A Comparative Analysis of the Effect of Exchange Rate Volatility on Exports in the CFA and Non-CFA Countries of Africa

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ABSTRACT Exchange rates have been highly volatile in Africa especially since the move to a floating exchange rate system with negative repercussions for trade, investment and growth. The paper empirically compares the effect of exchange rate volatility on the exports of the panel of Communaute Financiere Africaine (CFA) countries with that of the non-CFA counterparts during the period 1986-2006. Exchange rate volatility series were generated utilizing the GARCH model. These series were then incorporated into an export equation and estimated using the OLS, fixed effect, first difference GMM and systems GMM equation techniques. The results reveal that the system GMM technique performed better than the other estimation techniques. Exchange rate volatility was found to negatively impinge on the exports of both panels of countries. However, exchange rate volatility has a larger effect on the panel of the non-CFA countries than on the CFA. The paper concludes on the need to take appropriate monetary and fiscal policy actions to stem the rising exchange rate volatility.

I. INTRODUCTION

A major concern of policy makers at the demise of the Bretton Wood system is the consequence of exchange rate volatility perceived to be a prominent feature of a flexible exchange rate system. The premise is that exchange rate volatility makes firms to add risk premium to the cost of traded goods leading to higher prices and lower external trade. This has important implications for trade and growth prospects of countries. Exchange rate volatility is at the core of the raging debate on the performance of exchange rate regimes. This concern was reinforced by the large movements in nominal exchange rates that characterized world financial markets since the move to a managed floating exchange rate system in 1973. These movements were accompanied by large swings in real exchange rates. Further, exchange rate volatility was substantially much higher than the early advocates of floating had expected (Hassan and Wallace 1996; Bailey and Tavlas 1988). Thus, the

debate on the optimal management of exchange rates attracted renewed attention. It was fuelled by the observation of a possible link between increased volatility and the observed decline in the export growth.

Most African countries adopted economic reform programmes in the 1980s, with exchange rate liberalization as a major component. Exchange rates in Africa have been highly volatile since the adoption of the flexible exchange rate system. Exchange rate volatility ranged between 0.04% and 150% in 1973 and 2006 respectively, and an average of 95% in 1973-2006. Correspondingly, exports growth in Africa declined from an annual average of 13.35% in 1970-79 to 4.26% in 1990-2006. The perceived correspondence between exchange rate volatility and exports raise the important question of the effect of exchange rate volatility on exports.

This study empirically compares the effect of exchange rate volatility on the exports of the non-CFA countries with that of the CFA. It is motivated by the theoretical and empirical inconclusiveness of the effects of exchange rate volatility on exports. Further, empirical evidence on the effect of exchange rate volatility on trade flows in Africa is very sparse. There exist only two panel data studies in this connection (Ghura and Greenes 1993; Sekkat and Varoudakis 2000). However,

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these studies are limited by the period of observation employed and the risk measures adopted. Besides, they touch tangentially on exchange rate volatility. Moreover, previous studies employed pooled data of both fixed and flexible exchange rate periods. The use of such non-homogenous samples may unduly bias the results (see De Grauwe 1988; Himarios 1989; Arize and Walker 1992; McNown and Wallace 1992). It is our hope that this study will add to the scanty literature on the effects of exchange rate volatility on the exports of African countries by utilizing a more robust data base.

The knowledge of the degree to which exchange rate volatility affects trade is important for the design of both exchange rate and trade policies. For instance, if exchange rate volatility leads to a reduction in exports, trade adjustment programmes that emphasized export expansion could be unsuccessful if exchange rate is volatile. In addition, the intended effect of a trade liberalization policy may be doomed by a variable exchange rate and could precipitate a balance of payments crisis (Arize 1998; Arize et al. 2000). Thus, the results of this study provide a valuable piece of evidence informing the ongoing debate and the evaluation of policy options.

The rest of the paper is organized as follows. Section II examines the trade performance of Africa, the CFA and non-CFA countries. This is followed by the review of relevant literature in section III. The theoretical framework and model are presented in section IV while section V reports the discussions on the analysis of the data obtained. The paper concludes in section VI.

II. TRADE PERFORMANCE

Africa's share in world trade has been declining, falling from an annual average of 4.5% in the period 1970-79 to 1.8% in 2000-2006 as shown in table 1. Comparatively, the relative shares of Asia and other developing countries

have been on the increase. Africa has been described as being marginalized in world trade. Typically, this marginalization manifests in the region's exports and imports. The share of Africa's export in world export which was on the average 3.4% in 1970-2006 was the lowest regional contribution to world export. Indeed, Africa's share is substantially less than the combined share of developing countries that stood at 32.2% during the period.

Africa's share in world export consistently declined from an annual average of 5.29% in 1970-79 to 3.24% and 1.98% in the 1980s and 1990s, respectively; and in 2000-2006, it further declined to 1.92%. This is in contrast to Asia's share that has consistently been on the increase, rising from a mean annual share of 6.64% in 1970-79 to 19.81% in 2000-2006. If Africa had maintained its 1970s share of world exports, its total exports would now have been $65 billion higher than current levels. The extensive erosion of Africa's market shares in Organization of Economic Cooperation and Development countries contributed to this decline as the region's traditional exports were displaced by similar goods from competing suppliers. Market share losses for 30 of Africa's largest exports have been estimated to have reduced annual export earnings by about $11 billion in current dollars. These competitive losses, and the fact that global demand was generally below average for the types of goods African countries produced, reduced the growth rates for their exports well below that for world trade.

Related evidence showing growth rates for exports from Africa and other regions of the world is presented in table 2. Although there was a general drop in growth rates in exports in most regions in the 1980s, the decline in Africa's export was very massive, falling from 13.4% in the 1970s to only 1.31% in the 1980s. Africa's export growth rates are lower than those of other regions of the world, including the world's average.

Table 1: Africa's share in world trade (%)

Period	Share in world exports				Share in world trade			
	Africa	Asia	Developing	Industrial	Africa	Asia	Developing	Industrial
1970-06	3.36	12.26	32.18	67.82	3.09	12.32	31.37	68.63
1970-79	5.29	6.64	31.43	68.57	4.55	7.02	29.70	70.30
1980-89	3.24	10.88	31.92	68.08	3.17	10.97	31.14	68.86
1990-99	1.98	17.01	31.65	68.35	1.95	16.96	31.92	68.08
2000-06	1.92	19.81	37.26	62.74	1.79	18.95	35.83	64.17

Source: Computed employing International Monetary Fund, International Financial Statistics data

Table 2: Growth in Africa's exports (%)

Period	Export growth				
	Africa	Asia	Deve-loping	Indus-trial	World
1970-06	6.66	15.27	11.84	10.01	10.55
1970-79	13.35	25.88	23.48	19.47	20.62
1980-89	1.31	12.84	5.53	7.45	6.77
1990-99	4.26	10.20	8.00	5.98	6.59
2000-06	10.97	10.16	11.03	5.22	7.23

Source: Computed employing International Monetary Fund, International Financial Statistics data

Several explanations have been provided for the poor performance of Africa's exports. A major one is that Africa has been and remains the most heavily primary commodity-dependent region in the world (Oyejide 2004). It has also been attributed, in part, to the overvaluation of the exchange rate (Ndulu et al. 1995). Overvaluation of the exchange rates of the various countries made their exports very expensive and therefore, non-competitive in the international market. This had adverse impact on exports.

In general, African countries can be classified into two major groups based on their exchange rate policies – the Franc zone and the non-CFA zone. The African members of the Franc Zone share a common currency, the CFA franc, that is fixed to—and convertible with—the euro through special monetary arrangements with France. On the other hand, the non-CFA countries have adopted a variable exchange rate policy. These economic arrangements could affect the trade performance of the countries involved.

Overall, there appears to be no substantial difference in the average performance of trade in the CFA and non-CFA countries from 1970 to 2006. For instance, the average shares of trade in GDP for this period were 52% for CFA and 51% for non-CFA (see Table 3). However, trade as share

Table 3: CFA and non-CFA Countries Share of Trade in GDP (%)

Period	Export share		Trade share	
	CFA	Non-CFA	CFA	Non-CFA
1970-05	27.37	18.92	52.05	50.94
1970-79	20.98	19.81	40.28	49.48
1980-89	23.01	17.95	46.52	50.64
1990-99	28.83	18.81	53.19	52.09
2000-05	36.18	12.07	60.45	28.02

Source: Computed employing International Monetary Fund, International Financial Statistics data

of GDP was higher in the non-CFA countries during the 1970s and 1980s. It is only in recent years (1990s and 2000-2006) that trade share has been relatively higher in the CFA. Another disparity is the consistent increase in the trade share of the CFA countries. The annual average trade share rose from 40% in the 1970s to 60% in the period 2000-2006. Comparatively, the trade share of the non-CFA countries has been vacillating, rising from an annual average of 49% in the 1970s to 52% in the 1990s and declining to 28% in the 2000-2006.

A remarkable difference exists in the behaviour of the real exchange rates in the CFA and non-CFA countries. Real exchange rates in the CFA countries generally follow a discernible pattern unlike in the non-CFA countries. In the CFA countries, real exchange rates appreciated during the 1988-94 period but depreciated after the devaluation in 1994. This trend was sustained until 1996 after which the real exchange rates in the CFA countries began to appreciate. A few countries in this group however experienced depreciation in the real exchange rates after 2000. Also, the real exchange rates of the countries in the CFA do converge especially after the 1994 devaluation unlike those of the non-CFA countries.

III. REVIEW OF RELATED LITERATURE

Broadly, speaking, studies on the effect of exchange rate volatility can be distinguished in terms of measures of risks and technique of analysis adopted. A review of the various measures of risk is in Cote (1994).

The literature is replete with a number of measurements of exchange rate volatility. The use of the standard deviation of the percentage change of the exchange rate and the standard deviation of the first differences of the logarithmic exchange rate was popularized by Kenen and Rodrik (1986). An alternative variable that has been used is the standard deviation of the level of the nominal exchange rate. This measure relies on the underlying assumption that the exchange rate moves around a constant level. In the presence of a trend, this index would probably overestimate exchange rate uncertainty (see also Akhtar and Hilton 1984; Hooper and Kohlhagen 1978). The average absolute difference between the previous forward rate and the current spot considered to be the best indicator of exchange

rate risk is yet another measure proposed and used by Peree and Steinherr (1989). The most recent is the GARCH approach which takes into account information on the stochastic process by which exchange rates are generated but ignored by previous approaches (see Engle 1982; Bollerslev 1986; Bollerslev et al. 1992; Bollerslev et al. 1994).

The literature is saturated with studies on the effect of exchange rate volatility on exports of developed countries. The findings of these studies have however been conflicting. For instance, Hooper and Kohlhagen (1978), Gotur (1985), Asseery and Peel (1991), among others, do not find support for the negative impact of exchange rate volatility on trade. On the other hand, Akhtar and Hilton (1984a), Kenen and Rodrik (1986), Arize (1997) Dell'Ariccia (1999) and Doroodian (1999) reported adverse effect of exchange rate volatility on trade.

For Africa, similar studies are very sparse. Savvides (1992) decomposed exchange rate volatility into its anticipated and unanticipated components and tested the hypothesis that only the unanticipated component significantly affects trade flows. The study conducted for sixty-two industrial and developing economies covering the period 1973-1986 found that unanticipated exchange rate volatility inhibited the growth of exports of the developing countries.

Panel data approach was employed by Ghura and Greenes (1993) in exploring the effect of exchange rate volatility on the trade flows of sub-Saharan Africa countries. Gauging exchange rate volatility by the coefficient of variation and utilizing data covering the period 1972-1987, the study found that exchange rate volatility had a significantly negative and robust impact on trade flows. The study however, focused exclusively on the fixed exchange rate era and therefore did not investigate the likely impact of increased volatility during the flexible exchange rate period on trade flows.

An assessment of the impact of exchange-rate policy on disaggregated manufactured exports in Sub-Saharan Africa over the period 1970-1992 was undertaken by Sekkat and Varoudakis (2000) using standard econometrics techniques. It found that exchange rate volatility had significant negative effect on textile and chemical exports of non-CFA countries but insignificant positive effect on those of CFA countries. The utility of the study is however limited by its utilization of pooled data of both fixed and flexible exchange rate periods. The use of such non-homogenous data could introduce bias into results obtained. This study extends Sekkat and Vavoudakis (2000) by using a homogeneous data set. Furthermore, the link between the imports and exports of African countries are incorporated in this study.

An error correction approach was employed by Callabero and Corbo (1989) in investigating the effect of real exchange rate uncertainty on exports for six developing countries (Chile, Colombia, Peru, Philippines, Thailand and Turkey) and found that real exchange rate uncertainty did reduce exports in the short-run and the results were substantially magnified in the long-run. The cointegration technique was adopted by Samanta (1998) in examining the implications of exchange rate volatility for India's export. The results showed that over the period, 1953-1989, exchange rate risk had a significant adverse impact on exports. The results are similar to those obtained by Hassan and Tufte (1998) for Bangladeshi's aggregate exports over the period 1977 to 1992.

Hondroyiannis et al. (2006) investigated the relationship between exchange rate volatility and aggregate export volumes for twelve industrial countries, using the GMM and random coefficient (RC) estimation techniques. The study found no negative and significant relationship between exchange rate volatility and trade. On the other hand, Tenreyro (2007) and Arize (2008) found negative relationship between exchange rate volatility and exports in new emerging countries.

Following de Vita and Abbott (2004), Todani and Munyama (2005) used the ARDL bounds testing procedures to analyse the impact of short-term fluctuations/volatility in exchange rates on South African export flows covering the period 1984-2004. The study revealed that there exists no statistically significant relationship between South African export flows and exchange rate volatility or when a significant relationship exists, it is positive.

Chit et al. (2008) examined the impact of bilateral real exchange rate volatility on real exports of five emerging East Asian countries by employing a generalised gravity model that combines a long-run demand model with gravity type variables. The study found strong evidence that exchange rate volatility has a negative impact on the exports of emerging East Asian countries.

IV. THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

4.1 Theoretical Frame

The model by Clark (1973) is one of the earliest theories that examine the connection between exchange rate volatility and trade flows. It considers a competitive firm with no market power producing only one commodity which is sold entirely to one foreign market and does not import any intermediate inputs. The firm is paid in foreign currency and converts the proceeds of its exports at the current exchange rate, which varies in an unpredictable fashion, as there are assumed to be no hedging possibilities, such as through forward sales of the foreign currency export sales. Moreover, because of costs in adjusting the scale of production, the firm makes its production decision in advance of the realization of the exchange rate and therefore cannot alter its output in response to favourable or unfavourable shifts in the profitability of its exports arising from movements in the exchange rate. In this situation, the variability in the firm's profits arises solely from the exchange rate, and where the managers of the firm are adversely affected by risk, greater volatility in the exchange rate – with no change in its average level leads to a reduction in output, and hence in exports, in order to reduce the exposure to risk. This basic model was elaborated by Hooper and Kohlhagen (1978) who also reached the same conclusion of a clear negative relationship between exchange rate volatility and the level of trade.

The strong conclusion of a negative effect of exchange rate volatility on trade flows by earliest studies was based on a number of simplifying assumptions. First, it is assumed that there are no hedging possibilities either through the forward exchange market or through offsetting transactions.

One reason why trade may be adversely affected by exchange rate volatility stems from the assumption that firms cannot alter factor inputs in order to adjust optimally to take account of movements in exchange rates. When this assumption is relaxed and firms can adjust one or more factors of production in response to movements in exchange rates, increased volatility can in fact create profit opportunities. This situation has been analyzed by Canzoneri et al. (1984) and Gros (1987), for example. The effect of such volatility depends on the interaction of two forces at work. On the one hand, if the firm can adjust inputs to both high and low prices, its expected or average profits will be larger with greater exchange rate volatility, as it will sell more when the price is high, and vice versa. On the other hand, to the extent that there is risk aversion, the higher variance of profits has an adverse effect on the firm and constitutes a disincentive to produce and to export. If risk aversion is relatively low, the positive effect of greater price volatility on expected profits outweighs the negative impact of the higher volatility of profits, and the firm will raise the average capital stock and the level of output and exports.

Some authors have developed theoretical models in the context of the forward exchange market. For example, Barkoulas et al. (2002) developed a model in which exchange rate volatility had positive effect on exports. But the effect is adverse when the assumption of the existence of the forward exchange market is relaxed.

4.2 Model Specification

The export supply equation is a modified version of the standard "two-country" models of trade (see, for example, Dornbusch 1980) where the change in demand for a country's exports depends positively on the change in real foreign income and negatively on (foreign) relative prices. It takes into consideration the peculiarities of African countries where import is an important determinant of exports. Within the context of African countries where industrial and other production activities relies heavily on imported inputs, imports constitute a serious constraint on exports (see Khan and Knight 1988; Gyimah-Brempong and Gyapong 1993). The estimated export equation is as follows:

$$x = \delta_0 + \delta_1 y^* + \delta_2 V + \delta_3 m + \delta_4 rer + \omega$$

$$(\delta_1, \delta_3, \delta_4 > 0; \delta_2 < 0) \quad ....(1)$$

where x is export, y* is foreign income, V is exchange rate volatility, m and rer are imports and real exchange rate respectively. Theoretically, the income of foreign trading partners positively influences exports. Most empirical work treats exchange-rate volatility as a risk. The impact of exchange rate volatility on trade flows is negative within the context of African countries where forward exchange markets are non-existent.

Imports enhance the production and export capacities of African countries and therefore should stimulate exports. Real exchange rate movements are negatively correlated to real exports. An increase in the real exchange rate means a real depreciation of the domestic currency, which makes exportable items cheaper and therefore boosts demand of foreign trading partners. If the real exchange rate appreciates, the reverse is likely to occur. Exchange rate volatility is measured using the GARCH model

4.2.1 Estimation Procedure: Estimating equation (1) using cross-country time-series data raises some methodological challenges. A chief one is that there is likely to be correlation between the country specific disturbances and the determinants. Another problem emanates from the possibility of the determinants being jointly determined with exports. Tackling these challenges involves differencing the equation to remove the time-variant disturbance. Instrumental variables will have to be used to correct for the endogeneity. However, this procedure has many drawbacks that can be overcome by constructing an alternative GMM estimator that combines the level and first difference specifications, using lagged levels of the variables as instruments for the first difference specification.

The analysis is conducted for panels of non-CFA and CFA. The non-CFA panel consists of Ghana, Lesotho, Malawi, Nigeria, South Africa Sierra Leone, Uganda and Zambia while Burundi, Cameroon, Central African Republic, Cote D'ivoire, Equatorial Guinea, Gabon and Togo are in the CFA panel. There are numerous advantages of using panel data (see Theil 1954; Baltagi 1995; Hsiao 1996; Aboagye and Gunjal 2000; and Ho 2001). These include increased number of observations, increased range of variation of the variables in the model, thereby allowing for more precise estimates and reduced multicollinearity among explanatory variables. In addition, the use of panel data makes it possible to differentiate between economies of scale and technical change as well as providing the potential to study dynamic effects. Thus, the use of panel data in this study made possible valid inferences beyond what can be done using only individual country case study data.

But as a prelude to the estimation of the effects of exchange rate volatility on exports, the GARCH approach is adopted in generating the exchange rate volatility series.

4.2.2 Sources of Data: Pooled time series data were collected for 1986-2006 covering the flexible exchange rate period. They are derived from international sources. Export, import, domestic Gross Domestic Product and those of the foreign partners, terms of trade are derived from the World Bank *African Database 2006 CD* and supplemented by the World Bank *World Development Indicators 2006 CD*; exchange rates and money supply are obtained from the International Monetary Fund *International Financial Statistics 2006 CD*; the Economic Intelligence Unit (EIU) also provide pertinent country specific data.

V. RESULTS AND DISCUSSIONS

The results of the pooled estimates of the basic model are presented in table 4. The first column reports OLS estimates, which ignore the potential endogeneity of the regressors as well as the possible presence of country-specific effects. The coefficients are in general very small and concur with theoretical expectations. The signs of the coefficients on the standard export determinants appear reasonable. Imports induce exports in both the CFA and non-CFA panels. The income of foreign trading partners also stimulates exports in both panels. The positive association is found between the real exchange rate and exports. This implies that increases in the real exchange rate (that is, a depreciation of the exchange rate) induce exports by making the commodities internationally cheaper. Exchange rate volatility has an adverse effect on exports in both panels. However, import is found to significantly explain exports in both panels.

The second column reports fixed-effect estimates. In short panels, fixed-effect estimates are considered inconsistent. Nevertheless, the results are presented. The results appear generally better than those of the OLS. A number of the coefficients which were insignificant under the OLS such as real exchange rate and foreign income were significant.

The third and fourth columns of table 4 report the difference and system GMM estimates respectively, that attempt to correct for both endogeneity and unobserved country-specific effects. The regressions assume that all the explanatory variables are endogenous, and consequences all instrumented. The lagged values of the variables were used as instruments.

Table 4: Pooled estimates of export equation

Equation estimation method	Non-CFA				CFA			
	1 OLS	2 Fixed effects	3 First difference GMM	4 System GMM	1 OLS	2 Fixed effects	3 First difference GMM	4 System GMM
Constant	0.002 (1.353)	-0.020 (1.453)	0.092 (1.123)	-1.231** (2.434)	0.011 (1.453)	-0.017 (1.243)	0.231 (1.313)	-1.962** (2.434)
Exchange rate volatility	-0.022 (0.238)	-0.008 (1.441)	-0.034 (1.468)	-0.152*** (6.307)	-0.012 (0.248)	-0.003 (1.342)	-0.005 (1.268)	-0.090** (2.435)
Imports	0.002* (1.805)	0.028** (2.145)	0.349** (2.134)	0.582*** (5.651)	0.022* (1.855)	0.045** (2.215)	0.349** (2.124)	0.966*** (14.179)
Real exchange rate	0.037 (1.256)	0.422** (2.210)	0.152** (2.297)	0.350*** (6.023)	0.032 (1.326)	0.227** (2.350)	0.322** (2.287)	0.414*** (3.173)
Foreign income	0.127 (1.376)	0.245** (2.523)	0.180 (1.355)	0.798*** (11.789)	0.437 (1.456)	0.235** (2.213)	0.190 (1.295)	0.100* (1.998)
Wald test of joint significance(p-value)	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Time effects (p-value)	0.001	0.001	0.005	0.000	0.001	0.001	0.002	0.000
Sargan test (p-value)	-	-	0.322	0.642	-	-	0.433	0.732
1st-order autocorrelation (p-value)	-	-	0.008	0.003	-	-	0.004	0.002
2nd-order autocorrelation (p-value)	-	-	0.152	0.196	-	-	0.132	0.168

Notes: One (*), two (**) and three (***) stars denote statistical significance at the 10, 5 and 1 percent level respectively. The figures in parentheses are t-statistics.

The difference-GMM estimates in column 3 show a trend mostly similar to column 2 except that the magnitudes in the former are larger. Precision is poor and only imports and the real exchange rate are significant.

Unlike the estimates in columns 2 and 3, which utilized only the time-series dimension of the data, the system-GMM estimates in column 4 exploit the cross-section dimension as well. On the whole, the system estimates are quite precise. The focus of discussion therefore is column 4.

The results of the estimated export equation contained in column 4 of table 4 show that all the coefficients are appropriately signed. Foreign income has a positively significant effect on exports of the Non-CFA and CFA countries, suggesting that increases in the income of the major trading partners will induce exports from the sub-regions. The results show the positively significant linkage between exports and imports in both panels. This conjectures that within the context of African countries, imports are an important constraining factor on exports. The results show that the magnitude of the effect of imports on exports is relatively larger in the CFA panel. The real exchange rate positively affects exports, implying that an increase in the real exchange rate (which implies a depreciation of the domestic currency) will further enhance exports by making exports relatively cheaper in the international market. This could be suggestive of the fact that exchange rate depreciation that has virtually characterized reform programmes of African countries could be yielding intended results through its facilitation and promotion of exports. This indeed is a plus for exchange rate liberalization coupled with trade liberalization.

Exchange rate volatility has statistically significant negative effect on exports. This means that exchange rate volatility could indeed curtail the exports of both the CFA and non-CFA countries, with important repercussions for economic growth of the member countries. Though exchange rate volatility constrains exports in both panels, the magnitude of the effect is relatively larger in the non-CFA countries. This implies that the non-CFA countries are likely to respond more robustly by curtailing exports in response to increased exchange rate volatility than their CFA counterparts. A plausible reason for the relatively larger effect of exchange rate volatility on the exports of the non-CFA countries could be the diverse exchange rate and monetary

policies of the non-CFA countries that causes their exchange rates to be highly volatile unlike in the CFA where a common exchange rate and monetary policies are in place. This is attested to by the finding that exchange rate volatility in the panel of the non-CFA countries is almost twice that of the CFA countries.

The beta coefficients contained in table 5 show that imports and foreign income have relatively larger impact on exports in the non-CFA and CFA panels respectively. The least impact in both panels is from exchange rate volatility.

Table 5: Beta coefficients of the fixed effects models of exports of the Non-CFA and CFA countries

Variable	Non-CFA	CFA
Exchange rate volatility	-0.0047	-0.0519
Real exchange rate	0.0569	0.1516
Foreign income	0.0121	2.3695
Imports	1.1649	1.3775

Note:The beta coefficient of each of the explanatory variables is obtained simply by multiplying the estimated coefficient of the variable by its standard error and dividing the product by the standard deviation of the dependent variable..

VI. CONCLUSION

Exchange rate volatility has a statistically significant negative effect on the real exports, suggesting that risk-averse exporters will reduce their activities, switch sources of supply and demand or change prices in order to minimize their exposure to the effect of exchange risk. This, in turn, can alter the distribution of output across many sectors in the concerned countries. A major policy lesson of this finding is that trade policy actions aimed at stabilizing the export market are likely to generate uncertain results, at best, if policymakers ignore the stability, as well as the level, of the real exchange rate. Another implication is that trade adjustment programs in these countries that have mostly stressed the need for export expansion may lose their appeal to local policymakers in periods of high exchange-rate volatility. Also, the intended positive effect of a trade liberalization policy may not only be doomed by a variable exchange rate but could also precipitate a balance-of-payments crisis. The results also suggest that if policymakers wish to target exports, it is likely that policies which affect the level of economic activity should be very effective.

The adverse effect of exchange rate volatility on exports calls for policy actions to tackle rising exchange rate volatility. Monetary factors should be a major point of focus in this direction.

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