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Gwen Alexander '96

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Exchange Rate Variability and its Effect on Trade : a case study of the CFA Franc Zone

Abstract

Since the fall of the Bretton Woods agreement and the rise of a floating exchange rate regime there has been a marked increase in the volatility of exchange rates. The movement of exchange rates relative to other currencies, or exchange rate variability, is seen as a risk by importers and exporters. The uncertainty surrounding exchange rate movements affects importers and exporters who must determine domestic prices of traded goods without knowing how the exchange rate will move between the time an order is placed and the time payment is due. Theory supports that as exchange rate variability increases, international trade will fall, ceteris paribus.

Exchange Rate Variability and its Effect on Trade: a case study of the CFA Franc Zone

Gwen Alexander

I. INTRODUCTION¹

Since the fall of the Bretton Woods agreement and the rise of a floating exchange rate regime there has been a marked increase in the volatility of exchange rates. The movement of exchange rates relative to other currencies, or exchange rate variability, is seen as a risk by importers and exporters. The uncertainty surrounding exchange rate movements affects importers and exporters who must determine domestic prices of traded goods without knowing how the exchange rate will move between the time an order is placed and the time payment is due. Theory supports that as exchange rate variability increases, international trade will fall, *ceteris paribus*.

In the past, empirical studies of exchange rate variability and trade have not been very supportive of theory. Yeager (1976) found no significant relationship between exchange rate variability and international trade; yet, more recent studies have found coincidental results between the empirical modeling of exchange rate variability and its theory. Coes (1981) and Cushman (1983) find a significant negative effect on the level of trade for a number of cases.

This paper examines the effect of exchange rate variability on the level of imports of the countries of the CFA Franc Zone², a monetary union in Africa. Section II will discuss the history and structure governing the CFA Franc Zone members. I will present the theoretical basis for this study in section III, discuss the data and choice of variables in section IV, present the empirical model and results in section V, and make some concluding remarks in section VI.

II. THE CFA FRANC ZONE

The CFA Franc Zone is an interesting combination of a monetary union and a fixed exchange rate regime. The Zone was formed in 1948, when CFA stood for les Colonies Francais d'Afrique and served to ease administrative duties for France. When the colonies were granted independence from France in 1960, some countries opted to leave the Zone, but the acronym CFA is still used by the remaining countries. Today, the Zone consists of fourteen independent nations throughout Africa, each belonging to one of three central banks of the monetary union. Benin, Burkina Faso, Cote D'Ivoire, Mali, Niger, Senegal, and Togo belong to the Banque Centrale des Etats de l'Afrique de l'Ouest (BCEAO). Cameroon, Central African Republic, Chad, Congo, Equatorial Guinea and Gabon use the Banque des Etats de l'Afrique Centrale (BEAC). The fourteenth member of the Zone, the Comoros, uses the Central Bank of the Comoros.

As mentioned earlier, the Zone is actually made up of three central banks, each printing its own currency. These currencies, however, are referred to by the same name, the CFA franc (CFAF). Each version of the CFAF is pegged to the French franc (FF) at a parity of 50 CFAF to 1 FF. The parity can only be changed by unanimous agreement between France and the CFA member nations, and has only been changed once in its history³. France guarantees full convertibility of the CFAF to the FF, maintained through an operations account at the French Treasury (not the central bank of France), which is supported by special agreements between France and each central bank of the union. As witnessed through the

structure of the Zone, France still plays a vital role in the operations of these countries. This is especially true with regard to aid and balance of payments shortfalls--at which time, the operations account at the treasury acts "much like the resources of the IMF" (Medhora, 1992)⁴.

By observing the Zone's history, studies generally agree that member nations have derived definite gains from the union. Devarajan's 1987 paper points to faster economic growth within the CFA as compared to the rest of sub-Saharan Africa (SSA). Conway (1993) notes lower money creation and inflation in CFA nations than in other developing countries, Medhora (1990) finds that nominal exchange rate instability has not affected the Zone's imports, and Agenor (1994) defines the "credibility effect" through which pegging to a stable currency has proven the most beneficial asset to CFA members. However, the majority of the most recent studies have been less certain about the overall benefit of the Zone to its members. Assane and Pourgerami (1994), for example, found no difference in growth between the CFA and other SSA countries; Allechi (1994) found there to be more net losers than net gainers when looking at the partial reserves pooling used by CFA members.

"Real GDP growth rose above 8% in 1974, but fell below zero several times over the last decade."

Indeed, throughout the 1980s and 1990s, the Zone countries began to experience serious balance of payments problems, rising external debts, fiscal arrears, and general economic turmoil. For example, real GDP growth rose above 8% in 1974, but fell below zero several

times over the last decade. The total external debt among CFA members has skyrocketed from \$1 billion in 1970, to \$17 billion in 1980, and reached almost \$50 billion in 1993. Growth of per capita income has plummeted, with negative growth rates over most of the last decade. Figure 1 on the next page depicts the downturn (World Tables Database).

Some studies have alleged that France's change to a tighter monetary policy may have contributed to the economic downturn of the Zone. Both Allechi (1994) and van de Walle (1994) note France's increased efforts to keep French inflation at or below German inflation and the French franc in line with the Deutschmark beginning in 1983. The recent economic downturn can be attributed to several factors, but "in some sense, France's African partners are also paying the cost of her changing European and global ambitions" (van de Walle, 1994).

III. A THEORETICAL ANALYSIS OF THE VOLUME OF TRADE

Theory supports that exchange rate variability has an effect on trade. A complete model of trade must be developed in order to test this effect for the countries of the CFA Franc Zone. This section will set forth the determinants of the volume of international trade, including a full discussion of exchange rate variability.

A. Exchange Rate Variability

1. Variability and Risk

Exchange rate variability is simply the volatility of one nation's currency value relative to other currencies. This volatility causes exchange rate risk for importers and exporters in both countries whenever a future payment must be made or received in a foreign currency, since merchants cannot tell in which direction or with what magnitude exchange rates will move over time. Flexible exchange

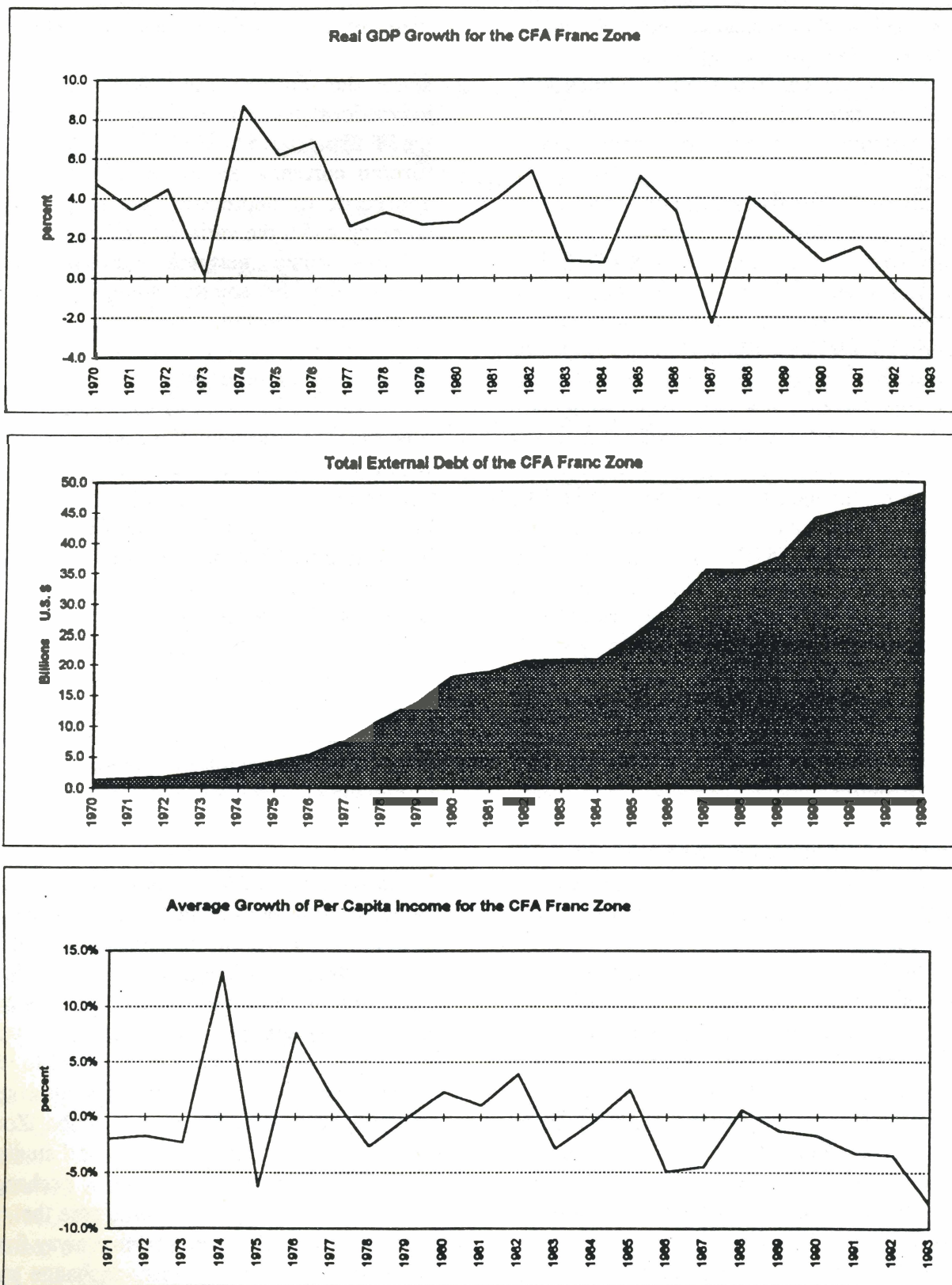


Figure 1: External Debt and Growth in the CFA Franc Zone

rates are laden with uncertainty which reduces the volume of international trade (Salvatore, 1995). Consequently, trade theory suggests that if merchants are risk averse, an increase in exchange rate variability means a decrease in the volume of international trade, *ceteris paribus*.

Exchange rate risk affects trade by forcing higher costs upon the merchants involved. This extra cost associated with the volatility, or "risk premium," can take on one of two forms. By hedging in forward markets, an importer takes out a loan in the currency of the transaction at the present spot rate and deposits that sum in a bank until the payment is due. The risk premium, in this case, is the positive difference between the interest he has to pay on his loan and the lower interest he earns on the bank deposit. Though there is a cost to this method, the importer avoids the possibility that the spot rate will rise between the present and the time the payment is due (Salvatore, 1995). The other means by which a risk premium is realized is by taking a loss. In this case, the importer takes a chance by not hedging and loses if the spot rate rises before payment is due. There is a possibility to gain by not hedging, but if we assume risk-averse merchants, there is still a premium for the gamble. In either case, the risk premium is positive and the volume of trade will be negatively affected by exchange rate instability.

2. The Currency Peg and its Relationship to Exchange Rate Variability

If one nation's currency is fixed relative to that of its trading partners, there should be no exchange rate variability. Trade should not be adversely affected, but rather encouraged since trade would occur without exchange rate risk. This is the case when discussing trade among CFA member nations as well as their trade with France. The common currency among the member states of the Zone and the fixed parity with France facilitate trade between these nations because there is no variability⁵.

However, trade between the CFA and non-member countries (other than France) will be adversely affected by exchange rate variability since the French franc floats freely on international markets. It is easy to see that, as the FF appreciates or depreciates relative to a foreign currency, so too would the CFAF appreciate or depreciate against that same currency, and if the variability of the FF to the CFA's trading partners increases, trade between the CFA and its trading partners will be adversely affected.

3. Trade Diversification

In the earlier years of the Franc Zone's existence, the majority of the Zone's trade was with France, obviously as a result of colonial heritage. Even in the mid-1960's, trade with France was nearly 50% of the Zone's trade. But since then, trade has diversified away from France. By the mid-1980's, 30% of the Zone's trade was with France, with much of the trade shifting to other European countries⁶ (Boughton, 1992). The graph below shows that as trade has diversified away from France, the rest of the Europe has absorbed a large part of that trade. Collectively, the European Economic Community (EEC) accounts for a majority of the Zone's trade, as shown in Figure 2.

Even Europe's total share in the Zone's trade has fallen. One can theoretically conclude that, as trade shifts to countries whose bilateral exchange rates with the CFA are more volatile than those of France and European countries, increased trade with countries that the Zone is not pegged to will increase exchange rate variability, inversely affecting the volume of trade for Zone members, *ceteris paribus*. Empirical studies, such as Medhora's 1990 study of exchange rate variability in the Franc Zone, note that, as the CFA's trade diversifies further away from the Franc Zone and France, exchange rate variability will rise. Medhora predicts that the continued rise in exchange rate variability will

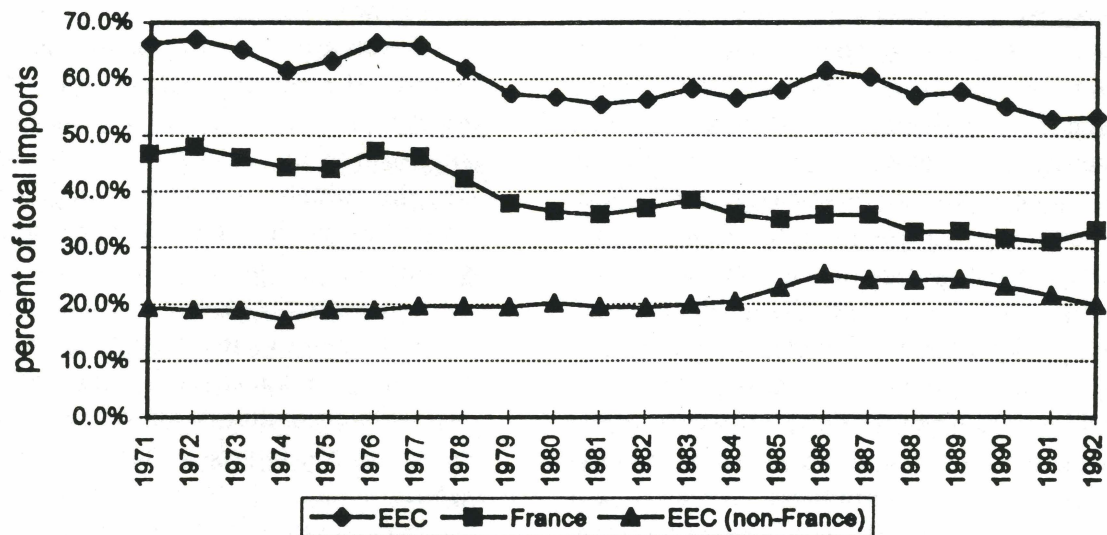


Figure 2: Imports From the EEC and France

make variability a more significant determinant of trade in the future.

B. National Income Level

Even the most basic trade model includes some measure of national income as a determinant of trade. An increase in a country's level of income will increase the possibility that it can import. The change in imports associated with a change in income level is the marginal propensity to import, or MPM. If a country's MPM is assumed to be positive (non-zero), then as income levels rise, so should the level of imports (Salvatore, 1995). A nation's level of exports will depend on the national income levels and the MPM's of its trading partners (Salvatore, 1995).

C. Trade and Aid

Countries give aid for several reasons, the most prominent being national security interest, economic self-interest, and altruism. (Noel, 1995). The economic self-interest of donor countries can make imports depend on aid. "Tying" aid, the practice where receipt of aid is contingent upon purchases of goods and services from the donor country, will have an

effect on the import levels of the recipient. Assume a CFA country, Benin, is offered aid which is tied, from a donor country, such as France. Tied aid would require that Benin purchase certain goods, such as agricultural machinery or capital equipment from France. In this case, Benin's imports increase due to an offer of tied aid. Studies have found that 78% of aid from the Netherlands was tied during 1972-76, at least 80% of German aid was tied (no time period given), and 74% of aid from the United Kingdom was tied in 1984 (White, 1994).

D. Currency Valuation

If the CFAF is away from its equilibrium exchange rate, or misaligned, trade will be affected. The level of misalignment can be measured by using Purchasing Power Parity (PPP) theory, which states that the domestic price level, P , is equal to the foreign price level, P^* , multiplied by the equilibrium nominal exchange rate, e (e is measured as domestic currency / foreign currency). Expressed otherwise: $P = eP^*$. When PPP holds, $e(P^*/P) = 1$, and the exchange rate adjusts in reaction to differences in

international price levels. The change in the exchange rate serves to keep purchasing power of the currency equal between countries. (Salvatore, 1995). For countries with a fixed exchange rate, when foreign and domestic price levels diverge, the exchange rate cannot adjust to equalize relative prices. This causes a misaligned real exchange rate.

If domestic price levels rise more than foreign price levels and the exchange rate cannot adjust to the differences in price level, then $e(P^*/P) < 1$, and the domestic currency is considered to be overvalued. If a currency is overvalued, the country's exports are less competitive on international markets and exports will tend to fall while imports will rise. If the currency is undervalued, or $e(P^*/P) > 1$, the country's exports are more competitive, and exports will rise while imports will fall (Gillis, 1992). In either case, the level of a nation's exchange rate will affect its level of exports and imports.

IV. DERIVATION OF THE EMPIRICAL MODEL

Now that the theoretical determinants of the volume of international trade have been identified, an empirical basis for the study can be formulated. This section outlines a quantitative means to define each variable of the model.

A. Optimal Model for Trade

The empirical model driven by the theory of the previous section is:

$$\begin{array}{l} \text{Volume} \\ \text{of} \\ \text{Imports} \end{array} = \alpha_1 + \alpha_2 \begin{array}{l} \text{Exchange} \\ \text{Rate} \\ \text{Variability} \end{array} + \alpha_3 \begin{array}{l} \text{National} \\ \text{Income} \\ \text{Level} \end{array} + \alpha_4 \begin{array}{l} \text{Tied} \\ \text{Aid} \end{array} + \alpha_5 \begin{array}{l} \text{Currency} \\ \text{Valuation} \end{array} + u$$

The volume of imports is expected to fall as exchange rate variability increases or as the currency becomes more overvalued. Import volume is expected to increase with a rise in

national income levels or a rise in tied aid, *ceteris paribus*.

There are several measures of trade that would theoretically show the effect of exchange rate variability. Because of the structure of the Zone's trade, this study will use the volume of imports for CFA member countries as the dependent variable. The volume of exports as such would be inappropriate for several reasons. First, there is great diversity in the exports of the Zone members. Since several Zone members are primarily agricultural, exports of some CFA countries are largely a function of weather, which is difficult to control for. Second, government policies to increase development may also support exports. These policies, such as subsidies and tax protection, are also difficult to find and control for, especially for a comparison of 12 member countries. The Zone's imports however, should be less difficult to model. The imports of the Zone are mainly manufactured goods, including machinery and industrial products (CIA, 1992), whose prices and quantities do not depend on factors that fluctuate wildly, such as weather.

B. Exchange Rate Variability

Previous studies have adopted several different measures of variability. Comparison of past forward and current spot exchange rates have been used in several studies (Makin, 1976; Hooper, 1978) as a measure of variability, but the CFA countries do not have well-developed forward markets and any

existing forward price data are not readily available. Medhora (1990) uses the standard deviation of a quarterly nominal effective exchange rate, which is a trade weighted index

of spot exchange rates, to measure variability. The nominal index was used in an attempt to separate price risk from exchange rate risk, making the measure of variability include only exchange rate risk. Recall that according to Purchasing Power Parity theory, the exchange rate will equalize relative prices between two countries. Thus, when PPP holds, exchange rate risk and price risk should offset each other. The real risk faced by merchants is when PPP does not hold and exchange rate risk and price risk do not offset each other. By using only exchange rate risk from a nominal index, past studies have ignored PPP theory and did not get a full measure of total risk. Three studies (Kenen, 1980; Coes, 1981; and Cushman, 1983) use some form of the real exchange rate, which accounts for both exchange rate risks and price risks, to measure exchange rate variability.

This study will use the purchasing power parity definition of the real exchange rate (RER) as a basis for measuring variability. The $RER = e (P^*/P)$, measures the relative valuation of goods between two countries. When the RER is weighted with respect to all of a nation's trading partners, it becomes a real effective exchange rate (REER), and is defined as the relative price of tradable goods with respect to non-tradable goods. The REER measures a country's level of competitiveness on international markets, such that a fall in the REER, or real exchange rate depreciation, indicates a decline in the country's competitiveness (Edwards, 1988). The REER in this study is defined as:

$$REER_i = \sum_{j=1}^n e_j * \frac{P^*}{\bar{P}} * w_j$$

The real effective exchange rate for CFA country I, which has n trading partners is the bilateral exchange rate, e_j defined as (CFAF/ j 's currency) ⁷, multiplied by the foreign price level, P^* , over the domestic price level, P , and

a trade weight, w_j (the percent of I's imports from j). The index is calculated for each country of the Franc Zone for each year of the study--1974 to 1992.

The REER alone does not measure variability. It is a yearly average of relative prices of tradable and non-tradable goods. It cannot incorporate any measure of variability or risk as a single yearly average. To show the volatility of the exchange rate, this study will use the percent change in the REER from year $(t-1)$ to year t to explain imports in year t . This will measure actual changes that show uncertainty and should affect the level of imports.

C. National Income Level

Gross Domestic Product (GDP) is used as a measure of the national income level. Real GDP is used over nominal GDP in order to remove the effects of inflation. As real GDP rises, imports are also expected to rise. Data for real GDP are found in the World Tables Database.

D. Tied Aid

The vast majority of aid tying is unreported, thus there are no data available that can be used to show a clear effect of tied aid on import volume. This study will use Official Transfers, monetary grants received from a donor government, as a measure of total aid to each CFA country. Not all official transfers are tied, only an unknown portion of them. As official transfers increase, this study assumes that the amount of tied aid in the figure increases proportionally. Thus, an increase in official transfers will have a positive effect on imports of the recipient country because some portion of the official transfers are tied. Data for official transfers are also found in the World Tables Database.

E. Currency Valuation

The real exchange rate (RER) between France and the CFA countries will be used as

a measure of the amount of currency misalignment. This is not the same as the variability index, because it does not include all of a nation's trading partners, only France. The $RER = e (P^*/P)$ where e is the bilateral exchange rate between France and the CFA (CFAF/FF), P^* is the price level of France, and P is the price level of the CFA country that the RER is calculated for. The RER used in this form shows the relative overvaluation of the CFA franc (Edwards, 1988).

Recall the theory that as the CFAF becomes overvalued, the level of imports rises, and as the CFAF becomes undervalued, the level of imports falls. Over time, price levels in France have risen slower than price levels in the CFA nations. This leads to a fall in the RER, which corresponds to a decline in competitiveness for CFA goods. Consequently, imported goods become more attractive compared to domestic goods. The real exchange rate with France will capture the effect of misalignment since the French Franc floats freely on international markets, and is thus aligned with other currencies. If the CFA Franc is misaligned with the French Franc, then the CFA Franc is also misaligned with the currencies that the French Franc floats against. A negative relationship is expected between the RER and imports, since a fall in the RER leads to a rise in imports.

V. EMPIRICAL MODEL RESULTS

A. The Empirical Model

Based on the theoretical framework and proxies presented in the above discussion, the model used in this study is:

$$Imports = \alpha_1 + \sum \alpha_{\text{countrydummy}} + \alpha_{13}variability + \alpha_{14}GDP + \alpha_{15}OfficialTransfers + \alpha_{16}RER + u$$

When running the model with Ordinary Least Squares, tests showed that autocorrelation was present, so the relationship was tested using a generalized least squares equation on a pooled sample of

CFA countries over the period 1974-1992.

Membership in the Franc Zone has not changed significantly over the past fifty years, but the changes that have occurred must be reflected in this study. Mali left the Zone at independence, but has since rejoined the Zone. Although it did not join the BCEAO until 1984, Mali has been a member of the Franc Zone since 1967 (Berg, 1993). Since its trade has been affected by France and this study specifies the Zone for the study (instead of a specific monetary union within the Zone), Mali will be included in the entire study. However, two countries will not be included: Equatorial Guinea which joined the Zone in 1984, and the Comoros which did not join the Zone until after 1992 (Berg).

A series of dummy variables to control for country have been included to account for cross-sectional differences among countries. This includes such entities as resource allocations and government programs aimed at trade issues, as well as the different needs of the countries with regard to imports. For example, some inland countries of the CFA Franc Zone must import food. These trade flows will be less reactive to changes in price and exchange rate levels, since a certain level of consumption must be maintained for survival.

B. Results

Overall, the model performs fairly well. The adjusted R^2 is 0.6795, meaning that the regression is able to account for almost 68% of the variation of the CFA Franc Zone's

imports. With one exception, individual variables also perform rather well. All but one coefficient estimated has the predicted sign, and each of those is statistically significant.

Most importantly, the coefficient for

Dependent Variable: Imports

Sample size: 210

adjusted R²: 0.6795

Variable	Definition	Expected Sign	Actual Coefficient (t statistic)
Variability	% change in RER index	-	- 0.1987 *** (2.3625)
GDP	Gross Domestic Product	+	0.4680*** (5.0769)
AID	Official Transfers to CFA nations	+	1.3330 *** (4.0788)
RER	Real Exchange Rate with France	-	9.683 *** (3.1086)

*** significant at 0.01 level

Table 1: Results

exchange rate variability was estimated to be -0.1987, which means for every 1% increase in the variability, imports fall by \$2,000. To put this in perspective, variability for Zone members averaged 71% a year (with a standard deviation of 37%). So, in the average year, the effect of exchange rate variability is a \$143,000 fall in the level of imported goods, which is about 0.2% of the imports for an average Zone country. This may not seem like a large effect, but that figure can account for one year's imports from one trading partner. This study can conclude that exchange rate variability has a significant negative effect on the volume of imports for the CFA Franc Zone.

The coefficient for GDP also performs in accordance with theory. The model estimates that for a \$1 billion rise in GDP, imports rise by \$468,000, *ceteris paribus*. Results show that imports react positively to a rise in national income. The effect of national income is important to the model and does improve the regression, since the variable is statistically significant at a very high level.

The coefficient on the aid variable represents a \$1.33 increase in imports for a

\$1.00 increase in official transfers. At first glance, this seems like an unreasonable figure, but due to the nature of tied aid, there is a very plausible explanation. Initial purchases required for the gathering of tied aid can result in future purchases from the donor country (White, 1994). For example, a French engineer paid with tied funds may call for French made parts and equipment for the project, which would require that future repair expenditure also come partly from France. Although these goods are not tied originally, the purchase is a result of tied aid.

The variable for the Real Exchange Rate with France is the only variable that does not perform according to theory. According to this model, as the RER rises, imports also rise. There is no obvious explanation for why this variable does not behave as theory predicts. One possible explanation stems from the presence of autocorrelation in the OLD model. If autocorrelation is present, then there is some evidence that a variable is missing in the original model. The RER variable may be picking up some of the effect of the missing variable. A different proxy for relative currency valuation may yield more

theoretically sound results.

VI. CONCLUSION

The majority of past empirical studies have not been able to find a significant effect of exchange rate variability on trade. This study, however, was able to find such an effect at a statically significant level for twelve members of the CFA Franc Zone. Empirical results were encouraging overall, but there is room for further research, especially in relation to CFA franc valuation.

Recent studies find that the effect of exchange rate variability on trade is rising. As exchange rates become more variable and as trade diversifies away from France and other Zone members, the effect of exchange rate variability is more visible for the Zone. In the future, as trade diversifies further away from risk-free trading partners, the coefficient for exchange rate variability may be stronger and exhibit a larger effect on trade in the Franc Zone.

The CFA Franc Zone must decide if the variability of the French franc is at an acceptable level. As it stands now, the effect of exchange rate variability is probably not large enough to warrant any major policy changes. However, if variability increases in the future, the structure of the Zone's trade and monetary policy may need to be changed. A short term solution to high exchange rate variability would be to encourage trade to shift back to France, the Zone, and Europe in order to decrease the level of variability. More involved action (a possibility only in the long term and with very high exchange rate variability) would question the fixed exchange rate regime as a whole since the Zone cannot make its own exchange rate policy when tied to the French franc.

FOOTNOTES

1. I would like to thank my project advisor,

Dr. Pamela Lowry, as well as the rest of my Research Honors committee, Dr. Robert Leekley, Dr. James Simeone, and Dr. Frank Boyd, for their support and helpful comments throughout the spring semester. I would also like to thank Dr. Michael Seeborg for supervision during the early stages of the project. Any remaining mistakes are, of course, my own.

2. The acronym CFA stands for either la Communauté Financière d'Afrique (the African Financial Community) or la Coopération Financière en Afrique Centrale (the Central African Financial Cooperation), depending on the location of the nation (Boughton, 1992).
3. The parity remained constant at 50 CFAF to 1 FF from 1948 to January 1994, when the CFA members and France agreed on a 50% devaluation, making the parity 100 CFAF to 1 FF. The Comorian franc's parity was only devalued by 33% and stands at 75 CF to 1 FF.
4. For further discussion of the Franc Zone and its institutions, see Clement (1994) or Appendix B of the Berg and Berlin study (1993).
5. Variability could occur, but only with a change in the parity that is not common for the Zone in this time period.
6. Europe is a fairly stable zone for trade since the advent of the European Monetary System (EMS). Since France is a member of the EMS, CFA countries will enjoy some relative exchange rate stability in their trade with Europe. Note that the European system differs from that of the Franc Zone. Exchange rates are variable among European members, although the variability is restricted to a narrow band.

7. Since a comprehensive source of bilateral rates was unavailable, the exchange rates were derived using the "conversion factor," in units of local currency per US dollar, from World Tables. To find the bilateral rates with each trading partner, the conversion factor was multiplied by the inverse of the conversion factor for France and by the rate of exchange between the French franc (FF) and the CFA franc (CFAF) for this time period 1 FF:50 CFAF.

$$\frac{\text{local}}{\text{US\$}} * \frac{\text{US\$}}{\text{FF}} * \frac{1 \text{ FF}}{50 \text{ CFAF}} = \frac{\text{local}}{\text{CFAF}}$$

Using quoted bilateral exchange rates or those calculated as cross-rates should not change the outcome significantly, since arbitrage by foreign currency traders brings spot rates close to each other. Any differences between the two rates would quickly disappear as traders sought a profit.

REFERENCES

- Agenor, Pierre-Richard. "Credibility and exchange rate management in developing countries." *Journal of Development Economics*, October 1994, 45, pp. 1-16.
- Allechi, M'Bet and Niamley, Madeleine A. "Evaluating the Net Gains from the CFA Franc Zone Membership: A Different Perspective." *World Development*, 1994, 22(8), pp. 1163-1173.
- Assane, Djeto and Konan, Abel. "Exchange Rate Variability and Imports in WAMU Countries: Is This Relationship Relevant?" *World Development*, 1994, 22(5), pp. 795-801.
- Assane, Djeto and Pourgerami, Abbas. "Monetary Co-operation and Economic Growth in Africa: Comparative Evidence from the CFA-Zone Countries." *The Journal of Development Studies*, 1994, 30(8), pp. 423-442.
- Berg, Elliot and Berlin, Phillip. "Exchange Rate Issues in the Franc Zone," Background note prepared for seminar on the CFA Franc Zone--U. S. Agency for International Development. January 22, 1993.
- Boughton, James M. "The CFA Franc: Zone of Fragile Stability in Africa." *Finance & Development*, December 1994, pp. 34-36.
- Braga de Macedo, Jorge. "Collective Pegging to a Single Currency: The West African Monetary Union," in *Economic Adjustment and Exchange Rates in Developing Countries*, ed. Sebastian Edwards and Liaquat Ahamed. Chicago: The University of Chicago Press, 1986, pp. 333-362.
- Central Intelligence Agency. *The World Factbook 1992*. Washington, D.C., 1992.
- Clement, Jean A.P. "Striving for Stability: CFA Franc Realignment." *Finance & Development*, June 1994, pp. 10-13.
- Coes, Donald V. "The Crawling Peg and Exchange Rate Uncertainty," in *Exchange Rate Rules*. New York: St. Martin's Press, 1981.
- Conway, Patrick and Greene, Joshua. "Is Africa Different?" *World Development*, 1993, 21(12), pp. 2017-2028.
- Cushman, David O. "The Effects of Real Exchange Rate Risk on International Trade." *Journal of International Economics*, 1983, 15, pp. 45-63.
- Devarajan, Shantayanan, and De Melo,

- Jaime.** "Evaluating Participation in African Monetary Unions: A Statistical Analysis of the CFA Zones." *World Development*, 1987, 15(4), pp. 438-496.
- Edwards, Sebastian.** *Exchange Rate Misalignment in Developing Countries*. (World Bank Occasional Papers, Number Two, New Series) Baltimore: The Johns Hopkins University Press, 1988.
- Gillis, Malcolm, et al.** *Economics of Development*. New York: Norton & Company, 1992.
- Guillaumont, Patrick and Sylviane.** "The Implications of the European Monetary Union for African Countries." *Journal of Common Market Studies*, 1989, 28(2), pp. 139-153.
- Hafer, R. W. and Kutan, A. M. Kutan.** "A Long-Run View of German Dominance and the Degree of Policy Convergence in the EMS." *Economic Inquiry*, 1994, 32, pp. 684-695.
- Hooper, Peter and Kohlhagen, Steven W..** "The Effect of Exchange Rate Uncertainty on the Prices and Volume of International Trade." *Journal of International Economics*, 1978, 8, pp. 483-511.
- International Monetary Fund.** *Direction of Trade Statistics Yearbook*. 1993, 1982, 1977, 1972, 1967.
- Makin, John H.** "Eurocurrencies and the Evolution of the International Monetary System." *Eurocurrencies and the International Monetary System*. Washington, D.C.: American Enterprise Institute for Public Policy Research, 1976.
- McKinnon, Ronald I.** "Optimum Currency Areas." *American Economic Review*, 1963, 53(4), pp. 717-725.
- Medhora, Rohinton.** "The West African Monetary Union: Institutional Arrangements and the Link With France." *Canadian Journal of Development Studies*, 1992, 13(2), pp. 151-179.
- , "The Effect of Exchange Rate Variability on Trade: The Case of the West African Monetary Union's Imports." *World Development*, 1990, 18(2), pp. 313-324.
- Mundell, Robert A.** "A Theory of Optimum Currency Areas." *American Economic Review*, 1961, 51(4), pp. 657-665.
- Noel, Alain and Theiren, Jean-Philippe Theiren.** "From Domestic to International Justice: the welfare state and foreign aid." *International Organization*, 1995, 49(3), pp. 523-553.
- Salvatore, Dominick.** *International Economics*. Englewood Cliffs: Prentice Hall, 1995.
- Savvides, Andreas.** "Economic Growth in Africa." *World Development*, 1995, 23(3), pp. 449-458.
- Schwartz, Anna J.** "Currency boards: their past, present and possible future role." *Carnegie-Rochester Conference Series on Public Policy*, December 1993, 39, pp. 147-187.
- Thursby, Marie C. and Thursby, Jerry G..** "The Uncertainty Effects of Floating Exchange Rates: Empirical Evidence on International Trade Flows," in *Exchange Rates, Trade, and the U.S. Economy*. Cambridge: Ballinger Publishing Company, 1985.

Change, 1994, 25, pp. 527-554.

Van de Walle, Nicholas. "Is the Bundesbank Running Africa?" *The International Economy*, January / February 1994, pp. 47-48.

World Bank. *World Tables Database*, 1994.

Yeager, Leland B. *International Monetary Relations: Theory, History, and Policy*. New York: Harper & Row Publishers, 1976.

White, Howard and Woestman, Lois. "The Quality of Aid: Measuring Trends in Donor Performance." *Development and*

Gwen Alexander ('96) was an Economics and International Studies double major. She is currently enrolled in the Ph.D. program in Economics at the University of Maryland, with a concentration in International Development.
