DISCUSSION PAPER SERIES

No. 2637

# BEYOND THE DESIGN OF MONETARY POLICY ALONE: FISCAL COMMITMENT, MACRO COORDINATION, AND STRUCTURAL ADJUSTMENT

David Begg

*INTERNATIONAL MACROECONOMICS AND TRANSITION ECONOMICS*


Centre for Economic Policy Research

www.cepr.org

*ISSN 0265-8003*

# BEYOND THE DESIGN OF MONETARY POLICY ALONE: FISCAL COMMITMENT, MACRO COORDINATION, AND STRUCTURAL ADJUSTMENT

**David Begg,** Birkbeck College, London and CEPR

Discussion Paper No. 2637
December 2000

Centre for Economic Policy Research
90–98 Goswell Rd, London EC1V 7RR, UK
Tel: (44 20) 7878 2900, Fax: (44 20) 7878 2999
Email: cepr@cepr.org, Website: www.cepr.org

CEPR Discussion Paper No. 2637

December 2000

# ABSTRACT

## Beyond The Design of Monetary Policy Alone: Fiscal Commitment, Macro Coordination, And Structural Adjustment*

Analysis of the design of institutions to counteract failures of monetary commitment has largely proceeded in a vacuum. It has ignored similar commitment problems in fiscal policy and in structural adjustment; and it has ignored coordination problems between monetary and fiscal policy. Optimal second-best monetary design will of course depend on the extent to which these other failures can also be solved.

The Paper develops a model in which the extent of structural adjustment thus far accomplished influences the ability to raise non-distortionary tax revenue. A poor structural inheritance implies both a low current output, reduced by severe tax distortions, and the need to resort to high levels of the inflation tax. Low output and high inflation both reflect a poor structural inheritance, which can be improved by investing scarce current resources in structural improvements for the future. The chosen rate of adjustment is derived in various regimes.

This framework leads naturally to a discussion of the appropriate form of delegated monetary independence, its relation to the ability to make fiscal and adjustment commitments, and the possible role that EMU may play. Clearly, monetary commitment alone cannot accomplish the first-best and might actually make things worse. The analysis offers insights about other forms of external conditionality that might be welfare-improving for transition economies hoping to accede to EMU. The analysis also highlights the danger of believing that a slimline IMF could confine itself to monetary and fiscal policy without worrying about structural adjustment.

JEL Classification: E32, E42, F41 and F42
Keywords: monetary policy, fiscal policy, structural adjustment, EMU, transition

David Begg
Department of Economics
Birkbeck College
7-15 Gresse Street
London W1P 1PA
UK
Tel: (44 20) 7631 6414
Fax: (44 20) 7631 6416
Email: dbegg@econ.bbk.ac.uk

* This Paper generalizes the analysis in Begg 'The Impact of EMU on European Transition Economies: Commitment, Institutional Capacity and the Monetary-Fiscal Mix' Working Paper 179, WIDER, April 2000, forthcoming in C. Wyplosz (ed): *The Impact of EMU*, CUP.

Submitted 31 October 2000

# NON-TECHNICAL SUMMARY

This Paper has two themes. The first is the theory of the second best, which counsels against solving monetary commitment failures on the assumption that no other failures exist. Too much of the literature on central bank independence falls into this pitfall. The second is the need to take seriously the ideas of transition and structural adjustment, and therefore to develop interesting models in which they evolve over time according to choices made by agents within the model. The Paper develops a more general model and uses it to assess the likely impact of EMU on transition economies hoping to accede to the EU and EMU itself. Although the principal object of the analysis is to shed light on forms of external conditionality that the EU might benevolently apply to EU applicants, the analysis also contains lessons for the design of monetary and fiscal institutions in developed countries, and for IMF programmes in developing as well as transition economics.

The model has the following structure. Output is affected by temporary shocks, by inflation surprises and by tax distortions that depend on the level of tax revenue relative to tax capacity. Structural adjustment enhances tax capacity, or some other index of supply performance, and thus the ability to raise non-distortionary tax revenue. Government spending is financed by tax revenue and the inflation tax. The government cares about price stability, output and deviations of government spending from an ambitious target level that remains constant over time. Early in transition, with a poor inherited structure, governments trade off three costs – high inflation, low output (caused by highly distortionary taxes) and government spending well below the ideal level. By devoting scarce resources to investing in supply-side improvements, the government can improve the terms of this trade-off in the future. In the steady state, once transition is complete and tax capacity has risen to the level of the spending ambitions, there is no need for distortionary taxation, output is no longer distorted, and there is no need for the inflation tax.

For easiest comparison with the familiar literature on central bank independence, the analysis first studies a similar problem. Tax capacity is exogenous and fixed. However, it is recognized that monetary policy is more flexible than fiscal policy: formally, this means that monetary policy can be chosen after fiscal policy and fiscal policy must anticipate future monetary actions. There is also the issue of when the contemporaneous output shock is observed. The following timing is assumed. Tax capacity is fixed, then private expectations are formed, then fiscal policy is chosen, then the output shock occurs, finally monetary policy chooses inflation. For the moment, it is assumed that fiscal policy faces no commitment problem.

The first-best is derived, and decomposes into rules for setting taxes and expected inflation – each a linear function of the state variable describing the

level of structural adjustment still to accomplish – and an innovation-contingent feedback rule, describing how surprise inflation optimally reacts to the output shock, having regard to the consequences for price stability, output, and the ability to undertaken government spending that is partly financed by the inflation tax.

Now problems of monetary commitment are introduced. Monetary policy succumbs to the temptation to create a systematic inflation bias. Foreseeing the consequent inflation tax revenue, fiscal policy sets tax rates lower than in the first-best (to reduce output distortions) and sets government spending higher than in the first-best. Welfare of course is lower than the first-best, perhaps considerably.

Suppose to counteract the commitment failure, monetary policy is delegated to an independent central bank. Suppose that bank cares about inflation and output but not government spending.

Shock accommodation by the bank therefore neglects the effect of surprise inflation tax revenue on the ability to finance government expenditure. This externality means that monetary policy creates surprise inflation that is on average 'too volatile'. Appointing a suitably conservative central banker can exactly internalize this externality. It is a totally different motive from the standard Rogoff argument, which applies to the inflation bias in first moments, but not the excess variance in second moments.

Of course, the appointment of a conservative central banker imparts a downward bias to the expected inflation rate, but not necessarily of the correct amount. Indeed, the model shows that three considerations are relevant. First, the original commitment problem (too much expected inflation), second, the imparted bias (too little expected inflation), and, third, the need to think about how monetary policy serves fiscal needs not in relation to unexpected inflation but in relation to expected financing of government spending. In general these can lead to a desire for more, *or less*, inflationary bias in monetary policy. The exact conditions are derived. Essentially, the larger the problem of monetary temptation, the larger the need for a conservative central banker, but the larger the need for inflationary finance (when output is very sensitive to tax distortions and when the inflation tax Laffer curve offers large revenue gains from higher inflation rates) the more it could be optimal to delegate to a liberal central banker.

In trying to reduce biases in both the first and second moments of inflation, having only one instrument – the relative weight the central banker puts on price stability – can never accomplish the first-best. Moreover, the second-best choice of conservativeness becomes a function of the state variable, the degree of structural adjustment remaining to be accomplished. This has the unfortunate feature that lengthy terms for central bank governors are time-

inconsistent if structural adjustment is occurring. The banker best for today quickly becomes redundant tomorrow.

However, two instruments may be available to solve the two problems. In addition to the relative weight on price stability, it is possible also to delegate an inflation target, the central banker being asked to care only about inflation deviations from this target rather than from price stability itself.

Decentralization of the first-best is now possible and has an attractive feature. The government can delegate an inflation target that moves with structural adjustment, but no change in the relative weights is required. Delegation of monetary policy is time-consistent and therefore credible.

As an alternative commitment device, EMU is likely to offer both the wrong response to shocks (unless EMU shocks are highly correlated with those faced by a potential entrant) but may also offer the wrong degree of manipulation of the inflation bias. The Paper offers an example in which, even in the absence of all shocks, EMU is simply too tough a price-stability club for the transition economy to want to join. Ever. Since all biases are linear in the state variable, the ranking of various sub-optimal regimes is preserved even as exogenous structural adjustment takes place. Waiting does not help.

In a sense, the rest of the Paper is motivated by the question ‘So why are transition economies so keen to join EMU?’ Part of the answer may lie in their perception of the Lucas critique, an issue beyond the scope of this Paper. Rather the Paper shows that by introducing other policy failures, the benefits of joining EMU are enlarged.

Some insight is obtained by adding fiscal failures to monetary failures. Many governments promise to raise taxes or reduce subsidies but then find ways not to deliver on these promises. Timing within the period now becomes as follows. Structure is still exogenous. First, private expectations are formed, then fiscal policy is chosen (but now with the potential to surprise private expectations), then the shock is realized, and finally monetary policy is chosen. The simplest motive for fiscal surprises is to assume that surprise taxes are lump sum and have no output distortions; only expected taxes can distort output.

Surprise taxes may as well be chosen to achieve the ambitious (bliss) level of government spending and this is foreseen by the private sector. Transition is now lopsided, with an immediate jump to steady state spending levels, leaving high inflation and high taxes (both anticipated) to foot the bill. The output recession can be large and protracted. Subsequent structural adjustment mitigates inflation and tax levels but has no effect on government spending.

Next, the Paper endogenizes structural adjustment. The benefits of adjustment are that it reduces the need for both distortionary taxes and the high inflation and low spending needed to mitigate these taxes. What about

the cost of adjustment? With fixed costs, there would be either a big bang or no bang at all. Whatever the fragile political dynamics of any initial window of opportunity to create momentum for reform, I assume that advanced transition economies have long since settled into slow but steady progress. Quadratic adjustment costs cause this incentive to go slowly.

To derive the chosen speed of reform, it is now necessary to consider the entire future, since costly reform today yields benefits later as well as today. Initially, I suppose that the rate of reform is not subject to any commitment difficulties. The chosen rate of reform is derived and has one simple property. Since the marginal cost of reform depends only on the speed of reform (but not other economic variables) and since the marginal benefit of reform is largest when distortions are greatest, the more distorted the regime the more rapid will be the chosen rate of reform. While eminently sensible, this has the implication that if EMU helps transition economies solve existing distortions, it will (optimally) slow down their rate of structural adjustment. This still seems somewhat difficult to square with what is actually going on.

The final part of the jigsaw comes by allowing commitment problems in reform as well. Then it is shown that a myopic enough government will abandon reform completely. The intuition is straightforward. Surprise taxes already allow bliss on government spending. Surprise reform would also change the inflation rate then chosen, but if this is optimized by appropriate monetary policies, the envelope theorem means there is no gain to using contemporaneous reform to affect this. For the present, other expectations are already predetermined. And with sufficient myopia, the future doesn't matter. A short policy horizon plus commitment failures in both fiscal and adjustment policies is therefore a lethal combination for transition.

Against this richer perspective, there are clearly diminishing returns to delegating monetary policy in isolation, or viewing the framing of external conditionality as principally a monetary problem. Other forms of conditionality are needed and the principle of targeting suggests that firepower should be concentrated as closely as possible on the specific problems identified. This may justify sticks and carrots both for fiscal rectitude and for continuing reform itself. EMU is not sufficient and may only be necessary in the sense that it triggers a process of discussion about these other forms of conditionality. Similarly, recommendations that a slimline IMF withdraws from all concern about structural adjustment are likely to be misguided.

## 1 Introduction

Economic transition entails macroeconomic stabilisation and structural adjustment. This Paper is about the relation between the two, and is prompted by the question of how European transition economies should react to the formation of EMU. Structural adjustment includes the development of the institutional infrastructure needed for markets to function effectively, the establishment of corporate governance, the promotion of competition and the forging of appropriate regulatory institutions, and the introduction of new tax regimes and enforcement of tax compliance. Satisfaction of macroeconomic stabilisation criteria is necessary for the future entry of European transition economies into EMU, but prior membership of the EU is also needed. In practice, EU accession will depend heavily on success in structural adjustment.

Macroeconomic stabilisation and structural adjustment should not be assessed independently of one another. Structural adjustment, for example the institution of modern tax structures and a tradition of their effective enforcement, is the most reliable route to lasting macroeconomic stabilisation. The 1990s have shown, most spectacularly in Russia, that sudden monetary rectitude unsupported by fiscal responsibility leads quickly to a new setback.

I focus on the effect of EMU entry, actual or prospective, on the credibility of macroeconomic policy, and through this, on the incentive to undertake reforms to promote structural adjustment.[1] This places the emphasis on the dynamics of adjustment, where it ought to be when assessing transition economies.

Reform is costly today but improves opportunities in the future. There are several candidates for a state variable to capture cumulative progress to date. I choose the extent to which an effective tax base has been established and enforced. Two reasons make this a good choice. First, collapse of the ability to raise revenue lay behind many of the setbacks in the countries lagging in transition. Second, tax capacity forms a natural link between structural adjustment of the supply side and the public finance constraint on the choice of fiscal policy, monetary policy, and inflation.

[1] For discussions of the relation between EMU entry and reform incentives, see Sibert (1997), Sibert and Sutherland (1998) and Ozkan, Sibert and Sutherland (1999). Begg, Halpern and Wyplosz (1999) discuss other forms of conditionality that the EU might impose to assist transition in prospective accession countries.

Although designed to answer questions about structural adjustment, my Paper needs first to develop some building blocks along the way. These are also of interest in their own right. I view various monetary and fiscal regimes as chosen delegation of operational powers in response to particular inefficiencies arising from market distortions or commitment failures. The delegation of monetary policy is now the subject of an enormous literature, spawned by the conservative central banker in Rogoff (1985). It has led to the creation of many independent central banks, whose obligations, explicit or implicit, have been examined in the formal contracts of Walsh (1995), and the inflation targets recommended in Svensson (1997).

For simplicity, I work with an amended version of the Lucas surprise supply function used originally in Barro and Gordon (1983). It would however be possible to recast the entire analysis within the framework of a New Keynesian phillips curve. For a recent survey of results on the latter, see Clarida, Gali and Gertler (1999). Note however that even their extensive survey of the science of monetary policy makes no reference to the simultaneous design of fiscal policy and the interactions between the two.

In fact, the literature on delegation of fiscal powers is conspicuous by its thinness. This partly reflects the fact that to date governments have rarely given away fiscal powers for macroeconomic reasons. However, disaggregation within the cabinet matters: the familiar political tactic of appointing an 'Iron Chancellor' as Finance Minister is merely the fiscal analogue of the conservative central banker. For an early examination of problems of fiscal commitment, see the 'benevolent dissembling dictator' in Fischer (1980). Moreover, some measure of fiscal delegation is precisely what is accomplished when countries agree to budget conditions or stability pacts imposed by external agencies, such as the IMF or EU, as part of some wider agreement.

Recognising the difficulties entailed in trying to achieve fiscal commitment also has implications for monetary policy design. Given the interaction between monetary and fiscal policy, it is inappropriate to design monetary institutions that neglect failures in fiscal policy. The problem is innately second best. Most of the literature on monetary institutions ignores this reality. A fortiori, it is impossible to understand the experience of transition economies in the 1990s without placing centre stage two problems of fiscal commitment: the difficulty in sticking to plans to set adequate tax rates (including dispensing with subsidies at the planned rate), and the difficulty of implementing previous promises to undertake reforms to bring about structural adjustment. I therefore construct a model in which strategic issues arise in the design of monetary and fiscal policy, and commitment failures exist, both in the conduct of macroeconomic policy and in the implementation of structural adjustment. I consider how a benevolent government might choose to

delegate powers to mitigate distortions [2], and then explore how prospective EMU entry may affect behaviour in transition economies.

This Paper is organised as follows. Section 2 sets out the basic model. For comparison with the existing literature on monetary commitment, I begin by treating the level of structural adjustment as given, represented by a given level of tax capacity, and ignore problems of fiscal commitment. Additional government spending can be undertaken only by resort to the inflation tax or other distortionary taxes that reduce output. If monetary policy can be precommitted, the first best policy is derived. Then various second-best policies are examined. Interestingly, for some parameter values, the government may choose to delegate monetary policy to a central bank that is *less* conservative, because the low inherited tax capacity makes other forms of taxation even more distortionary than expected inflation.

Another important mechanism operates once monetary and fiscal policy are considered together. The practice of delegating monetary policy to counteract the inflation bias means that the central bank typically gives too little weight to the fiscal consequences of its monetary actions. In itself this becomes a reason for choosing a conservative central banker. Less tempted to intervene to stabilise output shocks, such a banker induces less volatility in the inflation tax, creating less problem for the government's fiscal programme. Optimal conservativeness of the central bank must therefore balance this effect against whatever inflation bias needs offsetting. The Paper shows how two instruments – the conservativeness of preferences and a delegated inflation target - are
needed to offset the two problems (monetary temptation and inadequate coordination of monetary and fiscal policy).

Within this framework, a low level of structural adjustment leaves the government with poor opportunities even when it trades off as best it can. Such a country faces high inflation, high tax distortions, low government spending and low output. Even though the implicit 'Phillips curve' is vertical with respect to expected inflation, a cross-country comparison, using countries at different stages of structural adjustment, would find on average a negative relation between inflation and output [3], not because inflation depresses output but because resort to the inflation tax is a symptom distortionary taxes are already in use owing to a low initial level of tax capacity. In such circumstances, it may be best to press ahead with structural adjustment, improving all options for

[2] Assuming a single principal rules out many interesting issues in political economy. However, the ensuing analysis shows that resolving these political economy issues would still leave significant problems of commitment and strategic interaction, with important consequences for policy design.

[3] See Bruno and Easterly (1995) and the many subsequent Papers corroborating this empirical finding

the future, rather than to tighten monetary policy further, thereby depriving the government of the (optimal) amount of inflation and forcing further reliance on other distortionary taxes or inefficiently low levels of government spending[4].

Section 3 then examines how a government might invest to improve its underlying structure in the future. The optimal speed of reform depends both on costs and benefits. Benefits are the ability to raise more tax revenue for any given level of output distortion. Costs of reform may be modelled in various ways. I assume quadratic costs of reform, which provide a reason to smooth reform over time. Fixed costs would of course have the opposite effect; however, since the benefits depend on the extent of initial distortions, assuming fixed costs would lead to the outcome that either a country undertook full reform immediately, or never undertook any reform at all. Neither seems realistic. For the case of quadratic reform, the optimal speed of reform in the first best case is derived, and compared with the chosen speed of reform in various second best cases. Countries (or regimes) that are more distorted have a greater benefit of reform, and therefore a reason to go *more quickly* if they face the same costs of reform. If EMU entry acts to enhance commitment and diminish distortions, other things equal it should (optimally) reduce the speed of reform prior to entry unless particular entry criteria are specified.

But is the problem really that, without such conditionality, transition countries are having to reform too quickly? Many aspects of actual transition seem hard to square with such an interpretation. Section 4 shows that the introduction of problems of commitment in fiscal policy, and in reform itself (the two are related when structural adjustment is viewed as enhancing tax capacity), yields a world that seems much more familiar. Sluggish reform, high government spending, severely depressed output. I then explore various mechanisms of institutional design and external conditionality that would counteract these distortions, in the extreme case allowing the full decentralisation of the first best, including the optimal pace of structural adjustment. In such a setting, I ask how well EMU fulfils such a role, extending arguments set out in Begg, Halpern and Wyplosz (1999) about the role external conditionality can usefully play in these circumstances.

## 2 The basic model

Consider a single transition economy small enough not to raise strategic issues in relation to other countries. The extent of structural adjustment already accomplished is modeled in the following way. Distortionary taxes reduce equilibrium output, but the degree of distortion imposed by any

[4] The model endorses Begg (1996), which , reviewing IMF advice to European transition economies, argued that policy advice had been too proccupied with inflation symptoms and too little with fundamental causes.

particular tax revenue depends on the size of the tax base and the degree of tax compliance. Suppose $t^+$ describes the 'tax capacity' of an economy at a point in time, and that significant distortions arise when actual taxation t exceeds $t^+$. Structural adjustment increases tax capacity $t^+$ over time, allows the government to finance larger spending levels in a nondistortionary way[5].

Each period, the private sector sets nominal contracts given expected inflation. Output obeys

$$\mathbf{y = a\pi^u - b\tau + \varepsilon} \qquad \mathbf{a, b > 0} \quad , \quad \tau = \mathbf{t^e - t^+} \qquad \mathbf{(1)}$$

Output responds in the usual way to unexpected inflation $\pi^u$ and a contemporaneous shock $\varepsilon$, but also depends negatively on excess taxation $\tau$, the amount by which actual taxes are expected to exceed tax capacity. When capacity is low, the excess may be substantial even though actual taxes are low by standards of developed countries with much higher tax capacities[6].

The government supplies goods and services G. Following Debelle and Fischer (1994), I assume that this expenditure can be financed either by taxation or the inflation tax

$$\mathbf{G = t + \lambda\pi} \qquad \mathbf{(2)}$$

where, for simplicity, the inflation-tax Laffer curve is assumed to be linear in the relevant range with slope $\lambda$. The per period loss function of the government is

$$\mathbf{L = \pi^2 + cy^2 + dg^2} \qquad \mathbf{g = G - G^*,} \qquad \mathbf{c, d > 0} \qquad \mathbf{(3)}$$

implying a target level of zero for inflation and output (the latter being a source of inflation bias when $\tau > 0$), and where g is the deviation of G from its target level G*. Using (2)

$$\mathbf{g = \tau - h + \lambda\pi ,} \qquad \mathbf{h = G^* - t^+ > 0} \qquad \mathbf{(4)}$$

Thus, the government cares about price stability, and, by a suitable normalisation, about the deviation of output from zero. Crucially, its target level of spending G* exceeds its initial capacity $t^+$ for nondistortionary taxation. The government therefore plans to use both excess taxation and the inflation tax to move initial levels of government spending closer to its target level[7]. Over time, as tax capacity rises, tax distortions and inflation can fall. Indeed, once $t^+$ eventually increases to $G^+$, both $\tau$ and $\pi$ become zero.

---

[5] The model could be generalised to allow smaller distortions when taxes are below current tax capacity.

[6] Since equation (1) makes output supply an increasing function of tax capacity $t^+$, it is possible to reinterpret $t^+$ as any supply side improvement in which transition may invest.

[7] Ideally, the government budget constraint should also consider the possibility of borrowing. One might justify its omission by observing that the creditworthiness of governments in transition economies is in practice limited. I also plead a technical justification of its omission: within a linear quadratic framework, once I consider the intertemporal problem of choosing h, having debt as a second state variable complicates the analysis. In section 3, I allow governments to accumulate h, which acts as an implicit asset in intertemporal optimisation.

The analysis investigates both how policy depends on h, a measure of the tension between aspirations and existing capacity, and the dynamics of how structural adjustment of h proceeds over time. Superimposed on this problem of optimal taxation are commitment and coordination problems. In the baseline model, I study the usual monetary temptation to use surprise inflation to boost output and mitigate the distortionary effect of excess taxation; and the stabilisation problem caused by the authorities' informational advantage over the private sector: inflation can be chosen after the output shock is observed, but tax decisions and private wage setting reflects ex ante expectations[8].

One final remark on timing. I take seriously the idea that monetary policy is more flexible than fiscal policy. The sequence of events within each period is as follows. First, the government chooses government expected spending, g, and expected taxes, $\tau$ ; next, the private sector forms inflation expectations, $\pi^e$; then the output shock $\varepsilon$ is realised; finally, actual inflation is chosen. The government budget constraint (2) implies that surprise inflation tax revenue must be reflected either in unexpected spending, unexpected tax revenue, or both. In a model including debt accumulation, unexpected tax revenue could be used to retire debt. In my simpler model, once one controls for unexpected inflation and unexpected spending, unexpected tax revenue is of no benefit and simply disappears down a black hole. The spirit of the model is therefore better served by assuming that all unexpected inflation receipts go into unexpected government spending.

### 2.1 First-best policy, for given tax capacity $t^+$ and given fiscal tension h

Suppose the government could precommit not to exploit systematically the temptation to pursue surprise inflation. Policy would then have two characteristics: a vector of rules relating expected values of policy variables to inherited levels of the state variable, h ; and the optimal innovation-contingent stabilisation policy, which in this linear-quadratic framework constrains surprise inflation to depend (linearly) only on output shocks.

[8] After the seminal Paper by Barro and Gordon (1983), the literature recognised that the central bank chooses interest rates not prices directly. I revert to the earlier specification purely on the grounds of simplicity. Two caveats are necessary. First, the transmission mechanism of monetary policy is less well understood for transition economies, and may even be perverse earlier in transition. Second, since the interest rate effect on prices also depends on the fiscal stance simultaneously adopted, ignoring fiscal policy induces serious biases.

For a given h, choosing $(\pi^e,\tau)$ to minimise the expected loss E(L) subject to (expected values of) the output equation (1) and the budget constraint (4), and using subscripts F to denote these first-best levels

$$\mathbf{0} = \pi^e_F + d\lambda g_F = \pi^e_F + d\lambda [\tau_F + \lambda\pi^e_F - h] \quad \textbf{(5a)}$$

$$\mathbf{0} = -bcy^e + dg_F = cb^2\tau_F + d[\tau_F + \lambda\pi^e_F - h] \quad \textbf{(5b)}$$

whence, letting $\Delta_F$ be defined as

$$\Delta_F = [d + cb^2(1+d\lambda^2)] \quad \textbf{(6)}$$

the first best levels of taxes, expected inflation, expected output and expected spending are

$$\tau_F = [d/\Delta_F]\,h \qquad \pi_F^e = [\lambda cb^2 d/\Delta_F]\,h \quad \textbf{(7a)}$$

$$y^e = [-bd/\Delta_F]\,h \qquad g^e_F = [-cb^2/\Delta_F]\,h \quad \textbf{(7b)}$$

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 more the government finds it optimal to hold expected spending below its ideal level.

Ex ante, the expected loss also contains second moments because of the shock ε. Only when choosing inflation is the shock known to policy makers. Unexpected inflation can respond to the shock, and, via the budget constraint (4), yield revenue available for unexpected government spending. Choosing unexpected inflation to the loss subject to (1) and (4), and letting the superscript u denotes the unexpected component, yields

$$\mathbf{0} = \pi^u + ca(a\pi^u + \varepsilon) + d\lambda\pi^u \quad \textbf{(8)}$$

Hence, the first best degree of stabilisation is given by

$$\pi^u = -ac\,\varepsilon/\Psi \;,\quad y^u = (1+d\lambda^2)\,\varepsilon/\Psi \;,\quad g^u = -\lambda ac\,\varepsilon/\Psi \;,\quad \text{where } \Psi = [1+ca^2+d\lambda^2] \quad \textbf{(9)}$$

Thus, a positive output shock ε induces a tighter monetary policy to stabilise output, lower inflation, and less inflation tax available to finance government spending. Output stabilisation is greater the larger is a (the ease with which surprise inflation can stabilise output); the larger is c (the more the government cares about output); the larger is d (the more it cares about government spending); and the larger is λ (the more revenue it gets from a given rate of inflation).

Because of the linear-quadratic framework, the optimal policy decomposes into a set of innovation-contingent feedback rules (9) independent of the state variable h (the extent of structural adjustment thus far accomplished), and the reduced form policy rules (7) decribing how excess taxes, expected spending and expected inflation are each linearly related to h.

Having learned these lessons from the ideal solution, I next introduce the familiar problem of imperfect monetary commitment made famous by Barro and Gordon (1983).

### 2.2 Monetary discretion

For the moment, continue to assume a fixed level of h and an ability to commit to fiscal promises. Fiscal plans are made and announced, then the private sector forms expectations, then the shock is realised, and finally monetary policy and the inflation rate is chosen. All decisions are made by the government; the central bank is subservient. The equilibrium is derived by dynamic programming.

Monetary policy chooses inflation to minimise (3), subject to (1) and (4) whence, letting the subscript D denote the discretionary regime, the first order condition is

$$\mathbf{0 = \pi_D + cay_D + d\lambda g_D} \qquad \mathbf{(10)}$$

Everyone knows this is how monetary policy will be determined. Equation (10) is used to form expectations, and hence also to deduce how the unexpected component depends on the shock ε

$$\mathbf{0 = \pi^e_D + cay^e_D + d\lambda g^e_D} \qquad \mathbf{(11a)}$$

$$\mathbf{0 = \pi^u_D + cay^u_D + d\lambda g^u_D} \qquad \mathbf{(11b)}$$

Equation (11b) is identical to (8), hence the 'ideal' shock accommodation rules (9) still obtain even when monetary discretion exists: since accommodation of shocks treats expectations as predetermined, there is no reason to depart from the ideal accommodation policy.

Notice too that accommodation rules are independent of τ the choice of fiscal policy, which is chosen before shocks are known. In minimising the ex ante loss (3), fiscal policy is concerned with minimising only $L(\pi^e, y^e, g^e)$, since $E[L(\pi^u, y^u, g^u)]$ is unaffected by fiscal policy and the expected value of the cross term is zero. Substituting from (1) and (4), equation (11a) implies

$$\mathbf{\pi^e_D = [1+d\lambda^2]^{-1} [d\lambda\, h + \tau \{abc - d\lambda\}]} \qquad \mathbf{(12)}$$

Fiscal policy minimises $L(\pi^e, y^e, g^e)$, subject to the (expected values) of output equation (1) and the budget constraint (4), and to (12a) which shows how expectations depend on the choice of τ itself. This yields the first order condition

$$\mathbf{0 = [\pi^e_D + d\lambda g^e_D] \{ [1+d\lambda^2]^{-1} [abc - d\lambda\}\} + b^2 c\, \tau_D + dg^e_D} \qquad \mathbf{(13)}$$

The first term shows the effect of taxes on expected inflation, which enters the loss function directly but also through its ability to finance government expenditure; the second term the cost of

higher tax distortions in reduced output; and the third term the effect of higher tax revenue in allowing additional government spending ($g^e$ is negative). Solving (4) ,(12a) and (13)

$$\tau_D = [d / \Delta_D]\, h < \tau_F \qquad \Delta_D = \Delta_F + (abc)^2 > \Delta_F \qquad \textbf{(14a)}$$

$$\pi^e_D = [\lambda c b^2 (1+d\lambda^2) + abc(1+\lambda abc)]\, d\, h / [\Delta_D (1+d\lambda^2)]$$

$$= \pi^e_F + \{abcdh[\Delta_F + abcd\lambda]\} / \Delta_F \Delta_D (1+d\lambda^2) > \pi^e_F \qquad \textbf{(14b)}$$

$$g^e_D = -bc\, h\, [b(1+d\lambda^2) + a(abc-d\lambda)] / (1+d\lambda^2) \Delta_D \qquad \textbf{(14c)}$$

For *given* fiscal policy, monetary temptation makes inflation higher than the first best level. Anticipating this, fiscal authorities compensate by setting somewhat lower tax levels. This reduces expected inflation somewhat, but not all the way to the first best level (for then there would be no incentive to reduce tax rates). Relative to the first best, government spending is lower because tax rates are lower, but higher because inflation tax revenue is greater. Since the budget deficit is financed by the inflation tax, and since inflation is unambiguously higher than in the first best, commitment difficulties with monetary policy lead to larger budget deficits than in the first best.

### 2.3 Delegating the conduct of monetary policy

Thus far there are two distortions - monetary temptation and failure to coordinate monetary and fiscal policy - so one additional instrument cannot attain the first best. However, it is interesting to consider the second best tradeoff when only one additional instrument is available.

#### 2.3.1 Delegating using preferences of central bankers

Consider a Rogoff-conservative central banker, selected by the government because of the particular parameters of the banker's loss function. I assume this to be

$$L_B = \pi^2 + f y^2 \qquad f > 0 \qquad \textbf{(15)}$$

Conservative means that the parameter f is less than the parameter c in the corresponding loss function of the government in equation (3). Central banker means a concern for inflation and output, but zero weight on any fiscal implications of inflation. The government chooses f, and selects a particular banker, to minimise government expected losses given that the central bank then acts with discretion. This leads to the first order condition

$$0 = \pi + fay \qquad \textbf{(16)}$$

whence $0 = \pi^u + fa\,(a\pi^u + \varepsilon)$ and

$$\pi^u = [1+fa^2]^{-1}\,[\,-af\,\varepsilon] \qquad y^u = [1+fa^2]^{-1}\,\varepsilon \qquad (17)$$

From (16), expected inflation depends on the prior choice of the tax rate

$$\pi^e = abf\,\tau \qquad (18)$$

The government knows that it will choose fiscal policy recognising its effect on the independent central bank. Hence the first order condition for choosing the tax rate is

$$0 = \pi^e\,(abf) + cb^2\tau + d[\tau - h + \lambda abf\tau][1+\lambda abf\,] \qquad (19)$$

whence, using the subscript M to denote delegated monetary independence,

$$\tau_M = d\,h\,[1+\lambda abf\,]\,/\,\Delta_M \qquad \Delta_M = (abf)^2 + cb^2 + d(1+\lambda abf)^2 \qquad (20a)$$

$$\pi^e{}_M = abf\,\tau_M \qquad (20b)$$

Finally, the government chooses f to minimise $E(L^2)$ subject to (17), (20), and the corresponding equations for $g^e$ and $g^u$ derived from (4) and (20).

$$0 = \delta L^e/\delta f + \delta L^u/\delta f$$

$$= \{\pi^e\,(abf) + cb^2\,\tau + d[\,\tau - h + \lambda abf\,\tau][1+\lambda abf\,]\}\,\delta\tau/\delta f + \{\pi^e + \lambda d[\tau - h + \lambda abf\,\tau]\}(ab\tau)$$

$$+ \delta/\delta f\ \{\,[1+fa^2]^{-2}[c + a^2f^{\,2}\,(1+d\lambda^2)]\,\sigma^2$$

The first of these three terms is zero by equation (19): the envelope theorem applies to the effect of f on the choice of $\tau$. The middle term shows the effect of f on expected variables, other than through its induced effect on the choice of taxes (equation (20b)). The third term shows how the choice of f affects the accommodation of shocks, and hence the variance of inflation, output and government spending, expressed as functions of $\sigma^2$ , the variance the exogenous shock $\varepsilon$. Substituting from equations (20) and undertaking the differentiation in the third term, we can express the first order condition for the choice of f as

$$0 = \{\,[(ab^2dh\tau_M)/\,\Delta_M][af - bc\,\lambda]\,\} + \{a^2\sigma^2\,[1+fa^2]^{-3}\,[(1+d\lambda^2)f - c\,]\} \qquad (21)$$

Suppose there are no shocks. The second term becomes zero and the optimal choice $f_M$ is

$$f_M = [b\lambda\,/a]\,c \qquad (22)$$

It is optimal to delegate to a 'conservative' central banker ($f < c$) if and only if $a>b\lambda$. The parameter a shows the temptation to inflate, as measured by the effect of surprise inflation on output in equation (1). If this distortion is large enough, a conservative central banker will be chosen. When the inequality is reversed, the government will choose to appoint a 'weak' central banker who cares less about price stability and more about output than the government! The parameter b shows the damage distortionary taxes do to equilibrium output, and $\lambda$ shows the slope

of the inflation-tax Laffer curve, and hence the effectiveness of high inflation in providing revenue without resort to other (more) distortionary taxes $\tau$. Thus, when the fundamentals are bad, in the sense that $a < b\lambda$, high inflation is efficient because the alternatives are worse.

Now recognise that the variance of shocks is not zero in equation (21). If the first term happened to be zero, the optimal choice of f would now be $f = \{c / [1+d\lambda^2]\} < c$. A conservative central banker would now be appropriate, though *not* for any reason to do with mitigating temptations to inflate. Rather it is the consequence of the fact that the loss function of the central bank ignores the effect of its actions on government spending, whereas, in relation to the accommodation of shocks, the government dislikes the variance of government spending in addition to disliking the variance of output and inflation. Since the central bank does not internalise the effect of surprise inflation in changing the ability to finance government expenditure, its chosen level of surprise inflation is too responsive to shocks; a suitably conservative central banker will exactly offset this effect.

Of course, the two parts of equation (21) cannot be assessed separately. In practice, the optimal choice of f trades off its effect in partly mitigating the temptation to inflate against the fact that in consequence it departs from the ideal level of accommodation of shocks. Since equation (21) is a quintic equation in f, locating the global minimum is not straightforward. However, the right hand side of (22) is negative when f = 0, and positive when f exceeds both $[\lambda bc/a]$ and $[c / (1+d\lambda^2)]$. It therefore has at least one local minimum for nonnegative f.

In general, the optimal f will depend on $(h, \sigma^2)$. Shortly, I will describe how structural adjustment leads to the evolution of h over time. This means that the optimal f changes as h changes. Using the preferences of the central banker is therefore an unhelpful way to try to mitigate the problem of monetary commitment, since one would need to keep changing the central banker as h evolves! Asserting that any particular central banker had a long prospective tenure since this would be time inconsistent: unless structural adjustment had become bogged down, it would soon become optimal to change the central banker. The existing literature (Walsh, 1995; Svensson, 1997,1998) recognises that conservative preferences fail to achieve the first best by forcing a tradeoff between shock accommodation and inflation reduction. Whilst this still obtains in my analysis, it is additionally the case that the policy is time inconsistent. The objection to it is not just that it fails to achieve full efficiency but that it is internally contradictory.

This does not mean that it may not have been implemented in practice. Since my characterisation of transition is that countries begin with large h $(= G^*-t^+)$ which gradually shrinks as countries invest in enhancing tax capacity $t^+$, there is one further lesson to be learned from equation (21).

Suppose transition economies begin with h large relative to $\sigma^2$, but have different configurations of [a-bλ]. By assumption, the first term in (21) will largely determine the initial choice of f. Some countries will choose quite conservative central bankers but others will find it optimal to choose expansionary central bankers. As transition proceeds, h diminishes and the second term in (21) assumes ever-greater importance. There is therefore a convergence in the choice of f, at least among those transition economies that have managed to sustain reform. This is consistent with observation by Sachs (1996) and Begg (1996) that exchange rate regimes, and in particular the degree of exchange rate flexibility, has tended to converge as transition has progressed.

### 2.3.2 Delegation through contracts *and* targets

Since Walsh (1995) and Svensson (1997), it has been recognised that, provided the precommitment is equally good, there is no need to sacrifice the efficiency of shock accommodation in order to mitigate the systematic temptation to inflation. Instead, it may be possible to use a contractual approach in which the government lays down an inflation target, perhaps reinforced by an explicit penalty imposed on its agent, the central bank, in the event that operational independence of monetary policy is misused or pursued incompetently.

In my framework, prescribing an inflation target not only decouples the (optimal) manipulation of expected inflation from the ideal degree of shock accommodation, it also enables the government to lay down a moving target for inflation, which, if suitably calibrated with progress on structural adjustment, restores time consistency. Indeed, I will show that the first best can be fully realised provided the delegation is fully credible. To be specific, suppose the government appoints a central banker with preferences

$$\mathbf{L_B = (\pi - \pi^*)^2 + ky^2 \qquad k > 0} \qquad \mathbf{(23)}$$

where $\pi^*$ is the inflation target laid down by the government (which may differ from the zero target implicit in equation (3)) and k is the relative weight on output deviations from the zero target. The central bank's choice of inflation will therefore obey

$$\mathbf{0 = (\pi - \pi^*) + aky} \qquad \mathbf{(24)}$$

whence from equation (1), $0 = \pi^u (1+ka^2) + ak\varepsilon$, so

$$\mathbf{\pi^u = - ak[1+ka^2]^{-1}\ \varepsilon \qquad y^u = [1+ka^2]^{-1}\ \varepsilon} \qquad \mathbf{(25)}$$

and comparison with the first best response (9) shows that this can be accomplished by choosing

$$\mathbf{k = c / (1+ d\lambda^2)} \qquad \mathbf{(26)}$$

As we learned from (21), it is necessary to choose a somewhat conservative central banker merely to compensate for the fact that the central bank does not internalise the effect of its actions on the revenue that finances government spending. The optimal value of k in (26) is precisely what would have obtained in (21) had the first term happened to be zero.

The additional policy instrument ($\pi^*$) can be used to offset the appropriate inflation bias, optimising separately with respect to first and second moments, precisely as in the first best policy. A central bank told to behave according to (23) will choose inflation according to (24), whence

$$\pi^e = \pi^* + abk\,\tau \qquad (27)$$

The fiscal authority now chooses the tax rate knowing how the central bank will subsequently behave. Analogously to the derivation of (19) and (20) but using (27) instead of (18) we obtain

$$\tau = \{dh\,(1+\lambda abk) - \pi^*[abk(1+d\lambda^2)+d\lambda]\} / \{(abk)^2 + cb^2 + d(1+\lambda abk)^2\} \qquad (28)$$

which would reduce to (20a) if we replaced k by f and set $\pi^* = 0$.

Suppose $\tau$ is at the first best level $dh/\Delta_F$ in (7) and k is set according to (26). From (27) the first best expected inflation rate $\lambda cb^2 dh/\Delta_F$ is achieved by setting an inflation target

$$\pi^* = [bcd / \Delta_F\,(1+d\lambda^2)]\,[\,\lambda b(1+d\lambda^2) - a\,]\,h \qquad (29)$$

Evaluating (28) at this inflation target, yields $\tau = dh / \Delta_F$, which confirms that this combination ($k$, $\pi^*$) decentralises the first best.

As in condition (22), it is the size of the parameter a relative to other parameters in (29) that determines whether the delegated inflation target should be larger or smaller than the ideal level (zero) of the government. If the commitment problem is sufficiently large (large a), it will be optimal to ask the central bank to aim for an inflation target that is negative; conversely, the more other distortions matter, the more is optimal to set $\pi^*$ above the zero level in the government's own loss function (3).

This optimal inflation target $\pi^*$ is linear in h, and thus should decline in absolute value as structural adjustment takes place and h converges on zero. Notice in this model, in which all prices adjust by the end of the period, credible delegation until the end of the period would suffice to prevent reneging, so a relative short guarantee of tenure for the central bank governor might suffice. However this optimistic conclusion is unlikely to survive models in which price stickiness introduces greater persistence.

### 2.3.3 Open loop commitments for inflation

Suppose next that the country agrees to some form of external conditionality, for example membership of EMU, with the consequence that inflation has to follow a given path. Imagine first that this is completely certain. Hence

$$\pi^u = 0 = g^u \qquad y^u = \varepsilon \qquad \textbf{(30)}$$

Accommodation of shocks is now zero, which is inefficiently low. Consider now the first order condition for setting fiscal policy, which no longer affects inflation (any impact been undone by the foreseen component of monetary policy)

$$0 = -cby^e + dg = cb^2\tau + dg^e = cb^2\tau + d[\tau - h + \lambda\pi^e] \qquad \textbf{(31)}$$

Since this is precisely the same first order condition as in (5), it follows that setting the open loop path for inflation at the first best level in (7) will induce the same choice of $\tau$ as in the first best only if the exogenous open loop path for $\pi^e$ follows the first best level in (7a). Moreover, this achieves the first-best outcome only when the variance of shocks is zero. Otherwise, some shock accommodation is also desirable.

Clearly, if the commitment problem in monetary policy is large enough, and the variance of shocks small enough, a country would prefer the regime offering it an open loop path provided that path is sufficiently close to the first best level of inflation. Since the systematic component of first best inflation in (7) is linear in h, this implies for example that it would be costly for a transition economy with poor fundamentals, large h, and consequently an optimally large level of expected inflation, to enter an EMU characterised by low average inflation, which would correct 'too much' for the commitment problem. Is the converse true? If a country waits until sufficient structural adjustment has occurred that h has become small, could it then cope with a tough monetary union? To investigate, I offer a simple but instructive numerical example.

***Special case: a = b = c = d = $\lambda$ = 1***

Since optimal policy depends on the relative size of the temptation to inflate and the need to raise revenue through the inflation tax, a special case prejudges this question. My special case is therefore better regarded as a counterexample to the 'intuitively obvious' but incorrect view that sufficient structural adjustment can always resolve the problem.

Using the previous equations, I tabulate results for four cases: FB (the first best: complete precommitment and optimal shock accommodation);M-DISC (monetary discretion exercised by the government), M-DELEG (the government delegates an inflation target and chooses a central banker who is appropriately conservative), and EMU (exogenous path of complete and certain price stability). This last caricature can of course be generalised to an exogenous stochastic path

for prices, which may have nonzero mean and may be partly correlated with shocks experienced in the transition economy.

In the first best outcome, $\tau = \pi^e = h/3 = -y^e = -g^e$, and unexpected inflation accommodates a third of the output shock, so that $y^u$ equals $2\varepsilon/3$. The ex ante loss is therefore $[h^2/3 + 2\sigma^2/3]$. When the government cannot precommit monetary policy, expected inflation is higher at h/2, but would be even higher but for the fact that excess taxes have been held down to h/4 partly because this mitigates the subsequent incentive of the monetary authority to create inflation. Shock accommodation is unaltered, and the total ex ante loss rises to $[3h^2/8 + 2\sigma^2/3]$. The third column shows how the first best can be attained if it is possible to delegate money appropriately. The conservative central banker needs to have a weight k = 1/2 on output relative to inflation (half the unit coefficient in the government's own loss function), and must be instructed to use an inflation target of h/6 (rather than the zero ideal level in the government's own loss function).

The final column shows what happens if EMU membership lead to zero inflation ex post. Shock accommodation is abandoned, raising the ex ante loss from with shocks. Additionally, however, in this particular example even the first moments are unhelpful: EMU is a lower inflation club than the transition economy wants to join. Even if the variance of shocks is zero, the expected loss in EMU is $h^2/2$ which exceeds not merely the first best but even the outcome in which the transition economy retains monetary discretion. Since the economy would ideally delegate $[\pi^*=h/6]$, EMU with zero inflation is too tight. Interestingly, this conclusion applies even as structural adjustment proceeds and h converges on zero. Waiting won't alter things in this example!

**Table 1 Equilibrium and welfare under different regimes, given *a = b = c = d = λ = 1***

| Outcome | FB | M-DISC | M-DELEG | EMU |
|---|---|---|---|---|
| $\tau$ | h / 3 | h / 4 | h / 3 | h / 2 |
| $\pi^e$ | h / 3 | h / 2 | h / 3 | 0 |
| $y^e$ | - h / 3 | -h / 4 | -h / 3 | -h / 2 |
| $g^e$ | - h / 3 | -h / 4 | - h / 3 | -h / 2 |
| $L(\pi^e, y^e, g^e)$ | $h^2$ / 3 | $(3/8)h^2$ | $h^2$ / 3 | $h^2$/ 2 |
| $(\pi^*; k)$ | | | (h /6; 1/2) | |
| $\pi^u$ | - ε / 3 | - ε / 3 | - ε / 3 | 0 |
| $y^u$ | 2ε / 3 | 2ε / 3 | 2ε / 3 | ε |

| | | | | |
|---|---|---|---|---|
| $g^u$ | $-\varepsilon / 3$ | $-\varepsilon / 3$ | $-\varepsilon / 3$ | 0 |
| $L(\pi^u, y^u, g^u)$ | $2\sigma^2/3$ | $2\sigma^2/3$ | $2\sigma^2/3$ | $\sigma^2$ |

Other changes in parameters could of course reverse this. Specifically, if the parameter a, reflecting the monetary temptation to create surprise inflation, is larger relative to the benefits of expected inflation in reducing other distortionary taxation, the commitment value of EMU must rise relative to the discretionary solution. For large enough values of a, therefore, EMU entry becomes desirable (Another way to view this is that, as a rises, the optimal inflation target falls in (29), creating a range of values for a that make the tough EMU standard acceptible).

Instead of assuming EMU pursues zero inflation for certain, we could assume more generally that, even if expected inflation is zero, there is an unexpected component in addition. Transition economies therefore join EMU in which $\pi^u$ has a particular statistical distribution which small new entrants must treat as exogenous. If it so happens that $\pi^u$ equals $(-\varepsilon/3)$ then the policy pursued with EMU will just happen to deliver optimal shock accommodation for the new entrant too. The more EMU policy departs from this, the larger the cost of shocks for the new entrant, and such costs have to be set against any commitment gains that might be enjoyed.[9]

### 2.4 Taking stock

Section 2 has laid out the baseline model of a country facing monetary temptation to create surprise inflation but simultaneously needing to raise inflation tax revenue. The latter mitigates what would otherwise be even higher output distortions caused by trying to levy taxes when the tax base, and the capacity to enforce it, is low.

When precommitment is possible, optimal policy sets taxes and expected inflation as linear functions of the extent of structural adjustment so far achieved. Poor fundamentals generate low output and high expected inflation, and hence a negative correlation between the two despite the absence of any money illusion. Both are merely symptoms of the fundamentals, here the low tax capacity. Tougher monetary policy than this reduces inflation ‘too much’ and causes ‘too big’ a recession since scarce government spending has to be finance by ‘very’ distortionary taxes.

[9] This ignores the Lucas critique. It is possible, by the act of joining EMU, that the distribution of the output shock $\varepsilon$ itself is altered. One reason might be closer market integration with EMU countries, another might be an end to speculative attacks against the exchange rate; conversely, swings in confidence about the

First best policy partly stabilises output shocks by unexpected inflation. This stabilisation policy can be completely decoupled from the optimal choice of taxes and expected inflation. As fundamentals improve, expected inflation falls, output recovers, but the degree of shock accommodation remains constant. These properties would characterise the ideal design of policy rules – whether as feedback rules or as simpler 'bands' within which policy variables should lie.

Monetary precommitment may be achieved by appointment of a central banker, though this is only as credible as the ability of that banker then to resist pressure from the government. Simply appointing a central banker who places unduly high weight on price stability has several difficulties. First, accommodation of shocks is inefficiently low. Second, the appointment is time inconsistent, since the ideal appointment of a banker has to keep changing with the degree of structural adjustment accomplished; a long tenure is therefore incredible.

Since there is also a coordination problem between monetary and fiscal policy, and hence a need yet another policy instrument, the first-best can be decentralised by delegating an inflation target *and* choosing an appropriately conservative central banker. The latter is necessary only because the bank does not internalise the effect of its actions on fiscal policy; and since the extent of this externality does not change as transition proceeds there is no need to keep changing bankers to deal with this aspect of the problem.

Thinking of the conservative preference for price stability as internalising the central bank's failure otherwise to recognise that its stabilisation policies cause volatility in fiscal revenues, the additional instrument, the delegated inflation target, can then be viewed as coping with both the original degree of inflation bias and the deliberately induced conservatism. Given any parituclar level of h, the delegated inflation target could be lower *or higher* than the government's ideal target, depending on the importance of monetary temptation relative to the need to use inflation for the public finances and to avoid even larger output distortions when tax capacity is low. Since the optimal target depends on the level of structural adjustment, it should change as transition proceeds. However, the government can delegate such a *path* for the bank's inflation target without having to change the preferences of the appointed banker.

In circumstances where these domestic arrangements do not provide a credible bulwark against subsequent government actions, EMU may or may not be an attractive way of solving this

---

public finances of the transition economy might increase once inflation was no longer available as the financing channel of last resort.

problem. Generally, it will raise the costs of shocks because a small open economy is unlikely to find EMU pursuing a stabilisation policy appropriate to its own needs. Against this, EMU may sufficiently assist in the solution to the commitment problem to make entry attractive. However, it may not. I constructed a simple example in which EMU reduced inflation expectations to such an inefficiently low level that higher costs of distortionary taxes outweighed the commitment benefit to the transition economy; nor did this difficulty evaporate as structural adjustment progressed.

I raise this issue not to argue that, in theory or in practice, transition economies on the eastern fringes of EMU should not seek to join at an appropriate date. Partly, their enthusiasm serves as useful empirical evidence that the theoretical model is not yet adequate to the task. In the section 3, I endogenise the speed of structural adjustment[10]. Although an intellectually desirable extension of the model, this will still leave the results of the model some what at odds with the current ambitions of transition economies. Section 4 introduces further commitment problems in fiscal policy and structural adjustment, which not only capture important features of the real world but also increase the attractiveness of EMU membership as a solution.

## 3 Endogenising structural adjustment

Structural adjustment, here a greater capacity of nondistortionary taxes, allows lower expected inflation, fewer output distortions, and greater government spending. However incentives to adjust also depend on the costs of adjustment. I explore the case of quadratic adjustment costs. An increasing marginal cost of reform is a necessary feature of any plausible model of transition; otherwise, big bang on day one would always be optimal.

Within this framework, the first-best speed of reform is derived and compared with the chosen speed of reform in other regimes, for example when monetary commitment is impossible and when EMU membership is undertaken in such circumstances. The key to this analysis is that, since the marginal cost of any given degree of adjustment is exogenous, more adjustment will be undertaken when the benefits are larger, namely when initial distortions are greatest. Hence EMU speeds up reform only if it increases initial distortions and welfare losses. But then countries would choose not to join. Hence, within this framework, EMU (or any other form of access to external conditionality) must have the consequence of slowing down the (second best) optimal speed of

[10] Martin (1995) examines convergence but assumes that the speed of adjustment is exogenous. Sibert (1997), Sibert and Sutherland (1998) and Oskan Sibert and Sutherland (1999) endogenise adjustment, but with simplified dynamics.

adjustment. This could be an important insight, though there are circumstances it seems not to describe well.

Recall that the state variable h is defined as $(G^*-t^+)$, the excess of the ideal level of government spending over the existing level of nondistortionary tax capacity $t^+$. Structural adjustment increases $t^+$ and therefore reduces h towards zero. Once adjustment is complete, h = 0, and the first-best expected levels of inflation and output become zero, and expected government spending is G* and $g^e = 0$.

In this section, the per period loss function (3) is augmented to (33a), and governments care about the present value of expected losses, using the discount factor $\phi$.

$$\mathbf{L = \pi^2 + c\,y^2 + d\,g^2 + \mu\,(h-h_{-1})^2} \qquad \mathbf{c, d, \mu > 0} \qquad \mathbf{(33a)}$$

$$\mathbf{V = L^e + \phi\,V_{+1}^e} \qquad \mathbf{0 < \phi < 1} \qquad \mathbf{(33b)}$$

where $\mu$ measures the cost of adjustment. The timing of actions is as follows. In each period, the government first chooses h, then sets taxes. Inflation expectations are then formed, the output chock is realised, and finally monetary policy and inflation are chosen.

***The first best***

Since behaviour in response to shocks is independent of h, the government chooses h to minimise the expected value (33b) knowing how $\tau$, $\pi^e$ and $g^e$ will then be chosen. Since equations (5) already display the first order conditions for choosing $\tau$ and $\pi^e$ the envelope theorem applies. The marginal benefit of changing h operates only through $g^e$ , in other words through the h term in $[t–h+\lambda\pi^e]$. The first order condition is thus

$$\mathbf{0 = -dg^e_F + \mu(h-h_{-1}) - \phi\mu\,(h_{+1}-h)} \qquad \mathbf{(34)}$$

where $g^e_F < 0$ is the first best level of expected government spending, d is the weight on deviations of spending from target, and $-dg^e_F$ shows expected benefit of reducing h (also the expected cost of increasing h)[11]. The second term shows the present cost of changing h and the third term shows how changing h this period affects adjustment costs next period. From (7)

$$\mathbf{g^e_F = -\theta_F\,h} \qquad \theta_F = [cb^2/\Delta_F] \qquad \mathbf{(35)}$$

Conjecture that the solution to (34) and (35) is

$$\mathbf{h = \rho h_{-1}} \qquad 0 < \rho < 1 \qquad \mathbf{(36)}$$

then (34) becomes

$$\mathbf{0 = h_{-1}[ - \mu + \rho(d\theta_F + \mu + \phi\mu) - \phi\mu\, \rho^2 ] = h_{-1} [ \Phi(\rho) ]} \qquad \mathbf{(37)}$$

Since $\Phi(0)$ is negative, $\Phi(1)$ is positive, and $\Phi(\rho)$ is negative for large positive $\rho$, there is a unique value of $\rho$ satisfying (34)-(36). Denote this $\rho_{F,}$ the first best rate of structural adjustment.

***No monetary precommitments***

Now suppose the only outcome is monetary discretion. When the government chooses reform at the start of the period, it can rely on its own subsequent ability to optimise taxes, and hence apply the envelope theorem to $\tau$. However, it recognises that the commitment failure in monetary policy means that expected inflation is not chosen to maximise its own ex ante loss function. It is therefore necessary to keep track also of the extent to which h affects the subsequent choice of expected inflation (other than through its effect on $\tau$, which is internalised in the choice of $\tau$ itself). This yields a first order condition for h

$$\mathbf{0 = -dg^e_D + [d\lambda / (1+ d\lambda^2][\pi^e + d\lambda g_D]} + [\, \mu\mathbf{(h-h_{-1}) - \phi\mu\, (h_{+1}-h)]} \qquad \mathbf{(38)}$$

The first term, analogous to that in (34) shows the direct effect of h on $g^e$ for given choices of taxes and expected inflation. The third term remains the marginal cost of adjustment. The extra term in the middle shows how h affects affects expected inflation in (12) *other than through the effect on* $\tau$ *that subsequently will be internalised in the fiscal choice*, and the welfare effects on this induced change in expected inflation, both directly and through the provision of additional inflation tax revenue to finance government spending.

Since (12) implies that $[\pi^e + d\lambda g_D]$ equals $[abc\tau_D]$, the first two terms in (38) can be expressed (using (15)) as

$$\mathbf{-dg^e_D + [d\lambda / (1+ d\lambda^2][\pi^e + d\lambda g_D]} = \mathbf{-d[t_D - h - \lambda\pi^e] + [d\lambda / (1+ d\lambda^2)][abd\tau_D]}$$

$$= \mathbf{- d\theta_D h} \qquad \mathbf{(39a)}$$

where

$$\mathbf{\theta_D = cb\, \{b(1+ d\lambda^2)+ a^2bc \} / \Delta_D (1+ d\lambda^2) = \theta_F + a^2b^2c^2d / [\Delta_F\, \Delta_D\, (1+ d\lambda^2)] > \theta_F} \qquad \mathbf{(39b)}$$

Hence, without monetary precommitment, the dynamics of reform are given by the analogue of (37), replacing $\theta_F$ by the larger positive parameter $\theta_{D.}$ Since this has no effect on $\Phi(0)$, but raises $\Phi(\rho)$ for all positive $\rho$ , it unambiguously reduces the value of the unique convergent root. Hence $\rho_D < \rho_F < 1$, as shown in Figure 1. Initial conditions are therefore unwound more quickly under the regime of monetary discretion; there is less persistence. Structural adjustment is more rapid because the marginal benefit of reform is larger when initial distortions are greater.

---

[11] The first term in (33) can also be derived by inserting $\pi^e_F$ , $y^e_F$, and $g^e_F$ into (32a) to express it as a linear function of $h^2$, and then differentiate with respect to h.

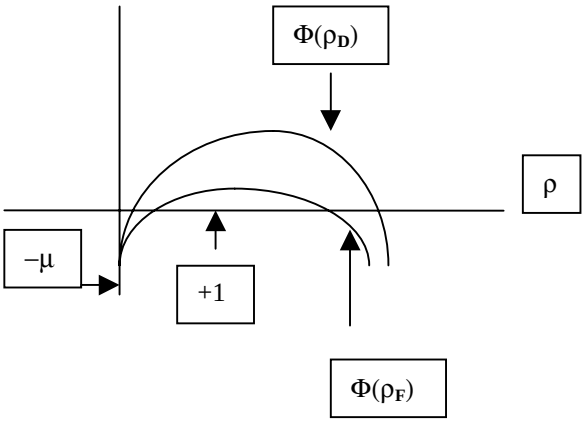


**Figure 1 : Convergent roots under first best and monetary discretion**

This is obviously quite general. Ignoring the welfare costs associated with shocks, which are independent of h, expected losses are of the form $Ah^2$ since all expected variables are linear in h. Larger values of A reflect larger distortions. With the marginal benefit of reform Ah increasing in A, but marginal cost $[\mu(h-h_{-1}) - \phi\mu(h_{+1}-h)]$ independent of A, reform is faster the larger is A. Suppose a country has joined EMU before structural adjustment is complete. If EMU reduces distortions (for example by counteracting a severe commitment failure in monetary policy), it will therefore slow the speed of adjustment of countries after entry. Nor is this anything to worry about: previous adjustment was rapid only because distortions were large. By allowing countries to get closer to the first best, EMU might allow them (optimally) to pursue slower adjustment! Nothing in this argument would justify entry conditions that forced a country to have extra rapid adjustment *prior to entry* for its own good[12]

## 4. Beyond monetary discretion: commitment failures in fiscal policy and in reform itself

Thus far, I have assumed that precommitment is possible with in the choice of the tax rate and the choice of tax capacity: each period both are chosen irreversibly before private sector expectations are formed. There is then no reason to distinguish separately t and $t^+$ that make up $\tau = t - t^+$, and the choice of $t^+$ can be viewed as the choice of h ($= G^*-t^+$).

I now relax these precommitment assumptions. Recognition of the problem of time inconsistency in fiscal policy dates back at least to Fischer (1980), even though this field has been much less ploughed than the field of monetary discretion. As in section 3, I begin by treating the level of tax capacity as fixed. The government now faces a temptation to use unexpected taxes $t^u$ (hence $\tau^u$) and the private sector anticipates this in forming expectations. The simplest way to motivate the analysis is to highlight the assumption in (1) that output distortions depend on *expected* taxes. Surprise taxes therefore avoid output distortions and give additional opportunities for financing valuable government expenditure. The analysis could easily be generalised to an output equation in which surprise taxes, though distortionary, had smaller adverse effects than foreseen taxes. Later in section 4, I also extend the commitment problem to the choice of reform itself. Section 4.1 however deals with given $t^+$ and h.

One last remark. Even if fiscal policy reneges at 1230 on Monday, I assume that the central bank could in principle change monetary policy at 1231 (or at least after a decent lunch). Faced with the modelling choice of having inflation and surprise taxes simultaneously chosen, or preserving the sequential structure in which monetary policy, being most flexible, is chosen last, I continue to prefer the latter description of the economy. One issue still unresolved is whether surprise tax policy, like monetary policy, enjoys the informational advantage of knowing the current shock, or whether the temptation to surprise merely occurs after expectations have been formed but before the shock is known. For simplicity, I analyse the latter, which makes all sources of tax surprise a source of trouble not a channel of potential benefit. Again, the present analysis could easily be generalised, allowing surprise tax policy also to respond to shocks and hence assist monetary policy in shock accommodation.

### 4.1 Failures of fiscal commitment

***The first best***

[12] Since each transition economy is small , no strategic issues arise from the EMU viewpoint. Any entry conditions are purely benevolent conditionality.

The first best solution by definition overcomes all commitment and coordination problems, and policy surprises are purely functions of shocks unobserved when expectations are formed. The characterisation of the first best in section 3 still remains relevant[13].

***Fiscal discretion (F-discretion)***

Solving backwards, monetary policy is chosen last. Suppose this is delegated to an independent central bank with parameters ($\pi^*$,k). The first order condition remains (24). (25) still describes unexpected inflation, and (27) expected inflation. These are reproduced as (40)

$$\pi = \pi^* - aky \qquad \textbf{(40a)}$$

$$\pi^u = -ak[1+ka^2]^{-1}\ \varepsilon \qquad y^u = [1+ka^2]^{-1}\ \varepsilon \qquad \textbf{(40b)}$$

$$\pi^e = \pi^* + abk\,\tau^e \qquad \textbf{(40c)}$$

Treating as predetermined the levels of $\tau^e$, $\pi^e$, and $g^e$, the government now chooses surprise taxes $\tau^u$ to minimise its loss function. Tax surprises do not affect output directly, nor do they influence the choice of surprise inflation whenever monetary policy is delegated to a central bank that puts no weight on fiscal outcomes. The only remaining effect is the direct effect of $\tau^u$ on $g^u$ via the budget constraint correctly perceived by the government. Hence, the first order condition for setting surprise taxes is

$$0 = dg_G = dg^e \qquad \textbf{(41)}$$

where $g_G$ denotes the government's expectation of spending before it knows the shock, and $g^e$ continues to denote the corresponding private expectation. Equation (41) says that, since surprise taxes are lump sum taxes, the government is tempted to use surprise taxes to achieve its bliss level of government spending (in conditional expectation, given the government's information set). Since the private sector can foresee this, they expect such behaviour and the equilibrium fiscal surprise $\tau^u$ is zero since the government and private sector have the same information set.

Unlike the first best, in which an initial scarcity of tax capacity induces a lower level of government spending in order not to require distortionary taxes or inflation that are excessive, the inability to precommit taxes leads the government to spend at a level which in the first best would be consistent only with the full completion of structural adjustment. The distortion thus induces too much, perhaps much too much, government spending during earlier stages of transition. This

[13] Of course, if fiscal surprises also reflect information in current shocks, the previous optimal innovation-contingent feedback rules would be altered and second moments of all endogenous variables would differ from the expressions in section 3.

excessive government spending has to be financed by high levels of inflation and highly distortionary taxes that cause a bigger output recession than along the first best path.

With $g^e = 0$, the budget constraint (4) implies $\tau^e = h - \lambda\pi^e$. Combining this with (40c)

$$\pi^e = [\pi^* + abkh] / (1+ \lambda abk) \quad (42a)$$

$$\tau^e = [ h - \lambda\pi^*] / (1+ \lambda abk) \quad (42b)$$

Consider again what happens in the special case of unit parameters. Suppose k=1/2 as in Table 1, to obtain appropriate shock accommodation. If $\pi^*$ is set at h/6, as would have been appropriate in the absence of fiscal temptation, equations (42) imply $\pi^e = 4/9$ and $\tau^e = 5/9$. Hence the ex ante loss within the period is $E(L) = (41/81)h^2 + 2\sigma^2/3$. Table 1 shows that the first term is $(27/81)h^2$ in the first best and only around $(30/80)h^2$ in the case of pure monetary discretion, which confirms both that problems of fiscal discretion may sometimes be an order of magnitude more important, and that monetary rectitude is quite insufficient to resolve them.

Where the consequence of imperfect solution of fiscal problems is that total distortions are higher, it follows trivially that the payoff to structural adjustment is higher and the optimal speed of reform should be faster. Thus, recognising the problem of fiscal discretion helps explain why some transition economies have large government spending relative to output, and correspondingly deep recessions, but cannot simultaneously explain why reform is also slow in such countries. Section 4.2 resolves this issue. First, I discuss how institutional design might seek to address fiscal problems directly.

***Stability pacts and other forms of fiscal conditionality***

By analogy with the delegation of inflation targets, delegation of a fiscal target might additionally play a useful role. To what extent can fiscal policy be delegated *within* the government? The appointment of an 'Iron Chancellor' as finance minister may make a small difference depending on the personality (preferences) of the minister but, within most forms of government, such ministers can be dismissed by the Prime Minister at will. Personality alone may be insufficient to confer commitment in testing times.

Some governments have endeavoured to 'educate' their voters in an attempt to raise the cost of reneging on fiscal promises. Famously, Mrs Thatcher proclaimed there would be 'no U-turn' from the tight fiscal policy needed to underpin tight monetary policy in the UK in the early 1980s. In so doing, she hoped to raise the costs of fiscal expansion, to enhance the commitment technology. In the late 1990s in the UK, Chancellor Brown voluntarily adopted a code of fiscal stability. The US

passed the Gramm-Rudman amendment for balancing the budget, though for a decade subsequently it was largely ignored. The EU has adopted the Stability Pact.

What lessons does the preceding analysis hold for transition economies prior to EU entry? One is to make the central bank care additionally about the fiscal position, thereby providing not merely a counterweight to opportunistic fiscal behaviour but a predictable response that will be internalised by tax policy and hence have a deterrent effect. The other is to invoke external conditionality that directly constrains fiscal policy itself.

The former could be accomplished by choosing a central banker with preferences not only over inflation and output but also government spending or taxes. However, since this would be tantamount to appointing a government in exile within the central bank, it would be likely to encounter problems in relation to accountability and democratic control. Even if it turned out to be in the interests of the voters, it might not be the best way to sell them the package.

***Direct conditionality on fiscal policy***

The obvious solution is to devise an additional restriction on fiscal policy. However, the issues is whether this can be accomplished credibly by domestic means alone. If sufficient commitment cannot be accomplished by domestic means, external conditionality is the only alternative. Early in transition, this was a role that the IMF sought to play, but often it lacked credible penalties for violation of promises. For more advanced transition economies, engaged in entry negotiations with the EU, conditions imposed by the EU may be much more significant.

From the preceding analysis, we know that central bank independence, coupled with appropriate choices of k and $\pi*(h)$, can take care of two of the problems. Think again about incentives to choose fiscal surprises, and consider how to augment the loss function to obtain the correct fiscal choice. Augmenting the loss function by a term $[g-\tau]^2$ will not work since $[g-\tau] = h - \lambda\pi$ which, being independent of $\tau^u$, will not have the desired influence on the first order condition for choosing $\tau^u$. In this example, conditions on the budget deficit are inappropriate.

Since the problem of fiscal failure is that taxes both taxes and government spending are too high, conditions on their difference are not the right way to address the problem. What is needed is a penalty for high levels of government spending *or* taxes. Suppose there is a fiscal target g* and the loss function is augmented by $(g-g^*)^2$. The first order condition for $\tau^u$ becomes $0 = g_G + (g_G - g^*)$, and g* can be chosen such that $g_G$ and hence $g^e$ replicate the first best formula in attain the first best value in (7).

***EMU membership***

As in the earlier remedies for purely monetary failures, the optimal settings for expected policy variables are linear in h, the degree of structural adjustment. Conditionality that makes inflation or fiscal variables *independent* of h, for example by using parameters appropriate to mature economies in which structural adjustment has been largely accomplished, could depart significantly from what is optimal for economies that still have substantial amounts of transition to accomplish. Thus, while EMU membership offers transition economies the potentially benefit of fiscal conditionality, it remains possible that the form in which it is applied is either less helpful than it could have been or actually harmful.

### 4.2 Commitment failures in reform itself

Finally, I examine commitment failures in the reform process itself. Up to now, I have assumed that each reform is undertaken at the start of each period, before expectations are formed. For commitment issues to arise, the reform decision must arise after expectations have been formed. Given any kind of intertemporal behaviour by the public, for example in pricing assets and debts, there will always be scope to use behaviour in future periods to renege on promises made today, and the exact timing of the reform decision within a period would be relatively unimportant for the qualitative results. It is therefore a special feature of the simplified model I have been using - flexible prices, no persistence in variables other than h - that makes commitment issues disappear when reform is undertaken each period before (single period) expectations are formed.

To explore commitment issues in reform, it is simpler to change the assumed timing of reform within the period than to develop a full intertemporal model of the public's behaviour. In this section, I suppose that in each period the timing is now as follows. First, the private sector 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. The only change compared with section 4.1 is inversion of the timing of expectations formation and reform.

Although the government actually chooses tax capacity $t^+$ and actual taxes t, we can think of this equivalently as choosing h ($=G^*-t^+$) and $\tau$ ($= t-t^+$). Since actual tax rates are chosen after reform, the equations of section 4.1 describing the choice of $\tau$ remain relevant. In particular, unless the problem of fiscal commitment can be solved, (41) implies that $g = g^e = 0$.

The prior decision about reform now treats inherited expectations as predetermined. Effectively the government chooses $h^u$, treating $h^e$ and other expectations as given. From (40)

$\pi^u = - ak[1+ka^2]^{-1} \varepsilon$ $\qquad$ $y^u = [1+ka^2]^{-1} \varepsilon$

so that neither surprise inflation nor surprise output can be affected by surprise reform. Moreover, from (41) it can already be foreseen that surprise reform in the current period will have no effect on government spending. Hence only reform incurs the current adjustment costs of reform without benefit in the current period. It does however have two future benefits – it reduces the cost of future reform by bequeathing a more advantageous state variable h, and thus it also affects expected variables one period ahead which will then be treated as predetermined in future decision making. It has no other effects, since, by the envelope theorem, there will be future opportunities to reoptimise with respect to all other variables entering the present value calculation as viewed from the current period.

One way to solve this problem is to note that in equilibrium h evolves according to $h = \rho h_{-1}$, so the reduced form for ex ante losses is always of the form $V = Mh^2_{-1} + N\sigma^2$, where M and N are positive constants. Hence, treating current expectations of the private sector as given, the government chooses $h^u$ to minimise $E[\{\pi^2 + cy^2 + d g^2\} + \mu(\Delta h)^2 + \phi Mh^2] + \phi N \sigma^2$. The preceding paragraph showed that the first of these four terms drops out of the first order condition since $h^u$ has no effect on current inflation, output, or government spending. Hence the first order condition for reform is $0 = + \mu \Delta h + \phi Mh$, and, letting $h = \rho h_{-1}$ in equilibrium, this implies $0 = h_{-1}[\mu(\rho - 1) + \phi \rho M]$, whence

$$\rho = \mu / [\mu + \phi \mathbf{M}] < \mathbf{1} \qquad \textbf{(43)}$$

When fiscal commitment is impossible and the government is sufficiently myopic, $\phi$ tends to zero, $\rho$ tends to 1, *and structural adjustment vanishes*. Hence the *simultaneous* presence of commitment problems in the related fields of tax policy and structural adjustment seriously inhibits structural adjustment when the future is heavily discounted. Fiscal temptation guarantees that surprise taxes will be used to optimise current government spending. Foreseeing this, there is nothing surprise reform can do in the current period. When the future is sufficiently discounted future benefits of reform cannot outweigh its current costs.

Neither difficulty is insuperable on its own. For example, suppose discounting of the future is complete but there are no precommitment problems in monetary policy, fiscal policy or reform. The speed for reform is then given by the first best case (37) treating $\phi$ as 0. Using (6) and (35) and

$$\rho = \mu / [\mu + \mathbf{d}\theta_F] < \mathbf{1} \qquad \theta_F = \mathbf{cb^2 / [d + cb^2 (1+d\lambda^2)]} > \mathbf{0} \qquad \textbf{(44)}$$

which implies persistence but not stagnation. Even when the future is completely discounted, credible commitments to reform sufficiently affect the public's behaviour *within the current period* to provide a substantial incentive to carry out reform. Conversely, if $g^e = 0$ but discounting is incomplete, there are some future benefits to reform. Provided the marginal cost of reform goes to zero as the speed of reform goes to zero, some reform must be optimal.

***Decentralising appropriate reform incentives***

Solving monetary and fiscal incentive problems is far from straightforward. In practice, reform design may need to consider an intricate second best case in which other distortions remain elsewhere. Nevertheless, it is helpful to know how one would try to solve the reform problem if monetary and tax distortions had already been eliminated. This helps answer the question of what sort of conditionality external bodies, such the IMF or EU, should seek benevolently to impose.

Suppose the objective is to replicate the first best rate of reform given by the $\rho$ solving (34) – (37). Augmenting the per-period loss function by a term in $eh^2$ would allow the appropriate Pigovian offset to reform failures, allowing the government to internalise the benefit of reform. Benevolent external conditionality should therefore include such a condition. This shadow price on poor fundamentals forces the government to internalise the cost of failing to reform.

## 5 Conclusion

In this Paper I have considered how actual or prospective membership of EMU might affect European transition economies. To answer the question one needs an interesting characterisation of what is special about a transition economy. Of the many possible aspects, I focus on the role of (costly) structural adjustment view in enhancing the capacity to raise nondistortionary taxes. In turn this allows greater levels of government spending, lower output distortions, and less reliance on the inflation tax. I examine a model in which smooth convergence to western standards is a possible outcome.

Monetary and fiscal policy both matter, and interact. Initially, I examined commitment failures of monetary policy, and explored EMU membership as a commitment device. Low levels of structural adjustment make early adoption of low inflation inefficient because it forces the government to adopt very distortionary taxes and inefficiently low levels of spending; EMU may also reduce the ability to accommodate shocks appropriately. Whether or not early EMU entry is beneficial depends on the relative magnitude of the need to find a monetary precommitment

device, the need for inflation tax revenue, and the need to be able to accommodate idiosyncractic shocks.

This much is pretty standard stuff, but for the observation that the alternative, domestic delegation of monetary policy, may not always choose a conservative central banker. Once monetary-fiscal interactions are recognised, the reason to appoint a banker with conservative preferences is not to solve monetary commitment but (optimally) to compensate for the fact that the banker ignores the effects of inflation surprises on fiscal revenues, and this needs to be dampened if the bank is implicitly to internalise government concerns. First best delegation also makes use of an inflation target, but this may be looser or tighter exact price stability depending on the competing needs of avoiding monetary temptation and raising inflation tax revenue to compensate for low structural adjustment to date. Optimal monetary design cannot ignore the fiscal position or the state of structural adjustment.

Moreover, the pace of structural adjustment can itself be endogenised. The benefit of adjustment is that higher tax capacity improves government tradeoffs between low inflation, low output distortions and high government spending. Provided there is an increasing marginal cost of adjustment, the optimal policy smooths the rate of adjustment over time. As adjustment occurs, optimal inflation rates fall, equilibrium output rises, and government spending increases. In this sense, a negative correlation exists between inflation and output once structural adjustment is endogenous. The efficient way to disinflate is to improve the fundamentals through structural adjustment, not to engage in draconian monetary policy that inefficiently curtails fiscal spending and induces unnecessarily high taxes that severely distort output.

Moreover, provided policy is appropriately decentralised, the pace of adjustment is orthogonal to the efficient policy of shock accommodation, which remains constant throughout structural adjustment unless the distribution of shocks is itself being affected. Per se, this supports policies analagous to exchange rate bands of constant width but slopes that decline over time at an ever decreasing rate.

Regimes in which distortions are larger offer a greater marginal benefit of reform. Hence, if the costs of reform are independent of other economic variables - which might not be true if the opportunity cost entailed other forms of government spending - then reform will be faster the more distorted the initial economy. Within such a framework, if EMU confers sufficient benefits to diminish distortions, it will also reduce the pace of structural adjustment.

Other circumstances might alter this result. In particular, it is strange to place so much emphasis on failures of monetary commitment without asking similar questions of fiscal policy and of reform itself. The simplest way to motivate failures in these aspects is to allow these policies to be chosen after the public's expectations have been formed. Thus, for example, if output distortions depend only on expected taxes, subsequent tax surprises are tempting because the act as lump sum taxes. This temptation will then be built into expectations themselves. Similarly, if promises to reform affect public expectations and behaviour but then costs of reform can be avoided by reneging on reform, there will be a (foreseeable) temptation to go slow on reform. Given unhelpful circumstances - heavy discounting of the future, and simultaneous commitment failures in reform and fiscal policy – structural adjustment can come almost to a standstill.

In such circumstances there may then be a large payoff to policies that enhance the ability to commit on both fiscal policy and reform. Few improvements are likely to be achieved while retaining all fiscal sovereignty within the government. Here, external conditionality offers the most plausible hope of advancement. For the commitment to be plausible, there must either be a large carrot or a large stick. EMU entry offers a possible carrot. Unlike earlier examples, in which EMU had at best a marginal advantage and might even make things worse, if EMU membership allows a transition economy to avoid a period of stagnation in structural adjustment its benefits could be very substantial. Prescibing entry criteria may well be appropriate. Ideally, these should be for the level of structural adjustment itself. The more indirectly related the criteria are to this ideal standard, the greater the induced side effects and the more the scope for other forms of strategic behaviour in attempting to meet the criteria.

In particular, there is nothing in the foregoing analysis to encourage the view that transition economies (or EMU countries) will be well served by forcing potential entrants into an ERM style arrangement that focuses on symptoms (such as inflation) rather than causes (such as progress in transforming the state variables). Nor is the current EMU preoccupation with price stability something that should be inflicted too soon of transition economies at the expense of other things, most notably progress in structural adjustment itself

One final remark. The analysis of this Papers offers little comfort to those favouring a slimline IMF that somehow can concentrate on disinflation but not structural adjustment.

## Bibliography


Barro, R.J. & D.B. Gordon (1983). ' A positive theory of monetary policy in a natural rate model,' *Journal of Political Economy*.

Beetsma, R. and H. Jensen (1999). 'Structural convergence under reversible and irreversible monetary policy' *CEPR Discussion Paper 2116*

Beetsma R. and H. Uhlig (1997). 'An analysis of the Stability Pact' *CEPR Discussion Paper 1669*

Begg, D. (1999). 'The impact of EMU on transition economies: structural adjustment and macroeconomic policy design,' mimeo, Birkbeck College, London

Begg, D. (1996). 'Monetary policy in Central and Eastern Europe: lessons after half a decade of transition,' *IMF Working Paper WP/96/109a.*

Begg, D., L. Halpern and C. Wyplosz (1999*) Exchange rate adjustment in transition economies, Economic Policy Initiative 5*, Centre for Economic Policy Research

Begg, D. and C. Wyplosz (1999). 'Untied hands are fundamentally better,' Paper presented at the 5th Dubrovnik Conference, June 1999.

Bruno, M. and W. Easterly (1995). 'Inflation crises and long-run growth', *NBER Working Paper 5209*

Clarida, R., J. Gali and M. Gertler (1999). 'The science of monetary policy', *Journal of Economic Literature,December*

Debelle, G. and S. Fischer (1994) 'How independent should a central bank be?' in J. Fuhrer(ed): *Goals, guidelines and constraints facing monetary policymakers,*' Federal Bank of Boston.

Dornbusch. R. & S. Fischer (1993) 'Moderate inflation', *World Bank Economic Review*

Fischer, S. (1980). 'The benevolent dissembling dictator, ' *Journal of Economic Dynamics and Control.*

Halpern, L. & C. Wyplosz (1996). 'Equilibrium real exchange rates in transition,' *CEPR Discussion Paper*

Martin. P. (1995). 'Free riding, convergence and two-speed monetary unification in Europe', *European Economic Review*

Ozkan, G., A. Sibert and A. Sutherland (1997). 'Monetary union, entry conditions and economic reform' *CEPR Discussion Paper 1720*

Rogoff, K. (1985). '. 'The Optimal Degree of Commitment to an Intermediate Monetary Target,'*Quarterly Journal of Economics.*

Sachs, J. (1996). Economic transition and the exchange rate regime', *American EconomicReview, Papers & Proceedings*

Sargent, T. & N. Wallace (1981). 'Some unpleasant monetarist arithmetic,' *Federal Reserve Bank of Minneapolis Quarterly Review*

Sibert, A.(1998). Monetary convergence and economic reform,' *Economic Journal*

Sibert, A. and A. Sutherland (1997). 'Monetary regimes and labour market reforms' *CEPR Discussion Paper 1731*

Svensson, L. (1996). 'Inflation forecast targeting: implementing and monitoring inflation targets' *Bank of England Working Paper 56*, November 1996.

Svensson, L. (1997). 'Optimal inflation targets, "conservative central banks, and linear inflation contracts,' *American Economic Review*.

Walsh, C. (1995). 'Optimal contracts for independent central bankers', *American Economic Review*