The Effectiveness Of Monetary Policy Instruments Under Inflation Targeting : An Emprical Analysis Case Of Algeria During The Period 1970-2018

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Summary: The aim purpose of this paper is to show the relation between inflation and monetary policy instruments in Algeria in the short and long run, as well as the use of unit root tests, bounds test and evaluation of the model. To achieve this goal, we used the ARDL methodology during the period (1970-2018) using EVIEWS 10. The results indicate that there is a long-term effect between independent variables and inflation as well as a positive relation between , rediscount rates and real output and inflation in the short and long term while there is no relation with the Other variables.We run also the Toda and Yamamoto approach , In contrast we found that there is causality between inflation and Exchange rates ,deposit interest rates.

Keywords: inflation targeting; ARDL ; Bounds Test; Eviews 10; Toda & Yamamoto approach.
Jel Classification Codes : C01.C32.E31.E52.E58.

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I- Introduction :

Since the 1980s, several developed and developing countries have recorded high rates of inflation, especially after the collapse of the Bretton Woods system (1944-1971), the Asian oil crisis and the South American crisis, which negatively affected the performance of their economic activity. These multiple economic turmoil have caused the development of Several researches to reduce the effects of the inflation problem, Where economists agreed that the goal of price stability has become a prerequisite for ensuring good monetary policy management, since this latter is considered the most direct instrument for controlling inflation, as it is among all government departments affecting the economy and directing it, in addition to being the most flexible means to achieve stability goals in the medium term .

In order to achieve this goal effectively, many economists believe the adoption of policy targeting a nominal anchor, Therefore the inflation variable was fixed as the central variable, from here, the policy of inflation targeting (IT) saw the light for the first time in New Zealand in February 1990, then it was adopted by many central banks such as Canada, England, Sweden and Chile ...etc. Like most developing countries, Algeria wanted to adopt this system, especially after it became possible to talk about monetary policy in Algeria after the issuance of the monetary law and loan 90-10 and order 03-11, also in light of the economic and financial reforms that Algeria witnessed, especially the order No. 10-04 On August 26, 2010, which stipulated that price stability became the ultimate goal of monetary policy.

The success of the inflation targeting policy is not guaranteed in Algeria due to the multiplicity of goals and the lack of some requirements for implementation, which makes us ask the following question: **To what extent can the inflation targeting policy in Algeria achieve price stability in the long run?**

To simplify this problem, we have tried to pose the following questions:
1.How is the relationship between monetary policy instruments and inflation?
2. Are the monetary policy instruments effective under IT?
3. Can inflation policy be applied in Algeria in light of reforms?

To answer these questions, we put forward the following hypotheses:
1.The possibility of adopting an IT policy in Algeria during the period of study.

2. There is a short and long-term relationship between the monetary policy tools and IT_____
3. There is a positive and significant relationship between inflation and money supply and a negative relationship with the economic growth rate.
4. The exchange rate channel is considered a useful channel in controlling inflation, and the rate of re-discounting has a significant impact-although is stable.

The research aims to show the relationship between inflation and monetary policy instruments in the short and long run as well as the use of unit root tests, cointegration between study variables in setting policies that lead to improved results, in order to achieve our goal of research and overcome problems, we apply the econometric Approch Auto-Regressive distributed Lags (ARDL).

Gottschalk & Moore.(2001)[1] used VAR to provide empirical evidence for the relationship between monetary policy instruments and inflation in Poland. They examined the effects of shocks of both the exchange rate and the interest rate on prices. The results showed that although the exchange rate appears to be effective on both output and prices, the direct links between the interest rate and inflation do not appear to be very strong. This requires a good understanding of the relationship between Monetary policy means and target inflation.

Christoffersen, Slok, & Wescott.(2001) [2] saw that Poland appears ready to target inflation using the underlying inflation than the headline . They also performed a statistical analysis of the relationship between monetary policy instruments and various leading indicators of inflation through a GRANGER causal test. They discovered that there is a predictive weak linkage between the exchange rate and the inflation measures, also may the movements in broad money influence certain representations of inflation. The relation between inflation and interest rate appear not good this is due that both variables have been falling nearly monotonically in Poland over the sample period, however the relationship between interest rate policy and inflation being more regular.They say that there is complete maturity and stability of the Polish economy.

TUTAR.(2002) [1] has done a pilot analysis to try to assess the statistical readiness of Turkey to achieve the requirements of targeting inflation through the use of VAR models. The results showed that inflation is an inertial phenomenon in Turkey. As for the money supply, the interest rates and the nominal exchange rates are not economically or statistically significant determinants of prices, most price variations are explained by the prices themselves. According to the results of VAR, the direct links between monetary policy instruments and inflation appear to be not strong, stable and predictable. While achieving the second condition of the inflation targeting system seems to have been met, there are still a problem related to the independence of the central bank and the availability of a stable and predictable relationship between monetary policy instruments and inflation in Turkey.

The first definitions of the inflation targeting policy began to emerge during the 1990s with their emergence as the first work shows some differences in the definition of IT policy.

I.1. The concept of inflation targeting policy:

We try to provide some key definitions, each of which shows a specific characteristic of this system, then we suggest a definition that summarizes the main points that most economists share.

Bernanke, & al.(1999)[3] "Inflation targeting is a framework for monetary policy characterized by the public announcement of official quantitative targets (or target ranges) for the inflation rate over one or more time horizons, and by explicit acknowledgement that low, stable inflation is monetary policy's primary long-run goal. Among other important features of inflation targeting are vigorous efforts to communicate with the public about the plans and objectives of the monetary authorities, and, in many cases, mechanisms that strengthen the central bank's accountability for attaining those objectives.

The European Central Bank.(2004) [4] defines inflation targeting as "a monetary policy strategy aimed at maintaining price stability by focusing on deviations in published inflation expectations from the declared inflation target". Add: "The central bank communicates with monetary policy decisions in response to deviations in forecasts for a given inflation measure from a specific inflation target in a given horizon". "The European Central Bank believes that introducing an inflation targeting policy will be relatively simple".

At the end of these definitions **Ftiti & Goux.(2010)** [4] proposed a definition that agrees with previous opinions and is close to the definition of **Bernanke & Mishkin.(1999)**. "In fact, we see that targeting inflation as a framework for monetary policy analysis and not just a rule to act on inflation in other words, its main goal is Maintaining price stability without excluding the independence of monetary authorities from the pursuit of other secondary goals such as the stability of economic activity and the stability of the exchange rate, which depends on numerical announcement with or without a period of tolerance, Inflation targeting aims to stabilize inflation expectations,this goal can only be achieved when economic agents trust decision-makers in the measures taken to achieve predetermined goals and therefore the central bank must have a relevant forecasting system and communication system that guarantees a high degree of transparency and credibility.

I.2. Procedures for implementing the inflation targeting policy:

In practice, the implementation of the inflation targeting policy must take into account some of the important issues, mainly:

Targeting time horizon design: A time horizon is defined by the longevity of the time period in which to reach previously announced targeting and the period over which it can be controlled.
Also, when there is a difference between the current rate and the target rate, central banks should set an implementation period of about two years, which includes delays (time lags) for monetary policy in achieving the target rate. The target time horizon is influenced by the ability of monetary policy to facing aggregate demand or supply shocks short-term and on the type of inflation targeting system applied by the central bank is rigid or flexible[6].

The choice of price index : The choice of price index used to calculate the target inflation rate differs from one country to another due to the difference in approaches in its across countries. The consumer price index CPI is considered as the most index used in measuring the rate of inflation instead of the GDP deflator, as it is known to the public that is easy to understand and does not need to a greater degree of review or adjustment, in addition to that it reflects the equilibrium between the indicators of the demand and the total supply in the economic activity, and does not allow to take into account the quantitative changes and adjustments in the spending structure.

Determining the level of targeting: Determining the quantitative target for target inflation is an important feature of the inflation targeting policy. In practice, several countries have set their inflation target rates as low single numbers, while in theory **Zero Inflation** appears to be a counterpart to price stability as ULTIMA THULE assumes as a normal case of capitalist economy[2]. While **Stanley Fischer.(1996)** believes that there are relatively few studies on the optimal goal, which ranges between 1-3%. **DEBLLE.(1997)** [7] states that it generally set inflation targets at around 2% annually in many countries.

Choosing between a target rate or range for inflation: focuses on whether the inflation targeting system uses a point or range, as both strategies reflect differences in policymakers' preferences, although the use of a point target reflects a strong and rigorous commitment by policymakers to target inflation but it is necessary for the central bank to communicate with the public to make them understand the inherent uncertainties in the inflation process and the ability to reach the goal, that is, it exposes monetary policy to the risks of uncertainties, which results in losing the goal and excessively reducing the flexibility of monetary policy[8], it is also difficult to assess the performance of the central bank in the short term and thus reduce the credibility reward for the inflation target[9], to avoid this problem, some banks have come up with a target range strategy - also known as a tolerance interval - as the range is able to point realistically what the central bank can expect to achieve through inflation expectations, allowing central banks to keep their goals intact for longer periods than they are on it with the target point, the range allows increases and decreases, this making it able to achieve stability in the medium term[3]. Although the very narrow range reflects the authorities' commitment to the goal, this type of choice exposes monetary policy to the risks of uncertainty and loss of credibility, it is difficult to respect a narrow range due to economic shocks and expected errors, and the wider the scope, the less credibility, so the ideal solution that provides arbitration effective between the credibility and flexibility of monetary policy is the adoption of practices of central banks in industrialized countries such as New Zealand, England, Sweden, and in most cases reached between 0-3% or 2-4%. We find that emerging market

economies have broader ranges because they are less appropriate in reducing the risk of a breach or errors owed in the modeling of inflation and the transition mechanism from developed countries and compared to developed economies they face difficulties in determining and measuring equilibrium rates in the future because they are growing rapidly and this uncertainty means that their policies will be exposed to more errors than the mistakes of advanced economies, and therefore monetary policy makers in emerging market economies prefer monetary policy rules with monetary aggregates.[10]

Communication: One of the primary characteristics of inflation targeting is ensuring a high level of transparency. This characteristic depends on the fact that policy makers must explain to the public the approaches, objectives, plans, and commitments in monetary policy. Goals and strategies are often set by a group of decision makers, the task of this group is to discuss and advise all members on monetary policy goals. Due to the transparency restrictions that the inflation targeting policy requires, this group is obliged to issue a press release where it will have to report all inflation targeting points: monetary policy goal, goal level, horizon, instruments and their actions, then this statement is signed by the central bank governor and perhaps by a minister Finance, this document is characterized by simplicity, brevity and clarity to facilitate its understanding by the public as it plays an important role in increasing the credibility and transparency of monetary policy[11].

I.3. The possibility of implementing an inflation targeting policy in Algeria: Some main conditions emerge from the definition of a targeting policy that clearly focuses on a target rate or target range of inflation through the announcement of the monetary authority, the government, or both, and / or another staff, about a numerical goal or a specific range of the inflation rate in a a certain time in the future, which is what the Governor of the Central Bank stated more than once through reports, as it was set at 4%[12], as for the second condition, it is the institutional commitment that price stability is the primary goal of monetary policy in the long term, as the monetary and loan law decided that price stability is the main goal of monetary policy through Order No. 10-04 issued on August 26, 2010[13].The presence of a comprehensive media strategy that contains many variables that are used in defining policy tools (as stipulated in Article 106 of Law 90-10), increasing transparency in the monetary policy strategy by communicating with the public, markets through plans, goals, and decisions issued by monetary authorities , increasing the accountability of the central bank to achieve the inflation goals, and finally, the central bank relied on a forward-looking method to estimate the target inflation rate. As for the preliminary conditions (preconditions), they are available (The independence of the central bank[4], the existence of one goal, the existence of a stable relationship between monetary policy instruments and the rate of inflation[14]).

II– Methodology:

We use the following variables for our study: Inflation (inf=$100*\ln(\frac{CPI_T}{CPI_{T-1}})$), Money supply (M2), real gross domestic product (GDP=$100*\ln(\frac{GDP_T}{GDP_{T-1}})$)), deposit interest rate (DEP), rediscount rate (TR), and nominal exchange rate (TC) and data are annual during period 1970 to 2018 obtained from The World Bank website. The recents studies have shown in many countries that the rise in the mass monetary is considered one of the most important sources of high domestic prices, the gross output is one of the real factors that affect inflation. As for re-discount rate, it positively affects inflation, The increase of interest deposits rates mean reducing inflation these two factors are considered among the monetary factors. The depreciation of the local currency lead to decrease the inflation[15].

II.1. The Bound test or cointegration test approach of Pesaran & al.(2001):
        when we have series with mix or same integration (I(0) or I(1), all I(1), all I(0)), we can use the cointegration test of **Pesaran & al.(2001)** [5]called "bound cointegration test" or "bounds test", originally developed by **Pesaran and Shin.(1999)**. If we use the Pesaran cointegration test to

verify the existence of one or more cointegration relationships between the variables in an ARDL model, we will say that we use the "ARDL approach to cointegrating" approach.
The model can be written as follows:

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** It can be applied according on the new research

$$\Delta inf_t = \alpha_0 + \beta_1 {}^* inf_{t-1} + \beta_2 {}^* m2_{t-1} + \beta_3 {}^* tr_{t-1} + \beta_4 {}^* tc_{t-1} + \beta_5 {}^* dep_{t-1} + \beta_6 {}^* gdp_{t-1} +$$

$$\sum_{i=1}^{n} \gamma_i \Delta(inf)_{t-i} + \sum_{j=1}^{m} \delta_j \Delta(m2)_{t-j} + \sum_{p=1}^{v} \varphi_p \Delta(dep)_{t-p} + \sum_{q=1}^{h} \delta_q \Delta(tc)_{t-q} +$$

$$\sum_{u=1}^{k} \varnothing_u \Delta(gdp)_{t-u} + \varepsilon_t \quad \dots\dots\dots(1)$$

       We can write the equation (1) as follow :

$$\Delta inf_t = \alpha_0 + \theta {}^* u_{t-1} + \sum_{i=1}^{n} \gamma_i \Delta(inf)_{t-i} + \sum_{j=1}^{m} \delta_j \Delta(m2)_{t-j} + \sum_{p=1}^{v} \varphi_p \Delta(dep)_{t-p} + \sum_{q=1}^{h} \delta_q \Delta(tc)_{t-q} +$$

$$\sum_{u=1}^{k} \varnothing_u \Delta(gdp)_{t-u} + \varepsilon_t \quad \dots\dots\dots(2)$$

Where " θ " is the error correction term, or adjustment coefficient.
Based on the equation (2), after estimation, we will conclude that there is a cointegration relationship between the dependent variable and explanatory variables if and only if the estimated θ is negativ and significant.

II.2. Toda-Yamamoto's approach:

These two authors proposed an approach to detect if there is causality between the variables although the series are integrated in order different. The Granger causality test procedure proposed by **Toda and Yamamoto.(1995)** [6] is as follows:
1) Find the order of maximum integration of the series denote "d_{max}"
2) Determine the optimal lag (lag length criteria) denote "k"
3) we then estimate a $(k + d_{max})$ th-order VAR .
We can write our model as follow:

$$inf_t = \alpha_0 + \sum_{i=1}^{k} \alpha_{11i}(inf)_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_{21j}(inf)_{t-j} + \sum_{i=1}^{k} \alpha_{12i}(m2)_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_{22j}(m2)_{t-j} +$$

$$\sum_{i=1}^{k} \alpha_{13i}(dep)_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_{23j}(dep)_{t-j} + \sum_{i=1}^{k} \alpha_{14i}(tc)_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_{24j}(dep)_{t-j} + \sum_{i=1}^{k} \alpha_{15i}(gdp)_{t-i} + \sum_{j=k+1}^{k+dmax} \alpha_{25j}(gdp)_{t-j} + \varepsilon_t \quad \dots\dots\dots(3)$$

The causality test on such an augmented or voluntarily over-parametered VAR will consist in testing restrictions on the first "k" coefficients, the other parameters being zero (they reflect a probable cointegration between series in the VAR). Thus, in the sense of **Toda and Yamamoto**, the test hypotheses are (the test is based on the Wald test with χ^2 distribution, the degree of freedom is the number of restrictions):
H_0: $\alpha_{12i} = \alpha_{13i} = \alpha_{14i} = \alpha_{15i} = 0$ that is mean the explanatory variables not cause (inf)
If $(\chi^2_c < \chi^2_t)$ we cannot reject the null hypothesis.

III- Results and discussion:

       We try first to study the stationarity of the series and the lag optimal then we apply the 2 approches.

       a) Unit root test and Lag legth creteria:
By studying the stationarity of each series and according to ADF and PP tests, and by using EVIEWS 10, we found that all series are stationary in first order except the GDP which is stationary in the level.
We estimate the equation (2) to choose the optimal lags of the model, Table (1) show that the appropriate lags is 1 according to the HQ, SC, FPE (which has the lowest value) while LR and AIC indicates 4 (we took a value of 1 according to **Pesaran & al.(2001)** and because the data is annual).

b) Bounds Test Results:
we estimate The ARDL-UECM from equation (1) using one lag period for all variables, and in order to test the extent of a long-term equilibrium relationship (co-integration) between inflation and monetary policy instruments, the F-Statistic and t-Statistic were calculated by the bounds test.

from Table (2) we can that the F statistic has reached the value of 5,35 which is greater than the critical value of the upper (4.21) and the lowest Bound (2,82) at the level of significance of 1%, so we cannot accept the null hypothesis (H0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$) that means the existence of a cointegration relationship among the study variables i.e. the presence of a long-term equilibrium relationship going from the explanatory variables towards the dependent variable and to make sure that this relationship exists we used a t-test (H0: $\beta_1 = 0$) we find that the calculated value is -6,01 which it exceeds the tabulate value -4,44 (taken in absolute value) at the level of significance of 1%.

c) The short and long term parameters and the error correction term:
After confirming the existence of a long-term relationship according to the methodology of Bounds test, it is now necessary to obtain the short and long term parameters and the error correction term.

Through table (3), we note that there is a positive non significant relationship (which corresponds to economic theory) between money supply and inflation, whether in the short or long term, probable is due to the country's abandonment of traditional financing which is represented in the money issuance. Concerning the non-significance of the nominal exchange rate and the interest deposit rates in the short and long term, it may be because the monetary authorities reduce the use of these two channels as a instruments of monetary policy.

The positive sign (at 1% level) indicates that parameter of the real output in the short and long term is mainly due to the high demand for foreign commodities, especially raw materials or intermediate goods, that led to higher costs for many sectors, which pushed the general level of prices and therefore in Inflation to rise. as the output increase (we took it with the logarithm) in one unit leads to an increase in inflation of about 40 percent and 0,0003 percent in the short and long term, respectively, ceteris paribus. The positive sign of the discount rate (at 3%) is the opposite of the expected (despite its stability), it is possible due to the central bank's reliance on this instrument to influence commercial banks in order to provide liquid sources of these banks by discunting the Money bills at the central bank.

We can also obtain long-term impact factors by dividing the short-term parameters by the error correction term, for example: With regard to the exchange rate for the long-term we divide 0.92 by 0.53 we get 1.73 and it can also be noted that the long-term parameters measure the direct and indirect impact while Short-term parameters measure the direct impact.

We find that the value of the error correction term is negative and significant, it takes the value -0.53 With a significant less than 1%, this means that 53% of short-term errors can be corrected at unit of time (approximately two years 1 / 0.53 = 1.18) In order to return to the long-term equilibrium.

d) the Evaluation econometric of the estimated model:
To ensure the quality of the model used in measurement we try to apply the following diagnostic tests:

1. Breusch Godfrey Serial Correlation Test:
It is noted from the table (4) that the value of F has reached the value of 0.39 with a probability value of 0.68 greater than the level of significance 5% and therefore we cannot reject the null hypothesis which says that there is no linear correlation of errors (the same thing is revealed by a chi square test).

2. Heteroskedasticity Test: ARCH:
According the table (5) the value of F has reached the value of 0.05 with a probability value of 0.82 greater than the level of significance 5% and therefore we cannot reject the null hypothesis which says that there is variance of errors is Homoscedastic (the same thing is revealed by a chi square test).

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ARED

3. Error normality test (Jarcque Bera):
In the figure (1), we find that the probability value of JARCQUE BERA is 0.69 greater than the level of significance of 5% and therefore we cannot reject the null hypothesis that the errors follow Normal distribution, as shown by the value of the Kurtusis coefficient (close to 3) and the Skewnes coefficient (close to 0).

4. Test Ramsey-RESEST:
It is clear from Table (6) that the value of F reached the value of 1.50 with a probability value of 0.23 greater than the 5% level of significance and therefore we cannot reject the null hypothesis that the model is valid.

e) Structural Stability Test Results for the Parameters of the Model (ARDL-UECM):
After estimating the error correction formula for the ARDL-UECM model, it is necessary to perform a structural stability test for long and short term parameters to ensure that the data used are free of any structural changes through CUSUM TEST.
Through the figure (2), at the 5% level of significance, and with the help of CUSUM TEST, we found that its statistics fall within the critical limits (confidence interval), which means that the model is generally stable, as it does not suffer from the problem of correlation of errors or Heteroscasticity during the period of study.

f) The Toda & Yamamoto Approch:
after estimating the equation (3) we get the fllowing results.
In contrast to the Bounds Test Approch the Table (4) show that only Exchange rates and deposits interest rates cause Inflation but Generally (see the prb of all) there is a causality.

IV- Conclusion:

After the failure of the prevailing monetary systems in the seventies and eighties of the last century in combating inflation and maintaining price stability in the long run, many economists as well as central bankers led to the search for a solution that enables them to achieve the goal and concluded to anchor the inflation, from here arose the idea of the inflation targeting, which was applied for the first time in New Zealand in February 1990, which had a wide resonance in a short period, especially in the economies of developing countries, which encouraged Algeria to adopt this system after many banking reforms have been addressed. Within this perspective, the study aimed to research the relationship between monetary policy instruments and inflation by applying the two approaches that has its ability to deal with time series even if their degree of integration varies, which was developed (PESARAN, SHIN, & SMITH.(2001), Toda& Yamamoto.(1995)), the results:
Algeria adopts an inflation targeting system after conducting several banking reforms, as the Central Bank stated that price stability is the ultimate goal of monetary policy by issuing Order No. 10-04 of August 26, 2010 which states: "The Bank of Algeria's assignment is to ensure price stability as the ultimate goal of monetary policy, and to provide and maintain the best conditions in the fields of money, loan and exchange for supportive growth of the economy while ensuring monetary and financial stability."
The results of the econometric analysis proved the stationarity of all the variables in the first differences (except the Output), using the unit root tests, Philips Peron and the advanced Dicky Fuller (ADF, PP), hence we applied the ARDL approch in estimating the relationship between the variables in the short and long term. by using the lag length criteria we found that most of the criteria refer to one optimal as optimal lag. The results showed a relationship (cointegration) in the long term, it is directed from the explanatory variables towards the dependent variable, which was revealed through the statistic of F-Bounds Test. Also, the error correction term with a negative and significant sign, with value of -0.53 that is 53% of the short-term errors can be corrected in 2 years in order to refer to the long-term equilibrium , we have approved that through the t-bounds test statistics. Concernant Toda&Yamamto Approch we found that there is general causality between the dependent variable and explanatory variable especially with Exchange rates and deposits interest rates.

We have also confirmed that the model is free from the econometric problems as autocorrelation, Heteroscedasticity of the errors, also according Ramsey reset test the model is adequate ,CUSUM test showed that the model is stable .
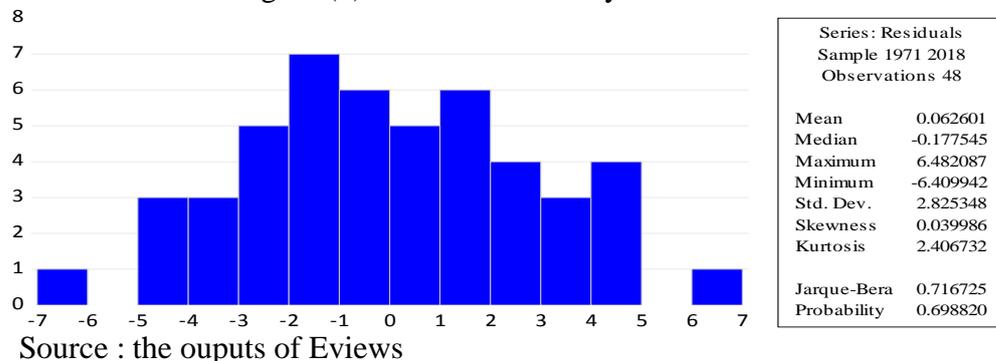
- Appendices:
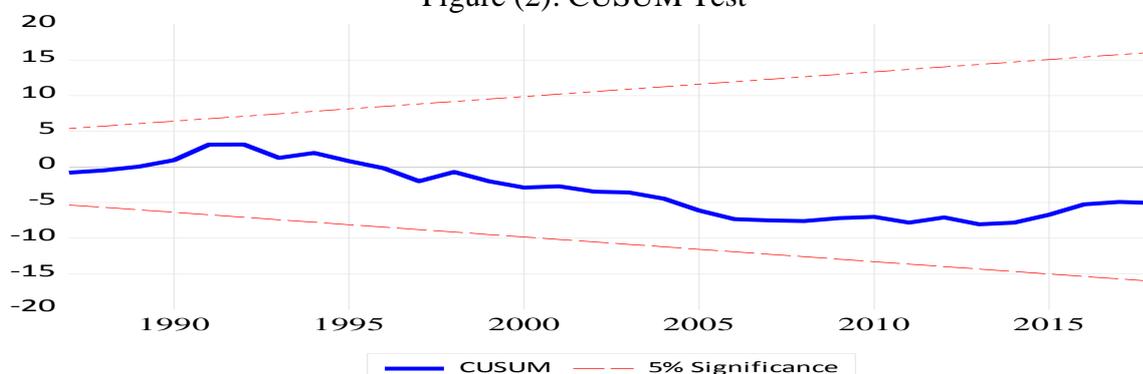
Figure (1): Heteroskedasticity Test ARCH

Source : the ouputs of Eviews

Figure (2): CUSUM Test

Source : the ouputs of Eviews

Table (1): lag length Criteria:

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1426.155	NA	1.77e+20	63.65	63.89	63.74
1	-1124.949	508.70	1.37e+15*	51.86	53.55*	52.49*
2	-1096.821	40.01	2.12e+15	52.21	55.35	53.38
3	-1064.293	37.59	3.13e+15	52.37	56.95	54.07
4	-1000.146	57.02*	1.49e+15	51.12*	57.14	53.36

Source : the ouputs of Eviews

Table (2): Results of the cointegration test according to the bounds test:

Sig	1%		5%		10%	
Bounds	Bound I(0)	Bound I(1)	Bound I(0)	Bound I(1)	Bound I(0)	Bound I(1)
F-Bound Test						
Tabulate values	2.82	4.21	2.14	3.34	1.81	2.93
Calculate values	5.355555					
t-Bound Test						
Tabulate values	-2.58	-4.44	-1.95	-3.83	-1.62	-3.49

Calculate values	-6.012487

Source : the ouputs of Eviews

Table (3):The estimators of court and long terms and Error correction term:

Variables	Long run	Sig	Short run	Sig
M2	1.97E-07	0.47	3.70E-07	0.4008
TC	-0.042576	0.2261	-0.079996	0.1393
TR	0.918569	0.0299	1.725916	0.0161
DEP	-0.545371	0.2260	-1.024707	0.2217
GDP	0.399380	0.0002	3.48E-06	0.0002
ECT(-1)	-0.532221 (0.00000)			

Source : the ouputs of Eviews

Table (4): Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.395926	Prob. F(2,38)	0.6758
Obs*R-quared	0.979817	Prob. Chi-Square(2)	0.6127

Source : the ouputs of Eviews

Table (5): Heteroskedasticity Test ARCH

F-statistic	0.051677	Prob. F(1,45)	0.8212
Obs*R-quared	0.053912	Prob. Chi-Square(1)	0.8164

Source : the ouputs of Eviews

Table (6): Ramsey-RESEST Test

Ramsey-RESEST Test			
Test	Value	DF	Probability
t-statistic	1.226510	39	0.2274
F-statistic	1.504327	(1, 39)	0.2274

Source : the ouputs of Eviews

Table (7):The estimators of T&Y approch:

Dependent variable: INF			
Excluded	Chi-sq	df	Prob.
M2	1.208204	2	0.5466
TC	4.444084	2	0.1084

TR	15.00905	2	0.0006
DEP	8.586678	2	0.0137
GDP	3.725934	2	0.1552
All	28.08140	10	0.0018

Source : the ouputs of Eviews

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