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Abhandlungen

Real Exchange Rates, Structural Reforms and Monetary Union

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I. Introduction

After European Monetary Union (EMU) has successfully started, the next major task is its enlargement. The question is whether all of the countries that joined the European Union (EU) in May 2004 and January 2007 are sufficiently close in economic structure to join monetary union as well (*Ca'Zorzi/De Santis* (2005); *Ca'Zorzi* et al. (2005); *Eickmeier/Breitung* (2006); *Fidrmuc/Korhonen* (2003, 2006)), and whether they should join immediately or later (*Buiter* (2004); *Maurel* (2004); *De Grauwe/Schnabl* (2006)). And what impact would it have if countries joined before convergence? In the view of the European Central Bank (ECB (2004)) not only inflation and fiscal policy should be sufficiently converged before enlargement is possible without posing macroeconomic dangers to current and new members.

Most of the literature on monetary unification stresses the importance of similarity of economic structures for the success of a monetary union (*Bayoumi/Eichengreen* (1996)). This literature usually takes the economic structure of countries as given, without realizing that economic structures change over time (see, however, *De Grauwe/Mongelli* (2005)). The question when a candidate country might be sufficiently reformed to join an existing monetary union has been formally addressed by *Martin* (1995) who, however, takes the convergence of an economy with high distortions as given. Endogenous structural reform, in turn, have been analyzed by *Ozkan* et al. (2004) and *Beetsma/Jensen* (2003), where the candidate country must decide how much to reform. In *Beetsma/Jensen* (2003) candidates always want to join, whereas in *Ozkan* et al. (2004) they decide whether they wish to fulfill entry criteria.

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However, present members of the monetary union also need to implement structural adjustments and the question is whether these reforms are speeded up or slowed down by enlargement (see *Hughes Hallett/Jensen* (2003)). Assuming that structural reforms and monetary expansion are perceived by governments as strategic substitutes to increase employment, *Calmfors* (2001), *Sibert* (1999) and *Sibert/Sutherland* (2000) have argued that labor market reforms will be lower in a monetary union. Since inflationary pressure due to labor market problems is automatically reduced in a monetary union, incentives for governments to implement structural reforms fall. While *Duval/Elmeskov* (2005) find some support for this prediction, broader samples of countries can not confirm this relation between monetary regime and structural reforms (*Belke* et al. (2007)).

Consistent with the mixed evidence, I show that the theoretical result need not hold in general. By introducing asymmetries in the degree of distortions and reform needs, I show that monetary union with a high distortion country can actually increase the incentives to implement reforms and lead to more reforms in low distortion countries. In other countries, in contrast, reform efforts could fall. Whether this is the case depends on the relative amount of distortions in the two countries, the presence and size of structural inflation differences, and countries' openness. Thus, earlier literature might paint too simple a picture and asymmetries, which are arguable more relevant for a larger monetary union, might yield additional effects. Also, I show that a "hard" currency peg, such as a currency board or a unilateral adoption of an anchor currency is not enough to induce structural reforms in the pegging country.

Finally, I show that by taking into account the real exchange rate results may be further qualified in comparison to what earlier literature has derived. Taking into account that a monetary union need not imply constant real exchange rates as inflation rates differ, for instance because of the Balassa-Samuelson effect, incentives to implement reforms are additionally affected. I show that a real appreciation, because it affects their international competitiveness, increases countries' incentives to implement structural reforms.

The paper is structured as follows: The next section discusses briefly the different dimensions of structural reforms that present and future member states of the monetary union exhibit. The following section sets up the basic model and derives monetary policy decisions in each country. Section IV determines the amount of structural reforms in the two

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countries and section V considers the alternative of a one sided hard peg. Section VI concludes.

II. The Need for Structural Reform

Compared with the situation from which they started, most of the accession countries have made considerable progress.[1] However, in many respects they are still quite a distance away from the European average; most clearly with respect to inflation and budget deficits (*Lane* (2006); *EBRD* (2007)). Moreover, while growth of productivity and GDP are higher than in older EU member states, higher unemployment and larger shares of agriculture and industry in GDP point to the still ongoing process of structural adjustment, which is also evident from a relatively large public sector. In particular, the large share of agriculture in some economies implies large fiscal requirements to subsidize and phase out this sector over time, and large current account deficits and external debt suggest that some of the countries are vulnerable to current account and currency crises. All this could pose danger for monetary policy.

Another important influence on monetary policy is the structurally higher rate of inflation in the accession countries (*Ca'Zorzi/De Santis* (2004); *MacDonald/Wojcik* (2005)). According to the Balassa-Samuelson theory, higher productivity increases in the tradables sector lead to strong wage increases in the tradables sector that spill over into the non-tradables sector, pushing up the relative price of non-tradable goods. This leads to a trend appreciation in the real exchange rate, making it difficult to fix the nominal exchange rates. Inflation differentials between accession countries and EMU members would then require either a very tight monetary policy in the accession countries or floating exchange rates (see e.g. *Buiter/Grafe* (2002)). Estimates of the size of this effect, however, differ widely. While *Corker* et al. (2003) and *Mihaljek/Klau* (2003) argue that up to 2 percent of the inflation differential between accession countries and EMU average is due to this effect, *Ègert/Halpern* (2006), *Égert* et al. (2006), and *Garcia-Solanes* et al. (2007) find that most of the inflation increase in accession countries cannot be attributed to the Balassa-Samuelson effect.

Last not least, new member states are usually doing worse when compared to older member states with respect to their institutional quality.

[1] Continuous monitoring is provided by the EBRD's *Transition Report* and the EU Commission's *Convergence Report*.

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Using the usual indicators, such as the Freedom House index on government size, freedom to trade and labor and product market regulation, or the World Bank index (*Kaufman* et al. (2007)) on political stability, rule of law, absence of corruption and government efficiency, shows they are often behind particularly with respect to institutional quality.[2]

On the other hand, *Boeri/Garibaldi* (2007) find that in terms of labor market regulation, new members are usually showing more flexibility and adaptability in terms of employment protection laws or unemployment benefits. In general, labor market regulation is less restrictive and unions have a lower influence on labor markets. They also find that wages are more in line with productivity developments than in older member states and attribute the higher unemployment in these countries mainly to fiscal policy rather than labor market policies.

Weighing different dimensions of labor market regulation and other institutions thus provides no clear evidence on which group of countries (let alone single countries) are more distorted, and there is considerable evidence that the current members as well have a need for structural reforms in some areas, particularly in labor and product markets. The theoretical analysis will thus abstract from any particular type of regulation and simply acknowledge that countries are different and more or less in need of reforms, depending on the particular type of regulation and distortions that is looked at. This observation is the starting point for the following theoretical analysis.

III. Monetary Policy with and without Monetary Union

1. The Basic Model

Consider two countries, one in which the level of structural distortions is relatively high, labeled H, while the other, labeled L, is characterized by lower structural distortions. This should capture the presence of asymmetries between the existing monetary union and the candidates for enlargement. As argued above, depending on the particular form of distortion, candidates for EMU might be more or less distorted than current members.

Each country's government determines the amount of structural reforms in each period while the central bank sets monetary policy. Both

[2] This is particularly true for the next wave of member states, as *Hammermann/Schweikert* (2005) report.

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interact with a private sector that rationally forms expectations about the rate of inflation, and both are interested in achieving full potential output and avoiding inflation. The government is additionally reluctant to implement structural reforms since this risks hurting voters and interest groups (*Saint-Paul* (2000)). Labor market reforms as well as structural reforms more generally are usually not happily accepted by the population, and the improvement of institutional quality might be opposed by those who presently benefit from distortions such as corruption and red tape because they create rents (*Huang/Wei* (2006)).

I express inflation in both regions $(i = L, H)$ in the form of a simple quantity equation (with constant velocity, normalized to zero here)

$$\pi_t^i = m_t^i - y_t^i, \tag{1}$$

where m_t^i refers to the rate of money growth set by the central bank (the policy instrument) and y_t^i refers to the output level. Equilibrium requires that money demand equal money growth.

For simplicity, the (log of) potential output is normalized to zero and actual output is increasing in the difference between the average price level and the average wage level $\pi_t^i - w_t^i$. Wages in country i are given as $w_t^i = \hat{w}_t^i + E[\pi_t^i]$ with E being the expectations operator. That is, wages are increasing in the expected rate of inflation and also in a component reflecting a target level of real wage increase. If average wages are increasing faster than productivity and expected inflation in a country this has negative influence on output. This should reflect the negative effect on average output in a country if average wages are increasing faster than average productivity.[3]

As argued above, factors that further reduce output can be a distorting tax system, a deficient legal system (the absence of rule of law), corruption or excessive regulation of product markets or investments. Collecting such factors, which are usually comprised in ease of doing business and institutional quality indicators, as x^i, total distortions can be summed as $k_t^i = x^i + \hat{w}_t^i$. They can be reduced through structural reforms s_t^i, which can be understood as the reform efforts of a country in terms of

[3] The rate of inflation could also be expressed as a weighted average of price increases in the tradable (T) and non-tradable (NT) sector $\pi_t^i = \chi\pi_t^{T,i} + (1-\chi)\pi_t^{NT,i}$, with a similar expression for wages (see, e. g. *Buiter/Grafe* (2002)). For simplicity, I look only at averages in what follows. Likewise, one could correct real wage increases for productivity increases and focus on the difference. I normalize productivity growth to zero here.

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improving institutional quality or reducing regulation in labor and product markets.[4] Since distortions are not specifically modeled, I also refer to reforms in a very broad sense. One might therefore best think of s_t^i as a vector of reform policies.

It is assumed that structural reforms are time independent, thus distortions in each period are influenced by structural reforms in that period (see *Beetsma/Jensen* (2003)). This is not unrealistic because unemployment benefits, minimum wages or tax rates are often adjusted by governments on a yearly basis, and indicators of institutional quality also vary from year to year. Moreover, changes in the governing party might involve policy changes as incoming governments often turn back reforms previous governments have implemented.

Finally, output is affected by open economy influences; a real devaluation increases foreign demand and thus output. Openness λ is assumed to be equal in the two equal sized economies. Under flexible exchange rates, the exchange rate adjusts for inflation differentials, thus $e = \pi^H - \pi^L$, so that the real exchange is constant and has no influence on output. Under fixed exchange rates, however, the real exchange rates varies with to differences in inflation.

With these assumptions, output in the two countries is

$$y_t^L = \pi_t^L - \left(w_t^L + x_t^L - s_t^L\right) - \lambda(\pi^L - \pi^H + e). \tag{2a}$$

$$y_t^H = \pi_t^H - \left(w_t^H + x_t^H - s_t^H\right) + \lambda(\pi^L - \pi^H + e). \tag{2b}$$

The timing in each period is as follows: (i) the amount of structural reforms is determined, (ii) inflation expectations are formed, (iii) monetary policy is set, and (iv) inflation and output are determined.[5] I assume that governments are Stackelberg leaders vis-a-vis the central banks, but that they play Nash against each other. The model is solved by backward induction.

Government preferences are given over an infinite horizon but are identical for each period. Governments aim to minimize differences between actual and potential output and to minimize deviations of inflation

[4] I thus distinguish, as in *Campos/Kinoshita* (2008), between reform efforts s_t^i and reform outcomes $k_t^i - s_t^i$.

[5] If the central bank would be able to commit to a policy rule, results would change because there would be no connection between structural reforms and the monetary regime.

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from zero. Structural reforms are (politically) costly since they hurt certain interest groups or voters. The more reforms are implemented, the higher the costs for the government. Then, per period utility (in logs) for the government is

$$v_t^i = -b\left(y_t^i\right)^2 - \left(\pi_t^i\right)^2 - c\left(s_t^i\right)^2 \tag{3}$$

All parameters in the utility function are set equal for both countries because I wish to abstract from effects through monetary unification that are only due to differences in preferences.

2. *Monetary Policy under Autonomy and Monetary Union*

Central bank preferences are similar to those of the respective government but without being concerned with the implementation of structural reforms. Since I do not focus on conflicts between central bank and government, the other utility parameters are set equal to those of the government. The period utility of the central bank is hence

$$u_t^i = -b\left(y_t^i\right)^2 - \left(\pi_t^i\right)^2 \tag{4}$$

Taking expectations as given, the central bank's reaction function is $m_t^i = (b-1)\left(E\left[\pi_t^i\right] + k_t^i - s_t^i\right)/(1+b)$. Rational expectations imply $E\left[\pi_t^H\right] = b\left(k_t^i - s_t^i\right)$, so that in equilibrium

$$m_t^i = (b-1)\left(k_t^i - s_t^i\right). \tag{5}$$

If $b > 1$, the central bank will run a more expansive monetary policy the higher are structural distortions in order to compensate for their negative output effect. If $b < 1$, however, monetary policy will be contractionary in response to structural distortions because they lower output and thus money demand, which would increase inflation for a given money supply.

Taking (1) into account, equilibrium inflation and output can be calculated as

$$\pi_t^i = b\left(k_t^i - s_t^i\right) \tag{6}$$

and

$$y_t^i = -\left(k_t^i - s_t^i\right) \tag{7}$$

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Summarizing, we have:

Result 1: Under monetary autonomy, the rate of money growth will increase in the degree of distortions if the central bank is sufficiently concerned with output. A very conservative central bank will contract money supply in response to high levels of distortions. Inflation is increasing and output is falling in distortions.

In a monetary union instead, monetary policy is determined by a common monetary authority. The common central bank is concerned with average inflation and output, and its utility function is thus

$$u_t^{CC} = -\left(\frac{\pi_t^L + \pi_t^H}{2}\right)^2 - b\left(\frac{y_t^L + y_t^H}{2}\right)^2 \tag{8}$$

where the relative weights of the two countries are equalized. I do not distinguish between economic and political weights (as in *Berger* (2007) or *Hefeker* (2008)) which would further complicate the analysis. I will discuss the influence of relative size below, however.

Taking rational expectations into account, monetary policy is

$$m_t = \frac{b-1}{2}\left(k_t^L - s_t^L + k_t^H - s_t^H\right) \tag{9}$$

The central bank's policy leads to the following inflation in the two regions

$$\pi_t^i = \frac{(1+\alpha)\left(k_t^i - s_t^i\right) + \alpha\left(k_t^j - s_t^j\right)}{1-2\lambda}, \qquad i,\ j = L,\ H,\ i \neq j \tag{10}$$

with $\alpha = (b-1)/2 - \lambda b$, which is positive if $b(1-2\lambda) > 1$.[6] That is, the country must not be too open. The influence of openness on inflation is derived from $\partial\pi_t^i/\partial\lambda > 0$ if $\left(k_t^i - s_t^i\right) > \left(k_t^j - s_t^j\right)$.

Result 2: Under monetary union the rate of inflation will react equally strong to distortions in both countries, but the reaction to any single country is less than under monetary autonomy. Again, the central bank will accommodate wage demands and distortions if $b > 1$. Whether openness has a positive or negative influence on inflation depends on relative distortions.

[6] Similarly, $1 + \alpha > 0$ if $b(1-2\lambda) + 1 > 0$.

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Obviously, a central bank concerned with a union will put less weight on developments in any single member states. The connection between monetary policy and inflation is further influenced through openness as this creates an additional channel of spillovers between national policies. National policies not only influence monetary policy but the real exchange rate and thus feed back into national inflation. Higher distortions in the other country push up domestic inflation because they could lead the central bank to increase money supply but they also lower inflation because they have a positive effect on the domestic real exchange rate and output. Inflation depends on the relative strengths of these opposing influences.

IV. Structural Reforms under Autonomy and Monetary Union

The central bank's policy is taken into account by the government when it determines optimal reform efforts. The incentive for the government to lower structural distortions is twofold. It will directly increase output and it will stabilize monetary policy and inflation. Without costs of reform, the government would therefore abolish distortions completely. In the presence of political costs of reform, however, the government will never reduce distortions to zero.

As shown in the previous section, the introduction of monetary union creates spillovers in the reform policies between the two countries since monetary policy and structural reform policies interact. The question is thus how monetary union influences the incentives for governments to implement structural reforms.

Reform efforts under autonomy are derived from (1), (2) and (3) as $s_t^i = \frac{b(1+b)k_t^i}{c+b(1+b)}$ so that distortions after reform are

$$k_t^i - s_t^i = \frac{ck_t^i}{c+b(1+b)} \tag{11}$$

Intuitively, distortions are a positive function of their initial level and increasing in reform aversion of the government c. They are falling in b, the relative weight that is being put on output stabilization. This is because governments have an interest to stabilize output but also because they are averse to inflation and internalize that more distortions will lead to higher inflation if the central bank puts a higher weight on output.

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Structural reforms in the two countries are no longer independent in case of monetary union. Subject to (9), governments optimize (3) with respect to s_t^i. This yields as a reaction function $s_t^i = \frac{k_t^i \cdot \left[(1+\alpha)^2 + b(1-\lambda)^2\right] + \left(k_t^j - s_t^j\right) \cdot \left[(1+\alpha)\alpha - \lambda b(1-\lambda)\right]}{\gamma + (1+\alpha)^2 + b(1-\lambda)^2}$ with $\gamma = c(1-2\lambda)^2$ for $i,\ j = L,\ H,\ i \neq j$. Clearly, reform efforts are increasing in domestic distortions. How reform efforts react to those in the other country depends on parameter values. In equilibrium, reform efforts are

$$s_t^i = k_t^i \cdot \left((1+\alpha)^2 + b(1-\lambda)^2\right)\left(\gamma + (1+\alpha)^2 + b(1-\lambda)^2\right)/A - \gamma k_t^j \cdot \left((1+\alpha)\alpha - \lambda b(1-\lambda)\right)/$$

A where

$$A = \left[\gamma + (1+\alpha)^2 + b(1-\lambda)^2\right]^2 - \left[(1+\alpha)\alpha - \lambda b(1-\lambda)\right]^2 > 0.$$

After reform distortions are

$$k_t^i - s_t^i = \gamma \frac{k_t^i \cdot \left[\gamma + (1+\alpha) + b(1-\lambda)\right]}{A} + \gamma \frac{\left(k_t^i - k_t^j\right)\left[(1+\alpha)\alpha - \lambda b(1-\lambda)\right]}{A} \qquad (12)$$
$$i = L,\ H,\ i \neq j$$

Obviously, distortions are again higher the higher is their initial level. Moreover, the difference in the levels of distortions in the two countries matter. Whether foreign distortions have a positive or negative effect depends on the sign of $\left[(1+\alpha)\alpha - \lambda b(1-\lambda)\right] = (b+1)\left[(b-1)/4 - \lambda b(1-\lambda)\right]$. Thus, it first matters whether the central reacts positively or negatively to distortions. If it expands money supply in reaction to high distortions ($b > 1$), foreign distortions have a disciplinary influence on the domestic government. Because governments are inflation averse, a low distortion country aims to avoid that high distortions in the foreign country increase common inflation. To lower the incentives for the common central bank to increase inflation, the government will then reduce its own distortions.

If, however, the real exchange has a large influence (λ being relatively large) the effect is turned around because higher distortions abroad increase exports and thus domestic output. This lowers inflationary pressure in the home country and the incentive to implement reforms. It is likely that the real exchange rate effect dominates the first effect if b is not too large. Then, reform efforts would become strategic substitutes and low distortion countries would allow an increase in domestic distortions.

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Comparing policies before (NAT) and after monetary union (MU), the condition for $(k_t^i - s_t^i)|_{MU} > (k_t^i - s_t^i)|_{NAT}$ is $k_t^i \frac{[\gamma + (1+\alpha) + b(1-\lambda)]}{c + b(1+b)} \cdot \left[b^2 - \frac{1+b}{2(1-2\lambda)}\right] + (k_t^i - k_t^j)[(1+\alpha)\alpha - \lambda b(1-\lambda)] > 0$. Whether reform incentives will decrease in a monetary union compared to monetary autonomy depends on the strength of the reaction of the central bank to distortions in member countries (the size of b). Even an active common central bank $(b > 1)$ will take developments in single member states less into account and produce less inflation in reaction to domestic distortions. They can thus be allowed go up without prompting more inflation. Therefore the first term is positive if b is sufficiently large. Again, the second term is likely to be negative if λ is large; in this case more distortions in the other country $k_t^j > k_t^i$ reduce the incentive to reform because they lead to more exports.

To isolate the influence of the exchange rate, let openness go to zero $\lambda \to 0$. The condition then collapses to $k_t^i \frac{[c + b + (b+1)/2]}{c + b(1+b)} \left[\frac{b^2 - (1+b)}{2}\right] + (k_t^i - k_t^j)(1+b)(b-1)/2 > 0$, whose sign only depends on whether b is larger or smaller than unity. If $b > 1$, we have convergence of distortions and the low distortion country experience an increase in distortions with the opposite happening in the high distortion country.

To summarize:

Result 3: If the common central bank is not too conservative, if countries are moderately open, and if initial distortions are sufficiently different, there will be convergence in the levels of distortions between high and low distortion countries.

This finding qualifies the results derived by *Calmfors* (2000) and *Sibert/Sutherland* (2000). These authors assume that symmetric countries form a monetary union which are therefore able to export part of the inflationary consequences of distortions. Not internalizing that both countries have the same incentives, both roll back structural reforms. Here, these results are reversed because the low distortion region "imports" inflationary pressure and therefore needs to increase structural reforms to counter this effect. Moreover, earlier results failed to take into account that distortions might have an influence on the real exchange rate. Real exchange rate movements can reinforce or mitigate the disciplinary influence of higher distortions in the other country.

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Which of the two influences prevails also depends on the relative weight of the high-distortion country, something which has not formally been introduced into the model. But is clear that the strength of those spillover effects is larger the larger is the relative weight of the other country. Clearly, one would expect Malta to have a lower influence on policies in other member states than Poland.

V. Eurozation

An alternative to full monetary union that has been adopted recently by some countries is a so-called hard peg in which one country ties its monetary policy credibly to that of another country. Such hard pegs could be in the form of a currency board or the introduction of the anchor currency as a means of payment.[7] Examples for either regime in the present context can be found in Bulgaria and Estonia that operate a currency board or Montenegro which has adopted the euro.

This section analyzes the effects of eurozation for accession countries. I will only consider the case of a full eurozation because it is more credible than a currency board and thus directly comparable to monetary union, and to abstract from minor implications that a currency board would entail, such as seigniorage distribution.[8] For the anchor country, the situation is the same as monetary autonomy. Thus, in line with the evidence, I assume that there is no feed back from the pegging country to the anchor currency.

When monetary policy is fully tied to that of the anchor country it must be that

$$m_t^i = \ddot{m}_t^j. \tag{13}$$

The strategic decision of setting structural reforms is now different because the rate of money growth is exogenous for the pegging government because it cannot, other than in monetary union, expect that monetary policy reacts to developments in its economy.

[7] Eurozation is, however, legally not compatible with the Maastricht treaty since it precludes that conversion rates be set by the Council of Ministers. But there are ways around this problem (*Buiter/Grafe* (2002)).

[8] The entry into the ERM II by the accession country would only qualify as a hard peg if countries could be expected not to leave the mechanism when shocks hit. The ERM I, before EMU, did not have this credibility. One might argue that the ERM II is more credible because the costs of leaving it are higher than in the ERM I though.

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Given (1) and (2) and realizing that the government is no longer Stackelberg leader vis-a-vis the central bank under a unilateral peg, inflation and output in the pegging country are

$$\pi_t^i = \frac{k_t^i - s_t^i + [b(1-\lambda) - 1]\left(\theta_t^j + k^j - s_t^j\right)}{1-\lambda} \tag{14}$$

and

$$y_t^i = \frac{-\left(k_t^i - s_t^i\right) + \lambda\left(k_t^j - s_t^j\right)}{1-\lambda}. \tag{15}$$

Given these values, and using equilibrium reforms in the anchor country, domestic post-reform distortions are

$$k_t^i - s_t^i = \frac{k_t^i c(1-\lambda)^2 - (b-1)\left(\dfrac{c k_t^j}{c + b(1+b)}\right)}{c(1-\lambda)^2 + (1+b)} \tag{16}$$

Again, of course, distortions are a positive function of their initial level and fall in the distortions of the other country if the anchor central bank is sufficiently concerned with output. This, again, is because inflationary pressure from an expanded money supply can be reduced through output increasing structural reforms.

One readily finds that distortions under the peg (P) are higher than under autonomy (NAT) $\left(k_t^i - s_t^i\right)|_P > \left(k_t^i - s_t^i\right)|_{NAT}$ if $\lambda k_t^i b(1+b)(1-2\lambda) - (b-1)k_t^j > 0$. If the pegging country is sufficiently open ($\lambda > 1/4$), distortions under a peg will go down in domestic distortions because they have a negative impact on the real exchange rate. For a closed economy ($\lambda = 0$), this effect is absent. Moreover, if $b > 1$ distortions fall under the peg in the distortions of the anchor country. This is because those distortions increase the money supply and hence inflation. While the pegging country cannot influence money supply, it can aim to compensate for this effect through increasing output which lowers inflation for a given money supply. Both aspects are absent under monetary autonomy and thus distinguish regimes.[9]

[9] However, it is rather unlikely that a country would peg to a high distortion country. There is not much point in pegging to a high inflation currency.

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Result 4: Compared with monetary autonomy, reforms efforts in the pegging country increase and distortions fall under a unilateral peg if the anchor country is moderately open and highly distorted. In case of a peg to a low distortion country reform efforts could decline, inducing a further polarization between countries.

The logic for these results is similar to the one presented above. With a unilateral peg, inflation in the pegging country will no longer reflect its distortions, therefore structural reform efforts fall because inflation is exogenously reduced (if the other country does not have higher distortions). The effect can be overcompensated if distortion would push up the real exchange rate. This influence is more important if the country is highly open (a large λ). Depending on which effect is larger, inflation will increase or fall and prompt a countervailing adjustment in structural reforms.

VI. Discussion and Conclusion

The paper has aimed to derive the influence of an enlargement of monetary union on structural reform efforts in monetary unions composed of asymmetric countries. However, no simple and unambiguous result could be established. It is important how conservative or "populist" the central bank is because one reason for inflation averse governments to pursue structural reforms is to avoid that they lead to more inflation (be it because they lower output for a given money supply or because the central bank reacts with monetary expansion). If there is no such danger, there is a reduced incentive for reforms. In that sense, ultra-conservative central banks may be less reform inducing. This fear of inflation is also the main reason behind earlier results that have derived a reform lowering influence from monetary union because inflationary pressure from domestic distortions is exogenously reduced.

Besides the characteristics of the central bank, two important qualifications have been added to those results. First, even if this effect exists it may be overcompensated if a country forms a monetary union with a country that is more distorted than itself because this induces the fear of imported inflation. In that sense, a monetary union can lead to a further polarization between highly and less distorted economies, and thus have a disciplinary influence on less distorted countries. Second, this effect is partly reversed through the influence of real exchange rates on output. Higher distortions abroad increase inflation there and with fixed nom-

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inal exchange rates this boosts domestic export which, in turn, lowers the pressure to implement reforms.

Thus, the simple results derived in the earlier literature are not universally applicable and need serious qualifications. In addition, it is obvious that the strength of the countervailing effects is also a question of relative sizes because small partner countries have hardly any spillover effects. Thus, small countries are more affected through these effects than large countries.

How results could be applied to predictions and policy conclusions is less clear. Quite obviously, categorizing particular countries as being more or less distorted depends on what type of distortions is concerned. Labor markets are arguably more distorted in some of the older member states and institutional quality may be worse in some of the newer member states. General conclusions are therefore hard to draw and this might also be an explanation why the empirical evidence is less than clear concerning the influence of EMU on reform efforts in member countries. It is obvious, though, that introducing even more disparities with enlargement will make simple predictions even more problematic.

It is tempting to speculate about which countries might gain from enlargement of EMU. It would be those countries where distortions are below those of the accession countries (which is probably the case for many older members), while accession countries would probably all experience output losses. In this respect, an early extension of EMU to the Middle and Central European countries could be desirable because reform increasing for older members. If, however, governments oppose structural reforms, this result can be one explanation why enlargement is made conditional on convergence of the candidates. In contrast, extension could also result in a slowing down of reform efforts in those accession countries who experience an overall fall in inflation.

Drawing conclusions beyond these general observations about who would agree to enlargement is difficult because I have assumed that preferences are similar in accession countries and present members. This is quite unrealistic; there are obvious differences among the present member states concerning aversion to reform, and probably also with respect to inflation and output gaps. Making predictions about voting behavior would therefore stretch the model too far since this is not only a question of preferences but of the degree of convergence and structural inflation at that time.

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The results have nevertheless direct implications for the current debate about the optimal exchange rate regime for accession countries. While it is widely debated whether accession country should unilaterally adopt the euro or whether they should float, my results suggest that a full membership in monetary union need not necessarily bring gains for accession country, which is usually assumed, but for current members since monetary union can lead to more structural reforms there. Indeed, enlargement could induces more structural reforms in current member states and be hence output increasing while having the opposite effect in accession countries. It is therefore not necessarily clear that the requirement of significant conversion before enlargement is in the best interest of present member states. Instead, one might argue that this requirement forgoes the chance of inducing more reforms and that an early accession might be preferable.

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Summary

Real Exchange Rates, Structural Reforms and Monetary Union

The paper addresses the question what effects the enlargement of a monetary union will have on necessary structural reforms in member countries with high and low degrees of distortions. I show that monetary union has asymmetric effects on reform efforts and under what circumstances governments increase their reform efforts. Depending on asymmetries in the degrees of distortions, the stance of monetary policy, and countries' openness, one could expect convergence or divergence in reform efforts. (JEL E61, E63, F33)

Zusammenfassung

Reale Wechselkurse, Strukturreformen und Währungsunion

Der Aufsatz untersucht die Frage, welche Konsequenzen die Erweiterung der Währungsunion haben wird auf die notwendigen Strukturreformen in Ländern mit größeren oder geringeren Verzerrungen. Er zeigt, dass die Währungsunion unterschiedliche Auswirkungen auf die Reformbemühungen haben wird und unter welchen Umständen Regierungen ihre Bemühungen erhöhen werden. Abhängig von den Unterschieden im Ausmaß der Verzerrungen, der Ausrichtung der Geldpolitik und der Offenheit der betroffenen Länder kann man eine Konvergenz oder Divergenz in den Reformbemühungen erwarten.

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