

Food Imports and Inflation in the Republic of Congo: An Analysis using an ARDL Approach

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Abstract

This paper analyzes the effect of food imports on inflation in the Republic of Congo, over a period from 1986 to 2020. Following the estimation of the ARDL (autoregressive distributed lags) model, the result shows that in the short and long run, food imports have a positive and significant influence on the inflation level. This result has enabled us to formulate implications for economic policies oriented towards food self-sufficiency and/or food security, food processing and/or food preservation.

Keywords: Inflation, Food imports, ARDL

JEL Code: E31; Q18; C10

1. Introduction

After the oil shocks of the 1970s, inflation targeting became a key issue for financial policy makers, and the number of countries that have implemented it has grown considerably at both global and continental level (Munepapa and Sheefeni, 2017). Globally, the United Nations Food Fund reports rising commodity prices in international markets. Food prices rose by an average of 0.05% per semester (or half-year) in the period between 1996 and 2006. From 2007 to 2011, this increase averaged 2% per semester. Since the blockades linked to COVID-19 in 2020 and 2021, and the start of the war in Ukraine on February 24, 2022, the annual rate of inflation worldwide measured by the consumer price index, has accelerated to 9.2% in March 2022, compared with 7.5% in February 2022, 6.8% in January 2022, and 6.4% in December 2021 (ILOSTAT, 2022).

Sub-Saharan Africa is the region with the highest inflation rate in the world. In recent years, the annual inflation rate in this region has accelerated further, reaching 24.6% in March 2022, compared with 23.8% in February 2022, 22.7% in January 2022 and 21.3% in December 2021 (ILOSTAT, 2022). It averaged 9.1% versus 3.9% for emerging and other developing countries in 2012 (ECOWAS, 2012). This inflation problem has a disastrous economic and social impact. Economically, inflation leads to a significant drop in purchasing power and a weakening of national competitiveness (Marseille and Plessis, 1983). Socially, it leads to increase unemployment and poverty (Blank and Blinder, 1985).

Since the studies of Berthomieu and Ehrhart, 2004 and Barro (2008), particular interest has been focused on food imports to explain the general price level. Thus, the economic literature shows a lack of consensus on both theoretical and empirical literatures. As a result, the theoretical literature highlights two approaches: the monetary approach and the non-monetary approach. The monetary approach reveals that inflation is caused by monetary variables (Keynes, 1936; Friedman, 1963; Lucas, 1976). In contrast, the non-monetary approach endorses that inflation is the result of non-monetary variables (Mankiw, 2001; Berthomieu and Ehrhart, 2004). Similarly, the empirical literature identifies controversial results. On the one hand, we have the studies approving that, monetary variables (money supply, interest rate, and others) strongly explain the general price level (Lougani and Swagel, 2001; Bari, 2013; Benziene and Salah, 2017). On the other hand, the studies confirming that non-monetary variables (product imports, food price fluctuations and others) are a source of inflation (Caceres et al, 2011; Zaid, 2013).

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From the above, we can see that the controversial results of the studies are characterized by a lack of consensus. This controversy can be explained by the different fields of studies and models used. Given this observation and the increase in the price of products on international markets, it is interesting to examine the relationship between food imports and inflation.

The choice of the Congo case is justified by its high dependence on food imports. Imports in value (Current US Dollars) continue to grow, rising from 306.89 million in 2010 to 597.43 million in 2014 to reach 619.183 million in 2015 (<https://perspective.usherbrooke.ca/AGFO/COG>). The consumer price index has also experienced seasonal variations from 100 in 2010 to 111 in 2014, and 117 in 2015. Despite the multiple sources of inflation identified in the literature, we question about the true source of these different variations in the Republic of Congo. From these facts, the specific relationship formulated by Barro (2008) showing the existence of a positive relationship between imports and inflation, would apply in the case of the Congo economy. Thus, the research question is formulated as follows: ***What is the effect of food imports on inflation in the Republic of Congo?***

The answer to this question allows us to highlight the effect of food imports on inflation in the Republic of Congo. Given the increase in the level of imports and the consumer price index, it is argued in this study that food imports are a factor of inflation in the Republic of Congo. This hypothesis is supported by the results of the studies by Zonon (2003), Munepapa and Sheefeni (2017).

In addition to the introduction, the rest of this paper is structured in four (4) points: inflation and food imports in Congo (Section 2); Inflation and Food imports in the economic literature (Section 3); Methodological approach and interpretation of results (Section 4), and Conclusion and policy implications (Section 5).

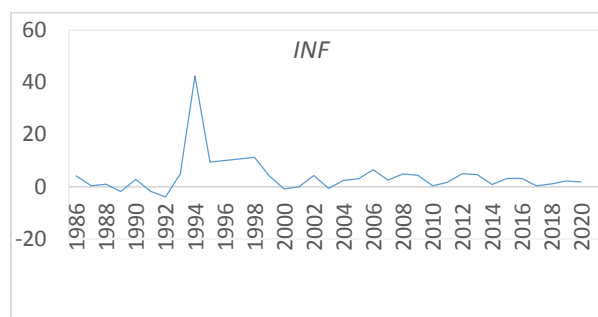
2. Inflation and Food imports in Congo

This section presents the trends of inflation (Figure 1) and food imports (Figure 2), and the cross trends of imports and inflation (Figure 3) in the Republic of Congo. These two variables are captured respectively, by food imports (% of imported products) and the Consumer Price Index.

2.1 Inflation

In economics, inflation is considered to be the generalized and continuous increase in the general price level of goods and services. Barro (2008) defines inflation as a persistent increase in the general price level, due to a decline in the purchasing power of economic agents. It is therefore a quantifiable phenomenon whose rate is evaluated as the change in the general price level from a previous period to a current period. It is measured by the Consumer Price Index. The Consumer Price Index is a synthetic index that describes the change in prices of a basket of goods and services between two periods. Calculating this index requires a base period determined by making observations on the evolution of the prices of goods and services over a relatively long period and estimating the budget coefficients taken into account in calculating this index. In practice, only consumer goods and services, purchased by households are taken into account in measuring price variations. The trend of inflation over the period from 1986 to 2020 is shown in Figure 1.

Figure 1: Trend of inflation (INF) in Congo



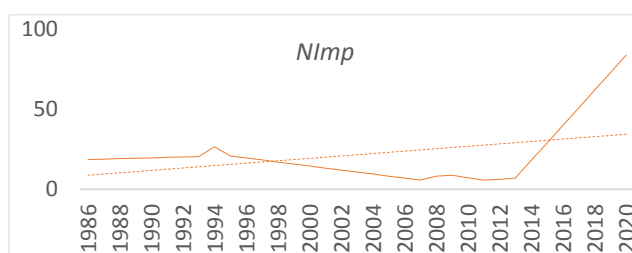
Source: author

In the Congo, the trend of inflation over the period under review shows variability over time, with periods of high and low inflation. This trend shows recurrent and alternating oscillations, reaching its most pronounced peak in 1994. The lowest inflation rate was recorded in 1992 (-3.93), before rising exponentially until 1994. The peak was due to the 50% devaluation of the XAF announced on January 11, 1994. Since then, inflation has fallen remarkably until 2001, before entering an alternating oscillatory cycle until 2020. Inflation recorded an average of 4.16.

2.2 Food Imports

Imports refer to the purchases of goods and services from abroad by economic agents in a given country. This presupposes the existence of trade between countries, referring us to the notion of international trade. For trade, the evaluation is based on "transactions", i.e., when goods cross borders, imports take into account the price of the good, and the cost of insurance and transport logistics (CIF: Cost Insurance Freight). Traditionally, the opening up of economies to trade is driven by the idea of a gain depending on how the economy or trade is conceived. Mill (1848) defines trade in terms of opportunity cost. Samuelson (1997), through the pure demand model, shows that tastes are likely to offer an opportunity to trade with the same factor endowment and production condition. New theories of international trade have been developed because of the inability of traditional theories to explain certain essential characteristics of contemporary international trade (i.e. the existence of intra-industry trade, the gradual liberalization of trade, particularly in the context of the creation of the GATT, technical evolution, etc.). In this study, food imports are measured by food imports as a percentage of imported goods. The trend of food imports is shown in Figure 2.

Figure 2: Trend of food imports (NImp) in Congo



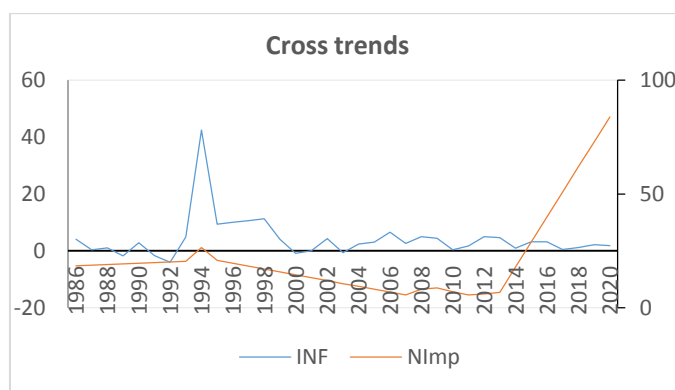
Source: author

In the Congo, the evolution of food imports, during the period under review, is almost stable until 1993, and then declines for a long period until 2013 before entering a phase of continuous growth until 2020. In general, this trend is upward, reaching the peak (83.79) most pronounced in 2020. For the whole period under review, the import records an average of 4.16 and an increase of 352.67% in 2020 compared to the year 1986. The highest (83.79) and lowest (5.63) import levels were in 2020 and 2007, respectively.

2.3 Cross-trends of inflation and food imports in Congo

This sub-section presents the cross-sectional evolution of food imports and inflation (Figure 3) in the Republic of Congo. These two variables are captured, respectively by food imports as a percentage of imported goods, and the Consumer Price Index.

Figure 3: Cross-trends of food imports and inflation in Congo



Source: author

This figure shows oscillating, alternating, recurrent and ascending variability for inflation, then a decreasing and increasing trend for imports, thus showing unambiguous correlation. From 2013 onwards, an increase in the level of imports of high products is characterized by an increase in the level of inflation.

3. Inflation and Food imports in the economic literature

This section presents the theoretical and empirical literature.

3.1. Theoretical literature

The theoretical literature proposes several factors at the origin of inflation. These factors are classified into two approaches: the monetary approach to inflation and the non-monetary approach to inflation.

In the monetary approach to inflation, neoclassical economists assert that money has no influence on real variables, and is therefore neutral. Thus, any monetary action has no effect on activity and leads only to inflation. Fisher (1911) formalized this position in his quantitative theory of money. Friedman and Schwartz (1963) enriched the theory, revealing that in the long term, inflation is essentially a monetary phenomenon, and retains the *money price* causal link. This link moves away from the traditional quantitative dichotomy, and stipulates that high monetary growth, greater than that of gross domestic product, leads to excess demand that, in the long term, has repercussions on the price level

Contrary to monetarists, who believe that money in circulation within an economy influences the price level without affecting the level of activity, Keynes (1936) highlights that the money action within an economy is not linked to its mass, but rather to its nature. The stable element in the Keynesian system is the marginal propensity to consume, thus challenging the stability of money circulation. According to Keynes (1936), inflation is explained by an unbalance between consumer supply and demand for goods and services, since too much demand leads to higher prices. Unlike Keynesians, neoclassical economists assume that economic agents are rational and consider inflation when calculating rents and wages (while considering real rather than nominal income). In this way, an increase in income becomes comparable to an increase in the general price level.

Pursuing the idea of anticipation in the non-monetary approach to inflation, Phillips (1958) established a negative correlation between wage variation and the unemployment rate. Theoretically, inflation dynamics are most often reproduced using the Neo-Keynesian Phillips Curve (NKPC). Here, inflation is represented as a forward-looking phenomenon, due to the optimizing behavior of firms faced with constraints on prices adjustments. However, these models have difficulty in correctly reproducing inflation persistence, as well as the response of inflation to certain monetary shocks (Mankiw, 2001). The neo Keynesian curve therefore distinguishes three (3) main determinants of inflation: the output gap (the difference between actual and potential output); lagged and/or expected inflation; supply shocks.

Keynesian teachings came up against economic and social development from 1960. *Cost-push* inflation made the policies put in place against *demand-pull* inflation inadequate. Indeed, companies pass on rising production costs to their prices. The most inflationary costs are those of intermediate goods (especially raw materials) and labor. Higher prices for imported intermediary products lead to higher production costs for domestic companies, and consequently to higher overall prices.

The state can also be a source of cost inflation, insofar as it influences production costs through heavy taxation on the production process, or through its pricing policy. If the cost increases are not offset by the productivity gains that would enable production at the same cost price, selling price rise, and employee demand higher wages. Thus, the price-wage loop begins to operate.

Berthomieu and Ehrhart (2004) believe that inflation is not a monetary phenomenon, but the result of the interaction of two (2) components: the structural factors behind price rises, and the propagation mechanisms. Inflation is therefore fundamentally due to the less development of the agricultural sector and the imbalance in the balance of payments. Agricultural less development, low productivity and the rigidity of agricultural supply lead to an imbalance between supply and growing demand, which is resolved by rising food prices. With the rising real cost of living, wages and food prices rise, transferring the initial inflationary pressure to other sectors of the economy. Given that the market for goods and services in developing countries is characterized by monopolistic and oligopolistic structures, food prices are rigid downwards, and are determined on a mark-up basis. As a result, any price increase translates into higher prices for all manufactured goods

3.2. Empirical literature

In the empirical literature, studies are divided into two categories. Those that explain inflation by other variables and those that have shown that inflation originates from food imports. In the first category, the studies of Lougani and Swagel (2001), using a VAR model, investigate the determinants of inflation in 53 developing countries for the period 1964-1998. The results show that money supply growth accounts for two-thirds of inflation variability in the short, medium and long term. Exchange rate variation induce between 7.0% and 22.3% of inflation variability. Similarly, Bari (2013) in Turkey during the period from 2002 to 2012 using the vector error correction model (VECM) find that the output gap and the interest rate are the main determinants of inflation in Turkey.

In the second category, the studies of Zaid (2013), estimating the vector error correction model (VECM), showed that import significantly explains inflation in relation to money supply and the exchange rate in Algeria. Munepapa and Sheefeni (2017) studied the impact of import on food inflation in Namibia over the period from 1991 to 2013. The error correction model (VECM) estimation revealed that in both the short and long run, import has a positive impact on inflation. Money supply and GDP were associated as additional exogenous variables.

Caceres et al (2011) used a panel VAR to show that food and oil prices affect the dynamics of non-monetary inflation for four or five quarters and their impacts diminish substantially over time. Dembo (2010), in his forecasting studies for UEMOA countries, used an autoregressive distributed lag (ARDL) to relate inflation to past values and other explanatory variables. The results show that estimated future values depend essentially on past values, imported inflation and the level of food production. In this context, imported inflation has a significant influence on the general price level.

From this literature emerges a theoretical and empirical controversy. From the theoretical controversy on the one hand, there are approaches based on money supply and those based on money demand and expectations. On the other hand, there are approaches based on structural conditions and those based on firms to explain the origin of inflation. Empirically, the controversial results depend on the models used and the field of study.

4. Methodological approach and interpretation of results

This section summarizes the methodological approach of the study, presents and interprets the results.

4.1. Methodological approach of the study

The review of previous studies presents a variety of explanatory models of inflation. To analyze the effects of food imports on inflation in the Republic of Congo, the methodology borrowed from Likukela (2007) is used to formulate the theoretical model. In this theoretical model, the author used the total price level as a weighted average of the prices of tradable goods P^c and non-tradable goods P^{nc} formulated as follows:

$$\log(P_t) = \alpha(\log P_t^c) + (1 - \alpha)(\log P^{nc}) \quad (1)$$

The price of marketable goods is determined on the world market and depends on foreign prices P^f and the exchange rate e

$$\log(P^c) = \log e_t + \log P_t^f \quad (2)$$

It is assumed that the prices of non-tradable goods are determined by the domestic money market. This implies that the price of non-tradable goods is determined by the money market equilibrium condition, i.e. the level of money supply (M^s) of the level of money demand (M^d):

$$\log P^{nc} = \beta(\log M_t^s - \log M_t^d) \quad (3)$$

Here, β is a scaling factor that represents the ratio of total demand in the economy to demand for nonmarketable goods. Demand for money is assumed to depend on real income and inflationary expectations. Typically, the money demand function would also include the interest rate as an opportunity cost variable. However, given the underdeveloped nature of capital markets in developing countries, the existence of the relevant substitution effect between commodities and money is captured among different financial securities. Thus, the expected inflation rate is used as a proxy to capture the opportunity cost of holding money.

$$M_t^d = f(Y_t, E(\pi_t)) \quad (4)$$

Economic theory predicts a positive relationship between money demand and real income, and an inverse relationship between money demand and the expected inflation rate, as summarized in equation (4). Likukela's (2007) model takes into account some of the variables specified in the author's study, including the econometric analysis of the determinants of inflation in Namibia. This explains the presence of the interest rate in the equation as the determinant of money demand. Taking into account the external price level, Munepapa and Sheefeni (2017), in the study on the impact of imports on inflation in Namibia, incorporate the import variable as an explanation for inflation. Saatcioglu and Korap (2006), in their study on the determinants of the inflationary process in the Turkish economy, consider the behavior of public sector pricing that exerts inflationary pressure on prices. Thus, the specific model of our study is as follows:

$$INF_t = \alpha_0 + \alpha_1 Nimp_t + \alpha_2 MM_t + \alpha_3 Ti_t + \alpha_4 GDP_t \quad (5)$$

For estimation purposes, the model is written as:

$$INF_t = \alpha_0 + \alpha_1 Nimp_t + \alpha_2 MM_t + \alpha_3 Ti_t + \alpha_4 GDP_t + \varepsilon_t \quad (6)$$

With: *INF*: Inflation; *Nimp*: Food imports; *MM*: Money supply; *Ti* Interest rate on deposits; *GDP*: Gross Domestic Product per capita; ε : Error term; *t*: time; α_0 : the constant and α_i (*i*: 1, 2, 3, 4) : the elasticities associated with the respective parameters. Our specified model has one endogenous variable and four (04) exogenous variables. These variables are presented in the following subsection.

4.2. Presentation and Interpretation of Results

This subsection presents the variables and descriptive statistics, analyzes and interprets the estimation results

1.2.1. Presentation of variables and descriptive statistics

This section presents the study variables and analyzes the descriptive statistics

4.2.1.1. Presentation of the variables

The variables used in this study are presented in the table 1:

Table 1: Presentation of variables

Variable	Description	Data source	Expected sign
<i>INF</i>	Inflation	WDI (2022)	Dependent Variable
<i>Nimp</i>	Food imports	FAO (2021)	+/-
<i>MM</i>	Money supply	WDI (2022)	+
<i>Ti</i>	Interest rates on deposits	WDI (2022)	-
<i>GDP</i>	Gross Domestic Product per capita (annual %)	WDI (2022)	+

Source: author. Data are from the WDI (2022) and FAO (2021) databases.

The study covers the period from 1986 to 2020. The choice of this period is dictated by data availability. We recall that the interest rate on deposits (*Ti*) is the interest rate paid by commercial banks or similar on demand deposits, fixed-term deposits, and savings account deposits. The money supply corresponds to the sum of fiduciary circulations outside banks, demand deposits other than those of the central government, fixed term savings deposits and foreign currency deposits of resident sectors other than the central government, bank and traveler's "check", as well as other securities such as certificates of deposit and commercial papers.

4.2.1.2. Analysis of descriptive statistics

For descriptive analysis of the variables, we use the Coefficient of Variation (CV), which is simply the standard deviation of the mean. When the CV is less than 17%, there is a low dispersion of the data around the mean. When the CV is higher than 17%, there is a strong dispersion around the mean. The descriptive analysis of the variables shows that all the series present a strong dispersion (coefficient of variation greater than 17%) around the mean value.

Table 2: Descriptive statistics

Variable	<i>INF</i>	<i>Nimp</i>	<i>MM</i>	<i>Ti</i>	<i>GDP</i>
Mean	4.16	21.49	18.89	4.85	-1.40
Maximum	42.43	83.79	82.85	8.08	8.03
Minimum	-3.93	5.63	0.55	2.45	-13.02
Standard deviation	7.52	18.70	26.10	1.90	5.21
Observations	35	35	35	35	35
Doornik-Hansen test		Chi(2) = 179.72***			

Source: Author, using Stata15. ***, ** and * explain significance at the 1%, 5% and 10% thresholds, respectively.

The Doornik-Hansen normality test shows significance at 1%. In conclusion, the distributions tend towards a normal distribution (with 35 observations, study period from 1986 to 2020), which allows us to proceed with stationarity tests.

1.2.2. Results Presentation and Analysis

This section presents the results of the various tests and model estimation performed.

1.2.2.1. Presentation and analysis of tests results

The results of the various tests are presented and analyzed as follows:

- **Stationarity analysis**

The estimation of an econometric model depends on the stationarity of the variables. In other words, the variables must be integrated in the same order. In this study, the variables are examined using two stationarity tests: the Augmented Dickey Fuller (ADF) test and the Philips Perron (PP) test. The use of the latter is conditional on the variables under study being normally distributed, following a normal distribution. The results of the stationarity tests are presented in Table 3.

Table 3: Stationarity tests

Variable	ADF Test		PP Test		Decision
	Trend	No constant	Trend	No constant	
<i>INF</i>	-4.37***	-3.64***	-4.37***	-3.63***	I(0)
<i>Nimp</i>	3.89**	4.81***	3.89**	4.81***	I(0)
<i>MM</i>	-3.72**	-2.22**	-3.72**	-2.22**	I(0)
<i>Ti</i>	-2.72	-2.01**	-2.72	-2.01**	I(0)
<i>GDP</i>	-4.44***	-4.34***	-4.44***	-4.34***	I(0)
<i>INF</i>	-3.55**	-2.69***	-4.37***	-3.60***	I(1)
<i>Nimp</i>	0.79	1.00	3.059	3.48***	I(1)
<i>MM</i>	-3.20*	-2.10**	-3.76**	-2.13**	I(1)
<i>Ti</i>	-2.57	-2.12**	-2.78	-2.10**	I(1)
<i>GDP</i>	-2.90	-2.74***	-4.42***	-4.31***	I(1)

Source: Author, using stata 15. ***, ** and * explain the significance respectively, at the 1%, 5% and 10% levels. I(1) and I(0) explain the stationarity, respectively, in first difference and at level.

The results obtained show that the variables are stationary in level and in first difference. However, a variable that is stationary at a lower level is also stationary at a higher level. This shows that all the variables are stationary of order one (1).

- **Cointegration analysis**

Having determining the order of integration of the different variables, we estimate the ARDL or Black Box approach for cointegration to determine the long-run relationship between the variables. To do this, we use the Bounds Test (Pesaran and *al*, 2001) which determines the F-statistic and the t-statistic. In this study, the *F-statistic* and the *t-statistic* are respectively, equal to 11.85 and -4.60. These are compared to the critical values below and above the significance level of 5%; 2.5% and 1%. The results show that the F-statistic is greater than all critical values of the upper bound I(1). These results verify a long-run cointegration relationship between the variables. The results of the Bounds test are reported in the table 4.

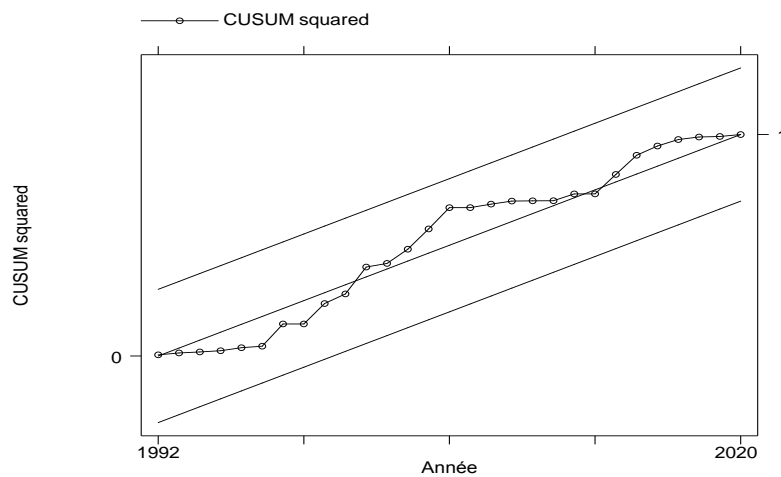
Table 4: ARDL Bounds test results

F-statistic	11.85	
Critical values		
Significance level	I(0) Bound	I(1) Bound
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06
t-statistic	-4.59	
Critical values		
Significance level	I(0) Bound	I(1) Bound
5%	-2.86	-3.99
2.5%	-3.12	-4.26
1%	-3.42	-4.60

Source: author, on stata 15.

• **Model stability test (CUSUM test)**

The result of the model stability test (CUSUM test) below allows us to conclude that the model is stable, and can therefore be used for estimation purposes.



Source: author, on stata 15

1.2.2.2. Analysis of the model estimation results

This section presents and discusses the results of the model estimation. The results are summarized in Tables 5 and 6 (for the short and long run, respectively).

Table 5: Estimation result (short run)

Endogenous variable: Inflation (INF)

Variable	Coefficient	t-statistic	Probability
$D(INF)$	0.41	1.86	0.086
$D(Nimp)$	0.91	2.16	0.050
$D(Nimp)(-1)$	-0.66	-1.30	0.218
$D(MM)$	-	-	-
$D(Ti)$	-17.33	-5.50	0.000
$D(GDP)$	-0.68	-2.59	0.023

Source: author, on stata 15.

Table 6: Result of the long-run estimation

Endogenous variable: Inflation (INF)

Variable	Coefficient	t-statistic	Probability
<i>Nimp</i>	0.27	2.76	0.016
<i>MM</i>	-0.23	-5.04	0.000
<i>Ti</i>	5.12	4.64	0.000
<i>GDP</i>	1.17	2.18	0.040
C	-45.70	-5.56	0.000
Recall Force	-1.85	-4.60	0.001
% R ²	93.45		

Source: author, on stata 15.

The estimation results, after the treatment and the validation of the model, show that the exogenous variables selected for this study explain 93.45% of the endogenous variable ($R^2 = 95.20\%$). The estimation results show a negative and significant coefficient of recall at the 1% threshold (-1.85[-4.60]), confirming the application of an ARDL model is therefore confirmed (see Appendix).

In the short run, the estimation results reveal that food imports have a positive and significant influence on the level of inflation. The money supply has no effect on the level of inflation, while the interest rate on deposits and GDP show a negative and significant relationship on inflation. Thus, one-point increase of the food imports, the interest rate on deposit, and GDP leads respectively, to a significant increase of 0.91 (at 5% threshold) and a significant decrease of 17.33 (at 1% threshold), and 0.68 (at 5% threshold) in the level of inflation, all other things being equal

In the long run, the food imports, the interest rate on deposits, GDP per Capital and the money supply, in relation to inflation, showed positive (0.27 ; 5.12 and 1.17) and negative (-0.23) results, respectively. As a result, the one unit increase of the food imports, the interest rate on deposit and GDP led to a significant increase in the inflation level of 0.27 (at 5% threshold), 5.12 (at 1% threshold) and 1.17 (at 5% threshold) respectively, all other things being equal. On the other hand, an increase of one unit in the money supply leads to a significant decrease of 0.23 (at 1% threshold) in the level of inflation.

1.2.3. Interpretation of Results

From these results, one lesson is formulated:

➤ **Food imports: a factor of inflation in the Republic of Congo.**

This finding corroborates the results of Ogbokar and Sunde (2011) who, in the case of Namibia, showed that inflation is explained by imports. Similarly, Bikai and *al* (2016), studying the determinants of inflation in CEMAC, find that in the short run, inflation is influenced by imports and the money supply. Thus, our result finds its explanation in the Keynesian theory of money demand, which states that economic agents can demand money to meet transaction needs. As a result, money in circulation is used for exchanges. Facing the constraints of the Congo market, where agro-food production is very low, any increase in demand leads to an increase in prices. In sum, the results obtained in the case of the Republic of Congo can be explained by the lack of sustained and sustainable development of the agricultural sector, thus justifying the increase in the level of food imports that influence prices on the local market. However, the results must be put into perspective insofar as a study conducted for the Republic of Congo, a member country of the CEMAC (monetary union), does not provide us with certainty on the origin of inflation.

2. Conclusion and Policy implications

This study analyzed the effects of food imports on the level of inflation using the ARDL approach. To achieve the result, annual frequency data spread over 35 years, from 1986 to 2020, were mobilized and combined with a multi-step procedure: from stationarity analysis (ADF and PP tests) to the estimation of the ARDL, via the cointegration test (Bounds test for ARDL). The unit root tests of ADF and PP have shown that the variables or series are stationary in level, and they are all stationary in first difference. These variables are integrated of the same order (1) or stationary and significant in first difference.

After the analysis of the stationarity of the series or variables, we analyzed the Bounds test. According to its criteria, the variables are cointegrated. This allowed us, after the stability test (Cusum) of the model, to estimate an ARDL. The estimation results confirmed the hypothesis of a positive and significant relationship between food imports and the level of inflation in the Republic of Congo. The effects of the money supply (*MM*) on the endogenous variable (*INF*) are significantly negative in the long run and non-existence in the short run. On the other hand, the effects of the interest rate (*Ti*) on inflation (*INF*) are significantly negative in the short run and positive in the long run.

The lessons drawn from the results allow us to formulate two (2) economic policy implications. The first is a policy oriented towards food self-sufficiency and/or food security, food processing and/or food preservation. Governments must encourage the Congolese to consume local products. They must also diversify the local agricultural portfolio and make use of the vast potential of unexploited arable land to reconcile supply, local demand for food products and consumer prices.

The second is a policy of intergovernmental cooperation based on the transfer of agricultural technologies. To achieve this, governments must encourage foreign direct investment by multinational firms in the agricultural sector. This would promote competition and encourage domestic companies to improve their performance and reorganize their production, management, and organizational methods, thereby facilitating the transfer of foreign agro-food technologies to the Congo. This would significantly reduce the volume of food imports.

References

- Bari, B. (2013). Main Determinants of Inflation in Turkey : A Vector Error Correction Model. *International Journal of Economics and Research*, 4(6), 13-19.
- Barro, R. J. (2008) *Macroeconomics: A Modern Approach*. Mason: Thomson corporation
- Benziane, R., & Sallah, N. (2017). The Relationship Between Interest Rate and Inflation in Algeria: 1990-2015. *El-Bahith Review*, 17(1), 79–91. Récupéré sur <https://elbahithreview.edu.dz/index.php/bahith/article/view/358>
- Berthomieu, C., & Ehrhart, C. (2004, mai). Le néostructuralisme comme dépassement du paradigme structuraliste en économie de développement.
- Bikai, J. L., Batoumen, M. H., & L, F. A. (2016, Novembre). Determinants of inflation in CEMAC: the role of money. BEAC Working Paper No. 02/15 P35.
- Blank, R., & Blinder, A. (1985). *Macroeconomics, Income Distribution, and Poverty*. National Bureau of Economic Research, Inc, No 1567, NBER Working Papers.
- Caceres, C., Poplawski-Ribeiro, M., & Tartari, D. (2013). Inflation Dynamics in the CEMAC Region. *Journal of African Economies*, 22(2), 239-275.
- ECOWAS. (2012). 2012 Annual Report of ECOWAS (Updated). ECOWAS Commission.
- Dembo, T. M. (2010). Inflation forecasting models in WAEMU countries', BCEAO.
- FAO. (2021). Food and Agriculture Organization of the United Nations. Faostat. Récupéré sur <http://faostat.fao.org>, 2021
- Fisher, I. (1911). *The Purchasing Power of Money* New York.: 2nd Edition, Macmillan Co. .
- Friedman, M., & Schwartz, A. J. (1963). *A Monetary History of the United States, 1867-1960*. Princeton University Press. Récupéré sur <http://jstor.org/stable/j.ctt7s lvp>
- ILOSTAT. (2022, mai). Récupéré sur International Labor Organization: <https://ilostat ilo.org/inflation-more-than-doubled-between-march-2021-and-march-2022/>
- Keynes, J. M. ((1936).). The supply of gold. *The Economic Journal*, 46(183), 412-418.
- Likukela, M. (2007). An econometrics analysis of the determinants of inflation in Namibia. Récupéré sur <http://hdl.handle.net/11070/409>
- Lougani, P., & Swagel, P. (2001). Sources of Inflation in Developing Countries. IMF Working Paper N° WP/01/198.
- Lucas, R. (1976). Econometric Policy Evaluation: A Critique. In: Brunner, K. and Meltzer, A.H., Eds., *The Phillips Curve and Labour Markets*, Chicago University Press, 19-46.
- Mankiw, N. G. (2001). The Inexorable and Mysterious Tradeoff between Inflation and Unemployment. Conference paper.111, pp. C45 - C61. Oxford University Press.
- Marseille, J., & Plessis, A. (1983). *Vive la Crise et l'Inflation*. Paris: Hachette.
- Mill, J. S. (1848). *Principles of Political Economy*. Toronto: Toronto University of Toronto Press.

- Munepapa, M., & Sheefeni, J. P. (2017). The Impact of Import on Inflation in Namibia. *European Journal of Business, Economics and Accountancy*, 5(2), 44-51.
- Ogbokor, C., & Sunde, T. (2011). Is Namibia's Inflation Import-driven? 30(1 and 2).
- Pesaran, M., Shin, Y., & Smith, R. J. (2001). Bounds testing Approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289-326.
- Phillips, A. W. (1958). The Relation between Unemployment and the Rate of Change of Money Wage rates in the United Kingdom. *Economica*, 25(100), 283-299. Récupéré sur <https://doi.org/10.2307/2550759>
- Saatcioglu, C., & Korap, L. (2006). Determinants of Turkish Inflation (éd. Discussion paper N° 2006/7.). Ankara: Turkish Economic Association.
- Samuelson, P. (1948). International trade and the equalization of factors prices. *The Economic Journal*, 163-18
- WDI (World Development Indicators) (2022). World Bank Database
- Zaid, H. (2013). Comprendre l'Inflation en Algerie. *Business, Economics, Marketing & Management Research (BEMM' 13)*, 2, 149-155.
- Zonon, A. (2003). Les déterminants de l'inflation au Burkina Faso. *CAPES*, 2003, 34.

Appendix

- Estimation and Bound tests Results

ARDL(3,2,0,4,4) regression

Sample: 1990 - 2020

Number of obs = 31

R-squared = 0.9345

Adj R-squared = 0.8488

Log likelihood = -71.794046

Root MSE = 3.7868

	D.INF	Coef.	Std. Err.	t	P> t	[95% Conf. Interval]	
ADJ	INF						
	L1.	-1.855897	.4037401	-4.60	0.001	-2.728125	-.9836701
LR	NImp	.2744029	.0992846	2.76	0.016	.0599116	.4888942
	MM	-.2398322	.0475871	-5.04	0.000	-.342638	-.1370265
	Ti	5.124051	1.104312	4.64	0.000	2.738331	7.509771
	PIB	1.175415	.5389196	2.18	0.048	.0111502	2.33968
SR	INF						
	LD.	.7604464	.2984598	2.55	0.024	.1156633	1.40523
	L2D.	.4177596	.224902	1.86	0.086	-.0681117	.9036308
	NImp						
	D1.	.9181656	.4254034	2.16	0.050	-.0008626	1.837194
	LD.	-.6662773	.5144567	-1.30	0.218	-1.777693	.4451387
	Ti						
	D1.	-7.794834	4.833822	-1.61	0.131	-18.23767	2.648002
	LD.	-8.031369	3.756909	-2.14	0.052	-16.14768	.0849383
	L2D.	-11.75178	3.7799	-3.11	0.008	-19.91775	-3.585801
	L3D.	-17.33094	3.151199	-5.50	0.000	-24.13869	-10.52319
	PIB						
	D1.	-2.185684	.8557262	-2.55	0.024	-4.034368	-.3369998
	LD.	-1.404892	.6873525	-2.04	0.062	-2.889827	.0800426
	L2D.	-1.092265	.4706622	-2.32	0.037	-2.109068	-.0754607
	L3D.	-.6803273	.2630022	-2.59	0.023	-1.248509	-.1121455
	_cons	-45.70407	8.225389	-5.56	0.000	-63.47394	-27.9342

note: estat btest has been superseded by estat ectest
as the prime procedure to test for a levels relationship.
([click to run](#))

Pesaran/Shin/Smith (2001) ARDL Bounds Test

H0: no levels relationship F = 11.852

t = -4.597

Critical Values (0.1-0.01), **F-statistic**, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_4	2.45	3.52	2.86	4.01	3.25	4.49	3.74	5.06

accept if F < critical value for I(0) regressors
reject if F > critical value for I(1) regressors

Critical Values (0.1-0.01), **t-statistic**, Case 3

	[I_0] L_1	[I_1] L_1	[I_0] L_05	[I_1] L_05	[I_0] L_025	[I_1] L_025	[I_0] L_01	[I_1] L_01
k_4	-2.57	-3.66	-2.86	-3.99	-3.13	-4.26	-3.43	-4.60

accept if t > critical value for I(0) regressors
reject if t < critical value for I(1) regressors