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MONEY SUPPLY, CAPITAL FLOWS AND EFFECTIVENESS OF MONETARY POLICY IN AN OPEN DEVELOPING ECONOMY: THE CASE OF THE WAMU (WEST-AFRICAN MONETARY UNION) (1963-1980)

University of Cincinnati **PH.D. 1982**

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A dissertation submitted to the
Division of Graduate Education and Research
of the University of Cincinnati

in partial fulfillment of the
requirements for the degree of

DOCTOR OF PHILOSOPHY

in the Department of Economics
1982
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May 28, 19 82

I hereby recommend that the thesis prepared under my supervision by Kassi Jean-Claude Brou

entitled "Money Supply, Capital Flows and Effectiveness of Monetary Policy in an Open Developing Economy: The Case of the WAMU (West-African Monetary Monetary Union) 1963-1980"

be accepted as fulfilling this part of the requirements for the degree of Doctor of Philosophy

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ABSTRACT

This dissertation attempts to provide an empirical estimate of the degree of endogeneity of the money stock in the West-African monetary union countries (WAMU) during the period 1963-1980. The WAMU central bank (B.C.E.A.O.) has been criticized for its inability to control the money stock. In a small open economy such as the WAMU's which faces fixed exchange rate (with France) and is committed to freedom of capital movements, the money stock becomes an endogenous variable, because it is affected by the balance of payments. Hence, we focus on the monetary base which accounted for 85 percent of the variations of the money stock in the period 1963-74.

A portfolio model developed by Kouri and Porter is reduced to a simple monetary model of an open economy under perfect capital mobility. From this model, empirical estimates of offset coefficients to policy induced changes in the domestic component of the base were derived for three countries of the WAMU: Benin, the Ivory-Coast and Senegal. In all cases, the offset coefficients were negative and highly significant. This implies that the B.C.E.A.O. has faced difficulties in using monetary policy for internal stabilization. However, the balance of payments can be effectively stabilized by using the monetary instruments.

Finally, the analysis was performed for two separate periods, taking into consideration the 1973 monetary reform introduced in the WAMU. Although the objective of this reform was to strengthen the role of the B.C.E.A.O. in its control of the money stock, the statistical analysis indicates a greater endogeneity of the base in the post-reform period.

Table of Contents

Page

INTRODUCTION 2

Chapter I: Theoretical Framework 5

A An overview 5
B Economic and Institutional background of the WAMU countries .10
C The balance of payments adjustment mechanism under a regime of fixed exchange rate 12
D The small country assumption 16
E The formal analysis 18
F The role of capital mobility in the international adjustment.22
G The role of non tradeable assets in the international adjustment 26

Chapter II: Institutional Framework 33

A The Real Economy 34
A-1 Structure of production 34
A-2 Trade structure 38
A-2-1 Importance of Foreign Trade 39
A-3 Attempts at trade integration 43
B The Banking and Monetary System 46
B-1 The Historical development of the WAMU 49
B-2 Formal organization of the WAMU 52
B-3 The Operation Account 58
B-3-1 Functioning of the operation account 58
C Interest rate policies in the WAMU 62

Chapter III: The Model 68

A The Relevance of the model 70
B Specification of the model 74
B-1 The demand for base money 75
B-2 The domestic demand for financial assets 76
B-3 The domestic demand for foreign financial assets . . .77
B-4 The foreign demand for domestic financial assets . . .78

Chapter IV: Empirical Analysis. 88

A Survey of Empirical Studies 88
B *Methodology and the Data*. 90
C The Results 93
C-1 Results based on the general model. 93
C-2 Testing the validity of the assumption 94
on high capital mobility
C-3 Results based on the reduced form model 100
D More on the offset coefficient. 114
E Implications for stabilization policies 126

CONCLUSION. 134

APPENDICES

Appendix I. 137

Appendix II 138

TABLES. 139

BIBLIOGRAPHY. 149

List of Exhibits

Exhibit		Page
1	General Model: Regression Equation - Benin	95
2	General Model: Regression Equation - Ivory-Coast	96
3	General Model: Regression Equation - Senegal	97
4	Testing the Speed of Adjustment	101
5	Regression Results of Reduced Form Model (Yearly Data)	103
6	Regression Results of Reduced Form Model with Quarterly Data - Benin	104
7	Regression Results of Reduced Form Model with Quarterly Data - Ivory-Coast	105
8	Regression Results of Reduced Form Model with Quarterly Data - Senegal	106
9	Price Equations	112
10	Benin: Net Foreign Asset of the Central Bank: Actual and Predicted Values	116
11	Ivory-Coast: Net Foreign Asset of the Central Bank: Actual and Predicted Values	117
12	Senegal: Net Foreign Asset of the Central Bank: Actual and Predicted Values	118
13	Simulation Results	119
14	Benin: Comparison Between the Pre and Post Reform Periods	121
15	Ivory-Coast: Comparison Between the Pre and Post Reform Periods	122
16	Senegal: Comparison Between the Pre and Post Reform Periods	123

List of Exhibits
(continued)

Exhibit		Page
17	Benin: Comparison of Various Monetary Aggregates	127
18	Ivory-Coast: Comparison of Various Monetary Aggregates	128
19	Senegal: Comparison of various Monetary Aggregates	129

List of Figures

Figure		Page
1	Monetary adjustment under a fixed exchange rate regime	15
2	Dynamic adjustment in the money market	24
3	The role of non-tradeable asset in the international adjustment	28
4	Money supply, the demand for money and monetary equilibrium	69

List of Tables

Table		Page
1	Decomposition of the Money Supply	139
2	Main Exports of WAMU.	140
3	Production and Value of Main Mineral Products	141
4	Trade Balance of the WAMU	142
5	Intra WAMU Trade - 1970	143
6	Intra WAMU Trade - 1974	144
7	Intra WAMU Trade - 1978	145
8	Trade Between WAMU Countries - Exports - 1978	146
9	Trade Between the WAMU Countries - Imports - 1978.	147
10	Real Yield on Money in WAMU (1973-1977)	148

Introduction

In the late fifties, economic development for most developing countries implied long-term objectives to be reached. Indeed, to cope with major structural problems facing these countries, five to ten years planning models were widely used. However, in the late sixties and early seventies on, the focus slowly changed. The importance and necessity of stabilization policies were more and more felt as high inflation and chronical payments deficits plagued most of these economies. The success of stabilization policies depends upon the ability of the central bank to control a key economic aggregate: the money stock. This dissertation will attempt to consider this question in the case of the six countries forming the West-African monetary union (WAMU). In other words, the purpose of this work will be to determine the degree of effectiveness of monetary policy in the WAMU.

The WAMU central bank (B.C.E.A.O.) has often been criticized for not being able to control the monetary aggregates. Most of these criticisms have concentrated their analysis on the lack of adequate instruments in the conduct of monetary policy.[1] Both the rediscount ceiling, and, before 1974, the liquidity ratio used by the B.C.E.A.O. were criticized as being ineffective in controlling the money supply.

---

1 J. Bathia & P.A. Acquah, "Monetary Instruments and Policies in the BCEAO countries, 1962-74, An Analysis", I.M.F. DM/77/52, June, 1977. Also "Money Supply Process in the B.C.E.A.O. area 1963-74" IMF DM/78/54, June 1978.

Although these criticisms are quite appropriate, this study will not specifically look at the policy instruments. Given the openness of these economies, it was never tested whether or not this high degree of openness has presented some difficulty to the B.C.E.A.O. in controlling the monetary aggregates. Hence, we will specifically look at the monetary base and determine the extent to which it was endogenous or exogenous.

The choice of the monetary base as key variable in this study stems from its importance in determing the money stock in the WAMU countries. As shown in Table I, about 80 percent of the variations of the money stock in the WAMU, between the period 1963-74, were explained by the monetary base. However, variations of the monetary base itself were explained by both its foreign assets and domestic credit component, each one accounting for about 50 percent of the overall variation. Therefore, fluctuations in the foreign asset, the non-controllable portion of the base, are as important as the policy controlled domestic credit in explaining variations in the money stock. Hence, it is important to not only look at the instruments of monetary policy, but also at the openness of the economy (through the balance of payments) in explaining money stock behavior. We will concentrate on the second approach in this study. The theoretical framework used will therefore be related to stabilization policies in interdependent economies. This analysis has lost some of its relevance in recent years due to the generalized floating of exchange rates among major currencies since 1971. However, this framework is

still very appropriate for currencies tied at par to one or several major ones. This theoretical framework has previously been used in the case of the WAMU. However, the discussion was rather heuristic and no rigorous attempt at statistical analysis was done.[2] The major contributions of this work will be the following: first, it will provide a statistical analysis of the hypothesis of offsetting reserve flows in the WAMU countries; second, it will allow us to find out whether or not in countries with no market-determined interest rate and no organized money and capital market, it is possible to explain the inefficiency of monetary policy in terms of the endogeneity of the monetary base; third, it will help define the role of monetary policy, and what can be done to strengthen this role.

Chapter I will discuss the theoretical framework from which the hypothesis to be tested will be derived. This framework discusses the effectiveness of monetary policy in an open economy with fixed exchange rate. It was developed by Mundell and Johnson, although several writers contributed to its various aspects. Chapter II will present the institutional framework of the WAMU countries. A major emphasis will be on the monetary system. Chapter III will discuss the model to be empirically tested in Chapter IV.

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2 Lamson G. Herbert, Central banking in an open export economy: The monetary system of French speaking West-Africa, 1956-1967. Unpublished Ph.D. dissertation, Northwestern University, 1971. Chapters I, IV and VI.

Chapter I

THEORETICAL FRAMEWORK

A. An Overview

In a closed economy, the effects of a change in the level (or rate of change) of the money stock on income and the price level have been developed. A consensus somewhat exists in the economic literature. Put simply, in the short-run, monetary policy affects both nominal and real income but affects only nominal income in the long-run. The division between the two depends only upon the level of expectation and the gap between actual and full-employment output. So in a closed economy, the monetary approach divides the effects of monetary policy between price and output. Basically, monetary policy will affect the economy mainly through three channels in a closed economy.[1] a) By temporarily reducing the real rate of interest, monetary policy will create a discrepancy between the market value and supply price of physical assets which will stimulate money income, output and/or price. b) The second channel, almost similar to the first one, works through asset with fixed nominal yield. A monetary disturbance will affect the market value of these assets and therefore the wealth position of these asset holders. c) The third channel works through the total wealth effect. A monetary disturbance will affect the total wealth of the public at an unchanged interest rate

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1 R.N. Cooper, "Monetary Theory and Policy in an Open Economy" Scandanavian Journal of Economics Vol. 78 No. 2 1976 pp. 146-163.

(in the case of a budget deficit financed by money creation). This implies that monetary policy can be a powerful tool for short run stabilization policy. In other words, the monetary authorities by their actions on the level or rate of growth of the money supply, can dictate the pace of economic activity in the short-run for internal stability. As Friedman puts it:

> "...changes in M (money stock) are a major factor, though even then not the only factor accounting for short run changes in both nominal income and the real level of activity. I regard the description of our position as money is all that matters for changes in real income as an exageration but one that gives the right flavor of our conclusions."[2]

This is possible because the money stock is fully exogenous and assumed exclusively controlled by the central bank. Several issues still remain unsettled and are the object of extensive research in the literature. To mention a few, the lag structure of response to monetary disturbances, the transmission mechanism of monetary policy and the proper monetary target and policy indicator have received considerable attention in recent writings of various economists. Nevertheless, there is a considerable agreement on monetary policy effects in the closed economy and monetary policy can be used as a countercyclical tool for stabilization purposes, since the money stock can be controlled in the short run, if not, at least in the medium run.

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2 M. Friedman: A Theoretical Framework for Monetary Analysis. NBER occasional paper 112 New York, 1971 p. 27.

In the open economy, however, the effects of monetary policy are not only extended to price and output, but also to the balance of payments. Indeed, in an open economy with a fixed exchange rate, the money supply is no longer a policy instrument (exogenous and fully under the control of the central bank). The money stock becomes endogenous because it is affected by the BOP (balance of payments) through the changes in foreign reserves constituting the money supply. Most of the pioneering work on this theoretical framework has been developed by Mundell.[3] Mundell emphasized three aspects of monetary policy in the open economy: a) The balance of payments adjustment mechanism which is viewed in a monetarist framework. b) The importance of the relative size of the country implementing the change which plays a critical role in this international adjustment. c) The role and the importance of capital mobility in the dynamic adjustment process of the foreign component of the money supply. Before turning to a discussion of each of these elements, we should pause and define several terms that we will be using in the following discussion. Basically, in a fixed exchange rate open economy, following Swoboda, we can summarize the effectiveness of monetary policy in the following statement which we will refer to as the fundamental proposition of this approach.

---

3 R. Mundell, International Economics: MacMillan, 1968 Chapter II and appendix.

> "...Monetary policy can have no lasting effect on the income of a small open economy under fixed exchange rate."[4]

By monetary policy, we do not mean a change in the overall stock of money of the domestic economy. Instead, by monetary policy, we refer to a change (exogenous) in the domestic component of the monetary base or, the domestic asset of the consolidated banking system. Since the domestic asset is part of the monetary base, one would expect a change in this variable to affect the money stock in the same direction. This will be correct in the immediate run, before any adjustment has taken place. Indeed, it is the purpose of this study to show that once all adjustments have been completed, the level of the money stock will depend upon the BOP adjustment mechanism and the speed of this adjustment.

By lasting effect on income is implied the level of income after all the adjustments due to the initial monetary disturbance have occurred. In a closed economy, as mentioned earlier, real income will increase in the short run after an initial monetary disturbance. In the open economy, depending upon the extent of the balance of payments adjustment and the speed of this adjustment, real income might or might not be affected. This is because in a closed economy, a once for all change in the domestic asset of the monetary base will affect the money stock in the same direction, making the money supply totally exogenous, while in an open economy, a once for all change in the domestic asset of the monetary base might not affect the money stock,

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[4] A.K. Swoboda, "Monetary policy under fixed exchange rate: effectiveness, the speed of adjustment and proper use" reading No. 10 in J. Frenkel & H.G. Johnson: The Monetary Approach to the BOP George Allen & Unwin, 1976 pp. 237-261.

which in turn will have no lasting effect on the level of income.

By a small economy is implied an economy which cannot affect foreign income, interest rate and price. Such an economy takes the price of its imports and exports as determined in the world market upon which it exerts no influence. To what extent was the central bank able to control the money supply in the WAMU (West African Monetary Union) countries? In other words, was the money stock an endogenous or exogenous variable in these countries? This will be the central theme of this dissertation. The answer to this question will have serious implications for these countries. With the exchange rate with their main trading partner fixed since 1948, and the usual difficulty of implementing fiscal policies in developing countries, an endogenous money stock will imply that the monetary authorities lack a policy instrument which can be used for continuous stabilization policies. As Mundell puts it, the only effect of monetary policy in this case will be on the balance of payments:

> "...in the fixed exchange system, money income (the price level) moves to equilibrate the market for domestic goods and services, and monetary policy is directed at the requirements of the foreign balance."[5]

Before going into the details of this international adjustment mechanism, we should pause and explain why this theoretical framework can be used in the case of the WAMU countries.

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5 R. Mundell, op. cit. p. 153.

B. Economic and Institutional Background of the WAMU Countries

The countries forming the WAMU are developing countries which still rely heavily on agricultural exports (cocoa, palm kernel, palm product and groundnut) and raw material (phosphate, uranium) for their income. The imports of these countries essentially consist, as expected of finished products and capital goods necessary for their industrialization programs. These countries belong to the franc area and as a result, have a liberal trade and payments regime. France is the main trading partner and inter-African trade (trade between the WAMU countries) is very small because of similar production structure and need (they produce competitive rather than complementary products). Moreover, these countries have a special monetary arrangement which has stimulated this study. As previously stated, they belong to the franc area in the sense that the six countries (Ivory Coast, Senegal, Upper- Volta, Togo, Benin, and Niger) have a common central bank responsible for the only monetary unit which is accepted in the whole union. Six national credit committees (central bank branches: CBB) are responsible for the implementation of different aspects of monetary policy at the country level. The main policy instrument used by the Central Bank is the rediscount ceiling on commercial bank credit. The central bank determines the overall amount of rediscounting allowed to each country upon the recommendations of the central bank branches. Each CBB in turn determines the maximum amount of rediscounting available to each commercial bank within the limit (fixed by the ceiling) set by the central bank. This overall limit is determined after examining the need for short term financing of the economy

of the state concerned and the amount of domestic resources available to meet those needs. Moreover the monetary unit called the CFA (Communaute Financiere Africaine) is tied on a fixed exchange rate basis with the French franc. Since 1973, when the agreement of the union was renewed, this fixed exchange rate could theoretically be modified. In practice, however, it was never changed since 1948. In fact, the whole system is geared towards maintaining free convertibility and free capital movement among countries of the franc area. Interest rate policy has been to keep rates low and stable with the basic rediscount rate remaining unchanged at 3.5% until 1973 when it was increased to 5.5%.

Four considerations in this institutional framework have dictated the choice of the monetary approach in explaining the behavior of the money stock. First, as mentioned earlier, there is a fixed exchange rate between the CFA and the French franc. Secondly, the economy of the WAMU is open and rarely have the authorities resorted to capital controls. Thirdly, the monetary authorities have followed a somewhat passive attitude towards the money supply, making sure to provide enough financing for export activities (in the period 1963-1974, changes in net foreign assets accounted for about half of the central bank liabilities which themselves accounted for 86% of the increase in the money supply).[6] Lastly, these countries have a relatively small economy that face prices of imports and exports determined on the world market and over which they have no control.

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[6] R.J. Bhatia, "The Experience of the West African Monetary Union" Unpublished paper I.M.F., DM/80/80 1980.

C. The Balance of Payments Adjustment Mechanism Under a Regime of Fixed Exchange Rate

As previously stated, the BOP in an open economy will affect the level (or the rate of change) of the money stock.[7] Several models of the open economy concentrated on two channels of the adjustment process.[8] The first channel works through the non-monetary sector of the economy. Basically stated, it implies that if foreign residents demand more goods and non-monetary assets from domestic residents than the latter demand from the former, international reserves will flow into the domestic economy. If the converse holds, international reserves will flow out of the domestic economy. On the other hand, the second channel works through the money market. If domestic residents desire to accumulate money balances at a faster rate than the rate at which the monetary authorities are providing real balances, foreign reserves will flow in, the converse being also true. Following several authors we will focus on this second aspect of the international monetary adjustment.[9] This implies that reserve flows result from a state of disequilibrium in the money market, and shows the crucial importance of the demand for monetary asset in determining reserve flows. In a sense, in an economy where the monetary

---

7 The balance of payments is by definition identically equal to the change in foreign reserve.

8 R. Mundell, op. cit. Chapter II.

9 H.G. Johnson, op. cit. pp. 147-167. See also R.J. Zecher, "Monetary equilibrium and international reserve flows in Australia" reading No. 12 in Frenkel & Johnson: The Monetary Approach to the Balance of Payments. pp. 287-297.

authorities are willing to buy or sell international reserves to maintain the parity of the domestic currency, the demand for money will be the key function in explaining reserve flows. An increase in the domestic asset of the consolidated banking system will increase the money supply instantaneously. Assuming that we were initially in full equilibrium, an increase in the money supply will create a *portfolio disequilibrium in the private sector. Domestic residents* in their attempt to move to a new portfolio equilibrium will increase their demand for non- monetary assets (domestic and foreign). This will create an increase in the price level and/or a deficit in the trade balance which will imply a deficit in the BOP. The deficit of the BOP will in turn reduce the level of foreign reserve and ultimately contract the money supply, assuming that no sterilization from the monetary authorities takes place. Another way to see this adjustment mechanism is to assume that private wealth holders, in their desire to move to a new portfolio equilibrium, will be buying foreign reserve from the central bank to make the necessary payments for the foreign goods and services they desire.

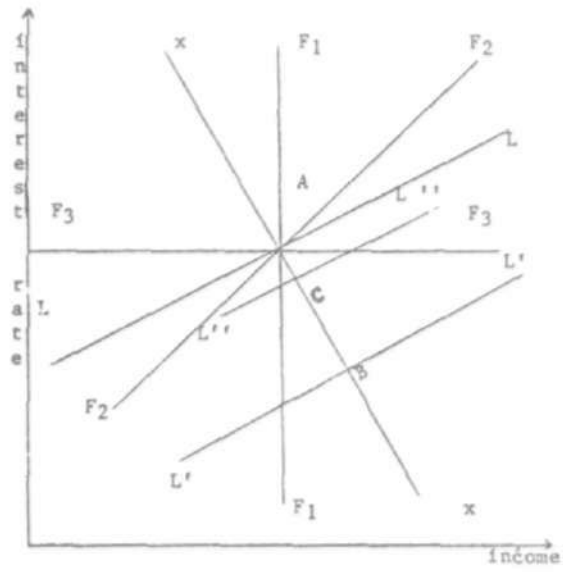
The second approach, the one we will be following, also starts from a disequilibrium in the money market. An increase in the domestic asset of the banking system will create a portfolio disequilibrium in the hands of the private wealth holders. In their attempt to move to another portfolio equilibrium they will be substituting financial assets (domestic and foreign) for domestic monetary assets and in the process, the balance of payments and therefore the level of reserve will also be affected. Several considerations need to be clarified at

this point. First, if we assume that the domestic residents will restore their portfolio equilibrium only through the foreign sector, then the final equilibrium (implying that all adjustments have worked out) will occur only when the system has returned to its initial equilibrium, or, stated differently, when the stock of money has returned to its initial level.[10] This shows the importance of the assumption on the degree of openness of the economy usually made in the monetary dynamics of international adjustment under fixed exchange rate. The higher the openness of the economy, the higher the initial deficit of the balance of payments due to the initial monetary disturbance. Second, an important aspect of this dynamics often overlooked is that this adjustment occurs quite independently of the degree of capital mobility. Put differently, the degree of capital mobility will not affect the outcome of this international adjustment. One can see this condition more clearly with the following graphical analysis.[11]

---

10 This can be possible only if the economic system is stable. We will return to the stability of such a system later on.

11 This graphical analysis is from A.K. Swoboda, "Equilibrium, quasi equilibrium and macroeconomic policy under fixed exchange rate" Quarterly Journal of Economics February 1972, p. 162.



with XX: goods market equilibrium

LL: money market equilibrium

FF: balance of payments equilibrium

Fig. 1: Monetary adjustment under a fixed exchange rate regime.

We have represented the usual IS-LM analysis along with the requirement that the balance of payments is also in equilibrium. The different balance of payments schedules represent different degrees of capital mobility. Hence F_1F_1 is the case of perfect immobility of capital, while F_3F_3 represents the other polar case where capital is perfectly mobile.[12] F_2F_2 thus represents an intermediate case of the degree of capital mobility. Point A represents a point of full equilibrium. It implies that each and every market is in equilibrium. If the domestic asset of the banking system is increased, in the immediate run, the stock of money will increase, shifting the LL curve to the right (reducing the interest rate and increasing the level of income). Point B represents, according to Swoboda, a quasi equilibrium situation, meaning a situation in which a disequilibrium in one

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12 By capital we mean financial capital (short term) and not real capital. See Takayama A., International Trade, New York, Holt, Rinehart and Winston -1972 p. 327.

market is consistently prevented from spreading to other markets.[13] In the absence of a sterilization policy, the international adjustment mechanism will prevent point B to be sustained, and L'L' will shift back to LL. In other words, the system will come back to the full equilibrium point A, which implies that monetary policy affects neither the interest rate nor the level of income. More important, this conclusion is reached independently of any specific assumption regarding the existence and the degree of capital mobility (irrespective of the shape of the FF curve). Monetary policy will only affect the composition of the asset of the consolidated banking system between domestic asset and foreign reserve. Stated differently, in the long run, there exists only one level (or rate of growth) of the money stock, which will imply payments equilibrium.

D. The Small Country Assumption

The small country assumption is critical for the above conclusion because the idea that the deficit of the balance of payments will reduce the money supply will not hold if we have a reserve currency country, or a large country.[14] A large country is by definition one which has a strong effect on world demand. An increase in the domestic component of the money supply of the large country will increase the demand for goods and non-monetary assets worldwide, preventing the international adjustment to take place. Nevertheless, the reserve

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13 Swoboda op. cit. p. 240.

14 The same conclusion will hold in case of sterilization policy as already assumed.

currency country will experience an outflow of reserve due to the initial monetary expansion once foreign central banks refuse to accumulate the reserve currency monetary asset. This outflow of reserve could be delayed if foreign countries hold a large amount of the large country's currency as reserve. During this period monetary policy in the large country could be quite effective in short run stabilization policy. Indeed the U.S. was in this position early in the seventies as European central banks were holding large amounts of U.S. dollars as reserve.[15] Our fundamental position outlined above, then crucially depends on this small country assumption. Using a Keynesian model with perfect capital mobility, Mundell showed that an expansionary monetary policy will have the same effects on the domestic economy as that of an expansionary monetary policy in a foreign country. In other words, the final result will depend upon the effect of the increase in domestic asset on the overall 'world money supply'. This is another way of stating Ricardo's natural distribution of specie: the smaller the size of the domestic economy relative to the rest of the world, the smaller the effects of the increase in domestic asset upon the world money supply. As Mundell puts it:

> "...A $1 open market purchase in a small economy has the same effect on the world money supply and world investment as a $1 dollar open market purchase in a large country. This means that the stabilization effect of monetary policy in a small country depends upon its impact on income in the rest of the world; and if the marginal propensity to import abroad is proportionally slight, such

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15 D.L. Kohn, "Interdependence, exchange rate flexibility and national economies" in Current issue in monetary theory and policy ed. by T.M. Havrilesky and J.T. Boorman, AHM publishing corporation 1976, p. 488.

a policy could quickly run into the practical limitation that exchange reserves are not inexhaustible..."[16]

E. The Formal Analysis

Most empirical analysis of this adjustment process have been based on modeling the excess demand for money and analyzing its effect on the foreign component of the monetary base. Basically, modeling the open economy with a fixed exchange rate has very often taken the following form:

Defining the money supply as (1.1) $Ms = mH$

with Ms: money supply (usually equal to currency plus demand deposit)

m: money multiplier

H: DC + FR

DC: domestic credit (domestic asset of the central bank)

FR: foreign component of the money supply

(1.1) can be rewritten as $Ms = (DC + FR)m$

Very often, the money multiplier was assumed to be stable and equal to 1. Next, the demand for money can be defined as:

(1.2) $Md = kPy^{a_1} i^{-a_2}$ with:

Md: demand for nominal balances

y: scale variable (current or permanent income)

i: opportunity cost of holding money (index of interest rate)

P: index of price level

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16 Mundell: op. cit. p. 266.

α_1, α_2 : income and interest elasticity of the demand for money

$\alpha_1 > 0, \quad \alpha_2 > 0$

k: adjustment coefficient

Monetary equilibrium implies that:

(1.3) $\quad Ms = Md$

substituting (1.1) and (1.2) into (1.3) yields, after taking the logarithm:

(1.4) $\quad Ln\ H \equiv Ln(DC + FR) = Lnk + LnP + \alpha_1 Lny - \alpha_2 Lni$

from which we can derive an equation for the foreign component of the change in the money supply, which is identically equal to the BOP:

(1.5) $\quad B \equiv \Delta\ FR$ with B : balance of payments.

Next, defining the rate of growth of a variable as $R_x=(dx/dt)/x$, equation (1.4) yields, after proper differentiation

(1.6) $\quad (FR/H)R_{FR}=R_k + R_p + \alpha_1 R_y - \alpha_2 R_i - (DC/H)R_{DC}$

Equation (1.6) has been the general form used to test whether or not monetary policy was effective in an open economy with fixed exchange rate.[17] Modifications of this general equation have included the extension of the policy induced instruments of the monetary authorities. This is the same as saying that the money multiplier m is

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17 Although several authors used different versions of equation (1.6), the main variables such as income, the domestic component of the money supply and the opportunity cost of holding money are always present: see M.I. Blejer & R.B. Fernandez: "On the output inflation trade-off in an open economy: a short run monetary approach" The Manchester school of economics and social studies June 1978 No. 2 pp. 123-138. Also: Hans Genberg: "Aspects of the monetary approach to the balance of payments theory: An empirical study of Sweden" reading No. 13, in Frenkel & Johnson: op. cit. pp. 298-325. Also D.L. Bean: "International reserve flows and money market equilibrium" reading No. 14, in Frenkel & Johnson op. cit. pp. 326-337.

different from 1. Some authors were then able to use the following equation instead of (1.6):

$$(1.7) \qquad FR = h(P,y,i,DC,RQ)$$

with RQ being the reserve requirement ratio which is considered as a policy tool under the control of the monetary authorities.[18] Whatever the form of the foreign reserve equation used, one would reach the conclusion that if $E_{FR,DC}$, the elasticity between FR and DC equals minus one, a change in the domestic component of the money supply will be offset by an opposite change in the foreign component of the monetary base. Monetary policy therefore becomes ineffective. One can see that by solving equation (1.6) for R_{FR}:

$$(1.8) \quad R_{FR} = (H/FR).(R_k + R_p + \alpha_1 R_y - \alpha_2 R_i) - (DC/FR).R_{DC}$$

Equation (1.8) implies that the rate of growth of foreign reserve is inversely related to the rate of growth of domestic credit expansion. If $E_{FR,DC}$ is equal to -1, theoretically there is a complete offset in reserve loss. In general however, only a fraction of the increase in domestic credit will be offset by a reserve loss. Nevertheless, it becomes impossible for the monetary authorities to attain the full impact of their policy instruments. If $E_{FR,DC}$ was equal to 1, on the other hand, monetary policy actions would have been amplified by the international adjustment of the BOP. The closer $E_{FR,DC}$ is to minus one, the higher the offset to changes in domestic credit and the higher is the loss of control of the monetary aggregates by the

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18 V. Galbis: "Monetary and exchange rate policies in a small open economy." I.M.F. staff paper, July 1975, Vol. 22, No. 2 pp. 313-343.

authorities. Ideally, the monetary authorities would like to have $E_{FR,DC}$ equal to 0. In this case, we revert to the closed economy conclusions discussed earlier when monetary policy reaches its full impact. In any event, the closer $E_{FR,DC}$ to 0, the easier it is for the authorities to control the monetary aggregates.

Changes in y and i will affect the foreign reserve equation only through their effects on the demand for money. This is one of the central propositions of the monetary approach to the BOP.[19] From (1.8), $E_{FR,y}$ is equal to (H/FR). α_1 and $E_{FR,i}$ is equal to -(H/FR) α_2. Hence $E_{FR,y}$ is positive. An increase in income will increase the demand for money. This will in turn positively affect the BOP through its impact on the capital account. The view taken here is necessarily a long-run approach because it abstracts from the effects of the increase in y on the current account of the BOP. Hence, according to this approach, reserve growth will be positively related to economic growth and $E_{FR,y}$ will be positive. An increase in the interest rate will reduce the demand for money which will in turn negatively affect the BOP. Reserve growth will therefore be negatively related to the rate of change of interest rate. Several considerations are necessary at this point. Firstly, we have derived these conclusions without any specific references to capital movements. Indeed, most of the international adjustments with fixed exchange rate discussed in the literature have assumed a high degree of capital mobility. What then

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19 See various articles on the monetary approach to the BOP previously mentioned.

is the role of capital mobility in this adjustment process? Secondly, to what extent can we say that this adjustment process would possibly work in developing countries such as the WAMU countries?

F. The Role of Capital Mobility in the International Adjustment

As previously stated, capital mobility will not affect the end result of the adjustment process. Stated differently, independently of the degree of capital mobility, a disequilibrium in the money market will be restored through the balance of payments. The question one can ask is the length of time necessary for this international adjustment to take place. In other words, how long will it take for the system to move back from point B to the full equilibrium point A (fig I), assuming no sterilization policy takes place. Indeed, the degree of capital mobility will affect the speed of this international adjustment. The higher the degree of capital mobility (assumed to be interest elastic) the larger the balance of payments disequilibrium brought about by a disequilibrium in the money market, and the more difficult it is for the monetary authorities to engage in any form of sterilization policy. Since the system will move quite rapidly from point B to point A, equations (1.6) or (1.7) frequently used to determine the extent of the effectiveness of monetary policy seem inadequate since they do not take into consideration the effects of this capital mobility. The point is that since we are dealing with the

short run, the degree of capital mobility will make a difference. If we assume capital immobility, then once we move at point B after a monetary disturbance, it will take a while before the full payments adjustment occurs. During this interim period, monetary policy can be quite effective in affecting the interest rate and income. On the other hand, if we assume perfect capital mobility, this interim period will be reduced to a minimum (in fact it will be instantaneous) since perfect capital mobility implies that the domestic interest rate is equalized to the world interest rate, and any discrepancy in the money market will be instantaneously removed through the international payments adjustment. Equations such as (1.6) or (1.7) therefore will be unable to capture the whole effect of the effectiveness of ineffectiveness of monetary policy in a short run analysis. Nevertheless, these equations will be quite correct in explaining this international payments in a long-run analysis when all the necessary adjustments have taken place. This is because with perfect capital mobility the adjustment is direct rather than cyclical. This can be shown through the following analysis.[20] Let us define the excess demand for goods and services by X and the balance of payments surplus by F. Equilibrium in both markets will be given by:

$$(1.9) \qquad X = X(p,r) = 0 \quad \text{with } X_p < 0 \text{ and } F_p < 0$$

$$(1.10) \qquad F = F(p,r) = 0 \quad \text{with } X_r < 0 \text{ and } F_r > 0$$

where p and r respectively represent the ratio of home and foreign price, and the domestic interest rate.

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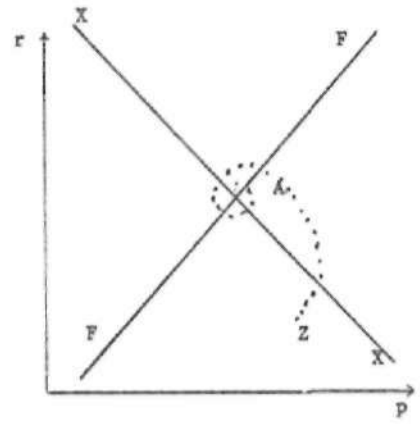
20 Mundell: *International Economics*, op. cit. p. 158.

Differentiating (1.9) and (1.10) totally yields:

$$(1.11) \qquad \left.\frac{dr}{dp}\right|_{X=0} = -(X_p/X_r) < 0$$

$$(1.12) \qquad \left.\frac{dr}{dp}\right|_{F=0} = -(F_p/F_r) > 0$$

the system (1.11) and (1.12) can be represented by the following graphical analysis:



XX: Goods and services market equilibrium

FF: Balance of payments equilibrium

Fig. 2: Dynamic adjustment in the money market.

any point above FF represents a point of BOP surplus and any point below FF represents a point of BOP deficit. Similarly any point below (above) XX represents a point of excess demand (supply) in the goods and services market. We can rewrite (1.11) and (1.12) in dynamic form in the following way:

$$(1.13) \qquad \frac{dp}{dt} = k_1 X(p,r)$$

$$(1.14) \qquad \frac{dr}{dt} = -k_2 F(p,r)$$

linerarizing, using Taylor's expansion yields:

$$(1.15)\quad \frac{dp}{dt} = k_1 X_p(p-\dot{p}) + k_1 X_r(r-\dot{r})$$

$$(1.16)\quad \frac{dr}{dt} = -k_2 F_p(p-\dot{p}) - k_2 F_r(r-\dot{r})$$

with $\dot{p}$ and $\dot{r}$: equilibrium price and interest rate.

From (1.15) and (1.16) one can derive the characteristic roots of the system as:

$$m_1, m_2 = \frac{k_1 X_p - k_2 F_r \pm \sqrt{(k_1 X_p + k_2 F_r)^2 - 4k_1 k_2 X_r F_p}}{2}$$

The interesting point is that the system will approach the equilibrium asympototically if the discriminant D is positive. But if D is negative, the system will approach the equilibrium cyclically. But D is positive only if F_r is very large, which implies that the movement back towards equilibrium will be direct when there is a high degree of capital mobility. In other words, assuming that a monetary disturbance decreases the interest rate so that the system moves from point A to point Z, the system will follow a cyclical pattern in coming back to point A in the case of capital immobility. But in the case of perfect capital mobility, the adjustment to point A will be direct rather than cyclical. This is because the decrease in the interest rate will create an excess demand for financial assets and a balance of payments deficit. This will in turn create a rapid rise in the interest rate due to the high degree of capital mobility. The interest rate will quickly bounce back to its initial equilibrium without any change in the price level. The higher the degree of

capital mobility, the faster the adjustment of the interest rate towards its equilibrium value $\dot{r}$.

G - The Role of Non-tradeable Asset in the International Adjustment

However, a strong assumption made in this international adjustment is the almost perfect substitutability between domestic and foreign assets. An open market operation by the monetary authorities will have no effect on the domestic economy because asset holders will readjust their portfolio through the international financial markets. Domestic money is therefore simply exchanged against international assets. In other words, the central bank has conducted its open-market operation with foreign asset holders. This adjustment will hold only if domestic citizens perceive international assets as close substitute for domestic assets. The existence of non-tradeable domestic assets will prevent this adjustment to take place. Put differently, there is room for short-run maneuvrability by the central bank. By conducting its monetary policy in the non-tradeable asset, the central bank could affect the domestic interest rate and therefore could force the economy to stay at a point such as C in the short run (fig. 1). The importance of non-tradeable debt for the effectiveness of short-run monetary policy was recognized only recently.[21] However, for countries such as the WAMU this argument has strong relevance. Indeed, as discussed in the institutional background of these

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21 R.S. Boyer, "Commodity markets and bonds markets in a small fixed exchange rate economy." Canadian Journal of Economics, VIII No. I, February 1975, p. 123.

economies, there seems to be a growing number of economic units issuing debts which are far from being a substitute for international or foreign assets. If this is the case, the central bank of the WAMU could affect domestic spending and therefore income. This will make monetary policy more effective in spite of the extreme openness of these economies. More formally, it is assumed that the non-tradeable asset is held by both the commercial and central bank and is supplied by the domestic private sector. The banking sector also holds tradeable debts. One can then specify the money and credit market equations in the following way:[22]

(1-17) $M = m(r,i,v) \quad (R + D + N)$

(1-18) $L = L(r,i,y,w)$

money market equations

(1-19) $K = \phi\ (r,i,v) \quad (R + D + N)$

(1-20) $V = V(r,i,y,w)$

credit market equations

$mi > 0, \quad Li < 0, \quad \phi\, i > 0, \quad \phi\, r < 0, \quad Vi < 0, \quad Vr > 0$

M: money supply

R + D + N = H = monetary base

m: money multiplier

r: interest rate on traded debt
(exogenously given)

i: interest rate on non-traded debt

R: Central bank reserve

D: Domestic credit

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22 This model is adapted from R. Dornbusch, "Capital Mobility and Portfolio Balance," in The Political Economy of Monetary Reform, ed. by R. Aliber - Allanheld, Osmun & Co., publisher, 1977, pp. 106-125.

v: vector of central bank control parameter

y,w: income and wealth variables (exogenously given)

L: Demand for money

K: supply of domestic loans by commercial banks

V: excess demand for loans from the private sector

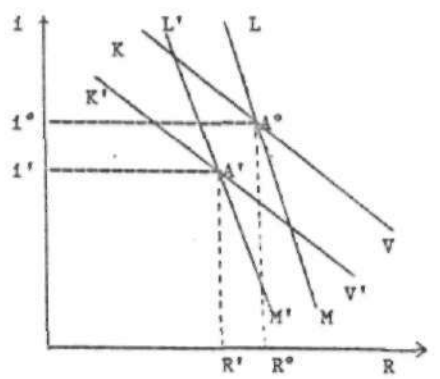
N: non-traded debt held by the central bank

Equilibria in both markets are given by:

(1-21) $m(r,i,v)H = L(r,i,y,w)$

(1-22) $\Phi(r,i,v)H = V(r,i,y,w) - N$

In the (i,R) space, (1-21) and (1-22) can be represented by the following graph:



LM: money market equilibrium

KV: credit marked equilibrium

Fig. 3: The role of non-tradeable asset in the international adjustment.

The relative slopes are calculated in the Appendix 1. A° represents a simultaneous equilibrium in both markets. An expansionary open-market policy (or increase in the rediscounting facilities) in the non-tradeable debt N will create an excess supply in both markets, at the initial interest rate. Both schedules will therefore shift to the left. However, VK will shift more than LM (see Appendix 2). At the new equilibrium A' both the domestic interest rate and the stock of

reserve have decreased. However, the absolute value of dR/dN is between 0 and 1, implying that the reserve offset is not complete. The decrease in i also implies that there is room for monetary policy in a small open economy on the assumption that open market operations are conducted through the non-tradeable asset. Given an initial portfolio equilibrium, an increase in the central bank holding of the non-tradeable debt will affect the yield of this domestic asset. This will in turn induce a portfolio shift towards money and international bond, thereby reducing the amount of reserve. One of the problems in Dornbusch's analysis is the confusion which might exist between D, the domestic credit, and N, the non-tradeable debt. In general, it could be very difficult to distinguish between the two. In conducting monetary policy, authorities will practically be unable to distinguish between different degrees of tradeability of assets in foreign markets. The only possible way to make this distinction will be through some selective credit control devices. This is the type of policy instruments used by the central bank of the WAMU. Indeed, policies such as inducing commercial banks to shift from holding of tradeable to non-tradeable debt, or subsidizing (taxing) financial intermediaries holding more non-tradeable (or tradeable) debt are devices which might strengthen the role of monetary policy. The response of commercial banks is therefore crucial to the extent that they could annihilate any or most of the policy effects. For example, faced with a restrictive monetary policy on non-tradeable debt (decrease in central bank holdings of N), commercial banks could borrow in the international market to buy local debt. Similarly, in the event of

expansionary monetary policy (increase in N), commercial banks lending in the foreign market after borrowing domestically could be a major drawback in the effectiveness of monetary policy in achieving the desired goal.

From the preceding analysis, it will be necessary to take into consideration the degree of capital mobility when modeling the foreign reserve component of the money supply. In other words, we should explain not only the factors which affect the demand for money, but also the factors which explain capital flows between the WAMU countries and France. Before turning to this model, one should point out that following Tobin, capital flows should be analyzed in a model of portfolio distribution.[23] Before Tobin's pioneering work on portfolio distribution, capital flows were basically related to the interest rate differential in a partial equilibrium analysis.[24] Accordingly, a reduction in the domestic interest rate would increase the outflow of capital (reduce the inflow), and more importantly, as long as the domestic interest rate remained low relative to the foreign interest rate, the outflow of capital would continue. The implications for balance of payments adjustments were obvious. If a country was suffering from a balance of payments deficit, the monetary authorities should simply use their policy instruments to increase the interest rate. This will bring about a permanent improvement in its

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23 J. Tobin: "A general equilibrium approach to monetary theory." Journal of Money, Credit and Banking, vol. 1, 1969

24 By capital flows was meant flows of non-direct investment items in the capital account plus errors and omissions.

balance of payments through its capital account. Until the early seventies, this flow approach to the international adjustment was widely accepted by well-known economists such as Mundell who wrote:

> "...at high rate of interest, the net inflow of capital will be larger, or the net outflow will be smaller, than at low rate of interest."[25]

This approach has been strongly criticized on two grounds: the first, also known in empirical analysis as the 'simultaneous equation bias' is that the flow approach implies that the interest rate will be completely independent of the capital flow. In fact, interest rates will affect capital flows which in turn will affect the interest rate, making it impossible to determine which way the causality runs. The second critique already alluded to earlier and also related to the first, refers to the fact that the flow approach fails to realize that international capital flows will change the non-monetary wealth of a given community, and will therefore shift the demand for money. In other words, the proper way to analyze these capital flows should be through a portfolio distribution between monetary and financial assets. At any point of time, given the interest rate and the estimate of risk, economic units will distribute their wealth between these two assets and a given change in the interest rate will bring not a continuous but a once and for all stock adjustment in the portfolio of wealth holders. As Branson and Hill put it:

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25 R. Mundell: "The monetary dynamics of international adjustment under fixed and flexible exchange rate." QJE, May, 1960, p. 230.

> "...Raising domestic interest rates will produce a one shot stock adjustment inflows of capital as portfolio are redistributed. Thus the major initial effect of an increase in domestic interest rate will be a reallocation of portfolio held by both foreigners and domestic citizens towards domestic assets."[26]

This implies that balance of payments adjustments through the capital account can only occur through a continuously rising interest rate. In other words, the continuous flow of international capital will depend upon the rate of growth of the stock of money. The continuous effect of capital flows will be accounted for by the rate of growth of the monetary asset in a given country which will in turn induce the residents of this country to accumulate financial assets (both domestic and foreign) at a faster rate. Most recent capital flows analysis have been done through this portfolio approach and we will do the same in this study.[27] Before presenting this model, we shall briefly discuss the institutional framework as it exists in the WAMU countries today.

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26 W.H. Branson & R.D. Hill, "Capital Movements in the OECD Area: An Econometric Analysis" OECD Economic Outlook,Occasional Studies, Dec. 1971.

27 Several authors have analyzed capital flows in the portfolio perspective: see for example J.E. Floyd, "International capital movements and monetary equilibrium" AER vol 59, Sept. 1969 pp. 472-92; "Monetary and fiscal policy in a world of capital mobility." Review of economics studies Vol 36, Oct. 1969 p 503, "Portfolio equilibrium and the theory of capital movements", International Mobility & Movements of Capital ed. by Machlup, Salant and Tarshis, NBER New York 1972.

CHAPTER II

THE INSTITUTIONAL FRAMEWORK

The six countries comprising the WAMU cover an area of about 2.2 million square kilometers and are populated by approximately 22 million inhabitants.[1] The gross domestic product commanded by this region was about 1,595 billion C.F.A. francs in 1975.[2] Before receiving their independence from France between 1959 and 1960, these countries used to belong to the French West African Federation (AOF).* As we shall later see, these countries never totally broke away from the former colonial power after independence, and their close ties are currently reflected in the organization of their political institutions, the monetary and banking system, a well as the pattern of trade. Indeed, special economic and financial relations were maintained with France, and since 1964, with the European Economic Community through several agreements. These agreements mainly govern trade relationships between the European Economic Community (EEC) on the one hand, and several countries from Africa, the Carribean and Pacific, on the other hand and therefore, affected the WAMU countries. Before discussing the monetary and banking system which is our main concern in this study, it will be necessary to present the

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1 The WAMU is formed by Senegal, Ivory Coast, Togo, Niger, Benin and Upper Volta. Before 1972, Mauritania belonged to the WAMU.

2 Before August 10, 1969, the conversion rate of the CFA was: 246.853 C.F.A Franc for 1 U.S. dollar. After August 10, 1969: 277.71 C.F.A Franc for 1 U.S. Dollar.

* Togo did not belong to the A.O.F. but was a United Nations Trust territory under French administration.

organization and functioning of the economy of the WAMU as evidenced by the structure of production and trade. It has often been said that problems in underdeveloped countries are more structural than anything else. Knowledge of these structural aspects of the economy will be helpful in understanding some of the constraints placed on the central bank in the conduct of monetary policy.

A - The Real Economy

A-1 Structure of Production.

The WAMU countries are predominantly agricultural countries which rely on the exports of a few crops as their main source of income to finance their development plans. In 1963, at the time of the creation of the WAMU, the agricultural sector represented about 40% of the G.D.P. Today, the importance of agriculture has not decreased much, even with the relative success of recent industrialization programs mainly in the Ivory-Coast and Senegal. The main income-generating crops are cocoa, coffee, groundnut, cotton and wood. Table 2 gives a breakdown of these main export products in terms of quantity produced and value of output. The only minerals produced by these countries are uranium, calcium and aluminum phosphate. Table 3 also gives a breakdown of the production of these minerals which still represent a small proportion of the overall export earnings of the WAMU. The WAMU countries are then exports economies which rely on the exports of mostly unprocessed or raw products which they sell in the world market at a given price. In other words, they are price takers for their

exports and can only maximize their export income by selling as much as they can at the given international price. The demand elasticity for export facing each country is therefore very high. The availability of substitutes and the perishable nature of these products make it difficult to be otherwise.

The relative importance of agriculture stems from a number of factors. First, historically, during the colonization, the economies of the WAMU countries were designed and organized to be a source of raw materials and tropical products for the French market, and later for the European economic community. These economies were therefore geared towards the outside. This is reflected in a trade pattern which is totally skewed against intra-African trade. Secondly, after the independence, relying on the theory of "comparative advantage", it was thought that the best and least costly way to accelerate the development process will be to heavily invest in the primary sector, which, in the future will help develop the industrial basis. Structurally, developing countries have usually been analyzed in terms of the dualistic structure of their economy. Indeed, any economy which heavily relies on export as its main source of income and uses foreign factors of production is a dual economy.[3] The dualism theory divides the economy into 2 main sectors. First, the traditional or subsistence sector is mainly confined to the primary sector. The techniques of production used in this sector are rudimentary, highly

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3 For a discussion of dualism theory, see several articles in G.M. Meier: Leading Issues in Economic Development, Oxford University Press. 3rd edition, 1976. p. 125-164.

labor intensive and productivity is usually low. More important, this sector is characterized by its low contribution to the overall money output, since most of the exchange takes the form of barter. Moreover, formal credit instruments are almost non-existent and most of the lending and borrowing activities are done on parole through traditional moneylenders, (usually Lebanese merchants). It is obvious that in such a case, monetary policy will have very little effect on this sector of the economy since it will be unable to affect spending. Moreover, with the interest rate institutionally fixed, monetary policy will be unable to affect the rates charged by traditional money-lenders in their borrowing or lending activities. The modern sector usually involves foreign owned concerns in majority subsidiaries of French companies or commercial banks. Their operations are totally different from the peasant sector. Production techniques used in this sector are modern and capital intensive. Management techniques are imported from abroad which implies that the manpower also is usually foreign.[4] Activities in this sector are concentrated in the modern export agriculture and the young industrial, banking and service sectors. More important for our subsequent analysis, the modern sector extensively uses formal credit instruments and issues local claims which are close substitutes to French assets. In other words, they are internationally tradeable assets. One would then

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4 In Ivory-Coast, in 1975, more than 75% of management positions were filled by Europeans, mostly French - See J.H. Pegatienan: "Le Role du Marche Mondial dans le developpement economique de la Cote d'Ivoire" in C.I.R.E.S. No. 26 - September 1980. p. 99-118.

expect this sector to respond to the stance of monetary policy and its behavior will be critical for our analytical framework. Spending decisions in this sector will be affected by both money market conditions and the international adjustment process. In other words, portfolio decisions in the modern sector will also depend upon foreign (French) money market conditions.

The notion of dualism is not actually well suited to analyze the productive structure of these economies because of the growing existence of a relatively modern African sector which fills the gap between the traditional and modern or international sectors.[5] Concentrated mainly in the service sector, these are young African firms with relatively capital intensive production processes. They issue credit instruments which are marketable only nationally (domestically). In this regard, they are quite different from the international firms. Spending decisions in this sector will be affected by monetary policy since they lack the flexibility of moving in the international money market. However, one would expect financial institutions to adjust their portfolios by buying or selling assets which are internationally tradeable, therefore releasing the pressure on these locally tradeable assets. Financial intermediaries could therefore borrow on foreign financial markets to finance local investments. In other words, changes in monetary policy could imply more changes in the holding of internationally tradeable assets than

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[5] This is what Lamson, G.H. refers to as the "Fringe of the Modern Sector:" in Central Banking in an Open Export Economy: the Monetary System of French Speaking West Africa, 1936-67. op. cit. p. 15.

the holding of non-tradeable assets. This has profound implications for our framework, since one of the elements which could prevent the working of the international adjustment mechanism is the existence of non-tradeable securities.

A-2 Trade Structure.

It is a characteristic of export economies to have a very important foreign trade. WAMU countries' foreign trade accounted for about 40% of their total gross domestic product at the time of independence and by 1975, the ratio had reached approximately 50%. Overall exports from the WAMU countries reached 782 billions of C.F.A in 1977: 72 percent of this trade was with Europe and only 5 percent between themselves; the rest accounting for trade with America, Asia and other African countries which are non-members of the WAMU. Exports towards France reached 33 percent, showing the relative decline but ever present French ties with its former colonies. In 1977, imports were valued at 847 billions of C.F.A. with the relative shares of Europe, France and intra-WAMU trade being 66, 40, and 3 percent respectively.[6] Two conclusions are quite obvious from these statistics. First, the relative importance of the foreign sector in the WAMU countries and, secondly, the relative weakness of intra-WAMU trade (Exports to and imports from Europe and North America reached approximately 80 and 74 percent in 1977). We will discuss each of these points.

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6 These trade statistics were computed from "Statistiques Monetaires et Economiques" in Notes d'Information et de Statistiques. published by the B.C.E.A.O. March, 1981. No. 297.

A2-1 Importance of Foreign Trade.

As mentioned earlier, WAMU countries' foreign trade has reached almost half their overall gross domestic product. This is accounted for by the combination of certain factors. First, apart from the historical situation already mentioned, the steady investment and equipment programs maintained by these countries since 1960 has implied a rapid increase in imports.To pay for these imports, the level of exports had to be increased over the years. Also, the industrial policy of import substitution started in the late sixties did little to reduce the level of imports as they were supposed to. On the contrary, these policies implied an even higher degree of imports to build and develop these import substitution firms.[7] More than anything else, the high ratio of foreign trade is caused by the very low domestic supply elasticity for import commodities in the WAMU countries. Indeed, there is a strong domestic demand for import products which cannot be satisfied by the domestic productive capacity of these economies. Paradoxically, there is a very high supply elasticity for export commodities coexisting with a very low domestic demand for these same export products. The imbalance between supply and demand elasticities of imports and exports is the basic explanation of the importance of foreign trade in the WAMU countries.

A2-2 Intra-WAMU Trade.

As table 4 shows, the trade balance of the WAMU has been in constant deficit since the formation of the monetary union in 1963.

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7 For a short discussion of Import-substitution strategy, see G.M. Meier. op. cit. p. 648-654.

This situation is partly due to the instability in world prices of primary commodities, and partly due to the rapid increase in import to meet the targeted investments in capital formation set by different development plans. Exports are made up of a few agricultural products with the share of semi-finished and finished products totally negligible. Imports, as expected, are made up of finished and manufactured goods for capital investment and consumption. This dichotomy in the structure of trade explains the skewedness of trade against intra-WAMU trade. Putting it differently, the WAMU countries produce similar and competitive products, which largely prevent the development of intra-WAMU trade. Interestingly, one should notice that this similarity of production in the WAMU countries does not cover only agricultural outputs, but also processed and industrial products. This comes from the creation of similar industries in these countries, which in turn implies a lack of planning harmonization at the regional level. The implantation of these competitive industries in very small markets is bound to reduce intra-WAMU trade flows and increase inefficiencies. Indeed, between 1972 and 1978, intra-WAMU trade decreased from 5.8% to 4.1% relative to the overall trade of these countries. This skewedness of foreign trade is clearly obvious from the following matrices of intra-WAMU trade as shown by tables 5, 6, and 7. In 1978, for example, the bulk of this intra trade has been industrial products (34%) and foodstuffs (30%). This also depicts a division between the more and less advanced of the WAMU countries. Ivory-Coast and Senegal were responsible for 90% of exports of industrial and semi-finished products. These goods consist of

articles such as flour, refined oil and soft drinks, soap, plastic and so on (tables 8 and 9). Another aspect of this intra-WAMU trade is the importance of overland or non-reported trade occuring between Upper Volta and Niger, the landlocked countries, on the one hand and the four other coastal countries. This overland trade takes the form of export of livestock from these "interior" countries to the coastal ones. The last aspect of this intra-WAMU trade is the relative decline of Senegal in the overall region. In 1960, at the time of independence, a full 30% of the WAMU intra trade came from Senegal. In 1973, this ratio fell to 1.5%. Several factors account for this decline. The loss of the Malian market after the breakdown of the Federation of Mali left several Senegalese firms with substantial excess capacity and to a lesser extent, the strong economic growth experienced by the Ivory-Coast since 1965 overshadowed Senegalese performance.

Clearly, intra-regional trade aspects represent one of the areas where most efforts should be deployed in the near future. Indeed, one should recognize that the problem does not only lie with the productive structure, but also with the transportation system (most asphalted roads run from the interior to the coastal ports which makes it difficult to travel by road between African countries), the communication system (it is easier to communicate between capital cities in WAMU and Paris than between two cities of the Union) and also the banking and insurance system (most financial intermediaries are simply French subsidiaries and they tend to deal more on export related activities). It is then necessary to reorient the whole

pattern of trade in Africa in general and in the WAMU in particular. It has already been recognized by some authors that there exists a limit in the capacity of industrial countries to absorb the increasing quantity of non-processed, semi-finished products and minerals coming from less developed countries. Hence, each of these countries is competing for a more and more limited market in developed countries.[8] Indeed, the recent downward movements in world prices of certain primary commodities such as sugar, coffee, cocoa, groundnut, and minerals such as copper, show a tendency towards a limit of the demand for these types of products in developed countries. If this is the case, it will then be more than urgent for the WAMU countries to move into progressive but steady changes in the pattern of intra-regional trade. Increasing regional demand with higher domestic supply elasticity for import products will be necessary to increase the level of productivity and change the overall structure of these economies. Such changes will definitively lead to an increase in the use of domestic factors of production and a better resource allocation if these changes are implemented on a regional scale. Indeed, the size of the market in each WAMU country (the most populated WAMU country has 8 million inhabitants) makes clear the urgency of changes at the regional level.

Unfortunately, while monetary integration in the WAMU is complete (with the existence of a common central bank which issues a common monetary unit), economic integration has been lagging, and even in the

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8 S.C. Nanan Sinkam, "Africa and Monetary Integration." Mouton Publishers, New York, 1978. p. 21.

trade area, the WAMU countries have fallen short of establishing a custom union.

A-3 Attempts at Trade Integration.

All WAMU countries plus Mauritania and Mali belong to the West-African Economic Community (C.E.A.O.) since 1972. The C.E.A.O. was created to replace the West African Custom and Economic Union (U.D.E.A.O.) dissolved in 1970 for lack of compliance of its terms by its members.

The predecessor of the U.D.E.A.O. was the West African Custom Union (U.D.A.O.) created on June 9, 1959, between Dahomey (now Benin), Ivory-Coast, Mali, Mauritania, Niger, Senegal and Upper Volta. The objectives of this custom union were the harmonization of import taxation among member countries, the complete reduction of customs and fiscal duties on trade among members, and the establishment of a common external tariff.[9] Unfortunately, the Union was unable to meet its objectives, because its goals were overambitious and also, its members failed to comply with the agreements. Indeed, after independence, members still were maintaining a differentiated structure of fiscal duties, according to their own financial needs and constraints. The goals of the Custom Union were overambitious because it prevented member countries from increasing their financial

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9 Custom duties varied according to the origins of the goods imported (ex: countries subject to the most favored nation treatment were subject to minimum tariff) - they were therefore used for fiscal and protective purposes. Fiscal duties were used mainly for revenue purposes, and they were levied independently of the origins of the goods.

resources from import taxes, their main source of income.[10] In June 1966, a new union (U.D.E.A.O.) was created to replace the former custom union. In fact, the U.D.E.A.O. never provided for a true custom union. Members perceived the sacrifice in terms of tax revenues as being too high and national interests prevailed over the regional ones.

Due to the failure of the U.D.E.A.O., a new organization (C.E.A.O.) was born in 1972. The West-African Economic Community called for free trade in crude material and, more importantly, a common external tariff to be put into effect within 12 years. The community also called for the establishment of a development fund to be used to compensate member countries suffering revenue losses from the reduction in tax on intra-union trade. Indeed, this last aspect has been one of the main impediments in the implementation of economic grouping in the area. The poorer and landlocked countries (Upper Volta and Niger) see any attempts at economic integration as benefiting only the richer and coastal countries. Reduction of intra-group fiscal duties will prevent poorer countries from relying on an important source of their financial revenues. Also, the common external tariff will potentially create a trade diversion from third countries' products to manufactured output of the more advanced countries of the Union. In other words, there is the possibility of the poorer countries subsidizing the more advanced ones by purchasing

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10 I.M.F., Survey of African Economies, published by the I.M.F., Washington, Vol. 3, 1970, p. 19.

their more expensive manufactured output.[11] It was then necessary to set up a mechanism to compensate the poorer nations.[12] Overall, more theoretical work still needs to be done on the means of achieving economic integration in Africa. As mentioned earlier, the widening of market will have its effect not only through the traditional trade diversion and creation, but also dynamically through industrial growth by increasing specialization and economic efficiency. By increasing the optimal size of firms, there will be a reduction in average cost.

Another aspect of the trade structure of the WAMU countries refers to their association with the European Economic Community. Under the second Convention of Association (known as Yaounde II) between the E.E.C. and 18 African countries (that includes the WAMU countries), trade advantages initially reserved to France by the WAMU countries were gradually extended to other E.E.C. members.[13] The Convention, therefore, provided for the same tariff treatment (custom duties) by WAMU countries regarding the imports from the E.E.C. members. Similarly, it also called for the progressive elimination of specific quotas on French exports maintained by the WAMU countries.

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11 I.M.F., Survey of African Economies. op. cit. p. 39.

12 The Entente Council (Ivory-Coast, Upper Volta, Niger, Togo, Benin) which is not discussed here created a solidarity fund which received its contribution from each member state (one tenth of each member government receipts). One fifth of the total fund was to be distributed among members in inverse proportion to their contribution.

13 The first convention of association occurred at the time of the creation of the European Economic Community. For a discussion of the trade effects of these conventions see: A.D. Ouattara, "Trade Effects of the Association of African Countries with the European Economic Community" I.M.F. Staff Papers, Vol. XX, July, 1973. p. 449-543.

The third and fourth conventions still maintain the close ties in trade relationship between the WAMU and European Community which in turn explains the high proportion of trade between these 2 groups of countries as noted earlier.

B. The Banking and Monetary System

While trade arrangement and integration have been far from being a success story in the WAMU, the monetary system, however, has shown a great deal of stability and cohesiveness. The monetary system of the WAMU has reached the highest degree of integration one could conceive. Practically, member countries have totally relinquished their monetary sovereignty and left monetary policy under the responsibility of a supranational entity: the Central bank of the West-African States (B.C.E.A.O.). The monetary system of the WAMU can then be characterized by the following points:

1. A common central bank responsible for the definition and implementation of monetary policy.

2. A common currency, the C.F.A. (Communaute Financiere Africaine) issued by the B.C.E.A.O. which is a legal tender in the whole union.

3. The centralization of reserves by member countries.

4. A fixed exchange rate between the C.F.A. and the French franc.[14]

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[14] 1 FF = 50 CFA: This exchange rate has not been modified since 1948.

What makes this monetary system a very peculiar and strange one is the so-called "convention of operation account", which is an agreement between the French Republic and the WAMU whereby France will guarantee the C.F.A. This guarantee contains some features worth further explanations. The French treasury opens an account in its books in the name of the B.C.E.A.O. which represents the WAMU countries on monetary affairs. THE B.C.E.A.O. puts all its foreign exchange earnings in this account called an "operation account". In return, the French treasury will grant unlimited overdraft facilities in French Francs to the B.C.E.A.O. under very specific and restrictive conditions. We will come back to the details of the organization of the WAMU and the functioning of this operation account, but one can already realize the strong French influence in the monetary affairs of the WAMU (a reflection of the strong French share of WAMU external trade). This heavily contrasts with other African countries which were former members of the Sterling area and used to belong to the currency board system.[15] The differences between the two systems can be partly explained by the philosophical differences in cultural patterns between the French and the British during the colonization period. While the French believed in centralization and the creation of an elite group, culturally dependant upon Paris, the British believed more in administrative decentralization and the promotion of

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15 One should notice that the currency boards had their own problems since they were more of an exchange office than a true Central bank. They were mainly exchanging African currency against the British pound and vice versa.

Africans from within the system. As Mundell euphemistically explains these divergencies in view:

> "The French system tended to provide their colonies with the product of (progress) but not the tools or technology which render the native production of those goods possible, or the native elite free from dependence on the metropolitan center.[16]

These philosophical differences can be found in the actual organization of the monetary systems in French and English speaking Africa. While today totally independent central banks exist in English speaking Africa, the former French colonies have never attained the same degree of monetary independence. This monetary independence has allowed the English speaking countries to gain experience in monetary organization and policy even though at a very high cost in terms of inflationary finance and strict exchange control systems which in most cases have tended to overvalue the monetary unit and reduce a great portion of trade to barter. In French speaking Africa, on the other hand, the lack of complete monetary independence has been compensated by better managed monetary affairs and a strong financial discipline which sometimes has inhibited economic growth.[17] In the case of the WAMU countries, free convertibility of the monetary unit, financial orthodoxy and complete freedom of capital movements

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16 R. Mundell, "African Trade, Politics and Money" in Africa and Monetary Integration, edited by Rodrigue Tremblay, HRW 1972, p. 27.

17 Rodrigue Tremblay, "Monnaie et sous development en Afrique Occidentale Sous Saharienne" Center for Policy Alternatives. Massachusetts Institute of Technology - July 1975.

seem to have been the major goals of the B.C.E.A.O. in the conduct of monetary policy. Strong criticisms especially geared towards the extreme conservatism of the B.C.E.A.O. and its lack of monetary independence (which manifested itself through the impact of successive French devaluation on the C.F.A.) led to a major reorganization of the WAMU in 1974. This was necessary to prevent the complete breakdown of the union (Mauritania left in 1972).

Before discussing the conduct of monetary policy in the WAMU, it will be necessary to discuss the internal organization of the union. This will be done in three steps. The actual organization of the WAMU has evolved historically from the time the member countries had no political identity. We will, therefore, briefly account for this period since it can throw some light on the basic relationship between the WAMU and France. Between 1962 and 1980, the Union underwent a major change (in 1974) and it will be necessary to distinguish between the period before and after 1974 since significant differences in the organization of the WAMU did occur.

B-1 The Historical Development of the WAMU.

Much has already been said on the historical development of the WAMU.[18] We will, therefore, briefly sketch the principal characteristics of the monetary system before independence of these African countries between 1959 and 1960. Monetary and financial

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18 See Gaston Leduc, Les Institutions Monetaires Africaines. Editions A. Pedone - 1965, Chapters 1 and 2. Also, Xavier de la Fourniere: La Zone Franc collection. Que sais je P.U.F. 1971. Chapter I.

institutions in West Africa have followed the political evolution of the WAMU countries. First, during the period 1830 to 1945, these countries belonged to the French empire and, as such, had no separate identity. Monetary and financial institutions did not differ from France's and if they did, they were mere overseas extentions of French institutions. Indeed, only one currency was in use at the time: the colonial Franc. During the period following World War II till 1955, known as the "French Union" or classical age of the Franc area, slight changes in monetary and financial organization occurred between France and its African territories.[19] The C.F.A. did appear in these territories after 1945 when the French Franc was heavily devalued because of inflation and payment imbalances resulting from the war. Because this devaluation did not apply to the colonial territories, monetary units issued in these areas received a new label: the C.F.A.*. Central banking activities in these overseas countries were put under the responsibility of a private commercial bank, the B.A.O. (West African Bank) to whom was granted the sole right of currency issue. Free convertibility of colonial Francs into French Francs at a fixed rate was maintained by the B.A.O. and in 1948, the exchange rate was fixed at 2 old French Francs to 1 C.F.A. After the French monetary reform of 1958, which created the new French Francs, the exchange rate followed this change and was set at 1 FF to 50 C.F.A.

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19 Xavier de la Fourniere: op. cit. p. 11.

* Before independence the C.F.A stood for Colonies Francaise d'Afrique (French Colonies in Africa).

It should be remembered that this did not imply a change in parity and in fact, the 1948 parity has not been changed up until now. The financial institutions were a mere extension of French commercial banks in Paris and many of these ties are still maintained.

During the period 1955 to 1960, the era of the "French Community", the ideas of independence for the colonies were already being discussed and some local autonomies were granted to colonial institutions. Federal and public institutions were created to recognize the specific character of the colonies and more important, in 1955, the right of currency issue was transferred from the B.A.O. to a public institute, the bank of issue (Institut d'emission de L'Afrique Occidentale Francaise et du Togo), which in 1959, changed its name to the actual B.C.E.A.O. It was during this period that the famous operation account was established. In 1955, such an account was opened in the French treasury under the name of the bank of issue and, later on, the B.C.E.A.O., providing overdraft facility for the Central Bank. In 1962, two years after formal political independence from France and the creation of political entities in these African countries, the treaty establishing the WAMU was signed and to it was added the convention of "operation account" between the WAMU countries and Frauce.[20]

Commercial banking did follow the same evolution during these 3 periods. While before 1955, they were simply French commercial banks

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20 It should be noticed that the treaty establishing the WAMU countries could continue in force even in the event of abrogation of the convention of operation account.

operating in West-Africa, and therefore, were subject to French banking legislation, after 1955, regulations on banking were still French, but African representations were allowed on the commissions on banking control. By 1960, and thereafter, one witnessed a reorganization of several commercial banks and the broadening of the capital base to include U.S., German and local government participations. With the WAMU treaty, commercial bank legislations were placed entirely under the responsibility of member countries. This period also witnessed the creation of several development banks through the WAMU, almost entirely capitalized with public funds. Their objectives are clearly specified in terms of development plans. They usually make credit available to specific sectors of the economy (agriculture, industry, services) at relatively low cost and very often, provide some forms of technical assistance with their lending.

B-2 Formal Organization of the WAMU.

With the 1962 treaty creating the WAMU, the member countries gave the right of currency issue in their countries to a common central bank, the B.C.E.A.O. . Notes and coins issued by the B.C.E.A.O. circulate freely within the WAMU. However, although the WAMU is considered a common currency area, the notes issued were distinguished for each country of issuance by a letter following the serial number. In other words, separate monetary accounts for foreign reserve and B.C.E.A.O. credits were kept for each member country. Under the 1962 treaty, the highest administrative body was a council of ministers

from each state. But the actual management of the bank was under the responsibility of a board of directors, composed of two directors from each member state, from whom one was elected president. Moreover, under the special cooperation agreement with France, 7 directors were appointed by the former metropolis (one third) of overall members of the board of directors). Daily management of the bank was under the responsibility of a general manager (a Frenchman). Decisions of the board were taken on a simple majority. However, in matters involving the distribution of credit, a two-thirds majority was required and in questions related to the safeguarding of foreign reserves, the ratio was raised to three-fourths, which provided France with a veto power on foreign payments decisions. At the national level, National Monetary Committees (NMC) with five members each were responsible for the implementation of monetary policy. The five members comprised the two directors from the board and three other members appointed by each government. The responsibility of the NMC covered the formulation of requests to the board of directors for rediscount ceilings for each country. Within the limit of credits ceilings determined by the board, the NMC's were also responsible for the proper allocation of these central bank credits between banks and particular firms. Quantitative ceilings on rediscount of short-term (six to nine months depending upon the nature of the financing) and medium term credits (less than five years) to commercial banks and limits on rediscount for individual enterprises were the main instruments of credit control. Medium term credits were granted only for the financing of

specific projects in accordance with each country's development policy. One of the main characteristics of this period was the relatively high proportion of short term finance compared to medium term credit financed by the Central bank. Long-term finance was almost nonexistent. In 1968, about 80 percent of overall credits in the Union were short term. Medium and long term credits each accounted for 10 percent. This, along with the progressive reduction in the ratio of Central bank rediscount to overall credit brought about strong criticisms on the ability of the B.C.E.A.O. to control the money supply and foster economic development and integration in this region.[21] These criticisms led to the reorganization of the WAMU through a new treaty in 1973.

The new treaty called for a reorganization of the administrative bodies of the B.C.E.A.O. as well as specific changes in the instruments given to the bank for the implementation of monetary policy. First, the highest political bodies consisted of the conference of the Heads of States and the council of ministers. Decisions taken at the conference of the heads of states concerned general decisions such as membership issues. Decisions are taken in unanimity. The council of ministers (formed by two ministers from each country) had the responsibility of formulating general monetary and banking orientation of the Union. The governor of the B.C.E.A.O. is appointed for a six years term (he must be a national of a member state) and chairs the

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21 See R.F. Bathia and P. Acquah, "Monetary Instruments and Policies in the B.C.E.A.O. Countries, 1962-74, An Analysis" IMF Unpublished Document DM/77/52 p/11. Also R.J. Bathia "The experience of the West African Monetary Union" IMF Unpublished Document DM/80/80 December 1980.

board of directors which consists of fourteen members (two from each member country and from France which lost its veto power on foreign payments decisions).

At the national level, the national monetary committees were replaced by the national credit committee (N.C.C.), chaired by the Finance minister of the given state. The role of the new N.C.C.'s was widened. The committee not only proposes to the board of directors the maximum amount of credit to be extended for the next twelve months period, but also decides on the use and allocation of credit between commercial banks and financial institutions on the one hand and the treasury on the other. The maximum amount of rediscount was determined by taking into consideration the evolution of overall economic activity, the balance of payments and also the development plan for each member state.* With the new statutes, specific ceilings on commercial banks and individual firms were removed and the allocation of credits were left to the discretion of the N.C.C.'s. Another major difference was the possibility for the Central bank to impose and maintain reserve requirement from commercial banks with the purpose of controlling credit expansion. Medium term credits were increased (from seven to ten years) and long term credits could be made revolving.[22]

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* These maximum amounts of rediscount did not apply to credit supplied to finance seasonal farm needs which were considered as priority.

22 Banques et Monnaies: "La Nouvelle Politique de la Monnaie et du credit de la B.C.E.A.O." published in Notes d'Informations et de Statistiques. No. 236, February 1976.

Another aspect on which the new treaty did bring a change concerns the possibility of B.C.E.A.O. finance of treasuries. Under the pre-1973 treaty, WAMU countries' treasuries could be granted short term advances from the B.C.E.A.O. for a period not exceeding 240 days per year and in an amount equal to a maximum of 10 percent of the particular government's previous year fiscal receipts. In 1968, this maximum amount was raised to 15%. The WAMU countries' treasuries have usually extended short-term credit in the form of promissory notes accepted for the payments of custom duties. These promissory notes (obligations cautionnees) which could be discounted at the B.C.E.A.O. were subject to the central banks overall short-term global rediscount. The purpose of this limit on government borrowing from the central bank was to reduce inflationary finance. However, it has also been one of the major criticisms of the B.C.E.A.O. since treasuries were very often obliged to increase the level of foreign indebtedness in case of financial difficulties. These statutory limits were thought to be too conservative since they prevented government to finance their development programs from financial resources other than their tax receipts, which were already low. This conservatism in central bank finance of government spending had a strong deflationist impact on the economies of these countries. To counter these criticisms, the new statutes raised the ceiling on these central bank advances to the treasuries to 20 percent of the previous year's fiscal receipts. More than the amount of these central banks advances, the key issue in terms of financial support to the treasuries is the total lack of money market instruments in these

countries. Indeed, it is almost impossible for the treasuries and also the private sector to borrow money from the public by selling securities. It is therefore customary for private firms and local government to turn to foreign money markets for their financial needs. Among the problems preventing the creation and growth of such instruments are, more than anything else, the fixed and usually low interest rate administered by the central bank and the lack of aggressiveness from commercial banks in attracting funds (they have tended to rely on cheap financial credit from the B.C.E.A.O.). Therefore, any hope in fostering financial saving in the WAMU will have to include policies that progressively free the interest rate and liberalize the banking system along with an adjustment of the external value of the C.F.A.

The actual parity of the C.F.A. which was set in 1948, given the specific conditions existing in France after the second world war is today totally out of line. This inadequacy of the exchange parity translates itself into a consistent deficit in the current account of the WAMU countries vis a vis France. It is rather astonishing that the new 1973 treaty and cooperation agreement with France did not call for a new definition of the exchange rate between the C.F.A. and the French Franc. The strong value of the C.F.A. vis a vis other West-African currencies (Ghanaian Cedi or Nigerian Naira) reflects more the high import tax against these countries, the ready availability of French Francs as well as strict exchange controls imposed upon these currencies than a real strength of the C.F.A..

B-3 The Operation Account.

What makes the monetary system existing in the WAMU very strange and peculiar in the world today is the famous "operation account". Indeed, the existence of this account has been used to conclude that the WAMU countries lack monetary independence. As stated earlier, the operation account formally came into existence in 1955. The French community was practically in existence, even though not formally created. It is the continuation of this colonial institution in the post-independence era which has pushed critics to refer to the WAMU as a neo-colonial monetary system. What is the operation account and how does it work? Before answering this question, one should notice that the operation account is the backbone of the Franc area, namely the centralization of foreign exchanges. While former British Africa formally left the sterling area with independence, French Africa still belongs to the Franc area and the crucial link which maintains the WAMU countries in this monetary area is the operation account. It is this account which provides the guarantee of the C.F.A. by the French Franc by theoretically providing unlimited overdraft facilities in French Franc to the B.C.E.A.O. . True and complete monetary independence will have to go through the progressive and complete removal of this operation account. During the period considered in the statistical analysis (1962-1978), the B.C.E.A.O. never used this facility because its overall net foreign reserves were positive.

B-3-1 Functioning of the Operation Account.

The operation account is the means by which France guarantees the C.F.A. . This cooperation agreement has been signed between the WAMU

countries and France and is annexed to the treaty establishing the WAMU. Basically, this agreement provides that the French treasury will open in its books a "Franc operating account" under the name of the B.C.E.A.O. . This account worked according to the following rules:

1. The B.C.E.A.O. is committed to deposit in this account all its foreign exchanges (whether they were in French Franc or not).
2. The B.C.E.A.O. has the right to request at its own profits against the C.F.A., all foreign assets existing in the union whether held by public or private institutions.
3. In case of insufficient amount of foreign asset existing in the Union, the B.C.E.A.O. can overdraw from its operation account any amount of French Franc necessary for its economic transactions.

One implication of this "Franc operating account" is that any foreign asset in currency other than French Franc held by the B.C.E.A.O. as a result of its transactions with other countries is exchanged against French Franc before being deposited in the "operation account". So, except for the small amount of foreign reserves necessary for financial commitments in international organizations such as the I.M.F., the balance of the operation account represented the net foreign asset of the B.C.E.A.O. before 1974. These reserves on deposit with the French treasury were receiving interest at the rate of 2.5 percent per year or the discount rate of the Bank of France, whichever was the highest.

Under the new 1973 Statutes, taking into consideration the increasing diversification in the WAMU countries trade structure, the B.C.E.A.O. could keep up to 35 percent of its foreign reserve in

monetary assets other than French Francs in other foreign central banks.[23] Theoretically, the balance of the B.C.E.A.O. "operation account" could be negative, as mentioned earlier. In such cases, the French treasury will receive an interest on the negative balance, at the following rate:

- from 0 to 5 million---1%
- from 5 to 10 million--2%
- above 10 million, the rate of interest is equal to 2.5% or the discount rate of the bank of France, whichever is the highest.

However, this mechanism, by which the "operation account" could be overdrawn is severely restricted because of some specific measures or "brakes" to be applied by the B.C.E.A.O., whenever its foreign reserves position seriously worsens. More precisely, when the ratio of the average amount of B.C.E.A.O. foreign reserves to the average amount of its demand liabilities is equal to 20 percent or less for 30 days, the B.C.E.A.O. must take appropriate actions such as an increase in the discount rate and a reduction of the rediscount ceiling and advances. If this ratio falls to 10 percent or less for 30 days, the board of directors will take necessary steps (as mentioned earlier) which will be maintained as long as this ratio remains at 10 percent or less unless decided otherwise by the board with a majority of 3/4 (which gave France a veto power in the pre-1973 statues). These are

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23 With the reduction of French in the board of directors (from seven to two) this modification is a positive step in bringing more flexibility in the financial dealing of the B.C.E.A.O. with other countries, and moreover reduces the scope of the "operation account."

the famous "brakes" which have been so often criticized as rendering the operation account meaningless. Under the period considered, the B.C.E.A.O. has operated with a ratio averaging 30 to 35 percent. Hence, technically the central bank has had great freedom in influencing its demand liabilities, and therefore, the money supply before the threshold point.

Another effect of the operation account has been the deleterious impact of the French Franc devaluation on the reserve position of the WAMU countries. By keeping its reserves in a Franc operating account, B.C.E.A.O. reserves were left to depend upon uncertainties and external pressures against the French Franc. Indeed, the 1969 French devaluation of about 12.5 percent had its full impact on the overall value of B.C.E.A.O. reserves.[24] Unfortunately, this loss in value of the B.C.E.A.O. reserves was the result of economic and balance of payments difficulties experienced by the French economy, not the WAMU's. We can conclude that the 1969 French devaluation and the relatively declining share of WAMU external trade with France were the main causes of the new 1973 statutes concerning the diversification of B.C.E.A.O. reserves as pointed out earlier. Also, to prevent further reduction of B.C.E.A.O. reserve value due to French Franc fluctuations, in the case of any depreciation or devaluation of the French Franc above 0.5 percent, the French treasury will compensate

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[24] The French Franc was devalued in 1949, 1957, 1958 and since the creation of the WAMU in 1969.

the B.C.E.A.O. for the loss in value of its reserves.[25] All in all, the operation account is becoming more and more an obsolete device, and has had the effect of increasing the trade bias (both imports and exports) towards French products. If the French guarantee of the C.F.A. cannot be said to have been really effective, it was surely not necessary for the stability of the C.F.A., given the overall reserve position of the union since 1962.

C. Interest Rate Policies in the WAMU

Interest rate policies in the WAMU have been one of the areas where criticisms have been the staunchest. Instead of a rate of interest freely determined by the relative supply and demand for money, the B.C.E.A.O. has relied on a fixed and low interest rate structure. This is the other side of the credit control policy used by the B.C.E.A.O. Since the interest rate does not play its role of clearing the credit market, another device had to be used to ration credit among potential users. The rediscount facility of commercial banks papers and, before 1974, the ceiling on the volume of credit allowed to each firm and commercial bank at the prevailing interest rate has provided such a device. Interest rate policy in the WAMU has been to keep the rate low to foster economic growth by encouraging investment demand. Hence, the B.C.E.A.O. discount rate which represents the basis for computing rate for credit operation was kept

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25 Such a compensation did occur in 1974 when the French Franc depreciated by about 5.2%. B.C.E.A.O. Note d'Information et de Statistiques No. 284, June 1980.

relatively low (3.5%) from 1956 to 1973 while during the same period, the discount rate of the Bank of France averaged 4.5%.

Low interest rate policy is based on two misleading and inconclusive arguments. First, it is argued that in developing countries, rates should be kept low to prevent restraint on investment demand. The second argument runs this way: Aggregate saving is not interest elastic, therefore, the low saving to gross domestic product ratio should be looked for somewhere else, in particular the low level of income. This is a typical Keynesian argument. Gross saving is too low because income is too low. But income is also low because there is not enough saving: the famous "vicious circle" so well known to development economists. Looking at the first argument, it is paradoxical that countries with such a low capital-labor ratio will maintain such a low interest rate structure. The interest rate represents the rate of return on investment. In a full equilibrium neoclassical model, it is also equal to the cost of borrowed funds or the price of capital necessary to carry out a given investment program. If it is kept too low in countries where capital is scarce, this will result in a misallocation of resources and a bias against the relatively abundant factor: labor. In such cases, several investment projects yielding low rates of return will be carried out with the resulting effect of increased inefficiency in the economy. Financing such projects with low cost funds are necessarily wasteful in terms of use of foreign exchanges and can have deleterious effects on the balance of payments since they will tend to require expenditures on expensive imports of capital goods. Strongly related

to this argument is the fact that a low interest rate policy will surely increase the desire for investment. However, in most developing countries, the bottleneck is not in the level of investment per se, but in the availability of financing sources. In such a case, a low interest rate policy will have little impact in the actual level of investment unless the monetary authorities are willing to accept a higher rate of inflation.

Another aspect of interest rate policy which has strong relevance for the WAMU countries is the role of the interest rate in the capital formation in these countries. The interest rate can also be viewed as the discount rate at which economic units are willing to substitute future for present consumption. It therefore will determine the optimum allocation of income. A low real interest rate policy will therefore be a bias against saving and an impediment to capital formation. The arguments relating to the interest inelasticity of saving are inconclusive when applied to countries where there is no market-determined rate of interest. However, in countries which devised a high real interest rate policy, the resulting increase in saving was overwhelming.[26] More importantly, a positive and high real interest rate will affect more the structure than the level of gross saving. Indeed, a high real interest rate policy will increase the ratio of financial and monetary assets to gross saving and therefore

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[26] The 1965 Korean Stabilization program is the most recent example of the effectiveness in raising saving through a high real interest rate policy. See D.J. Mathieson, "Financial Reform and Capital Flows in a Developing Economy" I.M.F. Staff Papers. Vol. 26, September 1979. p. 450-489.

reduce the financial bottleneck in investment discussed earlier. In the case of the WAMU countries, given the inflation rate prevailing over the period 1973-1976, the real yield on money has been consistently negative as shown in table 10. The deleterious effects of negative real rate of interest have been extensively discussed elsewhere.[27] Hence, a positive real interest rate policy in the WAMU would be more in line with the relative scarcity of capital, increase efficiency in resource allocation and more important, would increase and stimulate the rate of domestic saving in more productive forms. Such an interest rate policy would increase financial deepening and reduce the role of the unorganized money market by making financial resources available in the curb market at the lower official rate, therefore strengthening the role of the banking system.[28]

During the period 1963-73, the effective annual interest rate charged on short and medium term credits for financing of export crops and productive activities were kept between 4.5 and 5.25 percent, and the maximum saving deposit rate was set at 4.5 percent. During the same period, the average interest rate on world market reached almost 9 percent. The scenario was easy to understand. It was easy for a commercial bank or a private firm in the WAMU to borrow at the low

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27 For a classical discussion on the subject, see R.I. McKinnon, Money and Capital in Economic Development, The Brookings Institution, 1973, especially Chapter 7. Also, E.S. Shaw, Financial Deepening in Economic Development, Oxford University Press. 1973. especially Chapter 4.

28 A.G. Chandavarkar, "Some aspects of Interest rate policies in less developed economies, the experiences of selected Asian Countries." I.M.F. Staff Papers March 1971, p. 71-72.

preferential B.C.E.A.O. rate while investing its own financial resources in French financial or money market instruments. The situation was made easier by the fixed exchange rate and the complete freedom of financial flows existing between WAMU and France. There was no need for forward hedging. Hence, with the interest rate fixed at low and stable level, and the almost non-existence of reserve requirement, the only remaining instrument available to the B.C.E.A.O. for the control of the monetary aggregates was the rediscount ceiling on domestic credit. However, in such an open economy, foreign interest rates played a crucial role in financial flows. It was then necessary for the B.C.E.A.O. to increase its basic rediscount rate in 1973 to 5.50 percent (preferential rate) and 8 percent (normal rate)*. Even then, between the period 1973 to 1979, while interest on loans varied between 6.5 and 9.5 percent, and deposit rate averaged 5.75 percent, call money rate in France averaged 9.8 percent and French government bonds were yielding 10.2 percent on the average. Again, it was easy for commercial banks to borrow in the WAMU at low central bank discount rate while transferring their own resources outside to take advantage of higher yielding assets. Given the heavy capital outflows experienced during this period, the B.C.E.A.O. had no choice but to increase again its discount rate in May 1980, to 8 and 10.50 percent (preferential and normal rates). Given the high interest rate

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* The preferential rate is applied to the financing of export crops and priority investments.

actually prevailing in the world market (French call money rate reached 12.23 percent in April 1981, and French government bonds yields were at 14.25), it is not clear whether or not this last move by the B.C.E.A.O. was sufficient enough to prevent the drain of capital from the WAMU countries. A look at the data should give us an idea of the effect of these capital flows on monetary policy. However, before looking at the data, we should discuss the model from which a testable equation will be derived.

Chapter III

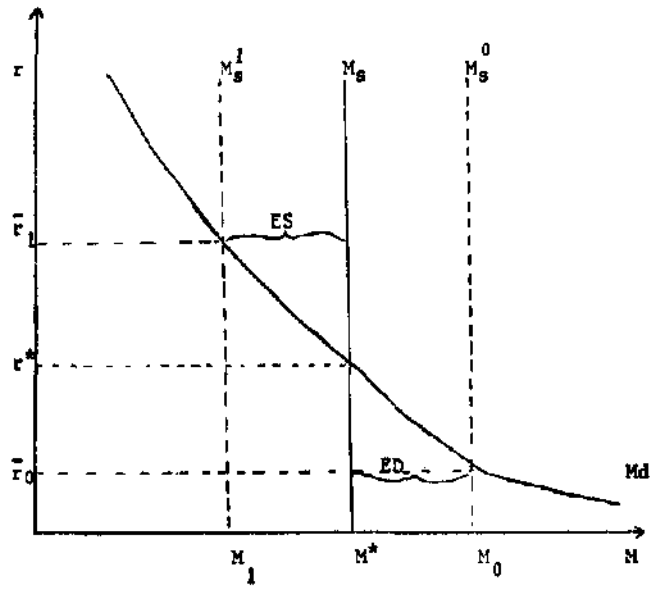
THE MODEL

To summarize our previous analysis, we first said that an increase in the domestic component of the money supply will bring about a payments deficit which will annihilate the initial increase in the money supply. Secondly, we also said the higher the degree of capital mobility, the faster this adjustment process. What is then the relevance of this preceding theoretical analysis for developing countries such as the WAMU countries?

As seen, the adjustment process heavily relies on the accumulation or decumulation of non-monetary relative to monetary assets, and the speed of adjustment (represented by the degree of mobility) relies on the role of the interest rate as the equilibrating mechanism. To what extent countries with no organized security market, and in which the monetary authorities have kept the interest rate fixed and low for development purposes can be expected to be subject to the international adjustment outlined above. First, one should mention that capital flows might occur not only because of interest rate differential, but also because of excess demand or supply of fund in the domestic economy.[1] In other words, the low administered interest rate can be seen to have the following effect on the money market:

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1 M. Porter, "Capital Flows as an offset to monetary policy: The German Experience", I.M.F. Staff Papers, Vol. 19, No. 2. July, 1972, pp. 395-417.



with MS and Md representing the supply and the demand for money

Fig: 4 Money supply, the demand for money and monetary equilibrium

r: the interest rate

If the interest rate was let free to adjust to the conditions prevailing in the money market, the money market will be cleared with the interest rate at r* and the demand for money being equal to the supply of money at M*. If the administered interest rate $\bar{r}_0$ is below the equilibrium interest rate, the result will be an excess demand for money equal to (M_0-M*). On the other hand, if the administered interest rate is $\bar{r}_1$, and above the equilibrium rate r*, this will lead to an excess supply of money equal to (M^*-M_1). In either case, one could expect commercial banks in WAMU countries to borrow (or lend) abroad (in this case in the French money market). In case of capital control on commercial banks exchange activities, one would expect business firms (which in most cases are subsidiaries of French firms) to borrow or lend directly into

foreign financial markets. A firm could easily borrow in the French money market and place the fund with a WAMU commercial bank and vice versa. Even with no well-organized security market, the portfolio of a wealth holder in the WAMU countries will include monetary as well as non-monetary domestic and foreign financial assets. Therefore, it should be possible to determine the variables which will bring about a reallocation in the portfolio of asset holders. Before turning to this specification of the model, we should mention that monetary equilibrium is assumed to prevail. The model we will be using was developed by Kouri and Porter.[2] This model basically explains international flows of capital as the mechanism through which an excess supply or demand for money is removed. It therefore develops an explanatory equation of capital flows in a portfolio approach. Extensively used in the literature for analyzing the effect of capital flows on monetary variables, the model was thought to be relevant to the case of the WAMU.[3]

A. The Relevance of the Model

1. As mentioned earlier, it is a portfolio model of a small open economy developed in a general equilibrium framework. Unlike earlier models which treated capital flow in total isolation and being only reponsible to interest rate differentials existing between the foreign

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2 J.K. Kouri and M.G. Porter, "International Capital Flows and Portfolio Equilibrium", Journal of Political Economy, Vol. 82, No. 3 May/ June 1974, pp. 443-467.

3 J.F. Helliwell and J.M. Lester, "External Linkages of the Canadian Monetary System." Canadian Journal of Economics, (11/76) p. 648.

Z. Hodjera, "Alternative Approaches in the Analysis of international capital movements: A case study of Austria and France". I.M.F. Staff Papers Vol. XXIII No. 3 Nov. 1976, p. 523-598.

and domestic markets, the Kouri and Porter (K.P.) portfolio model considers capital flows in its overall relationship to the broader concept of the balance of payments. The balance of payments is identically equal to the change in net foreign assets of the central bank. It therefore becomes possible to directly consider the effects of capital flows on the domestic monetary aggregates through their impact on the balance of payments. Moreover, since the real sector of the economy is considered exogenous (price, income and the current account balance), it also becomes possible to find out the effects of changes in these variables on capital flows through their impact on the demand for money.

2. The treatment of interest rates in the K.P. model makes it a very appropriate model to use in the case of the WAMU. Firstly, by treating the domestic interest rate as endogenous variable, the K.P. model resolves the problem of simultaneous equation bias found in earlier models. Indeed, these previous models developed within a partial equilibrium framework assumed the domestic interest rate to be exogenous. This implied that interest changes will affect capital flows but capital flow changes will have no effect on the domestic interest rate. This resulted in a bias of the estimated coefficient for the interest rate. The reason is that the crucial link between capital flows and monetary aggregates, so important in the K.P. model, is broken. The implicit assumption behind this approach is the complete neutralization of capital flows effects on monetary aggregates by the monetary authorities. This would indeed be a very restrictive assumption given the size of the WAMU countries and the finite amount of foreign assets held by the WAMU central bank.

3. The small country assumption made by the K.P. model allows the foreign interest rate and income to be treated as given by the WAMU policy makers. Moreover, it implies that domestic money market conditions are greatly influenced by foreign variables such as the interest rates. The experience of the WAMU clearly demonstrates this fact as administered domestic interest rates are consistently adjusted to the French money market rates.

4. The key advantage of the K.P. portfolio model is that it allows us to directly test our hypothesis concerning the extent of the endogeneity of the money supply in the WAMU countries. Indeed, by deriving a direct relationship between capital flows and the policy controlled monetary instruments, it becomes possible to determine an offset coefficient for the effectiveness of monetary policy.

Last, but not the least important, the K.P. reduced form equation lends itself to empirical testing without any data on domestic interest rate. This advantage delivers us from the difficult task of approximating the interest rate in countries with no market determined interest rates. The interest rate will therefore totally be implicit in the analysis.

However, despite all these positive elements one should be aware of some of the shortcomings of the K.P. model. First, as mentioned earlier, monetary equilibrium is assumed with almost no lag. While this might be a correct assumption in fully developed economies, it could be quite different in developing ones. Substantial lag could occur before excess demand or supply of money are removed. In the case of the WAMU, changes in the direction of monetary policy were decided every six months before 1974. Under the new statutes, extension of central bank

credits were proposed every twelve months. An appropriate lag structure should therefore be taken into consideration in the empirical analysis. Another problem of the K.P. model is the implicit assumption that there is absolutely no neutralization of monetary effects of capital flows. This is the opposite case of the assumption made by previous models. In other words, K.P. assumes that the monetary authorities consistently refrain from using monetary policy to offset the liquidity effect of capital flows. In the case of such relationship, the offset coefficient will be biased towards minus one. Also, if monetary policy is used to the BOP target, it will be very difficult to find a consistent relationship between capital flows and monetary policy as predicted by the K.P. model. To put it differently, the offset coefficient will be biased toward zero.[4] To what extent can we assume that the WAMU central bank was neutralizing partly or totally the monetary effects of balance of payments changes? The central bank of a small country will be able to use neutralization policies with some success only if the degree of monetary integration between this country and the rest of the world is low. Only in this case will the monetary aggregates become independent and exogenous. This is not the case for the WAMU. Monetary integration between the WAMU countries and France is quite perfect, or at least very high. More importantly, the guarantee of free convertibility of the C.F.A. by France at the prescribed exchange rate (through the operation account) should have precluded the WAMU central bank from directing monetary policy to the BOP target. The assumption of no neutralization is therefore quite acceptable for the WAMU.

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[4] Z. Hodjera, op. cit. p. 618

B. Specifications of the Model

The model specifies supply and demand equations for various assets. It is assumed that the asset holder has the choice between three different assets:

1. domestic base money,
2. domestic financial asset, and,
3. foreign financial asset.

Domestic residents will then hold a combination of these three assets in their portfolio and foreign residents hold both domestic and foreign financial assets. Furthermore, the small country assumption is maintained so that the WAMU countries cannot affect the foreign (French) interest rates through their economic actions. Before turning to the formal specification of the model, we should make the following provisos. Since we are using a portfolio model, a variable for the risk factor should be included in the various assets demand equations. However, because of the lack of data on risk, such a variable was not included to keep the model more manageable. The same considerations hold for a wealth variable. There is another reason for the exclusion of the risk variable. In an open economy, the key factor affecting risk is exchange rate variability. Variations in the exchange rate will affect the real return on various assets. This will in turn initiate a portfolio adjustment from various asset holders. In the case of the WAMU, the exchange guarantee of the C.F.A. will make this risk tend towards zero. As stated earlier, the exchange rate has not been changed since 1948. Hence, nothing will be lost by dropping the risk variable from the various equations.

B-1 The Demand for Base Money

In a closed economy, the demand for money is usually specified as a relationship between the desired holding of money on the one hand, and a scale variable (such as current or permanent income or wealth) and an opportunity cost variable (such as the interest rate) on the other hand. The role of the opportunity cost variable in the demand for money function is to measure the cost of holding money as opposed to other assets that might be held. We could specify the demand for money as:

$$(3\text{-}1) \qquad Md = Md\ (Y,\ i)$$

with Md: nominal demand for money

Y: nominal income

i: domestic implicit interest rate (opportunity cost of holding money)

i is the implicit rate because it represents the non-available market rate of interest.

In the open economy, however, the asset holder faces not only domestic money and financial assets, but also foreign financial assets. So, we will assume that depending upon the interest rate in the foreign market, which is taken as exogenous, the economic unit will hold part of its wealth in the form of foreign financial assets. If the foreign and domestic financial assets were perfect substitutes for each other, their rate would be perfectly correlated and using only one of them would be enough to capture portfolio shifts. As we will see later, in the case of perfect capital mobility, the foreign interest rate could be used as the relevant opportunity cost of holding money. However, for now, we

will not assume that domestic and foreign assets are perfect substitutes. Therefore, it will be useful and necessary to incorporate both the domestic and foreign interest rates in explaining portfolio shifts.[5] The demand for base money will then take the following form:

$$(3\text{-}2) \qquad Md = Md(y, i, r)$$

with r: foreign interest rate.

and the following partial derivatives:

$$Mdy > 0; \quad Mdi < 0; \quad Mdr < 0$$

Mdr was assumed to be negative because the higher the foreign rate, the higher the opportunity cost of holding money for the WAMU country resident; (by foreign we are still referring to the French economy because of the fixed exchange rate between the two countries). Mdy and Mdi have the usual signs assumed in the literature.

B - 2 The Domestic Demand for Financial Assets

Monetary policy in the WAMU is conducted through the rediscount policy of the central bank. Indeed, by rediscounting commercial banks and other financial institutions' short and medium-term papers, the central bank affects the overall liquidity of these institutions and therefore the economy. These eligible papers represent claims on non-bank institutions (government and private). They can therefore be classified as money market instruments and represent an alternative to holding money.

An expansionary monetary policy can be viewed as an increase in the

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5 M. Hamburger: "The demand for money in an open economy: Germany and the United Kingdom". Journal of Monetary Economics (1977). pp 25-40.

central bank holding of eligible papers and vice versa. Since most of these papers are held by commercial banks and other financial institutions, and since monetary policy is implemented through these institutions, we will concentrate on these financial institutions' demand for financial assets. We can therefore specify the domestic demand for these assets as:

$$(3.3) \qquad A^d = A^d(y,i,r)$$

with the following partial derivatives:

$$A^d_y > 0; \quad A^d_i > 0; \quad A^d_r < 0$$

An increase in income can be expected to increase the demand for domestic financial assets. As output increases, commercial banks will increase their holdings of financial assets. An increase in the domestic interest rate will induce a shift from domestic base money to domestic financial assets. On the other hand, an increase in the foreign interest rate relative to the domestic interest rate will increase the opportunity cost of holding domestic assets. We will then expect the demand for domestic financial assets to decrease with an increase in the foreign rate.

B - 3 *The Domestic Demand for Foreign Financial Assets*

With the exchange rate fixed, economic units in the WAMU will maximize the return on their portfolio while reducing the risk, by holding part of their wealth in French financial assets. So we could specify the domestic demand for foreign asset as:

$$(3.4) \qquad A^d_f = A^d_f(y,i,r)$$

with the following partial derivatives:

$$A^d_{fy} \gtrless 0; \quad A^d_{fi} < 0; \quad A^d_{fr} > 0$$

The signs of A^d_{fy} and A^d_{fi} can be justified on the same ground as A^d_y and A^d_i. An increase in domestic output will tend to reduce the domestic demand for foreign assets, as banks are financing the increase in aggregate demand (substitution effect). However, there is also a wealth effect which increases the demand for foreign assets when domestic income is rising. For now we will assume that the wealth effect is dominated by the substitution effect. An increase in the domestic interest rate will induce a shift towards domestic financial assets. By the same reasoning, an increase in the foreign interest rate will induce a shift towards foreign financial assets.

B - 4 The Foreign Demand for Domestic Financial Assets

Foreign demand for domestic financial assets could rise in two ways. First we could consider the case of private firms in the WAMU selling part of their commercial papers in the foreign market either directly or through their parent company. Second, commercial bank could borrow in the French financial market by reducing their holding of domestic commercial papers. In any case, this is made easy as most firms and commercial banks in the WAMU are subsidiaries of French firms. So foreigners will change their portfolio mix depending upon the changes in relative returns of various assets. We could then specify the foreign demand for domestic asset as:

$$(3.5) \qquad A^{f*}_d = A^{f*}_d(y^*, i, r,) \qquad \text{with } y^* : \text{foreign nominal income}$$

with the following partial derivatives:

$$A^{f*}_{dy^*} \gtrless 0; \quad A^{f*}_{di} > 0; \quad A^{f*}_{dr} < 0$$

$A^{f*}_{dy^*}$ is assumed to be negative or positive because of the same reasons

as A^{d}_{fy}. An increase in the domestic interest rate will increase the foreign demand for domestic financial assets, while an increase in the foreign interest rate will have the opposite effect. Equations (3.2), (3.3), (3.4) and (3.5) explain the demand side of the model.

Next, we will define the money supply as being identically equal to:

$$(3.6) \qquad Ms = DC + FA$$

with Ms: the money stock

DC: domestic credit of the central bank

FA: Net foreign asset of the central bank.

The money multiplier is therefore assumed to be equal to 1 or constant. The balance of payments is defined as being identically equal to the change in the foreign component of the money supply so that we will have:

$$(3.7) \qquad B \equiv \Delta FA = CF + CA$$

with CF: net capital inflow

CA: current account of the BOP

As assumed earlier, CA is exogenously given. Capital inflows can be seen as the difference between the change in foreign demand for domestic assets and the change in domestic demand for foreign assets. Therefore, CF can be specified as:

$$(3.8) \qquad CF = \Delta A^{f*}_{d} - \Delta A^{d}_{f}$$

The wealth constraint is specified as:

$$(3.9) \qquad W = Md + A^{d} + A^{d}_{f}$$

with W: nominal wealth

Monetary equilibrium is assumed to prevail in the domestic economy, implying:

(3.10) $Ms = Md$

The whole system of supply and demand equations can be summarized as follows:

System 1

(3.2) $M_d = M_d(y,i,r)$

(3.3) $A^d = A^d(y,i,r)$

(3.4) $A_f^d = A_f^d(y,i,r)$

(3.5) $A_d^{f*} = A_d^{f*}(y^*,i,r)$

(3.6) $Ms = DC + FA$

(3.7) $B \equiv \Delta FA = CF + CA$

(3.8) $CF = \Delta A_d^{f*} - \Delta A^f d$

(3.9) $W = M_d + A^d + A_f^d$

(3.10) $Ms = M_d$

Endogenous Variables

M_d: demand for money.

Ms: money supply.

i: domestic interest rate.

A^d: domestic demand for domestic financial assets.

A_f^d: domestic demand for foreign financial assets.

Af^*_d: foreign demand for domestic financial assets.

FA: net foreign asset of the central bank.

CF: net capital inflow.

Exogenous Variables

y, y^*: domestic and foreign income.

r: foreign interest rate.

CA: current account balance.

DC: domestic credit of the central bank.

Given the wealth constraint (3.9) one of the domestic demands for assets becomes redundant. We can then omit equation (3.3), the domestic demand for financial assets. By first differencing all the equations and substituting (3.7) into (3.6) and then substituting (3.6) and (3.2) into (3.10), the model can be reduced to:

$$(3.11)\quad M_d(y,i,r) = \Delta DC + \Delta FA \quad \text{or}$$

$$(3.11b)\quad M_d(y,i,r) = \Delta DC + CA + CF$$

Also substituting (3.4) and (3.5) into (3.8) yields the following equation for capital flows:

$$(3.12)\quad CF = \Delta A_d^{f*}(y^*,i,r) - \Delta A_f^d(y,i,r)$$

We could then derive a reduced form equation for Δi and CF.

First, substituting (3.12) into (3.11b) yields:

$$\Delta Md(y,i,r) = \Delta DC + CA + \Delta A_d^{f*}(y^*,i,r) - \Delta A_f^d(y,i,r)$$

Using (3.9), we will have:

$$\Delta DC + CA + \Delta A_d^{f*}(y^*,i,r) = -\Delta A^d(y,i,r)$$

or

$$\Delta DC + CA + A_{dy^*}^{f*}\Delta y^* + A_{di}^{f*}\Delta i + A_{dr}^{f*}\Delta r = -A_y^d\Delta y - A_i^d\Delta i - A_r^d\Delta r$$

rearranging and solving for Δi yields:

$$\Delta DC + CA + (A_{dr}^{f*} + A_r^d)\Delta r + A_{dy^*}^{f*}\Delta y^* + A_y^d\Delta y = -(A_i^d + A_{di}^{f*})\Delta i$$

from which:

$$(3.13)\quad \Delta i = -\frac{1}{(A_i^d + A_{di}^{f*})}\,(A_{dr}^{f*} + A_r^d)\Delta r + A_{dy^*}^{f*}\Delta y^* + A_y^d\Delta y + \Delta DC + CA$$

Using (3.13) into (3.12) yields the reduced form equation for CF:

$$(3.12b)\quad CF = A_{dy^*}^{f*}\Delta y^* + A_{di}^{f*}\Delta i + A_{dr}^{f*}\Delta r - A_{fy}^d\Delta y - A_{fi}^d\Delta i - A_{fr}^d\Delta r$$

$$CF = (A_{dr}^{f*} - A_{fr}^d)\Delta r + (A_{di}^{f*} - A_{fi}^d)\Delta i + A_{dy^*}^{f*}\Delta y^* - A_{fy}^d\Delta y$$

Substituting for the equation describing Δi yields:

$$CF = (A_{dr}^{f*} - A_{fr}^d)\Delta r + A_{dy^*}^{f*}\Delta y^* - A_{fy}^d\Delta y + (A_{di}^{f*} - A_{fi}^d)\left\{-\frac{1}{A_i^d + A_{di}^{f*}}\,(A_r^d + A_{dr}^{f*})\Delta r\right.$$

$$+ A_y^d \Delta y + \Delta DC + CA + A_{dy^*}^{f^*} \Delta y^* \Big\}$$

Rearranging the preceding equation:

$$CF = -\frac{1}{A_i^d + A_i^{f^*}} \Big[\Big\{ -(A_{dr}^{f^*} - A_{fr}^d)(A_i^d + A_{di}^{f^*}) + (A_{di}^{f^*} - A_{fi}^d)(A_r^d + A_{dr}^{f^*}) \Big\} \Delta r + \Big\{ (A_{di}^{f^*} - A_{fi}^d) A_y^d + A_{fy}^d (A_i^d + A_{di}^{f^*}) \Big\} \Delta y + \Big\{ (A_{di}^{f^*} - A_{fi}^d) A_{dy^*}^{f^*} - A_{dy^*}^{f^*} (A_i^d + A_{di}^{f^*}) \Big\} \Delta y^* + (A_{di}^{f^*} - A_{fi}^d) CA + (A_{di}^{f^*} - A_{fi}^d) \Delta DC \Big]$$

Defining by A, B and C the coefficient of Δr, Δy, Δy^*

yields after some additional transformations:

$$A = (A_{di}^{f^*} - A_{fi}^d)(A_r^d + A_{dr}^{f^*}) - (A_{dr}^{f^*} - A_{fr}^d)(A_i^d + A_{di}^{f^*})$$
$$= A_{di}^{f^*} A_r^d + A_{di}^{f^*} A_{dr}^{f^*} - A_{fi}^d A_r^d - A_{fi}^d A_{dr}^{f^*} - A_{dr}^{f^*} A_i^d - A_{dr}^{f^*} A_{di}^{f^*} + A_{fr}^d A_i^d + A_{fr}^d A_{di}^{f^*}$$

Rearranging, adding and subtracting $A_{fi}^d A_{fr}^d$ and using (3.9) yields:

$$A = -A_{fi}^d A_r^d + A_r^d A_{di}^{f^*} - A_{fr}^d A_{fi}^d + A_{fr}^d A_{di}^{f^*} - A_i^d A_{dr}^{f^*} + A_i^d A_{fr}^d - A_{fi}^d A_{dr}^{f^*} + A_{fi}^d A_{fr}^d$$

or

$$A = Md_r (A_{fi}^d - A_{di}^{f^*}) + M_{di}(A_{dr}^{f^*} - A_{fr}^d)$$

Following the same procedure yields for B:

$$B = (A_{di}^{f^*} - A_{fi}^d) A_y^d + A_{fy}^d (A_i^d + A_{di}^{f^*})$$
$$B = A_{di}^{f^*} A_y^d - A_{fi}^d A_y^d + A_{fy}^d A_i^d + A_{di}^{f^*} A_{fy}^d$$

Adding and substracting $A_{fi}^d A_{fy}^d$ yields:

$$B = Mdy(A_{fi}^d - A_{di}^{f^*}) - M_{di} A_{fy}^d$$

Similarly for C

$$C = (A_{di}^{f^*} - A_{fi}^d) A_{dy^*}^{f^*} - A_{dy^*}^{f^*} (A_i^d + A_{di}^{f^*})$$
$$= A_{di}^{f^*} A_{dy^*}^{f^*} - A_{fi}^d A_{dy^*}^{f^*} - A_{dy^*}^{f^*} A_i^d$$

$$- A_{dy}^{f*} A_{di}^{f*}$$

$$= A_{dy*}^{f*} (-A_i^d - A_{fi}^d) = A_{dy*}^{f*} Mdi$$

We can then reduce the equation for the capital inflows as a function of all the exogenous variables:

$$(3.12b) \quad CF = -\frac{1}{A_i^d + A_{di}^{f*}} \Big\{ \Big[(A_{fi}^d - A_{di}^{f*}) Md_r + M_{di} (A_{dr}^{f*} - A_{fr}^d) \Big] \Delta r + \Big[(A_{fi}^d - A_{di}^{f*}) Mdy - M_{di} A_{fy}^d \Big] \Delta y + (M_{di} A_{dy*}^{f*}) \Delta y^* + (A_{di}^{f*} - A_{fi}^d) \Delta DC + (A_{di}^{f*} - A_{fi}^d) CA \Big\}$$

Defining b_1, b_2, b_3, b_4, and b_5^* by the following:

$$b_1 = -\frac{1}{A_i^d + A_{di}^{f*}} \Big[(A_{fi}^d - A_{di}^{f*}) Md_r + M_{di} (A_{dr}^{f*} - A_{fr}^d) \Big]$$

$$b_2 = -\frac{1}{A_i^d + A_{di}^{f*}} \Big[(A_{fi}^d - A_{dy*}^{f*}) Mdy - Mdi\, A_{fy}^d \Big]$$

$$b_3 = -\frac{1}{A_i^d + A_{di}^{f*}} \; Mdi\, A_{dy*}^{f*}$$

$$b_4 = -\frac{1}{A_i^d + A_{di}^{f*}} \; (A_{di}^{f*} - A_{fi}^d)$$

$$b_5 = -\frac{1}{A_i^d + A_{di}^{f*}} \; (A_{di}^{f*} - A_{fi}^d)$$

$$B_5^* = -\frac{1}{A_i^d + A_{di}^{f*}} \; (A_{di}^{f*} - A_{fi}^d) + 1$$

We can then rewrite the capital flow equation in a more manageable form as the following:

$$(3.12b) \quad CF = b_1 \Delta r + b_2 \Delta y + b_3 \Delta y^* + b_4 \Delta DC + b_5 CA$$

adding CA on both sides of (3.12b) yields the equation for the change in foreign reserve as a function of the preceding exogenous variables

$$(3.14) \quad CF + CA = \Delta FA = b_1 \Delta r + b_2 \Delta y + b_3 \Delta y^* + b_4 \Delta DC + b_5^* CA \qquad \text{with } b_5^* = b_5 + 1$$

First let us consider b_1:

$$b_1 = -\frac{1}{\underset{>0}{A_i^d} + \underset{>0}{A_{di}^{f*}}} \left[\underset{<0}{(A_{fi}^d} - \underset{>0}{A_{di}^{f*}}) \underset{<0}{Md_r} + \underset{<0}{M_{di}} \; (\underset{<0}{A_{dr}^{f*}} - \underset{>0}{A_{fr}^d}) \right] < 0$$

So given the a priori restrictions on the signs of the partial derivatives, b_1 turns out to be negative (< 0). In other words, an increase in the foreign interest rate will reduce capital inflow (or increase capital outflows). b_1 can then be used to measure the degree of integration of both WAMU countries and foreign capital markets. A high negative value of b_1 will imply that small changes in the foreign interest rate will have strong effects on the capital account of the WAMU countries, validating the hypothesis of high capital mobility between the two capital markets.

The coefficient b_4 will measure the extent to which monetary policy is offset in the WAMU countries. It will then be the answer of our question concerning the effectiveness of monetary policy and the endogeneity of the money stock. Given the a priori restrictions on the different partials derivatives, b_4 will be negative,

$$b_4 = -\frac{1}{\underset{>0}{A_i^d} + \underset{>0}{A_{di}^{f*}}} \left[\underset{>0}{(A_{di}^{f*}} - \underset{<0}{A_{fi}^d}) \right] < 0$$

which implies that monetary policy will be somewhat offset through the international adjustment. If b_4 is equal to minus one (-1), this will imply that a 1% increase in the domestic asset of the central bank will bring about a 1% decrease in the foreign component of monetary base, nullifying the initial increase in the money supply. (In general the offset will be less than total). Hence b_4 will measure the extent to which our international adjustment outlined above works in the WAMU

countries. In term of our graphical analysis in figure 1, b_4 will tell us whether or not the central bank in the WAMU can attain and stay at a point such as B.

The coefficient for the domestic income is positive given our restrictions. Hence we have:

$$b_2 = -\frac{1}{A^d_i + A^{f*}_{di}} \left[(A^d_{fi} - A^{f*}_{dy*}) Mdy - Mdi\, A^d_{fy} \right] > 0$$

$A^d_i > 0$, $A^{f*}_{di} > 0$; $A^d_{fi} < 0$, $A^{f*}_{dy*} > 0$, $Mdy > 0$, $Mdi < 0$, $A^d_{fy} < 0$

This is one of the main conclusions of monetary approach to the balance of payments. Changes in income will not have their primary effects on the current account as hypothesized by the Keynesian income expenditure adjustment of the balance of payments. Indeed, change in income will affect the balance of payments in so far as it affects the demand for money. Put differently, changes in income will affect the reserve flow equation only through their effect on the money market. An increase in income will create an excess demand in the domestic money market which in turn will require an inflow of reserve equivalent to the initial excess demand for money. However, we have assumed that $A^f_{dy}<0$, or that the substitution effect outweighs the wealth effect of an increase in domestic income. If the opposite holds, and $A^f_{dy}>0$, then the sign of b_2 will be totally ambiguous. This is because as domestic income rises, the WAMU countries residents will be increasing their demand for foreign financial assets, while at the same time their demand for base money will also be increasing. The first effect will reduce the inflow of reserve while the second effect will have the opposite result. It then becomes impossible to distinguish which effect dominates the other. In any account, we should expect the substitution effect to outweigh the

wealth effect and therefore b_2 to be positive.

The coefficient b_5 is negative because a reduction in the current account of the BOP will have to be financed by a capital inflow. However, the sign of b_5^* is ambiguous and depends upon whether or not $(A_{di}^{f*} - A_{fi}^{d}) \gtrless 1$. If $(A_{di}^{f*} - A_{fi}^{d}) < 1$, b_5^* will be positive and an increase in the current account will improve the foreign position of the WAMU countries which is more likely to occur. Put differently, if $b_5 < 1$, which is very likely, b_5^* will be positive.

Equation (3.14) can then be used to perform some econometric tests during the period considered in the WAMU countries. We could then find out to what extent monetary policy can be effective as a stabilization policy tool.

However, it should be noted that the coefficients of (3.14) involve several structural parameters. It will be possible to reduce the complexity of these parameters when interpreting the estimated coefficients by assuming perfect capital mobility. Given the level of monetary integration between the WAMU and France, this additional assumption should not be unrealistic. Perfect capital mobility has two implications for the model. First, the various demands for financial assets can be dropped from the system because A_{di}, A_{fr}^{d}, A_{dr} and A_{fi}^{d} tends towards plus or minus infinity. Secondly, it implies that yields are equalized across countries.[6] Given our small country assumption, the relevant yield to be used in the demand for money function becomes

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[6] This assumption is possible because of the rigorously fixed exchange rate between the WAMU and France. Fluctuations of this exchange rate within a band could prevent the equalization of the yields across countries.

the foreign interest rate. With all these adjustments, system 1 can be transformed to the following:

System 2

(3.2b) $Md = Md\ (y,r)$

(3.6) $Ms = DC + FA$

(3.7) $\Delta FA = CF + CA$

(3.10) $Ms = Md$

with Ms, Md, FA, and CF endogenous variables. System 2 is a simple monetary model of a small open economy. Differentiating (3.2b) and (3.6), and using (3.10) yields:

$$\Delta Md = Mdy\Delta y + Mdr\Delta r$$

$$\Delta Ms = \Delta DC + \Delta FA$$

(3.14b) $\Delta FA = Mdy\Delta y + Mdr\Delta r - \Delta DC$

which can be statistically tested. (3.14b) is a special case of (3.14). We therefore could use this regression equation to find out whether or not the assumption of capital mobility can validly be assumed in the case of the WAMU.

Chapter IV

EMPIRICAL ANALYSIS

Before discussing the empirical analysis performed using data on the WAMU, we will briefly sketch previous empirical studies done on the same theoretical framework. After this, the methodology and the data used will be discussed before presenting the results. The implications of these results will then be discussed.

A. Survey of Empirical Studies

Empirical studies on monetary equilibrium in open economy with fixed exchange rate have generally taken two forms. The first approach has been to concentrate on the capital account and determine the extent of its response to monetary disturbances. This approach has been used by Kouri and Porter[1], Kouri[2], Porter[3] and Hodjera[4]. The approach allows the current account to be treated as an independent variable along with domestic income and foreign interest rate in the case of a small open economy. The capital account is therefore treated as the dependent variable. Since the capital account affects the balance of payments (defined here as the money account or the official settlement balance), any movements in this account following a monetary disturbance will have their effect

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[1]Kouri and Porter: op. cit.

[2]P.J.K. Kouri: "The hypothesis of offsetting capital flows: a case study of Germany." Journal of Monetary Economics, Vol. 1, January, 1975, pp. 21-39.

[3]Porter: op. cit.

[4]Hodjera: op. cit.

on the money account or the reserve position of the country in question. Using different definitions of capital flows (short-term or total capital flows), empirical estimates of offset coefficients for Germany, France, Austria and the Netherlands were derived. Typically, the offset coefficients in all these studies were negative and always significant. However, empirical estimates of the foreign interest rate coefficients were not significant in most cases. Including the forward premium substantially increases the significance of the foreign interest rate. The second approach concentrated directly on the overall balance of payments (or the money account). Studies done using this approach include those by Zecher, Bean, Hans-Genberg, Guitian and others.[5] In general, the independent variables included the domestic component of the base, domestic income and interest rate and sometimes the price level. These studies were done on Australia, Japan, Sweden and Spain. Again the offset coefficient were all negative and of the right sign. Guitian's study was quite interesting because he experimented with several definitions of domestic credit in his analysis. Basically, he divided the domestic component of the money supply into two broad categories: central bank credit variables on the one hand and the banking system credit variables

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[5] J.R. Zecher: "Monetary equilibrium and International reserve flows in Australia." Reading No. 12 in Frenkel and Johnson. op. cit. pp. 287-297.
Bean: op. cit.
Hans-Genberg: op. cit.
M. Guitian: "The balance of payments as a monetary phenomenon: Empirical evidence." Reading No. 15 in Frenkel and Johnson. op. cit. pp. 338-356.

on the other. He therefore assumed that the money multiplier was different from one. Within each group, he differentiated again using variables such as central bank's or banking system's miscellaneous assets. Another source of distinction was the difference between gross and net credit. In our empirical work, we have followed the second approach and concentrated on the overall balance of payments. This approach was chosen mainly for convenience. Data on short-term or total capital flows hardly exist for the WAMU countries, while yearly and quarterly data on central bank reserves are available. It is therefore possible to concentrate on the money account in analyzing monetary policy effects of capital flows.

B. Methodology and the Data

From the preceding chapter, a testable general form equation of the foreign component of the money supply was derived:

$$\text{(eq. 3.14)} \quad \Delta FA = b_0 + b_1\Delta R + b_2\Delta Y + b_3\Delta Y^* + b_4\Delta DC + b_5^*CA$$

When a high degree of capital mobility was assumed, equation (3.14) was reduced to:

$$\text{(eq. 3.14b)} \quad \Delta FA = \alpha_0 + \alpha_1\Delta R + \alpha_2\Delta Y + \alpha_3\Delta DC$$

We will first present regression results based upon the general model (eq. 3.14). Secondly, we will test the validity of the high capital mobility assumption by introducing an adjustment coefficient in a modified version of (3.14b). We will see that such an assumption is not unrealistic. Lastly, we will present regression results based upon (3.14b) and discuss its policy implications.

The coefficients of (3.14b) have the following expected signs:

$$\alpha_1, \alpha_3 < 0$$

$$\alpha_2 > 0$$

α_3 (or b4) is our offset coefficient discussed earlier. α_3 is therefore negative and implies a very low (or high) offsetting reserve flows to monetary disturbances if its absolute value is close to zero or not.

The foreign interest rate and domestic income will affect the balance of payments through their impact on the demand for money. According to the theoretical framework used, an increase in r will reduce the demand for money and therefore initiate an outflow of capital as portfolios are reequilibrated. This conclusion heavily relies on the assumption of perfect integration of capital markets. If capital markets are not fully integrated, but are rather segmented, the foreign interest rate will have little effect on the domestic demand for money. In this case, an increase in the domestic rate relative to the foreign rate will result in capital inflows because the law of one price no longer applies. This is a typical Keynesian result. A reduction in the domestic interest rate will result in capital outflows while the monetary approach used here implies the opposite result because the adjustment works through the demand for money. We will therefore expect α_1 (or b_1) to be negative. A highly significant α_1 will imply that variations in the French interest rate are a major determinant of the demand for money in the WAMU countries.

An increase in income will increase the demand for money and bring about an inflow of reserve as economic units in the WAMU move to their desired portfolio. Again this result is different from Keynesian theories of the balance of payments which work through the current account.

According to these approaches, increases in income will worsen the current account (and therefore the balance of payments). According to the monetary approach, this worsening of the current account could be more than offset by the capital account. The adjustment, according to the monetary approach works through the money market. Moreover, in export economies such as the WAMU's, variations in income would be strongly correlated with variations in the current account since the main sources of income are export products. We will then expect a strong correlation between export activities and the demand for money, or, more conventionally, between income and the demand for money. We will therefore expect α_2 (or b_2) to be positive and highly significant, validating its strong effect on the demand for money.

Before turning to the statistical analysis, it should be mentioned that because of difficulties in obtaining the necessary data on all 6 countries of the WAMU, three countries were left out of the analysis. Hence, we only considered Benin, the Ivory-Coast and Senegal in the empirical analysis. However, these restrictions will not do much harm to the results obtained from the regression equations. Indeed, in 1978, these three countries (Benin, Ivory-Coast and Senegal) accounted for about 72 percent of the WAMU foreign assets. Furthermore, in 1977 and 1978, about 93 and 92 percent of the overall domestic credit extended by the B.C.E.A.O. went to these three countries, (the Ivory-Coast received almost 64 percent of these credits). It appears therefore reasonable to deduce conclusions about the whole union based on the results from these three countries. Other considerations concerning different data should also be mentioned. First, in testing the general model, annual

data were used. However, in testing the reduced form model (3.14b), both annual and quarterly data were used because of the relatively quick adjustment assumed to prevail in the money market. However, an important problem was the unavailability of quarterly data on G.D.P. (gross domestic product used as a proxy for income). We tried to solve this problem by looking for a variable which will be highly correlated to G.D.P. and available both quarterly and annually. We therefore regressed annual G.D.P. on annual average money supply. From the estimated coefficients, we generated quarterly data on G.D.P. using the same relationship with money supply (see exhibit 6, 7, 8 for these regressions). Second, the proxy for the foreign interest rate used in this study was the yield on French government bonds since these bonds are relatively safe and can be easily converted into cash. They can therefore be seen as a good alternative to holding cash balance. Net foreign assets were derived by subtracting the foreign liabilities from the gross foreign assets of the B.C.E.A.O. Domestic credit in this study represents central bank's advances to commercial banks. We excluded other financial institutions because they were negligible. The estimation period in this analysis extends from 1963 to 1978, mainly because of difficulty in finding data on G.D.P. beyond this date. All the data were taken from the monthly and yearly publications of the I.M.F. (International Financial Statistics).

C. The Results

C-1. Results based on the general model

The results of the regression analysis for Benin, the Ivory-Coast and Senegal using the general model are presented in exhibits 1, 2 and 3. These regressions show mixed results: In the case of Benin and

Senegal, only the domestic credit variable is significant (at the one percent level) in explaining variations in the foreign component of the monetary base. Moreover, the offset coefficients are negative in both countries. However, none of the other explanatory variables is significant. Domestic income, foreign interest rate and income and the level of current account seem not important in explaining variations in the balance of payments. In the case of the Ivory-Coast, the results seem even more at odds with the theoretical framework. Indeed, the offset coefficient is not only insignificant, but it is also of the wrong sign. Only the level of current account seems to have an effect on the balance of payments. However, this coefficient is practically equal to 0 (zero). This result can be explained by the fact that the level of the current account in any given year should have a much bigger impact on the level of foreign reserve than on the change of this same variable.

Overall, except for the offset coefficients in the case of Benin and Senegal as mentioned earlier, the performance of the general model is not quite satisfactory. One way of possibly improving the statistical analysis will be to assume that the money market adjusts quickly enough to correct for any disequilibrium which might exist. However, before presenting regression results based upon 3.14b, it was necessary to test the extent of the validity of the assumption on high capital mobility.

C-2. Testing the validity of the assumption of high capital mobility.

To test the speed of adjustment in the money market, it is assumed that the effects of domestic credit, the foreign interest rate and income on the level of foreign assets extend over time with the weight declining geometrically. More specifically, we assume the following:

EXHIBIT 1

GENERAL MODEL

BENIN: REGRESSION EQUATION

(1965 - 1977)

	C	ΔDC	ΔR	ΔY	ΔY_F	CA
FA	1.20	-1.03	-0.18	0.06	-0.002	0.00005
t Statistics	(1.35)	(-5.34)	(-0.57)	(1.43)	(-0.92)	(0.73)

R^2 = 0.88

D.W. = 2.00

EXHIBIT 2

GENERAL MODEL

IVORY-COAST: REGRESSION EQUATION

(1963-1978)

	C	ΔDC	ΔR	ΔY	ΔY_F	CA
ΔFA	-2.16	0.56	-2.50	-0.04	-0.05	-0.0002
t Statistics	(-0.18)	(1.62)	(-0.55)	(-0.65)	(-0.93)	(-2.67)

R^2 0.65

D.W. = 1.9

EXHIBIT 3

GENERAL MODEL

SENEGAL: REGRESSION EQUATION

	C	ΔDC	ΔR	ΔY	ΔY_F	CA
ΔFA	4.69	-0.65	1.63	-0.03	-0.058	-0.0009
t Statistics	(0.79)	(-4.55)	(1.21)	(-0.34)	(-0.81)	(-0.46)

$R^2 = 0.88$

D.W. = 2.04

$$(3.15)\quad FA_t = (1-\lambda)\{[v_0 + v_1DC_t + v_2R_t + v_3Y_t] + \lambda^2[v_0 + v_1DC_{t-2} + v_2R_{t-2} + v_3Y_{t-1}] + - - - + \lambda^k[v_0 + v_1DC_{t-k} + v_2R_{t-k} + v_3Y_{t-k}] + - - -)\}$$

with $0 \leq \lambda < 1$.

where λ represents the speed of adjustment. If λ tends toward 1, this will imply that the adjustment is very slow and that the assumption of perfect capital mobility cannot validly be made. On the other hand, if λ is significantly different from 1, this will imply that changes in the exogenous variables will affect the dependent variable rather quickly. If λ is equal to 0, the adjustment is instantaneous. In general, we will not expect λ to be equal to 0 (zero), but a λ close to zero should be an indication that high capital mobility can be taken as an acceptable approximation and (3.14b) can therefore be used. Before testing (3.15) to determine the value of λ, it is necessary to reduce it in a manageable form. This is done by using the Koyck transformation. Assuming that the weights decline indefinitely into the past, (3.15) can be rewritten as:

$$(3.16)\quad FA_t = (1-\lambda)\sum_{i=0}^{\infty}\lambda[v_0 + v_1DC_{t-i} + v_2R_{t-i} + v_3Y_{t-i}]$$

Lagging (3.16) by one period yields:

$$(3.17)\quad FA_{t-1} = (1-\lambda)\{[v_0 + v_1DC_{t-1} + v_2R_{t-1} + v_3Y_{t-1}] + \lambda[v_0 + v_1DC_{t-2} + v_2R_{t-2} + v_3Y_{t-2}] + \lambda^k[v_0 + v_1DC_{t-k-1} + v_2R_{t-k-1} + v_3Y_{t-k-1}] + \text{----}\}$$

$$\text{or}\qquad FA_{t-1} = (1-\lambda)\sum_{i=0}^{\infty}\lambda^i[v_0 + v_1DC_{t-i-1} + v_2R_{t-i-1} + v_3Y_{t-i-1}]$$

Multiplying (3.17) by λ yields:

$$(3.18)\quad \lambda FA_{t-1} = (1-\lambda)\{\lambda[v_0 + v_1DC_{t-1} + v_2R_{t-1} + v_3Y_{t-1}] + \lambda^2[v_0 + v_1DC_{t-2} + v_2R_{t-2} + v_3Y_{t-2}] + - - - + \lambda^{k+1}[v_0 + v_1DC_{t-k-1} + v_2R_{t-k-1} + v_3Y_{t-k-1}] + - - - \}$$

$$\text{or}\quad \lambda FA_{t-1} = (1-\lambda)\sum_{i=0}^{\infty}\lambda^{i+1}[v_0 + v_1DC_{t-i-1} + v_2R_{t-i-1} + v_3Y_{t-i-1}]$$

Next subtracting (3.18) from (3.16) yields:

$$(3.19)\quad FA_t - \lambda FA_{t-1} = (1-\lambda)\sum_{i=0}^{\infty}\lambda^i[v_0 + v_1DC_{t-i} + v_2R_{t-i} + v_3Y_{t-i}] - (1-\lambda)\sum_{i=0}^{\infty}\lambda^{i+1}[v_0 + v_1DC_{t-i-1} + v_2R_{t-i-1} + v_3Y_{t-i-1}]$$

$$= (1-\lambda)[v_0 + v_1DC_t + v_2R_t + v_3Y_t]$$

from which FA_t can be deduced:

$$(3.20)\quad FA_t = (1-\lambda)[v_0 + v_1 DC_t + v_2 R_t + v_3 Y_t] + \lambda FA_{t-1}$$

$$\text{or } FA_t = (1-\lambda)v_0 + (1-\lambda)v_1 DC_t + v_2(1-\lambda)R_t + (1-\lambda)v_3 Y_t + \lambda FA_{t-1}$$

Equation (3.20) was used to determine the value of λ. Regression results of equation (3.20) are presented in exhibit 4. The adjustment coefficient in almost all cases is very close to 0 (zero). Moreover, λ is significant only in the case of Senegal. This will imply that the adjustment in the money market through the international adjustment mechanism is quite quick. We could therefore accept the assumption of high capital mobility and use (3.14b) to perform some statistical tests. Institutional and historical ties as well as control of major financial institutions seem to be the basic explanation of this result.

C-3. Results based on the reduced form model

Using (3.14b), some regressions analysis were performed on the three countries. Equation (3.14b) was tested with both yearly and quarterly data. The results of these tests are shown in exhibit 5, 6, 7 and 8. Several conclusions seem to emerge from these regressions. We will discuss each of them separately.

1. When we used yearly data, the overall results seem consistent across countries. The offset coefficients are negative and significant at the one percent level in all three countries. The income coefficients are also significant (except in the case of Senegal) and positive. The foreign interest rate is insignificant in all three countries, although

EXHIBIT 4

TESTING THE SPEED OF ADJUSTMENT

BENIN: REGRESSION EQUATION

(1963-1978)

	C	DC	R	Y	FA_{-1}
FA	-0.21	-0.69	0.47	0.04	-0.005
(t Statistics)	(-.12)	(-6.85)	(2.29)	(3.49)	(-0.01)

R^2 = 0.90

IVORY-COAST:

	C	DC	R	Y	FA_{-1}
FA	5.98	-1.26	-1.39	0.18	0.08
(t Statistics)	(0.44)	(-10.5)	(-0.73)	(12.82)	(1.21)

R^2 = 0.89

SENEGAL:

	C	DC	R	Y	FA_{-1}
FA	9.00	-0.39	0.08	0.01	0.22
(t Statistics)	(3.54)	(-5.90)	(0.24)	(0.74)	(2.64)

R^2 = .91

it exhibits the proper sign in the case of the Ivory-Coast and Senegal. Before drawing any conclusions from these results, we will have to compare them with the results using quarterly data. This is because this type of adjustment has been shown to occur quite rapidly and seemed to be more consistent with quarterly data.

2. The results derived with quarterly data are quite consistent with the ones using yearly data. In all cases, the offset coefficients are negative and significant at the one percent level. This result combined with the low value of λ appears to demonstrate how nearly impossible it is for the B.C.E.A.O. to affect monetary equilibrium even in the very short-run. Referring to our graph in figure 2, the adjustment is asymptotic rather than cyclical. The interest rate will almost instantaneously revert to its initial level, or, to put it in another way, even a temporary disequilibrium in the money market will be difficult to maintain in the WAMU. The negative and highly significant offset coefficients are critical for our theoretical framework. Simply stated, they imply that independently of the monetary instruments, policy-induced changes in the base are partly offset by reserve flows occurring in the opposite direction of the initial change. To put it differently, the B.C.E.A.O. can control the monetary base only if it is willing to accept large variations in the balance of payments or its foreign reserves. With the average offset coefficient being above 50 percent, it is not certain whether the B.C.E.A.O. would, or even could, accept such high variations in its foreign reserve positions. In the case of Benin, more than 70 percent of changes in domestic credit are offset through changes in the foreign reserve position. In other words, every increase in

EXHIBIT 5

REGRESSION RESULTS BASED UPON (3.14.b) YEARLY DATA

(1963-1978)

BENIN

	C	ΔDC	ΔR	ΔY
ΔFA	-6.21	-0.63	0.69	1.50
(t Statistics)	(-4.00)	(-4.49)	(1.13)	(3.41)

R^2 = 0.85

D.W. = 1.67

IVORY-COAST

	C	ΔDC	ΔR	ΔY
ΔFA	-6.51	-1.29	-0.43	2.40
(t Statistics)	(-2.51)	(-2.63)	(-0.54)	(3.55)

R^2 = 0.62

D.W. = 1.58

SENEGAL

	C	ΔDC	ΔR	ΔY
ΔFA	-6.31	-3.03	-3.49	4.07
(t Statistics)	(-0.54)	(-2.10)	(-1.58)	(1.33)

R^2 = 0.55

D.W. = 1.84

EXHIBIT 6

BENIN: REGRESSION RESULTS WITH QUARTERLY DATA

(1963-1978)

	C	ΔDC	ΔR	ΔY
ΔFA	0.10	-0.74	0.21	0.01
(t Statistics)	(1.53)	(-7.57)	(1.07)	(1.20)

R^2 = 0.53

D.W. = 2.05

N.B.: Quarterly data for gross domestic product were generated from the following regression equation:

GDPB = 5.87 MOSB

t-Statistics: (27.5)

R^2 = 0.89

GDPB: Yearly data on gross domestic product in Benin

MOSB: Average yearly data on money supply

EXHIBIT 7

IVORY-COAST: REGRESSION RESULTS WITH QUARTERLY DATA

(1963-1978)

	C	ΔDC	ΔR	ΔY
ΔFA	0.05	-1.33	-1.54	0.19
(t Statistics)	(0.05)	(-11.08)	(-0.55)	(12.00)

R^2 = 0.72

D.W. = 1.90

N.B.: Quarterly data on income were generated from the following regression equation:

GDPIC = 3.84 MOSIC

(t-Statistics) (15.33)

R^2 = 0.99

GDPIC: Yearly data on gross domestic product in the Ivory-Coast

MOSIC: Average yearly data on money supply

EXHIBIT 8

SENEGAL: REGRESSION RESULTS WITH QUARTERLY DATA

(1963-1978)

	C	ΔDC	ΔR	ΔY
ΔFA	-0.49	-0.55	0.92	0.12
(t Statistics)	(-1.85)	(-7.56)	(1.16)	(3.78)

R^2 = 0.59

D.W. = 2.01

N.B.: Quarterly data on gross domestic product were obtained from the following regression:

GDPS = 2.27 MOSS

t-Statistics = (6.25)

R^2 = 0.98

GDPS: Yearly data on gross domestic product in Senegal

MOSS: Yearly money supply average in Senegal

central bank credit of 1 billion will imply an outflow of reserve of about 700 million CFA. In the case of the Ivory-Coast and Senegal the leaks will reach 1.3 billions and 500 millions CFA respectively. In the case of the Ivory-Coast, the offset is more than complete in the first quarter. It should be remembered that the Ivory-Coast received about 63 percent of the overall B.C.E.A.O. credits in 1977 and 1978. We will come back to the offset coefficient later in this chapter. However, the implications of these results are obvious. The difficulty of the B.C.E.A.O. in controlling the money stock can partly be explained by its inability to control the monetary base. As we will see later, this inability seems to have increased recently despite the monetary reform introduced in 1974 to strengthen the role of the central bank. Monetary policy (changes in domestic asset of the central bank) becomes an instrument for controlling not the money supply, but the reserve position of the WAMU countries. Stated differently, although the current account balance is determined by exogenous factors such as world demand and prices, in periods of relative price stability, variations in the capital account will be critical in determining the balance of payments. At any rate, the current account will have its impact on income which will in turn affect the demand for money. In the case of these three countries, to improve the reserve position (or the balance of payments) by 1 billion CFA, domestic credit should approximately be reduced by 1.3, 0.7 and 1.8 billions respectively in Benin, the Ivory-Coast and Senegal. Such actions could, unfortunately, have serious effects on local and priority sectors which heavily rely on B.C.E.A.O. credits for their activities. As these policy measures are politically unpopular, it is quite doubtful

that the B.C.E.A.O. will be willing to take such actions. However, with the balance of payments difficulties experienced by the Ivory-Coast in the middle of 1980, such deflationist policies as reduction of central bank advances and certain fiscal measures were used to reduce the deficit of the balance of payments. Such actions were called for under the operation account agreement along with the conditions on the use of the International Monetary Fund's new extended facilities. In this program, the Ivory-Coast received 580 millions U.S. dollars in February 1981 to support its effort to stabilize the balance of payments. It is still quite early to judge the results, but the model used in this study predicts the appropriateness and the efficiency of such policies in reaching the stated objectives. In this case, the objective is to stabilize the balance of payments and the model predicts that reducing domestic aggregate demand through a reduction in central bank credit will be quite effective in reaching this goal.

As shown by the empirical results, the higher the offset coefficient the easier it is for the monetary authorities to adjust their instruments to the external balance of the country. Hence, stabilizing the balance of payments will be easier in Ivory-Coast than Senegal. To put it differently. the higher the degree of openness of the economy (the economy of the Ivory-Coast is more liberal and also more integrated to the world than the two others), the higher the international adjustment outlined above and the smaller the internal cost in terms of output loss to improve the balance of payments, and the more difficult it is to control the monetary aggregates This result has two implications. First, it will be almost impossible, or at least very difficult, for the

B.C.E.A.O. to control the inflation rate through some appropriate monetary actions. The cost of such attempts will again be very high in terms of output loss (through the priority sectors). In the case of the Ivory-Coast, such attempts would be totally annihilated, but there is more room for such actions in the case of Benin and Senegal. The tight state control on the economy of Benin partly explains this result. The loss of control of the money stock implies that the rate of inflation in these countries will be directly related to the World (French) inflation rate. More formally, we should have

$$(3.21)\quad (\dot{P}/P)_i = a_i(\dot{P}/P)_{world} + u$$

with $(\dot{P}/P)_i$: inflation rate in country i

a_i : inflation coefficient

u : stochastic error

$a_1 > a_3 > a_2 > 0$

1: Ivory-Coast
2: Senegal
3: Benin

One should be aware of the conditions under which the inflation rate in the WAMU countries will be strongly related to the French inflation rate. If France can be considered a reserve currency country with respect to the WAMU countries, then a relationship such as (3.21) will hold in the long-run. Indeed, by definition a reserve currency country will determine both the world interest rate and inflation rate in the short

and long-run respectively. The price effect of the demand for money will prevent the domestic monetary authorities to control the inflation rate as capital flows to accomodate the actual inflation rate. In any account there exists several channels of the transmission of inflation from abroad into the domestic economy. The prices of traded goods (imports, import competing goods and exportables) will directly be linked to the foreign inflation rate. Also the expansionary impact of a balance of trade surplus through the foreign trade multiplier and the increase in domestic money due to a BOP surplus will also affect the domestic inflation rate in an upwards direction. However, the model implicitly assumes that the economy considered is fully employed and that prices are fully flexible. In the case of substantial unemployment or stickiness in price levels in controlled sectors, a relation such as 3.21 will not hold. Hence, a_1 will tend towards 0. More important for these countries is the existence of non-traded goods (domestic goods produced for local consumption). Such goods will also affect (3.21) and make a_1 tend toward 0.[6] In any event, a relationship such as (3.21) would seem to prevail in the WAMU countries given the empirical results. We could therefore expect a_1 to be significantly different from 0. We tried to test for such a relationship using available data on price.* The results of these

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*Unfortunately, data on prices were not available for Benin. We therefore used only the Ivory-Coast and Senegal.

[6]R. Dornbusch: "Devaluation, money and non-traded goods", American Economic Review, 63, Dec., 1973, pp. 871-880.

Also M. Parkin: "Inflation, the balance of payments, domestic credit expansion and exchange rate adjustments" in R.Z. ALIBER, ed., National monetary policies and the international financial system, op. cit. pp. 220-241.

regressions are shown in exhibit 9. The empirical result seems to support (3.21). The relationship between French and WAMU countries' prices is positive and highly significant at the one percent level. In other words, a one percent increase in French prices will be fully transmitted into the WAMU countries. In the case of the Ivory-Coast, this adjustment is again amplified, which is consistent with the very high offset coefficient found earlier. The fact that the price coefficient is much higher in the Ivory-Coast is also probably due to expectations effect. Second, the results obtained on the offset coefficients show the importance of fiscal policy for stabilization purpose in these countries. With monetary policy tied to the requirement of the external balance, the bulk of internal adjustment must fall on fiscal policy. Hence, in face of strong domestic demand pressures, a reduction in public spending (such as a reduction of the budget deficit) stands a better chance than a reduction in domestic credit in stabilizing the economy. This implication of the results is again more crucial for the Ivory-Coast than Benin for reasons previously mentioned.

3. Except in the case of the Ivory-Coast, the coefficients for the interest rate are of the wrong sign. Furthermore, they are all completely insignificant at the 5 percent significance level. The conclusion we could draw is that the French interest rate does not represent the true opportunity cost of holding money in the WAMU. It seems strange at first that the demand for money in such small open economies would be totally independent from the foreign interest rate. Several explanations, each

EXHIBIT 9

Price Equations: (Eq. 3.21)

IVORY-COAST (1963-1978)

	C	LPIF
LPIC	-1.31	1.30
(t-Statistics)	(-2.62)	(12.23)

R^2 = 0.99

D.W. = 1.7

LPIC = log of Price index in Ivory-Coast (consumer price index)

LPIF = log of price index in France

SENEGAL (1963-1978)

	C	LPIF
LIPS	-0.36	1.04
(t-Statistics)	(-1.04)	(13.71)

R^2 = 0.98

D.W. = 1.96

LIPS = Log of Price index in Senegal

of which are quite plausible, can be given. Firstly, it might be that the yield on French government bond used in this study was not the appropriate rate. However, whatever the rate used, it could validly be assumed that all yields in French money market instruments are correlated and therefore are moving together. Hence the bond yield should be an acceptable proxy. Secondly, a good explanation could be that we left out of the demand for money function the expectad inflation rate. Previous studies have shown the importance of the inflation rate in explaining the opportunity cost of holding money in developing countries. More importantly, the insignificance of the interest rate coefficients is built into the model from which the regression equation was derived. To be more precise, α_1 measures the response of the reserve position of the WAMU to a change in the foreign interest rate when the domestic interest rate is allowed to adjust completely (the adjustment is instantaneous in the case of perfect capital mobility). The last part of this sentence is very critical since adjustments of the administratively controlled domestic interest rate to world market conditions were very slow. This feature more than anything else probably prevents α_1 from being significant and of the right sign.

4. Except in the case of Benin, the income coefficient α_1 is positive and significant at the one percent level. It implies that a one billion CFA increase in income will generate an increase in reserve inflow of about 10, 200 and 120 million CFA for Benin, the Ivory-Coast and Senegal respectively. This result could be explained in two ways. First, since income is highly correlated with the trade balance, a surplus in this account will definitely improve the reserve position of the

WAMU countries. Secondly, according to the theoretical framework used in this study, an increase in income will have its impact on the demand for money as already explained. In any event, the results obtained here are different from other balance of payments theories. In a Keynesian framework, an increase in domestic income will have a negative impact on the balance of payments because the adjustment works mainly through the current account. The view taken is partial since it concentrates on a subaccount of the B.O.P. However, to finance the deficit in the current account implies an offsetting change in the capital account. The statistical analysis suggests that this effect outweights the first one, and changes in income have their effects on the balance of payments mainly through the capital account (by affecting the demand for money).

The income coefficient α_2 could have been expected to be much higher and close to unity. This is because α_2 is the inverse of the marginal velocity of money. However, the lower value of α_2 can partly be explained by the fact that current income was used in the demand for money, instead of permanent income, which is a better known measure.

D. More on the offset coefficient

As shown in exhibits 10, 11 and 12, the model seems to predict the behavior of the foreign component of the monetary base well enough. The historical simulation performed yields acceptable results. A summary of the statistics derived from these simulations is given in exhibit 13. However, exhibits 10, 11 and 12 suggest that the model predicts the behavior of the dependent variable more accurately after 1973. Moreover, this same period (1973-1978) seems to witness high variations in the foreign component of the monetary base. This implies that while over the

whole period (1963-1978) the money supply was endogenous, in the latter period this endogeneity seems to have been more pronounced. In other words, the difficulties of the B.C.E.A.O. in controlling the monetary aggregates have increased recently. This seems paradoxical since one of the objectives of the 1973 monetary reform was to strengthen the role of the central bank in controlling the monetary aggregates. This suggests the necessity of distinguishing between both periods in the analysis. Equation (3.14b) was used to perform some econometric tests during both periods separately. The first period extends from 1963 to the third quarter of 1974 (even though the new treaty was signed in November 1973, the implementation of these new statutes started in the last quarter of 1974).

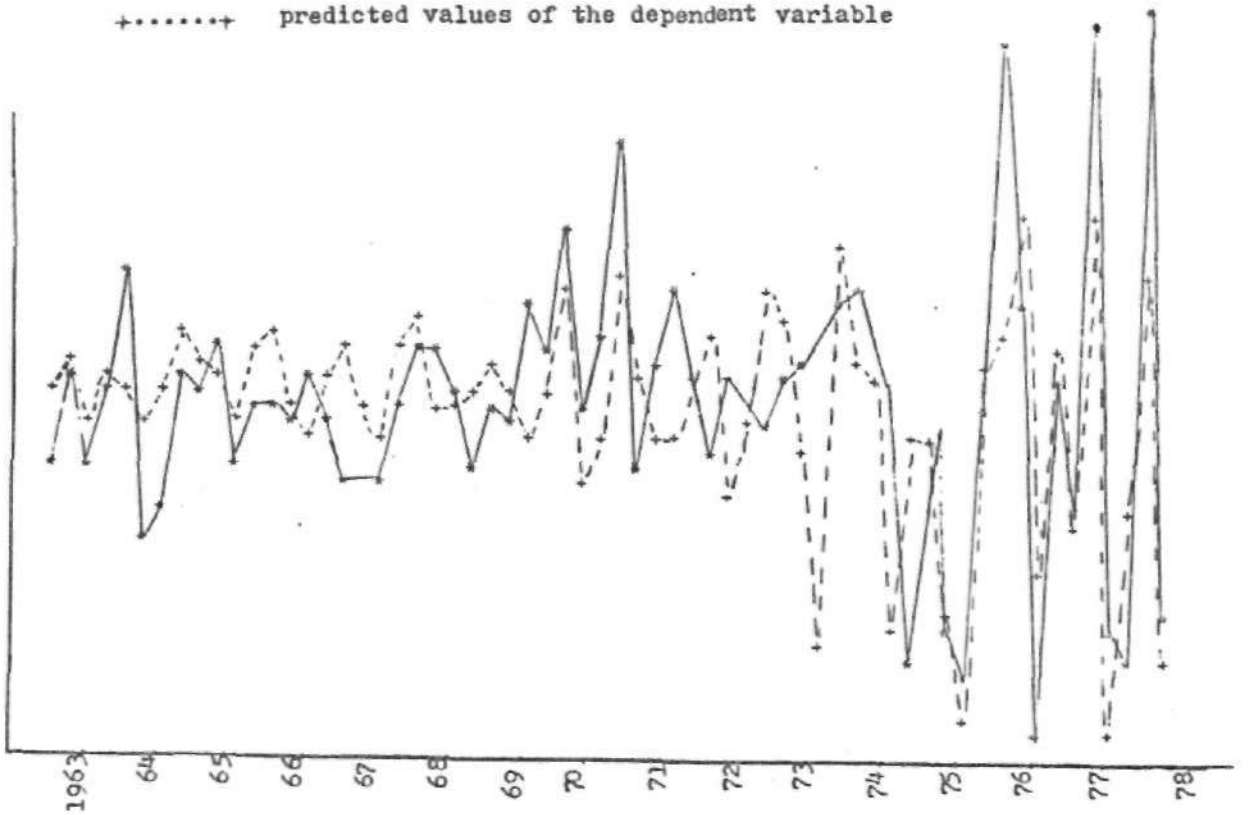
The results of these tests are presented in exhibits 14, 15 and 16. Several conclusions can be drawn from these regressions. First, the explanatory power of the model is much higher in the post reform for all three countries. In recent years, variations in the foreign component of the base have more strongly reflected changes in the direction of monetary policy as well as changes in income (itself being a strong reflection of the current account).

An overwhelming result is the increase in the absolute value of the offset coefficient for all three countries in the post-reform relative to the pre-reform period. Again, all these coefficients are significant at the 1 (one) percent significance level. In other words, the B.C.E.A.O. has increasingly lost control of the monetary aggregates in recent years. In the Ivory-Coast the offset coefficient has reached 1.58 in absolute value in the post-reform, against 0.96 in the pre-reform period. With

EXHIBIT 10

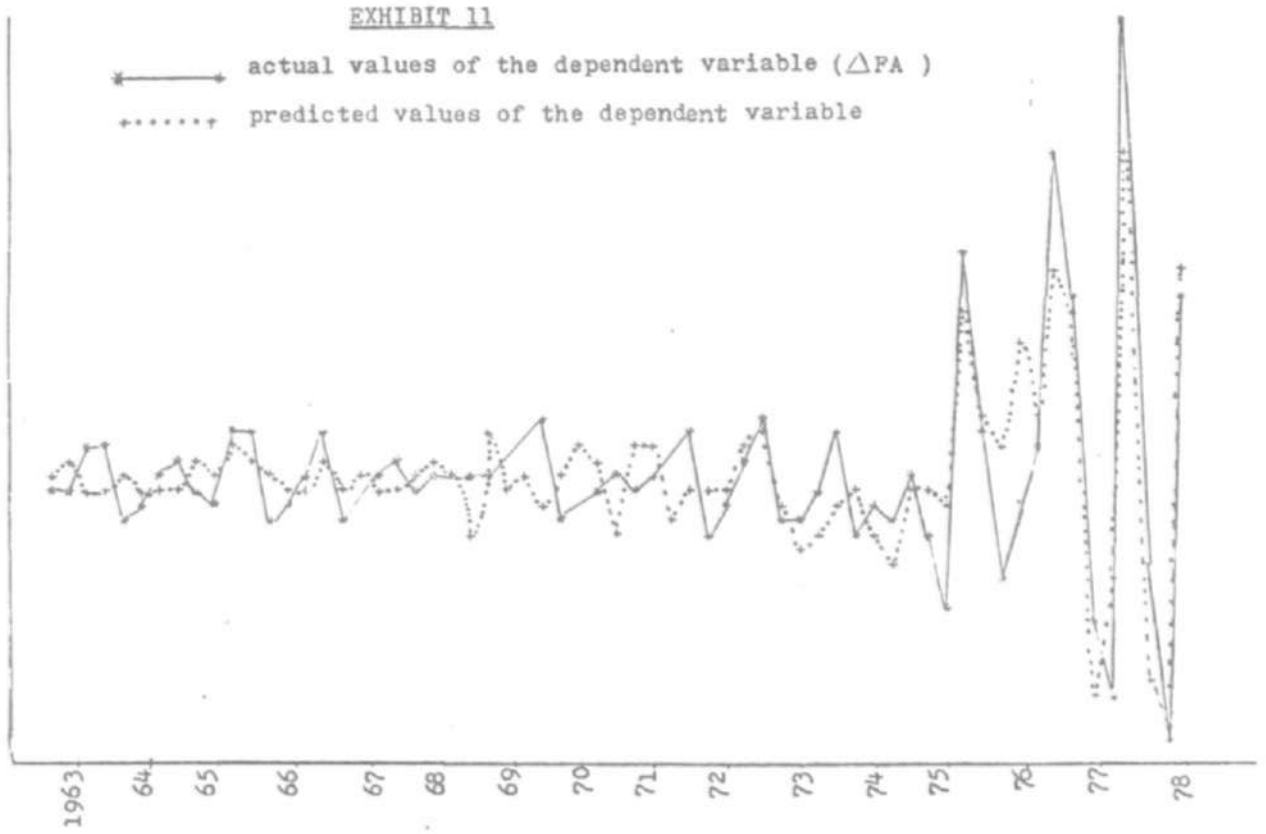
actual values of the dependent variable (Δ FA)

predicted values of the dependent variable



BENIN

EXHIBIT 11

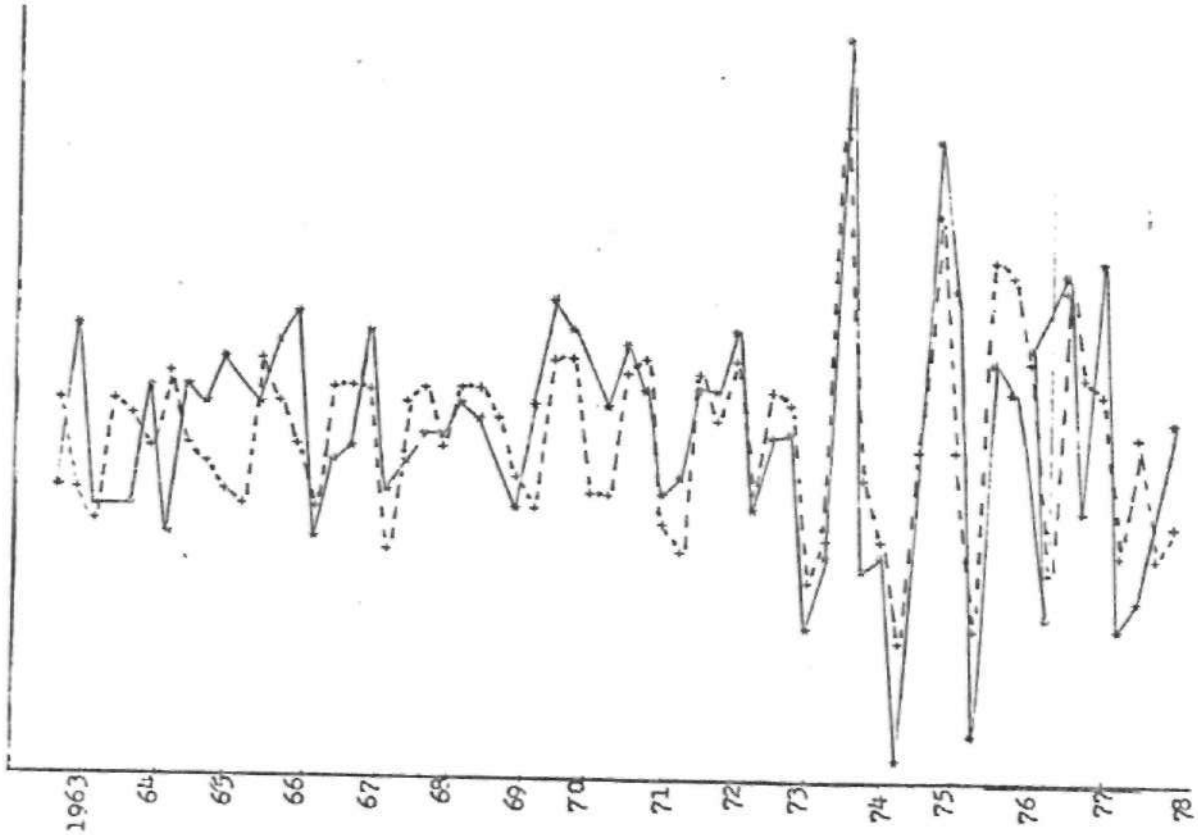


IVORY - COAST

EXHIBIT 12

actual values of the dependent variable (Δ FA)

predicted values of the dependent variable



SENEGAL

EXHIBIT 13

SIMULATION RESULTS

	BENIN	IVORY-COAST	SENEGAL
MEAN	0.72 (E-02)	1.19	-0.50
MEAN Error	0.01	0.00001	-0.07
MEAN Absolute Error	0.8	5.61	3.53

such a high coefficient, an attempt to reduce domestic demand pressure through the monetary instrument seems doomed to fail. The most that can be achieved by the monetary authorities is to meet the long-run requirement of the demand for money. In other words, the B.C.E.A.O. should let the monetary aggregates grow over time according to the trend of the demand for money. In terms of Figure 1, it has become more difficult for the central bank to move to point B in the short-run, or even an intermediate point such as C, without huge variation in its reserve position. This result again suggests the importance of having an accurate estimate for the domestic demand for money in these countries. Knowledge of the stability and cyclical variations of this function as well as the variables which significantly affect it become critically important. Accordingly, using monetary policy to stabilize the balance of payments has become more effective in recent years.

The increase in the offset coefficient in latter years suggests that significant changes in the implementation of monetary policy must have occurred in the post-reform period. We will therefore have to take a closer look at monetary policy in both of these periods.

In the pre-reform period, monetary policy was implemented through the rediscount policy. Credit was classified in two distinct groups: *rediscountable and non-rediscountable credit.** The B.C.E.A.O. regulated overall liquidity in the economy through the quantitative ceilings on rediscountable credit. Financial institutions could therefore expand or reduce non-rediscountable credits either through their own resources or

*Rediscountable credits received preferential treatment in the form of low rates. They usually affect priority sectors such as seasonal farm needs, export activities and national firms.

EXHIBIT 14

BENIN

1963 - 1974

	C	ΔDC	ΔR	ΔY
ΔFA	0.088	-0.528	-0.063	0.054
(t statistics)	(1.24)	(-3.70)	(-0.29)	(1.86)

R^2 = 0.28

DW = 1.99

1974 - 1978

	C	ΔDC	ΔR	ΔY
ΔFA	.389	-.943	.175	0.00006
(t statistics)	(2.00)	(-4.74)	(0.30)	(0.002)

R^2 = 0.71

DW = 2.14

NB: The COCHRANE-ORCUTT iterative technique was used to correct serial correlations in the disturbances.

EXHIBIT 15

IVORY-COAST

1963 - 1974

	C	ΔDC	ΔR	ΔY
ΔFA	-0.505	-0.709	-0.238	0.187
(t statistics)	(-1.68)	(-5.28)	(-0.23)	(8.31)

R^2 = 0.64

DW = 1.99

1974 - 1978

	C	ΔDC	ΔR	ΔY
ΔFA	-3.524	-1.58	-16.859	0.215
(t statistics)	(-0.66)	(-8.30)	(-1.92)	(8.30)

R^2 = 0.83

DW = 1.71

NB: The COCHRANE-ORCUTT procedure was used to correct serial correlation in the disturbances.

EXHIBIT 16

SENEGAL

1963 - 1974

	C	ΔDC	ΔR	ΔY
ΔFA	-0.080	-0.502	-0.567	0.152
(t statistics)	(-0.33)	(-6.65)	(-0.68)	(3.17)
R^2 = 0.57				
DW = 1.84				

1974 - 1978

	C	ΔDC	ΔR	ΔY
ΔFA	-1.574	-0.744	-0.338	0.201
(t statistics)	(-1.74)	(-3.77)	(-0.129)	(2.45)
R^2 = 0.70				
DW = 1.95				

NB: THE COCHRANE-ORCUTT procedure was used to correct serial correlation in the disturbances.

through the foreign market. Moreover, quantitative limits on the amount of rediscount for each particular firm were also used. These ceilings were determined by taking into consideration the rate of growth of deposit in the banking system as well as the potential need for credit in the economy. These ceilings were generous and reflected the low interest rate policy. This is because the B.C.E.A.O. viewed itself as a cofinancer of economic activity. The basic assumption behind this philosophy was the low level of financial resource available in each country. It was therefore felt that the B.C.E.A.O. should supplement these resources. Other monetary instruments included the liquidity ratio (defined as the ratio of the sum of cash reserves and rediscountable credit to the sum of short-term liabilities and rediscount from the central bank). Initially fixed at 70 percent, the liquidity ratio was raised to 75 percent in 1970. In the post-reform period, the distinction between rediscountable and non-rediscountable credit was abolished. The quantitative ceiling on commercial banks rediscount was maintained although the national credit committees (CBB) had more latitude in distributing these credits among various sectors. The liquidity ratio was abolished because it was found ineffective and the B.C.E.A.O. could impose reserve requirement on banks.

Despite these revised statutes, the rediscount ceilings still continue to be the major instrument of monetary policy. However, a quick look at the evolution of credits extended by the central bank seems to show a substantial modification between both periods and to some extent a contradiction in the use of this instrument. In the period 1963 to 1973 (the pre-reform period), the total deposits accruing to the banking sec-

tor averaged 20, 45 and 6 percent for Benin, the Ivory-Coast and Senegal respectively.* In the same period, overall credit extended by the B.C.E.A.O. stayed constant in Benin while it increased in Ivory-Coast and Senegal at a yearly rate of 11 and 16 percent respectively. The 20 percent growth rate in deposit was probably felt sufficient for the increase in private sector demand for credit in Benin. However, when we moved to the period 1973-1978, overall deposits accruing to the banking sector rose at a yearly average rate of about 40, 77 and 45 percent for Benin, the Ivory-Coast and Senegal respectively. This rapid increase in the resources of financial institutions should have given the signal to the B.C.E.A.O. to maintain the rate of growth of its advances in controllable limit and force financial institutions to use their own resources. On the contrary, the B.C.E.A.O. increased its advances to a yearly average of 240, 55 and 40 percent for these three countries respectively. A possible explanation for this rapid increase in central bank advances could be the broader responsibility of the B.C.E.A.O. in influencing credit in the post-reform. Under the revised statutes, the B.C.E.A.O. was empowered to provide rediscount facilities to some priority sectors such as seasonal farm needs and small and medium-sized national firms at preferential rates. In the meantime, overall credit extended to the private sector by commercial banks increased at an average rate of 55, 61 and 40 percent in the post-reform (against 18, 40 and 7 percent in the pre-reform) for Benin, the Ivory-Coast and Senegal respectively. Exhibits

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*Total deposit included: Demand and time deposit in commercial bank plus post office checking deposit as well as saving bank deposit.

17, 18 and 19 show very clearly the changes which occurred in the post-reform period. It would seem that the sudden outburst of these monetary aggregates is quite consistent with our higher offset coefficients found in the latter period of the study. Hence, although these aggregates increased at a faster rate in the post-reform period, at times when the rate of growth of central bank advances and overall deposits was different from the rate of growth of the private demand for credit, offsetting capital flows seem to have occurred.

E. Implications for Stabilization Policies

As discussed in the introduction, stabilization policies have become more and more important for developing countries since the early seventies. Basically, the goal of a stabilization program is to correct imbalances between overall supply and demand in the economy. These imbalances translate themselves in inflationary pressures co-existing with weak external positions. The results obtained from the regression analysis imply that it is quite possible for the WAMU countries in general to stabilize their external positions through some monetary actions. However, one should be aware of the shortcomings of these results which are implied from the theoretical framework used. First of all, the current account is taken as exogenous. It is therefore impossible to determine the effects of current account policy variables on the balance of payments. Put differently, we have totally ignored trade regimes and policies on the balance of payments. Policies such as devaluation (or revaluation), quantitative restrictions and tax (subsidy) on imports (exports)

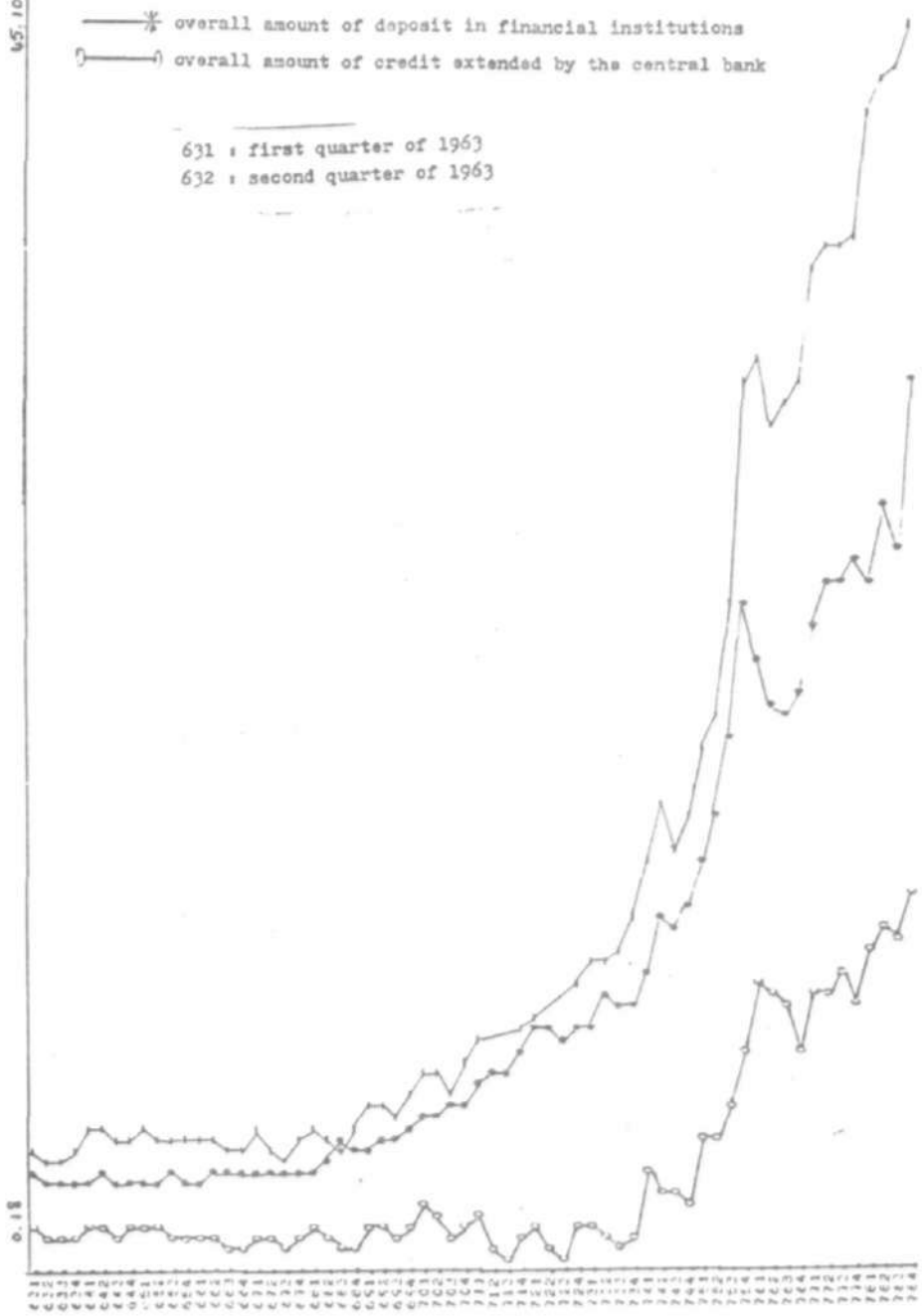
BENIN

credit extended to the private sector by commercial banks

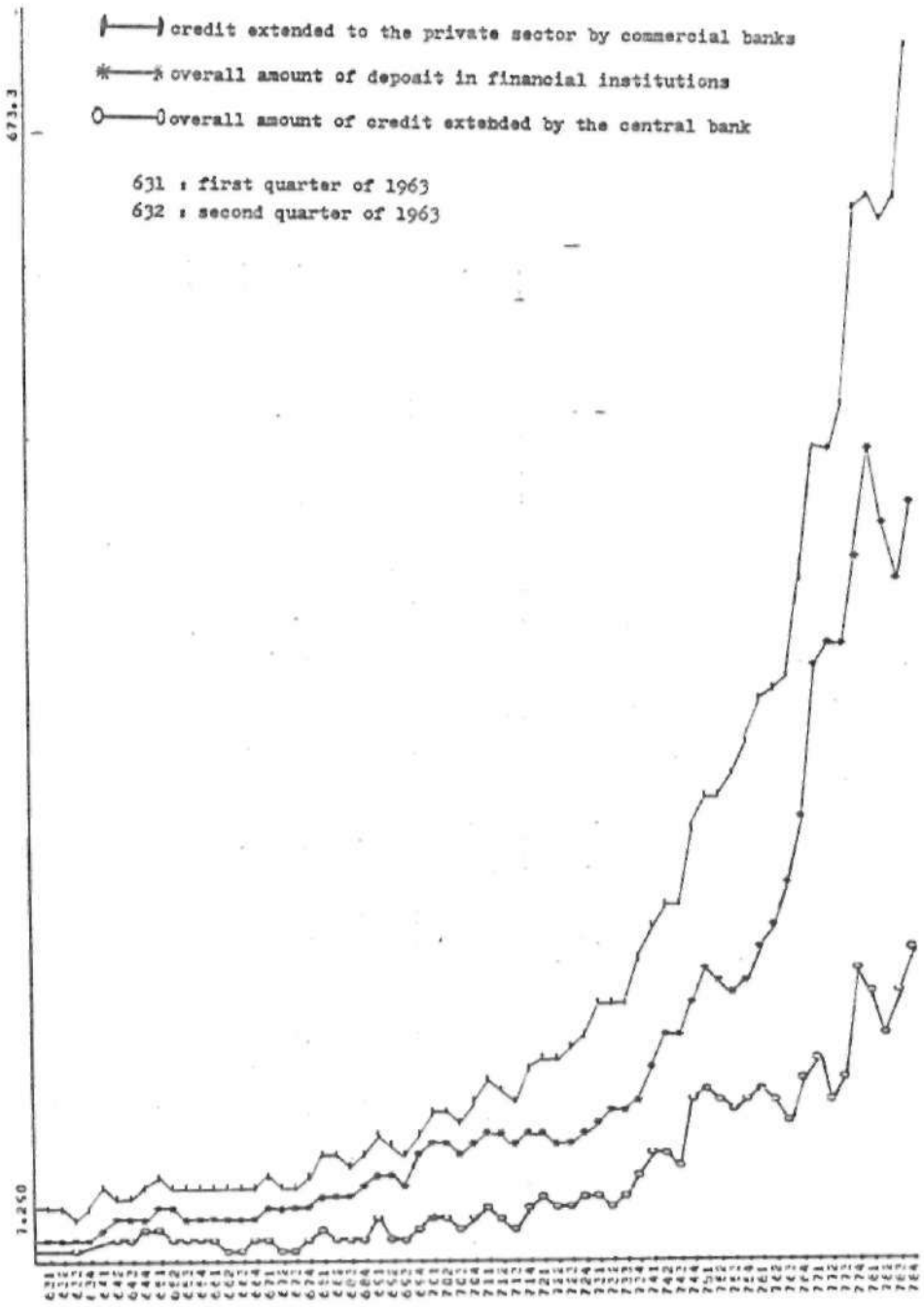
overall amount of deposit in financial institutions

overall amount of credit extended by the central bank

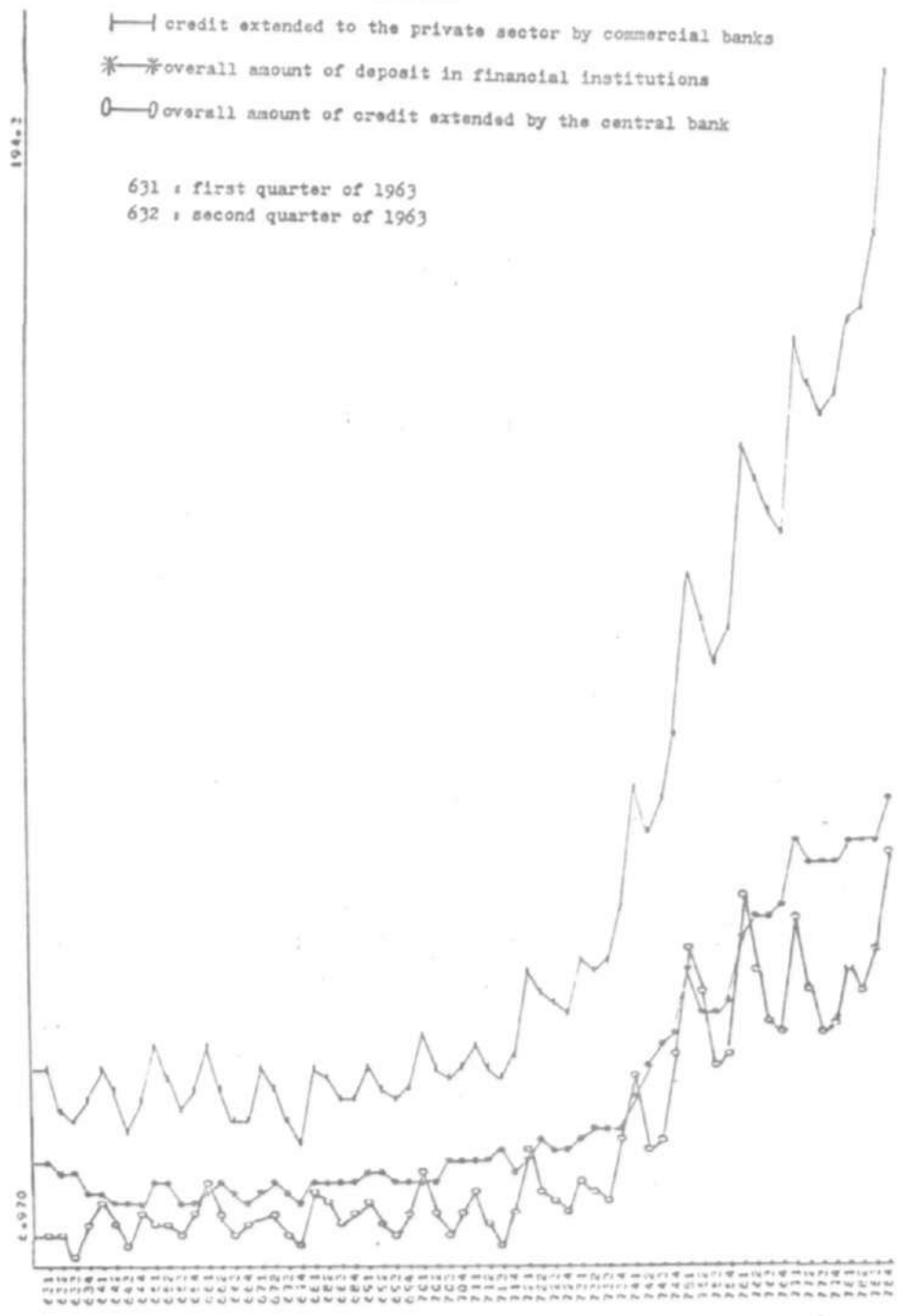
631 : first quarter of 1963
632 : second quarter of 1963



IVORY-COAST


credit extended to the private sector by commercial banks
overall amount of deposit in financial institutions
overall amount of credit extebded by the central bank
631 : first quarter of 1963
632 : second quarter of 1963
673.3
1.250

SENEGAL


credit extended to the private sector by commercial banks
overall amount of deposit in financial institutions
overall amount of credit extended by the central bank
631 : first quarter of 1963
632 : second quarter of 1963
1962
1970

should have an impact on the reserve position of the WAMU countries.[7] Instead, the model used in this study collapses all these effects through their influence on the demand for money. Concerning stabilization programs, policies designed to correct supply and demand imbalances will necessarily imply a short-run cost during the adjustment period. Real income and employment will almost inevitably be reduced during the implementation of the program.[8] Amidst the monetarist and structuralist debate concerning the main features of a stabilization program, it is now somewhat accepted that rigidities in the structure of developing countries economies make the adjustment more difficult and slower.[9] Hence, recent studies have pointed out the lower cost (in term of output loss) of stabilization policies when the adjustment is allowed to work for a longer period.[10] The model used here assumes income to be

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[7]See for example, A-D. Krueger, "Interactions between inflation and trade regime objectives in stabilization programs" in Economic stabilization in developing countries, ed. by W.R. Cline and S. Weintraub, the Brooking Institution, Washington, D.C., 1981, pp. 83-117.

[8]This statement should be qualified. Several Asian countries have been able to maintain their growth rate by a combination of appropriate commercial policies and monetary restraint. See: A.D. Crockett: "Stabilization policies in developing countries: Some policy considerations." I.M.F. Staff Papers: Vol. 28, No. 1, march, 1981, p. 72.

[9]For example, during the 1973-74 oil crisis, while the financial sector in developed countries played an important role in recycling international reserves, developing countries had to rely essentially on international agencies such as the I.M.F. or the world bank to alleviate the pressure on their external account.

[10]This is the basis of the I.M.F. new extended facility: see Moshin S. Khan and Malcolm D. Knight: "Stabilization programs in developing countries: a formal framework." I.M.F. staff papers, Vol. 28, No. 1, March, 1981, pp. 1-53.

exogenous and therefore abstracts from these income effects. In any account, a combination of monetarist policies (demand side management) and structuralist recommendations (supply side management) will be called for when devising a stabilization program in developing economies. In this respect, the results obtained from the regression support the case of demand side management in the WAMU countries. Obviously, unless these short-term approaches are combined with long-term policies to reduce these rigidities in the economies, new imbalances might reappear.

Although it is not the main topic in this study, a brief discussion of these rigidities will be necessary at this point. Rigidities imply inherent inflexibilities built into the economic system. Such rigidities exist, for example, in the productive sector (difficulties in shifting from the production of non-traded to traded goods because of lack of intermediate and capital goods to compete in world market) or the financial sector (lack of appropriate financial saving to finance a sudden increase in firms' inventories). Although correcting these rigidities will necessarily take time, specific measures can help to reduce these bottlenecks. For example, appropriate exchange rate policies will reduce the relative price distortions created by domestic inflationary pressures. Exchange rate policies such as a sliding peg (indexing the exchange rate to the differential between the domestic and main trading partner inflation rates) or a crawling peg or managed float (allowing the exchange rate to fluctuate within a band) will prevent the real exchange rate from becoming overvalued because of domestic policies. Although the same results could be obtained from specific commercial policies (import tax and export subsidy), such policies will create another type of distortion

(for example between subsidized and non-subsidized sectors).[11] Moreover, a crawling peg or managed float should allow the B.C.E.A.O. to have a better control on the domestic monetary base, therefore strengthening the role of monetary policy. In other words, such policies would tend somewhat to isolate the domestic monetary aggregates from foreign influences. However, any form of floating exchange rates could present some potential difficulties for these economies. The foreign exchange market for these countries (C.F.A.) is likely to be very thin and economic shocks originating in the supply side (falling export crops for example) could severely destabilize a freely fluctuating exchange rate. In this case, the cost of controlling the monetary aggregates could be quite high. Perhaps an alternative policy will be to continue the actual peg but not with the French Franc only, but with an appropriate basket of currencies, taking into consideration the diversifying trend of the WAMU countries' trade partners. This move will minimize the impact of any one currency's fluctuations on the C.F.A. even though domestic monetary policy would still be tied to the external balance.

Another type of distortions which should also be reduced are the below opportunity cost prices charged by the public sector. Such cost-price distortions will almost invariably have monetary consequences as central bank credits are used to finance these deficits. Probably the most important distortion in the WAMU today is, as already mentioned, the low interest rate policy. The bias introduced by such policies have already been discussed. Indeed, the present writer strongly feels that the

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[11] J.F. Laker, "fiscal proxies for devaluations: a general review", I.M.F. staff papers, op. cit. pp. 118-143.

road to economic development in sub-saharan Africa in general and in the WAMU in particular will have to go through the development of a capital market. This in turn cannot be accomplished without the progressive and complete freedom of interest rate and the liberalization of the financial system. This should lead to the creation of different types of financial institutions, each specializing in a specific financial function (therefore issuing different types of liabilities tailored to the needs of the economy). Implemented at the level of the monetary union, such policies should help in creating the financial depth necessary to any long-term process of economic development. For example, one of the problems preventing the development of a market for government securities is the high risk of default (due to political and economic factors) as well as the low real rate of return which might exist. With a freely determined interest rate and the guarantee of the B.C.E.A.O. (under certain conditions) such forms of saving could become a means of government financing as well as the beginning of a capital market.[12]

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[12] It is interesting to note that the central bank of the Philippines started issuing its own certificate of indebtedness in 1970, before buying and selling them. See B. Aghevli , M.S. Khan, P.R. Narvekav and B.K. Short: "Monetary policy in selected Asian countries," I.M.F. staff papers, 26 (December 1979) 775-799.

Conclusion

This dissertation attempted to explain the difficulty of the B.C.E.A.O. in controlling the money supply by its inability to control the monetary base. Hence, the focus has been on the relationship between the two components of the base: domestic credit and the net foreign asset of the central bank. The results seem to support the implications of the theoretical framework: In a small open economy with a fixed exchange rate, assuming a high degree of capital mobility, the stock of money becomes an endogenous variable, outside the control of the monetary authorities. This in turn implies that monetary policy (changes in the domestic component of the base) becomes an effective tool in controlling the balance of payments. Moreover, the domestic inflation rate will be linked to the world inflation rate. For the WAMU countries, the data used in this study support these conclusions. Hence, independently of its monetary instruments, the B.C.E.A.O. cannot control the monetary base. Paradoxically, although the 1973 monetary reform was meant to strengthen the role of the monetary authorities, the data show some opposite results. This is because none of the reforms taken in 1973 affected any of the basic assumptions of the theoretical framework: The WAMU's economies were still small, open and more importantly, the exchange rate was left pegged and unchanged. Therefore, when the central bank accelerated the rate of expansion of its advances to the commercial banks after 1974, a higher offsetting flow of reserve did occur, which is quite consistent with the higher offset coefficients found in this period.

The effect of the balance of payments on the domestic money supply could be reduced by adopting any form of flexible exchange rate. However, for reasons mentioned earlier, this move could create some other more important problems. Indeed, the exchange rate should still be pegged, but to a basket of currency instead of just one currency. Naturally, the cost of pegging the exchange rate will still be high in terms of controlling the stock of money.

Finally, we should be aware of the limitations of this study. First, output and price effects have been totally ignored in the analysis. A price variable could have been included in the various demands for asset functions. Previous studies have found that changes in price expectations significantly affect the demand for monetary asset in developing economies. Hence, the model could have been modified in this direction. However, one of the shortcomings of this approach will be the difficulty of finding sufficient and accurate data on prices for most of these countries. Second, the study has been done in a comparative static framework and no dynamic analysis has been performed. In other words, although the data suggest what will be the end result of a monetary disturbance, we do not know the time path of the main endogenous variable. Will net foreign asset first overshoot its final value or move slowly towards this level? Knowledge of this path will be useful to the monetary authorities in implementing monetary policy. Last, several other issues quite important to the WAMU countries have been ignored. For example, at the time of the creation of the monetary union, all countries were almost at the same development stage. This is not the case anymore. The economies of Ivory-Coast and Senegal expanded at a

faster rate than the others (while in the Ivory-Coast the GNP per capita reached $600 US in 1979, in Upper-Volta, it was still at about $100 US) due to the development of a young and dynamic industrial sector. The problem arises because of the implementation of a uniform monetary policy on an heterogenous group of countries (for example, in the case of exchange rate policy). This issue is related to the optimum currency area argument and is becoming an increasing cost which could outweigh the benefits of the monetary union in the near future.

APPENDIX I

From (1-21) and (1-22) differentiating totally and solving for di/dr yields

$$\left(\frac{di}{dR}\right)_{LM} = -m / (miH - Li) < 0$$

and $$\left(\frac{di}{dR}\right)_{KV} = -\Phi / (\Phi iH - Vi) < 0$$

It is assumed that the credit market adjusts faster than the money market to change in domestic interest rate.

Appendix II

From (1-21) and (1-22) we have:

$$mdR + mdN = 0 \rightarrow dR = -dN(\text{LM shifts})$$

$$\Phi dR + \Phi dN = -dN$$

$$dR = -(1 + \frac{1}{\Phi})dN(\text{VK shifts})$$

Since $1 + \frac{1}{\Phi} > 1 \rightarrow$ VK shifts more than LM

TABLE I

DECOMPOSITION OF THE MONEY SUPPLY

	M	ΔM	ΔML	ΔMFA	ΔMDC
1963	81.09				
1964	84.02	2.93	6.88	-2.21	11.02
1965	88.76	4.73	2.74	-3.19	4.73
1966	93.96	5.21	5.05	12.77	-8.21
1967	95.17	1.20	-3.03	2.44	-4.44
1968	110.17	15.01	12.16	-	12.51
1969	121.57	11.39	6.28	4.29	1.97
1970	143.45	21.88	21.31	33.98	-12.14
1971	158.74	15.29	11.20	21.35	-9.92
1972	178.82	20.08	20.82	0.18	17.39
1973	196.86	18.04	14.26	0.68	14.92
1974	254.92	58.06	50.13	-7.56	35.55
		173.82	143.80	62.73	66.40

ML changes in money supply due to the monetary base

MFA changes in money supply due to net foreign asset

MDC changes in money supply due to Domestic credit

From R.J. Bathia & P.A. Acquah, "Money Supply Process in the B.C.E.A.O. area: 1963-74" I.M.F. DM/78/54 June 1978

TABLE 2

MAIN EXPORTS OF WAMU (in millions of C.F.A.)

	1974	1975	1976	1977
groundnut and oil	37,016	42,815	67,028	72,884
palm products	20,547	15,792	13,092	13,818
cocoa	80,964	67,313	95,748	139,098
coffee	68,070	65,976	139,382	206,824
cotton	15,640	9,302	17,624	18,349
wood products	65,234	43,283	75,975	85,218

TABLE 3

PRODUCTION AND VALUE OF MAIN MINERAL PRODUCTS

	NIGER			SENEGAL			
Production	Tin	Uranium	Calcium Phosphate	Aluminum Phosphate	Calcinated Alumina Phosphate	Attapulgite	Phosphate & Polytes
	(ton)				(ton)		
1970	106	-	998	130,338	38,323	4,500	5,985
1971	126	410	1,396	146,623	45,737	1,902	1,097
1972	136	869	1,250	165,646	52,330	3,082	6,238
1973	136	949	1,533	218,895	63,816	5,052	5,407
1974	140	1,114	1,484	405,362	96,798	4,810	4,615
1975	127	1,305	1,600	201,445	37,091	8,217	7,699
1976	118	1,459	1,601	207,682	66,855	4,778	6,084
1977	105	1.441	1.596	274,510	68,750	2,502	5,788
1978	90	2,109	1,555	203,921	47,814	2,784	6,419
1979	78	3,540	1,651	184,884	78,361	8,647	6,740
Value				Millions of C.F.A. Franc			
1970	49	-	3,170	216	154	40	36
1971	52	2,000	3,633	306	184	54	27
1972	70	1,484	4,603	240	182	89	55
1973	99	5,011	5,278	282	318	117	46
1974	117	6,396	23,847	974	737	148	71
1975	138	13,999	21,510	837	374	210	131
1976	152	21,005	11,443	470	364	140	63
1977	82	28,421	14,021	513	-	130	89
1978	144	52,352	12,513	387	371	88	55
1979	-	83,399	14,250	385	488	260	44

TABLE 4

TRADE BALANCE OF THE WAMU
(millions of C.F.A.)

Annees	Benin (a)	Cote d'Ivoire	Haute Volta(b)	Niger	Senegal	Togo	U.M.O.A.
			EXPORTS				
1963.....	3,047	56,858	2,300	5,338	30,023	4,509	102,075
1964.....	3,254	73,186	3,005	5,260	32,844	7,448	124,997
1965.....	3,367	68,418	3,680	6,250	32,052	6,679	120,446
1966.....	2,585	76,659	3,985	8,574	37,114	8,872	137,789
1967.....	3,750	80,263	4,429	8,225	34,267	7,894	138,828
1968.....	5,505	104,890	5,288	7,125	37,853	9,549	170,210
1969.....	6,692	118,223	5,329	6,250	31,907	11,477	179,878
1970.....	9,062	130,191	5,056	8,795	42,181	15,176	210,461
1971.....	11,648	126,559	4,408	10,670	34,707	13,626	201,618
1972.....	9,189	139,541	5,141	13,712	54,412	12,659	234,654
1973.....	9,794	190,856	5,596	13,817	43,237	13,755	277,055
1974.....	10,240	291,771	8,702	12,621	93,983	45,174	462,491
1975.....	6,791	254,572	9,369	19,556	99,101	26,962	416,351
1976.....	9,053	392,501	12,690	31,979	115,925	24,914	587,062
1977.....	7,642*	529,212	13,614	39,335	152,920	39,115	781,838*
			IMPORTS				
1963.....	7,696	41,908	9,152	5,974	42,259	7,167	114,156
1964.....	7,762	58,106	9,794	8,114	43,611	10,286	137,673
1965.....	8,491	58,343	9,169	9,300	40,198	11,100	136,601
1966.....	8,270	62,792	9,293	11,115	39,481	11,668	142,619
1967.....	11,983	65,050	8,970	11,353	40,826	11,133	149,315
1968.....	12,211	75,831	10,803	10,237	45,798	11,623	166,503
1969.....	14,129	86,284	13,989	12,570	50,410	14,572	191,954
1970.....	17,660	107,704	13,701	16,214	53,857	17,928	227,064
1971.....	21,202	110,838	15,611	14,975	60,601	19,455	242,682
1972.....	23,510	114,317	17,269	16,576	70,551	21,381	263,604
1973.....	24,859	157,522	21,690	10,098	80,166	22,388	325,723
1974.....	35,530	232,286	34,664	23,144	119,382	28,612	473,618
1975.....	42,080	241,393	32,386	21,889	124,615	37,270	499,633
1976.....	50,528	311,607	34,423	30,383	153,887	44,420	624,948
1977.....	60,354*	429,566	51,356	48,221*	187,547	69,834	846,878*

TABLE 5

INTRA WAMU TRADE - 1970

(millions of Fr. C.F.A.)

IMPORTS

Exports	Benin	Ivory Coast	Upper Volta	Niger	Senegal	Togo
Benin		99,1	11,5	112,3	205,6	186,8
Ivory Coast	446,6		1794,	668,6	2788,5	142,7
Upper Volta	6,8	883,1		17,85	,6	28,4
Niger	187,6	261,4	69,2		11,4	130,
Senegal	572,2	2900,	186,	769,4		69,4
Togo	286,2	29,7	22,0	13,8	8,6	
Total of Imports	1499,4	4173,7	2077,	1582,	3014,8	557,4

From: "Trade between the WAMU countries: in L'Economie ouest Africaine, published Notes d'Information et de Statistique. B.C.E.A.O. no. 292, March, 1981

TABLE 6

INTRA WAMU TRADE - 1974
(millions of C.F.A.)

Imports

	Benin	Ivory Coast	Upper Volta	Niger	Senegal	Togo
Benin		61,35	11,7	315,65	119,15	238,5
Ivory Coast	1641,		5763,8	115,2	4475,8	599,
Niger	154,1	144,7	94,		1,	16,8
Senegal	734,2	4369,3	202,2	425,25		166,1
Togo	163,3	71,3	80,95	40,15	5,2	
Total of Imports	2698,	6242,	6152,6	2153,	4608,	1122,

N.B. numbers are average of import and export; given X_{12} export of country 1 into country 2, M_{21} import of country 2 from country 1.

$X_{12} = M_{21}$ should always hold, but because of statistical error in reporting the data, very often $X_{12} \neq M_{21}$. In such case the average was computed.

TABLE 7

INTRA WAMU TRADE - 1978
(millions of C.F.A.)

Imports

EXPORTS	Benin	Ivory Coast	Upper Volta	Niger	Senegal	Togo
Benin		16,65	15,65	298,3	28,	120,25
Ivory Coast	779,4		7813,8	4700,	6585,	1340,
Upper Volta	5,4	2162,1		107,3	8,05	41,4
Niger	15,4	16,	57,5		0,4	12,8
Senegal	640,7	6837,	312,1	531,7		514,3
Togo	145,3	1059,	781,15	214,5	436,7	
Total of Imports	1586,2	10091,4	8980,1	5701,7	7058,2,	2028,

TABLE 8

TRADE BETWEEN THE WAMU COUNTRIES - 1978
(millions of C.F.A.)

EXPORTS

	Benin	Ivory Coast	Upper Volta	Niger	Senegal	Togo	
1. Food Products	367,9	4701,0	3946,2	13,9	3400,5	60,2	
2. Drinks	0,1	-	-	1,2	46,1	2,1	
3. Tobacco & Cigarettes	9,7	261,1	-	7,3	373,5	-	
4. Petroleum Products	-	4819,3	11,2	137,9	1933,2		
5. Raw Materials	17,9	841,9	44,3	-	1414,0	26,8	
6. Oil and Grease	18,1	892,9	0,2	-	356,5	4,6	
7. Machinery	3,4	865,9	30,7	4,9	76,7	669,6	
8. Transportation Material	37,2	1485,0	4,4	13,3	73,9	118,9	
9. Industrial Products	101,2	9861,3	202,8	61,0	2767,5	906,6	
10. Others	5,8	272,4	0,3	0,5	7,9		
Total	561,3	24000,8	4240,1	102,1	8654,5	3722,0	

TABLE 9

TRADE BETWEEN THE WAMU COUNTRIES - 1978
(millions of C.F.A.)

Imports

	Benin	Ivory Coast	Upper Volta	Niger	Senegal	Togo	Total
1. Food products	119,0	7130,4	1587,4	691,7	2711,9	249,3	12489,0
2. Drinks	1,3	17,3	27,1	2,3	-	1,3	49,5
3. Tobacco & Cigarettes	200,7	95,5	51,3	219,6	18,0	66,5	651,6
4. Petroleum products	75,8	1081,3	4435,1	239,5	878,3	191,6	6901,6
5. Raw material	263,0	999,2	321,2	147,7	588,3	25,5	2344,9
6. Oil & grease	13,0	156,9	161,6	245,8	441,9	252,1	1272,3
7. Machinery	53,7	649,9	245,9	292,0	303,1	106,6	1651,2
8. Transportation material	69,3	150,7	532,3	488,0	304,7	187,7	1732,7
9. Industrial products	1102,3	2036,7	3603,1	3281,4	2709,1	1167,8	13900,4
10. Other	0,2	7,6	56,7	93,7	98,2	30,5	286,9
Total	1898,3	12325,5	11022,9	5701,7	8053,5	2278,9	41280,8

TABLE 10

REAL YIELD ON MONEY IN WAMU (1973 - 1977)

(in percentage)

	Nominal Deposit Rate	Inflation Rate	Real Deposit Yield
Ivory Coast	5.5	16.43	-10.96
Niger	5.5	17.3	-11.8
Senegal	5.5	16.2	-10.7
Togo	5.5	17.8	-12.3
Upper-Volta	5.5	6.6	-1.2

BCEAO: Notes d'informations et de Statistiques

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