

A detailed black and white engraving of three figures in historical attire. On the left, a man in a long coat and hat holds a staff. In the center, a woman in a long dress and hat stands with her hands clasped. On the right, a woman in a long dress and hat stands with her hands clasped. The background is a textured, light-colored surface.

WORKING PAPER 66  
GROWTH, INTEGRATION AND  
MACROECONOMIC POLICY DESIGN:  
SOME LESSONS FOR LATIN AMERICA

DAVID BEGG

WITH A COMMENT BY PETER BOFINGER

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## **Editorial**

On April 15 - 16, 2002 a conference on “Monetary Union: Theory, EMU Experience, and Prospects for Latin America” was held at the University of Vienna. It was jointly organized by Eduard Hochreiter (OeNB), Klaus Schmidt-Hebbel (Banco Central de Chile) and Georg Winckler (Universität Wien). Academic economists and central bank researchers presented and discussed current research on the optimal design of a monetary union in the light of economic theory and EMU experience and assessed the prospects of monetary union in Latin America. A number of papers presented at this conference are being made available to a broader audience in the Working Paper series of the Oesterreichische Nationalbank and in the Central Bank of Chile Working Paper series. This volume contains the third of these papers. The first ones were issued as OeNB Working Papers No. 64 and 65. In addition to the paper by David Begg the Working Paper also contains the contributions of the designated discussant Peter Bofinger.

July 10, 2002



**Growth, integration, and macroeconomic policy design:  
Some lessons for Latin America**

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## 1 Introduction

Even the richest countries face the ongoing challenge of how to combine monetary and fiscal discipline with sustainable growth. Increasingly, it is recognised that growth requires not merely factor accumulation but the appropriate market and political institutions. Rich countries are rich partly because of their past success in resolving these issues. Other countries hoping to catch up, for example those in Latin America or Eastern Europe, have to build the right institutions as well as adopt the correct policies. Different policy regimes alter the incentive to reform, and the inherited level of structural and institutional reform affects the policies then likely to be adopted.

A quick fix is unlikely to succeed, because it is wrong to think about problems in isolation from one another. Argentina's currency board lasted longer than Russia's pegged rouble exchange rate, but the eventual outcomes were the same. Monetary discipline was not a sufficient condition for either fiscal responsibility or institutional reform and significant supply-side improvement. Not merely was the flagship monetary policy doomed to fail, it may even have delayed progress on other fronts. Analysing whether or not this was true requires the specification of a suitable model, in which significant failures of monetary, fiscal and structural policy exist and interact.

Viewing the problem in this way emphasises the economics of the second best. Facing multiple failures, progress in a single dimension may not improve the outcome. Too frequently, the design of policy has ignored this essential interdependence. Nevertheless, the first best is unattainable in a single giant step. Although a change of monetary regime, uniquely, can be undertaken almost overnight, other regime changes take much longer. Changing the level and structure of taxation and government spending takes several years, and, as Arthur Okun famously remarked, there is nothing wrong with supply-side economics that dividing by ten would not cure. Vital as it is, it is a lengthy business that must be sustained over a long period.

Unlike the possible clarity of a change of monetary regime, changes in fiscal policy, and *a fortiori* changes in structural policy, are harder to monitor. For example, despite the need for fiscal commitment, the Euro Area Stability Pact remains ambiguous. Ideally, its constraints on budget deficits should apply to cyclically-adjusted budgets; in practice, uncertainty about the unobservable level of potential output so raised fears of strategic manipulation and moral hazard that the Pact was framed, less desirably, in terms

of actual deficits<sup>1</sup>. Those of us who worried about whether this would be enforced ex post have been proved correct. The widening German deficit sensibly escaped official censure in January 2002, but the slippery wording of the subsequent communiqué did little to enhance confidence in the commitment technology that the Pact is supposed to provide.

Moreover, whereas fiscal policy can partially be constrained by balanced budget amendments, codes of fiscal stability, or stability pacts, it is much harder to codify commitments to structural reform. This is one reason why, for example, the European Union has made so little progress on labour market reform. Despite evident economic benefits, its short-run political cost made it unattractive to most European governments, given the macroeconomic policy regimes that they expected to face. Would expectations of a different regime have changed the incentive to reform? Again, only a coherent model can answer this question.

Globalisation continues apace, undermining the sovereignty of nation states to set interest rates, choose tax rates, levy tariffs, and regulate domestic markets. Logically, this raises the payoff to coordinating some political decisions at a higher level. But sovereignty can be pooled only with partners with whom national citizens identify - otherwise, inevitable cross-border redistribution is simply not credible – many of the steps achieved to date have entailed closer integration with near neighbours within regions or continents. Against this background, closer macroeconomic integration in Latin America is a natural, perhaps inevitable, process.

As the Europeans discovered, this offers a unique opportunity to rethink and redesign institutions and regimes. European examples include not just the European Central Bank and the Stability Pact, whose rules were designed *ab initio*, but also significant evolutionary progress on common regulatory structures and migration policies.

The nation states of Latin America have ridden the rollercoaster of success and failure. Decisive changes in macroeconomic regime, particularly in monetary policy, have grabbed headlines, and have for a time succeeded. Yet they have usually been undermined by fiscal indiscipline and supply-side stagnation. These issues should be considered simultaneously. Feasible rates of progress vary across policies, making sequencing important. Where progress cannot be rapid, it must be sustained for a long time, making commitment important when time inconsistency is a problem. With closer regional integration on the

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<sup>1</sup> Wyplosz (2001b) proposes an independent fiscal policy committee, charged with choosing the overall level of the budget deficit over the business cycle, subject to which national politicians still set taxes and spending. Less



agenda, an appropriate response to underlying economic trends, there is now an opportunity to reconsider the appropriate design of policies and the institutions that support them<sup>2</sup>.

Section 2 gives an overview of economic performance in Latin America, showing output growth, inflation, and the evolution of budget deficits. Section 3 introduces a simple model, based on Begg (2000, 2001), capturing the interaction of macroeconomic policy and structural reform. Reform is costly today but improves future opportunities. These benefits may apply to means or variances. By increasing robustness to shocks, reforms that enhance labour market flexibility reduce the variance of output. Other reforms, by affecting means not variances, reduce systematic distortions that depress potential output. For simplicity, I focus on the latter, though the former also matter.

To be specific, I suppose that costly reform enhances the size and compliance of the future tax base. Failure to raise adequate tax revenue lies behind many of the setbacks in economic development, in Latin America as elsewhere<sup>3</sup>. Moreover, tax capacity is a key linkage between supply-side distortions and the public finance constraint on fiscal policy, monetary policy, and inflation.

I view monetary and fiscal regimes as the delegation of operational powers in response to inefficiencies arising from market failure or government failure. The delegation of *monetary* policy is well understood, since the pioneering paper of Rogoff (1985). Many central banks are now operationally independent, pursuing inflation targets, as recommended in Svensson (1997) and evaluated in Clarida, Gali, Gertler (1999).

Recognising that there are also limits to fiscal commitment has implications for monetary policy design. First-best monetary commitment is inappropriate in a second-best world where other failures exist. Most of the literature on monetary institutions ignores this reality<sup>4</sup>. I examine not only commitment problems in

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restrictively, Begg et al (2002) propose delegating estimates of potential output to an independent committee, but then applying the Stability Pact to cyclically-adjusted budget deficits.

<sup>2</sup> I share the assessment in Wyplosz (2001a) that European integration is best viewed not as the application of economic optimum currency area criteria but as an evolving political commitment to limit damaging types of policy competition between highly integrated nation states. Institutional deepening of the common institutions has thus been both the consequence of the process and the impetus for further integration.

<sup>3</sup> I view the fiscal authority as a single entity. A more complete analysis would include political equilibrium. Low tax revenue often reflects the equilibrium between competing factions in central government, or the inability of central government to control local government. For a useful introduction to political equilibrium and fiscal policy, see Persson and Tabellini ( ). For analysis of how relations between central and local government influences budget setting, see eg von Hagen and Harden (1994).

<sup>4</sup> Exceptions include Debelle and Fischer (1993), Beetsma and Uhlig (1997), Beetsma and Jensen (1999), Begg (2000, 2001), Dixit and Lambertini (2000), and Wyplosz (2001b).

monetary and fiscal policy but also in reform itself. I then analyse whether delegation, or other institutional changes, mitigate these distortions, and explore the desirability of supranational arrangements, such as membership of a monetary union or unilateral dollarization.

Government spending is financed by the inflation tax or by distortionary taxes that reduce output. A poor structure leaves the government with poor choices, so the optimal tradeoff entails high inflation, high tax distortions, low government spending, and low output. Output supply is independent of expected inflation. Nevertheless, a cross-country comparison of countries at different stages of structural adjustment would identify a negative relation between inflation and output because resort to the inflation tax is a *symptom* that distortionary taxes are already high owing to a low initial level of tax capacity. Structural adjustment improves all options for the future. In contrast, unduly tight monetary policy deprives the government of the (optimal) amount of inflation, causing higher distortionary taxes and inefficiently low government spending. Thus, premature dollarization is a mistake; nor should an early Latin American monetary union be preoccupied with price stability *uber alles*. Unlike the EU, it has no German constraint to satisfy.

I then analyse structural or institutional investment in a better future. The optimal pace of reform depends both on costs and benefits. Benefits are lower distortions, higher output, lower inflation, and higher government spending. I assume quadratic costs of reform, providing a reason to avoid rapid reform. It is the slowness of structural progress that makes commitment problems important.

I examine the optimal speed of reform under different macroeconomic regimes, and hence isolate the effects of the choice of regime on the pace of reform. In general, in more distorted countries (or regimes) the benefit of reform is greater. Hence, regimes that inefficiently mitigate distortions should induce faster reform. Consequently, if dollarization or other policy changes reduce distortions, they should (optimally) slow the pace of reform.

This presupposes no distortions in the process of reform itself. By introducing commitment problems, both in setting tax rates within fiscal policy and in honouring prior promises to deliver on costly structural reform, the outcome may be sluggish reform, high government spending, and depressed output. This allows a discussion of the mechanisms of institutional design and external conditionality that would appropriately counteract these distortions.

## 2 Some empirical background

Table 2.1 gives a brief macroeconomic picture of selected Latin American countries in recent years. For each country, I show annual inflation, annual real GDP growth, and the budget deficit relative to GDP<sup>5</sup>.

Several stylised facts emerge. First, as late as 1990, endemic inflation had not been eliminated, and was out of control in several countries. Second, since 1990 there has generally been a steady progress in disinflation, though it broke out again during crises in Ecuador, Venezuela, and most recently Argentina (not shown in the table).

Third, output growth continues to be unreliable. Some countries exhibited strong growth in particular years, often in rebounding from a crisis. However, given substantial population growth in most countries, sustained growth in living standards has not yet been achieved in all countries.

Finally, Chile apart, central government budgets have generally been in deficit. Although deficits do not look excessive, adding data for local government would presumably raise the size of these deficits, perhaps substantially.

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<sup>5</sup> These IMF data unfortunately refer only to the budget deficit of central government. In some cases, most recently in Argentina, fiscal laxity of local government is also part of the problem.

**Table 2.1 Macroeconomic developments, 1990-2001, selected countries, annual data**

Country	%	1990	1995	1996	1997	1998	1999	2000	2001
<b>Argentina</b>	Inflation	499	3	0	1	- 1	- 1	- 1	- 1
	Real growth	- 1	- 3	6	8	4	- 3	- 1	- 3
	Budget / GDP	- 2	- 2	- 2	- 2	- 1	- 3	- 2	- 3
<b>Brazil</b>	Inflation	2948	66	16	7	3	5	7	7
	Real growth	- 4	4	3	3	0	1	4	2
	Budget / GDP	3	- 2	- 3	- 3	- 5	- 7	- 3	- 5
<b>Bolivia</b>	Inflation	17	10	12	5	8	2	5	na
	Real growth	4	5	4	5	5	0	2	na
	Budget / GDP	- 5	2	2	- 4	- 3	- 3	- 4	- 7
<b>Chile</b>	Inflation	26	8	7	6	5	3	4	4
	Real growth	4	11	7	7	4	- 1	5	3
	Budget / GDP	3	4	3	2	0	- 2	- 1	- 2
<b>Columbia</b>	Inflation	29	21	21	19	19	11	9	8
	Real growth	4	5	2	3	1	- 4	3	1
	Budget / GDP	- 1	- 3	- 5	- 3	- 5	- 8	- 6	- 5
<b>Ecuador</b>	Inflation	48	23	24	31	36	52	96	37
	Real growth	3	2	2	3	0	- 7	2	5
	Budget / GDP	4	- 3	- 3	- 2	- 5	- 5	0	1
<b>Mexico</b>	Inflation	27	35	34	21	16	17	10	7
	Real growth	5	- 6	5	7	5	4	7	0
	Budget / GDP	- 3	- 2	- 1	- 2	- 2	- 2	- 2	- 2
<b>Peru</b>	Inflation	7486	11	12	9	7	4	4	2
	Real growth	- 4	9	2	7	- 1	1	3	0
	Budget / GDP	- 9	- 3	- 1	- 1	- 1	- 4	- 4	4
<b>Uruguay</b>	Inflation	110	305	54	71	29	29	25	27
	Real growth	0	- 1	6	5	5	- 3	- 1	- 1
	Budget / GDP	0	- 2	- 2	- 1	- 1	- 4	- 4	- 4
<b>Venezuela</b>	Inflation	41	60	100	50	36	24	16	13
	Real growth	7	4	0	6	0	- 6	3	3
	Budget / GDP	- 1	- 4	1	2	- 4	- 2	- 3	- 5

There is nothing in Table 2.1 to shed doubt on the familiar caricature of the region as still having trouble with inflation, yet to establish sustainable output growth at the high rate that its population growth should facilitate, and still vulnerable to fiscal laxity. Certainly, there was progress during the 1990s, including serious attempts at institutional reform, but much remains to be done. A clear analysis of the problems may be useful in guiding the directions that further reform should now take.

### 3 A baseline model

Let  $t^+$  be an economy's tax capacity. Suppose that tax distortions, which reduce output, arise only when actual taxation  $t$  exceeds  $t^+$ . Structural reform raises tax capacity  $t^+$ , letting the government finance larger spending without distorting output. Each period the private sector sets nominal contracts, given expected inflation. Output thus obeys

$$y = \pi^u - \tau + \varepsilon \quad \tau = t^e - t^+ \quad (1)$$

Output rises with unexpected inflation  $\pi^u$  and the contemporaneous shock  $\varepsilon$ , but falls with excess taxation  $\tau$ <sup>6</sup>. All coefficients are unity. For the general case, see Begg (2000).

Government purchases  $G$  are financed by taxation or the inflation tax

$$G = t + \pi \quad (2)$$

Each period, the government loss  $L$  is

$$L = \pi^2 + y^2 + g^2 \quad g = G - G^* \quad (3)$$

implying target levels of  $G^*$  for government spending, and zero for inflation and output (causing an inflation bias when  $\tau > 0$ ). Hence, from (2)

$$g = \tau - h + \pi \quad h = G^* - t^+ > 0 \quad (4)$$

Crucially,  $G^*$  exceeds initial capacity  $t^+$ . The government uses both excess taxation and the inflation tax to get government spending closer to its target level. Over time, as tax capacity rises, tax distortions and inflation can fall. As  $t^+$  rises to  $G^*$ ,  $\tau$  and  $\pi$  fall to zero.

Each period, the government chooses government expected spending,  $g^e$ , and expected taxes,  $\tau$ ; then private sector forms inflation expectations,  $\pi^e$ ; then the output shock  $\varepsilon$  is realised; finally, actual inflation is chosen. Unexpected inflation receipts finance unexpected government spending.

#### 3.1 Optimal monetary policy, given tax capacity $t^+$ and fiscal tension $h$

First-best policy avoids using surprise inflation to try to raise output systematically. For a given  $h$ , choosing  $(\pi^e, \tau)$  to minimise  $E(L)$  subject to the output equation (1) and the budget constraint (4), and letting subscripts  $F$  denote these first-best levels

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<sup>6</sup> Since (1) implies  $y = \pi^u - t + t^+ + \varepsilon$ , we can think of  $t^+$  as *any* stock that enhances output supply. Structural adjustment is any programme of costly structural adjustment that invests in raising this stock.

$$0 = \pi_F^e + g_F = \pi_F^e + [\tau_F + \pi_F^e - h] \quad (5a)$$

$$0 = -y_F^e + g_F = \tau_F + [\tau_F + \pi_F^e - h] \quad (5b)$$

whence

$$\tau_F = \pi_F^e = h / 3 \quad y_F^e = g_F^e = - h / 3 \quad (6)$$

The larger the fiscal tension  $h$  between aspirations and capacity, the larger are distortionary taxes and resort to the inflation tax, the more taxes reduce output, and the lower is expected government spending. With equal weights in the loss function, the optimal tradeoff in (6) shares the burden of inherited fiscal tension  $h$  equally among the three variables  $\pi$ ,  $y$ , and  $g$ .

Only monetary policy is set after the shock is known. Choosing unexpected inflation to minimise the ex post loss  $L$  subject to the unanticipated components of (1) and (4), and letting the superscript  $u$  denotes the unexpected component, yields  $0 = \pi^u + (\pi^u + \varepsilon) + \pi^u$ . Thus, optimally,

$$\pi^u = -\varepsilon / 3, \quad y^u = 2\varepsilon / 3, \quad g^u = -\varepsilon / 3 \quad (7)$$

A positive output shock  $\varepsilon$  induces a tighter monetary policy to reduce output. With lower inflation, there is less inflation tax to finance government spending.

Optimal policy is thus a set of innovation-contingent feedback rules (7) independent of the state variable  $h$ , plus the reduced form policy rules (6) relating excess taxes, expected spending and expected inflation to  $h$ . Thus, expected values should ‘crawl’ at the rate of structural adjustment, as the state variable  $h$  diminishes. However, the extent of accommodation of shocks, for which band width is a proxy, are constant throughout development.

### 3.2 Monetary discretion

I turn next to monetary discretion, made famous by Barro and Gordon (1983). Suppose  $h$  is fixed and fiscal promises are kept. Monetary policy chooses inflation treating as predetermined all expectations, the shock, and the level of  $h$ . If  $D$  denotes monetary discretion, the first order condition for choosing inflation is  $0 = \pi_D + y_D + g_D$ . This is now used to form prior expectations, and thus deduce the subsequent response to shocks.

$$0 = \pi_D^e + y_D^e + g_D^e \quad (8a)$$

$$0 = \pi_D^u + y_D^u + g_D^u = \pi_D^u + (\pi_D^u + \varepsilon) + \pi_D^u \quad (8b)$$

Hence

$$\pi_D^e = h / 2 \quad (9)$$

Knowing this, the optimal fiscal policy then entails

$$0 = \tau_D + g_D^e \quad (10)$$

Hence

$$\tau_D = h / 4 < \tau_F \quad \pi_D^e = h / 2 > \pi_F^e \quad g_D^e = - h / 4 > g_F^e \quad (11)$$

For a *given* fiscal policy, monetary temptation induces a positive inflation bias. Relative to the first best, the government ‘spends’ higher inflation tax revenue partly on higher spending and partly on lower taxes and lower output distortions.

### 3.3 Delegating monetary policy

Suppose the government selects a central banker with preferences

$$L_B = \pi^2 + f y^2 \quad f > 0 \quad (12)$$

The banker is responsible for inflation and output, but not government spending. Acting with discretion, the central bank chooses inflation such that  $0 = \pi + fy$ , whence

$$\pi^u = - f \epsilon / (1+f) \quad y^u = \epsilon / (1+f) \quad \pi^e = f \tau \quad (13)$$

Fiscal policy is chosen recognising its subsequent effect on the independent central bank. The second-best choice of banker  $f^*$  reflects both the variance of  $\epsilon$  and the inherited structure  $h$ .

Rogoff (1985) showed that choosing a single parameter  $f$  cannot simultaneously achieve the first-best ex post shock accommodation yet fully offset the ex ante inflation bias. In my context, a third problem arises. Since the inflation bias declines with structural adjustment in  $h$ , the government keeps wanting to alter  $f^*$ . Hence, long tenure of a particular central banker is time inconsistent, but short tenure undermines monetary commitment.

#### *Delegation through targets*

Prescribing an inflation target decouples the (optimal) manipulation of expected inflation from the ideal degree of shock accommodation. The government can prescribe a crawling target for inflation, which, suitably calibrated with progress on structural adjustment, restores time consistency. The government appoints a central banker with *constant* preferences  $k$  such that

$$L_B = (\pi - \pi^*)^2 + k y^2 \quad k > 0 \quad (14)$$

where  $\pi^*$  is an inflation target chosen by the government. The central bank’s discretionary choice of inflation now obeys

$$0 = (\pi - \pi^*) + ky \quad (15)$$

whence

$$\pi^u = - k \epsilon / [1+k] \quad y^u = \epsilon / [1+k] \quad (16)$$

The first-best response (7) is accomplished by choosing

$$k = \frac{1}{2} \quad (17)$$

A conservative central banker is *only* needed because the central bank does not internalise the effect of surprise inflation in making government spending more variable. Having used  $k$  to get the appropriate stabilisation, the extra policy instrument  $\pi^*$  deals with the inflation bias. From (15)

$$\pi^e = \pi^* + k\tau \quad (18)$$

The fiscal authority chooses  $\tau$  knowing how the central bank will subsequently behave, yielding

$$\tau = \{h(1+k) - \pi^*[2k+1]\} / \{k^2 + 1 + (1+k)^2\} \quad (19)$$

With  $k = 1/2$ , the government delegates the inflation target

$$\pi^* = h/6 \quad (20)$$

(19) implies that fiscal policy then chooses the first-best tax rate  $h/3$ , and (18) implies that expected inflation is then also  $h/3$ . This decentralises the first-best outcome. When the only commitment problem is in monetary policy, the *optimal inflation target*  $\pi^*$  is linear in  $h$ , and falls with structural adjustment as  $h$  converges on zero.

### 3.2 Dollarization

Suppose instead that the country adopts the dollar. For simplicity, suppose this makes inflation completely certain, at the rate  $\theta$ .

$$\pi = \theta \quad \pi^u = 0 = g^u \quad y^u = \varepsilon \quad (21)$$

Inefficiently, there is no accommodation of (country-specific) shocks.

The first order condition for setting fiscal policy is now

$$0 = -y^e + g^e = \tau + g^e = \tau + [\tau - h + \theta] \quad (22)$$

replicating (5b). Hence, *if* dollarization yields expected inflation  $\theta$  which happens to equal the first-best level  $h/3$  in (6), the induced choice of  $\tau$  is  $h/3$ , also first best. However, being more structurally advanced, the US will generally find it optimal to choose  $\theta$  well below the first best level for a poorer country.

Relative to the first best, dollarization implies both an expected inflation rate that is suboptimally low (inducing inefficiently high expected taxes, low output, and low government spending), and ex post accommodation of shocks that is also suboptimally low.

If monetary temptation is large and the variance of shocks small (or the correlation of domestic shocks with US shocks is large), dollarization may be superior to no monetary commitment. However, for the unit parameters of equations (1)-(4), dollarization is a mistake. Table 3.1 shows three cases: the first best (optimal commitment + optimal shock accommodation), monetary discretion by government, and dollarisation, caricatured as zero inflation for sure.



In the first best, the total ex ante loss is  $[h^2/3 + 2\sigma^2/3]$ . Without monetary commitment, expected inflation is higher but shock accommodation unaltered. Total ex ante loss rises to  $[3h^2/8 + 2\sigma^2/3]$ . Dollarizing when the US has price stability for sure, raises the ex ante loss associated from shocks still further to  $\sigma^2$ . But that is not its only cost.

**Table 3.1 Equilibrium and welfare under different regimes**

Outcome	Regime		
	First best	Monetary discretion	Dollarize
$\tau$	$h/3$	$h/4$	$h/2$
$\pi^c$	$h/3$	$h/2$	0
$y^c$	$-h/3$	$-h/4$	$-h/2$
$g^c$	$-h/3$	$-h/4$	$-h/2$
$L(\pi^c, y^c, g^c)$	$h^2/3$	$(3/8)h^2$	$h^2/2$
$\pi^u$	$-\varepsilon/3$	$-\varepsilon/3$	0
$y^u$	$2\varepsilon/3$	$2\varepsilon/3$	$\varepsilon$
$g^u$	$-\varepsilon/3$	$-\varepsilon/3$	0
$L(\pi^u, y^u, g^u)$	$2\sigma^2/3$	$2\sigma^2/3$	$\sigma^2$
L	$h^2/3 + 2\sigma^2/3$	$(3/8)h^2 + 2\sigma^2/3$	$h^2/2 + \sigma^2$

Additionally, expected inflation is wrong. The US is a lower inflation club than the country wants to join. Even if the variance of shocks is zero, the expected loss under dollarization is  $h^2/2$ , larger even than the corresponding loss under monetary discretion. Price stability is way too tight. Moreover, this conclusion applies however far structural adjustment proceeds, as  $h$  converges on zero. Waiting doesn't help.

Countries in this position might do better to form their own monetary union, in which the single central bank is set a target inflation rate suitable to the average level of structural development. It is then possible to converge and develop at rates closer to the first best. However, such a prescription would be on firmer ground if the rate of development was itself endogenous.

#### 4 Endogenising structural development

Supply-side improvement allows lower expected inflation, less output distortion, and more government spending. Incentives to adjust also depend on the costs of adjustment, which I assume to be quadratic. An

increasing marginal cost of reform is a necessary feature of any plausible model of development, in which improvement is slow and commitment problems arise.

The state variable  $h$  is  $[G^*-t^+]$ , the excess of ideal government spending over the existing tax capacity  $t^+$ . Structural adjustment raises  $t^+$  and reduces  $h$ . Once adjustment is complete,  $h = 0 = g$ , and the first-best levels of  $\pi^e$  and  $y^e$  are zero. I now augment the per period loss function (3) to (23a). The present value of expected losses  $V$ , using the discount factor  $\phi$ , is shown in (23b)

$$L = \pi^2 + y^2 + g^2 + (h - h_{-1})^2 \quad (23a)$$

$$V = L^e + \phi V_{+1}^e \quad 0 < \phi < 1 \quad (23b)$$

Each period, the government first chooses  $h$ , then sets taxes. Inflation expectations are then formed, the output shock is realised, and finally inflation is chosen.

### *The first best*

The government chooses  $h$  to minimise the expected value (23b) knowing how  $\tau$ ,  $\pi^e$  and  $g^e$  are then chosen. Equation (5) shows the first order conditions for choosing  $\tau$  and  $\pi^e$ , given  $h$ , and the envelope theorem now applies. The marginal benefit of changing  $h$  operates only through  $g^e$ , through the presence of  $h$  in  $[\tau - h + \pi^e]$ . The first order condition is thus

$$0 = -g_F^e + (h - h_{-1}) - \phi (h_{+1} - h) \quad (24)$$

Since  $g_F^e < 0$  is the first best level of expected spending,  $-g_F^e$  is the expected cost of a larger  $h$ . The second term is the present cost of raising  $h$ , the third term shows how raising  $h$  this period affects adjustment costs next period. From (6),  $g_F^e = -h/3$ . The solution to (24) has the form

$$h = \rho_F h_{-1} \quad 0 < \rho_F < 1 \quad (25)$$

so (24) becomes

$$0 = h_{-1} [-1 + \rho_F \{4/3 + \phi\} - \phi \rho_F^2] = h_{-1} [\Phi(\rho_F)] \quad (26)$$

$\Phi(\rho_F)$  is quadratic in  $\rho_F$ , and  $\Phi(0) = -1$ ,  $\Phi(1) = 1/3 > 0$ , and  $\Phi(\rho_F) < 0$  for large positive  $\rho_F$ . Figure 4.1 shows the unique convergent root  $0 < \rho_F < 1$ , the optimal rate of structural adjustment.

### *Monetary temptation*

Choosing reform at the start of the period, the government can rely on its own subsequent ability to optimise taxes, and apply the envelope theorem to  $\tau$ . However, a commitment failure in monetary policy means expected inflation is not chosen to maximise the government's own ex ante loss function. We need to keep track of the extent to which  $h$  affects the subsequent choice of expected inflation. Using (9), this yields a first order condition for  $h$

$$0 = -g_D^e + [1/2][\pi^e + g_D] + [(h - h_{-1}) - \phi (h_{+1} - h)] \quad (27)$$

The first term is the direct effect of  $h$  on  $g^e$  for given taxes and expected inflation. The third term is the marginal cost of adjustment. The second term shows how  $h$  affects expected inflation in (9), and thus

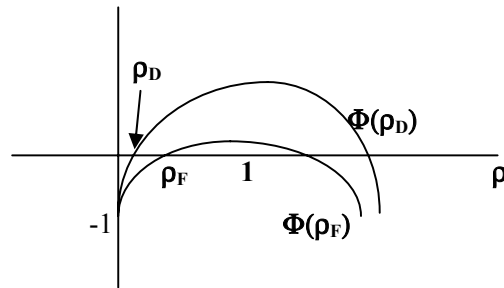
affects both inflation and the financing of government spending. Solving for the monetary and fiscal policy then chosen, and eliminating expected inflation and expected government spending, (27) implies

$$0 = 3h/8 + [(h-h_{-1}) - \phi(h_{+1}-h)] \quad (28)$$

and assuming an autoregressive solution akin to (25)

$$0 = h_{-1}[-1 + \rho_D \{11/8 + \phi\} - \phi \rho_D^2] = h_{-1} [\Phi(\rho_D)] \quad (29)$$

For positive  $\rho$ , the expression for  $\Phi(\rho_D)$  in (29) exceeds that in (27) since  $(11/8)\rho > (4/3)\rho$ . Figure 4.1 shows that the unique convergent root thus satisfies  $\rho_D < \rho_F < 1$ . Initial conditions are unwound more quickly under monetary discretion; there is less persistence. Structural adjustment is more rapid because the marginal benefit of reform is larger when distortions are greater. If dollarization, or a Latin American monetary union, *reduces* distortions by mitigating commitment failure in monetary policy, they *slow* the pace of reform by reducing its marginal benefit



**Figure 1 : Convergent roots under first best and monetary discretion**

### ***Fiscal discretion***

Now suppose commitment failures arise in both monetary and fiscal policy. Analysis of fiscal discretion dates back to Fischer (1980). Tax capacity is fixed at  $t^+$ , thus fixing  $h$  at  $(G^*-t^+)$ , but the government is tempted to use unexpected taxes  $t^u$  and the private sector anticipates this in forming expectations. In (1) output distortions still depend on *expected* taxes. Surprise taxes avoid output distortions yet finance valuable government expenditure. Since monetary policy is more flexible than fiscal policy, I assume that even surprise taxes are chosen before inflation. To emphasise pure fiscal temptation, I assume fiscal surprises predate the shock, which makes tax surprise a source of trouble not a potential benefit.

To overcome monetary temptation, monetary policy is delegated to an independent central bank. Monetary policy is chosen last, and previous equations for monetary policy remain relevant. Thus

$$\pi = \pi^* + ky \quad \pi^u = -k \varepsilon / [1+k] \quad y^u = \varepsilon / [1+k] \quad (30)$$

Treating  $\tau^e$ ,  $\pi^e$ , and  $g^e$  as predetermined, the government chooses surprise taxes  $\tau^u$ . Affecting neither output in (1) nor inflation in (30),  $\tau^u$  is chosen to minimise  $g^2$  in the government's loss function. Hence,

conditional on government information at this date,  $g^e = 0$ . Fiscal authorities do not yet know the output shock. Conditioning on information at the start of the period

$$g^e = 0 \tag{31}$$

Surprise taxes are lump sum taxes, raising sufficient revenue to meet all fiscal spending ambitions. However, this applies only in conditional expectation. Since the monetary authority has an informational advantage, surprise inflation generates surprise government spending from the fiscal viewpoint.

In the first best, low tax capacity induces low government spending to avoid excessive distortionary taxes or high expected inflation. In contrast, the inability to commit taxes leads the government to spend as if already enjoyed the riches of full structural adjustment. In equilibrium, supposedly surprise taxes are in fact anticipated, and thus distort output heavily. Historians of Latin America should have no trouble with these stylised facts.

With  $g^e = 0$ , the budget constraint implies  $\tau^e = h - \pi^e$ . Together with (30) this yields  $(\pi^e, \tau^e)$  as functions of the monetary regime  $(\pi^*, k)$ . Yet the monetary regime has no effect on government spending in (31). Three problems – monetary temptation, fiscal temptation, and spillovers from monetary to fiscal policy – cannot be solved by two design parameters  $(\pi^*, k)$ . What is needed of course is an additional policy instrument. Nor is it optimal to design regimes only to rectify monetary failures. Regime design must address monetary and fiscal failures simultaneously.

Moreover, conditional on  $g^e = 0$ , since then  $\tau^e = h - \pi^e$  the optimal second-best choice of  $\pi^e$  then minimises  $L$  by setting  $0 = \pi^e - h - \pi^e$ , whence

$$\tau^e = \pi^e = h / 2 \tag{32}$$

Fiscal temptation makes high government spending inevitable. However, the second-best form of monetary delegation ensures that expected inflation is sufficiently high that distortionary taxes are not too high. The second best thus *raises* expected inflation above its first best level. Dollarisation, hawkish monetary unions, and other forms of monetary rectitude, are positively misguided if the problem of fiscal failure has not been addressed. Monetary rectitude views the problem through a monocle when binocular vision is required.

### ***Fiscal conditionality***

Famously, Mrs Thatcher proclaimed there would be ‘no U-turn’ from the tight fiscal policy needed to underpin tight UK monetary policy in the early 1980s. In so doing, she hoped to raise the costs of fiscal surprises. However, fiscal conditionality is more likely to be binding if embedded in a formal regime.

Recent examples include the EU Stability Pact, the UK Code for Fiscal Stability, and balanced budget requirements at Federal and State level in the US.

Central bank independence, with appropriate choices of  $k$  and  $\pi^*(h)$ , can take care of two of the problems. Can the government loss function be augmented to then obtain the correct fiscal choice, the analogue of decentralising monetary policy to a central banker? For example, one could think of this either as a budget deficit target, as in a Latin American version of the EU Treaty of Maastricht, or as a precondition for IMF assistance.

Equation (1) defines  $\tau$  as *anticipated* taxes relative to tax capacity. The ex post deficit  $[g - \tau - t^u]$  also includes unanticipated taxes. Suppose the per-period government loss function becomes

$$L = \pi^2 + y^2 + g^2 + b(g - \tau - t^u - B)^2 + (h - h_{-1})^2 \quad (33)$$

where  $B$  is a deficit ceiling. However, in choosing surprise taxes, the government's first order condition remains (31), namely  $0 = g$ . The reason is that  $g^u = t^u$ , so the new term never enters the first order condition for  $t^u$ . In this example, extra conditions on the budget deficit don't work!

Fiscal failure makes *both* taxes and spending too high. What is needed is a penalty for high *levels* of government spending or high taxes. With a fiscal target  $g^*$  and the loss function augmented by  $(g - g^*)^2$ , the first order condition for  $t^u$  becomes  $0 = g^e + (g^e - g^*)$ . To attain the first best, one sets

$$g^* = 2g^e = -2h/3 \quad (34)$$

Government spending ceilings thus increase as  $h$  falls and development occurs.

Here the European experience is helpful in thinking about the future of Latin America. The prospect of monetary union can be used to impose additional constraints on fiscal policy. However, the purpose of additional constraints should be to provide discipline on average, not to compromise shock absorption. For simplicity, my model supposes that only monetary policy is set after shocks occur. However, some dependence of fiscal policy on shocks could easily be incorporated too, not least through automatic stabilisers.

### ***Reform with fiscal failures***

To highlight the role of fiscal failures in the pace of reform, imagine that policy cannot solve the fiscal failure but adopts the second-best monetary policy in those circumstances, given by (32), recognising that inflation should not be prematurely eliminated.

As usual the marginal cost of reform is given by  $-\{[(h-h_{-1}) - \phi (h_{+1}-h)]\}$ , the minus sign because we are discussing falls not rises in  $h$ , and the marginal benefit of reform is obtained by using (32) and differentiating  $\pi^2 + y^2 + g^2$  to yield  $\{1/2 \pi^e + 1/2 \tau^e\} = h/2$ . Hence the marginal benefit of reform is  $h/2$  when only fiscal failures exist,  $3h/8$  when only monetary failures exist, and  $h/3$  when neither failure exists. The benefit of reform is therefore greater under fiscal failure than under monetary failure. Compounding fiscal failure by a misguidedly tight monetary policy would raise distortions further and enhance the benefit of reform yet more.

If Latin America is also characterised by sluggish reform itself, the cause thus cannot be sought either in monetary failures or fiscal failures. The greater are these failures, the larger is the incentive to press ahead with structural reform. To explain sluggish reform we have to introduce failures in reform itself.

### ***Commitment failures in reform***

So far, I have assumed that reform is exogenous, uninfluenced by the macroeconomic regime, and undertaken at the start of each period, before expectations are formed. Now suppose, within each period, that the private sector first form expectations (about fiscal policy, reform, and monetary policy), then the government chooses the level of reform, then the level of taxes, and finally monetary policy chooses inflation. In comparison with the previous section, this inverts the timing of expectations formation and structural adjustment.

I illustrate for the case in which the country dollarises to a price-stable USA ( $\pi = \theta = 0$ ) but fiscal failures remain so taxes are set to make expected  $g$  equal to zero. The government budget constraint then implies  $\tau = h$ . Since these problems always partition into the independent choice of first moments and the response to output shocks, nothing is lost by supposing the output shock is always zero. We can then use the superscript  $e$  now to denote the private sector expectations at the start of the period. Everyone now has the same information set, but expectations must be set before reform and fiscal decisions are made.

With these amendments, imagine choosing  $h$  subject to the predetermined  $(h^e, \tau^e, \pi^e)$ . Because of the regime,  $\pi^e = 0$  and  $\tau^e = h^e$ . In effect the government's reform choice chooses  $h^u$ , and thus  $\tau^u$ . However, this has no effect on  $\pi$ , which by assumption is zero, or on  $g$ , which is also set equal to zero because of fiscal failure. Finally,  $y$  depends on expected taxes  $\tau^e$ , but not therefore on  $\tau^u$ . Hence, varying  $h$  has no effect on costs this period. However, it does affect the level of  $h$  inherited the next period, and hence  $\tau_{+1}^e$

and output in the next period. All other future variables can be neglected because of the envelop theorem since  $h$  is reoptimised next period.

Hence the first order condition for choosing  $h$  becomes

$$0 = -\phi h_{+1} + [(h-h_{-1}) - \phi (h_{+1}-h)] \quad (35)$$

The first term is (minus) the marginal benefit of reform, which reduces the level of output distortions the following period and must be discounted back to the present. The second term is (minus) the marginal cost of reform. Assuming the usual form of solution  $h = \rho_R h_{-1}$  where  $\rho_R$  is the convergent root ( $\rho_R < 1$ ), the marginal benefit of reform is now  $\phi \rho_R h$ , which may be considerably smaller than the terms  $h/3$ ,  $3h/8$ ,  $h/2$  that were previously computed as the marginal benefit of reform in the first best, under monetary discretion and under fiscal discretion respectively. In particular, since the only benefit of reform shows up in the future, heavy discounting of the future (small  $\phi$ ) may largely eliminate any benefit of costly reform, unlike previous examples where contemporaneous benefits always occurred. Reform failure, coupled with misguided policy design, induces stagnation.

Nor is this inevitable. Even with fiscal failures, second best monetary policy ( $\pi^e = h/2$ ) would provide a contemporaneous benefit to reducing  $h$  that would stimulate reform even when the future is heavily discounted. Dollarisation or monetary union with the wrong inflation rate substantially removes the benefit of reform. This of course is merely another application of the second best. The first best would have to resolve failures in monetary policy, fiscal policy, and in reform commitment itself.

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# Discussion

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## **The advantage of using winter tires in Venice:**

**Comment to the paper by David Begg**

### **1. Introduction**

I like the paper by David Begg because it offers very innovative insights in the difficult interplay of monetary, fiscal and structural policy – and all this under conditions of the second best. The paper was originally designed for analysing the transition of countries in Central and Eastern Europe to full membership in European Monetary Union. But since the underlying problems – above all an insufficient degree of structural reform – are very similar in many countries, David now applies the paper and its underlying model to all countries in Latin America. Given three fields of economic policy that are addressed in the paper, one could discuss all its implications. In the context of this conference I want to focus on its analyses and recommendations for monetary and exchange rate policy. More specifically I want to ask two questions:

- Can David's model provide a comprehensive theoretical case against dollarisation in Latin America?
- And more generally: What is the value-added of a the interactive approach for an analysis of monetary and exchange rate policy in emerging market economies?

### **2. The model's results for monetary and exchange rate policy**

For its analysis of monetary and exchange rate policies the paper discusses four different regimes.

In the **first-best regime** the government is confronted with the task of financing an arbitrarily chosen level of expenditures ( $G^*$ ) with a given tax capacity (which is not sufficient), an inflation tax, and additional distortionary taxes. In this case the government simultaneously sets an optimum inflation rate and an optimum distortionary tax. In this regime the role of monetary policy is very limited. After the expected inflation rate has been chosen by the government, the central bank's only task is to react with unexpected inflation to supply-shocks.

In the regime called "**monetary discretion**" the expected and the unexpected inflation rate are set by the central bank. Thus, monetary policy is now confronted with the task of financing the gap between expenditures and the tax capacity only with the instrument of the inflation tax, i.e. without being able to set the distortionary tax simultaneously. This tax is again set by the government but *after* the inflation rate has been decided by the central bank. Compared to the first best regime, "discretion" leads to a relatively high inflation rate and accordingly to a higher social loss.

This "inflation bias" can be avoided if the government decides for the regime "**delegation through targets**". In this regime the government can again set the first-best expected inflation by prescribing the central bank's inflation target. In addition, the first-best shock response of monetary policy can be attained by choosing a central banker with preference of  $k = \frac{1}{2}$ . Accordingly under this regime exactly the same results can be attained as under the first-best regime.

The forth regime is "**dollarisation**". Here the inflation rate (and thus the inflation tax) is determined by the United States. As the optimum inflation rate in the United States is lower as in the typical emerging market economy, the inflation tax is too low compared with the first- best regime. In addition, there is no possibility for monetary policy to cope with supply-shocks.

Thus, the ranking of the four regimes in terms of social welfare is quite intuitive: The highest level of welfare is achieved by the first-best solution and by delegation through targets. It is followed by "discretion" and "dollarisation" leads to the worst outcome.

### 3. The model's policy implications

If one tries to apply the model's results to countries in Latin America, the monetary policy implications as straightforward as surprising: Countries could either opt for the first-best solution or for delegation through targets. For exchange rate policy this would imply that instead of the fixed-rate corner solution the alternative of absolutely flexible exchange rates should be adopted.

The surprising feature of this result is that the first-best solution comes very close to the institutional arrangements that were prevailing in the 1970s and 1980s: A politically completely dependent monetary policy organised as a sub-division of the ministry of finance. As far as the alternative regime "delegation through targets" is concerned, it can be regarded as a politically dependent monetary policy in disguise since all relevant parameters can be controlled perfectly by the government.

A somewhat strange institutional arrangement is what the paper calls "monetary discretion". It assumes that the central bank is setting an optimum inflation rate without knowing the complete structure of the economy, especially the government's ability to raise additional taxes. However, a completely informed central bank, especially if it is not independent, would again chose the first-best inflation rate.

### 4. The model's set-up and specific assumptions

In my view these surprising results are mainly due to the models specific structure and assumptions.

First, the model is designed in a way that there is **no time-inconsistency problem** for monetary policy. In the model's basic version the government's income maximisation rests completely on expected inflation so that there is no need for inflation surprises. In addition in the loss function there is no deviation of the output target from its natural level which in Barro-Gordon-type models is the standard cause for an inflation bias. Accordingly, without a time-inconsistency problem the traditional argument for monetary policy rules is absent. Therefore, a completely

discretionary setting of inflation by the government (as in the first-best regime) leads to an optimum outcome. In addition, the central bank (or the government if it sets the inflation rate) is not confronted with a credibility problem.

Second, the model is a completely **closed-economy model**. It lacks any linkages with the rest of the world via purchasing power parity and interest parity theories. As a result,

- the domestically optimal inflation rate has no effects on competitiveness,
- there are no disturbances by exchange rate volatility and misalignments, and
- there are no problems of a risk-premium.

Thus, the model seems a priori better suited for large economies like the United States or the Euro Area than for the relatively small and open emerging market economies or larger economies with a high degree of dollarisation like Argentina.

Third, in the model the **options for fiscal policy** are rather limited. Above all the model does not address the standard policy option of financing expenditures with deficits. As a consequence the government is also not confronted with the problem of having to finance an outstanding debt for which exchange rate expectations and the risk premium are crucial and there is also no need to cope with demand shocks.

Under these specific conditions it is not astonishing that rule-based solutions like dollarisation or a currency board receives rather bad marks. While it is obvious that rules restrain the room for manoeuvre, it is also clear that their main attractiveness lies in their positive impact on the credibility of monetary and exchange rate policy and thus on private expectations concerning inflation and exchange rates. In other words, in world without credibility problems the results of the paper are as obvious as a study on the advantages of using winter tyres in Venice

- If there is no time-inconsistency problem for the central bank rules for the conduct of monetary policy are not required. (If there are no roads, tyres are not very useful).
- And if there is no open-economy design of the model, the specific rule of dollarisation can also not help very much. (In an area like Venice, summer tyres would be always sufficient). .

## **5. The value-added of an interactive approach**

The paper correctly argues that “it is wrong to think about problems in isolation from one another” (p.1). As a consequence it chooses an approach where it analyses the optimum design of monetary policy from a fiscal policy perspective. The price that has to be paid for this approach is that the model neglects genuine problems of monetary and exchange rate policy.

Looking at the situation in Argentina I think that exactly the opposite approach would be helpful. Instead of complaining about the lack of fiscal discipline which causes exchange rate problems, one could relate a large part of the fiscal policy problems to the increase of interest payments which were caused by an exchange rate regime which had lost its credibility over time.

In other words, the solution for Argentina would not have been an even more restrictive fiscal policy but rather a timely switch to a more flexible exchange rate regime. This leads me to a final comment. The paper is still very much shaped by the orthodox belief in the so-called two-corner solution. In my view the optimum solutions can only be found in-between, in forms of a managed floating (Bofinger and Wollmershäuser 2002) which provide a certain control over the exchange rate together with the required flexibility to cope with domestic shocks.

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