Regional Biases and Monetary Policy in the EMU

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Abstract:
One potential problem of monetary policy in a monetary union where the rate setting committee comprises representatives of countries or regions is the possibility of existence of regional biases, i.e. a situation where committee members focus on country/region specific rather than union-wide developments. This paper uses simulation framework to asses whether regional biases – if they existed – could negatively affect monetary policy in an EMU of up to 25 countries. It concludes that this is not more likely than in an EMU of 12 countries. Also, the results indicate that the recent reform of the ECB voting modalities is unlikely to improve the situation in this respect.

1. Introduction

Recent years witnessed an increased perceived importance of monetary policy in promoting sustainable growth and stability of economies (Mishkin, 1996). It is thus natural that several aspects of monetary policy making attracted substantial interest from the side of economist and financial market analysts. In particular, the actual functioning of monetary policy decision-making bodies became a topic of several studies. In central banks of major advanced economies following a floating exchange rate regime, monetary policy is usually decided by committees comprising from 6 (e.g. in Sweden) to 18 (in the euro area) members.

Several central banks such as the ECB, US Federal Reserve, and the former Bundesbank have a two-tier structure, where a governing council (the body responsible for interest rate decisions) consists of a board and representatives of regional or national banks. Consequently, several of the committee members have explicitly defined regional/national affiliation and can be – at least to some extent – perceived as representatives of regions or countries. Such a design has

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some advantages, e.g. in helping to build credibility, in providing insights into economic developments in the regions that are relevant for the whole area and in better managing bank supervision and regulatory tasks (Goodfriend, 2000; Baldwin et al., 2001). On the other hand, it can be perceived as creating an environment in which members of a decision-making body might be influenced by country- or region-specific considerations. A situation in which representatives of countries or regions at the rate setting body form their preferences giving a disproportionally high weight to development in their own countries / regions is referred to as 'regional bias'.

Regional biases, an in particular the risk of an emerging 'small countries bias' were often invoked in a discussion on the need to reform the ECB voting modalities before expected EMU enlargement. Authors such as Baldwin et al. (2001) and Eichengreen and Ghironi (2001) pointed to the fact that euro area enlargement expected over the next few years will result in a situation where small, fast growing countries that are characterised by somewhat higher inflation rates will have a majority in the ECB Governing Council that could result in suboptimal interest rate decisions if regional biases were present. However, there has been relatively little empirical work studying the existence, extent, and potential consequences of regional biases.

Meade and Sheets (2005) take advantage of availability of minutes of the FOMC meetings and analyse the regional affiliations of voter dissenting from the majority. They find some evidence that regional unemployment developments appear to impact on the committee members' decision to dissent. However, quite interestingly, such evidence is actually stronger for board members based in the central office in Washington than for the regional bank presidents.

A similar study of the Bundesbank is carried by Berger and de Haan (2002) and the findings are consistent with the hypothesis that regional inflation and growth differentials affect the probability of dissenting voting of respective Governing Council members.

Heinemann and Huefner (2004) attempt to assess in a more direct way a regional bias hypothesis for the ECB (both above-mentioned studies interpreted their results with reference to the ECB functioning). They compare the outcomes of estimations of versions of Taylor rules (Taylor, 1993) using the euro area data for 1999-2002 for specifications assigning different weights to regional biases among Governing Council. There are some differences in estimated coefficients between a specification based on euro area data only and specifications taking into account national inflation and output gaps. The results of an ordered probit model, where interest rates decisions (increase, decrease or no change in interest rates) are modelled, are not at adds with the hypothesis that divergences of national output gap and inflation rates may take a role in forming interest rate preferences.

Paczynski (2005), in discussing pros and cons of various reform options for ECB voting modalities, takes a somewhat different approach in trying to assess the potential relevance of regional biases in an EMU of up to 25 countries rather than looking for evidence on the existence and scale of biases. His analysis is somewhat simplified as inflation developments are taken as sole determinants of interest rate preferences. His results indicate that even a purely national perspective taken by majority of Governing Council members should not necessarily lead to

distorted interest rate decisions provided that just a few Council members take a union-wide perspective.

Aksoy et al. (2002) first estimate the optimal interest rate rules for 11 euro area countries applying the framework of the model of Rudebusch and Svensson (1999) and then simulate the outcome of monetary policy decisions under alternative decision making rules. The desired interest rate for the euro area is assumed to be identical to the weighted average of the interest rates desired by euro area members. Aksoy et al. (2002) find that in the case when ECB Board members take an area wide perspective, the voting outcomes coincide with the optimal policy most of the time, even if other members of Governing Council take a country specific perspective. Secondly, the results suggest that, on average, the preferences of larger countries appear to be somewhat closer to the decisions taken by the Governing Council than is the case of smaller countries. Finally, the higher the importance of output stabilisation in national objective functions, the larger the discrepancy between individually desired (by countries) and jointly decided (by the Governing Council) interest rates.

There exist also theoretical papers modelling the monetary union taking into account the existence of potentially conflicting country preferences. For example, in the monetary union model with voluntary participation of Fuchs and Lippi (2004), the optimal policy of the common central bank can be, under certain circumstances, influenced by preferences of specific countries due to the possibility of potential exit from the union.

This paper is closest to the approach of Aksoy et al. (2002). It extends the analysis of Paczynski (2005) by allowing for an explicit and more refined modelling of formation of interest rate preferences among Governing Council members. Similarly to Heinemann and Huefner (2004) Taylor rule is taken as a proxy for central bank decision rule. However, in contrast to Heinemann and Huefner (2004), this paper assumes a particular (standard) rule and looks at voting outcomes it would produce under alternative voting schemes and alternative forms of regional biases instead of estimating various specification of the rule and inferring from obtained coefficient. Assuming a particular form of interest rate rule rather than estimating it within a particular model of the economy, as done by Aksoy et al. (2002), is primarily motivated by lack of sufficiently long data series.

The rest of the paper is organised as follows. Section two sketches and motivates the basic assumptions underlying the approach taken in this study. Simulation framework is presented in section three. The following section describes the data and its transformations. Section five reports the results of the simulations. There are two sets of results – the first one based on historical (1997-2005) data for 25 member states of the European Union and the second one is based on constructed counterfactual data for 25 countries spanning for 2500 years. The construction of counterfactual data is intended to capture some of the feature of business cycles co-movements among 25 EU member states. The results for counterfactual data are preliminary in this version of the paper. The last section contains conclusions and discussion of directions for further work on this paper.

2. Assumptions

2.1. Business cycles and inflation dispersion

In this paper we assume that historical patterns (1997-2005) of inflation and output in 25 countries forming the European Union can be treated as providing an indication of paths these variables will take after more countries joins the euro area. For the 12 countries that currently form the EMU this assumption should not look too unrealistic. Indeed, first six years of the euro have already provided some insights into what the common currency can mean for the synchronicity of business cycles and inflation dispersion. The macroeconomic developments in countries that currently remain outside the euro area and particularly in those that joined the EU only in May 2004 are more difficult to predict. There are two major arguments supporting the basic assumption of this paper.

First, recent research on synchronicity of business cycles in Europe appears to suggest that there is a tendency towards more synchronisation of new EU member states from Central and Eastern Europe with the euro area (Darvas and Szapary, 2004). Furthermore, forming or joining the monetary union is likely to result in larger bilateral trade and thus more synchronised business cycles (Frankel and Rose, 1998). This mechanism can be counteracted by the fact that stronger financial integration allows for more specialised production bases and thus increased macroeconomic asymmetry (Krugman, 1993; Kalemi-Ozcan et al., 2001). The unified view of these two mechanisms is provided by Hoffmann (2003). Given the relatively low historical synchronisation of business cycles between Central and Easter Europe and the euro area it is likely that the forces acting towards more synchronisation will prevail.

Second, the historical period taken as a reference in this study contains time when inflation rates in several of the new EU member states were particularly high. While the impact of the adoption of the euro on constraining vs. fostering dispersion of inflation rates is not clear cut (Angeloni and Ehrmann, 2004; ECB, 2003; Honohan and Lane, 2003), inflation among future members of the euro area is unlikely to jump above 10%, a level which was occasionally observed in 7 out of 10 new EU member states during the period 1997-2000. One simple argument supporting such view is that if, after adoption of the euro, inflation in new member states continued at the level from 1998-2002, price levels in these countries would very quickly (5-10 years or so) go well above the EU15 average (see Maier and Cavelaars, 2003).

2.2 Interest rate preferences

The second bold assumption taken in this paper is that the interest rates, that would optimally suit the needs of each of the EU25 countries separately, can be approximated by a standard Taylor rule[2].

[2] An idea of a feedback policy rule can be attributed to Wicksell (1898). In his formulation a central bank was responding to price level deviations. See Humphrey (2002).

Following Taylor (1993) the use of the so-called Taylor rules has become widespread in research on central banks policies. This popularity owes mainly to extremely simple formulation, low data requirements and surprisingly good fit with actual conduct of monetary policy. Also, it can be derived from a version of a model of central bank functioning. Svensson (1999) shows that the traditional Taylor rule emerges as the optimal reaction function for an inflation-targeting central bank in a backward-looking two-equation model of an economy[3]. The Taylor rule coefficients in this setting turn out to depend on policymaker's preferences and the parameters of the IS and Philips curves.

The standard Taylor rule in its simplest formulation is given by:

$$i_t = r^{eq}_t + \pi_t + 0.5 * \{y_t + (\pi_t - \pi^{targ}_t)\} \qquad (1)$$

where i_t, r^{eq}_t, π_t, π^{targ}_t, and y_t denote nominal interest rate of the central bank, "natural" rate of interest (that is often assumed constant), current inflation, inflation target of the bank and output gap, respectively. It implies that the central bank is reacting to inflation deviations from its target and output deviations from potential output. The equal weight of 0.5 on output gap and inflation deviations is a benchmark value proposed by Taylor to describe the policy of the Fed. However, some empirical estimations of Taylor rules for the euro area (using constructed aggregate data for the period before creation of the monetary union) suggest that it can also provide a reasonably good description of monetary policy in the euro area (Gerlach and Schnabel, 2000; Gerdesmeier and Roffia, 2003; Gerlach-Kristen, 2003). While this is certainly not an undisputed view, other approaches are more sophisticated and consequently also require more data. In the case of limited data availability, standard Taylor rule, extended by adding a term controlling interest rate smoothing, and also focused on forecast rather than actual inflation can be safely treated as the best readily available proxy describing interest rate preferences.

3. Simulation framework

The simulations reported in the following sections are based on the following approach. It is assumed that a version of a Taylor rule approximates interest rate preferences of countries, and regions, should these preferences be formed independently from developments elsewhere. Some levels of target inflation rates and of natural interest rates are assumed for each country or region. Thus, historical or counterfactual data for output gap and inflation for 25 EU member countries as well as for EMU12 (euro area consisting of 12 countries that have used the common currency since 2002) and for EMU25 (the region consisting of all 25 countries that have formed the EU since May 2004) and possibly other groupings of countries are used to calculate interest rates that would be preferred by each of these entities.

[3] This remains true also in a strict inflation targeting, i.e. when the objective function of the central bank does not assign any weight to output stability. This is because output gap has forecasting power for future inflation.

Given the availability of inferred national interest rate preferences and single dimensionality of this variable it is relatively easy to aggregate individual preferences into a voting outcome under various feasible voting schemes. This is achieved by assuming single-peakedness of preferences so that a version of the median voter theorem can be used (Myerson, 1996). This assures that a median of interest rate preferences (of those entitled to vote) can be treated as the outcome of voting on interest rate.

Such a framework allows for analysis of outcomes under various extents of regional biases among Governing Council members and under alternative voting schemes.

4. Data and data transformations

The data set used in this work consists of GDP and HICP series for 25 EU member states, EMU12 (aggregate measure for the euro area as of 2005), and EU25 (aggregate measure for the European Union as of 2005) and its source is Eurostat. Quarterly GDP and monthly HICP data are available for the period from January 1995 till October 2005. Lack of data for some countries forced us to limit the simulations based on historical data to the period from January 1997 till June 2005, i.e. 102 months, while longer series were used e.g. to build output gap estimates, where possible. All GDP series were seasonally adjusted and transformed to logs[4]. In case of countries for which no official seasonally adjusted figures are available the transformations were carried using the Demetra software (ver. 2.0; service pack 1) provided by the Eurostat. Three-month moving average of inflation was used as an input for Taylor rule calculations.

Apart from output and inflation figures, calculations of the Taylor rules require measures of output gap, natural rates of interest, and inflation targets. The approach used for constructing these series is discussed below.

4.1. Output gap calculations

Output gap is defined as a difference between observed output and the (unobserved) potential output. The concept dates back to the start of measuring of business cycles (Mitchell, 1927; Burns and Mitchell, 1946). Output gaps are quite popular in economic policy debates and its measures are calculated by several statistical offices. As is typical for unobserved variables, there is a variety of estimation methods used in practice but no undisputed view on their usefulness. In the context of this work data availability restricts the menu of available tools to univariate approaches. Among these, we focused on Hodrick-Prescott filter (HP). Irrespective of its various limitations it remains a method of choice in several practical applications. For instance, it is applied by OECD in its Economic Outlook database to calculate output gap figures for countries where production function method proved unfeasible.

[4] Quarterly GDP figures for Luxembourg were approximated using the annual figures and the seasonal patterns of economic activity in the euro area as a whole.

We use GDP figures to calculate output gap. We prefer such solution over relying on industrial production (as done e.g. by Heinemann and Huefner, 2004), since, while the latter is available at monthly frequency, it provides an indication of the behaviour of a small fraction of the whole economy, is much more volatile than GDP and in the short-run can be strongly affected e.g. by exchange rate developments. Consequently, calculations of potential output would be subject to an even wider error margin. We choose the simplest way of transforming quarterly output gap figures to monthly frequency by simply assuming that output gap each month is equal to its level from the respective quarter. We could modify this approach, e.g. by interpolation using cubic spline method (as in Basistha and Startz, 2004), but given our focus this would not change the results in any meaningful way.

Since we are interested in the average conduct of monetary policy over longer horizons, rather than in modelling policy outcomes in any particular point in time we can safely abstract from the well known information problem, related to the fact that potential output estimations are particularly difficult to carry in real time (Kuttner, 1994; Orphanides, 2001; Cukierman and Lippi, 2004). Also, the lag structure with which inflation and output gap data enter the reaction function does not matter much.

4.2. Inflation targets

Another parameter of the Taylor rule that needs to be determined is an inflation target of a central bank. This is relatively straightforward in the analyses of banks following a direct inflation targeting regime, where targets are explicitly defined. For the purpose of this analysis the ECB is assumed to follow a 2% inflation target[5]. However, one cannot assume that this is also a realistic proxy of an inflation target for all national central banks. Euro area countries have experienced substantial divergence of inflation over the last few years (ECB, 2003; Honohan and Lane, 2003). Inflation rates in most of the new EU member states of Central and Eastern Europe were on average higher than those for the EMU12. Some, perhaps substantial, part of these differences in inflation patterns between countries can be explained by natural adjustments of economies that should not be counteracted by economic policies. In this paper two alternative sets of assumptions are used for constructing national inflation targets. The baseline scenario assumes that differences in inflation targets in particular countries are related to varying contributions of inflation that can be attributed to the Harrod-Balassa-Samuelson (HBS) effect as estimated by a selection of recent studies. Alternative assumptions are also tested – see section 5.3.

Specifically, inflation targets are set as the average between the inflation rate implied by the estimated strength of the HBS effect and the actual inflation performance over the period 1997-2004, normalised so that the EMU12 inflation is set to 2% (Table 1). For all the EMU12 countries,

[5] This is consistent with a quantitative definition of the price stability as adopted by the ECB Governing Council: "*Price stability is defined as a year-on-year increase in the Harmonised Index of Consumer Prices (HICP) for the euro area of below 2%. The Governing Council has also clarified that, in the pursuit of price stability, it aims to maintain inflation rates below, but close to, 2%* " (http://www.ecb.int/mopo/strategy/pricestab/html/index.en.html).

but Luxembourg, the HBS effect is taken as the average from several studies as reported by the ECB (2003). For seven out of ten new EU member states, HBS effect is taken from the study by Blaszkiewicz et al. (2005). For remaining countries, the average of the actual inflation performance was taken as an indication of an inflation target.

[Table 1]

4.3. Natural rate of interest

In the conduct of monetary policy, the central bank needs to know how a 'neutral' stance of policy would look like. An interest rate corresponding to such a neutral policy is referred to as a 'natural' real interest rate (or neutral real interest rate). The concept is more than a century old and is usually ascribed to Knut Wicksell who in his (1898) work stated: "*there is a certain rate of interest on loans which is neutral with respect to commodity prices and tends neither to raise nor to lower them*" (cited in Mesonnier and Renne, 2004; see also Woodford 2003). Still, in recent literature there is no one consensual concept (Giammaroli and Valla, 2003). Since the natural interest rate is a parameter of the standard Taylor rule used in this paper, all the simulations are based on some assumptions concerning the levels of natural rates of interests in EU25 countries.

For any particular economy, its natural rate of interest is time-varying. However, there are no commonly agreed simple and robust techniques of extracting a proxy of natural rate that would allow automatic calculations for the sample of countries analysed in this paper. Consequently, the simulations reported below are based on a set of alternative realistic values of natural rates that are constant over time.

For the euro area (EMU12), recent estimates of the time varying natural rate indicate that it oscillated between 1-4% in the first years of the EMU, but was much higher – up to 7% in the early 1990s (Mesonnier and Renne, 2004; Cuaresma et al., 2004; Giammaroli and Valla, 2003). In the pre-EMU period, the average of real rates in Germany was in the range of 3.25-3.75% (Clarida et al., 1998) which could be taken as an indication of an upper bound on natural rate in the EMU12 (IMF, 1998). Brzoza-Brzezina (2003) estimates the natural rate of interest in Poland to fluctuate in the range 2-6% over 1998-2003.

Natural rates of interest for the baseline scenario were set by adjusting the 2% level by half of the difference between 2% and an assumed inflation target (that is linked to average inflation as discussed above). Details are provided in Table 2.

[Table 2]

4.4. Construction of counterfactual data

While simulations based on historical series are certainly interesting and, as argued in the next sections, can provide useful insights into the characteristics of various voting schemes, more robust conclusions should be supported by analysis of a hypothetical monetary union functioning

over a long period, much longer than 8-9 years that is feasible when one relies on historical figures. Therefore, one is faced with a task of constructing counterfactual output and inflation data for 25 countries. Counterfactual data should represent realistic paths of these series for actual countries. In particular one would want that for each country output and inflation developments are not at adds with economic history and economic theory and for the countries as a group there is at least some degree of co-movement of series.

The current version of the paper takes the following approach to construct counterfactual data. First, a typical New Keynesian three equation model is taken to construct data for one 'benchmark' country (to be interpreted as Germany). Model parameters are taken from Cho and Moreno (2005). The length of the generated series is 10000, time frequency is quarterly, so in total the counterfactual series spans for 2500 years[6].

Second, data for 24 remaining countries are derived as forecasts from a simple vector autoregressive (VAR) model. The model is estimated on quarterly output gap and inflation data for 1997-2005. Endogenous variables are inflation and output gap for a chosen country and exogenous variables are German inflation and output gap data (historical – used to obtain VAR coefficients and constructed from the New Keynesian three equation model that feed to VAR forecast). Lag order was set at 4. Such a procedure allowed for constructing stationary output and inflation forecasts for 22 countries, while in case of 3 countries (Greece, Poland and Lithuania) resulting series were explosive. The simplest fix for this problem was applied, i.e. the series for these three countries were constructed independently by applying the same New Keynesian three equation model with appropriate staring values.

This simple and rather crude procedure yields broadly realistic paths of output gap and inflation for countries (median output gaps remain between -1% and 1% for the majority of countries; median inflation remains between 2% and 4% for the majority of countries; there are some outliers with output gap and inflation more volatile than was recently observed for this group of countries (still mostly within [-10%, 20%] range)). Resulting series also exhibit some degree of co-movement. For example, simple correlation coefficient for output gaps in case of Germany France and Italy are slightly higher for counterfactual data than for historical 1997-2005 series, whereas counterfactual correlations of German and UK output gaps is lower than the historical one.

Other approaches to generation of counterfactual data will be studied in future versions of this paper. Comment and suggestions on this would be particularly welcome.

5. Results

In order to be able to compare outcomes of various simulations we introduce a measure of divergence between an optimal (prescribed by an area-wide Taylor rule) interest rate path and a

[6] Such length of series is close to the feasible upper limit due to computational time constraints of the procedures applied to produce results reported in section 5. Some of the simulations required several hours to complete.

path implied by voting outcome under a particular set of assumptions. We calculate two numbers: a sum of absolute values of deviations (SAD) and a sum of squared deviations (SSD), both expressed in percentage points. We normalise both figures by dividing them by the number of observations (months or quarters). We report them jointly, as [SAD, SSD]. In calculating the deviations between optimal and decided interest rate we round them to the nearest quarter of the percentage point to better reflect the reality at the ECB, which sets its interest rates in discrete steps. As a guide for interpretation it might be worth recalling that the SAD value of 1 would be produced e.g. by an error in interest rate to the tune of 1 percentage point during 1% of all the Governing Council meetings. The value of 50 (100) would indicate that each meeting on average results in an interest rate missing the optimum by 0.5 (1) percentage point. A higher value of the SSD relative to the SAD would indicate less frequent but more severe errors.

5.1. Results for historical data

This section presents results obtained using historical monthly figures between 1M1997 and 6M2005. This corresponds to a though experiment – assuming an EMU of 12 or 25 countries was formed in January 1997 (and taking further assumptions as discussed in sections 2 and 3), how would the monetary policy decisions diverge from 'optimal' monetary policy under various extents of regional biases and various voting schemes.

Before presenting evidence of several other specifications it is useful to see the potential importance of regional biases under some benchmark scenarios. The first such scenario could be the (fully unrealistic) worst-possible case when all members of the Governing Council (both Board members and national central bank governors) form their interest rate preferences taking into account only developments in their home economies (Figures 1 & 2).

[Figure 1]

[Figure 2]

It is evident that the extreme assumption that all members of the Governing Council take a purely national perspective results in substantial divergence of interest rate decided by majority voting using the one-man one-vote principle from the interest rate that would be preferred by a single policy maker oriented towards area-wide developments. What is interesting, however, is that this is true both in the EMU consisting of 12 countries (current euro area members) and for a hypothetical euro area of 25 countries. There is almost no difference between our divergence measures for EMU12 ([36.3, 25.0]) and EMU25 ([40.4, 26.7]).

The second interesting case corresponds to an implicit or explicit assumption taken in some analyses (e.g. Baldwin et al., 2001) that ECB Board members take the perspective of the euro area as a whole, while national central bank governors are subject to pure regional biases. In our setting this amounts to an assumption that 6 Board members form their preferences on the basis of Taylor

rule calculated for area-wide data and 12 or 25 member countries' central bank governors only look at their home countries data. Figures 3 and 4 plot the differences between an interest rate implied by the area-wide Taylor rule and an interest rate decided by majority voting under the current voting system and the above described assumptions. Our deviation measures take the value of [2.2, 0.7] for the EMU12 compared to [2.7, 1.2] in the EMU25. These can be regarded as very small policy errors. As in the previous case the difference between EMU12 and EMU25 is not significant.

[Figure 3]

[Figure 4]

The assumption that members of the Governing Council take a purely national perspective and fully disregard developments in other countries is clearly absurd from a practical perspective. The interrelations between countries forming a monetary union are quite strong so that even an objective function trying to minimise only the home country loss (and paying no attention to area-wide losses) should take into account developments in other countries (e.g. important trade partners). A simple way of introducing such considerations into our modelling framework is to assume that interest rate preferences of Governing Council members are formed as weighted averages of interest rates implied by country specific Taylor rule and area-wide rule. By manipulating the weights we can consider the whole spectrum of regional biases – from a pure regional bias (assigning weight 0 to an interest rate calculated for the whole area) to a pure area-wide focus (assigning weight 1 to an interest rate calculated for the whole area). One way of interpreting this exercise is by looking at the minimum weight on area-wide interest rate that all Governing Council members need to assign, so that the interest rate emerging as an outcome of the majority voting is identical to the one implied by an area-wide Taylor rule. In our baseline specification of other parameters this weight equals 0.9 for EMU12 and 0.92 for EMU25. In other words, euro area monetary policy in EMU12 and in EMU25 would be carried optimally under majority voting using the currently utilised voting scheme, when all members of the Governing Council attached a weight not higher than 10% (in EMU12) or 8% (in EMU25) to developments in their home countries.

In March 2003, the EU Council adopted the reform of the ECB voting modalities (Council, 2003; for discussion see Paczynski, 2005). It was designed to better suit the larger and more heterogeneous EMU. It introduces rotation of voting rights among groups of central bank governors. The groups are to be created according to a ranking of countries that should reflect the importance of respective economies in the EMU economy. Central bank governors from larger countries (according to that ranking) will have a right to vote on monetary policy decisions more often than governors representing smaller countries. Intuitively, such a solution would appear well suited to eliminate some of the potential regional biases since the impact of representatives of

smaller countries on interest rate decisions is falling. This assertion can be put to a test in our modelling framework.

Since not all details of the solution are specified in Council (2003) it is necessary to take some assumptions. In particular, Council decision only requires that "*within each group, the governors shall have their voting rights for equal amounts of time*". Its remains to be decided how often the changes in the allocation of voting rights within groups will be done[7]. In our exercise all options between one and six months are tested. This appears to be a realistic range. Six months frequency would imply that in the EMU of 25 countries central bank governors from the countries in the third group would have voting rights for 1.5 years followed by 2 years of participating in discussions without a right to vote on final decisions. Also, we need to adopt rules for determining which country has a right to vote when. Since, given a relatively short sample of data at our disposal, manipulating the composition of countries with voting rights over time could lead to different results, in the simulation exercise 100 random draws are taken to determine the starting combination of countries with voting rights within each of the three groups.

The somewhat surprising results of such simulations indicate that the impact of regional biases on distortion of monetary policy appears to be actually higher under the new voting modalities decided by Council (2003) compared to the currently used one-country one-vote rule. In the case of pure regional biases (all members of the Governing Council look only at home country data) and a baseline specification of other parameters our deviation measures take the value of [47, 38] under the new rule compared to [40, 27] under the old rule. Such an ordering between deviation measures remains true under the whole range of regional biases among Governing Council members (see Figure 5)[8].

[Figure 5]

Yet another thinkable voting scheme that the ECB could be using for monetary policy making could be simply copied from a rule followed in some other spheres where Governing Council is

[7] As stipulated by Council (2003) this and other decisions on implementation details are to be taken by the Governing Council, acting by two-thirds majority of all its members.

[8] The results might at first sight appear somewhat counterintuitive. For better understanding of why it might happen that for particular data history new voting rule might turn out worse than an old voting rule it might be instructive to consider a very simple case of monetary union consisting of 3 countries. Suppose that one country is large and two others are very small so that aggregate union data are in practice determined by large country data. Suppose that the governing council of the central bank consists of representatives of 3 countries, each of whom only looks at data of her own country. The old rule would mean that 3 members are voting and under the new rule large country would get a permanent voting right and only one of two representatives of small countries would vote at any particular meeting.

One can always order the preferred interest rates from the lowest to the highest one as (x, y, z). Let us denote by L interest rate preferred by a large country (and thus the union as a whole) and by S rates preferred by small countries. Under the old rule the optimal decision is taken whenever an ordering (S, L, S) emerges. Under (S, S, L) or (L, S, S) the decision will be identical to the one preferred by a small country where economic conditions are 'closer' to the large country. Under the new rule median rate always falls between L and S (where S is a country that holds voting right at a moment). In the model it will thus always be different from the union-wide optimal rate and over a longer period the new rule may actually perform worse than the old rule.

making decisions. As stipulated by Article 10 of the ECB Statute[9] decisions in the spheres related to the allocation of ECB capital, foreign reserve assets, allocation of central bank losses and profits are taken by a qualified majority voting, where the votes of country representatives (central bank governors) are given weight equal to the respective country share in the ECB capital and the weight on the votes of the members of the Executive Board are zero. A weighted voting scheme for the ECB Governing Council was one of the possibilities discussed during the 1990 Intergovernmental Conference on the monetary union. The proposal from the European Commission advocating such a solution was at that time opposed by the Bundesbank and the German Ministry of Finance, who feared that it would "*encourag[e] a damaging spirit of compromise amongst national interests*" (Heisenberg, 2003).

Such a voting scheme is somewhat difficult to simulate in our setting. However, an approximation of the voting outcome can be obtained by taking the weighted average of countries' preferred interest rates. The results of this exercise can be summarised as follows. Such a solution would work reasonably well in the EMU12. With the deviation measure of [7.1, 1.8] it is, however, somewhat inferior to the outcome of one country one vote rule under the assumption that all Board members take an area wide perspective. The performance of weighted voting deteriorates, in a non-linear manner, with an increase in the number of countries participating in the monetary union. In the EMU25, deviations amount to [17.5, 6.9], with most of the problems in the beginning of the sample. The results are very sensitive to the inclusion / exclusion of particular countries. For instance, the poor behaviour of the rule in 1997-1998 could have been impacted by developments in Poland, which has a high weight in ECB capital (above 5%) and which was plagued with inflation at above 10% at that period. However, the exclusion of Poland actually significantly worsens the overall performance of the voting rule over the entire period with a deviation measure of [24.5, 10.4] in EMU of 24 countries (without Poland). The rule turns out to be very sensitive to economic performance of countries with high voting weight (i.e. countries with large GDP and / or population).

5.2. Results for constructed counterfactual data

This section presents results obtained using constructed counterfactual quarterly figures spanning for 2500 years (10000 observations) that were described in section 4.4.

We repeat some of the exercises carried in section 5.1. First, we consider the worst case scenarios where all Governing Council members exhibit pure regional biases. The Council is assumed to be dominated by representatives of large EMU member states – each of the six largest countries has a permanent seat there. Not surprisingly, this scenario results in very large policy errors. The specific error values are very similar to those obtained for historical series. In the EMU12 our deviation measure is [32.6, 16.1] (compared to [36.3, 25.0] for historical series) and for EMU25 it amounts to [47.7, 33.2] (compared to [40.4, 26.7] for historical series).

[9] *Protocol on the Statute of the European System of Central Banks and of the European Central Bank*. Protocol annexed to the *Treaty establishing the European Community*, OJ C 191, 29.7.1992, p.78.

Second, we carry an exercise where all central bank governors are still assumed to exhibit pure regional biases, but the six-person Board takes a union-wide perspective. In EMU12 this leads to almost optimal policy with a divergence measure of [0.4, 0.1] (compared to [2.2, 0.7] for historical series). In EMU25, policy errors remain small and are only marginally above errors obtained for historical data – [4.1, 1.9] compared to [2.7, 1.2].

Third, we analyse intermediate extents of regional biases of all Governing Council members, in the same way as it was done for historical data. The results are broadly identical, with a maximum weight of around 10% on domestic development ensuring that collective policy making leads to optimal policy decisions (see Figure 6).

Finally, the new voting modalities agreed by the European Council in 2003 are put to a test. 2500 years perspective on this yields identical conclusions as the analysis based on short historical series. From the perspective of preventing the negative consequences of (potential) regional biases, the reformed voting rule is unlikely to help. In fact, for the selected specification it again yields slightly higher policy errors than the one country one vote rule for the whole spectrum of regional biases. Figure 6 illustrates this point (it can be compared with Figure 5).

[Figure 6]

Analysis of weighted voting scheme will be reported in next versions of the paper.

5.3. Robustness checks

The results of simulations reported above were produced under the whole set of assumptions that can be viewed as arbitrary. It is thus necessary to see whether the findings are robust to changes in the assumptions. This section reports the results of applying various robustness checks to simulations based on historical data reported in section 5.1. Simulations based on constructed counterfactual data are much more demanding in terms of computational time and so far only a limited number of robustness checks was carried for this dataset. Specifically, adding noise to output gaps and Taylor rule coefficients (including the interest rate smoothing term) does not appear to affect the results in any important way. Next versions of the paper will involve more extensive robustness checks for counterfactual data.

First, there is certainly substantial uncertainty concerning the natural rate of interest and inflation targets for all analysed countries. All the exercised were thus repeated taking alternative values for these parameters. The first modification amounted to taking equal inflation targets of 2% for all EU15 countries and for EMU12, while assuming values of 3% for ten new EU member states and a value of 2.1% for EMU25. Natural interest rates are assumed to be 1 percentage point higher in each case, thus coming closer to the suggested estimate of rates in pre-EMU Germany (Clarida et al., 1998).

This does not change the results in any significant way. Pure regional bias among all members of the Governing Council result in deviations to the tune of [30.9, 18.5] in EMU12 and [47.5, 31.9]

in EMU25. Pure regional bias among governors of national central bank and pure area-wide focus of the ECB Board gives a deviation measure of [1.5, 0.5] for EMU12 and [3.9, 1.6] for EMU25. The comparison of policy deviations from the optimum under the old and the new voting rules proves that there is practically no difference between the two (Figure 7). Similar conclusions emerge form an exercise where random noise (normally or uniformly distributed random variable with mean zero and variance of up to one) is added to each of the natural rates of interest. This should not come as a surprise since, given the relatively large number of countries, the median measures are hardly affected by such transformation[10].

[Figure 7]

While the assumed standard Taylor rate coefficients of 1.5 on inflation and 0.5 on output gap appear not at adds with some evidence on the rate setting behaviour in the euro area, other values may be equally plausible. Also, assuming identical Taylor rules for all the countries analysed is certainly restrictive. Monetary policy in various countries may react differently to inflation and output diversions from targeted levels. In order to check the sensitivity of results to assumed specifications of Taylor rules three exercises are carried.

First, we introduce various interest-rate smoothing coefficients α (between 0 and 0.99) in a modified version of a Taylor rule (2). Interest rate smoothing appears a natural characteristic of central banks and empirical applications where Taylor rule is estimated for particular countries almost always introduce a rate-smoothing term. Repetition of the exercises reported above for various values of α does not change the results.

$$i_t = \alpha * i_{t-1} + r^{eq}_t + \pi_t + 0.5 * \{y_t + (\pi_t - \pi^{targ}_t)\} \qquad (2)$$

Second, we drop an assumption on identical Taylor rule coefficients between countries. This is achieved by adding a random term (normally distributed with mean zero and variance of 0.25) to baseline coefficients on inflation and output gap for each country and recalculating all the results. The outcome of this exercise is quite encouraging as, again, all the main findings are confirmed – the relations between results for various combinations of regional biases, compositions of a monetary union and voting schemes remain the same. Adding a random term to Taylor coefficients for each country and each period separately does not change the results in any significant way – any overall effect is just averaged out.

Third, we keep the assumption on homogeneity of countries with respect to Taylor rule coefficients but test various values of coefficients. The results appear robust to manipulating the coefficient on inflation between 1 to 2.5 and coefficient on output gap ranging from 0 to 1.5, at least with respect to comparison of EMU12 and EMU25 performance. Stronger reactions to inflation

[10] An identical reason most likely explains the observation that the results are unaffected by introducing random noise (with mean zero and variance of up to one) to output gap estimates.

deviations (coefficient in the range of 2-2.5) significantly worsened the performance of collective monetary policy making under the pure regional bias case (with all members of Governing Council looking only at domestic developments). Under the same scenario, low weights on inflation deviations give lower policy errors. Manipulations of output gap weights have much lower impact on the results, though weights closer to 0 result in somewhat worse outcomes. All these affect EMU12 and EMU25 in a very similar manner. Alternative values of coefficients do not change the findings concerning the comparison of the old voting rule and the new rule in the EMU25. Both rules lead to broadly similar policy errors under the whole range of regional biases (Figure 8). Manipulation of Taylor rate coefficients has negligible impact on the Governing Council performance under the scenario of Board members adopting an area-wide perspective.

[Figure 8]

6. Conclusions

This paper takes two bold assumptions, that (a) historical patterns of output and inflation among the EU25 countries provide a good approximation of future co-movements of these variables, or at least that the synchronisation of business cycles will not widen after the countries adopt the common currency and (b) that a Taylor rule can be treated as an indicator of interest rate preferences for all the EU25 countries, to assess the potential impact of regional preferences among members of the ECB Governing Council on the jointly decided monetary policy. The findings can be summarised as follows. First, the scenario in which members of the Governing Council took a purely home country perspective and opted for monetary policy that best suited their countries would result in sizeable deviations of monetary policy outcomes from its optimal path. Second, the situation would not improve sufficiently if Governing Council members took a less radical stance and were assigning a weight of above 15% or so to the domestic objectives and below 85% or so to the area wide objectives. Third, the presence of six Board members taking an area-wide perspective in the Governing Council would allow for almost fully overcoming the problem of regional biases among all national central bank governors, as ensuing policy errors would be small. Fourth, all the above assertions would hold true irrespective of whether the monetary union consisted of 12 countries as is the case at present or whether all 25 EU countries participated, thought the scale of the problem would appear marginally more pronounced in the larger union. Fifth, the eventual adoption of the new voting modalities as accepted by Council (2003) does not appear to be well suited to alleviate the potential problems due to regional biases. Sixth, an alternative voting rule based on weighted majority voting do not appear to be a viable option as its performance is very sensitive to diverging economic conditions in larger countries and overall they lead to large policy errors.

If one is convinced that the assumptions underlying the work reported here are realistic, there are potentially important policy lessons ensuing from these results. Ensuring the spirit of area wide focus among policy makers responsible for monetary policy appears to be of utmost importance for the policy conduct. This might provide a rationale e.g. for depoliticising the process of nominations of the members of the ECB Executive Board. The results also cast doubt on one of the arguments in favour of the project of the reform of voting modalities adopted by the EU Council in March 2003 (Council, 2003). While its adoption would not visibly worsen the potential of regional biases to affect the policy making at the ECB, it appears unlikely that new rules would improve the situation in this respect. This can be quite discouraging in view of several other problematic issues that the new rule involves (Paczynski, 2005). Finally, the EMU enlargement does not appear to have a potential to meaningfully worsen the problems that can theoretically be related to regional biases.

Further work on this paper will concentrate on refining ways for construction of counterfactual data and more extensive robustness checks.

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Table 1. Inflation targets – baseline scenario

Austria	1.9	Netherlands	2.1	Hungary	3.2
Belgium	2.0	Portugal	2.3	Latvia	2.8
Finland	1.9	Spain	2.3	Lithuania	1.7
France	1.9	Denmark	1.9	Malta	2.2
Germany	1.6	Sweden	1.7	Poland	2.7
Greece	2.6	United Kingdom	1.5	Slovak Republic	3.2
Ireland	2.6	Cyprus	2.3	Slovenia	3.2
Italy	2.1	Czech Republic	2.2	EMU25	2.0
Luxembourg	2.3	Estonia	2.7	EMU12	2.0

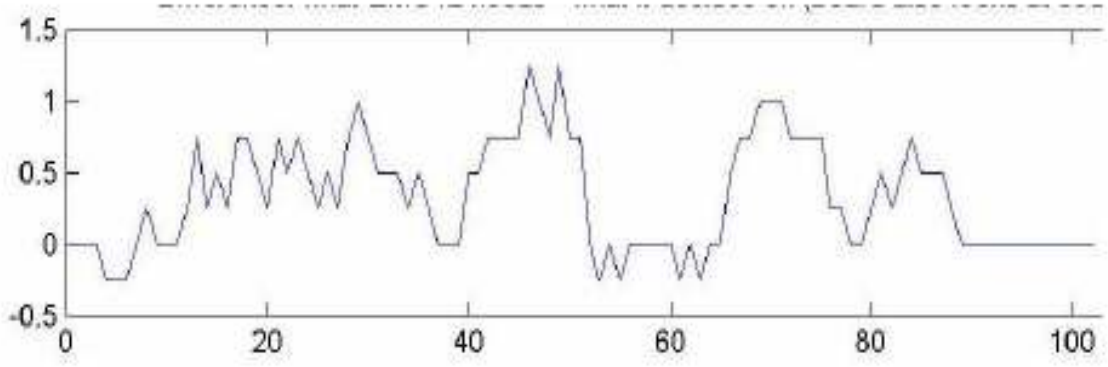
Note: See section 4.2 for details of calculations.
Source: Own calculations.

Table 2. Natural rates of interest – baseline scenario

Austria	1.9	Netherlands	2.0	Hungary	2.6
Belgium	2.0	Portugal	2.2	Latvia	2.4
Finland	2.0	Spain	2.2	Lithuania	1.9
France	1.9	Denmark	1.9	Malta	2.1
Germany	1.8	Sweden	1.9	Poland	2.3
Greece	2.3	United Kingdom	1.8	Slovak Republic	2.6
Ireland	2.3	Cyprus	2.2	Slovenia	2.6
Italy	2.1	Czech Republic	2.1	EMU25	2.0
Luxembourg	2.2	Estonia	2.4	EMU12	2.0

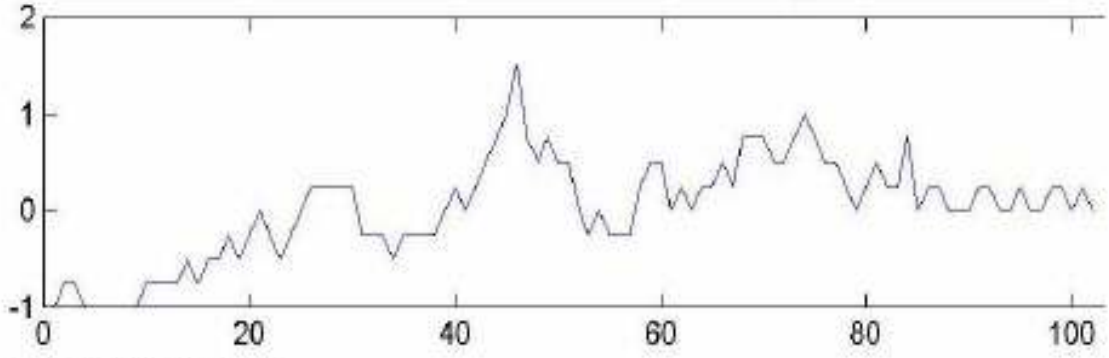
Note: See section 4.3 for details of calculations.
Source: Own calculations.

Figure 1. Policy error - difference between EMU12 optimal interest rate and interest rate that would be decided by the Governing Council. Worst case scenario – pure regional biases among all GC members (% points, months, 1997M1-2005M6)



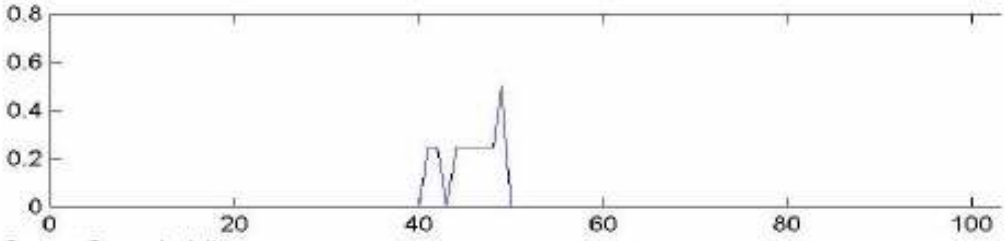
Source: Own calculations.

Figure 2. Policy error - difference between EMU25 optimal interest rate and interest rate that would be decided by the Governing Council. Worst case scenario – pure regional biases among all GC members (% points, months, 1997M1-2005M6)



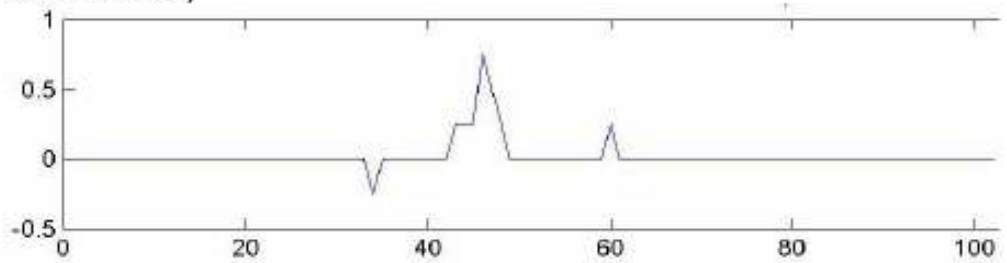
Source: Own calculations.

Figure 3. Policy error - difference between EMU12 optimal interest rate and interest rate that would be decided by the GC. Pure regional biases among national central bank governors and pure EMU-wide focus of ECB Board members (% points, months, 1997M1-2005M6)



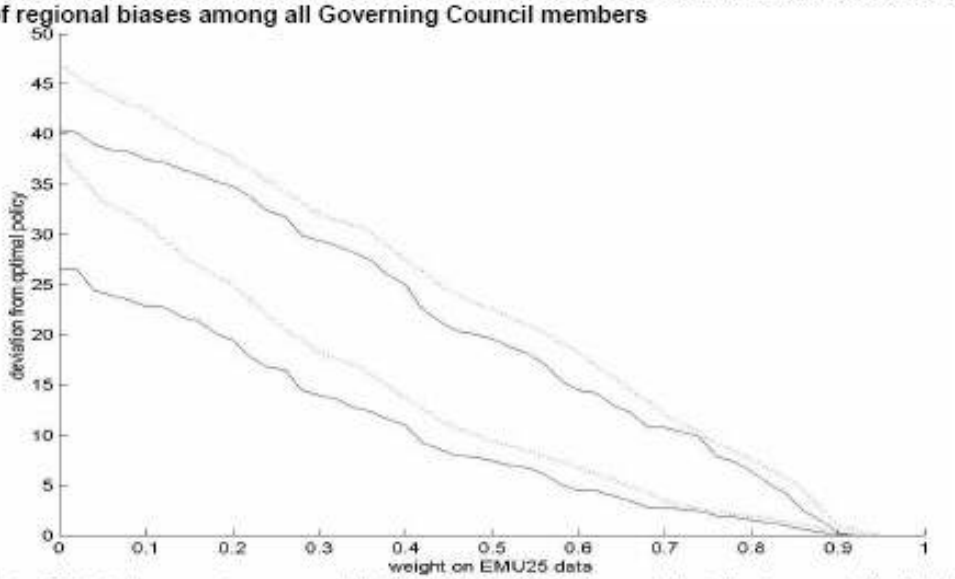
Source: Own calculations.

Figure 4. Policy error - difference between EMU25 optimal interest rate and interest rate that would be decided by the GC. Pure regional biases among national central bank governors and pure EMU-wide focus of ECB Board members (% points, months, 1997M1-2005M6)



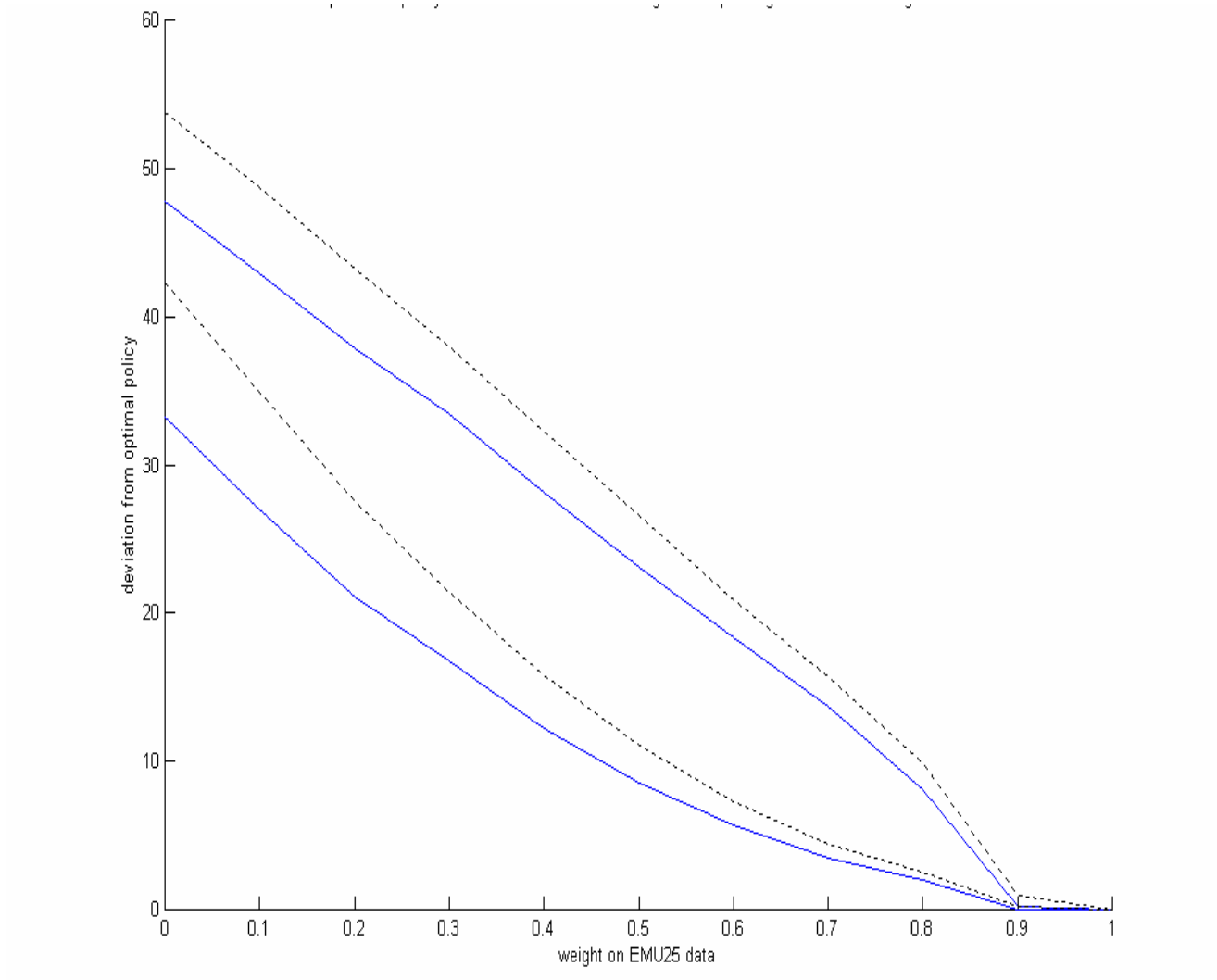
Source: Own calculations.

Figure 5. Comparison of policy errors under new and old voting rules: various extent of regional biases among all Governing Council members



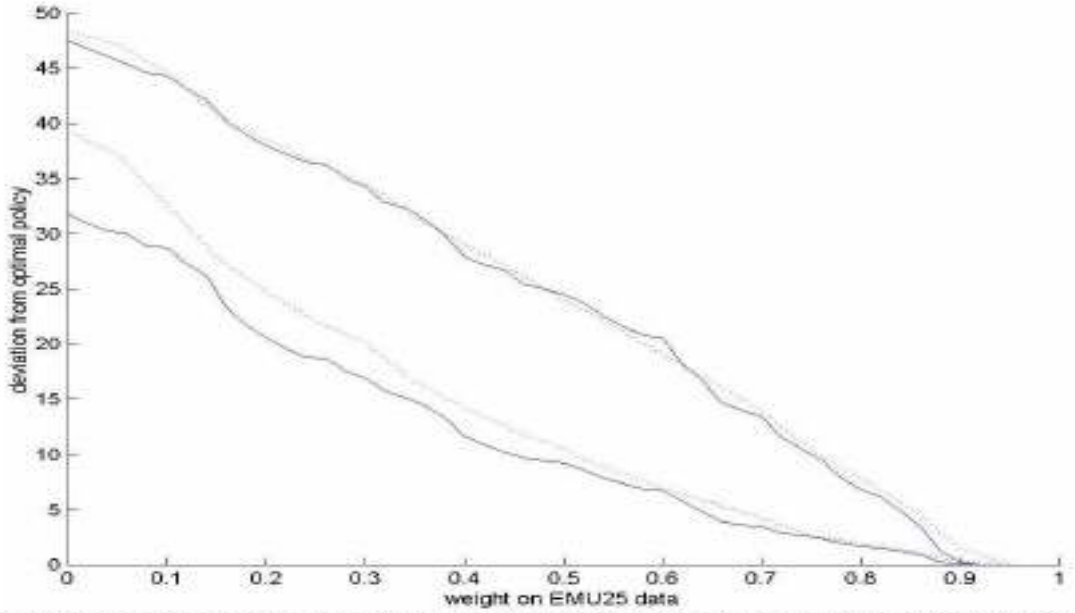
Note: Old rule (one country – one vote) depicted by solid line; new rule (rotation in groups) depicted by dotted line. For each of the rules two plotted lines showing two error measures: SAD and SDD

Figure 6. Comparison of policy errors under new and old voting rules: various extent of regional biases among all GC members for constructed counterfactual data



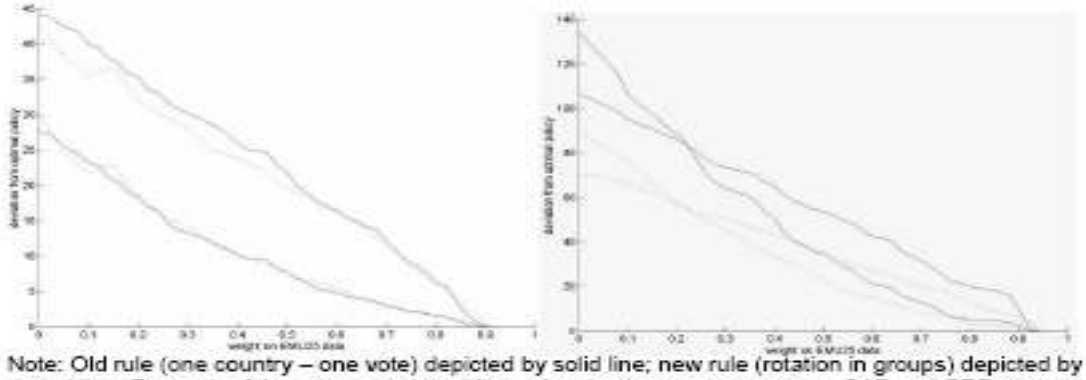
Note: Old rule (one country – one vote) depicted by solid line; new rule (rotation in groups) depicted by dotted line. For each of the rules two plotted lines showing two error measures: SAD and SDD

Figure 7. Comparison of policy errors under new and old voting rules: various extent of regional biases among all GC members (alternative values of inflation targets and neutral interest rates)



Note: Old rule (one country – one vote) depicted by solid line; new rule (rotation in groups) depicted by dotted line. For each of the rules two plotted lines showing two error measures: SAD and SDD

Figure 8. Comparison of policy errors under new and old voting rules: various extent of regional biases among all GC members (alternative Taylor rule coefficients)



Note: Old rule (one country – one vote) depicted by solid line; new rule (rotation in groups) depicted by dotted line. For each of the rules two plotted lines showing two error measures: SAD and SDD
Left panel plots the results for a Taylor rule with high weight on output gap (1) and low weight on inflation deviations (0) and the right panel for a Taylor rule with low weight on output gap (0.1) and high weight on inflation deviations (2.5)