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Non-technical Summary

There is an ongoing discussion about monetary policy in a monetary union when the countries forming this union are heterogenous with respect to their economic development. Because of the heterogeneity, individual countries might prefer a monetary policy that is different from the common monetary policy. The Governing Council, which is the decision-making body of the European Central Bank (ECB), consists of the national central banks governors. Because the representatives of national central banks might be looking at the economic situations in their countries of origin when taking their decision, country-specific factors may influence interest rate decisions of the ECB. In contrast to this view, however, the Statute of the ECB demands that monetary policy decisions are made only in view of the situation of the euro area as a whole.

The basic question concerning the individual decision-making behaviour of the members of the ECB Governing Council is how much the economic situation of the member states influences the interest rate decision of the Council. To investigate this question, we estimate Taylor-type reaction functions for the period from 1999 to 2005 and include country-specific variables of the euro zone member states. These country specific variables include inflation rates and economic sentiment indicators. Additionally, we construct time series containing the minimum and maximum values of inflation and economic sentiment in the euro area to capture extreme economic developments.

We do not detect a dominant influence of specific countries of the monetary union. Moreover, the results support the view that the decisions of the ECB are taken with respect to the developments in the whole euro area, and not with respect to selected countries. However, an influence can be detected for the dispersion of the developments measured by the maximum inflation and minimum economic sentiment values.

The Impact of Country-Specific Economic Developments on ECB Decisions

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June 2006

Abstract

The discussion about country-specific influence on the interest rate decisions of the European Central Bank does not cease. To investigate the possibility of regional influence on the determination of the policy rate, we estimate Taylor-type reaction functions for the period from 1999 to 2005 and include country-specific variables of the euro zone member states. We do not find convincing evidence that country-specific economic developments influence the decisions of the ECB Governing Council. However, the maximum inflation rate and the minimum economic sentiment of the euro area seem to have an effect on the decisions.

JEL Classification: E58, E52
Key Words: Taylor rule, ECB, monetary policy

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1 Introduction

Analysis of the monetary policy framework of the European Central Bank (ECB) often returns to the question regarding whether the differences in the economic situations of the European Monetary Union (EMU) members have significant effects on the ECB monetary policy decisions. The ECB conducts a uniform monetary policy for heterogenous economic regions. However, this is not a unique problem of the ECB. National central banks also have to deal with differing economic developments in the regions within their countries. Furthermore, in national central banks like the Fed or formerly the Bundesbank, the members of the decision-making body also originate from different regions of the country and can be seen as their representatives. The main difference between national central banks and the ECB is that the regions of the EMU are nation-states and, therefore, have a political status that is different from that of regions within a single country. This strengthens the opinion that no single country should have enough influence on monetary policy decisions in the EMU to be able to affect the votes of the Governing Council in its favour.

With the independence of the ECB, it should be guaranteed that the members of the Council only take the EMU average into account when they determine the policy rate. However, as discussions in the literature show, this fact is not necessarily trusted, e.g. Berger and de Haan (2002), Dixit (2000), or De Grauwe et al. (1999). There is even indication that regional differences indeed influence the interest decisions of the ECB (Heinemann and Hüfner 2004). The suspicion of prevailing national interests in the voting behaviour of the Council is reinforced by the insufficient transparency of the decision-making process. First, the ECB refuses to publish the minutes of the meetings leading to the interest rate decisions and does not provide the voting record even after a considerable delay, although there are some good reasons for a certain amount of secrecy. One is to protect the governors of the national central banks from political influence. If the voting behaviour could be addressed, the governors may become vulnerable to political demands from their countries of origin. Moreover, this could lead to anticipatory obedience of the governors. Second, the treaty establishes that the decisions of the Council should be taken with simple majority, but with no publication of the voting behaviour it is also possible that a decision is also reached by consensus. Even if one accepts the need for intransparency to protect the governors from political influence, there is no opportunity to control coalition formation or other concessions in the decision process.

The possibility of the representation of national interests in the Governing Council would not be a subject if the economic situations and economic prospects of the member states would be more or less similar. This would most probably generate concurrent interest rate decisions of the governors or, at least, very similar ones. However, economic development differs across present and potential EMU countries. On the one hand, the ECB continuously stresses the point that the differences in inflation rates and in the developments of other economic variables do not play a role in interest rate decisions. On the other hand, the differences between the economic and political weights of the national central bank governors in the ECB Council are extensively discussed, especially with respect to the reform of ECB decision-making with the enlargement of the European Monetary Union (see e.g. Bofinger 2003, de la Dehesa 2003, Gros 2003, Horn 2003, Wyplosz 2003)).

With the future enlargement of the EMU, the economic heterogeneity of the currency area will increase. Admittedly, the ten future EMU members are small with respect to their economic weight (6 percent of the euro area's GDP) but will provide 25 percent of the population. Even with the rotation scheme, which will be introduced to change the process of decision-making of the Governing Council, the political weight of the potential member states will exceed their economic weight by far (Berger, de Haan, and Inklaar 2003). Therefore, the possibility of regional influence on monetary decision-making is even more relevant than in the EMU with twelve member states. In addition, the economic development of the prospective EMU members differs systematically from the situation in the new member states. All countries are transition economies undergoing a convergence process to reach the welfare level of the EMU-12. Because these countries do not immediately accede to the monetary union, their economies should be more similar when the time comes to join the present members. The similarity in economic development is assessed for Slovenia that joins the EMU in January 2007. However, even if the accession will not take place until 2010, the convergence process will not be concluded, and considerably more time will be needed to reach the welfare level of the poorest OECD countries (Fischer et al. 1998a; Fischer et al. 1998b). New member states will perhaps still need a more expansive monetary policy at that time than old member states, but will not have the necessary influence because of their low economic weight in the determination of EMU variables. This could lead to a biased decision-making process, performed by the national central bank governors to even out this "disadvantage". Moreover, the potential members do not have a long history of independent central banking, which in turn could influence the behaviour of the decision-makers in two opposite ways. First, the new ECB

central bankers could behave especially tough to prove their ability of conservative central banking. Second, the new central bankers could pursue a loose monetary policy because of a potential pattern of behaviour to support fiscal policy.

The basic question concerning the individual decision-making behaviour of the members of the Governing Council of the ECB is described as how much the economic situation of the member states influences the interest rate decision of the Council. This question arises whether we look at the present or the future enlarged EMU. We address this question by including country-specific variables from the twelve present EMU members into an ordered probit estimation of a Taylor-type rule for the ECB from January 1999 to December 2005. These country-specific variables include inflation rates and economic sentiment indicators. Naturally, we cannot analyse the influence of future EMU members in this way. But, if we find a systematic regional influence, we can compare this situation with the likely future situation in the EMU and draw careful conclusions with respect to the influence of different regional economic developments in ECB decision-making.

We do not find a convincing country-specific influence on the interest rate decisions of the ECB. However, the extreme economic developments in the euro area, measured with the minimum economic sentiment indicator as well as the maximum inflation rate, compared to the euro area average seem to influence the monetary policy decisions. Therefore, it does not seem very likely that individual future EMU member states will contort the interest rate decisions of the ECB. However, this does not preclude that the new member states as a whole would influence the decisions if these countries provide the minimum and maximum inflation rates and economic sentiment of the then enlarged euro area.

In the following section, we resume the basic story of potential regional influences on the interest rate decision of the ECB Governing Council. These reflections are translated into an extension of the Taylor rule. After introducing the estimation approach and describing the data used, we show the estimation results. These results are used to make predictions about the influence of the potential EMU members in the conclusion.

2 Basic Story

The regional differences of the euro area have attracted a lot of attention with regard to monetary policy. The ECB's main goal is to achieve price level stability for the euro area as a whole (Treaty establishing the European Community, Article 105 (1)). In doing so,

the central bank is faced with different economic situations in the member states of the monetary union. This heterogeneity will increase if the potential members states join the monetary union, even if a certain degree of convergence will be reached when the time comes to join the EMU (see Figure 1). As the figure shows, the potential EMU members have a high real growth rate as well as a high inflation rate, whereas the present EMU members have rather low values for inflation and growth.

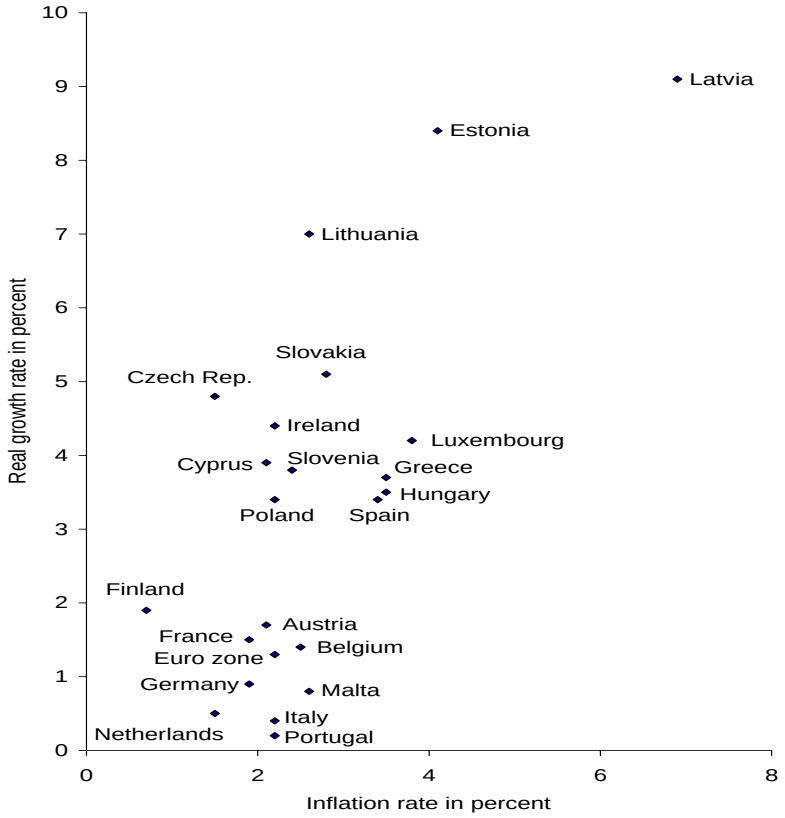

Figure 1: Scatter plot for inflation and GDP growth in 2005. Source: Eurostat Structural Indicators: growth rate of GDP at constant prices (base year 1996) - percentage change on previous year and the annual average rate of change in Harmonized Indices of Consumer Prices.

One can argue that this situation is not different from the situation of a national central bank facing different regional developments. However, now the regions are bigger and tend to be easily identifiable because of their characteristic as nation-states. The more

divergent the economic development in these countries, the more difficult it is to find a compromise in decisions about the interest rate, provided that regional development matters. The task will not get easier when the enlargement of the EMU takes place, even if a new voting scheme is introduced. Although the number of votes is restricted, every governor will be allowed to contribute to the discussion to prepare the interest rate decision. What adds to the difficulties is that the convergence process in the EMU has come to a halt, and the divergences seem to prevail, as research indicates (e.g. Michaelis and Minich 2004, Duarte 2003 or Honohan and Lane 2003).

On one hand, the economic development in the member countries is rather different, while on the other hand, the ECB always stresses the point that interest rate decisions are taken according to an area-wide view on economic development:

> "The ECB exclusively takes a euro area-wide perspective. So, in the preparation of its decisions, it takes a euro area-wide perspective and there is no question that monetary policy will be decided along considerations of national or regional interests, [...]. Monetary policy is one and indivisible for the euro area as a whole. There does not exist any regional monetary policy." (Willem F. Duisenberg, Frankfurt am Main, 1 March 2001)

If this statement is valid, there should be no detectable country-specific influence on the interest rate decisions of the Governing Council. Furthermore, one could also expect that the addition of more governors on the Council would not significantly change its decision-making behaviour.

Aside from the influence of country-specific economic developments, there are presumably differences in the reaction of the Council members regarding the relevant variables. The member countries of the monetary union follow a different tradition when it comes to monetary policy making. There are countries like Germany, which have played a major role in the European monetary policy until the formation of the monetary union. Countries like the Netherlands or Austria followed the German interest decisions. But there are even more fundamental differences, such as the status of the central bank. While the German Bundesbank was very independent in its interest rate decisions, France and the UK both had more dependent central banks. It was not until the introduction of the monetary union, that France made its central bank independent and the Bank of England was made operationally independent in 1997. Besides independence, the question of centralisation of power may also play an important role in EMU monetary policy

(de Jong 2004). With the introduction of the EMU and the necessity of independent national central banks, it is assumed that the differences in monetary policy making will disappear. But change of customs is a lengthy process that can not be completed within the six years of EMU existence. Additionally, new member states will join the union, introducing new traditions of monetary policy-making.

It does not seem possible to disentangle both effects, which are the influence of regional developments and the difference in the reaction of the Council members to the relevant economic developments. One possibility to investigate the influence of national divergence on interest rate policy of the ECB is to analyse different forms of the policy reaction function, taking into account aggregate euro zone data, national data represented by the median, and a combination of both as done by Heinemann and Hüfner (2004). They come to the conclusion that the ECB Council members take the divergent economic situation in Europe into account, although more pronounced for inflation than for output. Carstensen (2006) also employs the median as well as the average of German, French and Italian variables to detect country-specific influences. As his results show, there might be country-specific influences present in the ECB decisions. Ruth (2004) also looks for country-specific influences on the basis of a panel estimation. The forecasting properties of the ECB reaction function improves if the heterogeneity of the countries before the monetary union are taken into consideration. Berger and de Haan (2002) investigate the behaviour of the Deutsche Bundesbank as the role model for the ECB and discover that the economic situations in the different states influence voting behaviour. The application to the ECB, given the different economic performances and preferences, leads to the view that there is a risk that national divergences predominate EMU-wide considerations. The authors employ interest rate behaviour with respect to inflation and real GDP growth differences between regional inflation and inflation average and a latent variable approach to estimate the conservativeness of the ECB central bankers.

In the following, we rely on the approach of estimating monetary reaction functions and influences of country-specific conditions on the interest rate decisions in the Governing Council of the ECB, using Taylor-type rules. But instead of relying our analysis on an assumption regarding voting behaviour as in Heinemann and Hüfner (2004), we specify the country-specific influence directly, as outlined in the following paragraph.

3 The Model

We assume that the interest rate of the euro area, aimed in the decisions of the ECB Council, is a weighted average of the interest rates preferred by the governors, i_j^*, and the board, i_{bd}^*, where the weighting is done according to the parameter a, $0 \leq a \leq 1$. The interest rates the governors pursue, i_j^*, are aggregated according to the respective political weights, b_j, that the governors possess in the decision making process. This weight reflects the possibility that a governor can influence the interest rate decisions in its preferred direction. Therefore, we can write the interest rate of the euro area as the outcome of the Council decision as follows:

$$i^* = a \sum_j b_j i_j^* + (1-a) i_{bd}^*. \tag{1}$$

We base our analysis on a standard assumption of central bank monetary policy. The central bankers choose the short-term interest rate to minimise the loss. The bank incurs a loss if the inflation rate differs from its target. Additionally, a loss arises if there is a gap between actual and potential levels of output. Therefore, we assume that the governors and the board decide the interest rate according to the Taylor rule (Taylor 1993). The Taylor interest rate depends on the inflation rate, π, and on the output gap, $\bar{y}$. We assume that the constant includes the inflation target, as well as the real interest rate. The coefficients of the inflation rates and output gaps incorporate the preferences of the central bankers regarding the inflation and the output gap. We assume that a governor does not react differently to the inflation rate of the euro area and the country-specific value, β_j. The same goes for the output gap, γ_j. One has to be aware of the fact that the parameters β and γ incorporate the preferences of a central banker regarding inflation and output gap, as well as the structural parameters of the economy. Therefore, it could be a restrictive assumption that the reaction to country-specific and euro-wide gaps should be the same. However, the euro-wide variables are aggregated from the country-level measures. Therefore, it seems reasonable to assume that the reaction function of a governor has the same coefficient for the country-specific gap as for the euro-wide gap. The same mechanism applies to the output gap, because the euro area inflation rate and output gap do not develop independently, but are based on the developments in the member states. The assumption gets support by empirical evidence. If we cancel the restriction on the parameters, the estimation results do not change in an important way.

The board members behave as an entity and have the same preferences with regard to inflation and output gap, β_{bd} and γ_{bd}. Therefore, the differences between the behaviours of the decision makers are given by the variables they take into consideration. The governors look at country-specific inflation rates, π_j, and output gaps, $\bar{y}_j$, as well as at the respective euro area variables, π and $\bar{y}$. The interest rate a governor wants to see as the outcome of the decision is a weighted average of both rates. The weighting is done according to c_j, $0 < c_j < 1$. The board is assumed to decide according to euro area variables only. The desired interest rates of a governor and the board are, therefore, given by the following two equations:

$$i_j^* = c_j(\alpha_j + \beta_j\pi_j + \gamma_j\bar{y}_j) + (1 - c_j)(\alpha_j + \beta_j\pi + \gamma_j\bar{y}), \quad (2)$$

$$i_{bd}^* = \alpha_{bd} + \beta_{bd}\pi + \gamma_{bd}\bar{y}, \quad (3)$$

Inserting equation (2) and (3) into equation (1), we get the following equation for the euro area interest rate

$$\begin{aligned} i^* &= a\sum_j b_j[c_j(\alpha_j + \beta_j\pi_j + \gamma_j\bar{y}_j) + (1 - c_j)(\alpha_j + \beta_j\pi + \gamma_j\bar{y})] \\ &\quad +(1 - a)(\alpha_{bd} + \beta_{bd}\pi + \gamma_{bd}\bar{y}) \\ &= a\sum_j b_j\alpha_j + (1 - a)\alpha_{bd} + a\sum_j b_j c_j[\beta_j(\pi_j - \pi) + \gamma_j(\bar{y}_j - \bar{y})] \\ &\quad + \left[a\sum_j b_j\beta_j + (1 - a)\beta_{bd}\right]\pi + \left[a\sum_j b_j\gamma_j + \gamma_{bd}\right]\bar{y}. \end{aligned}$$

The area wide variables influence the interest rate according to the aggregated influence of the board and the governors, $[a\sum b_j\beta_j+(1-a)\beta_{bd}]$ for the inflation rate and $[a\sum b_j\gamma_j+\gamma_{bd}]$ for the output gap. The country-specific variables have an influence on the interest rate if they differ from the EMU average, and if a governor can carry through her idea that the country-specific variable should be considered when making decisions.

4 Estimation Approach and Description of the Data

To analyse these hypothesis empirically, we base our analysis on an ordered probit estimation of a Taylor-type rule. We encode the interest rate decision of the ECB into three

groups, where the Governing Council leaves the policy rate unchanged, rises the target rate, or lowers it. This is done with the help of a dummy variable where

$$\begin{aligned} c_t = 0 \quad &\text{if} \quad \Delta i_t < 0 \\ c_t = 1 \quad &\text{if} \quad \Delta i_t = 0 \\ c_t = 2 \quad &\text{if} \quad \Delta i_t > 0. \end{aligned}$$

A decision about the change of the policy rate is taken if the difference between the actual policy rate last period and the underlying target value exceeds a certain threshold in absolute terms, μ_j, $j = 1, 2$. The two thresholds generate an inactive zone, where no policy rate response is observable. The basis is the optimal interest rate of the central bank, i^*. We only consider three possible outcomes:

$$\begin{aligned} c_t = 0 \quad &\text{if} \quad i_t^* - i_{t-1} \leq \mu_1, \\ c_t = 1 \quad &\text{if} \quad \mu_1 < i_t^* - i_{t-1} < \mu_2, \\ c_t = 2 \quad &\text{if} \quad \mu_2 \leq i_t^* - i_{t-1}. \end{aligned}$$

We do not distinguish between interest rate steps of 0.25 or 0.5 percentage points, because we are interested only in the direction, and not the size of the rate change. To describe the unobserved interest rate change, we rely on the explanatory variables usually included in Taylor-type rules. This would be the inflation rate, π, the output gap, or a related measure, $\bar{y}$. Besides the standard variables, we include money growth, Δm, because one pillar of the ECB strategy refers explicitly to the monetary conditions in the economy. Additionally, an exchange rate variable may play a role in open economies, because the central bank should target "long-run inflation" – a measure of inflation adjusted to remove effects of exchange rate movements (Ball 2000). We consider the growth rate of the real exchange rate, Δe. With x_j we denote further explanatory variables capturing the country-specific influences, like individual inflation rates and output gap measures. The unobserved optimal interest rate level, i_t^*, is then determined by the following equation

$$\begin{aligned} i_t^* &= \rho i_{t-1} \\ &+ (1-\rho)\left(\alpha + \beta\pi_{t-1} + \gamma\bar{y}_{t-1} + \delta\Delta m_{t-1} + \theta\Delta e_{t-1} + \sum_j \eta_j x_{i,t-1}\right) \end{aligned} \tag{4}$$

where $0 < \rho < 1$. Since we are interested in the desired change of the policy rate, equation (4) changes to

$$\begin{aligned} i_t^* - i_{t-1} &= -(1-\rho) i_{t-1} \\ &\quad +(1-\rho)(\alpha + \beta\pi_{t-1} + \gamma\bar{y}_{t-1} + \delta\Delta m_{t-1} + \theta\Delta e_{t-1} + \sum_j \eta_j x_{i,t-1} \\ &\quad +\vartheta\Delta i_{t-1}, \end{aligned} \tag{5}$$

where we add the lagged change of the policy rate, Δi, as an explanatory variable to capture the short term dynamics of the interest rate, as suggested by Judd and Rudebusch (1998). An economic reason is to capture interest rate smoothing. There are different explanations for this special behaviour of central banks (Goodfriend 1991). One possibility is that a central bank is averse to large interest rate movements.

Equation (5) gives the basis for the ordered probit estimation for the respective currency areas and basically follows the specification of Gerlach (2004), but we extend the estimation by adding an exchange rate variable and country-specific variables to the equation. Other investigations relying on the Taylor rule to specify the latent variable are found in Dueker (1999) and Dolado et al. (2005).

For the influence of the variables on an interest rate step taken by the central bank, we expect the following behaviour. A higher inflation rate should lead to a higher probability for an interest rate increase, as well as a higher output gap or a related measure. In both cases, there is either direct or indirect danger to the goal of price stability pursued by the central bank besides the aim of output stabilisation. Also, a higher money growth rate should lead to a higher target interest rate because, in the long run, inflation does not exist without the respective liquidity in the economy. A positive growth rate of the exchange rate means an appreciation of the Euro vis-à-vis the rest of the world. This would reduce the risk of inflation and the probability of an interest rate cut would rise.

With the lagged change of the target interest rate included in the estimation equation, interest rate smoothing is incorporated in the explanation. If the central bank is averse to abrupt changes in the interest rates and averse to contradicting its decisions, one would expect a positive sign for this variable. In the first case, the central bank distributes necessary changes of the interest rate over several periods. There should also be a sequence of interest rate changes in the same direction. The same outcome would be observed if the central bank is reluctant to reverse its decisions. A negative sign would show that the central bank is reluctant to change the policy rate again immediately after a change (Galí et al. 2004).

The interest rate itself will determine whether the level of the interest rate is appropriate or needs to be adjusted. According to equation (5), we expect a negative sign for this variable.

If the central bank's decisions depend on country-specific variables, the same direction of influence should be expected. If the inflation rate of a country plays a role, the probability

of an interest rate cut should be higher, the lower this specific inflation rate. The same is expected for the country-specific output gap or a related measure. If the actual production exceeds the potential production, the central bank should more likely increase the interest rate to counter the resulting inflationary pressure.

The dependent variable is the interest rate of the main refinancing operations (MRO). Because the Governing Council of the ECB decides about the policy rate once a month, we get a monthly time series. The rate change will be effective in the auction following the decisions of the policy-maker. Because of this, there are two critical dates: April 2000 and August 2000. Because both decisions are taken at the end of the month, the changes become effective in the next month. Nevertheless, the decision was taken at that respective date, and we, therefore, decide to attribute the policy rate changes to April and August 2000.

Monthly time series are used for estimation, consisting of economic sentiment indicator and the inflation rate for the individual countries of the EMU (Germany, France, Italy, Netherlands, Belgium, Luxemburg, Ireland, Spain, Greece, Portugal, Austria, Finland) and the euro area. The series for the inflation rates are based on the Consumer Prices Index (Source: Eurostat), which were seasonally adjusted with Census X11. The series of the economic sentiment indicator used as an alternative for the output gap follows the specification of Gerlach (2004). It is derived from the economic sentiment series of the European Commission, following $100(esi_t - \overline{esi})/\overline{esi}$, where $\overline{esi}$ is the mean of the respective series.

For the euro area, the annual growth rate of M3, the policy rate of the ECB and the annual growth rate of the real exchange rate are incorporated. For money growth, the three month moving average of the annual growth rate of the monetary aggregate M3 is used (Source: ECB). The annual growth rate of the exchange rates bases on the series of the real CPI effective exchange rate index of the euro zone (EER-42, Source: ECB). All time series cover the period from January 1999 to March 2005, albeit with the Greek series starting in January 2001.

5 Estimation Results

The starting point for the investigation of country-specific influences on the interest rate decision of the ECB should be a well-specified Taylor rule. We rely on the specification of

Gerlach (2004) and include the inflation rate, the economic sentiment indicator, and the three month moving average of money growth M3 into the basic equation. Additionally, we employ the growth rate of the real exchange rate. To capture interest rate smoothing, we include the level as well as the change of the policy rate (Galí, Gerlach, Rotemberg, Uhlig, and Woodford 2004). All explanatory variables enter the equation with a lag of one month due to availability of the data at the time of decision-making by the ECB Council.

The estimation results seem to be reasonable: all explanatory variables enter the equation significantly at least at the ten percent level and with the expected sign (see Table 1, model (1)). The only exception is the inflation rate. This could be due to the fact, that the central bank's behaviour is forward-looking. This behaviour could not be captured by the lagged inflation rate. A higher economic sentiment and money growth would reduce the probability of an interest rate cut and lead to a higher probability of an interest rate increase. A higher policy rate in the last period would lead to a higher probability of an interest rate cut. A higher change in the policy rate in the last period would lead to the same reaction, and the central bank would probably not raise the interest rate further. As expected, a higher growth rate of the real exchange rate would lead to a higher probability of an interest rate decrease.

The dominance of certain countries or the economic situation in certain countries in the decision-making of the ECB Governing Council would appear in the estimation equation through a significant influence of country-specific variables. Since we do not have a sufficient number of observations, which would have enabled us to include all country-specific variables at the same time and get a reliable estimation, we proceed as follows. First, we estimate two equations, one with the basic specification extended by the respective differences between inflation rates of the EMU members and the area-wide inflation rate. The values of the Greek series differ from zero from January 2001 onwards. The second equation includes the differences between the sentiment indicators of the respective countries and that of the euro area.

	Ordered Probit Taylor rule adjusted sample 1999:03 - 2005:12 82 observations			
	Model (1)		Model (2)	
	Coef.	z-Stat.	Coef.	z-Stat.
i_{t-1}	-0.89^{**}	-2.15	-4.97^{**}	-2.46
Δi_{t-1}	-3.59^{**}	-2.20	-9.47^{***}	-2.64
π_{t-1}	0.83	1.46	3.00^{**}	2.12
esi_{t-1}	0.26^{***}	2.97	0.36^{**}	2.15
Δm_{t-1}	0.93^{**}	2.44	1.13	1.58
Δe_{t-1}	-0.14^{**}	-2.26	-0.42^{**}	-2.47
$\overline{\pi}_{t-1} - \pi_{t-1}$			1.76^{*}	1.91
$\underline{\pi}_{t-1} - \pi_{t-1}$			1.60	1.22
$\overline{esi}_{t-1} - esi_{t-1}$			-0.29	-1.63
$\underline{esi}_{t-1} - esi_{t-1}$			0.32^{***}	2.40
μ_1	2.11	0.52	-9.72	-1.35
μ_2	7.44^{**}	2.11	1.01	0.16
Log likelihood	-25.95		-15.78	
Restr. log likelihood	-51.56		-51.56	
LR index (Pseudo-R2)	0.4967		0.6940	

Table 1: Estimation results for the county-specific influence on the interest rate decisions of the ECB.

	Ordered Probit Taylor rule adjusted sample 1999:03 - 2005:12 82 observations			
	Model (3): x = inflation		Model (4): x = economic sentiment	
	Coef.	z-Stat.	Coef.	z-Stat.
i_{t-1}	-13.06^{**}	-2.44	-6.08^{*}	-1.67
Δi_{t-1}	-20.74	-1.64	-9.75^{*}	-1.65
π_{t-1}	3.58	1.25	8.74	1.42
esi_{t-1}	0.19	0.69	1.29^{*}	1.68
Δm_{t-1}	1.36	0.81	3.64	1.45
Δe_{t-1}	-1.04^{**}	-2.38	0.07	0.28
$x_{t-1}^{AU} - x_{t-1}$	8.03^{*}	1.81	0.19	1.21
$x_{t-1}^{BE} - x_{t-1}$	-3.97	-1.21	-1.03^{*}	-1.69
$x_{t-1}^{DE} - x_{t-1}$	-1.56	-0.52	-0.85	-0.49
$x_{t-1}^{FI} - x_{t-1}$	4.48	1.58	0.17	0.85
$x_{t-1}^{FR} - x_{t-1}$	-3.64	-0.99	0.23	0.36
$x_{t-1}^{GR} - x_{t-1}$	-1.42	-0.98	0.04	0.30
$x_{t-1}^{IR} - x_{t-1}$	2.47	1.55	0.38	1.37
$x_{t-1}^{IT} - x_{t-1}$	0.73	0.33	-0.43	-0.70
$x_{t-1}^{LX} - x_{t-1}$	0.77	0.30	0.32^{*}	1.80
$x_{t-1}^{PT} - x_{t-1}$	2.26	1.10	0.27	1.18
$x_{t-1}^{NL} - x_{t-1}$	-1.83	-0.75	0.67	1.55
$x_{t-1}^{SP} - x_{t-1}$	-4.14^{*}	-1.68	-0.22	-0.52
μ_1	-35.53^{*}	-1.93	13.75	0.92
μ_2	-14.31	-1.00	30.26	1.31
Log likelihood	-12.11		-14.23	
Restr. log likelihood	-51.56		-51.56	
LR index (Pseudo-R2)	0.7652		0.7240	

Table 2: Estimation results for the county-specific influence on the interest rate decisions of the ECB.

The estimation containing the country-specific inflation differentials leads to the results displayed in Table 2, model (3). Only the Austrian and the Spanish inflation differentials appear to be significant. However, this renders the more traditional explanatory variables

insignificant. Only the lagged interest rate and the exchange rate variable seem to be still important for the interest rate decisions of the ECB. Nevertheless, the value of the log-likelihood improves considerably.

The significant country-specific influences have the opposite sign. This could hint to a problem of multicollinearity. To assess how severe this problem is in the actual setting, we analyse the correlation coefficients of the series (see appendix, Table 7). As we can see, we have some stronger correlation, especially between Finland and Ireland and between Portugal and the Netherlands with correlation coefficients higher than 0.7. The case for multicollinearity is supported if the independent variables are regressed on each other and the resulting $\overline{R}^2$ is regarded (see appendix, Table 5). This does not matter for prediction, but for identifying country-specific influence this poses a severe problem.

The second equation contains the difference between the country-specific sentiment indicators and the euro area indicator (see Table 2, model (4)). Again, we have two significant country-specific influences, that of Belgium and of Luxembourg, with the opposite sign. However, the correlations between the sentiment gaps do not exceed the threshold of 0.7 (see appendix, Table 8). But the $\overline{R}^2$ statistics of the auxiliary regressions show high values (see appendix, Table 6). Unfortunately, the detection of multicollinearity does not help to reduce the number of explanatory variables appropriately and to find the variables that are crucial for the model.

One approach to reduce the number of explanatory variable is based on the following reflections. We do not expect that all countries of the euro area influence the interest rate decisions of the ECB. Rather, there are two different possibilities. The first is that countries with high political weight indeed influence the decisions depending on their economic situation. This we could not detect because of the similarities in the development of the inflation rates and sentiment indicators. The second possibility does not depend on the political weight, but on the economic situation in the euro area. It is imaginable that the highest and/or lowest country-specific inflation rates and output gaps influence the interest rate decisions. This would imply, that the ECB looks at country-specific developments but not at the same country for every decision. The decisions would be distorted in the direction of extreme developments. If the latter assumption is true, an influence of potential EMU members on the decisions could be expected in the future because they have higher inflation rates and growth rates than present members, at least at the moment. This situation should change until the countries join the EMU. In particular,

a convergence of inflation rates could be expected because low inflation rates are part of the convergence criteria determining the enlargement decision.

To test the assumption that not a country per se influences the decisions, but that central bankers are rather concerned with the extreme economic developments in the euro area, we built two artificial time series consisting of the minimum and the maximum of the country-specific inflation rates or economic sentiment indicators at every month. Greek time series are included beginning in 2001. Comparing the resulting series to that of the euro area, we see that the inflation rate of the euro area is more closely following the minimum of the country-specific inflation rates. The same is true for the economic sentiment indicator (see Figure 2). But for the inflation rate, a change in behaviour could be detected at the end of the sample, where the inflation rate of the euro area seems to be adjusting to the behaviour of the maximum inflation rate.

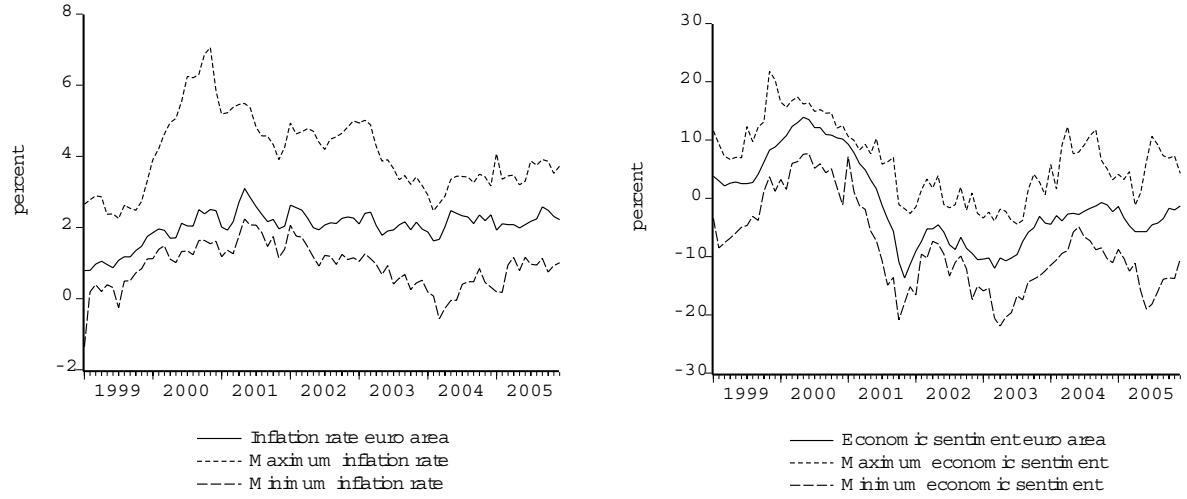

Figure 2: Minimum and Maximum of the inflation rates (left figure) and the economic sentiment indicator (right figure).

These series are used in the estimation (see Table 1, model (2)). As a result, the series for the minimum economic sentiment and the maximum inflation rate appear to significantly influence the decisions of the ECB. The inflation rate is now significant at the 5 percent level. But money growth does not seem to influence the ECB decisions any longer. The value of the log-likelihood improves. Even the maximum economic sentiment is barely significant at the 10 percent level (p-value of 0.1040). The opposite sign of the two sentiment series is puzzling. On the one hand, the wider the gap between the maximum economic sentiment indicator, the higher is the probability of an interest rate cut. This

would lead to expansionary monetary policy that does not counter possible inflationary pressure coming from the real economy. For the minimum indicator, the coefficient shows the expected sign. The smaller the gap between the minimum economic sentiment and the euro-wide value, the lower is the probability of an interest rate cut. The danger of a rising inflation pressure is taken into account, and monetary policy is rather restrictive.

For the inflation rate, only the maximum values seem to matter. A change of the dispersion of inflation measured by the distance between the euro wide price development and the extreme values displayed by country-specific developments, seems only to play a role for inflation rates higher than the euro wide average. In this case, a higher maximum inflation rate compared to the euro-wide level would lead to a higher probability of an increasing interest rate. This would support the view that the definition of price stability by the ECB is asymmetric: there seems to be a distortion in the sense that inflation plays a bigger role than the danger of deflation.

There is an important difference between the formation of the time series displaying the extreme economic development of the euro area. Inflation rates are highly persistent, and, therefore, certain countries deliver the values of the respective series for prolonged time. For maximum inflation, Ireland had the highest inflation rates most of the sample period, followed by Greece and Spain for shorter time periods. For the minimum inflation, we have Finland as the country with the lowest inflation in the euro area for a considerable time span, followed by France, Germany, and Belgium with much shorter time spans. This could induce the assumption that country-specific inflation rates influence the decision-making of the ECB. For the economic sentiment, the countries delivering the extreme values change much more frequently. Worth mentioning are Greece, Luxembourg, the Netherlands, and Portugal, which display the lowest values of the economic sentiment, each for some time.

The prediction of policy rate changes improves with the inclusion of country-specific influences compared to model (1), as the numbers in Table 3 show. The models with country-specific influence are less prone to error with respect to predicting interest rate changes, where the interest rate stayed the same. All models make some errors in predicting the timing of increasing interest rates in 2002. The basic model and the model containing the extreme developments, model (2), are better in explaining the interest rate increases than interest rate cuts. The interest rate cuts are better captured by models including country-specific developments. The best model in this respect is the model containing the inflation differentials, model (3). All interest rate cuts are hit at the right moment.

This supports the view that the decisions of the ECB are taken with respect to the developments in the whole euro area, and not with respect to selected countries. The only convincing influence can be detected for the dispersion of the developments measured by the maximum inflation and minimum sentiment values. Nevertheless, the inclusion of the extreme developments does not provide the same fit as the country-specific values. This is not surprising, because the minimum and maximum values cannot provide the same information as the individual series. However, the maximum and the minimum seem to provide an essential part of the information contained in the country-specific series.

		Count with maximum probability			
Interest rate	Count of observations	Model (1)	Model (2)	Model (3)	Model (4)
- decrease	8	3	6	8	7
- unchanged	66	62	62	64	63
- increase	8	4	7	6	6

Table 3: Prediction table for ordered dependent variable taking the timing of the interest rate changes into account.

To assign the magnitude of influence of the explanatory variables, we determine the marginal probabilities at the mean. The marginal probabilities do not add to zero for some of the variables because of rounding errors. First of all, the influence of all explanatory variables is rather small. This is especially true for the original model, but even more so for the extended model.[1] For model (2), a change of the mean of an explanatory variable has virtually no effect on the probabilities of a changing or an unchanged interest rate.

In the basic model, the influences of the lagged interest rate and the inflation rate are comparable but point in opposite directions. The impact of money growth on the probabilities is higher, but still of the same magnitude. A lower influence has a change of the mean of the economic sentiment indicator. The highest impact on the probabilities of an (un)changed policy rate has the change of the interest rate last month. In the extended model, the change of the probability of an interest rate change is near zero. The change of the mean of one of the explanatory variables would almost have no influence on the respective probabilities. This leads to the conclusion that the explanatory variables are important but their influence is small. However, there seems to be no dominant influence of one of the independent variables.

[1]For Model (1), the effects are of the same magnitude as Greene (2000, p. 879).

	Model (1)			Model (2)		
	Marginal probability					
	decrease	unchanged	increase	decrease	unchanged	increase
i	0.014	-0.007	-0.007	0.0000036	-0.0000033	-0.0000003
Δi	0.058	-0.028	-0.029	0.0000069	-0.0000063	-0.0000006
π	-0.013	0.006	0.007	-0.0000022	0.0000020	0.0000002
esi	-0.004	0.002	0.002	-0.0000003	0.0000002	0.0000000
Δm	-0.015	0.007	0.008	-0.0000008	0.0000007	0.0000001
Δe	0.002	-0.001	-0.001	0.0000003	-0.0000003	-0.0000000
$\overline{\pi} - \pi$				-0.0000013	0.0000012	0.0000001
$\underline{\pi} - \pi$				-0.0000012	0.0000011	0.0000001
$\overline{esi} - esi$				0.0000002	-0.0000002	-0.0000000
$\underline{esi} - esi$				-0.0000002	0.0000002	0.0000000

Table 4: The marginal probabilities of the basic equation and the equation including extreme development variables.

With the future enlargement of the EMU, the economic situation in the European currency area will be even more heterogeneous. However, the countries acceding to the monetary union will be of minor economic weight. Moreover, there will be a rotation system introduced in the decision-making of the Governing Council of the ECB, where the frequency of voting will depend on the economic weight of a country. The higher the economic weight, the more frequent a governor of a country will have the opportunity to vote. The economic weight depends on the share of the country with regard to the GDP to market prices and the share of the aggregated balance sheet of monetary financial institutions. Since the future EMU members are relatively small in economic terms, they will, for the most part, be situated in the third group and have a voting share of $3/(n - n/2 - 5)$, where n denotes the number of governors. With 22 governors in the extended Council, this number would be 1/2 within the third group. This would lead to a relatively low voting share, but would still be considerably more than the respective economic weights of these countries, which together count for 6 percent of the GDP of the EMU economy (Belke and Polleit 2003).

Because we could not detect a dominant influence of certain countries of the monetary union in a convincing way, it seems to be unlikely that the new member states would influence the decision-making of the ECB in an asymmetric way. The present analysis shows that the inflation rates and economic sentiments of the countries are too similar

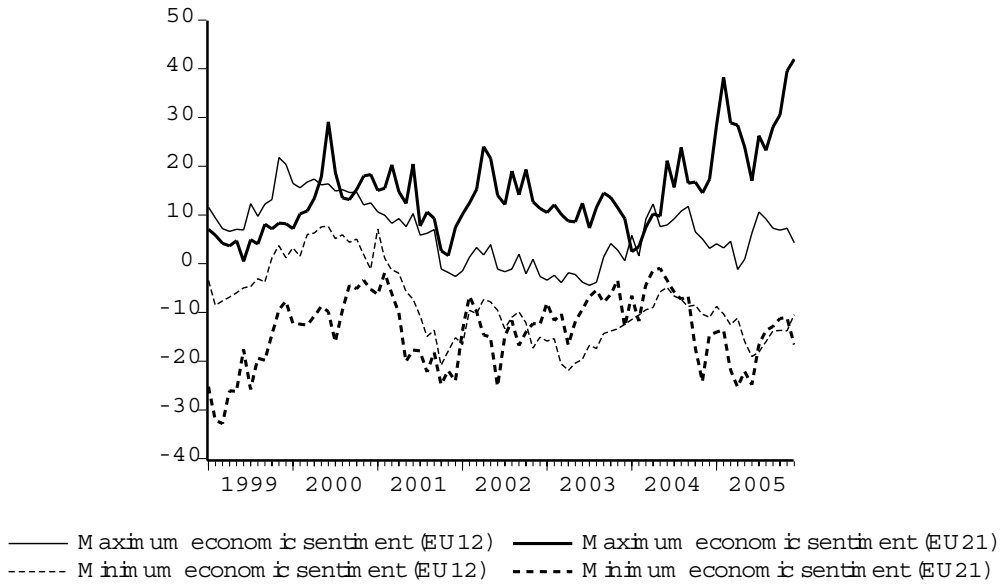

Figure 3: The minimum and maximum economic sentiment indicator for the EMU12 and extended for 9 new member states of the European Union.

to allocate interest rate decisions to the economic development in certain countries, in addition to the explanatory variables of the euro area. If the convergence process of the new EU members is sufficient to reach the same extent of economic synchronisation as the old EMU members have, it is not likely that the new states would exert special influence on the policy rate. This statement carries over to the minimum and maximum inflation rates and economic sentiment. Because low inflation is one of the convergence criteria to be fulfilled before joining the EMU, there seems to be no reason to expect a much different situation for the then-enlarged monetary union compared to the situation today. For the economic sentiment, the picture could be different. However, if we take a look at the development of the maximum and minimum sentiment indicator for the countries of the EMU and the respective series extended for the new members (Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Poland, Slovenia, and Slovakia), we see a similar development for the minimum sentiment indicator (see Figure 3). The difference is more marked for the maximum sentiment. Because we could only detect a significant influence of the maximum indicator, this supports the view that the enlargement of the monetary union should not generate a problem of country-specific influences on ECB decisions.

6 Conclusion

With the enlargement of the EMU, the economic heterogeneity of the European currency area increases. That could pose a problem for decision-making in the Governing Council of the ECB with respect to policy rate decisions. The greater economic heterogeneity would not be a problem if the governors and the board of directors only decide according to area-wide variables. If a country-specific influence is detected, this contradicts the task of the ECB. Moreover, the discussion regarding country-specific influence would be encouraged. With this, the country of origin of the Council members matters and gives room for political influence if a new governor or board member is appointed. As the former analysis shows, there seem to be no dominant country-specific variables.

Even after the agreed reform of the ECB decision-making, it is not theoretically clear how the representation of EMU members should be determined in the ECB Governing Council (Berger and Mueller 2004). This issue assumes that national central bank governors base at least part of their decision on regional economic development. In contrast to that standpoint, the ECB stresses the point that regional developments do not play a role in the interest rate decisions. Unfortunately, the transparency of the ECB, even if well-founded to protect political independence, does not provide proof of the fact. There are no minutes of the meetings or voting records available. Therefore, we try to detect country-specific influences on interest rate decision by estimating a Taylor-type rule and including time series of individual countries additionally to the common explanatory variables.

The detected influence of large inflation and sentiment differentials would probably carry over to the enlarged Council, whereas a convincing dominant influence of a country-specific influence could not be detected. However, for the time being, a more sophisticated analysis of the potential country-specific influence does not seem possible, since we lack the relevant data. If all present EMU countries had followed and all potential EMU members would actually follow a monetary policy strategy similar to that of the ECB, a comparison of the reaction functions of the central banks could give hints towards the future behaviour of the monetary authorities. Since this is not the case, we have to close our analysis at this point.

Appendix

dependent variable	$\overline{R}^2$
i	0.97
Δi	0.37
π	0.85
esi	0.92
Δm	0.92
Δe	0.87
$\pi^{AU} - \pi$	0.76
$\pi^{BE} - \pi$	0.77
$\pi^{DE} - \pi$	0.70
$\pi^{FI} - \pi$	0.92
$\pi^{FR} - \pi$	0.77
$\pi^{GR} - \pi$	0.74
$\pi^{IR} - \pi$	0.95
$\pi^{IT} - \pi$	0.78
$\pi^{LX} - \pi$	0.66
$\pi^{PT} - \pi$	0.85
$\pi^{NL} - \pi$	0.91
$\pi^{SP} - \pi$	0.56

Table 5: Adjusted R^2 for the auxiliary regression of the dependent variable on all other explanatory variables in the main regression.

dependent variable	$\overline{R}^2$
i	0.89
Δi	0.31
π	0.72
esi	0.98
Δm	0.84
Δe	0.88
$esi^{AU} - esi$	0.49
$esi^{BE} - esi$	0.74
$esi^{DE} - esi$	0.93
$esi^{FI} - esi$	0.84
$esi^{FR} - esi$	0.91
$esi^{GR} - esi$	0.49
$esi^{IR} - esi$	0.49
$esi^{IT} - esi$	0.91
$esi^{LX} - esi$	0.51
$esi^{PT} - esi$	0.66
$esi^{NL} - esi$	0.81
$esi^{SP} - esi$	0.87

Table 6: Adjusted R^2 for the auxiliary regression of the dependent variable on all other explanatory variables in the main regression.

	$\pi^{au}-\pi$	$\pi^{be}-\pi$	$\pi^{de}-\pi$	$\pi^{fi}-\pi$	$\pi^{fr}-\pi$	$\pi^{gr}-\pi$	$\pi^{ir}-\pi$	$\pi^{it}-\pi$	$\pi^{lx}-\pi$	$\pi^{pt}-\pi$	$\pi^{nl}-\pi$
$\pi^{be}-\pi$	0.59										
$\pi^{de}-\pi$	0.39	0.61									
$\pi^{fi}-\pi$	0.29	0.26	0.00								
$\pi^{fr}-\pi$	-0.32	-0.30	-0.47	-0.58							
$\pi^{gr}-\pi$	-0.11	-0.33	-0.18	-0.50	0.30						
$\pi^{ir}-\pi$	0.33	-0.02	-0.33	0.73	-0.27	-0.07					
$\pi^{it}-\pi$	-0.16	-0.37	-0.44	0.40	0.02	-0.23	0.27				
$\pi^{lx}-\pi$	0.43	0.40	0.15	0.47	-0.12	-0.28	0.44	0.06			
$\pi^{pt}-\pi$	0.01	-0.40	-0.34	0.42	-0.29	0.08	0.52	0.54	-0.06		
$\pi^{nl}-\pi$	0.01	-0.15	-0.08	0.63	-0.63	-0.08	0.48	0.43	-0.10	0.71	
$\pi^{sp}-\pi$	0.35	-0.04	-0.07	0.41	-0.22	-0.06	0.47	0.13	0.35	0.45	0.20

Table 7: The correlation coefficients for the inflation differentials.

	$esi^{au}-esi$	$esi^{be}-esi$	$esi^{de}-esi$	$esi^{fi}-esi$	$esi^{fr}-esi$	$esi^{gr}-esi$	$esi^{ir}-esi$	$esi^{it}-esi$	$esi^{lx}-esi$	$esi^{pt}-esi$	$esi^{nl}-esi$
$esi^{be}-esi$	0.58										
$esi^{de}-esi$	-0.22	-0.27									
$esi^{fi}-esi$	0.34	0.38	-0.20								
$esi^{fr}-esi$	0.50	0.53	-0.51	0.68							
$esi^{gr}-esi$	-0.17	-0.14	-0.19	-0.38	-0.16						
$esi^{ir}-esi$	-0.16	0.12	0.03	-0.25	-0.31	-0.01					
$esi^{it}-esi$	0.10	-0.03	-0.61	0.37	0.34	0.18	-0.35				
$esi^{lx}-esi$	0.44	0.58	-0.41	0.39	0.65	-0.09	-0.18	0.26			
$esi^{nl}-esi$	-0.53	-0.21	-0.27	-0.28	-0.33	0.25	0.36	0.07	-0.19		
$esi^{pt}-esi$	-0.56	-0.29	0.03	-0.44	-0.45	0.41	0.19	-0.13	-0.32	0.64	
$esi^{sp}-esi$	-0.24	-0.42	-0.09	0.14	0.07	0.31	-0.17	0.45	0.05	0.10	0.12

Table 8: The correlation coefficients for the economic sentiment indicators differentials.

References

Ball, L. (2000), *Policy Rules and External Shocks*, NBER Working Paper Series No. 7910, Cambridge, MA.

Belke, A. and T. Polleit (2003), EZB-Ratsreform: Zur Frage des politischen und wirtschaftlichen Missverhältnisses. (The ECB Council Voting Reform: The Question of Political and Economic Mismatch.), *Kredit und Kapital* 36(4), 557–71.

Berger, H. and J. de Haan (2002), Are Small Countries to Powerful Within the ECB? *Atlantic Economic Journal* 30(3), 263–82.

Berger, H., J. de Haan, and R. Inklaar (2003), *Restructuring the ECB*, CESifo Working Paper No. 1084, Munich.

Berger, H. and T. Mueller (2004), *How Should Large and Small Countries Be Represented in a Currency Union?*, CESifo Working Paper No. 1344, Munich.

Bofinger, P. (2003), *Consequences of the Modification of the Governing Council Rules*, Briefing Paper for the Committee for Monetary and Economic Affairs (ECON) of the European Parliament, 17 February 2003.

Carstensen, K. (2006), Estimating the ECB Policy Reaction Function, *German Economic Review* 7(1), 1–34.

De Grauwe, P., H. Dewachter, and Y. Aksoy (1999), *The European Central Bank: Decision Rules and Macroeconomic Performance*, CEPR Discussion Paper No. 2067, London.

de Jong, E. (2004), Differences in Political Culture Hamper European Integration, in: F. Astengo, and N. Neuwahl (eds.), *A Constitution for Europe? Governance and Policy-Making in the European Union*, Montreal, 261–287.

de la Dehesa, G. (2003), *The New Governing Rules of the ECB*, Briefing Paper for the Committee for Monetary and Economic Affairs (ECON) of the European Parliament, 17 February 2003.

Dixit, A. (2000), A Repeated Game Model of Monetary Union, *Economic Journal* 110(466), 759–780.

Dolado, J. J., R. María-Dolores, and M. Naveira (2005), Are Monetary-Policy Reaction Functions Asymmetric?: The Role of Nonlinearity in the Phillips Curve, *European Economic Review* 49 (2), 485-503.

Duarte, M. (2003), The Euro and Inflation Divergence in Europe, *Federal Reserve Bank of Richmond Economic Quarterly* 89(3), 53–70.

Dueker, M. (1999), Measuring Monetary Policy Inertia in Target Fed Funds Rate Changes, *Review, Federal Reserve Bank of St. Louis*, September/October, 3–9.

Duisenberg, W. F. (2001), Transcript of the questions asked and the answers given by Dr. Willem F. Duisenberg, President of the ECB and Christian Noyer, Vice-President of the ECB, *ECB Press Conference*, Frankfurt am Main, 1 March 2001.

Fischer, S., R. Sahay and C. A. Végh (1998a), *From Transition to Market: Evidence and Growth Prospects*, IMF Working Paper Series No. WP/98/52, Washington D.C.

——— (1998b), *How Far is Eastern Europe from Brussels?*, IMF Working Paper No. WP/98/53, Washinton D.C.

Galí, J., S. Gerlach, J. Rotemberg, H. Uhlig, and M. Woodford (2004), *The Monetary Policy Strategy of the ECB Reconsidered. Monitoring the European Central Bank 5*. CEPR, London.

Gerlach, S. (2004), *Interest Rate Setting by the ECB: Words and Deeds*, CEPR Discussion Paper No. 4775, London.

Goodfriend, M. (1991), Interest Rates and the Conduct of Monetary Policy, *Carnegie-Rochester Series on Public Policy* 34, 7–30.

Greene (2000): *Econometric Analysis*, Upper Saddle River, NJ.

Gros, D. (2003), *Reforming the Composition of the ECB Governing Council in View of Enlargement: How Not to Do It!*, Briefing Paper for the Committee for Monetary and Economic Affairs (ECON) of the European Parliament, 17 February 2003.

Heinemann, F. and F. Hüfner (2004), Is the View from the Eurotower Purely European? National Divergence and ECB Interest Rate Policy, *Scottish Journal of Political Economy* 51(4), 544–558.

Honohan, P. and P. Lane (2003), Divergent inflation rates in EMU, *Economic Policy* 18, 357–394.

Horn, G. A. (2003), *Consequences of the Modification of the Governing Council Rules*, Briefing Paper for the Committee for Monetary and Economic Affairs (ECON) of the European Parliament, 17 February 2003.

Judd, J. P. and G. D. Rudebusch (1998), Taylor's Rule and the Fed: 1970-1997, *FRBSF Economic Review* 3, 3–16.

Michaelis, J. and H. Minich (2004), Inflationsdifferenzen im Euroraum - eine Bestandsaufnahme, *Aussenwirtschaft* 59(4), 379–405.

Ruth, K. (2004), *Interest Rate Reaction Functions for the Euro Area. Evidence from Panel Data Analysis*, Deutsche Bundesbank Discussion Paper No. 33, Frankfurt.

Taylor, J. B. (1993), Discretion versus Policy Rules in Practice, *Carnegie-Rochester Conference Series on Public Policy* 39, 195–214.

Wyplosz, C. (2003), *The New Eurosystem*, Briefing Paper for the Committee for Monetary and Economic Affairs (ECON) of the European Parliament, 17 February 2003.