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Fiscal discipline and the choice of exchange rate regime

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Abstract

The conventional wisdom claims that fixed exchange rates provide more fiscal discipline than do flexible rates, but the recent experience in Europe, the record of Sub-Saharan countries in the 1980s and the history of stabilization attempts in Latin America cast empirical doubts on this wisdom. We present a standard intertemporal model with perfect capital mobility and price flexibility in which fiscal policy is endogenously determined by a maximizing fiscal authority. The model shows that the difference between regimes lies in the intertemporal distribution of the costs of fiscal laxity. Fixed rates push these costs into the future, while flexible rates allow the effects of unsound fiscal policies to manifest themselves immediately through movements in the exchange rate. Which system provides more discipline depends on the authorities' discount rate.

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1. Introduction

The conventional wisdom claims that fixed rates provide more discipline than do flexible exchange rates – be it discipline against loose monetary policies, high

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fiscal spending, or excessive wage demands. [1] This claim stresses that under fixed rates the adoption of lax fiscal policies or the pursuit of high wages by unions must eventually lead to balance of payments difficulties and thus to an abandonment of the peg. [2] Presumably, the eventual collapse of the fixed exchange rate would imply a big cost – loss of face for the policymaker and an unavoidable cut in real wages for union leaders. In other words, undisciplined behavior today would lead to a punishment tomorrow. If this deterrent is strong enough, the argument goes, unsustainable policies do not occur in equilibrium.

There are theoretical and empirical problems with this kind of argument. Theoretically, it is unclear where the costs of devaluation under fixed exchange rates come from, and why it is presumably less costly to have an equivalent depreciation under floating rates. After witnessing the recent problems in the EMS and the popularity of reflationary measures adopted by devaluing countries, it is reasonable to be skeptical about the magnitude of the alleged political costs of abandoning a peg.

Empirically, it is far from clear the evidence supports the conventional view. The mixed European experience of fiscal convergence and real wage claims under the EMS is one possible source of skepticism. [3] Two other sets of experiences also cast doubts on the disciplining power of fixed rates, particularly when applied to fiscal policy. Particularly striking is the recent experience of Sub-Saharan African countries. Countries in the French Franc zone maintained fixed rates from 1948 until 1994, while the other countries had variable exchange rates. In the late seventies Sub-Saharan Africa experienced a sharp decline in terms of trade, and the response of government spending was starkly different across both sets of countries. Between 1980 and 1984, countries with variable exchange rates on average reduced government spending by 5 percentage points of GDP, while this ratio remained constant in French Franc zone countries!

The conventional wisdom is not supported either by the history of Latin American stabilization programs in the last quarter-century: many exchange rate-based stabilizations have been notoriously unsuccessful in reducing the fiscal deficit. In a representative sample we consider below, only one of the countries that entered an exchange rate-based stabilization without a previous fiscal consolidation managed to achieve it in the course of the program. Conversely, several of the countries that entered a money-based stabilization without a previous fiscal adjustment managed to get the deficit under control in the course of the program.

[1] See Aghevli et al. (1991), Frenkel et al. (1991), and Giavazzi and Pagano (1988) for statements of this view.

[2] In the case of fiscal policies, money financing of a deficit eventually must lead to a balance of payments crisis. In the case of wages, if the real wage is set above the level that ensures long-run current account balance, then the resulting deficit will also eventually cause balance of payments problems.

[3] See, for instance, Buiter et al. (1993) and Svensson (1993).

In two recent papers (Tornell and Velasco 1994a,b) we concentrate on the issue of fiscal discipline, and show that the conventional wisdom that fixed rates provide more discipline need not hold in a standard intertemporal optimizing model in which fiscal policy is endogenously determined by a maximizing fiscal authority. On the contrary, we show that under flexible rates there are mechanisms which can provide more fiscal discipline. Our argument is based on the observation that under flexible rates imprudent behavior has costs as well. The difference with fixed rates is in the intertemporal distribution of these costs. Under fixed rates unsound policies manifest themselves in falling reserves or exploding debts. Only when the situation becomes unsustainable do the costs begin to bite. Flexible rates, by contrast, allow the effects of unsound policies to manifest themselves immediately through movements in the exchange rate. The basic message of those papers is that fixed rates induce more fiscal discipline than flexible rates only when fiscal authorities are sufficiently patient, so that future costs have enough deterrent power. If fiscal authorities are impatient, on the other hand, flexible rates – by forcing the costs to be paid up-front – provide more fiscal discipline. [4]

Rather than summarizing the results in those two papers, here we simply present an extremely simple model that illustrates some of the main points of the analysis. The paper is structured as follows. Section 2 introduces the model, solves for the equilibrium fiscal policy and compares the outcomes under fixed and flexible rates. Section 3 offers some suggestive empirical evidence, and section 4 concludes.

2. A simple model

We consider a standard model of a small open economy with price flexibility and perfect capital mobility. The economy is populated by a private sector and a government. We begin with a description of the private sector.

The representative private agent produces inelastically an amount y of a tradable good, which serves as numeraire. She can store her wealth in an internationally traded bond, whose real value is denoted by f_t, and in domestic money, whose nominal outstanding stock is denoted by M_t. We will adopt the convention that asset stocks are chosen at the end of each period. Hence, M_t is the stock nominal balances chosen at the end of period t and carried over to period

[4] Tornell and Velasco (1994a) presents an infinite-horizon, continuous-time model and focuses, among other things, on the responsiveness of fiscal policy to exogenous shocks under alternative exchange rate regimes. That paper also contains a more detailed analysis of the recent experience of sub-Saharan Africa. Tornell and Velasco (1994b) presents a discrete-time (two-period) model and focuses on the response of fiscal policy to the introduction of exchange rate-based and money-based stabilization policies. The empirical evidence in that paper is drawn from stabilization experiments in Latin America.

$t+1$. Assuming purchasing power parity and letting the foreign price level be constant and equal to one we have that the nominal exchange rate is equal to the domestic price level: $E_t = P_t$. Real money balances are defined as $m_t \equiv M_t/E_t$.

The world lasts two periods: 1 and 2, and the timing of transactions is as follows. [5] The agent enters period 1 with a stock of real bonds f_0 and a stock of nominal money M_0. During period 1 she receives production income y, interest payments rf_0 and a lump-sum transfer g from the government. She then pays taxes τy, ($\tau \in (0, 1)$), consumes an amount c_1, and chooses the holdings of real money m_1 and of the bond f_1 that she would like to carry over into period 2. During period 2 the agent uses all her accumulated wealth (including the real value of outstanding money balances) again to pay taxes τy and to consume an amount c_2. During this period she does not receive any government transfers.

Defining r as the exogenous world real rate of interest, $\pi_t \equiv E_t - E_{t-1}/E_t$ as the rate of inflation and nominal devaluation, and $i_t \equiv r + \pi_t$ as the domestic nominal interest rate, the intertemporal budget constraint of the individual is

$$(1+r)(f_0+m_0) + y(1-\tau) + \frac{y(1-\tau)}{1r} + g = c_1 + i_1 m_0 + \frac{c_2 + i_2 m_1}{1+r} \tag{1}$$

which has the usual interpretation that the present value of expenditures must be equal to the present value of income. The representative agent's objective function is

$$V^{IA} = v(c_1) + \left(\frac{\epsilon}{\epsilon-1}\right) m_0^{(\epsilon-1)/\epsilon} + \frac{v(c_2) + [\epsilon/(\epsilon-1)]\, m_1^{(\epsilon-1)/\epsilon}}{1+r}, \quad \epsilon \in (0, 1), \tag{2}$$

where $v(c_t)$ has the usual properties. Notice that the individual's discount rate is the same as the rate of interest. We have also assumed $\epsilon \in (0, 1)$ to ensure that total monetary revenue is increasing in i_t, so that the economy is always on the sensible side of the relevant Laffer curve.

We now turn to a description of the government, which consists of a Fiscal Authority (FA) and a Central Bank (CB). The government enters period 1 with a stock of net external debt b_0 and with nominal monetary liabilities M_0. During period 1, it transfers an amount g to the private agent and pays interest rb_0 on its net debt. It finances these expenditures with tax revenue τy and monetary revenue $M_1 - M_0/E_1 = (m_1 - m_0) - \pi_1 m_0$, which includes both seigniorage and the inflation tax. Any resulting deficit is covered by issuing more net debt. At time 2 the government must repay its outstanding debt (both real and monetary); its only

[5] We will refer to the time before the world starts as period 0. Policy announcements will be made at this time.

sources of income are tax revenue τy and the inflation tax. Since taxes are fixed, the exchange rate must adjust to insure that the inflation tax is sufficient to balance government accounts. It follows that the government intertemporal budget constraint is

$$(1+r)(b_0+m_0)+g=\tau y+i_1 m_0+\frac{\tau y+i_2 m_1}{1+r} \tag{3}$$

The FA has control over period 1's government transfers g, which it sets in order to maximize the following objective function:

$$V^{FA}=\alpha u(g)+(1-\alpha)\left[v(c_1)+\left(\frac{\epsilon}{\epsilon-1}\right)m_0^{(\epsilon-1)/\epsilon}\right.$$
$$\left.+\beta\left\{v(c_1)+\left(\frac{\epsilon}{\epsilon-1}\right)m_1^{(\epsilon-1)/\epsilon}\right\}\right] \tag{4}$$

where $u(g)$ has the usual properties, β is the FA's subjective discount factor, $\beta\in(0,1)$, and $\alpha\in(0,1)$. The key feature of this function is that government transfers g yield utility – political power, prestige, greater chances of reelection, etc. – to those who control fiscal policy, and this element carries weight α in the FA's overall objective function. This is the 'political' distortion that leads the FA to set g at a positive level in equilibrium. At the same time, the FA also internalizes the objectives of the representative individual, but discounts the future at a rate that need not coincide with the individual's. [6]

The FA and the CB make decisions independently of one another. Since we want to concentrate on fiscal discipline as opposed to monetary discipline, we restrict the CB to follow rules which are not the outcome of any optimization problem. Under predetermined rates (PERS) the CB sets time 1's nominal devaluation rate π_1 equal to some constant. Under flexible exchange rates (FERS) it sets period 1's growth rate of nominal money $\mu_1\equiv M_1-M_0/M_1$ equal to some constant. In both cases, and as in Sargent and Wallace (1981) and Drazen (1984), inflation in period 2 must adjust to ensure the government's budget constraint is met. [7] This is a key assumption: it is tantamount to assuming that the CB can only precommit its monetary or exchange rate policy for a limited amount of time (in this case, one period). Alternatively, in Calvo's (1986a) terminology, the CB's announcements suffer from 'lack of credibility'.

[6] Assuming this political distortion is just a shortcut. It could derived from first principles in many ways. One is to consider a situation with heterogeneous agents and divided government, as in Aizenmann (1992) and Velasco (1993a,b).

[7] It makes no difference whether in the second period the system operates under floating or fixing. For simplicity, we assume that the exchange rate regime is not altered in the second period. Under PERS, this means that the rate of devaluation is simply adjusted to ensure enough revenue is provided by the inflation tax. Under FERS the same thing happens, except that the necessary devaluation is market-driven.

The timing of actions is as follows. At the end of period 0, the CB announces its monetary policy (μ_1 or π_1). After this the FA announces g, the level of fiscal transfers that will take place at time 1. Given these announcements, the private agent chooses m_0, her desired time 1 real balances. Lastly, the CB transfers to the private agent the gains (or losses) s_0 it made as a result of movements in the exchange rate during period 0. [8] During period 1 the private agent selects c_1 and m_1, her desired real balances for time 2. The FA does not make any decision. [9] Once time 2 arrives, the government repays its outstanding debt, the CB redeems the real value of outstanding money balances, and the private agent consumes all her remaining wealth.

Acting atomistically, the representative agent takes as given the announcement of g, and she chooses c_1, c_2, m_0 and m_1 in order to maximize (2), subject to (1). It is straightforward to show that the solution to this problem implies that consumption is equal to national income each period and that therefore the current account is balanced. Furthermore, with a simple normalization the resulting money demand function is

$$m^*_{t-1} = i_t^{-\epsilon}, \quad t = 1, 2. \tag{5}$$

We now turn to the problem faced by the FA. The key question is: in which case will the fiscal authority set g at a lower level – under predetermined exchange rates or under flexible exchange rates? In setting g the FA must trade off benefits against costs. The benefits of increasing g derive from the increased utility of transfers, and the costs derive from the fact that higher g has to be financed with a higher inflation tax, which reduces equilibrium real balances in at least one, and maybe both, periods. To determine which regime provides more discipline we need to find the effects of changes in g on inflation rates, and thus on m_0 and m_1. The difference between both regimes is in the intertemporal allocation of this increase in the inflation tax. Under PERS π_1 is predetermined by the CB. Thus m_0 remains unchanged, and any change in g just affects m_1. Under FERS, on the other hand, only μ_1 is fixed by the CB, while inflation rates – and thus m_0 and m_1 – are endogenous and dependent on the choice of g.

Focus now on the case of PERS. Once the CB announces π_1 and the FA announces g at the end of period 0, private agents rearrange their portfolios by buying or selling domestic money from the CB. Let $M_{0^-}/E_{0^-} \equiv m_{0^-}$ and b_{0^-} be the levels of real balances and net foreign assets outstanding before the policy announcements are made. The nominal exchange rate E_{0^-} is given by history and cannot jump under PERS. Portfolio rebalancing is accomplished through the following asset swap: $(M_0 - M_{0^-}/E_{0^-}) \equiv m_0 - m_{0^-} = -(b_0 - b_{0^-})$. No capital

[8] See below for an explanation of this transaction.

[9] We have required that government decisions be taken prior to the private agent's decisions in order to avoid time inconsistency problems. We are also assuming away price bubbles and other kinds of monetary indeterminacy under flexible rates.

losses or gains can occur in that case. Substituting this into budget constraint (3) and using (5) to eliminate the i_t's, we have

$$(1+r)(b_{0^-}+m_{0^-})+g=\tau y+m_0^{(\epsilon-1)/\epsilon}+\frac{\tau y+m_1^{(\epsilon-1)/\epsilon}}{1+r} \tag{6}$$

so that the first term on the L.H.S. of (6) is given by history.

Formally, under PERS the FA's problem is to maximize (4) subject to (6) and the exchange rule chosen by the CB. The solution to this problem is

$$u'(g_p^*)=\left(\frac{1-\alpha}{\alpha}\right)\left(\frac{\epsilon}{1-\epsilon}\right)\beta(1+r). \tag{7}$$

Focus now on the case of FERS. At the end of period 0 the CB announces μ_1 and the FA announces g. Once again, and based on their expectations of π_1 that correspond to those announcements, agents attempt to rearrange their portfolios. The situation is slightly more complex than under PERS, for the CB now does not intervene in the foreign exchange market, so that the market can only clear as a result of an exchange rate movement at time zero. Let m_0^* be the stock of real balances agents want to hold given the announcements. It must be the case that $m_0^*=(1-\pi_0)m_{0^-}$, with $\pi_0 \equiv E_0-E_{0^-}/E_0$. Hence, in this case private agents experience a capital loss (gain) of magnitude $\pi_0 m_{0^-}$ that has a counterpart in an equal gain (loss) for the government. Such an effect on the government budget constraint was absent in the PERS case. In order to carry out a consistent comparison of exchange rate regimes we offset this additional revenue-raising capacity of the government under FERS by assuming that at the end of period 0 the government gives a rebate to agents equal to $s_0=\pi_0 m_{0^-}$. Hence, under FERS the FA faces (6), the same intertemporal budget constraint as under PERS.

Since π_1 is now an endogenous variable, we need an extra equation to determine the system. From the definition of real balances we get

$$m_1(1-\mu_1)\equiv m_0(1-\pi_1). \tag{8}$$

Under FERS the FA's problem is to choose g in order to maximize (4) subject to (5), (6), (8) and the CB's chosen μ_1. The solution to this problem is

$$u'(g_f^*)=\left(\frac{1-\alpha}{\alpha}\right)\beta(1+r)\left(\frac{\epsilon}{1-\epsilon}\right)\left[\frac{1+x}{1+x\beta(1+r)}\right],$$

$$x\equiv\left(\frac{1}{\beta}\right)\left(\frac{i_1}{i_2}\right)\left[\frac{(1-\mu_1)}{(1+r)+[(1-\epsilon)/\epsilon])i_1}\right]. \tag{9}$$

Next we compare the level of g under PERS and FERS and consequently the degree of discipline provided by either system. Note that the R.H.S. of (9) is equal to the R.H.S. of (7) multiplied by the term in square brackets. Note, furthermore, that their ranking is solely a function of $\beta(1+r)$, where β is the discount factor and r is the interest rate. Since $u''(g)<0$ by assumption, it follows that

$g^*_{\text{PERS}} > (<) g^*_{\text{FERS}}$ if and only if $\beta(1+r) < (>) 1$ and $g_{\text{PERS}} = g^*_{\text{FERS}}$ if and only if $\beta(1+r) = 1$.

To understand the intuition behind this result it is helpful to consider what the FA would do if it could control both monetary and fiscal policy. Since real money balances m_{t-1} are inversely related to inflation π_t, when the FA strongly discounts the future ($\beta(1+r) < 1$) its preferred time profile for the inflation tax is to shift it as much as possible to the future. In contrast, when the FA does not discount the future much ($\beta(1+r) > 1$), it prefers to endure the cost of raising resources through inflation in the present. Finally, if $\beta(1+r) = 1$, the FA is indifferent about the intertemporal allocation of the inflation tax burden.

If fiscal authorities strongly discount the future ($\beta(1+r) < 1$), PERS implement an intertemporal distribution of the inflation tax burden which is closer to the FA's preferred one. This implies that the marginal cost of financing an increase in g using money financing is lower under PERS than under FERS. As a result, $g^*_{\text{FERS}} > g^*_{\text{PERS}}$. In contrast, when $\beta(1+r) > 1$ the opposite happens. FERS, which tilt the inflationary burden more heavily toward the initial period, come closer to replicating the FA's preferred outcome. As a result, under FERS increasing g is less costly in terms of utility, and $g^*_{\text{FERS}} < g^*_{\text{PERS}}$.

These results suggest that one can think of exchange rate regimes as specific rules to distribute intertemporally the burden of the inflation tax. Under predetermined rates, if the government increases the level of transfers the entire necessary increase in the inflation tax is shifted to the future, while under flexible rates this necessary change is spread between the present and the future. This is because, under FERS and rational expectations, higher money creation means higher inflation today, and not just tomorrow. The less attractive the corresponding intertemporal allocation from the FA's point of view, the stronger the discipline. In particular, when the FA discounts the future at a rate higher than the world rate of interest, flexible rates provide more discipline.

3. Suggestive evidence

In this section we present two sets of evidence that should cast some doubts on the conventional view that fixed exchange rates provide more fiscal discipline than floating rates.

We first concentrate on the stabilization experience of Latin American countries. Table 1 lists a sample of stabilization attempts in the last 25 years. While the list is not exhaustive on any account, it includes all the widely-studied high-inflation stabilization experiences since 1970. [10]

[10] See, for example, the well known volumes edited by Bruno et al. (1988) and Bruno et al. (1991), and the influential papers by Kiguel and Liviatan (1988, 1992), Calvo (1986b), Vegh (1992) and Calvo and Vegh (1994). See also the data in Tornell and Velasco (1994b).

Table 1
Stabilization and fiscal adjustment in Latin America

	None	Before program	During program
Money-based	Brazil 1990		Chile 1975 Bolivia 1985 Peru 1990 Dominican Republic 1990
Exchange rate-based	Argentina 1979 Argentina 1985 Brazil 1986	Chile 1978 Uruguay 1979 Mexico 1987	Argentina 1991?

Sources: Bruno et al. (1988), Medeiros (1993), Bruno et al. (1991), Helpman and Leiderman (1988), Kiguel and Liviatan (1988, 1989, 1992), Vegh (1992) and Calvo and Vegh (1994).

We classify episodes according to two criteria. One is whether the program was exchange rate-based or money-based. The other is whether fiscal tightening occurred before the period of monetary stabilization, during the period, or not at all. Inevitably, not all episodes lend themselves to clear-cut classification. Some episodes listed as money-based stabilizations (Chile 1974, Bolivia 1985) did not display a clean exchange rate float, but rather a managed float or a policy of occasional mini-devaluations; still, money provided the main nominal anchor. Evaluating the depth of fiscal adjustment is also tricky. Some episodes listed as having had no fiscal adjustment (Argentina 1985, for example), did display some initial fiscal contraction; but this policy was eventually reversed, and lack of sustained fiscal tightness is widely regarded as the main cause for a return to high inflation. Finally, there are cases (in particular Argentina 1991) where some of the fiscal adjustment took place before the start of the plan, but substantial further adjustment has taken place during implementation as well.

The first fact that stands out is that only one (none if Argentina 1991 is classified as having had prior adjustment) of the exchange rate-based programs that started out without a previous fiscal consolidation managed eventually to achieve it. This suggests that there is little evidence in support of the idea that fixed rates per se induce fiscal discipline. The second noticeable fact is that a majority of money-based attempts that started out without a previous fiscal consolidation succeeded in achieving it in the course of the program. Of course, this evidence should be taken as simply suggestive. Many things happen during these episodes, and it is difficult to isolate the effects that the exchange rate regime has on fiscal policy.

The recent experience of Sub-Saharan African countries is also suggestive. [11] These countries can be classified in two groups: those in the CFA franc zone, which maintained a fixed exchange rate with the French franc from 1948 until

[11] For useful discussions, see Devarajan and Rodrik (1991) and Nashashibi and Bazzoni (1993).

Table 2
Sub-Saharan fiscal performance

	1980	1984
Primary deficit		
PERS	4.7	4.6
FERS	7.9	3.0
Total deficit		
PERS	6.5	7.8
FERS	9.6	6.3
Total revenue		
PERS	20.2	21.4
FERS	18.1	19.0
Current expenditure		
PERS	26.7	29.2
FERS	27.7	25.4
Interest payments		
PERS	1.8	3.1
FERS	1.6	2.3

Source: Sub-Saharan Fiscal Data Base from the IMF. All figures as percentage of GNP.

1994. (we will refer to them as PERS countries); and those with variable exchange rates (referred to as FERS countries). These countries are roughly similar in other respects: their GDPs per-capita are comparable, and they are mainly exporters of the same primary commodities.

During the 70s, positive shocks to the prices of major exports of Sub-Saharan countries (oil, coffee and cocoa) led to significant increases in government spending. These price hikes were reversed by the late 70s, and the enlarged levels of spending became unsustainable. Although during the first half of the 80s the terms of trade of both groups of countries did not change significantly, the policy and adjustment responses of both groups were starkly different. Table 2 shows that between 1980 and 1984 the fiscal deficit as a proportion of GDP declined by 3.3 percentage points in FERS countries, while it *increased by* 1.3 points in PERS countries. The same tendency can be observed in current government expenditure, which declined by 2.3 percentage points of GDP in FERS countries, while it increased by 2.5 points in PERS countries. In Tornell and Velasco (1994a), using cross-country data we regress measures of fiscal adjustment on changes in the terms of trade, initial debt, GDP per capita and on a dummy for the exchange rate regime. The coefficients on the dummy always have the right sign and are significant for three different specifications of fiscal adjustment. Hence, the data seem broadly compatible with the main prediction of our model.

Conditions deteriorated in the second half of the 1980s, especially for the PERS countries. Between 1985 and 1989, the terms of trade of the PERS declined by 25

percent, while those of the FERS declined by 10 percent. This finally forced adjustment on the PERS: between 1985–86 and 1990–91 government expenditure fell by almost 4 percentage points of GDP. Government expenditure in the FERS, which had adjusted earlier, remained basically constant as a share of GDP. Ultimately the fixed exchange rate proved unsustainable for the CFA countries: the peg to the French Franc established in 1948 fell prey to a 100 percent devaluation in January 1994.

4. Summary and conclusions

This paper offers both theoretical reasons and some very preliminary empirical evidence suggesting that the conventional wisdom that fixed exchange rates provide more fiscal discipline is in need of revision.

On theoretical grounds, we argue that under limited Central Bank autonomy or imperfect credibility the choice of exchange rate regime is essentially a choice of when to collect inflation tax revenues. In turn, this choice defines the costs the fiscal authorities must pay if they want to increase spending and the deficit. If the fiscal authorities are impatient, flexible rates provide more fiscal discipline; the opposite is true if fiscal authorities are relatively patient.

Some preliminary evidence suggests that the conventional wisdom is at variance with the facts – at least in some regions of the world. In Africa in the 1980s, countries in the CFA zone were notoriously slow in undertaking fiscal adjustment. In Latin America and elsewhere in the last quarter-century, it is hard to find a country that undertook and exchange rate-based stabilization while still suffering from a fiscal problem and managed to correct this problem in the course of the program. The same is not true of countries that undertook money-based stabilization programs.

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