# CHAPTER 2

## Monetary Policy, Credibility and Asymmetries: Small African Countries and the EMU Advent

## 2.1 Introduction

When a country pegs its nominal exchange rate (ER), it expects a convergence of its inflation level toward that of the anchor country[1]. Whether the peg is a currency or a basket of currencies, the objective is to target inflation reduction or control. Then, the challenge for the pegging monetary authority is to be able to record roughly an inflation level equivalent to the one of the anchor country. Otherwise, a real appreciation can emerge and current account problems are likely to occur because of the subsequent loss of competitiveness.

Moreover, theoretical models of anti-inflationary strategies that aim to gain monetary policy credibility through a currency peg are characterized by the existence of multiple equilibria. This feature causes fixed exchange rates (FER) regimes to be a source of speculative attacks due to uncertainty (Obstfeld, 1996, 1997; Rasmussen, 2002). Nevertheless, Rasmussen (2002) argues that the cost of reneging has an influence on the stability of the system. The higher the cost of reneging, the more stable will be the fixed exchange rate setup. Then a monetary union appears to be the most stable fixed exchange rates system as it implies a greater cost than other FER regimes.

[1]For a treatment of nominal and real exchange rate targeting, see Corden (1994) and Eichengreen et al. (1999) who provide a short but clear presentation.

More specifically, Corden (1994) argues that for Developing Countries (DCs), the true challenge is to reduce fiscal deficit: "...Since, to a great extent, monetary policy in developing countries is determined by fiscal policy (deficits tend to be monetized to varying extents), fiscal policy must adjust to exchange rate policy. To reduce the rate of money supply growth, a fiscal deficit will have to be reduced..."(see Corden, 1994, pg. 75). Daniel (2001) presents a fiscal theory of currency crises according to which the long run viability of a FER system depends on the present value of future fiscal surpluses. The monetary policymaker will abandon the exchange rate peg when its fiscal policy violates the constraint imposed by a FER.

The macroeconomic policy of the potential anchor country is, then, of great interest. As the disinflation process through exchange rate management mechanism proceeded in the European Union (EU), low inflation record became the *rule* and the revealed objective of monetary authorities of the former candidates and current members of the EMU. The current objectives of the European Central Bank remain consistent with an ever low inflation level record and low fiscal deficit. Thus, the adoption of the euro as the nominal anchor in a DC means for the policymaker to be engaged in a fiscal policy pattern and in a low inflation performance similar to those of the ECB. But the usual incentives to permissive fiscal policy and the high inflation that characterize some DCs make the introduction or the sustainability of the currency peg to the euro questionable. Accordingly, this could have increased the probability of currency or financial crises as the European monetary integration proceeded. The expectations of currency crises are more likely to increase as the increasing tightness of EMU macroeconomic policies — the anchor economy — makes the peg less credible.

Two facts of interest are the core motivation of this study. On the one hand, the existing CFA zone whose unique currency is pegged to the euro has existed for a very long time. Indeed, it is expected to still exist despite the differences in fiscal and inflation performances in comparison with the EMU. Before the euro birth, the CFA franc was pegged to the French franc. Actually, it can be observed that during some periods the inflation level in some CFA zone participating countries was above the level of the inflation record in France without any announcement of redrawing by African countries or frequent realignments of the parity. Thus, neither the principles of a currency peg nor the predictions of theoretical models have worked as it might be expected. On the other hand, Masson and Patillo (2001a) report that many other African countries are planning to build a monetary union that would include some current CFA zone participants. This would be a new monetary union including all but one of country members

of the Economic Community of West African States (ECOWAS)[2]. This project is raising some queries as both the very restrictive ECB monetary policy and the unstable broad economic environment in Africa are likely to make the peg of the future common currency to the euro — if it is adopted —a very heavy constraint.

To deal with these issues we build a theoretical framework based on Obstfeld (1996) and Rasmussen (2002). We will study in both positive and normative approaches the functioning of a pegged currency model that characterizes the current CFA zone. The handling of potential structural asymmetries is also an aspect of the study, especially an asymmetric aversion to inflation and an asymmetric broad economic and political environment. This work tries to show how these two asymmetries could affect the stability of a more classical CFA zone, the planned ECOWAS monetary union or a small pegging African DC like Comoros. Therefore, one kind of reform that could allow to better manage the implications of the considered asymmetries is suggested. The scope of this chapter is going beyond the functioning of monetary unions in the sense that any FER arrangement can be included in the range of frameworks to be analyzed by the means of our model.

The impact of asymmetries on monetary arrangements is largely documented in the literature on cooperative versus non-cooperative macroeconomic policies. It was stressed that either asymmetric shocks (see for example the Mundell (1961) seminal work on optimal currency areas) or structural asymmetries (see for example Bednar and Monfort (1997); Hughes Hallet and Weymark (2002)) could make a monetary cooperation counterproductive or could endanger the stability of a monetary union. This present model differs from the existing literature in some aspects. First, rather than dealing with the welfare analysis of the cooperative (non-cooperative) policies, particularly the choice to join or to remain in a monetary union, our model just tackles the role of asymmetries in the functioning of a FER regime that encompasses a monetary union. The framework is an extension of an open economy credibility model initiated by Obstfeld (1996), turning out to be a simpler way to analyze the role of asymmetries. Secondly, a way to express a structural asymmetry will be introduced to capture the existence of a weaker broad economic and political environment in the pegging country in comparison with those of the anchor country. Finally, for a first attempt, the model allows to formally shape the CFA zone operations account mechanism in a monetary model.

[2]The ECOWAS is composed of Nigeria, Ghana, Guinea, Liberia, Gambia, Sierra Leone and Cape Verde plus eight members of the West African CFA franc zone. All these countries are participants in the project of forming a common currency pegged to the euro, except for Cape Verde. The latter has already a currency peg to the euro, through the support of Portugal (Masson and Patillo, 2001a).

The rest of the chapter is organized as follows: the second section deals with the current functioning of the CFA zone and points to some stylized facts that feature some CFA zone members and some other non-CFA ECOWAS members in comparison with France. We show that despite the long lasting stability of CFA franc-euro (formerly French franc) parity, there is a structural difference in macroeconomic performance and broad economic environment in African countries in comparison with the anchor country, that is, France.

The third section introduces an anti-inflationary policy model characterized by multiple equilibria and uncertainty. It shows how the virtual convertibility of the CFA franc — sustaining the fixed parity — increases the stability of a currency peg. Asymmetries are also introduced in the model to show why without a "operations account"–like mechanism, a peg to the euro could be difficult to set up as these structural factors are implying a lesser ability to stabilize employment. The fourth section discusses the future of the franc zone in line of the current debate around the challenge of African currencies in the presence of the euro. The last section is a conclusion.

## 2.2 The CFA zone, the ECOWAS and Emu Advent: Empirics on existing asymmetries.

Two questions can be asked. To which extent maintaining a peg to the euro can become a matter of concern? Is the setup of a peg to the euro credible in African DC's? These questions lead to a prospective study on either the holding or the settlement of a nominal peg when asymmetries exist. Maintaining a peg to the euro is an issue related to the CFA zone that exists since the sixties. However, setting up an ER regime based on a peg to the euro is related to the ECOWAS which is a planned monetary union to be formed by some African countries and encompasses the current West Economic African Monetary Union (WAEMU) — a part of the CFA zone [3]. In this section, after the description of the functioning of the CFA zone, we will explore the macroeconomic performances of both the CFA and the non-CFA members of the ECOWAS in order to highlight possible structural asymmetries that could be influential when considering either the issue of maintaining a peg between an African currency and the euro or that of building a fixed ER regime with the euro as the anchor. These performances are compared with the ones of France as we invoke the European monetary integration

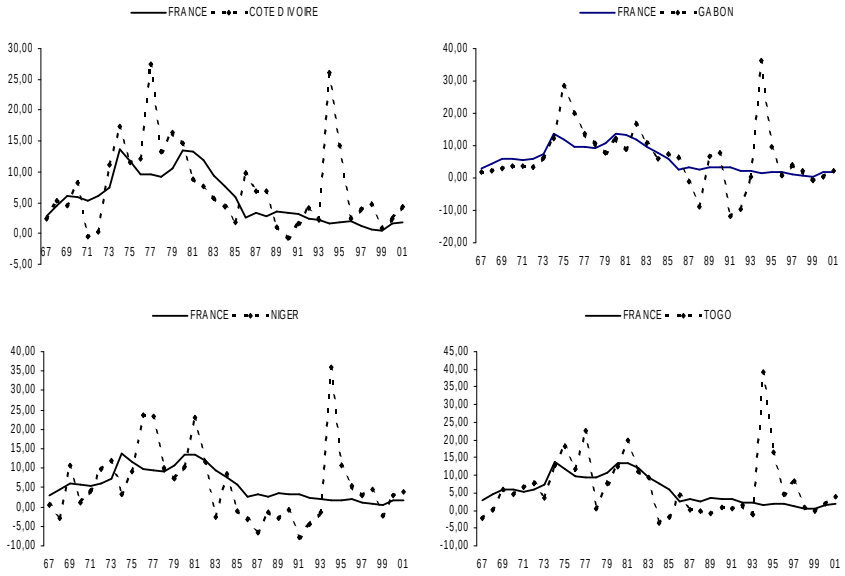
[3]The franc zone in Africa is composed of three monetary sub-zones: the West Economic African Monetary Union (WAEMU), the Central African Economic and Monetary Community (CAEMC) and the Comoros isles. The CFA zone is composed of two monetary sub-zones —the WAEMU and the CAEMC.

process which is a consequence of the creation of the European Monetary System (EMS) and the move from the EMS to the EMU. In addition, we will consider some events that could be indicators of the soundness of general economic and political environment in African countries. This may be another source of asymmetry in comparison with the EMU.

### 2.2.1 CFA, ECOWAS and the Disinflation Process in the European Union

Since the second part of the decade of the eighties, the monetary integration process has been boosted in Europe. To fulfill the EMS and the *Convergence* criteria in order to be eligible for the EMU participation, a disinflation process took place and allowed a structural low inflation pattern that currently characterizes the EMU members. It would be interesting to compare this pattern to the ones of some African countries in order to look for a possible structural difference. We consider the evolution of France's inflation performance as a representative structural pattern because of its importance for the CFA zone. France is not only the main trading partner of many of the zone countries, but also the country whose currency was the anchor. The existence of convergence criteria for non-CFA members of ECOWAS can then be interpreted as the result of considering the anchorage of the CFA franc as the reference for the ECOWAS monetary union project.

A first group of selected countries includes four CFA zone members, i.e., Ivory Coast, Gabon, Niger and Togo whose inflation pattern is displayed in figure 2.1, each in comparison to the one of France. It can be noticed that a disinflation process has begun in France since the beginning of the eighties. As France is characterized by a structural low inflation level, the ECB monetary policy is set to allow this low inflation feature to hold in the future. Furthermore, the rate of inflation in the targeted CFA countries has been volatile even if a downward trend can be observed as a consequence of originally pegging the CFA franc to the French franc and later to the euro. In addition to this volatility there are many periods during which the inflation in African countries is clearly above the French one despite the existence of the fixed ER. Of course, the converse situation also occurred, but it seems to us that it is of less interest because a devaluation is more of concern than a reevaluation for small country policymakers. In fact, periods of higher inflation in Africa — in comparison to France — could easily be interpreted as an inclination to pursue inflationary monetary policies. The devaluation that occurred in 1994 helps to explain why there is a peak of inflation during that year. Since the devaluation episode, the inflation has been reduced to be around the level of



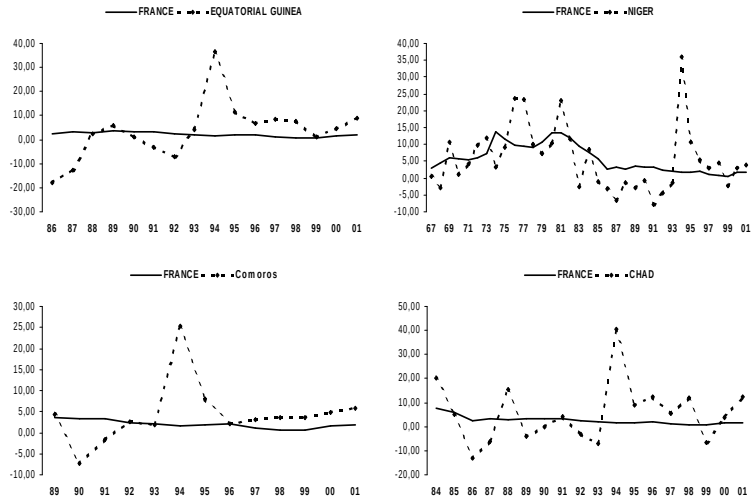

*Source*: IMF, IFS Cd-rom of june 2001

Figure 2.1: Inflation (%) pattern of France and a first group of selected CFA zone countries

inflation in France; the case of Ivory Coast is different as its inflation performance has been worse than the one of EMU country members.

Observing another group of countries whose inflation rate evolution is depicted in figure 2.2, we clearly see that the inflation level in these African countries remained above of the inflation level in France since the devaluation has occurred, except in 1999. In addition, like in the first group case, it can be noticed that the inflation rate is largely more volatile than in France; there are many periods during which inflation in CFA zone countries — plus Comoros — has been above the required level to maintain a fixed ER.

It can easily be understood why African policymakers are able to avoid a devaluation whilst they undertake inflationary policies. The reason is the existence of an institutional mechanism called *operations account*. As the African central banks (for the two monetary unions and Comoros) deposit a part of their external reserves in the so-called operations account located in the central bank of France, the French Treasury engages itself to provide for an amount of euros — formerly French francs — in order to support external transactions of African countries. This mechanism implies a *virtual convertibility* that allows African monetary authorities to keep the ER fixed without




*Source*: IMF, IFS Cd-rom of June 2001

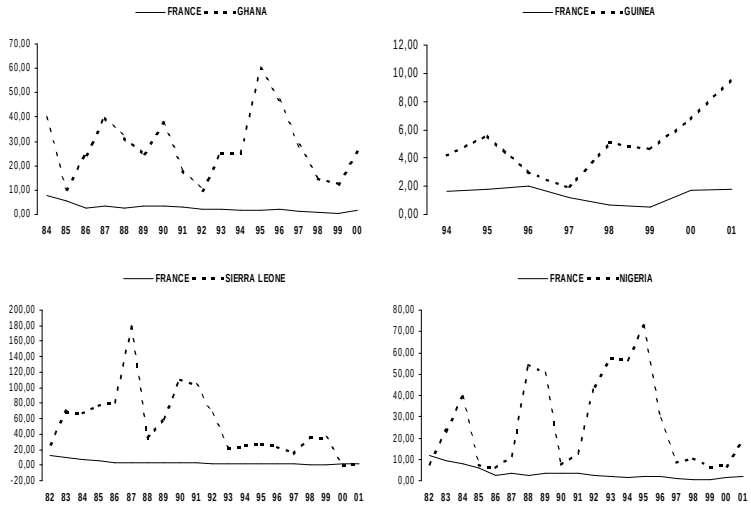
Figure 2.2: Inflation (%) pattern of France and a second group of selected CFA zone countries plus Comoros

the fear of lacking external reserves in order to defend the parities.

Observing Figure 2.3 which includes some non-CFA ECOWAS members is very informative. The rate of inflation in these countries is structurally above the one of France and its figure depicts the same volatility observed elsewhere in Africa.

### 2.2.2 Influential Factors of General Economic Environment

The desired credibility of a pegging policymaker is also related to its ability to successfully manage the economic shocks that the economy will face. But, as for as African countries are concerned, it is important to wonder whether the frequency of negative economic shocks is comparable to those of the anchor country. In fact, the more frequent the shocks, the less easy the ability to maintain a parity because the private agents will expect a higher probability of a devaluation to manage the shocks. Comparing the economic shocks occurrence in Africa and in EMU is an impossible task because of the lack of data. Alternatively, we are focusing on the study of general economic and political environments in order to highlight some factors that will allow us to speculate about the likelihood of negative economic shocks in Africa in comparison with the EMU.




*Source*: IMF, IFS Cd-rom of june 2001

Figure 2.3: Inflation (%) pattern of France and a non-CFA ECOWAS countries

On the side of economic factors, we first emphasize the structure of exports or the production of tradable goods. The African economies are characterized by a commodity bias of export pattern. The commodity prices are volatile and the production of this kind of goods is highly correlated with movements of prices. Conversely, exports of industrialized countries are diversified; thus, the production of tradables and the exports in industrialized countries will be less likely to drop if prices of a category of products decrease. Table 2.1 shows that, since the middle of the decade of the 90's, the prices of commodity exports[4] have declined in general. The only countries concerned by an increase in the prices of exports in the selected group are oil producers; they benefited from the oil price increases that happened in 1999 and continued in the beginning of the current decade. But the reversals observed, before and after the latter Iraqi war, emphasize the uncertainty that features the commodity price moves.

Drought is an another factor that could have a negative impact on the economic activity. Contrary to the *North*, the African economies are likely to suffer from episodes of drought that affect agricultural products. In general, African economies are more

[4]It is the growth rate of commodity price index weighted by the share of retained products in the global amount of commodity exports. For these countries the share of commodity in the total export varies between 70% and 100 %.

Table 2.1: Cumulated quarterly growth rate of Exports prices of selected African countries from January 1995 to September 2002.

| Benin | Cameroon | Congo | Ivory Coast | Gabon | Guinea | Mali | Niger | Togo |
|---|---|---|---|---|---|---|---|---|
| -17,9 | 26,0 | 53,8 | -3,2 | 48,0 | -25,5 | -16,0 | -23,0 | -19,6 |

*Source:* Author calculation. Data from Thomson Financial Data.

likely to be affected by adverse drought change than the industrialized ones because of the agricultural sector importance in the national product. Guillaumont et al. (1999) show that among primary instabilities, i.e structural in nature, the instability of climate and terms of trade have negative influence on growth in Africa. These factors are relevant because a fixed exchange rate regime implies a constraint on the use of exchange rate policy to stabilize the economy. It is admitted (Konate, 2001) that one reason for the devaluation of the CFA franc and the Comorian franc observed in 1994 is the economic shocks that the African economies faced since the mid-eighties, especially the decline of commodity prices. This feature is a kind of structural asymmetry that we will retain for modeling the functioning of an asymmetric fixed exchange rate arrangement.

In addition to a greater frequency of negative shocks in African economies than in the industrialized ones, it is interesting to note the negative impact of political instability on economic activity, especially on the economic growth. The instability induces a lack of property rights protection; this could lead to a decrease of capital accumulation as less investment is undertaken. Fosu (1992) argues that the same decrease characterizes human capital accumulation because of the brain drain that could occur due to the instability. He also argues that a breakdown in the level of GDP can be observed because the production process is likely to be interrupted during episodes of severe crises like *coups d'état* and revolutions. Moreover, a negative impact of instability on growth can work through a deterioration of productivity.

Futhermore, we also invoke a negative correlation between instability and sound economic policy which induces production declines in countries affected by political troubles. In times of trouble, three facts could be observed (Berthélemy et al., 2002). First, politicians could avoid any structural reforms and pursue *wait and see* policies in order to limit disagreement with the population and other political parties. Secondly they could be confronted to a time inconsistency problem, failing to keep their commitments in appropriate policies. Finally, corruption can become a tool for threatened governments to ensure loyalty of various bodies. All these facts could act negatively on

the level of production as economic shocks appear.

Table 2.2: Political instability during the 1995-2003 period in CFA zone countries and in non-CFA members of the Ecowas.

| Country | Coup d'état | Civil war | Others[a] | Total number of years |
|---|---|---|---|---|
| CAR | 2003 | | 2001,2002, 2003 | 3 |
| Chad | | | 1998,2002,2003 | 3 |
| Comoros | 1999, 2000 | 1998 | 1998 | 3 |
| Congo | 1998 | 1998,1999 | | 2 |
| Ivory Coast | 1999 | 2002, 2003 | 2000 | 4 |
| Guinea | | | 2000 | 1 |
| Guinea Bissau | 1999 | | 2000 | 2 |
| Liberia | | 1995-2003 | 2000 | 8 |
| Nigeria | | | 2003 | 1 |
| Sierra Leone | 1997 | 2000 | 1999 | 3 |

*Source*: Ecowas

a: riots, armed conflicts, elections with violence.

Empirically, this negative link between political instability and African economic growth is clearly established (Barro, 1991; Guillaumont et al., 1999; Berthélemy et al., 2002). For example, Guillaumont et al. (1999) find that, as other primary instabilities, political instability influences African growth through lowering the rate of investment and appreciating the real ER. Studying 22 African countries' data, Berthélemy et al. (2002) also establish an unambiguous negative correlation between instability and growth. It works through a negative impact on the capital accumulation and the productivity of investments.

In fact, we can notice an increasing political instability in Sub-Saharan Africa, concerning the studied countries. Guillaume and Stasavage (2000) proxy political instability by number of *coups d'état* and find that during the sub-period 1986-1993 there was on average a coup every 20 years in the WAEMU countries and no coup at all in Ivory Coast, the biggest economy of the region. They also find no coup at all in the CAEMC countries during this period. Since the second half of the preceding decade and the beginning of the current one, many major political crises have arisen and some of these have still hold whether in the franc zone or in the non-CFA countries ECOWAS members. Table 2.2 shows a selective distribution of coup d'état episodes, armed conflicts and civil war periods in the countries in review since the end of the nineties. We see that the two monetary unions of the franc zone and Comoros are characterized by a political instability, especially the biggest economy of the WAEMU. This can induce negative economic shocks in the regions.

## 2.3 The Model

A typical model of monetary policy credibility is presented here to illustrate the multiplicity of equilibria featuring this kind of model. The next step will introduce an *operations account*–like mechanism to show that the framework shifts to one of unique equilibria; thus explaining why the zone franc has recorded such long periods of unmodified fixed parity. Without this institutional arrangement we will see that, in the absence of an operations account mechanism, some asymmetries make the fixed exchange rate regime impossible to set up; unless to accept heavier constraint on the ability to stabilize employment. The model describes a small open economy in which a single tradable good is produced. The output is given by an expectations-augmented Phillips curve:

$$y_t = \bar{y} + (\pi_t - \pi_t^e) + z_t \tag{2.1}$$

where $\bar{y}$ is the natural level of output, $\pi_t$ is the inflation rate, $\pi_t^e$ is the expected inflation and $z_t$ is a productivity shock with zero mean and constant variance $\sigma^2$.

We assume that the PPP holds and the inflation in the anchor country is zero, i.e, $\pi_t^* = 0$. Thus, the inflation is determined by the depreciation rate of the exchange rate, $\pi_t = e_t$, the two variables becoming interchangeable. To keep the parity unchanged in the fixed exchange rate regime the DC policymaker has to manage the monetary policy to maintain $\pi_t = 0$.

The policymaker minimizes the loss function:

$$L = (y_t - \tilde{y})^2 + \chi (\pi_t)^2 + C(\hat{e}) \tag{2.2}$$

where $\tilde{y}$ is the output level targeted by the authorities and is greater than the natural level of output, $\tilde{y} > \bar{y}$. There is a positive wedge between the output level targeted and the natural level such that $k = \tilde{y} - \bar{y} > 0$. We assume that $k > Z$ in order to keep the intuition of the model more realistic[5]. The loss function depends on deviations in output and inflation from the desired levels. It also depends on a cost of reneging $C(\hat{e})$ that creates an incentive for the policymaker to avoid any change of the parity. For the moment, we follow Obstfeld (1997) and Rasmussen (2002) to assume a fixed term cost. When the ER remains fixed ($\hat{e} = 0$), there will be no cost at all but any change of

[5]Rasmussen (2002) argues that $k > Z$ implies that the analysis features only the cases where the incentive for fixing is relatively strong.

the ER ($\hat{e} \neq 0$) will imply a cost $C(\hat{e}) = \bar{c}$. The discussion about the choice of a fixed instead of a variable reneging cost is postponed. Then, the following representation holds:

$$C(\hat{e}) = \begin{cases} 0 & , \quad if\ \hat{e} = 0 \\ c & , \quad if\ \hat{e} \neq 0. \end{cases} \tag{2.3}$$

### 2.3.1 Multiplicity of Equilibria Versus Existence of an Operation Account Mechanism

The monetary authorities announce the exchange rate and engage themselves to maintain the parity unchanged. According to this announcement, the private sector agents form their expectations before a productivity shock occurs. After the shock, the choice of the actual ER regime is made by the monetary authorities. They decide either to support the parity or to renege and to let the currency float with an induced cost. The decision is based on the comparison of the actual losses stemming from the possible ER choices. In fact, the choice of an exchange rate is equivalent to a choice of the level of inflation. The choice of the inflation level in the case of ER floating (with $\hat{e} \neq 0$) goes through the minimization of the following loss function subject to $\pi_t$:

$$Min\ L_t = (-k - \pi_t - \pi_t^e + z_t)^2 + \chi(\pi_t)^2 + c$$

implying the optimal level of inflation:

$$\pi = \frac{k + \pi_t^e - z_t}{1 + \chi} \tag{2.4}$$

Substituting the above solution back in equation 2.2, we obtain the following monetary policymaker loss:

$$L^{FLEX} = \frac{\chi}{1 + \chi} (k + \pi_t^e - z_t)^2 + c \tag{2.5}$$

If the choice of keeping the exchange rate fixed prevails, i.e $\hat{e} = 0$ and $\pi = 0$, the loss will be:

$$L^{FIX} = (k + \pi_t^e - z_t)^2 \tag{2.6}$$

such that

$$L^{FLEX} - L^{FIX} = c - \frac{1}{1+\chi}\left(k + \pi_t^e - z_t\right)^2$$

If $L^{FIX} < L^{FLEX}$, the fixed ER regime will be chosen, otherwise the floating will prevail. Thus, the decision about whether to pursue the peg or to renege will be based on the expression:

$$c = \frac{1}{1+\chi}\left(k + \pi_t^e - z_t\right)^2 \tag{2.7}$$

When private sector agents are convinced that the monetary authorities will pursue the peg, they expect a zero value inflation, i.e. $\pi^e = 0$. Otherwise their expectations of inflation are set in such a way that $E(\pi) = \pi^e = \frac{k}{\chi}$.

Alternatively, putting back the two expressions of inflation expectations in equation 2.7, we get two different zone delimitations:

- In the case of a flexible ER regime expectation, $\pi^e = \frac{k}{\chi}$. The equation 2.7 becomes:

$$c = \frac{1}{1+\chi}\left(\left(1 + \frac{1}{\chi}\right)k - z_t\right)^2$$

- In the case of a maintained fixed ER expectation, $\pi^e = 0$. Thus, we get:

$$c = \frac{1}{1+\chi}\left(k - z_t\right)^2$$

From the expression 2.7, it follows that for all random shock $z_t$, given the structural parameters $k$, $\chi$ and $c$, the solution of the model allow for multiple equilibria to exist, depending on the expectations of the private sector. Indeed, there is a zone of a unique equilibrium where the cost, $c$, is sufficiently large to imply that the fixed ER regime will always prevail. Conversely, the cost of reneging could be so small that the flexible ER will be chosen. Between the two zones, we have a zone of multiple equilibria in which $\pi^e = \frac{k}{\chi}$ implies $L^{FIX} > L^{FLEX}$, leading to a switch to a floating ER regime, while $\pi^e = 0$ implies $L^{FIX} < L^{FLEX}$, inducing the maintenance of the parity.

We, then, obtain the following shape of the three different zones:

Note: $\mathrm{A} = \frac{1}{1+\chi}(k-z_t)^2 \quad \mathrm{B} = \frac{1}{1+\chi}\left(\left(1+\frac{1}{\chi}\right)k-z_t\right)^2$

The multiple equilibria of the second case, also highlighted by Obstfeld (1997) and Rasmussen (2002), characterize the anti-inflationary policies whose credibility is questionable[6].

But the CFA zone that has a lasting existence seems to be a credible monetary arrangement in the sense that neither the collapse predicted by models nor massive exit episode have occurred. Below, we will discuss to which extent an *operations account* mechanism extends the stability of the fixed ER regime by shifting the multiple equilibria zone to a unique equilibrium one.

A consequence of the operation account is to convince economic agents that the parity will be supported by the French Treasury, leading then to the absence of inflationary pressure. Contrary to a normal (non-CFA) case in which the inflationary expectations are either $\pi^e = \frac{k}{\chi}$ when private agents expect the flexible ER regime, or $\pi^e = 0$ when the fixed ER is expected, we assume that the CFA case is characterized by zero value expectations. Thus, in the CFA zone framework, the indeterminacy zone becomes a fixed ER zone, extending the range of reneging cost values that allow to maintain the ER parity.

As documented above, the CFA zone has recorded fixed ERs during a very long time despite many periods during which the inflation in African countries was clearly more important than in the anchor country. We argued that the key feature of this stability is the virtual convertibility of African currencies due to the operations account.

**Proposition 1** The *operations account*, by inducing a virtual convertibility of the CFA franc, removes the uncertainty related to fixed exchange rate regimes. It extends the range of the reneging cost values that allow the maintaining of the ER parity.

In fact, this result is an implication of having the ability to have an inflation level above the one required by the PPP ($\pi > 0$), without any ER realignment. The policy-

[6]They argue that the multiplicity of equilibria bears a factor of instability that could lead to speculative attacks. See also Obstfeld and Rogoff (1996) and references therein.

maker will be able to pursue inflationary policies while he avoids any related cost and enjoys a stable fixed ER setup. Indeed, figures 2.1 and 2.2 show many periods during which inflation level in Africa is higher than in France.

### 2.3.2 Existence of Structural Asymmetries and Constraints of Fixed Exchange Rate in the Absence of an Operations Account Mechanism

After relaxing the assumption of an operation account existence, the framework used above can be extended to highlight the implications of asymmetries on the constraint of pegging a currency. On the one hand, we assume that the anchor country policymaker is more inflation averse than the one who pegs its currency. On the other hand, we take into account that the general economic environment in the anchor country is better than in the other. Moreover, we assume the same framework for the anchor and the pegging country while we allow for the PPP to hold again. The PPP is, then, represented by $\hat{e} = \pi - \pi^*$. The major difference with the basic model is that now the inflation abroad is no more exogenously fixed to zero value. This zero value inflation is just a specific case of a more general framework in which the anchor country policymaker optimally determines its inflation level like the pegging country policymaker.[7]

#### Asymmetric Aversion to Inflation

The argument developed here is an open economy version of the *conservative central banker* issue initiated by Rogoff (1985) and presented in a very simply way by Obstfeld and Rogoff (1996). We consider now that the monetary policymaker is more inflation averse in the anchor country than in the pegging country, i.e. $\chi < \chi^*$. The two loss functions are:

$$L^* = (y_t^* - \tilde{y}^*)^2 + \chi^* (\pi_t^*)^2 \tag{2.8}$$

$$L = (y_t - \tilde{y})^2 + \chi (\pi_t)^2 + C(\hat{e}) \tag{2.9}$$

There is no cost $C(\hat{e})$ in the anchor country loss function as the level of inflation can be chosen optimally without any constraint. The pegging policymaker announces an ER he engages himself to keep fixed in order to avoid a cost of reneging defined like

[7] The framework turns out to be a partial equilibrium two country model that focuses on the functioning of a fixed ER regime based on the PPP.

in equation 2.3. The loss minimization process leads to equation 2.4 and its anchor country equivalent. Solving for the expected inflation and dropping the time subscript, we get:

$$E(\pi^*) = \pi^{e^*} = \frac{k^*}{\chi^*} \tag{2.10}$$

$$E(\pi) = \pi^e = \frac{k}{\chi} \tag{2.11}$$

Putting back equation 2.11 in the equation 2.4 and doing the same for the anchor country we obtain the following optimal inflation expressions:

$$\pi^* = \frac{k^*}{\chi^*} + \frac{z_t}{1+\chi^*} \tag{2.12}$$

$$\pi = \frac{k}{\chi} + \frac{z_t}{1+\chi} \tag{2.13}$$

As $k$ — or $k^*$ — induces greater inflation level, it can be seen as the feature of good (large $k$) and bad (weak $k$) fundamentals (see Obstfeld, 1996; Obstfeld and Rogoff, 1996). However, it can also represent the ability to stabilize the employment in the sense that a greater $k$ means the ability to obtain a higher output level $y_t$ without an additional loss by equation 2.9 and expression $k = \tilde{y} - \bar{y}$. In fact, its level is simply the indication of the constraint of policy soundness related to monetary policy objectives. With the assumption of a symmetric supply shock $z$, the implications of a fixed ER can easily be analyzed if we assume that the PPP prevails. We have:

$$\hat{e} = k\left(\frac{1}{\chi}\right) - k^*\left(\frac{1}{\chi^*}\right) - z\left(\frac{1}{1+\chi} - \frac{1}{1+\chi^*}\right) \tag{2.14}$$

Suppose that the two countries have the same ability to stabilize the employment, i.e. $k = k^*$. In this case, the equation 2.14 becomes $\hat{e} = k\left(\frac{1}{\chi} - \frac{1}{\chi^*}\right) - z\left(\frac{1}{1+\chi} - \frac{1}{1+\chi^*}\right)$

**Proposition 2.** Asymmetric aversion to inflation implies different abilities to stabilize employment, the smaller being that of the pegging country. Thus, if a structural change makes the anchor country policymaker have a greater aversion to inflation than the pegging country one ($\chi < \chi^*$), the level of constraints to maintain a fixed ER will rise.

**Proof.** If $\chi = \chi^*$ — the case of a symmetric aversion to inflation — we will get $\hat{e} = 0$ with $k^* = k$. We recall that $k > Z$. Therefore, since $k$ and $k^*$ can be interpreted as the abilities to stabilize employment, maintaining the parity unchanged is

possible with the same stabilization power. However, if we introduce asymmetry and consider that $\chi < \chi^*$, $k^*$ will be greater than $k$ to get $\hat{e} = 0$.

There are two facts interpreted as justifying a move from $\chi = \chi^*$ to $\chi < \chi^*$: the disinflation process in the EMU and the "very low inflation" objective of the ECB. In fact, the weaker ability to stabilize implied by this asymmetric aversion to inflation for African country policymakers is an increase of the constraints of macroeconomic performance required by a peg of a currency on the euro.

**Asymmetric General Economic Environment**

Now we consider the fact that the general economic environment is more favorable to negative supply shocks in the pegging country than in the anchor country. For a clear presentation of the argument, let us keep $\chi$ different from $\chi^*$ without excluding the possibility of an equality between the two parameters. It is also assumed that the two policymakers have a similar power of employment stabilization such that $k = k^*$. We will show below that if the asymmetry prevails, a fixity of the ER is impossible unless we relax the assumption of stabilization power similarity. We assume on the one hand that there are two different random productivity shocks $z_{t-i}$ and $z^*_{t-i}$ with $i = 0, 1, 2, ...n$ and, on the other hand, that $z_{t-i} = z^*_{t-i}$ for $i = 0$. Thus we have $z_t = z^*_t$ as above. In the anchor country, the productivity shock $z^*_t$ has a zero mean and a constant variance, while in the pegging country the probability of occurrence of a negative shock $-Z$ is greater than the probability related to a positive shock $Z$. Then, the interesting implication for our analysis is the fact that the mean can be defined as: $E(z_t) = -\omega$. The mean is smaller than zero. Indeed, the shocks are assumed to be similar in the two countries in period $t$ even if they are differently generated, that is, their means and variances are different.

The loss minimization process in the two countries leads to following expressions that we recall for an easy understanding:

$$\pi^* = \frac{k^* + \pi^{e^*} - z}{1 + \chi^*}$$

$$\pi = \frac{k + \pi^e - z}{1 + \chi}$$

Solving these for the expectations of inflation, we get:

$$E(\pi^*) = \pi^{e^*} = \frac{k^*}{\chi^*} \tag{2.15}$$

$$E(\pi) = \pi^e = \frac{k+\omega}{\chi} \tag{2.16}$$

At this stage, we can notice the additional term in equation 2.16, $\omega > 0$. It represents the impact of a less sound global economic environment in the pegging country. A higher level of expectations is a consequence of adverse events on the credibility of a currency peg. The implication of this on the constraints of an fixed ER regime can be drawn from the expressions of optimal inflation level:

$$\pi^* = \frac{k}{\chi^*} + \frac{z_t}{1+\chi^*} \tag{2.17}$$

$$\pi = \frac{k}{\chi} + \frac{\omega}{\chi+\chi^2} + \frac{z_t}{1+\chi} \tag{2.18}$$

We can derive an expression of ER:

$$\hat{e} = k\left(\frac{1}{\chi} - \frac{1}{\chi^*}\right) + \frac{\omega}{\chi+\chi^2} - z\left(\frac{1}{1+\chi} - \frac{1}{1+\chi^*}\right) \tag{2.19}$$

**Proposition 3.** When a pegging country faces a worser general economic environment than the anchor country, a fixed ER regime will be an unworkable setup even if the actual economic shock is symmetric, unless the pegging policymaker looses its ability to stabilize employment to some extent, i.e., $k$ becoming lesser than $k^*$.

**Proof.** By expression 2.19, a similar aversion to inflation ($\chi = \chi^*$) is no more a sufficient condition to get a parity unchanged, i.e ($\hat{e} = 0$), as in the subsection 2.3.2. Indeed, if $\chi = \chi^*$ the ER will depreciate ($\hat{e} = \frac{\omega}{\chi+\chi^2} > 0$). The only way to get a fixed ER regime is to consider that $k < k^*$.

This result seems to be usual in the sense that any attempt of fixing the currency, in order to obtain credibility, implies the loss of the monetary policy instrument. However, we highlight an innovative feature of the Fixed ER model. Actually, we clearly show that in addition to this loss of discretion in the monetary policy setup, structural factors and non economic events, that are unmanageable by the pegging country policymaker, can make the ER regime more difficult to undertake or to pursue. Since the EMU advent is likely to imply more economic and political stability — while African countries are

likely to face increasing negative globalization's externalities, still frequent political instability and various economic shocks —, we think that pursuing a peg to the euro for CFA zone countries and setting up a fixed ER regime could have more constraints than before if the PPP prevails.

### 2.3.3 Intermediary Target of Monetary Policy: The Extent of Devaluation

Unlike Rasmussen (2002), Obstfeld (1996) and Obstfeld and Rogoff (1996), we consider here a linear cost of reneging that is a function of the extent of devaluation. It is known that a devaluation implies inflationary pressures as it could entail an increase of the imported goods prices, affecting the general level of prices. The loss of private agent purchasing power induced by the devaluation can undermine the credibility of the monetary policymaker, leading to a rejection of the domestic currency. The large the scale of devaluation, the higher is the level of the induced inflation and possibly the deeper is the loss of credibility. The scale of the devaluation becomes then a matter of concern.

In addition, a devaluation could be a sign of the weakness of external reserves that policymakers are unwilling to reveal. In fact, a large devaluation scale is likely to be interpreted as a sign of a very weak level of external reserves. Then, the scale of devaluation is likely to have an impact on the financial market agent's perception about the external reserves management.

Moreover, when international contracts — short term obligations — are expressed in a foreign currency (say, the euro), a large devaluation could be highly damaging for the domestic financial system as bankruptcies increase and banks' loan portfolios deteriorate. Calvo (2000) states that "...this is the kind of consideration that prompts the central bankers to avert major swings in the exchange rate.". Also in this case, the scale of devaluation becomes a matter of concern.

Let the cost of reneging in the pegging country become a linear function of a devaluation extent, $C(\hat{e}) = \beta(\hat{e})$, while the anchor country one is again like in equation 2.9. $\beta$ is a coefficient that expresses the weight of the extent of devaluation in the loss function. The larger the devaluation, the higher will be the cost of reneging. Here the loss function of the pegging country is:

$$L = (y_t - \tilde{y})^2 + \chi (\pi_t)^2 + \beta(\hat{e}) \tag{2.20}$$

where $\hat{e} = \pi - \pi^*$, as the PPP works. We consider the two kind of asymmetries like in

Subsection 2.3.2, i.e., an asymmetric aversion to inflation ($\chi < \chi^*$) and the occurrence of negative shocks ($E(z) = -\omega$ in the pegging country). Through the process of minimization and after dropping the time subscript, we get the following expressions for the expected and the optimal levels of inflation in the pegging country:

$$E(\pi) = \pi^e = \frac{k+\omega}{\chi} - \frac{\beta}{2\chi} \tag{2.21}$$

$$\pi = \frac{k}{\chi} + \frac{z}{1+\chi} + \frac{\omega}{\chi+\chi^2} - \frac{\beta}{2}\left(\frac{1}{\chi+\chi^2}+1\right) \tag{2.22}$$

Now we can see the implication of a linear cost of reneging on the FER regime constraints and its impact on the consequences of structural asymmetries. We notice that $\beta$ enters in the equation 2.22 with a negative sign. If it increases, it will lead to a decrease of the inflation level of the pegging country. Then for a given level of inflation abroad ($\pi^*$), the greater the parameter $\beta$, the less is the extent of devaluation. This result is partly due to the fact that private agents expectations of inflation are reduced because of an additional incentive to fight inflation related to the level of devaluation. This can be observed by comparing the equation 2.11 with the equation 2.21.

**Proposition 4** A reform inducing the extent of devaluation as an intermediary monetary policy target alleviates the additional constraints of structural asymmetries because it induces greater ability to stabilize employment.

**Proof** To see this, let us combine $\hat{e} = 0$ with equations 2.13 and 2.22 to get, after rearranging , the following expression:

$$\frac{k^*}{\chi^*} - \frac{k}{\chi} = z\left(\frac{1}{1+\chi} - \frac{1}{1+\chi^*}\right) + \frac{\omega}{\chi(1+\chi)} - \frac{\beta}{2}\left(\frac{1}{\chi(1+\chi)}+1\right) \tag{2.23}$$

For an easy presentation consider first that $\beta$ equals to zero. If $\chi < \chi$ or $\omega > 0$, $k$ is obviously smaller than $k^*$. As $\beta$ enters the equation with a minus sign, the cost of reneging bears on the difference between $k$ and $k^*$ in an opposite way compared to the two kinds of asymmetries considered in our framework. Hence, the greater the $\beta$, the dampened the consequences of the asymmetries. In fact, while an asymmetric aversion to inflation ($\chi < \chi^*$) and a worse economic environment in developing countries ($\omega > 0$) make the pegging country loose more ability to stabilize employment ($k < k^*$), the additional incentives of the policymaker to avoid devaluation works in the opposite sense. Indeed, the greater the $\beta$, the

lower is the difference between $k$ and $k^*$.

Hence, introducing the extent of the ER variation as an explicit intermediary monetary policy's target is likely to increase the credibility and to also ease the burden of pegging a currency despite the presence of asymmetries. At the same time, when considering the third term of the second member of equation 2.23, it could be noticed that the impact of $\beta$ is dampened if $\chi$ is high. Then, any reform that could work as an introduction of a linear cost of reneging will have little impact if the country or the monetary union has a strong aversion to inflation yet.

## 2.4 The Future of the Franc Zone and Alternative Monetary Arrangements in Africa

In this section, we continue the current debate on the future of the franc zone taking into account the insights of our framework. The first issue tackled is whether the current framework of the franc zone could be safely maintained. On the institutional level, the French government has obtained from the other members of the EMU that the French Treasury continues to provide external reserves through the *operations account* mechanism. The zone agreements hold at the members own discretion except for the case of a new entrance or a fundamental change of the agreement. The induced virtual convertibility of the CFA franc and the Comorian franc worked in favor of a very long period of stability, avoiding the predictable collapse of the regime. In fact, the 1994 devaluation could be seen as an indication of the franc zone evolution. We can consider that this system has migrated to a more classical one in which currency devaluation becomes possible. Then, even if the *status quo* could be maintained, it is important to keep in mind that two facts make it risky:

On the one hand, the greater post-1994 likelihood to devaluate the CFA franc and the Comorian franc implies a higher probability of instability episodes occurrence[8] for the zone as a consequence of the multiplicity of equilibria we underlined above. Indeed, the aftermath of the latter devaluation episode is featured by very good subsequent macroeconomic performances till 1999, even after 1999 in some CFA countries of Central Africa. The devaluation now appears to be a more serious alternative of the monetary policy. This implies that, contrary to the situation before 1994, African policymakers have to engage themselves in sounder policies as they no longer have the possibility of

[8]The relation between the multiplicity of equilibria and the instability of a FER is clearly stressed in the related literature. See for example Rasmussen (2002), Obstfeld and Rogoff (1996) and the references therein.

recording an inflation level above the anchor economy one without a fear of devaluation. On the other hand, the asymmetries invoked in our model are likely to make the anchorage to the euro more difficult to pursue. The anti-inflationary biased policy objectives of the ECB and the greater political and economic instability in African countries are the main reason of the expected asymmetries.

In regards to alternatives aside the status quo there is the ECOWAS project, whose the building process is running. Masson and Patillo (2001a) argue that, if the project continues to go forward, a key element will be the setup of rules, institutions and mutual surveillance that have to lead to effective restraints for fiscal policies. They suggest (Masson and Patillo, 2001b) that, with appropriate reforms, the ECOWAS members are likely to achieve ER stability through an *informal* monetary union like the earlier EMS in Europe. However, non-WAEMU members of the ECOWAS are determined to achieve a formal monetary union with a precise agenda. The relevant issue that stems from this position is whether to peg or not a common currency to the euro ? The anchorage of the future common currency to the euro, if decided, will make the system work like a classical monetary zone — probably without the operations account mechanism[9]. As we argued above, structural asymmetries are likely to make the framework more restrictive for macroeconomic policies than before the nineties. Thus, if we consider the poor inflation records in non-WAEMU countries of the ECOWAS and the frequent excess of inflation level in the WAEMU compared to that of the anchor country, it seems to us that reforms and rules without an anchor could be better. The same conclusion will hold for the CAEMC if the members decide to form an autonomous monetary union, out of the CFA zone.

Although, if the ECOWAS members choose a formal monetary union with a single currency pegged to the euro — as well as if country pegs its currency to the euro — , the independence of the central bank and the introduction of intermediate objectives of monetary policies — especially the extent of the devaluation — will appear to be interesting features to implement as suggested by our framework. Following, for example, the *optimal contracts* argument of Walsh (1995), we suggest that, if currency anchorage to the euro prevails, political authorities should ensure the central bank independence and should give to the central banker more incentives in order to obtain better inflation performance along with less employment stabilization restraint, despite the existing structural asymmetries. There could be a clause included in the central bank governor's employment contract that makes the appointment related to the extent

[9]It seems to us that French Treasury could be reluctant to offer such a virtual convertibility to the whole ECOWAS including a large country like Nigeria.

of devaluation. This is an intuitive counterpart of the linear cost of reneging in our two country monetary framework.

Another issue to deal with is the heterogeneity of countries in the ECOWAS. Whatever the form of monetary cooperation will prevail, one of the most important points is the setup of substantial structural reforms in order to achieve central bank independence, better mutual surveillance or fiscal restraints. But in the case of a formal monetary union, the type and the extent of institutional or structural changes could be irrelevant for some country members. Indeed, we noticed in figures 2.2 and 2.3 that the inflation record is not the same in WAEMU countries compared to the non-WAEMU ones. This could be the result of franc zone memberships or simply — perhaps because of the former reason — a structural difference in those countries' aversion to inflation.

An asymmetric economic shock also raises the heterogeneity issue. Actually, as a possible devaluation of the CFA franc is invoked in order to deal with the current economic crisis in the WAEMU (Konate, 2001), an improvement of the economic growth and some macroeconomic performance indicators is observed in the CAEMC member's economy. The uniqueness of the CFA franc exchange rate becomes, then, questionable not only for different monetary unions in a zone, but also for various countries in the same monetary unions. Looking for some flexibility in the reforms to undertake is therefore an interesting caution.

Consequently, introducing the extent of ER change in the intermediary targets list of the monetary policy — for example, through an *optimal contracts* mechanism — will not necessarily have a great impact. One should carefully evaluate the true willingness to fight inflation before the introduction of a such reform. Suppose that we interpret $\chi$ of our model as an average aversion of inflation in a monetary zone. Countries that were initially more inflation averse have less interest to undertake such reforms. Actually, if the expected ECOWAS monetary union is accomplished, the setup of rules must take into account the possible difference in structural patterns of inflation performance. The convergence criteria established by non-CFA (non-WAEMU) countries as a step in the monetary union implementation is an indication that African policymakers are aware of this heterogeneity issue.

## 2.5 Conclusion

We have used a standard simple model of credibility in monetary policy to investigate some possible implications of the euro advent and the process that led to this advent for the African countries. The main issue was two fold: to which extent maintaining

a peg to the euro as it replaced the French franc for the CFA zone and setting up a new fixed exchange rate regime for ECOWAS members are feasible in the presence of asymmetries? We highlighted some evidence on the possible existence of structural asymmetries in the macroeconomic performances and the general economic environment that characterize the EMU and African countries. Then, the analysis leads to the following insights: first, the virtual convertibility of African currencies induced by the operations account mechanism explains why a predictable collapse of the FER arrangement failed to be accomplished, allowing the CFA zone to exist till now. Secondly, we have shown that, without the rigid application of the operations account mechanism, the constraint of pegging to the euro could have been increased with the disinflation process that preceded its advent. Moreover, we underlined the heavy constraint due to a bad political and economic environment that is now linked to the use of the euro as an anchor. To be aware of this will help to set up appropriate economic and political reforms necessary to the choice of the euro as a monetary anchor. Finally, we found that among reforms to set up, it could be more interesting to increase the central bank independence. Furthermore, giving an additional incentive to fight inflation through an intermediary target of monetary policy like the extent of devaluation could also be a good decision. This could be achieved through optimal central banker contracts.