

RESERVE POOLING IN THE EASTERN CARIBBEAN CURRENCY UNION AND THE CFA FRANC ZONE: A COMPARATIVE ANALYSIS

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1. Introduction

The theory of optimum currency areas (OCA) was once ridiculed as "primarily a scholastic discussion, which contributes little to the practical problems of exchange rate policy and monetary reform" (Ishiyama, 1975). The viability of OCA was recently called into question with the 50 percent devaluation of the (CFA) franc in 1994¹. However, the allure of OCA has re-emerged with the advent of the European Monetary Union (EMU) and the recent creation of the Euro currency in 1999. The choice of exchange rate regime, exposure to external shocks, and the criteria for the establishment of an OCA become important factors in the setting up of such a currency arrangement². In the case of EMU, the existence of a common currency was foreseen to foster intra-regional trade and to endogenize the OCA conditions. Frenkel and Rose (1998) argue that countries need not satisfy the conditions for a currency union ex-ante as the establishment of a single currency may well create these conditions ex-post.

The Eastern Caribbean Currency Union (ECCU) and the West and Central African Monetary Unions chose to peg their currencies to the U.S. dollar and French franc, respectively³. By so doing, inflation rates reflect those of the major country to which the domestic currency is pegged. The only comparative study of their respective monetary policies is given by Nascimento (1994). Allechi and Niamkey (1994) explo-

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¹ CFA denotes Communauté Financière Africaine in the Central African Economic and Monetary Community and Coopération Financière Africaine in the West African Economic and Monetary Union.

² The criteria include: (1) the extent of trade among members; (2) similarity in economic structures and commonness of shocks; (3) flexible factor mobility; and (4) existence of fiscal transfers.

³ The ECCU is comprised of the following independent countries; Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent, and two British dependent territories, Anguilla and Montserrat. The WAEMU consists of Benin, Burkina Faso, Côte d'Ivoire, Senegal, Togo, Niger, Guinea Bissau, and Mali, and these countries are governed by a common central bank, the Banque Centrale des Etats de l'Afrique de l'Ouest (BCEAO). Cameroon, Congo, Gabon, Central African Republic, Equatorial Guinea and Chad form the CAEMC and are governed by the Banque des Etats de l'Afrique Centrale (BEAC).

red the gains from pooling of reserves for the CFA.

The scarce literature on the structure and performance of these two monetary unions motivated this study. The study undertook four tasks: (1) explore the gains from pooling of reserves in the ECCU and CFA; (2) measure the level of reserves members of these monetary unions would have to hold in an independent state relative to pooling reserves; (3) examine the role of institutional arrangements in reserve management; and (4) measure the impact of unanticipated changes in the terms of trade on reserves. The optimal level and variability of reserve pooling, gains from non-pooling and the choice between reserve accumulation and capital formation are also examined.

The paper is organized as follows: Section 2 looks at the institutional framework for pooling reserves in the ECCU. As far as possible, a comparison will be made between the institutional framework governing the operations of the reserve pool in the ECCU with that of the West and Central African Monetary unions (CFA franc zone). Section 3 presents a theoretical framework. Section 4 data issues. Section 5 discusses the comparative results between the two currency areas. In doing so, the concept of hypothetical reserves is introduced with a view to estimate the level of reserves countries would have to hold assuming no reserve pooling, and pertinent methodological issues regarding the approach used are discussed briefly. In Section 6, some issues of reserve management in the respective currency areas are presented. Finally, some concluding remarks are made in Section 7.

2. Institutional Framework

2.1 ECCU⁴

In the ECCU, although commercial banks are not required to surrender their foreign exchange earnings to the Eastern Caribbean Central Bank (ECCB)⁵, they nonetheless submit their foreign exchange to:

⁴ For a more detailed account of the institutional framework of the ECCU/ECCB see "The Eastern Caribbean Currency Union: Institutions, Performance and Policy Issues", Occasional Paper 195/2000.

⁵ The ECCB is the monetary authority of the Eastern Caribbean Currency Union.

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- (i) maintain settlement balances with the central bank to settle transactions abroad; and
 - (ii) take advantage of interest bearing facilities at the central bank in accounts that must be funded by foreign currency.

The ECCB does not allocate foreign reserves to any particular country or bank because the only meaningful balance of payments in a currency union is at the aggregate level. With the introduction in 1986 of coding of banknotes by country of origin, it became possible to prepare separate balance of payment accounts for ECCU member countries using the concept of imputed foreign reserves for each country. The formula for calculating imputed reserves is based on the following identity:

$$NFA_i = RM_i - NDA_i \quad (1)$$

where NFA_i is net foreign assets, RM_i is reserve money, and NDA_i , net domestic assets for country i ⁶.

The fundamental constraint is fiscal in that any agent in any country can access the pool as long as he/she has local currency resources. This policy focus is reflected in the ECCB agreement, which limits the extent of domestic liquidity the bank can create at two levels. The ECCB is required to maintain a minimum foreign exchange cover equivalent to 60 percent of demand liabilities. Therefore, the ECCB cannot in the aggregate lend governments and banks more than 40 percent of demand liabilities. The second constraint is that under section 40(1) of the ECCB Agreement, temporary advances to meet seasonal needs, and holdings of treasury bills issued by member governments are limited to 5 percent and 10 percent of each government's recurrent revenue respectively. Additionally, the holding of securities other than treasury bills in respect of all governments may not exceed 15 percent of currency in circulation and other demand liabilities.

In determining its annual credit limit, the central bank takes into account the existing level of net foreign assets, demand liabilities at the beginning of the fiscal year

⁶ RM_i can only be calculated as currency is issued to banks in country i and generally will not coincide with currency held there. Notes move freely among the islands leading to discrepancies between currency issued and currency held.

and the statutory requirement of 60 percent foreign asset cover but after deducting a margin of 30 percent for credit allocated to finance governments for contingency lending to banks. Credit is allocated to each government based on the ratio of its recurrent revenues to total revenues for all members. Governments are free to draw on their allocation at anytime to finance budget deficits, and the central bank advises them on the appropriate mix of treasury bills and long-term securities.

Analysis of these arrangements suggests that each member government has an individual credit allocation at the ECCB, which cannot be extended upon exhaustion. Therefore, there is no spillover effect in regard to member's demand for credit.

2.2 CFA Franc Zone

The CFA franc zone comprises two regions: the West African Economic and Monetary Union (WAEMU) and the Central African Economic and Monetary Community (CAEMC). France guarantees convertibility of the CFA franc through an operations account that each of the central banks holds at the French treasury. In return for the guarantee, the CFA franc zone allows France to participate in the decision-making process within the currency arrangements. In instances when the operations accounts of the Central Bank of Central African States (BEAC) are in deficit, the statutes of the BEAC prescribe a reduction in net domestic credit when the central bank's position in the operations account is negative.

The net position of the two zones in the operations account was positive until 1980 as the negative position of the Central Bank of West African States (BCEAO) was offset by the positive position of the BEAC (Medhora, 1992a). Collectively, the external reserves of the CFA franc zone have been a small proportion of France's (less than 10 percent). All exports receipts must be exchanged for CFA francs with a local bank which in turn surrenders the foreign bill of payment to the BCEAO and BEAC. Before the CFA zone can avail itself of the facility, members must first contribute all of their own reserves. The respective central banks are also empowered to use all funds maintained abroad by both private and public institutions.

In order to prevent excessive recourse to central bank financing of budget deficits, both central banks have incorporated two monetary rules in their respective agreements. Both central banks restrict outstanding credit to governments to 20 percent of fiscal revenues of the previous year. In the case of the BCEAO, this rule was in effect

until 1998, when member states decided to freeze the ceiling for 1999 at the corresponding level of 1997 fiscal revenues, with a view to gradually bringing the stock of advances down to zero by end-2001. Moreover, the limit to statutory advances to the treasuries is defined in the BCEAO as 20 percent of the previous year's tax revenue and in the BEAC as 20 percent of the previous year's budgetary revenue. Although simple, it must be noted that the first rule does not take into account all sources of central bank credit to public entities that can relieve fiscal pressures. The second rule states that gross foreign assets for each central bank must be maintained above 20 percent of sight liabilities⁷. Moreover, the application of the first rule has not always been strict as some countries have had outstanding credit above the ceiling. Amounts exceeding the prescribed ceiling, however, require approval of the Conseil d'Administration.

The institutional framework in the CFA franc zone makes it possible for member states to use pooled reserves based on counterpart in local currency. Within these arrangements, fiscal imbalances of member countries, unless funded by other members within the pool, can result in a decline in the foreign assets of the respective central banks.

As a counterpart to the guarantee of the French treasury, each central bank is obliged to maintain 65 percent of its official reserves in the operations account. In the first instance, each country draws down on its own account of pooled and unpooled reserves. Once these are fully drawn down, the other countries' pooled reserves may be used. In essence, there is no statutory limit on a member country's use of another's reserves. A crisis management scheme takes over when the BCEAO or the BEAC reserves fall below the prescribed threshold, not when the reserves of individual countries are exhausted.

3. Theoretical Framework

The pooling of reserves offers participating countries two possible sources of gain. The first of these is access to increased reserve holdings while the second is a possible reduction in reserve variability. Dodsworth (1992) and Medhora (1992) utilized a

⁷ Sight liabilities include notes and coins, sight deposits of banks, financial institutions and the treasury, and foreign currency liabilities.

notion of coverage in a way, which incorporates these two sources of gain. Coverage is defined as the ratio of reserve holdings to their variability. According to this formulation, coverage rises if there is an increase in access to reserves or a decrease in reserve variability. Dodsworth (1992) and Medhora (1992) defined coverage in country i as:

$$C_i = \frac{PR_i}{Var (PR_i)} \quad (2)$$

where PR_i is the average level of reserves during a time period and $Var (PR_i)$ is their variability during the same time period (for each country).

In the case of a reserve pool, $PR = \Sigma PR_i$. It is important to note that coverage under reserve pooling is higher than that in the independent state if the variability of the pool is lower than that of each country's individual reserves, or if the increased access to reserves outweighs the higher variability of the pool⁶. The case of a partial pool can be presented as follows:

$$C_i = \frac{(R_i + \sum_{j \neq i} \rho R_j)}{VAR (R_i + \sum_{j \neq i} \rho R_j)} \quad (3)$$

where ρ is the degree of pooling $0 < \rho < 1$ and R_i is the total reserves of country i . That is, with partial pooling, country i 's total access to reserves equals all its own reserves plus the partially pooled reserves of all other members of the pool. In a 100 percent pooling scheme (i.e. $\rho = 1$) equation (3) reduces to equation (4) because $\Sigma R_i = PR$.

Studies on the demand for international reserves have typically assumed that reserves are held both to meet international payments as well as for precautionary reasons to face unexpected payment difficulties (Heller, 1966; Hamada and Ueda,

⁶ The optimization approach to reserve pooling, though very attractive, was not used in this paper largely because of the inherent difficulties in defining a cost function for reserves.

1977; and Frenkel, 1981). These studies assumed the demand for reserves to be a stable function of country size, the degree of openness of the country, the variability of payments and the opportunity costs of holding reserves. Country size has typically been measured using income and is expected to be positively related to reserves. The openness of a country, as reflected by its propensity to import, has an ambiguous impact on the demand for reserves. Heller (1966) asserts that in the hypothetical absence of reserves, any temporary deficit in the balance of payments would have to be corrected by means of a reduction in aggregate expenditure. The required adjustment is smaller the higher the propensity to import. This implies a negative relationship between reserves and the propensity to import. Frenkel (1977) argued that the propensity to import reflects the economy's openness and thus measures its vulnerability to external shocks. In this case the demand for reserves should be positively related to the import propensity. In order to account for the adjustment between actual and desired reserves a partial adjustment process is assumed in this study, (Mathieson and Lizondo, 1987). In studies by Edwards (1984), Heller (1966), and Frenkel (1981), it was assumed that the higher the variability of external payments the higher the level of reserves a country would desire to hold. This is particularly relevant the more predisposed the country is to negative external shocks. In this case, the sign of the coefficient on the variability measure is postulated to be positive. However, in this study we focus on the unexpected portion of external disturbances to measure its impact on the desired level of reserves. The coefficient of the unanticipated portion of terms of trade is expected to be negative.

The following equation summarizes the dynamics of desired reserves outlined in the theoretical section:

$$RES_t = \gamma (RES_t^* - RES_{t-1}) + \lambda (Z_t - Z_t^*) \quad (4)$$

where RES_t^* refers to desired reserves, RES_t is actual reserves held at period t and Z_t represents a vector of right hand side variables which include income and the propensity to import. This partial adjustment specification has been used in previous studies (Bilson and Frenkel, 1979; Edwards, 1984).

4. Data Issues

Equation (4) was estimated with reserves to GDP (RES_t) as the dependent variable regressed on the average propensity to import ($AVPIMP_t$) or imports to GDP, per capita GDP ($PCAPGDP_t$), the spread between French treasury bill rate and the CFA central banks' discount rate ($SPRD$), and the lagged dependent variable (RES_{t-1}) as independent variables. All variables are measured in logarithmic value whose coefficients are estimated using instrumental variables. The choice on instruments were U.S. and French interest rates, terms of trade, lagged average propensity to import and lagged per capita income. The spread between French treasury bill rate and the discount rate was used for the CFA. Alternatively, several measures of the variability of the terms of trade as these affect the ability of countries to meet payments were used in ascertaining their impact on reserve accumulation. In particular an attempt was made to determine how the unanticipated component of the terms of trade affected reserves.

Data for the analysis covering the period 1980–1997 were obtained from IMF IFS. Congo and Equatorial Guinea were excluded from the analysis for CAEMC due to gaps in the data. The standard deviation and the coefficient of variation indicate the pattern of reserve variability for member countries. The coefficient of variation corrects for the influence of extreme values on the estimates, therefore both measures will be used to examine reserve variability in the ECCU and the CFA franc zone. Reserve variations are analyzed for the period 1980–1997. Reserve holdings of the monetary authority are examined.

5. Result and Discussion

5.1 Reserve Variability

When the standard deviation is used as a measure of reserve variability of the monetary authority, St. Lucia, Antigua and Barbuda, and St. Kitts and Nevis record the highest variability in reserves for the period 1980–1997 (see Table 1). Both measures of reserve variability indicate that Anguilla and Montserrat record the lowest variability in the imputed reserves at the central bank over the period 1980–1997. This finding is consistent with lower than average variability in tourism revenue and merchandise export revenue in Montserrat and Anguilla during the period 1980–1997.

Table 1. Reserves Variability ECCU Monetary Authority 1980–1997

Country	Mean Reserves	Standard Deviation	Coefficient of Variation Reserves	Coefficient of Variation Terms of Trade
Antigua and Barbuda	79.86	44.19	0.55	0.18
Anguilla	26.65	10.44	0.39	n.a.
Dominica	35.37	20.35	0.58	0.07
Grenada	59.58	25.16	0.42	0.15
Montserrat	19.51	5.40	0.28	n.a.
St. Kitts and Nevis	47.69	30.79	0.65	0.14
St. Lucia	95.80	58.60	0.61	0.14
St. Vincent and the Grenadines	58.30	26.98	0.46	0.21

The high variability of reserves in Antigua and Barbuda may be associated with very high variability of tourism revenue in that country, perhaps related to the effects of hurricanes. The high variability of reserves in St. Lucia is consistent with high variability in banana export and tourism revenue.

Table 2. Reserves Variability WAEMU and CAEMC Monetary Authority 1980–1997¹

	Mean Reserves	Standard Deviation	Coefficient of Variation Reserves	Coefficient of Variation Terms of Trade
WAEMU				
Benin	15.14	47.23	3.12	0.21
Burkina Faso	67.02	41.04	0.61	0.16
Côte d'Ivoire	-294.51	203.00	-0.69	0.18
Mali	29.55	69.42	2.35	0.10
Niger	19.35	12.73	0.66	0.26
Senegal	-152.96	58.50	-0.38	0.09
Togo	41.60	27.04	0.65	0.21
CAEMC				
Cameroon	-109.21	134.17	-1.23	0.32
Central African Republic	29.49	37.62	1.28	0.33
Chad	16.40	17.88	1.09	0.28
Gabon	23.98	49.30	2.06	0.16

¹ Congo and Equatorial Guinea excluded from CAEMC due to gaps in data.

The standard deviation indicates that within the CFA franc zone Côte d'Ivoire and Cameroon record the highest variability of reserves for the period 1980–1997 (Table 2). This finding is consistent with the high degree of variability which revenue from service exports from Cameroon and Côte d'Ivoire demonstrates during the period under consideration. The coefficient of variation of reserves points to Benin, Mali and Gabon as high reserve variability countries.

5.2 Degree of Pooling

Using equations (3) and (4) coverage ratios using various pooling configurations ranging from a zero pool state to a 100 percent pool are computed for individual countries. All ECCU countries enjoy much higher coverage under a full pool than under a partial pool (Table 3). When the CFA franc zone was examined as a block the countries achieved much lower coverage ratios than the ECCU area for the entire period under consideration (Table 4). Also, all countries enjoyed more coverage under a pooling arrangement. Under a 70 percent pool Senegal, Niger and Chad achieved highest coverage. These three countries all recorded lower than average reserve variability for the period under consideration. Niger and Chad also recorded mean reserves that are higher than the average level of reserves.

Table 3. Coverage Ratios ECCU Monetary Authority 1980–1997

	Pool (in percent)					
	None	20	50	65	70	100
Antigua and Barbuda	1.81	2.84	3.91	4.31	4.43	16.18
Anguilla	2.55	5.74	7.38	7.79	7.90	16.18
Dominica	1.74	3.98	5.67	6.19	6.34	16.18
Grenada	2.37	3.99	5.34	5.77	5.90	16.18
Montserrat	3.61	7.47	8.70	8.96	9.02	16.18
St. Kitts and Nevis	1.55	3.16	4.63	5.13	5.27	16.18
St. Lucia	1.63	2.42	3.30	3.64	3.75	16.18
St. Vincent and the Grenadines	2.16	3.29	4.27	4.59	4.68	16.18

When WAEMU was examined as a block, Niger attained the highest coverage for the period 1980–1997. This may be due to low reserve variability and higher than average level of reserves. This result is consistent with Medhora (1992b) who concluded that Niger had low variability of reserves for the period 1974 to 1990. Senegal achieved a higher level of coverage in a no pool state than under any pooling configuration. Although Senegal has a low level of reserves, it also records low reserve variability. Côte d'Ivoire had the lowest level of coverage under a 70 percent pool. This may be as a result of its very low level of reserves and high level of reserve variability.

Cameroon and Chad had the highest coverage when CAEMC was examined as a block. Chad had low reserve variability and high mean reserves for the period under

consideration. However, Cameroon recorded the lowest level of reserves and high reserve variability. This is consistent with the fact that Cameroon recorded the highest variability in export revenue, and is third, after Côte d'Ivoire and Gabon, in terms of variability of revenue from exports of goods.

Table 4. Coverage Ratios WAEMU and CAEMC Monetary Authority 1980–1997¹

	Pool (in percent)					
	None	20	50	65	70	100
WAEMU						
Benin	0.32	0.58	1.14	1.29	1.33	2.06
Burkina Faso	1.63	0.02	0.96	1.21	1.28	2.06
Côte d'Ivoire	1.45	1.26	1.06	0.97	0.95	2.06
Mali	0.43	0.33	0.90	1.08	1.13	2.06
Niger	1.52	1.00	1.61	1.73	1.76	2.06
Senegal	2.61	2.08	1.71	1.60	1.57	2.06
Togo	1.54	0.40	1.24	1.44	1.49	2.06
CAEMC						
Cameroon	0.81	0.65	0.44	0.36	0.33	0.59
Central African Republic	0.78	0.31	0.07	0.19	0.22	0.59
Chad	0.92	0.17	0.22	0.32	0.35	0.59
Gabon	0.50	0.19	0.10	0.19	0.22	0.59

^{1/} Congo and Equatorial Guinea excluded from CAEMC due to gaps in data

The differences in economic structure of exports may in part explain some of the differences in coverage between the CFA franc zone and the ECCU. Within the CAEMC, Chad relies heavily on cotton exports while Gabon, Equatorial Guinea, Congo and Cameroon depend on petroleum exports. In the case of the oil exporters, the price of oil fell drastically from historical levels of US\$37 per barrel in 1980 to a low US\$18 per barrel by 1989 due in part to unraveling of the Oil Exporting Countries (OPEC) cartel arrangement. Oil prices recovered partially during the Gulf War in 1990–91 to around \$23 per barrel and by end-1997 were US\$19 per barrel⁹. Consequently, the terms of trade deteriorated dramatically during most of the 1980's and 1990's.

Cashin and Pattillo (2000) found adverse shocks to the terms of trade for the

⁹ These oil prices are based on the average of U.K. Brent, Dubai and West Texas Intermediate. West Texas Intermediate prices are typically US\$3–4 higher than the two other prices.

petroleum exporters of CAEMC to be very persistent. Within WAEMU, Côte d'Ivoire and Benin received between 20–49 percent of export earnings from cocoa and cotton respectively. Mali earned 10–19 percent of export receipts from gold and 20–49 percent from fish. Cashin and Pattillo (2000) also found that shocks to the terms of trade to members of WAEMU were not as persistent as compared to those to members of CAEMC. The terms of trade in WAEMU worsened during the second half of the 1980's and between 1990–97 with the exception of 1994 and 1995 (Clément et al., 1996; and Hernández-Catá et al., 1998). The deterioration in the terms of trade, rising labor costs, combined with an appreciation of the French franc against the U.S. dollar, led to a deterioration of the region's competitive position (Hernández-Catá et al., 1998).

Some of the ECCU countries, by comparison, also faced a high degree of primary commodity export concentration. Dominica, St. Lucia, and St. Vincent and the Grenadines during the 1990's share of banana exports revenue to revenue from total exports of goods averaged 40 percent, 49.4 percent and 38.5 percent respectively. St. Kitts and Nevis whose primary commodity export is sugar, averaged 29 percent of revenue from exports of goods during the same period. At the level of the currency union, receipts from exports of goods averaged 25.6 percent of total receipts from goods and services during the 1990's. These receipts however, have declined from a high of 34 percent in 1990 to 21 percent by end-1997, reflecting in part the worsening of the terms of trade and the increased importance of service exports.

5.3 Hypothetical Reserves

To understand the beneficial impact of pooling one needs to ascertain the level of reserves each country would have had to hold in an independent state to enjoy the level of coverage afforded by a pooling of reserves. This level of coverage is represented by the concept of hypothetical reserves and is computed using Medhora's (1992b) methodology in the following manner by rearranging equation (2) and solving for desired level of reserves. This yields:

$$HR_i = C_i * VAR(R_i) \quad (5)$$

where HR_i is the level of hypothetical reserves, C_i refers to the level of coverage,

and VAR (R_i) represents reserve variability. In the case of the ECCU countries reserves were proxied using the imputed reserves or NFA derived from equation (1) as the difference between reserve money (RM) and net domestic assets (NDA). In order to use this measure, we verified that the main component of RM, currency outside banks as a percentage of GDP, was in line with comparator fixed exchange rate countries in the Caribbean Community (CARICOM)¹⁰.

During the period 1980–1997 the level of hypothetical reserves indicated that in the ECCU Dominica, Anguilla, Montserrat and St. Kitts and Nevis earn more than 100 percent increase in reserves from a 20 percent pooling arrangement, for example (Table 5). It is noteworthy that hypothetical reserves increase with the degree of pooling.

Hypothetical reserves for countries in the CFA franc zone reveal that most countries experienced losses from the pooling arrangement for the period 1980–97 (Table 6). Among the West African countries, Benin benefits most (133 percent) from a 20 percent pooling arrangement. This may be due to its very high level of own reserve variability as measured by the coefficient of variation. All countries in CAEMC incur losses over the period 1980 to 1997 with the exception of Chad and Gabon.

Table 5. Hypothetical Reserves ECCU Monetary Authority 1980–1997

	Pool (in percent)					Mean		
	20	50	65	70	100	Reserves	Difference	Percent Gain/Loss
Antigua and Barbuda	125.66	172.94	190.51	195.71	714.96	79.86	45.80	57.35
Anguilla	59.90	76.99	81.31	82.45	168.88	26.65	33.25	124.74
Dominica	80.97	115.44	125.97	128.90	329.17	35.37	45.60	128.93
Grenada	100.29	134.29	145.30	148.42	407.09	59.58	40.71	68.32
Montserrat	40.33	46.97	48.38	48.74	87.38	19.51	20.83	106.76
St. Kitts and Nevis	97.37	142.52	157.93	162.37	498.11	47.69	49.68	104.18
St. Lucia	141.81	193.24	213.48	219.60	948.04	95.80	46.00	48.02
St. Vincent and the Grenadines	88.83	115.12	123.80	126.27	436.42	58.30	30.54	52.38

¹⁰Currency to GDP is highly correlated with the degree of economic activity based on the transactions demand for money. Average currency to GDP for Barbados was 5.5 percent, Belize 5.3 percent and Bahamas 2.6 percent. The result for Bahamas represented the high co-circulation of U.S. and Bahamian dollars and the higher use of credit and debit cards for transactions purposes. ECCU countries average currency to GDP ranged from 5.1 to 6.4 percent.

Table 6. Hypothetical Reserves WAEMU and CAEMC Monetary Authority 1980-1997¹

	Pool (in percent)					Mean		Percent Gain/Loss
	20	50	65	70	100	Reserves	Difference	
WAEMU								
Benin	35.33	71.59	82.36	85.34	134.07	15.14	20.19	133.38
Burkina Faso	6.14	54.85	68.76	72.55	116.48	67.02	-60.88	-90.84
Côte d'Ivoire	270.99	242.83	231.17	227.57	576.18	-294.51	565.50	-192.01
Mali	30.24	81.76	98.77	103.62	197.05	29.55	0.69	2.33
Niger	18.10	29.26	31.59	32.18	36.13	19.35	-1.25	-6.46
Senegal	159.66	165.01	166.70	167.18	166.04	-152.96	312.62	-204.38
Togo	16.78	46.97	54.62	56.64	76.74	41.60	-24.82	-59.66
CAEMC								
Cameroon	130.23	153.04	161.82	164.45	380.82	-109.21	239.44	-219.26
Central African Republic	25.37	60.15	69.83	72.45	106.79	29.49	-4.11	-13.95
Chad	23.12	38.42	41.89	42.78	50.75	16.40	6.73	41.02
Gabon	30.80	71.02	83.12	86.47	139.94	23.98	6.82	28.42

1. Congo and Equatorial Guinea excluded from CAEMC due to gaps in data.

Some important points emerge from this analysis. First, countries that are likely to gain the most are those which display relatively low levels of mean reserve availability coupled with high levels of variability. Secondly, pooling will not deliver equal reserve gain to all member states and, therefore, there is likely to be some asymmetry in the distribution of gains.

5.4 Regression Results

The demand for reserves in both the ECCU and CFA franc zone possessed a comparable amount of inertia between actual and desired reserves, taking approximately two to three years for 75 percent of the adjustment to take place (model 1, Table 7). The CFA franc zone had a higher propensity to import with a long-run elasticity of 0.88 compared to 0.75 for the ECCU. The income variables in both equations were, however, not significant. A dummy variable to capture the effects of the 1994 devaluation in the CFA franc zone was of expected sign but not significant. The lagged spread between the French treasury bill and the CFA franc discount was of expected sign but not significant.

Variability in payments measured by log changes in the terms of trade (DTOT) did

Table 7. Demand for Reserves ECCU and CFA Franc Zone

	ECCU					CFA				
	Instrumental Variable Estimation					Instrumental Variable Estimation				
	(1)	(2)	(3)	(4)	(5)	(1)	(2)	(3)	(4)	(5)
Constant	-1.16 (-2.78)	-1.17 (-2.83)	-1.16 (-2.87)	-1.16 (-2.77)	-1.12 (-2.19)	-0.84 (-2.01)	-0.83 (-1.99)	-0.74 (-1.39)	-0.82 (-1.97)	-0.79 (-1.51)
AVPIMP	-0.33 (-2.84)	-0.34 (-2.93)	-0.37 (-3.0)	-0.34 (-2.94)	-0.34 (-2.87)	0.31 (1.90)	0.34 (1.8)	0.59 (1.92)	0.24 (0.9)	0.46 (1.85)
PCAPGDP	0.002 (0.04)	0.003 (0.06)	0.001 (0.03)	0.001 (0.03)	0.001 (0.01)	-0.03 (-0.48)	-0.04 (-0.45)	-0.03 (-0.45)	-0.03 (-0.46)	-0.04 (-0.69)
RES(t-1)	0.56 (4.62)	0.56 (4.60)	0.56 (4.6)	0.56 (4.6)	0.57 (4.4)	0.56 (5.1)	0.56 (5.1)	0.50 (3.6)	0.56 (5.1)	0.43 (2.9)
DLTOT	-	0.07 (0.38)	-	-	-	-	-0.33 (-5.38)	-	0.39 (4.5)	-
DUMMY	-	-	-	-	-	-0.16 (-0.45)	-0.15 (-0.40)	-0.09 (-0.27)	-0.18 (-0.6)	-0.11 (-0.36)
SPRD _{t-1}	-	-	-	-	-	-0.18 (-0.05)	-0.06 (-0.01)	-0.06 (-0.01)	-0.06 (-0.01)	-1.5 (-0.31)
TOTVAR1	-	0.24 (0.62)	-	-	-	-	-	-	-	-
TOTVAR2	-	-	0.07 (0.16)	-	-	-	-	-0.43 (-2.17)	-	-
SHIFT	-	-	-	-	-	-	-	-	-0.76 (-5.2)	-
TOTVAR3	-	-	-	-0.27 (-0.11)	-	-	-	-	-	-
TOTVAR4	-	-	-	-	-	-	-	-	-	-0.27 (-3.88)
Adj. R ²	0.45	0.36	0.36	0.36	0.36	0.45	0.41	0.24	0.50	0.24
No. of obs.	101	101	101	101	101	187	187	187	187	187
S.E. of Regression	0.28	0.28	0.28	0.28	0.28	0.88	0.92	1.04	0.84	1.04

Note: t-statistics in parentheses. AVPIMP is the ratio of imports to GDP in logs. PCAPGDP is per capita GDP in logs and RES(-1) is lagged reserves to GDP in logs. DUMMY represents the 1994 devaluation of the CFA franc. DLTOT is defined as the growth rate in the terms of trade. SPRD_{t-1} denotes the spread between French treasury bill and the CFA franc zone discount rate. TOTVAR1 is defined as the residuals from a regression of log terms of trade on constant and trend for each country. TOTVAR2 is defined as the residuals from a regression of log terms of trade on a constant and lagged log terms of trade. SHIFT is defined as the product of a dummy variable and the growth rate of the terms of trade (DLTOT). The dummy variable assumes a value of 1 for all positive values in growth rate of the terms of trade, zero elsewhere. TOTVAR3 is the variance of TOTVAR1 and TOTVAR4 is the variance of TOTVAR2.

not significantly affect reserves in the case on the ECCU. A possible explanation is that receipts from export of goods account have declined over the period due to loss of preferential access to a number of markets amounting to 22 percent of exports of goods and services by end-1997. A similar result was found by Williams et al. (1999) using impulse response functions in analyzing the impact of banana price shocks on the reserves of the ECCU. Banana exports make up the majority of exports of goods from ECCU countries. Cashin et al. (1999) also found that the half life for bananas was less than one year suggesting these shocks are predominantly temporary.

In the case of the CFA zone (model 2), log changes in the terms of trade were negatively related to reserves reflecting external vulnerability due to the reliance on commodity exports (Cashin et al., 2000). An examination of asymmetries in these changes revealed that positive values did not increase reserves suggesting there has been a preponderance of negative changes in the case of the CFA zone. Moreover, variability in the terms of trade as measured by its unanticipated changes (model 3) and the variance of these anticipated changes had a strongly negative impact on reserves (model 5). Cashin et al. (2000) also found that nine of the CFA countries used in this study had half-lives to terms of trade shocks that lasted up to six years over the period 1960–1996¹¹. Three countries, primarily oil exporters, had terms of trade shocks that were very persistent. Therefore, countries that have low level of reserves and face persistent terms of trade shocks would benefit disproportionately from the pooling arrangement.

6. Reserve Management

During the period under study, both monetary unions borrowed externally to finance capital and development programs. In the case of the ECCU external debt was comprised of large concessional and grant components. However from 1991 onwards the grant element declined substantially from 52 percent in 1992 to 36 percent by 1997. Similarly concessional debt declined from a high of 98.7 in 1988 percent to 74.7 percent in 1997. The CFA franc zone similarly benefited from concessional debt

¹¹ Benin, Mali, and Togo had terms of trade shocks with a half life less than two years, Burkina Faso, Central African Republic, and Niger between two–four years, Senegal between four–six years and Cameroon, Côte d'Ivoire, and Gabon infinity.

rescheduling from Paris Club creditors¹². However debt service payments became unmanageable during the 1980's due to a combination of terms of trade shocks and a failure to pursue fiscal adjustment to restore balance.

While the average rate of return on reserves as measured by LIBOR has been the same for both monetary unions, the weighted average cost of debt was 5.5 percent for the ECCU compared to 3.5 percent for the CFA franc zone. However, the average rate of return on reserves as measured by the U.S. treasury bill rate and the French treasury bill rate for the ECCU and CFA franc zone respectively was much higher for the CFA franc zone (8.1 percent) compared to the ECCU (5.3 percent). While adverse terms of trade shocks may in part explain reserve loss in the CFA franc zone despite higher return on reserves relative to debt, institutional factors may also be relevant.

Two institutional factors contribute to some members in the CFA franc zone using more resources from the pool than they contribute. First, the French treasury's guarantee of the central banks' operations account relieves them of having to monitor their reserve position and credit creation using the fiscal borrowing and sight liabilities rules. Second, the fact that each country has unrestricted access to the pooled reserves of other members makes governments more inclined to monetize budget deficits and less inclined to monitor their balance of payments situation. This feature of the arrangement is one of institutional problems in the formation of clubs that attempts to mitigate the costs of bargaining among members. In essence, it allows for an upper and lower limit within which bargaining in accessing the common pool of reserves can occur. Not all countries will have a high level of own reserves and low reserve variability. To avoid the dilemma of persistent use of the common reserves by any country in the CFA zone, a gross reserve target is set based on the balance of payments and other factors such as debt service payments to ensure that its level of own reserves are greater than or equal to 20 percent sight liabilities rule. However, in practice some countries facing persistent shocks never contributed substantially to the pool of reserves.

The sight liabilities rule has also not been closely applied. In the case of the WAEMU, the ratio of gross foreign assets to sight liabilities was below 20 percent for the period 1980 to 1993. Within the CAEMC the ratio fell below 20 percent after 1986.

¹² Gabon and Congo were the only countries in the CFA franc zone that did not benefit from concessional rescheduling.

In both instances, the central banks found it difficult to restrict credit and refinancing ceilings to commercial banks.

Two important differences exist between the CFA franc zone and the ECCU area. Once governments in the ECCU have exhausted their credit allocation they must then seek residual financing from commercial banks and cannot draw on the undisbursed pools of other members. The global amount of credit allocated in any one year has never been taken up in full, though on occasions individual governments have utilized the full amount of their respective limits. In the CFA franc zone, global credit has often been exhausted and thus the French treasury has had to augment the operations account of the individual central banks. The absence of an external guarantor forces the ECCB to adhere to the foreign asset rule and maintain high levels of foreign reserves in order to maintain confidence in the currency. Within the ECCU it is likely that some countries with fiscal imbalances will seek external financing, as they cannot draw down on the allocated pools of other member countries. Fiscal adjustment therefore becomes especially important in an environment where the cost of debt is increasing, and grants and concessional lending are declining.

7. Conclusion

CFA franc zone countries enjoy much lower coverage than ECCU member states for the period under consideration. However, for both areas, countries with low levels of own reserves and high reserve variability benefit most from the reserves pooling exercise.

The higher coverage enjoyed by ECCU member countries is the combined outcome of institutional design, absence of an external guarantor, and reserve management. The ECCU area must, however, reassess their reserve management strategy, as the opportunity cost of holding reserves is increasing.

Both monetary unions had a comparable speed of adjustment between actual and desired reserves. The CFA zone had a larger long-run propensity to import relative to the ECCU. Unanticipated changes in the terms of trade had a strongly negative impact on reserves in the CFA zone.

In the CFA franc zone credit creation needs to be monitored more closely—in particular closer monitoring of the sight liabilities and the fiscal borrowing rules. Secondly, access to the pooled reserves of other countries should be restricted in order to promote fiscal discipline among countries. Thirdly, the CFA franc zone may need to reassess the enforcement of its current institutional framework with a view to improving governance mechanisms and adherence to rules on credit ceilings. The deterioration in the terms of trade was not corrected for with an appropriate degree of fiscal adjustment.

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Abstract

The paper presents a comparison of the gains from the pooling of reserves, and hence reserve variability, in the Eastern Caribbean Currency Union (ECCU) and the CFA franc zone. The results indicate that countries within the ECCU area have achieved greater balance of payments protection than the CFA zone countries from the pooling of reserves. Unanticipated changes in the terms of trade lowered reserves in the CFA relative to the ECCU, which may reflect a greater reliance on primary commodities in the CFA compared with services in the ECCU.

JEL CLASSIFICATION: C10, D61, E58, F36

KEY WORDS: Monetary unions, reserve pooling, exchange rates.