Voting power implications of a unified European representation at the IMF

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Abstract: We consider some of the implications of a proposed reform of the voting system of the IMF in which EU countries cease to be separately represented and are replaced by a single combined representative of the European bloc. The voting weight of the EU bloc is reduced accordingly. We analyse two cases: the Eurozone of 12 countries and the European Union of 25. Using voting power analysis we show that the reform could be very beneficial for the governance of the IMF, enhancing the voting power of individual member countries as a consequence of two large countervailing voting blocs. Specifically we analyse a range of EU voting weights and find the following for ordinary decisions requiring a simple majority: (1) All countries other than those of the EU and USA unambiguously gain power (measured absolutely or relatively); (2) The sum of powers of the EU bloc and USA is minimized when they have voting parity; (3) The power of every other non-EU member is maximized when the EU and USA have parity; (4) Each EU member could gain power - despite losing its seat and the reduction in EU voting weight - depending on the EU voting system that is adopted; (5) The USA loses voting power (both absolutely and relatively) over ordinary decisions but (6) retains its unilateral veto over special majority (85%) decisions (and the EU bloc gains veto power).

JEL Codes: F33, O19, C44, C71.

Keywords: IMF; European Union; Voting Power Indices; Penrose Index; Banzhaf Index.

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Voting-Power Implications of a Unified European Representation at the IMF

A key issue in the discussions surrounding the reform of the governance of the IMF is the representation of the European Union member countries. At present each EU country is an IMF member with its own seat on the governing body but the suggestion has been made that greater economic and monetary cooperation among European countries, particularly following the introduction of a common currency, makes that unnecessary and that, moreover there would be advantages in a unified European representation. If all EU members decided to adopt a common policy on all matters concerning the IMF and agreed to vote together as a single EU bloc, they would become a very powerful force. In fact it is obvious that if they retained their present voting weight they would become dominant with much greater voting power than the USA. However, as Van Houtven (2004) has pointed out, the fact that the EU does not act as a bloc makes the USA more powerful.

The case for separate representation to be replaced by a single seat for the EU therefore has considerable force and has been made on two distinct arguments. On the one hand the EU would be entitled to a much smaller share of the votes and that would increase the voting share of the other IMF members. The logical way to do this is by treating the EU bloc as a single country which would mean eliminating intra-EU trade from the formula which determines quotas and hence voting weights. On the other hand European advocates of a single seat at the IMF see it as a logical corollary of greater cooperation over economic, monetary and foreign policy among EU member countries. A single seat would be very powerful because the voting weight of all the members would be combined. The result would be that the formal voting structure of the IMF would be transformed, from being dominated by the large weight of one country, to having two powerful voting blocs, the EU and USA.[1]

In this paper we investigate the voting power implications of this change in structure, involving a simultaneous reduction in voting weight and a move to bloc voting, which are complex. First, a European bloc vote comparable in size to that of the USA will create a bipolar voting body in which the powers of the two rival blocs will be limited and those of the other members enhanced. Second, redistributing European voting weight will increase the relative voting weight of each of the other countries. This will affect their voting power in non-obvious ways. Third, we must also consider how the change affects the powers of the individual EU members, which would no longer be directly represented. They will not necessarily lose power since they will have indirect voting influence and may actually gain power if either the power of the bloc or their voting power within it (or both) is sufficient. It may be assumed that they would be unwilling to give up their separate seats otherwise.

The method of voting power analysis can be used to address these issues simultaneously. We use the approach, originally due to Coleman (1973), described in Leech and Leech (2004b), that we have previously used

[1] In this paper we are taking the voting system laid down in the Articles of Agreement quite literally. It is often said that votes are rarely taken at the IMF and decisions are made by consensus. We take it as axiomatic that the voting structure matters in a fundamental way; that it is an exogenous factor conditioning the way decisions are taken. Many decisions are actually taken by voting.

to analyse voting power in the IMF (Leech and Leech, 2004a) before and after the proposed reform.

We conclude that moving to a single European seat could improve the governance of the IMF by increasing both the absolute and relative voting power of all members except the USA - which currently enjoys more power than its voting weight. The EU member countries could also all benefit if an appropriate EU internal voting rule were adopted. These results are for ordinary decisions of the IMF requiring only a simple majority. For decisions requiring an 85% supermajority, the USA would retain its veto, but the EU would also have a veto.

In section 1 we discuss European representation in the IMF and possible scenarios for a single European seat based on actual proposals that have been made. In section 2 we outline the voting power methodology. In section 3 we consider the results in terms of the implications for power within the IMF governing body. In section 4 we examine the implications for the member countries of the EU and show that they all could gain power depending on the internal decision-making rule within the union.

1. A Unified European Representation in the IMF

1.1 The Governance of the IMF

The governing body of the IMF is its board of governors, corresponding to the shareholders of a corporation, which is made up of representatives of all the 184 member countries. Normally governors are ministers of finance of the member countries and their alternates their central bank governors. As the body to which the Fund is ultimately accountable, the functions of the board of governors are largely formal and ceremonial, but it also makes decisions on essentially political questions. It controls, but does not manage, the IMF, analogously to the way that a company's shareholders as a group control their corporation[2]. The board of governors uses a system of weighted voting, in which the number of votes possessed by each member is determined by its quota. Unlike shares in a joint stock company, quotas cannot be traded, each member's quota being fixed by decisions of the board of governors itself. The most powerful member is the USA with over 17.09 percent of the votes, followed by Japan with 6.13 and Germany with 5.99 percent.

The main function of the board of governors is to receive reports and recommendations from the executive board which manages the organisation as a board of directors does a corporation. The executive is a much smaller body, comprising 24 directors who are either directly appointed by certain member countries or elected by groupings of members arranged in constituencies. Executive directors are officials from member countries rather than politicians and the work of the executive is technical rather than political. The executive meets very frequently, unlike the board of governors that meets bi-annually. However, unlike the board of a company, whenever it has to take an important vote the IMF executive uses a system of weighted voting based on that of the governors. This reflects the fact that its members have different lines of accountability, to their respective country or constituency, rather than

[2] See Van Houtven (2002) for an authoritative account of the governance of the IMF.

the board of governors, whereas elected company directors are all accountable to the same shareholders meeting.

Eight directors are appointed by their governments and the other 16 are elected by constituencies. The eight appointed directors are those of the USA, Japan, Germany, France, the UK, Saudi Arabia, Russia and China; each of the elected directors represents a constituency that is constructed on a more-or-less geographical basis. Thus there are two African constituencies, three Latin American, one south Asian, one mainly south-east Asian, and so on. One of the implications of the constituency system is that a director who is elected by a constituency casts all the votes of all its members. Moreover, he must cast them as a bloc regardless of any differences of view there may be among his constituents. A constituency may not split its vote although it can instruct is director to abstain. Procedures used internally by constituencies are therefore a very important part of the system of governance of the Fund. But they are not covered in the Articles of Agreement since constituencies are regarded as strictly informal groupings which can change from time to time and are not part of the constitution of the IMF. Constituencies are not well defined by the Articles, being formally just the group of members who voted for their director.

1.2 The Current EU Representation

The EU countries are currently over-represented in both the governing bodies of the IMF. The table below shows the current voting shares of the EU countries and the USA in comparison with shares of world GDP and Population. The EU countries collectively are over represented both relative to their share of world GDP and compared with the USA: the EU countries (EU25) command 31.9 percent of the votes in the board of governors and have 31.1 percent of world GDP. By contrast the USA has 17.1 percent of the voting weight with 29.3 percent of GDP. The EU25 has 86 percent more voting weight than the USA with only a 6 percent greater GDP. The Eurozone countries (Euro12) have 33 percent more voting weight than the USA with a GDP that is 22 percent smaller. Both the EU group and the USA are massively over-represented in comparison with their shares of world population.

Voting Weight of European Union Countries
and the USA in the IMF Board of Governors

	IMF Vote Share %	GDP Share %	Population Share %
EU25	31.9	31.1	7.2
Euro12	22.9	22.9	4.9
USA	17.1	29.3	4.6

Source: IMF and World Bank webpages.

In the executive board, out of a total of 24 directors, the EU countries supply between 6 and 8. Germany, France and UK appoint their own directors, while the remainder are elected or rotate to represent constituencies. Italy, Netherlands and Belgium provide their own directors as elected representatives of their constituencies. This is such a permanent arrangement that the constituencies are named after the country that represents it: the Italian constituency includes also Albania, Greece, Malta, Portugal, San Marino and Timor-Leste; the Netherlands constituency contains Armenia, Bosnia, Bulgaria, Croatia, Cyprus, Georgia, Israel, Macedonia, Moldova, Romania, Ukraine; and the Belgian constituency contains Austria, Belarus, Czech Republic, Hungary, Kazakhstan, Luxembourg, Slovak Republic, Slovenia and Turkey. All these three constituencies contain both EU members and non-members. The voting weight of the EU directors is enhanced by the fact that votes of all countries belonging to a constituency are aggregated. This effect is offset to some extent by the fact that two EU members are in other constituencies permanently represented by non-EU members: Ireland is in the constituency represented by Canada and Poland is in the Swiss constituency. The two other constituencies with EU members have directors who are selected by rotation. The director of the constituency currently represented by Mexico rotates between it, Venezuela and Spain (the other members are five central American republics Guatemala, Honduras, El Salvador, Nicaragua and Costa Rica), while the Nordic/ Baltic constituency, whose representation (currently Norway) rotates among its members, consists almost entirely of EU countries[3].

1.3 Scenarios for a Proposed Single European Seat and Voting Power Analysis

A number of writers have discussed the possible adjustment of voting weights with a unified European representation in the IMF and various

[3] A detailed account of representation of EU countries is given in Bini Smaghi (2004).

proposals for reform have been made[4]. Van Houtven (2004) has proposed that the EU and USA be given equal representation and the number of executive directors reduced by the number of EU seats thereby lost. Buira (2002, 2003) argues that the introduction of the common European currency should lead to a recalculation of quotas of the countries of the euro area excluding their mutual trade. Such trade should be treated essentially as if it is domestic trade in the same way, for example, as between states of the USA. Kenen et al. (2004) suggest another model in which there are two European blocs –the Eurozone and the EU members outside the Eurozone. We have used these proposals as the basis of an investigation using the voting power approach to compute measures of voting power for all countries at different levels of the combined voting weight of the EU over a range of values.

An interesting feature of these proposed changes is that they do not appear to require extensive changes to the Articles and therefore the formal agreement of the USA. The primary requirement is that the countries of the EU agree among themselves to coordinate their actions and reduce their quotas. We do not assume that there would be any consequent change to the quotas of countries outside the EU; however it is obvious that there would be a redistribution of voting weight in relative terms.

It would clearly be desirable to consider other redistribution schemes based on changes to the quota formula but they would be much more radical, and we do not consider them in the present paper. Nor do we consider in detail the implications of a single EU seat, and associated changes in voting

[4] Buira (2002, 2003), Benassy-Quere and Bowles (2002), Kenen et al. (2004), Mahieu et al. (2003), Van Houtven (2004).

weights, for the structure of the executive board. Our analysis is confined solely to the board of governors where the scenarios can be simply defined[5]. In order to make a power analysis of the executive, by contrast, the scenarios required would involve other assumptions about changes to the composition of constituencies as well as the size of the board and the analysis would be overly speculative.

Moreover the voting power approach might not apply as well to the executive where the different constituencies have different decision rules; for example some might reasonably be modelled on the assumption that they use majority voting, for example to elect directors, while others have a permanent representation, in the sense that their director is always from the same country, and still others have a rotating system of choosing directors from a different country in turn. Furthermore, many of them are mixed constituencies, comprising both industrial countries and developing or transition countries, and it is argued that in such a case it would be wrong to assume that the elected director simply votes always on behalf of the majority within the constituency. The director has a responsibility to represent all constituency members and therefore developing countries have a voice even

[5] Such limited voting power analysis of scenarios for changes to the executive that we have done has given results which differ little from the board of governors.

if they have a minority of votes. This is a point however on which there are differences of opinion between industrialised and developing countries[6].

2. Voting Power Analysis and its Application to the IMF

The voting power methodology, using the Penrose and Banzhaf power indices, is described in Leech and Leech (2004b)[7]. There have been few previous voting power studies of the IMF although there is an extensive literature applying the approach to a number of other weighted voting bodies especially the EU council of ministers and the US presidential electoral college[8]. We begin with a heuristic account of its importance and relevance.

2.1 Voting Power versus Voting Weight

The starting point of voting power analysis is the recognition that the power of any member of a weighted voting body - that is one that uses a system of weighted majority voting to make decisions - is fundamentally different from its[9] share of the voting weight. Its voting power is defined generally as its ability to influence the result of a ballot; the member has some

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[6] Mahieu et al. (2003) argue in favour of mixed constituencies like that led by Belgium. Belgium has 2.13 percent of the voting weight but the Belgian director casts the total combined votes of all members of its constituency, some 5.15 percent. Buira (2002), however, argues from experience that for developing countries voice not backed by voting power is not enough: “This writer recalls occasions when a major industrialised country would not be prepared to engage in the discussion they could lose on logical grounds. After listening to the arguments, the director would simply state they had not changed their position on the issue.”

[7] Previously applied to the IMF in Leech and Leech (2004a) and Leech (2002)

[8] See Felsenthal and Machover (1998) for a literature survey. See Holler and Owen (2001) for a collection of recent studies.

[9] We use the impersonal pronoun here because members of the IMF are countries rather than individual voters.

power if it can change a vote that would fail to reach the threshold required for a decision without its support into one which does so with its support, that is, swing the decision; it has greater power the more often it can do that. Voting power is quantified by the Penrose index, which is the proportion of all the voting outcomes that could occur (taking account of all the possible ways that members could vote on any issue, that is 2^{n-1} outcomes) in which the member can swing the decision (Penrose, 1946)[10]. This is a very simple measure of the voting power of every member. The Banzhaf index (Banzhaf, 1965) is the same measure normalised, that is expressed in relative terms, with the power indices for all the members adding up to one. The Banzhaf index enables comparisons to be made between a member's voting power and voting weight, within the same voting body.

A member's voting power depends not only on its own weight but also those of all other members, as well as the level of the majority threshold for a decision. A member with 20 percent of the votes might be very powerful or not very powerful depending on how the other 80 percent is distributed. If, for example, in a voting body where a threshold of 51 per cent is required for a majority decision, there are 80 other members with 1 percent of the votes each, then the 20-percent member has virtual control (its Penrose index is

[10] The Penrose measure is more usually referred to as the Absolute Banzhaf index. The Normalised Banzhaf index is the same measure but normalised to make all members' indices sum to one. Much of the power indices literature has tended to emphasise the latter. We consider that both are needed and have different roles in the analysis and therefore it is useful to have separate terminology for them. We prefer to use the term Penrose index for the non-normalised version, after its original inventor, and to use the Banzhaf index for its normalised version.

equal to 97%[11]) and its share of the voting power, measured by the Banzhaf index at 62%, is much greater than its share of the votes. On the other hand, if there is another member that also possesses 20 percent, and 60 members each with 1 percent, its power is significantly lower (Penrose index 50%) and its power share much less than its vote share (Banzhaf index 12%).

Comparing the power indices for the 1-percent members shows an interesting phenomenon. In the first case (a single dominant 20-percent voter) the Penrose index is 0.73% (Banzhaf index 0.47%) while in the second case (two voters with 20 percent weight), the Penrose index increases to 5.04% (Banzhaf 1.27%). Thus the small voters gain considerably in power where there are two large countervailing blocs, a bipolar situation, in comparison with a situation of a single dominant power; in this case their power is greater than their weight[12].

2.2 The Importance of the Threshold

The power of a member also depends on the threshold required for a majority decision. The above examples assumed a simple majority rule, and in that case differences in weight led to great inequality of power. But if, to take an extreme case, unanimity were required to take any decision, then all members would have equal power regardless of the distribution of voting weights. Each member would have precisely one swing (that is, there is only one losing outcome that could become winning with the addition of its vote – when all other members are in favour of the proposal), so its Penrose index is

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[11] Authors' calculations using the program *ipgenf* on the website Leech and Leech (2003).

[12] See Leech and Leech (2004b) for the full mathematical details and numerical analysis.

equal to $1/2^{n-1}$ and its Banzhaf index is equal to 1/n (where n is the number of members), regardless of its weight and those of others. Each country here has a veto.

If (to take another hypothetical example of relevance to the IMF), the majority threshold is set at 85%, then the powers of the members may still not be very unequal, even though their weights may be. To continue the first example from the last section, the single 20-percent member in this case has not much more power than each of the 80 members having 1 percent: the 20-percent member has a Penrose index of 0.0000007% (or 7.057e-09), Banzhaf index 1.9%, while a 1-percent member has Penrose index equal to 0.00000045% (4.46e-09), Banzhaf index of 1.2%. This example illustrates the sensitivity of the results to the threshold. Essentially a threshold set as high as 85 percent means two things for voting power: that relative power (Banzhaf index) is much more equal than under a lower threshold and that the voting body is likely to be a very weak decision maker because very few of the possible voting outcomes lead to a majority decision, which substantially limits the measure of absolute voting power (Penrose index). In the terminology of Coleman (1971) the voting body has very little power to act. It is notable however that a voter with 20 percent weight has a unilateral veto power.

2.3 The Powers of European Bloc Members

In our assumed new IMF the two interacting voting bodies - the board of governors and the European bloc - both have their own voting systems. Their interaction is important for the powers of members of the European bloc and irrelevant for the other members of the IMF, for whom we can find their power indices straightforwardly with the aid of a suitable numerical algorithm[13]. We can then study the implications of the change by directly comparing the power indices before and after. We present the analysis for these non-EU countries in the next section.

For the members of the European bloc the analysis is more subtle because their roles change from being sovereign members of the IMF governing body to being indirectly represented by the single EU governor. They lose their direct power from having their own vote but retain indirect power through the EU decision rules. Their power with respect to IMF decisions can be formally measured within this two stage voting system by applying the power index methodology twice to compute Penrose indices: first its power in the EU's internal voting body, then the power of the EU bloc in the IMF governors as described in the previous paragraph. The indirect Penrose index for an EU member is the simple product of these two indices.

Thus if the unified EU bloc has enough power in the board of governors and the member country has enough power internally in the EU group, the member could become better off, that is more powerful than it was before, by giving up its seat. This analysis depends on the details of the internal decision rule of the EU bloc. We discuss possible scenarios for this and present results for them below. The indirect power analysis is important for the viability of the proposal to move to a unified European representation since countries would be unlikely to agree to a change that would reduce their voting power. The

[13] This has to be capable of handling a large number of voters (in this case 184) with large voting weights (2,176,037 votes in total in the IMF). We use the modified Owen method described in Leech (2003).

results for European countries that join the bloc are presented in section 4 on the assumption that the EU bloc had voting parity with the USA. We find that there exist some voting systems that would produce an increase in the power of all members of the European bloc.

2.4 The Logic of Voting Power Analysis

It is important to be clear what voting power analysis is and what it is not. At the base of the approach is the assumption that all members of a voting body are sovereign in the sense that they decide how to cast their votes on any issue independently of what others do and that they are just as likely to vote for it as against. This is an idealisation that is suitable for some purposes, most importantly when the focus is on the general properties of a system of voting rules - such as fairness and decisiveness - where voters' individual preferences are held to be completely irrelevant. This kind of voting power analysis has been called constitutional voting power in contrast to behavioural voting power which takes account of voters' preferences or voting histories and therefore treats some voting outcomes as more likely than others.

The power indices used here do have an interpretation in behavioural terms. Instead of assuming each voter to be equally likely to vote for and against a motion, we can make the weaker assumption that each voter's probability of voting for a motion is chosen at random. Then, as long as the voters are independent, the Penrose and Banzhaf indices are suitable measures of behavioural power[14]. In the context of the IMF this amounts to the assumption that the voting system is a means of deciding questions about the provision of global public goods in which the interests of different countries are likely vary by issue. Voting power indices measure power in relation to an average issue and therefore preferences do not matter. If this model fits approximately then the voting power indices will be a reasonable measure of behavioural power in this sense as well as being measures of constitutional power. On the other hand power indices cannot give information about the likely results of voting on any particular issue, taking account of the preferences of particular voters. The model cannot be used to predict in this sense.

The power indices we report can be taken as measuring power in general. Furthermore, the voting power approach is a way of gaining insights into the properties of a voting body that cannot be obtained by verbal reasoning alone although the arguments are often (at least implicitly) put in verbal terms. It is a useful quantification that enables verbal arguments about voting power to be taken further.

3. Implications of a European Seat for the Voting Power of IMF Members

In this section we report an analysis assuming a single EU representative on the board of governors and that all member countries of the EU bloc relinquish their individual seats. We compute power indices for this voting

[14] This was shown by Straffin (1977).

body on the basis of different assumptions about the nature and voting weight of the EU bloc. We can thus map out the power implications of different EU weights for the power of each country.

3.1 Two cases: Eurozone and EU

We investigate two cases: (1) a bloc consisting of the 12 countries that have adopted the euro, which we designate Euro12[15]; (2) a bloc consisting of the whole European Union of 25 countries, which we designate EU25[16]. For each case, we compute the power indices for hypothetical levels of the voting weight for the European bloc, over a range which includes the scenarios described in section 1.

We assume a majority threshold of 50% and therefore our analysis applies only to what are referred to in the Articles as ordinary decisions. Voting power analysis for decisions requiring a special majority of 85% is of little interest: in this case the effect of unequal voting weights between countries becomes very small since the decision threshold is set so high that it is close to being a unanimity rule where all members have equal power whatever their weight, and the power of the governing body to act is very low[17]. The 85% special majority rule is primarily important because it gives unilateral veto power to any member with more that 15% of the votes, notably the USA, but also now a unified EU.

[15] Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain.
[16] Euro12 plus Cyprus, Czech Republic, Denmark, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, Sweden, United Kingdom.
[17] Se Leech (2002) for an analysis of this effect. Detailed results for the 85% special majorities rule are available on request from the authors.

3.2 Results

We present results in two forms: a table showing power indices for the case of EU-US parity and graphs showing the sensitivity of power indices to the European bloc vote over a range of values.

The detailed results for both Euro12 and EU25 assuming voting parity with the USA are given in Table 1 (in the Appendix). The results in general terms are similar in both cases. There is a substantial quantitative effect. Before the introduction of a unified representation voting is virtually dominated by the USA whose relative power at 24.49 percent is well above its percentage of the votes, 17.09, and Penrose index of 0.7559. All other countries have a power share less than their vote share. The voting system can be said to redistribute power relative to weight to the United States. With a single European seat, however, all members except the US gain voting power and a have a power share greater than their weight, so to an extent we can conclude that the reform would redistribute power to the smaller countries to some extent. The largest beneficiary would be Japan, whose power share would increase from 5.46 to 9.42 percent with EU25 (7.67 with Euro12), but all countries would gain both in absolute and relative voting power. The voting power of both the European bloc and the USA would be much less than proportional to their weight: in the case of EU25 they would each have 20.06 percent of the votes and16.71 percent of the voting power, and in the case of Euro12 their weight would be 18.15 percent and power 16.06 percent. These results therefore show that the reform would be a significant improvement for all non-EU countries except the USA.

Figures 1, 2 and 3 show the power indices over the whole range of values of the EU weight for both cases. The graphs in Figure 1 show the effect of varying the weight of the Euro12 bloc on the voting powers of the USA, the EU, Japan and representative countries of various sizes. They show the weight shares and the normalised Banzhaf indices against the number of votes of the bloc. The diagrams also show the *status quo* value of the country's Banzhaf index as a baseline. The power indices have been calculated for different levels of the Euro12 bloc vote over the range between 140,000 to 500,000, increasing in steps of 20,000 or 10,000. This range covers all the scenarios including parity with the USA, 371,743 (18.15 percent), and also brackets the current combined actual quotas of the Euro12 countries, 498,627 (22.92 percent).

The results show that a Eurozone seat would increase the voting power of every other non-Eurozone member country, except the United States, over the entire range considered. Moving over to a structure with two large blocs of equal size would therefore have the effect of reducing US voting dominance even though the voting weight of the combined European countries would be substantially reduced on its current level. (It remains to be seen whether the Eurozone countries would also be more powerful: that is discussed in the next section.)

Apart from the two blocs, each country's voting power reaches a maximum when the Euro12 and the USA weights are equal, with 18.15 percent of the votes. The ratios in the table show that all countries apart from the USA would gain absolute voting power, as measured by the Penrose index, of at least 21 percent compared to the status quo. The biggest gainers would be Japan and the UK whose power indices would increase by 42 and 31 percent respectively. The same pattern is shown for the changes in relative voting power.

Figure 2 shows how the relation between Euro12 and US power is affected by the voting weight of the former. Figure 2(a) shows the Banzhaf indices plotted against the Euro12 weight. Figure 2(b) shows the trade-off between the power of the two blocs, with their respective Banzhaf indices plotted on the axes. The shape of this curve, convex to the origin, implies that the combined power shares of the two blocs is minimised when they are equal, when they have the same weight. This diagram illustrates the effect on power of moving from one dominant bloc to two countervailing powers.

Figure 3 shows the analogous diagrams for the EU25 bloc. These results are qualitatively very similar to those for Euro12 although the effects are generally bigger numerically. For the US and EU power is monotonic in the EU25 weight, respectively falling and rising, while for every other country the function has a maximum at parity; when the USA and EU25 both have 20.01 percent of the votes, each has 16.71 percent of the power; this compares with the present situation where the USA, with 17.01 percent of the votes has 24 percent of the voting power. The pattern is the same for all countries.

The analysis of this section suggests that a unified representation for Europe with reduced voting weight but parity with the United States would enhance the voting power and therefore influence in decision making of every member country outside Europe and the USA. The effects for developing countries with small voting weight would be small however: to give them appreciably greater influence would require also changes to their voting weights which are not considered in this paper.

Figure 1: Power Indices for Selected IMF Members when there is a Single European Seat: the Euro12 Case

Figure 1(a) Euro12

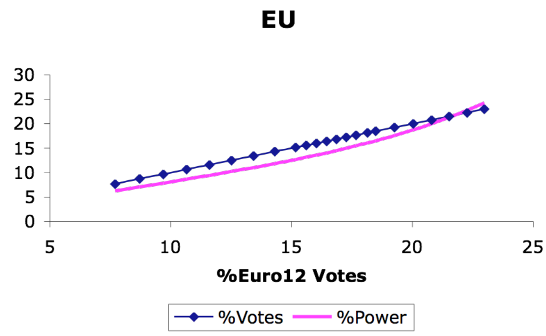


Figure 1(b) USA

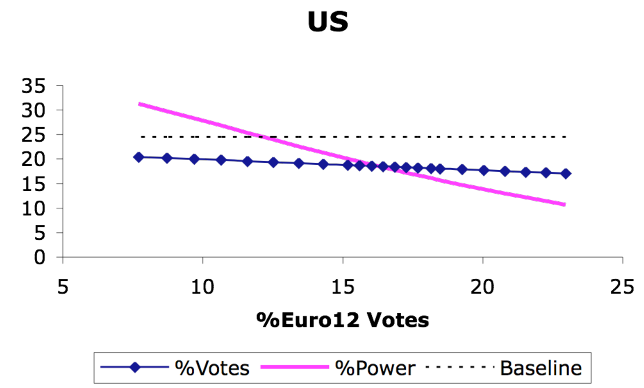


Figure 1(c) Japan

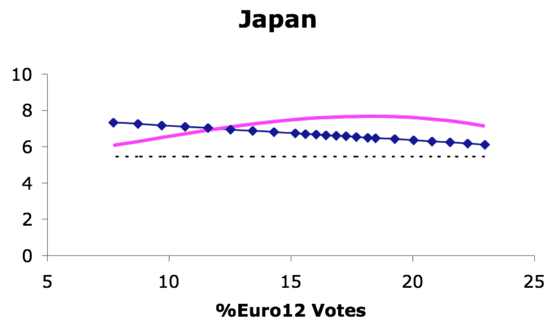


Figure 1(d) China

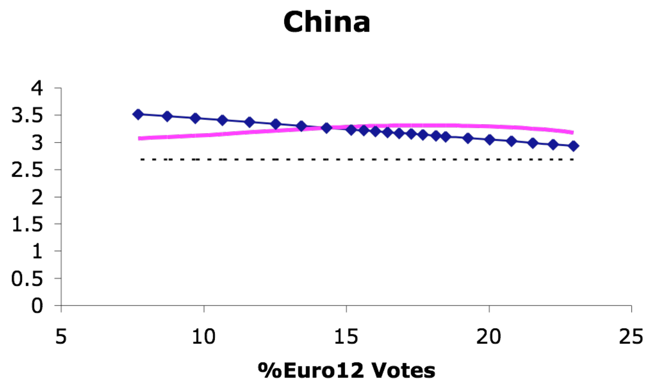


Figure 1(e) Mexico

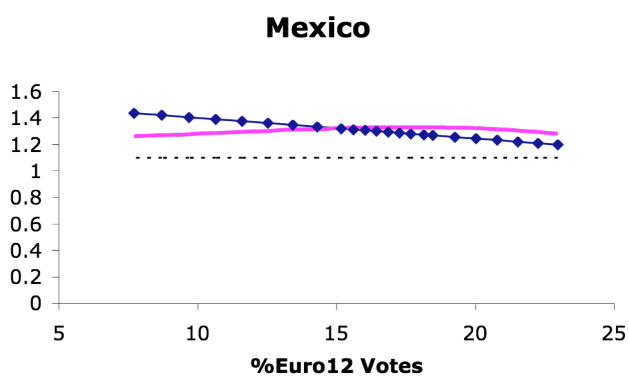
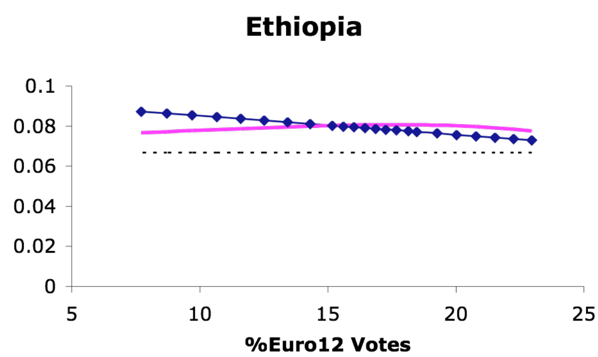


Figure 1(f) Ethiopia



Note. The dotted horizontal line is the status quo, where applicable.

Figure 2(a) Voting Power of the Euro12 and USA

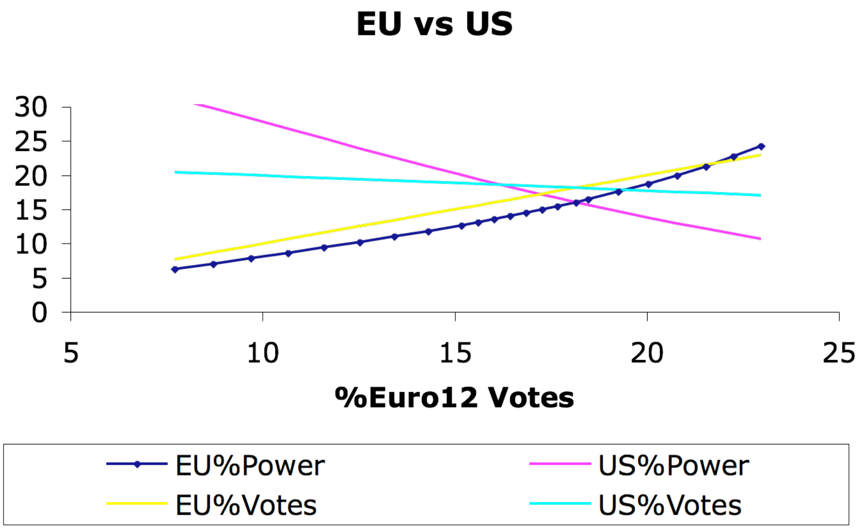


Figure 2(b) Tradeoff of Voting Power of Euro12 and USA

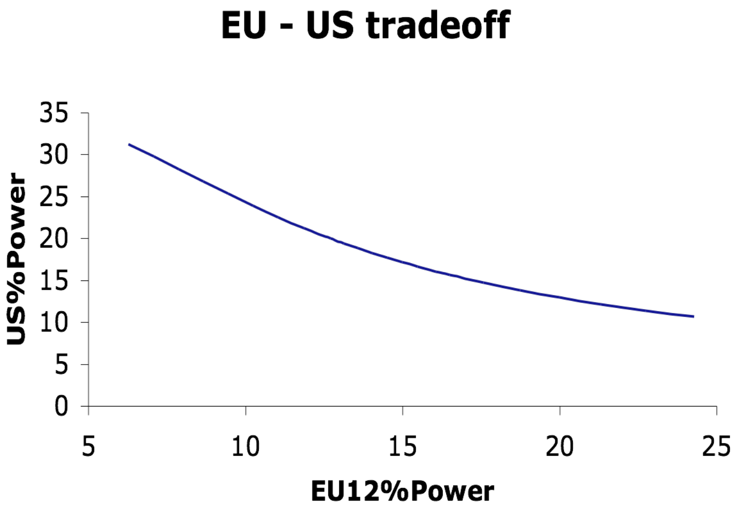


Figure 3: Power Indices for Selected IMF Members when there is a Single European Seat: the EU25 Case

Figure 3(a) Voting Power of EU25 and USA

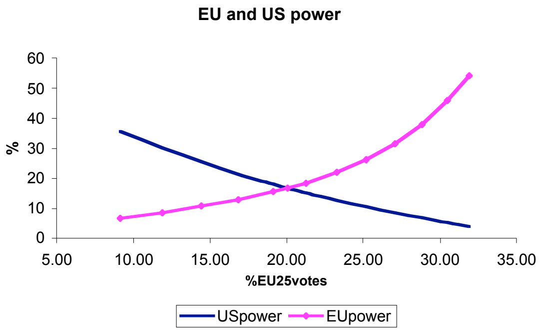


Figure 3(b) Voting Power Tradeoff of EU25 vs US

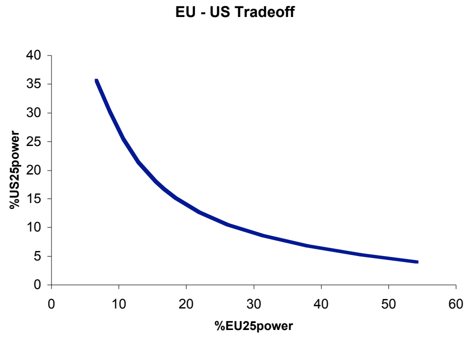


Figure 3(c) Japan

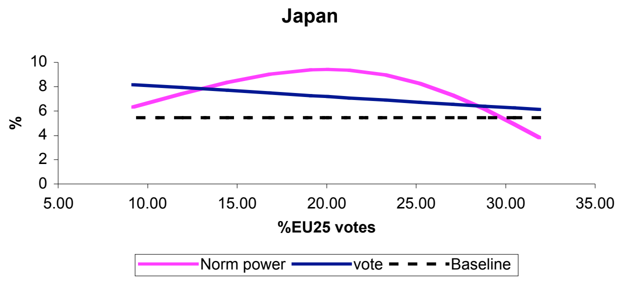


Figure 3(d) Saudi Arabia

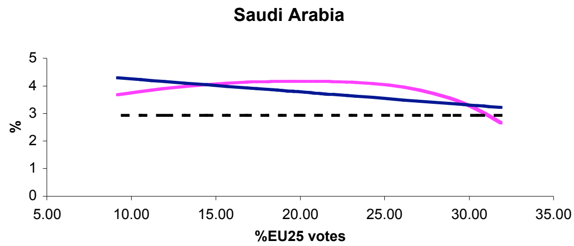


Figure 3(e) DR of Congo

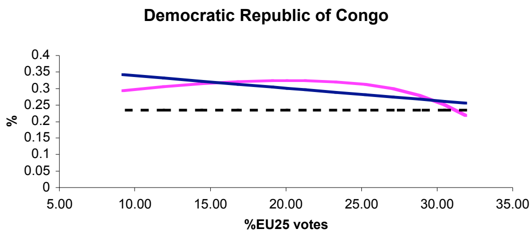
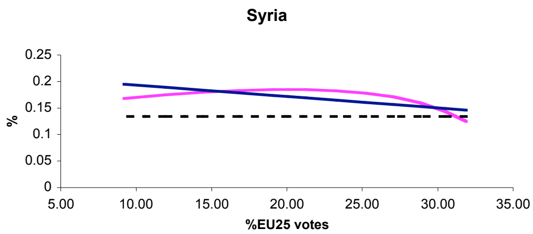


Figure 3(f) Syria



4. Implications for the Voting Power of European Countries

Now we investigate the effects of the single European bloc on the voting power of its members. Having found the power of the EU bloc in the last section, we can find the absolute power index of each EU member country as a compound of this with the member's power in internal European decision making. This is the product of the two Penrose indices. The Banzhaf indices are not really meaningful in this case. In order to keep the analysis simple we assume parity voting with the USA.

4.1 Assumptions about the Voting System in the European Bloc

In order to make a voting power analysis for the EU bloc – considered as a voting body - requires us to make explicit our assumptions about the decision rule that it uses to determine its vote in the IMF board of governors. We consider a number of possible voting systems for each of the two cases as follows.

<u>Euro12</u>:

(1) IMF Current weights: the Euro12 works like an IMF constituency that uses weighted majority voting based on the actual current weights determined by the IMF quotas;

(2) GDP weights: a system of weighted voting based on the economic size of each country;

(3) Population weights: a voting system based on population as an alternative measure of a country's size;

(4) One Country One Vote: all members have an equal vote; this is the basis on which the European Central Bank currently works.

EU25:

(1) IMF Current Weights;

(2) Nice: the system of qualified majority voting established in the Nice treaty currently in use in the Council of Ministers;

(3) Draft Constitution: the proposed alternative proposed by the European Convention to replace the Nice system;

(4) GDP;

(5) Population: both the Nice and the Draft Constitution voting systems are based on populations but they both require supermajorities for decisions, which means that these systems both give the EU25 fairly low power to act (in the case of Nice extremely low) and this will tend to limit the absolute voting power of members. In this system we consider population weights with a simple majority decision rule;

(6) Population Square Roots: proposals have been made that this would be a more equitable basis for EU voting weights[18];

(7) One Country One Vote.

In the case of the Euro12 we assume a simple-majority decision rule in all four schemes. In the case of EU25 we assume a simple-majority decision rule in all cases except (2) and (3) which are actual or proposed systems with a specified supermajority decision threshold.

4.2 Results

Table 2 gives the results for Euro12. For each voting system, the table shows each country's voting power measured by its two-stage or indirect Penrose index and the ratio of that to its power under the status quo. This

[18] Based on the arguments of Penrose (1946), hence the name: Penrose square root rule.

ratio gives a measure of whether its voting power has increased or decreased in consequence of the introduction of unified European representation[19].

The results from using current IMF weights are very favourable to a single EU seat since all 12 countries would enjoy a substantial increase in voting power. On the other hand, all three alternative schemes give mixed results. The use of GDP weights is beneficial to 8 countries but 4 lose power: the Benelux countries, especially Belgium, and Finland. Population weights give broadly similar results except that Austria replaces Finland as a loser of power; Spain and Portugal gain a lot of voting power. A system of unweighted voting gives a very different pattern of results. Now all countries gain voting power except France and Germany which lose power substantially; the smallest countries are all big gainers, especially Luxembourg which would have 28 times more voting power.

It is useful to compare power indices of different members under the status quo and a single Euro12 bloc. Such comparisons can reveal changes in power rankings. For example, let us assume Euro12 voting using current IMF weights. Germany becomes more powerful than Japan: Japan's power index increases from 0.169 to 0.239 while Germany's increases from 0.165 to 0.286. France and UK have the same power under the status quo, 0.138, but France becomes more powerful by being a member of a Euro bloc: its power index increases to 0.208, that of the UK increases to 0.18. There are many

[19] Normalised power indices are not meaningful here because they would depend on the internal voting rules of the Euro bloc. The power of a non-Euro12 country is obviously independent of that. Comparisons can be made for countries using the Penrose indices howver.

examples; another is Austria which gains power relative to Argentina and Indonesia.

Table 3 reports the power analysis for the EU25 countries for seven different weighted voting systems. As with Euro12, the results for simple majority voting using the current IMF weights are unambiguous and show that all countries would gain voting power substantially. The biggest gainer would be Germany. Also the population square root voting system would benefit virtually all members; only Belgium would lose very slightly.

The other voting systems considered would all produce mixed results and change the rankings of the power of individual countries in some cases. Under the Nice system only the smaller countries would gain voting power, and the large countries would lose substantially. This is largely a result of the fact that the Nice system requires large supermajorities of both weighted votes (74 percent) and populations (60 percent) and therefore only a small proportion of possible votes lead to a decision; the EU council has very low power to act under this system. This is important for the analysis of power in a two-stage voting model. The same effect is apparent in the results for the Draft Constitution which also uses supermajorities: the countries that are currently most powerful in the IMF all lose a lot of power. The use of GDP or population would enhance the power of the big countries and the small countries would lose power, while under voting equality only the big four countries would lose out and the small countries all gain considerably.

Our conclusion is that the voting system adopted by the single European bloc is crucial in determining whether the member countries gain or lose power. We have shown that it is possible that they all could gain absolute voting power under an appropriate European system of qualified majority voting.

5. Conclusions

We have considered the implications for voting power of the introduction of a unified representation of the EU countries at the IMF with a reduced voting weight. We considered two versions of a European bloc: the Eurozone and the newly enlarged European Union. The IMF governing body would change from one with 184 members and a single dominant voter to one with slightly fewer members two of which were dominant rivals.

The effect of this (as far as ordinary decisions requiring a simple majority is concerned) would be to reduce the power of the United States and to enhance the power of all other members over ordinary decisions. However the USA would retain its unilateral veto over decisions requiring a special majority of 85 percent, and the European bloc would gain the same veto.

Whether European countries gain or lose voting power depends on the internal voting arrangements within the European body that controls the votes of the European bloc. Some voting systems could be devised that would give members greater indirect voting power than they currently enjoy in the IMF, even if they give up their direct representation.

The reforms we have considered do not require any changes to the voting weights of countries outside the European bloc. Nor would they necessitate major amendment to the rules of the IMF.

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Table 1: Voting Power Analysis of the IMF with a Single European Seat with Voting Parity with the USA

	Status Quo				Euro12/US Parity						EU25/US Parity					
	Votes	%	Power Indices		votes	%	Power Indices		Ratios		votes	%	Power Indices		Ratios	
			Abs	Rel			Abs	Rel	Abs	Rel			Abs	Rel%	Abs	Rel
United States	371743	17.09	0.755917	24.49	371743	18.15	0.499745	16.06	0.66	0.66	371743	20.06	0.499991	16.71	0.66	0.68
Euro12					371743	18.15	0.499745	16.06								
EU25											371743	20.06	0.499991	16.71		
Japan	133378	6.13	0.168548	5.46	133378	6.51	0.238587	7.67	1.42	1.40	133378	7.20	0.281973	9.42	1.67	1.73
Germany	130332	5.99	0.16513	5.35												
France	107635	4.95	0.138111	4.47												
United Kingdom	107635	4.95	0.138111	4.47	107635	5.25	0.18028	5.79	1.31	1.29						
Italy	70805	3.25	0.091691	2.97												
Saudi Arabia	70105	3.22	0.090793	2.94	70105	3.42	0.113549	3.65	1.25	1.24	70105	3.78	0.124767	4.17	1.37	1.42
China	63942	2.94	0.082879	2.69	63942	3.12	0.103089	3.31	1.24	1.23	63942	3.45	0.113424	3.79	1.37	1.41
Canada	63942	2.94	0.082879	2.69	63942	3.12	0.103089	3.31	1.24	1.23	63942	3.45	0.113424	3.79	1.37	1.41
Russian Federation	59704	2.74	0.077423	2.51	59704	2.91	0.09599	3.09	1.24	1.23	59704	3.22	0.105656	3.53	1.36	1.41
Netherlands	51874	2.38	0.067321	2.18												
Belgium	46302	2.13	0.060117	1.95												
India	41832	1.92	0.054331	1.76	41832	2.04	0.066669	2.14	1.23	1.22	41832	2.26	0.073370	2.45	1.35	1.39
Switzerland	34835	1.60	0.045262	1.47	34835	1.70	0.055381	1.78	1.22	1.21	34835	1.88	0.060935	2.04	1.35	1.39
Australia	32614	1.50	0.042381	1.37	32614	1.59	0.051811	1.67	1.22	1.21	32614	1.76	0.057008	1.91	1.35	1.39
Spain	30739	1.41	0.039949	1.29												
Brazil	30611	1.41	0.039782	1.29	30611	1.49	0.048602	1.56	1.22	1.21	30611	1.65	0.053473	1.79	1.34	1.39
Venezuela	26841	1.23	0.034888	1.13	26841	1.31	0.042577	1.37	1.22	1.21	26841	1.45	0.046837	1.57	1.34	1.38
Mexico	26108	1.20	0.033936	1.10	26108	1.27	0.041407	1.33	1.22	1.21	26108	1.41	0.045549	1.52	1.34	1.38
Sweden	24205	1.11	0.031465	1.02	24205	1.18	0.038373	1.23	1.22	1.21						
Argentina	21421	0.98	0.027848	0.90	21421	1.05	0.033941	1.09	1.22	1.21	21421	1.16	0.037331	1.25	1.34	1.38
Indonesia	21043	0.97	0.027357	0.89	21043	1.03	0.03334	1.07	1.22	1.21	21043	1.14	0.036669	1.23	1.34	1.38
Austria	18973	0.87	0.024667	0.80												
SouthAfrica	18935	0.87	0.024618	0.80	18935	0.92	0.029989	0.96	1.22	1.21	18935	1.02	0.032982	1.10	1.34	1.38
Nigeria	17782	0.82	0.02312	0.75	17782	0.87	0.028158	0.91	1.22	1.21	17782	0.96	0.030967	1.04	1.34	1.38
Norway	16967	0.78	0.022061	0.71	16967	0.83	0.026864	0.86	1.22	1.21	16967	0.92	0.029544	0.99	1.34	1.38
Denmark	16678	0.77	0.021685	0.70	16678	0.81	0.026405	0.85	1.22	1.21						
Korea	16586	0.76	0.021565	0.70	16586	0.81	0.026259	0.84	1.22	1.21	16586	0.89	0.028879	0.97	1.34	1.38
Iran	15222	0.70	0.019792	0.64	15222	0.74	0.024095	0.77	1.22	1.21	15222	0.82	0.026498	0.89	1.34	1.38
Malaysia	15116	0.69	0.019655	0.64	15116	0.74	0.023927	0.77	1.22	1.21	15116	0.82	0.026313	0.88	1.34	1.38
Kuwait	14061	0.65	0.018283	0.59	14061	0.69	0.022254	0.72	1.22	1.21	14061	0.76	0.024473	0.82	1.34	1.38
Ukraine	13970	0.64	0.018165	0.59	13970	0.68	0.02211	0.71	1.22	1.21	13970	0.75	0.024314	0.81	1.34	1.38
Poland	13940	0.64	0.018126	0.59	13940	0.68	0.022062	0.71	1.22	1.21						
Finland	12888	0.59	0.016758	0.54												
Algeria	12797	0.59	0.01664	0.54	12797	0.62	0.020251	0.65	1.22	1.21	12797	0.69	0.022269	0.74	1.34	1.38
Iraq	12134	0.56	0.015778	0.51	12134	0.59	0.0192	0.62	1.22	1.21	12134	0.65	0.021114	0.71	1.34	1.38
Libya	11487	0.53	0.014937	0.48	11487	0.56	0.018175	0.58	1.22	1.21	11487	0.62	0.019986	0.67	1.34	1.38
Thailand	11069	0.51	0.014394	0.47	11069	0.54	0.017513	0.56	1.22	1.21	11069	0.60	0.019258	0.64	1.34	1.38

Both absolute and relative power indices are given (Penrose and Banzhaf indices). Ratios for both allow before and after comparisons. Calculations have been done using the program *ipmmle* in Leech and Leech (2003).

Table 1(continued): Voting Power Analysis of the IMF with a Single European Seat with Voting Parity with the USA

	Status Quo				Euro12/US Parity						EU25/US Parity					
	Votes	%	Power Indices		votes	%	Power Indices		Ratios		votes	%	Power Indices		Ratios	
			Abs	Rel			Abs	Rel	Abs	Rel			Abs	Rel%	Abs	Rel
Hungary	10634	0.49	0.013828	0.45	10634	0.52	0.016824	0.54	1.22	1.21						
Pakistan	10587	0.49	0.013767	0.45	10587	0.52	0.01675	0.54	1.22	1.21	10587	0.57	0.018419	0.62	1.34	1.38
Romania	10552	0.49	0.013721	0.44	10552	0.52	0.016694	0.54	1.22	1.21	10552	0.57	0.018358	0.61	1.34	1.38
Turkey	9890	0.45	0.012861	0.42	9890	0.48	0.015646	0.50	1.22	1.21	9890	0.53	0.017205	0.58	1.34	1.38
Egypt	9687	0.45	0.012597	0.41	9687	0.47	0.015325	0.49	1.22	1.21	9687	0.52	0.016851	0.56	1.34	1.38
Israel	9532	0.44	0.012395	0.40	9532	0.47	0.015079	0.48	1.22	1.21	9532	0.51	0.016582	0.55	1.34	1.38
New Zealand	9196	0.42	0.011958	0.39	9196	0.45	0.014547	0.47	1.22	1.21	9196	0.50	0.015997	0.53	1.34	1.38
Philippines	9049	0.42	0.011767	0.38	9049	0.44	0.014315	0.46	1.22	1.21	9049	0.49	0.015741	0.53	1.34	1.38
Portugal	8924	0.41	0.011605	0.38												
Singapore	8875	0.41	0.011541	0.37	8875	0.43	0.014039	0.45	1.22	1.21	8875	0.48	0.015438	0.52	1.34	1.38
Chile	8811	0.41	0.011458	0.37	8811	0.43	0.013938	0.45	1.22	1.21	8811	0.48	0.015326	0.51	1.34	1.38
Ireland	8634	0.40	0.011228	0.36											0.00	0.00
Greece	8480	0.39	0.011027	0.36											0.00	0.00
CzechRepublic	8443	0.39	0.010979	0.36	8443	0.41	0.013355	0.43	1.22	1.21					0.00	0.00
Colombia	7990	0.37	0.01039	0.34	7990	0.39	0.012638	0.41	1.22	1.21	7990	0.43	0.013897	0.46	1.34	1.38
Bulgaria	6652	0.31	0.00865	0.28	6652	0.32	0.010521	0.34	1.22	1.21	6652	0.36	0.011569	0.39	1.34	1.38
Peru	6634	0.30	0.008627	0.28	6634	0.32	0.010493	0.34	1.22	1.21	6634	0.36	0.011538	0.39	1.34	1.38
UnitedArabEmirates	6367	0.29	0.00828	0.27	6367	0.31	0.01007	0.32	1.22	1.21	6367	0.34	0.011073	0.37	1.34	1.38
Morocco	6132	0.28	0.007974	0.26	6132	0.30	0.009698	0.31	1.22	1.21	6132	0.33	0.010664	0.36	1.34	1.38
Bangladesh	5583	0.26	0.00726	0.24	5583	0.27	0.00883	0.28	1.22	1.21	5583	0.30	0.009709	0.32	1.34	1.38
CongoDR	5580	0.26	0.007256	0.24	5580	0.27	0.008825	0.28	1.22	1.21	5580	0.30	0.009704	0.32	1.34	1.38
Zambia	5141	0.24	0.006686	0.22	5141	0.25	0.008131	0.26	1.22	1.21	5141	0.28	0.008940	0.30	1.34	1.38
SerbiaMontenegro	4927	0.23	0.006407	0.21	4927	0.24	0.007792	0.25	1.22	1.21	4927	0.27	0.008568	0.29	1.34	1.38
SriLanka	4384	0.20	0.005701	0.18	4384	0.21	0.006933	0.22	1.22	1.21	4384	0.24	0.007624	0.25	1.34	1.38
Belarus	4114	0.19	0.00535	0.17	4114	0.20	0.006506	0.21	1.22	1.21	4114	0.22	0.007154	0.24	1.34	1.38
Ghana	3940	0.18	0.005124	0.17	3940	0.19	0.006231	0.20	1.22	1.21	3940	0.21	0.006851	0.23	1.34	1.38
Kazakhstan	3907	0.18	0.005081	0.16	3907	0.19	0.006179	0.20	1.22	1.21	3907	0.21	0.006794	0.23	1.34	1.38
Croatia	3901	0.18	0.005073	0.16	3901	0.19	0.006169	0.20	1.22	1.21	3901	0.21	0.006784	0.23	1.34	1.38
SlovakRepublic	3825	0.18	0.004974	0.16	3825	0.19	0.006049	0.19	1.22	1.21						
TrinidadTobago	3606	0.17	0.004689	0.15	3606	0.18	0.005703	0.18	1.22	1.21	3606	0.19	0.006270	0.21	1.34	1.38
Vietnam	3541	0.16	0.004605	0.15	3541	0.17	0.0056	0.18	1.22	1.21	3541	0.19	0.006157	0.21	1.34	1.38
Côted'Ivoire	3502	0.16	0.004554	0.15	3502	0.17	0.005538	0.18	1.22	1.21	3502	0.19	0.006090	0.20	1.34	1.38
Uruguay	3315	0.15	0.004311	0.14	3315	0.16	0.005242	0.17	1.22	1.21	3315	0.18	0.005764	0.19	1.34	1.38
Ecuador	3273	0.15	0.004256	0.14	3273	0.16	0.005176	0.17	1.22	1.21	3273	0.18	0.005691	0.19	1.34	1.38
SyrianArabRepublic	3186	0.15	0.004143	0.13	3186	0.16	0.005038	0.16	1.22	1.21	3186	0.17	0.005540	0.19	1.34	1.38
Tunisia	3115	0.14	0.004051	0.13	3115	0.15	0.004926	0.16	1.22	1.21	3115	0.17	0.005417	0.18	1.34	1.38
Angola	3113	0.14	0.004048	0.13	3113	0.15	0.004923	0.16	1.22	1.21	3113	0.17	0.005413	0.18	1.34	1.38
Luxembourg	3041	0.14	0.003955	0.13												
Uzbekistan	3006	0.14	0.003909	0.13	3006	0.15	0.004754	0.15	1.22	1.21	3006	0.16	0.005227	0.17	1.34	1.38
Jamaica	2985	0.14	0.003882	0.13	2985	0.15	0.004721	0.15	1.22	1.21	2985	0.16	0.005191	0.17	1.34	1.38

Table 1(continued): Voting Power Analysis of the IMF with a Single European Seat with Voting Parity with the USA

	Status Quo				Euro12/US Parity						EU25/US Parity					
	Votes	%	Power Indices		votes	%	Power Indices		Ratios		votes	%	Power Indices		Ratios	
			Abs	Rel			Abs	Rel	Abs	Rel			Abs	Rel%	Abs	Rel
Kenya	2964	0.14	0.003855	0.12	2964	0.14	0.004687	0.15	1.22	1.21	2964	0.16	0.005154	0.17	1.34	1.38
Qatar	2888	0.13	0.003756	0.12	2888	0.14	0.004567	0.15	1.22	1.21	2888	0.16	0.005022	0.17	1.34	1.38
Myanmar	2834	0.13	0.003685	0.12	2834	0.14	0.004482	0.14	1.22	1.21	2834	0.15	0.004928	0.16	1.34	1.38
Yemen	2685	0.12	0.003492	0.11	2685	0.13	0.004246	0.14	1.22	1.21	2685	0.14	0.004669	0.16	1.34	1.38
Slovenia	2567	0.12	0.003338	0.11	2567	0.13	0.004059	0.13	1.22	1.21						
DominicanRepublic	2439	0.11	0.003172	0.10	2439	0.12	0.003857	0.12	1.22	1.21	2439	0.13	0.004241	0.14	1.34	1.38
BruneiDarussalam	2402	0.11	0.003124	0.10	2402	0.12	0.003799	0.12	1.22	1.21	2402	0.13	0.004177	0.14	1.34	1.38
Guatemala	2352	0.11	0.003059	0.10	2352	0.11	0.003719	0.12	1.22	1.21	2352	0.13	0.004090	0.14	1.34	1.38
Panama	2316	0.11	0.003012	0.10	2316	0.11	0.003662	0.12	1.22	1.21	2316	0.12	0.004027	0.13	1.34	1.38
Lebanon	2280	0.10	0.002965	0.10	2280	0.11	0.003606	0.12	1.22	1.21	2280	0.12	0.003965	0.13	1.34	1.38
Tanzania	2239	0.10	0.002912	0.09	2239	0.11	0.003541	0.11	1.22	1.21	2239	0.12	0.003893	0.13	1.34	1.38
Oman	2190	0.10	0.002848	0.09	2190	0.11	0.003463	0.11	1.22	1.21	2190	0.12	0.003808	0.13	1.34	1.38
Cameroon	2107	0.10	0.00274	0.09	2107	0.10	0.003332	0.11	1.22	1.21	2107	0.11	0.003664	0.12	1.34	1.38
Uganda	2055	0.09	0.002672	0.09	2055	0.10	0.00325	0.10	1.22	1.21	2055	0.11	0.003573	0.12	1.34	1.38
Bolivia	1965	0.09	0.002555	0.08	1965	0.10	0.003107	0.10	1.22	1.21	1965	0.11	0.003417	0.11	1.34	1.38
ElSalvador	1963	0.09	0.002553	0.08	1963	0.10	0.003104	0.10	1.22	1.21	1963	0.11	0.003413	0.11	1.34	1.38
Jordan	1955	0.09	0.002542	0.08	1955	0.10	0.003092	0.10	1.22	1.21	1955	0.11	0.003399	0.11	1.34	1.38
Sudan	1947	0.09	0.002532	0.08	1947	0.10	0.003079	0.10	1.22	1.21	1947	0.11	0.003385	0.11	1.34	1.38
Bosnia	1941	0.09	0.002524	0.08	1941	0.09	0.003069	0.10	1.22	1.21	1941	0.10	0.003375	0.11	1.34	1.38
CostaRica	1891	0.09	0.002459	0.08	1891	0.09	0.00299	0.10	1.22	1.21	1891	0.10	0.003288	0.11	1.34	1.38
Afghanistan	1869	0.09	0.002431	0.08	1869	0.09	0.002956	0.10	1.22	1.21	1869	0.10	0.003250	0.11	1.34	1.38
Senegal	1868	0.09	0.002429	0.08	1868	0.09	0.002954	0.09	1.22	1.21	1868	0.10	0.003248	0.11	1.34	1.38
Azerbaijan	1859	0.09	0.002418	0.08	1859	0.09	0.00294	0.09	1.22	1.21	1859	0.10	0.003232	0.11	1.34	1.38
Gabon	1793	0.08	0.002332	0.08	1793	0.09	0.002835	0.09	1.22	1.21	1793	0.10	0.003118	0.10	1.34	1.38
Georgia	1753	0.08	0.00228	0.07	1753	0.09	0.002772	0.09	1.22	1.21	1753	0.09	0.003048	0.10	1.34	1.38
Lithuania	1692	0.08	0.0022	0.07	1692	0.08	0.002676	0.09	1.22	1.21						
Cyprus	1646	0.08	0.002141	0.07	1646	0.08	0.002603	0.08	1.22	1.21						
Namibia	1615	0.07	0.0021	0.07	1615	0.08	0.002554	0.08	1.22	1.21	1615	0.09	0.002808	0.09	1.34	1.38
Bahrain	1600	0.07	0.002081	0.07	1600	0.08	0.00253	0.08	1.22	1.21	1600	0.09	0.002782	0.09	1.34	1.38
Ethiopia	1587	0.07	0.002064	0.07	1587	0.08	0.00251	0.08	1.22	1.21	1587	0.09	0.002759	0.09	1.34	1.38
PapuaNewGuinea	1566	0.07	0.002037	0.07	1566	0.08	0.002476	0.08	1.22	1.21	1566	0.08	0.002723	0.09	1.34	1.38
Bahamas	1553	0.07	0.00202	0.07	1553	0.08	0.002456	0.08	1.22	1.21	1553	0.08	0.002700	0.09	1.34	1.38
Nicaragua	1550	0.07	0.002016	0.07	1550	0.08	0.002451	0.08	1.22	1.21	1550	0.08	0.002695	0.09	1.34	1.38
Honduras	1545	0.07	0.002009	0.07	1545	0.08	0.002443	0.08	1.22	1.21	1545	0.08	0.002686	0.09	1.34	1.38
Latvia	1518	0.07	0.001974	0.06	1518	0.07	0.002401	0.08	1.22	1.21						
Moldova	1482	0.07	0.001927	0.06	1482	0.07	0.002344	0.08	1.22	1.21	1482	0.08	0.002577	0.09	1.34	1.38
Madagascar	1472	0.07	0.001914	0.06	1472	0.07	0.002328	0.07	1.22	1.21	1472	0.08	0.002560	0.09	1.34	1.38
Iceland	1426	0.07	0.001854	0.06	1426	0.07	0.002255	0.07	1.22	1.21	1426	0.08	0.002480	0.08	1.34	1.38
Mozambique	1386	0.06	0.001802	0.06	1386	0.07	0.002192	0.07	1.22	1.21	1386	0.07	0.002410	0.08	1.34	1.38

<u>Table 1(continued): Voting Power Analysis of the IMF with a Single European Seat with Voting Parity with the USA</u>

	Status Quo				Euro12/US Parity						EU25/US Parity					
	Votes	%	Power Indices		votes	%	Power Indices		Ratios		votes	%	Power Indices		Ratios	
			Abs	Rel			Abs	Rel	Abs	Rel			Abs	Rel%	Abs	Rel
Guinea	1321	0.06	0.001718	0.06	1321	0.06	0.002089	0.07	1.22	1.21	1321	0.07	0.002297	0.08	1.34	1.38
SierraLeone	1287	0.06	0.001674	0.05	1287	0.06	0.002035	0.07	1.22	1.21	1287	0.07	0.002238	0.07	1.34	1.38
Malta	1270	0.06	0.001652	0.05	1270	0.06	0.002008	0.06	1.22	1.21						
Mauritius	1266	0.06	0.001646	0.05	1266	0.06	0.002002	0.06	1.22	1.21	1266	0.07	0.002201	0.07	1.34	1.38
Paraguay	1249	0.06	0.001624	0.05	1249	0.06	0.001975	0.06	1.22	1.21	1249	0.07	0.002172	0.07	1.34	1.38
Mali	1183	0.05	0.001538	0.05	1183	0.06	0.001871	0.06	1.22	1.21	1183	0.06	0.002057	0.07	1.34	1.38
Suriname	1171	0.05	0.001523	0.05	1171	0.06	0.001852	0.06	1.22	1.21	1171	0.06	0.002036	0.07	1.34	1.38
Armenia	1170	0.05	0.001522	0.05	1170	0.06	0.00185	0.06	1.22	1.21	1170	0.06	0.002034	0.07	1.34	1.38
Guyana	1159	0.05	0.001507	0.05	1159	0.06	0.001833	0.06	1.22	1.21	1159	0.06	0.002015	0.07	1.34	1.38
KyrgyzRepublic	1138	0.05	0.00148	0.05	1138	0.06	0.0018	0.06	1.22	1.21	1138	0.06	0.001979	0.07	1.34	1.38
Cambodia	1125	0.05	0.001463	0.05	1125	0.05	0.001779	0.06	1.22	1.21	1125	0.06	0.001956	0.07	1.34	1.38
Tajikistan	1120	0.05	0.001457	0.05	1120	0.05	0.001771	0.06	1.22	1.21	1120	0.06	0.001947	0.07	1.34	1.38
Congo	1096	0.05	0.001425	0.05	1096	0.05	0.001733	0.06	1.22	1.21	1096	0.06	0.001906	0.06	1.34	1.38
Haiti	1069	0.05	0.00139	0.05	1069	0.05	0.00169	0.05	1.22	1.21	1069	0.06	0.001859	0.06	1.34	1.38
Rwanda	1051	0.05	0.001367	0.04	1051	0.05	0.001662	0.05	1.22	1.21	1051	0.06	0.001827	0.06	1.34	1.38
Burundi	1020	0.05	0.001326	0.04	1020	0.05	0.001613	0.05	1.22	1.21	1020	0.06	0.001774	0.06	1.34	1.38
Turkmenistan	1002	0.05	0.001303	0.04	1002	0.05	0.001585	0.05	1.22	1.21	1002	0.05	0.001742	0.06	1.34	1.38
Togo	984	0.05	0.00128	0.04	984	0.05	0.001556	0.05	1.22	1.21	984	0.05	0.001711	0.06	1.34	1.38
Nepal	963	0.04	0.001252	0.04	963	0.05	0.001523	0.05	1.22	1.21	963	0.05	0.001674	0.06	1.34	1.38
Fiji	953	0.04	0.001239	0.04	953	0.05	0.001507	0.05	1.22	1.21	953	0.05	0.001657	0.06	1.34	1.38
Malawi	944	0.04	0.001228	0.04	944	0.05	0.001493	0.05	1.22	1.21	944	0.05	0.001641	0.05	1.34	1.38
Macedonia	939	0.04	0.001221	0.04	939	0.05	0.001485	0.05	1.22	1.21	939	0.05	0.001633	0.05	1.34	1.38
Barbados	925	0.04	0.001203	0.04	925	0.05	0.001463	0.05	1.22	1.21	925	0.05	0.001608	0.05	1.34	1.38
Niger	908	0.04	0.001181	0.04	908	0.04	0.001436	0.05	1.22	1.21	908	0.05	0.001579	0.05	1.34	1.38
Estonia	902	0.04	0.001173	0.04	902	0.04	0.001426	0.05	1.22	1.21						
Mauritania	894	0.04	0.001163	0.04	894	0.04	0.001414	0.05	1.22	1.21	894	0.05	0.001554	0.05	1.34	1.38
Botswana	880	0.04	0.001144	0.04	880	0.04	0.001392	0.04	1.22	1.21	880	0.05	0.001530	0.05	1.34	1.38
Benin	869	0.04	0.00113	0.04	869	0.04	0.001374	0.04	1.22	1.21	869	0.05	0.001511	0.05	1.34	1.38
Burkina Faso	852	0.04	0.001108	0.04	852	0.04	0.001347	0.04	1.22	1.21	852	0.05	0.001481	0.05	1.34	1.38
Chad	810	0.04	0.001053	0.03	810	0.04	0.001281	0.04	1.22	1.21	810	0.04	0.001408	0.05	1.34	1.38
CentralAfricanRepubli	807	0.04	0.001049	0.03	807	0.04	0.001276	0.04	1.22	1.21	807	0.04	0.001403	0.05	1.34	1.38
LaoPeople'sDemocrat	779	0.04	0.001013	0.03	779	0.04	0.001232	0.04	1.22	1.21	779	0.04	0.001355	0.05	1.34	1.38
Mongolia	761	0.03	0.00099	0.03	761	0.04	0.001203	0.04	1.22	1.21	761	0.04	0.001323	0.04	1.34	1.38
Swaziland	757	0.03	0.000984	0.03	757	0.04	0.001197	0.04	1.22	1.21	757	0.04	0.001316	0.04	1.34	1.38
Albania	737	0.03	0.000958	0.03	737	0.04	0.001165	0.04	1.22	1.21	737	0.04	0.001281	0.04	1.34	1.38
Lesotho	599	0.03	0.000779	0.03	599	0.03	0.000947	0.03	1.22	1.21	599	0.03	0.001042	0.03	1.34	1.38
Equatorial Guinea	576	0.03	0.000749	0.02	576	0.03	0.000911	0.03	1.22	1.21	576	0.03	0.001002	0.03	1.34	1.38
Gambia	561	0.03	0.00073	0.02	561	0.03	0.000887	0.03	1.22	1.21	561	0.03	0.000975	0.03	1.34	1.38
Belize	438	0.02	0.00057	0.02	438	0.02	0.000693	0.02	1.22	1.21	438	0.02	0.000762	0.03	1.34	1.38

Table 1(continued): Voting Power Analysis of the IMF with a Single European Seat with Voting Parity with the USA

	Status Quo				Euro12/US Parity						EU25/US Parity					
	Votes	%	Power Indices		votes	%	Power Indices		Ratios		votes	%	Power Indices		Ratios	
			Abs	Rel			Abs	Rel	Abs	Rel			Abs	Rel%	Abs	Rel
Vanuatu	420	0.02	0.000546	0.02	420	0.02	0.000664	0.02	1.22	1.21	420	0.02	0.000730	0.02	1.34	1.38
SanMarino	420	0.02	0.000546	0.02	420	0.02	0.000664	0.02	1.22	1.21	420	0.02	0.000730	0.02	1.34	1.38
Djibouti	409	0.02	0.000532	0.02	409	0.02	0.000647	0.02	1.22	1.21	409	0.02	0.000711	0.02	1.34	1.38
Eritrea	409	0.02	0.000532	0.02	409	0.02	0.000647	0.02	1.22	1.21	409	0.02	0.000711	0.02	1.34	1.38
St.Lucia	403	0.02	0.000524	0.02	403	0.02	0.000637	0.02	1.22	1.21	403	0.02	0.000701	0.02	1.34	1.38
Guinea-Bissau	392	0.02	0.00051	0.02	392	0.02	0.00062	0.02	1.22	1.21	392	0.02	0.000682	0.02	1.34	1.38
AntiguaBarbuda	385	0.02	0.000501	0.02	385	0.02	0.000609	0.02	1.22	1.21	385	0.02	0.000669	0.02	1.34	1.38
Grenada	367	0.02	0.000477	0.02	367	0.02	0.00058	0.02	1.22	1.21	367	0.02	0.000638	0.02	1.34	1.38
Samoa	366	0.02	0.000476	0.02	366	0.02	0.000579	0.02	1.22	1.21	366	0.02	0.000636	0.02	1.34	1.38
SolomonIslands	354	0.02	0.00046	0.01	354	0.02	0.00056	0.02	1.22	1.21	354	0.02	0.000616	0.02	1.34	1.38
Cape Verde	346	0.02	0.00045	0.01	346	0.02	0.000547	0.02	1.22	1.21	346	0.02	0.000602	0.02	1.34	1.38
Comoros	339	0.02	0.000441	0.01	339	0.02	0.000536	0.02	1.22	1.21	339	0.02	0.000589	0.02	1.34	1.38
St.KittsNevis	339	0.02	0.000441	0.01	339	0.02	0.000536	0.02	1.22	1.21	339	0.02	0.000589	0.02	1.34	1.38
Seychelles	338	0.02	0.00044	0.01	338	0.02	0.000534	0.02	1.21	1.20	338	0.02	0.000588	0.02	1.34	1.38
St.VincentGrenadines	333	0.02	0.000433	0.01	333	0.02	0.000527	0.02	1.22	1.21	333	0.02	0.000579	0.02	1.34	1.38
Dominica	332	0.02	0.000432	0.01	332	0.02	0.000525	0.02	1.22	1.21	332	0.02	0.000577	0.02	1.34	1.38
Maldives	332	0.02	0.000432	0.01	332	0.02	0.000525	0.02	1.22	1.21	332	0.02	0.000577	0.02	1.34	1.38
Timor-Leste	332	0.02	0.000432	0.01	332	0.02	0.000525	0.02	1.22	1.21	332	0.02	0.000577	0.02	1.34	1.38
SãoToméPríncipe	324	0.01	0.000421	0.01	324	0.02	0.000512	0.02	1.22	1.21	324	0.02	0.000563	0.02	1.34	1.38
Tonga	319	0.01	0.000415	0.01	319	0.02	0.000504	0.02	1.21	1.20	319	0.02	0.000555	0.02	1.34	1.38
Bhutan	313	0.01	0.000407	0.01	313	0.02	0.000495	0.02	1.22	1.21	313	0.02	0.000544	0.02	1.34	1.38
Kiribati	306	0.01	0.000398	0.01	306	0.01	0.000484	0.02	1.22	1.21	306	0.02	0.000532	0.02	1.34	1.38
Micronesia	301	0.01	0.000391	0.01	301	0.01	0.000476	0.02	1.22	1.21	301	0.02	0.000523	0.02	1.34	1.38
MarshallIslands	285	0.01	0.000371	0.01	285	0.01	0.000451	0.01	1.22	1.21	285	0.02	0.000496	0.02	1.34	1.38
Palau	281	0.01	0.000365	0.01	281	0.01	0.000444	0.01	1.22	1.21	281	0.02	0.000489	0.02	1.34	1.38
Totals	2175345	100	3.086340	100.00	2048461		3.111206	100.00			1853506	100	2.991795	100.00		

Both absolute and relative power indices are given (Penrose and Banzhaf indices). Ratios for both allow before and after comparisons. Calculations have been done using the program *ipmmle* in Leech and Leech (2003).

Table 2: Voting Power Comparison for the Euro12 Member Countries Assuming Euro12/USA Voting Parity

	Status Quo			Current IMF Weights				GDP Weights				Population Basis				Equality		
	Votes	%	power	Weight%	power	2-stage	**ratio**	GDP	power	2-stage	**ratio**	Populatio	power	2-stage	**ratio**	power	2-stage	**ratio**
Germany	130332	5.99	0.1650	26.14	0.5723	0.2860	**1.73**	29.37	0.6201	0.3099	**1.88**	26.97	0.6162	0.3079	**1.87**	0.2256	0.1127	**0.68**
France	107635	4.95	0.1381	21.59	0.4160	0.2079	**1.51**	21.38	0.3799	0.1898	**1.38**	19.51	0.3565	0.1781	**1.29**	0.2256	0.1127	**0.82**
Italy	70805	3.25	0.0917	14.20	0.2949	0.1474	**1.61**	17.93	0.3604	0.1801	**1.96**	18.83	0.3486	0.1742	**1.90**	0.2256	0.1127	**1.23**
Netherlands	51874	2.38	0.0673	10.40	0.1904	0.0952	**1.41**	6.26	0.0889	0.0444	**0.66**	5.30	0.0986	0.0493	**0.73**	0.2256	0.1127	**1.67**
Belgium	46302	2.13	0.0601	9.29	0.1709	0.0854	**1.42**	3.70	0.0518	0.0259	**0.43**	3.38	0.0635	0.0317	**0.53**	0.2256	0.1127	**1.88**
Spain	30739	1.41	0.0399	6.16	0.1006	0.0503	**1.26**	10.23	0.1357	0.0678	**1.70**	13.43	0.1787	0.0893	**2.24**	0.2256	0.1127	**2.82**
Austria	18973	0.87	0.0247	3.81	0.0703	0.0351	**1.42**	3.08	0.0518	0.0259	**1.05**	2.63	0.0420	0.0210	**0.85**	0.2256	0.1127	**4.57**
Finland	12888	0.59	0.0168	2.58	0.0518	0.0259	**1.54**	1.98	0.0264	0.0132	**0.79**	1.70	0.0361	0.0181	**1.08**	0.2256	0.1127	**6.73**
Portugal	8924	0.41	0.0116	1.79	0.0332	0.0166	**1.43**	1.83	0.0264	0.0132	**1.14**	3.33	0.0596	0.0298	**2.57**	0.2256	0.1127	**9.72**
Ireland	8634	0.40	0.0112	1.73	0.0313	0.0156	**1.39**	1.82	0.0264	0.0132	**1.17**	1.29	0.0283	0.0142	**1.26**	0.2256	0.1127	**10.04**
Greece	8480	0.39	0.0110	1.70	0.0313	0.0156	**1.42**	2.12	0.0303	0.0151	**1.37**	3.49	0.0635	0.0317	**2.88**	0.2256	0.1127	**10.23**
Luxembourg	3041	0.14	0.0040	0.61	0.0117	0.0059	**1.48**	0.32	0.0029	0.0015	**0.37**	0.15	0.0029	0.0015	**0.37**	0.2256	0.1127	**28.52**
TOTAL	498627	22.92		100.00				100.00				100.00						

Analysis assumes voting parity between the USA and Euro12. The power index for Euro12 is 0.499745. The power indices are the Penrose indices. Status quo refers to the present IMF. Two stage is the two-stage Penrose index: the product of the power index in the Euro12 with the power of the Euro12 bloc in the IMF governors (0.499745). The Status Quo is the current IMF board of governors. The ratio is the ratio of the power index to the status quo power index of the country. GDP and population figures are for 2003. Calculations of power indices for the members of Euro12 have been done using the program *ipdirect* in Leech and Leech (2003).

Table 3: Voting Power Comparison for the EU25 Members Assuming EU25/USA Parity

	Status Quo			Current IMF weights				Nice system					Draft Constitution system		
	votes	%	power	weight%	power	2-stage	ratio	weight	pop%	power	2-stage	ratio	power	2-stage	ratio
Germany	130332	5.99	0.1651	18.79	0.4855	0.2428	**1.47**	29	18.21	0.0551	0.0275	**0.17**	0.158	0.0790	**0.48**
France	107635	4.95	0.1381	15.52	0.3803	0.1902	**1.38**	29	13.09	0.0551	0.0275	**0.20**	0.113	0.0565	**0.41**
UnitedKingdom	107635	4.95	0.1381	15.52	0.3803	0.1902	**1.38**	29	13.15	0.0551	0.0275	**0.20**	0.114	0.0570	**0.41**
Italy	70805	3.25	0.0917	10.21	0.2273	0.1136	**1.24**	29	12.79	0.0551	0.0275	**0.30**	0.111	0.0555	**0.61**
Netherlands	51874	2.38	0.0673	7.48	0.1750	0.0875	**1.30**	13	3.5	0.0272	0.0136	**0.20**	0.058	0.0290	**0.43**
Belgium	46302	2.13	0.0601	6.68	0.1537	0.0769	**1.28**	12	2.27	0.0251	0.0126	**0.21**	0.050	0.0250	**0.42**
Spain	30739	1.41	0.0399	4.43	0.1000	0.0500	**1.25**	27	8.75	0.0522	0.0261	**0.65**	0.098	0.0490	**1.23**
Sweden	24205	1.11	0.0315	3.49	0.0795	0.0398	**1.26**	10	1.97	0.0210	0.0105	**0.33**	0.048	0.0240	**0.76**
Austria	18973	0.87	0.0247	2.74	0.0622	0.0311	**1.26**	10	1.79	0.0210	0.0105	**0.43**	0.470	0.2350	**9.53**
Denmark	16678	0.77	0.0217	2.40	0.0546	0.0273	**1.26**	7	1.18	0.0148	0.0074	**0.34**	0.044	0.0220	**1.01**
Poland	13940	0.64	0.0181	2.01	0.0456	0.0228	**1.26**	27	8.58	0.0522	0.0261	**1.44**	0.083	0.0415	**2.29**
Finland	12888	0.59	0.0168	1.86	0.0422	0.0211	**1.26**	7	1.15	0.0148	0.0074	**0.44**	0.043	0.0215	**1.28**
Hungary	10634	0.49	0.0138	1.53	0.0348	0.0174	**1.26**	12	2.24	0.0251	0.0126	**0.91**	0.050	0.0250	**1.81**
Portugal	8924	0.41	0.0116	1.29	0.0292	0.0146	**1.26**	12	2.22	0.0251	0.0126	**1.08**	0.050	0.0250	**2.15**
Ireland	8634	0.40	0.0112	1.24	0.0282	0.0141	**1.26**	7	0.83	0.0148	0.0074	**0.66**	0.042	0.0210	**1.87**
Greece	8480	0.39	0.0110	1.22	0.0277	0.0139	**1.26**	12	2.34	0.0251	0.0126	**1.14**	0.051	0.0255	**2.31**
CzechRepublic	8443	0.39	0.0110	1.22	0.0276	0.0138	**1.26**	12	2.28	0.0251	0.0126	**1.14**	0.050	0.0250	**2.28**
SlovakRepublic	3825	0.18	0.0050	0.55	0.0125	0.0062	**1.25**	7	1.2	0.0148	0.0074	**1.49**	0.044	0.0220	**4.42**
Luxembourg	3041	0.14	0.0040	0.44	0.0099	0.0049	**1.25**	4	0.1	0.0085	0.0043	**1.08**	0.037	0.0185	**4.68**
Slovenia	2567	0.12	0.0033	0.37	0.0083	0.0042	**1.25**	4	0.44	0.0085	0.0043	**1.27**	0.039	0.0195	**5.84**
Lithuania	1692	0.08	0.0022	0.24	0.0055	0.0028	**1.25**	7	0.82	0.0148	0.0074	**3.37**	0.041	0.0205	**9.32**
Cyprus	1646	0.08	0.0021	0.24	0.0054	0.0027	**1.25**	4	0.17	0.0085	0.0043	**1.99**	0.038	0.0190	**8.87**
Latvia	1518	0.07	0.0020	0.22	0.0049	0.0025	**1.25**	4	0.54	0.0085	0.0043	**2.16**	0.040	0.0200	**10.13**
Malta	1270	0.06	0.0017	0.18	0.0041	0.0021	**1.25**	3	0.08	0.0064	0.0032	**1.92**	0.037	0.0185	**11.20**
Estonia	902	0.04	0.0012	0.13	0.0029	0.0015	**1.25**	4	0.32	0.0085	0.0043	**3.63**	0.038	0.0190	**16.20**
Total	693582	31.88		100.00					100.00						
IMF Total	2175345														

The analysis assumes voting parity between the USA and EU25. The power index for the EU25 is 0.499991 The power indices are the Penrose indices. Status quo refers to the present IMF. Two stage is the two-stage Penrose index: the product of the power index in the EU25 with the power of the Euro12 bloc in the IMF governors (0.499991). The Status Quo is the current IMF board of governors. The ratio is the ratio of the power index to the status quo power index of the country. GDP and population figures are for 2003. Calculations of power indices for the members of EU25 have been done using the program *ipdirect* in Leech and Leech (2003)

Table 3 (continued): Voting Power Comparison for the EU25 Members Assuming EU25/USA Parity

	GDP weights				Population weights			Population Square Root weights				Equality		
	GDP %	power	2-stage	ratio	power	2-stage	ratio	√pop	power	2-stage	ratio	power	2-stage	ratio
Germany	21.88	0.5332	0.2666	**1.61**	0.4962	0.2481	**1.50**	4.267	0.3544	0.1772	**1.07**	0.1612	0.0806	**0.49**
France	15.93	0.3432	0.1716	**1.24**	0.3203	0.1602	**1.16**	3.62	0.2938	0.1469	**1.06**	0.1612	0.0806	**0.58**
UnitedKingdom	16.36	0.3548	0.1774	**1.28**	0.3219	0.1610	**1.17**	3.63	0.2945	0.1473	**1.07**	0.1612	0.0806	**0.58**
Italy	13.36	0.2652	0.1326	**1.45**	0.3121	0.1561	**1.70**	3.58	0.2900	0.1450	**1.58**	0.1612	0.0806	**0.88**
Netherlands	4.66	0.1102	0.0551	**0.82**	0.0820	0.0410	**0.61**	1.87	0.1469	0.0734	**1.09**	0.1612	0.0806	**1.20**
Belgium	2.75	0.0621	0.0310	**0.52**	0.0534	0.0267	**0.44**	1.51	0.1178	0.0589	**0.98**	0.1612	0.0806	**1.34**
Spain	7.62	0.1908	0.0954	**2.39**	0.2063	0.1031	**2.58**	2.96	0.2363	0.1181	**2.96**	0.1612	0.0806	**2.02**
Sweden	2.74	0.0618	0.0309	**0.98**	0.0463	0.0232	**0.74**	1.40	0.1096	0.0548	**1.74**	0.1612	0.0806	**2.56**
Austria	2.29	0.0516	0.0258	**1.05**	0.0421	0.0210	**0.85**	1.34	0.1045	0.0522	**2.12**	0.1612	0.0806	**3.27**
Denmark	1.94	0.0436	0.0218	**1.01**	0.0278	0.0139	**0.64**	1.09	0.0847	0.0423	**1.95**	0.1612	0.0806	**3.72**
Poland	1.91	0.0430	0.0215	**1.19**	0.2008	0.1004	**5.54**	2.93	0.2338	0.1169	**6.45**	0.1612	0.0806	**4.45**
Finland	1.47	0.0331	0.0166	**0.99**	0.0271	0.0135	**0.81**	1.07	0.0836	0.0418	**2.49**	0.1612	0.0806	**4.81**
Hungary	0.75	0.0169	0.0085	**0.61**	0.0527	0.0263	**1.90**	1.50	0.1170	0.0585	**4.23**	0.1612	0.0806	**5.83**
Portugal	1.36	0.0307	0.0153	**1.32**	0.0522	0.0261	**2.25**	1.49	0.1165	0.0582	**5.02**	0.1612	0.0806	**6.94**
Ireland	1.35	0.0305	0.0152	**1.36**	0.0195	0.0098	**0.87**	0.91	0.0709	0.0355	**3.16**	0.1612	0.0806	**7.18**
Greece	1.58	0.0355	0.0177	**1.61**	0.0550	0.0275	**2.49**	1.53	0.1196	0.0598	**5.42**	0.1612	0.0806	**7.31**
CzechRepublic	0.78	0.0175	0.0087	**0.80**	0.0536	0.0268	**2.44**	1.51	0.1181	0.0590	**5.38**	0.1612	0.0806	**7.34**
SlovakRepublic	0.29	0.0065	0.0032	**0.65**	0.0282	0.0141	**2.84**	1.10	0.0854	0.0427	**8.58**	0.1612	0.0806	**16.20**
Luxembourg	0.24	0.0054	0.0027	**0.68**	0.0024	0.0012	**0.30**	0.32	0.0246	0.0123	**3.11**	0.1612	0.0806	**20.38**
Slovenia	0.24	0.0054	0.0027	**0.80**	0.0103	0.0052	**1.55**	0.66	0.0516	0.0258	**7.73**	0.1612	0.0806	**24.14**
Lithuania	0.17	0.0037	0.0019	**0.85**	0.0193	0.0096	**4.38**	0.91	0.0705	0.0353	**16.02**	0.1612	0.0806	**36.63**
Cyprus	0.10	0.0023	0.0012	**0.54**	0.0040	0.0020	**0.93**	0.41	0.0320	0.0160	**7.48**	0.1612	0.0806	**37.64**
Latvia	0.09	0.0020	0.0010	**0.50**	0.0126	0.0063	**3.19**	0.73	0.0571	0.0286	**14.47**	0.1612	0.0806	**40.82**
Malta	0.04	0.0008	0.0004	**0.24**	0.0019	0.0009	**0.58**	0.28	0.0220	0.0110	**6.65**	0.1612	0.0806	**48.78**
Estonia	0.08	0.0017	0.0009	**0.73**	0.0075	0.0037	**3.20**	0.57	0.0440	0.0220	**18.73**	0.1612	0.0806	**68.70**
		2.2511			2.455			20.58						

The analysis assumes voting parity between the USA and EU25. The power index for the EU25 is 0.499991 The power indices are the Penrose indices. Status quo refers to the present IMF. Two stage is the two-stage Penrose index: the product of the power index in the EU25 with the power of the Euro12 bloc in the IMF governors (0.499991). The Status Quo is the current IMF board of governors. The ratio is the ratio of the power index to the status quo power index of the country. GDP and population figures are for 2003. Calculations of power indices for the members of EU25 have been done using the program *ipdirect* in Leech and Leech (2003)