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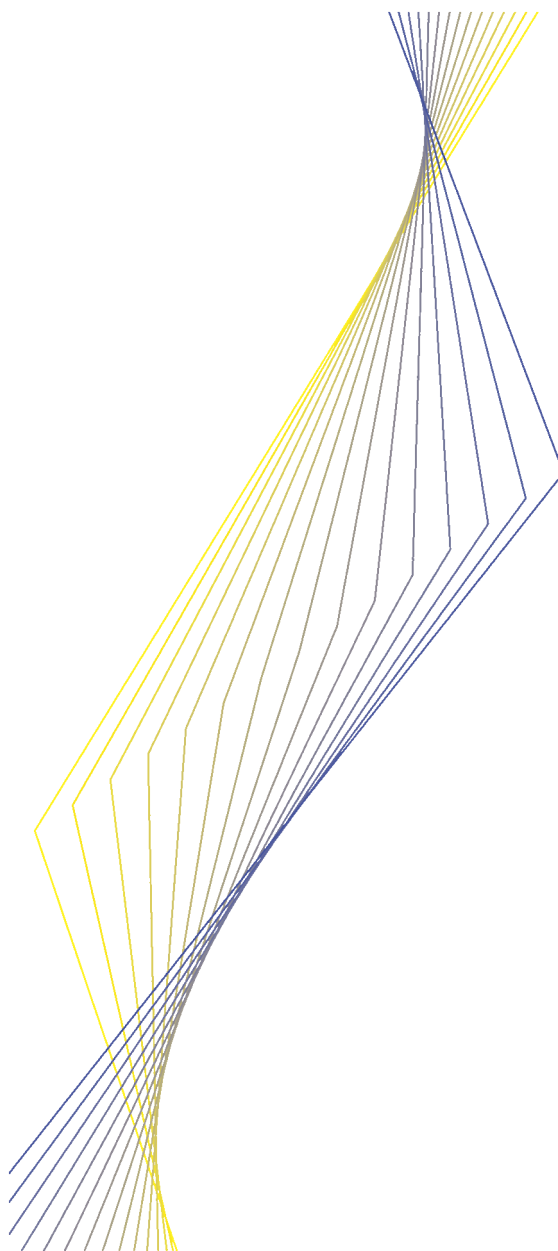
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**October 2002**

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**SHOULD CENTRAL BANKS  
REALLY BE FLEXIBLE?<sup>1</sup>**

**BY HANS PETER GRÜNER<sup>2</sup>**

**October 2002**

*1 I thank seminar participants at the ECB, and Carsten Hefeker, Oreste Tristani, and one referee for useful comments and suggestions. Address: Department of Economics, University of Mannheim, D-68131 Mannheim, Germany. Phone/fax: 49-621-1811886/4. Email: hgruener@rumms.uni-mannheim.de. This research was done while the author was visiting the Directorate General Research as part of the ECB Research Visitor Programme. The opinions expressed herein are those of the authors and do not necessarily represent those of the European Central Bank.*

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**Abstract** In this paper I show that central bank flexibility may not be desirable when it encourages trade unions to behave more aggressively. The argument is based on a model where risk averse trade unions interact with a central bank. A flexible central bank stabilizes economic shocks and reduces output volatility. This enables trade unions to realize higher real wages without risking the unemployment of some insider workers. Risk averse insiders demand higher real wages, generate more inflation and more unemployment. The overall effect on welfare may be negative. A conservative central bank instead increases output and employment on average but raises output volatility. The argument also sheds new light on the issue of optimum currency areas. Wage claims are lower and employment is higher in a currency union if national trade unions expect the central bank to do less to secure employment of insider workers in their country.

**Keywords:** central bank flexibility, central bank credibility, optimum currency area.

**JEL N.:** E52, E58.

### **Non-technical summary**

In a well known paper, Rogoff has argued that there exists a fundamental trade off between credibility and flexibility of monetary policy. When a government delegates monetary policy to a credible anti-inflation central bank then it sacrifices the flexibility of the central bank to stabilize macroeconomic shocks. A credible central bank therefore comes at the cost of more economic fluctuations. Rogoff's suggestion is that a government should institute an intermediate central bank which is more conservative than the government itself but not fully conservative. Such a central bank provides some - but not complete - price stability and reduced economic fluctuations.

In the present paper I argue that central bank flexibility need not always be desirable. I study the role of flexible central banks in a setup with unionized wage-setting. Trade unions are assumed to care for the employed insiders and to neglect the interests of the currently unemployed, the outsiders. Moreover, trade unions are assumed to be risk averse in the following sense: they want to avoid additional unemployment because this would hurt some of the current insiders. A conservative central banker exposes unions to more employment risk and thus induces them to make less aggressive wage claims. This raises employment on average and leads to lower inflation.

The argument is based on a model that studies the strategic interaction between the trade unions and the central bank. In the model economic shocks may occur after wages have been set. Monetary policy may react to these shocks. A central bank that accommodates economic shocks generates little uncertainty about future employment levels. From the point of view of a risk-averse trade union this is very desirable. Central bank flexibility enables trade unions to realize high real wages without risking the unemployment of insider workers. If instead the central bank does not accommodate macroeconomic shocks then the trade union fully takes the risk of unemployment into account. It will therefore target a lower increase of the

real wage. Consequently there will be less unemployment on average.

When designing institutions from monetary policy the government still faces a trade off between low inflation and reduced economic fluctuations. However, the reduction of economic fluctuations comes at a higher cost. Flexibility enables the central bank to reduce the volatility of output. However, the average level of output and the rate of inflation are adversely affected by flexibility. It may therefore be desirable to delegate monetary policy to a fully conservative central banker.

The model adds a new argument to the recent discussion of the role of common currency areas with unionized wage setting. Recent theoretical work by Grüner and Hefeker and Cukierman and Lippi suggests that the introduction of a common currency area may lead to low levels of employment and higher inflation when trade unions care less about the macroeconomic consequences of their actions. This raises wage claims, unemployment and inflation. Accordingly, larger currency areas should provide poorer macroeconomic results.

In the present setup this result is reversed. With an autonomous national monetary policy the central bank is likely to accommodate a part of national economic shocks. In a common currency area national trade unions instead expect the central bank to do less to stabilize their national shock. This increases their exposure to employment risk and makes them behave less aggressively. Consequently real wages and unemployment will be lower in the participating countries than with autonomous monetary policy. The benefit of national monetary autonomy therefore only lies in the reduction of economic fluctuations. On the other hand, there is a positive level effect from monetary unification on output and inflation. The same holds for the enlargement of existing common currency areas.



# 1 Introduction

In a seminal paper Rogoff (1985) has argued that there is a fundamental trade off between monetary policy credibility and flexibility. When the government decides on the design of monetary policy institutions it may institute a credible anti-inflation central bank in order to avoid an inflation bias. However, such a central bank does not react flexibly and appropriately to economic shocks. According to Rogoff's analysis a government should institute an intermediate central bank which is more conservative than the government itself but not fully conservative. Following Rogoff's contribution many papers have addressed this fundamental trade off between credibility and flexibility and have suggested different solutions (among others Walsh, 1995, Lohmann, 1994, Fratianni, von Hagen and Waller, 1993, and Persson and Tabellini, 1993).

In this paper I argue that central bank flexibility may actually not be desirable at all. Central bank flexibility reduces the trade unions' risk of excessive unemployment and encourages them to behave more aggressively. The argument is based on a model which explicitly analyzes the strategic interaction between the central bank and trade unions. Central bank flexibility enables trade unions to realize higher real wages without risking the unemployment of some insider workers. Risk averse insiders will demand higher real wages, generate more inflation and more unemployment. The overall effect on welfare may be negative. A conservative central bank instead increases output and employment on average but raises output volatility.

In my model many trade unions interact with a single central bank. The unions are interested in high real wages. Moreover, insiders on the labor market are interested in being re-employed. The trade union is assumed to be risk averse. This means that it does not want to risk that some of its members become unemployed. Macroeconomic shocks may adversely affect employment. A trade union which is risk adverse will therefore be reluctant to excessively raise nominal wages because it may risk the

unemployment of some of the insiders. From the point of view of the trade union it will therefore be desirable to have a central bank which accommodates macroeconomic shocks. If the central bank does not accommodate macroeconomic shocks then the trade union fully takes the risk of unemployment into account. It will therefore target a lower increase of the real wage. Consequently there will be less unemployment on average.

When designing institutions from monetary policy the government still faces a trade off between credibility and flexibility. However, flexibility comes at a higher cost. Flexibility enables the central bank to reduce the volatility of output. However, the average level of output and the rate of inflation are adversely affected by flexibility. It may therefore be desirable to delegate monetary policy to a fully conservative central banker.<sup>1</sup> A conservative central banker exposes unions to more employment risk and thus induces them to make less aggressive wage claims.

This argument also opens a new perspective on the discussion about the optimal size of a currency area and the effects of a common currency area on employment (Calmfors, 1998a,b, Grüner and Hefeker, 1999 and Cukierman and Lippi, 2001). Grüner and Hefeker and Cukierman and Lippi have argued that wage setters in a currency union internalize adverse macroeconomic effects of wage claims to a lesser extent. This raises wage claims, unemployment and inflation. In the present setup this result is reversed. With an autonomous national monetary policy the central

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<sup>1</sup>The present paper is related to the paper by Sorensen (1991). Sorensen has shown that a monetary authority with unknown preferences may reduce wage claims of an economy wide trade union. The union anticipates that higher wages will induce more variance of inflation. It should be noted that this effect becomes less important when wage negotiations are decentralized because individual unions matter less in the central bank's reaction. In the present paper the degree of centralization of wage negotiations does not play a role because unions only care about the way in which the economy wide shock affects their employment.

bank is likely to stabilize a part of national economic shocks. In a common currency area national trade unions instead expect the central bank to do less to stabilize their national shock. This increases their exposure to employment risk and makes them behave less aggressively. Consequently real wages and unemployment will be lower in the participating countries than with autonomous monetary policy. The benefit of national monetary autonomy therefore only lies in the reduction of economic fluctuations. There is a positive level effect from monetary unification on output and inflation.

The present paper is related to a recent literature that revisits Rogoff's classical argument. In particular Calmfors (1998b) and Jordahl and Laséen (2000) study the impact of less central bank flexibility on labor market reform. They argue that governments may be willing to pay the political cost of labor market reform when the central bank is less reluctant to stabilize employment. The present paper instead argues that the labor market itself will react to a more restrictive central bank behavior. Another interesting argument is provided by Lippi (1999). He provides an alternative microfounded model of the interaction between wage setters and a central bank. In his model imperfect competition among sectors leads to an externality that arises from higher wage claims. Non-atomistic wage setters know that their increased wage claims may lower the real wage in other competing sectors via additional inflation. In addition it softens the impact of wage claims on output. Lippi shows that - if the second effect dominates the first - a more conservative central bank may lead to more wage discipline and more employment in equilibrium.

## 2 The Model

### 2.1 Timing and Labor Demand

Consider the interaction of  $n$  sectoral trade unions and one central bank. Labor unions fix their wage simultaneously at stage one. At stage two the central bank observes an economy wide shock  $a$  and at stage three it unilaterally fixes inflation  $\pi$ .

There are workers of total mass 1 and each sector has equal size. Sectoral labor demand is

$$l_i = \frac{1}{n} (1 + \alpha (\pi - w_i + a)), \quad (1)$$

where  $w_i$  and  $\pi$  are the logs of the sectoral wage and the price level respectively. The variable  $a$  is an economy wide supply shock with mean zero and support  $[a', a'']$  where  $a' < 0 < a''$ . The economy's total employment is denoted by

$$l = \sum_{i=1}^n l_i. \quad (2)$$

Full employment is achieved at  $l = 1$ , i.e. when  $\pi = w - a$ , where

$$w = \frac{1}{n} \sum_{i=1}^n w_i \quad (3)$$

is the economy's average nominal wage. Unemployed workers receive a real wage which is normalized to zero in absolute terms. Total unemployment is given by

$$u = 1 - l = \alpha (w - \pi - a). \quad (4)$$

### 2.2 Preferences

The workforce is divided into employed insiders and the unemployed. The number of insiders in trade union  $i$  is denoted by

$$l_i^* < \frac{1}{n}. \quad (5)$$

For simplicity, it is assumed to be the same for all unions. Trade unions are assumed to maximize utility of the employed workers. This assumption is in the tradition of the insider-outsider theory (see Lindbeck and Snower, 2002, for a recent survey). It either represents a situation where unemployed workers leave the trade union or where the median voter in the trade union is an employed insider.

I assume that trade unions are infinitely risk averse in the sense that they maximize the minimum real wage that an insider can realize. This assumption makes the formal analysis very convenient because unions maximize the minimum of  $w_i - \pi$  subject to the constraint that there is no risk of unemployment of current insiders.<sup>2</sup> Hence unions pick a wage such that, even with the worst possible economic shock re-employment of the insiders is guaranteed.

The government maximizes a utility function in inflation and unemployment of the form:

$$G(\pi, l) = -A\pi^2 - u^2, \quad (6)$$

where  $A$  is a measure of the governments inflation aversion. The government delegates monetary policy to a central bank with objective

$$C(\pi, l) = -B\pi^2 - u^2. \quad (7)$$

The weight  $B$  can be chosen by the government. Note that the government and the central bank want employment to be above the current level which is given by  $u^* = 1 - nl_i^* > 0$ . The reason is that trade unions are willing to trade off some employment against higher real wages.

I assume that the central bank can not commit to a particular inflation rate.

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<sup>2</sup>I will later show that finite risk aversion is sufficient to make the main point.

## 2.3 Equilibrium

We can now solve for the subgame perfect equilibrium of the game. The central bank reaction to wage claims  $w$  can be derived by maximizing

$$C(\pi, u) = -B\pi^2 - \alpha^2(\pi - w + a)^2. \quad (8)$$

This yields

$$-B\pi - \alpha^2(\pi - w + a) = 0 \Leftrightarrow \quad (9)$$

$$\pi = \frac{\alpha^2}{B + \alpha^2}(w - a). \quad (10)$$

By defining

$$b := \frac{\alpha^2}{B + \alpha^2}, \quad (11)$$

we get

$$\pi = b(w - a). \quad (12)$$

The equilibrium policy of a single trade union is characterized by a nominal wage such that for the maximum adverse shock  $a = a'$  current employment is guaranteed. The reaction function of a single trade union can be derived by fixing

$$l_i = l_i^*, \quad (13)$$

where  $l_i = \frac{1}{n}(1 + \alpha(\pi - w_i + a'))$  and  $\pi = b(w - a')$ . This yields:

$$\frac{1}{n}(1 + \alpha(b(w - a') - w_i + a')) = l_i^* \Leftrightarrow \quad (14)$$

$$\frac{1}{n} \left( 1 + \alpha \left( 1 - \frac{b}{n} \right) (-w_i) + \alpha(1 - b)a' + \alpha b \frac{(n-1)w_{-i}}{n} \right) = l_i^*. \quad (15)$$

The reaction function of a single trade union is

$$w_i = \frac{\alpha(1-b)a' + \alpha b \frac{(n-1)w_{-i}}{n} + 1 - nl_i^*}{\alpha \left(1 - \frac{b}{n}\right)}. \quad (16)$$

Solving for the symmetric equilibrium wage yields:

$$w = \frac{\alpha(1-b)a' + \alpha b \frac{(n-1)w}{n} + 1 - nl_i^*}{\alpha \left(1 - \frac{b}{n}\right)} \quad (17)$$

$$w = a' + \frac{1}{\alpha(1-b)}(1 - nl_i^*) = a' + \frac{1}{\alpha(1-b)}u^*, \quad (18)$$

where  $u^* = 1 - nl_i^*$  is total initial unemployment. Accordingly, equilibrium wage claims are lower if the maximum adverse shock is larger and if more insiders are employed initially.

### 3 Results

This leads us to the following first result on the role of central bank flexibility.

**Proposition 1** *A more flexible central bank (lower  $B$ ) increases (i) nominal wage claims and (ii) average unemployment.*

PROOF (i) Obvious.

(ii) Average unemployment is

$$E(u) = (1-b)w = (1-b)a' + \frac{u^*}{\alpha}. \quad (19)$$

Note that  $a' < 0$ . Hence the derivative with respect to  $b$  is positive. Q.E.D.

The impact of flexibility on inflation is also undesirable if the maximum shock is not too large.<sup>3</sup>

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<sup>3</sup>Note that for a large maximum shock the trade union would fix wages such that more than full employment obtains. Given the central bank's loss function the reaction would be to deflate in order

**Proposition 2** *A more flexible central bank increases average inflation if  $-\alpha a' < u^*$ .*

PROOF Expected inflation is given by:

$$E(\pi) = E(b(w + a)) = ba' + \frac{b}{\alpha(1-b)}u^*. \quad (20)$$

The derivative is:

$$\frac{dE(\pi)}{db} = a' + \frac{\alpha}{(\alpha(1-b))^2}u^*. \quad (21)$$

Finally:

$$\frac{dE(\pi)}{db} > 0 \Leftrightarrow -a' < \frac{\alpha}{(\alpha(1-b))^2}u^*. \quad (22)$$

This condition holds for all  $b \in [0, 1]$  if  $-\alpha a' < u^*$ . Q.E.D.

The overall effect of flexibility on welfare depends upon the variance of the shock. If it is not too large then the negative impact on average inflation and employment dominates the negative effect from less stabilization.

**Proposition 3** *Assume that  $-\alpha a' < u^*$ . A more flexible central bank reduces welfare if  $\sigma_a^2$  is not too large.*

Welfare is

$$E(G) = E(-A\pi^2 - u^2) \quad (23)$$

$$= -AE(\pi^2) - E(u^2) \quad (24)$$

$$= -A(E(\pi))^2 - A\sigma_\pi^2 - (E(u))^2 - \sigma_u^2 \quad (25)$$

$$= -A(E(\pi))^2 - AE((ba)^2) - (E(u))^2 - E((\alpha(1-b)a)^2) \quad (26)$$

$$= -A(E(\pi))^2 - (E(u))^2 - (Ab^2 + (\alpha(1-b))^2)\sigma_a^2. \quad (27)$$

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to reduce employment. We concentrate on the case where unions have no such incentive to raise employment above full employment.



Using (20) and (19) we get:

$$E(G) = -A \left( ba' + \frac{b}{\alpha(1-b)} u^* \right)^2 - \left( (1-b)a' + \frac{u^*}{\alpha} \right)^2 - (Ab^2 + (\alpha(1-b))^2) \sigma_a^2. \quad (28)$$

The first two terms represent the costs of average inflation and average unemployment. From Proposition 1 and 2 we know that both strictly increase in  $b$  if  $\alpha a' > l_i^*$ . The last term represents costs of volatility of inflation and employment. These costs are decreasing in  $b$  for small values of  $b$ . The derivative with respect to  $b$  is finite. Hence, for a sufficiently small variance  $\sigma_a^2$  the overall effect of more flexibility on welfare is negative. Q.E.D.

## 4 Robustness

In this section I briefly discuss the robustness of the main result when trade unions are less than fully risk-averse. Consider for simplicity a single trade union with a von Neumann Morgenstern utility function

$$v(\omega) = \omega. \quad (29)$$

Note that this utility function describes a risk averse trade union since  $\omega$  is the logarithm of the real wage. Denote the log of the real wage if unemployed by  $\omega_0$ . The variable  $a$  is an economy wide supply shock. It is distributed uniformly on  $[-a', a']$  where  $a' > 0$ .

Denote by

$$d = (1-b)a \quad (30)$$

the residual real wage shock after monetary policy intervention.

For each nominal wage we may calculate an expected real wage  $E\omega = (1-b)w$ . For each such  $E\omega$  there is an expected fraction  $\phi(E\omega)$  of the insiders who will be

unemployed. Given the finite support of  $d$  there is a value  $E\omega^*$  below which  $\phi(E\omega) = 0$ . This value is given by

$$E\omega^* = -d' = -(1 - b) a'. \quad (31)$$

Moreover, the function  $\phi(E\omega)$  is strictly increasing in  $E\omega$  for  $-d' < E\omega < d'$ .

Expected union utility is

$$Ev = (1 - \phi(E\omega)) \int \omega d\mu(\omega, E\omega) + \phi(E\omega) \omega_0, \quad (32)$$

where  $\mu(\omega, E\omega)$  is the distribution of  $\omega$  conditional on  $E\omega$ .

Obviously, the unions' expected utility is strictly increasing in  $E\omega$  if  $E\omega < E\omega^*$ . This is so because all insiders remain employed with certainty for all  $E\omega < E\omega^*$ . Whether or not expected utility it is further increasing for  $E\omega > E\omega^*$  depends upon the value of  $\omega_0$ . If this value is sufficiently low then expected union utility is decreasing for  $E\omega > E\omega^*$ . In such a situation the union chooses the expected real wage  $E\omega = E\omega^* = -(1 - b) a'$ . A more flexible central bank therefore leads to a higher expected real wage and more unemployment. Hence the main result is robust, if (i) being unemployed is sufficiently undesirable for workers and (ii) the support of the shock is finite.

## 5 Optimum currency areas

The argument developed so far sheds new light on the issue of the optimal size of a currency area. The conventional wisdom of the corresponding literature is that there is a trade off between reduced transaction costs and the reduced ability to stabilize idiosyncratic shocks. Recently, Grüner and Hefeker (1999) and Cukierman and Lippi (2001) have made an additional argument in favor of smaller currency areas. They considered the impact of the size of the currency area on the behavior of wage setters.

According to their analysis a larger currency area may lead to less discipline of wage setters when they internalize the inflationary consequences of their behavior to a lesser extend.

In the present framework this last argument is reversed. To see why consider a setup with two countries, each with a single trade union. In each country  $j = 1, 2$  there is an idiosyncratic output shock  $a_j$  distributed uniformly on  $[-a', a']$ . Suppose that a national central bank reacts according to

$$\pi_j = b(w_j - a_j). \quad (33)$$

The part of the shock  $a$  which is not stabilized by the central bank is  $(1 - b)a_j$ . Note that the maximum residual shock that may hit the economy in country  $j$  is therefore  $d = -(1 - b)a'$ . A common central bank instead chooses an inflation rate that stabilizes the average shock. Inflation is given by

$$\pi = b\left(\frac{w_1 + w_2}{2} - \frac{a_1 + a_2}{2}\right). \quad (34)$$

With a common central bank the maximum residual shock in country  $j$  is larger then in the case of national monetary authority. To see why, consider a situation where country 1 is hit by an adverse shock  $a_1 = -a'$  while country 2 is hit by a positive shock  $a_2 = a'$ . There is no stabilization effort by the common central bank which means that  $d = a_1 = -a'$  fully hits economy 1. This reduces the national trade unions' ability to realize a high real wage without risking the unemployment of insiders.

National trade unions know that a common central bank will do less to stabilize national shocks. This increases the need for wage discipline if national employment is to be secured. Consequently, a common national monetary policy combines the virtues of low transaction costs with low unemployment and inflation.

## 6 Conclusion

The present paper provides an additional argument why central bank flexibility may lead to poor macroeconomic results. Monetary policy flexibility may have some important negative effects when wage setters are risk averse. A flexible central reduces employment risk for insiders and induces them to behave more aggressively. This increases unemployment and inflation. When the variance of macroeconomic shocks is not too large the government should delegate monetary policy to a fully conservative central bank. Note that wage setters would instead desire monetary policy to be fully flexible. This enables them to pick the desired point on their labor demand curve without risking any additional unemployment.

Interestingly the degree of centralization of the wage setting process does not play a role in the present analysis. Even with atomistic wage setting, the described effect remains intact. In a number of other papers decentralization instead plays a major role (Skott, 1997, Cukierman and Lippi, 1999 and 2001, Lippi 1999, or Grüner and Hefeker, 1999). In those papers trade unions internalize their impact on monetary policy to a lesser extent if wage setting is decentralized. In the present analysis instead no such externality is important. Instead trade unions simply care about the extent of residual uncertainty which they consider as given.

The present argument sheds new light on the issue of optimum currency areas. With idiosyncratic shocks and unionized wage setting larger currency areas may increase employment and reduce inflation if unions are risk-averse. This result is in stark contrast to the negative results in Skott (1997), Grüner and Hefeker (1999), Cukierman and Lippi (2001), and Grüner (1999). Further investigations into the empirical relevance of the present result should therefore be particularly useful.

## REFERENCES

- Barro, Robert J. und David B. Gordon (1983) "Rules, Discretion and Reputation in a Model of Monetary Policy," *Journal of Monetary Economics*, 12, 101-121.
- Backus, David and John Driffill (1985) "Inflation and Reputation," *American Economic Review*, 75, 530-538.
- Calmfors, Lars (1998a): "Macroeconomic Policy, Wage Setting and Employment: What Difference Does EMU Make?", Institute of International Economic Studies, University of Stockholm, Disc. Paper No. 657.
- Calmfors, Lars (1998b): "Monetary Union and Precautionary Labor Market Reform", Institute of International Economic Studies, University of Stockholm, Disc. Paper No. 659.
- Cukierman, Alex and Francesco Lippi (2001): "Labor Markets and Monetary Union: a Preliminary Strategic Analysis", *Economic Journal*, 111, 541 - 565.
- Cukierman, Alex and Francesco Lippi (1999): "Central Bank Independence, Centralization of Wage Bargaining, Inflation and Unemployment - Theory and Some Evidence", *European Economic Review*, 43, 1395-1434.
- Fratianni, Michele, Jürgen von Hagen und Christopher Waller (1993) "Central Banking as a Political Principal Agent Problem," CEPR Discussion Paper, No. 752.
- Grüner, Hans Peter and Carsten Hefeker (1999) "How Will EMU Affect Inflation and Unemployment in Europe?," *Scandinavian Journal of Economics*, 33-47.
- Grüner, Hans Peter (1999) "On the role of conflicting national interests in the ECB council", CEPR discussion paper.

- Jordahl, Henrik and Stefan Laséen (2000) "Central bank conservatism and labor market reform", mimeo, Uppsala University.
- Lohmann, Susanne (1992) "Optimal Commitment in Monetary Policy: Credibility versus Flexibility," *American Economic Review*, 82, 273-268.
- Lippi, Francesco (1999) "Strategic Monetary Policy with Non-Atomistic Wage Setters", CEPR discussion paper No. 2218.
- Lindbeck, Assar and Dennis Snower (2002) "The Insider-Outsider Theory: A Survey", IZA Discussion paper No 534.
- Persson, Torsten and Guido Tabellini (1993) "Designing Institutions for Monetary Stability," Paper presented at the Carnegie-Rochester Conference, Pittsburgh.
- Rogoff, Kenneth (1985) "The Optimal Degree of Commitment to an Intermediate Monetary Target," *Quarterly Journal of Economics*, 100, 1169-1190.
- Sorensen, J.R. (1991), "Political Uncertainty and Macroeconomic Performance", *Economics Letters* 37.
- Scott, Peter (1997) "Stagflationary Consequences of Prudent Monetary Policy in a Unionized Economy" *Oxford Economic Papers* 49, 609-22.
- Walsh, Carl (1994) "Is New Zealand's Reserve Bank Act of 1989 an Optimal Central Bank Contract?," *Journal of Money, Credit and Banking* forthcoming.
- Walsh, Carl (1995) "Optimal Contracts for Central Bankers," *American Economic Review*, 85, 150-167.

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