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« Is Monetary Union Necessarily Counterproductive ? »

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Document de travail n° 2005–06

Mars 2005

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Is Monetary Union Necessarily Counterproductive ?

Giuseppe Diana*and Blandine Zimmer†

Résumé

L'union monétaire est-elle nécessairement contre-productive ?

Dans ce travail, nous analysons les effets nominaux et réels de la création d'une union monétaire entre pays parfaitement symétriques, caractérisés par une situation de concurrence oligopolistique sur leur marché du travail. Nous démontrons que, selon la configuration structurelle de ces marchés du travail, le passage à la monnaie unique peut contribuer à améliorer les performances macroéconomiques des pays adhérents.

Mots clés : Union Monétaire, Emploi, Inflation
Classification JEL : E24, F33, J51.

Abstract

This paper analyses the case of a monetary union between identical countries characterised by oligopolistic competition in their labour market. It suggests that the switch to a common currency may improve their macroeconomic performances depending on labour market features.

Key words: Monetary Union, Employment, Inflation.
JEL Classification : E24, F33, J51.

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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, neutrality of monetary regime no longer holds. Applied to a monetary union (MU) context, this result suggests that the switch to a common currency may affect inflation as well as employment. Indeed, with the establishment of a MU all the wage setters become smaller relative to the monetary authority. This, in turn, reduces their perception of the impact of their decisions on monetary policy, inducing them to less wage discipline (Cukierman and Lippi, 2001; Grüner and Hefeker, 1999; Soskice and Iversen, 1998). As a consequence, MU unambiguously increases inflation and unemployment. So, recent studies mainly concludes to harmful effects of the formation of a MU.

In this paper, we investigate whether introducing oligopolistic competition in the member countries' labour market may change those pessimistic conclusions. The setup we use to specify the features of the underlying economies is based on the microfounded framework provided by Lippi (2003). As a result, in addition to the conventional wage-increasing effect of a MU, we identify a new mechanism through which MU strengthens the contractionary impact of wage hikes on output and thus on labour demand, leading unions to moderate their wage claims. If this mechanism prevails, depending on structural labour market parameters, the formation of a monetary union then has beneficial implications for price stability and employment.

2. The model

2.1 The underlying economies

We consider two identical countries named 1 and 2. The economy of country h ($h = 1, 2$) is populated by a representative profit-maximising competitive firm and a continuum of workers arranged in the unit interval. Workers are organised in $n \geq 1$ independent unions indexed by j ($j = \frac{1}{n}, \frac{2}{n}, \dots, 1$) and of size n^{-1} .

The firm of country h produces output (Y_h) using domestic differentiated labour inputs, with the technology

$$Y_h = \left(\sum_{j=\frac{1}{n}}^1 L_{hj}^{\frac{\sigma-1}{\sigma}} \right)^{\frac{\alpha\sigma}{\sigma-1}} ; \quad 0 < \alpha < 1, \sigma > 1 \quad (1)$$

where L_{hj} is the labour supplied by union j in country h , α is a return to scale parameter and σ measures the degree of substitutability among the

different types of domestic labour inputs.¹ The firm maximises profits $Y_h - \sum_{j=\frac{1}{n}}^1 W_{hj} L_{hj}$ subject to (1), taking real individual wages W_{hj} as given. This yields the firm's labour demand function for each union j in country h . Taking logarithms, this function can be written as

$$l_{hj} \equiv \ln L_{hj} = \bar{l} - \sigma(w_{hj} - w_h) - \frac{1}{1-\alpha}(w_h - \pi) \quad (2)$$

where $\bar{l} \equiv \frac{\ln \alpha}{1-\alpha}$, w_{hj} and w_h are respectively the growth of the nominal wage obtained by union j and the aggregate nominal wage growth in country h .² The variable π defines the inflation rate.

Equation (2) indicates that an increase in the nominal wage of union j triggers two effects on labour demand. First, it raises the aggregate nominal and real wages, causing the firm to reduce output and through it the demand for labour. Second, an increase in union j 's nominal wage also accrues its *relative* wage, making its labour less competitive. This leads the firm to substitute away from union j 's labour type. Following Lippi (2003), we refer to the former impact as the 'output effect' while the latter is labelled the 'substitution effect'.

In specifying the unions' objectives we draw on Grüner and Hefeker (1999). The loss function of a typical union j (in country h) is then given by

$$V_{hj} = -(w_{hj} - \pi) + \frac{A}{2}(l_{hj} - \bar{l})^2 + \frac{B}{2}\pi^2 \quad (3)$$

where A and B measures respectively union j 's dislike for deviation of employment from its target \bar{l} and union j 's aversion of inflation.³

2.2 The national monetary policy case (NMP)

We first analyse the case where each country has full monetary autonomy (superscript N) ie. a setup where country h has its own central bank setting the inflation rate. The model is a two-stage game in which wage setters act as Stackelberg leaders vis-à-vis the monetary authority. The game is solved by backward induction, so we begin by considering the choice of country h 's central bank.

¹We suppose that labour substitutability is confined to national borders.

²Without loss of generality, this implies that the previous period nominal wages are normalized to unity. Furthermore, note that w_h is defined by the relation: $1 + w_h = \left[\sum_{j=\frac{1}{n}}^1 (1 + w_{hj})^{1-\sigma} \right]^{\frac{1}{1-\sigma}}$, thus $\frac{\partial w_h}{\partial w_{hj}} = \frac{1}{n}$.

³We suppose the desired employment level is the natural one \bar{l} (at which $(w_h - \pi) = 0$ when $w_{hj} = w_h; \forall j, h$).

Following the literature initiated by Barro and Gordon (1983), we assume that the national central bank seeks both the natural employment level \bar{l} for all the unions and zero inflation, according to

$$\Omega_h = \frac{1}{2} \sum_{j=\frac{1}{n}}^1 (l_{hj} - \bar{l})^2 + \frac{I}{2} \pi^2; \quad I > 0 \quad (4)$$

where I captures the central bank's aversion to inflation and is commonly known, after Rogoff (1985), as the degree of central bank conservativeness.

The central bank chooses inflation so as to minimise (4) taking the nominal wages previously set by the domestic unions as given. This yields the reaction function

$$\pi_h = \frac{w_h}{(1 - \alpha)^2 I + 1} \quad (5)$$

As Stackelberg leaders, wage setters are perfectly aware of this reaction. Under simultaneous bargaining, each union in country h determines its nominal wage growth w_{hj} by minimising the loss function (3) taking the central bank's reaction (5) and the nominal wage set by the other domestic unions as given.

At symmetric equilibrium between domestic unions ($w_{hj} = w_h$; $\forall j$ in country h and $\frac{\partial w_h}{\partial w_{hj}} = \frac{1}{n}$), the resulting aggregate nominal wage growth can be written

$$w_{hj}^N = w_h^N = \frac{(1 - s^N) [1 + I(1 - \alpha)^2] n}{AI\phi^N + nBs^N} \quad (6)$$

where $s^N \equiv \frac{\partial \pi_h}{\partial w_{hj}} = \frac{1}{n[1 + I(1 - \alpha)^2]}$ and $\phi^N = 1 - ns^N + \sigma(1 - \alpha)(n - 1)$.

Combining expression (6) with the central bank reaction (5) and the labour demand function (2) we obtain the inflation rate and the equilibrium level of employment under the NMP regime.

$$\pi_h^N = \frac{(1 - s^N) n}{AI\phi^N + nBs^N} \quad (7)$$

$$l_h^N = \bar{l} - \frac{(1 - s^N)(1 - \alpha)In}{AI\phi^N + nBs^N} \quad (8)$$

2.3 The monetary union (MU)

We now derive outcomes under the monetary union regime (superscript U). With the movement to a common currency the national central banks are succeeded by a single monetary authority.⁴ Her loss function is given as

$$\Omega^U = \frac{1}{2} \left[\frac{1}{2} \sum_{j=\frac{1}{n}}^1 (l_{1j} - \bar{l})^2 + \frac{1}{2} \sum_{j=\frac{1}{n}}^1 (l_{2j} - \bar{l})^2 \right] + \frac{I}{2} (\pi^U)^2 \quad (9)$$

Minimisation of (9) yields a monetary union-wide inflation rate which is a function of nominal wage growth in the two member countries.

$$\pi^U = \frac{1}{2} \frac{w_1 + w_2}{(1 - \alpha)^2 I + 1} \quad (10)$$

All the labour unions (of country 1 and 2) play a Nash game against each other while they continue to act as Stackelberg leaders vis à vis the monetary authority. Hence, union j in country h minimises the loss function (3) subject to (10), taking the nominal wages of other unions, at home and abroad, as given.

At the Nash symmetric equilibrium between all the unions ($w_{hj} = w_h$; $\forall j$ and h), the aggregate nominal wage growth in country h is given by

$$w_{hj}^U = w_h^U = \frac{(1 - s^U) [1 + I(1 - \alpha)^2] n}{AI\phi^U + nBs^U} \quad (11)$$

where $s^U \equiv \frac{\partial \pi^U}{\partial w_{hj}} = \frac{1}{2} \frac{1}{n[1 + I(1 - \alpha)^2]} = \frac{1}{2} s^N$ and $\phi^U = 1 - ns^U + \sigma(1 - \alpha)(n - 1)$.

Combining expression (11) with the common central bank's reaction (10) and the labour demand function (2) we obtain the inflation rate and the equilibrium level of employment under the MU regime.

$$\pi^U = \frac{(1 - s^U) n}{AI\phi^U + nBs^U} \quad (12)$$

$$l_h^U = \bar{l} - \frac{(1 - s^U)(1 - \alpha) In}{AI\phi^U + nBs^U} \quad (13)$$

3. The effects of a MU

The nominal and real impact of the switch to a common currency is captured by comparing the equilibria obtained under a monetary union with

⁴We assume that institutional parameters such as the degree of central bank conservativeness are unaltered by the formation of the MU.

those obtained under national monetary policy. This leads to the following results

Result 1. *The formation of a MU increases employment and reduces inflation for sufficiently low degrees of domestic labour substitutability (σ) and of unions' inflation aversion (B).*

Proof. Comparison of expression (12) with (7) and (13) with (8) reveals that MU has positive effects on price stability ($\pi^U < \pi^N$) and on employment ($l_h^U > l_h^N$) if the following condition holds

$$\sigma + \frac{Bn}{AI(n-1)(1-\alpha)} < \frac{1}{1-\alpha} \quad (14)$$

Key to this result is the fact that in a MU, unions' decisions have a smaller impact on inflation.⁵ This translates into a change in their strategic behaviour via two distinct channels.

The first hinges on the assumption that wage setters are inflation averse (*inflation-based* channel). Since MU reduces the inflationary cost of wage hikes, it alleviates union's fears of inflation and hence induces them to demand higher wages. This point has already been highlighted by Grüner and Hefeker (1999) and Cukierman and Lippi (2001).

The second channel operates via the wage setters' concern about employment (*employment-based* channel). A non atomistic union perceives that an increase in its nominal wage raises inflation and through it reduces the real wage of all the other domestic unions. Since in a MU, union j 's wage increase results in less inflation and hence in a smaller decline in the other unions' real wage, it expects its wage claims to be less costly in terms of competitiveness. So, MU is associated with a smaller 'substitution effect', inducing unions to behave more aggressively. A broadly similar effect has been detected in Cukierman and Lippi (2001). However by grounding the labour demand function facing the individual union with explicit microfoundations, our analysis uncovers a second *employment-based* mechanism. As in the MU union j 's wage increase reduces the other domestic unions' real wage by a smaller amount, it translates into a greater aggregate real wage increase and thus into a greater decline in the labour demand. In that way, MU amplifies the 'output effect', leading to a less aggressive wage behaviour.

Wage restraint is favoured by the *employment-based* channel if the 'out-

⁵Indeed, we observe that $s^N \equiv \frac{\partial \pi_h}{\partial w_{nj}} > s^U \equiv \frac{\partial \pi_U}{\partial w_{nj}}$.

put effect' dominates the 'substitution effect'. This happens for sufficiently low degree of labour substitutability. In this case, if union's dislike for inflation is not too large (ie. the *inflation-based* channel not too relevant), MU finally leads to more wage discipline and through it improves macroeconomic performances.

Next, let us examine how the institutional design of monetary policy may act on whether the establishment of a MU is counterproductive or not.

Result 2. *The greater the degree of central bank conservativeness (I), the more MU's impact on employment and price stability is likely to be positive.*

Proof. See the algebra condition (14).

4. Concluding remarks

Most of the related literature has shown that MU renders the wage setting behaviour more aggressive, thus increasing unemployment and inflation. In this note, we demonstrate that this not necessarily be the case. Depending on labour market features, MU may even improve macroeconomic performances.

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