# NOMINAL DEVALUATION AND INTERNATIONAL COMPETITIVENESS: THE CASE OF THE CFA ZONE

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# CHAPTER I

# THE PROBLEM AND OBJECTIVE OF THE STUDY

## Economic Performance of the CFA Zone

The economic performance in Sub-Saharan Africa has been unsatisfactory, and this poor performance is not a recent phenomenon. The problem worsened starting from the mid-1980s, and most Sub-Saharan African countries were confronted with economic crises. These countries resorted to different reform programs in their attempts to counter the economic turmoil. The reform programs took a different form in the CFA countries, which reflected the rules and objectives of the zone. The latter, comprising fourteen countries (excluding the Comoros Islands), is served by two central Banks:

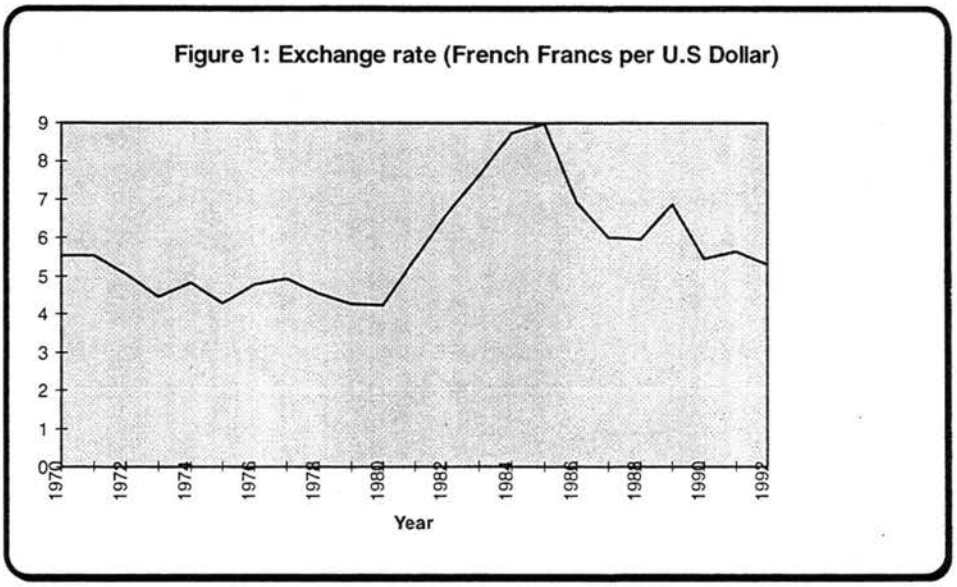
1. The "Banque Centrale des Etats de l'Afrique de l'Ouest" (BCEAO - Bénin, Burkina Faso, Côte d'Ivoire, Guinea Bissau, Mali, Niger, Sénégal, and Togo).
2. The "Banque Centrale des Etats de l'Afrique Centrale (BEAC - Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea, and Gabon).

The common currency of the two central banks, "Communoté Financière Africaine" (CFA), has been pegged to the French Franc (FF) at a fixed rate of 50 CFA to 1 FF since 1948 (and devalued for the first time in January 1994), and is guaranteed full

convertibility into French Francs through an operations account at the French Treasury. The member central banks are required to keep 65% of their foreign exchange reserves in French Francs at the central bank of France, "Banque de France".[1]

The CFA zone is intended to coordinate monetary and fiscal policies of the member countries and, thereby, foster and maintain their economic and financial stability. Although the zone members did enjoy a relatively sustained economic growth, with a low inflation rate comparable to that of the industrial countries, a serious turnaround in the economies of the Sub-Saharan African countries in the mid-1980s undermined the region's effort to improve growth. The problem stemmed from an unfavorable external environment as well as inappropriate domestic policies. On account of external shocks, the downturn in the economic activities in industrial countries (especially in the early 1980s) resulting in a decline of the export prices of the Sub-Saharan African countries, led to a major deterioration in their terms of trade. Equally important, is their lack of international competitiveness, due to the appreciation of their domestic currencies. The latter problem is even more acute in the case of the CFA countries which, because of the institutional arrangements of the zone, left the exchange rate parity unchanged on the face of the appreciating French Franc vis-à-vis the US dollar from the mid-1980s (Figure 1). Consequently, the nominal and real effective exchange rates of the zone countries appreciated.

The CFA zone's deteriorating terms of trade and its loss of international competitiveness (APPENDIX B) resulted in declining export earnings which reduced the

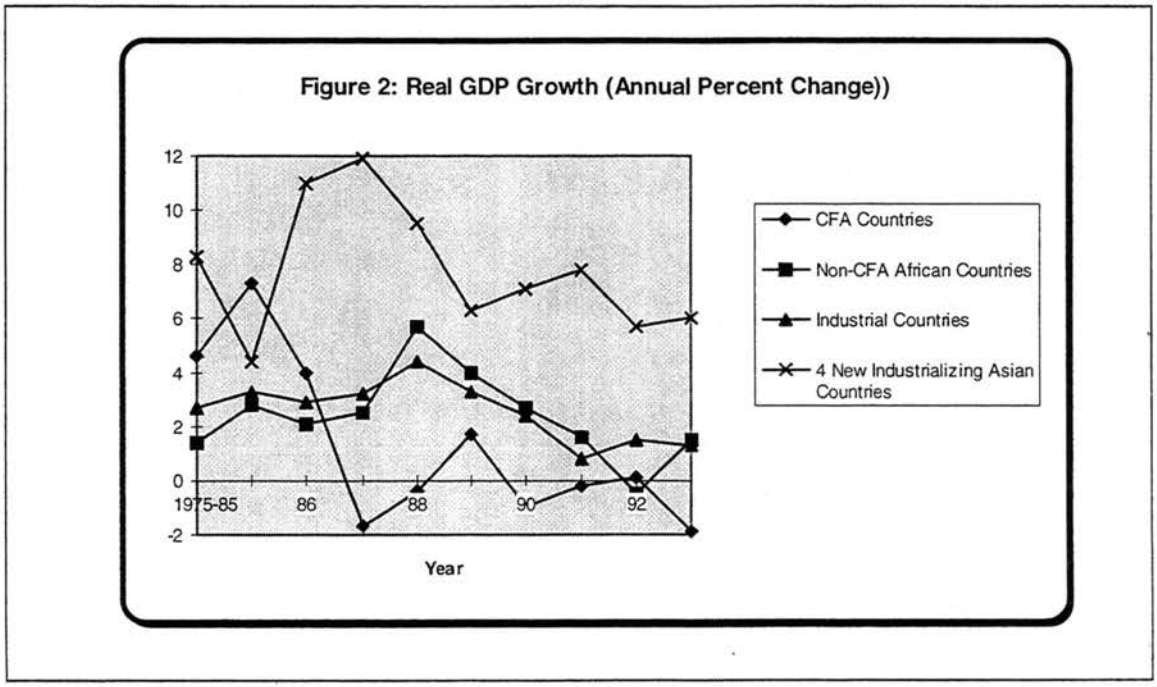



Note: An increase in the exchange rate indicates a depreciation
Source: International Financial Statistics

governments' revenues, while their already colossal expenditures were deemed difficult (and unpopular) to scale back to accommodate the ongoing economic crisis. Each country in the zone experienced an appreciation of its nominal and real effective exchange rates and a worsening terms of trade especially from the mid-1980s.

Hadjimichael et al. (1995) found that the effects of the CFA countries' worsening terms of trade and loss of external competitiveness switched the government saving position from a positive saving equivalent to 3.1 percent of GDP in 1986 to a dissaving of 4.7 percent of GDP by 1989. The external and internal imbalances (which led to the economic crisis) seriously undermined the economic growth of the CFA zone. Prior to 1985, it recorded higher economic growth compared to the non-CFA countries. The trend has abruptly reversed since 1985 and the economic performance of the zone lags far behind that of its neighbors, as can be seen in Figure 2.

Given the mounting economic and financial difficulties of the Sub-Saharan African countries in general, and the CFA zone in particular, structural adjustment programs, aimed at eradicating the impediments to growth and stimulating development, were undertaken. The adjustment strategies differed markedly between the CFA and non-CFA zones. Apart from other internal adjustments, countries with flexible exchange rates responded to their deteriorating terms of trade by depreciating their nominal exchange rates, thereby keeping real effective exchange rates close to equilibrium. In contrast, CFA countries, due to their exchange rate arrangements, could not use the exchange rate as a policy instrument. Consequently, the zone relied entirely on internal adjustments in its

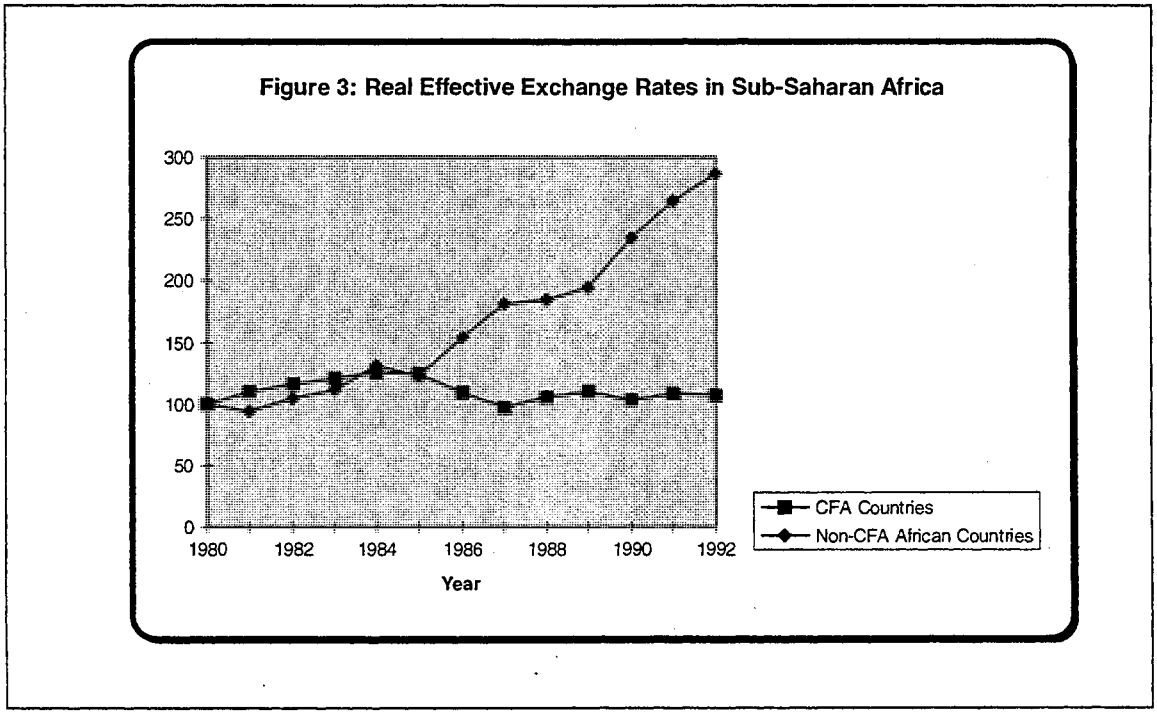



Source: World Economic Outlook.

attempts to secure a real effective exchange rate depreciation and regain its international competitiveness.

A real depreciation can come about either through a nominal devaluation or appropriate change in relative prices (lower domestic prices compared to foreign prices). The second alternative was the option chosen by the CFA zone's authorities to address their lack of external competitiveness. It consists of financial policies aimed at reducing the domestic demand for goods and services to accommodate the country's income, coupled with policies that switch expenditures toward nontradeables. To Devarajan and de Melo (1987a), this strategy is effective if properly implemented. They claim that participating in the CFA zone does not prevent member countries from adjusting to macroeconomic imbalances. According to the authors, there exists, apart from the exchange rate, enough instruments, such as a reduction in government expenditures or a change in commercial policies, to achieve a real devaluation.

A demand management policy, to effect a real depreciation, requires enough cut in government expenditures and credits to the private sector if it is to put sufficient downward pressure on nontradeable prices. Thus, internal adjustments alone, necessary to counteract the terms of trade deterioration and the loss of international competitiveness, can be very costly in terms of output and employment. This is exemplified by the case of the contractionary policy adopted by the CFA zone countries to correct both the terms of trade deterioration and the CFA Franc appreciation. According to the World Bank, between 1980-90, most currencies of Anglophone Africa depreciated in real terms by at least 77 percent while the CFA Franc appreciated by some 30 percent [2], (Figure 3).



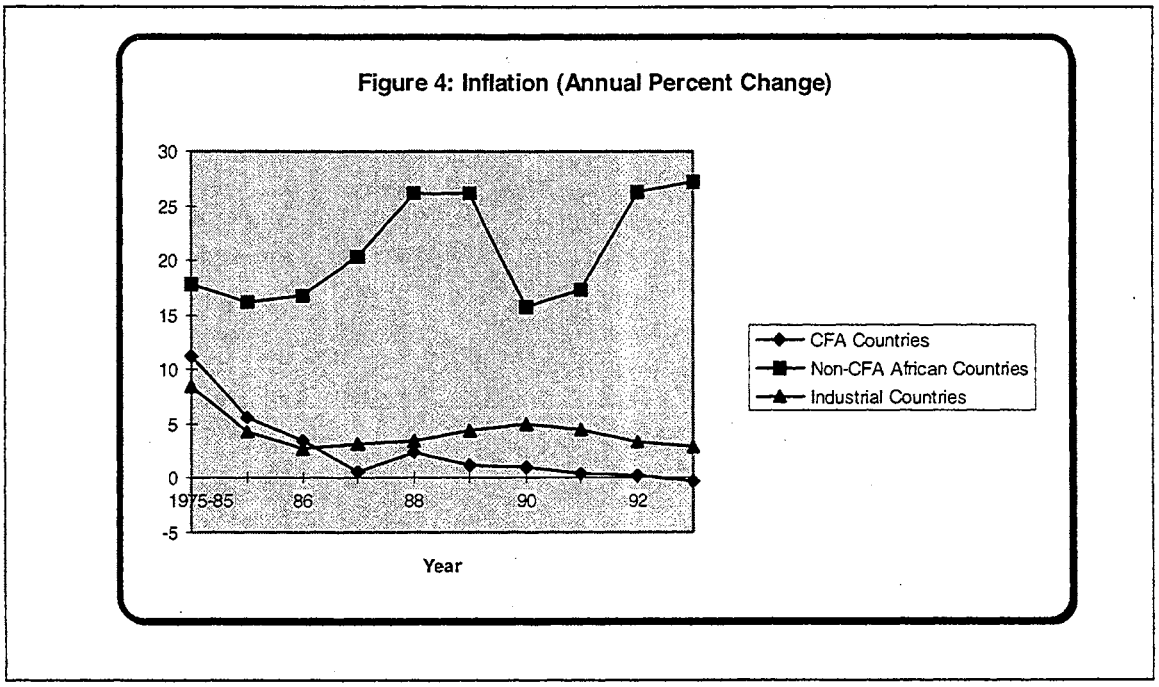

Note: An increase in real effective exchange rate indicates a depreciation
Source: Adapted from Bouton et al. (1994)

Given the sizes of the external and internal imbalances due to both terms of trade deterioration and CFA appreciation, internal adjustments alone would be incapable of restoring equilibrium, and would instead be associated with negative growth and high unemployment, as the monetary and fiscal policies become too restrictive and deflationary. As Hussain (1994) put it, "If the main cause of the decline is external shocks, then adjustment policies cannot be an effective answer to the problem. But if domestic policy weaknesses are the main culprit, then altering these policies should make a difference". Thus, the policies resorted to by the CFA zone countries to address their pressing reform needs turned out to be ineffective (as well as too costly and unpopular).

In their study on macroeconomic reforms and growth in Africa, Bouton et al. (1994) classified African countries according to their fiscal, monetary, and exchange rate policy stance. The study classified almost all of the CFA countries in the "poor" to "very poor" fiscal policy stance for the periods 1990-91 and 1991-92. The same result holds true for the exchange rate policy stance. Only for the monetary policy stance are all the CFA countries rated "good" (or adequate) to "fair" for the same periods.

The CFA countries, however, managed to keep inflation at an exceptionally low rate and below that of the industrial countries from mid-1980s, contrary to the non-CFA countries (Figure 4). Nevertheless, this low inflation rate was insufficient to compensate for the CFA appreciation and the deterioration of the terms of trade as the internal and external financial conditions of these countries continued to worsen.

With the internal adjustments alone seen as a failure, and the growing external and internal imbalances, an alternative strategy was required to effectively restore the




Source: World Economic Outlook.

competitiveness of the zone members. The substantial nominal devaluation (50 percent in terms of foreign currencies) in January 1994 came as a response to the pressing need. The question, however, arises as to whether this constitutes the end of the zone countries' problems. This question is difficult to answer beforehand given the controversies surrounding the effects of nominal devaluation on macroeconomic variables. Nashashibi (1983) nevertheless contends that " Devaluation is not painless; it is often better than the alternatives and it may be the only way to reduce distortions and restore profitability to exports".

## Objective of the Study

Since the mid-1980s, there was almost a unanimous view that the CFA Franc was overvalued and that a nominal devaluation was required to regain the zone's external competitiveness, and thereby revive its economies. As a consequence of the overvaluation, the zone's imports were made artificially cheaper for domestic consumers and exports dearer for foreign importers. The loss of international competitiveness that resulted was believed to have had profound adverse effects on the economic performance of the region. Dornbusch and Helmers (1988) highlighted the main consequences of a currency misalignment (overvaluation) as summarized below,

1. a loss in external competitiveness,
2. loss of domestic production, employment, and fiscal revenues,
3. an ultimate devaluation,

4. adverse effects on domestic financial markets.

The loss of international competitiveness is paramount in that it can be thought of as the source of the other problems of a currency overvaluation. External competitiveness is thus a very important parameter for a country's economic performance. Cottani et al. (1990) asserted that exchange rate stability and correct exchange rate alignment are crucial conditions to improve economic performance in developing countries, as evidenced by the case of some Latin American, Asian, and African countries. Edwards (1989b) in his test of the relationship between real exchange rate misalignment and economic performance, concluded that persistent misalignment is associated with poor economic performance. Ghura and Grennes (1993) using pooled time-series and cross-section data for 33 Sub-Saharan African countries, and, based on different measures of real exchange rate misalignment, also confirmed the negative relationship between real exchange rate misalignment and economic performance (economic growth, imports, exports, saving, and investment).

Drawing on these studies (and many others), and given the poor economic performance experienced by the CFA zone countries, international competitiveness (as measured by real effective exchange rate) can be viewed as a key factor for the economic recovery of the zone. The attempt by the responsible authorities to achieve the goal of economic recovery through contractionary (deflationary) policies was proven too costly and ineffective. Khan and Night (1982) posit that "Programs designed to achieve quick results on the balance of payments via sharp deflation are likely to have significant and undesirable effects on output, employment, and factor incomes, particularly in the short run."

To quickly and effectively restore international competitiveness and macroeconomic equilibrium, a nominal devaluation (an expenditure-switching and expenditure-reducing policy) was required. The policy works, other than reducing domestic demand, to switch demand toward domestic goods (nontradeables) through its upward effects on the relative price of tradeables. The real exchange rate, defined as the domestic relative price of tradeable, PT/PN (Dornbusch and Helmers, 1988) will thereby depreciate and the devaluing country's international competitiveness improved (Rivera and Rivera, 1985). The real exchange rate, as defined above, is a good indicator of the degree of profitability of the tradeable sector. Under plausible conditions, its increase (real depreciation) will be associated with a reallocation of resources from nontradeable to tradeable sectors, thereby, increasing the supply and reducing the domestic demand of the latter[3]. It is argued that the gain in competitiveness (real depreciation of the exchange rate) brought about by a nominal devaluation can be reinforced through contractionary monetary and fiscal policies designed to contain domestic inflation, without which the gain in competitiveness can be rapidly eroded. This implicitly indicates that a nominal devaluation may not bring about a permanent real depreciation of the real exchange rate, as domestic inflation will catch up and eradicate the competitiveness gain.

This gloomy effect of a devaluation on domestic relative price (real exchange rate) is even more disturbing when one considers (or adopts) the view of the purchasing power parity (PPP) doctrine. According to the PPP view, which expresses the real exchange rate as the nominal exchange rate adjusted for changes in domestic and foreign prices ($EP^*/P$), a deviation of the real exchange rate from its equilibrium level (assumed to be a constant) is a temporary phenomenon which ought to be reversed. Accordingly, a devaluation

(assuming initial external balance) forces the actual real exchange rate away from its equilibrium PPP level, making the domestic economy more competitive. The current account surplus that results will hinder the international competitiveness. Moreover, domestic prices (costs and wages) will be revised and increased to the same proportion as the devaluation, thereby leaving the real exchange rate unchanged. This approach is, however, highly criticized, especially for considering the equilibrium real exchange rate as a constant to which any deviation must return. Harberger (1986), Khan (1986), Khan and Montiel (1987), and Edwards (1989a) consider the equilibrium real exchange rate not as a constant, but as an endogenous variable which responds to its "fundamental" determinants. Other criticisms assert that the PPP holds only in the long run but not in the short run.

On all accounts, the effects of a devaluation are not clear-cut. Instead, they are fraught with controversies which make it difficult to predict beforehand the future trend of the economic variables following a nominal devaluation.

The main objective of this study is to investigate the effects of a nominal devaluation on the external competitiveness of the CFA zone economies. In other words, an inquiry will be made as to whether a nominal devaluation will lead to a permanent (or relatively so) real depreciation of the CFA Franc, and whether the zone's exports and imports will respond to the real devaluation, if any.

Critics argue that devaluation may prove counterproductive, and the inflation and social malaise which come with it, make a devaluation an undesirable alternative approach to solve the economic and financial problems of developing countries. In fact, inflation following a devaluation, is one of the threats that can seriously undermine the adjustment

efforts and may even force the devaluing country to another devaluation, thus plugging the country into an "inflation-cum-devaluation" spiral.

The study will, therefore, also investigate the inflation and output effects of a nominal devaluation of the CFA Franc. The research intends to shed light on what can be expected from a nominal devaluation in developing countries in general, and in the CFA countries in particular.

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1. See R. J. Bathia (1985) and APPENDIX A for more details.

2. Cited from Sonko (1994).

3. Some of these conditions are a positive supply elasticity of tradeables with respect to their relative prices, PT/PN, with a corresponding negative demand elasticity; and assuming that the Marshal-Lener condition holds. Other conditions include less than full employment of resources prior to devaluation, easy mobility of resources between sectors, and the change in domestic relative price must be perceived as lasting by the market participants.

# CHAPTER II

# LITERATURE REVIEW

## The Relative Performance of the CFA Zone, and Theories of Devaluation

The CFA zone countries are subject to a tradeoff between stability (as can be conferred by the fixed parity and the built-in monetary and fiscal discipline of the zone) and flexibility (through the ability to use the exchange rate as a policy instrument). This dilemma which can be thought off as a tradeoff between inflation and output (Philips curve) has taken a proportionally increasing importance in academic and policy debates due to the sharp reversal of the zone's economy (from mid-1980s) and the view that the overvalued common currency has been hampering the full structural adjustment required for economic recovery.

On the question as to whether or not participating in the zone hurts the members (or if the latter' s economic performance compares poorly relative to other developing countries), a number of empirical research studies emerged to supplement the theoretical discussions. Devarajan and de Melo (1987b) tested the economic performance of the CFA countries as compared to selected "comparators" (63 developing countries) during the period 1960-82. Using a variance component statistical model, the authors reported that if the CFA countries are treated as a single country, they performed better vis-à-vis their comparators than when considered individually. The results, the authors claim, are even

brighter for the CFA countries for the period 1973-82. Guillaumont et al. (1988) reached the same conclusion when they found that the zone's growth performance is close to the average performance of other developing countries and even better than that of other African countries for the period 1960-81.

Elbadawi and Majd (1992), in their empirical study on fixed parity and short- and long-run economic performance in the CFA zone, reached a more cautious conclusion. Their results pointed out an erosion of the external competitiveness of the CFA zone with regard to other comparators in the short run. Using a modified-control-group approach, and taking into account initial conditions, internal and external shocks, and policy stance, the authors found that over the short run the zone was outperformed by the group of comparators in terms of output growth, exports, investment, and saving (except for inflation). In the long run, however, the results are in favor of the CFA zone.

Other studies came up with a clear-cut negative view of the zone, and related its poor performance to the stringent rules of the Union. Devarajan and Rodrik (1991) highlighted the costs of maintaining a fixed exchange rate regime on the face of highly variable external terms of trade. Their analysis of the costs and benefits of the CFA membership resulted in the conclusion that "fixed exchange rates have been, on the whole, a bad bargain for the CFA member countries. For most of the CFA members, the inflation benefits do not appear to have been large enough to offset the costs on the output side. Under 'reasonable' output-inflation tradeoffs, these countries would have been better off having the flexibility to adjust to external shocks".

In another study, Devarajan and de Melo (1990) reassessed their 1987 work which helped them reconsider their earlier conclusion. They asserted that, as a consequence of a

failure to fully adjust their economy (including nominal devaluation) in light of changes in the world environment and persistent current account deficits, the zone members' GDP growth rates fell behind those of their counterparts. Allechi and Niamkey (1994) in a rather different approach performed a cost-benefit analysis of participating in the CFA zone. Using the theory of reserves pooling, they found that although there are gains from the reserves pooling, when the opportunity costs of maintaining the operations account are taken into account, there are more losers than gainers in the zone with the 65 percent reserves pooling system.

The available theoretical and empirical literature seem to go along the line indicated by Corden (1990). According to the latter, there are two approaches to exchange rate policy in developing countries: the "real targets" and the "nominal anchor" approaches. For the real target school, the nominal exchange rate should be viewed as a policy instrument (together with other policies) to affect real variables in the economy, such as the real exchange rate. The approach implies that because of rigidities (wages for instance) in the economy, nominal devaluation should be resorted to (in, say, periods of loss of international competitiveness), and is capable of generating long-lasting real effects. This is the view adopted by the opponents of the fixed parity system. To them, fixed parity can have severe consequences (through misalignment) in terms of lack of external competitiveness and a consequent decline in economic growth. This view is supported by studies by Cottani et al. (1990), Edwards (1989b, 1989c), and Ghura and Grennes (1993).

According to the nominal anchor view, nominal devaluation only leads to nominal effects with no (or little) real changes. Nominal devaluation is thus considered as not only

ineffective, but also as a threat to the economy due to the high inflation it imposes (Devarajan and Rodrik, 1991; Elbadawi and Majd, 1992). Adherents of this view (in other words, proponents of fixed parity) claim that a fixed exchange rate regime can accelerate economic growth through safe investment environment and the monetary and fiscal discipline conferred by the zone. Devarajan and de Melo (1987a) headed in that direction when they claimed that the CFA zone members have enough instruments at their disposal to effect real depreciation necessary to correct their internal and external imbalances. Their inability to achieve that, the authors believe, is simply explained by the fact that these available instruments (such as a reduction in government spending or a change in commercial policies) are not always used by the member countries, or are used in the wrong direction.

The theoretical and empirical literature on currency devaluation can also be arranged in three mainstream views: the elasticity, absorption, and monetary approaches. For the elasticity approach (which can be traced back to Bikerdike), nominal devaluation is a means to regain a country's external competitiveness through its direct effect on the real exchange rate. It embeds the view that (assuming a small country case where tradeable prices are determined in the world market), a nominal devaluation will result in an equiproportional real exchange rate depreciation, thus rendering goods in the exportable market more profitable for domestic producers (or cheaper, in other words, for foreigners), while imports are made more expensive for domestic consumers. The increase in relative tradeable prices frees up resources in the nontradeable sector for use in the tradeable sector whose activities flourish. The consequent increase in exports, and the decrease in imports (due to higher imports price), occasion a trade surplus (or reduce the

existing trade deficit), and boosts domestic employment. The approach however identifies conditions under which a nominal devaluation can induce a trade surplus (or a reduction in trade deficit). In fact, a devaluation reduces the unit price of exports (in foreign currency), while it increases the unit price of imports (in domestic currency). For the trade balance to improve following a devaluation, the increase in export volume, on one hand, and the decrease in import volume on the other hand, need to be sufficient to offset the changes in the unit prices. This is the famous Marshall-Lerner condition (or stability condition) which states that, for a devaluation to have a positive effect on trade balance, the sum of the elasticities of the domestic demand for imports ( $\xi$ ) and of the foreign demand for imports ( $\xi^*$ ) must exceed one (in absolute values),

$$|\xi| + |\xi^*| > 1.$$

The major criticism of the elasticities approach, however, is its analysis based on a partial equilibrium framework which prevents relative price change following a devaluation.

The second theory of devaluation, the absorption approach, stresses the relationship between domestic income and expenditures (absorption). According to the approach, for a devaluation to affect the trade balance, it must have the expenditure-switching and expenditure-reducing effects. The relative price change brought about by a devaluation can persist only if domestic demand is cut back in order to keep nontradeable prices from increasing due to the induced high demand in the nontradeable sector.

Viewed from another angle, an improvement in the trade balance can occur only if domestic expenditure is increasing at a rate less than that of the national income. This proposition is explicit in the following identity,

$$Y - (C + I + G) = X - M \quad \text{or } Y - A = X - M$$

where, Y = real income

C = consumption

I = investment

G = government consumption

X = exports

M = imports

A = C + I + G (or absorption)

Assuming that income is constant, a reduction in absorption (A) must take place for the trade balance (X - M) to improve regardless of the elasticities (Cooper, 1971).

The third theory, the monetary approach, contrary to the elasticities approach, takes into account the interactions between the external sector and the monetary side of the economy. It posits that a devaluation reduces the real balances of the economy due to the higher prices it entails. Assuming that the responsible authorities keep the nominal money balances unchanged, households and businesses will reduce their expenditures (absorption) in the face of the dwindling real balances in order to restore the "equilibrium" value of their real money and other financial assets. The trade balance will respond favorably. The assumption of full employment condition and purchasing power parity (flexible prices) embedded in the monetary approach, however, prevents domestic prices from going astray from a level consistent with foreign prices. The positive balance of payments following the temporary relative price change increases domestic real balances (wealth) until the initial equilibrium is fully restored. At the new equilibrium, the real exchange rate and the balance of payments return to their pre-devaluation levels.

It can be deduced from these three mainstream approaches that a devaluation is expected to increase the relative price of tradeables that may later be translated into an improved trade balance position and higher domestic output.

Certain conditions, however, might prevent the nominal devaluation from permanently altering the real exchange rate. On the production side, the higher relative price for tradeables undermines production in the nontradeable sector, thus lowering its output. On the demand side, the substitution effect of a devaluation (coupled with the trade surplus) increases the demand for nontradeables. The combined effects (lower production and higher demand) result in an upward pressure on nontradeable prices which, if left alone to pursue its normal course, can revert the initial real depreciation immediately following a nominal devaluation. This situation is reinforced if wages are indexed and if intermediate goods constitute an important part of the devaluing country's imports.

It is clear why much attention has been devoted in theoretical and empirical literature to the real exchange rate, as its change following a devaluation, while uncertain, constitutes a precondition for any improvement in the external and internal imbalances of an economy.

## Measures and Determinants of Real Exchange Rate

The real exchange rate, a measure of a country's international competitiveness, can be defined in different ways in the literature, but in all, what is sought is to find an indicator which explains more accurately movements in the trade balance (Dornbusch and

Helmers, 1988). One of these measures defines the real exchange rate as the relative price of tradeables to nontradeables (Edwards, 1989a; Marsh and Tockarick, 1994),

$$RER_{T,NT} = EP_T/P_{NT}$$

where, $RER_{T,NT}$ = real exchange rate

E = nominal exchange rate (defined as home currency price of foreign currency)

$P_T$ = price of tradeables (in foreign currency)

$P_{NT}$ = price of (domestic) nontradeables (in domestic currency)

The above measure can simply be written as $RER_{T,NT} = P_T/P_{NT}$, with $P_T$ redefined as tradeable price in domestic currency.

The computation of this indicator requires the knowledge of what constitutes tradeables, in order to determine their prices ($P_T$ and $P_{NT}$). Another problem with this measure, as pointed out by Edwards (1989a), is its inapplicability in empirical works, as proxies need to be found for the prices of tradeables and nontradeables. The advantage, however, is that its increase (real depreciation) signals the profitability in the tradeable sector as compared to that of the nontradeables.

A real exchange rate based on the consumer price indexes (CPI) is also frequently used in practice. It is defined as,

$$RER_{CPI} = E(P^*/P)$$

where, E = nominal exchange rate (defined as home currency price of foreign currency)

P = domestic price level

$P^*$ = foreign price level

Despite its wide use, the measure of competitiveness based on CPI is subject to criticisms as the CPI can be influenced by price controls and other distortions. Also because the CPI includes both tradeable and nontradeable prices, a change in the real exchange rate can not tell much about the relative profitability of activities in the tradeable sector (Marsh and Tokarick, 1994; Lipschitz and McDonald, 1991).

International competitiveness can also be measured through a comparison of unit labor costs (ULC) in the tradeable sector in different countries.

$$RER_{ULC} = E(ULC^{*}/ULC)$$

where, ULC = unit labor cost in the domestic tradeable sector

$ULC^{*}$ = unit labor cost in the foreign tradeable sector

In the context of developing countries, data on unit labor costs are rare (if not nonexistent). To the extent that they exist, real exchange rate based on unit labor costs should be interpreted with caution as its movements can be due to changes in other input costs used in production (Lipschitz and McDonald, 1991) or a substitution of capital for labor.

Other measures of international competitiveness include real exchange rate based on export unit values, and the profitability of producing traded goods (Marsh and Tokarick, 1994).

These different variants of the measure of external competitiveness have, each, advantages and drawbacks, and thereby, should be viewed as complementary rather than substitutes.

Movements in the real exchange rate are documented by various scholars to determine the responses of the actual and equilibrium real exchange rates to monetary and

real disturbances. In this respect, a distinction is made between actual and equilibrium real exchange rates. Following Edwards (1989a), " The equilibrium real exchange rate is that relative price of tradeables to nontradeables that, for given sustainable (equilibrium) values of other relevant variables - such as taxes, international prices, and technology - results in the simultaneous attainment of internal and external equilibrium". This definition differs from that of the purchasing power parity (PPP) approach which considers the equilibrium real exchange rate (a fixed number) as the one in the year in which the economy is thought to be in equilibrium. The main objection to the PPP definition is that it fails to recognize that the equilibrium real exchange rate is itself an endogenous variable subject to changes whenever its determinants - the "fundamentals" - are altered (Edwards, 1989a, 1994; Elbadawi, 1994; Coughlin and Koedijk, 1990). Although the PPP approach still has its appeal, evidence shows that the equilibrium real exchange rate follows movements in real variables considered as its determinants, thus denying the validity of the PPP approach. Economists seem to agree on the invalidity of the PPP approach in the short run, yet need to reach a consensus on its soundness in the long run.

Various studies reveal that the long-run (equilibrium) real exchange rate is determined by real variables - "fundamentals" - only, while the short-run (actual) rate is affected by nominal as well as real variables. Khan and Ostry (1991), based on a version of the dependent-economy model, linked the equilibrium real exchange rate (ERER) to (mainly) terms of trade movements and commercial policy changes. Edwards (1989a, 1989b), and Elbadawi (1994) also identified, in empirical works, the fundamental determinants of ERER. Although they acknowledge that the ERER is an endogenous

variable, Coughlin and Koedijk (1990), contrary to other studies, reported that little is known about its determinants.

In studying the behavior of actual real exchange rates, Edwards (1989a, 1994), Ghura and Grennes ( 1993) identified its real and nominal determinants. Of importance, they found that the nominal devaluation variable is always significantly positive, an indication that a nominal devaluation is a powerful device for reestablishing the external competitiveness of developing countries. One caveat for these studies is that they investigate only the contemporaneous effects of a nominal devaluation.

Long-run effects of nominal devaluation on external competitiveness were examined by Rouis et al. (1994) for Sub-Saharan Africa. Their empirical results show that there exists a long-run effect of nominal devaluation on the real exchange rate. The limitation of the model, however, is that it ignores the effects of real variables. A comprehensive model needs to include both real and nominal variables as well as devaluation lags as explanatory variables for an effective estimation of the relationship between nominal devaluation and real exchange rate, which this study is intended to do.

The issue of devaluation and its impact on external competitiveness entail other problems that need to be accounted for, namely, export and import growth, inflation, and output growth. A major concern of researchers over the past several years has been the relative price responsiveness of exports and imports (Marshall-Lerner condition). Khan (1974) in estimating the export and import demand functions for 15 developing countries, found that prices do play an important role in the determination of the developing countries' imports and exports. Similar results were found for African countries for their exports and imports (Bonds, 1983; Jaeger, 1991; Ghura and Grennes, 1994). These

studies confirm that the Marshall-Lerner condition for successful devaluation is satisfied for the Sub-Saharan African countries. Tegene (1989) criticized most of the above studies for failing to incorporate the effective exchange rate in their trade flow models. His results, however, confirm the conclusion reached by others. Moreover, his findings suggest that exchange rates have, in general, adverse effects in the short run, while they improve the trade balance in the long run.

An opposite view (elasticity pessimism) charges that Sub-Saharan African countries' exports (mainly agricultural products) and imports (with intermediate goods accounting for a higher proportion) are inelastic with respect to changes in relative prices. If so, a devaluation will be ineffective in inducing a trade balance surplus, even if it is successful in generation a real exchange rate depreciation (Hadjimichael et al., 1995).

Another problem tackled in different empirical studies in conjunction with devaluation is the inflation the latter imposes. Inflation pressure, following a devaluation, is not a hidden truth. By increasing the prices of imported goods, a devaluation leads to domestic inflation which, if not contained can not only revert the initial real depreciation, but also undermine the economic growth of the country. Evidence on non-CFA African countries confirm that view.

The effect of devaluation on real output, on the other hand, was documented by several authors, and the empirical results remain mixed. The discussion basically goes as follows. A devaluation affects both the supply and demand sides of the economy. On the demand side, a devaluation shifts domestic aggregate demand through substitution and income effects. On the supply side, a devaluation by increasing the price of imports (especially intermediate goods) shifts up the production cost of domestically produced

goods, thereby reducing output. The ultimate effect of a devaluation on domestic output depends on how changes in aggregate demand compare to those in aggregate supply (Krugman and Taylor, 1978; Gylfason and Schmid, 1983; van Wijnbergen, 1986).

The increasing pessimism of the effect of a devaluation on output in developing countries is essentially due to the complete dependence of these countries on the imports of intermediate goods, and the latter's non-substitutability with domestic products (Bruno, 1979). Using different methods of analysis (control group, econometric approach, macro-simulation, macromodel, etc.), Cooper (1971), Edwards (1986, 1989a, 1989b), Khan (1990), Edwards and Santella (1992), reached different conclusions of the effect of devaluation on output. Further empirical work, like the one under study is necessary in order to shed more light on the effect of a devaluation on the real exchange rate, exports and imports, inflation, and output.

# CHAPTER III

## INTERNATIONAL COMPETITIVENESS: REAL EFFECTIVE EXCHANGE RATE

Inappropriate exchange rate and macroeconomic policies in Sub-Saharan African countries that led to substantial exchange rate misalignment are at the core of the poor economic performance in the region. The negative relationship between poor real exchange rate policy and economic performance is an indication that real exchange rate is a key relative price in an economy, and that policies to keep the exchange rate close to its equilibrium value are indispensable for economic recovery. It is for that reason that a good number of developing countries in general, and Sub-Saharan African countries in particular, resorted to large and discrete nominal devaluations of their currencies in order to correct overvaluation, thereby improving their international competitiveness through real depreciation. Knowledge of all the determinants of the real exchange rate, both in the short and long run, and their relative weights can help achieve that goal.

Studies that addressed the issue include Cottani et al. (1990), Dornbusch (1985), Edwards (1989a, 1989b, 1994), Elbadawi (1994), Ghura and Grennes (1993), Harberger (1986), Khan 1986), Khan and Montiel (1987), Khan and Ostry (1991), and Snape (1988).

Contrary to the purchasing power parity theorists, these authors posit that the equilibrium real exchange rate is not an "*immutable number*", but responds to changes in

different variables known as its "*fundamentals*". The equilibrium (long-run) real exchange rate is thus sensitive to a wide range of variables among which some are believed to have more influence. These include the international terms of trade, capital flows, trade policies, exchange and capital controls, world market real interest rates, and the level and composition of government consumption (Cottani et al. (1990), Edwards (1989a, 1989b, 1994), Elbadawi (1994), Khan and Ostry (1991) among others). These real variables affect the long-run (equilibrium) real exchange rate, while in the short run, both real and nominal variables determine the actual real exchange rate. The theoretical foundation of the effects of some of these variables on the real exchange rate follows.

## Determinants of Equilibrium and Actual Real Exchange Rates

International terms of trade:

Exogenous changes in the external terms of trade (defined as the ratio of unit price of exports to that of imports) affect the equilibrium value of the real exchange rate. The theoretical literature points at an ambiguous effect depending on the sizes of the substitution and income effects.

A deterioration of the terms of trade (say, a permanent decline in the price of exports) leads to a substitution effect on both the supply and demand sides. On the production side, resources are reallocated from the export sector to import substitute and nontradeable sectors. Tradeable output will decline in favor of nontradeables. On the demand side, the lower export price will reduce the price of tradeables relative to that of nontradeables, forcing consumers to adjust their consumption pattern by consuming

relatively more tradeables. The income effect following the decline in export prices, on the other hand, reduces the real national income, thereby cutting down demand in both tradeable and nontradeable markets.

Thus, in the tradeable market, the worsening terms of trade leads to a reduction in output and an ambiguous effect on demand (increase due to substitution and decrease due to income effects), such that the ultimate effect of a decline in export price on the price of tradeables remains unclear (Table 1). However, if the substitution (in demand) effect dominates the income effect, a rise in the relative price of tradeables, thus a depreciation, will occur.

The change in the equilibrium relative price can be more exactly explained in the nontradeable market. Contrary to the tradeable market where excess demand/supply is translated into trade deficit/surplus (because of the exchange rate regime), in the nontradeable market, excess demand/surplus is eliminated through price adjustment . Thus, the rise in output (substitution effect) and fall in demand (both substitution and income effects) of nontradeables following the decline in export price, require a lower relative price (depreciation) of nontradeables for their market to clear (Table 1).

A similar analysis can be carried out when the terms of trade deterioration is due to a rise in the import prices. Using the nontradeable market, the analysis indicates a reduction (substitution effect) in the supply and a change (increase due to substitution effect and decrease due to income effect) in demand for nontradeables, thus, leading to an ambiguous effect on tradeable prices. Analysis of the tradeable market, on the other hand,

Table 1: Decrease in Export Prices

| | Tradeables | | | Nontradeables | | |
|---|---|---|---|---|---|---|
| | Supply | Demand | Price | Supply | Demand | Price |
| Substitution Effect | - | + | | + | - | |
| Income Effect | | - | | | - | |
| Total Effect | - | ? | ? | + | - | Depreciation |

Table 2: Increase in Import Prices

| | Tradeables | | | Nontradeables | | |
|---|---|---|---|---|---|---|
| | Supply | Demand | Price | Supply | Demand | Price |
| Substitution Effect | + | - | | - | + | |
| Income Effect | | - | | | - | |
| Total Effect | + | - | Appreciation | - | ? | ? |

following an increase in import prices, show an increase in supply and a decrease in demand for tradeables, thus, an unambiguous decrease of tradeable prices (real appreciation), Table 2.

In general, the effect of a terms of trade shock on the equilibrium real exchange rate depends on the (production and demand) substitution and income effects. In the case of a decline in export prices, a real depreciation of the equilibrium real exchange rate will occur (if the substitution effect dominates the income effect), while a real appreciation would result in the case of a rise in the import prices.

Productivity change:

An improvement in productivity results in more efficient production in the sector where the change occurs. An increase in productivity in both tradeable and nontradeable sectors may affect the equilibrium real exchange rate depending on the income elasticities of demand. Of more interest is an improvement in productivity in the tradeable sector relative to the nontradeables. A relative technological improvement in the tradeable sector has long been viewed as one of the causes of improvements in equilibrium real exchange rate (Balassa, 1964). Countries with faster growth of productivity in the tradeable sector will face a real appreciation of their currencies (the example of Japan is illustrative).

The reasoning goes as follows (and is presented in Figure 5). A productivity improvement in the tradeable sector relative to the nontradeables results in a higher tradeable output. The production possibility frontier of the country shifts outward (from AA to BA in Figure 5). Assuming that consumers' taste and preferences between tradeables and nontradeables remain unchanged, the new long-run equilibrium is reached

at a lower relative price of tradeables (or a real appreciation) as shown by $P_{NT}'$ compared to $P_{NT}$, where $P_{NT}$ represents the relative price of nontradeables.

Productivity improvement in the nontradeable sector, on the other hand, will result in a real depreciation of the country's exchange rate, a flatter $P_{NT}'$ as compared to $P_{NT}$ in Figure 6. Thus, the real exchange rate can appreciate or depreciate following a productivity improvement, depending on the sector in which it take place.

Capital flows:

Capital flows are another determinant of real exchange rates. A capital inflow will cause expenditures on tradeables and nontradeables to increase. This is because (given a fixed exchange rate regime), an inflow of capital is associated with a monetary expansion which increases domestic demand. Contrary to the tradeable market where nominal prices are fixed (because determined in the world market), there will be an increase in the prices of nontradeables (real appreciation) following the excess demand that disturbed the initial equilibrium.

In the case of a floating exchange rate regime, a capital inflow increases the foreign currency supply and, thus, appreciates the domestic nominal currency, and thereby its real rate. Similarly, a capital outflow depreciates the real exchange rate.

Figure 5: Effect of Productivity Improvement in the Tradeable Sector

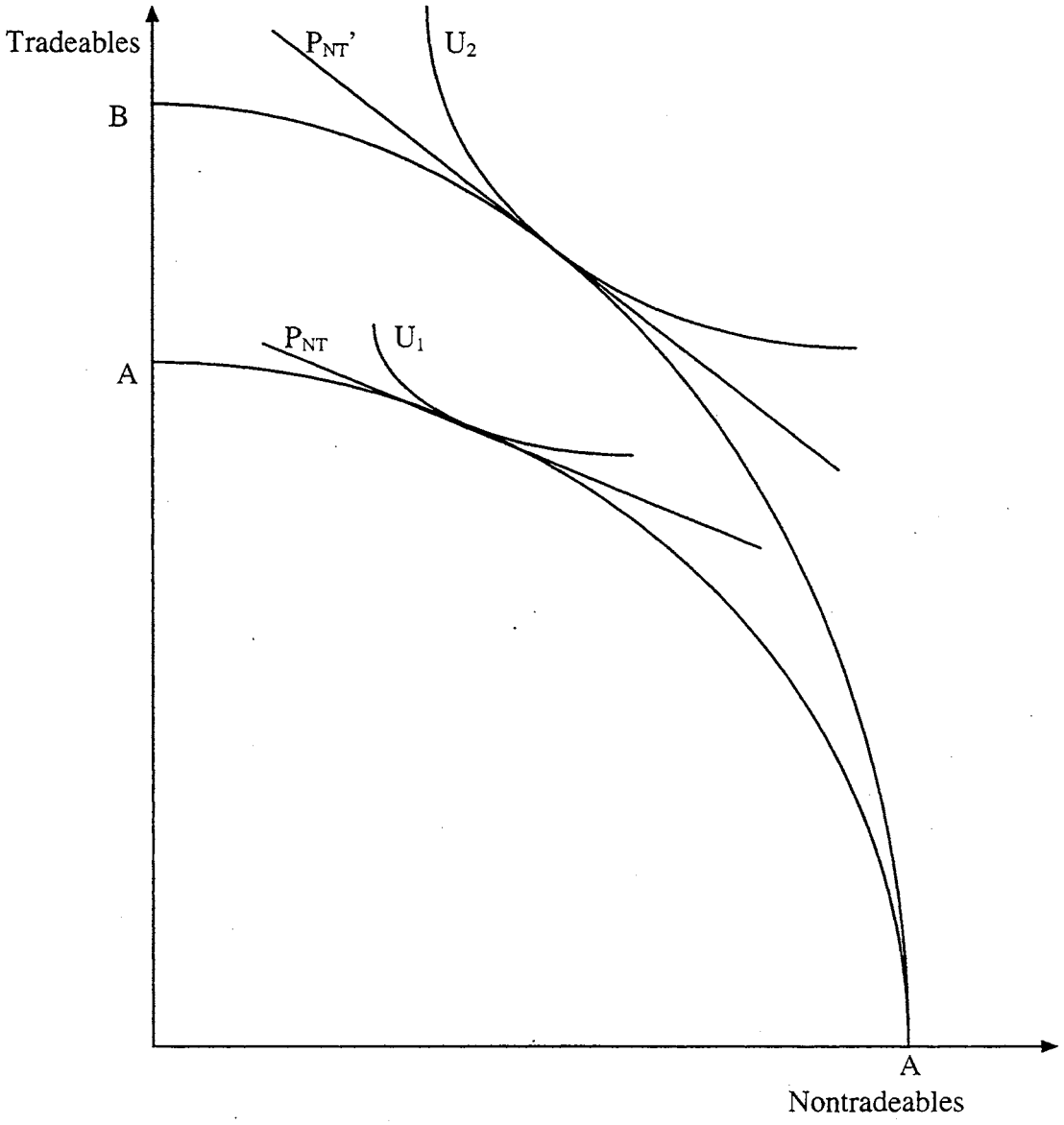
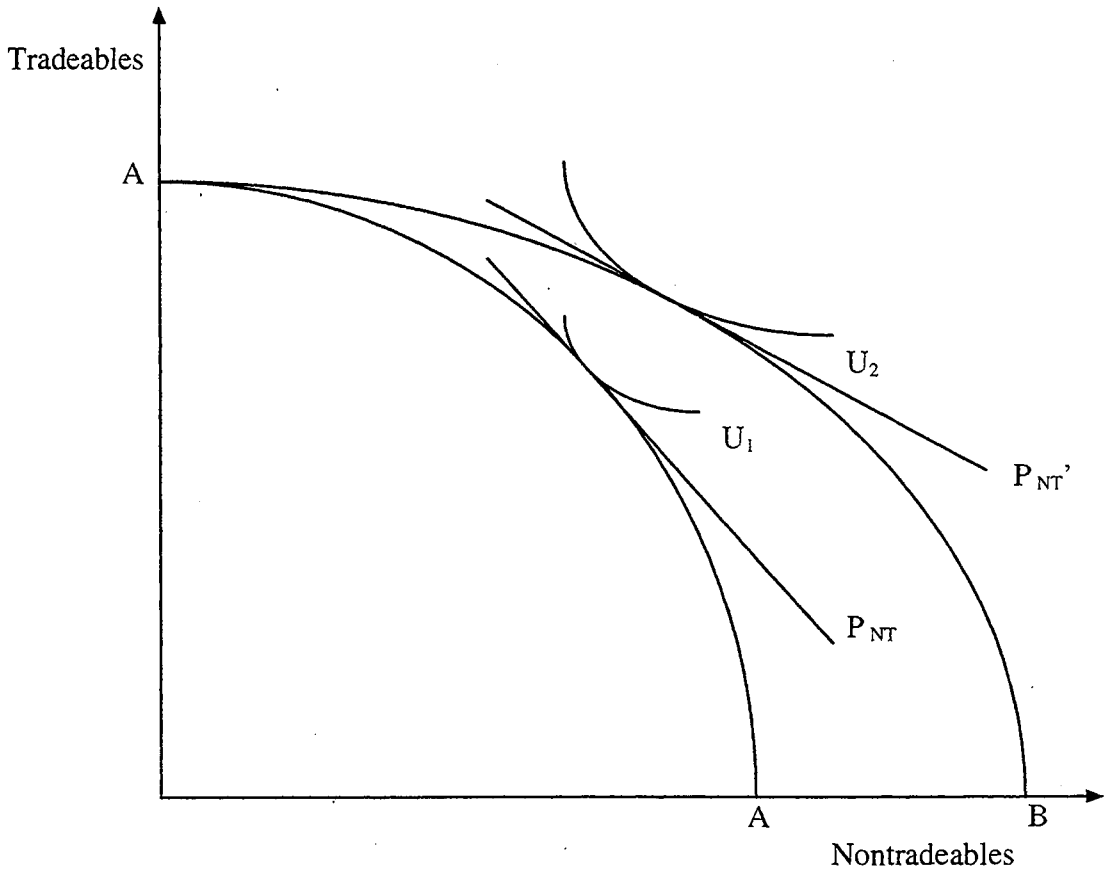


Figure 6: Effect of Productivity Improvement in the NonTradable Sector



Trade Policies:

Trade restrictions (import tariffs, quotas, and non-tariff restrictions) increase the price of imports relative to that of nontradeables (and other tradeables). As a result of the higher import prices, resources will be shifted to the import substitution (protected) sector, as activities in that sector become more lucrative. Consumption, however, will be shifted away from it. The excess demand of nontradeables that follows requires price adjustment (an appreciation) for the market to clear.

Viewed differently, imposition of tariffs and quotas reduces imports (as their prices rise) while leaving exports unchanged. A real appreciation of the exchange rate is thus required to eradicate the trade surplus that resulted.

According to Ghura and Grennes (1993),

> The variable CLOSE [Trade Restrictions in our case] is used as a proxy for policies affecting trade in general. It can be expected that in periods where trade restrictions are tightened by imports tariffs, quotas, and exchange controls, the economy becomes less open to international trade. The impact of trade restrictions is to reduce openness and exert downward pressure on the price of tradables versus nontradables (i.e., equilibrium RER appreciation).

As mentioned earlier, the short-run movements of the real exchange rate is caused by both real and nominal variable disturbances. It is generally argued (contrary to the PPP theory) that the real exchange rate can deviate from its long-run equilibrium level, and that the misalignment may last for a considerable period of time. These short-run movements are generally due to inappropriate macroeconomic policies (fiscal and monetary expansions) inconsistent with the domestic gross national product and money supply. As indicated by Edwards (1989a), "A fundamental principle of open macroeconomics is that

in order to have a sustainable macroeconomic equilibrium, it is necessary that monetary and fiscal policies be consistent with the chosen nominal exchange rate regime". The short-run determinants of real exchange rates include monetary and fiscal policies and nominal devaluation and reevaluation.

Monetary Policy

An increase in the money supply creates excess supply as the level of desired real money balances falls short of the available real balances. Market participants (including households and businesses) respond to the disequilibrium by adjusting their portfolios through higher demand of tradeables and nontradeables. Given a small country model and a fixed exchange rate regime, the excess demand in the nontradeable market causes higher prices, while the prices of importables and exportables in the tradeable market remain unchanged. The price differential in the two markets induces a reduction in nontradeable good consumption, while its production becomes more profitable. This end-result is an indication that the actual real exchange rate has appreciated. As Mussa (1986) put it, "with a pegged exchange rate, the real exchange rate is not independent of the policy-determined level of the money supply...".

Another way to view this is by relating domestic inflation to monetary growth. Higher domestic inflation (as compared to foreign) following monetary growth, increases the cost of producing goods at home, which is another way of expressing a lack of international competitiveness (or real appreciation). In fact, the substantially higher inflation and consequent real currency appreciation in non-CFA African countries has been strongly associated with money growth in these countries.

Fiscal Policy

Fiscal expansion, especially in developing countries where the government sector represents an important part of the economy, is another source of real appreciation of domestic currencies. Fiscal deficit financed by money creation, just like the monetary expansion phenomenon described above, increases the relative price of nontradeables, thereby appreciating the real exchange rate. The only difference with the monetary expansion is that fiscal expansion financed by money creation leads to more consumption on nontradeables (thus more appreciation) as the composition of government expenditures includes a higher proportion of nontradeables as compared to tradeables (Harberger, 1986; Rodriguez, 1980). This implies that the level and composition of government expenditures are factors that affect real exchange rate. On this ground, even a fiscal deficit financed by borrowing from the private sector (and because the latter will be crowded out) will induce a real appreciation. This is similar to the Mundell-Fleming model which predicts a real appreciation of the domestic currency following a fiscal expansion with no change in monetary policy (although the latter model applies to the flexible exchange rate in a high capital mobility world).

Nominal devaluation

The real exchange rate is affected whenever a given policy alters the ratio of tradeable prices (in foreign currency) to nontradeable prices (in domestic currency) ), $P_T/P_{NT}$, or the nominal exchange rate, E. A nominal devaluation by making tradeable goods more expensive at home, leads to a real depreciation, at least in the very short run.

Tradeables become relatively more expensive domestically (real depreciation), while the nontradeable prices are unaffected by the exchange rate change (because they are determined by the domestic supply and demand conditions).

The main question is whether the incipient real depreciation will be preserved. This may not be the case as the nominal devaluation by discouraging the production of nontradeables while encouraging their consumption sets in an upward pressure on their prices which may (unless contained by appropriate macroeconomic policies) reverse the initial real depreciation.

## The Real Exchange Rate Equation

Before formulating the real exchange rate equation, some light also needs to be shed on exactly what we mean by real exchange rate. The real exchange rate used so far should be understood as representing the real effective (or multilateral) exchange rate (as opposed to bilateral real exchange rate). We define the real effective exchange rate as follows,

$$REER_j = \sum_i W_i E_{it} P_{it}^* / P_{jt} \qquad (1)$$

where, $REER_j$ = real effective exchange rate of country j (CFA country in our case)

$E_i$ = nominal bilateral exchange rate between country i and country j (or CFA Franc price of currency i)

$W_i$ = weight corresponding to trading partner i

$P_i^*$ = price level of trading partner i

$P_j$ = price level of the home (CFA) country

t = time

With the background on the theoretically sound determinants of the real exchange rate, and following Edwards (1989a, 1994), the dynamic equation of the real effective exchange rate takes the form,

$$\Delta\log(REER)_t = \theta_0[\log(REER^*)_t - \log(REER)_{t-1}] + \theta_1(MP - MP^*)_t + \theta_2[\log(NEER)_t - \log(NEER)_{t-1}] \quad (2)$$

where, $REER^*$ = equilibrium real effective exchange rate

MP = variable representing macroeconomic (monetary and fiscal) policies

$MP^*$ = macroeconomic policy variables consistent with the domestic GNP and money demand

NEER = nominal effective exchange rate, $\sum_i W_i E_i$, with $W_i$ and $E_i$ defined as in Equation (1).

Equation (2) indicates that changes in the actual real effective exchange rate, REER, are explained by three forces. The first force, represented by the expression $[\log(REER^*)_t - (REER)_{t-1}]$, through a self-correcting mechanism, prevents the actual and equilibrium real effective exchange rates from drifting apart. A misalignment is progressively corrected and the speed of this partial adjustment is measured by $\theta_0$, whose values are constrained between 0 and 1.

The second driving force of the movements of the REER is represented by $(MP - MP^*)$. It captures the stance of the macroeconomic policies. The adoption of a fixed exchange rate regime imposes some restrictions on macroeconomic policies if misalignment is to be avoided. Macroeconomic policies that are inconsistent with the domestic GDP and money demand will be reflected in the REER via their effect on

relative prices. Policies that are more expansionary than required by the appropriate economic variables ($MP > MP^*$), will induce an appreciation of the REER. In the following, the term ($MP - MP^*$) will be represented by monetary and fiscal variables. The monetary variable is money supply (MONS), and the fiscal variable is proxied by fiscal deficits (FDEF).

The third explanatory term in Equation (2), [log(NEER)t - log(NEER)t-1], is changes in the (logarithm) nominal effective exchange rate, and can be interpreted as a nominal devaluation variable, NOMDEV. A nominal devaluation is expected to depreciate the REER, at least in the short run. In order to capture the long-run effects of a devaluation on REER, k lags of the nominal devaluation variable are included in the equation.

The final form of the actual REER equation to be estimated requires that the functional form of the equilibrium REER be first specified. It takes the form,

$$\log (REER^*)t = \tau_0 + \tau_1 \log(TOT)t + \tau_2(CAPF)t + \tau_3 \log(INV)t + \tau_4 \log(TRES)t + \varepsilon t \qquad (3)$$

where, TOT = terms of trade

CAPF = capital flows

INV = investment (standing for productivity change)

TRES = trade restrictions

Substituting Equation (3) into Equation (2), and taking into account k-lags of the nominal devaluation variable, gives (after rearranging),

$$\log(REER)t = \theta_0\tau_0 + (1 - \theta_0)\log(REER)t\text{-}1 + \theta_0\tau_1\log(TOT)t + \theta_0\tau_2(CAPF)t$$
$$+ \theta_0\tau_3\log(INV)t + \theta_0\tau_4\log(TRES)t + \theta_{11}\log(MONS)t + \theta_{12}FDEFt$$
$$+ \sum_i\theta_{2i}(NOMDEV)t\text{-}i + \theta_0\varepsilon t$$
$$i = 0,\ldots k.$$

The equation to estimate takes the form,

$$\log(REER)t = \sigma_0 + \sigma_1\log(REER)t\text{-}1 + \sigma_2\log(TOT)t + \sigma_3(CAPF)t$$
$$+ \sigma_4\log(INV)t + \sigma_5\log(TRES)t + \sigma_6\log(MONS)t + \sigma_7FDEFt$$
$$+ \sum_i\sigma_{8i}(NOMDEV)t\text{-}i + et \qquad (4)$$

The hypothesized signs of the explanatory variables are summarized in Table 3. If a devaluation has a permanent (or relatively so) depreciating effect on REER, its lagged coefficients (or the sum of the contemporaneous and lagged coefficients) should be positive and statistically significant.

Table 3: Hypothesized Signs (REER)

| Determinants | Short-run REER | Equilibrium REER |
|---|---|---|
| Deterioration of the terms of trade | Appreciation/ Depreciation (-/+) | Appreciation/ Depreciation (-/+) |
| Productivity increase | Appreciation/ Depreciation (-/+) | Appreciation/ Depreciation (-/+) |
| Capital inflow | Appreciation (-) | Appreciation (-) |
| Trade restrictions | Appreciation (-) | Appreciation (-) |
| Monetary expansion (Money supply) | Appreciation (-) | |
| Fiscal expansion | Appreciation (-) | |
| Nominal devaluation | Depreciation (+) | |

## Empirical Results for the CFA Zone

Basically, this study is about the effects of a devaluation on international competitiveness ( as measured by the real effective exchange rate, or export and import growth) of the CFA countries. Therefore, real effective exchange rate, export, and import equations are estimated.

Given the close relationship between a devaluation and some other economic variables, and in order to gauge the full effects of a CFA Franc devaluation, it is deemed important to also estimate inflation and output equations.

The complete model (APPENDIX C), a system of five (5) equations, will be estimated for the whole CFA zone, and each of the BCEAO and BEAC regions. In this section, we consider the results for the REER equation for the CFA zone as a whole.

### Data and Preliminary analysis

#### Data

All the variables are annual data covering the period of 1972 to 1992. They are from the following sources (see Tables 4 and 5 for variable definitions and descriptive statistics. Some of the variables in those tables will be used for estimations in later chapters):

1. International Financial Statistics - International Monetary Fund. various issues,
2. World Economic Outlook - International Monetary Fund, various issues,

Table 4: Variable Definitions

| | |
|---|---|
| CAPF | Capital flows (Aggregate Net Transfers, a proxy for capital flows) |
| INFLD | Domestic inflation rate |
| INFLF | Foreign inflation rate |
| INTD | Domestic interest rate |
| LEXP | Log of exports |
| LEXP1 | One-period lag of LEXP |
| LGCONS | Log of government consumption (a proxy for fiscal deficits) |
| LGDP | Log of gross domestic product (GDP) |
| LGDPF | Log of foreign GDP |
| LIMP | Log of imports |
| LIMP1 | One-period lag of LIMP |
| LINV | Log of investment (a proxy for productivity change) |
| LMONS | Log of money supply (M1 definition) |
| LREER | Log of real effective exchange rate |
| LREER1 | One-period lag of LREER |
| LRMONS | Log of real money supply (M1 definition) |
| LRMONS1 | One-period lag of LRMONS |
| LTOT | Log of terms of trade |
| LTRES | Log of trade restrictions |
| NOMDE1 | One-period lag of NOMDEV |
| NOMDEV | Nominal devaluation |

Table 5: Descriptive statistics

| Variables | Mean | Standard deviation | Minimum | Maximum |
|---|---|---|---|---|
| CAPF | 116.24 | 187.59 | -630.40 | 689.60 |
| INFLD | 0.07 | 0.07 | -0.09 | 0.27 |
| INFLF | 6.85 | 3.18 | 2.60 | 13.40 |
| INTD | 8.68 | 2.24 | 3.50 | 12.50 |
| LEXP | 5.72 | 1.37 | 3.01 | 8.74 |
| LEXP1 | 5.63 | 1.38 | 2.77 | 8.12 |
| LGCONS | 6.00 | 0.89 | 4.39 | 12.32 |
| LGDP | 7.84 | 0.79 | 6.75 | 9.42 |
| LGDPF | 13.72 | 0.47 | 12.89 | 14.76 |
| LIMP | 6.04 | 0.97 | 3.52 | 8.58 |
| LIMP1 | 5.95 | 1.01 | 3.52 | 8.00 |
| LINV | 6.17 | 0.96 | 3.37 | 8.33 |
| LMONS | 11.30 | 1.00 | 9.10 | 13.36 |
| LREER | 4.48 | 0.44 | 3.77 | 5.45 |
| LREER1 | 4.50 | 0.45 | 3.77 | 5.45 |
| LRMONS | 7.15 | 0.87 | 5.79 | 9.14 |
| LRMONS1 | 7.12 | 0.88 | 5.72 | 9.14 |
| LTOT | 4.73 | 0.26 | 3.97 | 5.48 |
| LTRES | 1.16 | 0.55 | -0.16 | 2.94 |
| NOMDE1 | -0.01 | 0.12 | -0.55 | 0.30 |
| NOMDEV | -0.01 | 0.12 | -0.55 | 0.30 |

3. Balance of Payments Statistics Yearbook - International Monetary Fund, various issues,

4. IBRD World Tables - World Bank, various issues.

Some variables are computed from raw data and, therefore need more explanation.

1. Real Effective Exchange Rates (REER)

This variable is a weighted average of the real bilateral exchange rates, as represented by equation (1).

2. Trade Restrictions

Following Ghura and Grennes (1993), the trade restrictions variable is defined as follows for a given country, i:

$TRES_i = GDP_i / (Exports_i + Imports_i)$

This is the ratio of gross domestic product (GDP) over the sum of exports and imports.

3. Nominal Devaluation

The nominal devaluation is proxied by the first difference of the nominal effective exchange rate. The latter is computed as,

$NEER_j = \sum_i W_i E_i$

where,

$NEER_j$ = Nominal effective exchange rate of country j

$W_i$ = Weight corresponding to trading partner i

$E_i$ = Nominal bilateral exchange rate between country i and country j.

Thus, the nominal devaluation (NOMDEV) of country j is,

$$NOMDEV_{jt} = NEER_{jt} - NEER_{jt-1}$$

Preliminary Analysis

All the variables in Equation (4), are subject to unit root tests. The Augmented Dickey Fuller and Phillips - Perron unit root tests are conducted to assure stationarity. The appropriate critical values can be obtain from various sources. In our case, the test statistics and critical values are obtained from the statistical software package used.

Significantly negative t-statistics correspond to a rejection of the null hypothesis of a unit root. The results of the unit root tests are reported in Table 6. With minor exceptions, the null hypothesis of unit root can be rejected for the variables included in the model.

Thus, the variables can be best characterized as integrated of order zero, I(0). This would avoid any implications for economic theory and modeling caused by nonstationarity, and therefore avoid the spurious regression phenomenon.

Table 6: Unit Root Test Results

| | Augmented Dickey - Fuller (ADF) | | Phillips - Perron (PP) | |
|---|---|---|---|---|
| Variables | Without Trend | With Trend | Without Trend | With Trend |
| CAPF | -4.52 | -4.59 | -6.49 | -6.50 |
| INFLD | -6.80 | -7.29 | -9.04 | -9.18 |
| INFLF | -6.07 | -6.06 | -5.69 | -5.71 |
| INTD | -4.40 | -5.70 | -7.57 | -7.91 |
| LEXP | -3.57 | -3.61 | -3.49 | -3.53 |
| LEXP1 | -3.50 | -3.54 | -3.49 | -3.53 |
| LGCONS | -3.65 | -3.64 | -6.10 | -6.10 |
| LGDP | -2.37 | -2.36 | -2.46 | -2.45 |
| LGDPF | -2.56 | -3.21 | -2.54 | -3.20 |
| LIMP | -3.68 | -3.68 | -4.05 | -4.05 |
| LIMP1 | -3.44 | -3.46 | -3.93 | -3.93 |
| LINV | -3.31 | -3.27 | -3.22 | -3.22 |
| LMONS | -3.98 | -3.97 | -4.11 | -4.10 |

Table 6: Unit Root Test Results (continued)

| | Augmented Dickey - Fuller (ADF) | | Phillips - Perron (PP) | |
|---|---|---|---|---|
| Variables | Without Trend | With Trend | Without Trend | With Trend |
| LREER | -2.25 | -2.59 | -2.75 | -3.06 |
| LREER1 | -2.83 | -3.08 | -2.94 | -3.21 |
| LRMONS | -2.85 | -2.85 | -2.87 | -2.87 |
| LRMONS1 | -2.82 | -2.82 | -2.86 | -2.86 |
| LTOT | -4.21 | -4.99 | -6.08 | -6.09 |
| LTRES | -4.58 | -4.60 | -5.50 | -5.56 |
| NOMDE1 | -5.85 | -5.81 | -10.77 | -10.75 |
| NOMDEV | -5.99 | -5.99 | -10.73 | -10.72 |

Sample: 1972 - 1992

Notes: The ADF statistics are based on the t-statistics in the following OLS regressions:

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \Sigma\gamma_j \Delta Y_{t-1} + \varepsilon_t \quad \text{(Without trend)}$$

$$\Delta Y_t = \alpha_0 + \alpha_1 t + \alpha_1 Y_{t-2} + \Sigma\gamma_j \Delta Y_{t-1} + \varepsilon_t \quad \text{(With trend)}$$

The Phillips - Perron unit root tests also are conducted. They use a non-parametric correction for serial correlation.

The critical values are the same as those used for the Dickey - Fuller tests.

The critical values are:

-2.57 (Without Tend)

-3.13 (With Trend)

Methodology

The REER equation will be estimated for the CFA zone as a whole (and each of the BCEAO and BEAC regions). The CFA zone comprises 14 countries, but because of data constraint, only 10 are considered. They are Bénin, Burkina Faso, Cameroon, Central African Republic, Congo, Côte d'Ivoire, Gabon, Niger, Sénégal, and Togo. The equation is, thus, estimated for 10 zone member countries for the period 1972 to 1992 (for a total of 210 observations).

Given the definition of the trade restrictions variable (LTRES), it is considered as an endogenous variable. As pointed out by Ghura and Grennes (1993), "The CLOSE variable [LTRES in our case] is affected not only by trade policies but also by a number of other factors including the terms of trade and the RER itself".

Because the real effective exchange rate equation includes an endogenous variable (LTRES) as an explanatory term, and in order to take into account the particularities of the state of each economy included in the sample, the equation will be estimated using two stage least squares (2SLS), and a fixed effect procedure, with country specific dummy variables.

Four versions of the REER equation are considered:

1. The equation is estimated using all the explanatory variables as they appear in Equation (4), with the fiscal deficits variable (FDEF) replaced by LGCONS (log of government consumption) due to data unavailability. The LGCONS is thus interpreted as a fiscal policy variable. It should be noted that it can also be considered as one of the fundamentals determinants of real exchange rates.

Also in this version (as in the others), one lagged devaluation (NOMDE1) is included.

2. In this version, the money supply variable (LMONS) is replaced by the domestic credit variable (LDCRE). In addition, the aggregate net transfers (proxy for capital flows) variable is replaced by its one-period-lagged variable (CAPF1).
3. In this version, all the variables in version 1 are included, except the capital flows variable (CAPF).
4. The main difference between this version and the others is that the government consumption variable (LGCONS) is left out. The LGCONS can be interpreted as a proxy for government consumption on nontradeable goods. Because the latter is unavailable, the total of government consumption (both on tradeables and nontradeables) is substituted for it. The purpose of its exclusion in this version is to see how it will affect the results. Also in this version the lagged domestic credit variable (LDCRE1) is substituted for the money supply variable, (LMONS).

Empirical Findings

The determinants of real exchange rates are of two types (real variables or fundamentals, and monetary variables). This distinction is important as changes in the real variables affect only the equilibrium real exchange rate, while movements in the short-run real exchange rates are due to either type of determinants. Knowledge of these determinants and the estimates of their quantitative effects on the real exchange rate can

help avoid exchange rate misalignment, by keeping the actual exchange rate at (or close to) its equilibrium level.

Most important to us in this study, are the effects of a nominal devaluation on the real exchange rate. This is investigated, and the empirical results, based on the different versions of Equation (4), are summarized in Table 7. Almost all the estimated coefficients have the expected signs (see Table 3 for postulated signs).

The international terms of trade (LTOT), a real variable, is expected to have either sign depending on whether the shock is due to export price or import price change, and on the substitution and income effects. The estimated terms of trade coefficient is negative and statistically significant in all four versions. This is an indication that an improvement in external terms of trade of a given country will be associated with an appreciation of its real exchange rate (at least in the CFA countries under investigation). This result sheds some light on the theoretical ambiguity related to the effect of external terms of trade on the real exchange rate as discussed earlier.

The technological improvement variable, proxied by (log of) investment (LINV) is also expected to either appreciate or depreciate the real exchange rate depending on the sector in which the technological progress occurred. The results point at a technological improvement occurring in the tradeable sector in the CFA countries. The estimated coefficient (of LINV) is statistically significant and negative in all the four versions of Equation (4).

Table 7: Real Effective Exchange Rate Equation Results, LREER (CFA zone)

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| LDCRE | | -0.045§ | | |
| | | (-3.10) | | |
| LDCRE1 | | | | 0.005 |
| | | | | (0.62 |
| CAPF | -0.000† | | | -0.000 |
| | (-1.53) | | | (-1.08) |
| CAPF1 | | -0.000 | | |
| | | (-0.62) | | |
| LTRES | -0.036† | -0.073§ | -0.022 | -0.010 |
| | (-1.57) | (-2.64) | (-1.27) | (-0.48) |
| LMONS | -0.011 | | -0.007 | |
| | (-0.85) | | (0.65) | |
| LREER1 | 0.908§ | 0.723§ | 0.925§ | 0.961§ |
| | (28.97) | (17.56) | (33.13) | (32.91) |
| LTOT | -0.062§ | -0.161§ | -0.051§ | -0.040‡ |
| | (-3.15) | (-4.63) | (-2.85) | (-2.05) |
| LINV | -0.029§ | -0.081§ | -0.037§ | -0.036§ |
| | (-2.64) | (-5.70) | (-3.69) | (-4.01) |
| LGCONS | -0.008 | -0.029§ | -0.009 | |
| | (-1.10) | (-2.68) | (-1.19) | |
| NOMDEV | 0.897§ | 0.850§ | 0.908§ | 0.929§ |
| | (21.45) | (14.60) | (22.41) | (23.50) |
| NOMDE1 | -0.015 | 0.178§ | -0.020 | -0.053‡ |
| | (-0.39) | (3.06) | (-0.55) | (-1.47) |
| N | 210 | 210 | 210 | 210 |
| $R^2$ | 0.9831 | 0.9654 | 0.9838 | 0.9846 |

All versions included country-specific dummy variables.
$R^2$ is the adjusted coefficient of determination.
N is the number of observations
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

Trade policy is another important variable that explains real exchange rates. In the theoretical model, it was postulated that trade restrictions will limit the openness of an economy to international trade, and will result in an appreciation of its real exchange rate. This is confirmed by the coefficient estimate of the trade restrictions variable (LTRES). In all the four versions the coefficient is negative, and statistically significant in three (1, 2, and 3). This is an indication that in a fixed exchange rate regime in general, and in CFA countries in particular, loosening trade restrictions not only will expose those countries to the benefits of the global trade environment, but also will help them avoid misalignment of their currencies.

The capital flows variable (CAPF or CAPF1) has a negative coefficient estimate (as expected), but is statistically significant in only one equation. Government consumption is also postulated to appreciate the real exchange rate. As indicated before, this variable stands for either the fiscal policy (due to data unavailability on fiscal deficits), or government consumption on nontradeables. Its coefficient is (as expected) negative in all the three versions (1, 2, and 3) in which it is included. Its statistical significance is, however, confirmed in only one of the three versions (2). Version (4) is estimated without the (log of) government consumption variable (LGCONS). This exclusion did not have any significant effect on the estimates of the other coefficients.

The lagged LREER (LREER1) has coefficient estimates ranging from 0.723 to 0.961. These results are similar to those found in Edwards (1989a) which are also quite high. Edwards (1989a) claims that:

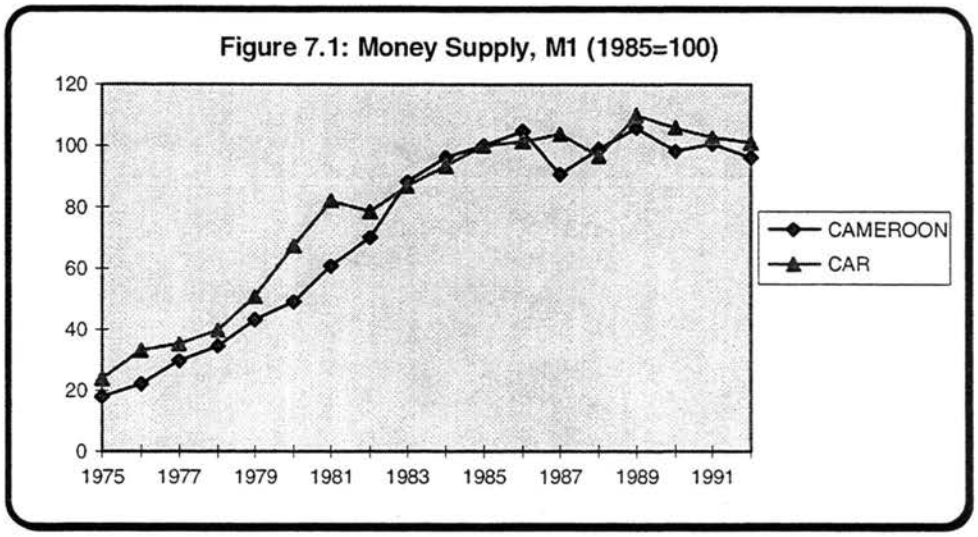
> In a way this is not too surprising in light of the analysis of the time series properties of RERs... From an economic prospective these high values for the coefficients imply that in the absence of other intervention, actual real exchange

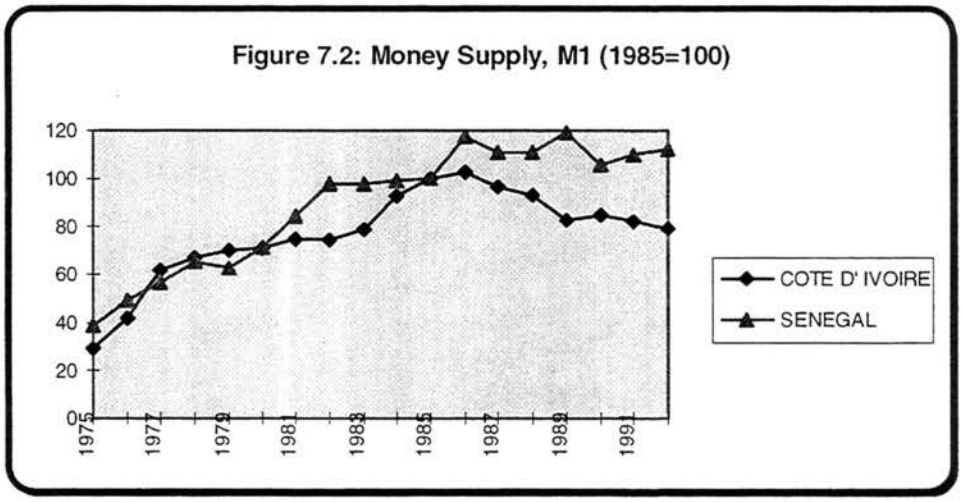
> rates converge very slowly toward their long-run equilibrium level. (pp.141).

The money supply (monetary variable) coefficient is negative as postulated, although not statistically significant in the two versions in which LMONS is included. In version (2), the money supply variable is replaced by (log of) domestic credit (LDCRE). Its coefficient is negative and statistically significant. In all, their is an indication that expansionary monetary policy appreciates the CFA currency. This result is in line with the position took by the CFA zone monetary authorities (from the mid-1980s) to address the appreciation of the CFA franc by opting for a contractionary monetary policy, as shown by the money supply variable for a selected CFA zone countries (Figure 7).

The main question we are concerned with is the effects of the nominal devaluation variable, NOMDEV, and its lagged variable, NOMDE1, on REER. We postulated that the coefficients of NOMDEV and NOMDE1 (or their sum) must be positive and statistically significant if a nominal devaluation is to have any contemporaneous (short-run) and long-run (or relatively so) real depreciating effects on the CFA franc. The results show without ambiguity that a nominal devaluation will have a short-run depreciation effect on the CFA Franc. The parameter estimates (of NOMDEV) range from (a positive) 0.850 to 0.929 and are all statistically significant. These results are very similar to those found in Rouis et al. (1994). Their estimate of the contemporaneous effect is 0.88. Given the results in our study, a 10 percent nominal devaluation in a given year will lead to a real depreciation of 8.50 to 9.29 percent in the same year, ceteris paribus.

The coefficient estimate of the lagged nominal devaluation variable (NOMDE1) has mixed signs. It is positive in one of the versions, 2 (and statistically significant), and




Source: International Financial Statistics

negative in three (1, 3, and 4) and significant in only one, (4). A test of the hypothesis that "the sum of the contemporaneous and lagged coefficients is zero", however, leads to the conclusion that a nominal devaluation will have a permanent real depreciating effect on the CFA Franc (as the null hypothesis was rejected). There is, thus, a support to the view that a nominal devaluation of the CFA franc will help the zone countries regain their international competitiveness even in the long run.

# CHAPTER IV

# EXPORT AND IMPORT GROWTH

After determining the impact of nominal devaluation on real exchange rate, another point to be considered is the response of exports and imports to changes in the real exchange rate. A real depreciation following a nominal devaluation may not be the end-issue, but how it induces a reallocation of resources from nontradeable to tradeable sectors, and most importantly, its impact on exports and imports. One of the ultimate objectives of a currency devaluation is its expansionary and contractionary effects on exports and imports, respectively, via its impact on the real exchange rate. Thus, two important conditions for a nominal devaluation to bring about the expected results are its ability to depreciate the real exchange rate, and the tradeable sector to respond favorably to the latter.

## Export Demand

Like any demand function, aggregate export demand is a function of relative price. In empirical research, the relative price in the export demand function can be expressed differently. For the purpose of the present study, it represents the real effective exchange rate as defined in Equation (1). A higher foreign price ($P^*$) or a depreciation of

the domestic nominal exchange rate, E, makes domestic goods relatively cheaper abroad and thereby induces more demand for domestic exports. The opposite is true for a higher domestic price (P). In addition to the relative price, export demand depends on the level of real output in foreign countries ($Y^*$).

Taking into account the fact that Sub-Saharan African countries' exports and imports are generally believed to be subject to quantitative restrictions by industrial countries, and particularly that the region's trade flows are severely affected by its own trade policies, the export demand equation (in logarithm form) is expressed as follows[1],

$$\log X_{it}^{d} = \varphi_0 + \varphi_1 \log(REER)t + \varphi_2 \log Y^{*}t + \varphi_3 \log(TRES)t + \mu t \qquad (5)$$

where, TRES = trade restrictions variable.

i = a given country (CFA country in our case)

t = time.

Because the equation is in logarithm form, the parameters $\varphi_1$, $\varphi_2$, and $\varphi_3$, represent relative price, income, and trade-restriction, elasticities, respectively, and their signs are postulated as follows,

$$\varphi_1 > 0, \varphi_2 > 0, \text{ and } \varphi_3 < 0.$$

Implicit in Equation (5), is that there is no time lag for adjustment from actual export ($X_i$) to the (equilibrium) export demand ($X_{it}^{d}$). Therefore, the actual export is always equal to the export demand ($X_i = X_{it}^{d}$). This restrictive assumption can be relaxed and a disequilibrium equation specified, and which allows for a partial adjustment mechanism[2].

To introduce this type of framework, changes in exports are assumed to be caused by any disequilibrium between demand for export in period t, and actual export in the previous period, t-1,

$$\Delta \log X_{it} = \log X_{it} - \log X_{it-1} = \lambda(\log X_{it}^{d} - \log X_{it-1}) \qquad (6)$$

$$0 \leq \lambda \leq 1$$

where, $\lambda$ measures the speed of adjustment.

Substituting Equation (5) into (6), and rearranging terms gives,

$$\log X_{it} = \lambda\varphi_0 + \lambda\varphi_1 \log(REER)t + \lambda\varphi_2 \log Yt^{*} + \lambda\varphi_3 \log(TRES)t + (1 - \lambda)\log X_{it-1} + \lambda\mu t$$

where, $\lambda\varphi_1$, $\lambda\varphi_2$, and $\lambda\varphi_3$, are the short-run relative price, income, and trade-restriction, elasticities, respectively.

The export equation to estimate has the form,

$$\log X_{it} = \delta_0 + \delta_1 \log(REER)t + \delta_2 \log Yt^{*} + \delta_3 \log(TRES)t + \delta_4 \log X_{it-1} + \upsilon t \qquad (7)$$

## Import Demand

Aggregate import demand equation for country i can be written as a function of the relative price, domestic income, and trade restrictions variables.

$$\log M_{it}^{d} = \beta_0 + \beta_1 \log(REER)t + \beta_2 \log Yt + \beta_3 \log(TRES)t + et \qquad (8)$$

where, $M_{it}^{d}$ = import demand

Y = domestic real income

i = a given country (CFA country in our case)

t = time

A lower domestic price, P, higher nominal exchange rate E (depreciation), or higher foreign price forces domestic consumers to substitute away from importables as they become relatively more expensive. The expected signs of the parameters are,

$\beta_1 < 0, \quad \beta_2 > 0, \beta_3 < 0.$

Here again, instead of assuming that domestic importers are always on their demand curve ($M_i^d = M_i$), a partial adjustment mechanism is introduced by assuming that disequilibrium between demand for imports in period t and actual imports in the previous period, t-1, explains changes in imports,

$$\Delta \log M_{it} = \log M_{it} - \log M_{it-1} = \phi(\log M_{it}^d - \log M_{it-1}) \qquad (9)$$

$$0 \leq \phi \leq 1$$

where, $\phi$ is the adjustment coefficient. Substituting Equation (8) into Equation (9) and rearranging terms gives,

$$\log M_{it} = \phi\beta_0 + \phi\beta_1 \log(REER)t + \phi\beta_2 \log Yt + \phi\beta_3 \log(TRES)t$$
$$+ (1 - \phi)\log M_{it-1} + \phi et$$

where $\phi\beta_1$, $\phi\beta_2$, and $\phi\beta_3$, are short-run relative price, income, and trade-restriction, elasticities, respectively.

The import equation to estimate has the form,

$$\log M_{it} = \gamma_0 + \gamma_1 \log(REER)t + \gamma_2 \log Yt + \gamma_3 \log(TRES)t + \gamma_4 \log M_{it-1} + mt \qquad (10)$$

A point worth mentioning is that the partial-adjustment mechanism considered in both export and import equations assumes a small country case where both export and import prices are determined exogenously.

## Empirical results

Our finding in chapter 3 that a nominal devaluation can have a real depreciation effect on the CFA Franc is not enough to make a strong case for a nominal devaluation as a policy instrument. How exports and imports react to changes in real exchange rate is another import issue. The theoretical analysis of the export and import equations above prepares us for the next step of empirically testing the responsiveness of exports and imports to changes in real exchange rate.

Before presenting the results, some preliminary discussions are in order. As in the previous analysis (in chapter 3), all the variables included in the export and import equations are subject to unit root tests (Dickey Fuller and Phillips-Perro) to avoid problems caused by nonstationarity. The variables used are annual data and cover the period from 1972 to 1992. The nominal and real effective exchange rates (NEER, REER, respectively), trade restrictions (LTRES), and foreign gross domestic product (LGDPF), variables are defined as follows:

1. The nominal and real effective exchange rates and trade restrictions variables are as defined in previous chapters.
2. Foreign gross domestic product (LGDPF):

   This variable represents a weighted sum of the gross domestic products of the 10 most important importing countries from a given CFA country (j).

   $GDPF_j = GDPF_i * Weights_i$

   where,

   $GDPF_j$ = foreign gross domestic product for country j (a CFA country).

$GDPF_i$ = a matrix where the columns are represented by the GDP of country j's 10 most important foreign countries i (in terms of country j's exports to those countries; i = 1, 2...10).

$Weights_i$ = weights corresponding to trading partner i (these are the same weights, W, used to compute the REER in equation (1)).

Starting with exports, different versions of equation (7) are estimated and the empirical results are summarized in Table 8. The first two versions (1 and 2) are estimated using (log of ) real effective exchange rate (LREER) as relative price. The last two versions (3 and 4) include (log of) nominal effective exchange rate (LNEER) as relative price. The trade restrictions variable (LTRES) is left out of versions 2 and 4 for comparison purposes.

All the parameter estimates have the expected signs in all four versions. However, the versions (1 and 3) that include the LTRES variable fit the data better than those without it, based on the adjusted $R^2$ (0.9621 and 0.9628 compared to 0.9482 and 0.9489, respectively). In addition, the LTRES coefficient is negative and statistically significant in the two versions 1 and 3. This is an indication that trade policies play an important role in international trade flows in the CFA countries.

The positive and statistically significant coefficient of the foreign GDP variable (LGDP) shows that growth in foreign importing countries is important for export growth in CFA countries.

The explanatory variable of particular importance in the export equation is represented by the real or nominal exchange rate variable. The coefficient of LREER is

Table 8: Export Equation Results, LEXP (CFA zone)

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| LREER | 0.216† | 0.161 | | |
| | (1.35) | (0.82) | | |
| LNEER | | | 0.181‡ | 0.188 |
| | | | (1.64) | (1.25) |
| LGDPF | 0.645§ | 0.813§ | 0.683§ | 0.857§ |
| | (3.57) | (3.93) | (3.76) | (4.07) |
| LEXP1 | 0.486§ | 0.625§ | 0.469§ | 0.605§ |
| | (9.46) | (13.37) | (8.92) | (12.25) |
| LTRES | -0.386§ | | -0.380§ | |
| | (-4.30) | | (-4.29) | |
| N | 210 | 210 | 210 | 210 |
| $R^2$ | 0.9621 | 0.9482 | 0.9628 | 0.9489 |

All versions included country-specific dummy variables.
N is the number of observations
$R^2$ is the adjusted coefficient of determination.
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

Table 9: Import Equation Results, LIMP (CFA zone)

| Variables | 1 | 2 | 3 | 4 |
|---|---|---|---|---|
| LREER | -0.157§ | -0.318§ | | |
| | (-2.34) | (-3.43) | | |
| LNEER | | | -0.153§ | -0.223§ |
| | | | (-2.79) | (2.83) |
| LGDP | 0.611§ | 0.250§ | 0.658§ | 0.304§ |
| | (7.04) | (2.33) | (7.68) | (2.75) |
| LIMP1 | 0.374§ | 0.740§ | 0.367§ | 0.746§ |
| | (7.08) | (19.44) | (7.12) | (19.53) |
| LTRES | -0.523§ | | -0.534§ | |
| | (-7.98) | | (-8.44) | |
| N | 210 | 210 | 210 | 210 |
| $R^2$ | 0.9785 | 0.9557 | 0.9790 | 0.9553 |

All versions included country-specific dummy variables.
$R^2$ is the adjusted coefficient of determination.
N is the number of observations
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

positive in both versions (1 and 2) as is the coefficient of LNEER in versions (3) and (4). Two out of four of these coefficients are statistically significant in (1) and (3) (the versions that include LTRES ). Considering real effective exchange rate and its definition, the results indicate that a real depreciation of the CFA Franc will be associated with higher export growth. The CFA countries can enjoy a 2.16 percent export growth following a 10 percent real depreciation of the CFA Franc (based on version 1). Thus, a nominal devaluation of the CFA Franc will not only depreciate the currency (in real terms), but will also lead to an increase in exports.

Turning to the imports equation, the empirical results are also encouraging for the member countries (Table 9). Again, this equation is estimated using different combinations of the explanatory variables. As in the export equation, including the trade policy variable (LTRES) improves the fit, based on the adjusted $R^2$ (0.9785 and 0.9790 compared to 0.9557 and 0.9553).

The coefficient of LTRES is negative and statistically significant in the two versions (1 and 3) in which it is included. This confirms our earlier claim that the trade policies in place in the CFA zone adversely affected the zone's trade flows. Economic growth in those countries (increase in domestic GDP) increases imports to the zone. The parameter estimate of the GDP variable is positive and statistically significant in all four versions.

The main question we want to answer with the estimation of this equation is whether real depreciation will reduce imports to the zone. Using either LREER or LNEER, the parameter estimate is negative in all four versions, and statistically significant. We can then conclude that lower imports should be expected following a real depreciation

of the CFA Franc. A reduction of 1.57 percent to 3.18 percent in imports can be brought about by a real depreciation of 10 percent of the CFA Franc.

These results (exports and imports effects of a nominal devaluation), however, should be handled with care, especially regarding the response of imports to relative price change immediately following a depreciation. The adjustment of imports and exports to relative price change occurs only slowly due to consumer- and producer-response lags. As a consequence, imports may increase (and exports decrease) in the short run following a depreciation. This is known as the J-curve effect. Thus our results can be best interpreted as the response of imports and exports after all (or most of the) adjustments take place.

We can confirm (based on our results) that a CFA nominal devaluation is capable of depreciating the currency (in real terms). Moreover, exports and imports are sensitive to changes in the real exchange rate such that an improvement in the trade balance should be expected as a result of a devaluation of the CFA Franc.

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1. See Khan (1974), for a discussion on empirical estimates of similar equation.

2. See Khan (1974), Bahmany-Oskooee (1984) for more details.

# CHAPTER V

## DEVALUATION, INFLATION, AND REAL OUTPUT

The basic objective in this chapter is to investigate the effects of a nominal devaluation on inflation and real output. These are covered in sections one and two. An additional section (section three) is included to present the empirical results of the effects of devaluation on economic variables (real exchange rate, exports, imports, inflation and real output) of the BEAC and BCEAO regions.

The analysis so far points to the fact that a nominal devaluation can help a country regain its international competitiveness and improve its trade balance, provided that some conditions are met. However, and as aforementioned, critics assert that devaluation is a risky approach because of the high inflation it entails, and may hurt domestic output as well, especially in the case of small, intermediate-goods-importing countries. As Nashabishi (1983) indicates,

> But behind every devaluation looms the danger of inflationary pressures for higher incomes, which will raise costs and increase the likelihood of monetary expansion to accommodate the higher demand. The result of monetary expansion will be a jump in prices, fueling inflationary expectations and the demand for foreign currency - both as a hedge against inflation and in anticipation of a further devaluation. Apart from the negative impact this will have on the external payments position, it will set in motion another devaluation and a new jump in prices. Such an inflation-devaluation spiral can be very damaging, not only because it fails to correct the disequilibrium but also because its undermines the credibility of exchange rate

depreciation as a policy instrument.

This warning provides a good reason for analyzing inflation and output growth when studying the effects of devaluation.

In the case of inflation, there is no denying that the price level will rise in the wake of a devaluation. The question is how severe will it be and how can it be contained. The uncertainty about the effect of a devaluation on real output is even more pronounced as different theoretical and empirical studies on the issue almost always land on different grounds.

## The inflation process

With an economy composed of two sectors (tradeable and nontradeables), the domestic price level is an average of prices in those two sectors. In the tradeable sector ( given a small country case), prices of imports and exports are exogenously determined in the world market, and excess demand/supply is reflected in the trade balance (the fixed exchange rate case). Movements in tradeable prices measured in domestic currency are due only to price developments in the world markets (changes in export and import prices, measured in foreign currency) and changes in the nominal exchange rate. In the nontradeable sector, however, prices adjust to the supply and demand conditions to clear the market. Excess demand in this market can be proxied by an excess supply of domestic liquidity,

$$\log(M/P)_{t-1} - \log(M/P)_t^d$$

where,

$$\log(M/P)_t^d = \rho_0 + \rho_1 \log Y_t + \rho_2(INTD)t \quad \text{(or real money demand)} \qquad (11)$$

$(M/P)_{t-1}$ = real money supply at time t-1

t = time

Y = domestic real output

INTD = domestic interest rate

The output condition is specified as the ratio between (actual) real output and its potential level, $(Y/Y_0e^{uT})$.

where, Y = actual real output

$Y_0$ = initial output level

u = potential (steady-state) growth rate

T = time trend

In sum, the domestic rate of inflation, $\Delta \log P_d$, is assumed to be positively related to excess supply of domestic liquidity, excess real output above its potential level (in the nontradeable sector), and movements in the tradeable prices, $P_T$[1]. In equation form,

$$\Delta \log P_d = \Phi_1[\log(M/P)_{t-1} - \log(M/P)_t^d] + \Phi_2 \log(Y/ Y_0e^{uT}) + \Phi_3 \Delta \log P_T \qquad (12)$$

The price of tradeables is defined as foreign price level in domestic currency,

$$P_T = (NEER)P^*$$

where,

NEER = nominal effective exchange rate

$P^*$ = foreign price level in foreign currency.

$$\log P_T = \log(NEER) + \log P^*$$

$$\Delta \log P_T = \Delta \log(NEER) + \Delta \log P^* \qquad (13)$$

Substituting Equations (11) and (13) into Equation (12) and rearranging terms gives,

$$\Delta \log P_d = -(\Phi_1\rho_0 + \Phi_2 \log Y_0) + \Phi_1 \log(M/P)_{t-1} + (\Phi_2 - \Phi_1\rho_1)\log Yt - \Phi_1\rho_2(INTD)_t$$

$$+ \Phi_3 \Delta \log(NEER)_t + \Phi_3 \Delta \log P_t^* + \Phi_2 uT$$

Taking into account k-lags of $\Delta$log(NEER), the equation to be estimated takes the form,

$$INFLD_t = \Psi_0 + \Psi_1 \log(RMONS)_{t-1} + \Psi_2 \log(GDP)_t + \Psi_3(INTD)_t + \sum_i \Psi_{4i}(NOMDEV)_{t-i}$$

$$+ \Psi_5 INFLF_t + \Psi_6 T + \eta_t \qquad (14)$$

where,

INFLD = domestic inflation (standing for $\Delta \log P_d$)

NOMDEV = $\Delta$log(NEER),

INFLF = $\Delta \log P^*$ (or foreign inflation).

RMONS = M/P (real money supply)

GDP = Y

## Devaluation and Real Output

The short- and long-run effects of a devaluation on real output are as controversial as its long-run effect on the real exchange rate. A number of economists studied the relationship, but arrived at no definite conclusion (Cooper, 1971; Edwards, 1986; Gylfason and Risager, 1984). These studies use different methodologies (before and after approach, control group approach, simulation model or reduced-form equations, and econometric approach) to determine the effects of a devaluation on economic performance (real output).

The approach here is to apply econometric methods to time-series cross-section data to examine the relationship between devaluation (and assuming that devaluation is

capable of having a real depreciation effect) and real output. The basic equation takes the following form

$$\log GDP_t = \psi_0 + \psi_1 \log(TOT)_t + \psi_2 \log(RMONS)_t + \psi_3 \log(GCONS)_t + \sum \psi_{4i} \log(REER)_{t-i} + e_t \quad (15)$$

where, TOT = terms of trade

RMONS = real Money supply

GCONS = government consumption

REER = real effective exchange rate

t = time

The terms of trade effects on economic growth are ambiguous in the theoretical literature. An improvement in the terms of trade may lead to an appreciation of the equilibrium real exchange rate (lack of profitability in the tradeable sector), and thereby lower economic growth. However, if the improvement in the terms of trade is due to lower import prices relative to export prices, it may stimulate economic growth as production activities become more profitable.

Money supply, on the other hand, is hypothesized to boost aggregate demand, and thereby, increase real output at least in the short run. Fiscal policy is captured by the government spending variable, and is expected to increase real output as well. The explanatory variable of interest in this equation is the real effective exchange rate. A negative coefficient will indicate that devaluation is contractionary. A positive coefficient, on the other hand, will confirm the view that devaluation is expansionary.

## Empirical results

Inflation is always a concern with devaluation. By making imports dearer to domestic consumers, devaluation fuels domestic inflation. This is one of the reasons raised by the opponents of a devaluation policy. Inflation is, thus, unavoidable in the aftermath of a devaluation (at least in the short run).

The analysis of the inflation equation in this study will provide an empirical estimate of the contribution of each factor to the general price level. In Equation (14), the domestic inflation variable (INFLD), is defined as the first difference of (log of) consumer price index, CPI.

The expected signs of the explanatory variables are summarized in Table 10. Higher (real) money supply in the economy increases aggregate demand, and therefore is expected to increase the general price level. Given the nature of the CFA countries, with high reliance on imports of final as well as intermediate goods, domestic inflation is highly influenced by the foreign price level. As such, foreign inflation (INFLF) is postulated to be positively related to domestic inflation in the CFA countries.

Table 10: Domestic Inflation Equation (Expected signs)

| Variables | Expected signs |
|---|---|
| Money Supply, LRMONS1 | + |
| Gross Domestic Product, GDP | + |
| Interest Rate (Domestic), INTD | - |
| Foreign Inflation, INFLF | + |
| Nominal Devaluation (Contemporaneous), MOMDEV | + |
| Nominal Devaluation (One lag), NOMDE1 | + |

Excess actual output over its potential level is expected to increase inflation while a higher interest rate is postulated to reduce it. To assess the short- and long-run effects of a nominal devaluation on domestic inflation, contemporaneous and one-period lagged nominal devaluation variables are included in the equation. Positive signs of the coefficients of these variables will support the general view that devaluation is inflationary.

Two versions of Equation (14) are estimated. As the results (presented in Table 11) show, almost all the coefficients have the expected signs. Expansionary monetary policy is inflationary. The coefficient of the real money supply (LRMONS1) is positive in the two versions (1 and 2) and statistically significant.

The coefficient of GDP is negative in the two versions (1 and 2) and statistically significant. The interest rate coefficient is, as expected, negative in version (1) in which it is included, but statistically insignificant. Foreign inflation, on the other hand, is confirmed to have a positive influence on domestic inflation. Its coefficient is positive and statistically significant in the two versions.

The nominal devaluation variable does confirm the traditional view of higher inflation following a devaluation. The contemporaneous and lagged coefficients came up positive and statistically significant. Higher inflation is, thus, the norm in the aftermath of a devaluation. This, however, can be controlled through adequate demand management policy in order not to allow a surge in the price of nontradeable goods.

Table 11: Domestic Inflation Equation Results (CFA zone)

| Variables | 1 | 2 |
|---|---|---|
| LRMONS1 | 0.068§ | 0.052§ |
| | (3.01) | (2.61) |
| LGDP | -0.037‡ | -0.31† |
| | (-1.80) | (-1.62) |
| INTD | -0.001 | |
| | (-0.33) | |
| NOMDEV | 0.061‡ | 0.059‡ |
| | (1.81) | (1.79) |
| NOMDE1 | 0.115§ | 0.115§ |
| | (3.31) | (3.72) |
| INFLF | 0.008§ | 0.008§ |
| | (4.57) | (5.15) |
| T | -0.004‡ | -0.004§ |
| | (-2.18) | (-4.56) |
| N | 210 | 210 |
| $R^2$ | 0.4967 | 0.4955 |

The two versions included country-specific dummy variables.
N is the number of observations
$R^2$ is the adjusted coefficient of determination.
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

The next empirical investigation involves the relationship between nominal devaluation and real output. As aforementioned, the theoretical and empirical treatment of this relationship has been controversial. More studies are required to resolve the controversy.

Again in this estimation, the variables are annual data (ranging from 1972 to 1992) and are defined as in previous chapters. To assess the effects of a nominal devaluation in the short and long run, both the real exchange rate (LREER) and its lag (LREER1) are included in the equation. The empirical results are presented in Table 12.

Starting with the terms of trade variable (LTOT), we postulated that changes in the terms of trade have ambiguous effects on real output. Our results confirm that view. The coefficients of the terms of trade variable has opposite signs in the two versions (1 and 2) and are statistically insignificant. This result is consistent with that reached in Edwards (1986). In his study, Edwards (1986) concluded that "Regarding the coefficient of $\tau$ [terms of trade] the results show that ... changes in the terms of trade have no perceptive effect on real output in developing countries".

Expansionary monetary policy, as represented by the real money supply, on the other hand, does impact real output. Its coefficient is positive in the two versions and statistically significant. This study did not investigate any long-run effect of money supply (which according to the traditional view calls for money neutrality). However, our results strongly support a short-run positive effect of money supply on real output.

Like the money supply, government consumption in a given year has a contemporaneous positive impact on real output. This is an encouraging result for developing countries (CFA countries in particular) where the public sector represents an

Table 12: Real Output Equation Results, LGDP (CFA zone)

| Variables | 1 | 2 |
|---|---|---|
| LTOT | 0.039 | -0.034 |
| | (0.90) | (-0.77) |
| LRMONS | 0.825§ | 0.755§ |
| | (18.47) | (15.61) |
| LGCONS | 0.105§ | 0.108§ |
| | (5.14) | (5.58) |
| LINV | | 0.097§ |
| | | (3.44) |
| LREER | -0.354§ | -0.219‡ |
| | (-2.95) | (-1.90) |
| LREER1 | 0.474§ | 0.325§ |
| | (4.75) | (3.40) |
| N | 210 | 210 |
| $R^2$ | 0.9556 | 0.9597 |

The two versions included country-specific dummy variables.
$R^2$ is the adjusted coefficient of determination.
N is the number of observations
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

important proportion of the economy. But this should not be interpreted as a support for a larger government since, as proven by numerous studies, the private sector can do even better than the government, especially in developing countries.

The next two variables (LREER and LREER1) in the equation are of particular interest. Given that a nominal devaluation has a real depreciation effect, will real output react positively to the latter? If so, then devaluation will be characterized as expansionary, and in terms of equation (14), the coefficient of LREER or LREER1 must be positive (or at least their sum should be). Based on the results, real output will contract in the short run following a devaluation. The coefficient of LREER is negative in the two versions and statistically significant. However, in the second year following the devaluation, real output will rebound and compensate for the losses incurred during the first year (based on the magnitude of the positive and statistically significant lagged LREER variable in the two versions). Assuming that the CFA countries' monetary authorities design a sound accompanying demand management policy to contain domestic inflation (to maintain the achieved real depreciation), a nominal devaluation will be expansionary (at worse, neutral) in the long run.

Although some researchers reached the conclusion that devaluation is contractionary, their results should be interpreted with caution due to the nature of the developing countries. Despite their conclusion that devaluation is contractionary in the developing countries, Gylfason and Risager (1984) pointed out that there are three factors which all tend to bias the results toward a contractionary devaluation view:

> ... the improvement of the current account is achieved at the cost of a reduction of GNP. This reduction, however,

> should be viewed in the light of three factors all of which tend to bias the results in this direction. First, we assumed conservatively that the elasticity of substitution is as low as 0.3 in the LDCs as well as in Portugal and Spain. Second, available national income accounts statistics for these countries attribute too low a share of GDP to labor with the result that the aggregate supply schedule in the present framework is unduly steep. Third, as said above, practically all the countries in the sample carry a heavy debt burden. All these factors increase the probability that devaluation reduces GNP. On the other hand, devaluation generally stimulates GNP in the industrial countries...

## Devaluation and the BEAC and BCEAO Regions

In this section, we consider the two regions of the CFA zone, namely the BEAC and BCEAO regions. The analysis to this point was devoted to the CFA zone as a whole. The following presents the empirical results for each region.

The theoretical analysis is the same as before, only that in this part, the samples used in the estimation differ. In the BCEAO region, the countries included in the sample are Bénin, Burkina Faso, Côte d' Ivoire, Niger, Sénégal, and Togo. The BEAC sample includes Cameroon, Central African Republic, Congo, and Gabon. The variables are annual data ranging from 1972 to 1992 (for each country) for a total of 126 and 84 observations for the BCEAO and BEAC regions, respectively.

As in the case of the zone as a whole, five different equations are estimated for each region. They are real effective exchange rate, exports, imports, inflation, and real output. The results are summarized in Tables 13 to 17.

Regarding the REER equation (Table 13), all the coefficients have the postulated signs. The capital flows (CAPF), and money supply (LMONS) coefficients, however, are

Table 13: Real Effective Exchange Rate Equation Results, LREER (BEAC and BCEAO)

| Variables | BEAC | BCEAO |
|---|---|---|
| CAPF | -0.000 | -0.000 |
| | (-0.69) | (-0.31) |
| LTRES | -0.051† | -0.027 |
| | (-1.62) | (-1.09) |
| LMONS | -0.010 | -0.010 |
| | (-0.56) | (-0.62) |
| LREER1 | 0.952§ | 0.962§ |
| | (26.33) | (18.84) |
| LTOT | -0.042† | -0.071§ |
| | (-1.50) | (-2.48) |
| LINV | -0.012 | -0.052§ |
| | (-0.86) | (-3.56) |
| LGCONS | -0.005 | -0.013† |
| | (-0.35) | (-1.42) |
| NOMDEV | 0.989§ | 0.870§ |
| | (21.07) | (13.39) |
| NOMDE1 | -0.107§ | -0.015 |
| | (-2.33) | (-0.27) |
| N | 84 | 126 |
| $R^2$ | 0.9915 | 0.9692 |

The two versions included country-specific dummy variables.
$R^2$ is the adjusted coefficient of determination.
N is the number of observations
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

Table 14: Export Equation Results, LEXP (BEAC and BCEAO)

| Variables | BEAC | BCEAO |
|---|---|---|
| LREER | 0.261† | 0.370‡ |
| | (1.36) | (1.74) |
| LGDPF | 0.511‡ | 0.120‡ |
| | (1.88) | (1.66) |
| LEXP1 | 0.488§ | 0.404§ |
| | (7.33) | (6.21) |
| LTRES | -0.552§ | -0.659§ |
| | (-4.20) | (-6.07) |
| N | 84 | 126 |
| $R^2$ | 0.9688 | 0.9544 |

The two versions included country-specific dummy variables.
$R^2$ is the adjusted coefficient of determination.
N is the number of observations
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

Table 15: Import Equation Results, LIMP (BEAC and BCEAO)

| Variables | BEAC | BCEAO |
|---|---|---|
| LREER | -0.239† | -0.298§ |
| | (-1.56) | (-3.21) |
| LGDP | 0.882§ | 0.914§ |
| | (4.57) | (6.53) |
| LIMP1 | 0.230† | 0.270§ |
| | (1.62) | (3.92) |
| LTRES | -0.519§ | -0.653§ |
| | (-3.03) | (-7.77) |
| N | 84 | 126 |
| $R^2$ | 0.9778 | 0.9791 |

The two versions included country-specific dummy variables.
$R^2$ is the adjusted coefficient of determination.
N is the number of observations
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

statistically insignificant in the two equations (representing the two regions). The other coefficients are statistically significant in at least one equation.

As in the case of the zone, nominal devaluation is found to have a real depreciation effect on the CFA currency in each region. The contemporaneous coefficient of NOMDEV is positive and statistically significant in the two equations (0.989 and 0.870 for the BEAC and BCEAO, respectively). The lagged coefficient is negative in the two cases (and statistically significant in the case of BEAC and insignificant in the other).

However, the magnitude of the lagged coefficient is far less compared to the contemporaneous one. In fact, a test of the hypothesis that the sum of the contemporaneous and lagged coefficients is zero is rejected in the two cases (BEAC and BCEAO). This means that nominal devaluation will have a long-run effect in each of he two regions.

In the export and import equations (Tables 14 and 15, respectively), the trade restrictions variable is included to account for the trade policies in the two regions. Its coefficient is negative in the two equations, again confirming the claim that trade restrictions reduce international trade flows in the zone. In the export equation , the other coefficients are positive (as expected) and statistically significant. The LREER coefficient is higher in magnitude for the BCEAO compared to that of the BEAC (0.370 and 0.261, respectively). The main result, however, is that real depreciation will lead to export growth in the two regions. As in the export equation, the parameter estimates in the import equation have the postulated signs and statistically significant. The coefficient of the LREER is almost the same for the two regions, and shows that a 10 percent real

depreciation will reduce import demand by 2.39 and 2.98 percent for the BEAC and BCEAO, respectively.

Regarding the inflation equation (Table 16), the real money supply, foreign inflation, and nominal devaluation have positive effect on inflation in each of the regions. As claimed before, nominal devaluation will be inflationary in either the BEAC or BCEAO region. Higher interest rates have a negative effect on inflation rates (although the coefficient is statistically insignificant in the case of BCEAO).

In the last equation, (real output, Table 17), the LTOT coefficient has opposite signs (negative and statistically significant for the BEAC, and positive and insignificant for the BCEAO). The real money supply (LRMONS) and government consumption (LGCONS), on the other hand, have unambiguous positive effects on real output in the two regions (both coefficients are positive and statistically significant). The contemporaneous LREER coefficient, although negative, is much different in magnitude for the BEAC and BCEAO regions (-0.206 and -0.717, respectively). The contemporaneous output contraction in the BCEAO region is much more pronounced. The lagged coefficient, however, is similar (0.271 and 0.293 for the BEAC and BCEAO, respectively.

We can conclude that in the first two years following a depreciation, output contraction is likely in the BCEAO region, while growth of output in the BEAC region in the second year will compensate for the losses incurred during the first year. If we consider a longer period (which we did not attempt in this study) and assume that the initial real depreciation is preserved, the output performance is likely to be brighter.

Table 16: Domestic Inflation Equation Results (BEAC and BCEAO)

| Variables | BEAC | BCEAO |
|---|---|---|
| LRMONS1 | 0.104§ | 0.118§ |
| | (3.49) | (2.69) |
| LGDP | 0.011 | -0.096§ |
| | (0.40) | (-2.53) |
| INTD | -0.016‡ | -0.002 |
| | (-2.07) | (-0.24) |
| NOMDEV | 0.031 | 0.086† |
| | (0.83) | (1.55) |
| NOMDEV1 | 0.113§ | 0.094† |
| | (2.93) | (1.54) |
| INFLF | 0.009§ | 0.009§ |
| | (4.09) | (3.25) |
| T | -0.000 | -0.004† |
| | (-0.23) | (-1.62) |
| N | 84 | 126 |
| $R^2$ | 0.6396 | 0.4363 |

The two versions included country-specific dummy variables.
$R^2$ is the adjusted coefficient of determination.
N is the number of observations
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

Table 17: Real Output Equation Results, LGDP (BEAC and BCEAO)

| Variables | BEAC | BCEAO |
|---|---|---|
| LTOT | -0.223§ | 0.075 |
| | (-4.81) | (1.12) |
| LRMONS | 0.918§ | 0.939§ |
| | (15.05) | (14.23) |
| LGCONS | 0.282§ | 0.102§ |
| | (8.20) | (3.93) |
| LREER | -0.206‡ | -0.717§ |
| | (-1.807) | (-4.14) |
| LREER1 | 0.271§ | 0.293‡ |
| | (2.62) | (1.97) |
| N | 84 | 126 |
| $R^2$ | 0.9824 | 0.9329 |

The two versions included country-specific dummy variables.
$R^2$ is the adjusted coefficient of determination.
N is the number of observations.
The numbers in parentheses are t-values.
† Significant at 10 % level
‡ Significant at 5 % level
§ Significant at 1 % level

1. See Otani and Sassanpour (1991).

# CHAPTER VI

## SUMMARY AND CONCLUSIONS

### Empirical Findings and Policy Implications

This study emerged from the poor economic performance of the Sub-Saharan African countries in general and the CFA countries in particular. The situation is really disappointing when one compares the results of the efforts of the other developing countries to those of Sub-Saharan Africa. As characterized in *Finance and Development*[1],

> A handful of developing economies are emerging as potential giants. In 1995, the 10 largest - Argentine, Brazil, China, India, Indonesia, Mexico, Pakistan, Russia, Thailand, and Turkey - accounted for 59 percent of the developing world's GDP and 44 percent of its exports, and 11 percent of world GDP. By contrast, the economies of Sub-Saharan Africa accounted for 10.4 percent of the world's population but only 1.1 percent of world GDP.

Our main concern has been the case of the CFA countries with an even worse economic performance when faced with an economic crisis (by the mid-1980s) following external shocks and inappropriate domestic policies. The subsequent lack of external competitiveness was given particular attention in this study.

The analysis of the real effective exchange rate (external competitiveness indicator) points to different factors that influence the CFA zone's external

competitiveness. Of particular importance is the effect of a nominal devaluation on the real effective exchange rate. It was found that a nominal devaluation will have a real depreciation effect on the real effective exchange rate of the zone in the long run. This result leads to a policy proposition that the CFA zone authorities should use the exchange rate as a policy instrument when needed. This does not mean that each country should (or can) resort to the exchange rate as a policy variable, as this is impossible given the arrangements of the zone. However, a misalignment of the exchange rate that threatens the entire zone needs to be given immediate attention by adjusting the currency to reflect its real value. This assumes, of course, that the other effects of a nominal devaluation are also taken into account .

The sizable overvaluation (appreciation) of the CFA Franc (from the mid-1980s to early 1990s) and its various consequences on the zone's economy, could have been avoided if corrective actions were taken earlier to address the problem by devaluing the currency.

In practice, a successful devaluation must entail more than a simple change in the parity of the currency. This is because the incipient gain in the external competitiveness following a nominal devaluation can be threatened by higher inflation brought about by the same nominal devaluation. As a consequence, to effectively guarantee (and protect) the competitiveness gain, the zone authorities need to accompany a nominal devaluation with restrictive monetary and fiscal policies to contain inflation. As such, devaluation will not be painless to society, and this explains its unpopularity to correct the zone's problem. A comprehensive analysis of a devaluation should be based on its long-run effects, and not (erroneously) on its effects in the short run. "[I]mplementation of rigorous fiscal, wage,

and monetary policies..."[2] , as part of a policy package to secure external competitiveness, is just the inevitable cost to incur in the short run in order to guarantee larger gains for the economy in the long run.

Arguments based on the short-run costs to society, against nominal devaluation are thus without economic foundation. As far as external competitiveness is concerned, and based on our results, a CFA Franc devaluation will help the zone regain its external competitiveness. Without this, and in the face of a CFA overvaluation, the zone (and the Sub-Saharan Africa in general) will be marginalised in today's challenging world environment and, therefore, continue to retain its "unfortunate" title of the world's poorest region. Adoption of the proposed policy would increase the gains derived from the CFA membership, apart from the fiscal and monetary discipline conferred by the zone.

Although the zone should use, when necessary, the exchange rate as a policy instrument, the problem, however, still exists at the individual country level, as the exchange rate policy cannot be tailored at any time to address the specific problems of a given country in the zone. The only solution to such a problem would be for each country to have its own currency and central bank. It is not advisable at this point to propose such a solution to any country until the costs and benefits of participating in the zone are evaluated.

Another crucial point worth studying when considering a devaluation of a currency is export and import growth. The question was raised as to whether a real depreciation will bring about export growth, and reduce imports to the zone. The results indicate that exports from the zone will expand while imports will contract following a devaluation of the CFA Franc. This finding lends strong support to the view that a

devaluation of the CFA Franc should be considered whenever necessary. It is important to note that the results only point to the fact that a reduction in export prices (in foreign currency) will be associated with more demand from the zone. Exports, however, may not increase as rapidly if the sector does not expand enough to satisfy the increased demand. Thus, one of the conditions necessary to reap all the benefits of a devaluation is factor mobility, especially from the nontradeable to the tradeable sector.

In addition to factor mobility, the zone needs to expand it tradeable commodity base to offer a larger variety of goods to its export market. The limited number of exportables has been one of the constraints of the CFA countries to adjust to external shocks. Favorable internal conditions[3] to attract foreign capital inflows can contribute to the fulfillment of that objective. Foreign capital inflows to the Sub-Saharan Africa (especially CFA countries) has been modest compared to other regions of developing countries (see Table 18).

The CFA countries also need to find better ways to penetrate the world market in order to increase their market share. A shrinking (or constant) export market share plays to the region's disadvantage.

Finally, the trade policies of the CFA zone should be reconsidered to allow for more openness of the zone's economies to the rest of the world (in other words, the zone should adopt a more outward looking approach). As our results show, trade restrictions impinge on the international trade flows of the zone. The zone, thus, stands to gain more (in terms of favorable external balances, output growth, and lower inflation) by liberalizing its exchange and trade regimes (see APPENDIX D). To the extent that the

Table 18: Foreign Capital Flows to Developing Countries (1990-1994)

| Region | Percentage |
|---|---|
| East Asia and the Pacific | 52 |
| Latin America | 29 |
| Eastern Europe and Central Asia | 9 |
| Sub-Saharan Africa | 4 |
| Middle East and North Africa | 4 |
| South Asia | 2 |

Source: Adapted from Bergsman and Shen (1995)

bulk of the trade restrictions on the zone's international trade flows derives from the zone's own policies, it is possible to expand trade flows by removing (or reducing) those, self-imposed costs of trade barriers. As Yeats et al. (1996) notes,

> Import restrictions frequently create a bias against exports that prevents local entrepreneurs from capitalizing on export opportunities. High tariffs and NTBs [Non-Trade Barriers] may significantly raise prices for production inputs and greatly diminish potential exporters' ability to compete in foreign markets. ... sub-Saharan African trade barriers are far more restrictive than those of any other group. Tariffs in the countries of sub-Saharan Africa average 26.8 percent - more than three times those of the fast-growing exporters, and more than four times the OECD average. OECD members reduced their tariffs by almost 40 percent in the recent Uruguay Round (to about 3.9 percent), and many of the fast-growing exporters also made important concessions on trade barriers. In contrast, sub-Saharan Africa's trade barriers were virtually unchanged by the Uruguay Round. As a result, the current spread between sub-Saharan Africa's tariffs (and between its tariffs and other import charges combined) and those in the other countries has widened, threatening export competitiveness.

Given this fact, much needs to be done by the CFA countries themselves if export growth is to be enhanced. In addition, a more global and export-friendly approach is to be adopted by the CFA zone countries in order to improve their position in the new and emerging international market arena. And, "The proper response is certainly not despair. For the one thing that can be said about the emerging global economic order is that it is redolent with opportunities for nations able to find nimbleness and efficiency. Who dares wins. A more open, predictable world trading system is coming to being. World aggregate demand is set to grow significantly. It is a climacteric. Niches can be found in the global market-place by those who organize themselves aright." (*West Africa*, 17-23 April 1995, Who dares wins).

Our study also extends to include inflation and real output effects of devaluation. As indicated before, one of the advantages generally associated with a pegged exchange rate regime is the low inflation it embeds. The monetary and fiscal discipline conferred by the CFA zone does confirm that view. Inflation has been very low in the member countries and is usually referred to as one of the reasons for opposing a devaluation of the CFA Franc. The low inflation secured through the pegging system, however, does not seem worth the loss of real output.

The lesson from the CFA experience during the period of the mid-1980s to 1993 is that correcting real exchange rate misalignment through demand management alone can be too costly to an economy (with a pegged system) in terms of real output loss. Adjusting the nominal exchange rate to reflect its real value is the effective way of addressing a lack of competitiveness problem, especially when the problem derives from external shocks. The inflation that results should not deter the policy makers, as it could be managed.

Inflation following a devaluation can be contained through appropriate policies. With the main objective being economic growth, policies to bring it about should be favored over policies to simply reduce inflation. As our analyses led us to conclude, devaluation, contrary to the view of its opponents, can restore economic growth (real output) of the CFA zone in the long run. Thus policies designed to affect real output should also take into account the exchange rate (to correct any misalignment). Again, this may be a difficult policy as the exchange rate alignment will require (to a certain degree) the agreement of all member countries. Exchange rate reevaluation not only will affect the member countries differently, but also given the state of each economy in the zone at the time of a devaluation, the latter and/or its magnitude may not suit all the member countries

individually. But as far as the zone is concerned, the exchange reevaluation policy to affect output growth should be favored.

The adoption of the fixed exchange rate regime should not constitute a handicap for reaping the benefits of exchange rate alignment. Although some deviations are unavoidable, major misalignments should be viewed as a serious problem, and therefore corrected. Of course, there is no denying that exchange rate misalignment is not the only distorting factor that affects real output growth. It is however by far the most important form of distortion that affects economic growth, as claimed by Agarwala (1983). This is no surprise as distortions of the exchange rate affect the prices of all other goods and their production.

The positive output response to exchange rate alignment is confirmed in a number of studies. In the developing countries in general and the CFA countries in particular, the fear has been the importance of the intermediate goods of those countries in their imports. The empirical results in this study, however, lead to a conclusion that the CFA zone will gain in the long run in terms of real output (following a devaluation). This should reduce the uncertainty of the zone's policy makers and encourage them to consider a devaluation policy when the economic conditions of the zone requires it. Observation of the (early) results (see APPENDICES E to I) of the 1994 devaluation of the CFA Franc indicates that devaluation can indeed improve the economic performance of the CFA zone.

A real depreciation of the CFA Franc occurred in 1994 following the nominal devaluation (APPENDIX E). Accompanying contractionary monetary and fiscal policies in the zone reduced the incipient and sharp inflation that resulted in the year of the

devaluation (APPENDIX F), and helped maintain (after a slight appreciation) the external competitiveness gain.

Exports responded favorably to the real depreciation although imports also increased in the wake of the devaluation (APPENDICES G and H, respectively). Exports and imports are expected to adjust more in the long run. Real GDP growth also increased in the member countries (APPENDIX I). Given that the real depreciation of the CFA is protected, real GDP will continue to grow in the years to come.

## Conclusion

The adoption of fixed exchange rate system by the CFA zone appeared to have paid off (in terms of economic growth and lower inflation) until the mid-1980s. The reversal of the economic performance of the zone since then, and the attempts to address the problem through internal adjustment alone reflected the zone's rigidity regarding the use of the exchange rate as a policy variable. The deterioration of the terms of trade, and severe exchange rate overvaluation that initiated the crisis, imply that internal adjustment (demand management alone) would be insufficient and must be coupled with exchange rate reevaluation policy.

The fixed exchange rate regime should not prevent the CFA zone from using the exchange rate as a policy instrument. The fear of that policy regarding its uncertain long-run effects on the external competitiveness, exports, imports, and real output, and especially its obvious effect on domestic inflation, deters policy makers. However, this should not constitute a major hindrance from using the exchange rate policy, as confirmed by this study. Moreover, the changing pattern of exchange rate arrangements (shifts from

pegged to more flexible regime; see APPENDIX J) is another indication that exchange rate policy is vital for good economic performance.

Because nominal devaluation is able to depreciate the CFA Franc in real terms, and thereby improve the zone's external competitiveness (and favorably affect the other economic variables), policies in the zone need to be flexible and respond to internal as well as external shocks (including nominal devaluation of the CFA Franc whenever deemed necessary). Adoption of such policy would, in addition to the stability and credibility conferred by the fixed exchange rate regime, allow the zone to derive some of the benefits of a flexible exchange rate regime. The result would be greater benefits for the zone as a whole and each member country.

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1. *Finance & Development*, March 1997, pp. 48

2. *IMF Survey*, February 1994. pp.35

3. Some of these conditions include stable political and economic environments, open markets, minimal regulation, good infrastructure facilities, low production costs. Most Sub-Saharan African countries, by contrast, are characterized by frequent civil strike, macroeconomic instability, slow economic growth and small domestic market, inward orientation and burdensome regulations, poor infrastructure facilities (Bhattacharya et al., 1997).

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# APPENDICES

## APPENDIX A : THE INSTITUTIONAL FRAMEWORK OF THE CFA FRANC ZONE

The CFA (Communoté Financière Africaine) zone comprises 14 countries (excluding the Comoros Islands) subdivided in two regions (west and central) each with its own central bank. All the zone member countries have a common currency (CFA Franc) pegged to the French Franc (FF) since 1948, with a parity rate of 50 CFA Francs for 1 FF until January 1994 when a large devaluation took place (100 CFA for 1 FF). France guarantees unlimited convertibility of the CFA Franc into French Francs through an operations account at the French Treasury. The member central banks are required to keep 65 percent of their exchange reserves in French Francs at the central bank of France, "Banque de France".

The CFA zone is characterized by a fixed exchange rate, monetary integration, and full currency convertibility, with the main objective of coordinating monetary and fiscal policies of the member countries, and therefore, foster and maintain their economic and financial stability.

To achieve those goals, the zone is governed by four principles (see Allechi and Niamkey, 1994):

1. Fixed parity between the CFA Franc and the French Franc. Such parity can be changed only by unanimous agreement between member countries and France.
2. Full convertibility of the CFA Franc into French Francs, guaranteed through the special operations account opened at the French Treasury, not at the Banque de France, the French central bank.

3. Free transferability without limit within member countries and between these countries and France.

4. Pooled reserves system under which the Franc zone uses a common foreign exchange policy against the rest of the world.

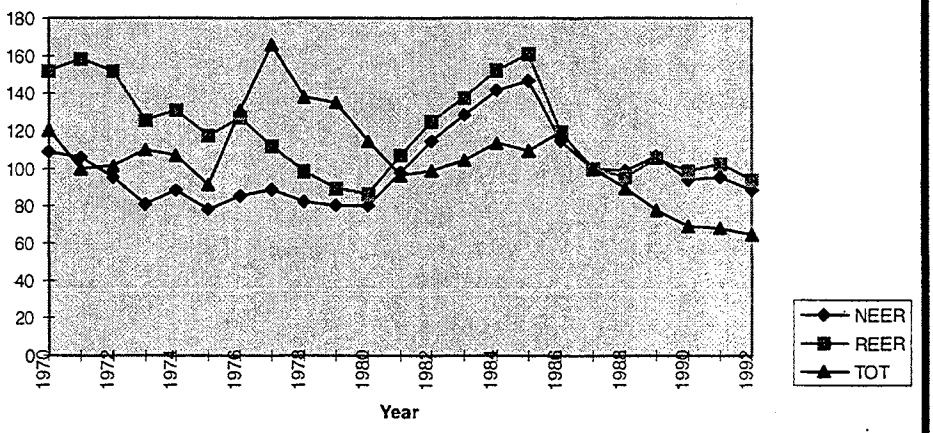
One of the drawbacks of the zone is that the member countries cannot, individually, adopt an exchange rate policy tailored at addressing their specific economic and financial problems.

The fifteen member countries (including the Comoros Islands) are as follows:

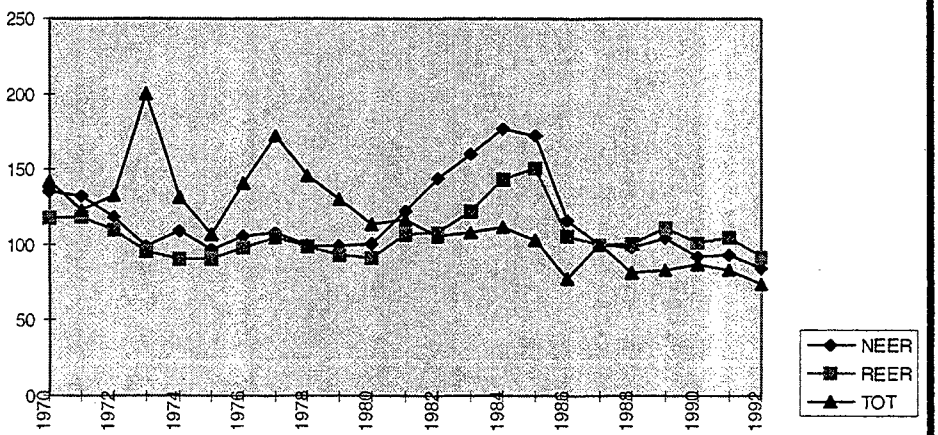
- West Africa: Bénin, Burkina Faso, Côte d' Ivoire, Guinea Bissau, Mali, Niger, Sénégal, and Togo, are grouped in the West African Monetary Union (Union Monétaire Ouest Africaine, UMOA). The Banque Centrale des Etats de l'Afrique de l' Ouest, BCEAO is their common central bank.
- Central Africa: Cameroon, Congo, Gabon, Central African Republic (CAR), Chad, and Equatorial Guinea, are served by the Banque des Etats de l' Afrique Centrale, their common central bank.
- The Comoros Islands, with its own central bank.

APPENDIX B: NOMINAL AND REAL EFFECTIVE EXCHANGE RATES, AND TERMS OF TRADE (SELECTED CFA ZONE COUNTRIES), 1970-92.

**APPENDIX B.1: COTE D' IVOIRE: Nominal and Real Effective Exchange rates, and Terms of Trade**




**APPENDIX B.2: BENIN: Nominal and Real Effective Exchange Rates, and Terms of Trade**

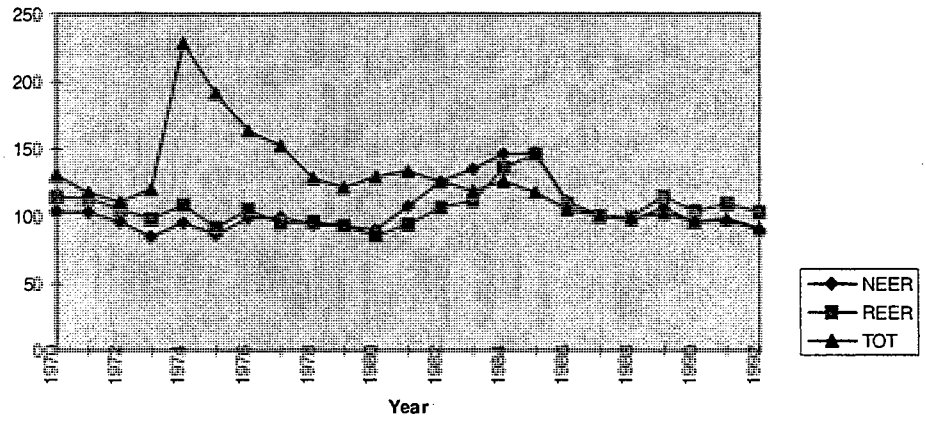



Note:

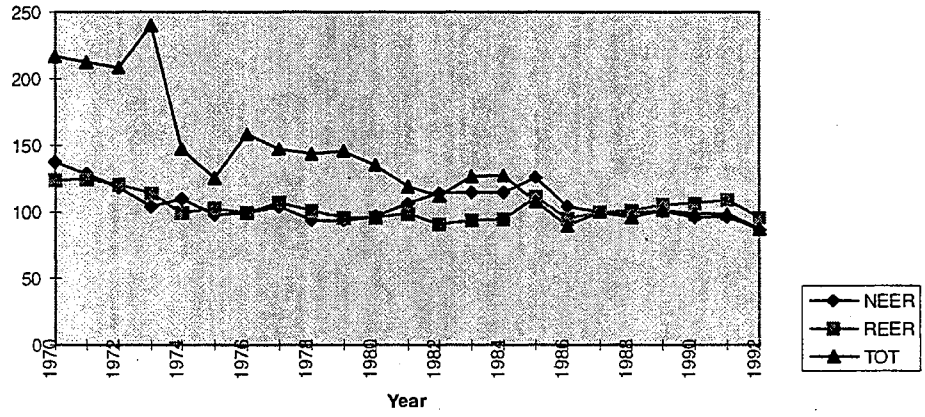
NEER is nominal effective exchange rate
REER is real effective exchange rate
TOT is terms of trade
An increase in NEER or REER is a depreciation. An increase in TOT is an appreciation

Source: The NEER and REER are computed by the author. The TOT are from the International Financial Statistics

**APPENDIX B.3: TOGO: Nominal and Real Effective Exchange Rates, and Terms of Trade**




**APPENDIX B.4: BURKINA FASO: Nominal and Real Effective Echange Rates, and Trems of Trade**

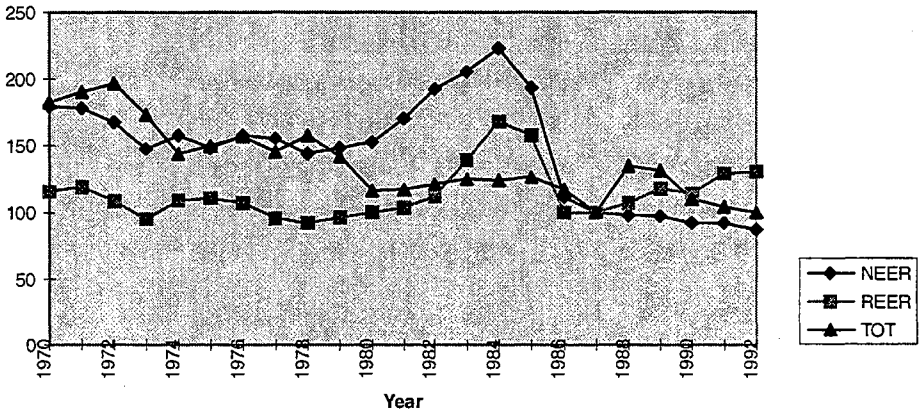



Note:

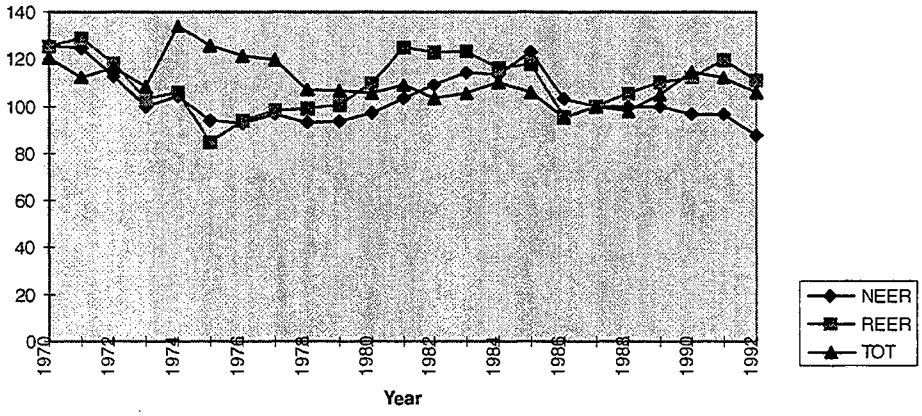
NEER is nominal effective exchange rate
REER is real effective exchange rate
TOT is terms of trade
An increase in NEER or REER is a depreciation. An increase in TOT is an appreciation

Source: The NEER and REER are computed by the author. The TOT are from the International Financial Statistics

**APPENDIX B.5: NIGER: Nominal and Real Effective Exchange Rates, and Terms of Trade**




**APPENDIX B.6: SENEGAL: Nominal and Real Effective Exchange Rates, and Terms of Trade**

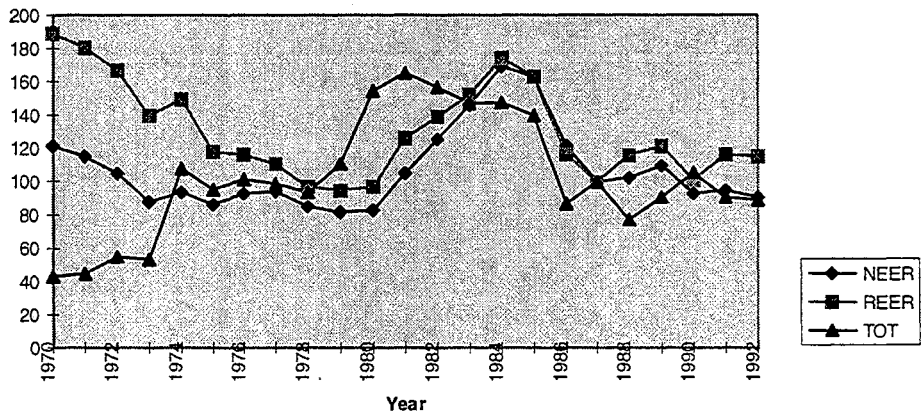



Note:

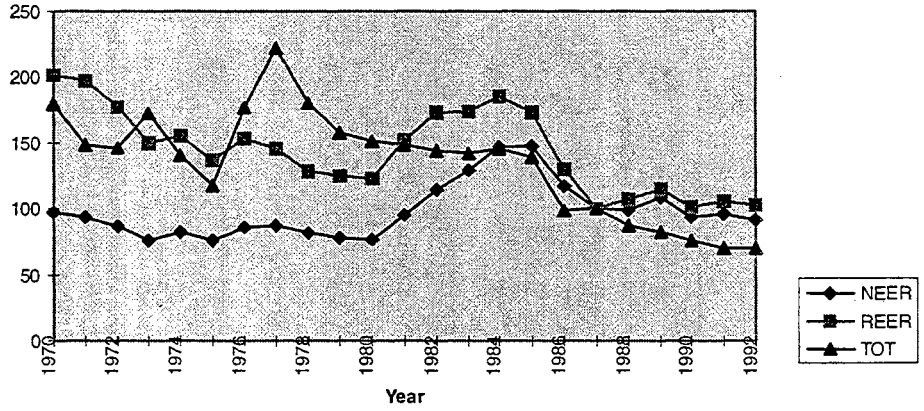
NEER is nominal effective exchange rate
REER is real effective exchange rate
TOT is terms of trade
An increase in NEER or REER is a depreciation. An increase in TOT is an appreciation

Source: The NEER and REER are computed by the author. The TOT are from the International Financial Statistics

**APPENDIX B.7: GABON: Nominal and Real Effective Exchange Rates, and Terms of Trade**




**APPENDIX B.8: CAMEROON: Nominal and Real Effective Exchange Rates,and Terms of Trade**

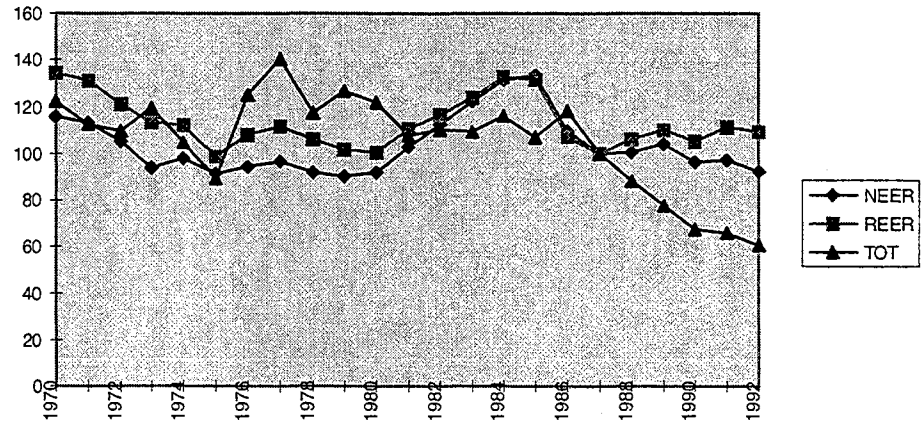



Note:

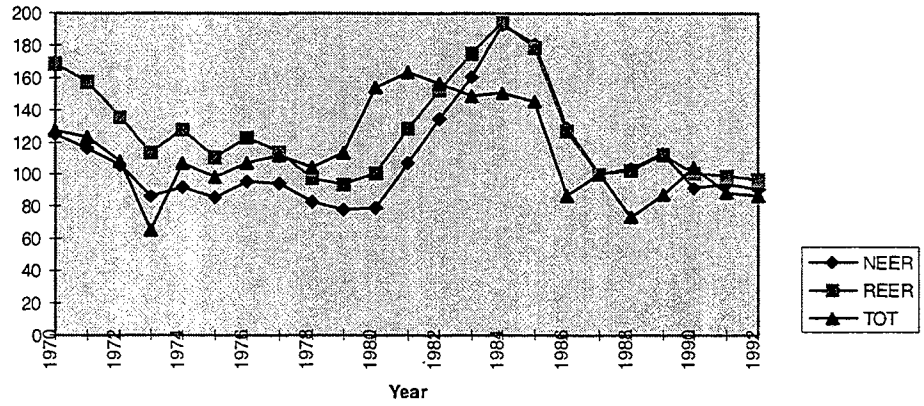
NEER is nominal effective exchange rate
REER is real effective exchange rate
TOT is terms of trade
An increase in NEER or REER is a depreciation. An increase in TOT is an appreciation

Source: The NEER and REER are computed by the author. The TOT are from the International Financial Statistics

**APPENDIX B.9: CENTRAL AFRICAN REPUBLIC: Nominal and Real Effective Exchange Rates, and Terms of Trade**




**APPENDIX B.10: CONGO: Nominal and Real Effective Exchange Rates, and Terms of Trade**




Note:

NEER is nominal effective exchange rate
REER is real effective exchange rate
TOT is terms of trade
An increase in NEER or REER is a depreciation. An increase in TOT is an appreciation

Source: The NEER and REER are computed by the author. The TOT are from the International Financial Statistics

APPENDIX C : THE COMPLETE MODEL

1. *Real Effective Exchange Rate*

$$LREER = \sigma_0 + \sigma_1 LREER1 + \sigma_2 LTOT + \sigma_3 CAPF + \sigma_4 LINV + \sigma_5 LTRES + \sigma_6 LMONS + \sigma_7 LGCONS + \sigma_8 NOMDEV + \sigma_9 NOMDE1 + e$$

2. *Exports*

$$LEXP = \delta_0 + \delta_1 LREER + \delta_2 LGDPF + \delta_3 LTRES + \delta_4 LEXP1 + \upsilon$$

3. *Imports*

$$LIMP = \gamma_0 + \gamma_1 LREER + \gamma_2 LGDP + \gamma_3 LTRES + \gamma_4 LIMP1 + m$$

4. *Inflation*

$$INFLD = \Psi_0 + \Psi_1 LRMONS1 + \Psi_2 LGDG + \Psi_3 INTD + \Psi_4 NOMDEV + \Psi_5 NOMDE1 + \Psi_6 INFLF + \Psi_7 T + \eta$$

5. *Real Output*

$$LGDP = \psi_0 + \psi_1 LTOT + \psi_2 LRMONS + \psi_3 LGCONS + \psi_4 LREER + \psi_5 LREER1 + e$$

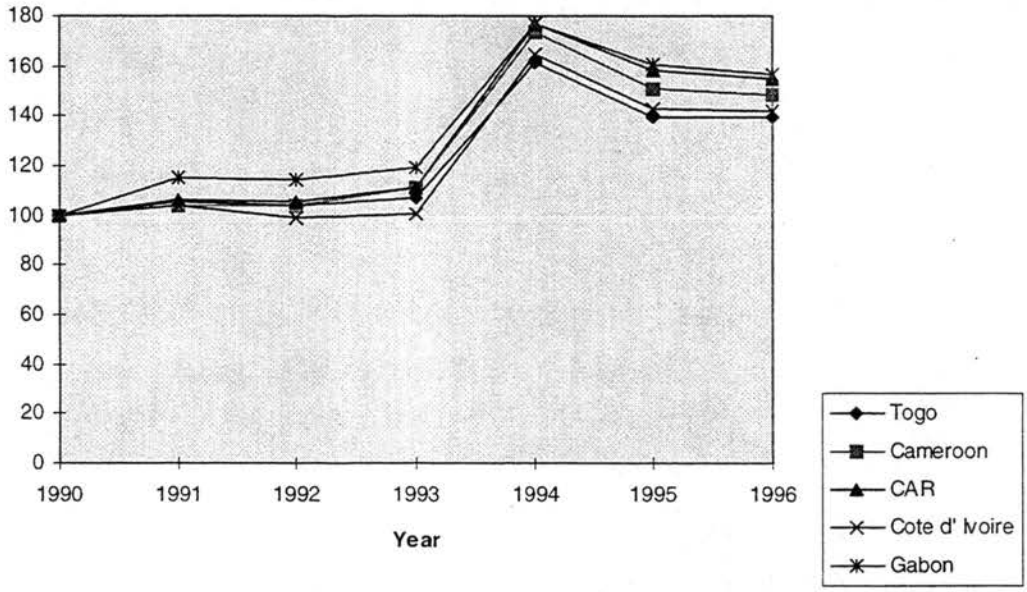
APPENDIX D: DEVELOPING COUNTRIES: THE DEGREE OF OPENNESS AND ECONOMIC PERFORMANCE
(Average annual percent change, 1986-91)

| | Number of countries | Growth (% a Year) | Inflation |
|---|---|---|---|
| Average degree of openness[1] | | | |
| Less than 25 | 28 | 3.5 | 344.6 |
| 25 to 40 | 23 | 5.2 | 50.7 |
| More than 40 | 23 | 5.7 | 5.0 |
| Openness by exports[2] | | | |
| Less than 25 | 38 | 3.5 | 247.6 |
| 25 to 40 | 16 | 5.3 | 14.4 |
| More than 40 | 20 | 6.2 | 3.1 |

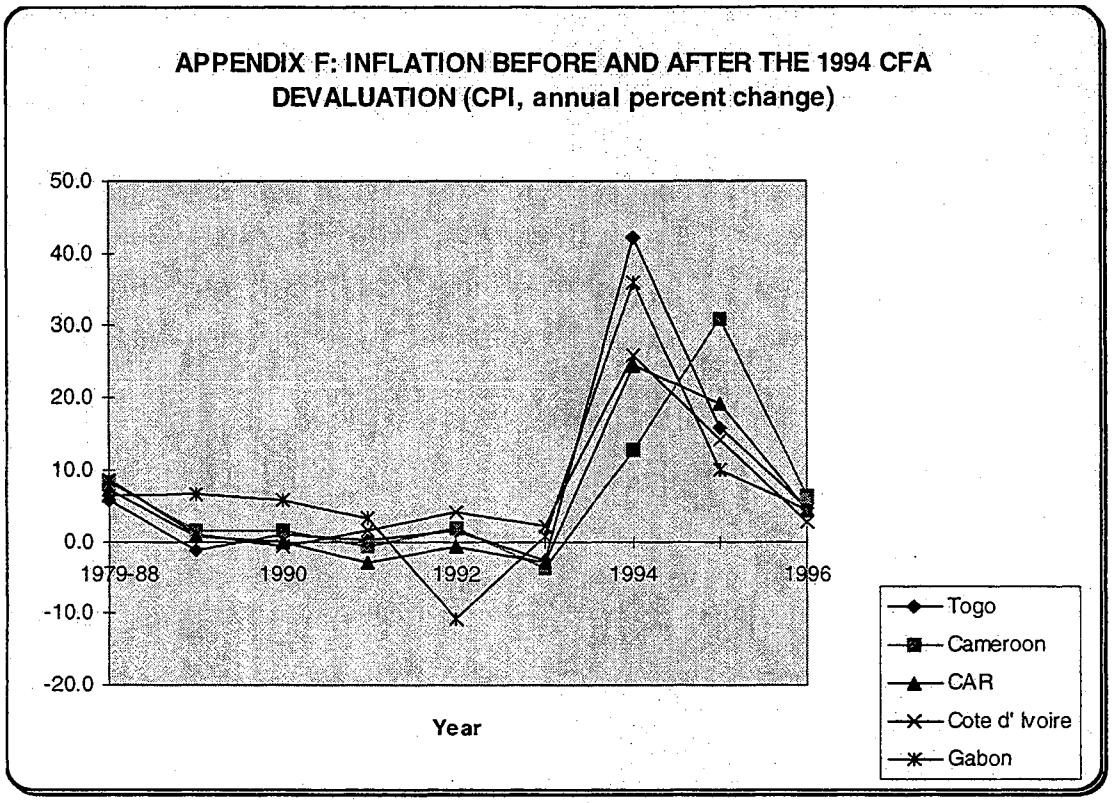
1. Defined as the average of exports and imports as percent of GDP
2. Defined as exports as percent of GDP
Source: World Economic Outlook, October 1992

Outward-looking strategy has been identified as a policy that can open an economy to the rest of the world. A country that is open to the rest of the world faces international competition which can lead to efficient resource allocation and lower domestic inflation. In addition, and in the case of developing countries (CFA countries in particular), a higher degree of openness will make available to domestic producers a wider range of intermediate goods to choose from. Thus, a high degree of openness must be positively associated with high economic growth and lower domestic inflation, as illustrated by the table above.

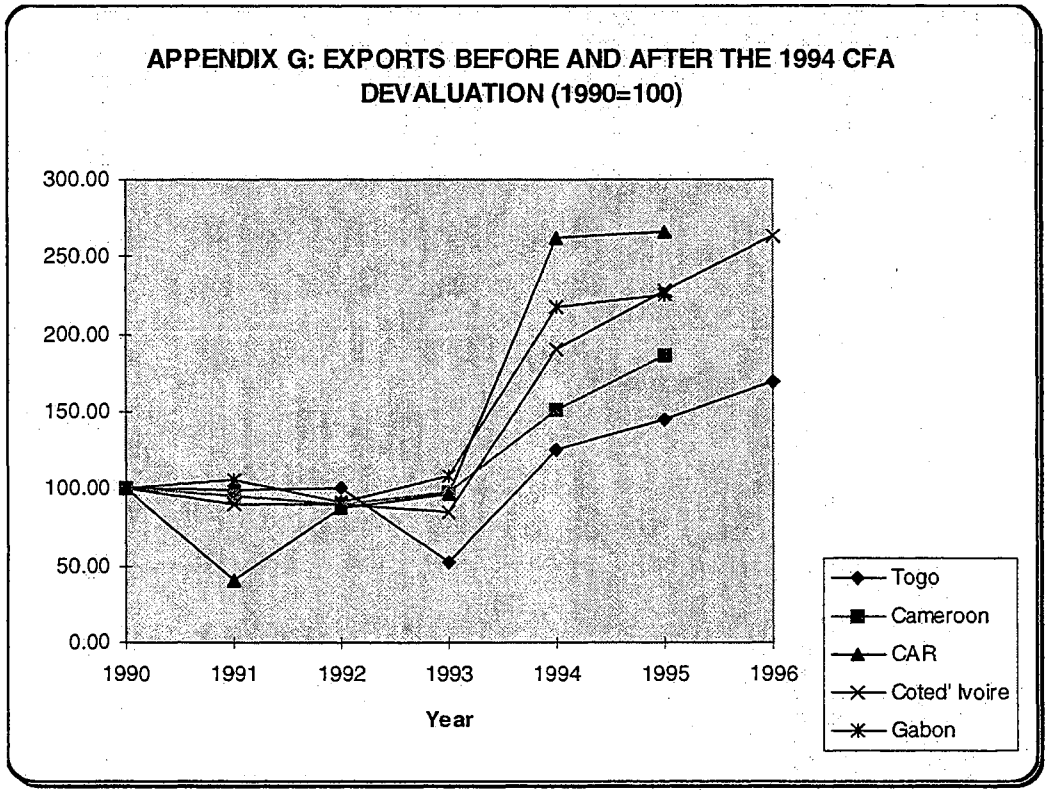
**APPENDIX E: REAL EFFECTIVE EXCHANGE RATES BEFORE AND AFTER THE 1994 CFA DEVALUATION (1990=100)**



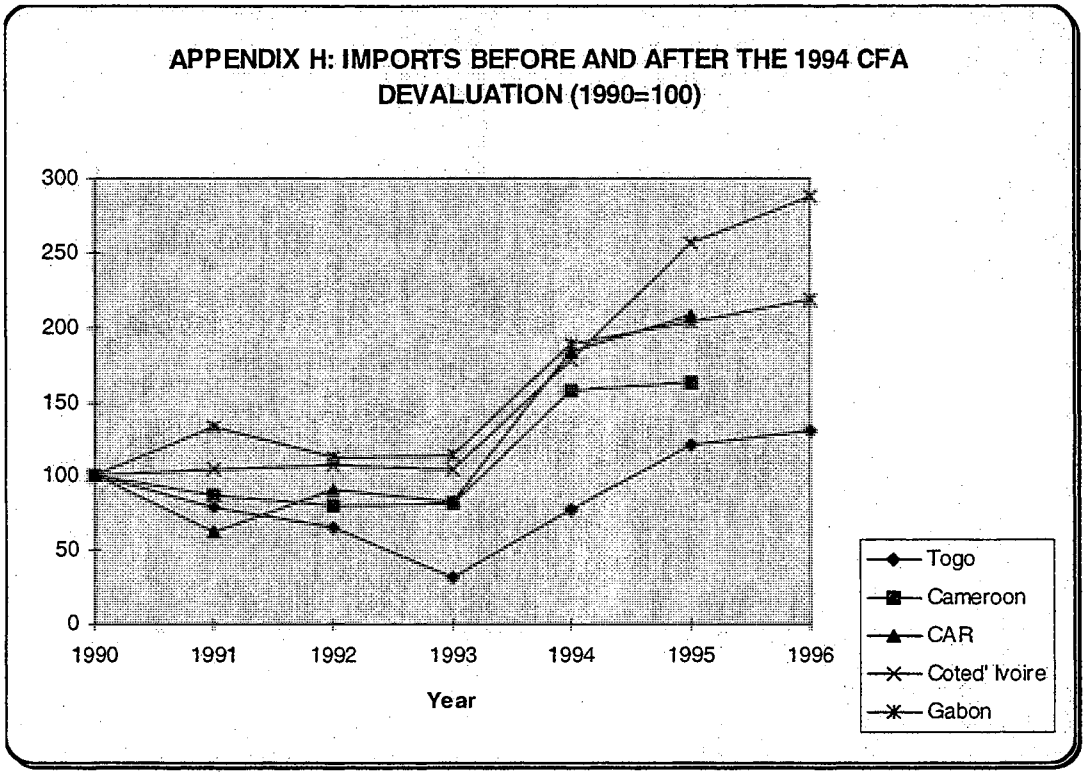

Note: An increase is a depreciation
Source: International Financial Statistics, September 1997.




Source: World Economic Outlook, October 1997

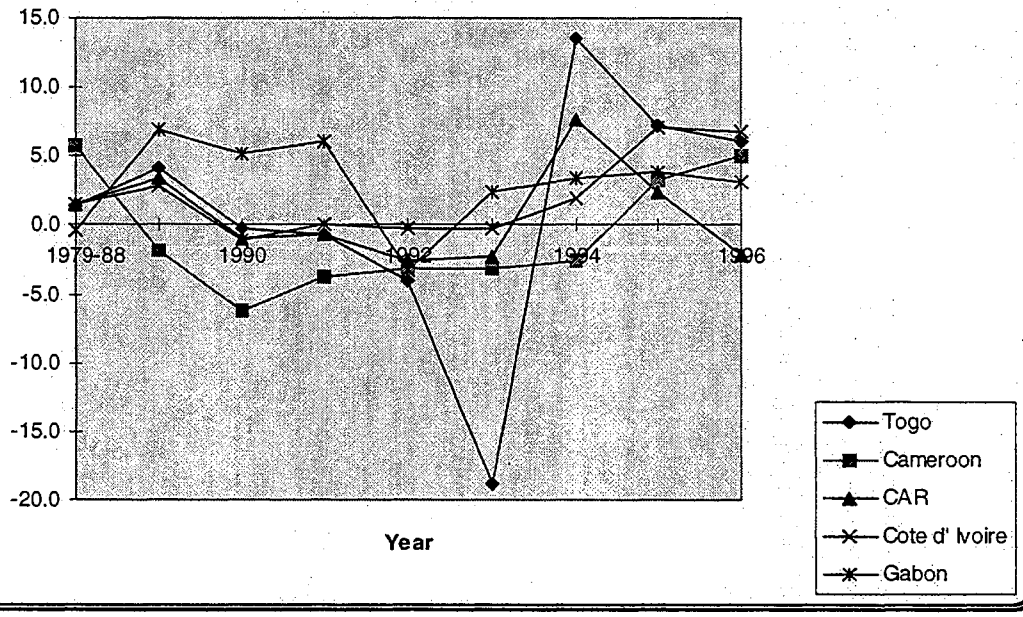



Source: International Financial Statistics, September 1997




Source: International Financial Statistics, September 1997

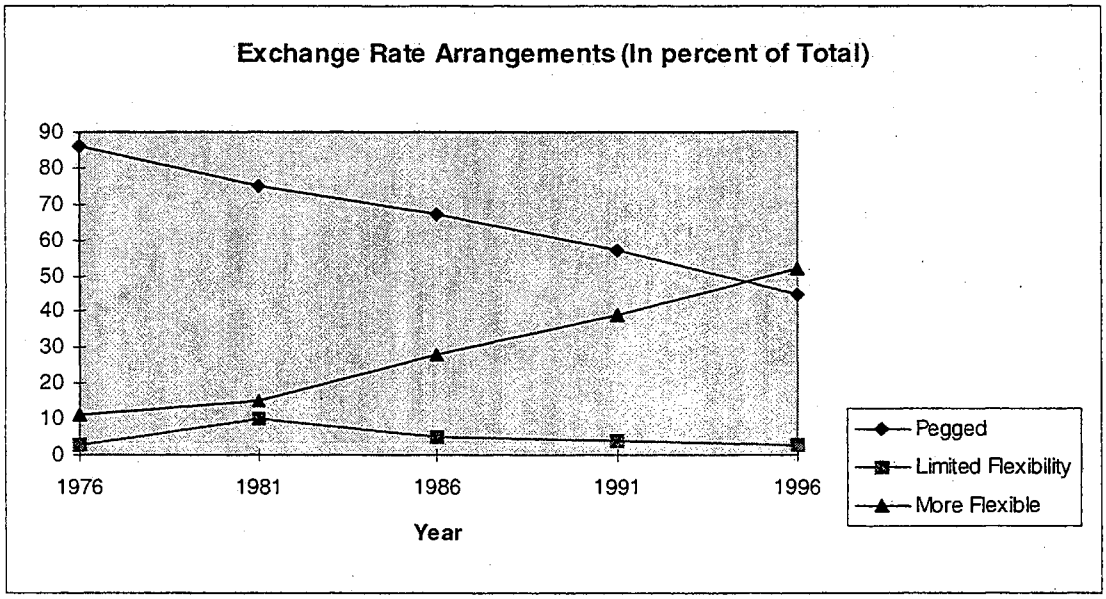
**APPENDIX I: REAL GDP GROWTH BEFORE AND AFTER THE 1994 CFA DEVALUATION (Annual percent change)**




Source: World Economic Outlook, October 1997

APPENDIX J: DEVELOPING COUNTRIES: OFFICIALLY REPORTED EXCHANGE RATE ARRANGEMENTS[1] (In percent of Total)

| | 1976 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|
| Pegged | 86 | 75 | 67 | 57 | 45 |
| U.S. dollar | 42 | 32 | 25 | 19 | 15 |
| French Franc | 13 | 12 | 11 | 11 | 11 |
| Other | 7 | 4 | 4 | 3 | 4 |
| SDR | 12 | 13 | 8 | 5 | 2 |
| Composite | 12 | 14 | 18 | 20 | 14 |
| Limited Flexibility | 3 | 10 | 5 | 4 | 3 |
| Single | 3 | 10 | 5 | 4 | 3 |
| Cooperative | - | - | - | - | - |
| More Flexible | 11 | 15 | 28 | 39 | 52 |
| Set to indicators | 6 | 3 | 4 | 4 | 2 |
| Managed floating | 4 | 9 | 13 | 16 | 21 |
| Independently floating | 1 | 4 | 11 | 19 | 29 |
| Number of countries | 100 | 113 | 119 | 123 | 123 |




1. Based on end-of-year classification.
Source. World Economic Outlook, October 1997

# VITA

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Candidate for the Degree of

Doctor of Philosophy

Thesis: NOMINAL DEVALUATION AND INTERNATIONAL COMPETITIVENESS: THE CASE OF THE CFA ZONE

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