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What Drives ECB Monetary Policy?

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Abstract

In this paper I have analyzed ECB interest rate setting in the first 5 years of its existence. Contrary to popular belief and continuous ECB statements, the ECB has not acted as an obsessed inflation fighter. By any measure, output considerations do play a significant role in the ECB's policy rule. If anything, the ECB has been on the loose side, especially since 2001, when taking economic development in the euro area as a whole as the starting point. Actual interest rates have been consistent with German (and to a lesser extent French) preferences, however. It suggests the ECB puts a dominant weight on German economic developments. Small peripheral countries receive too low weight rather than too high. In case the ECB actually focuses on euro area wide developments, its looseness is comparable to that of the Fed. In case ECB policy actually is geared towards Germany's preferences – or perhaps the average German-French preferences -- the ECB has been much closer to a standard Taylor-rule interest rate setting than the Fed. In that scenario, the Fed indeed has been much more aggressive in the lowering of its interest rates in the face of adverse economic shocks.

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1. Introduction

For six years now, the European Central Bank (ECB) has been in charge of monetary policy for the Euro area. The ECB took power under the conditions set by the Maastricht Treaty, which stipulated that “*the primary objective of the ESCB shall be to maintain price stability*”. In addition, the Treaty stated that “*without prejudice to the objective of price stability, the ECB shall support the Community’s general economic policies and its objectives*”. A high level of employment and stable economic growth definitely are among these latter objectives. How the ECB would implement monetary policy and how it would weigh its primary objective against other, secondary, considerations was unclear. An additional complication was formed by the fact that the ECB had no proven track record as an inflation fighter at its start. Of course, its creators hoped the ECB could inherit the Bundesbank’s reputation in this respect. Nevertheless, common opinion was that being too loose would considerably reduce any borrowed credibility the ECB might have. For that reason, many observers expected the ECB to focus on price stability alone. Alesina et al. (2001), for instance, formulate a benchmark interest rate rule for the ECB that only includes the deviation of inflation from its target as a determinant.

Over the past five years, many academic and popular commentators have commented on ECB policy and criticized its choices. Popular sentiment typically appears to be that ECB policy choices compare unfavorably with those of the Federal Reserve System in the United States. While Greenspan is seen as a fine-tuning expert “playing” the market with a keen eye for real developments, the ECB – and its president Duisenberg – do without the glamour and charisma and stubbornly talk about the need to maintain low inflation. Especially politicians in large countries with low growth – notably Germany, France and Italy – frequently complain about the lack of ECB attention for economic growth and (un)employment in its monetary policy. The academic literature, on the other hand, generally provides evidence that the ECB does pay attention to both price and output developments in setting monetary policy. Here, criticism more often takes the form of the ECB being too loose. A related but separate issue concerns the question whether the ECB exclusively sets interest rate policy on the basis of euro area wide economic developments or whether regional issues (in)appropriately play a role too.

In this paper, I intend to summarize and analyze the available evidence on the ECB's performance in the first five years of its existence. Quite naturally, the question arises whether and to what extent the ECB has been successful in reaching its goals. Moreover, an evaluation of the goals themselves and the strategies to obtain these goals are in order. In my view, it is a natural time to do so for two main reasons. First, in November 2003 Trichet became the second president of the ECB, succeeding Duisenberg and bringing the ECB in a new phase. Second, in 2003 the ECB itself performed an internal evaluation of its monetary policy strategy and implemented a number of changes in this strategy. Note though that even a five-year period still is quite short for a final verdict.

In the paper, I will focus on three questions. First, I analyze to what extent the ECB's focus has been on price stability as compared to a broader concern for macroeconomic stability. Second, I go into the issue to what extent policy has been set according to euro area wide developments as opposed to regional developments. Third, I compare ECB behavior with that of the Fed to investigate whether the ECB really has been more hawkish as an inflation fighter and simultaneously less activist in pursuing output goals than the Fed.

The paper is set up as follows. In section 2, I present a brief overview of the way these issues have been treated in the literature. In section 3, the data used for the analysis are introduced. Here, I focus on the period from 1999:1 to 2004:2 using quarterly data. In section 4, I compute hypothetical interest rate paths using standard Taylor rules to analyze Euro-area policy settings, both for centralized (euro area wide) and decentralized (national) developments. Subsequently, ECB and Fed interest rate policy are compared. Section 5 contains a summary and conclusion.

2. A Review of the Issues

2.1 The importance of real developments: words versus deeds

In 2003, the ECB presented the outcome of an internal evaluation of its monetary policy strategy (ECB, 2003). In summary, according to the ECB its strict focus on price stability as the core element of its monetary policy strategy remained unchanged. However, the ECB "clarified" – and slightly adjusted upward – its quantitative definition of price stability. Instead of defining price stability as a positive rate of increase in the HCIP lower than 2 percent, the ECB reformulated its objective

to maintain inflation below but close to 2 percent. Moreover, it downplayed the role of the second “monetary” pillar as a determinant of short-run monetary policy. Gali et al. (2004) critically review the ECB’s evaluation outcomes. They argue that the ECB in fact has structurally shown concern for the real side of the euro area economy and has set monetary policy accordingly. That is, while in words ECB policy aimed at price stability per se, ECB deeds reflect a more balanced concern for both price and output developments. In their view the recent strategy adjustments are a way to gradually reconcile words and deeds of ECB actions. Gali et al. (2004) blame the ECB for not being more explicit and transparent about its goals.

In a second chapter, titled “The Duisenberg Record” Gali et al. (2004) evaluate the results of ECB policy. Here, they conclude that the ECB has failed to accomplish its own (inflation) goals when measured against the ECB’s own yardstick. They quote from Duisenberg’s words before the Committee on Economic and Monetary Affairs of the European Parliament on 23 November 2000 as follows: *“At what point would I say that we can talk about a failure? That would be, if, over the medium term future, we were to have domestic inflation of our own making, which would over time, continue to exceed the definition of, at maximum, 2% inflation. Then we would be justified in speaking of a failure, but this is a hypothetical situation which I do not envisage happening at all.”* Given the fact that HICP inflation in the euro area has fluctuated between 2 and 2.5% per year for the complete period 2000-2003, Gali et al. conclude that even when accounting for all contingencies Duisenberg mentions in the above quote, they *“...cannot find convincing evidence that the ECB has worked hard at keeping inflation in check and back in line, when it crept back above the 2% maximum.”*

Sapir (2003) more or less arrives at the same conclusion. However, he looks at it much more positively. Sapir (2003, p. 54) concludes *“There is a large consensus that the ECB did a good job in an eventful period where it had to operate with less-than-perfect statistical information and knowledge of the functioning of the euro-area economy. Before the euro was launched, observers pointed to the risk of an over-restrictive monetary policy given the need of the newly-created central bank to build up its anti-inflationary reputation. This risk has not materialised and price stability has been achieved while maintaining a growth-supporting monetary stance”*.

Empirical work on monetary policy reaction functions largely confirms the hypothesis that the ECB does put a positive non-zero weight on output gaps in its

interest rate setting. Most of this work is based on Taylor rule type of equations.¹ These generally take the following form:

$$(1) \quad i_t = R^* + \pi_t + \alpha (\pi_t - \pi^*) + \beta(y_t - y^*)$$

where i represents the nominal short-term (policy) interest rate, R^* is the equilibrium real interest rate, π and π^* are realized and target inflation respectively and y and y^* are actual and potential output. Consequently, $(y_t - y^*)$ represents the current output gap and $(\pi_t - \pi^*)$ is the deviation of inflation from its target. According to Taylor (1993), a sensible monetary policy rule would be equation (1) with coefficients α and β both equal to 0.5. Taylor shows that actual interest rate policy in the United States in the period 1987-1992 closely follows this rule. In empirical work, equation (1) is typically reformulated as a regression equation of the following form:

$$(2) \quad i_t = \rho i_{t-1} + (1 - \rho)[c_0 + c_1 (\pi_t - \pi^*) + c_2 (y_t - y^*)] + \varepsilon_t$$

Here, ε_t is the error term of the regression. Note that in this specification values for c_1 and c_2 corresponding to $\alpha = 0.5$ and $\beta = 0.5$ are 1.5 and 0.5 respectively. Different specifications are used in the literature. Sometimes current inflation is replaced by lagged inflation or forward-looking measures, either inflation expectations or future inflation realizations. For the output gap, lagged variables are used as well. Finally, as shown in equation (2) a one-period lagged interest rate term is often added to capture possible interest rate smoothing by the central bank.

Hayo and Hofmann (2003) estimate a Taylor rule both for the Bundesbank (1979-1998) and the ECB (1999-2003). They find significantly positive coefficients c_1 and c_2 in both regressions. However, they conclude that the (long-run) output weight given by the ECB (c_2 equal to 1) considerably exceeds that by the Bundesbank (c_2 equal to 0.4). In both regressions they find c_1 to equal 1.2, suggesting a lower weight on inflation than in the original Taylor rule. Moreover, they report substantial persistence in interest rates as witnessed by an autoregressive parameter ρ around 0.9.

¹ See Taylor (1993) for the original idea and exposition of the Taylor rule. Orphanides (2001) criticizes the use of Taylor rule estimations based on final, possibly revised, data. Since policy makers only have real-time data as a basis for their decisions, inferences based on final data may be misleading. However, Adema (2004) concludes that using final data does not lead to more misleading policy descriptions compared to (quasi-) real time data for the euro area over the period 1994-2000.

Smant (2002) reports similar estimates for the Bundesbank's policy rule prior to 1999 and claims that the ECB set its interest rate consistent with the Bundesbank's old policy rule from mid 2000 to mid-2001. Gerlach and Schnabel (2000) estimate a hypothetical Taylor for the aggregated EMU-11 group of countries over the period 1990-1998 with similar results. In addition, they show that the use of forward looking expected inflation rather than actual inflation reduces the size of the output coefficient. The latter remains significant, though. They suggest the current output gap is an indicator of future inflation pressures. Results showing that the central bank attaches a positive weight to inflation thus do not necessarily prove that the central bank intends to stimulate output. Alternatively, the central bank may use current output development to stabilize future prices. Nevertheless, the fact that the output coefficient remains significant even with the inclusion of forward looking inflation measures suggests some output stabilization is still present. Finally, Fourçans and Vranceanu (2004) also provide evidence supporting a positive ECB response to the output gap in setting the interest rate under the Duisenberg presidency, using monthly data from January 1999 to October 2003.

Overall, the literature suggests that the ECB does indeed put a non-zero weight on real developments in setting its policy rate. The potential criticism that the ECB is a rigid inflation hawk with disregard of output losses appears to be unfounded, therefore. Note that most of the evidence only uses the first years of the ECB, say the period 1999-2001. Relatively scarce evidence is available on the second part of the five-year period.

To my knowledge, little empirical work exists that explicitly compares the Federal Reserve's and ECB's reaction functions. Begg et al. (2002) are the exception. They focus on events in 2001 and find that "*faster reductions in interest rates in the United States in 2001 reflected a more rapid deterioration in economic conditions than in Europe, not any systematic difference in how the ECB and the Fed respond to new information*". In addition, they state that "*a Fed-in-Frankfurt would have replicated ECB behaviour fairly closely*". It suggests the differences between the Fed and the ECB may reflect presentation rather than content.

2.2 *The importance of national versus aggregate developments*

Most research on the implementation and outcomes of the ECB's monetary policy uses an aggregate approach, focusing on euro area wide information variables. Such

approach is consistent with the ECB's mandate to obtain price stability in the euro area as a whole, as well as with the ECB's often-repeated position that the one-man one-vote system in the ECB Governing Council neither in theory nor in practice serves to guard national special interests.

However, it is clear that a common – one size fits all – monetary policy may not be optimal in case the participating countries (regions) do not form an optimum currency area. Then, the existence of asymmetric shocks or asymmetric transmission of common shocks due to differences in economic and financial structure may lead to temporary national inflation differentials – and output growth differentials for that matter – across countries.² Arnold and Kool (2004) provide empirical evidence on the magnitude of regional inflation differentials in the United States and their role in economic adjustment processes. Arnold and Kool (2004) observe that inflation differentials within the euro area have considerably increased since the start of EMU. From 1999 onward, each year at least 3 of the participating countries did not observe the Maastricht Treaty inflation criterion. Sapir (2003) also reports that inflation convergence and cross-country inflation correlations significantly decrease after 2000.

Berger and De Haan (2002) and Berger, De Haan and Inklaar (2003) argue that monetary policy decision-making is relatively decentralized in EMU compared to the situation in the United States (the Fed) as well as compared to the old Bundesbank system. In their view, the current voting system in the ECB makes small countries too powerful in the determination of monetary policy. Heinemann and Hüfner (2002) apply the median voter theory to extend the standard Taylor rule specification. Based on this generalized monetary policy reaction function, they find weak evidence of some regional impact on the ECB's policy choices. On the other hand, Von Hagen and Brückner (2001) use empirical Taylor rule results to argue that the ECB already in its early years mainly focused on events in Germany and France in its monetary policy choice and succeeded to overcome the “*median country's perspective on monetary policy*”.

Arnold (2004) provides a theoretical rationale to support a stronger position for the large and relatively closed economies in EMU. In his view, small and relatively open (peripheral) economies trade more with countries outside the euro area. These countries then have automatic stabilizers in the form of real exchange rate

² I refer to Alberola (2000) for a more detailed elaboration on the causes of regional inflation differentials.

changes vis-à-vis non-euro area trading partners that the larger central EMU economies lack. Consequently, ECB policy then could and should focus more on the latter group's development than on that of the former.

In summary, the evidence on the existence of growing national (regional) disparities – although temporary in character – is quite strong. The extent to which this influences ECB decision-making is inconclusive. Some research suggests ECB policy is more than proportionally directed at the core of EMU, while other research suggests undue influence of the peripheral countries.

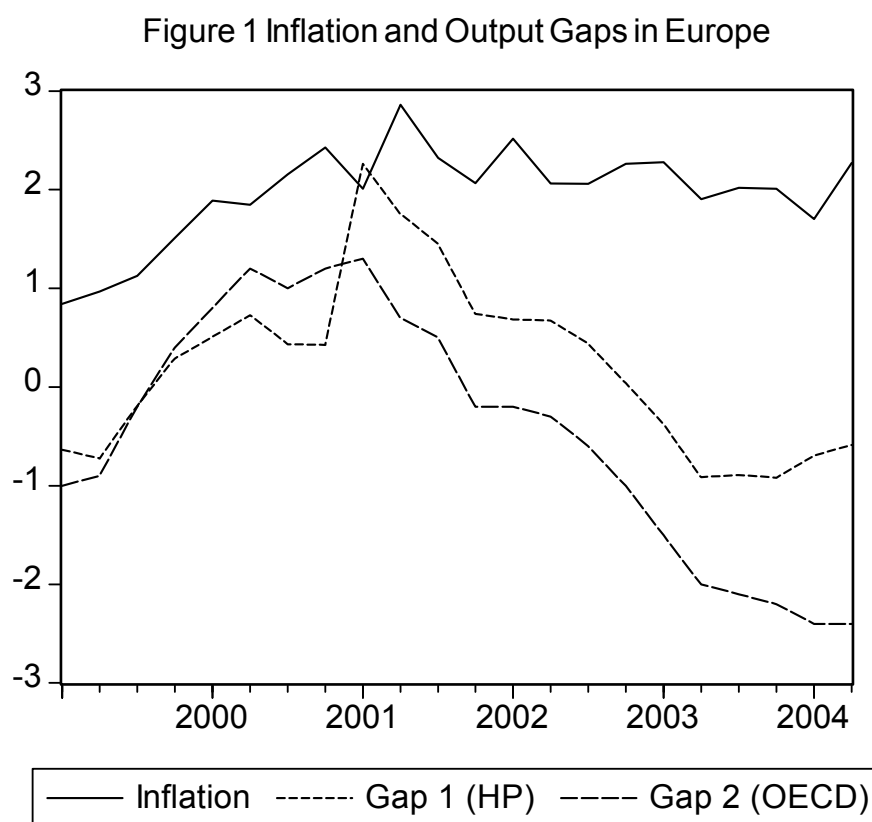
3. The Data

In the analysis, I focus on the period 1999:1-2004:2 using quarterly data for the twelve individual European countries participating in EMU, viz. Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal and Spain, for the euro area as a whole and for the United States.

All data were downloaded from DATASTREAM. For the individual European countries as well as the overall euro area harmonized CPI and real GDP were used. To construct a first measure of the output gap (Gap 1), the real GDP series were downloaded for a longer period. For euro area real GDP as well as the Spanish real GDP series, the period was 1980:1-2004:2. For all other European countries a real GDP series was available from 1973:1 onward. Subsequently, a Hodrick-Prescott filter was applied to these long real GDP series in order to extract a trend. The output gap then was defined as the difference (expressed in annual percentages) between observed real GDP and its trend value. Obviously, such derived measure of the output gap is subject to measurement error. One problem is the fact that trend estimates of output are particularly sensitive to actual observations at the first and last observations of the sample. This makes the trend estimates less reliable exactly in the period of most interest, the final years 1999-2004. In addition, possible future data revisions of the final few years of the sample compound the problem. Overall, it suggests caution is required in the interpretation of the empirical results. To check for the sensitivity of my conclusions with regard to the specification of the output gap, I also directly downloaded a quarterly output gap measure from DATASTREAM that was computed by the OECD (Gap 2). For Belgium, Luxembourg, Portugal, and Spain the OECD

does not provide quarterly output gaps, so that these four countries are excluded when the second gap measure is used.

In the analysis thus two different output gap measures are used. Inflation is computed as the year-over-year percentage price increase. The nominal interest rate is the Eueonia, measured as the three-month average of daily rates. For the United States, a similar procedure was applied to real GDP, using data from 1973:1 to 2004:2. I use the CPI excluding food and energy. The nominal interest rate is the federal funds rate measured as the three-month average of daily rates.



In figure 1, I present actual inflation performance as well as the two output gaps over the period 1999:1-2004:2 for the euro area as a whole. The figure confirms that inflation has been slightly above 2 percent per year for almost the complete period with little tendency to drop. The two output gap measures roughly display the same pattern. Actually the bilateral correlation coefficient is 0.82. Gaps are rising in 1999 and 2000 and subsequently turn negative early 2001 in line with the growing impact of the recession. However, from 2001 onward the OECD estimate of the output gap is considerably more negative than the HP extracted gap. The difference equals 1

percentage point in 2001-2002 and increases to almost 2 percentage points in 2003. In the next section, we will use these series to construct artificial interest rate paths.

4. Results

Due to the short sample, I perform no estimations but simply construct various hypothetical interest paths, based on different assumptions with respect to the specification of the Taylor rule. The advantage of using a number of different assumptions underlying the Taylor Rule is that it allows for a robustness analysis in the evaluation of actual ECB policy. Note that I abstract from the autoregressive component in a Taylor Rule; that is, I construct the long run interest rate path based on assumptions about the equilibrium real interest rate, the inflation target and the sensitivity of the interest rate to inflation deviations from target and to the output gap. Based on the graphical evidence I then discuss which Taylor rule the ECB may have followed and to what extent. A few caveats are in order. First, different methods exist to measure output gaps. As argued before, the results of the analysis may be sensitive to the definition of the output gap. Here, I use two alternative measures as a robustness check. In all cases, I use the one-quarter lagged output gap in the Taylor Rule. Second, I use one-quarter lagged annual inflation in my computations. Other studies sometimes use forward-looking expectations of future realizations as alternatives to actual (lagged) inflation. Again, the results may be dependent to some extent on the specification choices.

4.1 Aggregate Taylor Rules for the euro area

The benchmark Taylor rule in my analysis uses the original settings as defined by Taylor (1993). The equilibrium real interest rate is assumed to be 2%, the inflation target is 2% and both α and β (see equation (1)) are set equal to 0.5. Under these assumptions, a 1% rise in inflation above target is countered with a 1.5% nominal interest rate rise. The consequent real interest rate rise is assumed to stabilize inflation in the longer run. Output above target leads to contractionary monetary policy as well, to dampen real fluctuations.

Subsequently, I apply two variations. First, I raise the equilibrium real interest rate to 2.5 percent. Second, I lower the inflation target to 1.5 percent to better reflect the ECB's quantitative definition of price stability. Figure 2 gives the actual time path of

the EUEONIA together with the hypothetical interest rate paths based on the three alternative Taylor Rules described here. In figure 2A output gap measure 1 (HP) is used, while in figure 2B I use gap 2 (OECD). According to the evidence in figure 2, actual interest rates are reasonably consistent with a standard Taylor rule up till early 2001, but have been too low since 2001, regardless of the way the Taylor rule is specified. As could be expected from inspection of the relative values of the two output gaps, the appropriate interest rate according to Taylor rule computations is lower when the OECD output gap is used than for the HP output gap. In the latter case, the actual interest rate is about 1.5 to 2.0 percentage points lower than predicted by these three rules since 2001, while for the former case (the OECD gap measure) actual interest rates have been about one percentage point too low with the interest rate gap declining further in 2004. Note that both increasing the equilibrium real interest rate and lowering the value for the ECB's inflation target below 1.5 percent increase the gap between actual and computed interest rates. Only a very low equilibrium real interest rate would be able to solve the issue.

A second way to investigate the robustness of the results is to vary the value of coefficients α and β from equation (1). In figure 3, I present evidence on the issue for both output gaps. Again, the actual interest rate is shown together with the time paths predicted by three different Taylor Rules. In all rules the equilibrium real interest rate is assumed to equal 2 percent, while the inflation target is set at 1.5 percent. Given the mandate of the ECB to make price stability its first objective, the first alternative reaction function considered increases the weight on inflation (α) to one and reduces the weight of the output gap (β) to zero. This is a pure inflation rule. In the second and third rule, I assume the output coefficient (β) to equal 1 and 2 respectively. Clearly, the puzzle remains in the sense that no individual Taylor rule specification is able to roughly replicate actual ECB interest rate policy over the full period. Obviously, pure inflation rules exacerbate the problem as the divergence between actual and predicted interest rates increases. Since inflation has persistently remained above 2 percent, a strict inflation rule would require nominal interest rates of at least 4 percent over the whole period.

Figure 2A Taylor Rule Interest Rates
(gap 1 HP)

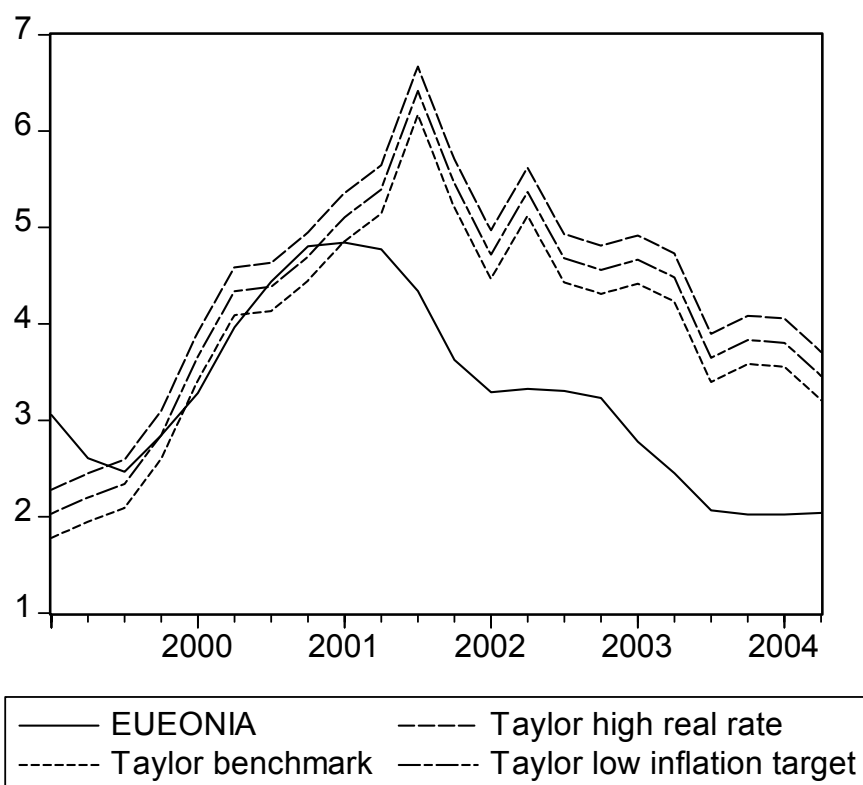


Figure 2B Taylor Rule Interest Rates
(gap 2 OECD)

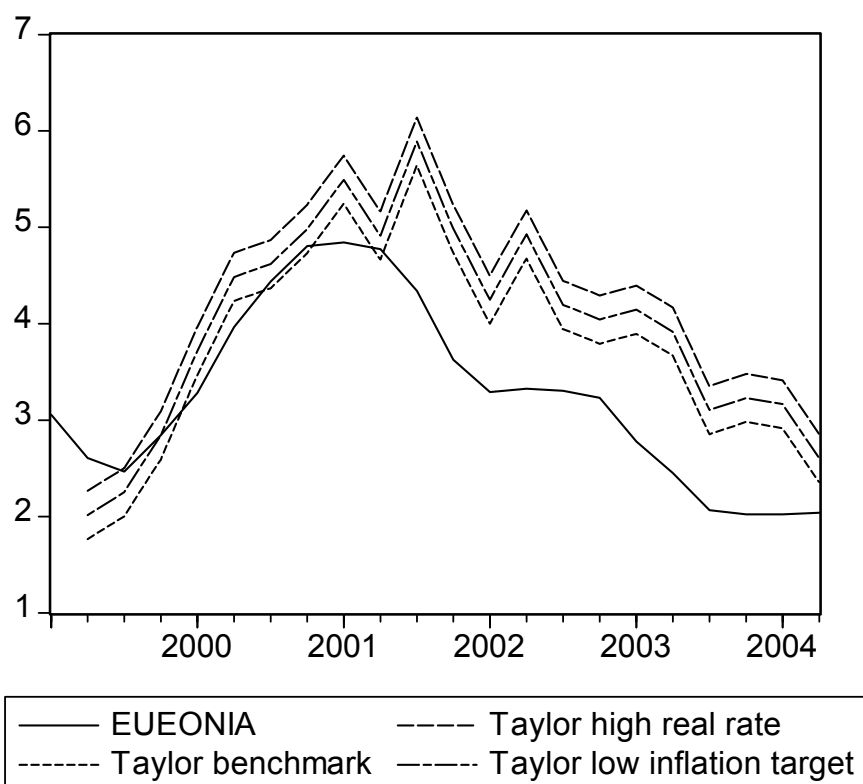


Figure 3A More Evidence on Euro Area Taylor Rules
(gap 1 HP)

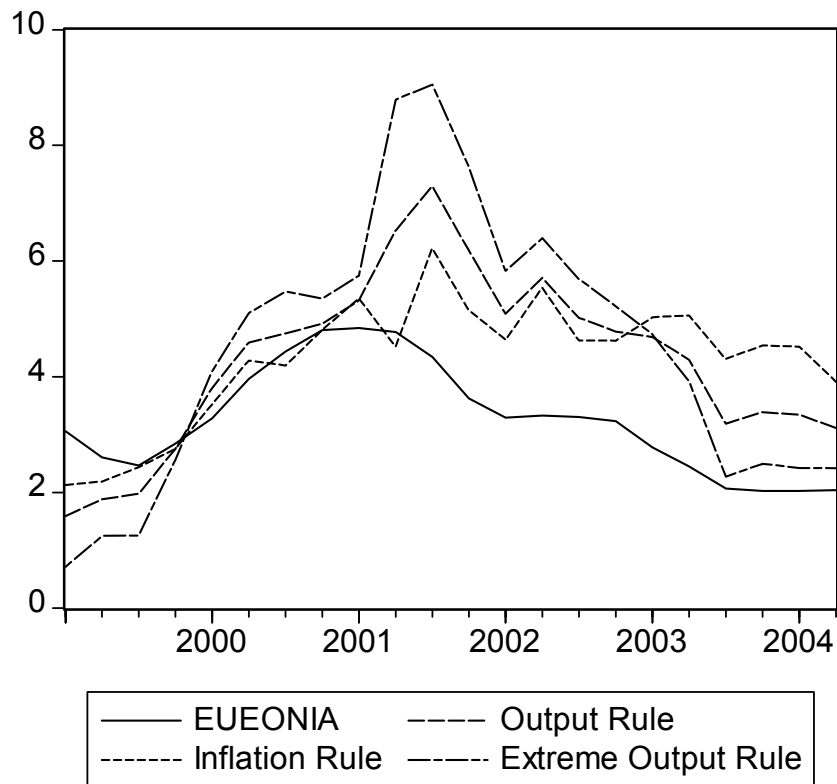
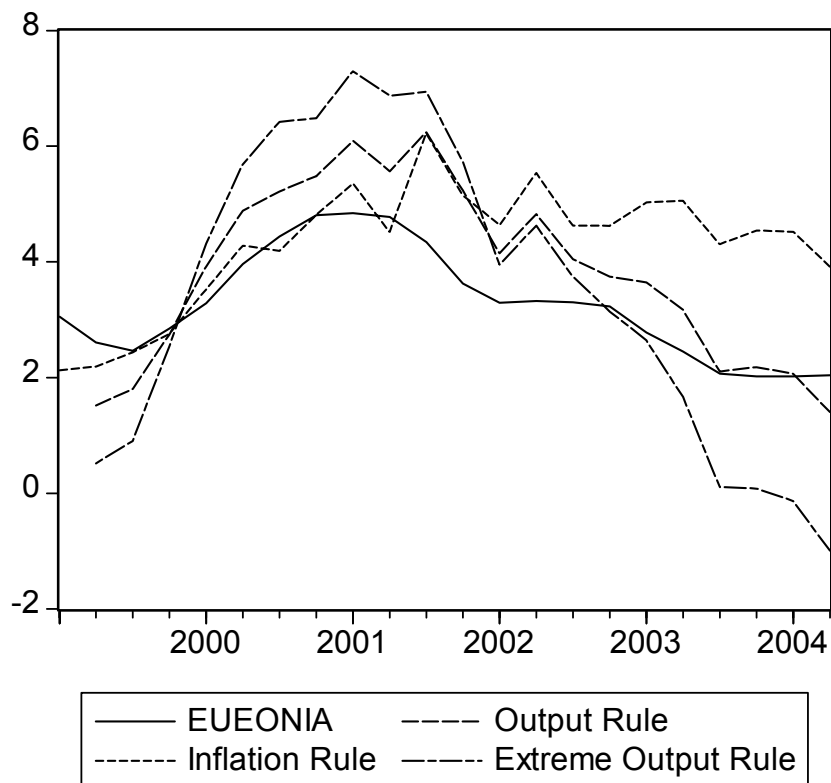


Figure 3B More Evidence on Euro Area Taylor Rules
(gap 2 OECD)



Here, I need to point at the use of actual (lagged) inflation rather than more appropriate forward-looking inflation forecasts in the Taylor rule here. One might argue that the ECB has consistently been too optimistic about the future decline of inflation below 2 percent and has been willing to lower interest rates based on that belief. To the extent that this has played a role in actual policy making, it may partly explain the observed interest rate gaps in figures 2 and 3. However, it simultaneously throws doubt on the ECB's ability to predict future inflation developments. Consistent overshooting of its own forecasts will at some point have negative repercussions on the ECB's reputation and credibility.

The evidence in figures 3A and 3B for higher – or even extreme – weights on the output gap is less uniform, though no rule is doing a good job for the whole period. Generally speaking, raising the output gap coefficient to higher values reduces the difference between the predicted and actual interest rates in later part of the sample (2003 and early 2004) but does so at the expense of even larger discrepancies between the two in the period 2000-2002. When using output gap 1 (figure 3A), predicted interest rates remain above actual rates even when the output coefficient is raised to a level of 2. It is possible to align predicted and actual interest rates for the last few years when output gap 2 is used and the output gap coefficient is equal to unity. Note that such high policy responsiveness to output developments is vehemently denied by the ECB.

Overall, ECB policy appears to have been overly expansionary since early 2001.³ This conclusion is based on an analysis that concentrates on aggregate euro area developments. These appear to be not very helpful in explaining ECB interest rate policy.

Therefore, I now turn to the possible influence of regional factors. In this respect, it is interesting to refer to earlier literature evaluating ECB policy in its first two years. According to Von Hagen and Brückner (2001) and Alesina et al. (2001) ECB policy was too expansionary in mid-1999 and 2000 as well.⁴ Both sources have a hard time explaining this apparent looseness. Both come up with evidence that actual

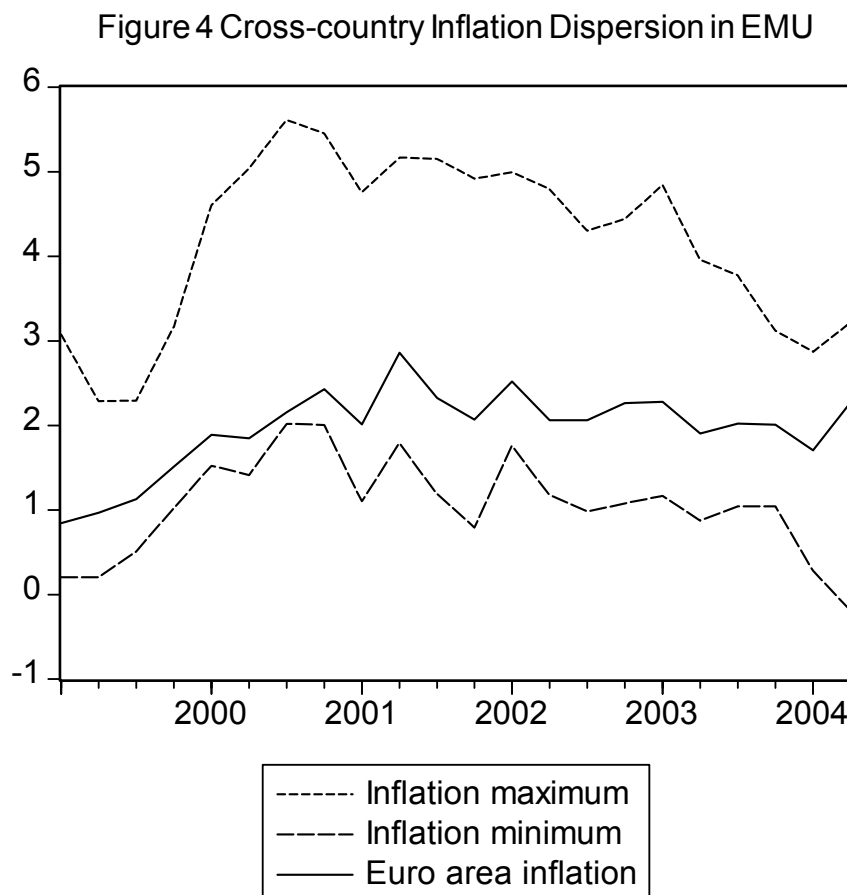
³ Growth rates of the M3 monetary aggregate in excess of its reference value support this conclusion as well.

⁴ The evidence in figure 2 shows that this verdict depends on the assumed level of the equilibrium real interest rate and the inflation target. Alesina et al. (2001) indeed assume the real rate to equal 2.5%. Figure 2 shows that my evidence then supports their conclusion.

interest rates are much more in line with standard Taylor Rule behavior when only inflation and output developments in Germany and France are taken into account.

4.2 *The Role of Regional Factors*

As explained in section 2, asymmetric shocks as well as differences in economic and financial structures may cause transitory divergences across countries in EMU. Obviously, automatic stabilizers are in place to ensure long-run convergence. Arnold and Kool (2004) show for states and regions in the United States that real exchange rates play an important role in the equilibrating process. To give an indication of the magnitude of divergences in EMU, figures 4 and 5 display the minimum and maximum inflation rates and output gaps across countries for each quarter from 1999:1 to 2004:2. As a benchmark, the aggregate euro area measure is given as well.⁵



⁵ Note that individual and aggregate output gaps by construction are not linearly additive, so that the aggregate gap occasionally can fall outside of the individual gap boundaries.

Figure 5A Cross Country Output Gap Dispersion in EMU
(gap 1 HP)

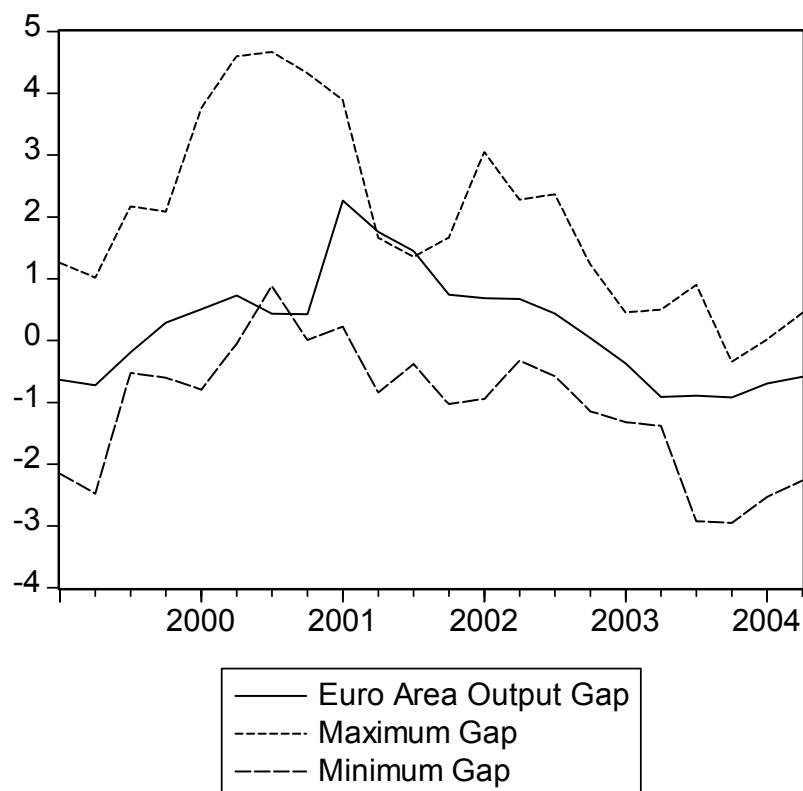
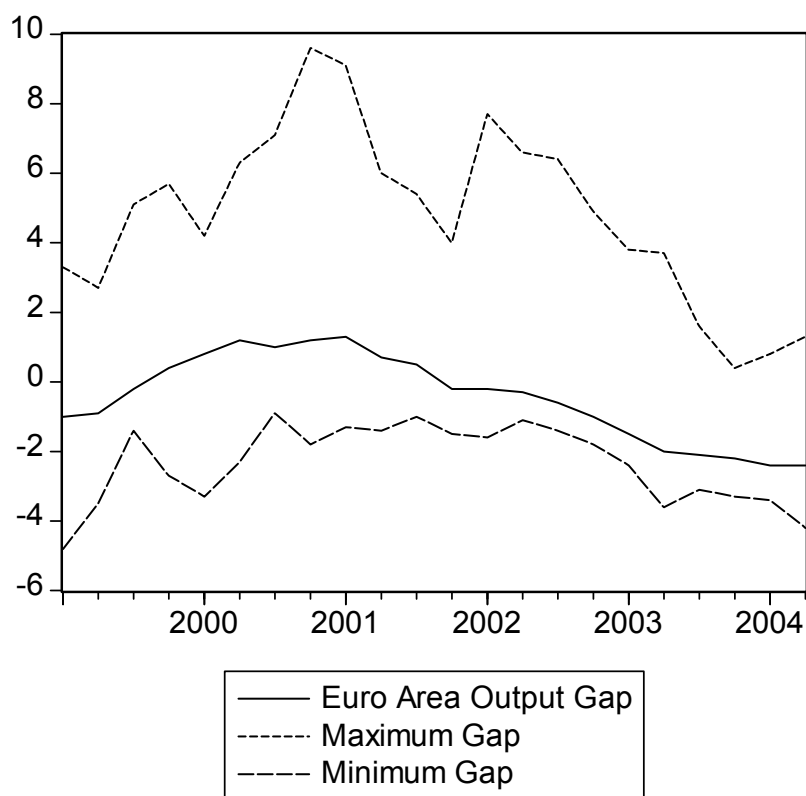


Figure 5B Cross Country Output Gap Dispersion in EMU
(gap 2 OECD)



Clearly, both inflation and output gap dispersion can be of considerable magnitude at any point in time. On average, the difference between the highest and lowest value is about 3 percentage points for the inflation gap and output gap measure 1. Output gap measure 2 from the OECD exhibits even more dispersion. Sometimes, the difference between the highest and lowest output gap is close to ten percentage points. For inflation, dispersion actually increases after 1999.

Figures 4 and 5 strongly suggest that a one-size-fits-all policy is very unlikely. Actually, for countries with inflation and growth very different from the euro area average, the common monetary policy may work procyclically rather than stabilizing in the short run. Arnold and Kool (2004) show for the United States that states with relatively high inflation and growth get a too low real interest rate due to the common interest rate policy which in turn further stimulates inflation and growth. A stabilizing real exchange rate appreciation only becomes dominant after about 2 years. Possibly, the common monetary policy thus lengthens individual country's business cycles. To some extent, this depends on inflation expectations in individual countries. If the citizens of a high-inflation country – say Ireland – expect Irish inflation to equal EMU inflation in the long-term and consequently base their wage claims and financial contracts on the low EMU expected inflation rate, the (expected) real interest rate in Ireland may not decrease. Then the procyclical effect may be limited or even absent. The more national experience and indicators play a role in the formation of inflation expectations, the more of a problem the common policy is.

A natural consequence of the observed difference in inflation and output developments across EMU countries is a difference in preferred monetary policy. Put differently, countries using the same Taylor Rule for their own economies may arrive at quite different optimal interest rate levels. Despite all this, national central bank governors sitting on Governing Council of the ECB in theory are supposed not to look at their own country's interest but at the common EMU interest. In section 2, already some literature was referred to that questioned this assumption.

Figure 6A Taylor Rules: Low Growth, Low Inflation Countries
(gap 1 HP)

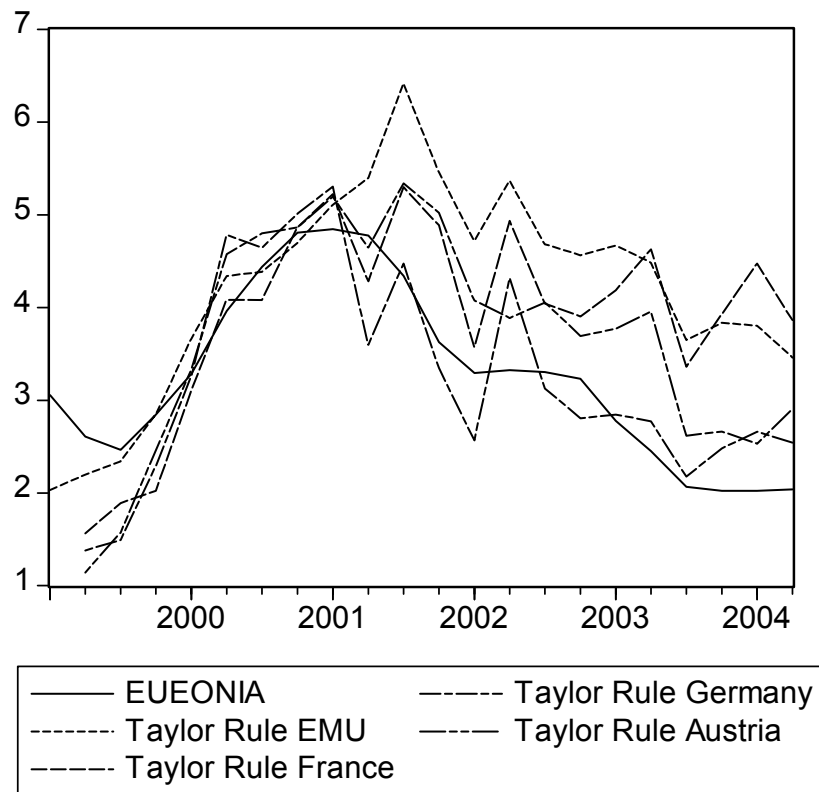
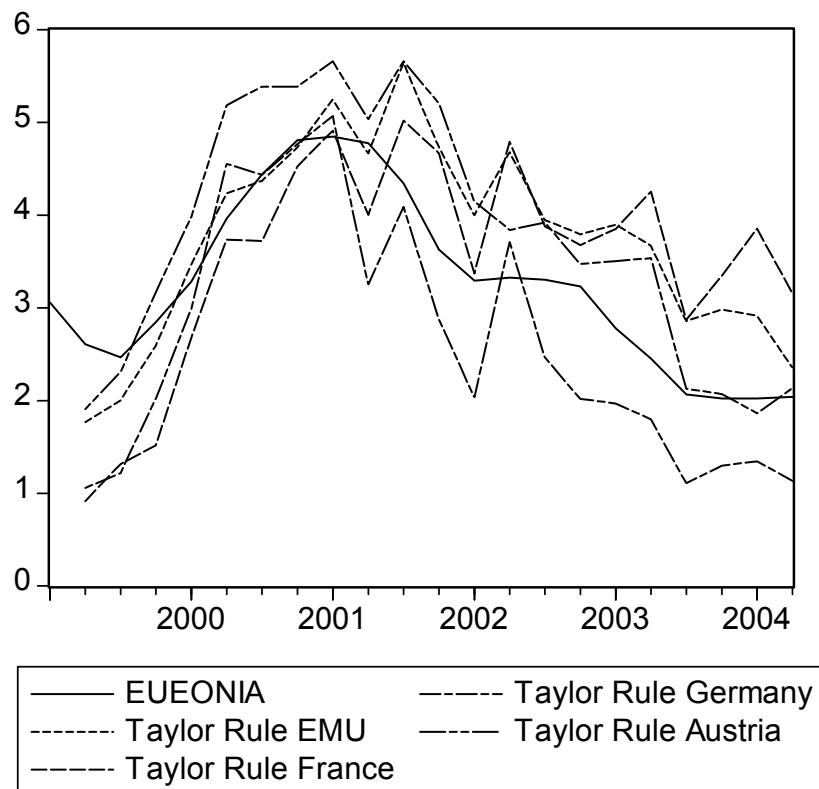


Figure 6B Taylor Rules: Low Growth, Low Inflation Countries
(gap 2 OECD)



In figure 6, the optimal Taylor Rules based on individual German, French and Austrian economic conditions are displayed together with the preferred overall EMU Taylor Rule (which is identical to the low inflation target rule from figure 2) and the actual EUEONIA. The choice of countries is not random. The three countries typically had low growth and low inflation over (most of) the period and – according to the Taylor Rule approach – should have been in favour of low interest rates most across all EMU members. Naturally, they all have preferred interest rates below the optimal EMU rate. More interesting is the comparison between the actual EUEONIA and each country's preferred interest rate. Here, I again distinguish between the two alternative ways to measure the output gap. Although the broad message is qualitatively similar, some difference exists. From figure 6A it is clear that using the HP-output gap, France and Austria would have preferred higher interest rates than the actual rate (EUEONIA) after 2001.⁶ German preferences are structurally below the French and Austrian ones since 2001. Only for Germany, the actually observed interest rate almost perfectly matches the preferred one over the whole sample. In figure 6B, the OECD output gap is used. France and Austria still would have preferred higher interest rates than the actual rate after 2001, though the gap is smaller and, in the case of Austria, disappears after mid-2003. Germany's preferences actually are for a lower interest rate than the actual one from mid-2002 onward.

Figure 7 provides evidence on three countries on the other extreme, Ireland, Italy and the Netherlands. These were (roughly speaking) high inflation, high growth countries over most of the period. Consequently, they needed a considerably more contractionary monetary policy. Their preferred interest rate is way higher than the EMU optimum and even more so than the actual EUEONIA. Unreported results for Greece, Spain and Portugal show that these countries fall in the same category and have similar interest rate preferences. Belgium, Luxembourg and Finland actually did prefer higher interest rates than the EMU optimum up till 2001 – which put them in the same group as Ireland, Italy, Spain, Portugal, Greece and the Netherlands – but then switched to the other group wanting lower interest rates subsequently.

⁶ Interest rate preferences up till 2001 were almost perfectly aligned across these three countries.

Fig 7A Taylor Rules: High Growth, High Inflation Countries
(gap 1 HP)

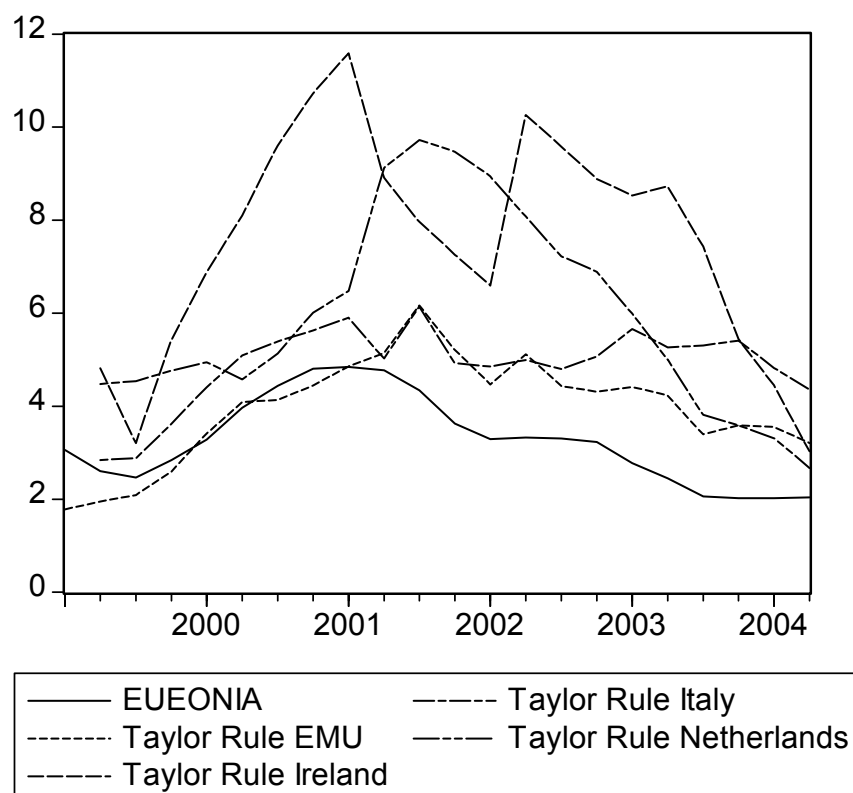
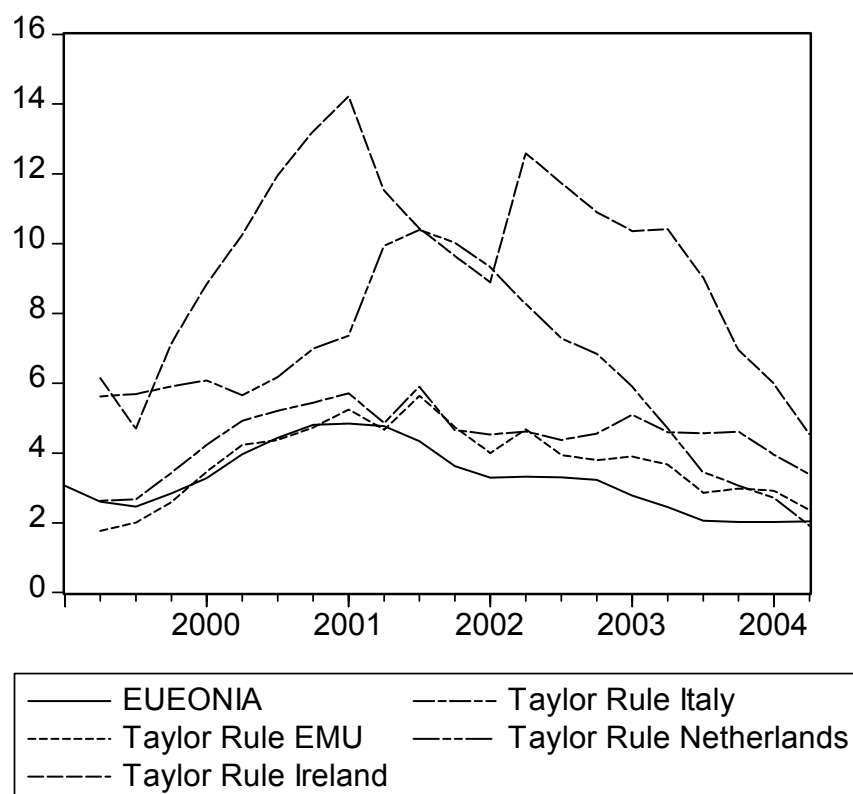


Fig 7B Taylor Rules: High Growth, High Inflation Countries
(gap 2 OECD)



Overall, the evidence from figures 6 and 7 does suggest that in the period 1999-2004 the ECB did not focus on euro area wide developments in setting interest rates. Up till 2001, the actual interest rate approximately matches the rate Germany, France and Austria wanted. This conclusion is not dependent on the actual output gap measure used and supports the findings by Von Hagen and Brückner (2001) and Alesina et al. (2001) who also claimed that ECB policy in the early years was (mostly) driven by common German-French preferences.

Especially since 2001, ECB interest rates have been too low from the perspective of almost all euro area countries. According to figure 6A, only for Germany the actual EUEONIA has been at the right level. It suggests that Germany is in the driving seat altogether. Casual inspection of figure 6B indicates that the actual interest rate has been set as the average of French and German preferences. Claims that small peripheral countries have a more than proportional say in ECB policymaking through the voting schedule, are clearly rejected here, regardless of the output gap measure used.

As shown by figures 6A and 6B, interest preferences of Germany and France start to diverge to some extent after 2001. Theoretically, that would allow an analysis of the relative weights of these countries in actual interest rate determination. However, casual inspection of these figures shows that the result in this respect is ambiguous due to the uncertainty about the correct output gap measure. To shed some light on the relative weight of German and French preferences in actual interest rate setting, I present some simple regression analysis in table 1 to address the weights of German and French preferences in the ECB's interest rate setting. The following regression has been performed:

$$(3) \quad EUEONIA_t = \alpha + \beta TR_GE_t + (1-\beta)TR_FR_t + u_t$$

where TR_GE and TR_FR are the preferred interest rates for Germany and France respectively as computed by a standard Taylor Rule. In the regressions I alternately use the Taylor Rule computed from the HP output gap and from the OECD output gap. Also, for each case I also run a regression where the intercept α is restricted to be zero.

Table 1 Evidence on German Dominance in ECB Interest Rate Setting

	HP Output Gap		OECD Output Gap	
α	0.09 (0.19)	-	0.45 (0.16)	-
β	1.05 (0.19)	1.01 (0.13)	0.80 (0.12)	0.59 (0.10)
R^2 adj	0.55	0.57	0.64	0.52

From the table we see that regardless of the output gap measure used, the German weight exceeds the French weight. Using the HP output gap, Germany is the only country that matters. French preferences literally get a weight of zero. Using the OECD output gap reduces the German weight and increases the French one when looking at the point estimates. However, even then, the hypothesis that β equals one (and the French weight is zero) cannot be rejected when an intercept is included in the regression. Overall, our results suggest that Germany still is the dominant party in the euro area. In that respect, apparently little has changed since the demise of the ERM.

4.3 *The Fed versus the ECB*

Finally, we turn to the comparison between Fed and ECB. In figure 8 and 9, I present the observed output and inflation developments in the United States and the associated actual and preferred (Taylor Rule) interest rates respectively. In the Taylor Rule, the target is taken to be 2 rather than 1.5 percent to better reflect US attitudes in this respect. From figure 8, we see that the OECD output gap indicates a somewhat deeper recession than the HP output gap from 2001 onwards, and a somewhat higher boom before. This is comparable to figure 1 for the euro area. It is clear that the output gap in the US falls earlier, faster and deeper than in Europe in the period 2000-2001. As a result, the US interest rate reacts before the European rate, see Begg et al. (2002) for a more detailed account of this episode. Apart from that, the behaviour of the federal funds rate compared to the Taylor rule rate for the United States since 2001 according to figure 9 is surprisingly similar to that of the EUEONIA rate compared to the EMU Taylor rule rate as presented in figure 2.

At first sight, therefore, the Fed and the ECB appear to have reduced nominal interest rates significantly below the levels suggested by a standard Taylor rule in a similar way. It is true that the gap between the rates is somewhat higher in the US

than in Europe, about 2 percentage points versus 1.5 percentage points respectively. That is, the Fed may indeed have been a little but more aggressive than the ECB. Similarly, ex post real interest rates in the US have been around -0.5 percent in the US since mid-2001, whereas in the euro area they have been marginally positive until late 2003.

However, taking into account the fact that the ECB policy actually has been primarily geared towards the interest rate preferences of Germany and to a lesser extent France, the interpretation of our findings changes. Based on German (and French) preferences, the actual euro interest rate approximately matches the predictions of the Taylor Rule. In that case, we need to conclude that indeed the Fed has been much more aggressive in fighting the real economic downturn than the ECB.

In summary, two alternative explanations are feasible which cannot be distinguished on the basis of the current data. Either the ECB has been concerned with euro area wide aggregates in setting policy. In that case, the actual interest rate has been set much too low (as compared to a benchmark Taylor Rule). Policy then is comparable in content to that of the Fed.⁷ Alternatively, the ECB may have focused on the economic situation in Germany (and France) and implicitly have reduced the weight of the smaller peripheral countries. This would satisfactorily explain the actual interest rate setting. It would simultaneously suggest that indeed the Fed has been much more willing to reduce interest rates to fight unemployment and low growth than the ECB.

⁷ The way their respective policies have been sold to the public of course have greatly differed. While the Fed (Greenspan) has had a tendency to move interest rates in small steps pretty frequently with high visibility and the pretence of being able to fine-tune the economy, the ECB has changed rates less often with larger steps and with persistent focus on its task to maintain price stability.

Fig 8 Inflation and Output Gaps in the US

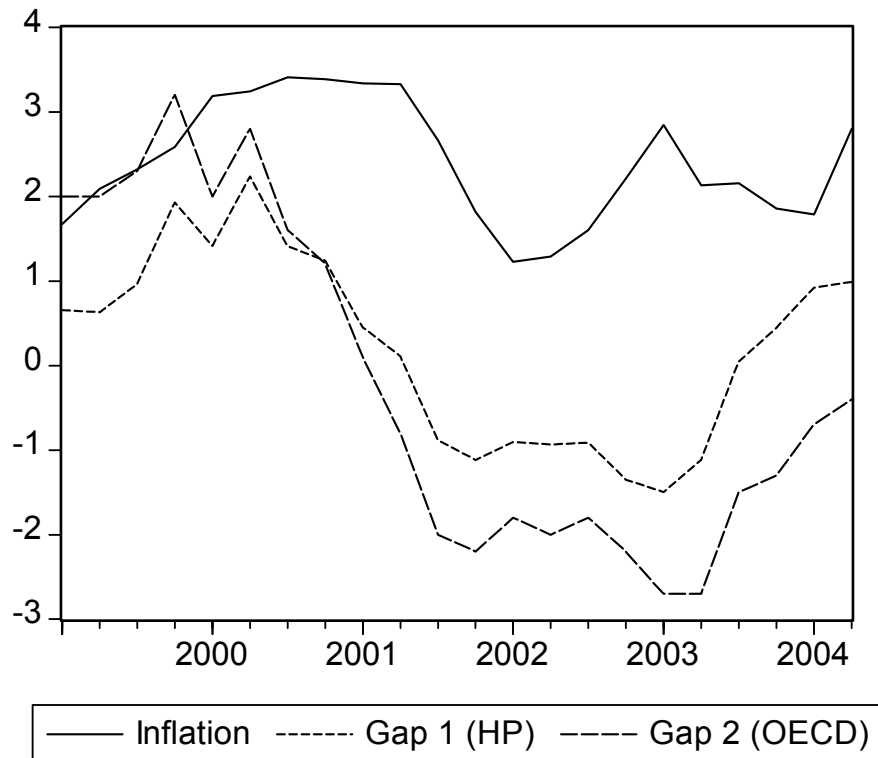
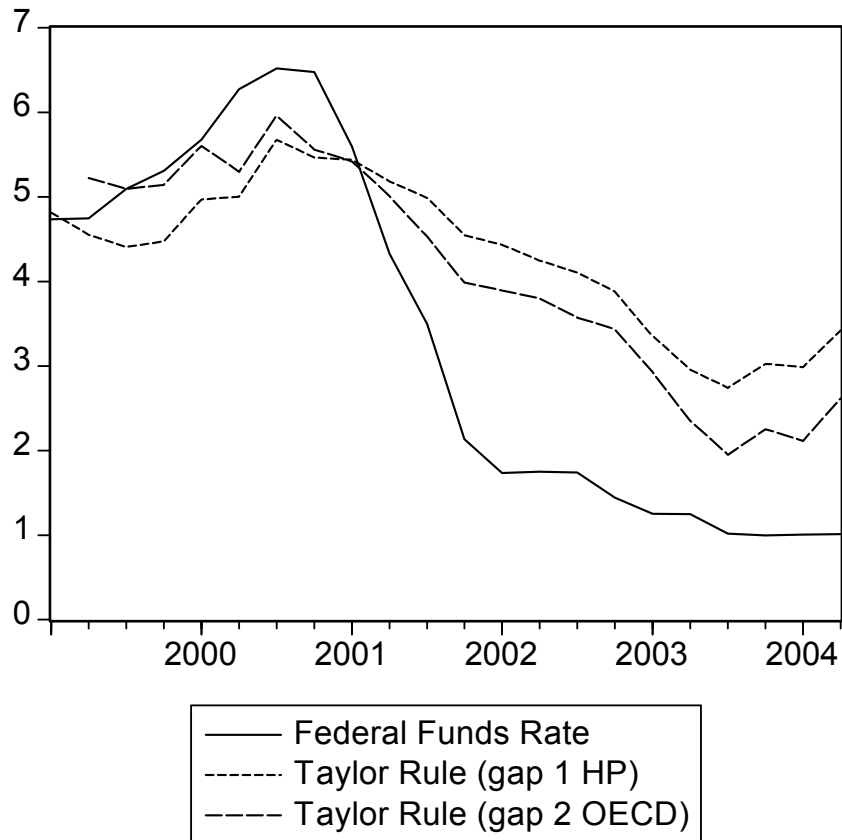


Fig 9 Taylor Rule Interest Rates US



5. Conclusions

In this paper I have analyzed ECB interest rate setting in the first 5 years of its existence. Contrary to popular belief and continuous ECB statements, the ECB has not acted as an obsessed inflation fighter. By any measure, output considerations do play a significant role in the ECB's policy rule. In this respect, my analysis supports earlier work on this issue.

In terms of actual policy, if anything, the ECB has been on the loose side, especially since 2001 when taking economic development in the euro area as a whole as the starting point. A wide range of Taylor rule specifications is unable to explain the low interest rates the past few years. Certainly, the euro area as a whole needed a higher rate according to conventional wisdom. Actual interest rates have been consistent with German (and to a lesser extent French) preferences, however. It suggests the ECB puts a dominant weight on German economic developments. Claims that small peripheral countries get their way within EMU is clearly rejected by the data. If anything, their interests receive too low weight rather than too high. When we assume the ECB does primarily look at the core of the euro area in setting its interest rate, the actual interest rate in fact can be roughly replicated using a standard Taylor rule.

Finally, the answer to the question whether the Fed and the ECB behave more or less similarly in the face of economic developments strongly depends on the view one takes with regard to the ECB's focus. In case the ECB actually focuses on euro area wide developments, its looseness is comparable to that of the Fed. In case ECB policy actually is geared towards Germany's preferences – or perhaps the average German-French preferences -- the ECB has been much closer to a standard Taylor-rule interest rate setting than the Fed. In that scenario, the Fed indeed has been much more aggressive in the lowering of its interest rates in the face of adverse economic shocks.

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