

BENIN – THE IMPACT OF THE REAL EXCHANGE RATE ON MANUFACTURING EXPORTS IN BENIN

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Abstract

The objective of this study is to assess developments in Benin's external competitiveness and hence its exchange rate policy. It analyses the relationship between the exchange rate regime and the performance of exports in Benin, a member country of the CFA Franc Zone for the 1980-2003 period. The study focuses, in particular, on the impact of the exchange rate policy differential on trade between Benin and Nigeria by incorporating informal trade data. Consequently, four indicators of the real effective exchange rate were designed: on the one hand, an indicator of the internal real exchange rate to measure the evolution of consumer prices with respect to the

wholesale price index for the United States; on the other hand, three indicators of the real effective exchange rate were developed: a real effective exchange rate index for exports, a real effective exchange rate index for imports and a real effective exchange rate for trade. These indicators allow us to explore the ways and means of diversifying and making export activities profitable in Benin, given that its export base is relatively poorly diversified, and to raise the question of the future of re-export trade towards Nigeria. This study underscores the difficulty of obtaining a comprehensive and detailed real exchange rate index.

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The Impact Of The Real Exchange Rate On Manufacturing Exports In Benin

By

Mireille Linjouom

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INTRODUCTION

In recent years, competitiveness has become the new buzzword of decision makers' economic policy. This concept, applied to macroeconomics with regard to the competitiveness of the national economy is thus defined as the economy's capacity to sell its products abroad for profit (Henner, 1997). In this context, competitiveness is equivalent to a strong performance of the national economy in relation to other countries. This calls for an increase in the export rate and a reduction in the import rate so as to improve the trade balance while maintaining economic growth. To this end, it is necessary to enhance the profitability of export activities and import substitution activities to foster producers' entry into these sectors.

In fact, the weak external competitiveness of the West African Economic and Monetary Union (WAEMU) economies and the failure of real adjustment policies led African countries in the CFA Franc Zone to devalue their currency by 50 percent in January 1994. In addition, with the opening up of (developed or non-developed) economies to international competition, Benin's competitiveness as well as its products and firms must be strengthened to enhance the country's economic integration into a unified world market. As a result, the question of macroeconomic competitiveness becomes an imperative.

The purpose of this study is to assess the evolution of Benin's economic competitiveness and hence its exchange rate policy, given that the requirements for managing a common currency do not facilitate the implementation of a monetary policy that is adapted to changing international trade. In a world where countries are increasingly diversifying the structure of their international trade and where the major currencies are floating, it is naturally more appropriate to determine the real effective exchange rate (REER), one of the most relevant indicators of macroeconomic competitiveness, to measure changes in the relative prices of international non-tradable goods (compared to tradable goods). In fact, this assessment allows us to understand situations of gains and losses in competitiveness and hence, of undervaluation and overvaluation of the CFAF currency in Benin.

In this perspective, the impact of the real exchange rates on Benin's foreign trade developments with its principal trade partners is assessed with particular attention to its trade dependence on its neighbor, Nigeria, during the 1980–2003 period. In fact, in Nigeria, the inconvertibility of the currency, the discount in the parallel market exchange rate compared to the official rate, the centralized exchange allocation to the official rate, the prohibitions of essential goods imports and competitiveness gains due to the depreciation of the Naira versus the CFAF currency are all elements that encourage informal trade. As elsewhere, economic policies and their assessments are based on official statistics which exclusively reflect the formal sector of Benin's economy; in our study, we intend to include informal sector data in the analysis of cross-border trade to better capture the reality of Benin's economy. In addition, all the growth potential of the informal sector prevents its assimilation with a simple tendency to operate at the fringes; it is evident that Benin's development cannot completely replicate the standard model represented by the Western World.

The objective of such an approach is thus to avoid skewing the assessment of Benin's trade transaction performance and to facilitate the formulation of policies and efficient economic objectives to ensure, among others, a rapid return to competitiveness.

Thus, conflicts between countries like Nigeria and Benin are all the more significant because these countries are part of the same regional space, ECOWAS, they do not have the same monetary regime, and they implement very different structural adjustment policies.

For the purposes of our study, we designed four relatively comprehensive and detailed indicators of the real effective exchange rate (*REER*): an index of the internal real effective exchange rate; and three indices of the real effective exchange rate, namely, a REER for exports, to measure the evolution of Benin's competitiveness in export markets, in terms of imports origin, a REER which reflects the competitiveness of the country considered

in its own market, and finally, a composite trade *REER* which measures global competitiveness, making it possible to associate both the weight of suppliers in imports and those of competitors in export markets. After reviewing their statistical properties, we will discuss the limitations of the methodology used.

The base period chosen is 1990. This year was chosen as base year because it is halfway between the impact of the exogenous shocks of the mid-80s and the devaluation shock of 1994. The real effective exchange rate derived with 1990 as base year thus helps assess the misalignment over the entire 1980-2003 period. We will focus primarily on four periods in Benin's economic history: the economic and financial crisis period (1986-1989); the Structural Adjustment Program (SAP) implementation period (1989-1993), the post-devaluation period (1994-1998), and the economic recovery period (1999-2003).

Using graphic analysis, the periods of overvaluation and undervaluation are highlighted and linked to the macroeconomic policies implemented by Benin and its partners. The interpretation of the evolution of the indices of the exchange rate depends on the type of nominal bilateral rate chosen. Conventionally, indirect exchange rate is the retained method of calculation. Thus, a depreciation of the national currency translates into a reduction of the indirect rate. According to our methodology, the *REER* is the weighted sum of the *NEER* multiplied by relative prices. An increase in *REER* indices (appreciation in the rate) calculated from the indirect rate, indicates a competitiveness loss, while a reduction (depreciation of the rate) indicates a competitiveness gain.

The first part analyses the composition of exports of Benin's economy, questioning the nature and the impact of the dynamism of the informal cross-border trade with Nigeria and then analyses the competitiveness of the export sector through an analysis of the deformation of relative prices in the domestic sector compared to the exposed sector. Next, the analysis of the competitiveness of Benin's economy leads us to study the evolution of price competitiveness based on the country's foreign trade developments with its trading partners, on bilateral exchange rates (nominal and real) developments, general price level developments in Benin and in partner countries, by examining the determinants of the parallel exchange rate of the Naira. Finally, the last part explores the different actions for improving Benin's international competitiveness, in particular, its situation with Nigeria.

I. THE STRUCTURE AND PERFORMANCE OF EXPORTS

Benin has a very limited variety of export products because of the poor diversity of its agricultural products. Its exports include local products and the re-export of imported goods. The local products exported are limited in number and are, for the most part, vegetables (Cottonseed, palm oil, shea butter, pineapples, cashew nuts, etc.).

Manufactured products are few and consist of raw fabric, pasta, and pharmaceutical products, among others. Mining products consist essentially of oil and cement.

The Structure and Composition of Exports

Benin's exports include the export of local products and the re-export of imported goods.

a) *Local Production for Export*

The overall value of exports for the 1992 to 2003 period amounted to a total of CFAF 1.326 billion for an export volume of close to 3, 967 thousand tons, or an annual mean value of CFAF 120 billion in exports. Benin's export sector was in full expansion from 1992 to 2003. Thus, between 1992 and 1993, recorded performance was 115 percent, compared to 74.7 percent between 1993 and 1994, reflecting the direct effect of the boost given Benin's economy by the economic policy reforms launched in 1990. The effects of the 1994 devaluation, whose objectives included increasing exports, continued with an average annual mean variation of 27 percent over the period.

Table 1: Benin - Exports in Value by Product from 1992-2003
(In billion CFA Franc)

	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003 ^{1/}	Sous total produit	Part relative
Coton égrené	14.6	37.6	57.6	64.1	107.3	87.7	108.0	106.5	94.3	96.8	93.4	80.9	948.8	71.6
Pétrole Brut	3.3	4.5	5.8	4.6	5.8	4.2	2.5	0.9	0.0	0.0	0.0	0.0	31.6	2.4
Graine de Coton	1.7	1.7	6.8	5.0	6.9	6.0	13.5	8.5	8.2	5.5	3.1	3.5	70.3	5.3
Noix de Cajou	0.6	4.0	4.7	5.3	6.1	8.0	2.9	9.3	12.4	8.7	11.9	6.7	80.6	6.1
Huile de palme	0.2	0.2	1.7	0.0	0.0	0.0	2.1	0.0	0.0	0.0	0.1	0.1	4.5	0.3
Ciment	0.5	0.7	3.1	1.0	0.4	0.7	0.0	0.0	1.4	0.7	1.1	1.3	10.8	0.8
Manioc	0.0	0.0	0.1	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	0.6	0.0
Total Produits	20.9	48.8	79.8	80.0	126.5	106.6	129.0	125.2	116.4	111.7	109.8	92.4	1147.2	--
Autres	2.1	0.7	6.7	8.7	5.7	1.7	8.1	13.4	17.8	38.7	57.7	17.4	178.9	13.5
Total export	23.0	49.5	86.5	88.8	132.2	108.3	137.1	138.7	134.2	150.5	167.5	109.8	1326.1	100.0

Source : SEC/DSEE/INSAE

^{1/} estimation des 7 premiers mois

As Table 1 shows, over the 1992-2003 period, cotton and cotton products dominated Benin's exports at 71.6 percent. Cotton from Benin, the main agricultural product exported over the entire period is reputed to be the best in all of French-speaking Africa and constitutes the Government's major source of foreign exchange. Benin is one of the main cotton producing countries in Africa, accounting for 2.5 percent of the world market, compared to 3 percent for Côte d'Ivoire in 1992. Today, cotton is the only export crop of significant economic importance. It expanded rapidly (from 45,000 tons in the 1980s, it reached its peak in 1995 with more than 277,000 tons, before stabilizing at 144,000 tons in 2002) compared to an existing ginning capacity of 160,000 without rain. In spite of Benin's comparative advantage in cotton production, the activity is still rather vulnerable in terms of financial stability. In 1992, the value of exported cotton was about CFAF 14.6 billion; it increased by close to CFAF 85 billion on average over the 1994-1998 period to more than CFAF 94 billion on average over the 1999-2003 period. These results reflect the impact of the reform of Benin's trade sector, specifically, cotton sector reform, which was the principal source of foreign exchange for the economy between 1992 and 2003. However, the relative decline in production recorded from 1996 is proof that this sector faces difficulties today.

Edible fruits, including cashew nuts, have been the second export product since 1999 and represent 6.1 percent of total exports for a total value of CFAF 80.6 billion over the period studied. On the international market, Benin is ranked third, after Guinea-Bissau and Tanzania, for the quality of its nuts. This is a promising sector whose crops are among those that command the best prices on the international market. Export sales of this product grew by 82.5 percent in value, increasing from CFAF 5.4 billion on average per year over the 1994-1998 period to CFAF 9.8 billion on average over the 1999-2003 period, despite the asymmetry between the values and the quantities exported — which have not changed proportionately — and the significant decline in the quality of Benin's nuts at the international level. The cashew nut sector is thus showing strong growth in world markets, especially in the U.S. market, but in European and Japanese markets as well.

Over the 1992 to 2003 period, oleaginous seeds and fruits, including cottonseeds, were the third export product after ginned cotton. Between 1992 and 2001, cottonseed exports amounted to CFAF 70.3 billion, representing 5.3 percent of total exports. On average, Benin's export sales amounted to CFAF 7.6 billion and CFAF 5.4 billion over the 1994-98 and 1999-2003 periods, respectively. Ginned cotton and cottonseeds represented 77 percent of Benin's total export sales.

After cotton, crude oil was the second product exported between 1992 and 1993. From 1994 on, this product lost its position as second highest export to oleaginous grains and fruits, various seeds and fruits. However, crude oil represents 2.4 percent of total exports for a total amount of CFAF 31.6 billion over the period observed and constitutes the bulk of the extractive industries. However, as a result of the oilfields drying up and of the poor output of the wells being drilled, production fell gradually from 44.7 million barrels in 1997 to 40, 933 barrels in 2001 and zero barrels in 2000.

Tobacco and tobacco products account for 1.7 percent or CFAF 16.9 billion; while wood and coal, which amount to CFAF 9.7 million, represent 1 percent of exports.

Fats and oils, consisting mostly of soy oil, palm oil, sunflower oil and cocoa oil, amounted to CFAF 4.5 million over the 1992-2003 period, representing 0.3 percent of export revenues. First on the list of Benin's exports in the 1970s, palm oil definitely lost its first place position to cotton products from 1988 on, and is now ranked last among the four major export groups identified. Aging plantations, scarce rainfall and the absence of a real development policy for this crop largely explains the decline in the palm oil sector.

Benin's official exports also include other goods such as cement and related products; however, in spite of rich deposits, this sector is not well organized and is therefore not very aggressive. Consequently, average cement exports amount to less than CFAF 1 billion per year. The same goes for manufactured products such as Fancy fabric from SOBETEX, which used to be exported in the recent past, but has practically disappeared today. The disappearance of manufactured goods confirms the fact that the industrial sector has gradually become less competitive compared to the Nigerian market.

With respect to diversifying the export base, promising sectors include pineapples, cassava and shea. Thus, pineapple exports have reached a substantial level, with a volume of 286 thousand tons since 1998. In 1999, the volume of exports fell to 246 thousand tons. However, since 2000, exports have recovered, with volumes increasing to 461.5 thousand tons in 2000, and 658 thousand tons in 2001, an upward adjustment of 42.5 percent, and 1023 thousand tons in 2002. Cassava, contrary to pineapple has declined notably in recent years after a substantial increase between 1994 and 1996. Indeed, cassava exports gradually increased from 755 tons in 1993 to a peak of 6,421 tons in 1996. From 1997, exports fell considerably to a low of 297 tons in 2003. Shea, an important raw product for pharmaceutical and cosmetic industries, is an oleaginous product that exists only in Africa. Benin's shea sector is relatively limited despite the various uses of shea butter and its exclusiveness to Africa.

Benin, therefore, has very few clients because of the very limited number of tradable products.

b) The Re-export of Imported Goods

Re-export products are products that were imported initially but were destined ultimately for another country. The majority of re-export activities take place in the informal sector towards ECOWAS and WAMU countries, in particular towards Nigeria. Indeed, taking advantage of its proximity to Nigeria, Benin has developed trade opportunities with its big neighbor. These re-export activities are the most important link in Benin-Nigeria trade, and constitute a significant source of income for Benin, representing close to 25 percent of customs revenue and 13 percent of the country's total tax revenue (LARES-IRAM, 2004). These re-exports currently represent 70 percent of Benin's official exports, and diversion strategies, through parallel markets and the formal banking system encourage these flows. About 50 percent of Benin's chronic trade deficit is attributable to these re-exports.

Benin's re-exports towards Nigeria are essentially products that are officially prohibited and highly taxed when imported into Nigeria. These products are rice, milk, wheat flour, vegetable oil, sugar, tomato concentrate, cotton fabric for loincloths (super wax from Holland, uni wax, TOGOTEX, SOBETEX fabric, bazins etc.), second hand clothes, batteries, used cars, tires, frozen chicken, cigarettes, rice and luxury goods.

A large percentage of the products imported are re-exported either officially or fraudulently. According to the estimate of non-recorded trade in Benin prepared by INSAE in 2001, Table 2

indicates that the overall value of re-exports amounted to CFAF 93.3 billion on average over the 1995-2003 period. According to official statistics for 1992-2001, these same products were officially re-exported to ECOWAS and WAMU countries for a total of CFAF 45.6 billion with the re-export volume increasing over the period under study (INSAE, 2002). An analysis of Benin's foreign trade data shows that close to 51 percent of imports destined for re-export evade the official sector, thus largely undermining Benin's trade with other countries. This is the case with trade with Nigeria, which occurs essentially through informal channels.

Table 2: Benin – Principal Re-export Products, 1995-2002

	1995	1996	1997	1998	1999	2000	2001	2002
<i>(en volume)</i>								
Huile alimentaire	305.3	396.6	441.0	4909.4	9382.0	3949.8	3211.2	4299.8
Volaille morte	3208.3	2539.3	3660.6	11249.0	29550.0	14387.5	13970.2	16778.3
Boissons alcoolisées	797.7	2592.9	2321.8	3430.0	4363.2	5166.0	5439.8	4819.7
Produits laitiers	883.0	2933.6	4499.0	6928.5	6098.0	5793.1	6117.5	5823.9
Conserves tomates	899.0	2625.7	3715.9	13331.8	12300.4	5387.6	5446.8	4074.2
Véhicules	5222.8	8006.6	9383.9	8375.6	7373.5	6193.7	6094.6	7289.2
Friperies	11265.9	17202.5	22134.8	18504.4	15974.7	11278.1	12969.9	15200.7
Sucre	9716.7	0.0	0.0	13640.9	21651.9	0.0	5954.3	8032.3
Tissus et confections	6407.3	9914.8	13208.8	8113.0	6744.5	7445.9	9389.3	8018.5
Tabacs cigarettes	424.8	351.6	517.3	374.7	313.0	122.1	88.7	135.0
Riz	121892.8	72047.8	18381.9	16300.0	3249.5	1569.5	2101.6	2982.1
Autre	29725.5	15087.3	20039.4	23873.5	32453.0	43324.2	43039.9	62549.8
Total	190749.1	133698.7	98304.4	129030.8	149453.7	104617.6	113823.9	140003.4
<i>(en milliards de Francs CFA)</i>								
Huile alimentaire	0.2	0.2	0.3	2.2	5.1	1.6	0.9	0.5
Volaille morte	1.8	1.5	2.2	9.4	30.2	11.0	10.5	11.3
Boissons alcoolisées	0.9	2.4	2.2	3.2	4.4	3.2	3.3	3.2
Produits laitiers	1.0	3.2	5.1	8.3	7.1	7.7	8.6	7.9
Conserves tomates	0.6	1.2	1.9	6.7	8.1	4.7	4.5	3.3
Véhicules	12.4	13.1	16.4	17.4	15.9	14.4	14.1	16.2
Friperies	5.4	10.5	15.6	13.4	13.7	8.8	9.5	11.0
Sucre	3.7	0.0	0.0	3.9	4.3	0.0	1.9	2.3
Tissus et confections	13.7	19.2	26.8	20.4	17.1	12.9	15.0	3.9
Tabacs cigarettes	2.5	1.8	2.9	1.9	1.8	0.6	0.4	0.6
Riz	30.3	20.0	5.1	4.2	0.9	0.3	0.4	0.5
Autre	7.7	6.3	9.1	9.7	12.1	25.2	27.6	30.0
Total	80.1	79.5	87.7	100.8	120.6	90.5	96.7	90.7

Source: INSAE/DSEE/SEC et LARES/IRAM (2004)

In 1995, work related to the summit of French-speaking countries led to massive imports of re-export products; consequently, some machines and vehicles that were temporarily registered were re-exported. The situation returned to normal from 1996 on, and from 1996 to 1999, the re-export trend was on the rise, with an annual average growth rate of 11 percent in value over the period. As a result of the implementation of the WAMU Common External Tariff (UMOA CET), re-export trade towards Nigeria declined by close to 30 percent of the volume of re-export products in 2000. However, analysis by product reveals strong growth in re-export trade in 2001 and 2002. This is the case with second hand clothes, which grew in volume (15 percent and 17 percent) and in value (8 percent and 15 percent). The same trend was observed in 2002 for cigarettes (64 percent increase in value and 52 percent in volume), vegetable oils (46 percent and 34 percent), used cars (15 percent and 20 percent) and sugar (27 percent and 35 percent). This expansion in re-export trade is attributable to the recent tightening of Nigeria's trade policy. Ultimately, the CET had a negative impact on re-export during its first year of implementation without, however, determining the level of re-export trade, considering the fluctuations in Nigerian customs policy and the resilience of the different operators.

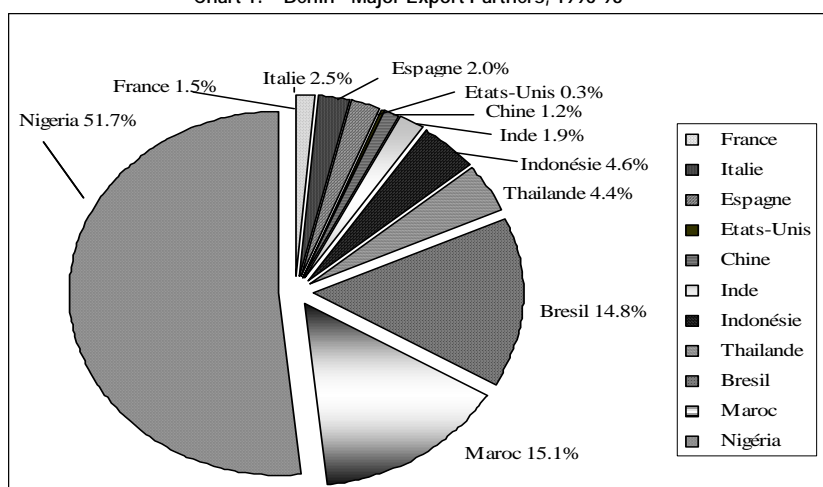
According to a study by the Ministry of Economy and Finance, the expansion of the CET to ECOWAS will translate into an 18.5 percent increase in the volume of Nigerian imports from the sub-region. This provides an opportunity for Benin, which has enjoyed a long tradition of trade with Nigeria, as long as all its industries develop the capacity to meet this new demand in terms of specialization. Currently, Benin's industries are less competitive, compared to Nigerian industries, in all industrial sectors, except for sectors such as "food and tobacco", "wood work" and "metal works" which are more competitive (Agbodjan, 2001).

Destination of Export Products

Exports include the sale of local products and the re-export of products such as automobiles, machines, mechanical equipment, electrical equipment and supplies. In general, crude oil is exported to several countries referred to as mixed origin of oil products (*Origines Mélangées des Produits Pétroliers*) for production. Cottonseeds are often exported to Spain and Italy, cashew nuts to India, palm oil to the Netherlands and Cameroon. Cement is sold mostly to Nigeria, Niger and Burkina Faso. France, the United Kingdom, Denmark, Senegal, Belgium, Holland, and Switzerland purchase shea nuts and almonds.

It should also be noted that Benin's foreign trade data largely underestimates its trade with some countries. This is the case with respect to trade with Nigeria, which is conducted essentially through informal channels. Indeed, according to official trade statistics, Nigeria ranks eighth among Benin's clients and provides 5 percent of export receipts. However, by incorporating into official data the findings of the survey on informal import/export trade with Nigeria, jointly conducted by CAPE and LARES with support from INSAE (2001), Nigeria appears as Benin's primary client, absorbing close to 51.7 percent of exports. Data analysis reveals the following classification of Benin's major clients:

Chart 1: Benin - Major Export Partners, 1996-98



Source: FMI, *Direction of Trade* and author's calculations

Benin sells 15.1 percent of its exports to Morocco and 14.8 percent to Brazil. It is worth mentioning that trade relations are imbalanced between Benin and its major suppliers such as France, the USA and China, which account for 44 percent of imports and only purchase 3 percent from Benin.

Against this backdrop, we will now analyze the competitiveness of Benin's export sector using a measure of domestic real exchange rate.

II. DETERMINATION OF THE DOMESTIC REAL EFFECTIVE EXCHANGE RATE

To analyze the competitiveness of the export sector in developing countries, economists prefer to use a measure of the domestic real exchange rate that relates the relative price of non-tradable goods to that of tradable goods:

$$E = \frac{P_N}{P_T}$$

where P_T and P_N represent the domestic price index for tradable and non-tradable goods, respectively. In the absence of data on domestic prices of tradable goods (P_T), an indicator of the prices of tradable goods on the world market (P_T^W) is used. According to empirical literature on the measure of the real exchange rate in developing countries (Edwards (1989), Ghura and Grennes (1993)), proxy variables for P_N and P_T , are Benin's consumer price index (CPI) and the US wholesale price index (IPGUS), respectively. Thus:

$$TCER_{INT.} = \frac{P_N}{eP_T^W} = \frac{IPC}{eIPG^{US}}$$

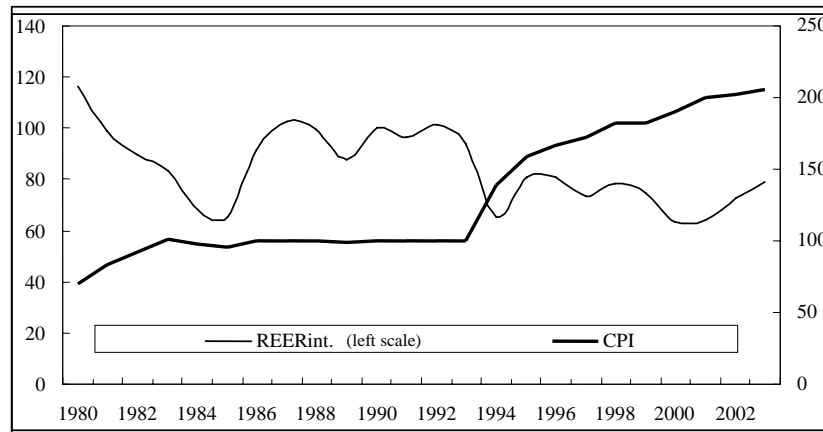
where e represents the nominal exchange rate expressing the value of the dollar in CFA currency.

In other words, the indicator of the real domestic exchange rate selected is the evolution of the ratio of consumer prices (representing prices in the sheltered sector) to the US wholesale price (representing prices in the sector exposed to international competition).

An increase in the domestic real exchange rate usually indicates profitability loss in the exposed sector. A price increase in the sheltered sector implies a resource reallocation towards this sector. A relative price decrease in the exposed sector will hamper supply of such products. In addition, an increase in consumer prices will tend to be reflected in salary increases, which will result in an increase in production unit prices, if productivity remains constant.

Chart 2 allows a breakdown of the 1980-2003 period into five sub-periods. Thus, between 1980 and 1986, the real domestic exchange rate declined by 3.5 percent on an annual basis as a result of a consumer price decline of a greater extent than US wholesale prices. This increase is attributable to an increase in the export sector's margins as a result of gains from oil production.

Chart 2: Benin – Evolution of the Real Domestic Exchange Rate, 1980-2003
(Index base 100 = 1990)



Source: Author

Between 1986 and 1989, the domestic real exchange rate increased by 9.1 percent as a result of the economic slowdown. This real appreciation reflects profitability laws in the export sector due to a price decline on the international market for the major commodities. From 1990 to 1993, the structure of the domestic real exchange rate was still erratic with a reduced appreciation rate 2 percent on average over the period, owing to the initial effects of the SAP. Devaluation resulted in competitive gains of 1.9 percent on average on a yearly basis over the 1994-1998 period, despite the upward trend of inflation (13.4 percent on average per year over the period). In the recent period from 1999-2001, the domestic real exchange rate continued its downward trend, confirming the recovery of Benin's external competitiveness, with gains of 6.2 percent on average per year over the period as a result of strong

performance in export areas such as cotton and related products and cashew nuts. From 2002, the trend was reversed because of persistent inflation caused not only by intermediary goods imports and high transaction costs, but also by the rigidity of the productive structure and by illicit exports of basic food products.

III. ESTIMATING THE EXTERNAL REAL EFFECTIVE EXCHANGE RATE (REER)

We shall review the various steps for calculating the real effective exchange rate (*REER*), which is a synthetic index consisting of two components:

- The effective component of the exchange rate is obtained by calculating the average of the indices of the exchange rate of the currency of the country under study, in this case Benin, expressed in the currency of the countries with which it trades. This average is weighted by the respective weights of its trade partners. The result is the *NEER*, which provides the price of the currency in relation to a representative basket of currencies.
- The real component of the exchange rate is obtained by calculating the ratio of a domestic price index to an external price index representative of the country's trade. The real effective exchange rate is, therefore, the *NEER* corrected by the fluctuations of Benin's production costs in relation to those of its partners.

Three indicators of the real effective exchange rate will be calculated to measure the competitiveness of Benin's economy: a real effective exchange rate index for exports, a real effective exchange rate index for imports and a real effective exchange rate index for trade. Indeed, Benin is a country with a relatively diversified export base, with its geographical location playing a significant role in this case. It is for this reason that by using a weighting for exports to these main trade partners, the real effective exchange rate indicator for exports reflects its external competitiveness. A reduction of this index, at a given nominal exchange rate, shows that domestic prices increase at a slower pace than the prices of the partner countries that receive Benin exports.

The use of a weight based solely on the origin of imports helps to define a real effective exchange rate index, which reflects Benin's competitiveness in its domestic market. Consequently, a drop in the real effective exchange rate index weighted for imports shows, at a given nominal exchange rate, that domestic prices vary more slowly than the prices of the main partners from where Benin imports. This suggests that the price competitiveness of domestic import substitution activities is increasing. The use of double weighting, based on the trade partner countries and on the competitor countries, helps in the calculation of a real effective exchange rate index as an indicator of the overall competitiveness of costs and prices at the international level.

The data needed for the calculation of real effective exchange rates are:

- The nominal bilateral exchange rates for Benin and its main trade partners in relation to a reference currency, generally the US dollar.
- Consumer price indices.
- The share represented by trade partners in Benin's trade for the choice of the weight.

Estimating the Bilateral Nominal Exchange Rates between Benin and its Trade Partners.

In the first step, we consider BER_i ($i=1...n$) which represents the nominal exchange rates between a country's currency and those of its major trade partners, indexed i , during the period t . We are therefore going to calculate Benin's nominal bilateral exchange rates (indirect exchange rate) and the corresponding *IBER* indices ($i=1...n$) (base 1990=100) from the bilateral exchange rates pegged to the American dollar (indirect exchange rate) published by International Financial Statistics.

Table 3 shows the evolution of the nominal bilateral exchange rates of the CFA Franc in relation to the currencies of Benin's major trade partners during the significant periods of its economic history.

Table 3: Benin and its trade partners: Evolution of nominal bilateral exchange rates, 1980 – 2003 (on average over the period)

	1986-89	1990-93	1994-98	1999-03
<u>Developed countries</u>				
French Franc	99.9	99.9	50.0	48.6
Italian Lira	98.2	107.5	68.3	64.5
Pesetas	105.3	105.1	66.4	65.7
dollar	86.3	98.8	49.8	41.0
<u>Developing countries</u>				
Chinese Yuan	66.1	110.2	87.2	70.8
Indian Rupee	68.4	133.7	100.2	107.7
Indonesian Rupee	74.2	106.0	86.3	196.5
Bath	86.9	98.3	56.5	66.1
Dirham	89.4	104.2	55.0	51.9
Naira	42.0	162.4	135.7	561.2

Source: IMF *International Financial Statistics*, European Central Bank

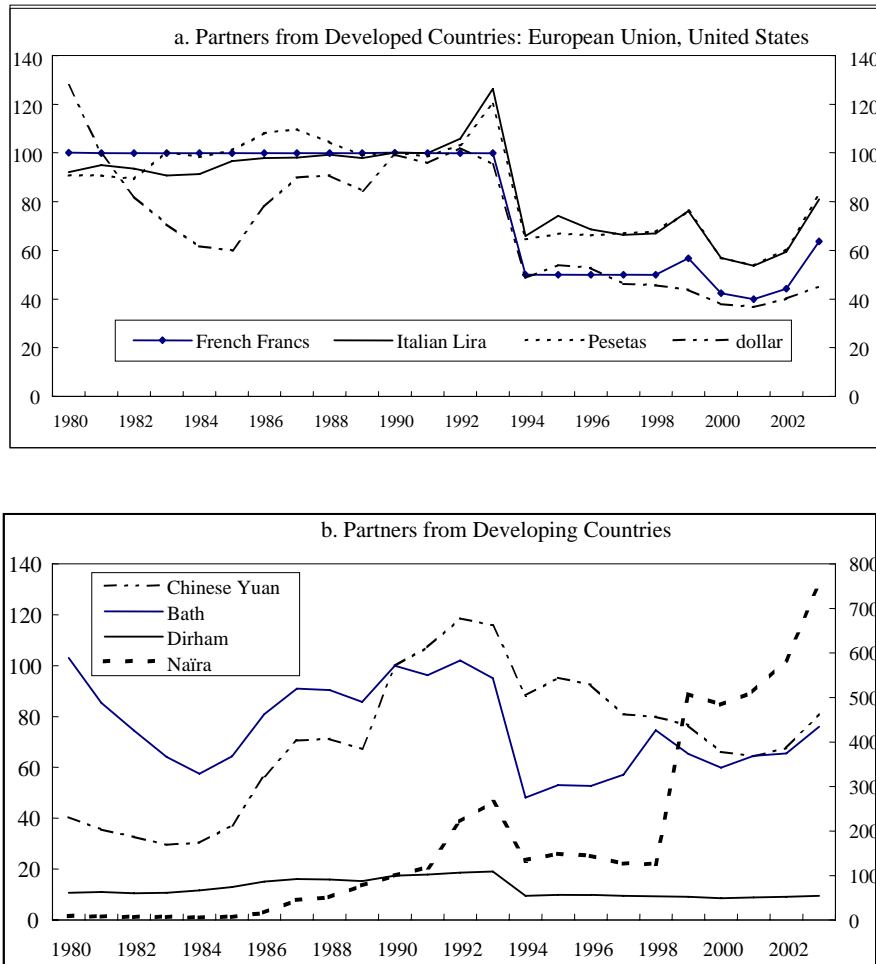
¹ Author's estimation based on the rate quotation compared to the CFA ;
baseline index 1990 = 100

Figure 3 below shows that the bilateral exchange rates of the partner countries of the European Union very rapidly converged with the successive depreciations, notably of the French Franc within the EMS then reversed towards a stabilization of the currencies with the institution of the Economic and Monetary Union.

By the end of the 1990s, the bilateral exchange rate of the CFA in relation to the dollar fell very rapidly under the impact of the strong rise in the dollar resulting from the sharp depreciation of the Euro vis-à-vis the dollar. This depreciation stabilized in 2001; but the trend was reversed in July 2002.

Compared to countries like China and Nigeria, the nominal bilateral exchange rates of the CFA Franc in relation to these currencies remained relatively stable up to 1985. From this date, the rates rose sharply until the 1994 devaluation when rates started falling gradually. While the bilateral exchange rate of the CFA against the Chinese Yuan continued its downward trend, the bilateral exchange rate of the CFA Franc against the Naira rose strongly, absorbing the effects of the 1994 devaluation.

Chart 3: Evolution of Nominal Bilateral Exchange Rates, 1980-2003
Indirect Exchange Rate Pegged to the CFA; base index 100=1990



Source: IMF, *International Financial Statistics*, European Central Bank and author's calculations.

After calculating the bilateral nominal exchange rates between Benin and its trade partners, the next step focuses on defining Benin's external trade structure.

Structure of External Trade

In the second step, we consider a set of weights $a_{i(i=1...n)}$, which are trade-weighted with $\sum_{i=1}^n a_i = 1$. We estimate the weight of Benin's trade partners. Since the calculation of the trade-weighted exchange rate requires a clear definition of the weights, we distinguish between three types of weights: when the share of imports accounts for more than 20 percent of the total trade between the country under study and the partner is considered substantial. Weighting by the simple mean of import and export shares is used as a verification measure. In some cases, this mean is insignificant when there is a big difference between the share of imports and the share of exports. (Ondo Ossa, 1992).

The three forms of weights selected are:

- The respective share of imports:

$$m_i = M_i / \sum_{i=1}^n M_i$$

where M_i represents imports from the country i and $\sum_{i=1}^n M_i$, all the imports of country i .

- The respective share of exports:

$$x_i = X_i / \sum_{i=1}^n X_i$$

where X_i represents exports from country i and $\sum_{i=1}^n X_i$, all the exports of country i .

- The simple mean of the share of imports and exports:

$$w_i = (x_i + m_i) / 2$$

Weights are calculated based on the assumption of trade monopoly with the selected major partners.

It is worth noting that the official data on imports/exports used to identify the major trade partners are from the IMF. The data on informal import/export trade with Nigeria are drawn from the survey jointly conducted by CAPE and LARES with support from INSAE.

The development of world trade shows that Benin is influenced both by its trade partners and by its competitors. With respect to the influence of partner countries, an analysis of the main characteristics of Benin's foreign trade over more than 20 years has helped to identify the ten countries mentioned in Table 4. The analyses show that among these countries, Nigeria and the countries of the European Union, France in particular, are Benin's major partners. These countries alone account for close to 75 percent of Benin's overall trade.

Table 4: Benin – Influence of Main Trade Partners
excluding Brazil, 1996-1999 (annual average over the period)

	Exports		Imports		Exports+Imports	
	Market share	Standardized weight	Market share	Standardized weight	Market share	Standardized weight
<i>Developed countries</i>						
France	3.15	1.77%	86.08	29.97%	89.22	19.21%
Italy	5.15	2.90%	10.20	3.55%	15.35	3.30%
Spain	4.23	2.38%	12.53	4.36%	16.75	3.61%
United States	0.58	0.33%	20.73	7.22%	21.31	4.59%
<i>Developing countries</i>						
China	2.51	1.41%	17.79	6.19%	20.29	4.37%
India	3.95	2.23%	7.37	2.56%	11.32	2.44%
Indonésia	9.49	5.35%	1.74	0.61%	11.24	2.42%
Thailand	9.25	5.21%	12.33	4.29%	21.57	4.64%
Morocco	31.45	17.73%	2.00	0.70%	33.45	7.20%
Nigeria	107.60	60.67%	116.44	40.54%	224.04	48.23%
Total	177.35	100.00%	287.20	100.00%	464.55	100.00%

Source: IMF, *Direction of Trade Statistics*, LARES and author's calculation

Nigeria accounts for 48.2 percent of trade with Benin; (Sinzogan (1999) found similar results at 47.2 percent), followed by France with 19.2 percent.

During the 1994-1999 period, the majority of exports were to Nigeria (61percent), Morocco (18 percent) and Asian countries (13 percent), mainly Indonesia and Thailand. With respect to the main import markets, Nigeria, France, the United States and Germany supply close to 41

percent, 30 percent and 7 percent, respectively, of Benin's imports. Imports from China (6 percent) are also significant.

However, it should be noted that the dynamics of informal cross-border trade between Benin and Nigeria are not reflected in the official statistics which show that Nigeria accounts for only 4 percent of imports and 5 percent of exports on average. Based on this, any economic policy designed to improve Benin's global competitiveness would be doomed to failure as long as Nigeria's impact on Benin's economy is not integrated in the policy.

After reviewing the external trade structure, we next calculate Benin's nominal effective exchange rates.

Benin's Nominal Effective Exchange Rates

In the third step, we calculate Benin's NEER for the 1980-2003 period. The evolution of the nominal effective exchange rate indicates to what extent the exchange rate of Benin's currency and that of its trade partners has varied in relation to a base period based on the following formula:

$$NEER_x = \sum_{i=1}^n BER_i^* * A_i$$

Where $BER_i^* = BER_{i,t} / BER_{i,0}$, (BER_i , the nominal bilateral exchange rate is expressed as an index during a period t in relation to the base period 0). NEER is the nominal effective exchange rate index weighted by trade, which is represented by a standardized weight, A_i . Since we distinguish between 3 types of external trade weights, we therefore have three nominal effective exchange rate indices:

- An exchange rate index weighted by exports:

$$NEER_x = \sum_{i=1}^n BER_i^* * x_i$$

- An exchange rate index weighted by imports:

$$NEER_m = \sum_{i=1}^n BER_i^* * m_i$$

- An exchange rate index weighted by the simple mean of the two (double weighting):

$$NEER_{x,m} = \sum_{i=1}^n BER_i^* * (x_i + m_i) / 2$$

or:

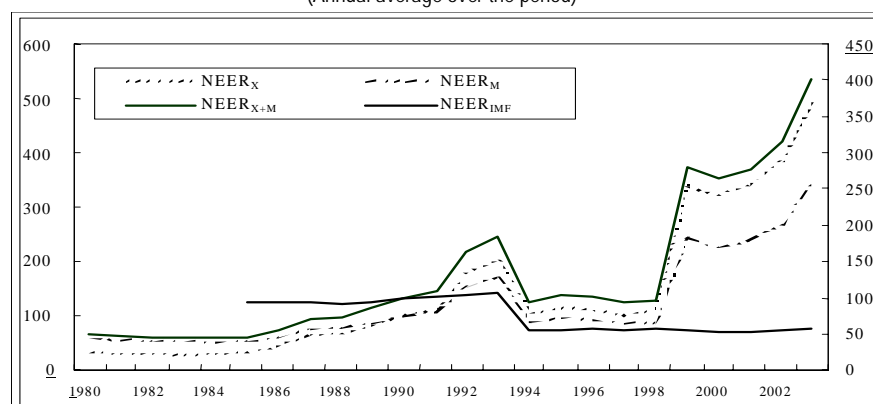
$$NEER_{x,m} = (NEER_x + NEER_m) / 2$$

Graph 4 illustrates the 1980 to 2003 evolution of three nominal effective exchange rates for Benin. The graph shows relative rate stability up to 1986 (except for the NEERFMI), followed by a rise in the rates up to the breakdown point in 1994, where as the nominal exchange rate had remained unchanged since 1948. From 1999, the NEER started rising again, (except for the IMF index which remained stable over the entire period), in particular as a result of the establishment of the European Monetary Union and the rise of the Euro against the dollar.

The deviations observed between the series of calculated nominal effective exchange rates and those of the IMF in particular are attributable to the different weights. In its estimation, the IMF does not incorporate the dynamics of the informal cross-border trade between Benin and

Nigeria and, on average, considers that Nigeria accounts for only 4 percent of imports and 5 percent of exports.

Chart 4: Benin: Evolution of Nominal Effective Exchange Rates, 1980-2003
(Annual average over the period)



Source: IMF, *International Financial Statistics* and author's calculations

Table 5 below details the evolution of the NEER during the main periods of Benin's economy.

Table 5: Periods of Appreciation and Depreciation of the NEER
(Average over the period)

	1986-89	1990-93	1994-98	1999-2003
<i>NEER_X</i>				
Level (Index, 1990=100)	61.77	142.01	108.78	371.70
Annual variation	28.3%	26.9%	-8.2%	49.3%
<i>NEER_M</i>				
Level (Index, 1990=100)	73.82	129.54	90.43	262.03
Annual variation	13.9%	19.1%	-9.7%	43.8%
<i>NEER_{X+M}</i>				
Level (Index, 1990=100)	69.31	134.39	97.44	303.90
Annual variation	18.3%	22.1%	-9.1%	46.2%
<i>NEER_{IMF}</i>				
Level (Index, 1990=100)	92.39	102.83	54.82	53.14
Annual variation	-0.3%	3.4%	-8.9%	0.4%

Source: Author's calculations

During the 1986-1989 economic crisis years, the currency was overvalued with an average nominal appreciation of close to 28 percent, 14 percent and 18 percent of the currency over the period, for the *NEER* weighted by exports, imports and trade, respectively. The strategy of a strong Franc pursued during this period was one of the reasons for this appreciation up to 1993. The IMF *NEER* was at equilibrium. The impact of the 1994 devaluation resulted in a relatively low depreciation of around 8 percent to 10 percent over the 1994-1998 period. From 1999, the appreciation of the *NEER* was sustained with an average variation of 44 to 49 percent, except for the IMF *NEER*, which remained virtually at equilibrium over the 1996-2003 period.

The evolution of nominal rates do not, however, allow any conclusion in relation to changes in the purchasing power of a currency, neither does it indicate to what extent the competitiveness of Benin's tradable goods may have improved over time. To measure how the purchasing power of a given currency has changed over time, the nominal effective exchange rate (*NEER*) index must be corrected by estimating the fluctuations of relative prices and by calculating the real effective exchange rate (*REER*) index. Discrepancies

between the *REER* index and the index of the base period would then allow us to estimate the relative evolution of the currency's purchasing power, locally and externally. The next step consists primarily of calculating relative consumer prices in Benin in relation to those of its partners.

Calculating Relative Consumer Prices in Benin in Relation to its Partners.

To obtain the corrected *REER* of relative prices, we will calculate, in the fourth step, Benin's relative consumer prices in relation to those of its trade partners, CPI_i/CPI , with *i* referring to Benin's trade partners. It is worth mentioning that the general level of prices both on the domestic market and on the partners' markets is responsive data whose development foreshadows the competitiveness of Benin's economy.

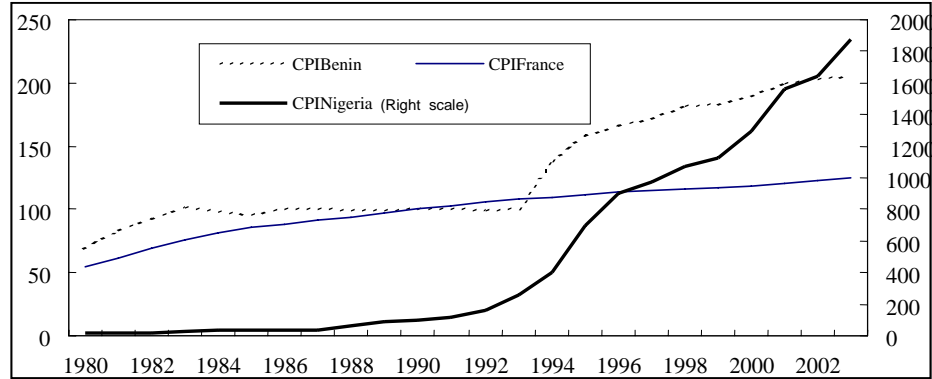
Table 6: Benin and Trade Partners: Evolution of Consumer Price Indexes
1980-2003 (Average Percentage over the Period)

	1986-89	1990-93	1994-98	1999-2003
<i>Developed countries</i>				
France	92.3	104.2	113.3	119.6
Italy	86.5	108.5	131.0	146.0
Spain	86.0	108.7	131.6	148.8
United States	89.0	105.5	119.5	133.1
<i>Developing countries</i>				
China	77.1	109.5	188.1	200.2
India	82.1	118.4	179.0	246.6
Indonesia	83.3	113.5	177.2	383.7
Thailand	88.5	107.3	134.3	158.8
Morocco	89.7	110.3	136.1	150.3
Nigeria	53.7	147.6	767.0	1391.1
Benin	99.7	100.0	162.8	193.7

Source: IMF *International Financial Statistics WDI 2003*
and Author's calculation.

Table 6 and Graph 5 show that, in general, over the entire sample period, the rate of inflation in Benin remained below the 15 percent threshold; a level Dornbush and Fisher (1993) define as a moderate level of inflation.

Chart 5: Comparison of the Evolution of Prices Between Benin and its First Two Partners
(In annual average percentage)



Source: IMF, International Financial Statistics and author's calculations.

Meanwhile, the shock triggered by the devaluation translated into a 39 percent price inflation in 1994 alone. However, Benin's performance of less than 1 percent inflation on average during the 1986 – 1999 crises years is proof of the benefits of belonging to the CFA Franc zone and the credibility it derives from its relationship with France, which pursued its strategy of a strong Franc during this period. The question still at issue, however, is whether performance in terms of inflation was not achieved at the expense of growth.

In addition, the evolution of prices during the period under study show a relative mastery of inflation in Benin compared to Nigeria which experienced over inflation, in particular, between 1989 and 1996 as a result of slippages in the fiscal policy following the windfalls of the mini oil boom during the Gulf war. This raises fears that the inflationary pressure in Nigeria may be transferred to the Benin market, given the key position of Nigeria among Benin's trade partners.

After calculating relative consumer prices in Benin in relation to its partners, the next step determines Benin's real bilateral exchange rates.

Benin's Real Bilateral Exchange Rates

In the fifth step, we determine Benin's real bilateral exchange rate using the following formula:

$$RBER = NEER * \frac{CPI_{CMR}}{CPI_i}$$

The evolution of bilateral real exchange rates helps to measure price competitiveness, which plays a key role in placing Benin in a competitive position, locally and internationally. We consider Benin's price competitiveness in relation to its major partners —France and Nigeria—, which account for 19 percent and 48 percent, respectively, of aggregate trade.

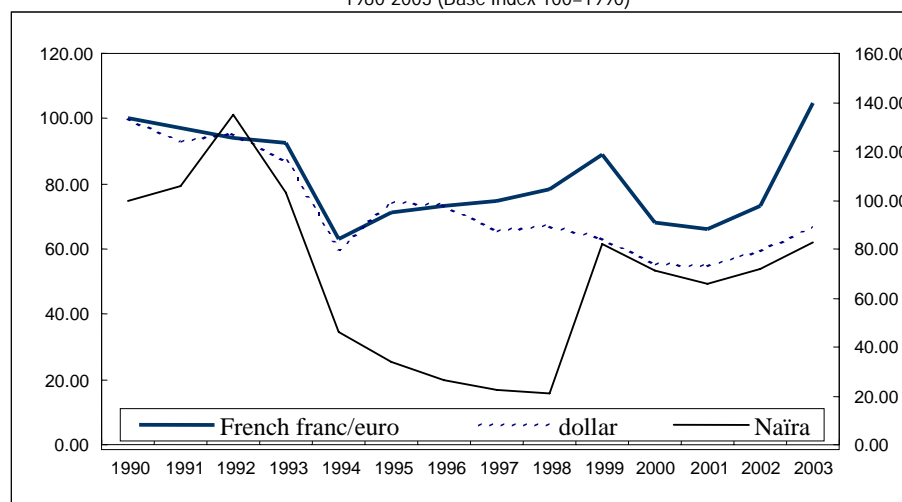
Table 7: Benin and its Major Trade Partners: Evolution of Real Bilateral Rates
(Average over the period); Baseline Index 1900=100

	1986-89	1990-93	1994-98	1999-03
<i>Developed countries</i>				
French Franc	108.0	95.9	71.8	78.9
Italian Lira	113.2	99.1	84.9	85.5
Pesetas	122.0	96.7	82.1	85.2
dollar	96.7	93.7	67.9	59.7
<i>Developing countries</i>				
Chinese Yuan	85.5	100.6	75.5	69.3
Indian Rupee	83.0	113.0	91.1	84.3
Indonesian Rupee	88.8	93.3	79.3	96.7
Bath	97.8	91.7	68.5	81.3
Dirham	99.3	94.4	65.9	67.3
Naira	78.1	110.0	28.8	74.5

Source: IMF, *International Financial Statistics*, European Central Bank WDI 2003

As Table 7 shows, between the economic crisis period (1986-1989) and the implementation of the SAP (1990-1993), the real bilateral exchange rate depreciated against the French Franc and the Dollar, resulting in an 11 percent gain in competitiveness vis-à-vis France and 3 percent vis-à-vis the United States, while the overvaluation of the currency was more significant in relation to Nigeria with a real appreciation of 41 percent. The 1994 devaluation fostered gains in price competitiveness in the order of 25 percent and 28 percent in relation to France and the United States and 74 percent on average in relation to Nigeria from the SAP implementation period to the post devaluation period (1994-1998).

Chart 6: Benin: Evolution of Real Bilateral Exchange Rates, 1980-2003 (Base Index 100=1990)



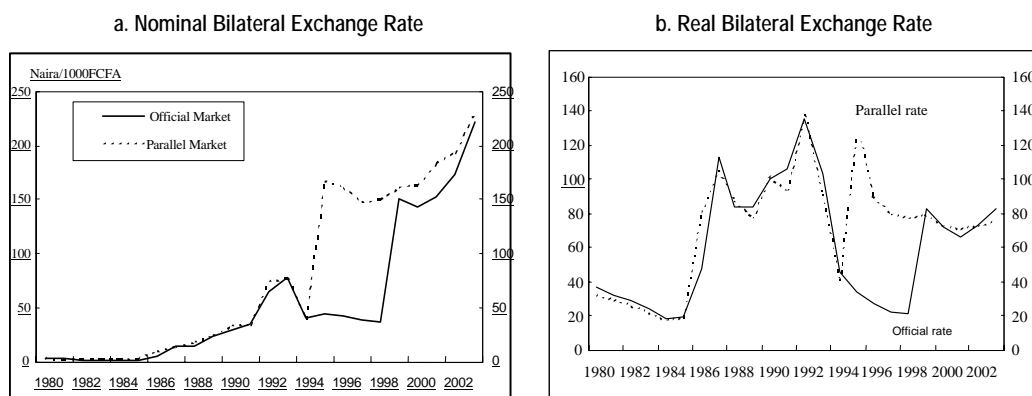
Source: IMF, *International Financial Statistics* and author's calculation.

Graph. 6 shows that the competitive advantage gained by Benin's products as a result of the devaluation has been completely lost and the over-valuation of the CFA currency is more substantial against the Naira. The bilateral real exchange rate of the Naira/CFA appreciated 159 percent on average from the post devaluation period to the recent 1999 – 2003 period. This resulted in imported inflation in Benin because of its close trade ties with Nigeria and the fiscal slippages in Nigeria. In fact, by acting as a transit market for products from Nigeria to other countries in the sub region, Benin recycles its trade surplus with Nigeria. These surpluses, measured in Nairas, can only be used to buy products from Nigeria and, because

of Benin's narrow market, part of the products have to be disposed of in the Franc zone markets. The surplus, measured in Naïras, is thus converted into CFA and the cycle can start all over again. Pursuing re-exports is thus contingent on the possibility of importing Nigerian products that are consumed by households in the Franc zone. Undermining the key role of Benin as a transit market would reduce the purchase of Nigerian goods intended for other countries in the sub region, thus compromising the clearing of the surplus in Naira of Benin's re-export trade to Nigeria. Because the domestic market is small, it cannot absorb the import surplus, and Benin could thus find itself in the uncomfortable situation of not being able to recycle all the Naïras obtained from re-exports.

The behavior of the parallel exchange rates series in the different informal exchange markets lends support to the assumption of an exogenous determination of parallel rates in the Franc zone. There is no autonomous CFA market that is detached from other exchange markets, and whose rate would be determined by the supply and demand of CFA against the Naira. In fact, Benin's parallel market is an uninterrupted extension of Nigeria's parallel exchange market. The parallel rate depends more on Nigerian macro-economic factors (external debt servicing, level of industrial activity, exchange allocation system, etc.) than on the bilateral balance of trade between Nigeria and Benin. These facts have important implications for the policy adopted by Benin because the depreciation of the Naira seriously affects the competitiveness of Benin's economy in relation to Nigerian industries and weakens the industrial sector and taxation.

Chart 7: Nigeria/Benin: Evolution of the Parallel and Official Real and Nominal Bilateral Exchange Rates. (1980-2003)



Source: IMF, *International Financial Statistics*, LARES

The parallel exchange rate, and not the official rate, determines the terms of exchange between Nigeria and its neighbors. Since informal cross-border trade transactions in Benin are done essentially in CFA Franc and not in Naira, traders are bound to carry out exchange transactions; this has led to the development of a Naira and CFA Franc parallel exchange market. In deed, it is more beneficial for an economic operator in Benin to use the parallel exchange market rather than the official market. In the official market, an operator deals with three currencies: CFA Franc, Dollar and Naira, resulting in a depreciation of funds because of the commission charges levied by foreign exchange dealers. The impossibility of converting the CFA Franc directly to the Naira through official channels penalizes economic operators and constitutes a major financial constraint to the development of official transactions between Nigeria and its neighbors. By eliminating a currency, the parallel market fosters opportunity gains, one of the reasons for resorting to the parallel market to raise the funds needed to carry out transactions.

Furthermore, the assessment of the successful change in par value that occurred in 1994 requires that account be taken of the parallel market of the CFA Franc in relation to the Naira. The real bilateral exchange rate correlation coefficient calculated from the official and parallel exchange rate is -0.185 over the 1994-2003 period, thus reflecting the split evolution of the two exchange rates. The decision to devalue the CFA Franc is not only attributable to the failure of the real adjustment programs but also to the depreciation spiral of the parallel exchange rate of the Naira between 1986 and 1994 in reaction to imbalances in Benin's economy (Graph7).

After relative stability following the devaluation of the CFA, the Naira/CFA parallel exchange rate entered a phase of accelerated depreciation from the second half of 1994. This renewed depreciation of the Naira was attributable to the Nigerian economic situation, which was characterized by the failure of measures aimed at banning the parallel market in the country, the launching of strikes, oil shortage in a context of slippages in macro-economic policies. The year 1995 witnessed a noticeable slowdown in the depreciation, followed by the start of stabilization. From 1996, this trend towards stability was confirmed by a slight rise in the Naira. The institution of a new exchange allocation system dubbed the "Dutch auction system" in July 2001 fostered the stabilization of the exchange rate: the depreciation rate fell from 57 percent between 1994 and 2001 to about 29 percent between 2001 and 2003.

The analysis of the statistical properties of the evolution of the CFA real bilateral exchange rate in relation to the Naira of the parallel market in Table 8 shows that the rate is volatile and varies significantly over all the sample periods. The rate increased sharply during the period preceding the 1994 nominal devaluation before plummeting following the devaluation. The variability of the real exchange rate over time is measured by comparing the coefficients of variation. The coefficient of variation ratio of the highest real exchange rate over the lowest rate is almost 4. The variability of the rate increased significantly with time.

Table 8: Benin - Statistical Properties of the Real Bilateral Exchange Rate Index in Relation to Nigeria on the Parallel Market.

	1986-89	1990-93	1994-98	1999-2003	1980-2003
Average	87.31	105.44	79.08	74.90	70.30
Standard deviation	10.38	18.39	23.70	5.63	31.73
Variation ratio	0.12	0.17	0.30	0.08	0.45
Maximum	104.01	136.80	114.84	84.60	136.80
Minimum	77.11	91.02	41.17	69.43	17.26
Trend	91.25	103.05	73.13	79.75	44.59

Source: Author

The immediate consequence of the evolution of the Naira should have been a reasonable expansion of Nigerian exports to neighboring countries, but this trend was hampered by the tribulations of Nigerian trade legislation.

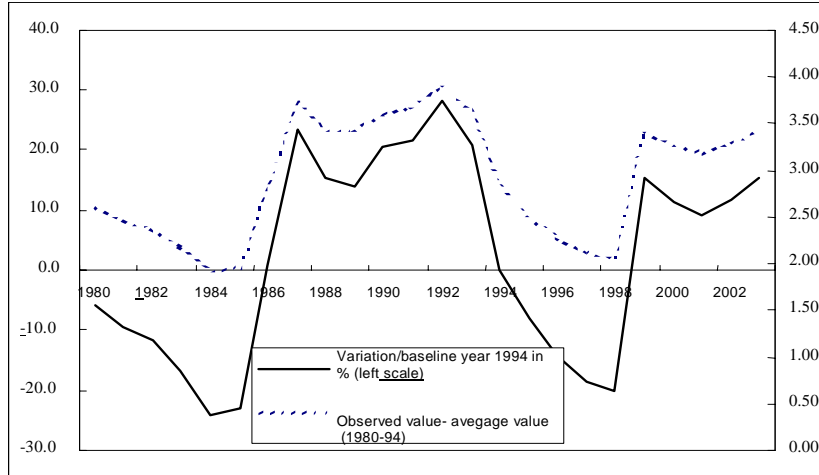
If we resort to the theory of purchasing power parity, the equilibrium exchange rate must help attain parity between two currencies in such a way that both can buy the same basket of goods in both sample countries – Nigeria and Benin. However, the lack of detailed statistics on prices and difficulties deciding on a homogeneous basket of goods calls for a number of assumptions in the application of the theory.

According to the theory of relative purchasing power parity, when the REER is stationary, the long-term equilibrium exchange rate can be calculated either based on a reference year or by using an approach that analyses the real exchange rate trend or its mean value which goes back to the long-term equilibrium rate.

In this case, the measured misalignment corresponds to any variation from this trend or its mean value. The approach based on a reference year selects a base year during which the observed equilibrium real exchange rate is at equilibrium. The measured misalignment is estimated as the difference between the real exchange rate and its value at the selected base year, in light of the implicit assumption of the estimated equilibrium exchange rate (Ahlers and Hinkle, 1999).

As in the case of multiple exchange rates, the exchange rate of the parallel market is often used as an indicator of misalignment; we shall use the 1994 period when the Naira/CFA parallel and official exchange rates converged. We shall also estimate a long-term equilibrium exchange rate based on the mean value of the real exchange rate of 1980 – 1994 period, during which the evolution of the parallel market rate and the official rate were identical.

Chart 8: Misalignment of the Official Naira/CFA Franc
Bilateral Real Exchange Rate



Source: IMF, International Financial Statistics and author's calculations

According to the calculations, the real bilateral exchange rate remained close to and around the estimated equilibrium level from 1980 to 1986. From 1986, when Benin's economic and financial crisis started, the deviation started increasing, and continued increasing until 1994. The graph shows that Benin has experienced more periods of appreciation of the CFA currency against the Naira, which only reflects the exchange policy differential between the two countries.

The real exchange rate index used seems appropriate for the bilateral comparison of exchange rates and prices. The main inconvenience is that it does not take into account all the trade relations of the country. It is for this reason that in a world where countries are increasingly diversifying their trade structure with other countries and where the major currencies are floating, it is useful to undertake a multilateral comparison of the exchange rates and prices, using the concept of a real effective exchange rate.

After determining the real bilateral exchange rates, the next step consists of calculating Benin's external real effective exchange rates and comparing the indices.

Estimating Benin's External Real Effective Exchange Rates and Comparison of Indices

In the sixth step, the weights calculated on the assumption of a trade monopoly with the selected major partners allow us to calculate three indices of the real effective exchange rate:

- An exchange rate index weighted for exports:

$$REER_x = \sum_{i=1}^n REER * x_i$$

- An exchange rate index weighted for imports:

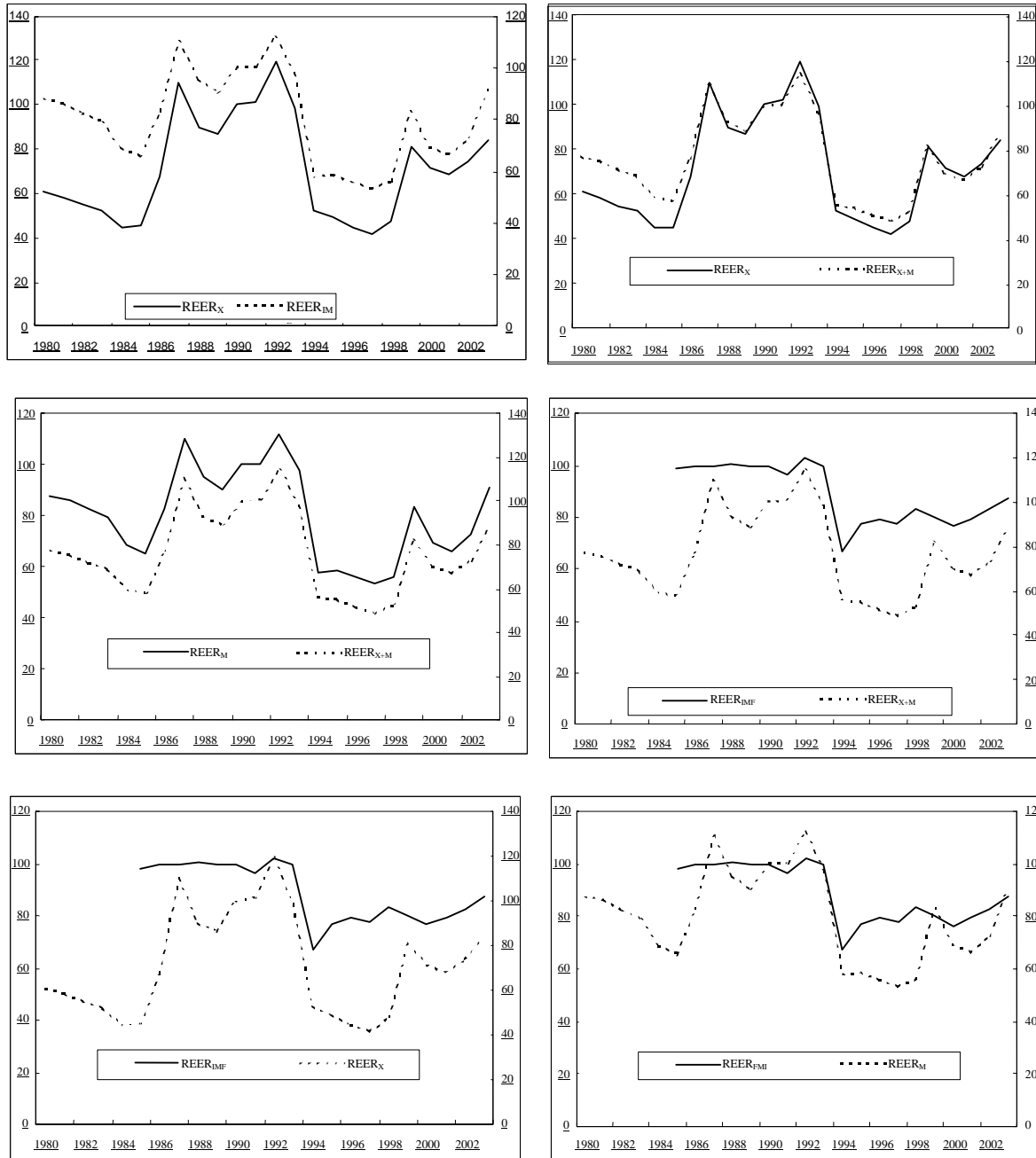
$$REER_m = \sum_{i=1}^n REER * m_i$$

- An exchange rate index weighted by the simple average of the two (double weighting):

$$REER_{x,m} = \sum_{i=1}^n REER * (x_i + m_i) / 2$$

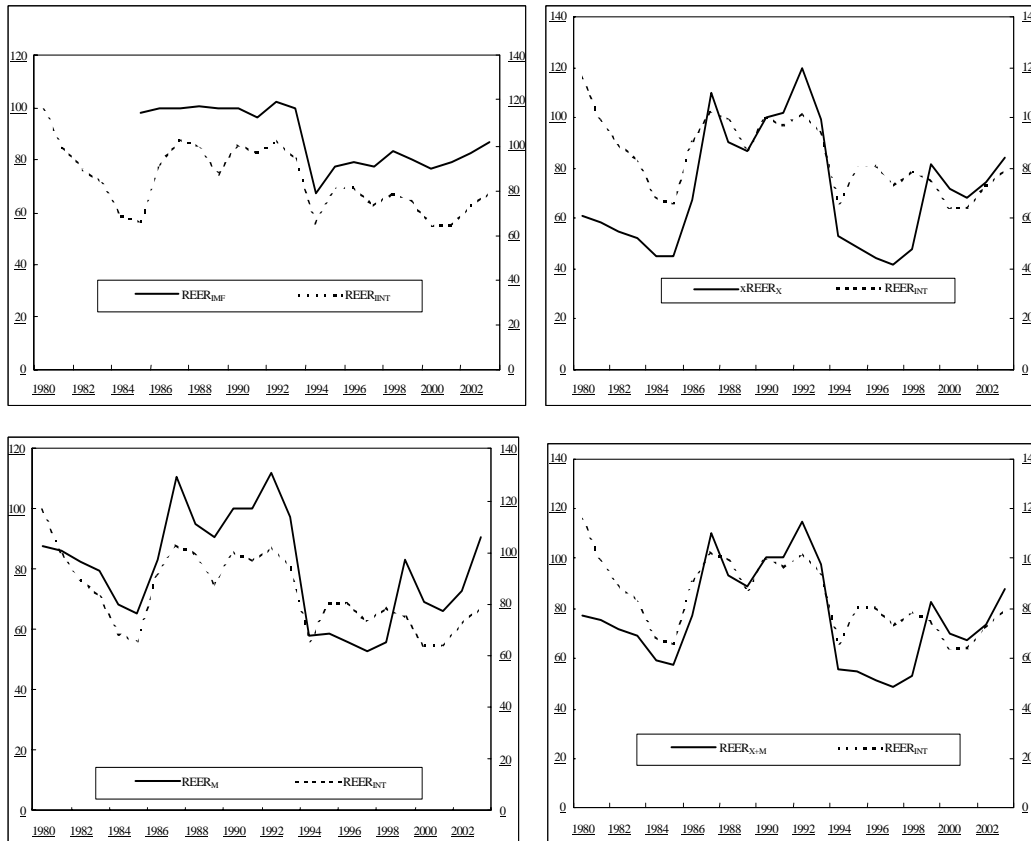
Over the entire sample period, 1980-2003, Graph 9 shows irregular and erratic fluctuations of exchange rates, irrespective of the effective exchange rate considered. The series of REER constructed, considered in two follow the same trend, except for the real internal effective exchange rate and the REER calculated by the IMF, whose data is only available as of 1985. In general, from the 1980s, the real effective exchange rate was on a downward trend until 1986 when the trend reversed and accelerated to reach its peak during the crisis years (1986-1993). This real appreciation of the real effective exchange rate reflects the loss in competitiveness of the economy. The deterioration in the terms of trade since the mid 1980s explains the downward trend of the real effective exchange rates despite the nominal appreciation of the French Franc. The REER calculated by the IMF and the internal REER show that despite the competitive advantage gained from the January 1994 devaluation, Benin very quickly lost part of its competitiveness vis-à-vis its competitors. However, the various REERs weighted by imports, exports and trade and which incorporate informal trade data show that Benin preserved the benefits derived from the devaluation for much longer. The devaluation translated into a clean break followed by an upswing of real effective exchange rates within a 7 to 8 percent bracket until 2003. The deviations observed between the series of real effective exchange rates we calculated and the series of real effective exchange rate indices determined by the IMF are attributable to the use of different weights.

Chart 9: Benin: Comparison of Unfiltered REER Series, 1980-2003
 (Annual Average); Base Index100=1990



Source: IMF, International Financial Statistics and author's calculations.

Graph 9. Benin: Comparison of Unfiltered REER Series, 1980-2003 (continued)



Source: IMF, International Financial Statistics and author's calculations.

Graph 9 shows real effective exchange rates indices, which have two major characteristics. First, the real exchange rates are variable. Second, despite the variability observed, these indicators show no significant long-term trend over the sample period. However, in the short-term, successive upward trends (real appreciation) and downward trends (depreciation period of the exchange rate) are noted.

Table 9 outlines periods of depreciation and real appreciation of the real effective exchange rate. From the 1986 – 1989 economic crisis period to the SAP implementation period (1990 – 1993), Benin recorded limited appreciation attributable primarily to the government's development strategies. From one period to another, therefore, the Benin CFA currency was thus overvalued with its appreciation translating into a corresponding loss of competitiveness for all real effective exchange rates considered, 20 percent and 9 percent for the measure of the exchange rate weighted for exports and imports, respectively, and 13 percent and 3 percent for the exchange rate weighted by aggregate trade and the internal real exchange rate (REERINT).

Table 9: Periods of Appreciation and Depreciation of the REER
(Average over period)

	1986-89	1990-93	1994-98	1999-2003
<i>REER_X</i>				
Level Ratio, 1990=100	87.32	104.62	47.03	75.59
Annual variation	22.72%	4.29%	-10.94%	15.17%
<i>REER_M</i>				
Level Ratio 1990=100	94.28	102.38	56.25	76.01
Annual variation	10.14%	2.41%	-8.70%	12.44%
<i>REER_{X+M}</i>				
Level Ratio, 1990=100	91.68	103.24	52.75	75.86
Annual variation	14.09%	3.10%	-9.57%	13.31%
<i>REER_{IMF}</i>				
Level Ratio 1990=100	99.95	99.61	76.73	81.13
Annual variation	0.39%	-0.03%	-1.89%	0.99%
<i>REER_{INT}</i>				
Level Ratio 1990=100	94.90	98.04	75.47	70.63
Annual variation	9.13%	2.15%	-1.86%	0.59%

Source : Author's calculations.

Devaluation fostered a gain in competitiveness from the recession period to the post devaluation period of the same magnitude irrespective of the real effective exchange rate considered: 55 percent, 45 percent and 49 percent for the real effective exchange rate weighted by exports, imports and trade, respectively, and 23 percent in the two cases of the *REER* calculated by the IMF and the internal real effective exchange rate. An improvement in overall competitiveness was felt in 1999 and mostly in 2000 as a result of the gradual and marked weakening of the Euro against the dollar (from -4.1 percent in 1999 to -13.7 percent during the year 2000 alone).

The situation was different in 2000. Inflation was clearly higher than in the previous years, the bilateral exchange rate of the CFA against the dollar remained stable: the *REERs* appreciated, competitiveness weakened. In 2002, the appreciation of the Euro triggered a greater weakening in competitiveness. Benin's rates thus appreciated and competitiveness consequently weakened from the post-devaluation period to the economic recovery period (1999-2003) by 61 percent, 35 percent, and 44 percent for the real effective exchange rate weighted for exports, imports and trade, respectively. The appreciation was more moderate in the case of the Fund *REER* at 6 percent.

This situation reflects the impact from July 2002 of the impact of the appreciation of the Euro against the dollar whereas, by only measuring the internal real effective exchange rate, Benin continued to record gains in competitive advantage of 6 percent from the post-devaluation period to the 1999-2003 economic recovery period, thereby reflecting the improvement in the terms of trade from 1997.

These recent results also demonstrate that the relative weakening of Benin's competitiveness, measured in the *REER*, derives more from exogenous factors (the impact of weather conditions and of the prices of raw materials on internal supply and demand, thus on prices; effects of changes in the Euro/dollar par value) than from the impact of the economic policy (inflation is relatively low in the Franc zone because of its fixed exchange rate).

After calculating Benin's external real effective exchange rate and comparing the indices, the next step consists of defining the statistical properties of indices of the real effective exchange rate and the limitations of the method for calculating the *REER*.

IV. STATISTICAL PROPERTIES OF REAL EFFECTIVE EXCHANGE RATE INDICES AND LIMITS OF THE METHODOLOGY FOR CALCULATING THE REER

This subsection seeks to analyze the statistical properties of the indices of real effective exchange rates and to reflect on the methodology for calculating weighted real effective exchange rates and indices of competitiveness.

Statistical Properties of Indices of Real Effective Exchange Rates

Table 10 shows the main properties of the indices of real effective exchange rates observed and calculated. The real effective exchange rate is volatile in each case and the level of variability differs from one index to another. The volatility can be measured by the difference between the maximum and the minimum values, which, in this case, is not more than 50 points. The difference between indicator averages is significant.

Table 10: Benin - Statistical Properties of Indices of Real Effective Exchange Rates (annual data 1980-2003)

	Average	Standard Deviation	Coefficient of Variation	Maximum	Minimum	Trend
$REER_x$	71.07	22.78	0.32	119.32	41.78	67.55
$REER_m$	80.14	17.30	0.22	111.99	53.21	89.26
$REER_{x+m}$	76.68	18.85	0.25	114.79	48.85	80.97
$REER_{FM}$	88.81	10.96	0.12	102.49	67.10	101.64
$REER_{INT}$	84.47	14.27	0.17	116.17	63.71	97.46

Source: Author

Reflection on the methodology for calculating weighted exchange rates and indices of competitiveness

Criteria for the choice of methodology are grouped into two categories:

➤ First category: Criteria relating to the statistical choices which the indices must address: Fisher has defined the mathematical conditions which an index must meet to be satisfactory. Though the conditions are numerous, six of them are deemed of special importance:

- Identity: Calculation of the index must yield the value 100 if the situation studied is the same as the base situation
- Reversibility in time: The index of the $REER_1^2$ of the situation under period 2 reached by using the situation under period 1 as base, has to be equal to the inverse of the $REER_2^1$ index of the situation under period 1 reached by using the situation under period 2 as base. Hence:

$$REER_1^2 = \frac{1}{REER_2^1}$$

- Transitivity and transferability: The determinant for the situation under period 3, reached by using the situation under period 1 as base has to be equal to the result of the index of the situation under period 3 reached by using the situation under period 2 as base, by the determinant of the situation under period 2 reached by using the situation under period 1 as base. Hence:

$$REER_1^3 = REER_2^3 * REER_1^2$$

- Homogeneity: The index must be independent of the units used for measuring basic information.
- Proportionality: If all the basic relations or indices have the same value, the composite index has to be equivalent to this common value.

- Determination: the index must neither be nil, nor infinite nor indeterminate
- Second category: criteria relating to economic choices for assessing the adequacy of envisaged indices for problems relating to the determination of weighted exchange rates and four conditions are worth noting.
 - Economic Interpretation: It is desirable for the type of calculation to have a simple economic interpretation.
 - Reflexivity: The index obtained by calculating the weighted exchange rate from the elementary CFA exchange rate against currency must be the inverse of the index obtained by calculating from the elementary exchange rate of currency against CFA. If an index is reversible in the statistical sense of the term then it is reflexive in the sense above.
 - Neutrality of the choice of the base year: Evolution within the time described by the index has to be independent of the choice of base year.
 - Coherence between the methods of calculating indices of competitiveness: There are two options for calculating indices of competitiveness. Method A which we used is based on the calculated weighted exchange rate, which is reconciled against a calculated index of weighted relative prices to reach a global indicator of competitiveness.

Method B is based on calculating elementary determinants of competitiveness for each country by reconciling the exchange rate and the index of relative prices of the said country, and then from the said determinants of basic competitiveness, the determinant for global equilibrium competitiveness is determined. On the whole, for the sake of coherence, it is desirable for the indices of competitiveness reached using both methods to be similar.

Table 11 examines to what extent the indices obtained using each of the methods proposed meet the various criteria. This table allows for the verification of the properties of each method for calculating the indices.

Table 11: Comparison of REER calculation methods

Statistics	Criteria of choice	Harmonic mean	Geometrical average
	Economic		
Identity	Economic	Yes	Yes
Reversibility	interpretation	(very good)	(average)
Transitivity		Yes	Yes
Homogeneity	Reflexivity	no	Yes
		Yes	Yes
Proportionality	Neutrality base year	Yes	Yes
Determination			
	Coherence	no	Yes
	competitiveness	Yes	Yes
	A-B	Yes	Yes
		no	Yes

Source: Extract « Cahier économique et monétaire, *Banque de France* », n°10 (1979)
The word «yes » indicates that a property has been verified

Determining the weighted exchange rate of Benin's CFA using the harmonic mean method entails finding the arithmetical mean of the elementary weighted exchange rate by the volume share of the main corresponding trade partner countries in Benin's external trade. From the viewpoint of economic interpretation Pinçon (1979) recognizes it as the ideal method, especially for work regarding measurement of competitiveness. In effect, it allows for a direct comparison of the cost of Benin products to that of a basket of equivalent foreign products, the volume content of this basket is obtained each time from the volume share of corresponding countries in trade. A highly satisfactory economic interpretation is the argument that favors the use of this method in our calculations. Moreover, it meets the

minimal conditions of identity, proportionality and determination, and also has the property of transitivity. The property of reflexivity is not met and is thus a shortcoming. The neutrality of the choice of the base year is a condition yet to be satisfied. Indeed, calculation of volume shares of various countries strongly depends on the choice of the base year, and Pinçon (1979) points out from experience that clear distortions may appear between results from different base years. In the case of Benin, the volume share of transactions of the main trade partners has not changed significantly, the order of magnitude remains unchanged (Sinzogan (1999), Vignon (1998)). Moreover, the method does not lead to coherent results between calculations of competitiveness carried out using Method A or method B.

The outcome of the geometric mean method used in many research works (Kalinda Mkenda (2001), Sinzogan (2000), Hinkle and Montiel (1999), among others) is very different. The composite index reached using this method checks against all the statistical conditions described in the table, and hence meets the economic property of reflexivity and neutrality in the choice of the base year. On the other hand, the economic interpretation has to be tempered. The composite index obtained by the geometric method has to be translated, not from the level where they are located, but from its relative variables. The relative variables between two neighboring dates t and $t+1$ of the weighted index obtained by using the geometric mean method is equal to the arithmetic mean of their relative variables between the same dates for simple indices of exchange rates. In spite of these shortcomings, the economic interpretation is still acceptable even if it does not directly lead to conclusions regarding competitiveness, as is the case with the harmonic mean method.

V. ECONOMETRIC ANALYSIS AND RESULTS

In order to set up strategies and actions for developing the export sector, it is important to understand the impact of determinants such as the real exchange rate on its evolution. The exports supply function used in this study is simplified and independent of the exports demand function. It is based on the assumption that Benin is a price taker and faces international competition. This equation is especially based on the hypothesis of demand for raw and semi-processed materials by partner countries. Improvement in growth conditions within these countries would stimulate Benin's exports. The low level of external competitiveness reflected by the appreciation in the real effective exchange rate translates into a drop in the production and profitability of exported goods. A real appreciation of the exchange rates can be associated with an overvaluation, leading to a gap between the marginal costs and the prices, and hence, acts as an implicit tax on the production of exportable goods and reduces export supply. On the other hand, real appreciation of exchange rates can result from a modification of fundamental determinants of exchange rates, hence reducing the profitability of exportable goods. To discuss the impact of these factors, the empirical equation used is

$$\log X_t = \beta_0 + \beta_1 \log GDP_{re} + \beta_2 \log TEER_t \quad (1)$$

$\beta_1 > 0$ $\beta_2 < 0$

Where

X_t	export volume
$GDP_{share.t}$	real gross average domestic product of main partner countries
$REER$	real effective exchange rate

Considering the special relation between Nigeria and Benin, the impact of bilateral real official and unofficial exchange rates and Nigeria's domestic revenue derived from Benin's exports will be evaluated after analysis of time series, the Engle-Granger (1987) method is used to avoid problems of "fallacious regressions" and identify a long term relationship between the variables of the equation (1) by using the least squares method.

The data used come from the World Bank's development indicators database, International Financial Statistics (IMF), and foreign trade statistics supplied by the Institut National Institute de la Statistique et des Eudes Economiques (INSAE) covering the period 198-2002.

Official exports of goods and services are deflated by GDP deflators, the GDP of Benin's major trading partners was constructed on the basis of the nominal GDP of partner countries

deflated by the GDP deflator; and the various formerly calculated real exchange rates were chosen for the purposes of econometric analysis.

Statistical Properties of Data

The Augmented Dickey-Fuller statistical tests (ADF) deal with the variables used in the study: X , $GDPW$, $REERX$, $REERX+M$, $REERINT.$, $BEROfficial$, $BERpar$.

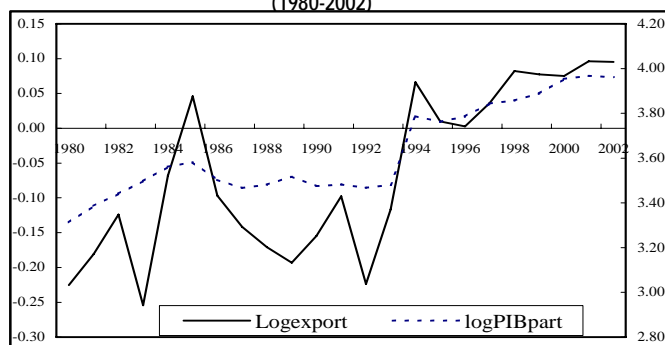
Results of unit root tests (Table 12) show that all variables are integrated to the order 1, noted $I(1)$.

Long Term Export Supply Relations

Analyses of the results of the estimate of the export model presented in Table 13 hereunder shows that estimated coefficients for the real effective exchange rate and the GDP of trade partners have expected signs and are significant at the conventional level of 0.5 percent.

This implies that the level of activity of trade partners is a determinant for Benin's export supply. In this regard, a 1 percent increase in the revenue of partners increases export volume by 0.5 percent in the $REER_X$ model and the $REER_{X+M}$ model by 0.4- percent in the $REER_{INT}$ model.

Chart 10: Benin – Comparative evolution of average exports and GDP of Benin's trade partners (1980-2002)



Source: Author

Table 12: Benin - Units root tests. Annual data, 1980-2003

Variables	Trends	Delays	ADF		PP	I(d)
			Level	Primary difference		
$\log X$	Yes	0	-2.60	-4.46	-2.54	I(1)
$\log REER_X$	Yes	0	-1.74	-3.50 ^{3/}	-1.96	I(1)
$\log REER_{X+M}$	Yes	0	-1.84	-3.77 ^{3/}	-2.08	I(1)
$\log REER_{INT}$	Yes	0	-2.75	-4.44 ^{1/}	-4.45	I(1)
$\log BER_{offi.}$	Yes	0	-2.26	-5.13	-6.19	I(1)
$\log BER_{paral.}$	Yes	0	-1.75	-3.59	-9.68	I(1)
$\log GDP_{share.}$	non	0	-0.75	-2.34 ^{2/3/}	-6.52	I(1)

Source: Author

Notes : ADF test: rejection of unit root at ^{1/}1%, ^{2/}5%, ^{3/}10%

PP Test (Phillips-Perron) with trend and constant: the number of delays is based on the Newey-West truncation parameter $l=2$, estimated in relation to the number of observations: $l=(n/100)29=2$

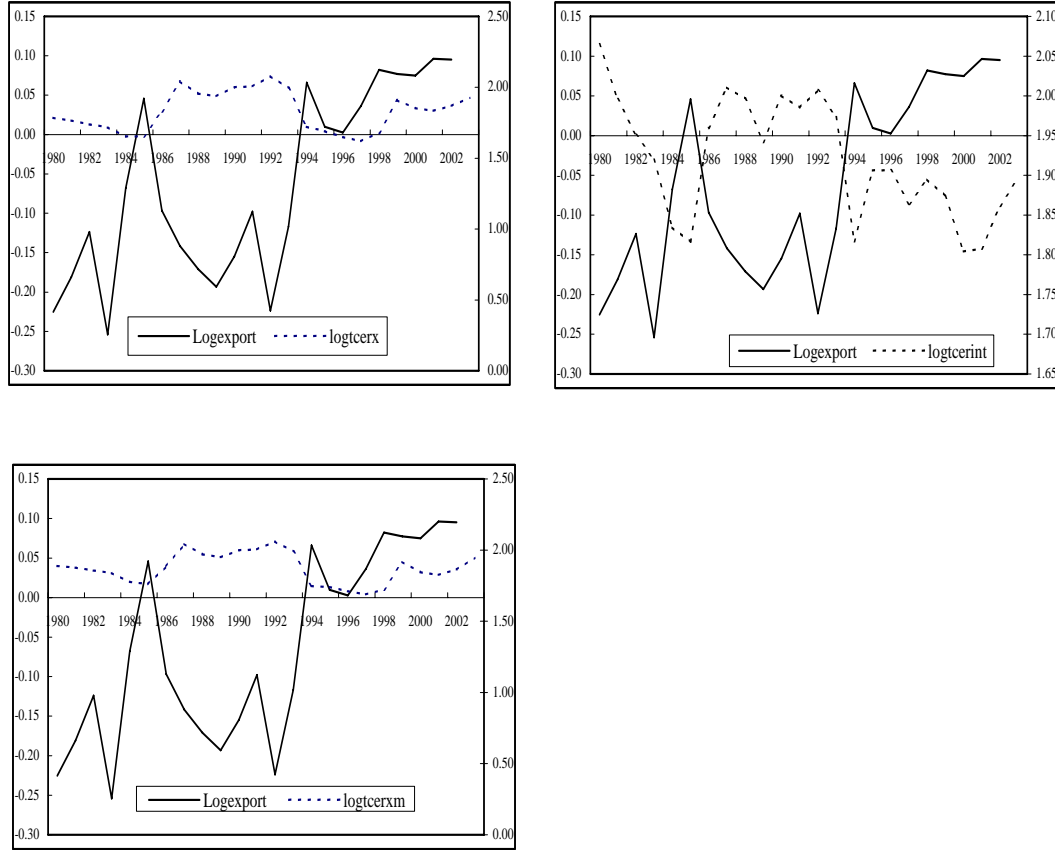
Table 13: Benin - Estimation of the long-term relation

	Model $Export_{REER_X}$	Model $Export_{REER_{X+M}}$	Model $Export_{REER_{INT}}$	Model $Export_{BER_{off.}}$	Model $Export_{BER_{par.}}$
$\log REER_X$	-0.108 (-1.404)				
$\log REER_{X+M}$		-0.172 (-1.537)			
$\log REER_{INT}$			-0.413 (-1.992)		
$\log GDP_{part.}$	0.488 (9.138)	0.461 (7.770)	0.396 (5.265)	0.5127 (9.896)	0.5378 (10.104)
$\log BER_{offi.}$				-0.051 (-1.350)	
$\log BER_{paral.}$					-0.055 (-1.360)
Constant	-3.768 (-6.044)	-3.253 (-3.763)	-1.627 (-1.116)	-1.836 (-8.958)	-1.916 (-10.147)
R ²	0.838	0.840	0.850	0.837	0.838
DW	2.03	2.03	2.02	2.07	1.97
ADF	-4.680	-4.658	-4.805	-4.520	-4.294

Source : Author

On the other hand, the real exchange rate remains a factor, which affects the production volume of exported goods even if it is not statistically significant. As a result, a 1 percent appreciation of the $REER$ reduces export volumes by 0.1 percent under the $REER_X$ model, by 0.2 percent under the $REER_{X+M}$ model, and by 0.4 percent under the $REER_{INT}$ model.

Chart 11: Benin – Comparative Evolution of Exports and Real Effective Exchange Rates (1980-2002)

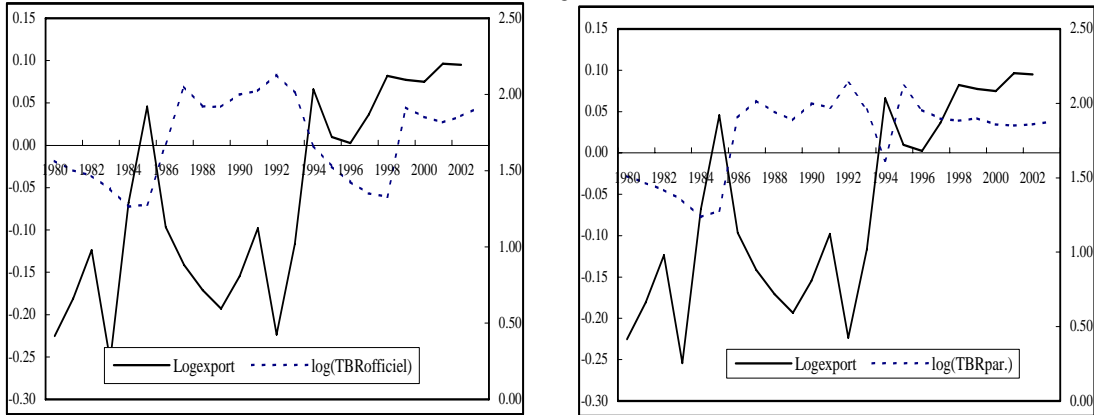


Source: Author

Moreover, with regard to the preponderance of Nigeria's weight in trade relations with Benin, equation (1) is used to study the bilateral relation between Nigeria and Benin. It appears that bilateral official or parallel real exchange rate and the level of economic activity in Nigeria have a significant impact on the production volume of Benin's exports.

Thus, a 1 percent real depreciation of the official bilateral real exchange rate and the parallel bilateral real exchange rate stimulate the real exports production volume in Benin by 0.5 percent. The incidence is weak and not too significant given the lack of data on informal exports in the long-term. Also, a 1 percent increase in the Nigerian GDP translates into an increase of almost 0.5 percent in Benin's exports in the $BER_{official}$ and $BER_{parallel}$ models, respectively.

Chart 12: Benin – Comparative evolution of Nigeria/Benin Exports and bilateral real exchange rates (1980-2002)



Source: Author

On the whole, the model used very simply explains the export variations. To determine if the variables are co-integrated, residues of each regression reached through the least squares methods are tested using ADF tests. If the residues of a regression are stationary, then the variables of the estimated equation are co-integrated. In other words, if all the series included in the regressions are $I(1)$, but their linear combination is $I(0)$, the series are co-integrated. Results show that the terms of the error are stationary for each equation tested and, therefore, the estimated regression provide the long-term relations.

CONCLUSIONS AND RECOMMENDATIONS

Far from the controversy on the management of the CFA Franc, the common currency of Franc Zone countries, this study seeks to underscore the need for policy makers to get a good understanding of the competitiveness of Benin's economy through a comprehensive and detailed indicator of the real exchange rate. Indeed, the first step in this empirical approach has allowed us to identify four series of real effective exchange rate indicators. This step was indispensable because of the lack of a real effective exchange rate series over the period considered, i.e. 1980-2003. As a matter of fact, the IMF only has the comprehensive series from 1985 onwards. Consequently, on the one hand, a real internal exchange rate indicator was designed to measure consumer price developments (representing prices in the sheltered sector) in relation to US whole sale prices (representing prices in the sector exposed to international competition); on the other hand, three real effective exchange rate indicators were designed: a real effective exchange rate index for exports, reflecting the dynamics of Benin's external competitiveness; a real effective exchange rate index for imports, reflecting Benin's competitiveness in its own market; and finally, a real effective exchange rate index with double weighting for trade partner countries and another for competitor countries, an indicator of overall cost and price competitiveness at the international level. These indices make it possible to measure the competitiveness of Benin's economy.

The analysis of trade performance and competitiveness shows that Benin has proven comparative advantages in exports for very few products (cotton, grains and oil seeds, textiles). It therefore shows the need to diversify the export base and to develop other assets. Indeed, Benin is a country with a relatively poorly diversified export base, with Nigeria and France as its major trade partners.

Results analysis clearly shows that no matter the model observed, Benin's problems lie more with overvaluation than with undervaluation of its exchange rate. In particular, after 1990, in spite of the initial impact of economic recovery resulting from the measures implemented as part of Structural Adjustment Programs, the study indicates that the real exchange rate is still misaligned especially in relation to Nigeria, which means that Benin's economy is still not competitive. This situation calls for specific measures to adjust the exchange rate. If Benin had full control of its monetary policy, the best strategy would be to devalue the CFA Franc because devaluation with a few well-targeted accompanying measures would restore real exchange rate equilibrium through an upward adjustment in the domestic prices of tradable goods. By acting directly on the real exchange rate without necessarily demanding a reduction in the domestic prices of non-tradable goods, devaluation does make it possible to avoid the adjustment costs inherent in the automatic adjustment approach also known as disinflation approach. Also, if it were possible for Benin to establish a tax policy providing simultaneously for an increase in export subsidies and an increase in import taxes, this would lead to a correction of real exchange rate imbalances and, thus, a relatively quick return (but slower than in the case of devaluation) to economic competitiveness (Sinzogan, 1999).

However, in view of the requirements for common monetary management under WAMU and the common tax harmonization mechanisms (the Common External Tariff, for example) implemented within WAEMU, the only real exchange rate adjustment strategy that Benin can use is automatic adjustment, which consists in tackling the sources of imbalances by suspending the implementation of policies that are out of step with the exchange rate level.

The study findings have clearly identified Nigeria and France as Benin's major trade partners. The first lesson to be learned from such findings is that Benin's economic competitiveness depends not only on the establishment of virtuous domestic policies; it is also strongly influenced by its trade partner's economic policies. Thus, in relation to Nigeria, the prospects for strengthening competitiveness depend on an acceleration of integration between both countries, especially through the following actions:

- Creating a customs union between Benin and Nigeria.
- Harmonizing legislation in the legal, taxation and accounting areas to foster trade and increase investment that Benin badly needs.

- Formulating common sectoral policies regarding energy, agriculture, industry and transport.
- Tackling the monetary issue within a WAEMU/Central Bank of Nigeria joint commission with a view to ensuring that relations between Benin and Nigeria are profitable for both countries.

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