EMU AND LABOUR MARKET REFORM

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ABSTRACT

We focus on the political economy question of how incentives to reform are likely to be affected under the unique policy regime provided by the EMU. We develop the analysis using an extended ins & outs Barro-Gordon model of inflation and public expenditure within a framework where labour market reform is endogenous and open-economy effects from fiscal policy are accounted for. We show that when the latter are sufficiently strong, traditional literature results that monetary union reduces incentives to reform no longer hold. Conversely, when open-economy effects are negligible, more reforms are delivered outside the monetary union to the extent that the outsiders' fiscal commitment problems are sufficiently severe.

Key Words: EMU, Reform, Monetary Policy, Fiscal Policy, Central Bank
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I INTRODUCTION

This paper addresses the issue of labour market reforms in a framework where policymakers are subject to traditional commitment problems. Specifically, it focuses on the political economy question of how incentives to reform are likely to be affected under the unique policy regime provided by the EMU.

Existing literature in this regard has conducted an interesting analysis of the impact that different policy regimes have on the incentives to implement structural reforms. The possibility that macroeconomic policy might affect the implementation of reforms was first suggested by Gordon (1996), and was subsequently addressed by Sibert (1996) using a simple framework characterised by absence of time inconsistencies. More recently, a comprehensive analysis of the political incentives to conduct structural reforms was undertaken by Calmfors (1998a,b). His argument is that there is more reform outside a monetary union to the extent that the national inflation bias can be reduced. However, he finds that the existence of a precautionary motive for low average unemployment might reverse this result. Less ambiguous conclusions are reached by Sibert and Sutherland (1997), who argue that monetary union lowers the incentives to reform because it internalises the negative spillovers associated with the independent conduct of monetary policy. Among other related works is the contribution by Ozkan *et al.* (1997), studying the extent to which the inflation entry condition contained in the Maastricht Treaty encourages structural reforms by potential EMU entrants.

Overall, these studies generally find that monetary union reduces the incentives to reform. Hence, the (often implicit) conclusion that, if governments were to base their decision to join a monetary union predominantly on the impact that this has on their incentives to reform, they would most probably choose to stay outside.

We are rather uncomfortable with the policy-implications of this literature. The reason is that we believe such implications do not apply to the case of the EMU. In fact, if it is clearly obvious that the decision to join a monetary union has potentially severe output costs, why were so many countries – particularly those with unsound fiscal policies – willing to join the European Monetary Union? There is obviously something that the literature is not able to account for.

We argue that the counterfactual policy implications of the mainstream literature – at least for the case of EMU – derive from the fact that none of the existing works has linked

monetary union and the issue of reforms to the existence of some kind of penalty imposed upon either excessive government spending or debt (i.e. a SGP or surrogate). Moreover, the literature on reforms has systematically failed to consider open-economy effects of the type this paper introduces.

The model we set up in section II formalises both labour market and tax distortions in a framework where fiscal policy is endogenously treated and subject to an explicit balanced budget rule. Our aim is to analyse how incentives to reform are affected in a monetary union characterised by restricted fiscal discretionary power (EMU) as compared to countries preserving their autonomy in the management of both fiscal and monetary policies (outsiders). Crucial to our analysis is the assumption that, while all countries gain from an increased amount of labour market reforms, tax distortions uniquely affect the outsiders 'economies. We motivate this assumption with the fact that participation to EMU is conditional on the acceptance of the SGP[1]. Such a condition *de facto* implies the precommitment of the fiscal authorities, who have no choice other than avoiding deviations of distortionary taxes from their steady state values.

The outline of the paper is as follows: section II introduces the model and develops the game. Section III presents the results for both EMU countries and outsiders, and section IV provides some concluding thoughts.

II THE MODEL

Let us consider an economy consisting of $n+1$ countries belonging to a monetary union (EMU) and m outsiders. Inside EMU fiscal policies are managed by decentralised non co-operative fiscal authorities whereas monetary policy is conducted at a federal level by the union central bank (ECB). Conversely, outsiders maintain their autonomy in the management of both monetary and fiscal policies, which, as in the case of EMU, are assumed to be conducted in a discretionary way. Moreover, we assume that output of both outsiders and insiders increases with reform, although this carries a political cost. Finally, all national governments are subject to the balanced budget rule:

$$g_i = t_i \qquad (i = 0, n) \tag{1}$$

[1] Ozkan *et al.* (1997) assumes that monetary union faces no tax distortions. However, they do not motivate this assumption with the existence of the SGP and exclude from their analysis the possibility that labour market distortions might affect output.

This means that distortionary taxes[2] is the only instrument available to finance public consumption.

i) The output function

This is derived from the combination of microfounded demand and supply functions as in Levine and Pearlman (1998). We assume that in country *i* [*i = 0, n*] C_{ij} units of good *j* are imported from country *j* [*j = 0, n*].[3] Given the total consumption expenditure C_i, consumers choose the units of consumption $\{C_{ij}\}_{j=0,n}$ to maximise an expected utility function $E_{-1}(U_i)$ where:

$$U_i = \sum_{j=0}^{n} g_{ij} \log C_{ij} + h_i \log G_i \qquad g_{ij} = \frac{1}{n+1} \quad ; \qquad \sum_{j=0}^{n} g_{ij} = 1 \tag{2}$$

subject to:

$$C_i = \sum_{j=o}^{n} E_{ij} C_{ij} \tag{3}$$

E_{ij} is the real exchange rate between country *i* and *j* and g_{ij} is the share of good *j* in the consumption of the representative consumer of country *i*. Government spending G_i falls exclusively on domestic goods. Equation (2) implies that the utility of individuals depends on the levels of both government and private consumption, where the latter is allocated equally between domestic and foreign goods.

Straightforward calculations show that the demand in country *i* is:

$$Y_i = \frac{1}{(n+1)}\left[C_i + \sum_{j=0; j\neq i}^{n} C_j E_{ij} \right] + G_i \tag{4}$$

where the first two terms stand, respectively, for domestic and foreign consumption and G_i is public expenditure. We can express all exchange rates relative to country zero and drop subscript *0* for notational convenience. The demand equation for country *0* is therefore:

$$Y = \frac{1}{(n+1)}\left[C + \sum_{j=1}^{n} C_j E_j \right] + G_i \tag{5}$$

[2] Later in the paper we shall assume these to be VAT taxes levied upon firms 'profits.
[3] All variables are dated at time *t*. A subscript *-1* indicates time *t - 1*.

We are now ready to move on to the supply side. Consider country *0*. We assume that the representative firm maximises:

$$(1-t)PY - WL \tag{6}$$

where L is labour and t is a tax on firms 'profits (VAT) . Production (Y) is described by the Cobb-Douglas production function:

$$Y = \overline{K}^{b} L^{1-b} \tag{7}$$

where $\overline{K}$ an exogenous capital stock.

Workers are represented by trade unions whose sole objective is to achieve a target real wage, the logarithm of which we normalise to unity: Hence, unions 'welfare function can be written as (small letters denote logs):

$$U = \left(w - p^{c}\right)^{2} \tag{8}$$

p^{c} is the consumer price index (CPI), defined as:

$$p^{c} = p + \frac{1}{(n+1)} \sum_{i=0}^{n} e_{i} \tag{9}$$

e_{i} the log of the real exchange rate of country i relative to country *0*. Observe that equation (8) implies that wage setters only care about a real *post-tax* wage target, while they regard any employment target as unimportant[4].

The supply-side of the model is completed with an exogenous partial indexing arrangement $k \in (0,1)$ linking the nominal wage to the CPI so that:

$$w = w^{e} + k\left[p^{c} - \left(p^{c}\right)^{e} \right] \tag{10}$$

The expression for the real product wage is obtained by differentiating (8) with respect to w and combining this result with (10). This yields:

$$w - p = -(1-k)\left[p^{c} - (p^{c})^{e} \right] + \frac{1}{(n+1)} \sum_{i=o}^{n} (e_{i}) \tag{11}$$

Conversely, the firm's maximisation problem requires:

$$(1-b)\overline{K}^{B} L^{-b} (1-t)P - W = 0 \tag{12}$$

Taking logs and approximating $\log(1-t)$ with $(-t)$ (12) becomes:

$$f(\overline{K}) - t + p - bl = w \tag{13}$$

where $f\left(\overline{K}\right) = \log(1-b) + b\log\overline{K}$. The final equation for employment (*l*) is derived by combining (10)-(12). This gives:

$$l = \bar{l} + \frac{1}{b}\left\{(1-k)\left[p^c - \left(p^c\right)^e\right] - \frac{1}{n+1}\sum_{i=0}^{n} e_i\right\} - \frac{1}{b}t \qquad (14)$$

where $\bar{l} = \frac{f(\overline{K}_{-1})}{b}$ and $e = \frac{u}{b}$.

Equation (3.13) shows that employment depends upon the familiar surprise price effect – which can only be eliminated with full indexation (*k=1)* –, tax distortions and the supply shock. Employment also depends upon the real exchange rate. This happens because a real exchange rate appreciation contracts the real wage as shown by (11).

The closure of the model is given by the following standard results for country *0:*

$$\left[\frac{C_t(1+R_t)}{C_{t+1}(1+q)}\right]^e = 1 \qquad (15)$$

$$\left\{\left[\frac{E_{it+1}}{E_{it}}(1+R_{it}) - (1+R_t)\right]\right\}^e = 0 \qquad (16)$$

(15) is the Keynes-Ramsey Rule for consumption where R_t is the real interest rate over the interval [*t, t+1*] in country *0*, R_{it} is the real interest rate in country *i* and q is the representative consumer's rate of time preference. (16) is an UIP arbitrage condition for the real exchange rate.

Let us now define $p = p^c - p^c_{-1}$ the CPI inflation of country *0* and $\tilde{p} = p - p^e$ the inflation surprise. Likewise we define $\tilde{e}_i = e_i - (e_i)^e$. The next step in the model is to express all variables in deviation form about a baseline steady state, where policy instruments are set at their optimal values. Lower case variables will denote either a proportional change relative to the steady state (e.g. $y = \frac{Y - \overline{Y}}{\overline{Y}}$, with $\overline{Y}$ the steady-state path), or an absolute change, such as inflation rates or $g = G/Y - \overline{G}/\overline{Y}$). The country *0* model linearised about a zero-inflation steady state is therefore given by the following four equations:

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[4] Introduction of an employment target would complicate the algebra without affecting the substance of the results.

$$\left(1-\frac{\overline{G}}{\overline{Y}}\right)y=\frac{\overline{C}}{\overline{Y}(n+1)}[c+\sum_{i=1}^{n}(e_i+c_i)]+g \tag{17}$$

$$y=\frac{(1-b)}{b}\left\{(1-k)\tilde{p}-\frac{1}{(n+1)}\left[\sum_{i=1}^{n}\tilde{e}_i+\left(\sum_{i=1}^{n}e_i\right)^e\right]-\left[\left(t^w\right)^e+t^v\right]\right\} \tag{18}$$

$$(c_{+1})^e=c+r/(1+R) \tag{19}$$

$$(e_{i,+1})^e=e_i+(r-r_i)/(1+R) \tag{20}$$

(17) and (18) are the linearised equations for demand and supply[5], and (19) and (20) are the linearised forms of respectively (15) and (16). To compute the rational expectations solution we combine (19), its country *i* counterpart, and (20) to obtain:

$$c=c_i+e_i \tag{21}$$

We can now equate demand and supply in the domestic and foreign country to get expressions of the expected and surprise exchange rate effects. These are respectively:

$$(e_i)^e=-\frac{m_1\left(g^e-g_i^e\right)}{a+(1-b)/b} \tag{22}$$

$$e_i-(e_i)^e=\tilde{e}_i=\frac{(1-b)(1-k)/b\,(\tilde{p}-\tilde{p}_i)-m_1(\tilde{g}-\tilde{g}_i)}{a+(1-b)/b}$$

(23)

where

$$m_1=\frac{1}{(1-\overline{G}/\overline{Y})}+\frac{1-b}{b}$$

$$a=\frac{\overline{C}/\overline{Y}}{1-\overline{G}/\overline{Y}}$$

(23) shows that a domestic public expenditure surprise determines a surprise appreciation of the exchange rate, whereas the opposite is true in the case of a domestic monetary surprise. The combination of (18) and (22)-(23) gives our reduced form of output for country *0*:

$$\begin{aligned}y=y\ \ c\tilde{p}+\frac{(1-y\ )c}{n}\sum_{i=1}^{n}\tilde{p}_i+\\+\frac{m_1(1-y\ )}{n}\left[n\tilde{g}-\sum_{i=1}^{n}\tilde{g}_i\right]+m_2\left[ng^e-\left(\sum_{i=1}^{n}g_i\right)^e\right]-\frac{(1-b)}{b}t\end{aligned} \tag{24}$$

where:

[5] The transformation: $y=(1-b)l-b\,\epsilon$ has been applied to the supply side equation.

$$c = \frac{(1-b)}{b}(1-k)$$

$$y = \frac{[a + 1/(n+1)(1-b)/b]}{[a + (1-b)/b]}$$

$$m_2 = \frac{(1-b)m_1}{b(n+1)(a + (1-b)/b)}$$

Hence, employment depends not only upon the traditional inflation surprise but also upon a domestic public expenditure surprise relative to other countries, because of the impact this has on the relative prices and on the real product wage. Additional elements affecting output are the domestic level of (income and VAT) tax distortions and the supply shocks both at home and abroad. The impact of the latter – as well as of the public expenditure surprises – depends on the degree of openness of the economy as captured by $(1-y)$. Finally, (foreign) monetary policy spillovers increase output *via* the appreciation of the domestic real exchange rate.

It is important to observe that (24) implies a potentially negative transmission of fiscal policy. This is related to the fact that, for a given level of public expenditure in the home country, an expenditure increase in the rest of the union results in a real exchange rate appreciation abroad, which – as we have seen in (11) – reduces the real product wages and increases foreign production. For the home country, however, this is equivalent to a real depreciation, with opposite effects on its output level. Observe that the underlying reason for a negative transmission of fiscal policy is the same as in van der Ploeg (1990) and Levine and Pearlman (1998). The sign of the transmission would of course change if we were to drop these assumptions and consider models were demand increases output without affecting the price level (Obstfeld and Rogoff, 1995). However, it is worth saying that our assumption does not appear to be contradicted by a large part of the empirical evidence. An excellent survey by Douven and Peeters (1997) in fact shows that the traditional positive spillover effects of fiscal policy are often not matched by the data, especially in the case of Europe. Moreover, whenever positive externalities exist, these are normally very contained and often turn negative in the long run.

We can now transform the *n+1* country model for which no particular regime has been specified into a model of ins and outs to a monetary union (EMU). We also add an endogenously determined extra term of reform to identify any positive deviations from the steady state. Let *n+1* be the countries belonging to EMU and *m* be the number of countries

outside the monetary union. For convenience and notational consistency all exchange rates remain all relative to country *0*. The general function for output for country *i* outside EMU is therefore given by:

$$y_i = y\ c\tilde{p}_i + \left(\frac{1-y}{n+m}\right)c\tilde{p}_{-i} + \frac{m_1(1-y)}{(n+m)}\left[(n+m)\tilde{g}_i - \tilde{g}_{-i}\right] + \\ + m_2\left[(n+m)(g_i)^e - (g_{-i})^e\right] + d\varepsilon_i - \frac{(1-b)}{b}t_i \tag{25}$$

where: $x_{-i} = \sum_{j=0;\, j\neq i}^{n+m} x_j$ $(\forall x)$. Observe that for outsiders monetary spillovers are defined as:

$$\tilde{p}_{-i} = (n+1)\tilde{p}_i + \sum_{j=n+1;\, j\neq i}^{n+m}\tilde{p}_j \tag{26}$$

Conversely, for insiders these amount to:

$$\tilde{p}_{-i} = n\tilde{p}_i + m\tilde{p}^o = n\tilde{p}_i + \sum_{j=n+1}^{n+m}\tilde{p}_j \tag{27}$$

Hence, combining (27) with (28), the output function for the generic country *i* belonging to EMU can be rewritten as:

$$y_i^{EMU} = c\,y_1\tilde{p}^{EMU} + \frac{1-y}{n+m}mc\tilde{p}^o + \frac{m_1(1-y)}{(n+m)}\left[(n+m)\tilde{g}_i - \tilde{g}_{-i}\right] + \\ + m_2\left[(n+m)(g_i)^e - (g_{-i})^e\right] + d\varepsilon_i - \frac{(1-b)}{b}t_i \tag{28}$$

where

$$y_1 = \frac{n+my}{n+m} > y \ .$$

ii) The loss functions

Let us now move on to the definition of the loss functions. We assume these to be standard quadratic Barro-Gordon, but with one important innovation. This is the introduction of a single composite variable s (normalised so that $s \geq 0$) standing for the cost arising from the adoption of labour market reforms. This means that, alongside the traditional inflation, public expenditure and output deviation components, the policymakers' welfare functions are also affected by the amount of labour market reforms government are able (or willing) to deliver while in office.

Hence, the loss function of the EBC can be written as:

$$U_I^{ECB} = \sum_{i=0}^{n} \left(p_i^2 + b_{ECB}(y_i - \$)^2 + c_{ECB} g_i^2 + g_{ECB} s_i^2 \right) \quad (29)$$

where p, y, g and s stand respectively for inflation, output, public expenditure and labour market reforms. $\$$ is a deterministic output target. Observe that reforms are taken as given by the monetary authorities.

Conversely, for the outs each central bank is run by bankers with different preferences reflected in their single-period loss function:

$$U_{i,O}^{CB} = p_i^2 + b_{CB}(y_i - \$)^2 + c_{CB} g_i^2 + g_{CB} s_i^2 \quad (30)$$

Moving on to the outsiders 'fiscal authorities, their objective function is given by:

$$U_{i,O}^{FA} = p_i^2 + b_{FA}(y_i - \$)^2 + c_{FA} g_i^2 + g_{FA} s_i^2 \quad (31)$$

The interpretation is the same as for (30), with the difference that governments assign a larger weight to the output target $(b_{FA} > b_{CB})$, and that *s* is no longer exogenously given. Reforms are in fact decided by the fiscal authorities at the end of their optimisation process.

EMU fiscal authorities have a similar loss function. However, their discretionary power when it comes to a particular choice for taxes is limited by an endogenously determined linear penalty in public expenditure. Its aim is to reduce tax distortions to an optimal steady state value[6]. This means that governments belonging to the monetary union internalise the fact that expenditure in excess of a given socially optimal level will be punished by a (credible) institutional arrangement at the union level (i.e. the stability pact).

Hence for the generic country *i* we have:

$$U_{i,I}^{FA} = p_i^2 + b_{FA}(y_i - \$)^2 + c_{FA} g_i^2 + g_{FA} s_i^2 + p_i g_i \quad (32)$$

where the last term on the R.H.S. of (32) stands for a linear penalty in public expenditure. Observe that for analytical simplicity and in accordance with the mainstream literature (Calmfors 1998c, Allsopp and Vines 1998) we have assumed that the cost of reform is invariant to the choice of the monetary regime ($g_{FA,i,EMU} = g_{FA,j,O} = g_{FA}; \forall i, j$).

We conclude the description of our modelling framework with the assumptions regarding the sequence of events. These follow Beetsma and Bovenberg (1998):

1. labour market institutions (i.e. reforms) are determined;

[6] This chapter neglects the issues of credibility raised by McCallum (1995).

2. money wages are set;

3. (*) Only for EMU countries (Ins): Optimal penalty in public expenditure is set;

4. fiscal and monetary authorities simultaneously and independently set taxes and inflation.

III REFORMS UNDER EMU

Let us start with EMU countries. The first order condition of the ECB is found deriving (29) with respect to inflation. This yields:

$$\frac{\partial U_{i,I}^{ECB}}{\partial p_i} = \sum_{i=0}^{n}\left[p_i + b_{ECB}\, c\, y_1 (y_i - \hat{y})\right] = 0 \tag{33}$$

(33) can be rearranged so as to get:

$$p_{EMU} = \frac{1}{n+1}\sum_{i=0}^{n} p_i = b_{ECB} y_1 c\left[\hat{y} - \bar{y}_{EMU}\right] \tag{34}$$

where $\bar{y}_{EMU}$ is equilibrium output, defined as:

$$\bar{y}_{EMU} = -\frac{1-b}{b} t_{i,EMU}^{w} + m_2 m\left(t_{i,EMU}^{w} - t_{j,O}^{w}\right) + d_{i,EMU} \tag{35}$$

Observe that equilibrium output depends on the difference of the fiscal biases of insiders and outsiders, when fiscal asymmetries are assumed. In a balanced budget framework, this is captured by the term $m_2 m\left(t_{i,EMU}^{w} - t_{j,O}^{w}\right)$. To understand why this is so we must recall that fiscal policy in our model is *beggar-thy-neighbour* because is increases domestic output at the expenses of other countries welfare.

While the ECB sets inflation, fiscal authorities simultaneously set public expenditures. The optimal level of government spending is given by:

$$\frac{\partial U_{i,I}^{FA}}{\partial g_i} = b_{FA} m_1 (1-y)\left(y_i - \hat{y}\right) + c_{FA} g_i + p_i = 0 \tag{36}$$

from which it is straightforward to derive:

$$g_i = t_i = \frac{b_{FA} m_1 (1-y)\left(\hat{y} - \bar{y}_{EMU}\right) - p_i}{c_{FA}} \tag{37}$$

As expected, public expenditure is negatively affected by the linear penalty p_i. This should be optimally chosen so as to induce fiscal authorities to eliminate any deviations of tax distortions and public expenditures from their equilibrium steady state values. Hence, elimination of fiscal commitment problems requires that the optimal penalty in public expenditure be:

$$p^* = b_{FA} m_1 (1 - \gamma)(\pi - \bar{y}_{EMU}) \tag{38}$$

This means that, if $p = p^*$:

$$g_{i,EMU} = t_{i,EMU} = 0 \tag{39}$$

Substituting (38) and (37) into (34) we get:

$$p_{i,EMU} = b_{ECB} \chi \gamma_1 (\pi - \delta s_{i,EMU} + m_2 m t_{j,O}) \tag{40}$$

For a given level of central bank independence, the central bank will choose to lower inflation whenever labour market reforms are being implemented $(s > 0)$. Observe that the actual inflation inside EMU depends also on the overall level of distortionary taxation outside the monetary union (last term on the RHS of (40)). Such a level depends in turn on the number of outsiders *m*.

We have now reached the final stage of our optimisation process. The optimal amount of reform inside the monetary union is obtained deriving the expected value of $U^{FA}_{i,EMU}$ with respect to *s*. This gives:

$$\frac{\partial (U^{FA}_{i,EMU})^e}{\partial s_i} = -\delta b^2_{ECB} \chi^2 \gamma^2_1 (\pi - \bar{y}^1_{EMU} - \delta s_i) + b_{FA} \delta (\bar{y}^1_{EMU} + \delta s_i - \pi) + \gamma_{FA} s_i = 0 \tag{41}$$

where

$$\bar{y}^1_{EMU} = \bar{y}_{EMU} - \delta s_{i,EMU} = -m m_2 t_{j,O} \tag{42}$$

It follows that:

$$s^*_{i,EMU} = \frac{(b_{FA} + b^2_{ECB} \chi^2 \gamma^2_1) \delta (\pi + m m_2 t_{j,O})}{\gamma_{FA} + (b_{FA} + b^2_{ECB} \chi^2 \gamma^2_1) \delta^2} \tag{43}$$

IV REFORMS OUTSIDE EMU

Consider the generic country *j* which is outside the monetary union. Computation of the first order condition for its monetary authority yields:

$$\frac{\partial U^{CB}_{j,O}}{\partial p_j} = p_j + b_{CB} \chi \gamma (y_j - \pi) = 0 \tag{44}$$

As before, we can rearrange (44) so as to get:

$$p_{j,O} = b_{CB} \chi \gamma [\pi - \delta s_j - \bar{y}^1_O] \tag{45}$$

where

$$\bar{y}_O^1 = \bar{y}_O - \delta_{j,O} = \left[(n+1)m_2 - \left(\frac{1-b}{b}\right)\right] t_{j,O} \tag{46}$$

Conversely, the optimal choice of the tax instrument is given by:

$$\frac{\partial U_{j,O}^{FA}}{\partial g_j} = b_{FA} m_1 (1-\gamma)(y_j - \bar{y}) + c_{FA} g_j = 0 \tag{47}$$

It is then straightforward to derive the equilibrium optimal level of public expenditure. This is:

$$g_{j,O}^* = t_{j,O}^* = \bar{a}\left(\bar{y} - \bar{y}_O^1 - \delta_j\right) \tag{48}$$

where $\bar{a} = \dfrac{b_{FA} m_1 (1-\gamma)}{c_{FA}}$.

Combining (48) with (46) we can re-write public expenditure (i.e. taxation) as:

$$g_{j,O}^* = t_{j,O}^* = a\left(\bar{y} - \delta_j\right) \tag{49}$$

where $a = \dfrac{1}{\dfrac{1}{\bar{a}} + \left[-\left(\dfrac{1-b}{b}\right) + m_2(n+1)\right]}$.

Therefore, substitution of (49) into (45) yields :

$$p_{j,O} = \left[1 + a\left(\frac{1-b}{b} - m_2(n+1)\right)\right] b_{CB} c \gamma \left(\bar{y} - \delta_j\right) \tag{50}$$

Observe that, when deciding on the optimal inflation rate, the central bank of the generic outsider *j* internalises the positive spillover effects on output deriving from the existence of relative price (open economy) fiscal effects. Therefore, for a given degree of central bank independence and reforms, it will increase inflation only when output tax distortions are greater that such relative price effects ($\dfrac{1-b}{b} > m_2(n+1)$).

In this modified scenario, the optimal amount of reforms is given by:

$$\frac{\partial \left(U_{j,O}^{FA}\right)^e}{\partial s_j} = -\beta b_{CB}^2 c^2 \gamma^2 z^2 \left(\bar{y} - \delta_{j,O}\right) - b_{FA} \alpha^2 (\bar{y} - \delta_j) - c_{FA} a^2 \alpha \left(\bar{y} - \delta_{j,O}\right) + g_{FA} s_{j,O} = 0 \tag{51}$$

where $z = 1 + a\left[\dfrac{(1-b)}{b} - m_2(n+1)\right]$. This yields:

$$s^*_{j,O} = \frac{\left[\left(b_{FA} + b^2_{CB} c^2 y^{\ 2}\right) z^2 + c_{FA} a^2\right] d g_{FA}}{g_{FA} + \left[\left(b_{FA} + b^2_{CB} c^2 y^{\ 2}\right) z^2 + c_{FA} a^2\right] d^2} \tag{52}$$

V RESULTS

We can now compare reforms inside a monetary union with limited fiscal discretionary power with reforms outside. Subtracting (52) to (43) subject to (39), and assuming for simplicity that $b_{ECB} = b_{CB}$ we get that:

$$s^*_{i,EMU} - s^*_{j,O} = \left\{ \frac{\left[\left(1 - z^2\right) b_{FA} - c_{FA} a^2 + b^2_{ECB} c^2 \left(y_1^{\ 2} - y^{\ 2} z^2\right)\right] + m m_2 a \left(b_{FA} + b^2_{ECB} c^2 y_1^{\ 2}\right)}{\left[g_{FA} + \left(b_{FA} + b^2_{ECB} c^2 y_1^{\ 2}\right) d^2\right]\left\{g_{FA} + \left[\left(b_{FA} + b^2_{ECB} c^2 y^{\ 2}\right) z^2 + c_{FA} a^2\right] d^2\right\}} \right\} d g_{FA} \tag{53}$$

The sign of (53) is uncertain and is given by:

$$\left\{\left[\left(1 - z^2\right) b_{FA} - c_{FA} a^2 + b^2_{ECB} c^2 \left(y_1^{\ 2} - y^{\ 2} z^2\right)\right] + m m_2 a \left(b_{FA} + b^2_{ECB} c^2 y_1^{\ 2}\right)\right\} \tag{54}$$

The sign of (54) depends on a combination of the following three factors:

1. Tax distortions outside the monetary union. The higher these are (i.e. the higher *a*), the higher the incentives to reform facing the outsiders;
2. Open economy effects from fiscal policy affecting the relative exchange rate between ins and outs. Since fiscal policy in our ins & outs model *is beggar-thy-neighbour* and transmits negative externalities *via* the exchange rate, the greater there externalities (i.e. the more serious the commitment problem of governments outside the monetary union), the higher the incentives to reform for the ins. Observe that this occurs when $m_2 \neq 0$, i.e. when fiscal anticipated effects matter as well as the fiscal surprises.
3. For given the degree of central bank independence, monetary time inconsistencies are more severe inside monetary union (recall that $y_1 > y$). This contributes to higher reforms inside the union. Observe that this effect disappears only when the union becomes sufficiently large (i.e. when $m \to 0$).

Hence, the sign of (54) depends on the relative magnitude of each of the above three effects. It is important to observe, however that, if open-economy effects are absent ($m_2 = 0$) and if *m* becomes large, then $z > 1$ and $y_1 \cong y$. Hence, all terms in (54) are negative and outsiders reform more than insiders. This is indeed the traditional result of the mainstream

literature. This literature, however, neglects the open-economy effects from fiscal policy. (54) shows that when we depart from this very special case and assume that open-economy effects are sufficiently strong, then it will generally be true that more reforms are achieved under the monetary union. This is especially true when m is small, because in this case $y_1 > y$ and the third term of (5.29) is more likely to be positive.

Observe also that for $g_{FA} \to 0 \Rightarrow s^*_{i,EMU} = s^*_{j,O}$. This means that when reforms are made at zero cost, their optimal choice remains invariant to the monetary regime. This happens because, when the (political) costs of reforming an economy are zero or at least negligible, outsiders are no longer tempted to engineer exchange rate surprises to gain output benefits. Choosing to deliver a higher level of reforms will in fact avoid the negative effects of *distortionary-taxed* public expenditure programs.

VI CONCLUSION

Analyses of international monetary integration often find that the costs and benefits from joining depend on the degree of labour market reform. However, the state of the labour market is typically taken as exogenous. In this paper we used an extended Barro-Gordon model of inflation and public expenditure – in a framework where labour market reform is endogenous – to analyse how monetary union in Europe is likely to affect the amount of labour market reform. Our key assumption is that labour-market institutions continue to be determined nationally also when monetary policy is delegated to the ECB. Our results depend on the relative strength of open-economy effects. When these are sufficiently strong, reforms are higher under a monetary union than in countries preserving the autonomy in the management of their macroeconomic policies Conversely, when open-economy effects are negligible and the number of outsiders becomes sufficiently large, than the opposite is true. Hence, only under these very special circumstances, our results are in line with the mainstream literature. Their interpretation, however, remains less conventional. In fact, lower reforms inside the monetary union are simply the outcome of the (implicit) precommitment of EMU national fiscal policies, which is obtained through the application of the stability pact. The latter constitutes a tax reform creating a sort of 'competitive advantage' on outsiders.

We find these results particularly interesting. They in fact suggest that, once we depart from the traditional assumption of absence of open-economy effects, rather 'less conventional' implications about the incentives to reform under different monetary policy arrangements may have to be derived.

There two ways which we believe it would be useful to develop the analysis started with this paper. One way would be to modify the game theoretical structure so as to provide a *first-mover* advantage to the fiscal authorities in a framework where monetary policies continue to suffer from time-inconsistencies (i.e. as in Catenaro and Tirelli 1999). It is reasonable to expect that these changes would strengthen our results because uncoordinated governments will fail to internalise the positive externalities that occur when a fall in equilibrium unemployment induces a reduction in the common rate of inflation. This analysis would be particularly useful if we believe that the recent low inflation inside the EMU is a temporary phenomenon and inflation bias problems are likely to remain in the future. A second way to extend the model would be to incorporate some of the more recent political economy research and treat the cost of reforms as endogenously determined, linked to the political fortunes to the national parties or government coalitions. This may not prove to be an easy task, but we believe that the exercise would be useful.

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