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Optimal Monetary Instruments and Policy Games Reconsidered

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Abstract

Optimal Monetary Games and Policy Instruments Reconsidered

Tabellini (1987) shows that when a monetary and a fiscal authority are engaged in a deterministic Nash game, monetary targeting Pareto dominates interest rate targeting. His conclusion depends on a crucial assumption about the two authorities' relative preferences. I point out that the deep institutional change implied by the move from interest rate to monetary targeting, is likely to cause an endogenous modification of those preferences. As a result, his findings would not apply any more.

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1. Introduction

A standard conclusion in the 'money vs. interest rate targeting' debate is that if the economy is hit by real disturbances, output would be relatively more stable when monetary targeting rather than interest rate targeting is adopted, while the opposite is true when the shock comes from the monetary sector.

Contrary to this ambiguous conclusion, Tabellini (1987) obtains a clear-cut result by considering a deterministic Nash game, played by a monetary and a fiscal authority. Namely, he shows that monetary targeting implies a less expansionary fiscal policy, a less restrictive monetary policy and a lower aggregate demand (closer to its zero target level), compared to interest rate targeting. He proves, therefore, that the former regime is Pareto superior to the latter for both the monetary authority and, provided that a rather loose condition is satisfied, the fiscal authority.

In this paper I question Tabellini's crucial assumption about the two authorities' relative preferences. I also point out that, due to the deep institutional change implied by the move from interest rate to monetary targeting, Tabellini's assumption might be particularly unrealistic precisely

when the latter regime is adopted. As a result, his conclusions lose their general validity and only obtain in particular cases.

2. Tabellini's model

Tabellini (1987) considers an IS-LM model:

$$y = \gamma f - \delta i \tag{1}$$

$$m = \alpha y - \beta i \tag{2}$$

where y is real output, i is the nominal (and real) interest rate, m is the real money supply, f is public expenditure and γ, δ, α and β are exogenous parameters. Equation (1) provides the well known equilibrium condition on the goods market from which the IS curve is derived. Equation (2) gives the equilibrium condition on the monetary market, identifying the LM curve.

Both the monetary authority and the fiscal authority are assumed to be penalised, although with different weights, by output variability around a zero target level, by fiscal expansion exceeding its positive and exogenously given target level $(\bar{f})$, and by interest rate variability around a zero target level, i.e.:

$$V_M = \frac{1}{2}[y^2 + \chi_M{}^2 (f - \bar{f})^2 + \theta_M i^2] \tag{3}$$

$$V_F = \frac{1}{2}[y^2 + \chi_F{}^2 (f - \bar{f})^2 + \theta_F i^2] \tag{4}$$

where V_i (i = F, M), is the respective authority's loss function and χ_M, θ_M, χ_F and θ_F are the weights assigned by the fiscal and the monetary authority respectively to fiscal policy and interest rate variability.

Tabellini (1987) assumes that $\chi_F / \chi_M > \theta_F / \theta_M > 1$.[1] Such a condition implies that the fiscal authority assigns a higher weight to fiscal deficit variability around the desired target than the monetary authority does ($\chi_F > \chi_M$). His conclusions, however, depend crucially on the assumption that the fiscal authority places a higher weight on interest rate variability, compared to central bankers ($\theta_F > \theta_M$). Such an hypothesis is justified by arguing that the fiscal authority tends to be more concerned than the monetary authority about the "*fiscal repercussions of interest rate changes*" (Tabellini, 1987, p. 318) and, presumably, about the fact that high interest rates also crowd-out investments. As a result, the fiscal authority should follow a restrictive policy.

3. Some critical remarks on Tabellini's main assumption

I believe that the assumption that $\theta_F > \theta_M$ is far from being "*a very weak sufficient condition on the parameter values*" (Tabellini, 1987, p. 316).

Since interest rates are under the direct control of the central bank, I would find more appropriate to assume that the latter cares about their variability more than the fiscal authority does, i.e. that $\theta_M > \theta_F$. Moreover, historical evidence relative to several countries (Italy, among others) shows that the disciplining market mechanism based on interest rates, implicitly assumed by Tabellini, is not effective because of the low intertemporal government's

[1] His assumption also implies that the disagreement between fiscal and monetary authority is larger for expenditures than for interest rates ($\chi_F / \theta_F > \chi_M / \theta_M > 1$).

discount rate. In other words, the threat of high interest rates does not prevent the fiscal authority from following expansionary fiscal policies.

Tabellini's assumption appears even more inappropriate when considering the actual functioning of most central banks, which are more and more held strictly responsible for not allowing money supply to diverge from an assigned positive target, the latest example being the European Central Bank. As a matter of fact, the passage from interest rate to monetary targeting is accompanied by a deep institutional change, characterised by a stricter definition of the tasks and responsibilities of the central bank as to monetary control. In other words, while the interest rate targeting regime may imply a rather loose and implicit commitment to interest rate stability, undertaken by a not necessarily independent central bank, the monetary regime is associated with a strict and explicit commitment to monetary stability, to be followed by an independent central bank. Even accepting Tabellini's hypothesis that $\theta_F > \theta_M$ when an interest rate regime is in place, then, the move to monetary targeting makes that assumption much less plausible, since it implies a much higher weight on central bank's monetary variability. A paradoxical result, reminiscent of the Lucas' critique, may therefore arise: due to the endogenous variation of θ_M, Tabellini's conclusion might not apply any more, especially when following the prescriptions resulting from his model!

4. Modifying Tabellini's model

By including money supply rather than interest rate in the policymakers' objective functions, [2] equations (3) and (4) are replaced respectively by:

$$L_M^r = \frac{1}{2}[y_r^2 + \chi_M{}^2 (f - \overline{f})^2 + \quad \theta_M^r m^2] \tag{3'}$$

$$L'_F = \frac{1}{2}[y_r^2 + \chi_F{}^2 (f - \overline{f})^2 + \quad \theta_F m^2] \tag{4'}$$

with $r = p, q$. Letters p and q refer respectively to the interest rate and to the monetary targeting regime.

4.1. Interest rate regime

In the interest rate regime, the monetary authority adjusts the money supply in order to let the interest rate as close as possible to its target. Since the monetary authority controls the interest rate, we need to express money supply, m, in terms of i. As a result, after substituting equations (1) and (2) into equations (3') and (4') first order conditions of the Nash game give:

$$m_p = -\frac{\delta}{\theta_M^p (\beta + \alpha\delta)} y_p \tag{5}$$

and

$$f_p = \overline{f} - \frac{\gamma\theta_M^p (\beta + \alpha\delta) - \alpha\gamma\delta\theta_F}{\chi_F \theta_M^p (\beta + \alpha\delta)} y_p, \tag{6}$$

where m_p and f_p are respectively the optimal monetary and fiscal policy to be followed when considering an interest rate regime.

[2] Tabellini (1987) does not provide any justification for including interest rate rather than money supply in the objective function of the two authorities. In any case the inclusion of either variable does not imply any change in the results of the model.

By substituting (5) and (6) into (1), it turns out that:

$$y_p = \frac{\gamma\beta\chi_F\theta_M^p(\beta+\alpha\delta)}{\Delta}\overline{f} \tag{7}$$

where $\Delta = \chi_F[\theta_M^p(\beta+\alpha\delta)+\delta^2]+\theta_M^p(\gamma\beta)^2+\gamma^2\beta\alpha\delta(\theta_M^p-\theta_F)]$

In turn, by substituting (7) into (5) and (6), we have:

$$f_p = \frac{\chi_F[\theta_M^p(\beta+\alpha\delta)^2+\delta^2]}{\Delta}\overline{f} \tag{8}$$

and

$$m_p = -\frac{\delta\beta\gamma\chi_F}{\Delta}\overline{f} \tag{9}$$

Intuition for these results, which are the same as in Tabellini (1987), is immediate.

4.2. Money supply regime

In the money supply regime, the central bank is committed to leave the money supply unchanged, so that the interest rate is allowed to fluctuate. In such a case, however, as we have argued, it might well be that the weight assigned by the central bank to monetary variability is higher than in the case of interest rate targeting. When referring to a monetary targeting regime, then, it is necessary to consider in the monetary authority's loss function the weight $\theta_M^q > \theta_M^p$.

First order conditions give respectively:

$$m_q = -\frac{\delta}{\theta_M^q(\beta+\alpha\delta)}y_q \tag{10}$$

and

$$f_q = \overline{f} - \frac{\gamma\beta}{\chi_F(\beta + \alpha\delta)} y_q, \tag{11}$$

By substituting (11) and (12) into (1) it turns out that:

$$y_q = \frac{\gamma\beta\chi_F\theta_M^q(\beta + \alpha\delta)}{\widetilde{\Delta}} \overline{f}. \tag{12}$$

where $\widetilde{\Delta} = \chi_F[\theta_M^q(\beta + \alpha\delta)^2 + \delta^2] + \theta_M^q(\gamma\beta)^2$.

It is now possible to calculate the optimal values for the money supply and for the fiscal policy, by substituting equation (13) respectively into equations (11) and (12):

$$f_q = \frac{\chi_F[\theta_M^q(\beta + \alpha\delta)^2 + \delta^2]}{\widetilde{\Delta}} \overline{f} \tag{13}$$

and

$$m_q = -\frac{\delta\gamma\beta\chi_F}{\widetilde{\Delta}} \overline{f} \tag{14}$$

By comparing y_q with y_p, it turns out that:

$y_q \geq y_p$ if and only if:

$$\frac{[\chi_F\delta^2(\theta_M^q - \theta_M^p) + \gamma^2\alpha\beta\delta(\theta_M^p - \theta_F)\theta_M^q]}{\widetilde{\Delta}} \overline{f} \geq 0 \tag{15}$$

Tabellini's model obtains when assuming both that $\theta_M^q = \theta_M^p$, and that $\theta_M^p < \theta_F$. In such a case condition (15) applies with a strictly negative sign, implying also that $f_q < f_p$ and $m_q > m_p$. His conclusions, of course, would be reversed when assuming, together with $\theta_M^q = \theta_M^p$, that $\theta_M^p > \theta_F$. I have argued that I find the latter assumption as highly plausible.

Since $\theta_M^q > \theta_M^p$, however, even when $\theta_M^p < \theta_F$ equation (15) shows that it is neither possible to conclude that $y_q < y_p$, nor that $f_q < f_p$ and $m_q > m_p$. Contrary to Tabellini (1987), then, Pareto superiority of the monetary compared to the interest rate regime for both the monetary and the fiscal authority remains ambiguous, and will only obtain for particular parameter values of the model. [3]

5. Concluding remarks

In this short note I have pointed out that due to the deep institutional change implied by the move from interest rate to monetary targeting, the assumption made in Tabellini (1987) about the relative preferences of a monetary and a fiscal authority is particularly unrealistic, precisely when the latter regime is adopted. As a result, his conclusions lose their general validity and only obtain in particular cases.

References

Tabellini, G. (1987), 'Optimal Monetary Instruments and Policy Games', *Ricerche Economiche*, n. 3-4, pp.315-325.

[3] In order to increase the realism of the model, it would be possible to consider also a positive and not necessarily equal monetary target for both the fiscal and the monetary authority. In particular, it would seem plausible to assume a lower monetary target for the monetary than for the fiscal authority. Even this modification, however, would not change my conclusions.

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