One size fits none?
Common monetary policy and
inflation differentials in EMU

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1. Nominal divergence: violation of the 'law of one price'?

Nominal divergence is the deviation of absolute, i.e. money prices, from average values, which emerge on homogenous markets. On the one hand, such deviations may be interpreted as violations of the 'law of one price', signalling market failure or imperfections. Either agents are to blame for a lack of rationality, or arbitrage is limited because of institutional restrictions. On the other hand, it has to be examined whether the market is homogenous in the first place. If not, persistent price differences reveal a market separation, and nominal divergence turns out to be a relative price.

Nominal divergence may appear on labour, goods and asset markets, i.e. on markets where flows or stocks are traded. Financial integration in EMU has made great strides; we observe interest rate conformity even of those assets that cannot safely be regarded as homogenous assets, namely public debt paper issued by different national agencies. Real estate prices, however, show large divergence across Europe. There are several possible explanations:

− In a process of general asset price inflation (which is currently observed as a mirror image of euro M3 growth) agents are searching for real estate objects in order to improve their portfolio allocation. Because of lagging price developments and expected locational quasi-rents in some countries, market equilibrium is not yet achieved.

− Structural change, which is a by-product of the catching-up process,

brings about strong demand for real estate objects in some countries.

− Demand for real estate may show particular dynamics because national inflationary expectations drift apart from average EMU inflation target. The reason for such discrepancies has to be found by analysing goods and labour market dynamics.

*Figure 1: Inflation in Germany and in EMU countries*
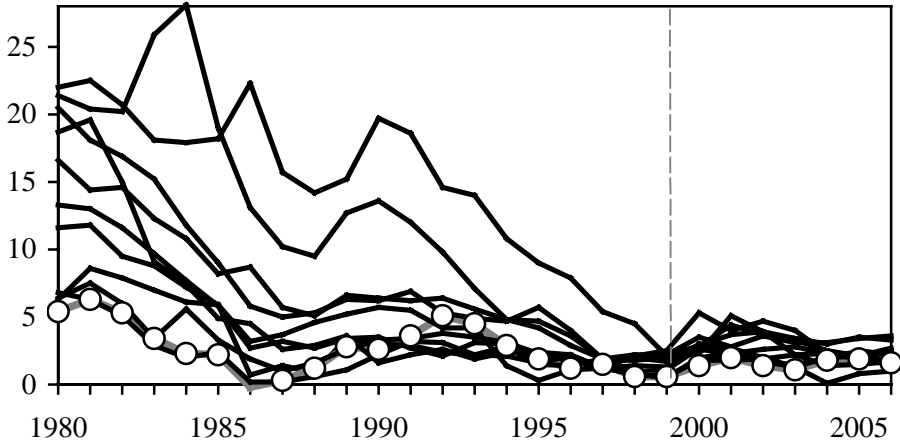
EMS already was oriented towards the elimination of nominal wage differentials throughout Europe. Wage inflation, which due to a lack of credibility of national monetary institutions diverged from the Bundesbank norm, was expected to be lowered to the German standard by means of fixed exchange rates. EMU has sharpened this approach by abolishing exchange rates altogether. From the viewpoint of the institutional theory of credibility and inflation it could be argued that a common EMU rate of inflation would emerge, as the possibility of devaluation no longer existed and the common goods market improved.

Actually, national inflation rates have adjusted to a large extent; what remains is a small amount of inflation divergence, which – looking at the national level – shows strong persistence (Figure 1). Small and persistent differences with respect to inflation rates run up to large differences of national price levels. Hence, it is important to understand the origins and consequences of such adjustment failures.

2. Analysing a simple macro model

On the highly aggregate level, wage formation moves into the centre stage. Early debates on the transition from EMS to EMU were dominated by the question how the precarious interplay of wage and monetary policies would be affected by the change of leadership role from the Bundesbank to the ECB. The existence of two countries equipped with a different 'stability culture' (as measured by the vertical distance of their national Phillips curves) enforces nominal exchange rate adjustments in a fixed-rate system. Whereas the Bundesbank exerted a disciplinary pressure on German wage policy, the latter ruled the roost in the competition on the EMS level. With a currency union established, the 'Italian' Phillips curve was expected to shift downwards if ECB preferences conform to those of the Bundesbank (Figure 2; cf. De Grauwe 2005, 52).

Figure 2: German and Italian Phillips curves before and after supposed credibility effect of Monetary Union
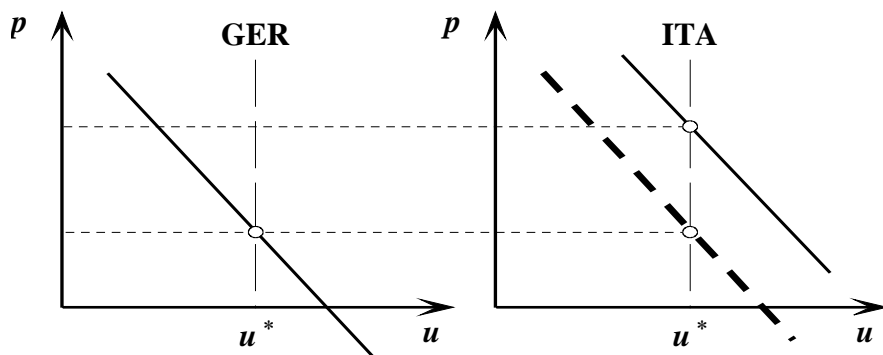
However, the ECB was established just because it appeared intolerable, from a political point of view, to maintain the Bundesbank style of policy making, or – to be more precise – to let the Germans decide on Europe's money on their own. The early discussion on EMU often started from the assumption that preferences of the new monetary policy institution might be less stability oriented, compared to the Bundesbank. Moreover, German wage policies might perceive the ECB's monetary control to be 'more remote', compared to the previous regime. As a consequence, German leadership in wage policies might get lost. If national unions tend to downgrade the Euro-wide inflationary effects of their own wage

claims, and the degree of the ECB's dislike of inflation, the outcome would be stagflation: supply-side wage pressure and demand-determined unemployment (Soskice/Iverson 1998, Hefeker 2002). The relevance of this line of reasoning has been challenged right from the beginning, and empirical findings support this critique (Posen 1998, Posen/ Gould 2006).

The decisive weakness of that debate is its focus on autonomous factors of wage formation, particularly inflation expectations. This is the legacy of the Barro-Gordon era in the theory of monetary policy, where the focus was on strategic 'games' at given full employment and where inflation was explained by credibility gaps on the part of the central bank. This scenario is hardly appropriate for analysing EMU. There is no doubt about the ECB's preference for price stability. But, nevertheless, inflation in some countries appears to be uncoupled from the common European guideline.

In order to understand the logic of this deviation, the following model tries to grasp the macroeconomic constellation of a single EMU member country. Domestic inflation depends on the output gap and the shock term w_t. Inflation expectation is built of two components: the forward-looking element is given by the belief in the long-term realisation of the ECB's inflation target p^E; the adaptive element, on the other hand, is fed by the experience of domestic inflation itself. The weights of both elements add up to unity and are assumed to be constant.

$$p_t = \mu \, p^E + (1 - \mu) \, p_{t-1} + \alpha \, y_t + w_t$$

Goods demand depends on the real interest rate, calculated in terms of domestic inflation,[2] and on the *change* of the real exchange rate, measured as the difference between euro-wide and national inflation (for reasons of keeping the model as simple as possible, price levels do not appear explicitly). Domestic autonomous demand g_t can be interpreted as a not serially correlated shock term; persistence of macro activity is mod-

[2] Hagen/Hofmann (2003) assume that domestic firms calculate real interest rates by using EMU inflation. This leads to more favourable results with regard to dynamic stability. However, it is not true that all producers deliver their goods on the European market.

elled by the parameter $0 < \theta < 1$.

$$y_t = \theta \, y_{t-1} + g_t - \beta \left(i^E - p_t \right) + \tau \left(p^E - p_t \right)$$

The euro nominal interest rate depends on the estimated equilibrium real interest rate (which equals g^E / β in the model) and on the inflation target. As macro equilibrium is assumed on the EMU level, Taylor reaction terms can be dropped from the interest rate rule:

$$i^E = \frac{g^E}{\beta} + p^E$$

A compact presentation of the model in vector-matrix form $\mathbf{v} = \mathbf{A}\mathbf{v}_{-1} + \mathbf{B}\mathbf{z} + \mathbf{c}$ is:

$$\begin{bmatrix} p_t \\ y_t \end{bmatrix} = \begin{bmatrix} \dfrac{1-\mu}{\Psi} & \dfrac{\alpha\theta}{\Psi} \\ \dfrac{(\beta-\tau)(1-\mu)}{\Psi} & \dfrac{\theta}{\Psi} \end{bmatrix} \begin{bmatrix} p_{t-1} \\ y_{t-1} \end{bmatrix}$$

$$+ \begin{bmatrix} \dfrac{1}{\Psi} & \dfrac{\alpha}{\Psi} \\ \dfrac{\beta-\tau}{\Psi} & \dfrac{1}{\Psi} \end{bmatrix} \begin{bmatrix} w_t \\ g_t - g^E \end{bmatrix} + \begin{bmatrix} \dfrac{\mu - \alpha(\beta-\tau)}{\Psi} \\ \dfrac{(\beta-\tau)(\mu-1)}{\Psi} \end{bmatrix} p^E$$

where $\Psi = 1 - \alpha(\beta-\tau)$. The solution $\mathbf{v} = [\mathbf{I} - \mathbf{A}]^{-1}[\mathbf{B}\mathbf{z} + \mathbf{c}]$ is

$$\begin{bmatrix} p_t - p^E \\ y_t \end{bmatrix} = \begin{bmatrix} \dfrac{1-\theta}{\Omega} & \dfrac{\alpha}{\Omega} \\ \dfrac{\beta-\tau}{\Omega} & \dfrac{\mu}{\Omega} \end{bmatrix} \begin{bmatrix} w_t \\ g_t - g^E \end{bmatrix}$$

where $\Omega = \mu(1-\theta) - \alpha(\beta-\tau)$, assumed to be positive. Both domestic variables, inflation and the output gap, deviate from their equilibrium values, $p_t = p^E$ and $y_t = 0$, only in case of shocks. Note that domestic output, under specific parameter constellations, may even increase after a wage shock, which can be explained by the impact of the real interest rate.

The crucial issue is the question of dynamic stability. Temporary

shocks may divert both the endogenous variables from equilibrium and bring about cumulative processes (this threat will be all the more imminent if the shocks are serially correlated, which has been ignored here for simplification). Stability can be checked by inspection of matrix **A**. Applying Schur's Theorem, the twofold condition for convergence is given by

$$\frac{\theta\left(1-\mu\right)}{\left|\alpha\left(\beta-\tau\right)-1\right|} < 1 \text{ and } \frac{\mu\left(1-\theta\right)-1}{\alpha\left(\beta-\tau\right)-1} < 1$$

A sure-fire recipe for convergence is given by $\alpha = 0$, i.e. if the slope of the supply function is zero. This implies that national wage polices do not react to labour market conditions. This case corresponds to a scenario which sometimes is recommended as a baseline for European wage policies: these ought to be oriented to the EMU inflation target and domestic productivity growth (which has been excluded from the model). The problem of such a wage guideline, however, is that it suppresses market forces in wage determination – this is the typical drawback of (mostly) Keynesian income polices.

If $\alpha > 0$, convergence always prevails if $\beta < \tau$, i.e. if the real exchange rate channel dominates the real interest rate channel. If however $\beta > \tau$ is assumed, the interplay of two other coefficients, the degree of the belief μ in the realisation of EMU target inflation and the degree θ of domestic output persistence, move into centre stage. Note that convergence is not guaranteed by $\mu = 1$. After fixing the parameters $\alpha = 0.1$, $\beta = 3$ and $\tau = 1$, the region of stability with respect to μ and θ can be displayed as follows (Figure 3):

The message is straightforward: if market agents put little trust in the ECB's inflation target, but are highly impressed by last period's domestic inflation (low μ) and/or if the domestic cycle unfolds strong persistence tendencies (high θ), the national economy may stray from EMU average. Moreover, it appears plausible to suppose that the experience of persistent differences between p^E and p_t over time will diminish the value of the parameter μ.

The following graphs show the path of domestic output and inflation gaps after a *1.0* demand shock and a *1.0* supply shock, respectively. Equilibrium values are normalised to zero; in addition to the parameter

specification as indicated above, $\theta = 0.4$ was chosen, supplemented by $\mu = 0.2$ and $\mu = 0.4$, respectively. This last mentioned alternative represents a rough watershed between convergence and divergence ($\mu = 1/3$ yields the unit root case).
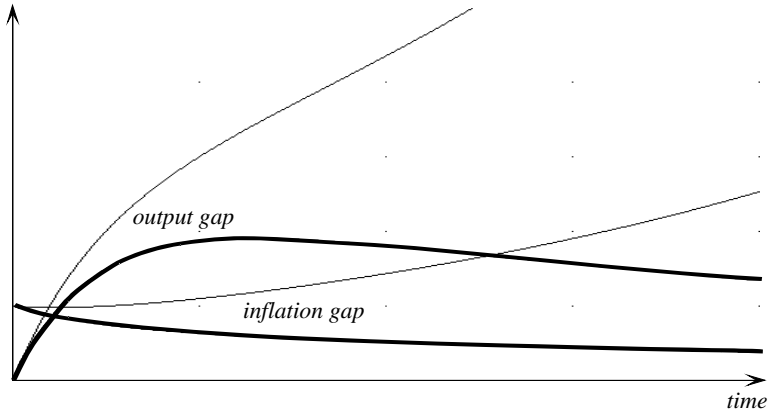
Figure 3: Region of convergence with varying belief in EMU inflation target and varying domestic output persistence
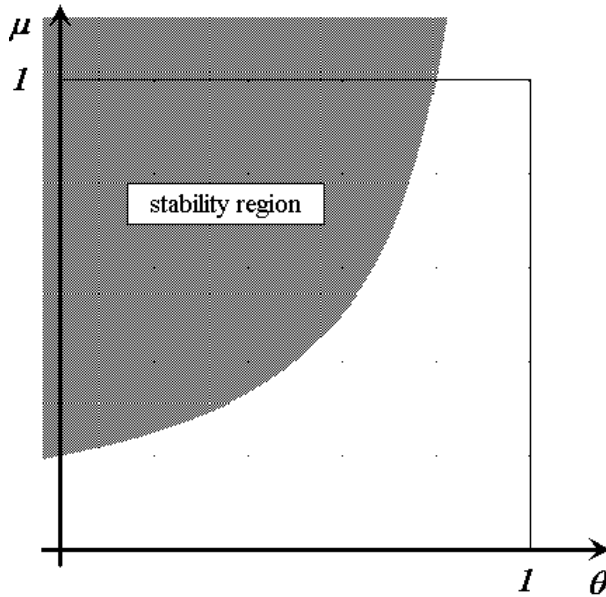
Figure 4: Demand shock with low belief (thin line) and high belief (bold line) in EMU inflation target
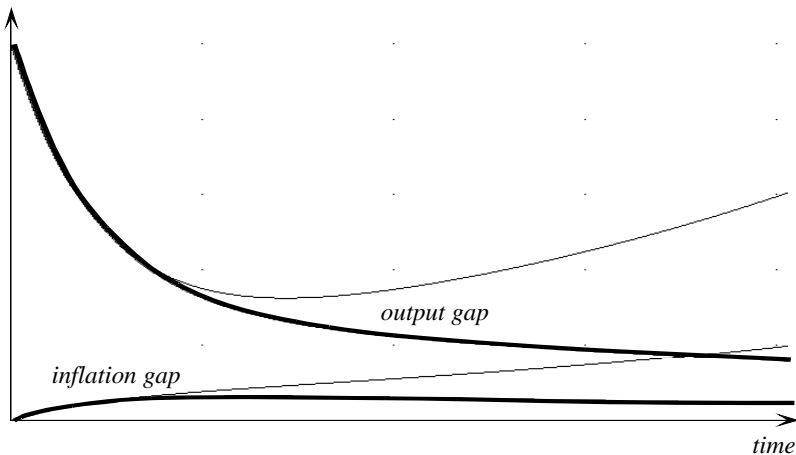
*Figure 5: Supply shock with low belief (thin line) and
high belief (bold line) in EMU inflation target*

Instability stems from both the persistence of the domestic cycle and the weak belief in the realisation of the EMU inflation target in the home country. The latter topic may not be confused with the well-known problem of central bank credibility. Rather, the problem is that market agents in EMU member countries learn that the ECB target rate, whether realised or not, is of little significance for the national economy. It is true that the domestic economy suffers from a loss of competitiveness vis-à-vis the European market if $p_t > p^E$, but the real interest rate strengthens domestic demand so that employment, and thus prices, increase. This pattern of the macro process appears not only in case of demand, but also in case of supply shocks: there is no 'stagflation', i.e. high inflation and *low* output.

3. Looking at the data

The model shows that inflation differentials can occur when national cyclical activity diverges. Besides this result, the ECB emphasises further origins of inflation differentials owing to price and wage rigidities on the one hand, and to the convergence process on the other (ECB 2005, Altissimo et al. 2006). However, according to Figure 6, the latter cannot account for recent inflation dynamics in EMU and does not support the often cited Balassa-Samuelson model, in which inflation differentials arise from the supply side and meet with high service-sector inflation growth.

Figure 6: Evolution of Balassa-Samuelson relation
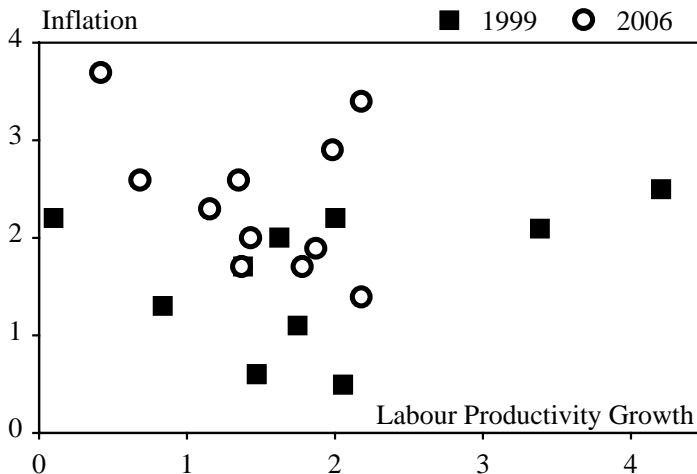
With such an explanation attempt, inflation deviations would signal a desirable and equilibrating adjustment process. Indeed, trend productivity growth did not increase significantly during that time for the Euro zone. This is especially true for the high-inflation countries like Ireland, Spain and Greece. With converging productivity in EMU countries, the inflation spread should have rather diminished or at least remained constant (MacDonald/Wojcik 2003).

In the above model, economies deviating from the European average are characterised by high output and high inflation (also in case of positive shocks); accordingly, although not modelled, trade deficits will prevail. The latter should occur from two sides. High and above EMU-average inflation triggers a distortion in European competitiveness, since it implies a real appreciation vis-à-vis the Euro zone. Moreover, countries with high output dynamics demand more goods and services from abroad, as their production capacities may be fully employed and this generates an impairment of their trade accounts.[3]

By linking the model's results to the empirical setting, we first studied whether the highly stylised pattern can be found, when we look at the performance of EMU countries on an aggregated level without identifying country-specific origins. The findings are somewhat disappointing,

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[3] It is also argued that rising trade 'imbalances' are to be expected in a currency union because of integrating mechanisms that disentangle national saving and investment (Blanchard/Giavazzi 2002).

however. There are weak signals of a positive inflation-output nexus, a relationship that can be expected to prevail because of the macro supply function. Deviations from that pattern might be explained by supply shocks. There is also a weak negative link between the current account and inflation, which confirms the analytical assumptions with regard to effect of varying competitiveness. Finally, there is hardly any relation between current account and output. This ambiguity can be explained on theoretical grounds: on the one hand, a domestic recession typically improves the trade account; on the other hand, a demand stimulus from abroad at the same time strengthens domestic output and export performance.

Next, the focus is on the performance of single countries. With respect to cumulative inflation differences since 1999 (see Figure 7), a group of low-inflation countries (Germany, Finland, Belgium, Austria and France) stands opposed to high-inflation countries (Ireland, Greece, Spain, Portugal), with the Netherlands and Italy forming an intermediate position. Busetti et al. (2006) derive the same results when analysing Euro zone inflation dynamics with econometric methods. Note, however, that there is no linear trend of deviation in all countries. The rapid increase of relative inflation in Ireland has stopped since 2003 and a marked stabilisation can also be observed in the Netherlands and in Finland.

By disaggregating the harmonised consumer price index (HICP), further findings may be revealed (Figure 8). It is worth mentioning that overall and non-energy industrial[4] cumulative inflation move simultaneously for most EMU countries besides Ireland, Italy and the Netherlands. Firstly, the individual country figure of Ireland shows that cumulative overall inflation deviations ascend at least until 2003; meanwhile the corresponding development for non-energy industrial inflation moves in the opposite direction. In addition, the latter can account for the observed overall inflation stabilisation in recent years, since it compensates the ongoing above-EMU average inflation growth in the service sector. This fact, however, does not support the already mentioned Balassa-Samuelson effect for the Euro-zone countries as a whole. Especially in Spain and Greece productivity growth appears not sufficient to avoid national inflationary pressure.

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[4] The non-energy industrial price index is taken as a proxy for tradable goods.

*Figure 7: Cumulative inflation deviation from EMU average*
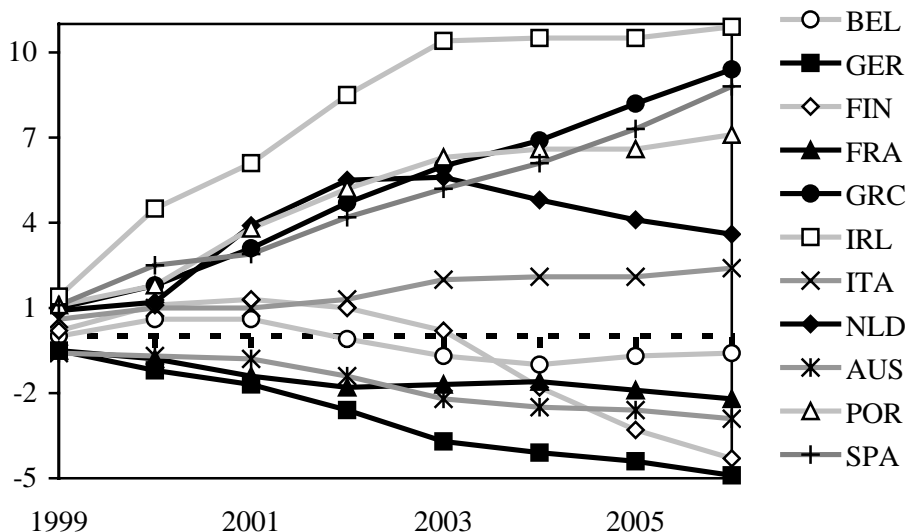
Secondly, a closer look at the disaggregated level shows the deterioration of Italian competitiveness, although Italy's cumulative overall inflation differences do not seem to be too high. That is probably the reason why it does not belong to the high-inflation cluster due to the regression results of Busetti et al. (2006). The cumulative inflation of tradable goods exceeds overall HICP inflation by a multiple and provokes rising current account deficits. Finally, the Netherlands experience a rapid disproportionate decline in non-energy industrial inflation since 2003, which supported the massive build-up of current account surpluses.

By comparing inflation, output und trade performance, we may guess in which EMU member countries the $\beta > \tau$ scenario, as analysed in the model, gives an appropriate image of the actual market process.[5] Two obvious candidates are Greece and Spain, where strong domestic macro activity with respect to output and prices is accompanied by substantial trade deficits. This is especially true for Spain where current account deficits soared recently. The real-interest-rate effect thus exceeds the real-exchange-rate channel, indicating from the model's point of view some kind of dynamic instability.

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[5] Note, however, that we cannot check the subcases referring to θ and μ when we link individual country performances to the model's implications.

Figure 8: Country Ratings
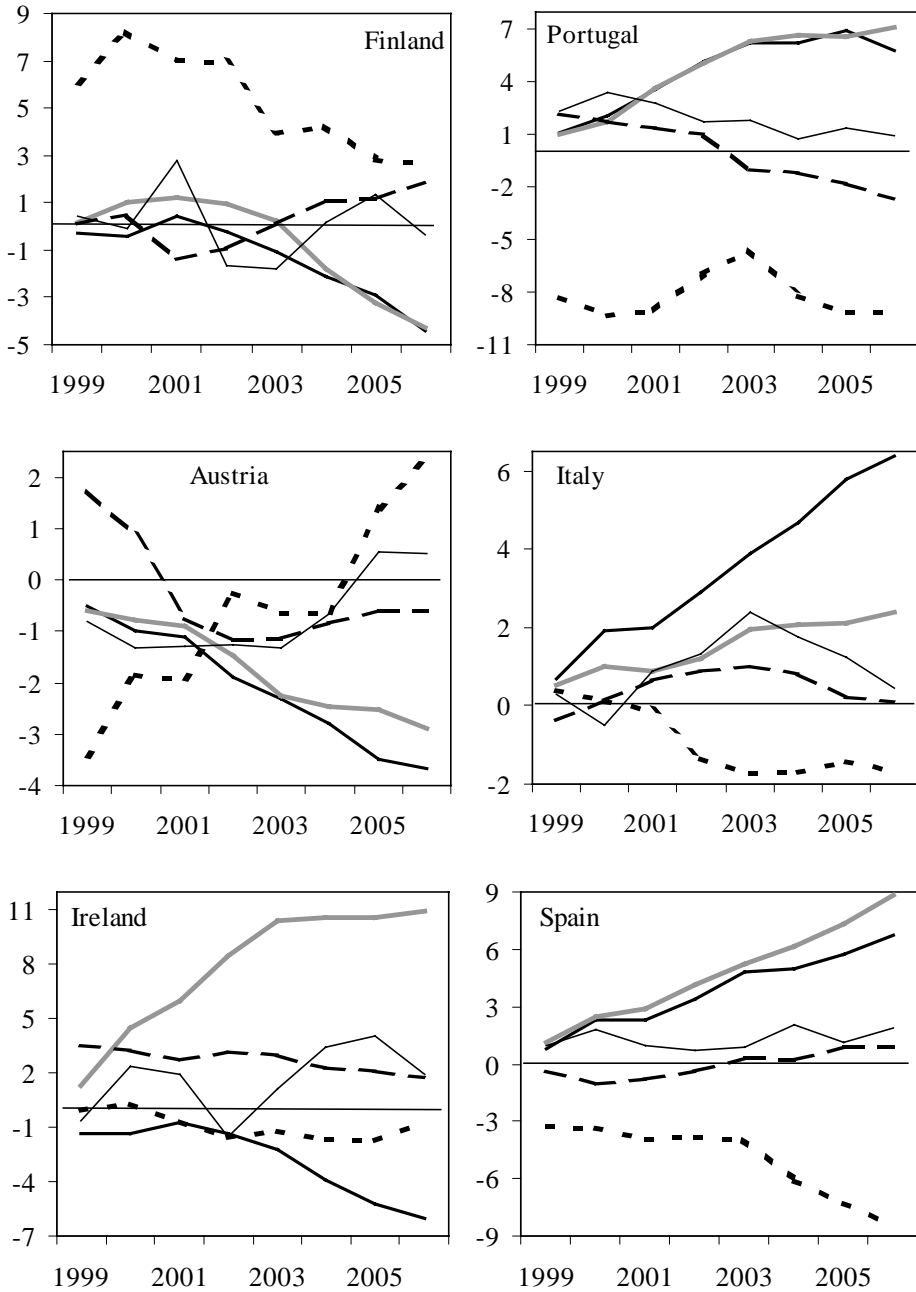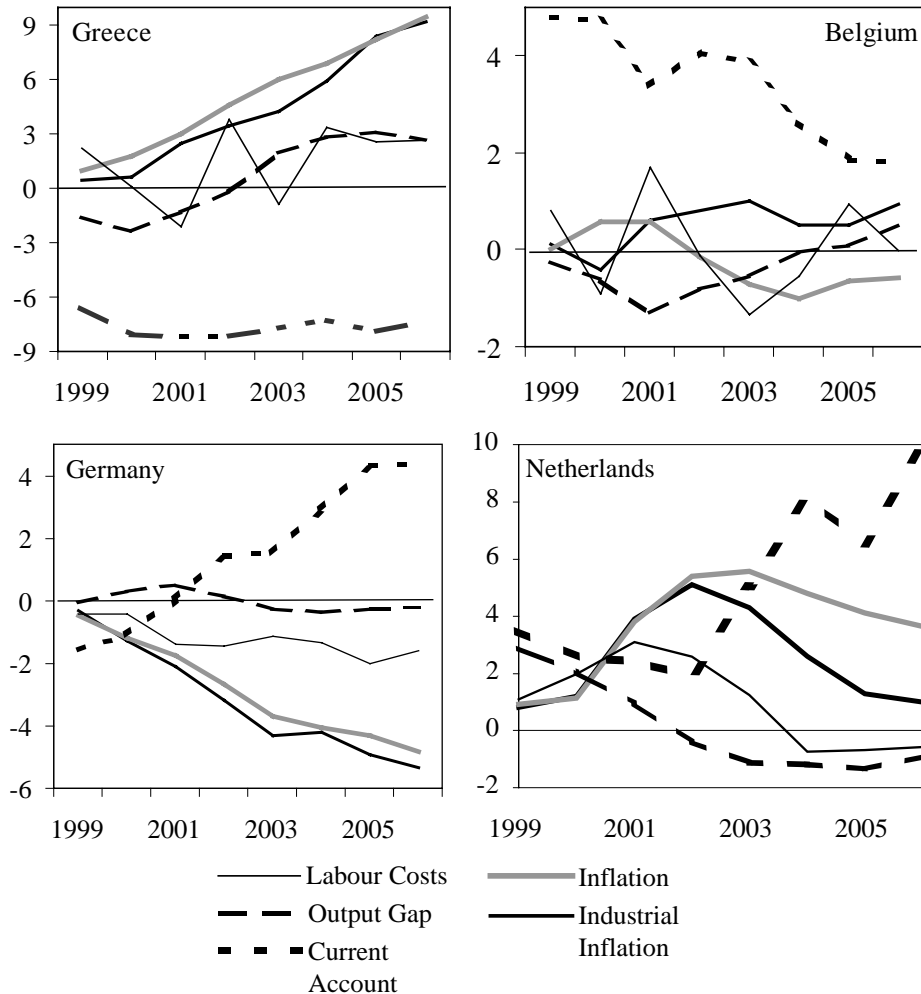
Source: Own calculations based on Eurostat data; industrial inflation is the cumulative non-energy industrial inflation difference from EMU average; inflation is the cumulative overall inflation difference from EMU average; output gap is the deviation from EMU average; labour costs are nominal unit labour cost growth relatively to EMU average.

In Greece, and to a lesser extend in Spain, the unfavourable trade account might be explained also by cyclical effects, i.e. by strong domestic demand. Two mirror-image candidates with respect to the model scenario may be Austria and Germany (at least until 2003 for the latter), in which low domestic activity and moderate inflation go along with trade surpluses. As indicated above, Ireland forms the exception with high overall inflation and output growth, but equilibrating trade accounts. The cumu-

lative deflation relatively to EMU average in the tradable sector can account for sustainable current account dynamics.

A dominance of the real exchange rate over the real interest rate ($\beta < \tau$) seems to prevail in Portugal. While high cumulative inflation generates massive current account deficits, low real interest rates seem insufficient to stimulate domestic demand. Indeed, inflation depresses output via the trade effect. The dominance of the real exchange rate causes both trade deficits and an increasing negative output gap. Note, however, that according to the model's convergence and stability criteria, this process appears to be stable, since $\beta < \tau$ represents a stability condition under the conducted parameter calibration.

Italy is on its way to follow Portugal with inflation-induced current account deficits triggering a deterioration of its output gap in the last two years. Thereby, price developments for Italian non-energy industrial goods emphasise the above statement. Finland, like Austria in the first scenario, builds the mirror image regarding the macro-variable movements. Low inflation boosts output via the export channel. Considering wage policies, an out-of-line solution emerges, if wage developments do not respond to changing output dynamics, namely to increasing negative output gaps. In Italy, this wage adjustment process has already started, since decreasing output gaps relative to EMU average have recently gone hand in hand with falling labour costs. In Portugal, the appropriate labour market reaction is overdue.

The criterion of $\beta > \tau$ or $\beta < \tau$ may not be invariable in historical time, and thus, may not be suitable to separate macroeconomic regimes for longer periods. Market forces may shift macroeconomic systems from the instable scenario to a stable one. The ECB, also, reckoned that instable paths in some countries might find their way back to equilibrium over time.[6] One way, under which this possibility could be demonstrated for-

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[6] 'In sum, it is plausible to conclude that the move to Stage Three of EMU may have led to transitory expansionary effects on domestic demand in countries that experienced the largest decline in nominal and real interest rates, most notably Ireland, Portugal, Greece and Spain. Given the one-off nature of this regime shift, however, this source of inflation differentials is temporary. Moreover, as illustrated by the model simulations, the equilibrating effect of changes in national competitiveness triggered by an increase in inflation differentials is likely to offset any expansionary effects of real interest rate changes over time. The loss in competitive-

mally, would be to endogenise the parameter β and write it as a function of the past real exchange rate path, when increasing European sales expectations and opportunities make investments more interest-rate sensitive.[7] Low-inflation countries like Germany over time may then succeed in strengthening domestic demand by means of the trade channel. On the other hand, a real interest-rate driven boom over time may collapse, as the increasing loss of competitiveness finally may prevail.

4. Economic policy consequences

The basic message of the model and the inspection of empirical trends is that nominal divergence in EMU not necessarily results from market failure or 'bad behaviour' of market agents. Therefore, enhancing (labour) market flexibility and asking for unions' wage restraint will not improve the situation. If, because of an at least temporary low weight of the real exchange-rate impact on demand, domestic cyclical activity becomes detached from the macroeconomic conditions on EMU level, national fiscal policy regains its responsibility for stabilisation purposes.

Thus, in case of excessive national inflation, a fiscal tightening might help to reduce the inflation gap, excess demand and the trade deficit. Spain and Greece, under the $\beta > \tau$ scenario, and Ireland should conform to such a policy guideline in order to stabilise macroeconomic processes. In contrast, fiscal tightening might not represent a coherent solution for Italy and Portugal, because high inflation goes in line with negative output gaps. Concerning domestic output, expansionary fiscal policy would be a more suitable advice, but hardly seems possible to accomplish. Budget deficits already exceed both the average EMU budget balance and the criteria of the Stability and Growth Pact (Figure 9).

A major problem is that, with the transition from EMS to EMU, macroeconomic restrictions for the national economy have changed substan-

ness in countries with above average inflation rates should eventually help to counterbalance the expansionary effect of the real interest rate decline on economic activity. By the same token, countries with below-average inflation rates, such as Germany and Austria, are found to benefit particularly from the gain in competitiveness resulting from the induced real depreciation' (ECB 2003, 42).

[7] This modification would yield an uncomfortable non-linear equation system.

tially. Surely, the competitive pressure stemming from the Common Market has gradually strengthened. The decisive distinction between the former fixed-rate system and the current currency union is that trade deficits have lost their stabilising force with respect to a monetary transmission channel. Beyond their indicative role for signalling the competitive weakness of an EMS country, trade deficits also triggered devaluation expectations of a country's exchange rate (mostly vis-à-vis the mark), which made domestic interest rates rise beyond the level defined by the key currency country (Germany). In general, this type of domestic interest 'policy' (which actually was induced by foreign exchange speculators) helped to stabilise the national economy.

Figure 9: Deviations from average EMU budget surplus ratio
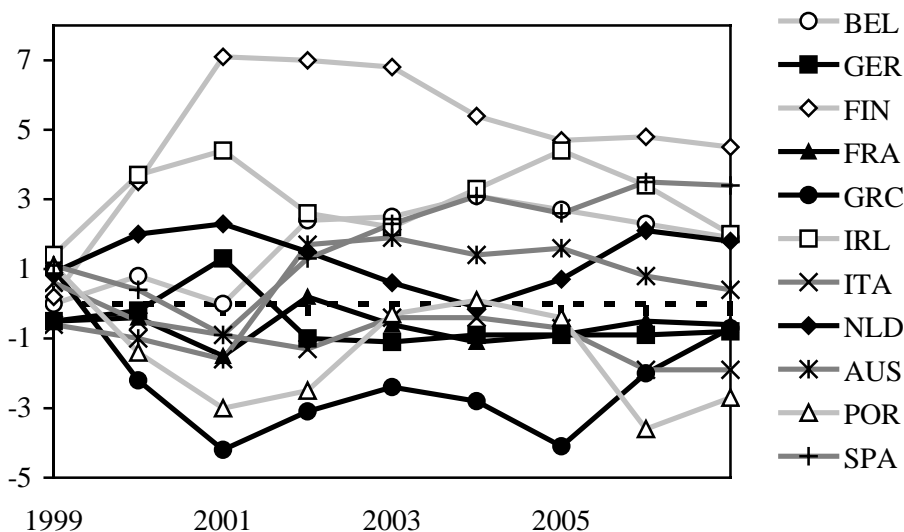
Today, from the point of view of a prospering EMU country, large imports are welcome, as they tend to dampen price increases on the national goods market. But with a lacking speculation against the national currency, macro imbalances between EMU countries thus can be financed on a larger scale, and for longer periods of time. Current account imbalances of a much larger amount (up to 10 %, compared to only 5 % in the EMS) are financed by intra-EMU capital flows, which are no longer exposed to any exchange rate risk. Trade deficits therefore no longer pose a problem for national economic policy making, at least in the case of ex-

cess demand. Matters are different if low competitiveness and high un-employment prevail, but this state of affairs may emerge and persist just because the current account constraint is no longer present within the European economy.

The ECB hopes that diverging tendencies in the Euro area will not get out of control.[8] The problem is that incentives to correct non-sustainable paths in the single member countries are weaker compared to the EMS era. If member countries remain 'out of line' for some long time, macro-economic stabilisation and institutional reform are difficult to implement as there is no obvious sign of 'crisis'. The threat of a transfer union comes up (Flassbeck/Spiecker 2005). A remedy that hopefully might help to prevent such a state of affairs is the re-introduction of EMS-type sanctions in the working of EMU monetary policy: the ECB might dif-ferentiate its main refinancing interest rate according to macroeconomic conditions in the member states (Siebert 2006). If national debt paper can be used in repurchase transactions only with a heavy discount, depending on the country's trade and/or budget deficit, or on the national inflation gap, interest rates on securities issued by public and private agents of that particular country will rise.

Surely, this kind of monetary reform will undermine the uniformity of the euro bond market. But this latter feature did not rank prominently amongst the promises that were used to propel the EMU project. Market agents still can dispose of a single currency in their transactions. The re-introduction of the instrument of interest rate differentials only serves to maintain a market-oriented character of the necessary adjustments, and helps to prevent the EU from drowning in the abyss of transfer policies.

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[8] A recent ECB paper on trends and cycles in the euro area (Giannone/Reichlin 2006) posed the question 'How much heterogeneity and should we worry about it?' The concise answer given was 'Not so much and we should not, at least not yet.'

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One size fits none? Common monetary policy and inflation differentials in EMU

Abstract

Nominal divergence in EMU can be explained by the dominance of the real-interest effect over the real-exchange-rate effect. This Chapter contributes, first, to the analytical debate on the macroeconomic sources of divergence. If national wage setters use domestic inflation instead of the ECB's inflation target when forming inflation expectations, and if national cycles exhibit high persistence, the probability of convergence is low. Second, on an empirical level, trade-deficit EMU countries are to be distinguished according to their overall macro performance: in high-employment countries the trade deficit helps to curb inflation, in low-employment countries fiscal policy is trapped in the conflict of serving external or internal equilibrium. EMU has abolished a balance-of-payment channel of stabilization, working, besides the competitiveness channel, via the interest rate. To restore this effect of monetary policy, the ECB might impose higher repo rates on securities of high-inflation countries.