EU Representation at the IMF – A Voting Power Analysis

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To analyze the consequences of a hypothetical consolidated EU representation at the IMF, we regroup the 27 EU Member States into a euro area EU constituency and a non-euro area EU constituency (based on the IMF's new quota formula) and calculate voting power measures as proposed by Penrose-Banzhaf (PBI) and Shapley-Shubik (SSI). For theoretical reasons and reasons of empirical plausibility, we favor the results based on the SSI. Concerning the Executive Board, our results confirm the PBI-based evidence in the literature, as we find that the two large constituencies (U.S.A and euro area) would have more voting power than their voting shares indicate. Above majority thresholds of 67%, the PBI and SSI results become increasingly divergent, with the difference being most pronounced at the majority threshold of 85%, at which the PBI has already plunged dramatically whereas the SSI remains more or less constant. Concerning the Board of Governors, we find that voting power depends on both EU-related decision rules and the power measure used. If decision-making within the group is based on EU Council votes, smaller EU Member States tend to gain voting power and would hence have an incentive to push EU consolidation. By contrast, most of the larger EU Member States tend to lose voting power and might consequently be inclined to retain the status quo. However, above all by bundling individual euro area concerns, a consolidated euro area representation would act as a booster for the euro area as a whole.

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The global financial crisis creates feelings of déjà vu: Most of the conclusions at which international policymakers have arrived lately were already listed in the *Report on the international monetary system – how to make it work better and avoid future crisis,* submitted by the Committee on Economic and Monetary Affairs of the European Parliament in 2001. In particular, with reference to EU representation at the IMF, the report – with strong rhetoric – states that

> *To counterbalance the invasive influence of the United States, EU Member States would do well to bring Europe's weight in the world to bear in the IMF. That would mean insisting on an intelligent realignment of the different 'constituencies', in particular those on which some EU States are somewhat isolated.*

The discussion on consolidating representation of EU Member States at the IMF has a long tradition and has only gained additional momentum in the current global financial crisis. As pointed out by Bini Smaghi (2006a), Europe has been slow to improve its external representation in the field of international economic policy for two reasons. First, the degree of European integration varies considerably across countries with regard to structural and financial policies; moreover, the fact that only 16 of 27 EU Member States have the same currency is an added complication. Second, joint representation presupposes giving up a certain number of seats in international forums, a fact that some Member States might see as a loss in international prestige. With international representation

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being fragmented, the EU arguably exerts much less influence on international policy issues than it might do given its economic weight.

Referring to the external representation of the EU, Almuñia (2009, p. 5) stated that

> *… The Commission has long called for a consolidation of European representation on the boards of the IFIs. In the case of the IMF, the argument for a single consolidated euro-area chair is quite obvious. Yet, Member States concerned jealously guard their seats …*

When discussing EU representation at the IMF, it is important to focus not only on technical issues such as the number of seats on the Board or the size of IMF quotas assigned to individual countries, but also on the implications of those conditions for actual power. Political power depends not only on a member's share in the votes, but also on its *a priori voting* power, i.e. its ability to cast decisive votes under majority voting rules. In an organization, members with a large voting share may have even greater voting power at the expense of members with smaller voting shares, whereas other members might have no voting power at all, notwithstanding their nominal voting shares.[2] Individual voting power is closely linked to the voting power of all other members and to the voting or majority rules. In fact, a country may have the incentive to join a group as the loss of individual power would be outweighed by the gain achieved as a member of a more powerful group. In this respect, the political discussion on consolidating EU representation at the IMF seems to ignore that a priori voting powers are not identical with voting shares within a weighted-voting system, as evidenced by IMF-related empirical analysis (Leech, 2002a; Bini Smaghi, 2006b).

According to the IMF's Articles of Agreement, which also provide the legal basis for the IMF's voting system, a member's voting power should reflect its financial contribution. Therefore, IMF decision-making should be built on voting weights that confer adequate voting power in line with original intentions. Following an overview of the current governance structure of the IMF (sections 1 and 2), we analyze the voting power implications of consolidating EU representation at the IMF Executive Board and at the Board of Governors. On the basis of the new quota formula, agreed upon in 2008 and still to be ratified by many IMF member countries, we calculate voting power indices to compare the distribution of voting power under the *current* structure with a *reorganized* structure based on *consolidated/fully-fledged EU membership* (sections 3 and 4).

In particular, we look deeper into the difference between nominal voting shares and a priori voting power and evaluate whether individual EU Member States gain or lose voting power in our proposed structure as compared to the status quo with the new quota formula.[3]

[2] *The voting power of Luxembourg in the EEC Council of Ministers before 1973 is an often-cited classic example. Although formally having one vote, Luxembourg did not have the power to swing decisions in the Council given the prevailing majority rules and distribution of votes – i.e. Luxembourg's voting power was actually zero.*

[3] *Leech (2002a) calculates the voting weights that should be assigned to IMF member countries to align the distribution of voting power with the distribution of IMF quotas. However, this study does not deal with the issue of how to reduce the gap between voting shares and voting power.*

1 Overview of Governance Structures at the IMF

1.1 Representation at the IMF under the IMF's Articles of Agreement

The IMF was established in 1944 at the Conference of Bretton Woods, with the number of founding members totaling 44 states. At that time, membership in most international organizations was traditionally based on statehood. Article II, Section 1 (Original members) of the Articles of Agreement stipulates that

> *The original members of the Fund shall be those of the countries represented at the United Nations Monetary and Financial Conference whose governments accept membership before December 31, 1945.*

Section 2 (Other members) of the Articles of Agreement adds:

> *Membership shall be open to other countries at such times and in accordance with such terms as may be prescribed by the Board of Governors. These terms, including the terms for subscriptions, shall be based on principles consistent with those applied to other countries that are already members.*

However, according to Gold (1974), a former legal IMF counsellor, the IMF should not preclude from membership a single entity in international law having the scope of a country.

Horng (2005) analyzes the legal and institutional implications of IMF membership for the ECB and assesses the relevant provisions of the EC Treaty and the Articles of Agreement. He basically acknowledges that the IMF is a state-based institution, but mentions that in the Balance of Payments Statistics (IMF, 2000), the term "country"

> *… does not in all cases refer to a territorial entity that is a state as understood by international law and practice; the term also covers some non sovereign territorial entities, for which statistical data are maintained and provided internationally on a separate and independent basis …*

A frequently cited legal difficulty for consolidating EU representation at the IMF concerns Article XII, Section 3,[4] which stipulates that

> *(a) The Executive Board shall be responsible for conducting the business of the fund, and for this purpose shall exercise all the powers delegated to it by the Board of Governors.*
> *(b) The Executive Board shall consist of Executive Directors with the Managing Director as chairman. Of the Executive Directors:*
> *(i) five shall be appointed by the five members having the largest quotas; and*
> *(ii) fifteen shall be elected by the other members.*
> *For the purpose of each regular election of Executive Directors, the Board of Governors, by an eighty-five majority of then total voting power, may increase or decrease the number of Executive Directors.*

Under Article XII, the five countries holding the largest IMF quotas must appoint an Executive Director, and they must not form a joint representation *(Constituency)* with other member countries at the Executive Board. Hence, consolidation of EU representation which affects any of these five countries would only be feasible under an amendment of the Articles of Agreement. According to Article XXVIII (a), this amendment would need to be agreed upon by three-fifths of the members and 85% of the total voting share.

[4] *The second amendment of the Articles of Agreement in 1978 set the size of the Executive Board at 20 Directors, however with the proviso that* "… for the purpose of each regular election of Executive Directors, the Board of Governors, by an eighty-five percent majority of the total voting power may increase or decrease the number of elected Directors." *(Van Houtven, 2002).*

The formation of constituencies is not formally guided by the Articles of Agreement. In the past, formal rules *(Decisions)* have been passed to safeguard some equality of power between constituencies, but over time these rules have gradually lost effectiveness and are not applied any more. According to Martin and Woods (2005), elected directors were originally supposed to have a minimum voting power of 19% and a maximum voting power of 20%. By 1970 the margins had been altered to 6% and 13%. The maximum percentage of votes to be wielded by an elected Director is currently 9%. At present, 15 Executive Directors represent constituencies whose voting share is below 4%.

Elected Executive Directors serve for a two-year term. In a number of constituencies, the Executive Director is selected by the country with the highest voting share within the constituency, in others there are rotation arrangements. Each constituency defines its own modus operandi *(Constituency Agreement),* which determines the rules of appointment and representation. For instance, the Constituency Agreement between Austria, Belarus, Belgium, the Czech Republic, Hungary, Kazakhstan, Slovakia, Slovenia and Turkey covers a period of ten years.

1.2 The System of IMF Constituencies

Table 1 shows the current representation of the 27 EU Member States at the Executive Board, based on the old quota formula. EU Member States are represented in ten (out of the total of 24) constituencies, three single-state (Germany, France, United Kingdom) and seven mixed-state constituencies. Presently, EU Member States hold eight chairs, with euro area Member States accounting for six chairs (Germany, France, Italy, Netherlands, Belgium, Spain) and non-euro area EU Member States for two (United Kingdom, Sweden). The two other mixed-state constituencies with an EU Member State are chaired by Canada and Switzerland. In sum, EU Member States have an aggregate voting share of 32.1% (euro area Member States: 22.9%; non-euro area EU Member States: 9.2%).

Within the seven mixed-state constituencies, there are five constituencies which are dominated by one country, namely Italy (77.8% of the constituency's total voting shares), Netherlands (49.0%), Belgium (40.6%), Canada (79.3%) and Switzerland (56.3%). The two other mixed-state constituencies are more balanced; Spain – with a relative voting share of 31.2% – chairs the South-American constituency, followed by Venezuela (27.2%) and Mexico (32.2%). Finland currently chairs the Nordic constituency under a biannual rotation scheme, with a relative voting share of 16.9%. In the same constituency, Sweden has a relative voting share of 31.7% and Norway of 22.2%.

The dispersion of EU Member States across constituencies complicates the pursuit of a common strategy at the IMF. Phillips (2006) argues that EU Member States are simply incapable of following a common position given the mixed nature of their constituencies. In the present situation, this is likely to be most difficult for Spain, Poland and Ireland, which are the sole EU Member States in their respective constituencies.

McNamara and Meunier (2002) argue that, given the single monetary policy, it would be reasonable for the euro area countries to reorganize themselves at the IMF as a more coherent and streamlined grouping. However, the larger euro area countries would

prefer to keep the status quo, since unlike within the EU, where they may well remain dominant players even as euro area members, they are unlikely to influence decisions in international organizations such as the IMF to a similar extent otherwise. Smaller EU Member States, by contrast, would be more inclined to pool representation at the IMF, although Belgian and Dutch policymakers could be reluctant to give up their chairs.

In the past, countries have changed constituencies quite often. The search for a more influential role within a constituency (Director, Alternate Director, Senior Advisor, Advisor) and geographical considerations seemed to play major roles. For example, in the 1950s Indonesia joined the Italian-chaired constituency, then switched to a constituency of Islamic countries with North-African countries and Malaysia, before it eventually formed a more geographically motivated constituency with countries such as Korea, the Philippines and Vietnam in 1972. Switzerland became a member of the IMF in 1992 and was accepted as head of a constituency with CEE and a few CIS countries.[5] Spain, Poland and Greece used to be members of a constituency chaired by Italy. Spain left the constituency in 1978 to become a member of a Central-American constituency, holding the chair in turn with Mexico and Venezuela. Poland decided to join the Swiss-headed constituency to hold the position of Alternate Executive Director. Greece joined the Iran-chaired constituency to obtain the position of Alternate Executive Director but switched back to the Italian-headed constituency when Spain vacated the Alternate chair.

The five IMF members with the highest quotas used to be the U.S.A., the United Kingdom, China, France and India. In 1944, the U.S.A. insisted that the quota share of the British Commonwealth must not exceed the U.S. share (36.2%), so that the U.K., per se, received a starting quota of 17.1%. In 1958, Syria and Egypt informed the Management of the IMF about their intention to become a single member with a single quota.[6] The two individual quotas were aggregated; their basic votes, however, were reduced to the scope of a single member. At the end of 1961, the United Arab Republic was split again at the request of Syria. When the Treaty of Rome entered into force in 1958, the six founding members of the European Economic Community (EEC) held 15.75% of the IMF's total voting shares, compared with 25.78% held by the U.S.A. at the time.[7] In 1960, Germany replaced the Republic of China (Taiwan) and in 1970 Japan replaced India in the group of the Directors to be appointed. In 1978, the size of the Board was raised to 21, when Saudi Arabia received the right to ap-

[5] *Azerbaijan, the Kyrgyz Republic, Poland, Serbia and Montenegro, Tajikistan, Turkmenistan and Uzbekistan.*

[6] *The Executive Board deemed neither an amendment of the Articles of Agreement nor a specific resolution by the Board of Governors as necessary. According to Mathieu et al. (2003), the Executive Board did not see any reason* "to adopt a membership resolution establishing terms that had been laid down already and requiring actions, such as the payment of subscriptions and the agreement on par value that had been taken already." *Gold (1974)* states that the IMF continued "to hold the currencies of the two regions, have separate depositories in Cairo and Damascus for the two currencies, deal through two fiscal agencies, make separate calculations of monetary reserves."

[7] *Since then, the size of the U.S. voting share has declined further, mainly as a result of the increase in member countries, to currently 16.78%. As already mentioned, by comparison, the aggregated EU share is 32.1% and the aggregated euro area voting share 22.9%.*

Table 1

EU Constituencies at the IMF Executive Board

EU Member States						Other countries			Executive Board chairs		Voting share in the IMF / in the constituency
Euro area			Non-euro area						Executive Director	Alternate Executive Director	
Country	Voting share		Country	Voting share		Country	Voting share				
	IMF	Consti-tuency		IMF	Consti-tuency		IMF	Consti-tuency			
%											
Germany	5.88								Germany	Germany	5.88
France	4.86								France	France	4.86
			United Kingdom	4.86					United Kingdom	United Kingdom	4.86
Italy	3.20	77,84				Albania	0.03	0.81	Italy	Greece	4.10
Portugal	0.40	9,81				San Marino	0.02	0.46			
Greece	0.38	9,32				Timor-Leste	0.01	0.36			
Malta	0.06	1,40									
Netherlands	2.34	48,97	Romania	0.48	9.96	Ukraine	0.63	13.19	Netherlands	Ukraine	4.78
Cyprus	0.07	1,55	Bulgaria	0.30	6.28	Israel	0.43	9.00			
						Croatia	0.18	3.68			
						Bosnia-Herzegovina	0.09	1.83			
						Georgia	0.08	1.65			
						Moldova	0.07	1.40			
						Armenia	0.05	1.10			
						Macedonia, FYR	0.04	0.89			
Belgium	2.09	40.63	Hungary	0.48	9.33	Turkey	0.55	10.67	Belgium	Austria	5.14
Austria	0.86	16.65	Czech Republic	0.38	7.41	Belarus	0.19	3.61			
Slovak Republic	0.17	3.36				Kazakhstan	0.18	3.43			
Luxembourg	0.14	2.67									
Slovenia	0.12	2.25									
Finland	0.58	16.90	Sweden	1.09	31.73	Norway	0.77	22.24	Sweden[1]	Norway[1]	3.44
			Denmark	0.75	21.87	Iceland	0.06	1.87			
			Lithuania	0.08	2.22						
			Latvia	0.07	1.99						
			Estonia	0.04	1.18						
Spain	1.39	31.16				Venezuela	1.21	27.21	Spain[2]	Mexico[2]	4.45
						Mexico	1.43	32.21			
						Guatemala	0.11	2.38			
						Costa Rica	0.09	1.92			
						El Salvador	0.09	1.99			
						Honduras	0.07	1.57			
						Nicaragua	0.07	1.57			
Ireland	0.39	10.71				Canada	2.89	79.30	Canada	Ireland	3.64
						Jamaica	0.13	3.70			
						Barbados	0.04	1.15			
						Antigua and Barbuda	0.02	0.48			
						Belize	0.02	0.54			
						Dominica	0.01	0.41			
						Grenada	0.02	0.46			
						St. Kitts and Nevis	0.02	0.42			
						St. Lucia	0.02	0.50			
						St. Vincent and the Grenadines	0.02	0.41			
			Poland	0.63	22.55	Switzerland	1.57	56.34	Switzerland	Vacant	2.79
						Uzbekistan	0.14	4.86			
						Azerbaijan	0.08	3.01			
						Kyrgyz Republic	0.05	1.84			
						Tajikistan	0.05	1.81			
						Turkmenistan	0.05	1.62			
Total	**22.92**			**9.15**							**43.95**

Source: IMF (voting shares as at June 30, 2009). [1] *Chair rotates every two years.* [2] *Chair rotates between Spain, Mexico and Venezuela.*

point an Executive Director by itself, reflecting the fact that in the two preceding years the Saudi riyal had been one of the two most frequently used currencies in IMF transactions. In 1980, the People's Republic of China assumed representation and its quota was augmented to an extent that permitted China to elect an Executive Director by itself. In 1981, the quota of Saudi Arabia was raised in an ad hoc manner so that Saudi Arabia could also elect an Executive Director. In the wake of the dissolution of the Soviet Union, the size of the Board was raised to 24. Ex-Soviet Union Member States and some other formerly centrally planned economies joined various constituencies, and Russia, because of the scope of its quota, was entitled to elect an Executive Director.

1.3 Decision-Making

The IMF is governed by two decision-making bodies: the Board of Governors and the Executive Board. The Board of Governors is the highest decision-making body of the IMF. It consists of one Governor and one alternate Governor for each member country. While the Board of Governors has delegated most of its powers to the IMF's Executive Board, it retains the right to approve quota increases, special drawing right (SDR) allocations, the admittance of new members, the compulsory withdrawal of members, and amendments to the Articles of Agreement and By-Laws. The Board of Governors also elects or appoints Executive Directors and is the ultimate arbiter on issues related to the interpretation of the IMF's Articles of Agreement. The Board of Governors is advised by the International Monetary and Financial Committee (IMFC). The IMFC has 24 members, drawn from the pool of currently 186 Governors. Its structure mirrors that of the Executive Board and its current 24 constituencies. The IMFC discusses matters of common concern affecting the global economy and also advises the IMF on the direction of its work. The second decision-making body is the Executive Board, which takes care of the daily IMF business. For this purpose, the Executive Board exercises all the powers delegated to it by the Board of Governors.

IMF decisions are taken by weighted voting. The individual voting share depends on the quota and the number of basic votes assigned to each member country. According to Article XII, Section 5(a), each IMF member has 250 basic votes plus one additional vote for each SDR 100,000 of quota. Section 5(c) stipulates that all decisions of the IMF shall be made by a majority of the votes cast.

However, decisions are generally not taken by formal voting but by consensus at the Board of Governors and the Executive Board. This is a long-standing tradition. When the IMF was founded with the U.S.A. and the U.K. as the two dominant countries in terms of voting and political power, the view prevailed that – because of the variety in membership – decision-making had to be conducted in a consensual way. A cooperative decision-making framework evolved that generally led to middle-of-the-road solutions where differing interests of the member countries had to be reconciled and, in particular, the interests of developing countries need to be protected (Van Houtven, 2002).

This cooperative decision-making framework is reflected in the By-Laws, Rules and Regulations (IMF, 2006). Referring to the Board of Governors, the *By-Laws of the International Monetary Fund,* state in Section 11 *(Voting)* that

> *Except as otherwise specifically provided in the Articles of Agreement, all decisions of the Board of Governors shall be made by a majority of the votes cast. At any meeting the Chairman may ascertain the sense of the meeting in lieu of a formal vote but he shall require a formal vote upon request of any Governor. Whenever a formal vote is required the written text of the motion shall be distributed to the voting members.*

As regards the Executive Board, the *Rules and Regulations of the Monetary Fund* stipulate in Section C that:

> *C-10. The Chairman shall ordinarily ascertain the sense of the meeting in lieu of a formal vote. Any Executive Director may require a formal vote to be taken with votes cast as prescribed in Article XII, Section 3(i), or Article XXI (a) (ii).*
>
> *C-11. There shall be no formal voting in committees and subcommittees. The Chairman of the committee and subcommittee shall determine the sense of the meeting (including alternative points of view) which shall be reported.*

The *"sense of the meeting"* is generally regarded as a position that would have sufficient votes to come to a decision if a vote were taken. Although *"consensus"* normally means *"unanimity,"* a large majority is generally regarded as sufficient for many decisions. However, this does not necessarily mean that voting shares are irrelevant. Formal voting shares exert a substantial influence on the de facto decision-making process.[8]

If complex issues are on the table, the Chairman of the Executive Board[9] urges the Board to consider matters at least until a broad majority has emerged on the issue under discussion. It is a generally accepted principle that *"nothing will decided until everything is agreed upon."* This principle, which equals a de facto potential veto power for smaller countries, ensures that – even without a formal vote – minority views are protected in important decisions where special majority thresholds are formally needed.[10]

Board discussions on tricky issues such as surveillance and general policy formulation generally end with a *Chairman's Summing Up* or *Chairman's Concluding Remarks*. While the *Chairman's Concluding Remarks* aim to capture, for instance, the progress of a policy debate in a more tentative sense, thereby suggesting how the debate can be moved on, the *Chairman's Summing Up* comprises the main differences of opinion between Executive Directors during a Board discussion as well as differences between the Board's views and the position of the staff.[11] The parts of a *Summing Up* that mirror the *sense of the meeting* have the character and the effect of a Board decision. However, decisions which require a special voting majority of 70% or 85% are submitted by the Chairman to the Board for a straight up-or-down vote before the meeting is closed (Van Houtven, 2002). Hence, in practice, IMF decisions are rarely brought to a vote. As Leech

[8] *The impact Executive Directors can have on IMF decision-making is nevertheless contingent not only on their voting share but also on their persuasiveness, technical expertise, diplomatic skills and period of service. This phenomenon can also be observed in the Governing Council of the ECB or the Council of Ministers at the EU level.*

[9] *According to the Articles of Agreement, Article XII Section 4 (a), "The Managing Director shall be chairman of the Executive Board, but shall have no vote except a deciding vote in case of an equal division. He may participate in meetings of the Board of Governors, but shall not vote at such meetings."*

[10] *Decision-making at the Board is, however, not 100% consensual. For instance, when the Board approved Mexico's request for a Stand-by Agreement on February 1, 1995, several Board members from Western European countries abstained for various reasons.*

[11] *If the members of a constituency cannot reach a common understanding on the opinion the Executive Director may express at the meeting of the Board, the Executive Director can request the different views to be mentioned in the minutes of the meeting and remain free to abstain from or object to a particular decision.*

(2002a, p. 379) notes, formal voting is impeded with the intent *"to avoid the element of confrontation associated with a contested vote."*

Ordinary decisions, which are the bulk of decisions taken by the Executive Board, require a simple (weighted) majority of the votes cast. There are several other cases, specified in the Articles of Agreement, which are subject to special majorities. The reason for the existence of special majorities is mainly historical: At the Bretton Woods conference, the U.S.A. aimed to reserve the right to exercise a veto over the most important decisions and proposed a special majority of four-fifths for major decisions. The British delegation under John Maynard Keynes argued – for various reasons – against special majorities, bringing forward the argument that higher majority rules would also limit the influence of the U.S.A. on important decisions, since a smaller group of countries would be able to block U.S. initiatives. However, the U.S. view prevailed and the original Articles of Agreement foresaw several special majorities for nine categories of decisions. The number was increased to 21 on the occasion of the first amendment of the Articles (taking effect on July 28, 1969), raised further to over 50 in the second amendment (taking effect on April 1, 1978) and increased by one in the third amendment (taking effect on November 11, 1992). In the second amendment, the number of special majorities was simplified and reduced to the current special majority rules of 70% and 85%.

Rapkin and Strand (2006) mention that the emergence of special majorities in the decision-making process of international organizations frequently discriminate against developing countries and propose that the current special majority provisions be rationalized. They also argue that the U.S.A. exerts a disproportionally large influence on the IMF not only through its large voting share, its seat in the Executive Board, the large proportion in the IMF staff of U.S. citizens and/or staff members trained at U.S. universities, but also through its direct transmission of U.S. concerns to the IMF management/staff and to individual members. This is called the *Treasury effect* (Evans and Finnemore, 2001). A possible solution to avoid the dominance of one country would be to determine special majorities just above a country's total vote or to wait until the voting share of the U.S.A. falls below 15%. This scenario would occur in the event of future general quota increases if the U.S.A. were to agree to its nominal voting share not being increased.

Decisions which require special majorities range from cases that occur only on rare occasions, for instance the suspension of voting rights or a country's compulsory withdrawal, to more frequently occurring cases: These – highly sensitive – decisions (13 categories) are to be taken by the Board of Governors and cannot be delegated to the Executive Board. The Executive Board, as the main decision-body of the IMF in day-to-day work, can decide upon around 40 categories of decisions requiring special voting majorities. 16 categories fall under the 85% majority rule; the remaining categories, which refer mainly to financial and operational issues, have a majority rule of 70%.[12]

With a voting share of 16.78%, the U.S.A. is the only country able to veto major decisions. However, as Leech

[12] *For special majority rules in the context of financial operations see, for instance, IMF (2001, p. 172).*

and Leech (2005) point out, the veto power does not necessarily mean that the U.S.A. would be able to control the IMF. The 85% majority threshold would rather tend to balance voting power to a considerable extent. Indeed, it gives the U.S.A. the power to prevent action/hinder initiatives by other countries but also restricts the U.S.A.'s power to initiate action, since a group of countries with a sufficient voting share would be able to block any U.S. effort.

2 External Representation of the EU and EU Representation at the IMF

The idea of consolidating EU representation at the IMF has been launched several times in the past. For instance, Ahearne and Eichengreen (2007) recommend consolidating Europe's representation at the IMF by creating either a single chair for the EU as a whole or a pair of chairs, one for the euro area Member States and one for the other EU Member States. They argue that a single EU seat or even a pair of seats would make the EU, with its cohesive block of votes, a key swing voter. Eurodad (2006) argues along the same lines. Truman (2006) mentions that under EU consolidation, Europe would be better able to speak with one voice and could potentially exert greater influence. He puts forward a four-step procedure under which the EU Member States would be grouped into two constituencies (euro area Member States and the remaining EU Member States) and eventually form a single combined EU constituency. The remaining chairs currently held by EU Executive Directors could go to new constituencies, or the overall size of the Executive Board could be reduced.

2.1 The EU's External Representation according to the EC Treaty

The legal basis for the external representation of the EU is Article 111(4) of the EC Treaty, stating that

> *… the Council [in composition of Member States without a derogation] shall, on a proposal from the Commission and after consulting the ECB, acting by a qualified majority decide on the position of the Community at international level as regards issues of particular relevance to economic and monetary union and on its representation, in compliance with the allocation of powers laid down in Articles 99 and 105.*[13]

Reference to Article 99 means that – where economic policies are concerned – EU external representation should reflect the obligation of Member States to regard their economic policies as a matter of common concern and to coordinate these policies within the Council (Horng, 2005). The reference to Article 105 means that the ECB has to be involved when monetary and foreign exchange operations are discussed. According to the Treaty of Nice, which entered into force on February 1, 2003, the Council is entitled to define arrangements on the external representation more precisely by qualified majority voting. In brief, the Council, the Commission and the ECB are involved in various aspects of external representation, whereby the Commission and the ECB have the right to initiate on the one hand the formulation of exchange rate agreements regarding the euro in relation to non-Community currencies and on the other hand the

[13] *Amended by Article 2(6) of the Treaty of Nice, OJ C 80/1/2001.*

formulation of general exchange rate policies with third countries.[14] In addition to the aforementioned Article 111, the EC Treaty contains several other specific provisions which stipulate that EU Member States are obliged to closely cooperate in international forums. This close cooperation, however, is not intended to prevent individual Member States from assuming international rights and obligations such as membership of the IMF[15] as long as they gear their external obligations towards the Community framework. In this context, the European Court of Justice[16] states that

> *… when it appears that the subject matter of an international convention falls in part within the competence of the community and in part within that of Member States, it is important that there is a closer association between the institutions of the community and the Member States both in the process of negotiation and conclusion and in the fulfilment of the obligations entered into. This duty of cooperation … results from the requirement on unity in the international representation of the community …*

It is, however, clear that EU Member States would need a strong common political consensus to set the process of consolidating IMF representation in motion. At the December 1998 European Council in Vienna, the heads of state or government agreed

> *… that, while trying to reach early solutions pragmatically with international partners, these solutions should be further developed over time adhering to the following principles:*
>
> *– the Community must speak with one voice;*
> *– the Community shall be represented at the Council/ministerial level and at the central banking level;*
> *– the Commission will be involved in the Community external representation to the extent required to enable it to perform the role assigned to it by the Treaty …*

On this basis, the Council agreed on concrete arrangements related to the G-7 and the IMF:

> *… The President of the ECOFIN Council, or if the President is from a non-euro area Member State, the President of the Euro 11, assisted by the Commission, shall participate in meetings of the G7 (Finance) (Annex 2). The ECB, as the Community body competent for monetary policy, should be granted observer status at the IMF board. The views of the European Community/EMU on other issues of particular relevance to the EMU would be presented at the IMF Board by the relevant member of the Executive Director's office of the Member State holding the euro Presidency, assisted by a representative of the Commission. The European Council invites the Council to act on the basis of a Commission proposal incorporating this agreement …*

Moreover, according to the Presidency Conclusions, Annex 2: *"Report to the European Council on the state of preparation for Stage 3 of EMU, in particular the external representation of the Community,"* as regards the representation at the IMF:

> *… The Council considers that pragmatic solutions for presenting issues of particular relevance to EMU may have to be sought which do not require a change in the Articles of Agreement of the IMF: A first neces-*

[14] *As the short discussion above shows, the division of power and responsibility between EU institutions is rather complex. A thorough legal analysis, though, is clearly beyond the scope of this paper, hence we refer to more comprehensive surveys, such as Steinki (2003) or Herrmann (2002).*

[15] *According to Article 111(5), "Without prejudice to Community competence and Community agreements as regards economic and monetary union, Member States may negotiate in international bodies and conclude international agreements."*

[16] *ECJ Opinion 2/91 [1993] ECR I – 1061, paragraphs 36 and 37.*

sary step has already been taken; the IMF Executive Board agreed to grant the ECB an observer position at that Board; secondly, the views of the European Community/EMU would be presented at the IMF Board by the relevant member of the Executive Director's office of the Member State holding the Euro 11 Presidency, assisted by a representative from the Commission …

In sum, from a legal point of view, even if all EU Member States were to join the same IMF constituency, each Member State would retain its own rights and responsibilities according to the Articles of Agreement. The Executive Director would then cast the vote for the constituency as a whole. Alternatively, the EU or the euro area could also become a fully-fledged IMF member in its own right. This, however, would not only change the composition of the Executive Board and the Board of Governors, it would deeply affect the governance structure of the IMF in many other respects, for instance in terms of surveillance under Article IV or balance of payments support, since funds could then only be transferred to the new legal entity instead of individual countries.

Mathieu et al. (2003) cite two possibilities of setting up a single quota. In the first scenario, EU Member States would join a single EU constituency while either maintaining individual quotas, or following the example of the United Arab Republic, aggregating individual quotas to a single quota. In the second scenario, the EU would become a fully fledged single member with a new quota[17] that would, however, be smaller than the sum of the individual quotas, but still considerably higher than the current U.S. quota. The authors doubt whether an EU quota that is nearly twice the size of the U.S. quota would be politically feasible. This would endow the EU, for instance, with the power to veto major IMF decisions, even for 70% majority votes.[18]

2.2 Intra-EU Coordination at the IMF

In principle, coordination of EU positions at the IMF takes place at the *EURIMF*, an informal group of representatives of EU Member States in Washington D.C., which comprises Executive Directors, alternates and counsellors. Moreover, a representative from both the Commission Delegation and the ECB, each seated in Washington, participate in EURIMF meetings. An additional forum in Washington is the so-called *mini EURIMF,* which includes only the Executive Directors of EU Member States. Another formal coordination mechanism is the *SCIMF (Sub-Committee on IMF-related issues),* established in 2001 as a substructure to the EFC *(Economic and Financial Committee),* which prepares the meetings of the Ecofin Council (the EU Council meeting in the composition of economic and finance ministers). In the end, according to Article 111 of the EC Treaty, the Ecofin Council is formally in charge of major IMF issues. For a detailed discussion of the *EURIMF* and the *SCIMF* see, for instance, Eurodad (2006).

[17] *In this case, the newly calculated EU quota does not correspond to the aggregated individual quotas, since intra-EU trade in particular would have to be eliminated.*

[18] *A 70% majority is for instance required for many financial and operational decisions and the suspension of voting rights.*

3 Voting Power Analysis and Consolidating EU Representation

3.1 Voting Power Analysis

Voting power analysis is useful for understanding decision-making processes in collective bodies that are governed by voting rules, as it provides measures of players' *a priori voting power.* A priori voting power is a component of the actual (or *a posteriori*) voting power that voters derive solely from the voting rule itself. Thus, it is computed without regard to (or in ignorance of) information about the voters (preferences, complex interaction of real-world factors, etc.) and the nature of the issues put up for a vote (Felsenthal et al., 2003).

Power index methodology is widely used in social sciences to measure the a priori voting power of members of a committee. As Felsenthal and Machover (2004) observe, the Penrose-Banzhaf index and the Shapley-Shubik index are by far the most important measures of a priori voting power, and hence are also the most widely used. Penrose (1946, 1952) proposed a probabilistic measure of a priori voting power, to be interpreted as the probability that the given voter can be decisive (or critical in terms of achieving a majority). Banzhaf (1965) took the same approach as Penrose, but focused on the relative power of each voter (as compared with Penrose's absolute measure). Originally, the Shapley and Shubik (1954) measurement of voting power was derived from the theory of cooperative games with transferable utility.

Power measurement theory and its game-theoretic extensions rely either on an axiomatic approach or on a probabilistic approach.

In an axiomatic approach, each power index is interpreted as a unique measure embodying a set of properties that characterizes it. While this approach has attracted much attention in the literature, it has been criticized for its abstract nature: Axiomatizations may give plausible conditions for the outcome prediction, but they pay little attention to the meaning of the axioms in terms of the voting situation that underlies simple games.

In a probabilistic approach (Niemi and Weisberg, 1972; Straffin, 1977, 1988), the concepts underlying the power indices have a direct probabilistic interpretation, an interpretation disregarded in the game-theoretic literature: Paterson (2006), building on the work of Straffin (1977), demonstrated that if the *number of members voting in favor of (or against) the issues discussed is equally likely* – i.e. the uniform distribution on $\{0, 1, \ldots, n\}$ – then the voting power of individual members corresponds to the Shapley-Shubik index. If the members of the voting body each vote with a *probability of 0.5 for – and against – regardless of the issue discussed,* then the voting power of individual members corresponds to the Penrose-Banzhaf index. In other words, the Penrose-Banzhaf measure assumes that all coalitions are equally likely, whereas the Shapley-Shubik index assumes that all sizes of coalition are equally likely.

Laruelle and Valenciano (2001) developed a more general measure of voting power as a probability of the corresponding voter becoming crucial in a precise sense. Their general concept of voting power measurement takes both the voting rule and the probability distribution over the voting configurations as inputs and is not limited to any particular power index or measure in the traditional sense (Laruelle and Valenciano, 2004).

A similar definition of voting power that also encompasses the two major

power indices of Shapley-Shubik and Penrose-Banzhaf was developed by Paterson (2006). He regarded the output of a yes/no voting process in terms of the number (or percentage) of participants who vote in favor of the proposition put up for a vote ("voting poll"). Paterson (2006) then defines the voting power of a voting body member as the expected decisiveness of his/her vote for a given distribution of the voting poll; the Shapley-Shubik and Penrose-Banzhaf indices are uniquely defined by their corresponding poll distributions.

Recently, Turnovec (2007) showed that both the Shapley-Shubik and Penrose-Banzhaf index could be successfully derived as cooperative game values, and at the same time both of them can be interpreted as probabilities of being in some decisive position (pivot, swing – see below) without using cooperative game theory at all.

3.2 Measuring Voting Power

Formally, decision-making at the IMF (as a voting body) can be thought of as a weighted voting game, which is a subclass of simple games. A simple game, introduced by Von Neumann and Morgenstern (1944), is a n person cooperative game *(N, v)* where the n members of the voting body are represented by a finite set $N = \{1,\ldots,n\}$ and a characteristic function $v : 2^N \to \{0,1\}$ such that $v(\varnothing) = 0$ and $v(S) \le v(T)$ whenever $S \subseteq T$, the subsets S and T representing coalitions of members (a voting configuration). A coalition wins if $v(S) = 1$, and loses if $v(S) = 0$; let W denote the set of all winning coalitions. The weighted voting game is represented by $[q; w_1,\ldots,w_n]$ with $0 < w_i < q$ for all i where w_i represents the voting weight of member i and q is the quota needed to win. Now the characteristic function is defined by $v(S) = 1$ if $w(S) \ge q$, and $v(S) = 0$ otherwise, where $w(S) = \sum_{i \in S} w_i$.

A power index is defined in terms of the number of times that a player can "swing" the decision by transferring his/her vote to a coalition that would lose without – but win with – his/her vote. A (negative) swing for voter i is defined as a pair of voting configurations $(S_i, S_i \backslash \{i\})$ such that S_i wins but $S_i \backslash \{i\}$ loses. In terms of voting weight, S_i is a swing if $w(S_i \backslash \{i\}) < q \le w(S_i)$. A voter i is pivotal in a sequence of one of the $n!$ possible orderings of the n voters if he/she casts the vote that puts the total vote at or over the required quota.

The Penrose index (PI) (or absolute/non-normalized Penrose-Banzhaf index) for voter i is the proportion of votes which are swings for voter i and is defined as

$$\beta_i = \frac{1}{2^{n-1}} \sum_{S \subseteq N; i \in S} (v(S) - v(S \backslash \{i\}))$$

The Shapley-Shubik index (SSI) for voter i is the probability that voter i is pivotal and is defined as

$$\varphi_i = \sum_{S \subseteq N; i \in S} \frac{(s-1)!(n-s)!}{n!} (v(S) - v(S \backslash \{i\}))$$

Both indices measure the absolute power of each voter i as a probability. Since $\sum_{i=1}^{n} \varphi_i = 1$, the SSI may itself also be treated as defining a probability distribution over all voters: the power index is then a probability of a voter being critical for the outcome of the voting decision. A corresponding statement is not true for the PI, as it does not in general sum to unity (Paterson, 2006). Normalizing the PI with the total number of swings for all voters yields the Penrose-Banzhaf index (PBI, or normalized Banzhaf index). The PBI is interpreted as the share of voter i in the power of all voters to influence decisions by means of a swing.

With the probabilistic interpretation in mind, what is the difference between PI (PBI) and SSI? The answer can be found by examining the voting poll distributions. Following Paterson (2006), the *decisiveness* d_i of a voter i for a particular poll (with $0 \le s \le n$ votes in favor, $s = |S|$) is the potential of his/her vote (for/against) to be critical for the outcome of the voting decision. Considering voting configurations S, i.e. voting coalitions that have exactly s members who vote in favor, and the configuration S_i^*

$$S_i^* = \begin{cases} S \setminus \{i\} & \text{if } i \in S \\ S \cup \{i\} & \text{if } i \notin S \end{cases}$$

then decisiveness is defined as

$$d_i(s) = \sum_{S \in S_s} |v(S) - v(S_i^*)| \Big/ \binom{n}{s}$$

Decisiveness $d_i(s)$ is thus the share of voting configurations (coalitions) that are (positive or negative) swings for each voter i, and depends only on the parameters represented by voting weights and the threshold that defines a winning coalition or majority. It does not itself depend on any probabilistic aspects – and it is identical for the Shapley-Shubik or the Penrose-Banzhaf approaches.

Paterson (2006) defines expected decisiveness δ_i of voter i for a poll distribution $p(s)$ as

$$\delta_i = \sum_{s=0}^{n} d_i(s) \cdot p(s)$$

This makes it possible to differentiate between SSI and PBI voting power indices solely in terms of the poll distribution. He shows that for the SSI,

$$p_{SSI}(s) = 1/(n+1)\ , \quad s = 0,\ldots,n$$

i.e. a uniform or "random" distribution of poll outcomes on $\{0,\ldots,n\}$, and for the PI (absolute PBI),

$$p_{PI}(s) = \binom{n}{s} \Big/ 2^n \quad , s = 0,\ldots,n$$

i.e. the binomial distribution on $\{0,\ldots,n\}$ with probability ½.

We prefer the SSI as opposed to the PBI. Our preference is based on the analysis of Paterson (2006). Paterson provides evidence on the consequences of the underlying poll distributions (uniform versus binomial distribution); the binomial distribution leads to voting results that hover around 50% when the number of voters is increased, whereas the uniform distribution does not influence the probability of poll outcomes with an increasing number of voters.

In order to obtain our empirical results we used the software by Leech and Leech (www.warwick.ac.uk/~ecaae/).

3.3 Consolidating EU Representation at the Executive Board

In order to conduct the empirical analysis, we adapt the current constituency structure and establish EU constituencies:[19]

Kenen (2007) argues that an Executive Board with "*… only twenty members may be too large for the efficient conduct of business, and one with twenty-four is surely too large. It would be difficult, however, to reduce the size of the Board, even, to return to twenty members without unifying EU representation.*" He proposes reorganizing the 27 EU Member States into six constituencies (one each for Germany, France, and the

[19] *In this paper we do not elaborate a "constituency agreement" for the euro area constituency. We explicitly do not address issues such as procedures for decision preparation, reporting, etc. Also, we do not make any suggestions on distributing the chair or other posts within the constituency, although we are well aware that this will be a major issue/obstacle in forming a euro area constituency. Dealing with these primarily political questions is beyond the scope of this paper.*

United Kingdom, and three multi-country constituencies). Under this proposal, the total number of constituencies would only be reduced by one, from 24 to 23.

We, however, follow suggestions made by Eurodad (2006), Truman (2006), Bird and Rowlands (2006) and Ahearne and Eichengreen (2007), among others, and establish two EU constituencies, a euro area EU constituency (EAC), which consists of the 16 EU Member States that form the euro area, and a non-euro area EU constituency (NonEAC), which comprises the 11 remaining Member States that have not yet adopted the euro. Apart from necessary changes implied by the withdrawal of EU Member States from their current constituencies, we aim at keeping the current constituency structure unchanged to the highest extent deemed appropriate.

Under our approach, the five countries with the highest calculated quotas that are entitled to appoint an Executive Director are the U.S.A., Japan, China, Saudi Arabia and Canada, with the latter three countries replacing Germany, France and the United Kingdom as they move to the two new EU constituencies.

In the current structure of the Executive Board, three countries (China, Saudi Arabia and Russia) are considered large enough to elect an Executive Director. On the basis of the size of the quota we replace China and Saudi Arabia, which are now among the five countries that may elect an Executive Director, with India and Brazil. Russia remains the third single-country constituency. Moreover, we reduce the size of the Executive Board from 24 to 20 seats, acting on a proposal that has often been put forward as one way to increase efficiency in IMF decision-making.

As a result of our proposed Board composition, a number of countries have to change constituency. First, we regroup these countries geographically and, second, make an effort to balance the size of the constituencies in terms of voting shares. For technical purposes, the chairs of the constituencies are allotted to the countries with the highest calculated quota within the constituency. This purely technical assumption only serves the envisaged consolidation of EU Member States and is not intended to propose a new country-specific structure of the Executive Board.[20]

However, though this is not the main focus of this paper, we also pay due attention to the current discussion on increasing the representation of emerging market economies and developing countries at the IMF.[21] For instance, according to the G-20 (2009),[22] as one of the most recent contributions, "… *emerging and developing economies, including the poorest, should have greater voice and representation and the next review of IMF quotas should be concluded by*

[20] *As already mentioned earlier, the formation of constituencies is at the discretion of IMF member countries and not subject to any provisions of the Articles of Agreement.*

[21] *The efforts of emerging market economies to gain a higher share in IMF decision-making are also fuelled by a shift of quotas that was largely felt inadequate by many emerging market economies in 2008. In spring 2008 the IMF changed the quota formula and adopted a new quota formula, which entailed a shift in calculated quotas of 1.8% from "advanced economies" to "emerging market and developing countries." This was well below the expectations of many emerging market economies, which would rather have seen a shift of around 4%. In sum, the total of quotas was increased by 11.5%, and 54 countries received an increase in their quota shares on an ad hoc basis. The ad hoc quota increase for these countries amounted to a shift of total quota shares of 1.1% and voting shares of 2.7% from "advanced economies" to "emerging market and developing countries."*

[22] *G-20 Communiqué Meeting of Finance Ministers and Central Bank Governors, United Kingdom, March 14, 2009.*

January 2011 …" Accordingly, in their official Statement which was prepared in addition to the aforementioned G-20 document, the BRIC countries (Brazil, China, Russia and India) called for

> *… urgent action with regard to voice and representation in the IMF, in order that they better reflect their real economic weights. In the Fund, a significant realignment of quota should be complemented not later than January 2011. This is necessary to enable members more equitable and fuller participation in the Fund's efforts to play its mandate role. A rebalancing of representation on the Executive Board and DVIFC would lead to a more equitable representation on the membership …*[23]

For illustrative purposes, table 2 shows the *current* and the *proposed* composition of the Executive Board, regrouping the chairs of the constituencies into *advanced countries, emerging market economies and developing countries*. We present figures (in absolute values and percentage shares) of the current number of chairs, calculated quotas (on the basis of the new quota formula) and voting shares. It should be noted that the *proposed* composition leads to a loss of (nominal) influence of the advanced economies and a strong increase (31%)

Table 2

IMF Executive Board: Current and Proposed Composition

	Executive Board chairs		Calculated quotas [1]		Votes	
	number	%	absolute	%	absolute	%
	Current composition					
Advanced economies	12	50.0	160,190.0	67.4	1,655,150.0	65.8
Emerging market economies	8	33.3	56,513.2	23.8	601,132.0	23.9
Developing countries	4	16.7	21,125.1	8.9	258,501.0	10.3
Total	24	100.0	237,828.3	100.0	2,514,783.0	100.0
Memorandum:						
U.S.A.	1	4.2	42,122.4	17.7	421,974.0	16.8
EU (euro area)	6	25.0	55,125.5	23.2	563,255.0	22.4
EU (non-euro area)	2	8.3	20,844.7	8.8	216,697.0	8.6
	Proposed composition					
Advanced economies	8	40.0	162,961.6	68.5	1,587,929.0	63.1
Emerging market economies	10	50.0	66,614.7	28.0	793,387.0	31.5
Developing countries	2	10.0	8,252.0	3.5	133,468.0	5.3
Total	20	100.0	237,828.3	100.0	2,514,784.0	100.0
Memorandum:						
U.S.A.	1	5.0	42,122.4	17.7	421,974.0	16.8
EU (euro area)	1	5.0	55,125.5	23.2	421,974.0	16.8
EU (non-euro area)	1	5.0	20,844.7	8.8	224,546.0	8.9

Source: Authors' calculations.

Note: differences may be due to rounding.

[1] *Based on the new quota formula adopted in April 2008, which is currently being ratified.*

[23] *See G-20 Information Centre, Statement of the Finance Minsters of Brazil, China, Russia and India, March 14, 2009. It is evident that emerging market economies are striving for more influence in the G-20 and the IMF. However, it is still a matter of fact that major decisions at the IMF are prepared by the G-7 countries.*

of voting shares for the emerging market economies, which would then hold half of the chairs at the Executive Board.

4 Empirical Results

4.1 Voting Power Distribution within Constituencies

As mentioned above, in the past IMF Member States frequently changed constituencies for various reasons, e.g. greater influence in the constituency or the division of posts. Likewise, the formation of two EU constituencies leads to significant intra-constituency changes for all of the 27 EU Member States, in particular for EU Member States that currently have a chair/alternate chair in the Executive Board[24] or dominate their constituencies in terms of relative voting share.

In table 3 we display the hypothetical relative voting shares of all 27 EU Member States in the *current* constituency and the *proposed* constituency structure with two EU constituencies, the euro area EU constituency (EU EAC) and the non-euro area EU constituency (EU nonEAC).

The voting shares in the respective *current* constituencies are based on relative *IMF voting shares*. In the respective *proposed* constituencies, assumed relative voting shares are based on either *IMF voting shares* or *EU Council voting shares* following the Treaty of Nice. By comparison with our benchmark scenario (respective current constituency structure, intra-constituency decision rule: *IMF voting shares*) all EU Member States have a significantly lower relative voting share in the proposed two EU constituencies). The loss in relative voting shares is most pronounced for Germany, France, Italy, the Netherlands, Belgium, Spain, U.K., Sweden and Denmark. These mostly large EU Member States lose even more relative voting share if the intra-constituency decision rule is based on *EU Council voting shares* rather than *IMF voting shares*.

In our voting power analysis – applying the Shapley-Shubik index – we differentiate between intra-constituency majority thresholds of 50%, 70% and 85%. Again, our benchmark scenario is the individual *current* constituency structure where we assume that intra-constituency decision-making is based on IMF voting shares. Most of the 27 EU Member States lose relative voting power in the proposed two constituencies. The only EU Member States that gain voting power are Ireland, Greece and Portugal in the EU EAC at majority thresholds of 50% and 70%, and Poland (50%) and Lithuania, Latvia and Estonia (all at 85%) in the EU nonEAC. These Member States have virtually no voting power at all in their current constituencies at the respective majority thresholds. It is also worth mentioning that when comparing the decision rule (*IMF* versus *EU Council voting shares*) in the *proposed* constituency structure, the larger EU Member States lose more relative voting power than the smaller EU Member States when *EU Council voting shares* are used. The reason is mainly the above described difference in voting shares.

To sum up, from the perspective of individual EU Member States (posts in the constituency, relative voting shares and voting power) with assumed pure national interest there are actually no incentives to consolidate EU representation at the IMF. However, this tentative conclusion does not preclude the possibility that – after having consoli-

[24] *Germany, France, U.K., Italy, Greece, the Netherlands, Belgium, Austria, Sweden, Spain and Ireland.*

Table 3

IMF Constituencies - Individual "Shapley-Shubik" Voting Power within the Constituency

%

	Current constituencies – decision rule within the constituency based on *IMF voting shares*				Proposed constituencies – decision rule within the constituency based on *IMF voting shares*				Proposed constituencies – decision rule within the constituency based on *EU Council voting shares*	
	relative voting shares	voting power			relative voting shares	voting power			relative voting shares	voting power
		majority threshold				majority threshold				majority threshold[1]
		50	70	85		50	70	85		73.9
EU (euro area)										
Germany	100.00	100.000	100.000	100.000	25.99	29.957	28.914	24.594	13.88	14.94
France	100.00	100.000	100.000	100.000	19.20	19.032	19.641	24.594	13.88	14.94
Italy	74.13	100.000	100.000	64.286	14.13	14.073	12.700	16.426	13.88	14.94
Netherlands	45.96	69.788	54.873	30.930	9.30	8.441	8.803	7.859	6.22	5.91
Belgium	36.28	48.730	47.421	26.825	8.31	7.569	7.850	6.939	5.74	5.24
Spain	34.92	33.333	44.881	33.333	7.28	6.692	6.937	6.209	12.92	14.12
Austria	16.97	13.016	15.278	26.825	3.89	3.554	3.821	3.272	4.78	4.29
Finland	15.62	4.048	15.119	25.000	2.38	2.110	2.280	1.881	3.35	2.92
Ireland	14.67	0.000	0.000	41.667	1.96	2.110	2.259	1.875	3.35	2.92
Greece	10.96	0.000	0.000	17.619	2.37	1.845	2.057	1.751	5.74	5.24
Portugal	10.29	0.000	0.000	14.286	2.09	1.748	1.963	1.681	5.74	5.24
Slovak Republic	3.90	3.095	2.937	4.008	0.89	0.803	0.781	1.046	3.35	2.92
Luxembourg	3.83	3.095	2.937	4.008	0.62	0.803	0.751	1.027	1.91	1.74
Slovenia	2.71	3.095	2.937	0.833	0.41	0.564	0.545	0.447	1.91	1.74
Cyprus	2.05	1.507	1.548	2.474	0.31	0.380	0.391	0.227	1.91	1.74
Malta	1.65	0.000	0.000	0.952	0.88	0.324	0.310	0.173	1.44	1.19
EU (non-euro area)										
United Kingdom	100.00	100.000	100.000	100.000	49.90	81.818	58.658	32.709	21.32	24.40
Sweden	28.82	37.381	34.167	25.000	11.40	1.818	10.364	17.312	7.35	7.30
Denmark	22.94	25.000	18.214	25.000	9.07	1.818	7.745	11.955	5.15	4.52
Poland	25.46	0.000	30.357	39.643	8.14	1.818	6.476	10.090	19.85	21.90
Hungary	8.63	6.270	6.349	8.373	5.14	1.818	4.015	6.678	8.82	8.33
Romania	9.70	4.538	8.269	11.789	5.10	1.818	4.015	6.678	10.29	9.44
Czech Republic	8.35	6.270	6.349	7.183	4.97	1.818	3.936	6.558	8.82	8.33
Bulgaria	6.28	4.538	5.116	7.896	3.30	1.818	2.349	3.582	7.35	7.30
Lithuania	3.02	2.143	4.643	0.000	1.19	1.818	0.999	1.836	5.15	4.52
Latvia	2.53	2.143	3.214	0.000	1.00	1.818	0.841	1.717	2.94	1.98
Estonia	1.97	2.143	3.214	0.000	0.78	1.818	0.603	0.884	2.94	1.98

Source: Authors' calculations.

[1] *For euro area EU Member States equivalent to 154 out of 209 votes; for non-euro EU Member States equivalent to 101 out of 136 votes.*

dated their representation – EU Member States would gain voting power at the Executive Board and the Board of Governors and hence profit from an (all the more important) EU perspective.

4.2 Voting Power Distribution at the Executive Board

In this section we analyze the voting power distribution of the 24 constituencies at the Executive Board in the *current* composition (table 4) and in the *proposed* composition with 20 constituencies (table 5). We differentiate between majority thresholds of 50%, 70% and 85% and calculate the PBI and the SSI. In table 6 we compare the relative gain/loss in voting power of the 27 EU Member States when changing the constituency structure of the

Table 4

IMF Executive Board – Current Composition Voting Shares and Voting Power

Constituency/ chair	Number of member countries	Voting share (%)[1]	Voting power (%)					
			majority threshold					
			50		70		85	
			Penrose-Banzhaf	*Shapley-Shubik*	*Penrose-Banzhaf*	*Shapley-Shubik*	*Penrose-Banzhaf*	*Shapley-Shubik*
U.S.A.	1	16.78	20.93	18.55	11.02	19.24	6.33	19.51
Japan	1	6.24	5.95	6.25	6.55	6.22	5.76	6.27
Germany	1	5.82	5.54	5.80	6.14	5.77	5.60	5.81
France	1	4.30	4.09	4.21	4.60	4.20	4.76	4.17
United Kingdom	1	4.30	4.09	4.21	4.60	4.20	4.76	4.17
Belgium	10	5.13	4.88	5.08	5.45	5.04	5.28	5.08
Netherlands	13	4.53	4.30	4.44	4.83	4.42	4.94	4.47
Spain	8	4.67	4.44	4.59	4.98	4.58	5.01	4.57
Italy	7	4.27	4.06	4.18	4.56	4.17	4.74	4.14
China	1	3.82	3.63	3.72	4.10	3.70	4.39	3.67
Canada	12	3.61	3.43	3.52	3.87	3.49	4.21	3.45
Indonesia	13	3.94	3.75	3.85	4.23	3.83	4.49	3.79
Korea	13	3.47	3.29	3.37	3.73	3.35	4.08	3.32
Sweden	8	3.41	3.23	3.30	3.66	3.29	4.03	3.28
Egypt	13	3.23	3.07	3.13	3.47	3.11	3.86	3.08
Saudi Arabia	1	2.81	2.67	2.71	3.02	2.69	3.44	2.66
Sierra Leone	20	3.12	2.96	3.02	3.36	3.01	3.76	2.98
Switzerland	8	2.75	2.61	2.65	2.97	2.64	3.37	2.59
Russia	1	2.39	2.27	2.30	2.58	2.28	2.99	2.25
Iran	7	2.27	2.15	2.17	2.45	2.16	2.86	2.15
Brazil	9	2.81	2.67	2.71	3.03	2.70	3.44	2.67
India	4	2.81	2.67	2.71	3.03	2.70	3.44	2.67
Argentina	6	1.84	1.75	1.75	2.00	1.74	2.36	1.74
Rwanda	23	1.66	1.57	1.57	1.79	1.57	2.11	1.53

Source: Authors' calculations.

[1] *Based on the new quota formula adopted in April 2008, which is currently being ratified.*

Executive Board to the *proposed* composition.

Table 4 presents the voting power of all 24 constituencies under the current constituency structure; the voting shares are based on the new quota formula. With reference to the frequently mentioned dominance of the U.S.A. our results confirm the evidence in the literature (Bini Smaghi, 2006b; and Leech, 2002a) that the voting power of the U.S.A. is higher than its (nominal) voting share at a majority threshold of 50%. By contrast, the voting power of all other 23 constituencies is below their nominal voting shares. This result holds for both indices.[25]

At majority thresholds of 70% and 85%, the results depend on the index used. When using the PBI, the U.S.A. loses and the other constituencies gain voting power, whereas when the SSI is applied, the U.S.A. gains and the other constituencies lose voting power as compared with their nominal voting share.[26]

[25] *The only exception is Japan, which slightly gains voting power under the SSI.*

[26] *With the exception of Japan at a majority threshold of 85%.*

It is interesting to note that the difference in voting power becomes even more pronounced the higher the majority threshold. These findings provide new insights: Bini Smaghi (2006b) and Leech (2002a) do not include the SSI in their analysis; they draw their conclusions only from calculations with the PBI. Leech (2002a), for instance, concludes that a majority threshold of 85% tends to balance voting power to a large extent, which is – as already pointed out – in contradiction to calculations based on the SSI.

Table 5 displays the voting power results of the proposed constituency structure (two EU constituencies, reduced number of constituencies). As pointed out before, any consolidated voting share of EU Member States which exceeds the voting share of the U.S. constituency (USC) does not seem to be politically feasible. Hence, we distribute the difference between the votes (in absolute numbers) of the EU EAC and the USC to the remaining constituencies in a uniform way. As a result, the EU EAC and USC have an equal voting share of 16.78% of total IMF votes. Note that under this redistribution schedule constituencies with a smaller voting share benefit more than constituencies with a higher share.

At a majority threshold of 50%, the two largest constituencies, the EU EAC and USC, gain voting power relative to their (nominal) voting shares at the expense of all other constituencies. This

Table 5

IMF Executive Board – Proposed Composition Voting Shares and Voting Power

Constituency/ chair	Number of member countries	Voting share (%)[1]	Voting power (%)					
			majority threshold					
			50		70		85	
			Penrose-Banzhaf	*Shapley-Shubik*	*Penrose-Banzhaf*	*Shapley-Shubik*	*Penrose-Banzhaf*	*Shapley-Shubik*
U.S.A.	1	16.78	17.55	18.36	15.34	18.27	8.31	20.76
Japan	1	6.56	6.43	6.36	6.83	6.37	7.34	6.14
China	1	4.13	3.98	3.91	4.26	3.99	5.38	3.47
Saudi Arabia	1	3.12	3.02	2.93	3.23	2.93	4.22	2.64
Canada	1	2.87	2.79	2.70	2.98	2.71	3.89	2.44
India	1	2.66	2.58	2.49	2.77	2.49	3.60	2.25
Russia	1	2.71	2.63	2.54	2.82	2.53	3.68	2.30
Brazil	1	2.03	2.01	1.94	2.17	1.95	2.66	1.63
EU (euro area)	16	16.78	17.55	18.36	15.34	18.27	8.31	20.76
EU (non-euro area)	11	8.93	9.17	8.89	9.63	8.76	8.05	9.31
Norway	16	3.88	3.75	3.67	4.01	3.71	5.15	3.31
Mexico	7	3.35	3.23	3.14	3.48	3.19	4.49	2.82
Colombia	20	2.23	2.18	2.10	2.35	2.09	2.96	1.81
Indonesia	13	4.26	4.09	4.03	4.38	4.10	5.52	3.57
Australia	14	3.81	3.68	3.60	3.94	3.65	5.06	3.23
Kuwait	13	3.54	3.42	3.33	3.66	3.35	4.75	3.04
South Africa	20	3.43	3.31	3.23	3.56	3.26	4.61	2.94
Switzerland	10	3.53	3.41	3.32	3.65	3.34	4.72	3.02
Argentina	7	2.33	2.27	2.19	2.44	2.17	3.14	1.93
Algeria	27	3.08	2.98	2.90	3.19	2.88	4.18	2.62

Source: Authors' calculations.

[1] *Based on the new quota formula adopted in April 2008, which is currently being ratified.*

result holds for both the PBI and the SSI.[27] This finding is line with the results of table 4, where the U.S. gains voting power under the *current* composition of the Executive Board.

Under majority thresholds of 70% and 85%, the EU EAC and USC lose and all other constituencies gain voting power when the calculations are carried out with the PBI. These results are in line with Bini Smaghi (2006b). However, when applying the SSI, a completely different picture arises, which mirrors the SSI results at a majority threshold of 50%: The USC and EAC still gain, whereas all other constituencies lose voting power.[28] As already observed in the results of the *current* constituency, the difference between the PBI and SSI values widens the higher the majority thresholds are. When applying the SSI, the EU EAC and USC – as compared with their voting share – gain even more voting power under the 85% majority threshold scenario than under the 50% scenario.

Another interesting aspect is to compare the voting power of those *current* single-chair constituencies that retain their status in the *proposed* composition of the Executive Board (U.S.A., Japan, China, Saudi Arabia and Russia). Note, however that the PBI has to be replaced by the PI, which measures absolute voting power. The PBI can only be used to compare the voting powers of several voters under the same voting rule (because of the normalization, which depends on the voting game). The SSI is still a valid concept here; it can be used to compare voting power independently of the voting rule, since it is a probability of power and, hence, already measures absolute voting power. The calculations of the PI (not included in the tables) show that regardless of the majority threshold all five single-chair constituencies (U.S.A., Japan, China, Saudi Arabia and Russia) gain voting power.[29] A mixed picture arises if the SSI is taken for comparison.

In view of the differences in the results of the PBI (PI) and the SSI, the question arises as to which index should be used to measure voting power. Felsenthal and Machover (1998) note that in general the Shapley-Shubik and (normalized) Penrose-Banzhaf indices behave quite differently, although their values are often fairly similar. With the exception of Leech and Leech (2002b), the question of whether the PBI or the SSI is more adequate is not explicitly dealt with in the empirical literature, which therefore gives little guidance in this respect. Hence, where both indices are calculated, the results are presented without explicit comments on the differences. Leech (2002a), Leech and Leech (2005) build their analyses on the PBI and justify their preferences on the basis of Coleman (1971) and the empirical findings in Leech (2002b). Paterson (2006), however, presents convincing arguments in favor of the SSI.

In charts 1, 2 and 3 we plot the differences between the two indices. Chart 1 shows that the PBI of the two large equal constituencies (EU EAC and USC) remains constant until a majority threshold of 60% is reached. The PBI then starts to decline and gradually approaches the value of 5, which is the value for a unanimity rule ($1/n$), where

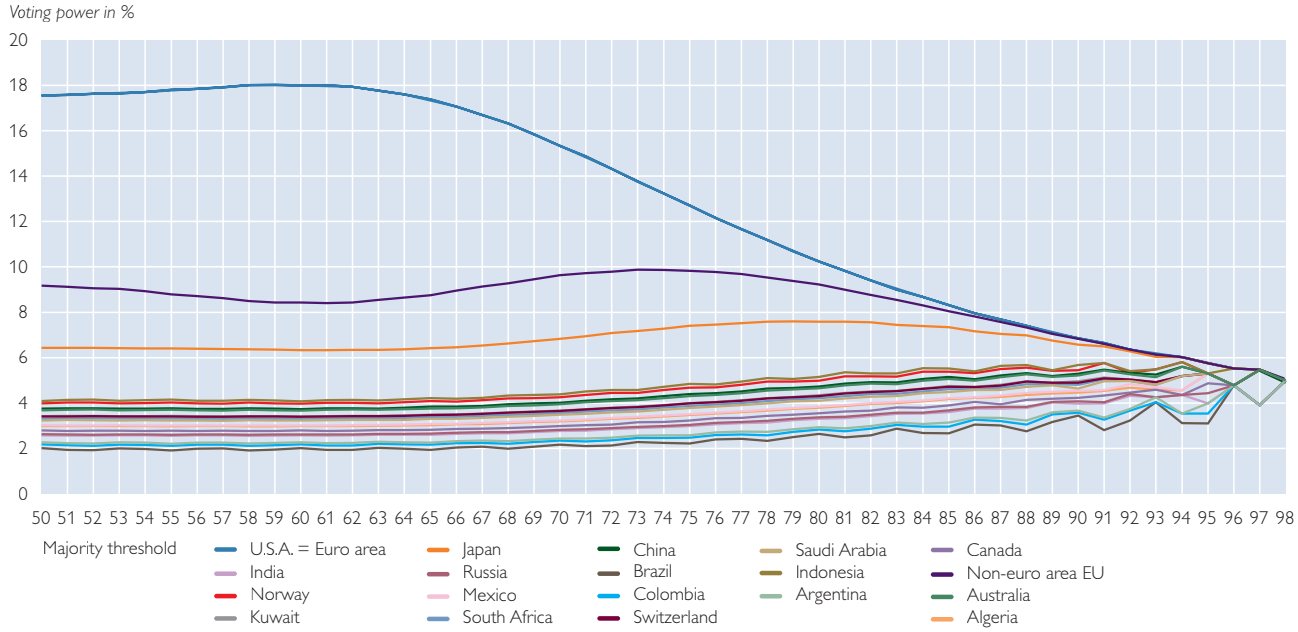
[27] *The only exception is the EU nonEAC, which slightly gains under the PBI.*

[28] *The only exception here is the EU nonEAC, which loses voting power under the PBI and gains under the SSI at a majority threshold of 85%.*

[29] *U.S.A., Japan and China are an exception at a majority threshold of 50%.*

Chart 1

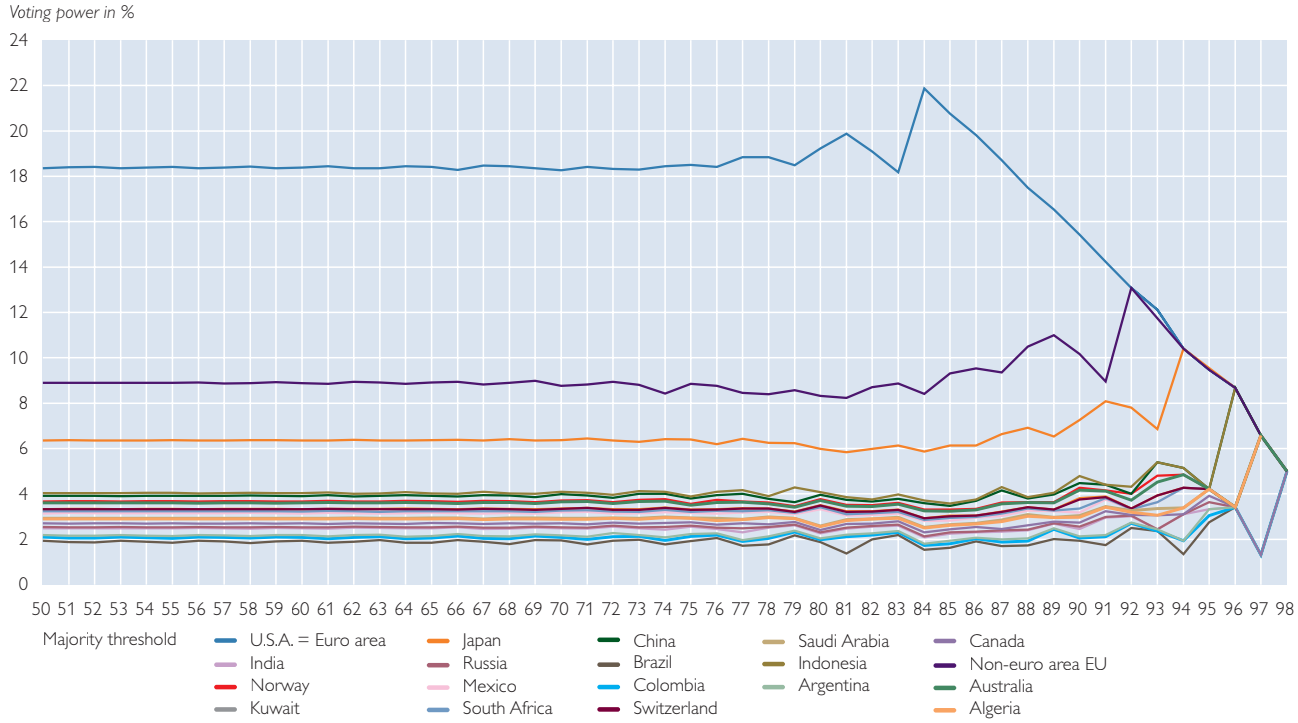
Penrose-Banzhaf Voting Power as a Function of the Majority Threshold



Source: Authors' calculations.

Chart 2

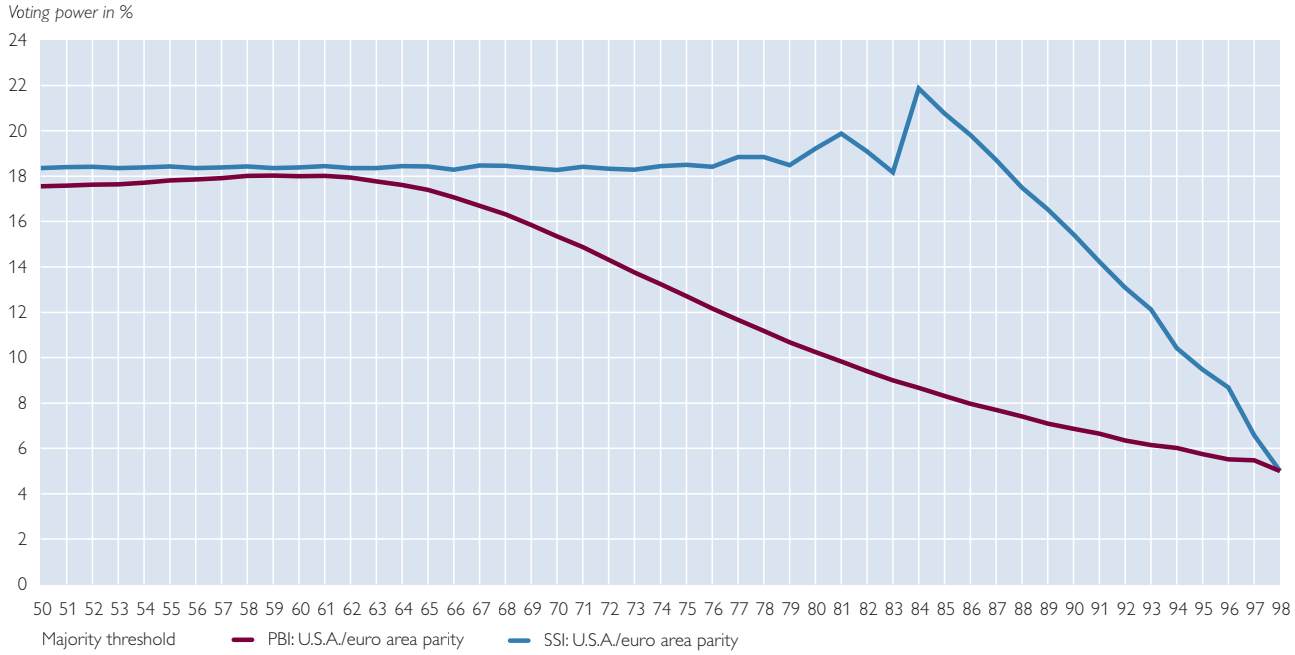
Shapley-Shubik Voting Power as a Function of the Majority Threshold



Source: Authors' calculations.

Chart 3

Penrose-Banzhaf vs. Shapley-Shubik Voting Power as a Function of the Majority Threshold



Source: Authors' calculations.

all constituencies have equal voting power. It is interesting to note that at an 85% majority threshold, the voting power of the EU EAC and the USC is just slightly above 8%. Based on these PBI-based results, Leech (2002a, p. 394) calculates that in order to equalize voting power to the (former U.S.) voting share of 17.55%, the voting share of the USC and the EU EAC would have to be raised to 67.45%, and the share of all other constituencies would have to be reduced substantially.

The SSI (chart 2) shows a different picture: The voting power of the EU EAC and USC remains constant at approximately 18% until a majority threshold of 84% is reached, then jumps to 22% and falls sharply to 5% (unanimity). Put differently, both constituencies have a fairly constant voting power for majority thresholds between 50% and 85%, which is marginally above their voting share. The respective voting power of the other 18 constituencies shows the opposite behavior to that of the EU EAC and USC.

The difference in the behavior of the PBI and SSI for the EU EAC (identical with USC under voting share parity) is explicitly displayed in chart 3. When calculating the SSI, the voting power is fairly constant between majority thresholds of 50% and 85%, whereas for the PBI, the voting power starts to increase already at fairly low threshold levels. In other words, for majority thresholds above 67% (including the special IMF majorities of 70% and 85%), under the PBI the two large constituencies have less voting power and the other constituencies more voting power than their voting share indicates. In contrast, however, under the SSI, the two large constituencies still have more voting power than voting shares and the other constituencies less voting power than voting shares.

Given the empirical plausibility and taking theoretical considerations (Paterson, 2006) into account, we prefer the SSI and hence favor the voting power results based on the SSI.

In a next step (table 6), we analyze the voting power changes (SSI only) for EU Member States on the Executive Board level for various thresholds when changing the constituency structure of the Executive Board to the *proposed* composition. We assume that decision-making within the EU EAC and EU nonEAC is based on IMF voting shares. At majority thresholds of 50% and 70%, in the EU EAC larger EU Member States lose and smaller EU Member States gain voting power. In the EU nonEAC, the evidence is mixed and less clear-cut. At a majority threshold of 80% the picture changes; in the EU EAC, larger EU Member States gain and smaller EU Member States lose voting power. In the EU nonEAC, EU Member States mostly gain voting power.

To sum up the results of our voting power analysis on the Executive Board

Table 6

IMF Executive Board (EB) - Individual *"Shapley-Shubik"* Voting Power Decision Rule within Constituency Based on *IMF Voting Shares*

	EB – current composition			EB – proposed composition[1]			Relative gain / loss in power		
	majority threshold			majority threshold			majority threshold		
	50	70	85	50	70	85	50	70	85
	%								
EU (euro area)									
Germany	5.802	5.769	5.806	5.501	5.282	5.106	−5.2	−8.4	−12.0
France	4.213	4.201	4.174	3.495	3.588	5.106	−17.0	−14.6	22.3
Italy	4.180	4.166	2.661	2.584	2.320	3.410	−38.2	−44.3	28.2
Netherlands	3.101	2.425	1.382	1.550	1.608	1.632	−50.0	−33.7	18.0
Belgium	2.473	2.389	1.362	1.390	1.434	1.441	−43.8	−40.0	5.8
Spain	1.530	2.054	1.523	1.229	1.267	1.289	−19.7	−38.3	−15.4
Austria	0.661	0.770	1.362	0.653	0.698	0.679	−1.2	−9.3	−50.1
Finland	0.134	0.497	0.819	0.387	0.416	0.390	189.6	−16.2	−52.3
Ireland	0.000	0.000	1.436	0.387	0.413	0.389	+ ∞	+ ∞	−77.4
Greece	0.000	0.000	0.729	0.339	0.376	0.364	+ ∞	+ ∞	−50.2
Portugal	0.000	0.000	0.591	0.321	0.359	0.349	+ ∞	+ ∞	−41.0
Slovak Republic	0.157	0.148	0.203	0.147	0.143	0.217	−6.1	−3.6	6.7
Luxembourg	0.157	0.148	0.203	0.147	0.137	0.213	−6.1	−7.3	4.8
Slovenia	0.157	0.148	0.042	0.104	0.100	0.093	−34.0	−32.7	119.5
Cyprus	0.067	0.068	0.111	0.070	0.072	0.047	4.1	4.5	−57.4
Malta	0.000	0.000	0.039	0.060	0.057	0.036	+ ∞	+ ∞	−8.7
EU (non-euro area)									
United Kingdom	4.213	4.201	4.174	7.274	5.138	3.044	72.7	22.3	−27.1
Sweden	1.235	1.123	0.819	0.162	0.908	1.611	−86.9	−19.1	96.8
Denmark	0.826	0.599	0.819	0.162	0.678	1.113	−80.4	13.4	35.9
Poland	0.000	0.803	1.028	0.162	0.567	0.939	+ ∞	−29.3	−8.6
Hungary	0.318	0.320	0.425	0.162	0.352	0.621	−49.2	10.0	46.2
Romania	0.202	0.365	0.527	0.162	0.352	0.621	−19.8	−3.7	17.9
Czech Republic	0.318	0.320	0.365	0.162	0.345	0.610	−49.2	7.8	67.4
Bulgaria	0.202	0.226	0.353	0.162	0.206	0.333	−19.8	−9.0	−5.5
Lithuania	0.071	0.153	0.000	0.162	0.088	0.171	128.3	−42.6	+ ∞
Latvia	0.071	0.106	0.000	0.162	0.074	0.160	128.3	−30.3	+ ∞
Estonia	0.071	0.106	0.000	0.162	0.053	0.082	128.3	−50.0	+ ∞

Source: Authors' calculations.

[1] *Number of votes: U.S. constituency equals euro area constituency.*

level, we point out that in the *proposed* composition of the Executive Board, the EU EAC and the USC both have the same voting share (16.78%) and both have a consistently higher voting power than voting share at all three majority thresholds. The EU nonEAC is the third-largest constituency with a voting share of 8.93%; its voting power is slightly below its voting share at majority thresholds of 50% and 70% and exceeds the voting share at a majority threshold of 85%. All other constituencies have less voting power than their voting share indicates in the *proposed* composition. This, however, generally corresponds to the *current* composition of the Executive Board, where only the U.S.A. has more voting power than its voting share indicates. Hence, from an EU perspective, it would definitely be in the interest of EU Member States to consolidate their representation at the Executive Board, since even the EU EAC alone would find itself in the same position as presently the U.S.A. and could block major IMF decisions at an 85% majority threshold. Moreover, like the U.S.A., the EU EAC would have a voting power that is well above its voting share. Furthermore, in a common understanding, the EU EAC and the USC would be able to veto 70% majority decisions and if, for instance, a third large country such as Japan were to join the common understanding, the three countries would also be able to determine IMF decisions with a 50% majority rule.

As regards the country specific-analysis, for ordinary decisions, which are the bulk of IMF decisions, smaller EU EAC Member States could increase their voting power in the *proposed* composition as compared with the *current* composition. Note that these conclusions are based on calculations with the SSI, which is our preferred measure of voting power.

4.3 Voting Power Distribution at the Board of Governors

The changes in voting power at the Board of Governors have been analyzed in the empirical literature on several occasions, e.g. Ahearne et al. (2006a, 2006b) and Leech and Leech (2005). Leech and Leech (2005)[30] calculate voting power indices for a group of Euro-12 and EU-25 Member States. Each country's voting power is measured by its two-stage or indirect PI. For decision-making within the group they use various measures, including IMF voting shares with simple majority and the system of qualified majority voting of the Nice Treaty (EU-25). When IMF voting shares are used, all Euro-12 Member States and all EU-25 Member States gain voting power as compared with the status quo. When the EU Council votes are applied, larger EU-25 Member States lose substantially and smaller EU-25 Member States gain voting power. In brief, it is the decision-making system of the Nice Treaty that prevents all EU-25 Member States from gaining voting power at the IMF Board of Governors. Leech and Leech (2005, p. 268) argue that *"the countries that are currently most powerful in the IMF, all lose a lot of power."*

[30] *Leech and Leech (2005) and Ahearne et al. (2006a, 2006b) use the "old" quota formula with the current constituency structure of 24 seats. Furthermore, in order to avoid an unrealistic scenario of an EU voting weight in excess of the U.S. weight, they propose to redistribute the "excess" EU voting rights uniformly to all other IMF member countries. Under this "realistic" assumption the nominal total voting power of the EU Member States would be reduced by one-third in comparison with the current situation. Whether EU Member States, however, would be willing to accept such a dramatic cut in voting rights remains to be seen.*

Ahearne et al. (2006a, 2000b) use the same voting power measure (PI) as Leech and Leech (2005) and, hence, argue along the same lines. According to their calculations – while decision-making within EU Member States is determined by the EU Council votes – a few larger and all the smaller EU Member States would benefit from a single EU chair, whereas most of the larger and some medium-sized Member States would lose voting power.

In the following we present the results of our voting power analysis. We apply two different systems of decision-making, current IMF voting shares and the decision rules based on

Table 7

IMF Board of Governors (BoG) – Decision Rule within Group of EU Member States Based on *IMF Voting Shares*
Individual Voting Shares and *"Penrose-Banzhaf"* Voting Power

	BoG – current composition 184 countries[1]				BoG – proposed composition 169 countries[2]			Relative gain / loss in power	
	voting shares	voting power Penrose index			indirect voting power Penrose index				
		majority threshold			majority threshold			majority threshold	
		50	70	85	50	70	85	50	70
	%								
EU (euro area)	22.398								
Germany	5.822	0.162	0.039	0.000	0.303	0.062	0.000	**86.4**	**56.8**
France	4.300	0.122	0.031	0.000	0.185	0.052	0.000	**51.4**	**66.4**
Italy	3.164	0.090	0.023	0.000	0.146	0.034	0.000	**61.8**	**46.7**
Netherlands	2.083	0.060	0.016	0.000	0.086	0.022	0.000	**43.8**	**38.3**
Belgium	1.861	0.053	0.014	0.000	0.077	0.020	0.000	**44.0**	**41.6**
Spain	1.630	0.047	0.012	0.000	0.068	0.017	0.000	**46.4**	**40.8**
Austria	0.870	0.025	0.007	0.000	0.039	0.009	0.000	**56.8**	**36.6**
Finland	0.532	0.015	0.004	0.000	0.023	0.006	0.000	**48.9**	**39.2**
Ireland	0.530	0.015	0.004	0.000	0.023	0.006	0.000	**49.5**	**38.3**
Greece	0.468	0.013	0.004	0.000	0.020	0.005	0.000	**46.3**	**39.9**
Portugal	0.439	0.013	0.003	0.000	0.019	0.005	0.000	**48.1**	**39.6**
Slovak Republic	0.200	0.006	0.002	0.000	0.009	0.002	0.000	**49.5**	**38.7**
Luxembourg	0.196	0.006	0.001	0.000	0.009	0.002	0.000	**52.2**	**38.0**
Slovenia	0.139	0.004	0.001	0.000	0.006	0.001	0.000	**40.1**	**36.3**
Cyprus	0.093	0.003	0.001	0.000	0.004	0.001	0.000	**50.9**	**41.6**
Malta	0.070	0.002	0.001	0.000	0.003	0.001	0.000	**71.7**	**36.1**
EU (non-euro area)	8.617								
United Kingdom	4.300	0.122	0.031	0.000	0.295	0.095	0.000	**141.5**	**207.7**
Sweden	0.982	0.028	0.007	0.000	0.001	0.031	0.000	**–98.0**	**321.0**
Denmark	0.782	0.022	0.006	0.000	0.001	0.023	0.000	**–97.4**	**291.7**
Poland	0.701	0.020	0.005	0.000	0.001	0.020	0.000	**–97.1**	**275.8**
Hungary	0.443	0.013	0.003	0.000	0.001	0.013	0.000	**–95.5**	**277.7**
Romania	0.439	0.013	0.003	0.000	0.001	0.013	0.000	**–95.4**	**280.6**
Czech Republic	0.428	0.012	0.003	0.000	0.001	0.012	0.000	**–95.3**	**282.1**
Bulgaria	0.284	0.008	0.002	0.000	0.001	0.008	0.000	**–92.9**	**250.2**
Lithuania	0.103	0.003	0.001	0.000	0.001	0.003	0.000	**–80.5**	**314.7**
Latvia	0.086	0.002	0.001	0.000	0.001	0.003	0.000	**–76.7**	**312.2**
Estonia	0.067	0.002	0.001	0.000	0.001	0.002	0.000	**–70.1**	**270.8**

Source: Authors' calculations.

[1] *186 IMF Member States; excluding Zimbabwe and the Republic of Kosovo.*
[2] *Under the assumption that all 27 EU Member States are represented by two "fully-fledged" IMF members; a "euro area EU group" and "a non-euro area EU group."*

Table 8

IMF Board of Governors (BoG) – Decision Rule within Group of EU Member States Based on *EU Council Voting Shares* Individual Voting Shares and *"Penrose-Banzhaf"* Voting Power

	BoG – current composition 184 countries[1]				BoG – proposed composition 169 countries[2]			Relative gain / loss in power	
	voting shares	voting power Penrose index			indirect voting power Penrose index				
		majority threshold			majority threshold			majority threshold	
		50	70	85	50	70	85	50	70
	%								
EU (euro area)	22.398								
Germany	5.822	0.162	0.039	0.000	0.055	0.021	0.000	**−65.9**	**−45.8**
France	4.300	0.122	0.031	0.000	0.055	0.021	0.000	**−54.7**	**−31.4**
Italy	3.164	0.090	0.023	0.000	0.055	0.021	0.000	**−38.8**	**−9.3**
Netherlands	2.083	0.060	0.016	0.000	0.027	0.010	0.000	**−55.2**	**−34.5**
Belgium	1.861	0.053	0.014	0.000	0.024	0.009	0.000	**−54.1**	**−33.1**
Spain	1.630	0.047	0.012	0.000	0.052	0.020	0.000	**12.3**	**63.6**
Austria	0.870	0.025	0.007	0.000	0.021	0.008	0.000	**−16.3**	**21.4**
Finland	0.532	0.015	0.004	0.000	0.014	0.006	0.000	**−5.2**	**37.4**
Ireland	0.530	0.015	0.004	0.000	0.014	0.006	0.000	**−4.7**	**38.1**
Greece	0.468	0.013	0.004	0.000	0.024	0.009	0.000	**82.1**	**164.0**
Portugal	0.439	0.013	0.003	0.000	0.024	0.009	0.000	**94.0**	**181.1**
Slovak Republic	0.200	0.006	0.002	0.000	0.014	0.006	0.000	**152.6**	**265.9**
Luxembourg	0.196	0.006	0.001	0.000	0.009	0.003	0.000	**53.0**	**121.6**
Slovenia	0.139	0.004	0.001	0.000	0.009	0.003	0.000	**115.8**	**212.7**
Cyprus	0.093	0.003	0.001	0.000	0.009	0.003	0.000	**223.8**	**369.2**
Malta	0.070	0.002	0.001	0.000	0.006	0.002	0.000	**186.9**	**315.3**
EU (non-euro area)	8.617								
United Kingdom	4.300	0.122	0.031	0.000	0.057	0.027	0.000	**−53.2**	**−13.5**
Sweden	0.982	0.028	0.007	0.000	0.023	0.011	0.000	**−20.1**	**41.5**
Denmark	0.782	0.022	0.006	0.000	0.015	0.007	0.000	**−33.1**	**18.4**
Poland	0.701	0.020	0.005	0.000	0.055	0.026	0.000	**175.3**	**387.5**
Hungary	0.443	0.013	0.003	0.000	0.027	0.013	0.000	**113.5**	**277.7**
Romania	0.439	0.013	0.003	0.000	0.031	0.015	0.000	**147.1**	**337.2**
Czech Republic	0.428	0.012	0.003	0.000	0.027	0.013	0.000	**120.7**	**290.5**
Bulgaria	0.284	0.008	0.002	0.000	0.023	0.011	0.000	**175.7**	**387.7**
Lithuania	0.103	0.003	0.001	0.000	0.015	0.007	0.000	**407.8**	**798.4**
Latvia	0.086	0.002	0.001	0.000	0.008	0.004	0.000	**226.1**	**477.0**
Estonia	0.067	0.002	0.001	0.000	0.008	0.004	0.000	**319.1**	**641.6**

Source: Authors' calculations.

[1] *186 IMF Member States, excluding Zimbabwe and the Republic of Kosovo.*
[2] *Under the assumption that all 27 EU Member States are represented by two "fully-fledged" IMF members, a "euro area EU group" and "a non-euro area EU group."*

EU Council votes according to the Treaty of Nice.[31] Algaba et al. (2003) show that the triple-majority decision rules, adopted at the Nice Summit meeting, are almost equivalent to a simple-majority decision rule with EU Council votes alone. In any case, the required population quota to adopt a decision does not change the voting power of the countries in practice.

[31] *The Nice European Council in December 2000 established two decision rules. The rules are contained in the "Treaty of Nice amending the Treaty on European Union, the Treaties establishing the European Communities and certain related Acts," in particular in Section 21 "Declaration on the enlargement of the European Union and the Declaration on the qualified majority threshold and the number of votes for a blocking minority in an enlarged Union." 2001.*

Table 9

IMF Board of Governors (BoG) – Decision Rule within Group of EU Member States Based on *IMF Voting Shares*
Individual Voting Shares and *"Shapley-Shubik"* Voting Power

	BoG – current composition 184 countries[1]				BoG – proposed composition 169 countries[2]			Relative gain / loss in power		
	voting shares	voting power			indirect voting power					
		majority threshold			majority threshold			majority threshold		
		50	70	85	50	70	85	50	70	85
	%									
EU (euro area)	22.398									
Germany	5.822	5.816	5.816	6.034	5.903	5.673	5.209	**1.5**	**−2.5**	**−13.7**
France	4.300	4.230	4.231	4.326	3.750	3.853	5.209	**−11.3**	**−8.9**	**20.4**
Italy	3.164	3.079	3.079	3.118	2.773	2.492	3.479	**−9.9**	**−19.1**	**11.6**
Netherlands	2.083	2.006	2.006	2.015	1.663	1.727	1.664	**−17.1**	**−13.9**	**−17.4**
Belgium	1.861	1.789	1.789	1.794	1.491	1.540	1.469	**−16.6**	**−13.9**	**−18.1**
Spain	1.630	1.563	1.563	1.565	1.319	1.361	1.315	**−15.6**	**−12.9**	**−16.0**
Austria	0.870	0.829	0.829	0.825	0.700	0.750	0.693	**−15.5**	**−9.6**	**−16.0**
Finland	0.532	0.506	0.506	0.502	0.416	0.447	0.398	**−17.8**	**−11.5**	**−20.7**
Ireland	0.530	0.503	0.503	0.500	0.416	0.443	0.397	**−17.4**	**−11.9**	**−20.5**
Greece	0.468	0.444	0.444	0.441	0.364	0.404	0.371	**−18.1**	**−9.1**	**−15.9**
Portugal	0.439	0.417	0.417	0.414	0.344	0.385	0.356	**−17.4**	**−7.6**	**−13.9**
Slovak Republic	0.200	0.189	0.189	0.188	0.158	0.153	0.221	**−16.4**	**−19.0**	**18.1**
Luxembourg	0.196	0.186	0.186	0.184	0.158	0.147	0.217	**−14.9**	**−20.8**	**18.1**
Slovenia	0.139	0.132	0.132	0.131	0.111	0.107	0.095	**−15.6**	**−18.8**	**−27.4**
Cyprus	0.093	0.088	0.088	0.087	0.075	0.077	0.048	**−14.7**	**−12.4**	**−44.8**
Malta	0.070	0.067	0.067	0.066	0.064	0.061	0.037	**−4.1**	**−8.8**	**−44.3**
EU (non-euro area)	8.617									
United Kingdom	4.300	4.230	4.231	4.326	7.468	5.261	3.247	**76.5**	**24.4**	**−24.9**
Sweden	0.982	0.937	0.937	0.933	0.166	0.930	1.719	**−82.3**	**−0.8**	**84.2**
Denmark	0.782	0.744	0.744	0.741	0.166	0.695	1.187	**−77.7**	**−6.7**	**60.3**
Poland	0.701	0.667	0.667	0.663	0.166	0.581	1.002	**−75.1**	**−12.9**	**51.0**
Hungary	0.443	0.420	0.420	0.417	0.166	0.360	0.663	**−60.5**	**−14.3**	**59.0**
Romania	0.439	0.417	0.417	0.414	0.166	0.360	0.663	**−60.2**	**−13.6**	**60.2**
Czech Republic	0.428	0.406	0.406	0.403	0.166	0.353	0.651	**−59.2**	**−13.1**	**61.4**
Bulgaria	0.284	0.270	0.270	0.267	0.166	0.211	0.356	**−38.4**	**−21.8**	**33.1**
Lithuania	0.103	0.097	0.097	0.097	0.166	0.090	0.182	**70.4**	**−8.0**	**88.9**
Latvia	0.086	0.082	0.082	0.081	0.166	0.075	0.170	**103.1**	**−7.7**	**110.7**
Estonia	0.067	0.064	0.064	0.063	0.166	0.054	0.088	**161.4**	**−14.9**	**39.5**

Source: Authors' calculations.

[1] *186 IMF Member States, excluding Zimbabwe and the Republic of Kosovo.*
[2] *Under the assumption that all 27 EU Member States are represented by two "fully-fledged" IMF members, a "euro area EU group" and "a non-euro area EU group."*

We consider three majority thresholds (50%, 70% and 85%) and calculate two different indices (PI (absolute PBI) and SSI). Our analysis, however, differs from the aforementioned papers in one important institutional aspect. We deem a consolidation of all 27 EU Member States in a group of (currently 16) euro area Member States and a group of (presently 11) non-euro area EU Member States essential to take account of different inner EU interests.

Our results accomplished with the PI mirror the results of Leech and Leech (2005) and Ahearne et al. (2006a, 2006b); the results are displayed without any further comment in tables 7 and 8. We refer to the point made above that we prefer the SSI as the more adequate measure for voting

power changes and hence focus on describing the results achieved with the SSI (tables 9 and 10), which – in part – contradict the PI-based results of the aforementioned papers.

Table 9 shows the voting power results obtained under decision-making within the group of euro area Member States on the basis of IMF voting shares. Our benchmark scenario *(current composition)* is the Board of Governors with a number of 184[32] members. The *proposed* composition of the Board of Governors comprises 169 members, the group of euro area Member States and the group of non-euro area Member States being fully-fledged IMF members. Overall, most of the 27 EU Member States lose voting power as compared with the current composition. Non-euro area EU Member States are the only exception worth mentioning; they mostly gain voting power at the 85% majority threshold.

Alternatively, we assume that the decisions within the two groups of EU Member States are determined by EU Council votes (table 10). In this case, the euro area Member States need 154 out of 209 EU Council votes, and the non-euro area EU Member States 101 out of 136 EU Council votes (equivalent to a majority threshold of 73.9%, respectively). As compared with the decision rule based on IMF voting shares, the results differ substantially: At all majority thresholds (50%, 70%, 85%), most of the larger euro area and non-euro area Member States lose, whereas all smaller EU Member States gain voting power.

To briefly sum up the results of the voting power analysis of the Board of Governors, there is clearly no incentive for all 27 EU Member States to consolidate their representation at the Board of Governors if decision-making within the group is based on IMF voting shares. In this case, all EU Member States would lose voting power compared with the status quo. If, however, decision-making within the group is based on EU Council votes, in particular smaller EU Member States would gain voting power. Yet this country-specific analysis should not blur the overall perspective that EU Member States would have a greater influence on IMF decision-making if they were to act in a consolidated bloc also in the Board of Governors.

5 Summary and Conclusions

We analyze the consequences of consolidated EU representation at the IMF. The 27 EU Member States are regrouped into two constituencies, a euro area EU constituency (EU EAC) and a non-euro area EU constituency (EU nonEAC). For reasons of political feasibility, we downsize the voting share of the EU EAC to align it with that of the U.S. constituency (USC). In the voting power analysis we use Penrose-Banzhaf and Shapley-Shubik voting power measures. Our approach should not be taken too literally, given the consensus-oriented decision-making process at the IMF, which is also mirrored in the formal lack of intra-constituency decision rules.

In the empirical literature on IMF voting power analysis, the results concerning the Executive Board are primarily based on the PBI. Our results, which are based on the new quota formula and the EU-27, confirm the PBI-based evidence in the literature, where the voting power of the two large constituencies (USC and EAC)

[32] *The voting rights of Zimbabwe were suspended effective as of June 6, 2003. The Republic of Kosovo became the 186th member of the IMF on June 29, 2009.*

Table 10

IMF Board of Governors (BoG) – Decision Rule within Group of EU Member States Based on *EU Council Voting Shares*
Individual Voting Shares *and "Shapley-Shubik"* Voting Power

	BoG – current composition 184 countries[1]				BoG – proposed composition 169 countries[2]			Relative gain / loss in power		
	voting shares	voting power			indirect voting power					
		majority threshold			majority threshold			majority threshold		
		50	70	85	50	70	85	50	70	85
	%									
EU (euro area)	22.398									
Germany	5.822	5.816	5.816	6.034	2.943	2.930	3.163	**−49.4**	**−49.6**	**−47.6**
France	4.300	4.230	4.231	4.326	2.943	2.930	3.163	**−30.4**	**−30.7**	**−26.9**
Italy	3.164	3.079	3.079	3.118	2.943	2.930	3.163	**−4.4**	**−4.8**	**1.5**
Netherlands	2.083	2.006	2.006	2.015	1.165	1.160	1.253	**−41.9**	**−42.2**	**−37.8**
Belgium	1.861	1.789	1.789	1.794	1.033	1.028	1.110	**−42.3**	**−42.5**	**−38.1**
Spain	1.630	1.563	1.563	1.565	2.782	2.770	2.990	**78.0**	**77.2**	**91.1**
Austria	0.870	0.829	0.829	0.825	0.846	0.842	0.909	**2.0**	**1.6**	**10.1**
Finland	0.532	0.506	0.506	0.502	0.575	0.572	0.618	**13.7**	**13.2**	**23.0**
Ireland	0.530	0.503	0.503	0.500	0.575	0.572	0.618	**14.2**	**13.7**	**23.6**
Greece	0.468	0.444	0.444	0.441	1.033	1.028	1.110	**132.4**	**131.5**	**151.7**
Portugal	0.439	0.417	0.417	0.414	1.033	1.028	1.110	**147.7**	**146.6**	**168.2**
Slovak Republic	0.200	0.189	0.189	0.188	0.575	0.572	0.618	**203.8**	**202.5**	**229.5**
Luxembourg	0.196	0.186	0.186	0.184	0.342	0.341	0.368	**84.1**	**83.3**	**99.7**
Slovenia	0.139	0.132	0.132	0.131	0.342	0.341	0.368	**159.8**	**158.7**	**181.8**
Cyprus	0.093	0.088	0.088	0.087	0.342	0.341	0.368	**290.2**	**288.5**	**323.2**
Malta	0.070	0.067	0.067	0.066	0.234	0.233	0.252	**251.6**	**250.1**	**281.9**
EU (non-euro area)	8.617									
United Kingdom	4.300	4.230	4.231	4.326	1.765	1.734	1.920	**−58.3**	**−59.0**	**−55.6**
Sweden	0.982	0.937	0.937	0.933	0.695	0.683	0.756	**−25.8**	**−27.1**	**−19.0**
Denmark	0.782	0.744	0.744	0.741	0.464	0.455	0.504	**−37.7**	**−38.8**	**−31.9**
Poland	0.701	0.667	0.667	0.663	1.712	1.682	1.861	**156.6**	**152.1**	**180.7**
Hungary	0.443	0.420	0.420	0.417	0.838	0.823	0.911	**99.5**	**96.0**	**118.6**
Romania	0.439	0.417	0.417	0.414	0.963	0.946	1.047	**130.9**	**126.8**	**153.0**
Czech Republic	0.428	0.406	0.406	0.403	0.838	0.823	0.911	**106.2**	**102.6**	**125.9**
Bulgaria	0.284	0.270	0.270	0.267	0.695	0.683	0.756	**158.0**	**153.5**	**183.0**
Lithuania	0.103	0.097	0.097	0.097	0.464	0.455	0.504	**375.9**	**367.6**	**422.4**
Latvia	0.086	0.082	0.082	0.081	0.250	0.245	0.271	**205.5**	**200.1**	**235.5**
Estonia	0.067	0.064	0.064	0.063	0.250	0.245	0.271	**293.0**	**286.1**	**331.5**

Source: Authors' calculations.

[1] *186 IMF Member States, excluding Zimbabwe and the Republic of Kosovo.*
[2] *Under the assumption that all 27 EU Member States are represented by two "fully-fledged" IMF members, a "euro area EU group" and "a non-euro area EU group."*

exceeds the corresponding voting shares. The other smaller constituencies, by contrast, have a voting power that is below their voting shares. For majority thresholds higher than 67%, the PBI and the SSI increasingly diverge. The difference is most pronounced at the qualified majority threshold of 85%, where the PBI has already plunged dramatically whereas the SSI remains more or less constant. For theoretical reasons and reasons of empirical plausibility, we favor the SSI.

The voting power results concerning the Board of Governors depend both on decision rules among EU Member States and the power measure used. Under the PBI, our results confirm the evidence in the empirical PBI-based literature. However, applying the SSI produces quite a different picture. With this preferred voting power mea-

sure, if decision-making within the group is based on IMF voting shares virtually none of the 27 EU Member States has an incentive to consolidate EU representation at the Board of Governors. In this case all EU Member States would lose voting power as compared with the status quo. If, however, decision-making within the group is based on EU Council votes, in particular smaller EU Member States would gain voting power and hence have an incentive to push EU consolidation. By contrast, most of the larger EU Member States tend to lose voting power and might consequently be inclined to retain the status quo. This country-specific analysis, however, should not conceal the overall perspective that – in accordance with the analysis of the Executive Board – EU Member States would have a greater influence on IMF decision-making if they act in a consolidated bloc at the Board of Governors.

With a consolidated representation the euro area would be able to act as a second global player at the IMF, disposing of veto capabilities like the U.S.A. The euro area voting power would also exceed its voting share even if its voting share were reduced to the voting share of the U.S.A. In particular, by bundling individual euro area concerns, a consolidated euro area representation would act as a booster for the euro area as a whole. A consolidation is more important than ever, since all constituencies involving EU (euro area and non-euro area) Member States currently have a voting power below their voting shares. Furthermore, because of the "mixed constituency" structure, the influence of EU (euro area and non-euro area) Member States on intraconstituency decision-making is heterogeneous, in some cases slight.

However, whether individual EU (euro area and non-euro area) Member States are willing to join a common IMF representation crucially depends on the (future) design of the decision-making process within EU constituencies. In this context, it could also become relevant to address the issue of veto power. This topic, however, is left to further research.

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