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## Fixed Exchange Rate and the Autonomy of Monetary Policy: The Franc Zone Case

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African Department

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**Abstract**

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This paper compares monetary policy of currency boards with that of the franc zone during the period 1956–2005. It concludes that monetary policy in the zone was more autonomous than under a currency board, even though both systems faced the same exchange rate constraint. So far, the contingency line provided by the French treasury and capital controls have allowed the zone to combine a fixed exchange rate and a relatively autonomous monetary policy. Financial development and zone enlargement would challenge this relative autonomy for two reasons: (1) the potential cost to the French treasury would increase; and (2) residents would potentially be able to avoid capital controls. For the zone to maintain its fixed exchange rate, close targeting of foreign reserves would become important.

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## I. INTRODUCTION

Can monetary policy be autonomous in the context of a fully pegged exchange rate and a capital account officially free? The objective of the monetary cooperation in the franc zone is to maintain the ability of monetary policy to offset unexpected shocks within the framework of a fixed exchange rate. However, for more than 50 years, the zone had officially free capital movements among its members and a fixed exchange rate, which is inconsistent with an autonomous monetary policy in the classic “trilemma” (Triffin, 1963). In fact, the autonomy of the monetary policy is achieved because of a contingent credit line provided by the French treasury (the *compte d’operation*), which reduces the need to build up reserves, and *de facto* widely spread capital controls. In the first section, this paper explains the institutional setup of the zone; it details in particular the functioning of the contingency line. The second section proposes a method to test the autonomy of monetary policy. This paper systemically compares the franc zone with another long-lasting fixed exchange regime, the Eastern Caribbean Currency Union (ECCU), which is based on a different exchange rate arrangement, namely, a currency board. The test corroborates that monetary policy has been overall autonomous in the zone, although this description changes with the periods. Conversely, the monetary policy clearly appears to be nonautonomous in the ECCU.

## II. MONETARY POLICY AUTONOMY IN THE FRANC ZONE

### A. Franc Zone Institutional Setup

*The franc zone is the result of the historic monetary cooperation between France and 15 countries in Africa. Nowadays, one of its most remarkable features is the unlimited contingency line provided by the French treasury to support the peg. This instrument significantly reduces the need for the central bank to build up reserves despite the fixed exchange rate. In addition, there are widespread de facto capital controls, including on intrazone transfers, which provide some margin for autonomy of monetary policy.*

*The franc zone is an exchange rate arrangement that links six central banks (Table 1): The Banque de France, which issues the French franc, and two monetary institutions that directly depend on French authorities.<sup>2</sup> The other central banks are African and include the Banque des Etats d’Afrique Centrale (BEAC), the Banque des Etats d’Afrique de l’Ouest (BCEAO), and the central bank of the Comoros. The BCEAO issues CFA francs for the West Africa Monetary Union (WAEMU), and the BEAC issues CFA francs for the Central Africa Economic Monetary Community (CAEMC). Despite having the same acronym (CFA), the two currencies are distinct,<sup>3</sup> with each franc acting as legal tender only in its own issuance area. The monetary unions encompass former French colonies apart from Guinea-Bissau and Equatorial Guinea. Nevertheless, not all former French colonies in Africa now belong to*

<sup>2</sup> The IEOM and IEDOM, which are in charge of French franc circulation in overseas territories.

<sup>3</sup> The acronyms have different meanings: « *Coopération Financière en Afrique* » for CAEMC and « *Communauté Financière Africaine* » for WAEMU.

*the zone. For instance, Algeria, Guinea, Madagascar, Morocco, and Tunisia left the zone soon after independence, and Mauritania abandoned both the franc zone and WAEMU in 1972. Finally, the central bank of the Comoros issues the Comorian franc. Thus, the name “CFA franc zone” is misleading—besides the Comorian and French francs there are two distinct CFA francs within the zone.*

The zone is derived from international cooperation between France and several African countries codified in the ***conventions de cooperation (CC)***. Among zone members, there are two monetary unions (CAEMC and WAEMU); they are based on international treaties independent of those ruling the franc zone. In 1972, the *conventions de cooperation* created an exchange arrangement based on international cooperation comprising the two unions and the Comoros. In each area, members and France have signed the conventions. The zone is thus based on three separate conventions.

### **The *compte d’operations* and regulations of the French treasury guaranty**

The *compte d’operations* (CO) is the key instrument for guaranteeing the access of zone members to foreign reserves. Through this account, the French treasury guarantees the unlimited convertibility of CFA and Comorian francs at a given rate. As a result, the level of reserves required to support the peg is lower than it would be without the contingency line. The guaranteed convertibility is the main item that distinguishes the zone from other fixed rate arrangements. In compensation for the guaranty, the zone members agreed on rules to avoid excessive deficits (Box 1). Furthermore, once pooled, the reserves become less vulnerable to external shocks because the economies of the unions are, by definition, more diversified than the economy of each member. Finally, the influence of each government on monetary policy is reduced by the need to define a common monetary policy. This necessity of compromising reduces the likelihood of monetary policy changes, thereby protecting foreign reserves.

Both the BCEAO and BEAC<sup>4</sup> effectively used the CO facility before the 1994 devaluation even though the former withdrew reserve currency relatively more frequently than the latter. Overall, apart from the Comoros (and France), all zone members used the CO facilities several times, resulting in significant CO debits. For the BCEAO and the BEAC, the deficit episodically appeared during the 1980s for several months (up to 3 years). Deficits occurred first for the BCEAO in 1983 and later for the BEAC in 1987. These periods have been longer and more frequent for the BCEAO than for the BEAC, and the maximum deficit in terms of base money was larger for the BCEAO. After the 1994 devaluation, no new deficits appeared. In the case of the BEAC, the deficit faded away after some months in 1994, although foreign liabilities have increased in the aftermath of the devaluation.

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<sup>4</sup>For BCEAO and BEAC, the database is built on their respective monthly central banks bulletins, which have been issued since 1956.<sup>4</sup> They include the balance sheet of the monetary authorities, which reports base money and its counterparts. Foreign assets (FA) consist of the following subaggregates: reserves deposited on the CO, reserves position at the IMF, and other FA. Other FA incorporates reserves invested in convertible currencies. Building the series on the central bank bulletins allows us to describe how zone members have used the CO facilities.

**Table 1. Franc Zone Members**

Institutions	Establishment Date	Currency	Exchange Rate	Countries and Territories in 2005
Banque de France <sup>1</sup>	(1998) Banque centrale européenne (1800) Banque de France	Euro (since 1999, previously French francs)		France (metropolitan) Monaco
IEDOM	(1959) Took over from the Caisse centrale de l'outre-mer	Euro (since 1999, previously French francs)		Guadeloupe, French Guyana, Martinique Reunion, Mayotte, St-Pierre et Miquelon
IEOM	(1967) Took over from la banque d'Indochine	French franc French CFP (1945) (Communauté Financière du Pacifique)	1CFPF = 0.055 FF	New-Caledonia, Wallis-et-Futuna, French Polynesia
BCEAO	(1959) Took over la Caisse centrale de l'outre-mer, which took over from la banque d'Afrique de l'Ouest	Franc CFA <sup>2</sup> (Communauté Financière Africaine) (1945)	1 CFA = 0.01 FF	Benin Burkina Faso Côte d'Ivoire Guinea-Bissau (1997) Mali Niger Senegal Togo
BEAC	(1959) Took over from la Caisse centrale de l'outre-mer, which took over from la banque d'Afrique de l'Ouest.	Franc CFA (Coopération Financière en Afrique centrale) (1945)	1 CFA = 0.01 FF	Cameron Central African Republic Congo (Republic of) Gabon Equatorial Guinea Chad
Banque centrale des Comores	(1962) Took over from la Banque centrale de Madagascar et des Comores  (1973) Madagascar abandoned the zone  (1979) The Comoros joined the franc zone as an independent state	Franc Comorian	1 CF = 0.0133	Comoros

<sup>1</sup> Since 1997, the Banque de France has belonged to the European System of Central Banks.

<sup>2</sup> The CFA franc was established in 1948 (d'Almada-Topor, 1996) as a currency distinct from the metropolitan franc.

Source: Banque de France.

## BOX 1. THE *COMPTE D'OPERATIONS*

### Origins

The French treasury created the *compte d'operations* (CO) to deal with the balance-of-payment issues between France and Algeria. The first version of the CO appeared in Algeria in 1878, when the French treasury deposited its reserves in Algerian francs into the accounts of the Bank of Algeria. Because Algerian and French francs were supposed to be the same, the French treasury made sure that they could be converted into each other at a given rate. In practice, this meant that a debtor in Algeria repaid its debt to a creditor in France with a money transfer in Algerian francs; the French treasury would receive the transfer and pay it in French francs. This operation did not entail currency exchange. The French treasury netted all these transactions and had in its account a net position in the currency of one of the partners. At that time, because of the unfavorable balance-of-payment situation of Algeria, the French treasury had a net position in Algerian francs. Consequently, the French treasury deposited its balance in the Bank of Algeria. In return, the Bank of Algeria was in charge of controlling the advances given by the French treasury. The practice implied that the French treasury demanded a gradually increasing interest on its advances to the bank of Algeria, thereby conditioning its monetary policy to the balance of the treasury account. This mechanism, the first version of the CO, established a clear link between the treasury deposit and monetary policy of the country benefiting from the arrangement. In 1925, an account was opened in the French treasury book for the Bank of Morocco as a special treasury account. Subsequently, the treasury opened accounts for the other central banks in the Zone.

### Institutional Setup

Legally, the CO is a special treasury account. These accounts are created to highlight the balance of resources and spending for a specific purpose, and they are distinct from the general French budget. For the franc zone, the CO works as a current account with overdrafting facilities. The account is credited with the foreign reserves of the central banks but could become negative when members' balance of payments are unfavorable. In that case, the treasury provides foreign reserve advances to the central banks. These special accounts are based on international conventions (*convention de compte d'operation*) that stipulate the conditions for using this facility to avoid excessive deficits:

- Since 1972, the CO beneficiaries have to pool 65 percent of their foreign reserves in the CO. Before, they were supposed to pool all their reserves but what was necessary for daily transactions. The banks tended to keep on the CO larger amounts than required by the conventions (89 percent for the BCEAO and 83 percent for the BEAC).
- The deficit of the CO is unlimited.
- The central bank receives interest for the credit of the CO<sup>1/</sup>, and they have to pay a progressively increasing interest rate on the debit<sup>2/</sup>. Since 1956, the BEAC and BCEAO respectively received (paid) interest corresponding to 2.1 (0.72) and 2.9 (1.5) of their base money (medians). On the other hand, the French treasury received (paid) interest corresponding on median to 0.11 (0.36) percent of its fiscal revenues. The financial conditions of this facility (CO) are fixed by the conventions and are no longer used as an instrument to control the account position.
- In case of a rapid decrease of the CO credit, public entities are supposed to surrender their reserves to the central banks, the so-called *ratissage*. This is complementary of a balance of payment regulation that demands that exporters surrender their currency receipts to the central bank.
- The French treasury appoints auditors to control whether the use of the CO is consistent with the conventions. In case of misuse of the facilities, the treasury (and the central banks) remains free to cancel the conventions.

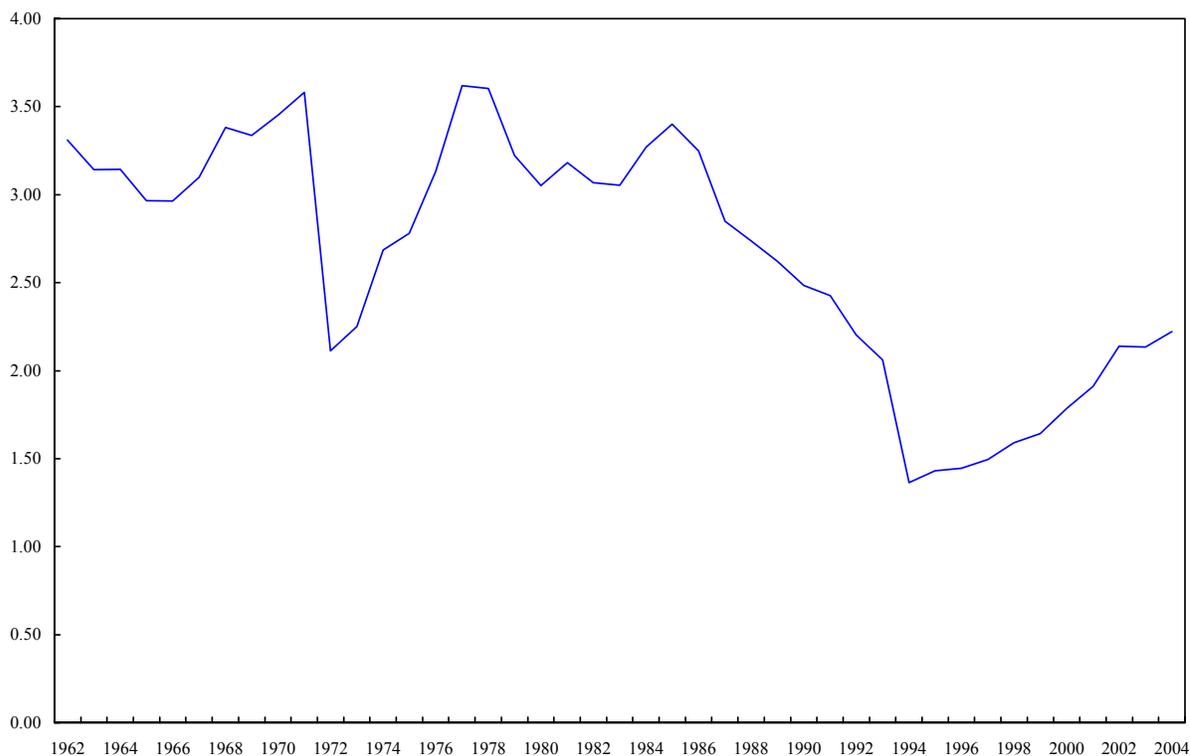
Additionally to the *convention de compte d'operation*, the *conventions de cooperation* also intend to preserve the credit of the special account.

- The foreign reserves should correspond to at least 20 percent of the base money. For other fixed exchange rate arrangements, a higher level of reserves is often considered adequate to face the demand of foreign reserves.
- Historically, the stocks of advances to the treasuries were limited to 20 percent of the tax revenue of the previous year. The advances have been ruled out in WAEMU, but not in CAEMC.
- The French treasury still appoints members to the board of the central banks.

<sup>1/</sup> The European Central Bank intervention rate (or at least 2.5 percent) for more than 10 million franc.

<sup>2/</sup> 1 percent for 0 to 5 million francs, 2 percent for 5 to 10 million francs, and the European Central Bank intervention rate (or at least 2.5 percent) for more than 10 million francs.

Figure 1: Potential Fiscal Effort for the French Treasury  
(M2 as a percentage of French fiscal revenue)



Source: IMF International Financial Statistics

The advances of the French treasury have been low enough not to endanger the guarantee. If we assume a neutral fiscal impact, when the CO deficit increases, the French treasury would have to raise more tax, entailing a “fiscal effort.” This effort is estimated small in terms of actual past CO deficits (Figure 1), simulated major bailouts, and French GDP. First, the median of the actual effort demanded on debit period corresponds to 0.13 percent of the fiscal revenue, and the largest increase in deficit represents 1.89 percent. As a result, the financial effort by the French treasury during 1956–2005 has been small and infrequent, giving credibility to the guarantee. Second, money and quasi-money in the zone together also equal a small portion of French fiscal revenue. During the period 1962–2005, the ratio never exceeded 3.6 percent, and the period median was 2.8 percent. Moreover, the ratio followed a downward trend. Consequently, the zone has never been short of the resources needed to guarantee its financial stability. In a catastrophic scenario, the zone’s monetary authorities could have been faced with a demand for foreign reserves corresponding to the liability of the financial system (M1). The cost for the treasury would not have corresponded to more than 3 percent of its revenue. Third, an interesting figure is also the cost in terms of French income (GDP), which is a proxy for the cost incurred by each French citizen. During 1962–2005, the median of the potential cost has been 0.8 percent and, at maximum, 1.3 percent—figures not significantly higher than foreign aid provided to developing countries. Interestingly, the cost both in terms of fiscal revenue and GDP follows a stable, if slightly decreasing, trend. Chronologically, costs seem to have increased until 1986, probably as a result of sustained growth and financial development in the franc zone. After 1986, the cost

decreased sharply when a tightened monetary policy reduced credit growth during this period of structural adjustment. The 1994 devaluation exacerbated the downward trend in cost. Finally, after the devaluation, cost increased again, reflecting the economic recovery.

Further developing the financial system and enlarging the zone could encourage the French treasury to reconsider the conditions for its support. First, the cost is low because the financial system is still underdeveloped. A sustained increase in credit owing to economic development would automatically increase the financial system's liabilities, increasing the cost of an eventual bailout. At some point, the implicit liability for the French treasury could reach a potential cost that French taxpayers would be unwilling to pay. In that case, the conventions may be reconsidered on the grounds that zone members' level of development does not necessitate this form of cooperation. Alternatively, the cooperation could be pursued unchanged but with more stringent measures to avoid a CO deficit. Second, in the past the zone had lost members, but this trend seems to have stopped, and two small countries (Guinea-Bissau and Equatorial Guinea) have already joined the zone. In West Africa, a larger monetary union including Ghana and Nigeria has also been considered. There are alternative scenarios for an enlarged West Africa Monetary Union, and one of them entails enlarging the zone as well. Other countries joining the union would automatically result in a higher potential cost to the French treasury. If the zone included Ghana and Nigeria, the potential cost would have been 7.4 percent (the median for the period 1962–2005). Moreover, during the period, the maximum cost would have been 17 percent higher, and the standard deviation of the new sample would have been more than six times higher. This significant cost increase could deter the enlargement of the zone. Alternatively, supporting zone enlargement, more restrictive measures to preserve foreign reserves could be implemented.

**Table 2. Foreign Reserve Target**

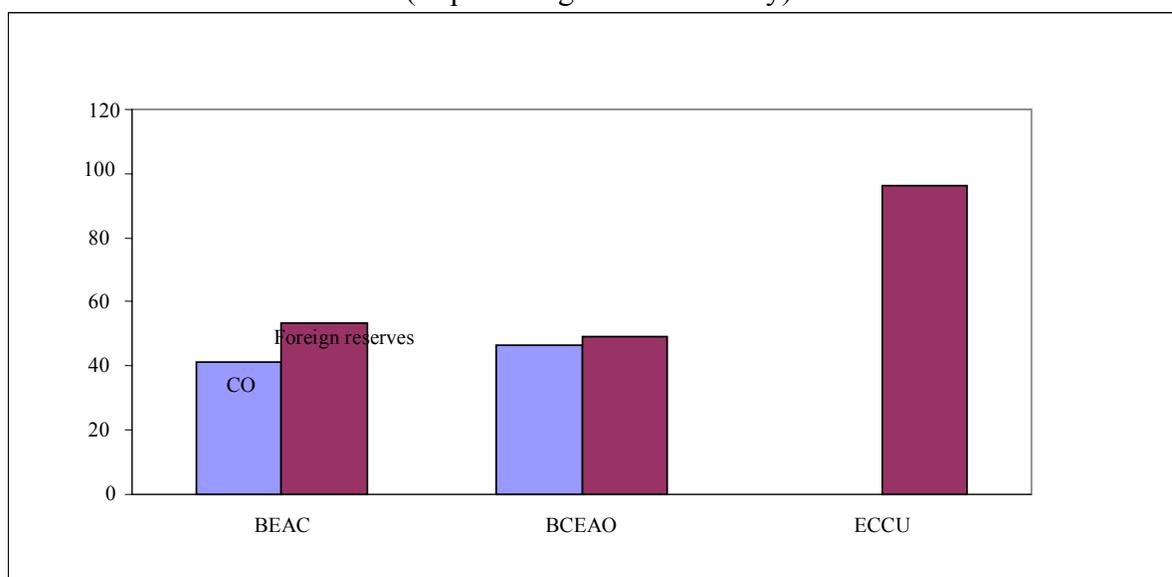
1956–2005 (monthly data)	Number of months during which CO balance is below 20 percent of base money	Number of months during which foreign reserves are below 20 percent of base money
BCEAO	105 (17.6%)	36 (6%)
BEAC	161 (27.4%)	116 (16%)
ECCU <sup>1/</sup> (1983– 2005)		0 (0%)

<sup>1/</sup> According to ECCU regulation, the reference here is 60 percent of base money

Net interest paid corresponds to a cost for the French treasury, but the sums were not large (cf. Box 1). The French treasury has paid net interest because the CO has been in surplus more frequently than in deficit. Nevertheless, interest paid has never exceeded 0.4 percent of French fiscal revenue, meaning that interest payments were not a significant charge for the treasury. Although its withdrawals could be large because of the size and frequency of terms of trade shocks in CAEMC, the BEAC received more interest than it paid, mainly because the CO was in surplus most of the time. Over the period, the BCEAO also benefited from net interest receipts; nevertheless, the interests charged appear significantly higher than for the BEAC, probably because of its longer periods of deficits.

The ratio of the CO over base money frequently falls below the 20 percent limit, revealing a lower foreign reserve target than that of the ECCU (the currency board). This ratio is below the limit more frequently than the ratio of foreign assets to base money (Table 2). Political actions are only triggered after the ratio stays below the limit for three months, but an overall review of the number of months below target reveals that this situation was rather frequent: for the BEAC, 17.6 percent of the period, and for the BCEAO, 27.4 percent, or more than a quarter of the period. On the contrary, the ECCU always complied with the limit; for instance, the lowest figure, 60 percent (the limit itself), was reached only once. The ECCU covered 98 percent of its demand liability with foreign reserves, in line with a strict currency board rule, whereas the BEAC covered 50 percent (40 percent with CO deposits) and the BCEAO covered 45 percent (40 percent with CO deposits).

Figure 2. Foreign Reserves Target  
(as percentage of base money)



Source: BCEAO and BEAC monthly bulletins.

After staying at low levels during the 1980s, the coverage of foreign reserves in terms of base money rose to high levels after 1994. Chronologically, the coverage has not been constant. From 1956 to 1980, the banks maintained a ratio of between 20 to 80 percent. From 1980 to 1994, the stock of foreign reserves declined because of exchange rate misalignment. In spite of the measures supposed to protect foreign reserves (cf. Box 1), they went under the 20 percent ratio during most of the period, revealing the difficulty in adjusting the real exchange rate by tightening monetary policy. Nevertheless, the 20 percent limit was not amended. After the devaluation in 1994, the banks built up high levels of foreign reserves, so the ratio often exceeded 100 percent.

### Capital mobility?

Free capital mobility among zone members is still an official principle of the zone's monetary cooperation although controls are implemented *de facto*. In 1939, the French administration implemented exchange controls, but the currencies inside the zone (the French

franc and the francs of the colonies) have remained freely convertible among themselves. The term “franc zone” dates back to this period. In 1967, France removed most of its capital controls,<sup>5</sup> making all zone francs, which were already fully convertible into French francs, freely convertible to all other currencies. Theoretically, the conventions still call for a common exchange regulation and free intrazone transfers; consequently, the IMF has long described capital restrictions as follows<sup>6</sup>: “capital movements between Benin and France, Monaco, and the Operations Account countries are free from controls” and “capital movements outside the zone are subject to restrictions.” In fact, the conventions are not enforced, so the capital regulations in the zone are not uniform.

Zone members now impose capital control on intrazone transactions; only transfers and invisibles remain free from restrictions in the zone. Nowadays, for its balance of payments, the zone defines the term “nonresident” in two ways: outsiders and insiders. Nonresidents “outside” the zone are nonzone members and are subject to capital controls. Nonresidents inside the zone consist of the four members of the zone (France, CAEMC, the Comoros, and WAEMU). Capital regulations affecting insiders are basically the same as those affecting outsiders, apart from transfers and invisibles, which remain free. More precisely, the restrictions on insiders consist of the following: control the foreign assets of the financial institutions; deposit export receipts in a registered institution and repatriate them; control the issuing and selling of shares; import and export gold; import and export bills (and coins); and control foreign investments and borrowing abroad. Inside the monetary unions, the capital regulations remain harmonized.

### **A fixed exchange rate**

Theoretically, the exchange rate is pegged but adjustable; in practice, the zone has a long record of unconditional fixity. Even before the advent of capital controls, the zone *de facto* existed because the French administration determined the exchange rate of colonial currencies in French franc, which, incidentally, defined a monetary zone. Under the conventions, the peg is defined as adjustable, so zone members could decide to change the peg, as they did in 1994. However, such an exchange rate adjustment occurs only if required by economic reasons, as determined during consultations between the French government and zone members, and with a unanimous vote of all member countries within each monetary area (CC Article 12 for CAEMC, CC Article 8 for the Comoros, and CC Article 5 for WAEMU). These rules significantly reduce the likelihood of such a move; indeed, since 1945, the peg has changed only once. Interestingly, the CAEMC CFA and the WAEMU CFA were always pegged to the euro (and before that, francs) at the same rate, even after the

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<sup>5</sup> France fully liberalized its capital account only with the European Economic and Monetary Union; indeed, exceptional restrictions remained in effect until 1989, and capital controls were temporarily reestablished in 1968 and 1981. After 1992, the Maastricht Treaty eliminated all capital account restrictions.

<sup>6</sup> Different issues of the IMF’s *Annual Report on Exchange Arrangements and Exchange Restrictions*. In the case of the Comoros, the description still applies.

1994 devaluations (except for the Comoros,<sup>7</sup> where the devaluation rate differed from that of the other zone francs).

## **B. The Eastern Caribbean Currency Union**

*Reserve pooling in the ECCU provides a limited amount of reserves to support the peg; therefore, the union should strictly avail itself of the rule of currency boards, abandoning monetary policy autonomy. The section below reviews the case of the ECCU.*

The ECCU, one of the remaining historical examples of currency boards in developing countries, can be compared with the franc zone (Table 3). The franc zone and currency boards were two different solutions that aimed at solving the same problem: how to organize financial relationships in a colonial empire. In both cases, the concern with financial stability encouraged the colonial authorities to favor the stability of exchange rates, resulting in long-lasting and unconditional pegs. Before 1950, currency boards were widely spread across developing economies. However, most of the historical currency boards dating from the British Empire vanished with the independence of the colonies, except for those in Hong Kong and Eastern Caribbean Islands.<sup>8</sup>

As in the zone, the ECCU has a long-lasting record of exchange rate fixity, and it pools foreign reserves. The ECCU is not strictly a currency board; indeed, in 1975, the monetary authorities adopted a lower foreign reserve target (60 percent of base money). Furthermore, currency boards are not commonly based on international cooperation, while the ECCU is a monetary union involving foreign reserves pooling among independent states. However, the regime has maintained a pegged exchange rate for more than 55 years<sup>9</sup> and a high level of foreign reserves. Consequently, the “CFA francs Unions” and the ECCU are among the few systems “combining a currency union among sovereign countries with firm peg to a country external to the zone” (Boughton, 1991).

Currency Boards impose a simple and strict monetary rule to support the exchange rate. They support the exchange rate by establishing foreign reserves as an explicit target for monetary policy (100 percent base money). Indeed, the only counterpart allowed in the balance sheet of a currency board is foreign reserves. For instance, orthodox Currency Boards were simple exchange offices. Furthermore, the ECCU does not benefit from an unlimited contingency line, such as the CO, to support the pegs (Table 4). Consequently, foreign reserves adequacy is a major concern of monetary policy.

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<sup>7</sup> In 1994, CAEMC and WAEMU devalued their franc by 50 percent; while the Comoros devalued its franc by 33 percent. Since then, 1 euro = 655,957 CFA francs and 1 euro = 491,96775 Comorian francs.

<sup>8</sup> Djibouti is another historical example of a currency board. However, it did not originate in the British Empire but in the franc zone; in fact, the territory abandoned the zone in 1949 to establish a currency board and pegged its currency to the U.S. dollar.

<sup>9</sup> Actually, the authorities manipulated the exchange rate once, in 1976 but only to replace the pound sterling with the U.S. dollar as reference currency.

**Table 3. Eastern Caribbean Currency Union: Members and Rules**

British Caribbean Currency Board (1950–1965)	Eastern Caribbean Currency Authorities (1965–1983)	Eastern Caribbean Currency Union (1983–2004)
Members		
Anguilla (1950–65)	Anguilla (1965–83)	Anguilla (1983–2004)
Antigua and Barbuda (1950–65)	Antigua and Barbuda (1965–83)	Antigua and Barbuda (1983–2004)
Barbados (1950–65)	Barbados (1965–72)	Barbados did not join
St. Kitts and Nevis (1950–65)	St. Kitts and Nevis (1965–83)	St. Kitts and Nevis (1983–2004)
Dominica (1950–65)	Dominica (1965–83)	Dominica (1983–2004)
Grenada (1950–65)	Grenada (1968–83)	Grenada (1983–2004)
British Guyana	Guyana did not join	Guyana did not join
Montserrat (1950–65)	Montserrat (1965–83)	Montserrat (1983–2004)
Trinidad and Tobago (1950–62)	Trinidad and Tobago did not join	Trinidad and Tobago did not join
St. Lucia (1950–65)	St. Lucia (1965–83)	St. Lucia (1983–2004)
St. Vincent and the Grenadines (1950–65)	St. Vincent and the Grenadines (1965–83)	St. Vincent and the Grenadines (1983–2004)
Rules		
Foreign reserves / base money : 100 percent	Foreign reserves / base money : 70 percent	Foreign reserves / base money : 60 percent (1975)
1950–65 exchange rate : 4.8 East India dollars for a pound sterling	1965–76 exchange rate : 4.8 East India dollars for a pound sterling	1976–2004 exchange rate: 2.7 East India dollars for a U.S. dollar

*Source:* Oral and al. (2001).

**Table 4. Franc Zone and ECCU: Differences and Similarities**

	Franc Zone	ECCU
Exchange rate	Fixed by international treaties since 1948 (one adjustment in 1994)	Fixed by law since 1955 (change of reference currency in 1976)
Capital account	Free movement with the anchor currency since 1939 but <i>de facto</i> widely spread controls	Open capital account
Monetary policy (foreign reserves management)	Pool of foreign reserves  French Treasury guaranty through the CO	Pool of foreign reserves  Foreign reserves cover a high level of base money

### III. TESTING MONETARY AUTONOMY IN THE FRANC ZONE

#### A. Long-Run Relationship Between Base Money and Foreign Reserves

*In this section, a test is run to assess whether foreign reserves determine base money supply in the franc zone. Whereas the influence of reserves is clear for the ECCU, the test does not provide such evidence for CAEMC and WAEMU, hinting at monetary policy autonomy in the zone. However, the level of autonomy changes over time, declining after 1994 in particular.*

Assuming there is a long-run, or cointegration, relationship between foreign reserves and base money, we can write:

$$(1) \quad Bs_t = \alpha R_t + e_t,$$

Where

$R_t$  is the stock of reserves accumulated at end- $t$ .

$Bs_t$  is the base money stock at end- $t$ .

$\alpha$  is a coefficient that represents how reactive base money supply is to net foreign reserves; and

$e_t$  is the part of base money not predicted by reserve changes.

We assume that a discretionary (or autonomous) monetary policy is characterized by a stochastic trend in  $e_t$ , implying that domestic counterparts have a permanent impact on base money supply. On the other hand, in the case of a fully pegged exchange rate, the elasticity of base money with respect to reserves is strictly equal to 1, and domestic counterparts are equivalent to a random shock, which is mean reverting by definition. The random term would stand for temporary deviations. Consequently, monetary policy could qualify as nonautonomous. Table 5 summarizes the results of the unit root tests.

**Table 5. Long-Run Relationships**

Domestic counterparts $e_t$	Zone	CAEMC	WAEMU	ECCU
$e_t^1 = Bs-R$	0.002 (1.00)	5.06 (1.00)	0.164 (0.99)	-9.57 (0.00)
$e_t^2 = Bs-CO$	2.78 (0.59)	4.57 (1.00)	-2.17 (0.50)	..

*P-value in parentheses*

Source: Author

The test consists in determining whether  $e_t$  is stationary or not; the cointegration between base money and reserves (1) would hold only if domestic counterparts are stationary, meaning that the monetary policy is not autonomous. If our tests reveal a stable relationship, we could investigate the short-run dynamic that stands for the adjustment of temporary deviations (i.e., of domestic counterparts) from the long-run relationship defined in equation (1). To assess the

long-run relationship, we apply a unit root test, developed by Phillips and Perron (1979),<sup>10</sup> to domestic assets defined as the difference between base money and net foreign reserves.

There is a long-run relationship between base money and foreign reserves in the ECCU, but not in CAEMC and WAEMU. The co-integration relationship as defined in equation (1) holds in the case of the ECCU but is rejected in the case of CAEMC and WAEMU. Consequently, in the ECCU, domestic assets have no permanent effects on base money supply; therefore, monetary policy is nonautonomous, which is consistent with the exchange rate constraint. On the contrary, the tests support the hypothesis of an autonomous monetary policy in CAEMC and WAEMU.

### **Temporal nonlinearity: changes in the relationship following time periods**

Our estimates potentially include structural breaks that we did not previously control for. Until now, we assumed that the long-run relationships are constant, so that we estimated only one coefficient over the period. The period 1956–2005 is long; monetary policy autonomy could have changed even if the exchange rate regime remained unaltered. This change would produce structural breaks that modify the estimated coefficients, depending on the date.

In the history of the zone, two major events could correspond to a structural break: the first negative CO in 1981 and the devaluation in 1994. The 1980s were characterized by downward pressures on foreign reserves, a situation that created pressures to tighten monetary policy. Moreover, even though the exchange rate regime has been stable, the exchange rate effectively changed once—in 1994. This change could have signaled a change in the monetary policy stance, thereby revealing a structural break.

Structural breaks are likely to occur in the long-run relationship, meaning that cointegration between base money and foreign reserves changes over time (Table 6). To test<sup>11</sup> this possibility, we allow the Dickey-Fuller coefficient to change with the chosen subperiods (1956–1981, 1981–1994, and 1994–2005) by using a dummy variable ( $D_{ra}$ ), as shown in equation (2).

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<sup>10</sup> Phillips and Perron's test has the advantage of controlling for heteroscedasticity and serial autocorrelation without adding lags.

<sup>11</sup> Derived from Khan and Senhadji (2001)

$$(2) \quad e_{i,t} - e_{i,t-1} = \alpha_i + S_m + \beta_{1,i}[e_{i,t} * D_{ra}] + \beta_{2,t}[e_{i,t} * (1 - D_{ra})] + u_{i,t},$$

$$\beta_i = 1 - \rho_i$$

Where

$\alpha_i$  is a fixed effect;

$S_m$  is a dummy variable controlling for seasonality;

$D_{ra}$  is a dummy variable that takes the value 1 before a certain date and 0 after; and

$\beta_i = 1 - \rho_i$  is the Dickey-Fuller coefficient.

**Table 6. Franc Zone : Time Breaks in Long-Run Relationships**

Seasonally Adjusted Ordinary Least Squares			
Zone-Wide Coefficient	Domestic counterparts	Coefficient	p-value
Co-integration foreign assets - base money	$e_t^1$ (1994–2005)	2.14	0.03
	$e_t^1$ (1980–1994)	-1.00	0.31
	$e_t^1$ (1956–1980)	1.28	0.19
Co-integration CO - base money	$e_t^2$ (1994–2005)	-3.13	0.00
	$e_t^2$ (1980–1994)	0.47	0.63
	$e_t^2$ (1956–1980)	1.64	0.10
Member-Specific Coefficient	Domestic Assets (NDA)	Coefficient	p-value
BCEAO			
Co-integration foreign assets - base money	$e_t^1$ (1994–2005)	1.13	0.25
	$e_t^1$ (1980–1994)	-0.91	0.36
	$e_t^1$ (1956–1980)	1.38	0.16
Co-integration CO - base money	$e_t^2$ (1994–2005)	-3.99	0.00
	$e_t^2$ (1980–1994)	0.74	0.45
	$e_t^2$ (1956–1980)	1.87	0.06
BEAC			
Co-integration foreign assets - base money	$e_t^1$ (1994–2005)	4.11	0.00
	$e_t^1$ (1980–1994)	0.00	0.99
	$e_t^1$ (1956–1980)	0.03	0.65
Co-integration CO - base money	$e_t^2$ (1994–2005)	1.78	0.07
	$e_t^2$ (1980–1994)	0.52	0.59
	$e_t^2$ (1956–1980)	0.76	0.44

The long-run relationship is valid mainly during the last period (1994–2005). Testing a unit root for the entire zone maximizes the number of observations (useful for asymptotic tests) but imposes a limit of estimating only one coefficient. The statistic is the highest for the last period (1994–2005), when the relationship tilts toward a stable long-run one. For the BCEAO, the valid cointegration seems to be between base money and the CO; no significant results are obtained from using foreign reserves. The test supports a long-run relationship essentially during the last period. For the BEAC, the two estimates give us the same result, and they support a long-run relationship only in the last period (1994–2005).

### **B. Short-Run Dynamic Between Changes in Foreign Reserves and Money Supply**

The short-run relationship is simply the long-run one in first difference, which represents how changes in foreign reserves influence changes in base money supply. Where cointegration holds (ECCU), it includes an error correction term, giving us the speed at which the regime corrects deviations from the long-run relationship. From the short-run relationship, we infer offsetting coefficients, which are commonly used to study the autonomy of monetary policy in the context of free capital movement, and assess the activism of monetary policy (Table 7).

The short-run relationship corroborates that monetary policy heavily depends on foreign reserves for currency boards (ECCU), but not for CAEMC and WAEMU. For the ECCU, the error correction model is significant and efficient; indeed, each month more than 10 percent of the deviation from the long-run relationship, as defined in equation (2), is corrected (i.e., in a year, three-quarters of the deviation is corrected). Base money is also responsive to foreign reserves. For BCEAO and BEAC, we could not estimate an error correction model because the long-run relationships are not stable, but we separately estimate the coefficients presented in Table 7. As expected, there is no error correction; each month the share of the deviations corrected is close to zero (in the best case, only 3.8 percent of the deviation would be corrected after a year).

The responsiveness of base money supply to changes in foreign reserves increases after the 1994 devaluation, reflecting a change in monetary policy. The devaluation reduced the need to use CO advances because it adjusted the exchange rate. Afterward, the monetary authorities have targeted foreign reserves tightly. The change is somewhat dramatic because the zone and its member switch from a low elasticity of base money to change in reserves to a large one. Overall, the elasticity seems higher for BCEAO than for BEAC, but the estimated coefficients remain close. On the contrary, for the ECCU, the coefficient is stable and significant for the entire period. Consequently, even though the zone's monetary policy is not irresponsive to foreign reserves in the short run, the impact of reserves is less straightforward than for the counterfactual (the ECCU).

Much of the economic literature testing monetary policy autonomy focuses on interest rates (Rose, 1996; Shambaugh, 2004) or base money counterparts. On the interest rate side, some of these studies build on the panel co-integration techniques recently developed (Frankel, Schmukler, and Servén, 2000) and analyze the special case of the franc zone; their results suggest that interest rates are co-integrated, but converge toward their long-run relationship with significant delays (Shortland and Stasavage, 2004). On the base money counterpart side, there is an older body of literature, which is related to the “monetary explanation of the

balance of payments.” Basically, local factors, such as money demand, and external factors, such as foreign interest rates, determine capital flows, and monetary authorities decide whether they should try to offset the effects of these flows on base money (Kouri and Porter, 1974). If the authorities perfectly counterbalance flows over a long period, they keep perfect control over base money; therefore, policy is completely autonomous. Conversely, if external flows influence base money, the autonomy is lower. The extent to which external flows influence base money determines the level of autonomy.

**Table 7. Short-Run Relationship**

March 1956–August 2005	Dependant Variable : $\log Bs_t - \log Bs_{t-1}$			
	Seasonally Adjusted Ordinary Least Squares			
	Zone	BEAC	BCEAO	ECCU <sup>1</sup>
Change in base money (Bs)				
$Bs_t - Bs_{t-1}$	0.13 (0.00)	-0.31 (0.00)	0.21 (0.00)	-0.04 (0.39)
Change in foreign reserves ( $r_t$ )				
(1956-2005)	0.12 (0.00)	0.19 (0.09)	0.11 (0.00)	0.17 (0.00)
(1956-1980)	-0.10 (0.36)	-0.16 (0.61)	-0.08 (0.50)	..
(1980-1994)	0.10 (0.01)	0.07 (0.21)	0.14 (0.03)	..
(1994-2005)	0.30 (0.09)	0.45 (0.19)	0.30 (0.14)	..
Change in the <i>compte d'operation</i> ( $CO_t$ ) balance				..
(1956-2005)	0.016 (0.09)	-0.07 (0.54)	0.015 (0.11)	..
(1956-1980)	-0.19 (0.2)	-0.27 (0.43)	-0.17 (0.30)	..
(1980-1994)	0.06 (0.16)	0.07 (0.23)	0.058 (0.35)	..
(1994-2005)	0.32 (0.09)	0.46 (0.19)	0.32 (0.14)	..
Error correction model				
Error correction term CT (domestic assets) <sup>2</sup>	..	..	..	-0.11 (0.0)
$R^2$	0.35	0.39	0.39	0.35
<i>Obs.</i>	1176	589	579	319

<sup>1</sup> January 1979–August 2005

<sup>2</sup> The error correction term (ECT) is kept in the regression only for the ECCU, for which an error correction model is valid throughout the period.

Estimating offsetting coefficient demands base money counterparts, which are available on a monthly basis and for a long period in the zone. Conversely, methods based on interest rates would be more difficult to implement because of the lack of data and the difficulty to identify the relevant interest rate. The extent to which monetary policy offsets external flows can be estimated; these estimates are called “offsetting coefficients.” The closer the coefficient is to -1, the more flows are offset. Therefore, coefficients close to -1 suggest an active monetary policy, and coefficients close to zero indicate the opposite. Offsetting coefficients and the automatic adjustment model are both based on base money counterparts. From the short-run relationship

that corresponds to the automatic adjustment equation (1), we can infer offsetting coefficients, that is, the proportion of reserve changes that offset domestic counterparts.

**Table 8. Offsetting Coefficients**

March 1956–August 2005	Zone	BEAC	BCEAO	ECCU
Change in foreign reserves (r) during indicated period				
1956–2005	-0.88	-1.0	-0.89	1956–2005 <sup>1/</sup> -0.14
1956–80	-1.1	-1.6	-1.08	
1980–94	-0.9	-0.93	-0.86	
1994–2005	-0.7	-0.55	-0.7	
Change in the CO balance during indicated period				
1956–2005	-0.98	-1.07	-0.98	
1956–80	-1.19	-1.27	-1.17	
1980–94	-0.94	-0.93	-0.94	
1994–2005	-0.68	-0.54	-0.68	

<sup>1/</sup> Two lags are taken into consideration.

$$(3) \quad nda_t - nda_{t-1} = \alpha + \beta(TC_t) + X_t + e_t$$

where  $TC$  corresponds to capital flows,  $\beta$  is the offset coefficient, and  $X_t$  a set of control variables. Let us assume that:

$$(4) \quad TC_t = R_t - R_{t-1}.$$

The short-run equation corresponding to the automatic adjustment model could be rewritten as follows:

$$(5) \quad Bs_t - Bs_{t-1} = \alpha_i + \alpha_1(R_t - R_{t-1}) + \alpha_2(Bs_{t-1} - Bs_{t-2}) + e_t$$

$$(6) \quad R_t + nda_t - nda_{t-1} - R_{t-1} = \alpha_i + \alpha_1(R_t - R_{t-1}) + \alpha_2(R_{t-1} + nda_{t-1} - r_{t-2} - nda_{t-2}) + e_t$$

$$(7) \quad nda_t - nda_{t-1} = \alpha_i + (\alpha_1 - 1)(R_t - R_{t-1}) + \alpha_2(R_{t-1} - R_{t-2}) + \alpha_2(nda_{t-1} - nda_{t-2}) + e_t$$

with

$$(8) \quad (\alpha_1 - 1) = \beta.$$

We obtain the following equivalence between short-run and offset coefficients:

$\alpha = 1, \beta = 0$  No sterilization / full impact of capital flows

$\alpha = 0, \beta = -1$  Full sterilization

$\alpha > 1, \beta > 0$  Balance-of-payments target

The offset coefficients corroborate the finding that the activism of monetary policy was high in the zone before 1994 but low after 1994 and low in the ECCU (Table 8). A low offset coefficient means that capital flows (that is, changes in foreign reserves) fully influence base money. For the ECCU, several lags have a significant influence on base money supply, so this paper takes into account some policy delays and estimates the offset coefficient for two periods. Even on a monthly basis, the offset coefficient is close to zero, meaning that monetary policy does not try to offset reserve changes. This result suggests that the activism of monetary policy is low in the ECCU. For BCEAO and BEAC, the coefficients are close to 1 during 1956–2005, revealing that the monetary authorities largely offset changes in foreign reserves. According to the offset coefficients, this activism seems to decrease after the devaluation; a finding consistent with our previous results. Over the entire period, offset coefficients for the CO are slightly higher than the coefficient for foreign reserves, confirming that the account has served as a buffer. Nevertheless, after the devaluation, the offset coefficients for both the CO and foreign assets are similar, suggesting that the account has lost some of its traditional function.

### C. Foreign Reserve Thresholds

To estimate the foreign reserve threshold, we use the same procedure as for time breaks (Table 9). The threshold is defined as the ratio foreign reserve/base money under which monetary policy becomes more sensitive to foreign reserves. We run the equation (3) for ratios between 5 and 100 percent. We already know that central banks are supposed to maintain the ratio above 20 percent. The threshold is probably also subject to time breaks, but the procedure could not efficiently control for two different structural breaks at the same time.

$$(3) \quad Bs_{i,t} - Bs_{i,t-1} = \alpha_i + S_m + \alpha_{1,i}[(r_{i,t} - r_{i,t-1}) * D_{ra}] + \alpha_{2,i}[(r_{i,t} - r_{i,t-1}) * (1 - D_{ra})] + e_{i,t}.$$

$D_{ra}$  is a dummy variable that takes the value 1 under a certain ratio foreign reserves /base money and 0 above. Alternatively foreign reserves are replaced  $r_{i,t}$  with the CO position  $CO_{i,t}$

Zone members seem to aim for foreign reserves corresponding to more than 30–35 percent of base money. For the zone altogether, monetary policy becomes more responsive to the CO position under a ration CO/base money (threshold) of 35 percent. Alternatively, we could not find a change in monetary policy related to the ratio foreign reserve/ base money. For BEAC, the threshold corresponds to a ratio of 30 percent (foreign asset, or CO/base money), and it entails a moderate tightening of monetary policy. For BCEAO, no target of foreign reserves could be found. Nonetheless, a threshold of 35 percent could be estimated using the CO as the target.

**Table 9. Monetary Policy Thresholds**

Seasonally Adjusted Ordinary Least Squares			
Zone-wide Coefficient	Threshold ( $D_{ra}$ )	Coefficient	p-value
Change in foreign reserves (r)			
$\alpha_{1,i}$	..	..	..
$\alpha_{2,i}$	..	..	..
Change of the <i>compte d'operation</i> (CO) balance			
$\alpha_{1,i}$	0 to 35 %	0.12	0.00
$\alpha_{2,i}$	35 to 100 %	0.037	0.00
Zone: Member-Specific Coefficient		Coefficient	p-value
BCEAO			
Change in foreign reserves (r)			
$\alpha_{1,i}$	..	..	..
$\alpha_{2,i}$	..	..	..
Change of the <i>compte d'operation</i> (CO) balance			
$\alpha_{1,i}$	0 to 35 %	0.11	0.00
$\alpha_{2,i}$	35 to 100 %	0.026	0.00
BEAC			
Change in foreign reserves (r)			
$\alpha_{1,i}$	0 to 30 %	0.16	0.00
$\alpha_{2,i}$	30 to 100 %	0.10	0.00
Change of the <i>compte d'operation</i> (CO) balance			
$\alpha_{1,i}$	0 to 30 %	0.18	0.00
$\alpha_{2,i}$	30 to 100 %	0.12	0.00

#### IV. CONCLUSIONS

The degree of autonomy of the monetary policy conducted by the ECCU and the franc zone appears to differ significantly even though the two systems share the same exchange rate constraint. The rule that currency boards use for monetary policy is consistent with their exchange rate commitment. The franc zone is able to combine autonomy with fixity mainly because the size of its economies is small. In fact, its limited financial development has made potential bailouts by the French treasury inexpensive, deterring it from calling for more stringent rules. In addition, the limited financial development also allows capital controls to be more binding. In fact, combining a credible support for exchange rates and capital controls restored monetary policy autonomy.

The autonomy of the monetary policy in the zone has not been stable. First, starting with a structural shift in 1994, monetary policy has tilted toward less autonomy. Second, the central banks also target a specific reserve level, so the responsiveness of money supply to foreign reserves would change depending on the reserve level. Other instruments designed to limit the CO deficit, such as the progressively increasing interest rate, did not appear to have a significant influence on monetary policy.

The main policy implications concern the future of the zone. In the near term, the size of the zone will probably stay the same. Therefore, cooperation may be unchanged. However, financial development and growth could put pressures on the fixed exchange rate and, as a result, on monetary cooperation in the zone. Maintaining the zone as it is today will require stricter compliance with rules that aim to preserve foreign reserves. Nevertheless, more strictly targeting foreign reserves would abolish the historic objective of the zone, which is to maintain the autonomy of monetary policy in the context of a fixed exchange rate. In particular, it would require building up reserve stocks consistent with the peg and taking away the monetary authorities' ability to react to unexpected shocks. On the other hand, when zone members become emerging economies, they can dismiss the peg as no longer an appropriate exchange rate strategy. In such cases, the members could decide to terminate the cooperation or preserve it with a more flexible exchange rate. Deepening the integration in the monetary unions would then make it easier to soften the peg and to reform the arrangement because such a deepening would reduce zone members' exposure to external shocks, allowing for autonomy of monetary policy.

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