

Does the EMU-enlargement impair price stability in Europe? A Voting Power Analysis of the ECB Reform

Christian H. Fahrholz [‡] and Philipp Mohl ^{*}

This version: February 24th, 2006

Abstract

This analysis focuses on price stability in an enlarged European Monetary Union (EMU). At the heart of this study is the introduction of the new rotational decision-making procedure within the Governing Council of the European Central Bank (ECB). The authors analyse the impact of this procedure on price stability in an enlarging EMU of up to 25 members with the help of a voting power analysis. It is presumed that current EMU-members lose a considerable amount of influence power, especially in conjunction with the admittance of ‘catch-up’ Central Eastern European Countries (CEECs). This loss of influence ultimately impedes the ECB reputation. Consequently, this may have a negative impact on the monetary credibility of the ECB. However, our voting power analysis indicates that the EMU-enlargement process only slightly impairs the price stability of the euro.

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

JEL classification: D72, D78, E58.

[‡] Research fellow; Department of Politics and Management, University of Konstanz, Email: christian.fahrholz@uni-konstanz.de.

^{*} Research assistant; Jean Monnet Centre of Excellence, Free University Berlin, Email: philmo@zedat.fu-berlin.de.

1 Introduction

The admittance of ten new member countries to the European Union (EU) in May 2004 has attracted much academic attention, especially with regard to the likely implications of the proposed enlargement of the European Monetary Union (EMU) [see, for instance, Bacaria et al. (2002); Berger (2002); De Grauwe (2002); Gros et al. (2002); Hefeker (2002); Hendrikx and Maier (2002)]. It is assumed that the new members'—and in particular the Central and Eastern European Countries' (CEECs')—adoption of the euro as legal tender provokes an inflationary bias of the common currency. At the crux of the matter is how the reshaping of decision-making procedures within the European Central Bank (ECB), throughout the course of the EMU-enlargement process, will effect market expectations. The number of actors within the ECB, their voting behaviour, and the voting schemes in conjunction with currently effective transparency regulations influence the private sector's expectations.

Changes to the decision-making rules of the ECB have been inevitable in order to cope with the enlargement of the eurozone [Baldwin et al. (2000)]. Berger (2002) suggests that the ten new member countries, especially the CEECs, may be over-represented if no reforms are to be passed. In this regard, the European Council approved the ECB reform proposal [ECB (2003)] to utilize a rotation model [see, for instance, Belke and Baumgärtner (2004) for a discussion on the agreed upon reform].

Against this background, this article uses a voting power analysis to investigate the effects of enlarging the eurozone to a 25 member EMU. In order to gain a long-term perspective, we analyse an EMU-25.¹ There is extensive literature on voting power analysis of various EU institutions. These studies have estimated the power of the member states in the Council of the EU [for instance, Bilbao et al. (2002); Leech (2002)], the European Parliament [for instance, Lane and Maeland (1995)] or both [for instance, Aleskerov et al.

¹The focus on the EMU at 25 includes the assumption that the current 'members with a derogation' (Denmark, United Kingdom, and Sweden) adopt the euro, as well.

(2002); Nurmi and Meskanen (1999)]. In our opinion, voting power analyses of the ECB have only recently gained researchers' attention [Belke and Styczynska (2004); Stöckebout (2004); Ullrich (2004); Haradau (2003); Lagogiannis (2004)]. Exceptional early studies are Mangano (1999) and Brueckner (2000).

In this study we carry out a voting power analysis of the ECB's reform impact on price stability in an enlarging eurozone. In doing so, we consider a dynamic setting by taking into account the growing number of EMU-members, i.e. we investigate the impact on price stability when admitting the 13th- up to the 25th-member. The EMU-enlargement will likely occur incrementally. This way the analysis accounts for possible leaps in the formation of the ECB's monetary credibility, thus, affecting price stability in Europe.

The remainder of this paper is structured as follows: Section 2 deals with crucial junctures for further analysis, and presents some general aspects of the eastward enlargement of the eurozone that are relevant to European monetary policy-making. Section 3 briefly surveys the relevant voting power literature with regard to the analysis of the decision-making process within the ECB. Section 4 conducts a voting power analysis, which ascertains the changes in power and influence throughout the EMU-enlargement process. Finally, section 5 summarizes the impact of the ECB reform and EMU-enlargement on future price stability. The voting power analysis indicates that the EMU-enlargement process only slightly impairs the euro's price stability.

2 Crucial junctures

This section presents a brief discussion of the basic presumptions of our analysis. In the following paragraph, we start with the presentation of the economic starting position of new EU-members. Subsequently, we introduce into the legal framework of monetary policy in Europe. Finally, we discuss

the importance of transparency issues affecting the private sector's rational expectations concerning price stability in Europe.

2.1 Economic starting position of CEECs

The eastward enlargement of the eurozone entails the inclusion of countries with a relatively low level of capital endowment. In this regard, CEECs are in the process of catching-up with current EMU-members. 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 (evidence of increasing productivity growth) in CEECs are higher compared with current EMU-member countries. Thus, capital flows ensue. CEECs may favour relatively low interest rates—in spite of the fact that a levelling out of the interest rate differential would certainly be of discomfort to them—because these would help finance the CEECs' catching-up. In sum, CEECs can be expected 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 [Sinn and Reutter (2001)].² In this regard, ambiguous changes within the decision-making process of the ECB risk the euro's price stability at stake. This is particularly valid when market sentiments expect the ECB to be overly inclined towards the CEECs' concerns of accepting possible higher inflation at the periphery [cf. Baldwin et al. (2000, p. 26)]. This may entail setbacks for the current level of price stability in the eurozone, as the risk premium of the euro rises and the ECB faces higher inflationary pressure.

²In the context of debating the appropriateness of the Maastricht criteria for CEECs, this has already demanded a relaxation of the inflation-rate criterion, thus improving the prospects of real convergence in these countries.

2.2 Legal framework of ECB monetary policy

According to Article 107(3) of the consolidated version of the ‘Treaty establishing the European Community’ (2002) each EMU-member delegates its monetary policy competencies to ECB’s voting bodies, i.e. the Executive Board (EB) and the Governing Council (GC). The former consists of the ECB’s President, its vice-president and four other EB-members.³ The GC consists of all EB-members plus national central bank (NCB)-governors of the EMU-member countries. The EB-members are appointed in “common accord of the governments of the Member States at the level of Heads of State or Government, on a recommendation from the Council, after it has consulted the European Parliament and the Governing Council of the ECB” [Article 112(1)]. The EB-members serve eight-year terms and are not eligible for re-election. Accordingly, new EB-members have to be nominated at the end of 2006.

The tasks of these two decision-making bodies are formally defined by Article 12 of the ‘Protocol of the Statutes of the European System of Central Banks and the European Central Bank’ [Protocol 1992]. The GC’s central responsibility is to “adopt the guidelines and make the decisions necessary to ensure the performance of the tasks entrusted to the ECB” [Protocol, Art. 12(1)]. The tasks of the EB are operational in nature—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 short, the GC is the ECB’s relevant decision-making body. At present, this voting body comprises twelve national representatives and six EB-members as voting members.

With regard to the decision rule it is generally noted that the GC shall “formulate the monetary policy of the Community” [ECB (1999, p. 64)]. According to Article 10(2) of the Protocol decisions are to be taken by a simple majority on a one member - one vote basis. If the vote is tied, the

³Currently, the EB-members are from France (President), Greece (Vice-President), Germany, Italy, Spain and Austria.

ECB's President will have the decisive vote. As Lindner and Olechowski-Hrdlicka (2002) point out, past decisions of the ECB have been unanimous. Berger and de Haan (2002) assume that unanimous decisions will be less likely as the EMU enlarges. The subsequent voting power analysis is based on simple majority voting in the GC as set out in Art. 10(2) of the Protocol (1992).

2.3 The reshaping of the private sector's expectations

There are transparency issues which are particularly relevant in the context of the ECB decision-making procedure's impact on private sector's expectations. We broadly define transparency as the public's level of genuine understanding of ECB monetary policy-making [Winkler (2000, p. 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)]. According to the present stance of the ECB's communication policy there is no disclosure of minutes and voting records of the board meetings. This kind of (in)transparency—whether it is advantageous or not—is not the subject matter of this paper [see Hahn (2002) for a survey of the literature].⁴ The ECB does not reveal its preferences regarding macroeconomic aggregates such as output and inflation thus establishing an information asymmetry vis-à-vis the public. Hence, our theoretical ambitions relate to a time-inconsistency model with incomplete information [here, the standard references are Kydland and Prescott (1977); Barro and Gordon (1983)]. Relevant literature assumes forward-looking agents. In academia, it is accepted that delegating monetary policy control to central bankers—with a more 'conservative' attitude towards price stability than respective governments—reduces the inflationary bias implicitly in the optimal mone-

⁴Furthermore, the work of Heisenberg (2003) especially refers to the relationship of transparency regulations and the ECB decision-making procedure in terms of accountability.

tary policy stance [Rogoff (1985)]. In line with this reasoning, market agents form their expectations on future inflation relative to the perceptible degree of central bankers' 'conservatism'.

Accordingly, the conveyed ECB 'conservatism' attracts particular attention in our analysis. We assume that the perceived extent of 'conservatism' in the market agents' view is linked to the ECB's decision-making procedure. Beyond the impact of expected changes in any fundamentals on the euro's value the current level of price stability can also be seen as the result of attaining a better balance than was present in the initially uneven interplay of the private sector and the ECB. The reverse of the argument is that the ECB has an established reputation. In this respect, ambiguous changes as well as the admittance of new EU-members to the GC will constitute an idiosyncratic shock to the ECB's reputation. Bofinger (2003, p. 6) stresses that the ECB reform will further complicate the internal deliberation process, thus contributing to the further deterioration of transparency. Consequently, an ECB reform may be rather upsetting for the private sector's expectations—i.e. provoking uncertainty regarding possible outcomes of the decision-making process within the ECB—and thereby lead to a surge in inflation or interest rates. This applies particularly when markets would expect the ECB to be overly inclined towards the CEECs' interests concerning relative low (real) interest rates. If markets were to accuse the ECB of 'lax' monetary policy, then both current and new members of the EMU would 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. A surge in inflationary pressures can be expected because the public is unable to fully reconstruct the deliberations and voting decisions of the GC—given the effective transparency regulations—and because the ECB cannot make binding agreements vis-à-vis the public.

Summarily, given the present transparency standard of ECB decision-making procedure, any changes—whether new voting members or a voting scheme reform—will most probably undermine monetary credibility, ulti-

mately impairing price stability in Europe.

3 A cut glance at the voting power literature

This section serves as a basis for our voting power analysis. First, we introduce the voting power concept, though focusing on the Banzhaf indices. Second, the characteristics of voting members' preferences as well as the rules of the game—i.e. the decision rules and the ECB's decision-making procedure respectively—are discussed.

3.1 Voting power indices

According to the power index literature [see, for instance, Felsenthal and Machover (2001)] the 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. Generally, power indices inquire into a pivotal voter in a ballot, who turns a portion of the voters into a winning coalition. There are two different strands of power indices [see, especially, Felsenthal and Machover (1998, p. 84)]. 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 influence the outcome of a division of a voting body. The according concept is labelled 'I-power'. A second concept concerns power as a voter's expected relative share in some *prize*, which is accordingly called 'P-power'. According to the latter, the members of the winning coalition receive some kind of a *prize*, whereas those of the losing coalition come away empty-handed. 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 instead of office-seeking behaviour that pertains to P-power indices [(Felsenthal and Machover, 1998, p. 18). In this regard,

monetary policy decisions are deemed ‘public goods’: They are binding for all eurozone members, and they are not prizes going 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 [Banzhaf (1965)] capture the essential characteristics of voting within the GC of the ECB.

Brueckner (2000, p. 60) as well as Belke and Styczynska (2004) argue that the application of the Shapley-Shubik index would be more appropriate. The argument is derived from the assumption that EMU-members are highly integrated, and considerable communication among NCB-governors results in some kind of homogeneity in deliberations. Accordingly, all voting members would rather agree on a proposal with the same probability. On the contrary, we have already set forth in section 2 that such homogeneity can hardly be maintained in the course of integrating ‘catch-up’ CEECs into the eurozone. Instead, we give precedence to heterogeneity and independent voting of each other, hence, we use the Banzhaf indices [see Leech and Leech (2004) for a rigorous critique of using the Shapley-Shubik index].

Our voting power analysis determines each minimal winning coalition, at which at least one—but not necessarily all—members of a winning coalition can induce a change in European monetary policy-making. I-power indices are suited to measure *a priori* power of EMU-members. In particular, the Banzhaf indices can account for the relative influence of each GC-member in a European monetary policy vote.

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 $N = \{1, \dots, n\}$. 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 the concept of 'swings'. The term 'swing' denotes a crucial member entering a coalition S , which converts a losing coalition into a winning one. The non-normalized or absolute Banzhaf index (aBI) is the sum of voter i 's swings divided by the number of coalitions (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. Unfortunately, the sum of all voting members' aBI does not add up to one. This is traced back to the fact that the amount of influence that voters can exert is a probability but not necessarily a fixed number [see also Leech and Leech (2004, pp. 3-5)]. On the other hand, it is the Shapley-Shubik index that shows the desired property of all voting members' power values adding up to one. In this respect, it can be argued that the value simply denotes a share of a prize and, thus adds up to one (Felsenthal and Machover (2004)). There also exists a normalized Banzhaf index (nBI) that sums up to one, too. At this point, the 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. The nBI is interpreted as measuring each voter's relative share among all pivotal positions [Berg (1999, p. 20)]. However, the nBI does not allow for an interpretation of changes to individual voting members' power over different voting games [Felsenthal and Machover (2004, p. 6)]. Therefore, our voting power analysis catches the *relative* changes among EMU-members—i.e. we focus on the relationship between the influence power of an NCB-governor and the entire voting body in the form of shifts of the aBI—throughout the course of the EMU-enlargement.

3.2 Voting preferences

Closely related to the issue of identifying the appropriate power concept is a discussion of the voting members' preference characteristics. In general, policy positions are located within a continuous range, the poles of which reflect

the basic trade-off between inflation and employment in a monetary policy stance. Hence, the policy space is uni-dimensional. The latter is also related to the fact that the GC-members are national delegates in a voting body, which constitutes a rather unique composition. However, the ‘eurogroup’, a forum for policy-coordination in the eurozone, does not have any relevant decision-making competence. For that reason, we exclude issue linkages in our analysis. Instead, we conduct a ‘preference-free analysis’ [Sutter (2000, p. 48)] of *a priori* voting power without respect to policy positions of single voting members.⁵ The reason is that our analysis concentrates on the impact of changes in the ECB decision-making procedure on monetary credibility in the long term. National policy positions hinge upon economic conditions in the domestic arena. The economic situation, however, may vary considerably over time, for instance, due to exogenous shocks. Therefore, we neither determine exact policy positions nor make strict assumptions regarding the distribution of preferences.⁶

Nevertheless, we presuppose one auxiliary assumption: In our view, there is a tendency for a shifting median towards a less restrictive monetary policy during the course of the admission of the catch-up CEECs. The preceding discussion has already highlighted that such an assumption is highly plausible. This way, we can easily qualify the effects of altering voting power in the ECB-board on future price stability and monetary credibility respectively.⁷

Furthermore, concerning the formation of market agents’ expectations, it is particularly relevant whether *partisan* or *non-partisan* voting behaviour of GC-members is presumed. There are a number of reasons to assume that NCB-governors within the EMU are concerned about domestic structures at

⁵For a further theoretical discussion of pros and cons of preference-based power indices, see Braham and Holler (2005a) and the subsequent interchange between Napel and Widgrén (2004) and Braham and Holler (2005b).

⁶See Warntjen (2003) for a related analysis of short-term effects that takes into account the policy positions of actors involved.

⁷Note that this assumption is unnecessary to explain fluttering market expectations at the outset of an enlarged eurozone. Nonetheless, such a tendency gives a re-calibrating private sector a clear-cut orientation.

home. This issue has been frequently debated in academia: 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 influence the policy choice through its central bank governor. Von Hagen and Süppel (1994) base their model of monetary policy on the assumption that the countries' representatives consider national inflation and output objectives.⁸ It is also established in literature that 'national central banks may care about a policy that accommodates macroeconomic shocks in their own country while making a collective decision about common monetary policy' (Grüner, 2001, p. 4). Albeit, Articles 105 and 108 of the Treaty (2002) oblige decision-makers to be euro-minded and impartial. The national-bias assumption may be less realistic in the case of the EB-members, particularly with regard to the ECB President [Chapell et al. (1995)]. Nevertheless, one may assume that the EB-members may also be inclined to favour the economic prospects of their home country [cf. Vaubel (1999)]. For instance, Dornbusch et al. (1998, p. 26) assume that in the end all GC-members—i.e. the current twelve national representatives and the six EB-members—vote in favour of their national constituency's interests.

However, we assume non-partisan EB-members. Given that EB-members relative to NCB-governors are to a lesser extent accountable to their national constituency, assuming euro-mindedness within the EB seems to be quite plausible. As far as we can tell, there are only a very few studies—chiefly, Haradau (2003) and Ullrich (2004)—that consider partisan EB-members. These authors encounter some difficulties when taking into account, first, a possibly varying number of partisan members within the EB; second, strictly speaking one has to determine respective expectation values for each country's probability of having a representative in the EB after 2006 [Haradau (2003, p. 62)]. Both aspects would definitely overcharge our voting power

⁸The very same is claimed regarding the United States: Krause (1996) and Gildea (1992) suggest that the decisions within the Federal Reserve Board are also influenced by regional as well as industrial and commercial interests of primary constituencies.

analysis. Hence, we resort to the case of non-partisan EB-members.

4 Voting power analysis

This section evaluates the alteration of voting powers throughout the course of the ECB reform. The analysis, firstly, determines the voting rules. Then the voting powers are calculated according to the Banzhaf indices. Finally, the resulting changes in power are linked to their likely impact on price stability.

As indicated above, our focus is mainly on an EMU of 25. However, we are also interested in the gradual development of this enlargement process. More precisely, we calculate the changes in voting powers throughout the course of admitting the 13th- up to 25th member state. The EMU-12 establishes the reference values, with which we evaluate possible setbacks in ECB ‘conservatism’. This way, we ascertain whether there are ups and downs in relative voting power changes particularly with regard to the EB’s power.

Similar to Grüner (1999), Mangano (1999), Stéclebout (2004) and Ullrich (2004) our calculations take partisan and non-partisan voting behaviour into account. All EB-members are assumed to act according to the ECB statute as an entirely separate entity exclusively concerned with price stability. At the same time, the other GC-members disregard their obligation and consider solely domestic macroeconomic aggregates. EB-members are therefore denoted as non-partisan. In turn, every NCB-governor will be assumed to represent domestic interests when voting on European monetary policy—i.e. displaying partisan behaviour.

According to the approved ECB reform the principle of rotation will be introduced gradually [ECB (2003), see table 1]. In the case that the number of NCB-governors does not exceed 15, the GC consists (besides the members of the EB) of one single decision-making group. As long as there are between 16 and 21 NCB-governors, the GC will operate using two groups. Finally, when the 22nd member joins the euro area, NCB-governors are allotted to

three groups (see table 1). The division into groups is based on a ranking of member states, depending on a composite indicator consisting of two components: the GDP at market prices (5/6 weight) and the share of a member states' in the total aggregated balance sheet of the monetary financial institutions (1/6 weight) [see ECB (2003, pp. 77-78)]. The respective weights are adjusted at five year intervals [Protocol, Article 29(3)]. However, so-called non-regular adjustments are made when new EMU-members join.

In all enlargement scenarios there are six members of the EB within the GC. As shown in table 1 this implies that the total number of votes in

Table 1: Members and voting frequencies within the ECB GC

	EMU-12		EMU-13		EMU-14		EMU-15		EMU-16	
	mem- bers	voting freq.	mem- bers	voting freq.	mem- bers	voting freq.	mem- bers	voting freq.	mem- bers	voting freq.
EB	6	1.00	6	1.00	6	1.00	6	1.00	6	1.00
1. group	12	1.00	13	1.00	14	1.00	15	1.00	5	1.00
2. group									11	0.91
3. group										
TOTAL	18		19		20		21		22	
	EMU-17		EMU-18		EMU-19		EMU-20		EMU-21	
	mem- bers	voting freq.	mem- bers	voting freq.	mem- bers	voting freq.	mem- bers	voting freq.	mem- bers	voting freq.
EB	6	1.00	6	1.00	6	1.00	6	1.00	6	1.00
1. group	5	1.00	5	1.00	5	0.80	5	0.80	5	0.80
2. group	12	0.83	13	0.77	14	0.79	15	0.73	16	0.69
3. group										
TOTAL	23		24		25		26		27	
	EMU-22		EMU-23		EMU-24		EMU-25			
	mem- bers	voting freq.	mem- bers	voting freq.	mem- bers	voting freq.	mem- bers	voting freq.		
EB	6	1.00	6	1.00	6	1.00	6	1.00		
1. group	5	0.80	5	0.80	5	0.80	5	0.80		
2. group	11	0.73	12	0.67	12	0.67	13	0.62		
3. group	6	0.50	6	0.50	7	0.43	7	0.43		
TOTAL	28		29		30		31			

the GC ranges from 18 (EMU-12) to 31 (EMU-25). However, not every NCB-governor has a permanent voting right: As soon as the 16th country is

admitted, the eleven members of the second group have the right to vote in roughly 91% of all cases (see table 1). Yet, in the case of an EMU-25, the voting right of each member is to a different extent restricted (first group 80%, second group 62% and third group 43%) (see table 1). This means that the more economically important members have relatively low voting weight as a group, but cast their vote often. On the contrary, smaller EMU economies are involved less frequently, but have more clout as a group.

Taking into account these features, the following steps are taken to calculate the voting power indices: First of all, the share of the composite EB as well as that of each of the NCB-governors in relation to the total number of votes are determined on a ‘one-entity-one-vote’ basis. For example, in the case of an EMU-12 the EB has a share of 33.33% of the total votes, while each of the NCB-governors has 5.56% (see table 2).⁹ These shares represent the weighted votes. Subsequently, the aBIs are calculated for all the weighted voting games on the basis of a simple majority (see above).¹⁰ Finally, the computed ‘preliminary’ aBIs are re-weighted with the respective voting frequencies resulting in the final aBIs. This procedure differs significantly from that used by Ullrich (2004) and Belke and Baumgärtner (2004), who include the voting frequency within the calculation of the votes, i.e. before computing the power indices. However, this approach is inappropriate: Given that we have an additional voter who is a dictator with a very small but positive probability, this voter becomes a dummy in the case of frequency-weighting. As a consequence, the power of other players would not be altered when adding such a player. However, with a very small but positive probability the additional player is the pivotal voter. Therefore, his vote must affect—though, to a small extent—other players’ power. Accordingly, the approach of frequency-weighting the votes first, and then calculating the power indices afterwards is incorrect.

⁹The displayed country-ranking of NCB-governors in table 2 follows the current composite ECB indicator of an EMU of 25 as calculated by Dvorsky and Lindner (2003).

¹⁰We used *Powerslave*—a voting power programme by Pajala et al. (2002)—and *IOP 2.0*—a programme by Bräuninger and König (2002).

Table 2: Voting Power of an EMU-12 and an EMU-25

	EMU-12					EMU-25				
	votes	shares	aBI	voting freq.	final aBI	votes	shares	aBI	voting freq.	final aBI
EB	6	33,333	0.8540	1.00	0.8540	6	19,355	0.7705	1.00	0.7705
DE	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.80	0.0623
UK						1	3,226	0.0779	0.80	0.0623
FR	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.80	0.0623
IT	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.80	0.0623
ES	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.80	0.0623
NL	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.62	0.0483
BE	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.62	0.0483
SE						1	3,226	0.0779	0.62	0.0483
AT	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.62	0.0483
DK						1	3,226	0.0779	0.62	0.0483
PL						1	3,226	0.0779	0.62	0.0483
FI	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.62	0.0483
EL	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.62	0.0483
PT	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.62	0.0483
IE	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.62	0.0483
LU	1	5,556	0.0806	1.00	0.0806	1	3,226	0.0779	0.62	0.0483
CZ						1	3,226	0.0779	0.62	0.0483
HU						1	3,226	0.0779	0.62	0.0483
SK						1	3,226	0.0779	0.43	0.0335
SL						1	3,226	0.0779	0.43	0.0335
LT						1	3,226	0.0779	0.43	0.0335
CY						1	3,226	0.0779	0.43	0.0335
LV						1	3,226	0.0779	0.43	0.0335
EE						1	3,226	0.0779	0.43	0.0335
MT						1	3,226	0.0779	0.43	0.0335
Σ	18	100,005	1.8212		1.8212	31	100,005	2.7180		1.9445

The results for EMU-12 and EMU-25 are displayed in full detail in table 2. Additionally, table 3 provides an overview of the final aBIs with respect to the gradual enlargement process. As table 3 shows, the members of the first group always have greater voting power than those of the other groups; yet members of the second group are throughout the enlargement process more powerful than those in the third group. Consequently, the voting power reflects more or less the members' economic weight. This result is caused by the introduction of the voting frequencies.

Table 3: Voting Power of the EMU-12 up to the EMU-25

	EMU-12	EMU-13	EMU-14	EMU-15	EMU-16	EMU-17	EMU-18
EB	0.8540	0.9077	0.8815	0.8815	0.9232	0.8565	0.7621
1. group	0.0806	0.0537	0.0611	0.0611	0.0417	0.0667	0.0944
2. group					0.0379	0.0554	0.0727
3. group							
	EMU-19	EMU-20	EMU-21	EMU-22	EMU-23	EMU-24	EMU-25
EB	0.8329	0.8847	0.8108	0.8662	0.7900	0.8484	0.7705
1. group	0.0566	0.0414	0.0591	0.0443	0.0610	0.0468	0.0623
2. group	0.0559	0.0378	0.0510	0.0404	0.0511	0.0392	0.0483
3. group				0.0277	0.0381	0.0252	0.0335

Shifts in the relative influence of the EB are of particular interest to our study. Resuming our crucial junctures in section 2 on the prospects for future price stability in an enlarged EMU, a non-partisan EB may act as the quasi-‘guardian’ of price stability in a possibly nationalized GC. Therefore, a sharp reduction in the EB’s influence over the course of the EMU-enlargement will most probably result in a change in expected inflation. This is to say that the greater 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.

Presently, the EB is quite powerful comprising of an aBI of 0.8540. However, its influence will diminish during the course of the eurozone’s eastward enlargement. In the case of an EMU-25, the power of the EB will drop to an aBI of 0.7705 (see table 2 and 3). A consideration of the gradual enlargement process indicates that there are fluctuations in the power changes.¹¹ Since voting power indices are each time calculated on the basis of different numbers of voters, comparing the aBIs makes the most sense when analysing

¹¹This approach pertains to some extent to the voting power literature that concerns monotonicity properties and axiomatic of power indices respectively (see, for instance, the discussion in Holler and Napel (2004)). As we analyse different voting games in terms of the number of actors involved we do not refer to a monotonicity discussion in the strict sense. Nevertheless, it is quite interesting to know whether there are leaps in each voting members’ power in the course of the EMU-enlargement process.

the effects of the ECB reform scenario (see above): Interestingly, with the admittance of the first new member—i.e. an EMU-13—the EB gains influence, whereas each individual member of the first group loses power. The EB loses influence slightly during the course of enlargement to an EMU-15. At the outset of introducing the rotation model at an EMU-16 the EB regains power, whereas members of the new second group gain power at the expense of the first group members. Further enlargement to an EMU-18 indicates that both first and second group members’ influence increases, whereas the EB’s power declines. In this context, a member of the first group—i.e. a core country of the present EMU—gains relatively more power than a second group member. However, at an EMU-19 a first group member’s influence drops roughly by 50% and a second group member catches up in terms of aBI. At the same time the EB increases slightly in power. This also applies at the stage of an EMU-20, before the EB loses again at an EMU-21. Though, the impression is that the losses of the EB in power are compensated by the members of the first group and vice versa. This tendency towards relative power changes seems to occur as the enlargement process progresses up to an EMU of 25. At the same time, the influence of a member from the new third group (occurring at an EMU-22) is only marginal.

Calculating the power changes sheds even more light on the prospects of price stability in an enlarged eurozone. In order to compare the different scenarios, the quotients of the voting power indices of an EMU-12 and an EMU-25 are listed in table 4.¹² Values greater than 1 would indicate that the voting power of an actor under the EMU-25 distribution is greater than the voting power of an actor in the EMU-12 scenario in terms of aBI. On the contrary, values less than 1 indicate that the given actor will lose voting power due to the ECB’s institutional reform. It is obvious that all current members of the EMU will lose influence throughout the course of the EMU-enlargement: Present EMU-members allotted to the first group lose about 20%, whereas prospective members of the second group lose at most (c. 40%).

¹²The allocation of countries again follows Dvorsky and Lindner (2003).

Table 4: Comparison of Voting Powers

	EMU-25 / EMU-12
EB	0.9022
DE	0.7732
FR	0.7732
IT	0.7732
ES	0.7732
NL	0.5992
BE	0.5992
AT	0.5992
FI	0.5992
EL	0.5992
PT	0.5992
IE	0.5992
LU	0.5992

At the same time, the EB will lose only about 10% of its power (table 4).

Summarily, the ups and downs in power changes may start to alter the private sector's expectations regarding price stability in Europe. Although, in view of the rather moderate fall of the influence of the EB, as well as of the core EMU-members of the first group we expect only a marginal leap in inflation.

5 Conclusion

The voting power analysis of the changes in influences for the national members in the ECB yields some interesting results. This applies particularly with regard to the prospects of future price stability in an enlarged eurozone.

We have set forth a relationship between the admission of new members to the EMU and the altering of market expectations that this would bring about. A pillar of our argument is the present degree of (in)transparency in the ECB decision-making process, and the presently established reputation of European monetary policy. The latter is subject to an idiosyncratic shock provoked by the EMU-enlargement. In this respect, any doubts regarding

the extent of ‘conservatism’ of the GC may render market agents jittery. This study assumes a linear relation between the reshaping of current EMU-members’ influence in the GC and private sector inflation expectations in order to evaluate the ECB reform to introduce a rotational model for the GC. The assessment is carried out with regard to the impact of the reshaping of decision-making in the ECB on price stability in the enlarged eurozone. In doing so, we have inquired into the long-term effects of an expanding Europe up to an EMU of 25. Additionally, we explored the dynamics of this enlargement process.

The calculations of the absolute Banzhaf indices have shown that fears of considerable loss to both the EB’s and core EMU-members’ influence on European monetary policy are not well founded. Interestingly, relative changes in power of both the EB and prospective first group members are rather balanced. The EB also gains more voting power in relative and absolute terms at the outset of the EMU-enlargement. Nevertheless, there is a downward trend in influence for the present EMU-12. This is certainly the case as no reform in the course of admitting new voting members to the GC can compensate losses of influence for both current EMU-members and a euro-minded EB. This is valid, at least, as markets may particularly deem peripheral countries to be overly inclined towards a less restrictive European monetary policy stance in comparison to the core countries.

Obviously, during the course of the enlargement process, all present EMU-member states will lose influence. However, members of the EB and those of the first group will both lose less compared with the other members. As we assume that these members may act as the quasi-‘guardian’ of price stability in a possibly nationalized GC, the EMU-enlargement process only slightly impairs the overall price stability of the euro.

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: 379–394.
- Bacaria, J., G. E. Chortareas, and A. P. Kyriacou 2002, 'Enlargement and the European Central Bank'. In: B. Steunenberg (ed.): *Widening the European Union. The Politics of Institutional Change and Reform*. New York: Routledge, pp. 163–179.
- Baldwin, R. E., E. Berglöf, F. Giavazzi, and M. Widgrén 2000, 'EU Reforms for Tomorrow's Europe'. *CEPR Discussion Paper* 2623.
- Banzhaf, J. F. 1965, 'Weighted Voting Doesn't Work: A Mathematical Analysis'. *Rutgers Law Review* 19: 317–345.
- Barro, R. and D. Gordon 1983, 'Rules, Discretion and Reputation in a Model of Monetary Policy'. *Journal of Common Market Studies* 12(1): 101–122.
- Belke, A. and F. Baumgärtner 2004, 'Die EZB und die Erweiterung - eine ökonomische und rechtliche Kurzanalyse des neuen Rotationsmodells'. *Integration* 1-2: 75–84.
- Belke, A. and B. Styczynska 2004, 'The Allocation of Power in the Enlarged ECB Governing Council: An Assessment of the ECB Rotation Model'. *University Hohenheim Discussion Paper*.
- Berg, S. 1999, 'On Voting Power Indices and a Class of Probability Distribution: With Applications to EU Data'. *Group Decision and Negotiation* 8: 17–31.
- Berger, H. 2002, 'The ECB and Euro-Area Enlargement'. *IMF Working Paper* 02(175).
- Berger, H. and J. de Haan 2002, 'Are Small Countries Too Powerful Within the ECB'. *Atlantic Economic Journal* 30(3): 263–282.
- Bilbao, J., J. Fernández, N. Jiménez, and J. López 2002, 'Voting Power in the European Union Enlargement'. *European Journal of Operational Research* 143: 181–196.
- 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* 3.
- Bofinger, P. 2003, 'Consequences of the Modification of the Governing Council Rules'. *Briefing paper for the Committee for Monetary and Economic Affairs of the European Parliament*.
- Braham, M. and M. J. Holler 2005a, 'The Impossibility of a Preference-Based Power Index'. *Journal of Theoretical Politics* 17(1): 137–157.

- Braham, M. and M. J. Holler 2005b, 'Power and Preferences Again. A Reply to Napel and Widgrén'. *Journal of Theoretical Politics* 17(3): 389–395.
- Bräuning, T. and T. König 2002, 'Indices of Voting Power (IOP)'. *Version 2.0*.
- Brueckner, M. 2000, 'Voting Power in the European Central Bank'. *Homo Oeconomicus* 17(1/2): 57–66.
- Chapell, H., T. Havrilesky, and R. McGregor 1995, 'Policymakers, Institutions and Central Bank Decisions'. *Journal of Economics and Business* 47: 113–136.
- De Grauwe, P. 2002, 'Challenges for Monetary Policy in Euroland'. *Journal of Common Market Studies* 40(4): 693–718.
- Dornbusch, R., C. Favero, and F. Giavazzi 1998, 'Immediate Challenges for the European Central Bank'. *Economic Policy* 26(April): 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: 144–150.
- ECB 1999, 'The Institutional Framework of the European System of Central Banks'. *Monthly Bulletin* July: 55–63.
- ECB 2003, 'The Adjustment of Voting Modalities in the Governing Council'. *Monthly Bulletin* May: 73–83.
- Felsenthal, D. S. and M. Machover 1998, *The Measurement of Voting Power: Theory of 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): 81–97.
- Felsenthal, D. S. and M. Machover 2004, 'A Priori Voting Power: What is it All About?'. *Political Studies Review* 2: 1–23.
- Gildea, J. 1992, 'The Regional Representation of Federal Reserve Bank Presidents'. *Journal of Money, Credit and Banking* 24(2): 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*. Brussels: Centre for European Policy Studies.
- Grüner, H. P. 1999, 'On the Role of Conflicting National Interests in the ECB Council'. *Centre of Economic Policy Research (CEPR)* No. 2192.
- Grüner, H. P. 2001, 'Collective Decisions with Interdependent Valuations'. *IZA and CEPR* September.
- Hahn, V. 2002, 'Transparency in Monetary Policy: A Survey'. *Ifo-Studien* 48(3): 429–450.
- Haradau, R. 2003, 'Voting Power and Coalition Formation in the European Central Bank'. *Master thesis University of Konstanz*.

- Hefeker, C. 2002, 'Monetary Policy in a Union of 27: Enlargement and Reform Options'. *Intereconomics* 6: 315–320.
- Hendriks, M. and P. Maier 2002, 'Implications of EMU Enlargement for European Monetary Policy: A Political Economy View'. *MEB Series. Netherlands Bank, Monetary and Economic Policy Department*.
- Holler, M. and S. Napel 2004, 'Local Monotonicity of Power: Axiom or just a Property'. *Quality and Quantity* 38(5): 637–647.
- Krause, G. 1996, 'Agent Heterogeneity and Consensual Decision-Making on the Federal Open Market Committee'. *Public Choice* 88: 83–101.
- Kydland, F. and E. Prescott 1977, 'Rules Rather than Discretion: The Inconsistency of Optimal Plans'. *Journal of Political Economy* 85(3): 473–491.
- Lagogiannis, P. 2004, 'European Central Bank Decision-Making and the Proposed Rotation Scheme: A Voting Power and Bloc Analysis'. *Master thesis University of Liverpool Management School*.
- Lane, J.-E. and R. Maeland 1995, 'Voting Power under the EU Constitution'. *Journal of Theoretical Politics* 7: 223–230.
- Leech, D. 2002, 'Designing the Voting System for the Council of the European Union'. *Public Choice* 113: 437–464.
- Leech, D. and R. Leech 2004, 'Voting Power and Voting Blocs'. *Warwick Economic Research Papers, forthcoming in Public Choice* 716.
- Lindner, I. and K. Olechowski-Hrdlicka 2002, 'Institutionelle Auswirkungen der EU-Erweiterung im Bereich der Wirtschafts- und Währungspolitik'. *Österreichische Nationalbank. Berichte und Studien*. 2/2002: 177–193.
- Mangano, G. 1999, 'Monetary Policy in EMU: A Voting-Power Analysis of Coalition Formation in the European Central Bank (ECB)'.
- Napel, S. and M. Widgrén 2001, 'Inferior Players in Simple Games'. *International Journal of Game Theory* 30: 209–220.
- Napel, S. and M. Widgrén 2004, 'Power Measurement as Sensitivity Analysis. A Unified Approach'. *Journal of Theoretical Politics* 16(4): 517–538.
- Nurmi, H. and T. Meskanen 1999, 'A Priori Power Measures and the Institutions of the European Union'. *European Journal of Political Research* 35(2): 161–179.
- Pajala, A., T. Meskanen, and T. Krause 2002, 'Powerslave Power Index Calculator: A Voting Body Analyser in the Voting Power and Power Index Website'. *Version 1.0*.
- Rogoff, K. 1985, 'The Optimal Degree of Commitment to an Intermediate Monetary Target'. *Quarterly Journal of Economics* 100(4): 1169–1190.

- Shapley, L. 1953, 'A Value of n-Person Games'. In: H. Kuhn and W. Tucker (eds.): *Contributions to the Theory of Games*. Princeton: Princeton University Press, pp. 307–317.
- Shapley, L. and M. Shubik 1954, 'A Method for Evaluating the Distribution of Power in a Committee System'. *American Political Science Review* 48: 787–792.
- Sinn, H. and M. Reutter 2001, 'The Minimum Inflation Rate for Euroland'. *NBER Working Paper* No. 8085.
- Stéclebout, E. 2004, 'Monetary Policy-Making in an Enlarged European Union'. *Paper presented at the 21st Symposium on Banking and Monetary Economics, CNRS Research Group on Monetary and Financial Economics, Nice*.
- Sutter, M. 2000, 'Flexible Integration, EMU and Relative Voting Power in the EU'. *Public Choice* 104: 41–62.
- Ullrich, K. 2004, 'Decision-Making of the ECB: Reform and Voting Power'. *ZEW Discussion Paper* 04-70.
- 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: 774–782.
- Warntjen, A. 2003, 'The Effects of Eastern Enlargement on the Decision-Making Procedure in the Governing Council of the European Central Bank'. *University of Konstanz. Paper prepared for the 7th Graduate Student Conference CGES. Georgetown University*.
- Winkler, B. 2000, 'Which Kind of Transparency? On the Need for Clarity in Monetary Policy Making'. *ECB Working Paper* 26.