, which carried strict procedures to manage the levels of deterioration in the value of the dinar.

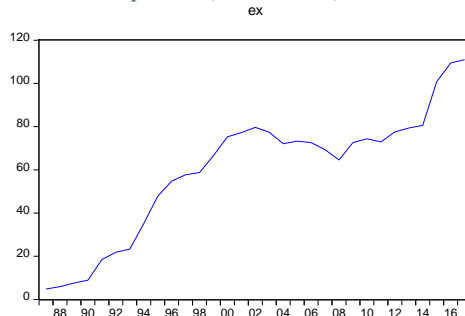
During the period (1992-1994), the government introduced a new economic program and retreated significantly from previous reforms and gave another direction to economic policy. This approach is concerned with the establishment of a double exchange market, one

part of which operates at a fixed exchange rate and the other part operates under a floated and controlled exchange system. The exchange rate was stable at the level of 22.5 dinars against the dollar until the month of April 1994, where an agreement was concluded with the International Monetary Fund, which reduced the value of the dinar by 40.17% to reach the level of 36 dinars per dollar, a decision approved by the Monetary and Loan Law on 10 April 1994 Exchange at this point that was considered transitional to achieve the convertibility of the dinar for current transactions gradually and based on the availability of the terms of the balance of the foreign exchange market.

During the period (1995-2004), the exchange rate of the Algerian dinar witnessed a significant decline from 1\$, equivalent to 40 Algerian dinars, to 1\$, equivalent to 75.25 Algerian dinars in 2000, due to a series of reductions made during the 1990s. In 2003, the Central Bank has reduced the value of the dinar by between 2% and 5%, with the aim of limiting the development of the money supply circulating in the parallel market. During the period (2005-2014), the exchange rate continued to fluctuate and the value of the Algerian dinar collapsed by more than 10%.

During the period (2011-2017) the value of the dinar decline against the US dollar, and this decline intensified during 2015 and this in the wake of the shock of the collapse of oil prices that characterized in 2014, where the value of the dinar fell by 20% against the dollar, and during the first six-month 2016 fell by 3.2, and beginning with the third triple of 2016, the exchange rate of the dinar against the dollar was known to be stable around 110 dinar per dollar, and there were decreases in the exchange rate against the dollar in the second half of 2017 by 6.02%.

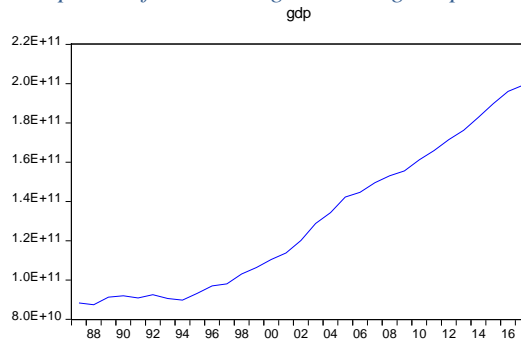
Fig.4 : The evolution of the exchange rate against the US dollar in Algeria during the period (1987-2017).



2.2.5. Development of Gross Domestic Product in Algeria during the Period 1987-2017.

We note from the figure that the evolution of gross domestic product GDP is fluctuating, especially in the mid-eighties, a significant decline due to the gradual decline in oil prices in the world market and followed by the collapse of oil prices in 1986, which actually revealed the fragility of the Algerian economy as a rentier economy linked performance significantly with the fluctuations in oil prices, GDP also recorded low levels during the period 1993-1997, accompanied by a large rise in unemployment rates, the reason for this decline is due to the adoption of Algeria's economic reforms with the international monetary and financial institutions in order to prepare the ground for the process of changing the trend as a result of the structural adjustment program, starting from 2001, the (GDP) improved significantly due to the state intervention as a result of previous conditions to stimulate economic growth through the adoption of economic recovery programs based on strengthening the basic structures and means of communication. In addition to the high oil prices, all these factors helped in the rise of GDP.

Fig.5 : The Development of GDP in Algeria during the period 1987-2017.



Source: Software Outputs 10 Eveivs.

3. Study Results:

3.1. Assessment and Analysis of the Study Model

3.1.1. Time series stability test:

This test aims to avoid the problem of false correlation between independent and dependent variables caused by time series instability in the estimation of the standard model. It is used the extended Dickey-Fuller test to study the stability of these series and determine their

degree of integration, and with (Eviews 10), we performed ADF tests on all series (results are shown in Table 1), and note in Table 1 that the exchange rate (Ex), money supply (M2) and interest rate (R) are stable chains in level I (0) which contains the root of the unit, where the differences and probability values are less than 0.01 in the formula (The existing of the constant and the general trend), when the first difference is taken I (1), the rest of the series, inflation (inf) and GDP (gdp) are type I (1), it contains the root of the unit and become stable when the first difference is taken, the probability value Less than 0.01 in all cases, which means rejecting the null hypothesis and accepting the alternative hypothesis (the static time series).

Since chains contain a combination of I (0) and I (1), the appropriate way to study long-term equilibrium relationships is the ARDL approach.

Table 1 : Unit root tests for stability

UNIT ROOT TEST RESULTS TABLE (ADF)						
At Level						
		EX	GDP	INF	M2	R
With Constant	t-Statistic	-1.1185	3.4530	-1.5448	-1.1997	-1.7325
	Prob.	0.6947	1.0000	0.4967	0.6613	0.4047
		n0	n0	n0	n0	n0
With Constant & Trend	t-Statistic	-4.4652	-2.3187	-2.0600	-3.7496	-5.8296
	Prob.	0.0086	0.4118	0.5461	0.0347	0.0004
		***	n0	n0	**	***
Without Constant & Trend	t-Statistic	1.2514	9.3965	-1.1437	-0.2600	-0.3916
	Prob.	0.9425	1.0000	0.2239	0.5840	0.5337
		n0	n0	n0	n0	n0
At First Difference						
		d(EX)	d(GDP)	d(INF)	d(M2)	d(R)
With Constant	t-Statistic	-3.8382	-3.3001	-4.6214	-4.1665	-4.7578
	Prob.	0.0068	0.0242	0.0009	0.0030	0.0007
		***	**	***	***	***
With Constant & Trend	t-Statistic	-3.7809	-4.0976	-3.7241	-4.8195	-4.7130
	Prob.	0.0324	0.0162	0.0372	0.0030	0.0041
		**	**	**	***	***
Without Constant & Trend	t-Statistic	-3.0224	-0.7107	-4.7062	-4.2420	-2.1278
	Prob.	0.0038	0.3998	0.0000	0.0001	0.0345
		***	n0	***	***	**

Source: Software Outputs 10 Eviews.

3.1.2 Testing the appropriate gaps of the model:

One of the most commonly used methods for testing the appropriate gap is to use information functions, of which SIC and AIC are used. According to this case and through Figure 06, the appropriate model is ARDL (2,3,0,4,4), based on the AIC standard, this means that the dependent variable has four degrees of delay, similar to inflation and money supply M2, while economic growth has had a different estimate of 3 degrees.

The model takes the following formula (1):

$$\Delta M2_t = c + \sum_{i=1}^2 \beta_{1i} \Delta M2_{t-1} + \sum_{i=1}^3 \beta_{2i} \Delta r_{t-1} + \sum_{i=1}^0 \beta_{2i} \Delta INF_{t-1} + \sum_{i=1}^4 \beta_{3i} \Delta EX_{t-1} + \sum_{i=1}^4 \beta_{4i} \Delta GDP_{t-1} + \alpha_1 M2_{t-1} + \alpha_2 r_{t-1} + \alpha_3 INF_{t-1} + \alpha_4 EX_{t-1} + \alpha_5 GDP_{t-1} + \varepsilon_t$$

Where:

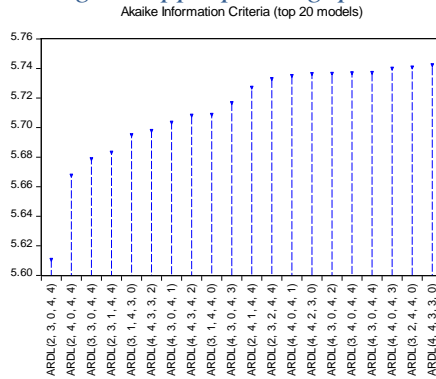
Δ : shows first order differences, c: fixed term, t:direction of time, ε_t : random error limit, ($\beta_1, \beta_2, \beta_3, \beta_4, \beta_5$) : short-term relationship coefficients (Error correction), ($\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5$):long-term relationship coefficients.

The zero and alternative hypothesis in the ARDL approach in equation (1) is:

$$H0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = 0$$

$$H1: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq 0$$

Fig.6 : The Testing the appropriate gaps in the study model



Source: Software Outputs 10 Eviews.

3.1.3. Simultaneous Integration Test:

Simultaneous Integration Testing is done by Fisher's test on the variables representing the long-term equilibrium relationship at the level, but the critical values do not follow the standard distributions and therefore are compared with the critical values of “Pesaran *at al.* (2001)”, and this methodology does not require that the variables be stable in the same degree but can be applied to variables of different degrees. Critical values in the F test do not follow standard critical values and are compared with upper and lower limits, and if the calculated value exceeds the upper limit, the variables have a long-term

equilibrium relationship, and if the calculated value is less than the minimum, the variables do not have a long-term equilibrium relationship. Table 2 shows that the calculated value $F = 7.61$ exceed the highest value of 4.37, which indicates a long-term integral relationship between the independent and dependent variables. The table shows that the interest rate, the inflation rate, the exchange rate and the GDP have a significant effect in the long term on the money supply in Algeria, where the significance ratios respectively are 0.0008, 0.0657, 0.0778, 0.0193, and with order.

Table 2: Simultaneous integration test in accordance with ARDL methodology.

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
R	-2.649984	0.540370	-4.904017	0.0008
INF	0.655753	0.313088	2.094467	0.0657
EX	0.375312	0.188583	1.990175	0.0778
GDP	1.70E-10	5.97E-11	2.844362	0.0193
C	35.67954	10.76027	3.315858	0.0090
EC = M2 - (-2.6500*R + 0.6558*INF + 0.3753*EX + 0.0000*GDP+ 35.6795)				
F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	7.610481	10%	Asymptotic: n=1000	
			2.2	3.09
K	4	5%	2.56	3.49
			2.88	3.87
			3.29	4.37
Actual Sample Size	27	1%	Finite Sample: n=35	
			2.46	3.46
			2.947	4.088
			4.093	5.532
			Finite Sample: n=30	
			2.525	3.56
	3.058	4.223		
	4.28	5.84		

Source: Software Outputs 10 Eveiws.

The ARDL test indicates that there is a significant long-term relationship and the expression of this relationship along with the short-term relationship is shown in Table (9), where it shows that the speed

of adjustment towards equilibrium in the presence of imbalances from this level in the short term is estimated at 131.59% (this As shown by the error correction coefficient with a negative signal), a higher-than-average ratio shows that about 131% of the imbalances occurring at the equilibrium level are corrected during the previous period and are not present in all variables except inflation. This indicates that inflation does not affect money supply in the short term; the remaining variables affect the money supply in the short term.

This corresponds to reality. Many phenomena do not respond immediately to their determinants but are the result of historical accumulations, which made the coefficient of determination very sufficient to explain the model by more than 89%.

Table 3: ARDL error correction model.

ARDL Error Correction Regression Dependent Variable: D(M2)
 Selected Model: ARDL(2, 3, 0, 4, 4) Case 2: Restricted Constant and No Trend
 Date: 05/22/19 Time: 13:44 Sample: 1987 2017
 Included observations: 27

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(M2(-1))	0.410642	0.117564	3.492918	0.0068
D(R)	-2.716507	0.516721	-5.257204	0.0005
D(R(-1))	-0.821620	0.634438	-1.295037	0.2275
D(R(-2))	2.765393	0.566663	4.880138	0.0009
D(EX)	0.481861	0.129394	3.723985	0.0047
D(EX(-1))	-0.390818	0.122530	-3.189577	0.0110
D(EX(-2))	0.003641	0.122068	0.029824	0.9769
D(EX(-3))	-0.695424	0.185128	-3.756451	0.0045
D(GDP_1)	9.34E-10	3.61E-10	2.590704	0.0292
D(GDP_1(-1))	-1.28E-10	3.11E-10	-0.412954	0.6893
D(GDP_1(-2))	-1.23E-09	3.18E-10	-3.850764	0.0039
D(GDP_1(-3))	-8.42E-10	3.92E-10	-2.151352	0.0599
CointEq(-1)*	-1.315965	0.156142	-8.427998	0.0000
R-squared	0.890977	Mean dependent var		0.694851
Adjusted R-squared	0.797530	S.D. dependent var		6.339028
S.E. of regression	2.852354	Akaike info criterion		5.240350
Sum squared resid	113.9029	Schwarz criterion		5.864271
Log likelihood	-57.74472	Hannan-Quinn criter.		5.425874
Durbin-Watson stat	1.978343			

Source: Software Outputs 10 Eviews.

In terms of economic analysis, the results showed that the money supply in Algeria is inversely affected by the interest rate and directly with the exchange rate, GDP and inflation. This corresponds to the economic theories that state that:

- If the inflation rate is high, this indicates that there is an increase in the money supply in the Algerian economy, and when the increase of money supply because of the increasing of exchange rate, consequently the money supply is going up. Moreover, the increase of economic growth rates (there is prosperity) it will lead to increase the lending, and the result is the money supply is going up. On the contrary, the increase of the interest rates will lead to the absorption of liquidity in the economy in search of the return of the interest rate and thus decrease money supply.

3.2. Diagnosis of residues

3.2.1. Sequential correlation of residues and variance of variance: The problem of correlation of residues across time gaps and variance of errors varies on the efficiency of the parameters, ie, they do not have less variance than all estimated parameters available, which affects the testing of the hypotheses of this model. The most important tests to find out the problem are respectively (Breusch-Godfrey and ARCH), which can be summarized in Tables 4 and 5. These tables show that the model is free of the problem of sequential correlation of residues and also of the problem of difference of variance, which is confirmed by the probability values of the Fisher test respectively (0.2304 and 0.1510), which exceeds the level of significance 5%, which leads to the rejection of the null hypothesis (with Sequence correlation and variance instability), and therefore the estimated parameters are efficient which

gives reliable results in relation to hypothesis testing.

Table 4: Sequential correlation test for residues Table 5: Contrast variation test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	1.823742	Prob. F(2,7)	0.2304
Obs*R-squared	9.249328	Prob. Chi-Square(2)	0.0098

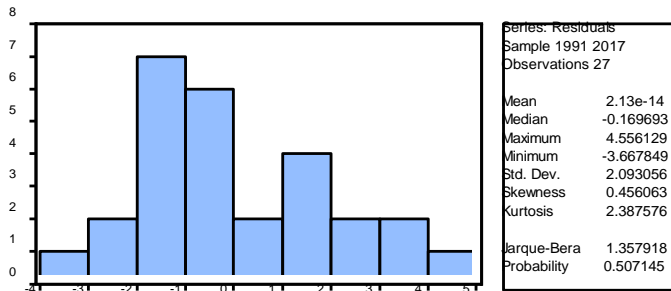
Heteroskedasticity Test: ARCH			
F-statistic	2.200367	Prob. F(1,24)	0.1510
Obs*R-squared	2.183539	Prob. Chi-Square(1)	0.1395

Source: Software Outputs 10 Eviews

3.2.1. Residual distribution test:

To clarify that residues are distributed naturally, the probability value of Jarque-bera test is (0,0507145) which is greater than (0.05) and therefore it is distributed naturally as shown in the following figure:

Fig7: Residual distribution test



Source: Software

Outputs 10 Eveiws

3.2.2. Model Stability Test:

In order to ascertain that there are no structural imbalances in the data used, especially the long-term and short-term relationship parameters during the duration used in the ARDL estimation we use the residual cumulative sum test and the residual cumulative sum test for residual squares.

We can see from Figures 8 and 9 that the repeated cumulative residual sum CUSUM for this model is a median line located within the critical limits indicating the stability of the model at the 5% significant limits, and the cumulative total return to the residual squares is also a median line located within the boundaries of the region Critical, and what can be deduced is that there is stability and harmony in the model between the long and short term results.

Through our analysis of the model we conclude that it is economically and statistically acceptable, and that the macroeconomic determinants of performance in the Amman Stock Exchange during the study period are primarily inflation and less money supply (M2).

Fig 8: Cumulative residual cumulative test

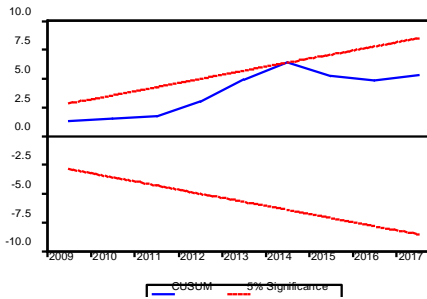
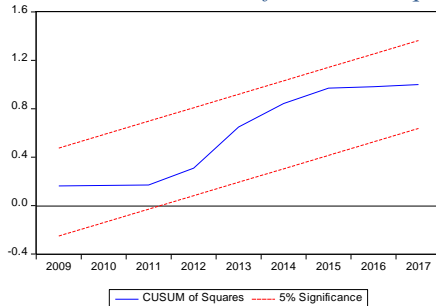


Fig 9: Recurring cumulative sum test for residual squares



Source: Software Outputs 10 Eviews

4. Conclusion :

The Study has reached the following results:

- The development of money supply in Algeria has gone through several stages as a result of the economic conditions experienced by it. 2008 as a result of the international financial crisis and after 2010 was characterized by fluctuation and this is due to a change in oil prices or policy pursued by the monetary authority.
- It was also found that the influential study variables have a statistical significance in their past and present times.
- The main determinant of money supply in Algeria during the study period is interest rates.
- From the coefficient of determination, it was found that the independent variables accounted for more than 89% of the changes in money supply in the study period.
- Through the ARDL methodology, the rate of inflation, interest rate, exchange rate and GDP have a significant effect in the long term on the money supply in Algeria, and therefore it is one of its determinants.

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