The impact of imported inflation on domestic inflation in Algeria : An ARDL Testing Approach(1990-2019)

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Abstract: Inflation moves between the capitalist countries through the international business cycle. Therefore, it is exported from the capitalist countries group to the one of developing countries through the international trade movement and the mechanisms of economic integration among the advanced industrial countries, as well as mechanisms of international transfer and international prices. In fact, the capitalist countries dominate about 75% of world trade and exports inflation to developing countries with which it deals. The present study found out that there was about 22. 7% of domestic inflation which is inherent to exported inflation in Algeria. In addition, it occurred that there is a direct relationship between imported inflation and domestic inflation in the short and long term.

Keywords: inflation, domestic inflation, imported inflation, inflation channels, ARDL model…

JEL Classification Codes: E30, E31, E50,E51, E52.

1.Introduction

Inflation is one of the topics still controversial in matters of its triggering factors as well as the appropriate policies to curb it. However, it is advisable to state that it is generally affected by internal and external factors that differ in their importance according to economy's nature and degree of its openness to the world. As so, if we assume that a country is closed from the world, its inflation would be only induced by interactions

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between local factors and policies. Besides, if we conceive that a country is importing its whole needs from the outside world and thus focusing its spendings only on imports, the inflation in import prices would be reflected in the level of local prices index. In addition, by excluding the existence of a continuous increase in tariffs or by local monopolies, domestic inflation is resulted from external factors. Therefore, we conclude from the tenor of these two visions that it is theoretically possible to measure the role of factors and the rate of inflation resulted from the countries with which it economically deals.

1.1. The problematic of the study

According to the aforesaid elements, the main problematic of this study can be formulated as follows:

What is the level of the imported inflation impact on domestic inflation in Algeria?

1.2. The study objectives:

The present study aims to:

✓ Show the extent of the impact between the Algeria's economy and the world prices rise, by focusing on the imported inflation and the domestic one.

✓ Highlight the most important factors contributing to supply the inflationary pressures in Algeria.

✓ Study both the theoretical and practical sides of the present topic.

1.3. Previous studies

As for the previous studies, we mention the following:

-The first study is a paper submitted during the seventeenth annual meeting of the Saudi Economic Association organized, in 2009, by Hassan bin Rafdan Al-Hahjuj, when the method of co integration has been used, and it has been concluded that inflation in these countries was related - in the long and short term - to the level of money supply and global inflation rates through the flow of imports as well as oil prices. The results of this study have also mentioned the impact of each of the previous factors on the inflation severity as well as the extent of the inflation level response to

change in economic factors, through analysing   variance and response functions.

-The second study is that of Hussein El Omr about the determinants of inflation in the State of Kuwait. Within this framework, the researcher opts for three possible variables to impact on local inflation rates and its behaviour, i.e. the import prices index to represent the external factor, local money supply and GDP with fixed prices to reflect the internal factor. A long-term relationship between inflation rates and money liquidity has been found out, as well as a lack of this relationship regarding the other variables.

-The third study: The one of Henri Mercillon, entitled « external dominants and their economical development», economical magazine, 1958, who has pointed out that imported inflation was transmitted through two channels, i.e. the spending channel and the income one, by mentioning that the imported inflation treatment could be carried out through the sterilization policy of the income channel and its impact on domestic monetary developments, as well as the import substitution policy of the spending channel.

2. What is imported inflation?

In the present study, we try to explain an important factor causing domestic inflation, i.e. imported inflation, by giving a definition of imported inflation and trying to correlate the national economy to the global one.

2.1. Definition of imported inflation.

Everyone considers that the United States of America has played the most prominent and important role in creating and internationally transmitting global inflation, by using the financial and monetary abilities provided by the international monetary system to the US dollar since the end of World War II, with the accumulation of dollars in central banks in the majority of capitalist countries.

Imported inflation is one of the most important sources of external inflation and is often considered to be one of the main reasons of high domestic production costs in third world countries. The International

interest in global inflation appeared at the end of the last century, during which imported inflation has been considered as a source of inflation in underdeveloped countries.

Imported inflation is the increase in the level of domestic prices resulting from an increase of world prices of goods, services and materials imported from the global market, whether they are intermediate or final goods, raw, manufactured or services materials. In simple words, imported inflation reflects the extent of the international prices impact and external factors on the general level for domestic prices. (jcurwen, 1976, p. 78)

Inflation starts to appear as a new political phenomenon through the nature of international transactions, as it has become a new systematic and planned tool to transfer inflation from advanced industrial countries to developing ones, adding a new inflation to the inflationary pressures of local origin. (Mahmoud, 1982, p. 40)

Industrialized countries have responded by compensating for their loss in terms of trade by exporting manufactured goods (consumer, intermediate, and investment) necessary to develop countries at inflationary prices. Thus, imported inflation became managed by developed countries.

2.2. Channels of imported inflation transmission

Generally, imported inflation is transmitted through several channels, which we outline as follows:

2.2.1. Commodity Channel

Is one of the most important mechanisms to transmit inflation due to the import rate in developing countries. Imported goods and services have taken a primary role in the structure of the prices of goods and services traded in local markets.

The increase of imports to the output will lead to a very important impact on the level of local prices. Usually, Imported goods consist of food commodities and intermediate goods, necessary for the production process, as well as raw materials, industrial materials and consumables. These goods and materials take part of the economic session and play various roles in influencing the final product, which would be more dangerous to the national economy than if these imports were additional.

However, if the imported goods are considered as investment ones, such as spare parts required to compensate for depreciation, the high prices of this type of imports will lead to an increase in the value of consumption allowances and therefore a reduction of the available economic surplus. (Zaki, 1986, p. 183)

2.2.2. The monetary channel

The linked exchange rate has allowed to keep a low average of inflation for the economic policy practitioners from ancient times, as fixed exchange rates do provide a high level of commitment and rigour concerning monetary and financial policies. In light of the principle stating that the linked exchange rate is credible in terms of policy commitment to maintain a link rate, we say that it is ready to preserve the value of the local currency, which reduces the inflationary effects in order to expand in the money supply.

In a study carried out by the International Monetary Fund (Ghosh, 1996 , p. 04), by taking a set of samples (The whole countries of the world, industrialized countries, low and middle income countries), it has been concluded that the countries following a stable exchange rate systems have registered an inflation rates of 8% and 14% for intermediate systems, as well as 16% in terms of free exchange rate systems. The relationship between exchange rate regimes and inflation can be justified by two important factors according to the study results, which are:

Assiduity: Countries adopting linked exchange rate systems have low rates of money supply growth, with a large cost when abandoning the currency linked system. Money supply growth rates, in case of link, have been annually estimated at 17%, compared to 30 % for free systems, regardless the level of incomes in these countries.

In addition, the demand for money (because of reserve) will reduce inflation rates, in countries adopting linked exchange rate systems, as it enhances confidence in both of the currency value and its stability. Therefore, the cash turnover ratio will reduce with a significant decrease in domestic interest rates in light of the absolute concept of economic policy

credibility. For example, in the previous study, interest rates under linked systems have been estimated at 2.0%, 8.1% in intermediary systems, and 3.2% in free systems of exchange rates.

3. indicators of the imported inflation transmission

In this context, we will try to highlight the most important indicators or measures enabling us to distinguish between an open economy and a closed one, as well as to which extent this economy is exposed to the inflation imported from abroad.

3.1. International trade ratio

This ratio reflects the extent of openness of the country's economy to the global one, thus determines the impact of foreign economic policies on the local economy, as well as the ability of the concerned country to draw economic policies that are somewhat independent of external developments. The proportion of trade is to be measured as follows:

Trade ratio $= \dfrac{M + X}{Y} = T$.

Whereas, when the percentage is high, the impact of the rise, in import prices, on domestic prices increases, and the economy sensitivity to import inflation will also increase.

According to the table below, we point out that the degree of commercial openness of the Algerian economy – which highlights the importance of foreign trade and the average of transactions with the outside world - confirms a large state of openness in general, leading to negative repercussions in the economic situation and its developments as it makes the Algerian economy very sensitive to both fluctuations and international crises, as well as vulnerable to policies inherent to these fluctuations concerning the commodity or monetary side.

The increase in the level of foreign trade ratio, during the period under study, indicates that the economic autonomy process is a little bit weak and denotes the importance of imports in fixing the level of domestic prices, thus the Algerian economy becomes weak in front of international fluctuations. Besides, the high degree of economic openness indicates the control of developed capitalist countries on world prices in order to obtain

raw materials from the underdeveloped countries and to redistribute the production surplus to these countries. Therefore, the small economies of the underdeveloped countries have been transformed to entities belonging to the big industrialized countries.

The economic openness rate, which has reached an average of 55.53%, indicates the difficulty of carrying out economic policies and impacts on their success, as this ratio reduces the effectiveness of financial policy when it is designed to correct the economic growth path and reduce internal and external economic fluctuations.

Table N°01 : Foreign trade ratio (degree of economic exposure) for the period. Unit: one million Algerian dinars.

Economic openess (5) = (4) / (3) * 100	External trade (4) = (1) + (2)	Gross domestic product (3)	Imports (2)	Exports (1)	State
59.50%	7 140 260	11 991 600	2892930	4247330	**2010**
59.80%	8 726 735	14 588 500	3418339	5308396	**2011**
58.90%	9 546 697	16 208 700	3998366	5548331	**2012**
57.10%	9 505 200	16 650 200	4360770	5144430	**2013**
55.80%	9 617 560	17 242 500	4799350	4818210	**2014**
52.50%	8 719 010	16 591 900	5263970	3455040	**2015**
49.5%	8620415	17406800	5411759	3208656	**2016**
49%	9270596	18906600	5434820	3835776	**2017**
60.4%	10276554	16999000	5403004	4873550	**2018**
52.8%	9182275	17376000	4951933	4230342	**2019**
55.53%					**Average**

Source : Made by researchers according to International Monetary Fund data

3.2. The import structure nature.

This indicator enables to know and determine the possibility of facing up and avoiding the effects of the rise of imports prices, by making pressure on imports and reducing their average. Therefore, if the largest part of imports is reflected by food commodities group to meet local consumption, and by the intermediate goods required for the rotation of the product wheel, the impact of high international prices on domestic prices will be

significant, unlike in case the import structure is characterized by the predominance of unnecessary imports such as luxury consumer goods. In the first case, it is difficult to make pressure on the average of imports to face up the international prices impact. However, it is possible – in the second case - to make pressure on the average of imports by minimizing them.

We also find out that capital goods have ranked first - on the average- by 80.41 percent, followed by consumer goods with 15.27 percent, then imports of raw materials and raw materials occupy the third position with an estimated rate of 2.74 percent, during the period from 2010 to 2019.

The high rates of importing capital goods can be interpreted by the deficit of economic development programs in the long term and the building of foundations and rules of capital industries, which increases the import of a significant proportion of consumer goods, leading therefore to the creation of inflationary pressures resulting from the necessity to import these goods and the increase of their prices in the international market .

Table No. (2): Commodity composition of imports in Algeria for the period. Unit: one million dinars.

Total of imports	Ratio %	Raw Materials	Ratio %	Capital Goods	Ratio %	Consumer Goods	Stateme-nt
38885000	3,43	1335000	81,94	31863000	14,63	5687000	**2010**
4719000	3,54	167000	81,86	3863000	14,60	689000	**2011**
5156000	3,34	172000	78,43	4044000	18,23	940000	**2012**
5499000	3,15	173000	77,71	4273000	19,15	1053000	**2013**
5967000	3,03	181000	80,39	4796600	16,58	989400	**2014**
5964000	2,48	148000	83,70	4991700	13,82	824300	**2015**
5194897	2.21	115229	82.35	4278011	15.43	801657	**2016**
5110705	1.13	109363	80.62	4120681	17.23	880661	**2017**
5403232	2.26	121615	79.24	4281729	18.50	999888	**2018**
5005302	2.8	140182	77.94	3901603	19.20	963514	**2019**
	2.74		80.41		15.27		**Average**

Source: Made by researchers according to algerian customs.

3.3. The ratio of imports to GDP.

The ratio of imports to GDP reflects the average of external economic activity directed to internal markets, it is expressed by the following relationship X / Y.

Henrichs has fixed an average of 20% to judge whether a country's economy is exposed (open) or closed to the outside world. He considered that the economy is open to the outside if imports reach more than 20 % of GDP and vice versa in case to find other results. (Mashal, 1986, pp. 168-175)

The relative importance of imports in the national economy is measured according to the ratio of imports to Gross Domestic Product. In fact, we calculated this ratio - shown in the table below -, and we noticed through this table that the ratio of imports to GDP has not decreased under 20% during the whole study years as the minimum value has been estimated at 26.9%.Within this framework, Henrichs considered that the economy is open to the outside world if the percentage exceeds to 20 percent of the Gross Domestic Product. In general, we say that the Algerian economy is open to the outside world according to Henrichs assumption, which fact makes the national economy vulnerable to external shocks, especially inflation leakage from outside.

The indication, that the importation marginal propensity reflects in some years, consists of the imports growth at a value exceeding to the national product growth rate, which is in fact reflected in the deficit payment balance, by weakening the internal financial and monetary policy when to influence the level of economic activity, because the marginal propensity rise of imports reduces the government spending and money multipliers (the amount of change in national income as a result of the change in the money amount).

Table No. (3): Evolution of the imports ratio to GDP, average and marginal propensity of imports for the period.

Marginal propensity of importe	Imports rate to global result %	Statement
0.13	23.90%	**2010**
0.39	25.70%	**2011**
0.18	24.13%	**2012**
0.01	21.65%	**2013**
0.45	24.72%	**2014**
0.50	28.71%	**2015**
0.18	31.08%	**2016**

0.01	28.74%	**2017**
0.02	31.78%	**2018**
-1.2	28.5%	**2019**
0.067	26.9%	**Average**

Source: Made by researchers according to the International Monetary Fund data.

4. Measuring imported inflation

Imported inflation is measured according to the following relationship:

Imported inflation = value of imports / GDP x rate of imported inflation.

We note - through the present equation- that imported inflation depends on the ratio of imports to GDP, so if this ratio increases, the rate of imported inflation increases too. Besides, imported inflation depends also on the ratio of world inflation, as when the global inflation rate increases, the imported inflation increases too. The table below shows the rates of imported inflation and its percentage from local inflation.

The contribution of the ratio of import prices to GDP does not mean excluding the global inflation contribution, but rather the participation of the imports ratio in GDP more than in the world inflation.

As for the percentage of the contribution of imported inflation to local inflation, it has contributed in varying proportions, but has been on the average estimated at 22.30% of inflation during the study period (2010-2019).

Table No. (4): Measuring imported inflation and the percentage of its contribution to domestic inflation. Unit: one million Algerian dinars.

The contribution of imported Inflation to the domestic one % (5) = (3) / (4)	Domestic Inflation % (4)	Imported inflation % (3) = (1) x (2)	The average of the world inflation % 2	Imports rate to domestic product (1)	Stateme-nt
30.06	3.91	1.20	5.05	23.90	**2010**
23.00	4.52	1.04	4.07	25.70	**2011**
09.90	8.89	0.88	3.65	24.13	**2012**
18.40	3.26	0.60	3.22	21.65	**2013**
23.36	2.91	0.68	2.78	24.72	**2014**
17.36	4.78	0.83	2.90	28.71	**2015**
13.00	6.39	0.83	2.7	31.08	**2016**
15.42	5.90	0.91	3.2	28.74	**2017**
26.51	4.30	1.14	3.6	31.78	**2018**

50.00	2.00	1.00	3.5	28.5	**2019**
22.7					**Average**

Source: Made by researchers according to the International Monetary Fund data.

5. The standard study of the impact of imported inflation on domestic inflation in Algeria1990-2019.

5.1. Model design: The dependent variable can be expressed in terms of the independent variable as follows:

$$\text{inf} = f(\text{iminf}, \text{ex}, \text{m2}, \text{u})$$

5.2. Defining the mathematical form of the model: the general form between the dependent variable: domestic inflation and the independent variable: imported inflation, as the general form of the proposed model becomes:

$$\text{lninf}_i = \alpha_0 + \alpha_2 \text{lnminf}_{1i} + \alpha_2 \text{lnex}_{2i} + \alpha_3 \text{lnm2}_{3i} + \mu_i$$

As:

i: represents the number of observations and reflects the years 1990-2019.

lninf: Logarithm of the local inflation.

lniminf : Logarithm of the imported inflation.

lnex: Logarithm of the exchange rate.

LnM2: Logarithm of money supply

u_i: Random error.

Before assessing the model, it is necessary to study whether the aforesaid series are stable to avoid the occurrence of a Spurious Regression (Isabelle Cadoret, 2004, p. 319), as this term refers to a regression with good results according to the test (t, F), and R^2 value, but it neither gives a real meaning to the results, nor provides a meaningful economic explanation, i.e. Falling back on the OLS method gives spurious results in case of the series instability.

5.3. Studying the time series stationarity

To test the time series stationarity, related to the study model variables, in terms of mono root, we need a unit root test of Dickey ad Fuller (1979) (R.Bourbonnais, 2004, pp. 50-52), Augmented Dickey-Fuller

test and Flip-Byron (PP) test, as these tests prove the nature and characteristics of time series related to the variables under study. The following table shows the following:

Table No. (5): Unit Root Test results concerning the study variables

UNIT ROOT TEST TABLE (PP)					
At Level					
		LNEX	**LNIMINF**	**LNM2**	**LNINF**
With Constant	t-Statistic	-5.9378	-1.7994	-0.8640	-2.1835
	Prob.	*0.0000*	*0.3733*	*0.7851*	*0.2161*
		***	n0	n0	n0
With Constant & Trend	t-Statistic	-5.2949	-1.6969	-3.5854	-2.6526
	Prob.	*0.0010*	*0.7267*	*0.0489*	*0.2618*
		***	n0	**	n0
Without Constant & Trend	t-Statistic	1.4974	-2.2593	0.3649	-1.4836
	Prob.	*0.9635*	*0.0253*	*0.7834*	*0.1265*
		n0	**	n0	n0
At First Difference					
		d(LNEX)	**d(LNIMINF)**	**d(LNM2)**	**d(LNINF)**
With Constant	t-Statistic	-6.1399	-5.6624	-5.5158	-7.7454
	Prob.	*0.0000*	*0.0001*	*0.0001*	*0.0000*
		***	***	***	***
With Constant & Trend	t-Statistic	-5.9931	-5.7064	-5.4449	-7.7307
	Prob.	*0.0002*	*0.0004*	*0.0007*	*0.0000*
		***	***	***	***
Without Constant & Trend	t-Statistic	-5.7373	-5.6002	-5.1974	-7.8428
	Prob.	*0.0000*	*0.0000*	*0.0000*	*0.0000*
		***	***	***	***

UNIT ROOT TEST TABLE (ADF)					
At Level					
		LNEX	**LNIMINF**	**LNM2**	**LNINF**
With Constant	t-Statistic	-6.3235	-1.7833	-0.8640	-2.3481
	Prob.	*0.0000*	*0.3809*	*0.7851*	*0.1647*
		***	n0	n0	n0
With Constant & Trend	t-Statistic	-5.6540	-1.7506	-3.3170	-2.6267
	Prob.	*0.0004*	*0.7022*	*0.0834*	*0.2721*
		***	n0	*	n0
Without Constant & Trend	t-Statistic	2.2544	-1.4923	0.3636	-1.5605
	Prob.	*0.9926*	*0.1245*	*0.7831*	*0.1097*
		n0	n0	n0	n0

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		At First Difference			
		d(LNEX)	d(LNIMINF)	d(LNM2)	d(LNINF)
With Constant	t-Statistic	-6.1399	-5.6825	-5.1566	-7.7454
	Prob.	*0.0000*	*0.0001*	*0.0003*	*0.0000*
		***	***	***	***
With Constant & Trend	t-Statistic	-5.9931	-5.6480	-3.9645	-7.6309
	Prob.	*0.0002*	*0.0004*	*0.0228*	*0.0000*
		***	***	**	***
Without Constant & Trend	t-Statistic	-5.7373	-5.6002	-5.1450	-7.7797
	Prob.	*0.0000*	*0.0000*	*0.0000*	*0.0000*
		***	***	***	***
Notes: a: (*)Significant at the 10%; (**)Significant at the 5%; (***) Significant at the 1% and (no) Not Significant b: Lag Length based on SIC c: Probability based on MacKinnon (1996) one-sided p-values.					

Source: Made by researchers according to the outputs (E-views10).

✓ According to the table No. (5), it occurs that the study the exchange rate are stationary in the level, while imported inflation, domestic inflation and money supply are not stationary in the level, while the variables have reached the stage of stillness and stationarity at the significance level 1%, 5% and 10%, after taking the first difference. Consequently, we conclude that the time series are integrated at degree zero CI~(0) and first degree CI ~ (1), which has allowed us to carry out a co integration test by using ARDL model.

5.4. Defining the optimal time lag and co integration test

In light of the stationarity test, it became clear that each variable is integral in the first degree, i.e., it is not stationary at the level but at the first difference. To determine the presence or the lack of a co integration, we proceed to the following:

- Determining the optimal time lag

To determine the optimal time lag of the Unrestricted Equilibrium Correction Model, we use three criteria for choosing the time lag, these parameters are: (HQC), (SBC), (HQC), (AIC), (LogL), (LR), (FPE) so that we choose the time lag giving the lowest value to these criteria. The following table explains that:

Table No. (6): The results of the optimal time lag test

Lag	LogL	LR	FPE	AIC	SC	HQ
VAR Lag Order Selection Criteria						
Endogenous variables: LNINF LNIMINF LNEX LNM2						
Exogenous variables: C						
Date: 01/13/21 Time: 14:15						
Sample: 1990 2019						
Included observations: 28						
0	-41.86178	NA	0.000311	3.275842	3.466157	3.334023
1	**45.43424**	**143.4149***	**1.94e-06***	**-1.816732***	**-0.865157***	**-1.525826***
2	58.03326	17.09866	2.68e-06	-1.573804	0.139030	-1.050173
* indicates lag order selected by the criterion						
LR: sequential modified LR test statistic (each test at 5% level)						
FPE: Final prediction error						
AIC: Akaike information criterion						
SC: Schwarz information criterion						
HQ: Hannan-Quinn information criterion						

Source : Made by researchers according to the outputs (E- view 10)

According to the Table No. (6), we point out that the optimal time lag for the first difference variables is P = 1 according to the indicated criteria and it has been the best obtained model according to economic and statistical standards. The following figure shows this:

Figure 01 : The results of the best model according to akaike information criteria

Akaike Information Criteria
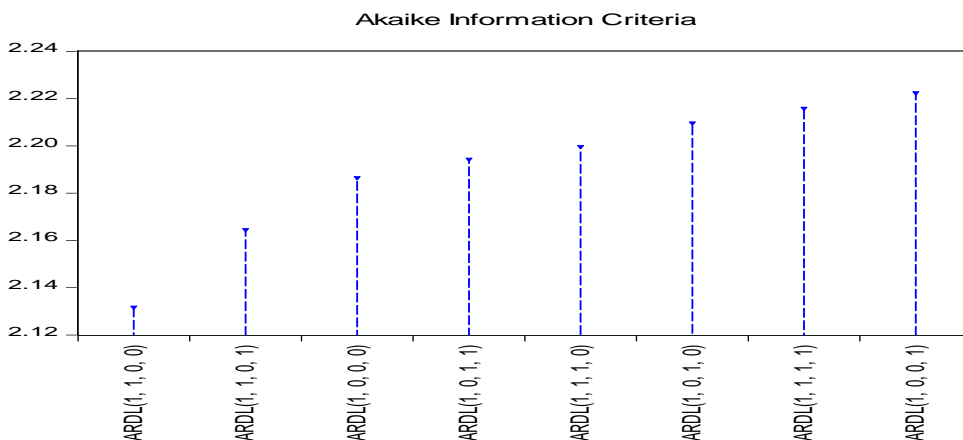
Source : Made by researchers according to the outputs (E – views.10)

According to the figure N°1, we observe that the optimal time lags according to the Akaike information Criteria for the model ARDL (p, q_1,q_2,q_3) is (1,1,0,0).

5.5. Co integration Test by using ARDL Method

Testing the extent of a long-term equilibrium relationship existence between domestic inflation on the one hand, and the independent variable on the other hand. The following table explains that:

Table No. (7): Results of the co integration test for the Autoregressive Distributed Lag Model (ARDL).

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	**I(0)**	**I(1)**
Asymptotic: n=1000				
F-statistic	**4.952520**	10%	**2.37**	**3.2**
K	3	5%	**2.79**	**3.67**
		2.5%	**3.15**	**4.08**
		1%	**3.65**	**4.66**

Source : Made by researchers according to the outputs (E- views10)

K denotes the number of independent variables.

According to the table No.(7), we observe that the calculated F-statistic value is more than the higher critical value at the significance level of 10%, 5%,2.5%,1%, which means that there is a co integration relationship between domestic inflation and the imported one.

5.6. Assessing the long-term and short-term model by using the ARDL model

As the results confirmed a co integration between the variables, we should estimate the long-term equilibrium relationship of this equation. The long-term and short-term model are estimated by using the model:

Table N° 08 : Results of assessing the short term model by using the ARDL model (1,1, 0,0) .

Conditional Error Correction Regression				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	-6.519836	4.272780	-1.525900	0.1407
LNINF(-1)*	-0.762740	0.174745	-4.364870	0.0002
LNIMINF(-1)	1.019260	0.462057	2.205919	0.0377
LNEX**	-0.142938	0.639530	-0.223505	0.8251
LNM2**	1.598450	0.606396	2.635986	0.0148
D(LNIMINF)	0.237164	0.498090	0.476146	0.6385
R-squared	0.521634	Mean dependent var		-0.073925
Adjusted R-squared	0.503917	S.D. dependent var		0.840482
S.E. of regression	0.591978	Akaike info criterion		1.855778

Sum squared resid	9.461828	Schwarz criterion		1.950074
Log likelihood	-24.90878	Hannan-Quinn criter.		1.885310
Durbin-Watson stat	2.272434			

Source : Made by researchers according to the outputs (E – views10)

Assessing the statistical and standard quality of the short-term model (correction model): The correction model tends to define the function in the short – term by considering the equilibrium state in the long term. In other words, the model assumes, in the long term, an equilibrium state of the function (defined by the variables form), that it is unbalanced in the short term, for adjusting it and measuring the speed of equilibrium return.

We conclude, through the assessment results of the estimated parameter values, the following:

• The ECMt-1 statistical parameter signal is negative, and it is statistically significant (at the level of 5%) because (P = 0.0002 <0.01), confirming a co integration between the two study variables, as the estimated value of the error correction coefficient, for the previous year, reached - 0.762, which also means that about 76.2% of the domestic inflation value deviation, in the previous years, from its equilibrium values in the long term is corrected in the current year, by requiring about (1 / 0.762 = 1.31), i.e. approximately 1.31 years to reach its balanced value in the long term.

• The imported inflation factor is positive, indicating a direct relationship between imported inflation and domestic one, as the value of this coefficient reached 1.01. This value indicates that imported inflation – with one unit - will rise the domestic inflation, by 1.01.

Table No. (8): Results of the assessment of a long-term model by using ARDL model (1,1,0,0).

ARDL Long Run Form and Bounds Test				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNIMINF	1.336314	0.530177	2.520504	0.0191
LNEX	-0.187401	0.844942	-0.221791	0.8264
LNM2	2.095668	0.887682	2.360832	0.0271
C	-8.547911	5.630195	-1.518226	0.1426

Source : Made by researchers according to the outputs (E-views, 9)

Assessing the long-term model: Through the Table No. (8), we notice the following:

- The parameter value, estimating the constant term, indicates that domestic inflation is at -8.54 when the independent variable values doesn't exist.

- There is a positive effect of the imported inflation on local inflation, indicating that when the imported inflation is higher with one unit, the increase of domestic inflation by 1.33 is occurred.

- There is a negative effect of the exchange rate on domestic inflation, and this indicates that whenever imported inflation increases by one unit, it will lead to a decrease of local inflation by 0.187.

- There is of a positive effect of money supply on domestic inflation. This indicates that whenever the money supply increases by one unit, it will lead to an increase in domestic inflation by 2.09.

5.7. Diagnosing the model

- Comparing between real values and estimated ones: Comparing between real values and estimated ones by using the model, through the following figure :

Figure No. (2): Real, estimated values and the model residuals
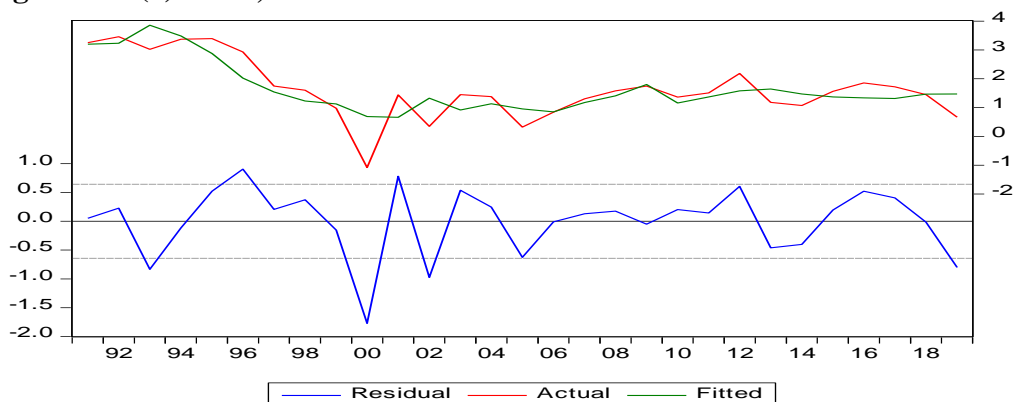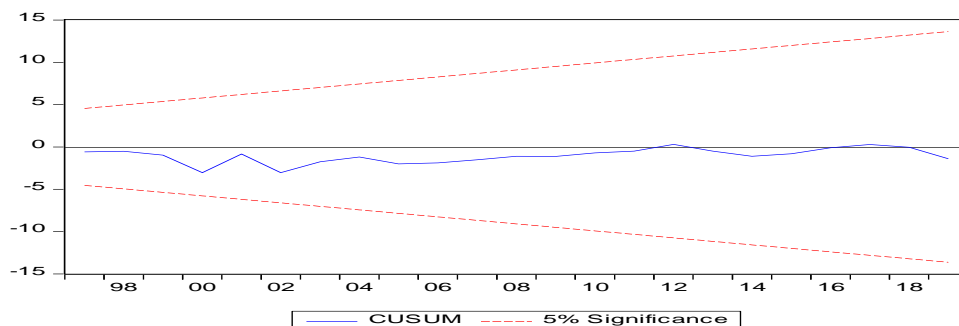

Sources : made by researchers according to the outputs (E- views. 9)

According to the Figure (2), it is observed that the estimated values converge with the real ones, indicating the estimated model quality. Therefore, we can rely on it to interpret and analyse the results.

- Model structural stationarity test: To test the model stationarity, two tests have been used: Cumulative Sum of Recursive Residual TEST and CUSUM OF SQUARES TEST, it then occurred that the model has been

characterized by stationarity in most study periods as the following figure shows:

Figure No. (3): Testing the model stability or stationarity

Source : Made by researchers according to the outputs (E – views. 9)
Conclusions and recommendations:

6. Results:

Within this scope, the imported inflation and its effect on local inflation in Algeria during the period (1990 -2019) has been highlighted. In line with the nature of the subject, a model has been built to measure the impact, by using modern standard techniques in analysing co integration and Autoregressive Distribution Lag Bounds Test (ARDL). The study has concluded a set of results which can be summed up as follows:

✓ Depending on the OLS method leads us to fake results in case of the series instability, as the assessment results are good in terms of test (t, F), and value, but it neither gives a real meaning to the results nor provides a meaningful economic explanation, thus we call that Spurious Regressions.

✓ The whole results of unit root tests showed that the study variables contained a unit root, i.e., that the study exchange rate are stationary in the level, while imported inflation, domestic inflation and money supply are not stationary in the level, while the variables have reached the stage of stillness and stationarity at the significance level 1%, 5% and 10%, after taking the first difference. Consequently, we conclude that the time series are integrated at degree zero CI~(0) and first degree CI ~ (1), which has allowed us to carry out a co integration test by using ARDL model;

✓ The Bound Test Approach, through F-statistic, t-statistic has indicated a co integration between imported inflation and domestic inflation. Therefore,

the model used is the ARDL model by which we define the short-term and long-term relationships between Model variables;

✓ The ECMt-1 statistical parameter signal is negative, and it is statistically significant (at the level of 5%) because (P = 0.0002 <0.01), confirming a co integration between the two study variables, as the estimated value of the error correction coefficient, for the previous year, reached - 0.762, which also means that about 76.2% of the domestic inflation value deviation, in the previous years, from its equilibrium values in the long term is corrected in the current year, by requiring about (1 / 0.762 = 1.31), i.e. approximately 1.31 years to reach its balanced value in the long term;

✓ The imported inflation factor is positive in the short term, indicating a direct relationship between imported inflation and domestic one, as the value of this coefficient reached 1.01. This value indicates that imported inflation – with one unit - will rise the domestic inflation, by 1.01;

✓ There is a positive effect of the imported inflation on local inflation is positive in the long term, indicating that when the imported inflation is higher with one unit, the increase of domestic inflation by 1.33 is occurred.

Recommendations

In light of the study results, we propose a set of recommendations, which are:

The necessity of limiting imports and opting for import substitution policy, as follows:

✓ The necessity of linking the imports with the necessities, rather than luxuries,

✓ Backing up and encouraging small and medium firms to exploit the available local resources.

✓ Increasing domestic production directed to the local market, by expanding the production base in a manner enhancing the country's abilities to reduce the volume of imports.

✓ Developing the local industry through modernizing manufacturing methods, using technology to increase production and reduce costs.

✓ Increasing the production efficiency of local industries and producing comparatively advantageous goods.

✓ Diversifying the sources of imports, changing their commodity composition and reducing their concentration in capitalist countries that have high inflation rates

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