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Fiscal Policy and Imperfectly Credible Targets: Should We Appoint Expenditure-Conservative Central Bankers?

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Abstract

We reconsider Svensson’s inflation-targeting proposal in a model where the need to raise seigniorage revenues determines the socially optimal inflation rate and distortionary taxes cause the inflation bias. Interpreting the targets as contracts, we show that the interaction between fiscal and monetary policy complicates the structure of the optimal contract. Moreover, if the commitment technology is imperfect, “highish” targets generate lower inflation than targets which are too low to be credible. Then we turn to an interpretation of inflation targets as monetary policy delegation to a non-distortionary, target-conservative agent. In our model target-conservative bankers are public-expenditure conservative. Expenditure-conservatism may explain why central bank independence is orthogonal to output variability.

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Introduction

Following the seminal work of Barro and Gordon (1983), a number of proposals have been put forward to correct the inflation bias. Some are inherently sub-optimal, in the sense that lower inflation may be attained only if distortionary stabilisation policies are implemented. Policy delegation to a weight-conservative central banker *à la* Rogoff-Lohmann[1] is the classical example. The inflation bias is reduced and output variability increases to the extent that the central bank is more inflation-averse than society and institutional arrangements preserve the bank independence. More recently, advocates of the principal-agent approach (Walsh, 1995; Persson and Tabellini, 1993) claimed that the trade-off between credibility and flexibility is probably overstated. By means of a relatively simple performance-based contract, society can entirely remove the inflation bias and yet avoid distortionary responses to shocks. Instead of relying on the banker's specific and "perverse" attitude towards inflation, society itself can provide the right incentives for the banker to generate low inflation. The contractualist approach has renewed interest in the issue, and has been subject to sharp criticisms as well. McCallum (1995) argued that if the lack of commitment technology causes the inflation bias, performance-based contracts are simply going to relocate the time-inconsistency problem at a different level, i.e. the contract credibility – or lack of it. In fact, ex-post contract enforcement cannot be taken for granted if the bank and the government share the same views on the output-inflation trade-off and both regard equilibrium output as inefficiently low. As pointed out in Waller (1995), contracts may raise policy credibility relative to simple announcements only to the extent that renegotiation costs are sufficiently high.

If the pioneering work of Walsh set the stage for the contractualist research agenda, Svensson's inflation targets (Svensson, 1997) bridged the gap with the reality of

[1] See Rogoff (1985) and Lohmann (1992).

monetary policy-making. After all, performance-based contracts are seldom observed in practice, while in several countries central banks have endorsed inflation targets following the early failure of money supply targets and the difficulties met with nominal exchange rate pegs. Svensson showed that by an appropriate choice of the target, society can replicate the outcome which would obtain under an optimal contract. Two alternative interpretations may be given of this result. If the central banker may be held accountable, a target is a non-distortionary performance-based contract. Alternatively, Svensson's proposal may be interpreted as a suggestion that monetary policy be delegated to a genuinely target-conservative central banker, that is, a banker who implements non-distortionary responses to shocks but prefers an average inflation rate lower than the socially optimal one.

This paper explores the implications that either approach bears to the working of the inflation targets proposal. We follow a three-step strategy. To begin with, we define the socially optimal inflation rate in a model where distortionary taxes and seigniorage revenues are needed to finance public expenditure, which fall short of the socially optimal level, as in Alesina and Tabellini (1987). Then we derive the inflation bias, which arises as a consequence of discretionary monetary policies when the supply function is adversely affected by tax distortions and labour market imperfections. Finally, we focus on the two alternative interpretations of the inflation targeting proposal, assuming that the government and the central bank independently set their policy instruments, respectively the tax and the inflation rate. We show that the optimal contract is substantially different from the one discussed in Svensson: either the inflation target is implausibly negative or a linear penalty in inflation must be added to the contract[2]. Moreover, if the commitment technology is imperfect, i.e. if the cost of reneging on the

[2] For a criticism of negative inflation targets see De Grauwe (1996).

assigned target is “too small”, any target so low to generate an *ex-post* loss in excess of the renegotiation cost will be renegotiated . It follows that under these circumstances only “highish” inflation targets are credible. To make an impact on inflation expectations, imperfectly credible targets must be inversely related to renegotiation costs. We present a new perspective also on the alternative view, which regards the inflation target proposal as a form of delegation to a target-conservative banker. In this case the task of credibility-building should be easier. Since the banker has no incentive to ex-post collude with the government, all we need are sufficient legal guarantees of the bank independence. But why should a central banker be target-conservative? In our model a target-conservative banker à la Svensson is an expenditure-conservative banker, that is, an agent or an institution whose public expenditure target falls short of the socially optimal one. This has interesting implications. The *public choice school* argues that political incentives lead governments to inefficiently raise expenditure in favour of pressure groups. If this is the case, independent bankers, being unelected, are not affected by interest groups and thus would be inherently expenditure-conservative. Hence, their expenditure (and not weight) conservatism may explain why central bank independence lowers inflation without raising output variability (Alesina and Summers, 1993).

The rest of the paper is organised as follows. Section 1 reviews the basics of the Svensson proposal. In section 2 we present a model of the socially optimal inflation rate following a typical public finance approach. In section 3 we define the optimal contract. In section 4 we discuss the credibility issue. Section 5 shows that non-distortionary, target-conservative bankers are expenditure-conservative agents. Section 6 concludes.

1. The simple analytics of inflation targets

Consider an economy described by the following aggregate supply function:

$$y = (p - p^e) + e - \tilde{y} \tag{1}$$

where output y – expressed in logarithms – depends on inflation surprises $(p - p^e)$, a term which captures the distortionary consequences of taxes and labour market imperfections , $\tilde{y}$, and a shock e, whose realisations are independently distributed with zero mean and finite variance s_e^2. The private sector has rational expectations:

$$Ep = p^e \tag{2}$$

where *E* is the expectations operator. Observe that $Ey = -\tilde{y}$, that is, expected output falls short the socially optimal level, assumed to be zero.

Under discretion, the policymaker's loss function

$$L^G = \frac{1}{2}\left[(y)^2 + c(p - \tilde{p})^2\right] \tag{3}$$

where $\tilde{p}$ defines the socially optimal inflation rate, is minimised at

$$p^G = \frac{c\tilde{p}}{1+c} + \frac{(p^e - e + \tilde{y})}{1+c} \tag{4}$$

Solving for rational expectations yields:

$$p^G = \tilde{p} + \frac{\tilde{y}}{c} - \frac{e}{1+c} \tag{5}$$

where the term $\frac{\tilde{y}}{c}$ is the well-known inflation bias.

Alternatively, monetary policy can be *delegated* to a central banker whose loss function is – by statute – defined as

$$L^B = \frac{1}{2}\left[(y)^2 + c^b(p - p^b)^2\right] \tag{6}$$

where p^b and c^b are appropriately selected by the policymaker. The central banker implements:

$$p^B = \frac{c^b p^b}{(1+c^b)} + \frac{(p^e - e + \tilde{y})}{(1+c^b)} \qquad (7)$$

If $c^b = c$ and $p^b = \tilde{p} - \frac{\tilde{y}}{c}$,the policymaker can eliminate the inflationary bias – $p^e = \tilde{p}$ – without suffering any output distortion.

Svensson gives two interpretations of this result. The first is that (6) is equivalent to a non-distortionary performance-based contract[3] if one assumes that central banker may be held accountable for achieving the target. Alternatively, Svensson's proposal may be interpreted as a suggestion that institutional design techniques allow the policymaker to establish a central-bank whose preferences genuinely coincide with those defined in (6). In this case, accountability is no longer an issue. The crux of the matter obviously lies in whether c^b and p^b may be treated as independent parameters in the banker's loss function, namely whether the central banker's degree of aversion to inflation may reflect social preferences whereas her desired inflation rate is lower than $\tilde{p}$. In what follows we will show that both interpretations are open to criticisms, leading to the conclusion that inflation targets are either imperfectly credible – i.e. unable to fully remove the inflation bias – or credible to the extent that a tension arises between the bank preferred policies and the desiderata of the government – potentially resurrecting the familiar trade-off between credibility and flexibility.

2. A model of the socially optimal inflation rate

The Svensson's proposal relies on the assumption that the socially optimal inflation rate is positive. If the optimal inflation rate were zero, removal of the inflation bias would require the endorsement of an implausibly negative target. If we interpret the targeting

approach as delegation to a target-conservative agent, a socially optimal zero rate of inflation would imply that monetary policy should be delegated to a peculiar agent who sees benefits from systematic deflation!

As a matter of fact there are reasons why society may benefit from a positive equilibrium inflation rate. The first and foremost is the possibility of raising seigniorage revenues when non-distortionary taxes are not available (Phelps, 1973; Mankiw, 1987). Alternatively, one might consider the potential effect of inflation on output through the Tobin-Mundell effect on the real interest rate. However, the sign of the latter, traditionally expected to be positive, is reversed in plausible models (Stockman, 1981, Sweeney,1987). Moreover, a new wave of endogenous growth models, supported by growing empirical evidence, shows that inflation may in fact reduce growth (Gylfason and Herbertsson, 1996). Thus, we will focus on the seigniorage motive. The determination of the optimal level of seigniorage and the analysis of stabilisation policies are usually treated as logically distinct issues[4]. We show that the optimal inflation rate is logically connected to the weight attached to the output-inflation trade-off. To do this, we first determine the optimal level of seignorage and then turn to the analysis of stabilisation policy. The model presented in Alesina and Tabellini (1987) provide the ideal framework for our analysis.

Consider an economy where the government provides a certain amount of public goods, G, to be financed by means of distortionary taxes, τ, and seignorage revenues, assumed equal to inflation, p [5]:

$$G = t + p \qquad (9)$$

Equation (9) approximately holds if money demand, specified according to a quantity theory, is independent of fiscal policy and G is defined as a fraction of nominal income[6].

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[3] The contract would have the following form: $w = \overline{W} + cp^b p - \frac{c}{2}(p^b)^2$.

[4] See for instance Alesina and Tabellini (1987), Van Der Ploeg (1995) and Svensson (1997).

Since taxes are now endogenous to the model, output distortions may be decomposed as follows:

$$\tilde{y} = t + \tilde{U} \tag{10}$$

where $\tilde{U}$ defines the distortions generated by monopolistic trade unions. The government loss function is

$$L^G = \frac{1}{2}\left[(y)^2 + k_1\left(G - \tilde{G}\right)^2 + k_2 p^2\right] \tag{11}$$

where $\tilde{G}$ defines the government expenditure target. The first step in our analysis is the determination of the optimal inflation (tax) rate, that is, the rate which would obtain if the policymaker were able to precommit. The solutions for the expected optimal amount of seigniorage, tax revenues and public expenditures are straightforward[7]:

$$p^* = \frac{k_1\tilde{G} + k_1\tilde{U}}{k_1 + k_2 + k_1 k_2} \tag{12a}$$

$$t^* = \frac{k_1 k_2\tilde{G} - \tilde{U}\left(k_1 + k_2\right)}{k_1 + k_2 + k_1 k_2} \tag{12b}$$

$$G^* = \frac{\left(k_1 + k_1 k_2\right)\tilde{G} - \tilde{U}k_2}{k_1 + k_2 + k_1 k_2} \tag{12c}$$

We now turn to the analysis of stabilisation policy when the policymaker retains full discretion, that is, when he is free to optimise taking expectations as given. The solutions are:

$$p^d = p^* + \frac{2k_1(\tilde{G} + \tilde{U})(k_2 + k_1 k_2)}{(k_1 + k_2 + k_1 k_2)(2k_1 + k_2 + k_1 k_2)} - \frac{2k_1 e}{4k_1 + k_2 + k_1 k_2} \tag{13a}$$

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[5] To simplify the analysis, we follow Alesina and Tabellini (1987) in ruling out the possibility that public expenditure be financed issuing debt. The implications of debt accumulation are discussed in a companion paper (Lossani, Natale and Tirelli, 1997).

[6] This is shown in Alesina and Tabellini (1987, p.622).

[7] At this stage we do not consider the policy responses to shocks. Following Alesina and Tabellini (1987) we compute p^*, t^*, G^* imposing that $p = p^e$ before taking the first order conditions.

$$t^d = t^* - \frac{\left(\tilde{G} + \tilde{U}\right)k_1^2 k_2}{(k_1 + k_2 + k_1 k_2)(2k_1 + k_2 + k_1 k_2)} + \frac{(k_2 + 2k_1)e}{4k_1 + k_2 + k_1 k_2} \qquad (13b)$$

$$G^d = G^* + \frac{(\tilde{G} + \tilde{U})(2k_1 k_2 + k_1 k_2)}{(k_1 + k_2 + k_1 k_2)(2k_1 + k_2 + k_1 k_2)} + \frac{k_2 e}{4k_1 + k_2 + k_1 k_2} \qquad (13c)$$

Relative to the first best solutions, on average inflation and public expenditure increase whereas taxes and output distortions fall. The monetary policy response to shocks has the standard sign. By contrast, taxes and public expenditure are positively related to e. Adverse supply shocks raise the marginal cost of taxes, thus governments are less willing to finance expenditures. Equipped with these results, we are able to analyse the working of the inflation targets regime.

3. Inflation targets as imperfectly credible contracts

Suppose the policymaker adopts a performance-based contract with an explicit inflation target. The central banker's loss function becomes:

$$L^B = \frac{1}{2}\left[(y)^2 + c(p)^2\right] - w \qquad (14)$$

where

$$w = \overline{W} - sp + cp^b p - \frac{c}{2}\left(p^b\right)^2 \qquad (15)$$

Thus, equation (14) can be written as:

$$L^B = \frac{1}{2}\left[(y)^2 + c\left(p - p^b\right)^2\right] - \overline{W} + sp \qquad (16)$$

where $\overline{W}$ ensures that the banker's participation constraint is satisfied. In this framework the policymaker and the central bank minimise (11) and (16) by setting the tax and the inflation rate respectively. Following Alesina and Tabellini (1987), we assume that fiscal and monetary authorities act non-cooperatively:

$$p = \frac{k_1\left(\tilde{G} + \tilde{U}\right)}{k_1 + c\left(1+k_1\right)} + \frac{\left(cp^b - s\right)\left(1+k_1\right)}{k_1 + c\left(1+k_1\right)} + \frac{-k_1 e}{2k_1 + c\left(1+k_1\right)} \tag{17}$$

$$t = \frac{\tilde{G}k_1 c - \tilde{U}k_1\left(1+c\right)}{k_1 + c\left(1+k_1\right)} - \frac{\left(cp^b - s\right)k_1}{k_1 + c\left(1+k_1\right)} + \frac{\left(k_1 + c\right)e}{2k_1 + c\left(1+k_1\right)} \tag{18}$$

If

$$c = \frac{k_2}{2}, p^b = p^*, \text{ and } s = s^* = cp^* + \frac{(\tilde{G} + \tilde{U})k_1 k_2}{(k_1 + k_2 + k_1 k_2)} \tag{C.1}$$

the central banker implements non-distortionary policy responses and the socially optimal rates of inflation, taxes and public expenditure obtain on average. Without a linear penalty in inflation the optimal inflation rate could be achieved only by assigning the central bank a negative inflation target! Unlike in Svensson's model, this result holds as the inflation rate is determined simultaneously with taxes and output distortions. Within this framework, setting a non-negative inflation target is neither necessary nor sufficient to reduce inflation expectations, whereas the linear penalty σ is necessary and sufficient if contract enforcement is credible. On the other hand, if we think of highly visible targets as a coordination device for expectations, the contract defined in (15) may improve on simpler contracts which only include a linear inflation penalty.

4. Renegotiation costs and contract credibility

Let us now turn to the issue of credibility. Early empirical tests cast doubts on the size of credibility gains following the adoption of inflation targets. Svensson's (1993) tests of inflation target credibility are inconclusive for Canada, reject the credibility hypothesis for New Zealand in the early days of the new arrangement – but not later on – and again reject it for Sweden. Almeida and Goodhart (1996) are unable to find a statistically significant difference between countries which adopted inflation targets and countries which opted for alternative disinflationary strategies. They conclude that the case for

inflation targets is unproven. In the face of the observed imperfect credibility of inflation targets, Svensson states that: "*Nevertheless, if the inflation target is sufficiently low, the resulting inflation may be lower than it would have been without the target.*" (Svensson, 1997). In our view, this argument is misleading, as it postulates that an inflation target – *per se* may determine expectations, whereas it is the size of renegotiation costs that ultimately generates the credibility of the regime. In this section we present a formal discussion of the issue.

The incentives to ex-post renegotiate the contract are obvious. To the extent that inflation expectations attach credibility to the target, ex-post both the policymaker and the banker are made worse off by any monetary stance more "conservative" than the one which would be implemented under discretion[8]. To see it, observe that

$$L^G\left(p\,|e,p^e,p^b=p^*,s=s^*\right)-L^G\left(p^G|e,p^e\right)=$$
$$\left[\frac{4k_1+k_2(1+k_1)}{(1+k_{1)}}\right]\left\{\frac{2k_1k_2(1+k_1)(\tilde{G}+\tilde{U})}{\left[2k_1+k_2(1+k_1)\right]\left[k_1+k_2(1+k_1)\right]}\right\}^2 \qquad (19)$$

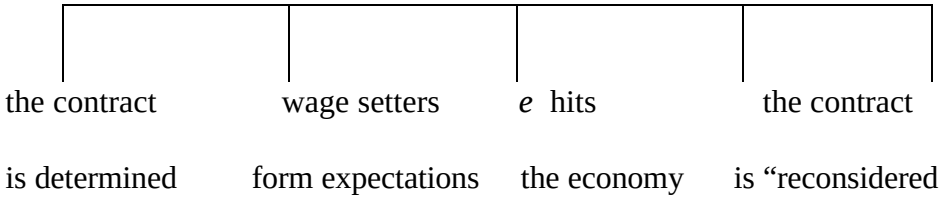
Therefore the contract is credible only if the policymaker's decision to renegotiate is costly. Lohmann (1992) presents an exhaustive analysis of the link between the size of renegotiation costs and the credibility of monetary policy delegation schemes, treating renegotiation costs as a control variable for the policymaker together with the bank degree of weight-conservatism. In her model this assumption is justified because the banker's conservatism generates a conflict of interests in the conduct of monetary policy. Hence central bank independence can be graduated – as in fact it is number of countries (Grilli, Masciandaro and Tabellini 1991) – to obtain the optimal combination of commitment and flexibility. In the contractualist framework the bank and the

[8] Al-Nowaihi and Levine (1996) identify other reasons to support the view that Walsh contracts are not renegotiation-proof. The first is that the distortionary taxes needed to finance the bank generate adverse selection problems. The second is moral hazard and arises when the bank is risk-averse.

policymaker hold identical views on the benefits from ex-post surprises. Thus, legal arrangements aiming to preserve the bank independence cannot prevent collusive behaviour, unless either the bank or the government, or both, incur some other cost in reneging on the contract. Such cost may in fact be linked to reputational factors and "ego-rents" if inflation targets provide a highly visible benchmark to assess the consistency of the policy stance (Persson and Tabellini, 1993). Cukierman (1992) emphasises the role of policy announcement, showing that institutional adherence to precision in monetary announcements exerts a moderating influence on monetary activism. This may explain why countries which recently endorsed monetary targets also attempted to increase the transparency of monetary policy decisions. For instance, in New Zealand the Reserve Bank Act creates an institutional environment which compels the bank to publicly state in advance its intended policy action, and to motivate subsequent revisions. Similar procedures have been followed in the UK (Haldane, 1995). Al-Nowaihi and Levine (1994) redefine the time-inconsistency issue in terms of a signal-extraction problem for the private sector, who is unable to observe shocks and to correctly interpret the monetary stance. They show that Walsh contracts may greatly alleviate such informative inefficiencies by making monetary policy more open and accountable. As a result, reputational equilibria may be sustained at least for a non-negligible time-span. However, their conclusion is open to standard criticisms concerning the difficulties with models based on reputation building, that is, the requirement of long horizons and the possibility of multiple equilibria (Persson and Tabellini, 1990). All in all, although Walsh contracts probably increase the cost of monetary surprises, it seems unlikely that institutional design is able to raise renegotiation costs at will. Indeed, if simple policy announcements provided an adequate commitment technology, time

inconsistency would hardly be an issue in monetary policy games[9]. Therefore we posit that the policymaker's decision to renegotiate the contract entails an exogenous cost, $c>0$.

We assume the following sequence of events:



Under these circumstances a policymaker would stick to his commitment only if

$$L^G\left(p\left|e,p^e,p^b,s\right.\right)-L^G\left(p^G\left|e,p^e\right.\right)\le c \qquad (20)$$

This sets a lower bound on the inflation target and the penalty that the policymaker can credibly assign to the central banker. It is easy to see that (20) holds in the form of identity if

$$p=\hat{p}\equiv p^G-\left(2c\frac{1+k_1}{4k_1+k_2(1+k_1)}\right)^{\frac{1}{2}} \qquad (21)$$

Observe that:

$$E\hat{p}=\hat{\Pi}\equiv Ep^d-\left(2c\frac{1+k_1}{4k_1+k_2(1+k_1)}\right)^{\frac{1}{2}}\frac{2}{2k_1+k_2(1+k_1)} \qquad (22)$$

Given $0<c<\infty$, $\hat{\Pi}$ defines the lowest credible inflation target. Only if

$$c\ge\frac{(k_1k_2)^2(1+k_1)\left[4k_1+k_2(1+k_1)\right](\tilde{G}+\tilde{U})}{2\left[4k_1+k_2(1+k_1)\right]^2} \qquad (23)$$

the contract $p^b=p^*;s=s^*$ is feasible and able to remove entirely the inflation bias. Otherwise the best feasible contract is

[9] Jensen (1996) correctly points out that if the government could choose the costs of her actions delegations would not be necessary.

$$p^b = \hat{\Pi};\ s = \frac{k_2}{2}p^b + \frac{k_1(\tilde{G}+\tilde{U})}{(1+k_1)} - \hat{\Pi} \qquad \text{(C.2)}$$

This proves the fallacy in Svensson's argument that by suitably lowering the target the policymaker can compensate for the apparent lack of credibility. In fact, it is only when an adequate commitment technology is available that sufficiently low targets may be credibly implemented!

One could argue that the lack of commitment technology could be offset by assigning the inflation target $\hat{\Pi}$ to a weight-conservative central banker. Consider the reaction functions in Fig.1. Let $p^G|p^e$ and $p\left(c = \frac{k_2}{2}; p^b\right)|p^e$ be respectively the policymaker's and the central banker's reaction function for any given p^e. Moreover, let $p\left(c > \frac{k_2}{2}; p^b\right)|p^e$ be the reaction function of a weight-conservative central banker who is nonetheless assigned p^b. For any $e \le \bar{e}$, a weight-conservative central banker would be unable to pursue her own preferred policy. In fact for any $e \le \bar{e}$, :

$$L^G\left(p^B\left(c > \frac{k_2}{2}; p^b = p^b\right)|p^e\right) - L^G\left(p^G|p^e\right) > c \qquad (24)$$

Hence for any $e \le \bar{e}$, actual inflation cannot fall below $p\left(c = \frac{k_2}{2}; p^b\right)|p^e$. Instead, for $e > \bar{e}$, a weight-conservative central banker will keep a less activist stance than an target-conservative central banker and thus $p\left(c > \frac{k_2}{2}; p^b\right)|p^e \le p\left(c = \frac{k_2}{2}; p^b\right)|p^e$ As a consequence, one gets the paradoxical result that inflation expectations increase if $c > \frac{k_2}{2}$!

The above conclusion is probably biased against the weight-conservative approach. As pointed out in Waller (1995), the tension between the conservative banker

and the government wipes out the scope for collusive behaviour. Thus it should be possible to increase the credibility of a weight-conservative central banker by setting an appropriate system of checks and balances and the procedures for resolving conflicts between the two institutions, as discussed for instance in Lohmann (1994). However, output distortions would unambiguously remain. From this point of view, the alternative interpretation of the Svensson's proposal has the merit of raising an important point: to escape from the commitment versus flexibility dilemma, society should be able to find a target-conservative banker which is not weight-conservative. In the next section we will explore the issue.

5. The foundations of target-conservative preferences

Appointing a central banker who on average implements the socially optimal inflation rate without imposing distortionary responses to shocks is in principle possible. Suppose that monetary policy is delegated to a central banker whose loss function is characterised as follows.

$$L^B = \frac{1}{2}\left[(y)^2 + k_1^b\left(G - \tilde{G}^b\right)^2 + k_2^b p^2\right] \tag{25}$$

We assume that the government and the central bank – having observed expectations – play non-cooperatively. The policymaker minimises (11) with respect to t, taking p as given, and the central banker does just the opposite in order to minimise (25). The two reaction functions are

$$t = \frac{(1-k_1)p + e - p^e + k_1\tilde{G} - \tilde{U}}{(1+k_1)} \tag{26}$$

and

$$p = \frac{(1-k_1^b)t - e + p^e + k_1^b\tilde{G}^b + \tilde{U}}{(1+k_1^b+k_2^b)} \tag{27}$$

If

$$k_1^b = k_1, k_2^b = k_2; \tilde{G}^b = \frac{\tilde{G}k_1(1+k_2)}{(k_1+k_2+k_1k_2)} - \frac{k_2\tilde{U}}{(2k_1+k_2+k_1k_2)} \qquad \text{(G.1)}$$

expected inflation, taxes and public expenditure correspond to the socially optimal levels. This interpretation of the Svensson proposal does not necessarily involve the announcement of inflation targets which are systematically missed. In fact, achieving the socially optimal inflation rate without imposing distortionary responses need not involve any explicit inflation target[10]. On the other hand, G.1 provides firmer ground to the criticism that inflation targets may not entirely remove the inflation bias if the optimal inflation rate is too small relative to actual average inflation. In our framework this happens when labour market imperfections are "large" and the costs of missing the public expenditure target, k_1, are "small". In this case the central banker should aim for a negative expenditure level!

However, an expenditure-conservative banker is beneficial only to the extent that public expenditure is a sufficiently flexible instrument. For instance, consider the polar case where the amount of expenditure to be financed in each period is exogenous:

$$G = \tilde{G} \qquad (28)$$

Under these circumstances, the loss functions (11) and (25) become

$$L^G = \frac{1}{2}\left[(y)^2 + k_2 p^2\right] \qquad (29)$$

$$L^B = \frac{1}{2}\left[(y)^2 + k_1^b(\tilde{G} - \tilde{G}^b)^2 + k_2^b p^2\right] \qquad (30)$$

Assuming $k_2^b = k_2$ the bank would implement

[10] This may perhaps explain the Bundesbank paradox. In fact, according to Bernanke and Mihov (1996), the German central bank *de facto* behaves like an "inflation targeter", implementing flexible responses to shocks, but never announced an explicit inflation target, without apparently suffering from any reputation loss.

$$p = \frac{2\left(\tilde{U} + \tilde{G}\right)}{2 + k_2} - \frac{e}{2 + k_2} \tag{31}$$

whereas the socially optimal response would be

$$p^{**} = \frac{\tilde{U} + \tilde{G}}{1 + k_2} - \frac{e}{2 + k_2} \tag{32}$$

In this case lowering expected inflation without suffering output distortions would prove to be impossible.

As it stands, the model does not provide any insight on how to select an expenditure-conservative central banker. The weight-conservative banker à la Rogoff was easily labelled as a member of the financial community, whose sectoral interests are clearly identifiable on the grounds of economic theory (Posen, 1993). In our case the task of selecting the banker's preferences is more complex as the constraints on the banker's preferences are tighter. Expenditure-conservatism must obviously originate from an idiosyncratic view about the benefits from public expenditure. Lindbeck (1985) identifies three main forces which determine the level of public transfers: efficiency-driven motivations, "welfare altruism" and the ability of pressure groups to influence political decisions. It seems natural to rule out the first motivation, as it is difficult to explain why an agent should be opposed to the provision of public goods. Turning to the second one, partisan models suggest that expenditure-conservatism is usually correlated with stronger aversion to inflation. Hibbs (1987) and Tabellini and La Via (1989) document partisan influences in the US budget deficit, just as Alesina (1988) and Alesina and Roubini (1992) argue that left-wing parties are less inflation-averse than their ideological rivals. It seems therefore unlikely that a partisan expenditure-conservative banker would be able to deliver the optimal stabilisation policies. We are then left with the third main component of public transfers. The *public choice school* (Buchanan and Tullock, 1962; Musgrave, 1985) posits that – whatever the ideological preferences of the

incumbent government – the political decision-making process is biased towards excessive budget growth, which does not entirely reflect the preferences of the public[11]. In this case an independent central banker should be inherently expenditure-conservative because, being unelected, she would be free from the interference of interest groups. This may help to explain why central bank independence is usually associated with lower inflation, but the corresponding increase in output variability – predicted in the popular Rogoff model – seems difficult to detect (Alesina and Summers, 1993).

5. Conclusions

This paper raises two points. The first is that inflation, and the inflation bias, have a fiscal root. The second point concerns the credibility of monetary arrangements. Setting a contract between the policymaker and the banker may increase the cost of monetary surprises, but it is unlikely to remove the inflation bias. If credibility requires a genuine conflict of interests between the banker and her principal, then an expenditure-conservative agent should be appointed. It is intuitively clear that if inefficiencies in the political process generate excessive expenditure levels, the establishment of an independent central bank is a rough-and ready measure to reduce both expenditure and inflation. Further research should investigate how to select a banker who is expenditure-conservative and shares society's preferences on the output-inflation trade-off. Perhaps even more important, institutional design should aim to relieve the fiscal burden on monetary policy through a reform of the political process.

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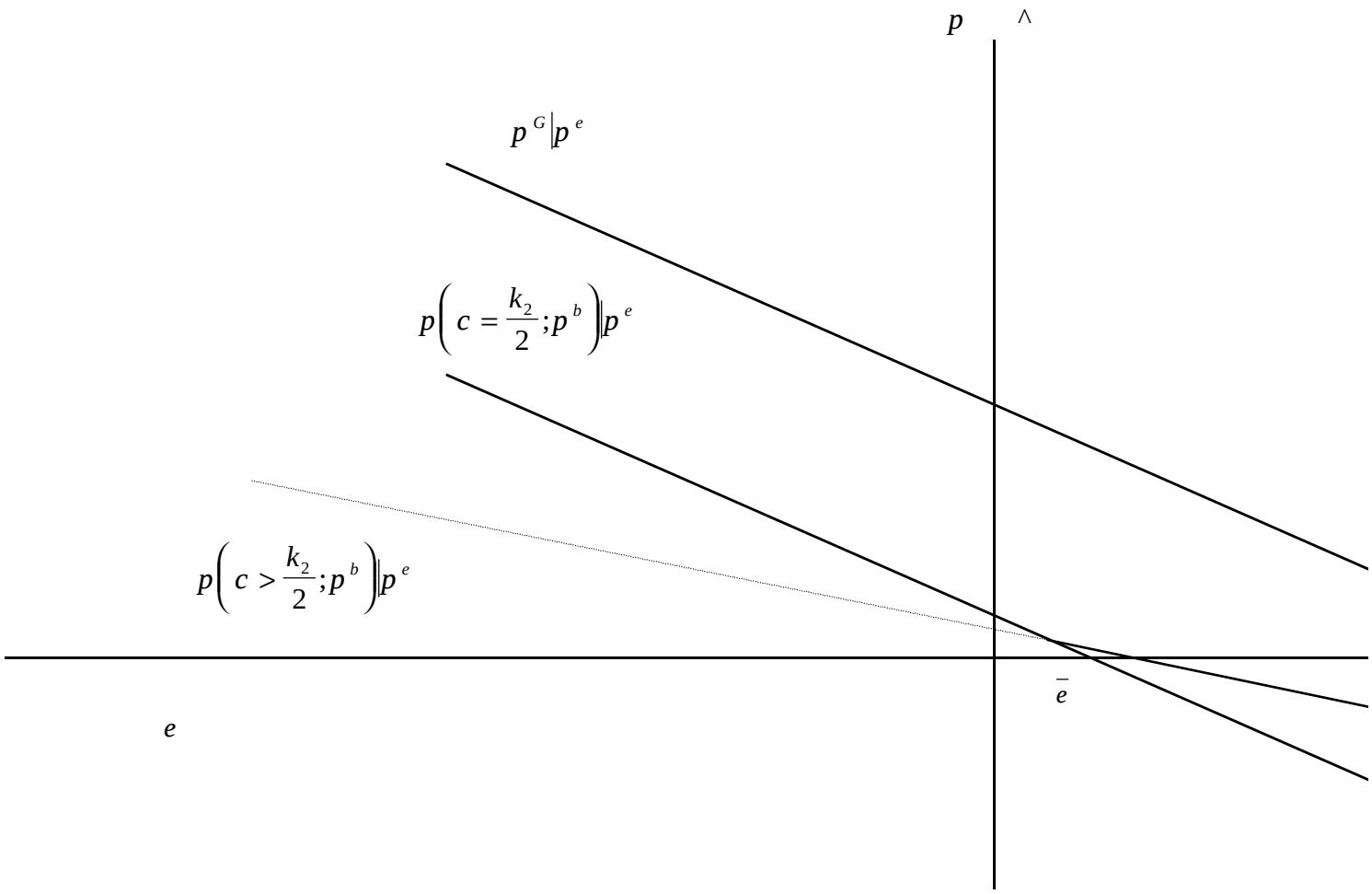
Fig.1


p ^
$p^G \mid p^e$
$p\left(c = \frac{k_2}{2}; p^b\right) \mid p^e$
$p\left(c > \frac{k_2}{2}; p^b\right) \mid p^e$
$\bar{e}$
e