

# The development of the main determinants of inflation in Algeria over the period 2002-2017.

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## الملخص

سعى البحث إلى تحليل المحددات الرئيسية للتضخم في الجزائر خلال الفترة 2002-2017، حيث وإلى جانب التضخم، ركز الباحث على ثلاث متغيرات رئيسية التي تؤثر على التضخم هي: الكتلة النقدية، الناتج المحلي الخام وكذا احتياطات الصرف الأجنبي المسيرة من قبل بنك الجزائر. وقد خلص البحث إلى أن تغيرات المتغير الأخير تعتبر من أكثر المحددات تأثيراً على قيمة التضخم المسجل في الجزائر، وذلك لأنه يؤثر بشكل كبير على قيمة الكتلة النقدية، كما يتأثر هو الآخر بمقدار الناتج المحلي الخام.

الكلمات المفتاحية: تضخم، كتلة نقدية، ناتج محلي خام، احتياطات الصرف الأجنبي

## Abstract

*This research tried to analyze the main determinants of inflation in Algeria over the period 2002-2017. Beside inflation, the researcher focused on three variables influencing inflation which are: money supply, global domestic product as well as foreign exchange reserve owned by the bank of Algeria. The research concluded that the volatility of the last variable has been among the most influencing determinant of inflation since it affects enormously the amount of inflation, and it is affected by the volume of global domestic product.*

**Key words:** *inflation, money supply, global domestic product, foreign exchange reserve.*

## **Introduction**

Inflation actually is a great challenge for all the countries of the world since it has a negative impact on the effectiveness of any economic policy. Also, it affects many economic factors which are at the same time the main determinants of inflation such as: global demand, import price, global domestic income, exchange rate, money supply, public expenditure ..., etc. Moreover, it occupies a very important place in the most influencing economic strategies adopted by any country owing to the fact that the best economic strategy, among them, should cut down as much as possible inflation rates to be efficient and helpful for the economy altogether. In addition, if the adopted strategy is not able to decrease the inflation rate, it may conduct the entire economy toward a worse situation in the future.

So, for the Algerian economy, the weak coordination between the amount of money supply and the value of global domestic product, recorded in the country since many years, has perhaps decreased the inflation rate despite the kind of monetary tools used by the bank of Algeria, including the new tools aiming to recuperate money supply and, subsequently, to cut down the excess liquidity available in the economy.

Currently, after the decrease of the oil prices in the international market and the decrease of the amount of national income, the monetary authorities in Algeria have increased the value of money supply. In fact, the bank of Algeria has given to the government more money in order to cover the deficit recorded in the public budget. This issue has a negative impact on the economy because it's a source of raising the value of inflation rates that can be recorded in the future, if the Algerian bank will not intervene to rebalance the situation between the amount of global domestic product and the value of money supply that exists in the economy.

This research aims to study the main determinants of inflation in Algeria by focusing on some variables such as: money supply, global domestic product and the foreign exchange reserve owned by the bank of Algeria. These variables are to be analysed by the researcher in order to determine their relationship with the inflation rate recorded every year of the period studied by the researcher here. As well, some recommendations are among the purpose of the research that should be given to the monetary authorities in order to adjust the value of the variables highlighted by this research and, as a result, to avoid as much as possible the wave of inflation that can be recorded in the future.

### 1.1-Problematic of the research

- This research actually tries to treat the following problematic:
- How have variables such as: money supply, global domestic product, and foreign exchange reserve affected inflation in Algeria during the period 2002-2017?

### 1.2-Importance of the research

The importance of the research is related to the current economic situation in Algeria which is highlighted by the decrease of oil income owned recently by the country, knowing that such decrease has supported the inflation. In fact, it is crucial to study the main determinants of inflation in Algeria in order to design the way of reducing the value of inflation rates that can be recorded in the future.

### 1.3-previous study

Many researches have been allocated to study the main determinants of inflation around the world. Among them are the following:

- **(MAURICE & JOHNNY, 2002):** This research tried to investigate the relationship between inflation, interest rate, and exchange rate for eight countries. The researcher used International Fisher Effect (IFE) as a test to investigate the direction of effect. Also, applying regression analysis to historical exchange rate and interest differentials was developed in a simplified statistical test of International Fisher Effect (IFE).the main results of the research illustrated that one of the limits of the theory, studied by the researchers, is related to the fact that exchange rate determination is not affected just only by inflation, but there are other psychological factors that have a crucial role in determining the likely future exchange rate.<sup>1</sup>
- **( BABALOLA & others, 2015):** This research aimed to investigate the impact of inflation and interest rate on economic growth. It aimed as well to identify whether the correlation measures to inflation and interest rate trend are sustainable in Nigeria over the period 1981-2014. The research focused on ordinary least square method to investigate the relationship between the variables of the research. Also, the research used time series analysis to examine the long run relationship between the variables and to determine the direction of causality and trend between those variables. The researchers concluded that inflation and interest rate has a negative effect on economic growth but neither inflation nor interest rate granger causes economic growth. The research pointed out that policy makers must go into achieving interest rate stability and maintaining inflation at a low rate in order to make them good enough for the economy.<sup>2</sup>
- **(BIKAI & others, 2016):** This research tried to investigate the reason of inflation in the countries of central Africa CEMAC with a particular importance given to money

supply. The researchers used VAR panel model for the previous countries during 1990-2014. The research found that a very strong trend of inflation exists owing to the structural problems, and particularly because the pattern of the economic agents' adjustment.<sup>3</sup>

- **(ENNEMRI, 2016):** The researcher tried to investigate inflation by focusing on the effectiveness of the bank of Algeria in managing the excess liquidity of money. The research used multiple regression analysis over the period 2001-2015. it pointed out that both local and foreign reserve available in the bank of Algeria are among the main determinants of inflation recorded in Algeria during the period studied by the researcher.<sup>4</sup>

- **(RABIUL & others, 2017):** This research has been established to highlight the determinants of factors affecting inflation in Malaysia. The researchers used a regression model to clarify the relationship that exists between inflation as a dependent variable and some independent variables which are: money supply, exchange rate, unemployment rate. The research suggested that in Malaysia all the economic factors should be oriented to achieve 02 % inflation rate that must be the targeted rate in the country.<sup>5</sup>

- **(BAKER, 2018):** This research highlight that the American federation bank must consider also the shelter component from the core inflation indexes it uses in assessing the situation of the economy. it pointed out that the gap between the inflation rate in shelter and the rest of the core indices was large and growing. It pointed out as well that when the shelter components are not taken into consideration, there is no evidence of any acceleration in the inflation rate during the last four years studied so far by the researcher.<sup>6</sup>

## 2- Method

### 2.1-Variable of the research:

This research focused on the upcoming variables:

- **M2:** Money supply is the main variable which is related to inflation since it's obvious, according to many economic theories, that the decrease of money supply in comparison with its required level affects inflation and conducts it into higher levels.

- **GDP:** This variable, representing global domestic product, is among the main determinants of inflation because any kind of disequilibrium between this variable and money supply affects the value of inflation rate and the efficient of the entire economy.

- **EXR:** This variable, illustrating the value of foreign exchange reserve owned by the Algerian central bank, is a very important variable since money supply can move according to the value of this variable, knowing that without the intervention of the bank

of Algeria to reduce the excess liquidity of money, if the amount of foreign exchange reserve decreases, the value of money supply decreases and causes inflation.

- **INF:** Obviously, inflation is a crucial topic in Algeria since the Algerian economy altogether is suffering a lot of the negative impact of this variable. For this reason, it's critical to study the relationship between this variable and its main determinants in order to take some measures aiming to reduce it.

### **2.2-Data of the research:**

The research based, in getting its data, on some reports published by the bank of Algeria through its website, which illustrates the development of the main economic indicators. These reports cover the targeted period studied by the research (2002-2017).

### **2.3-Tools of the research:**

The research actually is a descriptive analysis which focuses on the control concerning the development of the previous variables over the period targeted by the current research. This manner allows analysing the relationship between these variables and inflation and, as a result, getting some conclusions related to the impact of the same variables on the value of inflation rate.

### **3-Developments and analysis:**

Because the variables of this research have different impacts on inflation, it's significant to analyse the development of each variable in order to determine how inflation is affected in Algeria.

#### **3.1-The values of the variables of the research:**

The following table illustrates the value of the variables in question during the period 2002-2017 (in Billion AD):

Table 01: the value of the main targeted variables over the period 2002-2017

YEARS	M2	GDP	EXR	INF
2002	2901,5	4537,7	1742.7	2,2
2003	3354,4	5264,2	2325.9	3,5
2004	3738	6126,7	3109.1	4,6
2005	4146,9	7519	4151.5	1,9
2006	4933,7	8514,8	5526.3	1,8
2007	5994,6	9366,6	7382.9	3,9
2008	6955,9	11090	10227.5	4,4
2009	7173,1	10034,3	10865.9	6,1
2010	8280,7	11991	12005.9	4,1
2011	9929,2	14588,5	13880.6	5,7
2012	11015,1	16208,7	14932.7	9,7
2013	11941,5	16643,8	15267.2	4,15
2014	13686,7	17242,5	15824.5	3,8
2015	13704,5	16591,9	15522.5	4,4
2016	13816,3	17406,8	12694.2	6,4
2017	14974,6	18906,6	11320.8	5,9

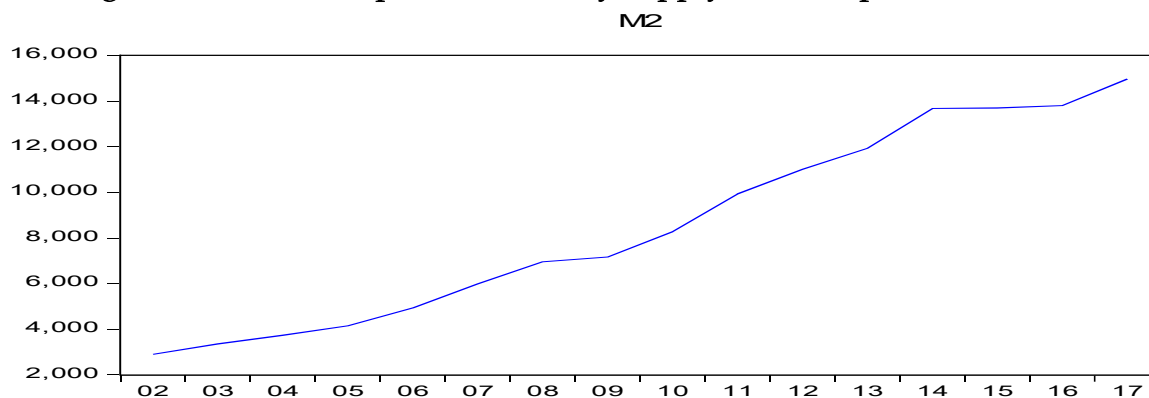
Source: Reports of the bank of Algeria (2002-2017)

The table illustrates that money supply has known continuous decrease from 2002 to 2017, while the value of domestic products has known an ascending trend during the period investigated here by the research with a little fluctuation. Also, the amount of foreign exchange reserve decreased continuously from 2002 until 2014, and then it has known a huge decrease during the upcoming years.

### 3-2 The development of money supply during the period 2002-2017:

The following figure shows how money supply developed during the period in question:

Figure 01: the development of money supply over the period 2002-2017



Source: from EViews using table 01

The figure proves that the ascending trend of money supply over the period 2002-2017. This enormous increase is due to the decrease of the Algerian exchange rate which allowed to the Algerian government to get more money from the bank of Algeria in order to finance its public expenditure. But this manner has a negative impact on the economy because it's a source of increasing inflation.

### 3.3 – The development of global domestic product over the period 2002-2017:

This development is presented thanks the following figure:

Figure 02: the development of GDP over the period 2002-2017



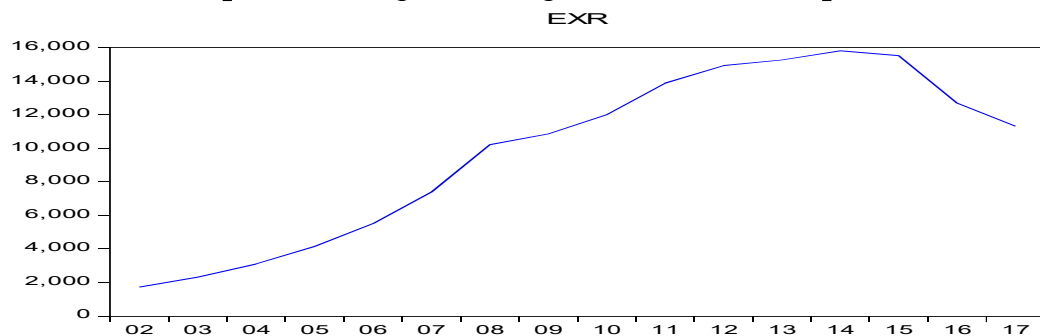
Source: from EViews using table 01

The figure illustrates that regardless of the decrease of global domestic product in some years of the period studied by the researcher, the general trend of this indicator is positive over the great part of the period. But starting from 2014, it has known a huge fluctuation according to the huge volatility of the oil prices recorded during the same period in the international market, knowing that oil income constitutes the main source of income for the Algerian economy.

### 3.4- The development of foreign exchange reserve during 2002-2017:

The upcoming figure illustrates the volatility of foreign exchange reserve during the period in question:

Figure 03: the development foreign exchange reserve over the period 2002-2017



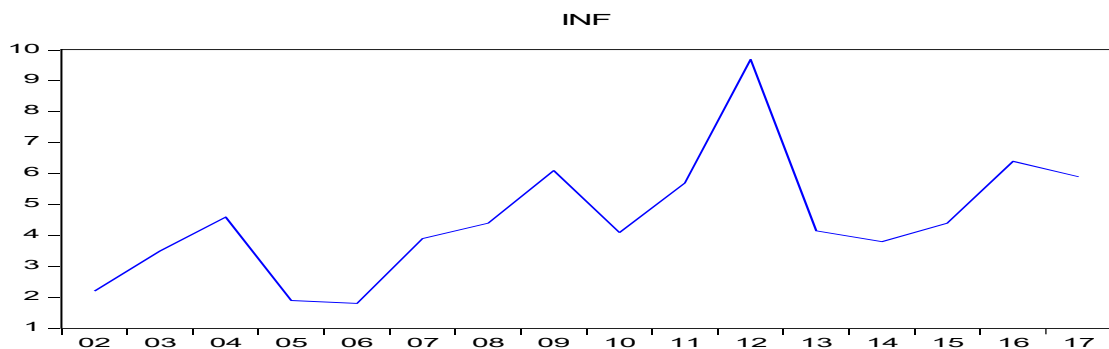
Source: from EViews using table 01

The figure provides evidence the good economic situation of the country until 2014. In fact, the trend of this indicator was positive, but starting from 2014, it has known an enormous decrease simultaneously with the decrease of the oil prices in the international market which caused the deficit of the balance of payment.

### 3.5-The development of inflation rate during 2002-2017:

The following figure presents a clear image about the development of inflation in Algeria during the period of the research:

Figure 04: the development of inflation rate over the period 2002-2017



Source: from EViews using table 01

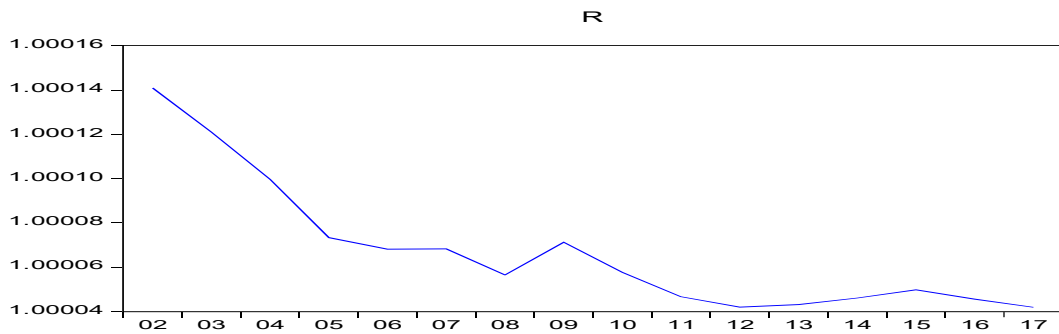
The figure illustrates clearly the huge volatility of inflation rate during 2002-2017, which means that it was influenced a lot by the variables studied by the research since they have different impacts on inflation.

### 3-6-The development of M2/GDP over the period 2002-2017:

To really evaluate whether the development of money supply was reasonable or not, it's so essential to follow the development of the ratio M2/GDP. This development is presented thanks the next figure:



Table 01: the development of M2/GDP over the period 2002-2017



Source: from EViews using table 01

The figure shows that the trend of the ratio M2/GDP is negative over the great part of the period of the research. Also, the figure proves the results illustrated by the previous figure (figure 04) owing to the fact that in 2009, for example, this ratio increased and the inflation rate recorded in the same year increased as well. Moreover, it's crucial to point out the role of the development of foreign exchange reserve, which affected a lot the amount of money supply because when it increased, that means that its equivalent amount by dinar was put into circulation in the economy. In addition, when the amount of foreign exchange reserve decreased, that means that a part of money supply has been recuperated by the bank of Algeria and, subsequently, this decrease of money supply participated in decreasing the inflation rate during the same period.

## Conclusion

Regardless of the development of the ratio M2/GDP, the foreign exchange reserve is a very important determinant of inflation that should be taken into consideration by the monetary authorities in order to reduce the value of inflation, since it affects mainly the value of the previous ratio. In this context, the increase of foreign exchange reserve is generally followed by the increase of money supply and precipitated by the increase of global domestic product. So, this case could participate in achieving the required equilibrium between money supply and global domestic product. In fact, to cover the deficit of the balance of payment, the bank of Algeria should use a little part of its foreign exchange reserve against the equivalent amount by dinar of this part, which participates in reducing the value of money supply. For this reason, it's very important to take into consideration the truth that the increase of money supply should not be above the deficit of the balance of payment in order to reduce inflation rates.

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