

Fahrholz, Christian; Mohl, Philipp

**Working Paper**

## EMU-enlargement and the reshaping of decision-making within the ECB Governing Council: a voting-power analysis

Ezoneplus Working Paper, No. 23

**Provided in Cooperation with:**

Jean Monnet Centre of Excellence (JMC) - Ezoneplus Research Project, Free University Berlin

*Suggested Citation:* Fahrholz, Christian; Mohl, Philipp (2004) : EMU-enlargement and the reshaping of decision-making within the ECB Governing Council: a voting-power analysis, Ezoneplus Working Paper, No. 23, Free University Berlin, Jean Monnet Centre of Excellence, Berlin

This Version is available at:

<https://hdl.handle.net/10419/31940>

**Standard-Nutzungsbedingungen:**

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

**Terms of use:**

*Documents in EconStor may be saved and copied for your personal and scholarly purposes.*

*You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.*

*If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.*



EMU-enlargement and the Reshaping of  
Decision-making within the ECB Governing  
Council: A Voting-Power Analysis

Christian Fahrholz  
Philipp Mohl

Ezoneplus Working Paper No. 23

June 2003



FIFTH FRAMEWORK PROGRAMME

**Ezoneplus**

The Eastward Enlargement of the Eurozone  
Research Project HPSE-CT-2001-00084  
Fifth Framework Programme 2001-2004  
European Commission  
[www.ezoneplus.org](http://www.ezoneplus.org)

**Jean Monnet Centre of Excellence**

Freie Universität Berlin  
Hnestr. 22, 14195 Berlin, Germany  
Phone: +49 (30) 838 – 54966  
Fax: +49 (30) 838 – 52357  
Email: [info@ezoneplus.org](mailto:info@ezoneplus.org)



The Eastward Enlargement of the Eurozone

Berlin Evora Helsinki Ljubljana Bologna Tartu Warsaw

# EMU-enlargement and the Reshaping of Decision-making within the ECB Governing Council: A Voting-Power Analysis

Christian Fahrholz\* and Philipp Mohl†

This draft version: June 1<sup>st</sup>, 2004

## Abstract

The monetary policy of the European Central Bank (ECB) is the subject matter of this paper. We analyze the prospects for future price stability in an enlarged European Monetary and Economic Union (EMU). At the heart of this study are the potential effects of altering decision-making procedure within the Governing Council of the ECB on price stability in the eurozone. The authors compare the impact of three alternative reform scenarios of the ECB Governing Council with the help of a voting-power analysis. It is presumed that a considerable loss of current EMU-members' influence power especially in favour of joining Central Eastern European Countries (CEECs) results in a loss of monetary credibility of the ECB: As transparency of the decision-making process within the ECB is lacking, markets may consider the ECB to be too much inclined to the economic performances of the CEECs. This has then a negative impact on the level of price stability in Europe. The voting-power analysis indicates which reform proposal is best with respect to a price-stability benchmark.

KEYWORDS: power indices, Banzhaf, ECB, monetary policy, enlargement, eurozone.

JEL classification: D72, D78, E58.

---

\*Freie Universität Berlin, Jean Monnet Centre of Excellence, Ihnestr. 22, D-14195 Berlin, E-mail: fahrholz@zedat.fu-berlin.de; Scholar of the DFG-graduate programme "The New Europe" / Berlin Graduate School of Social Sciences.

†Freie Universität Berlin, Jean Monnet Centre of Excellence, Ihnestr. 22, D-14195 Berlin, E-mail: philmo@zedat.fu-berlin.de.

# 1 Introduction

While ten new member countries <sup>1</sup> (NMC) joined the European Union (EU) in May 2004, the next step towards the enlargement of the European Monetary Union (EMU) is already being discussed in academics (see, for instance, Berger et al. 2002; De La Dehesa 2003; Gros et al. 2002; Maier and Hendrikx 2002). Changes in the decision-making rules of the European Central Bank (ECB) may be inevitable in order to cope with the enlargement of the eurozone (Baldwin et al. 2000). Recently, the European Central Bank (ECB 2003) as well as the German Institute of Economic Research (DIW)—i.e. Lommatzsch and Tober (2003)—published two practical relevant reform proposals comprising new voting schemes for the decision-making bodies within the ECB. Current members of EMU will lose influence on European monetary policy making in favour of the newcomers. The NMC, in particular the Central Eastern European Countries (CEECs), may be over-represented if no reform would be passed (Berger 2002). As a result the efficacy of ensuring price stability in the eurozone may be impaired.

This paper inquires into the effects of the newcomers' admittance to the eurozone on price stability in EMU. Our initial position is that the NMC' and in particular the CEECs' adoption of the euro as legal tender provokes an inflationary bias of the common currency. The crux is the reshaping of decision-making procedures within the ECB in course of the EMU-enlargement on market expectations. The number of actors in the ECB board, their voting-behaviour—whether they are partisan or non-partisan—, and the voting schemes in connection with present transparency regulations have a bearing on those market expectations.

The analytical tool with which we tackle the research topic is voting-power analysis. There exists a voluminous literature on voting power

---

<sup>1</sup>The list of accession countries comprises Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, the Slovak Republic and Slovenia. In addition, we consider “the Euro at 25” (Gros 2003)—i.e. Denmark, United Kingdom, and Sweden adopting the euro, as well.

analysis of EU institutions. These studies have estimated the power of the member states in the Council of the EU (Berg 1999; Bilbao et al. 2002; Schroeder 1998; Widgrén 1994), the European Parliament (Lane et al. 1995) or both (Aleskerov et al. 2002; Nurmi and Meskanen 1999). Interestingly, the ECB has rarely been a subject matter of voting-power analysis. This study strives to close this gap. As a result, the voting-power analysis indicates which of the currently debated reform proposal is best in terms of ensuring price stability.

The remainder is structured as follows: Section 2 considers some general aspects of the eastward enlargement of the eurozone relevant to European monetary policy-making. The power-index literature, in particular the Banzhaf-indices, is reviewed in section 3. By the same token, we outline alternative voting-behaviour of national members within the ECB. Section 4 analyzes the present voting scheme of the ECB as well as of the existing reform proposals. The empirical analysis of section 5 ascertains the most appropriate reform scenario with respect to our benchmark—i.e. the price stability objective of the ECB. Finally, section 6 concludes.

## **2 Crucial junctures of the EMU-enlargement**

This section surveys the economic starting position of the NMC particularly of the CEECs. In that way, we find out something important about some accession countries interests regarding rather growth promoting monetary policies. These insights are connected with the formation of market expectations. The ECB's communication policy towards the public is characterized by limited transparency. The latter affects market expectations and thus inflation in the eurozone. The following considerations contribute to the later analysis on partisan voting-behaviour of national central bank governors.

The eastward enlargement of the eurozone entails the inclusion of

countries with a relative low level of capital endowment. In particular, CEECs are replacing a relative obsolete capital stock. At the same time, they are catching-up towards current members of EMU. This process of real convergence requires capital influx. Current account deficits balance these capital account surpluses. Higher real interest rates reflect that expected rates of return—reflecting increasing productivity growth—in CEECs are higher compared with current EMU-member countries. Thus, capital flows ensue. CEECs may favour relative low interest rates—albeit a levelling out of the interest rate differential would certainly discomfort them—because these would facilitate the financing of CEECs’ catching-up. That is CEECs can be suspected to opt for growth promoting monetary policy in an enlarged eurozone. In turn, a common monetary policy can be too restrictive—i.e. curtailing output and employment—for CEECs.<sup>2</sup> In this regard, ambiguous institutional changes within the decision-making process of the ECB can put the price stability of the euro at stake. This applies particularly when market sentiments expect the ECB to be too much inclined to CEECs’ concerns and to accept possibly higher inflation in the periphery, thus, forfeiting credibility (cf. Baldwin et al. 2000: 26). This can entail setbacks for the current level of price stability in the eurozone as the risk-premium of the euro can rise and the ECB faces higher inflationary pressure.

According to Article 107(3) of the Treaty each EMU-member delegates its monetary-policy competencies to the ECB’s two voting bodies depicted in figure 1: The Executive Board (EB) consists of the ECB’s President, its vice-president and four other EB-members.<sup>3</sup> The Governing Council (GC) consists of all EB-members plus national central bank (NCB)-governors of the EMU-member countries.

The tasks of these two decision-making bodies are formally defined by

---

<sup>2</sup>Sinn and Reutter (2001)—though in context of debating the appropriateness of the Maastricht criteria for CEECs—already demanded a relaxation of the inflation-rate criterion allowing for better prospects of real convergence in these countries.

<sup>3</sup>Currently (since 1 November 2003) the EB-members are France (President), Greece (Vice-President), Germany, Italy, Spain and Austria.

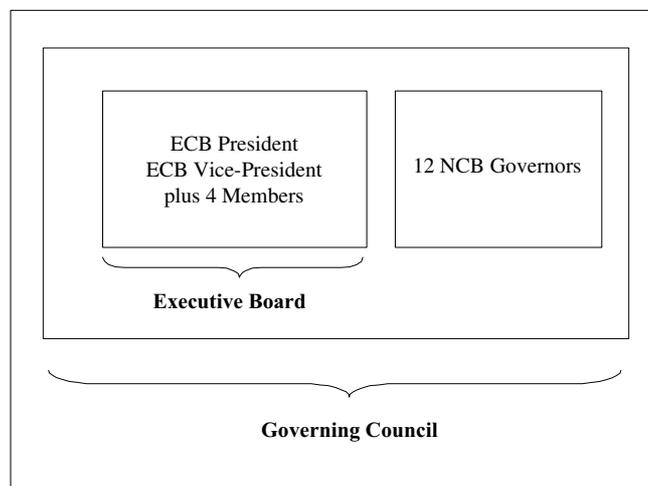


Figure 1: The institutional structure of the ECB

Article 12(1) of the Protocol of the Statutes of the European System of Central Banks (ESCB) (Protocol). The central responsibility falls on to the GC that “shall adopt the guidelines and make the decisions necessary to ensure the performance of the tasks entrusted to the ESCB” (Protocol, Art. 12(1)). Besides, the tasks of the EB are of operational matter—i.e. it “shall implement monetary policy in accordance with the guidelines and decisions laid down by the Governing Council” (Protocol, Art. 12 (1)).

In this context, the issue transparency is of high relevance. We broadly define transparency as the degree of genuine understanding of monetary policy-making of the ECB by the public (Winkler 2000: 7). This is to say, that the ECB reveals enough about its analysis, internal deliberations and decision-making processes for the public to see the logic behind each policy decision (Blinder et al. 2001: xix). According to the present stance of the ECB’s communication policy there is no disclosure of minutes and voting records of the ECB board meetings. This kind of (in)transparency—whether it is generally of advantage or disadvantage is not the subject matter of this paper (see Hahn 2002 for an according survey of the literature)—affects the

formation of market expectations in a certain way. The ECB establishes an information asymmetry vis-à-vis the public as it does not reveal its preferences regarding macroeconomic aggregates such as output and inflation. For that reason, our considerations rely on a time-inconsistency model with incomplete information in spirit of Barro and Gordon (1983).<sup>4</sup> Accordingly, the ECB's accountability in terms of giving prominence to price stability is impaired. This applies particularly when markets expect the ECB to be too much inclined to CEECs' aforementioned interests concerning relative low (real) interest rates. If markets will accuse the ECB of 'lax' monetary policy, then both current and new members of EMU will be stuck with a leap in the euro's risk premium. Therefore, higher interest rates may be required in order to maintain the present level of price stability.

Summarily, given the current transparency regulations, the inclusion of catching-up economies—in particular CEECs—engenders less price stability or higher interest rates in the eurozone. This is due to the fact, that neither the public can reconstruct the deliberations and voting decisions of the GC, nor the ECB can make binding agreements vis-à-vis the public. The GC-members' voting behaviour as well as their potential influence on European monetary policy-making is subject of the following section.

### **3 Voting power and behaviour**

This section aims at introducing the idea of voting power indices especially the Banzhaf indices. By the same token, we address partisan and non-partisan voting behaviour.

Voting power of a member of a decision-making body is the extent to which the member is able to affect the outcome of a vote given a specific decision-making rule or voting scheme. Generally, power indices inquire into pivotal voters in a ballot, which turn a portion of voters in a winning coalition. There are two different strands of power indices (Felsenthal and Machover

---

<sup>4</sup>NB: The underlying model is not developed here.

1998, 2001). These two interpretations are distinguished as follows:

The first understanding is that of power as *influence*. This specific concept revolves around the extent to which a voter can affect the outcome of a division of a voting body. The according concept is labelled “I-power”. The other concept concerns power as a voter’s expected relative share in some *prize*, which is accordingly called “P-power” (Felsenthal and Machover 1998: 84). P-power, in contrast to I-power, has a distinct game-theoretic notion. It presupposes office-seeking behaviour aimed at winning, since only the winner can get a part of the prize. Unlike in the case of I-power, interaction is an essential element of coalition formation. However, with respect to the GC of the ECB the P-power indices—such as the Shapley-Shubik index (Shapley and Shubik 1954, Shapley 1953)—are rather inappropriate. The voting outcome of a ballot within the GC affects both the winning and the losing coalition. According to the rationale of I-power, voting behaviour is motivated by policy-seeking. Therefore, monetary-policy decisions are public goods rather than prizes which go to a winning coalition. A reasonable way of explaining the idea of I-power mathematically is in terms of probability (Berg 1999, Napel and Widgrén 2001; Nurmi and Meskanen 1999). The power of a distinct voter in a given voting game is the a priori probability of that voter being pivotal—i.e. being in a position to turn a winning coalition into a losing one by withdrawing from it and vice versa. In this regard, the Banzhaf indices are proper measures capturing essential characteristics of the voting within the GC of the ECB.

This voting-power analysis aims at determining each minimal winning coalition, at which at least—but not necessarily all—members of a winning coalition can induce a change in European monetary policy-making. At this point, we consider a voter’s impact on a voting outcome independent of the sequential order of forming a coalition as all coalitions are equally likely. Hence, the I-power indices are suited to measure the a priori power of current EMU-members.<sup>5</sup> In particular, the Banzhaf indices can account for the

---

<sup>5</sup>Most often, I-power indices are criticized for being independent of players’ preferences

relative influence of each GC-member on the vote on European monetary policy.

In a few words, the Banzhaf indices consider the set of all winning coalitions  $W$  that can be formed out of a set of players  $N = \{1, \dots, n\}$ .<sup>6</sup> A weighted voting game  $v$  consists, additionally, of a quota  $q$  and weighted votes  $w_i$  with  $i \in N$ . A coalition  $S \subseteq N$  is said to be a winning one, if  $\sum_{i \in S} w_i \geq q$ . Therefore, a weighted voting game  $v$  is characterized by the set of all winning coalitions  $W = \{S \subseteq N \mid \sum_{i \in S} w_i \geq q\}$ . In order to calculate a player's voting power, the Banzhaf power indices refer to a concept of 'swings'. The term 'swing' denotes a crucial member entering a coalition  $S$ , as a result of which a losing coalition is turned into a winning one. In other words,  $v$  can also be simply described as a function

$$v(S) = \begin{cases} 1 & \text{if } S \in W \\ 0 & \text{else} \end{cases}.$$

Accordingly, the member  $i$  is crucial if  $v(S) - v(S \setminus \{i\}) = 1$ .

The non-normalized or absolute Banzhaf index (aBI) is the sum of voter  $i$ 's swings divided by the  $2^{n-1}$ —i.e. the number of coalition in which  $i$  is a member—calculated as

$$\beta'_i = \frac{\sum_{i \in S} (v(S) - v(S \setminus \{i\}))}{2^{n-1}}.$$

In regard to our research focus a desirable property of a power index is having the sum of each voter's power adding up to one—i.e. supposing  $\sum_{i=1}^n \beta'_i = 1$ . The normalized Banzhaf index (nBI) value for voter  $i$  is obtained by dividing the sum of  $i$ 's swings (regarding all possible  $2^n$  combinations) by the sum of all voters' swings, so that

$$\beta_i = \frac{\beta'_i}{\sum_{i=1}^n \beta'_i} = \frac{\sum_{i \in S} (v(S) - v(S \setminus \{i\}))}{\sum_{i=1}^n \sum_{i \in S} (v(S) - v(S \setminus \{i\}))}.$$

---

(see, for instance, Braham and Holler (2003) for further discussion).

<sup>6</sup>The subsequent representation of the Banzhaf follow to a great extent Schröder (1998).

The nBI can be interpreted as measuring each voter's relative share among all pivotal positions (Berg 1999: 20).

Apart from voting power, the voters' behaviour is also of relevance. This concerns alternatively *partisan* and *non-partisan* behaviour of GC-members. There are a number of reasons to assume that NCB-governors within EMU are concerned about domestic structures at home. This issues has been frequently debated in academics.

Alesina and Grilli (1991) agree that NCB-governors represent their national interests at the ECB as each EMU-member country has the opportunity to participate and affect the policy choice through its central bank governor. Von Hagen and Süppel (1994) and De Grauwe et al. (1998) base their models of monetary policy on the assumption that the countries representatives consider national inflation and output objectives.<sup>7</sup> It is also established in literature that "national central banks may care about a policy that accommodates macroeconomic shocks in their own country while taking a collective decision about common monetary policy" (Grüner 2001: 4).

The national-bias assumption may be less realistic in case of the EB-members, particularly with regard to the ECB President, as mentioned by Chapell et al. (1995). However, it can be presumed that the EB-members are also inclined to the economic prospects home country (cf. Vaubel 1999). Although, Article 105 of the Treaty establishing the European Community (Treaty) obliges them to impartiality and euro-mindedness. Nevertheless, Dornbusch et al. (1998: 26) assume that in the end all GC-members vote in favour of their national constituency's interests.

In line with these considerations and similar to Grüner (1999) and Mangano (1999) our calculations take partisan and non-partisan voting be-

---

<sup>7</sup>The very same is claimed regarding the United States: Krause (1996), Gildea (1992), and Knott (1986) suggest that the decisions within the Federal Reserve Board are influenced by regional, industrial and commercial interests of primary constituencies.

behaviour into account. First, EB-members are assumed to act according to the ECB statute as an entirely separate entity exclusively concerned with price stability in the EMU-12 and at the EMU-25 respectively.<sup>8</sup> At the same time, the other GC-members disregard their obligation and consider solely domestic macroeconomic aggregates. EB-members are accordingly denoted as “non-partisan”. In turn, every NCB-governor will be assumed to represent domestic preferences when voting on European monetary policy—i.e. they display “partisan” behaviour. The second set of assumptions assumes that all GC-members including the EB-members are guided by domestic concerns—i.e. displaying exclusively partisan behaviour.

## 4 The ECB in reform process

In the following, we overview present reform proposals and scenarios. The section starts with sketching the current institutional framework of the ECB (see, for details, ECB 1999). In general, we aim at determining the various (weighted) voting schemes for the subsequent calculations.

Since the GC shall “formulate the monetary policy of the Community” (ECB 1999: 64), its composition and the formal decision-making procedures are the main research subjects at this stage of analysis. Regarding this, Article 10(2) of the Protocol says that decisions are to be taken by a simple majority on a one member - one vote basis. If the vote is tied, the ECB’s President will have a decisive vote.<sup>9</sup> Past decisions of the ECB have been taken unanimously as pointed out by Linder and Olechowski-Hrdlicka (2002). Nevertheless, it is assumed that decisions are to be taken by simple majority in the following. This presumption is supported by Berger and De Haan (2002), who assume that unanimous decisions will be less probable in course of an EMU-enlargement.

---

<sup>8</sup>For reasons of simplicity, EB-members are assumed to decide collectively.

<sup>9</sup>Actually, the voting power of the country whose representative is the ECB President should be weighted more. The reader should note, however, that our calculations do not take this into account at the moment.

In order to receive a reference value—i.e. our price stability bench (see above)—we calculate the temporary voting power distribution within the ECB as follows: Equivalent to the current distribution of EB-members, six countries get additional voting weights in the partisan-scenario. With regard to the assumptions in the preceding section, there are two weighted voting games with 12 or 13 players formally described by:

- “Non-Partisan”:  $[6, 1, \dots, 1; 9]$  with  $n = 13$
- “Partisan”:  $[2, 2, 2, 2, 2, 2, 1, 1, 1, 1, 1, 1; 9]$  with  $n = 12$ .

#### 4.1 Scenario 1: Enlarging the status quo

This scenario considers an enlargement of those ten NMC joining the EU-15 in 2004 plus the three current ‘members with a derogation’ (namely Denmark, Sweden and the UK) to an EMU-25. In regard to the status quo it is assumed that the voting-distribution scheme as well as the composition of the EB remain unchanged<sup>10</sup>, so that

- “Non-partisan”:  $[6, 1, \dots, 1; 16]$ , with  $n = 26$
- “Partisan”:  $[2, 2, 2, 2, 2, 2, 1, \dots, 1; 16]$ , with  $n = 25$ .

#### 4.2 Scenario 2: The reform proposal of the ECB

After a long time of tough negotiations, the ECB finally agreed on a reform model (ECB 2003: 79-90) which is fiercely debated (see, for instance, Dvorsky and Lindner 2003, Lommatzsch and Tober 2003). However, the passage of a reform of the ECB decision-making system was urgent to keep an enlarged ECB capable of acting.<sup>11</sup> The principle of rotation will be introduced gradually: As soon as the 22nd Member State will join the euro area,

---

<sup>10</sup>The fixed composition of the EB is indeed an unrealistic assumption as the enlargement process will certainly lead to changes. It serves as a cross bench for the case that no reform is implemented at all.

<sup>11</sup>The reform proposal of the ECB has been approved—after Finland and the Netherlands have put aside their reservations—in March 2003. However, this reform of the ECB

the system will operate on the basis of three groups (see table 1). The first

	Weighted ECB indicator	Votes
GER	23,45	4
UK	17,86	
FRA	16,00	
ITA	12,19	
ESP	6,48	
NED	4,59	8
BEL	2,82	
SWE	2,52	
AUT	2,31	
DEN	1,91	
POL	1,66	
FIN	1,31	
GRE	1,30	
POR	1,29	
IRL	1,25	
LUX	0,69	
CZE	0,57	
HUN	0,49	
SLK	0,21	3
SLO	0,20	
LIT	0,11	
CYP	0,10	
LET	0,07	
EST	0,05	
MAL	0,04	
EB		6
<b>Total</b>		<b>21</b>

Table 1: Relative share of votes in the ECB scenario

group consists of the five governors from the euro area countries occupying the highest positions in the country ranking. This group shares four voting rights. The second group comprises half of all governors, rounded up to the nearest full number, and has three voting rights. Finally the third group is composed of the remaining governors, who share three voting rights.

The division into groups is based on the ranking of governors' respec-

---

can still break down. The proposal has to be ratified by national parliaments in current EU-member countries until the end of April 2004. If the ratification process fails the reform of the ECB will be again on the agenda.

tive member states, depending on a composite indicator consisting of two weighted components: the GDP at market prices (5/6 weight) and the share of a member state in the total aggregated balance sheet of the monetary financial institutions (1/6 weight) (see ECB 2003: 77).

Regarding the voting power calculations, the division is based on data by Dvorsky and Lindner (2003). Obviously, this group is not fixed, but able to change at any time. Especially the difference between the second and the third group is quite so small that fluctuations are likely to occur. In order to be able to compare the different scenarios concerning shifts in voting powers it is assumed that this division will not be changed in the near future. In respect of the ‘partisan scenario’ it is assumed that each of the three groups has two members in the EB, accordingly:

- “Non-Partisan”: [6, 4, 8, 3; 11] with  $n = 4$
- “Partisan”: [6, 10, 5; 11], with  $n = 3$ .

### **4.3 Scenario 3: Reform á la DIW**

The DIW published an institutional ECB reform model (Lommatzsch and Tober 2003) as well (see table 2). After the harsh criticisms of the ECB-reform concept, this scenario is used to compare possible differences in voting power. This scenario is also based on the principle of rotation, but in contrast to the ECB scenario the DIW proposes only the smaller countries to rotate whereas the bigger countries have a permanent right to vote. Furthermore, the four biggest economies even have the right to propose the EB governors. The according rationale can be based on the previously discussed objections that the ECB’s monetary reputation would be impaired in course of enlarging the eurozone towards the ten NMC. As far as possible, the eight groups are divided by regional criteria. Otherwise, the relative share of GDP and the relative share of population (both equally weighted) serve as an indicator in order to group the countries (see table 2). The DIW proposal can be described by:

	<b>GDP (in %)</b>	<b>Population (in %)</b>	<b>Votes</b>
GER	22,4	18,2	1
UK	17,2	13,3	1
FRA	15,8	13,1	1
ITA	13,2	12,7	1
ESP	7,0	8,9	1
POL	2,1	8,5	1
NED	4,6	3,5	1
SWE	2,6	2,0	
DEN	2,0	1,2	1
FIN	1,5	1,1	
BEL	2,8	2,3	
IRL	1,2	0,8	1
LUX	0,2	0,1	
AUT	2,3	1,8	
POR	1,3	2,2	1
SLO	0,2	0,4	
GRE	1,4	2,3	
CYP	0,1	0,2	1
MAL	0,0	0,1	
CZE	0,7	2,3	
HUN	0,6	2,3	1
SLK	0,2	1,2	
LIT	0,1	0,8	
LET	0,1	0,5	1
EST	0,1	0,3	
EB			4
<b>Total</b>			<b>17</b>

Table 2: Relative share of votes in the DIW scenario

- “Non-Partisan”: [4, 1, ..., 1; 9] with  $n = 14$
- “Partisan”: [2, 2, 2, 2, 1, ..., 1; 9] with  $n = 13$ .

After having determined the weighted voting rules of each reform scenario as well as of our reference scenario ‘status quo’ of EMU-12, we turn to the calculations of the Banzhaf indices in the following.

## 5 Empirical analysis

This section deals with the calculated Banzhaf indices.<sup>12</sup> Table 3 provides an overview of the calculations for the nBI and the aBI with regard to our reference value of the status quo and the three reform scenarios. At the same time, the scenarios are distinguished into the “partisan” and “non-partisan” alternatives.

The overview in table 3 clarifies that the economic weight of the EMU-members is of no relevance to their voting power. Actually, it is only the number of votes which affects voting power. Hence, each aBI and nBI of the status quo of the EMU-12 and at the EMU-25 are identical across all countries concerning the non-partisan alternative. Regarding the presumed partisan behaviour, the results are identical with respect to each group, too.

Due to the Banzhaf indices’ properties the relative share of votes is only an appropriate indicator of voting power in exceptional cases. It is a proper measure in case of the status-quo for the EMU-25, at which, for instance, the relative share of Germany in the EMU-25 scenario is  $2/31 = 0.0645$  whereas its nBI amounts 0.0655 from the partisan angle. However, the very same indicator fails in respect of a non-partisan environment for the present EMU-12. At this point, Germany’s relative share corresponds to  $1/18 = 0.0555$  and is hence 60 % higher than the value of its nBI amounting to 0.0346.

Shifts in the relative influences of the EB are of particular interest to our study. Resuming our considerations on the dismal prospects for future price stability in an enlarged EMU (see section 2), it will be desirable to have a non-partisan EB with a great deal of influence. We suppose that the higher the influence of the EB, the easier it is to ensure price stability in an enlarged eurozone. This is because market expectations are kept in check.

The results in table 3 show that the voting power of the EB ranges

---

<sup>12</sup>We have used *Powerslave*—a voting power program by the Finland University of Tartu—and *IOP* a programme by the University of Konstanz (see references).

	Status quo of the EMU-12				Status quo at the EMU-25				ECB Scenario				DIW Scenario			
	Non-Partisan		Partisan		Non-Partisan		Partisan		Non-Partisan		Partisan		Non-Partisan		Partisan	
	nBI	aBI	nBI	aBI	nBI	aBI	nBI	aBI	nBI	aBI	nBI	aBI	nBI	aBI	nBI	aBI
GER	0,0346	0,0537	0,1124	0,2930	0,0287	0,0779	0,0655	0,2483	0,0333	0,0500	0,0660	0,1000	0,0524	0,1208	0,1204	0,3296
UK					0,0287	0,0779	0,0319	0,1211	0,0333	0,0500	0,0660	0,1000	0,0524	0,1208	0,1204	0,3296
FRA	0,0346	0,0537	0,1124	0,2930	0,0287	0,0779	0,0655	0,2483	0,0333	0,0500	0,0660	0,1000	0,0524	0,1208	0,1204	0,3296
ITA	0,0346	0,0537	0,1124	0,2930	0,0287	0,0779	0,0655	0,2483	0,0333	0,0500	0,0660	0,1000	0,0524	0,1208	0,1204	0,3296
ESP	0,0346	0,0537	0,1124	0,2930	0,0287	0,0779	0,0655	0,2483	0,0333	0,0500	0,0660	0,1000	0,0524	0,1208	0,0576	0,1577
POL					0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0524	0,1208	0,0576	0,1577
NED	0,0346	0,0537	0,0543	0,1416	0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0524	0,1208	0,0576	0,1577
SWE					0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
DEN					0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
FIN	0,0346	0,0537	0,0543	0,1416	0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
BEL	0,0346	0,0537	0,0543	0,1416	0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
IRL	0,0346	0,0537	0,0543	0,1416	0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
LUX	0,0346	0,0537	0,0543	0,1416	0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
AUT	0,0346	0,0537	0,1124	0,2930	0,0287	0,0779	0,0655	0,2483	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
POR	0,0346	0,0537	0,0543	0,1416	0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
SLO					0,0287	0,0779	0,0319	0,1211	0,0238	0,0357	0,0471	0,0714	0,0175	0,0403	0,0192	0,0526
GRE	0,0346	0,0537	0,1124	0,2930	0,0287	0,0779	0,0655	0,2483	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
CYP					0,0287	0,0779	0,0319	0,1211	0,0238	0,0357	0,0471	0,0714	0,0175	0,0403	0,0192	0,0526
MAL					0,0287	0,0779	0,0319	0,1211	0,0238	0,0357	0,0471	0,0714	0,0175	0,0403	0,0192	0,0526
CZE					0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
HUN					0,0287	0,0779	0,0319	0,1211	0,0385	0,0577	0,0254	0,0385	0,0175	0,0403	0,0192	0,0526
SLK					0,0287	0,0779	0,0319	0,1211	0,0238	0,0357	0,0471	0,0714	0,0175	0,0403	0,0192	0,0526
LIT					0,0287	0,0779	0,0319	0,1211	0,0238	0,0357	0,0471	0,0714	0,0175	0,0403	0,0192	0,0526
LET					0,0287	0,0779	0,0319	0,1211	0,0238	0,0357	0,0471	0,0714	0,0175	0,0403	0,0192	0,0526
EST					0,0287	0,0779	0,0319	0,1211	0,0238	0,0357	0,0471	0,0714	0,0175	0,0403	0,0192	0,0526
EB	0,5848	0,9077			0,2834	0,7705			0,1667	0,2500			0,3182	0,7332		

Table 3: Calculations of Banzhaf indices

from 16.7 % (ECB Scenario) to 58.5 % (Status quo of the EMU-12). At present, the EB is quite powerful as it exhibits significantly more voting power (58.5%) than its relative share of votes would imply (6 out of 18, i.e. 33.3%). Accordingly, the EB rather stands as firm as a rock. This is possibly why market expectations concerning inflation can presently be curbed. However, the influence of the EB will diminish in course of the eastward enlargement of the eurozone. Supposing the DIW scenario is put through, the voting power of the EB almost halves to 31.8%. If the ECB reform is really implemented, the influence of the EB will even shrink to 16.7%.<sup>13</sup>

An assessment of the quality of different reform scenarios against the background of price stability in the eurozone requires a comparison of alternative outcomes in different scenarios. The results of the calculations—in relation to the nBI—are summarized in table 4.

It is obvious that all current members of EMU will lose influence, if the status quo of the voting scheme in the GC is simply preserved after the NMC' admittance to the eurozone. This applies certainly to both the partisan and the non-partisan attitude. In respect of the latter, the loss of I-power for the biggest economies of the eurozone (France, Germany, Italy, and Spain) is only marginal (-0.1%) in the ECB scenario when compared to the status quo at the EMU-25. At the same time, the status of the remaining current EMU-members is enhanced (0.4%). Interestingly, when comparing the non-partisan DIW scenario with the status quo of the GC's decision-making procedure the signs of the results are rather reversed. Though, the Netherlands are the exception. In addition, the changes even range from -1.7% to 1.8%.

As regards the partisan perspectives, the relative sizable variations of changes in national members's influences is apparent. When comparing

---

<sup>13</sup>NB: A similar argument can be made in respect of the current EMU-12 in comparison with the status quo at the EMU-25. If the status quo of the voting scheme in the GC is not altered, then the voting power of the entire group EMU-12 declines to about 70% in the EMU-25 (not displayed in any table).

	Relative Gains and Losses from of the ... to the EMU-12						Relative Gains and Losses from of the ... to the EMU-25			
	EMU-25		ECB Scenario		DIW Scenario		ECB Scenario		DIW Scenario	
	Non-Partisan	Partisan	Non-Partisan	Partisan	Non-Partisan	Partisan	Non-Partisan	Partisan	Non-Partisan	Partisan
GER	-0,6%	-4,7%	-0,1%	-4,6%	1,8%	0,8%	0,5%	0,1%	2,4%	5,5%
UK							0,5%	3,4%	2,4%	8,9%
FRA	-0,6%	-4,7%	-0,1%	-4,6%	1,8%	0,8%	0,5%	0,1%	2,4%	5,5%
ITA	-0,6%	-4,7%	-0,1%	-4,6%	1,8%	0,8%	0,5%	0,1%	2,4%	5,5%
ESP	-0,6%	-4,7%	-0,1%	-4,6%	1,8%	-5,5%	0,5%	0,1%	2,4%	-0,8%
POL							1,0%	-0,7%	2,4%	2,6%
NED	-0,6%	-2,2%	0,4%	-2,9%	1,8%	0,3%	1,0%	-0,7%	2,4%	2,6%
SWE							1,0%	-0,7%	-1,1%	-1,3%
DEN							1,0%	-0,7%	-1,1%	-1,3%
FIN	-0,6%	-2,2%	0,4%	-2,9%	-1,7%	-3,5%	1,0%	-0,7%	-1,1%	-1,3%
BEL	-0,6%	-2,2%	0,4%	-2,9%	-1,7%	-3,5%	1,0%	-0,7%	-1,1%	-1,3%
IRL	-0,6%	-2,2%	0,4%	-2,9%	-1,7%	-3,5%	1,0%	-0,7%	-1,1%	-1,3%
LUX	-0,6%	-2,2%	0,4%	-2,9%	-1,7%	-3,5%	1,0%	-0,7%	-1,1%	-1,3%
AUT	-0,6%	-4,7%	0,4%	-8,7%	-1,7%	-9,3%	1,0%	-4,0%	-1,1%	-4,6%
POR	-0,6%	-2,2%	0,4%	-2,9%	-1,7%	-3,5%	1,0%	-0,7%	-1,1%	-1,3%
SLO							-0,5%	1,5%	-1,1%	-1,3%
GRE	-0,6%	-4,7%	0,4%	-8,7%	-1,7%	-9,3%	1,0%	-4,0%	-1,1%	-4,6%
CYP							-0,5%	1,5%	-1,1%	-1,3%
MAL							-0,5%	1,5%	-1,1%	-1,3%
CZE							1,0%	-0,7%	-1,1%	-1,3%
HUN							1,0%	-0,7%	-1,1%	-1,3%
SLK							-0,5%	1,5%	-1,1%	-1,3%
LIT							-0,5%	1,5%	-1,1%	-1,3%
EST							-0,5%	1,5%	-1,1%	-1,3%
EB	-30,1%		-41,8%		-26,7%		-11,7%		3,5%	

Table 4: Comparison of different reform scenarios

the ECB- and the DIW scenario with the EMU-25 baseline similar changes occur—however, under changed signs. In this context, a very interesting result is that partisan behaviour makes almost all of the current EMU-members comparatively worse off. This applies to all countries that have no “wild card” in the DIW scenario as well as to the rotation procedure in the ECB scenario.

A comparison of the topical reform proposals by the ECB and the DIW is of particular interest when we assess the prospective impact of the EMU-enlargement on future price stability in the eurozone. At this stage, we are particularly concerned with the non-partisan EB stance. Again, it is obvious that the EB loses influence when ten—respectively thirteen—new members enter the GC. It is very alarming that particularly the ECB-proposal, which will probably be carried through, deteriorates the EB’s status most (c. 42%). Most notably, the EB will be even more worse off compared to the present status quo (c. 30%). In respect of the DIW-proposal, the EB’s influence shrinks ‘only’ in amount of almost 27%. As regards the status quo at the EMU-25, this reform proposal rather strengthens the position of the EB (3.5%), whereas the ECB-proposal makes the EB worse off (c. -12%). As regards the price-stability benchmark, we would, therefore, prefer the DIW scenario.

## 6 Conclusion

The voting-power analysis of changing influences of national members in the ECB highlights some interesting results. This applies particularly in regard to the prospects of future inflation in the enlarged eurozone.

We have developed a relationship between the NMC’ especially CEECs’ demand for a rather growth promoting stance of the common monetary policy, the present degree of (in)transparency of the decision-making process within the ECB, and altering market expectations. Supposing a linear relation between the reshaping of current EMU-members’ influence in the GC

and inflation expectations this study has evaluated three different scenarios. The assessment is carried out with regard to the impact of the reshaping of decision-making in the ECB on the price stability in the enlarged eurozone. In particular, we have inquired in the EMU at 25 given that the voting scheme of the GC remains unchanged, the ECB scenario—which will probably put through—and the DIW scenario as the latest alternative reform proposal.

The calculations of the Banzhaf indices have shown some interesting results: First, fears of considerable loss of current EMU-members' influence on European monetary policy are well-founded. When comparing partisan and non-partisan behaviour, second, current EMU-members (particularly relative small economies) will be rather worse off if they resort to partisan behaviour—i.e. when their voting-behaviour is especially inclined too domestic structures. Therefore, this counterintuitive result rather suggests a strengthening of actual monetary independence as this can enhance those countries status—as indicated by the according calculations of non-partisan behaviour. Third, in respect of the presumed price stability benchmark the reform proposal of the ECB is even worse than the status quo. In contrast, the DIW-reform proposal mitigates the possibly negative impact of NMC' admittance to EMU on the euro's price stability. Certainly, no reform can compensate the loss of influence of current EMU-members. This generally applies as long as peripheral countries are coming up, which are associated with attitudes toward a rather growth promoting monetary policy stance compared to core countries. Therefore, both current and prospective members of EMU may consider a revision of the ECB's transparency rules. Such revision may result in a more price stable monetary equilibrium in the eurozone.

## References

- Alesina, A. and V. Grilli (1991): "The European Central Bank: Reshaping Monetary Politics in Europe", *NBER Working Paper* **3860**.
- Aleskerov, F., G. Avci, V. Iakouba and Z.U. Türem (2002): "European Union Enlargement: Power Distribution Implications of the new Institutional Arrangements". *European Journal of Political Research* **41**, pp. 379-394.
- Baldwin, R.E., E. Berglöf, F. Giavazzi and M. Widgrén (2000): "EU Reforms for Tomorrow's Europe." *CEPR Discussion Paper* No. **2623**.
- Barro, R.J. and D. Gordon (1983) "Rules, Discretion and Reputation in a Model of Monetary Policy." *Journal of Monetary Economics*, **12**(1), pp. 101-22.
- Berg, S. (1999): "On voting Power Indices and a Class of Probability Distributions: With applications to EU data". *Group Decision and Negotiation* **8**, pp. 17-31.
- Berger, H. (2002): "The ECB and Euro-Area Enlargement". *IMF Working Paper* WP/02/175.
- Berger, H. and J. de Haan (2002): "Are Small Countries Too Powerful Within The ECB?" *Atlantic Economic Journal* **30**(3), pp. 263-282.
- Berger, H., J. de Haan and R. Inklaar (2002): "Restructuring the ECB". *CESifo*, Munich, Germany.
- Bilbao, J.M., J.R. Fernández, N. Jiménez and J.J. López (2002): "Decision Aiding. Voting power in the European Union enlargement". *European Journal of Operational Research* **143**, pp. 181-196.
- Bindseil, U. and C. Hantke (1997): "The power distribution in the decision making among EU member states". *European Journal of Political Economy* **13**, pp. 171-185.
- Blinder, A., C. Goodhart, P. Hildebrand, D. Lipton and C. Wyplosz (2001): "How do Central Banks Talk?" *International Center for Monetary and Banking Studies - Geneva Reports on the World Economy*, No. **3**.
- Braham, M. and M.J. Holler (2003): "The Impossibility of a Preference-based Power Index." *Sozioökonomisches Seminar der Universität Hamburg - Beiträge zur Wirtschaftsforschung* No. **130**.
- Chapell, H., T. Havrilesky and R. McGregor (1995): "Policymakers, Institutions, and Central Bank Decisions", *Journal of Economics and Business* **47**, pp. 113-136.
- De Grauwe, P, H. Dewachter and Y. Aksoy (1998): *Decision Rules in the European Central Bank and Monetary Stability*, mimeo, University of Leuven, September.
- De La Dehesa, G. (2003): "The New Governing Rules of the ECB". *Working Paper European Parliament*.
- Dornbusch, R, C. Favero and F. Giavazzi (1998): "Immediate challenges for the European Central Bank". *Economic Policy* **26**, April, pp. 17-64.

- Dvorsky, S. and I. Lindner (2003): "Institutionelle Entwicklungen im ESZB. Anpassung der Stimmrechtsmodalitäten im EZB-Rat". Österreichische Nationalbank. Berichte und Studien **2/2003**, pp. 144-159.
- ECB (1999): Monatsbericht Juli 1999. Frankfurt a. Main.
- ECB (2003): Monatsbericht Mai 2003. Änderungen der Abstimmungsregeln im EZB-Rat, pp. 79-90. Frankfurt a. Main.
- Felsenthal, D.S. and M. Machover (1998): *The Measurement of Voting Power: Theory and Practice, Problems and Paradoxes*. Cheltenham: Edward Elgar.
- Felsenthal, D.S. and M. Machover (2001): "Myths and meanings of voting power". *Journal of Theoretical Politics* **13**(1), pp. 81-97.
- Gildea, J. (1992): "The Regional Representation of Federal Reserve Bank Presidents". *Journal of Money, Credit and Banking* **24**(2), May, pp. 215-225.
- Gros, D., M. Castelli, J. Jimeno, T. Mayer and N. Thygesen (2002): *The Euro at 25*. Special Report of the CEPS Macroeconomic Policy Group. Centre for European Policy Studies. Brussels.
- Gros, D. (2003): "Reforming the Composition of the ECB Governing Council in View of Enlargement: An Opportunity missed!" *CEPS Policy Brief*, No. **32**, April 2003.
- Grüner, H.P. (1999): On the role of conflicting national interests in the ECB council. *Centre for Economic Policy Research (CEPR)*, No. **2192**, July 1999.
- Grüner, H.P. (2001): "Collective decisions with interdependent valuations". IZA and CEPR. September 2001.
- Hahn, V. (2002): "Transparency in Monetary Policy: A Survey." *Ifo-Studien*, **48**(3), pp. 429-450.
- Hendriks, M. and P. Maier (2002): "Implications of EMU enlargement for European monetary policy: A political economy view". De Nederlandsche Bank. Monetary and Economic Policy Department. Amsterdam.
- Holler, M. J. and G. Illing (1996): *Einführung in die Spieltheorie*. Berlin: Springer Verlag, 3. edition.
- IOP 2.0. Indices of Voting Power V 2.0 R2/01. copyright by T. Bräuninger and T. König. Department for Politics and Management. University of Konstanz.
- Knott, J. (1986): "The Fed Chairman as a Political Executive". *Administration and Society* **18**(2), August, pp. 197-231.
- Krause, G. (1996): "Agent Heterogeneity and Consensual Decision-Making on the Federal Open Market Committee". *Public Choice* **88**, pp. 83-101.
- Lane, J.-E. and R. Maeland (1995): "Voting Power under the EU Constitution", *Journal of Theoretical Politics* **7**, pp. 223-230.
- Lindner, I. and K. Olechowski-Hrdlicka (2002): "Institutionelle Auswirkungen der EU-Erweiterung im Bereich der Wirtschafts- und Währungspolitik". Berichte und Studien. Österreichische Nationalbank **2/2002**, pp. 177-193.
- Lommatzsch, K. and S. Tober (2002): "Geldpolitische Aspekte der Erweiterung des Euro". *DIW-Wochenbericht* **15/2002**.

- Lommatzsch, K. and S. Tober (2003): "Zur Reform der Abstimmungsregeln im EZB-Rat nach der Erweiterung des Euroraums". *DIW-Wochenbericht* **5**/2003.
- Mangano, G. (1999): "Monetary Policy in EMU: A Voting-Power Analysis of Coalition Formation in the European Central Bank". Centre Walras-Pareto and London School of Economics.
- Napel, S. and M. Widgrén (2001): "Inferior players in simple games". *International Journal of Game Theory* **30**, pp. 209-220.
- Nurmi, H and T. Meskanen (1999): "A priori power measures and the institutions of the European Union". *European Journal of Political Research* **35**(2), pp. 161-179.
- Powerslave: Finland University of Turku. Faculty of Social Sciences. Department of Political Science. <http://powerslave.val.utu.fi/cgi-bin/powerslave.cgi>
- Schröder, C. (1998): "Die Auswirkungen der EU-Osterweiterung auf den EU-Haushalt: Eine Anwendung des Power Politics Ansatzes". *Forschungsbericht 9803. Europa-Institut*, Februar 1998.
- Shapley, L.S. (1953): "A Value of n-Person Games", in: Kuhn, H. and W. Tucker (eds.): *Contributions to the Theory of Games II*, Princeton: Princeton University Press, pp. 307-317. printed in: Roth, A.E. (ed.): *The Shapley Value: Essays in Honor of Lloyd S. Shapley*, Cambridge: Cambridge University Press, pp. 31-40.
- Shapley, L.S. and M. Shubik (1954): "A Method for Evaluating the Distribution of Power in a Committee System", *American Political Science Review* **48**, pp. 787-792. printed in: Shubik, M. (ed. 1964): *Game Theory and Related Approaches to Social Behavior*, John Wiley and Sons, New York, London, Sydney.
- Sinn, H.-W. and M. Reutter (2001): "The Minimum Inflation Rate for Euroland". *NBER Working Paper* No. **8085**.
- Vaubel, R. (1999): "The future of the Euro: a public choice perspective", mimeo.
- Von Hagen, J. and R. Süppel (1994): "Central Bank Constitutions for Federal Monetary Unions". *European Economic Review* **38**, pp. 774-782.
- Widgrén, M. (1994): "Voting Power in the EC: Decision making and the consequences of two different enlargements". *European Economic Review* **38**, pp. 1153-1170.
- Winkler, B. (2000): "Which Kind of Transparency? On the Need for Clarity in Monetary Policy Making." *ECB Working Paper* No. **26**.

EMU-enlargement and the Reshaping of  
Decision-making within the ECB Governing  
Council: A Voting-Power Analysis

Abstract

The monetary union of the European Central Bank (ECB) is the subject matter of this paper. We analyze the prospects for future price stability in an enlarged European Monetary and Economic Union (EMU). At the heart of this study are the potential effects of altering decision-making procedure within the Governing Council of the ECB on price stability in the eurozone. The authors compare the impact of three alternative reform scenarios of the ECB Governing Council with the help of a voting-power analysis. It is presumed that a considerable loss of current EMU-members' influence power especially in favour of joined new member countries (NMC) results in a loss of monetary credibility of the ECB: As transparency of the decision-making process within the ECB is lacking, markets may consider the ECB to be too much inclined to the economic performances of the NMCs. This has then a negative impact on the level of price stability in Europe. The voting-power analysis indicates which reform proposal is best with respect to a price-stability benchmark.

*JEL-Classification:* D72, D78, E58

Keywords: power indices, Banzhaf, ECB, monetary policy, enlargement, eurozone

Corresponding authors:

Christian Fahrholz, Research Fellow  
Philipp Mohl, Junior Research Assistant

email: [fahrholz@zedat.fu-berlin.de](mailto:fahrholz@zedat.fu-berlin.de)  
email: [philmo@zedat.fu-berlin.de](mailto:philmo@zedat.fu-berlin.de)

Freie Universität Berlin  
Dept. for Political and Social Sciences  
Hnestraße 22  
D – 14195 Berlin  
phone: +49/30/838-54966  
fax: +49/30/838-52357

This paper has been prepared as a part of a broader Ezoneplus project that evaluates European Monetary Union (EMU) and its enlargement to prospective members in central and eastern Europe. The project is financially supported by European Commission (HPSE-CT-2001-00084).