An Empirical Analysis of the Determinants of Food Imports in Congo

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AERC Research Paper 195
African Economic Research Consortium, Nairobi
April 2010

THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are those of the author, however, and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 - City Square
Nairobi 00200, Kenya

Printed by: Regal Press (K) Ltd
P.O. Box 46166 - GPO
Nairobi 00100, Kenya

ISBN 9966-778-65-9

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Abstract

The aim of the study was to identify the factors that are likely to explain the evolution of food imports in Congo. Several variables related to the Dutch disease, the necessity to ensure food security following the crisis in the agricultural industry, armed conflicts, re-export trade, and the tax and customs reform were tested using an econometric model. The analysis showed that the exchange rate of the local currency, armed conflicts, re-export trade, income and the domestic production index all represent the main factors that account for food imports in Congo in the short and/or long term. These results allowed us to draw some economic policy implications.

Acknowledgements

We would like to thank the African Economic Research Consortium (AERC) for funding this study. We would also like to thank all the Group D researchers as well as all the resource persons, in particular Prof. Ademola Oyejide, Prof. Jean-Paul Azam, Prof. Andy McKay and Dr. Dominique Njinkeu for their useful comments and suggestions. However, we are solely responsible for any shortcomings of this study as well as the views expressed in it.

1. Introduction

Food security is a central concern of decision makers in Africa. Congo-Brazzaville is no exception. The instability of supplies and often non-availability of food products in Congo led to the implementation of a number of policies from the 1980s. Indeed, following the failure of the National Board for the Marketing of Agricultural Products, which had been created in 1964, the government revamped its policy on food self-sufficiency. Three boards were established from the 1980s – the Coffee and Cocoa Board (OCC), the Congolese Tobacco Board (OCT), and the Food Crops Board (OCV). The mission of the three boards was to supervise farmers and to market the farm produce of peasants organized into "cooperative groups". The agricultural policy also called for setting up state-owned farms. Both the boards and the farms performed poorly, however, and the government stopped their activities in 1990 as part of economic liberalization. Other liberalization measures included the government's withdrawal from supervising farmers and marketing their products and the deterioration of farm to market roads. These factors help explain the slow evolution of production in relation to the needs felt in the country, as Table 1 shows.

This table shows that there was an increase in production, except for cereals whose production decreased in the past decade. However, this increase in production was not proportional to the increase in consumption: the latter increased faster, which led to low rates of coverage of the country's needs.

Faced with its inability to increase the supply of agricultural products, which would have improved food security, the country was able to meet its ever-increasing needs only through food imports. These represented 23.61% of the total imports in 2000 and 18% in 2004.

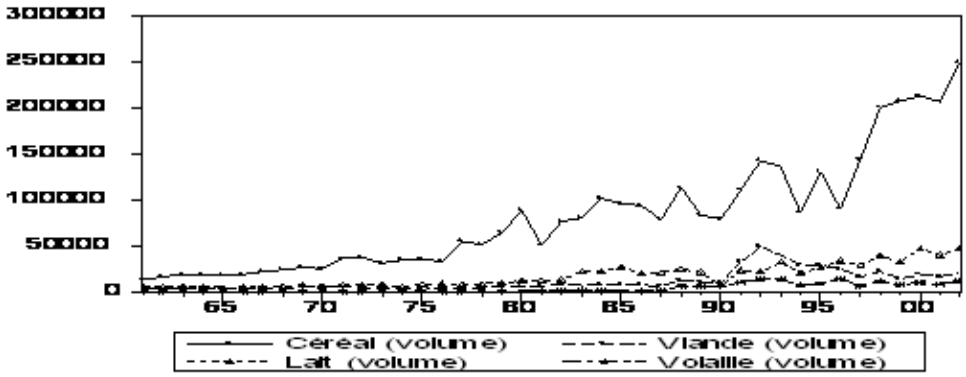
Europe led with exports to Congo with food accounting for 60% in 2000 and 56.6% in 2004. The Americas and Africa followed at 13.4% and 13% in 2004, respectively. From Europe, the top exporters of food products to Congo were France, the Netherlands and Italy while the United States and Argentina led in the Americas. In Africa, the leaders were Cameroon and South Africa. Imports of food products such as cereals, meat, milk and poultry have greatly increased since the 1980s (Koutassila, 1998), as Figure 1 shows. Clearly, the trend has accelerated markedly. The 1980s, 1990s and 2000s are characterized by massive food imports, which were at the centre of the debate on the country's food security strategy.

Table 1: Annual average production, average consumption and the rate of consumption as covered by production

	1961-1970			1971-1980			1981-1990			1991-2000		
	AP	**AC**	**RC**	**AP**	**AC**	**RC**	**AP**	**AC**	**RC**	**AP**	**AC**	**RC**
Cereals – except beer	7,745	26,757	28.95	14,531	52,876	27.48	15,037	98,049	15.34	8,000	145,000	5.52
Roots and starchy foods	539,699	518,131	104.16	602,147	578,181	104.15	752,729	694,490	108.39	783,000	764,000	102.49
Vegetables	18,600	18,086	102.84	27,183	25,612	106.13	35,330	34,330	102.91	40,000	50,000	80.00
Meat	10,848	14,093	76.97	14,717	18,545	79.36	20,047	28,137	71.25	23,000	51,000	45.10
Fish	13,390	39,113	34.23	24,868	42,190	58.94	36,451	73,759	49.42	44,000	69,000	63.77
Dairy products, except butter	415	5,567	7.45	745	9,494	7.85	950	22,148	4.29	1,000	31,000	3.23
Fruit products, except wine	60,552	55,047	110.00	86,373	78,272	110.35	120,657	109,508	110.18	175,000	160,000	109.38

Note: AP: Average production (in thousands of tonnes); AC: Average consumption (in thousands of tonnes); RC: Rate of coverage of needs by domestic production
Source: Authors, based on FAO data (www.fao.org)

Figure 1: Evolution of Congo's main food imports



Justification for the study

Several facts justify the choice of this topic. First, Congo experienced armed conflicts in 1993, 1997 and 1998. These conflicts had a negative impact on the agricultural sector and it is important to know whether the increase in food imports resulted from this situation. Moreover, by its geographical position Congo is de facto a transit country. This gives it a comparative advantage in re-export trade, notably with the Democratic Republic of Congo (DRC), which constitutes a big market of more than 30 million consumers. That is why it becomes important to study the possible link between re-export trade activities and food imports. Finally, like much of the rest of Africa Congo has experienced rapid urbanization – at the rate of 61.7% between 1993 and 2003 according to the 2004 Poverty Reduction Strategy Paper (Ministry of Planning and Development, 2004). Urbanization is thus generally seen as one of the determinants of food imports because it comes with new consumption habits that lead to a high demand for increasing volumes of goods and services that the country does not produce.

Analysis of some of Congo's specificities

Congo is in fact fortunate to afford to import a large part of its food needs. Two major factors contribute to this. For one, the Congolese economy relies almost exclusively on the oil sector. Indeed, it is this sector that has spurred the country's economic growth since 1980. On average, oil represents more than 80% of the total annual exports and, as a result, it is the most important source of financing of imports in general and food imports in particular. Thanks to oil revenues and, to a lesser extent, revenues from timber exports, the country has sufficient funds to pay for food imports (see Ministry of Planning and Development, 2004).

Moreover, Congo is a member of the Central Africa Economic and Monetary Community (CEMAC), which is part of the Franc Zone, and as such is eligible to benefit from the solidarity mechanism in force in the zone through the transactions account held at the French Treasury in order to cover its food imports.

Civil wars and food aid

The 1990s were characterized by recurrent civil wars in Congo that caused great damage both human resources and infrastructure. The situation negatively affected living conditions through loss of human life, destruction of economic and social infrastructure, looting, displacement of large numbers of people, and an increase in the cost of foodstuffs and other products as a result of the difficulty in supplying commodities to the capital and other main cities (see Ministry of Planning and Development, 2004).

The weakening of agricultural productive capacity, which manifested itself in the abandonment and deterioration of farm land as a consequence of armed conflicts, led to a fall in agricultural production. Further, agricultural research centres were destroyed during this period, thus annihilating the potential for agronomic research in the country.

In order to ensure food security for its population during those years of political and social instability, Congo largely resorted to importing food. In this it was helped by several countries and national and international non-governmental organizations. Food aid had been marginal before the war, but increased tremendously. The structure of food aid also changed from the 1990s when it was principally composed of cereals, nearly half of which was rice (46.67%). The high proportion of rice was at the expense of wheat flour, the share of which fell from 38.04% in 1970 to 31.07% in 1980, then to practically 0% in subsequent years. Vegetable oil is another product whose share in the total food imports evolved over the years: from 0% in 1970, its share rose to 4.96% in 1980, 5% in 2000 and 9.7% in 2002. The share of the other products remained very small.

Lack of link between urban and rural areas

One obstacle to development in Congo is the lack of easy communication between urban and rural areas: The transport infrastructure deteriorated because of lack of maintenance and numerous armed conflicts. As a result, farmers and producers of forest products were isolated. This situation had a demoralizing effect on farmers, who were reduced to subsistence farming. It also led to the disappearance of trade middlemen, resulting in job and revenue losses (Ministry of Planning and Development, 2004).

Transport difficulties are also behind the increase in the prices of the national agricultural products on the urban market. Because of this, imported food products are becoming cheaper than those produced in the country, especially since food imports from western countries are subsidized.

Jacquemot and Raffinot (1993) point out that urban centres in Africa are places of change in eating habits, which result in growing discrepancy between urban and rural areas. Moreover, these authors maintain that an African town becomes a big enclave linked to the international economy rather than to its hinterland. This explains why, in general, the eating habits of Congolese town dwellers are mostly based on imported foods. The demand for food in urban areas has been on the increase and has diversified as well. Consumers have turned to new products, on which they often spend a great amount of foreign currency. This change in eating habits that is characteristic of urban centres in Congo is now rapidly spreading to rural areas as well.

The re-export trade

There is intense cross-border trade, both formal and informal, between Congo and its big neighbours, notably the Democratic Republic of Congo and Angola. One mark of this is that Congo indirectly supplies the markets of the neighbouring countries with products imported from other countries: in fact, quantities of goods that outstrip the population's consumption capacity are imported into Congo, only to be moved out again through informal channels.

The Initiative for Central Africa (INICA, 2005) pointed out that Congo and the DRC are largely interdependent and have developed a complementary production in the face of the inability of the local offer to meet the national demand of either country. According to the INICA economic research institute (INICA, 2004), in 2002 the DRC had a trade surplus of CFAF 1 billion (the equivalent of US$1.5 million), in comparison with Congo. Trade between the two countries consists of food products (fish, flour, meat), manufactured products, oil products, diamonds, gold, etc. The exchanges can be explained by the fact that Congo's currency is stable while that of the DRC is subject to fluctuating rates and macroeconomic instability. This will explain the high demand for the CFA franc and hard currencies such as the US dollar and the euro on the part of traders from the DRC. The cross-border parallel trade also arises from excessive regulation, price distortions and official corruption in both countries.

In addition to official trade in food products, there is an important illicit trade in kerosene, diamonds, gold, etc. The illicit cross-border trade between the two countries represents about CFAF 10 billion (equivalent toUS$15,250,000) that is lost annually by the Treasury in both countries (INICA, 2005). This trade is carried out along the two banks of the River Congo, while trade networks generally rely on the traditional links between the communities in the two countries (INICA, 2005).

There is also trade between Congo and Angola. This trade is both official and illicit, especially since Congo's second city, Pointe Noire, is close to Cabinda, an oil city in Angola.

The issue of the Dutch disease in Congo

The focus on the oil industry in Congo has led to the decline of other sectors (agriculture, timber, industry). Before the first oil boom, exports of agricultural products (coffee, cocoa), potassium and timber were the main sources of Congo's foreign exchange, but the expansion of the oil sector in 1973 pushed oil into first place. Manufacturing and agricultural activities suffered in particular from increases in oil prices. Their share in the total exports fell continuously during the period of increase in oil revenues (1973–1985); timber exports fell significantly (Koutassila, 1998), too. Oil represented 59.1 % of the GDP in 2005. The share of oil revenues in the country's export revenues was 94% in 2006, while its share in tax revenues was 80% during the same year (Ministry of Economy, 2006).

The expansion of the oil activity in Congo through huge export revenues is the cause of the appreciation of the real effective exchange rate, which stimulated food imports by making them less expensive in local currency. The increase in food imports in Congo

during the period of increase in oil revenues is due in part to the overvaluation of the local currency. It is this overvaluation that had justified the devaluation of the CFA franc by 50% in 1994. Thus, the hypothesis of the Dutch disease would be probable in the case of Congo. But this phenomenon is not the only determinant of the decline of other traditional sectors (agriculture, industry, timber); rather, the decline was due to a combination of the Dutch disease and other factors such as bad governance stemming from the weakness of national institutions; inadequate development policies; and the difficulty in managing public investment in productive sectors, thus leading to their low yields. Other elements are the use of rudimentary production techniques in agriculture; a highly state-run production system; and a deteriorating transport and energy infrastructure. This macroeconomic environment perpetuates the non-diversification of the economy and exposes it to external shocks.

Regulatory framework for food imports in Congo

Food imports are governed by the Republic of Congo, Law No. 07-94 of 1 June 1994. This law specifies the conditions of importing, exporting and re-exporting products, merchandise, foodstuffs and all sorts of objects into and from the country. With regard to imports, the law provides that imports of products from countries outside CEMAC, with which the Republic of Congo has signed trade agreements, are subject to a licence or an import declaration, subject to the application of these agreements. The import of the following products is conditional upon getting a licence: salt fish, saltwater fish, meat and poultry, oils, tomatoes, salt, wheat flour, sugar, and cement. The following conditions must be met by every importer: being a holder of the trader's card bearing the label "importer" and having paid the importer's trading licence.

This law includes the requirements of the 1994 tax and customs reform instituted by CEMAC, of which Congo is a member together with five other countries (Cameroon, the Central African Republic, Gabon, Equatorial Guinea, Chad) and those of the national legislation. The main objectives of this reform are: the setting up, at the regional level, of new fiscal and customs instruments; the abolition, within the CEMAC borders, of all indirect taxes, and the abolition of all import duty exemptions that were linked to specific tax regulations. The reform was aimed at abolishing tariff barriers related to intra-CEMAC trade and at harmonizing the policies related to tax exemptions or taxation of products in order to reduce the complexity of the taxation system in the subregion.

Before the adoption of the law in question, imports, particularly food products, were subject to several indirect taxes and duties, thus making the import system complex. There was also a range of exemptions applicable to some food and other products. The 1994 law subjects imports to the requirements of the common external tariff (CET) for the goods manufactured outside Congo whatever their entry point into the country. Products are classified into six categories, with the taxation rate based on the product's c.i.f. value:

- The excise duty is a domestic tax mainly applicable to luxury products such as salmon, foie gras, some spirits and tobaccos. Its rate is 24% on the duty-paid c.i.f.
- The community integration tax (CIT) was set up to raise money to be paid into the CEMAC Solidarity Fund and only concerns imports from developing countries. Its rate is 1% of the product's c.i.f. value.

- The value-added tax (VAT) is applicable to the normal rate of 18.9 % on the c.i.f. value increased by adding the CET and the excise duty.
- The reduced rate was abolished on the following three products: fish, meat and offal.
- The statistical tax is 0.2% of the product's c.i.f. value, but does not apply to processed foodstuffs.
- The "Societe Generale de Surveillance (SGS)" inspection tax amounts to 0.95% of the product's f.o.b. value.

In addition, Congo often subjects its imports and exports to a certain number of para-tariffs and over-taxation not provided for by the CEMAC tariff system. These additional taxes constitute a heavy burden on trade, while at the same time rendering the whole system opaque and prone to discretionary actions. These practices are probably also the cause of the massive food imports into the country. Considering the institutional apparatus and the way it is used, one can conclude that it encourages food imports.

Research problem

Several factors come to light through this analysis of the Congolese economy that are likely to explain the country's massive food imports. There is first of all the country's capacity to pay for those imports using the exchange reserves obtained from oil exports and the solidarity mechanism enjoyed by the Franc Zone countries through the operations account held at the French Treasury. But there are also other contributions: the civil wars the country has gone through that have occasioned the need for high levels of food aid, the discrepancy between urban and rural areas, the flourishing of re-export trade activities with the DRC and Angola, and the Dutch disease phenomenon.

Those factors suggest that the low domestic food production and the low competitiveness of the country's food products are no longer the only reasons for its massive food imports. With soaring food prices at the international level and the need to ensure that the population has an easier access to those products, it is vital to have a good grasp of the most significant determinants in order to facilitate the government's intervention in matters of food security.

Several previous studies have pointed out the high urbanization rate, transit economy or re-export trade and the Dutch disease as some of the factors that stimulate imports in a given country. Taking into account the specific nature of Congo's economy, this study aims to answer the following questions: What are the potential factors determining food imports in Congo? Does the increase in food imports have to do with economic or non-economic factors? What economic policy measures are needed to improve food security and to exploit Congo's position as a transit country in order to get the most benefit from trade liberalization?

Research objectives and hypothesis

The general objective of the study is to identify all the factors that are capable of explaining the evolution of food imports in Congo. Its specific objectives are:

- To specify the relationship between food imports and the different variables that determine them, notably those related to the urban bias, Dutch disease, the crisis of the agricultural sector, the re-export trade and armed conflicts.
- To analyse the institutional framework regulating food imports in Congo.
- To verify the nature, and the lasting or temporary character of the influence of the determinants of food imports in Congo.
- To recommend economic policy measures, especially those in relation to food security and the optimal use of Congo's position as a transit country in order to make the best use of trade liberalization.

The literature on the determinants of imports has pointed out several factors. In the case of Congo, food imports depend not only on traditional factors, but also, and especially, on the specificities of the Congolese economy. In this respect, the present study hypothesizes that the Dutch disease, armed conflicts and the re-export trade are the determining factors explaining the evolution of food imports in Congo in the short and the long term.

2. Literature review

An analysis of previous studies reveals that the need for food imports in developing countries can be explained by one or a combination of several factors related to urban bias, crisis in the agricultural industry, Dutch disease, food security policy, and the re-export trade. In the present literature review, a distinction is first made between economic and non-economic determinants. The review then considers the research on food imports in Congo and, finally, it draws some lessons from the accumulated evidence.

The economic determinants of food imports

Heading the list of economic determinants of food imports are the weakness of agricultural production, which in developing countries is generally the result of the crisis of the agricultural sector, food security policies, the Dutch disease phenomenon, a country's importing capacity and the re-export trade or transit economy.

With regard to the crisis in the agricultural sector, it should be noted that one of the major manifestations of the multifaceted and generalized crisis confronting the African continent resides in the collapse of agriculture and, as a consequence, the inability to attain food self-sufficiency (Centre for Economic Research on Africa, 2000). Several reasons explain the poor agricultural performance: inadequate agricultural policies, unrealistic price policies, inadequate use of modern technology in agriculture and low productivity (Shahla and Rosen, 1999; ITC, UNCTAD/WTO and IAF, 2004). This low agricultural production leads to food import in several African countries.

To this end, food self-sufficiency is a sure way of slowing down food imports. A food self-sufficiency policy rests on the premise that domestic production should be the only source of the food a country needs (Requiert-Desjardins, 1995). Such a policy emphasizes the need for an integrated approach that includes quantitative controls of imports, or even their prohibition, and policies aimed at the development of the agricultural sector in order to guarantee a domestic supply of foodstuffs (Schweigman, 2003).

Under the Dutch disease phenomenon, a boom in a sector that produces natural resources will tend to compromise any industrialization effort and export diversification, thus aggravating the vulnerability of the economy. The "Dutch disease" theory postulates that the increase in imports, especially food imports, during the period of increase in oil or mining revenues is a consequence of the over-valuation of the local currency following an increase in oil revenues. The Dutch disease phenomenon is particular to rent economies (agriculture-, oil- or mining-based). As world prices rise, the increase in revenues is equated with net transfers of capital to be used for public expenditure. The logic of profit

redistribution prevails over that of their allocation to lasting productive projects. A collapse of the world prices will automatically kill the rent economy by suddenly revealing all the financial imbalances and the dependency of products in general and food products in particular on foreign economies (Koutassila, 1998).

In a study on Nigeria, for example, Kwanashie et al. (1998) underline the fact that the oil boom increased the level of distortion in the economy and that the collapse of the oil prices on the international market was the cause of the economic crisis in 1980.

Food security policy can also be a determinant of food imports. The notion of food security rests on three essential dimensions: availability, access and stability as far as countries, households and individuals are concerned (World Bank, 1986). Availability can be achieved by a combination of domestic supplies, imports and food aid, and stocks. In this connection, Shahla and Rosen (1999) point out that the main factors influencing food security are national production, the exchange reserves available for importing foodstuffs and the population growth.

The capacity to finance food imports depends on the level of the national income. The performance of the export sector and the volume of foreign currency generated guarantee those imports (Rosen, 1998). Export revenues and the prices of foodstuffs on the international market have an effect on the food import capacity. The capacity to save revenues in foreign currency and the state of the security of foreign supply sources can enable a country to set up an import strategy that guarantees the supply of foodstuffs.

The re-export trade can be one of the factors stimulating food imports. This type of trade, referred to as "cross-border", consists of importing food into the country and then supplying it to the market of a neighbouring country. The re-export trade enables a country to meet the excess demand from consumers from a neighbouring country that has a big market. It is mainly stimulated by the existence of a higher level of taxation on imports in the neighbouring country, resulting from a protectionist policy (Gautier, 2000). Dorosh and Dissou (1998) found that the control of foreign currency by determining the parallel exchange rates largely influenced the price of re-exports from Niger to Nigeria. Herrera (1997) identified the difference in petrol prices on both sides of the border as the main determinant of cross-border flows of Nigerian petrol into Cameroon.

The non-economic determinants of food imports

An important element in this category of determinants is "urban bias", which refers to the implicit preference for urban areas in development policies, a preference that manifests itself in numerous ways (price policies, investment policy, transport, etc.) with the intention of protecting the living standards of urban consumers, for social and often political reasons – urban voters are numerous, concentrated and usually vocal. Imported food products are not generally taxed or are taxed at a very low rate. Since, on the other hand, food imports are subject to strong protectionist measures, it follows that the relative prices of agricultural products are particularly low. Marketing boards have nonetheless had an impact on the market which contributes to maintaining low prices, to the detriment of peasants but to the benefit of urban consumers (Coussy, 1998).

That is why the urban area represents a place of change in eating habits, which results in a growing discrepancy between urban and rural areas. Given that the bulk of African

food imports is intended for urban areas, these appear to be the propagation agent for the imported consumption model. The demand for food in urban areas is increasing considerably, as urbanization increases and incomes grow, while at the same time diversifying. This situation thus perpetuates the demand for imported foodstuffs in the country (Bricas and Seck, 2004).

Research on food imports in Congo

Two main studies have analysed the determinants of food imports in Congo. One is a study on food products supply and demand carried out in 2004 by the Pointe Noire Chamber of Commerce, Industry, Agriculture and Trade. The other study was conducted in 1998 by Koutassila on the Dutch disease in Congo and Cameroon. The two studies found that food security in Congo was still far from satisfactory, as the national agricultural production did not cover the population's quantitative and qualitative needs, a situation that could only lead to food imports.

Cross-border trade between Congo and the DRC has been the subject of interest for some researchers, notably Dzaka (2004) and INICA (2005). In a study on entrepreneurial strategies of risk management in cross-border trade networks in Central Africa, Dzaka (2004) found that entrepreneurs from Congo export some local products to the DRC, but mainly re-export manufactured goods imported from Europe, Asia and West Africa (textiles and clothing, processed food and consumer electronics). The Initiative for Central Africa (2005) pointed out that following the civil war in the Republic of Congo (1997-1999) and the collapse of the nation-state in the DRC, people had to find alternatives to rebuild an economic space in a complex post-conflict context. Numerous official structures have been replaced by a parallel system of informal trade relations that have ensured a vital link between the two capital cities, Brazzaville and Kinshasa.

Lessons drawn from the literature review

Several lessons can be drawn from the literature review. First, the literature on food imports in Congo is mainly descriptive, which does not make it possible to bring out the most significant determinants in a rigorous way that would enable one to put forward useful policies to ensure food security.

Second, in the literature, the re-export trade appears simply as a determinant of food imports. This is very simplistic in the sense that when a country has a comparative advantage owing to its geographical position or its economic environment, the re-export trade can constitute an opportune strategy for enabling the country to benefit from globalization, in particular trade liberalization. In such a case, an analysis of potential food imports in relation to current food imports would be necessary.

Finally, a quick growth of food imports can be attributable to a factor prevailing at the time of the increase. That is the case when a civil war disrupts the agricultural sector and destroys the communications infrastructure that enables the movement of food products from production areas (i.e., rural areas) to consumption areas (i.e., urban areas). In this rationale, the war becomes a factor stimulating food imports in order to meet the demand for domestic food products.

3. Methodological approach

The theoretical foundations of the model of the demand for imports used in this study were developed by Hemphill (1974) and later modified by Moran (1989) and Egwaikhide (1999). These models are based on the principle of the minimization of costs resulting from the difference between imports and exchange reserves. From an analytical point of view, this function of costs, which is of a quadratic form, is written as follows:

$$Ct = \alpha 1(Mt - M^*)^2 + \alpha 2(Rt - R^*) + \alpha 3(Mt - Mt - 1)^2 \quad (1)$$

In this first specification *M* and *M** represent the current levels of imports and that of long term equilibrium respectively; *R* is the current level of exchange reserves; and *R** is the desired level of exchange reserves. It is assumed that in a stable country the current levels of imports and the long-term level would be equal and that both would be equal to the exchange reserves in the long term, *F** (Hemphill, 1974).

In economic theory, it is assumed that economic decision makers tend to minimize the costs resulting from the deviation of the level of imports from the long-term equilibrium. Another argument put forward in the literature is that the exchange reserves are not mainly used to pay the import bill. In this rationale, the exchange reserves have to be at a level capable of maintaining imports through time. However, it has been hypothesized that the desired level of exchange reserves is directly related to the level of foreign currency obtained from abroad, in such a way that:

$$R^*_t = \beta_0 + \beta_1 F^*_t \quad 0 \leq \beta \leq 1 \quad (2)$$

In the long term, *F** = *M**; in the short term, the two variables are linked through their identical nature accounting for the balance of payments. This identical nature is written as follows:

$$\begin{aligned} &M_t + \Delta R + F_t \\ &\text{or } \Delta R = F_t - M_t \end{aligned} \quad (3)$$

In general, it is assumed that F^* can be approximated from its current level. This hypothesis results from the fact that the future can be considered to be the result of previous developments. As a result, if the short-term exchange reserves F remain constant through time, it can be hypothesized that their long-term variation is marginal. Thus, these reserves remain unchanged in the long term. The short-term foreign currency fluctuations have an impact on the decision makers' perception, as if F represented foreign currency obtained in the long term. Such changes also influence their judgement, depending on whether the fluctuations of F were temporary or permanent.

In view of what precedes, it can be assumed that:

$$F^*_t = F_t - \lambda \Delta F_t \tag{4}$$

In this relation, λ represents the way in which decision makers perceive the exchange reserve fluctuations. A positive value of λ means that they consider the fluctuation to be transient. Conversely, a negative value of λ means that decision makers consider the fluctuation to be permanent. To simplify matters, and following Moran (1989), the current level of exchange reserves is identical in the short and long term; this implies that $\lambda=0$.

The aggregated function of the demand for imports is generally specified as follows:

$$\begin{aligned} M_t &= a_0 + a_1 y_t + a_2 (P_m / P)_t + a_3 M_{t-1} \\ & a_1 \le 0; a_2 \le 0; 0 \le a_3 \le 1 \end{aligned} \tag{5}$$

In this equation Y is the real revenue, P_m represents import prices that take into account tariff and non-tariff measures, and P is the domestic prices index. When this equation is estimated in a logarithmic form, the coefficients a_1 and a_2 are directly interpreted as elasticities of the revenue from the prices of the short-term demand for imports. In the long term, these elasticities are obtained in the following way: $a_1 / (1 - a_3)$ and $a_2 / (1 - a_3)$. This specification has microeconomic foundations because it is based on consumer demand theory, which stipulates that the consumer's objective is to maximize satisfaction under the constraint of an income allocated in the process of acquiring competitive goods. This argument is also used in relation to demand for imported goods. Thus the demand for imported goods by a consumer is influenced by income, import prices and those of other goods. The total amount of individual demands for imported goods constitutes the aggregated demand for imports for the economy.

Other functions of the demand for imports can be derived by incorporating Equations 2 and 5 into Equation 1 and minimizing this function under the constraint of the exchange reserves represented by Equation 3. That gives us the following specification:

$$\begin{aligned} M_t &= b_0 + b_1 F_1 + b_2 R_{t-1} + b_3 M_{t-1} + b_4 (P_m / P) + b_5 Y_t \\ & b_1, b_5 > 0; \quad 0 \le b_2 b_3 \le 1; \quad b_4 \le 0 \end{aligned} \tag{6}$$

This is the equation that was estimated by Moran (1989). It is a general function of imports from which other functions can be derived, such as that estimated by Hemphill (1974). Indeed, if one ignores delayed imports, relative prices and real income, Equation 6 becomes Hemphill's import demand function. This function has also undergone modifications, the most important being that effected by Hendry et al. (1986). Their modification used the structure of dynamic delay in Equation 6, thus making it over-parameterized. This necessitated the use of statistical techniques in order to give the function an acceptable form for the purposes of estimation.

Capet and De Vallerin (1993) took into account supply conditions. Indeed, traditional modelling assumes that the demand addressed to foreign producers by the national economy and that addressed to domestic firms by foreign economies are not hindered by supply constraints. So, if the demand for imports or exports comes up against capacity constraints, their levels will not be determined in the same way. A good modelling would therefore involve writing the levels as determined by equations of the type, $Mt = Min\ (Md_t, Mo_t)$, where *d* indicates the quantities demanded and *o* the quantities supplied.

It should be pointed out, however, that at the theoretical level, no specific indication is given on how to appropriately measure the dependent and independent variables. It is thus not surprising that different authors use their own measures of those variables and the functional forms of the aggregated model of the demand for imports. Leamer and Stern (1970) maintain that there are no specified criteria for the choice of a particular functional specification. It is up to the individual researchers to decide, and their choice is probably influenced by their theoretical leanings.

The empirical model

The theoretical model presented earlier was developed for overall imports. As a result, its use here for just food imports is an adaptation. Furthermore, this general framework for the import function has undergone several modifications at an empirical level (Zejly, 1993; Tati, 2001; Egwaikhide, 1999). These modifications were justified by the fact that the explanator variables were not relevant and/or available for different countries. That is why Egwaikhide (1999), in a study on total imports, adds total consumption to the general model. As one of the authors who studied the food imports demand function, Marrakchi (2002) offers a more limited model that characterizes imports as a function of the GDP and the exchange rate. For his part, Zejly (1993) characterizes this import demand as a function of the GDP in volume, private investment, the agricultural sector's value-added, import prices including import duties, the GDP deflator, the pressure on the productive capacity, the fluctuation rate of the productive capacity, anticipation, and the rationing indicator.

This last model has been discussed by several authors (e.g., Capet and De Vallerin, 1993; Tati, 2001). It takes into account several aspects of demand. In the case of Congo, however, some explanatory variables are hardly measurable. These are variables like the pressure on the productive capacity, the fluctuation rate of the productive capacity and anticipation. Moreover, the model to be tested as part of the present study must also take into account all aspects likely to influence the evolution of imports in Congo: Dutch

disease, urban bias, the agricultural sector crisis, food security, food aid, the re-export trade (importing with a view to re-exporting to the big markets in neighbouring countries, in particular those of Kinshasa in the DRC and Cabinda in Angola), and the effects of war on the agricultural sector.

Taking into account these factors enables us to formulate the following empirical model:

$$Log(IMP)_t = \beta_0 + \alpha_0 \log(IMP)_{t-1} + \alpha_1 \log(PRI)_t + \alpha_2 \log(RH)_t + \alpha_3 \log(PAD)_{it} + 0\alpha_4 \log(TEER)_t +$$
$$(+) \qquad (-) \qquad (+) \qquad (-) \qquad (-)$$
$$\alpha_5 \log(Aid)_t + \alpha_6 \log(PT)_t + \alpha_7 \log(TCPRRDCH)_t + \alpha_8 \log(TCPRANG) + \alpha_9(\lg) + \alpha_9(lr) + \alpha_{10}(1Pol) + \varepsilon t \quad (7)$$
$$(-) \qquad (+) \qquad (?) \qquad (?) \qquad (-)(+) \qquad (+)$$

In this relation, *log* designates the Napierian logarithm; *IMP* refers to annual food imports; *RH* to revenue; *PAD* to domestic food production (this variable will make it possible to verify the impact of the agricultural sector crisis on imports); *TEER* to the real effective exchange rate – which makes it possible to verify the Dutch disease hypothesis; *Aid* to food aid; and *PT* to loans or capital entry as a percentage of the GDP. *TCPRRDC* is the exchange rate multiplied by the prices of products in the DRC in order to take into account the re-export trade between Congo and the DRC and *TCPRANG* is the exchange rate multiplied by the prices of products in Angola in order to take into account the re-export trade between Angola and Congo. Dummy variable *1g* represents the war years; it takes the value 1 for the years Congo experienced war and the value 0 for the other years, while *1r* represents the tax and customs reform carried out by CEMAC in 1994. This variable takes the value of 1 for the period 1994-2002, and 0 for the other years. Finally, *Pol* is included to take into account the move from a protectionist trading regime to a liberal one in 1990; this variable takes the value of 1 for the period 1990–2002 and 0 for the other years.

The index *i* in this specification suggests that the study will estimate an equation of overall imports and four equations for Congo's main import products. These products, which were selected from a table on the structure of food imports, are cereals, meat, poultry and fish. Indeed, this table, which was established by the Ministry of Agriculture, Fishing and Livestock in 2004, reports that the most imported processed foodstuffs are: cereals and oilcakes (47.36%); flour and starch (15.13%); meat and poultry (20.20%); and fish (7.48%). That is why the analysis by products or type of products will focus on cereals, meat, poultry and fish.

Description of the variables

The data collected cover the period 1970-2004. The variables used are described in Table 2. It is worth noting that the data collection process encountered some difficulties, especially in relation to the availability of statistical series. This situation

led to the use of several sources of data, as Table 2 shows. The lack of certain statistical series led to the use of other variables. For instance, the re-export trade, which ought to be taken into account by using statistics on the volumes of goods and services re-exported by Congo to the DRC and Angola, was replaced by the exchange rates between the CFA franc and the *franc congolais* (CDF – the DRC currency) and the *kwanza* (AON – Angola's currency). This can be justified by the fact that the export trade is partly determined by the exchange rate differential.

Table 2: Description of variables

Abbreviation	Description	Source
IDE	Foreign direct investment (in billions of CFA francs)	WBI, 2005
IMAT	Total food imports in volume (1,000 tonnes)	FAO Database, 2005
IPA	Agricultural production index	FAO Database, 2005
IPC	Cereal production index	FAO Database, 2005
IPCEREA	Cereal price index	FAO Database, 2005
IPLAIT	Milk price index	FAO Database, 2005
IPPE	Livestock products production index	FAO Database, 2005
IPVIAN	Meat price index	FAO Database, 2005
IPVOLAI	Poultry price index	FAO Database, 2005
POP	Population (1,000 people)	FAO Database, 2005
RER	Real effective exchange rate	WBI 2005
RPT	Per capita GDP (1990 constant price in US$)	WBI 2005
VOCEREA	Cereal imports in volume (1,000 tonnes)	FAO Database, 2005
VOLAIT	Milk imports in volume (1,000 tonnes)	FAO Database, 2005
VOVIAN	Meat imports in volume (1,000 tonnes)	FAO Database, 2005
VOVOLAI	Poultry imports in volume (1,000 tonnes)	FAO Database, 2005
Aid	Food aid in volume (1,000 tonnes)	FAO Database, 2005
PT	Loans or capital entry as a percentage of the GDP	WBI 2005
TCRDC	Exchange rate of the DRC currency	IMF Database, 2005
TCANG	Exchange rate of the Angola currency	IMF Database, 2005
G	Variable indicating armed conflict; it takes the value 1 for the years Congo experienced war and 0 for the other years	Created by the authors
R	Variable indicating the tax and customs reform; it takes the value 1 for the period 1994–2002 and 0 for the other years	Created by the authors
Pol	Variable indicating the move from one trading regime to another; it takes the value 1 for the period 1994–2002 and 0 for the other years	Created by the authors

Two variables are not represented in the model in spite of their importance. They are: European subsidies and the urbanization rate. The former determine the prices of imported food products. These prices form a variable that is already taken care of in the model as the "Index of the prices of the various imported products". Regarding the urban population, it is worth pointing out that the variable *income* has been approximated by the per capita GDP. This GDP variable covers the urban population, which is part of the total population. The GDP variable has thus been excluded from the model for to include it would result in colinearity with the variable *income*.

Before carrying out various stationarity and cointegration tests, it is imperative to calculate the central tendency and dispersion characteristics of the various variables. These characteristics have been calculated using *Eviews*; the results are given in Appendix A. It transpires from these results that all the variables have a low dispersion (variation coefficient), except for the variables *demand* and *level of unemployment*. These two variables saw great variation in the course of their evolution. In addition, under the null hypothesis of normality, the probabilities associated with the Jarque-Bera statistics suggest that all the variables are normally distributed. This conclusion enables us to proceed with the study of the dynamic properties of series, as the available tests can only be conducted with normally distributed series.

4. Estimation of the model, presentation and interpretation of the results

In the literature, the Augmented Dickey–Fuller (ADF) and Phillips–Perron (PP) tests are the most used. They are increasingly criticized for their often problematic application especially in the case of the ADF test. This test requires carrying out embedded tests on the one hand and, on the other hand, constitutes a framework that is not well-suited to series with trend. That is why, in the present study, the two tests were combined with the Kwiotowski–Phillips–Schmidt–Shin (KPSS). This test takes into account the existence of residue autocorrelations and, in contrast with the others, tests the null hypothesis of level stationarity or around a tendency against the alternative hypothesis of a unit root. A sequential strategy was used while applying these tests: first the model with a trend and a constant was tested, then the significance of the trend was tested. If it turned out that the trend was not significant, the model with a constant but without a trend was tested. And if the constant was not significant, the model without a constant and a trend was tested.

The stationarity tests equally necessitated the choice of truncation parameters. With regard to the ADF and Phillips–Perron tests, two criteria were used. The first involved estimating partial autocorrelations of series. In this connection, for *p* we used the lag corresponding to the last autocorrelation that was significantly different from zero. The second criterion entailed estimating several processes for different values of *p* and selecting the model that minimized Akaike's information criterion.

As a result of this procedure, the lag (*l=1*) was used for the ADF test. But adding lags did not improve the results and the Akaike criterion was not minimized. For the Phillips–Perron test, the choice of the truncation parameter was done by using the value suggested by Newey and West (1987). This value is after all the default value one will get with the *Eviews* software. We observed in our study that conducting this test with *l=3; l=2* or *l=1* did not change the results. Thus we used l=1 in order to have more degrees of freedom. As for the other unit root tests, and in order to carry out the KPSS test we first selected the truncation parameter and used the model with or without a linear trend. To this effect, we relied on graphs on series and results of the ADF and Phillips–Perron tests.

Appendix A shows that all the variables are integrated to the order 1, which means that they are stationary in primary difference. This is because even when a variable is integrated to the order 0, it is also integrated to the order 1 and higher. This test also allows us to conclude that there is a deterministic trend in the evolution of almost all the variables. It equally follows from these results that time should be included in the variables

while carrying out cointegration tests that will make it possible to know whether there exists a long-term equilibrium relationship between variables. It is only on the basis of the results of the cointegration test that one can determine whether it will be legitimate to apply the ordinary least squares (OLS) method while carrying out estimations and to deduce the short-term model.

The cointegration test was the next stage. For a regression that contains several variables, the appropriate test is Johansen's, which enables one to know the number of cointegration relations in one regression. With "N" variables (all assumed to be endogenous by this method), the existence of cointegrating "N" equations shows that no series is integrated. This test is based on the maximum likelihood method and allows one to determine the proper vectors (or cointegrating vectors) that best reflect the cointegration relations. The various results of Johansen's test indicate the existence of at least three cointegration relations at the 5% threshold, hence the existence of an interference phenomenon between these different variables. Indeed, explanatory variables influence each other and can be cointegrated separately from the variable "food imports". The various cointegration vectors point to the existence of at least three long-term economic relations between variables. In each case our study dealt only with one cointegration relation – that which has the highest own value (see the results of the tests in Appendix B).

According to Granger's representation model, if the variables are in a long-term equilibrium relationship, then the best short-term representation of the long-term relationship is the error correction model. If one considers the series *{Y}, {Xi}i=1,Ö,n,* the equation of the short-term representation takes the following form:

$$\Delta Y_i = a_0 + \sum_{i-1}^{n} \varpi_i \Delta_{it} - (-\xi) E_{t-1} - v_i$$

where *E* is the residue of the long-term estimation, ϖi the impact or short-term elasticity, *(1-*ξ*)* the extent of the adjustment of ΔY to the preceding period, and υ the error term of. The extent of the adjustment increases when ξ gets closer to zero. A negative sign of *(1-x)* confirms the existence of a long-term equilibrium relationship between variables.

Presentation of results

The results of the long- and short-term models are summarized later. The estimations of the short-term equations are given in Table 3, while Table 4 gives the results of the estimations of the long-term models.

Table 3: Results of error correction models

	Total food imports		Cereal imports		Meat imports		Poultry imports		Milk imports	
	Coef.	t	Coef.	t	Coef.	t	Coef.	t	Coef.	t
D[ln(Agricultural products index]	-0.17	-0.30	0.09	0.32	-0.12	-0.54	-0.75	-2.70**	-0.66	-4.60**
D[ln(Domestic production index)]	0.17	0.85	-0.12	-0.77	-1.34	-0.97	0.43	0.16	-	-

continued next page

Table 3 Continued

	Total food imports		Cereal imports		Meat imports		Poultry imports		Milk imports	
	Coef.	**t**	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**
D[ln(Per capita income)]	0.53	1.92*	1.95	3.51**	1.57	2.14**	0.75	0.34	1.83	3.00**
D[ln(Real effective exchange rate)]	0.15	2.28**	-0.42	-1.66	-0.85	-2.95**	0.30	0.47	-0.36	-3.35**
D[ln(Foreign direct investment)]	0.03	1.60	0.03	0.72	-0.09	-1.99**	-0.22	-2.79**	-0.03	-0.78
D[ln(Food aid)]	0.04	2.90**	0.05	0.90	0.06	1.95*	-0.10	-2.83**	-0.08	-2.35**
D[ln(Exchange rate for* Angolan products prices)]	0.05	3.55**	-0.04	-1.03	-0.09	-2.35**	0.02	0.46	-0.02	-0.73
D[ln(Exchange rate for * DRC products prices)]	-0.03	-2.82**	-0.00	-0.04	0.10	4.64**	-0.05	-0.29	0.05	2.10**
Dummy 1 (Armed conflicts)	-0.12	-1.41	0.33	1.52	0.33	1.46	-0.17	-0.85	0.09	0.47
Dummy 2 (Tax-and-customs reform)	-0.10	-1.85*	0.00	0.01	-0.07	-0.55	-0.82	-3.47**	0.09	-0.67
Dummy 3 (Change of regime)	0.04	0.56	0.09	0.44	-0.09	-0.60	0.59	1.93	-0.18	-1.16
Residue delayed by a period	-1.09	-4.51**	-1.07	-5.12**	-0.51	-2.22**	-0.42	-3.31**	-1.07	-4.61**
Constant	-0.06		-2.90**		0.05		1.21		0.07	
0.83	0.27		1.80*		-0.07		-1.28			
R^2	0.81		0.78		0.81		0.86		0.96	
F-statistic	6.33		5.40		5.53		8.35		39.26	
D-W	1.90		1.84		2.24		1.79		2.15	
Number of observations	33		34		31		31		33	

*(**) refers to coefficients that are significant at the threshold of 10% (and 5%, respectively)
Source: Authors' results obtained by using *Eviews*

Table 4: Results of the long-term models

	Total food imports		Cereal imports		*Meat imports*		Poultry imports		Milk imports	
	Coef.	**T**	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**	**Coef.**	**t**
Ln(Imports delayed by one period)	0.44	3.31**	0.19	0.66	0.08	0.33	0.24	1.24	-0.31	-2.76**
Ln(Agricultural products index)	2.39	-1.23	-0.30	-1.50	-0.06	-0.17	-0.35	-0.58	-0.00	-1.93*
Ln(Domestic production index)	-0.74	-1.28	-0.24	-1.56	3.08	2.07*	6.28	1.73		
Ln(Per capita income	0.32	1.12	0.16	0.52	1.29	2.84**	3.35	2.01*	-1.65	-6.49**
Ln(Real effective exchange rate)	0.51	2.25**	0.56	1.96*	-0.35	-1.06	-2.23	-2.12*	-0.48	-2.40*
Ln(Foreign direct investment)	-0.07	-2.30**	-0.01	-0.28	-0.05	-0.56	-0.13	-0.84	-0.10	-2.92**
Ln(Food aid)	0.05	1.41	0.06	0.89	0.18	3.76**	0.45	1.90*	-0.05	-1.10

continued next page

Table 4 Continued

	Total food imports		Cereal imports		*Meat imports*		Poultry imports		Milk imports	
	Coef.	T	Coef.	t	Coef.	t	Coef.	t	Coef.	t
Ln(Exchange rate for * Angolan products prices)	-0.02	-2.06*	0.01	0.65	-0.12	-3.86**	-0.07	-1.08	-0.03	-2.75**
Ln(Exchange rate for * DRC products prices)	-0.00	-0.50	0.01	0.55	0.09	2.69**	0.01	1.15	0.07	5.48**
Dummy 1 (Armed conflicts)	0.20	1.56	0.17	1.03	0.49	1.96*	1.09	1.85*	0.22	2.06*
Dummy 2 (Tax-and-customs reform)	0.25	0.84	-0.65	-1.84*	-0.64	-1.49	0.42	-0.34	-0.58	-2.54**
Dummy 3 (Change of regime)	-0.00	-0.00	-0.17	-0.77	0.24	0.63	1.32	1.45	-0.84	-4.69**
Constant	-6.38	-1.01	7.13	2.26**	-18.46	-3.82**	-51.59	-3.25**	0.04	-0.02
R^2	0.94		0.78		0.92		0.93		0.92	
F-statistic	25.18		6.85		16.20		18.78		22.46	
Number of observations	34		33		32		2.01		1.46	

*(**) refers to coefficients that are significant at the threshold of 10% (and 5%, respectively),
Source: Authors' results obtained by using *Eviews.*

Interpretation of the results of the estimations

In the long run, the OLS estimation method is valid only under certain conditions, except for stationarity and cointegration properties (Haudeville, 1996). Tables 3 and 4 give some indications on their overall qualities. Indeed, the values of the Fisher (F) statistic and the determination coefficient indicate the degree of suitability of the model for the data. The F-statistics that are significant at the 5% threshold for the different models suggest that the explanatory variables jointly contribute to explaining their variance. In other words, all the four models are statistically significant at the 5% level. The values of the determination coefficient indicate the proportion of the variance of the variable explained by the explanatory variables. The determination coefficient is sufficiently high for the four models. Such results can be considered to be satisfactory, as the diagnostic tests in Appendix C show. In the following sections short- and long-term results are provided.

Analysis of the traditional variables explaining food imports in Congo

In the short term: It transpires from the results of the different regression analyses that the agricultural products index has a negative and significant effect at the 5% threshold on two products, poultry and milk. When the prices of these two products increase by 10%, other things being equal, their imports decrease by 7.5% and 6.6% respectively. With regard to income, the results show that it has a positive and significant effect at the

10% level on total imports and at the 5% level on cereal, meat and milk imports. A 10% fluctuation in income increases total imports by 5.5%, cereal imports by 19.2%, meat imports by 15.7% and milk imports by 23.3%. It should also be noted that in the short term foreign direct investment, though not significant for the total imports, is significant at the 5% level for meat and poultry imports. Other things being equal, a 10% increase in FDI reduces meat imports by 0.9% and poultry imports by 2.2%. This result can probably be explained by the fact that part of this FDI is destined for the agricultural sector, which increases domestic production and reduces imports.

In the long term: An analysis of the traditional variables (imports delayed by one period, the agricultural products index, the domestic production index, and FDI) suggests that only previous food imports and the FDI have a significant effect at the 5% level on the total food imports. In the case of previous food imports, a 10% fluctuation of the index of these two variables increases food imports by 4.4% and, for FDI, reduces the total food imports by 0.7%.

The analysis by group of products indicates that previous food imports have a negative and significant effect at the 5% level on milk imports; a 10% increase in previous milk imports reduces milk imports by 3.1%. For its part, domestic production has a positive and significant effect at the 5% level on meat imports where a 10% increase in domestic production increases meat imports by 30.8%. Domestic prices have a negative effect on food imports, But this effect is significant only at the 5% threshold with regard to milk imports. As Caves and Jones (1985) note, when the prices of imported products increase, three factors that contribute to the decline in the demand for these products:

- the substitution effect in consumption because of the lower demand for the products;
- the income effect as the increase in prices leads to a reduction in real income and, as a result, a reduction in the demand for imported products; and
- the production effect that results when the increase in imported products leads to the resources of other industries being attracted to competitive importing industries, which reduces the production of importable goods.

In relation to revenue, positive effects have been recorded for both total food imports and food imports by group of products, with these effects significant at the 10% level for meat, poultry and milk imports. This finding corroborates those obtained by Mwega (1993), Marrakchi (2002), Bourema and Kouedeu (2000), for Kenya, Morocco and Senegal, respectively. Finally, FDI has a negative and significant effect at the 5% level on milk imports.

Furthermore, it has been observed that for certain variables such as previous food imports and domestic food production, the sign for elasticities varied from one product group to another. This finding can be explained by the fact that these elasticities are specific to groups of products, market conditions and the period during which the analysis is carried out.

Effect of the exchange rate and the Dutch disease phenomenon

In the short term: The exchange rate significantly influences (at the 5% level) total imports and those of meat and milk. The effect on total imports is positive, while that on meat and milk imports is negative. Thus, a 10% appreciation of the exchange rate increases total imports by 1.5%, while it reduces the imports of meat by 8.5% and those of milk by

3.4%.

Considering the total imports, this finding can be explained by the fact that, as Pilbeam (1998) and Collier and Gunning (1994) point out, the domestic prices of importable goods are linked to the exchange rate and foreign prices if one takes into account the buying power parity. Because of this, an overvaluation of the local currency can artificially render imports less costly relative to substitutable domestic products. The direct consequence of this would be an increase in imports. One can thus say that in the short term the Dutch disease phenomenon has been verified.

When one considers the results by group of products, especially meat and milk imports, the conclusion drawn on the basis of the results for the total imports needs to be qualified. Indeed, the appreciation of the exchange rate resulting from the accumulation of foreign currency owing to oil exports increases food imports overall, but there is an opposite effect for certain groups of products. The nature of certain food products and their relative weight in the group of imported products can explain the results obtained, especially the differences in signs.

In the long term: Our results show that the real effective exchange rate has a significant influence at the 5% level on total food imports. These results corroborate those obtained by Marrakchi (2002), Mwega (1993) and Egwaikhide (1999) for Morocco, Kenya and Nigeria, respectively, in relation to overall imports,but they differ from the findings of Bourema and Kouedeu (2000) for Senegal.

The results obtained by Bourema and Kouedeu (2000) cannot be completely rejected for the case of Congo, to the extent that signs differ when one considers the results by group of products. From the results, the real effective exchange rate has a positive and significant effect at the 10% level on cereal imports and a negative and significant effect at the 10% level on poultry and milk imports. Thus, other things being equal, a 10% increase in the real effective exchange rate increases cereal imports by 5.6%, while it reduces poultry imports by 22.3% and those of milk by 4.8%.

In view of the results obtained using short- and long-term models, it can be argued that the Dutch disease phenomenon needs to be qualified, as this phenomenon can be said to have been verified in relation to overall imports. Indeed, the appreciation of the exchange rate resulting from the massive entry of foreign currency coming from oil exports leads to an increase in food imports. When one considers the results by group of products, the effects of the phenomenon disappear because Congo's economy is disjointed and suffers from numerous market imperfections. The lack of cohesiveness of this economy – which is reflected in the heterogeneity of price systems, the stabilizing factor of the informal sector, the importance of self-consumption and the low rate of monetization of rural areas – are some of the factors that have actually curbed the spread of the effects of the Dutch disease in the long term in the country (Koutassila, 1998).

Effect of armed conflicts, the tax and customs reform, and the change in the trade system

In the short term: Over the short term, armed conflicts reduced the level of total food imports, although this effect was not significant at the 5% level. This is the same result

that was observed in the case of poultry food imports, but is different from that obtained for cereal, meat and milk imports. In the latter case, the effect of armed conflicts was positive and marginal at the 5% significance level.

Regarding the tax and customs reform, the results show that the effect was negative and significant at the 5% level on total imports and those of poultry. These results can be explained in the short term in terms of the time required for the importers to adjust to the new regulations and procedures that came with CEMAC's tax and customs reform.

With regard to the change in the trade system, the short-term results indicate that the move from a protectionist trade system to a liberal one had a positive impact on total food imports. This effect was not significant at the 5% level. When one looks at the results by group of products, one realizes that the change in the trade system stimulated cereal imports and, especially, those of poultry, where the effect was significant at the 10% threshold. But the change did not stimulate meat and milk imports.

In the long term: The results of the long-term model show that the effect of armed conflicts remained positive but not significant at the 5% level for the total food imports. The overall results suggest that armed conflicts play a stimulating, though marginal, role on total food imports.

As for product groups, the long-term results show that the effects of armed conflicts on meat, poultry and milk imports were positive and significant at the 10% level. For these three categories of food products, such results are not surprising. After all, armed conflicts come with destruction of livestock, the replacement of which takes time, especially in a country like Congo where animal husbandry is essentially done the traditional way.

The tax and customs reform had a positive and non-significant effect on food imports in the long-term. By product group, the results suggest that the effects of this reform were negative and significant at the 10% level for cereal and milk imports. The nature of the products comprising the groups can explain the results.

Finally, the change in trade system had a variable and marginal effect on food imports overall. That was the case of total food imports and those of cereals and milk — which were negatively influenced by this change, while poultry and milk imports were positively influenced. It should be pointed out that the effect of the change in trade system on milk was actually significant at the 5% level.

Effect of food aid

In the short term: Food aid is an important determinant of food imports in the short term. Other things being equal, a 10% increase in food aid increases total food imports by 0.4%. However, the findings by product group show different effects: food aid had a positive and significant effect at the 10% level on meat imports, but a negative effect on poultry and milk imports. Other things being equal, a 10% increase in food aid increases meat food imports by 0.6% and reduces those of poultry by 1% and milk by 0.8%.

In the long term: The results obtained for food aid suggest that it is not significant at the 5% level for the total food imports. Food aid, which arrives massively in the case of

specific products like cereals and milk, depends on the prevailing situation: it often comes during crisis periods. Because of this, it cannot significantly explain the long-term total food imports. By groups of products, however, food aid had a positive and significant impact at the 10% threshold for meat and poultry imports.

Effect of the re-export trade

In the short term: Prices of the products from Angola and the DRC had a significant short-term impact at the 5% level on Congo's total food imports, but this impact was positive for Angolan products and negative for DRC ones: A 10% price increase leads to a 0.5% rise in Congo's food imports in the case of Angola products and a 0.3% fall in the case of DRC products. Thus, an increase in the price of Angolan products is one of the factors that are favourable to the re-export trade in the short term, which is not the case for DRC products. That said, this observation must be qualified if one takes into account food products by groups: the effect of the Angolan products was negative and significant at the 10% level for meat imports, while the effect of the DRC products was positive and significant at the 5% level for meat and milk imports. It can be said, therefore, that the re-export trade with the DRC is favourable although not significant for some products, while the re-export trade is less favourable in the case of Angola if one considers products by groups.

In the long term: The results suggest that only the prices of foods destined for Angola have a negative and significant impact at the 5% level: thus, a 10% price increase in Angola and the DRC reduces total food imports by 0.2% and 0%, respectively. These results suggest that the re-export trade is not possible in the long term to the extent that the increase in the prices of products from the DRC or Angola goes with a fall in the total food imports.

With regard to products by group, the results show that some discrepancies exist between products and even overall results. In the long term, Angolan products had a negative and significant effect at the 5% level on meat and milk imports. Conversely, the effect of DRC products on those imports was positive and significant at the 5% level.

So, while the hypothesis of re-export trade overall has not been verified for the long term, for certain products like meat and milk it does hold for both the long and the short term. Thus, econometric analysis has confirmed the existence of re-export trade between Congo and its neighbours (DRC and Angola) in the short term. However, there is a discrepancy in the findings that can be explained by the fact that trading is done at night so as to avoid administrative controls, which makes it difficult to capture the flows of products. In this connection, the INICA (2005) points out that in view of the multiplicity of taxes (be they customs duties or other types of tax) and the extent of the predatory red tape suffered at the hands of various administrative services (e.g., the border police, sanitation, health, water, forest services, etc.) at the official border posts, a widespread contraband between Brazzaville and Kinshasa is reported to be going on mainly through informal ports that operate mostly at night, for the traffic of both goods and, to a lesser extent, passengers. And even at the official entry points there are flows of goods that are not accounted for, because the two countries have agreed not to search or tax disabled people twice a week.

5. Conclusion and economic policy implications

The aim of our study was to identify all the factors that are capable of explaining the evolution of food imports in Congo. In this respect, several variables were tested. These have to do with the Dutch disease, the need to ensure food security because of the crisis in the agricultural sector, the effect of armed conflict, the re-export trade, and the tax and customs reform.

The econometric analysis carried out in this study showed that the exchange rate of the local currency (the CFA franc), armed conflicts, the re-export trade, per capita income, and the domestic production index represented the principal factors explaining Congo's food imports on the whole.

First, the foreign currency from oil exports leads to a currency appreciation that stimulates food imports, with a loss of competitiveness on the part of the Congolese economy in the short term. This is the effect of the phenomenon known as the Dutch disease. To avoid this negative effect on the economy, the government must manage the oil revenues wisely by investing them in other sectors so as to diversify the economy.

When one considers groups of products, our findings show that Dutch disease had a marginal effect in explaining the evolution of Congo's food imports. Thus, food imports would be boosted by the increase in revenues, which is in line with the hypothesis that food is imported to achieve food security.

Second, our findings show that the effect of armed conflicts on increase in food imports was marginal in relation to the total imports, but significant for certain groups of products. Because of this, the institutionalization of good (political, economic) governance mechanisms would contribute towards preventing armed conflicts, as these have negative effects on the economy.

Third, our findings have highlighted the existence of a re-export trade between Congo and the DRC and Angola in the short term. Such trade flows mostly go through informal channels, which does not help to capture this phenomenon well. Thus, it is essential that the government, research institutions and researchers conduct more robust investigation into this type of trade.

Fourth, the per capita income is a function of the national wealth (GDP). It reflects the country's capacity to import food products and, hence, to ensure food security. Congo gets foreign currency mainly from oil and timber exports and the CEMAC solidarity mechanism. These sources of foreign currency offer the country a guarantee to fund food imports and thus to ensure food security. Although the government can indeed rely on these sources of funding, it should diversify its production system in order to diversify

sources of foreign currency with a view to mitigating the negative impact on the economy of the fluctuations of oil prices on the international market.

Our study indicates that Congo's massive food imports represented a strategy not only for ensuring the country's food security, but also for supplying food products to neighbouring countries, notably the DRC and Angola. On the basis of this finding, recommendations can be put forward that would enable Congo to strengthen its position as a transit country. Congo should make an effort to strengthen the three modes of transport (road, rail and water) as part of its strategy to be better integrated within CEMAC and the Economic Community of the Central African States (CEEAC). Such an enterprise would also increase the positive effect of the tax and customs reform on the country's economy in the long term.

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Appendix A: Results of the ADF, PP and KPSS tests

Results of the unit root tests

Series	Types of tests	Statistics	Decision
Logarithm of per capita food aid	Level ADF (constant and trend)	-3.448 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-7.374 (-3.556)	
	Level PP (constant and trend)	-5.445 (-3.547)	I (0)
	First-difference PP (constant and trend)	-9.605 (-3.551)	
	Level KPSS (constant and trend)	0.152 (0.146)	I (1)
	First-difference KPSS (constant and trend)	0.028 (0.146)	
Logarithm of food prices index	Level ADF (constant and trend)	-2.692 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-3.645 (-3.556)	
	Level PP (constant and trend)	-2.036 (-3.547)	I (1)
	First-difference PP (constant and trend)	-4.095 (-3.551)	
	Level KPSS (constant and trend)	0.056 (0.146)	I (0)
	First-difference KPSS (constant and trend)	0.057 (0.146)	
Logarithm of foreign direct investment	Level ADF (constant and trend)	-2.880 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-4.859 (-3.556)	
	Level PP (constant and trend)	-2.819 (-3.547)	I (1)
	First-difference PP (constant and trend)	-6.640 (-3.551)	
	Level KPSS (constant and trend)	0.135 (0.146)	I (0)
	First-difference KPSS (constant and trend)	0.124 (0.146)	
Logarithm of per capita food imports	Level ADF (constant and trend)	-2.452 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-4.250 (-3.556)	
	Level PP (constant and trend)	-2.068 (-3.547)	I (1)
	First-difference PP (constant and trend)	-6.269 (-3.551)	
	Level KPSS (constant and trend)	0.176 (0.146)	I (1)
	First-difference KPSS (constant and trend)	0.075 (0.146)	
Logarithm of the agricultural production index	Level ADF (constant and trend)	-3.028 (-3.551)	I (1)
	First-difference ADF (constant)	-3.649 (-2.956)	
	Level PP (constant and trend)	-2.700 (-3.547)	I (1)
	First-difference PP (constant and trend)	-5.980 (-3.551)	
	Level KPSS (constant and trend)	0.063 (0.146)	I (0)
	First-difference KPSS (constant and trend)	0.060 (0.146)	
Logarithm of the cereal price index	Level ADF (constant and trend)	-2.885 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-3.787 (-3.556)	
	Level PP (constant and trend)	-3.358 (-3.556)	I (1)
	First-difference PP (constant and trend)	-7.016 (-3.551)	
	Level KPSS (constant and trend)	0.075 (0.146)	I (0)
	First-difference KPSS (constant and trend)	0.051 (0.146)	

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Appendix A Continued

Series	Types of tests	Statistics	Decision
Logarithm of the cereal production index	Level ADF (constant and trend)	-3.675 (-3.551)	I (0)
	First-difference ADF (constant and trend)	-4.534 (-3.556)	
	Level PP (constant and trend)	-2.650 (-3.547)	I (1)
	First-difference PP (constant and trend)	-4.921 (-3.551)	
	Level KPSS (constant and trend)	0.162 (0.146)	I (1)
	First-difference KPSS (constant and trend)	0.116 (0.146)	
Logarithm of the milk prices index	Level ADF (constant and trend)	-2.603 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-5.522 (-3.556)	
	Level PP (constant and trend)	-2.269 (-3.547)	I (1)
	First-difference PP (constant and trend)	-7.706 (-3.551)	
	Level KPSS (constant and trend)	0.165 (0.146)	I (1)
	First-difference KPSS (constant and trend)	0.061 (0.146)	
Logarithm of the index of the prices of animal husbandry products	Level ADF (constant and trend)	-2.138 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-4.345 (-3.556)	
	Level PP (constant and trend)	-2.535 (-3.547)	I (1)
	First-difference PP (constant and trend)	-6.550 (-3.551)	
	Level KPSS (constant and trend)	0.094 (0.146)	I (0)
	First-difference KPSS (constant and trend)	0.052 (0.146)	
Logarithm of the meat production index	Level ADF (constant and trend)	-2.644 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-4.288 (-3.556)	
	Level PP (constant and trend)	-2.354 (-3.547)	I (1)
	First-difference PP (constant and trend)	-6.644 (-3.551)	
	Level KPSS (constant and trend)	0.152 (0.146)	I (1)
	First-difference KPSS (constant and trend)	0.097 (0.146)	
Logarithm of the poultry production index	Level ADF (constant and trend)	-3.416 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-5.239 (-3.556)	
	Level PP (constant and trend)	-3.852 (-3.547)	I (0)
	First-difference PP (constant and trend)	-8.042 (-3.551)	
	Level KPSS (constant and trend)	0.083 (0.146)	I (0)
	First-difference KPSS (constant and trend)	0.064 (0.146)	
Logarithm of the real per capita GDP excluding agriculture	Level ADF (constant and trend)	-2.019 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-2.693 (-1.951)	
	Level PP (constant and trend)	-1.640 (-3.547)	I (1)
	First-difference PP (constant and trend)	-3.248 (-2.953)	
	Level KPSS (constant and trend)	0.173 (0.146)	I (1)
	First-difference KPSS (constant and trend)	0.071 (0.146)	
Logarithm of per capita cereal imports in volume	Level ADF (constant and trend)	-3.068 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-5.775 (-3.556)	
	Level PP (constant and trend)	-4.594 (-3.547)	I (0)
	First-difference PP (constant and trend)	-9.195 (-3.551)	
	Level KPSS (constant and trend)	0.102 (0.146)	I (0)
	First-difference KPSS (constant)	0.176 (0.463)	
Logarithm of per capita milk imports in volume	Level ADF (constant and trend)	-2.988 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-5.424 (-3.556)	
	Level PP (constant and trend)	-4.623 (-3.547)	I (0)
	First-difference PP (constant and trend)	-9.513 (-3.551)	
	Level KPSS (constant and trend)	0.087 (0.146)	I (0)
	First-difference KPSS (constant)	0.263 (0.463)	

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Appendix A Continued

Series	Types of tests	Statistics	Decision
Logarithm of per capita meat imports in volume	Level ADF (constant and trend)	-2.175 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-4.317 (-3.556)	
	Level PP (constant and trend)	-2.367 (-3.547)	I (1)
	First-difference PP (constant and trend)	-6.184 (-3.551)	
	Level KPSS (constant and trend)	0.097 (0.146)	I (0)
	First-difference KPSS (constant and trend)	0.075 (0.146)	
Logarithm of per capita poultry imports in volume	Level ADF (constant and trend)	-2.309 (-3.551)	I (1)
	First-difference ADF (constant and trend)	-4.351 (-3.556)	
	Level PP (constant and trend)	-2.463 (-3.551)	I (1)
	First-difference PP (constant and trend)	-6.022 (-3.551)	
	Level KPSS (constant and trend)	0.241 (0.146)	I (1)
	First-difference KPSS (constant and trend)	0.053 (0.146)	
Logarithm of the exchange rate* of DRC prices	Level ADF (constant and trend)	-2.016(-3.553)	I (1)
	First-difference ADF (without constant and trend)	-2.046(-1.951)	
	Level PP (constant and trend)	-1.772(-3.548)	I (1)
	First-difference PP (without constant and trend)	-2.004(-1.951)	
	Level KPSS (constant and trend)	0.164(0.146)	I (0)
Logarithm of the exchange rate* of Angolan prices	Level ADF (constant and trend)	-9.655(-3.553)	I (0)
	First-difference ADF (constant and trend)	-3.794(-3.558)	
	Level PP (constant and trend)	0.532(-3.548)	I (1)
	First-difference PP (constant and trend)	-4.873(-3.553)	
	Level KPSS (constant and trend)	0.162(0.146)	I (0)
	First-difference KPSS (constant)	0.153(0.146)	
Logarithm of the real effective exchange rate	Level ADF (constant and trend)	-3.228(-3.548)	I (1)
	First-difference ADF (constant and trend)	-7.560(-3.553)	
	Level PP (constant and trend)	-3.152(-3.548)	I (1)
	First-difference PP (constant and trend)	-8.843(-3.553)	
	Level KPSS (constant and trend)	0.104(0.146)	I (1)
	First-difference KPSS (constant and trend)	0.471(0.146)	

Appendix B: Results of cointegration tests (Johansen tests)

Overall food imports equation

Sample: 1970-2004

Included observations: 33

Test assumption: Linear deterministic trend in the data

Series: IMAP1 IPA1 FPI1 RPH1 RER1 IDE1 RERIPCANG1 RERIPCRDC1 AIDEA1

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.952323	379.3952	192.89	205.95	None **
0.917019	278.9659	156.00	168.36	At most 1 **
0.879280	196.8241	124.24	133.57	At most 2 **
0.827410	127.0527	94.15	103.18	At most 3 **
0.547609	69.07702	68.52	76.07	At most 4 *
0.397910	42.90112	47.21	54.46	At most 5
0.352131	26.15861	29.68	35.65	At most 6
0.301292	11.83441	15.41	20.04	At most 7
9.55E-05	0.003151	3.76	6.65	At most 8

*(**) denotes rejection of the hypothesis at the 5%(1%) significance level
L.R. test indicates 5 cointegrating equation(s) at the 5% significance level

Cereal imports equation

Sample: 1970-2004

Included observations: 33

Test assumption: Linear deterministic trend in the data

Series: VOCEREALES1 IPCEREALES1 RER1 IDE1 AIDEA1 RERIPCANG1 RERIPCRDC1

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.801892	171.4402	124.24	133.57	None **
0.702331	118.0150	94.15	103.18	At most 1 **
0.616107	78.02657	68.52	76.07	At most 2 **
0.451288	46.43265	47.21	54.46	At most 3
0.398704	26.62664	29.68	35.65	At most 4
0.239396	9.840612	15.41	20.04	At most 5
0.024259	0.810420	3.76	6.65	At most 6

*(**) denotes rejection of the hypothesis at the 5%(1%) significance level
L.R. test indicates 3 cointegrating equation(s) at the 5% significance level

Meat imports equation

Sample: 1970-2004

Included observations: 33

Test assumption: Linear deterministic trend in the data

Series: VOVI1 IPVIANDE1 IPPE1 RPH1 RER1 IDE1 AIDEA1 RERIPCANG1 RERIPCRDC1

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.934146	314.5551	192.89	205.95	None **
0.845359	224.7847	156.00	168.36	At most 1 **
0.807517	163.1852	124.24	133.57	At most 2 **
0.623549	108.8095	94.15	103.18	At most 3 **
0.559373	76.56960	68.52	76.07	At most 4 **
0.488626	49.52424	47.21	54.46	At most 5 *
0.381600	27.39267	29.68	35.65	At most 6
0.247847	11.53221	15.41	20.04	At most 7
0.062600	2.133276	3.76	6.65	At most 8

*(**) denotes rejection of the hypothesis at the 5%(1%) significance level
L.R. test indicates 6 cointegrating equation(s) at the 5% significance level

Poultry imports equation

Sample: 1970 2004

Included observations: 33

Test assumption: Linear deterministic trend in the data

Series: VOVO1 IPVOLAILLES1 IPPE1 RPH1 RER1 IDE1 AIDEA1 RERIPCANG1 RERIPCRDC1

Lags interval: 1 to 1

Eigenvalue	Likelihood Ratio	5 Percent Critical Value	1 Percent Critical Value	Hypothesized No. of CE(s)
0.925761	313.7666	192.89	205.95	None **
0.842343	227.9514	156.00	168.36	At most 1 **
0.783040	166.9893	124.24	133.57	At most 2 **
0.733537	116.5640	94.15	103.18	At most 3 **
0.556017	72.92088	68.52	76.07	At most 4 *
0.416164	46.12591	47.21	54.46	At most 5
0.387558	28.36744	29.68	35.65	At most 6
0.270451	12.18751	15.41	20.04	At most 7
0.052559	1.781682	3.76	6.65	At most 8

*(**) denotes rejection of the hypothesis at the 5%(1%) significance level
L.R. test indicates 5 cointegrating equation(s) at the 5% significance level

Milk imports equation

Sample: 1970-2004

Included observations: 33

Test assumption: Linear deterministic trend in the data

Series: VOLAIT1 IPLAIT1 RPH1 RER1 IDE1 AIDEA1 RERIPCANG1 RERIPCRDC1

Lags interval: 1 to 1

	Likelihood	5 Percent	1 Percent	Hypothesized
Eigenvalue	**Ratio**	**Critical Value**	**Critical Value**	**No. of CE(s)**
0.925360	247.8378	156.00	168.36	None **
0.787931	162.2001	124.24	133.57	At most 1 **
0.670318	111.0223	94.15	103.18	At most 2 **
0.523019	74.40462	68.52	76.07	At most 3 *
0.479997	49.97541	47.21	54.46	At most 4 *
0.427624	28.39603	29.68	35.65	At most 5
0.259729	9.983374	15.41	20.04	At most 6
0.001786	0.058975	3.76	6.65	At most 7

*(**) denotes rejection of the hypothesis at the 5%(1%) significance level
L.R. test indicates 5 cointegrating equation(s) at the 5% significance level

Appendix C: Results of diagnostic tests

Error correction model

Type of diagnostic test		Null hypothesis	Total	Cereals imports	Meat	Poultry	Milk
Test of coefficients	Limitations on coefficients (Wald test)	Equality of coefficients	++	++	++	++	++
Test of residues	1. Normality test	Normality of residues	••	••	••	++	••
	2. Breusch-Goldfrey autocorrelation test (LM test[b])	Lack of autocorrelation of errors	••	••	••	••	••
Test of specification and stability	1. Structural break-up (Chow's 1990 test)	Homogeneity or stability	••	••	-	••	••
	2. Ramsey Reset test	Good specification	••	++	••	••	••

(+) indicates the rejection of the null hypothesis of the null hypothesis at the 5% level; (ÝÝ) indicates the acceptance of the null hypothesis at the 5% level. (a) As some coefficients are negative, the test was carried out by taking the absolute value of coefficients. (b) The LM test is used with two lags. (-) means that it has not been able to carry out the test.
Source: Authors' calculations from the results obtained using *EVIEWS*.

Models estimated using the OLS

Type of diagnostic test		Null hypothesis	Total imports		Cereals	Meat	
Poultry	**Milk**						
Test of coefficients	Limitations on coefficients (Wald test)	Equality of coefficients	++	++	++	++	++
Test of residues	1. Normality test	Normality of residues	••	••	••	••	••
	2. Breusch-Goldfrey autocorrelation test (LM test[b])	Lack of autocorrelation of errors	••	••	••	••	••
Test of specification and stability	1. Structural break -up (Chow's 1990 test)	Homogeneity or stability	••	••	••	••	••
	2. Ramsey Reset test		Good specification		-	••	-
-	-						

(+) indicates the rejection of the null hypothesis at the 5% level; (ÝÝ) indicates the acceptance of the null hypothesis at the 5% level. (a) As some coefficients are negative, the test was carried out by taking the absolute value of coefficients. (b) The LM test is used with two lags. (-) means that it has not been able to carry out the test.
Source: Authors' calculations from the results obtained using *Eviews*.

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