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## « Monetary accommodation and unemployment : Why central bank transparency matters »

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# Monetary accommodation and unemployment: Why central bank transparency matters

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## Abstract

*Recent contributions have shown that in the presence of strategic interactions between non atomistic unions and the central bank, an accommodating monetary policy rule may increase equilibrium unemployment. This note demonstrates that this result can be reversed considering the case where the central bank is not fully transparent concerning its reaction to wage decisions.*

*Keywords:* Monetary regime; Wage setting; Central bank transparency.

*JEL Classification:* E24, E5, J51.

## 1. Introduction

An important strand of literature has shown that, in the presence of strategic interactions between non atomistic labour unions and the central bank, equilibrium unemployment is sensitive to the monetary regime. In particular, equilibrium unemployment varies according to the type of monetary rule adopted. So, recent contributions have revealed that in an economy with large wage setters, an accommodating monetary rule may prove to be counterproductive by increasing equilibrium unemployment [Bratsiotis and Martin, 1999; Soskice and Iversen, 2000; Coricelli et al., 2001; Holden, 2005]. The intuition underlying

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this somewhat surprising result is that an accommodating monetary policy renders labour demand less responsive to wages. This induces unions to behave more aggressively and to demand higher wages, thus increasing equilibrium unemployment.

However, in this literature, wage setters are supposed to have complete information about the monetary regime. Hence, they perfectly know how an increase in their wage claims will affect the central bank's decision and thus, via monetary policy, the labour demand. The aim of this paper is to extend this literature by investigating the impact of an accommodating monetary rule on unemployment considering the possibility that the central bank's reaction to wages may be uncertain for the unions. More precisely, we assume a lack of transparency concerning the central bank's behaviour in the spirit of Sorensen [1991], Grüner [2002] and Grüner and al. [2005]. In this context, we show that the standard result can be reversed: monetary accommodation may recover its expected decreasing effect on unemployment when monetary policy uncertainty is high as wage setters then act more cautiously and abstain from raising wages.

## 2. The model

This section presents a basic economic model in the line of Holden [2005] extended to allow for monetary uncertainty as in Sorensen [1991], Grüner [2002] and Grüner and al. [2005].<sup>1</sup> Hence, we consider an economy consisting of  $n$  symmetric sectors indexed by  $j$  ( $j = 1, \dots, n$ ). Workers of each sector are organised in a single labour union, so that there are  $n$  labour unions in the economy (also indexed by  $j$  with  $j = 1, \dots, n$ ). Each sector is populated by several firms producing a single homogenous good  $y_j$  under constant returns to scale with labour  $l_j$  as the unique input. The technology of firms in sector  $j$  is given by

$$y_j = l_j, \tag{1}$$

where lowercases denote natural logarithms. Thus, each sector is characterised by Bertrand competition which implies that each firm of sector  $j$  sets the output price  $p_j$  equal to unit

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<sup>1</sup>The model of Holden [2005] can be considered as a simplified version of Soskice and Iversen [2000] and Bratsiotis and Martin [1999].

costs, that is

$$p_j = w_j, \quad (2)$$

where  $w_j$  is the nominal wage set by union  $j$ .

The demand for products from sector  $j$  is described by

$$y_j = \alpha (m - \bar{p}) - \eta (p_j - \bar{p}); \quad \alpha, \eta > 0, \quad (3)$$

where  $m$  is the nominal money stock,  $\eta$  the elasticity of substitution among the  $n$  goods produced in the economy and  $\bar{p}$  the log of the aggregate price level  $\bar{P}$  defined as

$$\bar{P} = \left( \frac{1}{n} \sum_{j=1}^n P_j^{\frac{1}{1-\eta}} \right)^{1-\eta}. \quad (4)$$

The nominal money stock is set by the central bank (henceforth CB) in response to wage decisions according to the following predetermined monetary rule

$$m = m^* + \rho \bar{w}, \quad (5)$$

where  $m^*$  is an exogenous component of the money supply,  $\bar{w}$  an average measure of the economy-wide wage level and  $\rho$ , the rate of accommodation of monetary policy to the wage setting.<sup>2</sup>

We assume that unions are not perfectly informed about the monetary reaction to their wage decisions since the CB is not fully transparent in terms of its behaviour. Unions only know the mean  $E(\rho) = \bar{\rho}$  and the variance  $\sigma_\rho^2 = E[(\rho - \bar{\rho})^2]$  of the degree of monetary accommodation  $\rho$ . An increase in  $\sigma_\rho^2$  renders the monetary decision process more uncertain for the unions. Thus, we interpret the parameter  $\sigma_\rho^2$  as the degree of monetary policy uncertainty.

In specifying the objectives of union  $j$ , we assume that it is concerned about the real

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<sup>2</sup>This monetary policy rule is exogenous as in Soskice and Iversen [1998, 2000] and Holden [2005]. Note that Coricelli et al. [2002] derive a broadly similar monetary rule from the minimisation of the CB's loss function that is quadratic in inflation and unemployment.

wage and employment in its sector. Its loss function is then given by

$$V_j = -(w_j - \bar{p}) + \frac{\theta}{2} (l_j - l_j^*)^2; \quad \theta > 0 \quad (6)$$

where  $\theta$  measures the unions' relative concern for employment and  $l_j^* > 0$ , the target level of employment which corresponds to the labour force in sector  $j$ .<sup>3</sup>  $l_j$  represents the labour demand function faced by union  $j$  which can be derived by combining equations (1) and (3), *i.e.* by imposing the condition that employment is demand-driven.

### 3. Equilibrium

To determine the equilibrium of the model we consider the following sequence of events: first, all unions simultaneously set their nominal wage taking into account the CB's expected reaction. Then the CB fixes the nominal money stock according to the monetary rule. Finally firms set prices and supply the demanded output. We derive the time consistent solution by solving the game backwards. Since the CB and the firms' decisions have already been specified, we can directly consider the union's decision problem.

Union  $j$  chooses its nominal wage to minimise  $E(V_j)$ , the expected value of its loss function (6), subject to the anticipated monetary rule (5). At symmetric equilibrium between unions, the resulting aggregate nominal wage can be written as<sup>4</sup>

$$w_j = \bar{w} = \frac{(n-1)}{\alpha\theta [\alpha(1-\bar{\rho})^2 + \eta(n-1)(1-\bar{\rho}) + \alpha\sigma_\rho^2]} > 0, \quad (7)$$

where we assume, without loss of generality, that  $l_j^* = \alpha m^*$ .

Substituting expressions (7) and (5) into (3), defining the mean unemployment rate in sector  $j$  as  $E(u_j) = E(l_j^* - l_j)$  and invoking symmetry so that  $E(u_j) = E(u)$ , we obtain

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<sup>3</sup>Moreover, we have admitted that the total labour force  $l^*$  is uniformly distributed across sectors so that  $l_j^* = l^* - \ln n$ .

<sup>4</sup>Symmetric equilibrium between unions implies:  $w_j = \bar{w}$  and  $\frac{\partial \bar{w}}{\partial w_j} = \frac{1}{n}$ . Hence, from equality (2), it can also be written:  $p_j = \bar{p}$  and  $\frac{\partial \bar{p}}{\partial w_j} = \frac{1}{n}$ ;  $\forall j$ .

the mean equilibrium unemployment rate in the economy

$$E(u) = \frac{(1 - \bar{\rho})(n - 1)}{\theta [\alpha(1 - \bar{\rho})^2 + \eta(n - 1)(1 - \bar{\rho}) + \alpha\sigma_\rho^2]} > 0. \quad (8)$$

Equation (8) allows us to examine the sensitivity of the mean equilibrium unemployment rate to various characteristics of monetary policymaking. In the following result, we first consider the impact of monetary policy uncertainty.

**Result 1.** *An increase in monetary policy uncertainty  $\sigma_\rho^2$  reduces the mean equilibrium unemployment rate.*

**Proof.** Differentiating (8) with respect to  $\sigma_\rho^2$ , we obtain

$$\frac{\partial E(u)}{\partial \sigma_\rho^2} = -\frac{\alpha(1 - \bar{\rho})(n - 1)}{\theta [\alpha(1 - \bar{\rho})^2 + \eta(n - 1)(1 - \bar{\rho}) + \alpha\sigma_\rho^2]^2} < 0. \quad (9)$$

This result is in the line with the findings of Sorensen [1991], Grüner [2002] and Grüner and al. [2005]. The intuition to this result is that if the central bank's reaction becomes less predictable ( $\sigma_\rho^2$  increases), unions are induced to behave more carefully by moderating their wage demands. This leads to a reduction in the mean unemployment rate.

Then we turn to consider the effect of the expected monetary rate of accommodation on the mean equilibrium unemployment. This effect is described in the following result.

**Result 2.** *The mean equilibrium unemployment rate decreases (increases) with the expected degree of monetary accommodation  $\bar{\rho}$  when monetary policy uncertainty  $\sigma_\rho^2$  is sufficiently high (low).*

**Proof.** Differentiating (8) with respect to  $\bar{\rho}$ , we obtain

$$\frac{\partial E(u)}{\partial \bar{\rho}} = \frac{\alpha(n - 1) [(1 - \bar{\rho})^2 - \sigma_\rho^2]}{\theta [\alpha(1 - \bar{\rho})^2 + \eta(n - 1)(1 - \bar{\rho}) + \alpha\sigma_\rho^2]^2}. \quad (10)$$

This derivative is negative *iff*:  $\sigma_\rho^2 > (1 - \bar{\rho})^2$ .

The intuition of this result is as follows. An increase in the expected degree of monetary accommodation has two opposing effects on the mean unemployment rate. On the one hand, it directly reduces the mean unemployment rate as monetary policy becomes more expansive. On the other hand, it renders the unions' wage claims less costly in terms of reduced labour demand, inducing them to behave more aggressively and thus increasing the mean unemployment rate. It appears from our analysis that the degree of monetary uncertainty influences the strength of this latter effect. At low levels of monetary uncertainty, this indirect positive effect may dominate. In particular, a degree of monetary uncertainty equal to zero delivers the 'standard' result that a more accommodating monetary rule accrues the unemployment rate. However, as the degree of monetary uncertainty becomes high, the indirect positive effect is weakened. This happens since greater monetary uncertainty implies more wage discipline. Indeed, if unions can not perfectly anticipate how an increase in their wages will translate into monetary policy and hence into labour demand, they will be more cautious and abstain from raising wages. In this case, the direct negative effect of the expected degree of monetary accommodation on the mean unemployment rate eventually dominates.

#### 4. Concluding remarks

Recent contributions have shown that if non atomistic labour unions are engaged in a strategic interaction with the CB then an accommodating monetary rule may increase unemployment as it leads unions to demand higher wages. In this note, we study the impact of monetary accommodation on equilibrium unemployment assuming that the CB's reaction can be uncertain for the unions. We demonstrate that an increase in the expected degree of monetary accommodation may reduce the mean unemployment rate whenever the uncertainty about the CB's reaction is high. This result is likely to have significant implications for the appropriate conduct of monetary policy. It implies that the CB should take into account the uncertainty surrounding its decisions when choosing the accommo-

dition degree of its monetary rule.

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