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FINDING A NEW FORMULA TO DETERMINE QUOTAS AT THE IMF

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TECHNICAL REMARKS

The data used in this paper are – unless otherwise indicated – based on an IMF release in 2007, which takes 2005 as the most recent year for economic data. The simulations are based on the quota distribution at the IMF following the quota increase for China, Korea, Mexico and Turkey in September 2006, which amounted to a 1.8 increase in the IMF's total quotas.

Where voting shares are discussed, it is assumed that all members can vote. Currently however, Somalia, Liberia, and Zimbabwe do not vote, so that the actual voting shares of the remaining 182 members, as posted on the IMF's website, are currently marginally higher than shown in this paper.

LIST OF TERMS AND ABBREVIATIONS

(Actual) quota	The contribution of a country to the IMF, usually denominated in SDR millions.
(Actual) quota share/AQS	The percentage share of a country's quota in the IMF's total quota. Quota shares represent the relative position of a country in the IMF and are the key variable in the current quota review.
African Constit.-19	The abbreviation used in the tables for the IMF constituency currently chaired by Kenya, which comprises the following countries: Angola, Botswana, Burundi, Eritrea, Ethiopia, the Gambia, Kenya, Lesotho, Malawi, Mozambique, Namibia, Nigeria, Sierra Leone, South Africa, Sudan, Swaziland, Tanzania, Uganda, and Zambia.
African Constit.-24	The abbreviation used in the tables for the IMF constituency currently chaired by Rwanda, which comprises the following countries: Benin, Burkina Faso, Cameroon, Cape Verde, the Central African Republic, Chad, Comoros, Congo (Democratic Republic), Congo (Republic), Côte d'Ivoire, Djibouti, Equatorial Guinea, Gabon, Guinea, Guinea-Bissau, Madagascar, Mali, Mauritania, Mauritius, Niger, Rwanda, São Tomé and Príncipe, Senegal, and Togo.
Calculated quota	The outcome (in SDR millions) of the five-formula framework, which is based on GDP, trade openness (current payments and current receipts), variability in exports and official reserves.
Calculated quota share/ CQS	The percentage of a member's calculated quota in the total calculated quota. Serves as reference value for the analysis of under- or overrepresentation and for the determination of quota increases.
Votes Voting share/VS	Members receive one vote for each SDR 0.1 million of their quota plus 250 "basic votes". The voting share (the percentage share of a country's votes in the IMF) represents the relative influence of a country in the IMF. Next to the quota share, it is the second-most important variable in the review. For larger countries, voting shares differ only marginally from quota shares, but for smaller countries, the difference is substantial due to basic votes.
Under-representation/ over-representation	This is the gap between a country's actual quota share and its calculated quota share.

BV	basic votes
EMEs	emerging market economies
FDI	foreign direct investment
IIP	International Investment Position
IMFC	International Monetary and Financial Committee
MER	market exchange rate
O	openness (sum of current payments and receipts)
PPP	purchasing power parity
R	reserves
Rest of the world (ROW)	The term used in the tables for the aggregate of countries that do not belong to the EU or the G7 and are not one of the 18 emerging markets listed.
ROW-Developing	The "rest of the world" aggregate excluding the "other advanced economies", i.e. without Australia, Norway, Iceland, Switzerland, San Marino, Israel and New Zealand.
SDR	Special Drawing Rights
VC	variability of current receipts
Y	GDP at market rates

I INTRODUCTION[1]

Some time after returning from his discovery voyages, Christopher Columbus attended a dinner given in his honour. Unexpectedly, several guests were jealous of his success and began teasing him. "Anybody can sail across the ocean and coast along the islands on the other side – it is the simplest thing in the world", they said. Instead of replying, Columbus took an egg from a dish and asked "Who among you, gentlemen, can make this egg stand on end?" The egg was passed around the table; all guests tried the experiment but nobody succeeded. "It cannot be done," they said. Columbus took the egg and struck its small end gently onto the table so as to break the shell a little. After that there was no trouble in making it stand upright. "Gentlemen," he said, "what is easier to do than this, which you said was impossible? It is the simplest thing in the world. Anybody can do it – *after he has been shown how*!"[2]

At the International Monetary Fund (IMF), the issue of quotas – which are the member countries' financial contributions to the IMF – is discussed around the table of the Executive Board every five years and discussions often stretch over one to two years. Quotas play a central role in the Fund because they determine not only member countries' financial contributions but also their rights to draw on IMF financial support and their voting rights in the institution. Therefore, quotas are essentially a matter of the representation, visibility and influence of countries in the IMF. The quota discussions run like a red thread through the history of this institution. The Fund's historians[3] provide ample testimony of the intricacies, political difficulties and resource-intensiveness of these discussions over the past decades.

At present, the Board is engaged in what is now the 13th review of quotas in the institution. Once again the quota discussions are turning out to be difficult. They are difficult because many countries would like to see their share in the Fund increase, no country wants to see their share shrink, and yet it is a zero-sum game.

This time, the quota review looks particularly important, if not vital, for the institution, in view of the focus on representation rather than on the financial aspects. The Fund is faced with considerable pressure in particular from emerging economies to raise their representation. The systemic role of emerging economies in the global economy is felt on a daily basis by consumers, firms and investors around the world, and these countries have considerably improved their economic and financial fundamentals compared with some years ago. Some regional cooperation initiatives, especially in Asia, could even be seen as rivalling the Fund's role in the long term, and the substantial endowment of emerging economies with foreign exchange reserves would also make such initiatives financially powerful.

The institution is also facing ongoing pressure from low-income and developing economies to increase their voice in the Fund. Many of these countries feel marginalised in the Fund's decision-making. Yet these members are deeply affected by developments in the global economy and IMF policies, as they have been long-standing recipients of financial assistance and are today virtually the only country group over which the Fund has direct policy influence through conditionality in its programmes. Hence the Fund has to ensure that its entire membership continues to be adequately represented, if it does not want to lose its universal status.

However, what makes the current quota review particularly difficult and important is that this time, the Fund has decided not only to adjust country representation but also to fundamentally overhaul its framework for determining quotas. This framework, which is the result of decades of compromises, reflects a degree of complexity that makes it unwieldy even according to

1 The authors would like to thank L. Bini Smaghi, F. Moss, G. Pineau, M. Fratzscher, C. Just, R. Ritter and A. Benassy-Quéré for very helpful comments, and É. Hörcsöki and A. Fauvet for excellent editorial assistance.
2 Adapted from Baldwin (1905).
3 See Horsefield (1969); de Vries (1985); and Boughton (2001).

insiders. It consists of five different formulae with different economic variables that are first applied individually to all members. The results of the most favourable combination of formulae for a country are then picked to yield the basis for the quota. Besides being complex, the framework is inherently intransparent. This is why, at its last Annual Meetings in Singapore in autumn 2006, the Fund committed itself to a deadline for developing a more appropriate formula to determine members' quotas.

The search for a new quota formula that is simple, transparent and satisfies virtually the entire membership is comparable to a search for a solution to Columbus' egg problem. "It cannot be done", some officials involved in past processes may say. As a result, the egg of a simple, transparent and widely acceptable quota formula has been passed around the Board table for years if not decades. Some, who have actively tried to develop new formulae, may say "I did it" but then have to acknowledge that the membership did not accept their proposal. Many proposals have indeed been devised, but nobody has found a way to break its shell "a little" so that it stands the test of wide acceptance.

So why should it work this time? The best answer may be: because it has to. The highest governing body of the Fund, the Board of Governors, has officially and publicly opened the search for a new formula with the request that a solution be found within an ambitious time frame. Hence the Fund has set the stakes of representation and the need for a better quota formula so high that a solution must be found to maintain the credibility of the institution.

There are also substantive reasons of why it must work this time, the most important being the answer given to so many current questions: globalisation. The rapidly growing economic and financial integration across the world has given rise to new challenges, many of which are of a macroeconomic nature. Global imbalances are one of them, others are the reinforced economic and financial transmission of shocks across countries, an increased need for structural change, and rising welfare coupled with rising inequality. The IMF has committed itself to tackling macroeconomic challenges related to this process, as its Managing Director has outlined a Medium-Term Strategy framed under the heading of globalisation and assisting member countries to deal with the challenges arising from it. Greater interlinkages and faster spillovers need a well-functioning international cooperation framework, which, on monetary, macroeconomic and financial matters, is offered predominantly by the IMF. The institution cannot afford, if it wants to continue serving its members, to be bound up in internal governance issues.

As Buira (2005), Cottarelli (2005), De Gregorio et al. (1999), Kenen (2007), Truman (2006), Van Houtven (2002), Woods (2005) and a large number of other analysts note, the issue of quotas is central to reforming IMF governance, which again is central to strengthening the legitimacy and ultimately the effectiveness of the institution. Hence, the challenge of the current review is to design a better formula – simpler and more transparent – that ultimately ensures a country representation that is both efficient and fair, meaning that it has to follow sound economic principles and that it must give the less advantaged economies an adequate stake in the institution that affects them so importantly. This challenge is even more difficult than earlier in the history of the Fund because it is widely accepted that the institution as a whole does not need more liquidity and financial endowments. As a result, the quota adjustment cannot occur within a context of a large overall increase but has to take place under the constraint of an overall ceiling.

* * *

The present paper does not claim to solve the Columbus' egg conundrum. There even may not be a "silver bullet" formula that would convince the entire membership. However, there may be a simpler, more transparent formula that produces more intuitive and more equitable

results for the distribution of quotas across the membership. The paper aims to provide an extensive, comprehensive and hopefully useful overview of the various technical issues involved in choosing an appropriate quota formula. It offers a detailed analysis of the current quota system, illustrating its functioning and showing which countries and groups are most under and over-represented. It also puts forward an analysis of the various avenues of reform that are currently under discussion. To illustrate the main directions of the current reform efforts, it presents three benchmark formulae that could be useful in these discussions.

This paper has been motivated by ongoing work at the European Central Bank (ECB) on issues related to the IMF and the international monetary system. The ECB has also been asked to support EU Member States' reflections on quota reform by providing technical analysis of different options through various simulations. The motivation to write the paper has been inspired by the analysis provided during 2006 and 2007 to the Subcommittee on IMF and related issues (SCIMF) of the Economic and Financial Committee of the EU, and the numerous discussions with SCIMF members that offered helpful insights into this complex matter, which are gratefully acknowledged. The issue of quotas and IMF governance is also of interest to the ECB itself. The implications of the current debate on the set-up and the operation of the IMF will have an important bearing on the functioning of the international monetary system and the global economy, in which the euro area as the world's largest trading partner and the euro as the world's second international currency play a significant role and have an important stake. Although the euro area is not a member country of the IMF, all its participating countries are IMF members, and the ECB has observer status at the IMF's Executive Board. Nevertheless, it should be stressed that any views expressed in this paper are solely those of the authors and should not be seen as the official views of the ECB.

2 THE ROLE OF QUOTAS AND THE MAIN ISSUES FOR REFORM

2.1 THE ROLE OF QUOTAS IN THE FUND

Quotas play an important role in all areas of the IMF. They determine a member's contribution to the Fund's resources, the access it has to IMF financial support in the event of balance of payments problems, and the share it receives in general SDR allocations. Quotas are also the overriding factor determining the voting rights of members in the institution and therefore decide the influence that individual members have in the IMF.[4]

While the Board tends to adopt decisions on a consensus basis and to avoid formal voting procedures, voting rights matter considerably in the daily business of the IMF. Most decisions have to be taken by a simple majority of the votes cast. However, for some decisions a majority of 70% or even 85% is required.[5] Hence even medium-sized members or smaller members can have an influential role in voting. For example, the decision to raise the quota of four emerging economies taken in Singapore in 2006, which will be an important reference in this paper, required an 85% majority and was approved by just above 90%.

When a country joins the IMF, it is assigned a quota based on its relative economic position in the world economy. The Fund's Articles of Agreement stipulate only that the quotas be determined by the Board of Governors (Article III Section 1); they do not specify how this should be done. In practice, the starting point for determining a country's quota is the calculated quota share that results from applying a set of formulae that have been developed at the Fund for this purpose to economic data for that country. The set consists of five different formulae, some of them non-linear, which together include essentially four variables: the value of a country's GDP, its external trade, its endowment with official reserves and fluctuations in its exports. The application of the formulae is complex and de facto different formulae apply to different countries, which makes a comparison of variables and weights across countries difficult.[6] The complexity of the five-formulae framework is one of the root causes of the increasing dissatisfaction with the Fund's approach to quota determination, as this framework is inherently intransparent.

Moreover, the outcome of the application of the formulae is just one element in the process of determining a country's quota. Also entering the consideration is a comparison with the quotas of existing members that are considered to be broadly comparable in economic size and characteristics. And last but not least, the quota determination involves a political negotiation between the Fund and the respective member. Hence, the formulae only provide a general orientation for the size of the quota, while the ultimate decision is discretionary and political in nature. Accordingly, the history of the Fund is full of discussions on quotas in which the Board took deliberate departures from the formula.[7]

4 According to the Articles of Agreement, each member has one vote for each 100,000 SDR of its quota plus 250 "basic votes". Basic votes currently account for only 2% of total votes in the Fund. Since they are given in equal amounts to each member, they raise the share of the smallest members which have few quota-based votes, while lowering marginally the voting share of larger members, which have many quota-based votes.

5 Examples of decisions requiring an 85% majority are: an amendment of the IMF's Articles of Agreement; an adjustment of quotas; an allocation of SDRs; a change in obligatory periods for repurchase; and a sale of gold. Examples of decisions requiring a 70% majority are: a suspension or reinstatement of voting rights; the determination of rates of charge or remuneration.

6 See Chapter 3 for further details.

7 One of the earliest cases was in 1946, when the representative of Paraguay requested an increase in his country's quota from 2 million to 5 million US dollars. As the Fund historian writes, the respective director "sought to support the case by citing the formula". This however did not impress the Board, which ruled "that the formula had no official standing in Bretton Woods and was merely used as a departure for negotiations". After the negotiations, Paraguay received an increase to 3.5 million dollars (Horsefield, 1969, p. 150). De Vries (1985) reports that the first important quota increase of 1959 took place "with little reliance on the formula" (p. 515), whereas in the 1960s and 1970s, "calculated quotas were heavily used in determining selective increases in quota" (p. 517).

2.2 QUOTA ADJUSTMENTS IN THE PAST

Members' quotas are not cast in stone forever but are reviewed periodically. Five-yearly general quota reviews are designed to ensure that the Fund continues to have sufficient resources to fulfil its mandate and that the distribution of quotas among members adequately reflects developments in the world economy. The quota reviews can therefore entail an augmentation of quotas and/or a redistribution of quota shares.

The Articles of Agreement provide for considerable flexibility in the adjustment of quotas. Quota increases can be conducted by the Board of Governors either in the context of the five-yearly general quota reviews or at any other point in time at the request of the members concerned ("ad hoc" increases). For both cases, the constraining factors are that any change requires an 85% majority of all votes, that a member's quota cannot be changed without that member's consent and that a quota increase should be justified by a need for additional funding. However, as mentioned, the Articles of Agreement do not stipulate how quotas should be adjusted and this can lead to adjustments not based on formulae.

General quota increases in the context of the five-yearly reviews have been the main vehicle for adjustments in members' quotas (Table 1). The bulk of these increases have typically had a large equiproportional element, meaning that quota increases were distributed in proportion to existing quota shares, leaving the quota distribution unchanged. However, there have been cases in which part of the increase was "selective", i.e. given only to a subset of the membership so as to adjust the distribution of quota shares. These selective quota increases have generally been based on the results of the quota formulae. However, as quotas have never been reduced for "over-represented" countries, and have only been adjusted to some extent for "under-represented" countries, actual quota shares have shifted only very gradually in the direction of calculated quota shares. Gaps resulting from judgement exercised the past and fluctuations in the global economy have remained considerable for many members.

Table 1 General reviews of IMF quotas from 1951 to the present

(in percentages)

General review of quotas	Concluded by	Overall increase in quotas	Share of equiproportional element	Share of selective and ad hoc elements
First review	March 1951	-	-	-
Second review	January 1956	-	-	-
Special review	Feb./April 1959 [1]	60.7	82.4	17.6
Third review	December 1960	-	-	-
Fourth review	March 1965	30.7	81.4	18.6
Fifth review	February 1970	35.4	70.6	29.4
Sixth review	March 1976 [2]	33.6	-	-
Seventh review	December 1978	50.9	98.2	1.8
Eighth review	March 1983	47.5	40.0	60.0
Ninth review	June 1990	50.0	60.0	40.0
Tenth review	January 1995	-	-	
11th review	January 1998	45.0	75.0	25.0
12th review	January 2003	-	-	
13th review	to be concluded in 2008	[3]	to be determined	to be determined

Source: IMF, Quota Distribution – Selected Issues, 17 July 2003.
1) The February 1959 resolution provided for an equiproportional increase of 50% and special increases for three countries; the resolution adopted in April 1959 provided for special increases for 14 additional countries.
2) The quota shares of the major oil exporters were doubled with the stipulation that the collective share of the developing countries would not fall.
3) Currently under discussion.

Ad hoc quota increases have been used at times to address an individual member's relative position, especially in cases where a quota was considered particularly out of line with a country's relative economic weight, or to reflect a major change in a country's relationship with the Fund. There have been 19 ad hoc increases outside a general quota review, the bulk of which took place in the first two decades. The initial increases were to correct obvious anomalies in the early years of the Fund, for example raising quotas for those members whose initial quotas had been fixed at unduly low levels at the time of the Bretton Woods Conference. However, since the 1970s the Executive Board generally has concluded that ad hoc increases should normally be considered in the context of a general review. This position has been followed except in four ad hoc cases, where action was taken to address specific issues. Two of these – for China in 1980 and Cambodia in 1994 – were associated with the resumption of active relations with the Fund by these countries. The third increase, for Saudi Arabia in 1981, was associated with the very large-scale borrowing by the Fund from that member and also the fact that the member's quota was low in relation to its relative economic size. The last ad hoc increase was for China in 2001 following its resumption of sovereignty over Hong Kong.

In some previous quota reviews, selected members have voluntarily accepted a reduction in their quota shares (however, not absolute quotas). Such "sacrifices" have typically taken place in the context of an overall quota increase, when one member or a group of members have accepted a lower increase than they would have been entitled to. One example was the redistribution of quota shares among G7 countries during the ninth general review in 1990 to accommodate an increase in Japan's quota such that the quota increases for the rest of the membership were unaffected.

A number of the general quota reviews have raised the issue of the quota formulae, and suggested reviewing whether the current formulae are still adequate for their purposes. Up to now, however, these discussions have been inconclusive, but they have certainly paved the way for the current review.[8]

2.3 THE CURRENT QUOTA REVIEW AND THE SINGAPORE RESOLUTION

The current quota review stands out from earlier reviews for a number of reasons. Fund officials as well as several member country officials and outside analysts have suggested that this review will be important not only for the internal governance but also for the credibility and universal role of the Fund. The review has started with the clear presumption that both the distribution of quotas in the Fund and the way quotas are determined are flawed, and that these flaws are detrimental to the credibility and effectiveness of the institution. Moreover, in contrast to earlier reviews, the problem of under-representation is now seen as affecting a very large number of members, including strategically important ones (such as China and emerging economies more broadly). Therefore, the Board of Governors explicitly and publicly called for a new framework to determine quotas in the Fund. Further to this, and again in contrast

8 A Quota Formula Review Group was mandated in 1999 to provide an independent review of the quota formulae. The main recommendation of the group (see IMF 2000) was to have a single formula with only two variables: GDP as a measure of the ability to contribute resources to the Fund and variability of current receipts and long-term capital flows as a measure of external vulnerability, with GDP having about twice the weight of variability. Views in the Executive Board were split on this proposal, the main concern being that the suggested formula would lead to a greater concentration of quotas among the largest industrial countries and thus benefit in particular the United States. Moreover, the deletion of openness as a determinant of quotas was considered to be at odds with the Fund's purpose to "facilitate the expansion and balanced growth of international trade". The proposal was also widely criticised in the academic community, mainly for being biased against developing economies; see for example Buira (2001b).
In subsequent discussions at the Executive Board after 2000, members were able to agree on some principles for an alternative quota formula, but continued to be divided on crucial details. It was generally endorsed that the new system should be simpler and more transparent and that it should entail three or four variables which are used in the existing quota formulae. No consensus emerged, however, on the exact definitions and weights. Views also diverged on whether or not to make discretionary changes to the outcome of a new quota formula and on how to strengthen the representation of developing countries.

to earlier quota reviews, the current review has been put into the context of a "medium-term strategy" for the IMF, highlighting the need for improvements in quota allocation to safeguard the universal representation and strategic role of the IMF. All of this gives the quota reform a central place in determining the IMF's future.

As far as the problem of inadequate representation in the Fund is concerned, the Managing Director used strong words to describe the problems: "The current allocation [of quotas and voice] puts this legitimacy at risk in many regions, for example in Africa, where the Fund is heavily engaged, and in Asia, whose place in the world economy has grown far more than its role in the Fund. … In the view of too many, governance and ownership imbalances in the Fund now rival global current account imbalances. Neither imbalance is sustainable. … Such rebalancing may, at first glance, seem like a zero sum game, but all members will ultimately gain in belonging to an institution with greater legitimacy." (September 2005).

This shows that in the assessment of IMF management the problem of representation in the Fund is not limited to Asia and other fast-growing emerging market economies but includes also the representation of Africa and other developing economies, in which the Fund is heavily engaged. As we will see further below, there are therefore two distinct objectives in rebalancing quotas: an economic objective, i.e. to give greater weight to fast-growing emerging economies, and a political objective, i.e. to give a greater sense of ownership to developing economies that are more under the influence of Fund policies than many other members.[9]

In the course of 2006 the Managing Director was able to gather support for a package of reform measures, which was embraced in a resolution of the Board of Governors at the Annual Meetings in Singapore in September 2006. This resolution (henceforth the "Singapore resolution") is central to the current quota review and contains the following four elements:[10] an ad hoc increase for four countries, guidance for a new quota formula, a call for a further ad hoc increase in quotas and a call for an increase in basic votes. These elements are taken up in the following sections.

2.3.1 INITIAL AD HOC INCREASE

An initial ad hoc quota increase was agreed for four countries – China, Korea, Mexico and Turkey – and implemented immediately. These countries were selected because they were seen as most under-represented on the basis of the existing quota formulae and various filters used to further classify countries (GDP, openness, variability and reserves).[11] Each of the four countries was given the equivalent of one-third of the difference between its actual quota share and the calculated quota share. The effect of this increase on the Fund's total quotas was an increase of 1.8%. Table 2 shows the effect of the ad hoc increase for the four beneficiaries and certain other Fund members. Inevitably, this ad hoc increase lowered the quota shares of the countries that did not benefit from the increase, while their absolute quotas were left untouched. For example, the quota share of the euro area countries declined by 0.4 percentage points to 22.8% as a result of the increase of quotas for the four emerging economies.

This ad hoc increase was intended as a first step, and was intentionally not high enough to resolve either the issue of under-representation for the four countries concerned or to address the broader picture of inadequate representation,

9 The point that ownership is crucial in countries for which the Fund has an important impact on policies is made forcefully in Solimano (2001) and Birdsall (2003). The latter also argues that not only does the legitimacy of international organisations suffer from inadequate representation of developing economies, but also their effectiveness. Cottarelli (2005) provides an in-depth discussion of the link between legitimacy and effectiveness.

10 It is worth noting that the Managing Director's original intention was to also tackle issues related to the size and composition of the Board, to which he had referred in his September 2005 report. However, this was not taken up in his report to the Board of Governors in 2006.

11 Ironically, China is one of only three countries in the history of the Fund that did not accept an increase in its quota. During the 1960s it refused – along with Cuba and Panama – to take up a quota increase it was granted (Horsefield, 1969, p. 451).

Table 2 Effects of the ad hoc quota increase decided in Singapore in 2006

	Before ad hoc increase		After ad hoc increase	
	Actual quota share	Voting share	Actual quota share	Voting share
Beneficiaries	5.41	5.34	7.06	6.96
China	2.98	2.93	3.72	3.65
Mexico	1.21	1.20	1.45	1.43
Korea	0.76	0.76	1.35	1.33
Turkey	0.45	0.45	0.55	0.55
memo items:				
Euro area	23.19	22.84	22.78	22.45
United States	17.38	17.03	17.08	16.74
Other countries	54.02	54.80	53.08	53.86

Source: Authors' calculation.
Note: The voting share differs marginally from the actual quota share because the basic votes are added – of which each member receives the same amount – to the quota-dependent votes.

in order to maintain the pressure for a compromise on a second ad hoc increase to be agreed upon by 2008.

2.3.2 GUIDANCE FOR THE QUOTA REFORM PACKAGE

The resolution also provides guidance for the work on a new quota formula, which is to be completed in a rather ambitious timeframe, namely *"before the Annual Meetings 2007, and not later than the Spring Meetings 2008"*. The resolution stipulates that the new formula should *"provide a simpler and more transparent means of capturing a member's relative position in the world economy"*. It also mentions that a *"significantly higher weight"* should be given to GDP, *"together with ensuring that other variables, in particular openness ... also play an important role"*.

The resolution also commits the IMF to a second round of ad hoc increases for a broader range of countries and an increase in basic votes. This second round of increases will have to be based on the new formula. It will not, however, become effective until the amendment of the Articles of Agreement regarding the basic votes has entered into force. On the subject of basic votes, the resolution calls for at least a doubling and says that the increase will have to be sufficient to preserve the voting shares of low-income countries as a group. Both the second ad hoc quota increase and the basic vote increase are to be implemented by the Annual Meetings in 2007, and not later than by the Annual Meetings of 2008.

2.4 OVERVIEW OF THE MAIN ISSUES AT STAKE

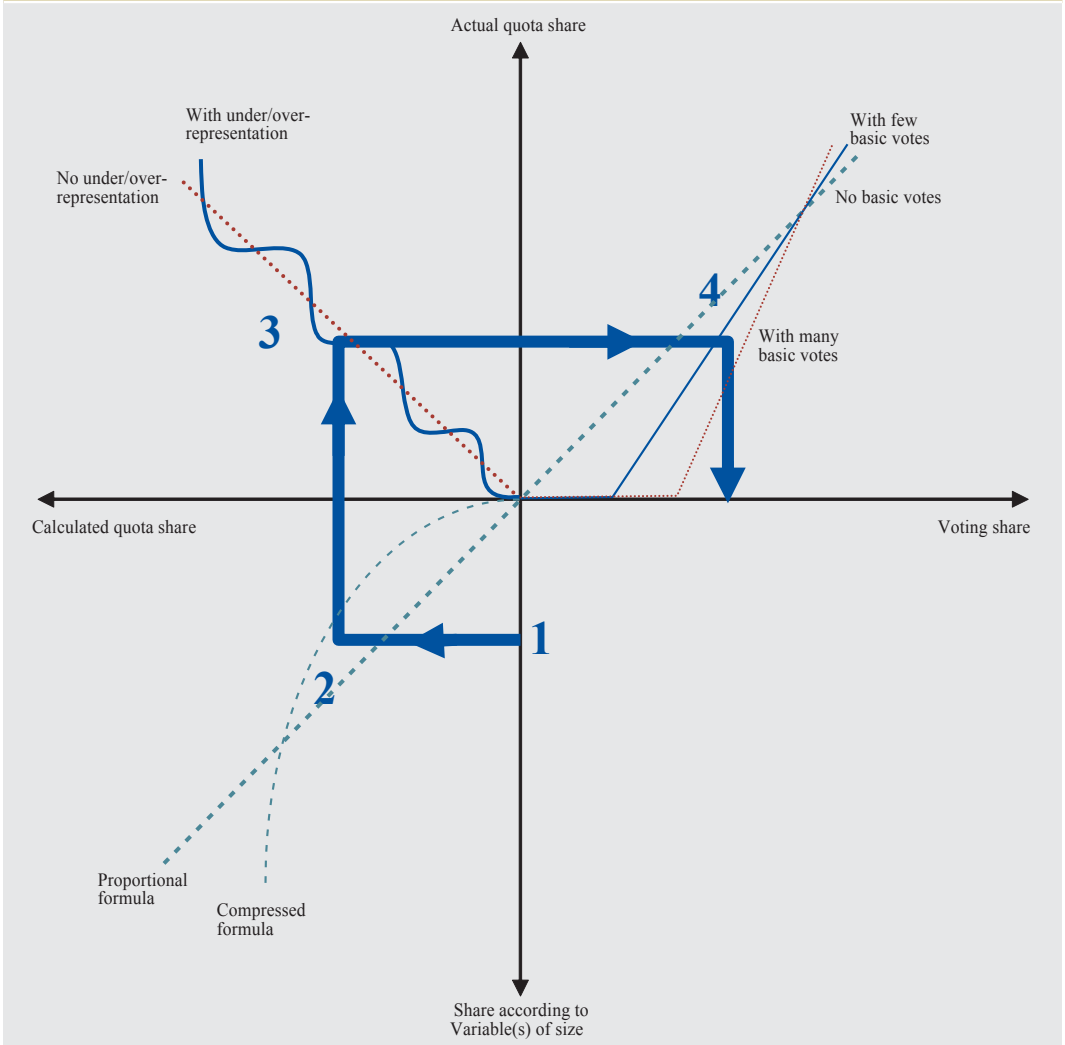
The guidance provided by the Singapore resolution for the new quota formula is relatively clear. Two objectives need to be met: (i) to agree on a simpler and more transparent formula, and (ii) to achieve a country representation that corresponds more closely to a judgemental assessment of relative weights in the global economy, while enhancing the ownership and voice of smaller and developing countries in the Fund.

Following this guidance will be challenging because of the mixture of economic and political reasoning as well as the large number of parameters of choice. Many variables are potential candidates for a formula to determine quotas at the IMF, in addition to GDP and openness. These include other variables currently used, namely the variability of export receipts (often suggested as a measure of vulnerability and hence potential need for IMF financing) and the level of official foreign exchange reserves. And there is no shortage of other candidates, ranging from financial openness to population. Moreover, the weights attached to each of the variables also need to be agreed, and there are "special" issues that need

to be considered, such as international conversion rates (exchange rates or PPP), compression and basic votes.

The call for a simpler and more transparent formula can only be understood as a call for a single formula. This formula should include variables that are straightforward to compile across the membership, that are related to the purposes of the Fund and that can be easily communicated to the educated public. The desired country representation means that the formula cannot rely solely on economic weight (compared at market exchange rates) because this would marginalise the developing world. Possible ways to achieve a greater role for the developing world include using a "compression coefficient" (explained below), converting some variables not at market exchange rates but at PPP (which helps low-income countries with generally undervalued exchange rates), or significantly increasing the basic votes, which are allocated in equal number across members.

Chart 1 Four steps from economic weight to voice



Source: Authors' presentation.
Note: See text for explanation.

While an extensive analysis of the various parameters of a reform is provided in Chapter 4, the following sections give an overview of some of the main elements. These elements can be divided analytically into four groups that correspond to the four steps needed to go from economic data to votes in the IMF (see also Chart 1):

1. First, *variables and weights* must be chosen for the quota formula. The result of this step can be considered a first indicator of the economic weight of a country in the global economy, in a form that is relevant for the IMF.

2. Second, it must be decided whether to adjust, in a transparent manner, the derived economic weights by applying a *compression index*. This step determines whether the economic weights are "compressed", which shifts weight from larger to smaller economies. Without a compression index, economic weight enters the formula in a linear fashion. The result of this step is the calculated quota share.

3. Third, the level of the *actual quota share* must be chosen, either taking the calculated quota share or accepting a deviation from the result of the quota formula. As explained above, the calculated quota share was in the past considered as only one indicator to determine the actual quota share.[12]

4. Fourth, the amount of *basic votes* that is allocated to each member in equal number must be chosen. In addition to the actual quota, this represents the second pillar for determining the number of total votes with which a member is endowed and hence its voting rights.

The most important step is the first because it determines the ranking of members within the Fund, which cannot be changed by compression or basic votes. The latter two elements may be used to improve the relative position of smaller members, but they leave the ranking unchanged. Compression shifts weight from larger to smaller members, and basic votes water down the quota-based voting endowment. The only step that can change the relative position is a discretionary deviation of the actual quota share from the calculated quota share (step 3).

2.4.1 VARIABLES AND WEIGHTS

The starting point for designing a quota formula and choosing variables and weights is the Singapore resolution.[13] The call for a simpler and more transparent formula can only be read to imply a move to one single formula, abandoning the complex five-formula approach of the past, which is explained in more detail in Chapter 3. On the choice of functional form, there are the two options of additive and multiplicative formulae. Since their main properties are similar (discussed in Chapter 4), it seems favourable to opt for an additive formula, given the emphasis placed on transparency and easy communication.

In terms of variables, only GDP and openness are confirmed for a new formula; the possibility of other variables is implied, but none is referred to. Hence, the simplest formula compatible with the Singapore resolution would use only the two variables mentioned explicitly. A first illustrative formula could thus read:

$$Q1 = a \cdot GDP + b \cdot Openness$$
$$(where\ a+b=1)$$

The distribution of weights between GDP and openness is difficult to infer from the Singapore resolution, especially since the notion of a "higher weight" for GDP makes an implicit reference to the current weight. The latter, however, can only be inferred indirectly and

12 For example, Korea's calculated quota share of 2.5% is more than twice that of Saudi Arabia (1.0%), and yet in actual quota shares, Saudi Arabia has received an endowment of 3.2%, compared with 1.4% for Korea.

13 The resolution states that the new formula should "provide a simpler and more transparent means of capturing a member's relative position in the world economy". It also says, on variables and weights, that a "significantly higher weight" should be given to GDP and that it should be ensured that "other variables, in particular openness (…) also play an important role".

approximated. The estimates provided in Chapter 3 suggest that in the current five-formula setting GDP and openness carry weights of 22% and 53% respectively. One option would be to increase the weight of GDP from 22% to 50%, while retaining an important role for openness at a weight of 50%.

A second illustrative formula could retain all four variables currently used (noting also that the resolution speaks of variables other than GDP in the plural) and combine them into a single formula. This formula would read:

Q2 = c· GDP + d· Openness + e· Variability + f ·Reserves
(where c+d+e+f=1)

This formula would be closest to the current method of calculating quotas at the IMF, yet provide a simpler and more transparent framework.

The resolution leaves open whether GDP should continue to be converted at market exchange rates or whether PPP comparisons should also receive consideration. A third illustrative formula could take GDP on board not only at market prices (as currently measured) but also measured in PPP terms. Given nominally undervalued exchange rates in lower-income countries – the well-known Balassa-Samuelson effect – a move towards PPP would shift quotas from higher income countries to lower income countries. Openness could be retained with the same weight as GDP, whereas variability and reserves could be dropped in order to limit the number of variables and to create room for a GDP weight measured in PPP terms.

Q3 = g ·GDP + h· Openness + i ·GDP in PPP
(where g+h+i=1 and g=h)

Hence, the total number of variables under overall consideration would be five – the current four plus GDP in PPP terms.

KEY CONSIDERATIONS SURROUNDING VARIOUS VARIABLES

What would justify the choice of the above variables, besides the formal argument of their being mentioned in the Singapore resolution, and what justifies leaving out some of the other variables that are often referred to in the policy discussion? The case for the two main variables is relatively straightforward:

– *GDP* is the most widely used measure of economic size, readily available for all members and easy to communicate to the general public.

– *Openness* – the sum of exports and imports – corresponds most closely to one of the core objectives of the Fund, namely to facilitate the growth of international trade.[14] Moreover, openness reflects the stakes of members in the global economy and is hence an indicator of their willingness to cooperate. As with GDP, data are readily available for all members and are easy to communicate to the general public.

The case for all other variables is less clear-cut:

– *Variability* is a variable used in the past, but its definition (fluctuations in export receipts "over a recent 13-year period") is arbitrary, it is not intuitive and it could even be seen as rewarding volatile policies or market developments. Moreover, variability measured as absolute variations in export receipts favours advanced economies because they have not only the largest trade volumes, especially when converted into international currencies, but also the largest absolute swings, due to either market developments, exogenous shocks or large exchange rate variations. What is more, such variability in the international trade of advanced economies would not induce these countries to draw on the Fund. Hence the

14 Article I of the IMF's Articles of Agreement gives "to facilitate the expansion and balanced growth of international trade" as one of the main purposes of the institution.

ultimate argument that variability captures vulnerability and hence the potential need for IMF financial assistance is of limited relevance.[15]

– *Reserves, i.e. official foreign exchange reserves*, are a variable whose inclusion is more difficult to justify today than when the Fund was founded, partly because some of the most recent accumulation has taken place in the context of deliberate policy choices in connection with insufficient flexibility of exchange rate levels.[16] The inclusion of reserves in the formula hence can be seen as rewarding such policies. Capping reserves would be a way around this problem, but thresholds are difficult to set and may need to vary among countries. Therefore most simulations assign only a small weight to reserves, in the neighbourhood of the current weight of about 5%.

– *PPP conversions* for GDP or other variables, rather than conversions based on market exchange rates, have some economic validity, especially when comparing economic welfare across countries. Such conversions are also used in the IMF's World Economic Outlook to make the comparison of the volume of goods and services for final consumption easier. However, in view of the Fund's role as a financial institution, PPP conversion cannot be considered as generally appropriate for inclusion in a quota formula that should stand the test of time. Nevertheless, it must be acknowledged that market exchange rates favour high-income economies, and the inclusion of PPP would divert influence away from advanced countries.

– *Openness in financial variables*, through the inclusion of either stocks or flows, is clearly a desirable concept over the longer term, given the ever increasing role of financial transactions in the world economy. However, at the current juncture data are still missing for many members and there are still significantly more open issues with regard to data quality and comparability than for trade data. The variable would favour advanced economies – more so when employing stocks than when using flows – as they are more integrated internationally, given that for most developing economies, the degree of international financial integration is still negligible.

– *Population* has democratic appeal but seems difficult to justify in a financial institution. Moreover, the high correlation with PPP would suggest that a population aspect could be captured by PPP.

2.4.2 CHOICE OF COMPRESSION INDEX

A decision to be made is whether or not to introduce compression when translating economic weight into quotas. So far, the Fund has not implemented it, although it was considered at Bretton Woods in 1944. It has instead opted for basic votes in its decision-making process as a way to make a politically determined adjustment to the economic data. Both mechanisms have their justification, separately as well as jointly. Basic votes essentially affect the lower end of the quota spectrum and have a very significant effect on mainly the smallest members. They give an initial endowment to members that would otherwise be truly negligible in any voting process because of their reduced economic weight. However, any reasonable absolute endowment of basic votes has hardly any effect on the distribution of votes among larger

15 The idea of excluding variability is at least 25 years old. Boughton (2001) reports on Board discussions in 1982, in which it was noticed that "in practice the link between variability and demand for Fund resources was not all that strong, and some directors saw this variable as a source of distortion in the distribution." A majority of the Board favoured dropping this variable, but the Managing Director dissuaded the Board from doing so, "primarily on the grounds that the oil-exporters at the time were important contributors to the supply of liquid assets to the Fund" (p. 863). Given fluctuations in oil prices, especially in the early 1980s, variability of exports boosted the quotas of oil exporting members.

16 For example, some countries have openly acknowledged the existence of excess reserves and have initiated the creation of a new institution (a so-called sovereign wealth fund) outside the central bank to manage these excess reserves.

members because the relative importance of the basic votes is negligible. In contrast, compression works mainly at the upper end of the quota spectrum and is important for large members because it implies that the marginal increase resulting from an increase in the value of the determinant variables falls for higher quota levels. Hence, compression shifts quota very significantly from the very largest members of the organisation to the smaller ones.

To balance the economic rationale of principle-based variables with the political objective of giving non-advanced countries a greater say, we include a compression of 0.9 in our illustrative formulae. This may be considered as noticeable for smaller members and still tolerable for the larger ones. In particular, such a value would bring the calculated quota share of the largest member more in line with political declarations that the United States will not seek to increase its share in the Fund above pre-Singapore levels.[17]

2.4.3 DETERMINING THE NUMBER OF BASIC VOTES

When the Fund was established, basic votes amounted to 11% of total votes. In subsequent years, when new members joined without a general quota increase, this share rose to a peak of around 16% in the late 1950s and from then onwards continuously declined to only 2% today.[18] The reason is that the absolute number of basic votes has been left unchanged at 250 votes per member, while the total quota and financial size of the Fund has risen considerably. The guideline given in the Singapore resolution that a greater weight should be given to GDP, if based mainly or entirely on market exchange rates, would reduce the voice of the smaller economies even more. The Board of Governors therefore expressly stipulated that basic votes would also need to at least double.[19]

Simulations illustrate that a doubling of basic votes would only cancel out the worsening of the positions of low-income countries resulting from a larger GDP weight in the formula; it would not improve their standing within the Fund. How far should basic votes be raised? If the membership seriously wants to improve the standing of low-income countries with a new formula, basic votes may have to rise to around 1,000 or even 1,500. At the latter level, their share in total votes would be brought back to that in the early years of the Fund, namely around 11%.[20] The examples chosen here include raising basic votes to 1,000 in combination with the formulae that are based only on market exchange rates and raising them to 500 in combination with the formula that includes PPP conversions.

2.5 THREE ILLUSTRATIVE FORMULAE

On the basis of the above considerations, taking the three above-mentioned illustrative formulae and setting, for illustrative purposes, coefficients for the weights of the variables and the compression factor as well as new levels for basic votes would deliver the scenarios summarised in Table 3 below. Any of these three formulae would bring improvements compared with the status quo. They all are much simpler and more transparent than the current framework for quota calculations. Instead of five different formulae, only one formula would be applied to all members, and all variables would be applied to all members in the same way. The new formula, in which variables enter in the form of shares rather than absolute levels, would also be more transparent since explicit weights do not diverge from the implicit weights.

17 US Secretary of the Treasury Henry Paulson stated that the United States is "firmly on record to forego any share increase". Such an increase could arise from raising the weight of GDP in the formula, which would benefit the United States. Source: Statement by Mr Paulson to the International Monetary and Financial Committee of the IMF, 17 September 2006.

18 Table 16 in Chapter 3.3 provides an overview of the relationship between basic votes and total votes over time.

19 Buira (2001a) makes an institutional argument for spreading voting shares more equally, arguing that "a concentration of power in a few countries impairs the transparency and political accountability of the Fund". He also says that a better distribution of voting shares would help to ensure the good use of public resources.

20 If one wanted to raise the share of basic votes in total votes to 15.6% as was the case at the peak in the history of the Fund, one would have to allocate 2,185 basic votes to each member.

Table 3 Three illustrative formulae consistent with the Singapore resolution

No	Formula	Basic votes
1	$Q_1 = (0.5\ GDP + 0.5\ Openness)^{0.9}$	1,000
2	$Q_2 = (0.5\ GDP + 0.3\ Openness + 0.15\ Variability + 0.05\ Reserves)^{0.9}$	1,000
3	$Q_3 = (0.4\ GDP + 0.4\ Openness + 0.2\ GDP\ at\ PPP)^{0.9}$	500

Source: Authors' compilation.
Note: For a discussion of these formulae see text. The necessary rescaling factor, which ensures that the shares of all members sum up to 100%, is not shown purely for simplicity reasons.

How can these three formulae be assessed (see Table 4)? Formula 1 may be the easiest to communicate: two variables capture the economic weight and a compression coefficient reflects equity considerations; this could be coupled with a substantial increase in basic votes to foster the voice of the smallest members. Formula 2 is easy to communicate mainly in the sense that the structure of the variables remains broadly unchanged from the present. However, at least two of the variables – variability and reserves – are difficult to justify. The third formula would include a partial PPP conversion for GDP to reduce a possible bias of market exchange rates towards developed economies; the increase in basic votes could then be limited to 500.

An important feature of the first and third formulae is that they correspond most closely to what people actually observe in the global economy: general economic growth reflected in GDP and growing trade integration reflected in rising openness. Hence, the probability that over the longer term a difference will emerge between actual quota shares and the perceived distribution of weight in the global economy is minimal. Variability and official reserves, by contrast, are much less directly observable or less perceived by general observers. Hence risks of gaps between perception and actual quota shares may be somewhat higher in the second formula.

The implications of these three formulae for the distribution of quota shares and voting shares among selected members are illustrated in Table 5. Columns 1 and 2 give the actual quota share and the voting share of today, columns 3, 7, and 11 show the calculated quota share based on the respective formula, columns 4, 8, and 12 indicate whether absolute under or over-representation exceeds 0.2 percentage point, columns 5, 9, and 13 give the associated voting shares of the members, and columns 6, 10, and 14 compare old and new voting shares and

Table 4 Formula checklist

	Formula 1	Formula 2	Formula 3	Comment
Simple	Yes	Limited yes	Yes	No reduction in the number of variables in Formula 2
Transparent	Yes	Limited yes	Yes	Variability concept and definition not easy to grasp
Easy to update	Yes	Yes	Yes	
Robust against risk of a gap between perceived and actual quota	Yes	No	Yes	Variability not directly observable
In line with Singapore resolution	Yes	Yes	Yes	
Per memoriam:				
Sum of all negative or positive absolute deviations from results under the current five-formula system (in percentage points)	7.0	7.7	8.5	

Source: Authors' compilation.

Table 5 Three illustrative formulae: Effects on calculated quota shares and voting shares

(assumptions: total quota increase of 5%; basic votes increased to 1,000 (500))

	Status quo		Formula 1 (compressed)				Formula 2 (compressed)				Formula 3 (compressed)			
	Actual quota share	Voting share	Calc. quota share	Diff. in excess of 0.2 (3-1)		Voting share with 1,000 BV	Diff. in excess of 0.05 (5-2)	Calc. quota share	Diff. in excess of 0.2 (7-1)	Voting share with 1,000 BV	Diff. in excess of 0.05 (9-2)	Calc. quota share	Diff. in excess of 0.2 (11-2)	Voting share with 500 BV	Diff. in excess of 0.05 (13-2)
	1	2	3	4		5	6	7	8	9	10	11	12	13	14
Euro area	22.89	22.56	27.35	+		22.00	-	24.96	+	21.83	-	24.34	+	22.28	-
Germany	5.98	5.87	6.94	+		5.69	-	6.29	+	5.62	-	6.24	+	5.80	-
France	4.94	4.84	4.57	-		4.39	-	4.14	-	4.39	-	4.25	-	4.54	-
Italy	3.24	3.19	3.94	+		3.12	-	3.50	+	3.08	-	3.75	+	3.21	0
Netherlands	2.37	2.33	2.50	0		2.25	-	2.05	-	2.13	-	2.02	-	2.19	-
Belgium	2.12	2.08	1.82	-		1.91	-	1.60	-	1.91	-	1.43	-	1.96	-
Spain	1.40	1.38	2.65	+		1.49	+	2.40	+	1.48	+	2.49	+	1.52	+
Austria	0.86	0.85	1.17	+		0.87	0	1.01	0	0.86	0	0.99	0	0.87	0
Finland	0.58	0.58	0.65	0		0.59	0	0.63	0	0.58	0	0.57	0	0.57	0
Portugal	0.40	0.40	0.60	+		0.43	0	0.55	0	0.43	0	0.55	0	0.43	0
Ireland	0.39	0.39	1.14	+		0.49	+	1.26	+	0.53	+	0.87	+	0.46	+
Greece	0.38	0.38	0.67	+		0.43	0	0.71	+	0.44	+	0.66	+	0.42	0
Luxembourg	0.13	0.14	0.53	+		0.21	+	0.68	+	0.24	+	0.37	+	0.18	0
Slovenia	0.11	0.12	0.16	0		0.15	0	0.15	0	0.15	0	0.14	0	0.13	0
Total EU	32.36	31.99	37.72	+		31.44	-	34.55	+	31.01	-	33.68	+	31.52	-
United Kingdom	4.94	4.84	5.35	+		4.66	-	4.61	-	4.39	-	4.82	0	4.65	-
Sweden	1.10	1.09	1.22	0		1.07	0	1.11	0	1.06	0	1.04	0	1.03	-
Denmark	0.76	0.75	0.92	0		0.76	0	0.96	+	0.77	0	0.77	0	0.75	0
Poland	0.63	0.63	0.83	0		0.65	0	0.86	+	0.66	0	0.84	+	0.66	0
Hungary	0.48	0.48	0.48	0		0.48	0	0.46	0	0.47	0	0.43	0	0.46	0
Romania	0.47	0.47	0.29	0		0.46	0	0.30	0	0.46	0	0.30	0	0.45	0
Czech Republic	0.38	0.38	0.53	0		0.41	0	0.53	0	0.41	0	0.47	0	0.40	0
Bulgaria	0.29	0.30	0.13	0		0.30	0	0.14	0	0.30	0	0.13	0	0.29	0
Slovakia	0.16	0.17	0.23	0		0.20	0	0.23	0	0.20	0	0.20	0	0.18	0
Lithuania	0.07	0.08	0.11	0		0.11	0	0.11	0	0.11	0	0.11	0	0.09	0
Cyprus	0.06	0.07	0.08	0		0.10	0	0.08	0	0.10	0	0.07	0	0.08	0
Latvia	0.06	0.07	0.07	0		0.10	0	0.07	0	0.10	0	0.07	0	0.08	0
Malta	0.05	0.06	0.05	0		0.08	0	0.05	0	0.08	0	0.04	0	0.06	0
Estonia	0.03	0.04	0.08	0		0.07	0	0.07	0	0.07	0	0.07	0	0.06	0
G7	45.22	44.35	49.14	+		42.40	-	47.53	+	42.10	-	48.20	+	43.71	-
United States	17.08	16.73	18.03	+		15.95	-	18.11	+	15.99	-	18.87	+	16.69	0
Japan	6.12	6.00	7.39	+		5.85	-	8.24	+	6.01	0	7.62	+	6.12	+
Canada	2.93	2.88	2.92	0		2.75	-	2.65	-	2.62	-	2.66	-	2.70	-
18 main EMEs	21.98	21.73	20.87	-		20.98	-	22.40	+	21.29	-	24.01	+	21.98	+
China	3.72	3.65	5.11	+		3.65	0	5.40	+	3.73	+	6.74	+	4.02	+
India	1.91	1.88	1.49	-		1.72	-	1.57	-	1.72	-	2.40	+	1.93	0
Indonesia	0.96	0.95	0.78	0		0.88	-	0.83	0	0.88	-	0.97	0	0.94	0
Korea	1.35	1.33	2.09	+		1.37	0	2.25	+	1.42	+	1.97	+	1.40	+
Malaysia	0.68	0.68	0.82	0		0.69	0	0.87	0	0.70	0	0.68	0	0.68	0
Thailand	0.50	0.50	0.76	+		0.53	0	0.81	+	0.55	0	0.76	+	0.54	0
Philippines	0.40	0.41	0.43	0		0.42	0	0.46	0	0.42	0	0.48	0	0.42	0
Singapore	0.40	0.40	0.89	+		0.47	+	1.08	+	0.51	+	0.66	+	0.44	0
Vietnam	0.15	0.16	0.24	0		0.19	0	0.22	0	0.19	0	0.28	0	0.18	0
Brazil	1.40	1.38	1.35	0		1.29	-	1.52	0	1.35	0	1.69	+	1.40	0
Mexico	1.45	1.43	1.93	+		1.44	0	1.93	+	1.45	0	1.90	+	1.48	0
Argentina	0.97	0.96	0.45	-		0.90	-	0.56	-	0.90	-	0.56	-	0.91	-
Chile	0.39	0.40	0.34	0		0.39	0	0.36	0	0.39	0	0.35	0	0.38	0
Colombia	0.36	0.36	0.29	0		0.35	0	0.31	0	0.35	0	0.37	0	0.37	0
Saudi Arabia	3.21	3.16	0.87	-		2.87	-	0.85	-	2.87	-	0.81	-	2.96	-
Russia	2.73	2.69	1.59	-		2.45	-	1.80	-	2.45	-	1.80	-	2.52	-
Turkey	0.55	0.55	0.85	+		0.58	0	1.00	+	0.61	+	0.89	+	0.60	0
South Africa	0.86	0.85	0.60	-		0.80	-	0.60	-	0.80	-	0.70	0	0.81	0
Rest of the world	19.54	20.67	13.07	-		23.03	+	14.05	-	23.07	+	13.16	-	20.99	+
ROW: Developing	14.79	15.94	8.43	-		18.44	+	9.45	-	18.50	+	9.00	-	16.42	+
African Constit.-19	2.85	3.00	1.45	-		3.28	+	1.58	-	3.29	+	1.63	-	3.01	0
African Constit.-24	1.14	1.38	0.53	-		1.98	+	0.59	-	1.98	+	0.58	-	1.55	+

Source: Authors' calculation.

indicate whether the absolute difference exceeds 0.05 percentage point. Countries' shares in the variables are given in Table 6.

Policy-makers that do not find the resulting representation adequate have two main parameters of choice, which affect members in a broadly similar way, namely the size of the compression index and the number of basic votes. And they have the option to shift the weights assigned to the variables, which will also affect the quota distribution among the members, as different variables matter differently for individual countries.

Table 6 Variables entering the formulae: Countries' shares in global totals

	Actual quota share	GDP	Openness	Variability	Reserves	Purchasing power parity
		share	share	share	share	share
Euro area	22.89	22.83	32.11	23.67	5.03	15.44
Germany	5.98	6.55	8.66	6.02	1.42	4.31
France	4.94	4.54	5.02	3.16	1.00	3.11
Italy	3.24	4.11	4.00	1.83	0.82	2.87
Netherlands	2.37	1.46	3.43	1.32	0.30	0.86
Belgium	2.12	0.86	2.59	1.88	0.26	0.55
Spain	1.40	2.51	2.71	1.74	0.29	1.83
Austria	0.86	0.70	1.41	0.73	0.21	0.47
Finland	0.58	0.45	0.65	0.64	0.28	0.28
Portugal	0.40	0.42	0.58	0.42	0.14	0.35
Ireland	0.39	0.44	1.60	2.97	0.06	0.28
Greece	0.38	0.63	0.51	0.88	0.03	0.42
Luxembourg	0.13	0.08	0.80	1.99	0.01	0.05
Slovenia	0.11	0.08	0.16	0.09	0.22	0.07
Total EU	32.36	31.00	43.74	31.26	11.42	21.51
United Kingdom	4.94	5.09	6.31	2.38	1.05	3.10
Sweden	1.10	0.83	1.37	0.95	0.59	0.45
Denmark	0.76	0.59	1.02	1.34	0.98	0.32
Poland	0.63	0.63	0.80	0.95	1.06	0.83
Hungary	0.48	0.24	0.55	0.46	0.46	0.28
Romania	0.47	0.19	0.25	0.26	0.48	0.31
Czech Republic	0.38	0.27	0.62	0.58	0.77	0.31
Bulgaria	0.29	0.06	0.12	0.17	0.22	0.12
Slovakia	0.16	0.10	0.24	0.17	0.42	0.14
Lithuania	0.07	0.06	0.10	0.10	0.10	0.08
Cyprus	0.06	0.04	0.07	0.08	0.10	0.03
Latvia	0.06	0.03	0.06	0.05	0.06	0.05
Malta	0.05	0.01	0.05	0.05	0.07	0.01
Estonia	0.03	0.03	0.08	0.05	0.05	0.04
G7	45.22	62.64	47.72	43.27	29.54	42.33
United States	17.08	28.89	15.05	20.73	2.06	20.47
Japan	6.12	11.00	5.31	6.87	22.28	6.62
Canada	2.93	2.46	3.37	2.28	0.92	1.86
18 main EMEs	21.98	18.00	21.03	23.39	47.40	38.18
China	3.72	5.23	5.61	3.38	19.45	15.22
India	1.91	1.66	1.09	0.86	3.63	5.87
Indonesia	0.96	0.64	0.70	1.00	0.87	1.60
Korea	1.35	1.71	2.31	2.41	5.51	1.65
Malaysia	0.68	0.29	1.12	1.21	1.98	0.47
Thailand	0.50	0.40	0.91	1.10	1.29	0.90
Philippines	0.40	0.22	0.47	0.71	0.41	0.68
Singapore	0.40	0.26	1.28	1.97	3.07	0.20
Vietnam	0.15	0.11	0.25	0.12	0.22	0.41
Brazil	1.40	1.56	0.90	1.89	1.56	2.63
Mexico	1.45	1.72	1.95	2.06	1.80	1.79
Argentina	0.97	0.38	0.35	0.94	0.62	0.86
Chile	0.39	0.23	0.31	0.38	0.43	0.32
Colombia	0.36	0.25	0.20	0.27	0.37	0.56
Saudi Arabia	3.21	0.64	0.87	0.81	0.68	0.58
Russia	2.73	1.46	1.49	2.18	3.95	2.57
Turkey	0.55	0.74	0.73	1.57	1.11	0.93
South Africa	0.86	0.51	0.48	0.52	0.44	0.95
Rest of the world	19.54	8.65	11.50	15.47	15.92	11.38
ROW: Developing	14.79	5.04	6.89	10.95	11.56	9.13
African Constit.-19	2.85	0.99	1.16	1.70	1.61	1.90
African Constit.-24	1.14	0.26	0.38	0.65	0.32	0.54

Source: Authors' calculation.

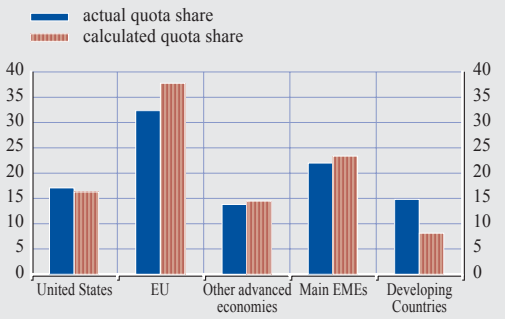
3 AN ANALYSIS OF THE CURRENT QUOTA SYSTEM

3.1 THE ISSUE OF UNDER AND OVER-REPRESENTATION

The widespread view that the actual quota shares of many countries in the Fund no longer reflect their weight in the global economy is at the core of the current debate. Specifically, there are three main facets to this view: first, that emerging market economies, which have grown significantly in recent years and increasingly play a systemic role, are under-represented in the Fund; second, that developing economies have been unduly marginalised in Fund's decision-making; and third, that advanced economies, especially in Europe, are generally over-represented.

Chart 2 Under or over-represented? Actual quota shares and calculated quota shares of selected country groups

(in percentages)



Source: Authors' calculation.
Notes: *Other advanced economies* comprises: Australia, Canada, Iceland, Israel, Japan, New Zealand, Norway, San Marino and Switzerland. *Main emerging market economies (EMEs)* comprises: Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Korea, Malaysia, Mexico, the Philippines, Russia, Saudi Arabia, Singapore, South Africa, Thailand, Turkey and Vietnam. *Developing countries* refers to the rest of the world.

It is remarkable to note that all three aforementioned perceptions are factually incorrect, at least on the basis of the current quota formulae system. Emerging market economies as a group are not under-represented; developing economies are actually over-represented; and advanced economies, including many European economies, are if anything under-represented (see Chart 2). This is the result that emerges when countries' actual quota shares are compared with calculated shares, i.e. when the existing quota formulae are applied to the most recent economic data.[21] Of course, analysis by country groupings does not allow judgement of the situation for individual countries; information on this will be presented in greater detail below.

When entering the current debate, it is therefore important to fully understand the facts and look closely into the details of under and over-representation. What exactly is the status quo, which countries are under or over-represented in the current system, and by which measure? The following sections will first consider some general trends and then turn to the different country groupings and individual countries.

Under and over-representation is defined as the deviation of a country's actual quota share in the Fund from its calculated quota share. In the absence of an agreement on a new quota formula, the calculated quota share is that which would result from applying the existing five-formula system to the most recent economic data.

Since the current debate is about countries' positions in the Fund, the main discussions concentrate on quota *shares*, i.e. the relative positions of countries within the Fund, rather than the absolute value of their subscriptions to the institution. If one were to consider the absolute value of countries' subscriptions and compare them with the absolute quotas resulting from the formulae, virtually all IMF members[22] would be "under-represented" because in recent

21 This is why some it is argued in some quarters that the current five-formula system ought to be changed on the grounds that it no longer reflects reality. These issues will be taken up in Chapter 4 when analysing the issues at stake in the current quota reform.

22 Only 12 countries are over-represented (while 173 are under-represented) when actual quotas are compared with calculated quotas (both in SDR millions): Burundi, the Central African Republic, Dem. Rep. of Congo, Gambia, Guinea, Liberia, Rwanda, São Tomé and Príncipe, Sierra Leone, Somalia, Zambia, and Zimbabwe. All of these countries are located in Africa, and a majority have suffered from civil war or unrest in recent times. This contrasts with 129 over-represented countries (and 56 under-represented) when actual quota *shares* and calculated quota *shares* are compared.

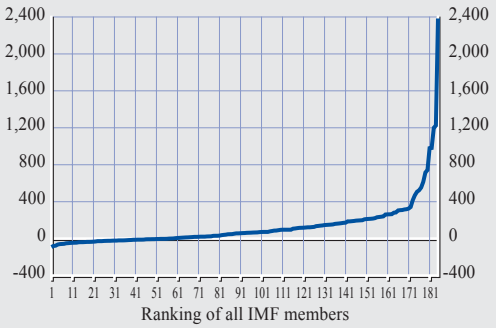
decades their economies have grown much more significantly than the absolute size of the Fund.[23]

How serious is the issue of under and over-representation for the countries and for the Fund? There are different ways to look at this question. The gap between a country's actual and calculated quota shares can be expressed either in absolute terms (actual minus calculated quota share) or in relative terms (actual minus calculated quota share as a percentage of the calculated quota share). Both measures have their validity and show different perspectives. The absolute measure illustrates the significance of the problem of under or over-representation from, particularly the Fund's perspective, as it shows the respective amounts of quota share that would need to be redistributed to align representation. At present, the absolute gaps of all under-represented IMF members add up to 15.5 percentage points of the Fund's total quota (corresponding to SDR 33.7 billion); by definition, the same overall gap can be computed for the over-represented countries. This means that the Fund would have to shift 15.5% of its quota internally if it wanted to consistently eliminate all cases of under and over-representation at the current level of total quota. In practice, of course, quota shares have been modestly rebalanced by increases in overall quota allocated to a certain group of countries, not by redistribution. Moreover, all past quota adjustments have only been partial, i.e. narrowing but not closing any under-representation gaps. Such moves are less difficult in political terms as they mean that no member would has to give up quota in absolute terms, but they of course lengthen the period of adjustment of under and over-representation.

Relative measures of under or over-representation show the significance of the problem mainly from the country's perspective and also allow countries of different size to be compared. When discussing which countries are seriously under or over-represented, it is helpful to consider the two concepts together,

Chart 3 Relative under or over-representation of all IMF members

(in percentages)



Source: Authors' calculation.
Note: The chart plots relative under or over-representation, formally expressed as actual quota share minus calculated quota share divided by the calculated quota share. Points above the horizontal axis show over-represented countries; points below show under-represented countries.

since small countries with low quota shares can never reach significant levels of absolute gaps.

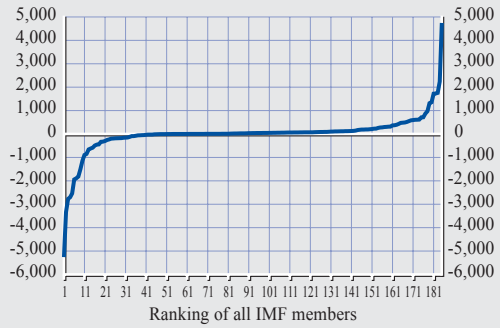
Chart 3 ranks the 185 IMF member countries according to their relative position of under or over-representation, formally expressed as (AQS-CQS)/CQS. The most under-represented country, Luxembourg, is ranked first on the far left-hand side, while the most over-represented country, Somalia, is ranked 185th on the far right-hand side. As can be seen, far more countries are over-represented (129 countries) than under-represented (56 countries). Hence, although the political pressure comes mainly from cases of under-representation, in terms of numbers, the Fund is facing a much more significant issue of over-representation.

Chart 4 illustrates the gaps in terms of SDR between the actual quotas and a hypothetical situation characterised by the absence of any

23 The last time actual quotas were broadly in balance with total calculated quotas was in the 1970s. Since then, the difference has increased quite substantially. Today, the size of the Fund, equivalent to the sum of all members' actual quotas, is SDR 217.6 billion. The calculated quotas, by contrast, would add up to SDR 1,139.7 billion, i.e. roughly 5.2 times the former. Of course, this number is purely indicative, as nobody is arguing that the overall financial size of the IMF should be raised by 420%.

Chart 4 Absolute under or over-representation of all IMF members in SDR terms

(SDR millions)



Source: Authors' calculation.
Note: The chart plots absolute under or over-representation of all IMF members transposed into SDR terms. Points above the horizontal axis show over-represented countries; points below show under-represented countries.

under and over-representation, i.e. the Fund's current total quota is distributed among members according to their respective calculated quota shares. It can be seen that for several countries the difference is quite significant, at times exceeding SDR 1 billion. For example, Saudi Arabia's quota is SDR 4.7 billion in excess of what its calculated share in the Fund's total quota would suggest. At the other end of the spectrum, China's quota falls short by SDR 5.3 billion. However, for 78% of all IMF members the gap is SDR 400 million or less.

Table 7 lists the absolute gaps in quotas for the 20 most over-represented and most under-represented countries. Less than half of the 20 most under-represented countries are emerging market economies; all others are advanced economies. Furthermore, as many as 17 out of the 20 most over-represented members are emerging or developing economies. Only three advanced economies are members of this group. This illustrates that, on the current metric,

Table 7 The IMF's 20 most under-represented and over-represented members

Most under-represented members			Most over-represented members		
		SDR millions			SDR millions
1	China	-5,260	1	Saudi Arabia	4,745
2	Singapore	-3,334	2	Russia	2,243
3	Ireland	-2,772	3	France	1,757
4	Luxembourg	-2,700	4	Venezuela	1,730
5	Korea	-2,538	5	United States	1,722
6	Japan	-1,941	6	India	1,358
7	Germany	-1,894	7	Argentina	1,316
8	Spain	-1,818	8	Nigeria	972
9	Malaysia	-1,503	9	South Africa	870
10	Netherlands	-1,141	10	Ukraine	717
11	Thailand	-897	11	Brazil	710
12	Mexico	-852	12	Australia	615
13	United Kingdom	-661	13	Kuwait	609
14	Denmark	-620	14	Pakistan	608
15	Austria	-583	15	Libya	596
16	United Arab Emirates	-494	16	Iraq	584
17	Czech Republic	-454	17	Iran	550
18	Turkey	-442	18	Algeria	516
19	Belgium	-334	19	Romania	491
20	Poland	-326	20	Congo, Kinshasa	484
	Sum of top 20	-30,562		Sum of top 20	23,191
	Sum of all under-represented members	-33,660		Sum of all over-represented members	33,660
	per memoriam:				
	Total IMF quota:	217,556			

Source: Authors' calculation.
Note: Data show the gap between the actual quota and a hypothetical quota that would bring the actual quota share in line with the calculated quota share.

Table 8 Different thresholds for under and over-representation, and number of members affected

a) Under-representation

Absolute deviation		Relative deviation	
percentage points	No. of members	percentages	No. of members
-0.10	23	-10	45
-0.15	19	-15	38
-0.20	18	-20	32
-0.25	15	-25	25
-0.30	13	-30	22
-0.50	10	-50	8
-0.90	5	-90	1

b) Over-representation

Absolute deviation		Relative deviation	
percentage points	No. of members	percentages	No. of members
0.10	34	10	122
0.15	25	15	118
0.20	21	20	114
0.25	17	25	108
0.30	11	30	107
0.50	7	50	98
0.90	2	90	77

Source: Authors' calculation.

under and over-representation cuts through all country groups.

Given ongoing economic developments, a country's calculated quota relative to that of other members fluctuates over time. Hence if any deviation, however small, were to qualify as under or over-representation, practically all members would fall into this group, i.e. 56 countries would classify as under-represented and 129 as over-represented. In order to capture the most important cases of under and over-representation, one needs to set a threshold beyond which deviations are defined as under or over-representation, and below which representation is considered as "broadly in line" with the country's calculated quota share. Setting such thresholds is necessarily arbitrary and depends on the purpose of the analysis. Various absolute and relative thresholds shown in Table 8 illustrate the pattern of under and over-representation. From this overview it becomes clear that meaningful thresholds are needed. If the thresholds are too low, more than half of the membership would be considered misrepresented, due to the high number of over-represented countries.

For example, if all cases in which the gap exceeded 10% of the country's calculated quota share were taken as misrepresented, almost the entire membership would fall into this group, with 45 countries being under-represented and 122 being over-represented. Even when this relative threshold is raised, the number of over-represented countries hardly falls; the large number of over-represented countries can also be seen in Chart 3 above. As we will see later, these are mainly smaller developing countries, particularly in Africa, whose calculated quota share has fallen in relative terms as they have benefited less from strong global GDP growth (especially when measured in international currencies), rising trade integration and growing foreign exchange reserves.

Table 8 also illustrates that, among the under-represented countries, five countries are have a large absolute deviation of more than -0.9 percentage point of IMF quota, whereas only

two over-represented countries (i.e. Saudi Arabia and Russia) are situated above this threshold.

3.1.1 EMERGING MARKET ECONOMIES

The perception that emerging market economies[24] are heavily under-represented is one of the core issues in the current debate on quota reform. Years of above-average growth, rising openness and global economic integration, increasing international financial integration and massively increasing foreign exchange reserves have turned the key emerging market economies into global players. They have contributed two-thirds to global GDP growth measured in PPP terms in recent years, represent about 60% of the world's population and hold more than two-thirds of the world's foreign exchange reserves. Emerging economies are not only an integral part of the world economic system but are shaping the state of the global economy. Through the outsourcing and offshoring of production from advanced economies, they contribute to lower manufacturing output prices and influence global bond markets through large-scale purchases of securities. Moreover, the phenomenon of global imbalances would be difficult to conceptualise without the surpluses of emerging Asia and oil producers. In market exchange rates, seven of the world's 20 largest economies are emerging market economies (11 in PPP terms), and this figure is rising, as others are moving up the ranks. All these considerations suggest that these countries should play an important role in the IMF.

Nevertheless, it is far from true that all emerging market economies are under-represented in the current five-formula system. There are actually many which are over-represented, and significantly so, even in Asia. India and Indonesia are both over-represented; India has a relatively large absolute gap of 0.6 percentage point or SDR 1.4 billion. In Latin America, Venezuela and Argentina have quotas well above their calculated weight and even Brazil must be considered over-represented under the current quota formulae. The two largest cases of over-representation (Saudi Arabia and Russia) could together free up, if fully adjusted, 3.2% of the Fund's total quota, enough to double the share of its 92 smallest members.

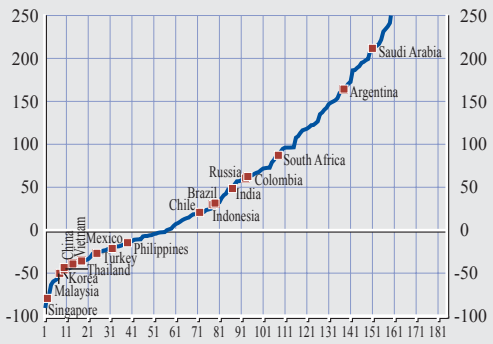
However, many emerging economies are still under-represented, despite far-above-average growth rates. The reason for this differs among the various countries in the group. In some cases, actual quota shares were set well above the calculated quota shares for reasons that could be considered political. When Russia joined the IMF in 1992, it was seen as a considerable economic and political power. It received its own seat on the IMF Executive Board and its actual quota share was set at around 100% above its calculated quota share. Even today, despite strong economic growth, its actual quota share exceeds the calculated share by as much as 60%. A similar case is Saudi Arabia, which joined in the 1970s when the Fund was in need of financing. It too received a separate seat on the Executive Board[25] and its actual quota share today is still three times its calculated quota share. In the case of Argentina and Indonesia, there may have been political reasons for the countries' quotas at the time, but there are also economic reasons. The fact that these economies went through a sharp recession and exchange rate depreciation from which income levels and the exchange rate have not yet recovered (to a much more significant extent than other Asian crisis-hit economies) also helps explain their low calculated quota shares, which are based on variables measured in international currencies (i.e. in SDRs). Moreover, the relatively high endowment with foreign exchange reserves which some of these countries have accumulated

24 There is no single definition of an emerging market economy. In the context of the quota discussion, emerging market economies are mostly taken to mean countries that are not among the traditional advanced countries but are relevant for the world financial system and the global economy. We take a pragmatic stance and include the following 18 countries in the group of "main emerging market economies": Argentina, Brazil, Chile, China, Colombia, India, Indonesia, Korea, Malaysia, Mexico, the Philippines, Russia, Saudi Arabia, Singapore, South Africa, Thailand, Turkey, and Vietnam.

25 The single chairs for Russia, Saudi Arabia and China were not foreseen in the Articles of Agreement.

Chart 5 Relative under or over-representation of the main EMEs

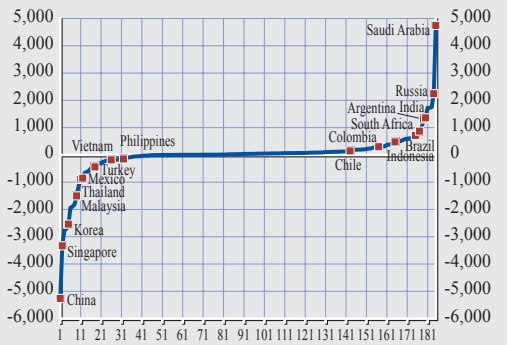
(in percentages)



Source: Authors' calculation.
Note: The chart plots relative under or over-representation, formally expressed as actual quota share minus calculated quota share divided by the calculated quota share. Points above the horizontal axis show over-represented countries; points below show under-represented countries.

Chart 6 Absolute under or over-representation of main EMEs in SDR terms

(SDR millions)



Source: Authors' calculation.
Note: The chart plots absolute under or over-representation of all IMF members transposed into SDR terms. Points above the horizontal axis show over-represented countries; points below show under-represented countries.

does not boost the countries' calculated quota shares significantly, as the weight of reserves in the current IMF formulae is only about 5%.

Chart 5 highlights 18 main emerging market economies in the ranking of all IMF members according to their current relative position of under or over-representation. It shows that there are as many over-represented emerging economies as there are under-represented ones and that over-representation in relative terms is more important than under-representation. Some Asian economies are currently under-represented, such as China, Korea, Malaysia and Singapore, but some are over-represented, such as India and Indonesia. In Latin America, only Mexico is under-represented, while Brazil, Chile and Columbia are over-represented. In the EU neighbouring regions, Turkey is under-represented, but Russia is over-represented. Hence, there is no clear-cut case of emerging market under-representation, whether globally or regionally.

Chart 6 re-ranks the countries according to the absolute differences in quotas expressed in

Table 9 Under or over-representation of the main EMEs in SDR millions

	Relative (percentages)	in SDR millions	Absolute (percentage points)
Singapore	-79.5	-3,334	-1.53
Malaysia	-50.3	-1,503	-0.69
Korea	-46.4	-2,538	-1.17
Thailand	-45.4	-897	-0.41
China	-39.4	-5,260	-2.42
Vietnam	-35.9	-183	-0.08
Turkey	-27.0	-442	-0.20
Mexico	-21.3	-852	-0.39
Philippines	-14.6	-150	-0.07
Chile	20.7	146	0.07
Indonesia	29.7	475	0.22
Brazil	30.6	710	0.33
India	48.5	1,358	0.62
Russia	60.6	2,243	1.03
Colombia	62.5	297	0.14
South Africa	87.2	870	0.40
Argentina	164.4	1,316	0.60
Saudi Arabia	211.7	4,745	2.18

Source: Authors' calculation.
Note: A negative sign denotes under-representation; a positive sign denotes over-representation. The table can be read as follows. For example, Malaysia's quota share is about 50% lower than it should be, and the country contributed SDR millions 1503 less than it would have if its actual quota share were at the appropriate level. The absolute gap between the actual and calculated quota shares is 0.69 percentage point.

SDR millions. It does not change the above picture significantly. The number of cases on both sides stays the same, and countries shift according to the absolute value of their representation gap. On this scale, China, Singapore and Korea are the most significantly under-represented members; while Saudi Arabia and Russia are the most over-represented (see also Table 9).

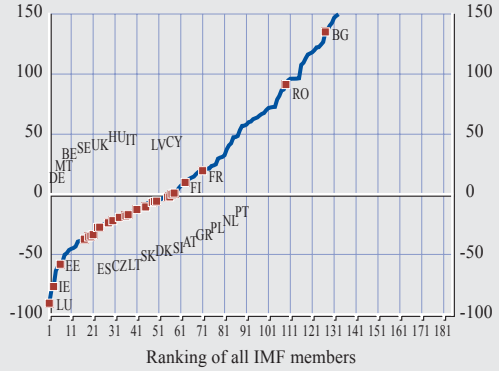
3.1.2 EU COUNTRIES

EU countries are often perceived as over-represented in the Fund and hence as the first candidates to give up quota share. This perception might be linked to the fact that these countries had strong economic positions in the 1950s through to the 1970s, during which time they "built up" their quotas. They are often seen as not having given up sufficient quota share in favour of fast-growing emerging economies, partly because quota reviews have only led to gradual adjustments of actual quotas. A typical question that epitomises the debate is whether it is appropriate that Belgium maintains a higher quota in the Fund than India.[26] The fact of the matter is that India, not Belgium, is over-represented in the Fund on the basis of the current framework, i.e. when the current five formulae are applied. Moreover, almost all of the EU countries are either broadly in line with their calculated weights or even below them and would thus qualify as under-represented (see Chart 7, Chart 8 and Table 10). The reasons for the under-representation of many European countries are strong growth (e.g. Ireland), a very high degree of openness combined with strong trade growth (virtually all countries) and stable and strong currencies relative to other parts of the world.

26 In terms of total GDP at market prices, India's GDP is more than twice as large as that of Belgium. India's quota share in the Fund is 1.91%; Belgium's 2.12%. However, while Belgium's quota is broadly in line with its calculated quota share, India's is almost 50% above. The reason for this is that openness, i.e. international trade flows, plays an important role in the formula, and Belgium is a highly open economy, much more open than India.

Chart 7 Relative under or over-representation of EU countries[1)]

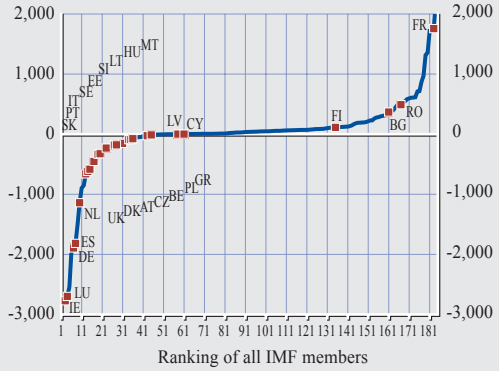
(in percentages)



Note: Points above the horizontal axis show over-represented countries; points below show under-represented countries.
1) The abbreviations used in the chart are as follows: Belgium – BE, Bulgaria – BG, Czech Republic – CZ, Denmark – DK, Germany – DE, Estonia – EE, Ireland – IE, Greece – GR, Spain – ES, France – FR, Italy – IT, Cyprus – CY, Latvia – LV, Lithuania – LT, Luxembourg – LU, Hungary – HU, Malta – MT, Netherlands – NL, Austria – AT, Poland – PL, Portugal – PT, Romania – RO, Slovenia – SI, Slovakia – SK, Finland – FI, Sweden – SE, United Kingdom – UK.
Source: Authors' calculation.

Chart 8 Absolute under or over-representation of EU countries in SDR terms

(SDR millions)



Source: Authors' calculation.
Note: The chart plots absolute under or over-representation of all IMF members transposed into SDR terms. Points above the horizontal axis show over-represented countries; points below show under-represented countries.

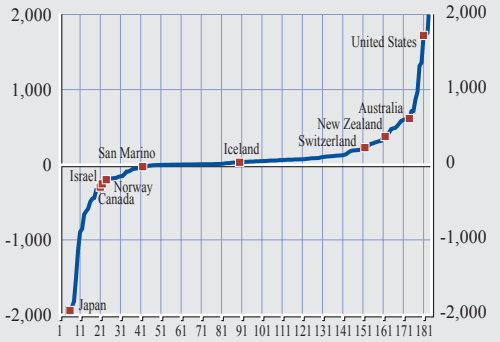
Table 10 Under or over-representation of the EU countries

	Relative (percentages)	in SDR millions	Absolute (percentage points)
Luxembourg	-90.7	-2,700	-1.24
Ireland	-76.8	-2,772	-1.27
Estonia	-58.2	-91	-0.04
Spain	-37.4	-1,818	-0.84
Czech Republic	-35.6	-454	-0.21
Lithuania	-34.8	-76	-0.04
Slovakia	-33.6	-180	-0.08
Slovenia	-27.6	-90	-0.04
Denmark	-27.4	-620	-0.28
Austria	-23.7	-583	-0.27
Greece	-22.0	-231	-0.11
Poland	-19.2	-326	-0.15
Netherlands	-18.1	-1,141	-0.52
Portugal	-17.0	-178	-0.08
Germany	-12.7	-1,894	-0.87
Malta	-10.6	-12	-0.01
Belgium	-6.8	-334	-0.15
Sweden	-6.1	-154	-0.07
United Kingdom	-5.8	-661	-0.30
Hungary	-2.5	-25	-0.01
Italy	-2.2	-161	-0.07
Latvia	0.1	1	0.00
Cyprus	1.0	2	0.00
Finland	9.8	113	0.05
France	19.6	1,757	0.81
Romania	91.3	491	0.23
Bulgaria	135.1	368	0.17

Source: Authors' calculation.
Note: A negative sign denotes under-representation; a positive sign denotes over-representation. The table can be read as follows. For example, Luxembourg's quota share is about 90% lower than it should be, and the country contributed SDR millions 2,700 less than it would have if its actual quota share were at the appropriate level. The absolute gap between the actual and calculated quota shares is 1.24 percentage point.

Chart 9 Absolute under or over-representation of other advanced countries in SDR terms

(SDR millions)



Source: Authors' calculation.
Note: The chart plots absolute under or over-representation of all IMF members transposed into SDR terms. Points above the horizontal axis show over-represented countries; points below show under-represented countries.

Table 11 Under or over-representation of other advanced countries

	Relative (percentages)	in SDR millions	Absolute (percentage points)
San Marino	-59.7	-26	-0.01
Israel	-21.5	-255	-0.12
Japan	-12.7	-1,941	-0.89
Norway	-10.7	-199	-0.09
Canada	-4.5	-299	-0.14
United States	4.9	1,722	0.79
Switzerland	7.1	228	0.11
Australia	23.5	615	0.28
Iceland	37.4	32	0.01
New Zealand	72.2	375	0.17

Source: Authors' calculation.
Notes: A negative sign denotes under-representation; a positive sign denotes over-representation. The table can be read as follows. For example, Israel's quota share is about 22% lower than it should be, and the country contributed SDR millions 255 less than it would have if its actual quota share were at the appropriate level. The absolute gap between the actual and calculated quota shares is 0.12 percentage point.

3.1.3 OTHER ADVANCED ECONOMIES

The current picture for the ten other advanced economies outside the EU is more varied. Half are under-represented – Japan even significantly so (see Chart 9 and Table 11). Hence, the notion that advanced economies are generally over-represented does not stand up to the facts, at least not on the basis of the current formulae.

Three countries, namely Australia, Iceland and New Zealand, are over-represented in double digits in relative terms. Interestingly, the IMF's largest member, the United States, is also slightly over-represented in relative terms, with its actual quota share of 17.1% being above its calculated share of 16.3%. Even though the gap amounts to less than 5% for the United States, the absolute difference is quite significant – 0.8

percentage points of the IMF quota or SDR 1.7 billion.

What explains the situation of the countries in this group? The reasons differ greatly among the economies. Some of them have experienced solid growth rates; many (although by no means all) have had stable exchange rates and seen rising openness through trade integration. Finally they have been subject to considerable variability in external receipts, which also enters the formulae.

3.1.4 DEVELOPING ECONOMIES

Developing economies constitute the bulk of the over-represented countries in the Fund. A look at the larger developing economies in terms of population confirms this general picture. When the existing framework is applied, all developing countries with a population above 20 million are over-represented; and some of them considerably so (see Chart 10, Chart 11, and Table 12). The reason in the case of most of these countries is the fact that their growth performance over the past decades has been less favourable than that of other economies. Moreover, their currencies have often weakened, so that when national GDP figures are converted into SDR, their economic weight is even lower.

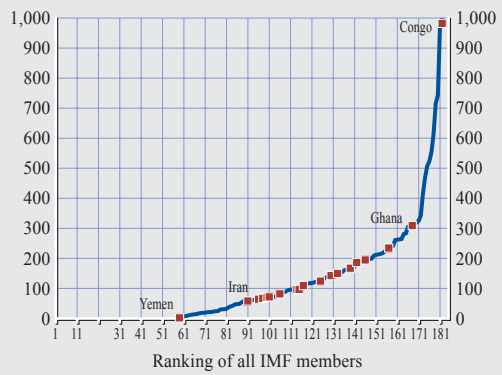
Table 12 Under or over-representation of selected developing economies

	Relative (percentages)	in SDR millions	Absolute (percentage points)
Yemen	1.8	4	0.00
Iran	58.0	550	0.25
Morocco	64.0	230	0.11
Nepal	66.8	28	0.01
Algeria	69.9	516	0.24
Egypt	71.8	394	0.18
Afghanistan	81.8	73	0.03
Peru	96.3	314	0.14
Iraq	96.5	584	0.27
Ukraine	109.4	717	0.33
Nigeria	124.5	972	0.45
Pakistan	142.5	608	0.28
Bangladesh	146.8	317	0.15
Ethiopia	149.8	81	0.04
Tanzania	167.1	125	0.06
Venezuela	186.2	1,730	0.80
Uzbekistan	194.8	182	0.08
Sudan	213.0	214	0.10
Uganda	234.2	126	0.06
Kenya	237.1	191	0.09
Myanmar	280.8	190	0.09
Ghana	309.1	279	0.13
Congo, Dem. Rep.	982.0	484	0.22

Source: Authors' calculation.
Notes: The table shows developing countries whose population exceeds 20 million. The positive sign denotes over-representation.

Chart 10 Relative under or over-representation of developing economies

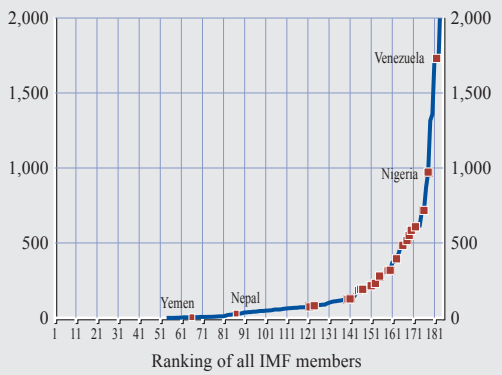
(in percentages)



Source: Authors' calculation.
Note: The chart shows developing countries whose population exceeds 20 million.

Chart 11 Absolute under or over-representation of developing economies in SDR terms

(SDR millions)



Source: Authors' calculation.
Note: The chart shows developing countries whose population exceeds 20 million.

3.2 HOW QUOTAS ARE CURRENTLY CALCULATED

As previously explained, when countries have joined the Fund, the result of the quota formulae has been taken only as a reference point that feeds into the analysis for determining the country's quota. Probably the more relevant factor is ultimately the judgement of the Executive Board as to how the country in question compares with other members of the Fund. However, one cannot conclude that the quota formulae are irrelevant for the distribution of financial contributions and voting rights in the Fund. Calculated quota shares have always played an important role in the choice of countries that qualified for the selective parts of general quota increases or for ad hoc increases.

3.2.1 THE CURRENT FIVE-FORMULA SYSTEM

The current system of calculating quotas in the Fund is very complex. Not only is it based on five formulae, but different formulae are applied to different members depending on the result they give. The formulae contain the following variables: GDP; current receipts and current payments (i.e. export and import values), which together are considered to signify openness; variability of current receipts (i.e. fluctuations in exports); and official reserves. Initially in 1944 there was only a single formula, the "Bretton Woods" formula. As Boughton (2001) points out, "the equation was calibrated so as to yield an aggregate quota of the size agreed upon during preliminary negotiations among the major countries." The equation was "not derived from theory or econometrics and was neither discussed nor even officially disclosed during the conference" (p. 860). The economist at the US Treasury who actually constructed the formula, Raymond Mikesell, confirmed this "reverse engineering" approach in his memoirs. He said that US Treasury Assistant Secretary Harry Dexter White essentially gave him the variables but no weights, instructing him to derive a formula which "was to give the United States a quota of approximately $2.9 billion, the United Kingdom (including its colonies) about half the US quota, the Soviet Union an amount just under that of the United Kingdom, and China somewhat less" (Mikesell, 1994, p. 22).

In the early 1960s the Bretton Woods formula was complemented by four other formulae, leading to the multi-formula approach still used today (see also Table 14). This reform was intended to slightly increase the calculated quota shares of small open economies, as they were favoured by the new formulae; the Bretton Woods formula continued to be favourable to large members. The last revision of the formulae took place in the context of the eighth general review in 1982/83.

The application of the formulae follows a complex procedure: first, five quotas (Q1 to Q5) are calculated on the basis of the five formulae. Then the lowest two quotas of Q2, Q3, Q4 and Q5 are averaged and the result compared with Q1. The higher of the two is taken as the member's calculated quota; this figure as percentage of the total calculated quota is the country's calculated quota share. This implies that either Q1 is used to calculate quotas or the average of a pair out of the other formulae is taken. Given that the four other formulae can be combined into six pairs, there are a total of seven permutations in the calculation process.

Table 13 Relevance of the different formulae for the derivation of countries' calculated quota shares

Formula	Number of members which used the formula in 2005
Q1	78
Q2	75
Q3	33
Q4	74
Q5	32

Source: Authors' calculation.
Notes: Only Q1 can be used alone, which it was in 78 cases. Q2, Q3, Q4 and Q5 can, by construction, only form half of the calculation, e.g. Q2 was used 75 times, but always in combination with Q3, Q4, or Q5. As a result of changes in the underlying data, the number of members which use a specific formula can change from year to year.

Table 14 The current five formulae employed to determine calculated quota shares

Formula	Alias
$Q1 = (0.01Y + 0.025R + 0.05P + 0.2276VC)*(1 + C/Y)$	Bretton Woods
$Q2 = (0.0065Y + 0.0205125R + 0.078P + 0.4052VC)*(1 + C/Y)$	Scheme III
$Q3 = (0.0045Y + 0.03896768R + 0.07P + 0.76976VC)*(1 + C/Y)$	Scheme IV
$Q4 = 0.005Y + 0.042280464R + 0.044\ (P + C) + 0.8352VC$	Scheme M4
$Q5 = 0.0045Y + 0.05281008R + 0.039\ (P + C) + 1.0432VC$	Scheme M7

where:

Y = GDP at current market prices for a recent year;
R = 12-month average of gold, foreign exchange reserves, SDR holdings and reserve positions in the IMF, for a recent year;
P = annual average of current payments (goods, services, income and private transfers) for a recent five-year period;
C = annual average of current receipts (goods, services, income and private transfers) for a recent five-year period (note that *P+C=openness*); and
VC = variability of current receipts, defined as one standard deviation from the centred five-year moving average, for a recent 13-year period.

The results of each of the four non-Bretton Woods formulae are multiplied by an adjustment factor, to ensure that the sum of the calculations across members equals that derived from the Bretton Woods formula. The calculated quota of a member is the higher of the Bretton Woods calculation and the average of the lowest two of the remaining four calculations.

Source: IMF.

In practice, all formulae are used, but to a widely differing extent (see Table 13). The original Bretton Woods formula remains relevant for about one-third of members. The other formulae in different combinations have led to the calculated quotas and corresponding shares of the other 118 member countries.

It is interesting to note that there is no need to employ five formulae. With very little loss of precision, these five formulae can be condensed into a single formula. Regressing (with no constant) the calculated quota onto the four current variables, GDP (Y), openness[27] (O), variability of current export receipts (VC) and reserves (R), yields a goodness of fit of $R^2 = 0.998$. The coefficients with the respective t-statistics of the variables in brackets are shown in the equation below. Hence, the difference between the five formulae and the condensed formula is, on average, very small. It would make little difference to use a single formula, which would make the calculations much less complex and the process of quota determination much more transparent.

3.2.2 THE WEIGHTS OF INDIVIDUAL VARIABLES

The Singapore resolution suggests that a "significantly higher" weight should be attributed to GDP compared with the present situation. This raises the question of the weight of GDP in the current formulae. The problem is that in the current framework variable weights can only be approximated, for several reasons: first, as explained above, varying combinations of formulae apply to different members; second, the first three formulae are, due to a multiplicative element, non-linear; third, as the variables are highly correlated and not independent of each other, multicollinearity is present. All in all one has to be cautious with the interpretation of the estimates.

One way of approximating contributions of a variable in the current five-formula system is to regress the calculated quota on the variables Y,

27 In line with usual practice in the current quota debate, the variable O (openness) equals the sum of the traditional variables P and C, i.e. current payments and current receipts, and measures a country's external trade.

$$Q = 0.0058769\ Y + 0.040339\ O + 0.794659\ VC + 0.0176256156\ R$$

$$[22.85] \qquad [44.70] \qquad [14.97] \qquad [11.60]$$

Source: Authors' estimation.

Table 15 Approximation of the current weights of variables

Variable	Coefficient (R^2: 0.998)	t	Standard deviation	Coefficient times standard deviation	Importance ("weight"): coefficient times standard deviation as a share
Y	0.0059	22.85	704,142	4,138	22
O	0.0403	44.70	252,844	10,199	53
VC	0.7947	14.97	4,714	3,746	20
R	0.0176	11.60	57,045	1,005	5
Sum				19,089	100

Source: Authors' estimation.

O, VC and R. Multiplying the coefficient of a variable by its standard deviation yields a measure of the importance of a variable (see column 4 in Table 15). After normalising these data to 100, one can gauge the relative importance of a variable, as a rough approximation of its "weight". This method assigns weights of 22% to GDP, 53% to openness, 20% to variability of export receipts and 5% to official reserves.

The following equation is carried out to test the coefficients against a country having the average in each variable:

$$0.0059\ \bar{Y} + 0.0403\ \bar{O} + 0.7947\ \bar{VC} + 0.0176\ \bar{R} = 6{,}152$$

The coefficients are multiplied by the average for the respective variable. The sum of the results is SDR m 6,152. This is a close fit to the true average calculated quota of SDR m 6,160.

3.3 FROM QUOTA TO VOTES AND THE ISSUE OF BASIC VOTES

As explained before, voting at the Fund is – in principle – a combination of a concept of "voting according to economic size" and an egalitarian concept of "one country one vote", with the votes under the first pillar derived by dividing the economic quota by SDR 100,000 and those under the second pillar being the basic votes. To illustrate: for Argentina, a quota of SDR 2,117.1 million yields 21,171 votes. Adding 250 basic votes gives a total of 21,421 votes.[28]

The weights of the two pillars have, however, shifted over time. Originally, the egalitarian concept of basic votes was quite important, with basic votes accounting for 11.3% of total votes. The share even peaked at 15.6% in 1958 because new members joined without the Fund receiving an overall quota increase.[29] From then on the share of total basic votes in total votes decreased continuously, as the Fund's overall quota augmented but the number of basic votes remained fixed (see Table 16). If the share of basic votes in total votes were to reach its initial level of 11.3% today, an increase to 1,506 basic votes would be needed, and the peak in the relative importance of basic votes would only be reached at 2,185 basic votes per member.

Table 17 shows the votes deriving from quota and basic votes for selected IMF members. It illustrates that the importance of basic votes ranges from negligible for the largest member to predominant for the smallest. The table also shows that basic votes are significant, accounting for more than 10% of total votes for close to 100 countries.

Even though basic votes play a limited overall role in the institution, making up only 2% of total votes, they affect the distribution of voting

28 This paper deals only with voting shares, which reflect the distribution of votes in the institution. It does not deal with voting power, which measures the effective influence members have in specific decision-making processes, for example by creating coalitions or blocking certain decisions. For such an analysis in an IMF context see Bini Smaghi (2006) or Leech and Leech (2006).

29 To be precise, the share of total basic votes in total votes increases only when new members have below-average voting shares; in the opposite case it decreases.

Table 16 Share of basic votes in total votes at the IMF, 1944 to the present

Year	Number of IMF members	Total votes	Number of basic votes	Share of basic votes in total votes (in percentages)
1944	45	99,390	11,250	11.3
1958	68	108,930	17,000	15.6
1965	101	179,928	25,250	14.0
1970	115	236,835	28,750	12.1
1976	132	319,714	33,000	10.3
1978	140	432,415	35,000	8.1
1983	145	646,415	36,250	5.6
1990	152	1,387,910	38,000	2.7
1998	183	2,166,040	45,750	2.1
2005	184	2,173,313	46,000	2.1

Source: IMF, Quota Distribution – Selected Issues, 17 July 2003.
Note: Montenegro is not included in this compilation.

Table 17 Votes of selected IMF members and the importance of basic votes

Ranking according to voting share	Country	Quota-based votes 1	Basic votes 2	Total votes 3 = 1+2	Share of basic votes in total 2/3; in percentages
1	United States	371,493	250	371,743	0.07
30	Malaysia	14,866	250	15,116	1.65
60	Zambia	4,891	250	5,141	4.86
90	Lebanon	2,030	250	2,280	10.96
120	Guinea	1,071	250	1,321	18.93
150	Chad	560	250	810	30.86
185	Palau	31	250	281	88.97

Source: Authors' calculation.

shares. Since they raise the votes of smaller members over-proportionally, they raise their voting share, while diminishing the voting share of larger members. The point below which countries benefit from basic votes is currently 0.54% of the total IMF quota. Given that there are many small members and fewer large members, basic votes can improve the situation for the majority of the membership. At present, 148 members have a larger share owing to basic votes, while 37 countries see their share slightly decline.[30] Hence basic votes are important for a large number of small and very small economies in the Fund.

3.4 SUMMARY

This chapter has reviewed in detail the status quo of under and over-representation of individual members and country groups at the IMF, comparing countries' actual quota shares with the calculated quota shares that result from applying the existing five formulae to the most recent economic data. It has shown that under and over-representation is widespread and cuts through all groups of countries; it is not concentrated on emerging economies. It has also shown that many countries are actually over-represented, especially developing economies, whose economic growth has been in a lower range than that of many other parts of the global economy in recent years.

30 Before the ad hoc increase for China, Korea, Mexico and Turkey agreed in Singapore in 2006 only 36 countries were negatively affected by the basic votes; Turkey switched sides after its ad hoc increase.

Some of the under and over-representation results may be counter-intuitive, especially the fact that many advanced economies, including in Europe, are under-represented and many emerging economies and developing countries are over-represented. Two important explanations for this are that some emerging economies' currencies have been weakened compared by periods of crisis and did not fully recover since, implying a lower weight when converted into international currencies, and some of their quotas were set deliberately above the calculated level initially. Moreover, a number of European economies have experienced strong growth in recent years, coupled with a stable or appreciating exchange rate. Table 18 summaries under and over-representation (column 4) and the redistribution of voting shares due to basic votes (column 5) for selected countries.

The chapter has also explored the current framework for setting quotas at the IMF, including the five-formula approach, underpinning the case for simplification. The various avenues towards a different way to set quotas will be explored in the next chapter.

Table 18 Actual and calculated quota shares and voting shares of selected members

	Status quo			Deviations	
	Actual quota share	Calculated quota share	Voting share	Under and over-representation (1-2)	Voting (3-1)
	1	2	3	4	5
Euro area	22.89	27.50	22.56	-4.6	-
Germany	5.98	6.85	5.87	-0.9	-
France	4.94	4.13	4.84	0.8	-
Italy	3.24	3.32	3.19	-0.1	-
Netherlands	2.37	2.90	2.33	-0.5	-
Belgium	2.12	2.27	2.08	-0.2	-
Spain	1.40	2.24	1.38	-0.8	-
Austria	0.86	1.13	0.85	-0.3	-
Finland	0.58	0.53	0.58	0.1	-
Portugal	0.40	0.48	0.40	-0.1	+
Ireland	0.39	1.66	0.39	-1.3	+
Greece	0.38	0.48	0.38	-0.1	+
Luxembourg	0.13	1.37	0.14	-1.2	+
Slovenia	0.11	0.15	0.12	0.0	+
Total EU	32.36	37.77	31.99	-5.4	-
United Kingdom	4.94	5.24	4.84	-0.3	-
Sweden	1.10	1.17	1.09	-0.1	-
Denmark	0.76	1.04	0.75	-0.3	-
Poland	0.63	0.78	0.63	-0.1	-
Hungary	0.48	0.49	0.48	0.0	+
Romania	0.47	0.25	0.47	0.2	+
Czech Republic	0.38	0.59	0.38	-0.2	+
Bulgaria	0.29	0.13	0.30	0.2	+
Slovakia	0.16	0.25	0.17	-0.1	+
Lithuania	0.07	0.10	0.08	0.0	+
Cyprus	0.06	0.06	0.07	0.0	+
Latvia	0.06	0.06	0.07	0.0	+
Malta	0.05	0.05	0.06	0.0	+
Estonia	0.03	0.07	0.04	0.0	+
G7	45.22	45.90	44.35	-0.7	-
United States	17.08	16.28	16.73	0.8	-
Japan	6.12	7.01	6.00	-0.9	-
Canada	2.93	3.06	2.88	-0.1	-
18 main EMEs	21.98	23.36	21.73	-1.4	-
China	3.72	6.14	3.65	-2.4	-
India	1.91	1.29	1.88	0.6	-
Indonesia	0.96	0.74	0.95	0.2	-
Korea	1.35	2.51	1.33	-1.2	-
Malaysia	0.68	1.37	0.68	-0.7	-
Thailand	0.50	0.91	0.50	-0.4	+
Philippines	0.40	0.47	0.41	-0.1	+
Singapore	0.40	1.93	0.40	-1.5	+
Vietnam	0.15	0.24	0.16	-0.1	+
Brazil	1.40	1.07	1.38	0.3	-
Mexico	1.45	1.84	1.43	-0.4	-
Argentina	0.97	0.37	0.96	0.6	-
Chile	0.39	0.33	0.40	0.1	+
Colombia	0.36	0.22	0.36	0.1	+
Saudi Arabia	3.21	1.03	3.16	2.2	-
Russia	2.73	1.70	2.69	1.0	-
Turkey	0.55	0.75	0.55	-0.2	-
South Africa	0.86	0.46	0.85	0.4	-
Rest of the world	19.54	12.51	20.67	7.0	+
ROW: Developing	14.79	8.12	15.94	6.7	+
African Constit.-19	2.85	1.32	3.00	1.5	+
African Constit.-24	1.34	0.40	1.59	0.9	+

Source: Authors' calculation.

4 AN ANALYSIS OF THE MAIN PARAMETERS OF REFORM

"When the facts change, I change my mind. What do you do, Sir?" is a well-known quip of John Maynard Keynes. Applied to the discussion on misperceptions of under and over-representation discussed in the preceding chapter, it could suggest that once confronted with the facts regarding actual under and over-representation, the voices of those accusing the IMF of under and over-representation of its membership would fade. But the opposite happened. The views persisted, although they were not supported by the "facts" of the calculated quota share. In fact, the critics went a step further and called for new ingredients for a quota formula, which is the issue now on the table.

A new quota formula is highly welcome, even from a technical viewpoint, because the varying application of five different formulae is highly opaque and does not support the IMF's calls for good governance in its member countries.

Therefore it has become widely accepted that a new formula would mean a single formula uniformly applied to all members, and that it should be simple and transparent. But this is probably as far as the consensus reaches, and the debate – as at summer 2007 – is fully open, both on the variables to be included and the weights to be assigned to them. Experts ponder over the mathematical shape of the ideal formula, in particular whether it should be additive or multiplicative to have certain desirable properties, and whether variables should be expressed in absolute levels as in the past or in shares in the world aggregate. Finally, officials are searching for ways to combine purely economic variables, which by definition favour the large and rich economies, with a sense of greater participation and ownership for the smaller and less rich economies. The use of compression, PPP, a larger number of basic votes and even population size are options considered.

Technical as these issues may sound, each of them matters greatly as far as the ultimate distribution of quotas, and thus representation and eventually the governance of the institution are concerned. Therefore it is no surprise that one has to enter into the "technicalities" in order to find economically and politically viable solutions, both for today and into the future.

Since the allocation of shares in the Fund is a zero-sum game where certain countries can only gain if others lose, the international financial community is faced with a classic distribution problem. We know from experience as well as economic theory that distribution issues should ideally be decided under the "veil of ignorance" (John Rawls, 1999), where decision-makers agree on the rules of the game without knowing the outcome for themselves. Otherwise their view on the rules will always be biased by knowledge of the outcome of individual decisions. Applied to the debate on Fund quotas, this would mean that countries should agree on the method – i.e. variables and weights in a new formula – without knowledge of the outcome. Of course, such a principles-based approach is as ideal as it is unrealistic. In reality, officials and country representatives will comment on the method once they have seen the results for their country. Taking the issue a step further, some may even start from desirable results for their country and then design the method that supports this result, inspired by the "reverse engineering" approach that was applied at the time of the establishment of the Fund.

In practice therefore, the new formula needs to meet both ends: it needs to be compliant with certain principles that in themselves are reasonable, and it needs to produce results which are acceptable to the individual members and comply with a notion of fair and effective representation of the membership as a whole.

Further to the preview given in Chapter 2, this chapter explores the various ingredients in this debate in more depth. It starts by analysing

existing variables together with points raised against them, reviews possible further variables and analyses various technical aspects. Throughout the discussion, it tries to closely link these aspects with political reality, by assessing the impact of various changes on the overall representation in the Fund.

4.1 EXISTING VARIABLES

A natural starting point for the discussion of a new quota formula is the role of quotas themselves. As explained in Chapter 2, quotas play a critical role in the financial structure (financial contributions), financing operations (credit access) and governance (voting shares) of the Fund. These multiple roles for quotas inevitably have to provide guidance for the choice of variables that should enter the formula. However, given the diversity of the roles, the quota formula will have to fulfil competing objectives:

- To reflect the fact that quotas determine a country's financial contributions, variables that enter the formula should reflect countries' *ability to contribute* to the funding of the IMF.

- Since access limits are set in terms of quotas, it has often been argued that the variables should reflect the *potential size of countries' borrowing needs*. In practice this argument may be less relevant today than a decade ago, given the considerable increase in emerging economies' reserves and the decline in external debt, but it still figures regularly in quota discussions.

- Quotas determine the capacity to influence IMF decisions. Since decisions often deal with the use of Fund resources, this role would suggest once again linking variables to the ability to contribute. In a broader sense, however, decisions also concern IMF responsibilities in the global economy, including its surveillance activities and technical assistance. Hence one can argue that the variables should reflect *countries' weight and role in the world economy*, i.e. their integration in the world economy and the international financial system and the responsibility they bear for the functioning of the system. This would also imply that the quota formula should set appropriate incentives for member countries to pursue policies consistent with IMF principles and objectives, which, on the basis of the Fund's Articles of Agreement, can be summarised as a contribution to global integration, a stable global financial system and worldwide growth and development.[31]

There are currently five variables included in the formulae: GDP; current payments and current receipts (both taken together are referred to as "openness"); variability of export receipts; and reserves. Loosely linking these variables to the above considerations, both GDP and openness would be related to all three aspects, namely the ability to contribute, the borrowing needs and the weight and stake in the world economy; variability would be related to borrowing needs, and foreign exchange reserves to the funding ability of members. At first glance, therefore, one could conclude that all relevant considerations are reflected in the current system. However, as usual, the devil is in the detail: depending on the perspective taken when looking more closely into the variables, problematic aspects can be detected that cast doubt on either the definition used or, more fundamentally, the reasoning for including a certain variable into the formula. These considerations will be discussed in turn.

4.1.1 GDP

GDP is widely recognised as an essential variable in a new quota formula because it is the most comprehensive measure of the economic size of a country. It is also well reported and available in a timely fashion for virtually the entire membership. In terms of

31 Some authors argue that given the multiple role of quotas in the Fund, they should not be summarised in one single number but should be differentiated across purposes. They suggest splitting up the various functions that quotas currently perform; see for example Bird and Rowlands (2005). This, however, would make the overall system of quota determination even more complex.

quota functions, GDP can be regarded as a relevant indicator of a country's ability to contribute, its potential borrowing needs and more broadly its role and weight in the global system.

The current definition of GDP in the quota formulae refers to a single recent year and converts national data at annual average market exchange rates into SDR values. While it has been agreed to move to three-year averages in order to smooth the effect of fluctuations in economic performance, the main question mark relates to the conversion at market exchange rates, which has traditionally been used in quota calculations and tends to favour advanced economies. The alternative would be to adopt a conversion method based on PPP rates, which would lead to a significant change in calculated quota shares in favour of developing countries since the distribution of PPP-based GDP differs substantially from the that based on market exchange rates, as will be discussed in detail below.

4.1.2 OPENNESS

The variable of current import payments and export receipts – or openness – is also considered as essential by most analysts because it relates squarely to one of the IMF's main purposes namely to "facilitate the expansion and balanced growth of international trade" (Article I of the Articles of Agreement) and is relevant to all of the various roles of Fund quotas. It reflects more than GDP the stake countries have in the global economy: countries that are more open and thus more exposed to international trade and financial flows will have a greater willingness to engage in international cooperation than economies that are more domestically focused. Openness also has a bearing on countries' ability to contribute. In addition, it may be seen as an indicator of potential demand for Fund resources, since relatively open countries may be more vulnerable to external shocks.

In the existing five formulae, openness is defined as the sum of current receipts (export values, adjusted for re-exports) and the sum of current payments (import values) with regard to goods, services, income and private transfers using a five-year average. Current receipts and payments enter separately and combined; in three of the five formulae, a ratio of current receipts to GDP is used as a multiplicative factor. Since the latter element can lead to anomalous results if a country's GDP growth exceeds its export growth, a simpler measure of openness has been proposed in recent discussions, namely the sum of current receipts and payments averaged over a five-year period.

One of the main questions raised on openness concerns the fact that the data enter the quota calculations on a gross rather than a value-added basis, which is regarded as double counting of cross-border flows for countries with large entrepôt trade activities, financial centres, or that process imports for re-export.[32]

However, the process of globalisation is based on an international division of labour, which – through outsourcing and offshoring – implies a stronger role for processing trade and re-exporting by definition. In recent years, this has involved not only countries such as Singapore and the Netherlands (which have large harbours) but also China and many countries in eastern Europe, with considerable volumes of foreign direct investment from global corporations. Hence globalisation is spreading processing and re-export trade across a much larger number of countries.

It has sometimes been argued[33] that openness does not need to be included since it is highly correlated with GDP. While this argument could also be used the other way round, i.e. to suggest dropping GDP, one has to be aware that several

32 In recognition of this issue, the Fund has traditionally made adjustments to the database for the purpose of quota calculations. However, such adjustments inevitably involve judgement and depend on data availability. Since Singapore is one of the main examples of such countries – its openness share is almost five times its GDP share in the world economy – this matter has become known as the "Singapore issue".

33 See, for example, Cooper and Truman (2007).

Table 19 Correlation between modified original variables

	Y	O	VC	R
Y	1			
O	0.92	1		
VC	0.97	0.92	1	
R	0.42	0.44	0.40	1

Source: Authors' calculation.

Table 20 Shares of selected IMF members in world totals

	Y	O	VC	R
United States	28.9	15.0	20.7	2.1
Euro area	22.8	32.1	23.7	5.0
Japan	11.0	5.3	6.9	22.3
China	5.2	5.6	3.4	19.4

Source: Authors' calculation.

of the variables discussed are highly correlated. Large countries often display high trade volumes and large absolute fluctuations in trade as well as high reserves, which all enter in absolute levels into the current formulae. Correlation coefficients between GDP, openness and variability are all above 0.9. And only recently has the correlation of GDP with reserves fallen, currently to about 0.4, as, since 2000, the accumulation of reserves has been concentrated on a few economies (see Table 19).

However, even if the correlation between some variables, e.g. GDP and openness, is very high across all members, this does not mean that the respective variables are equally important for all members. The shares of individual members in the global total of a variable, e.g. a country's share in world GDP, differ considerably (see Table 20). For example, the United States may prefer GDP – since its share in the global total is 29% – to openness – in which its share is only 15%. For the euro area, the opposite is the case. This is yet another element that makes agreement on a new quota formula difficult, because members tend to favour variables which favour them.

Another question under debate is whether the openness variable should be broadened from trade flows to also cover financial flows. This issue will be dealt with in the section on new variables below.

4.1.3 VARIABILITY

Variability is a traditional variable in the quota formulae and is intended to gauge a country's potential vulnerability to balance of payments shocks and hence its potential need for Fund resources. While some consider that the potential need for Fund resources is already captured by the openness variable, others argue that relatively closed economies can face balance of payments crises. In line with the latter argument, the Cooper group suggested giving a prominent role to variability in a new formula along with GDP.

Variability is currently defined as the standard deviation from a centred five-year moving average of export values (in SDR terms), for a "recent 13-year period", currently 1992-2004. The Executive Board has recently proposed to modify the definition in a new formula by adding to it the variability of net capital inflows.[34] The modification is understood as an attempt to capture financial vulnerability. Paradoxically, however, while this would lift the shares of a few emerging market economies, the principal beneficiary by far would be the United States, whose share in that variable would increase considerably, from 13.4% to 20.7%. Some other industrial countries would also profit from the proposed modification, since that they have the largest cross-border financial flows and also the largest absolute swings in these flows.

Regarding its relevance for the future of quota calculations, the question has to be addressed as to whether the variability variable implies a reward for unstable economic policies.

34 This measure of net capital flows is the difference between net asset and liability flows in the financial account. In addition, there have been suggestions to use the deviation from a three-year average (rather than the five-year average in the existing formulae) so as to capture shorter term-trends.

4.1.4 RESERVES

Since the Fund's creation foreign exchange reserves have been considered a key indicator of a country's financial strength and thus of its ability to contribute to the Fund's resources.

Reserves are currently defined in the formulae as the twelve-months average of a recent year and include foreign exchange, SDR holdings, reserve position in the Fund, and monetary gold valued at SDR 35 per ounce.[35]

Global economic developments in recent years have, however, fundamentally changed the perspective on foreign exchange reserves. If authorities conduct large-scale interventions and build up foreign exchange reserves in order to keep exchange rates artificially weak and thus contribute to distortions in global trade patterns, should this imply a higher quota in the Fund? If countries themselves recognise that they have "excess" reserves, should these excess reserves still be included in the calculation? Inclusion of reserves in a quota formula would reward such practices and would thus hardly be compatible with the objectives of the Fund. In addition, reserves have become a less relevant indicator of ability to contribute for countries with access to international capital markets; this is even more the case for the international reserve currencies.[36]

Against this background, there are three main options: one would be to eliminate reserves from the quota formula, which might meet with opposition from countries that would benefit from its inclusion. A second option would be to give reserves only a very limited weight in the formula. A third option would be to cap the reserves that enter the formula. Such a cap could be set in relation to domestic (e.g. money stock, GDP) or external (short-term debt) variables.

A cap on reserves would face many challenges. Most importantly, the IMF membership would need to agree on one benchmark for what could be considered a reasonable level of reserves for all countries. However, members are too diverse to fit under a single measure of optimal reserves, partly due to different exchange rate regimes they have chosen.

4.2 NEW VARIABLES AND RELATED ISSUES UNDER DISCUSSION

Two variables receive the main attention as candidates for a new quota formula, namely financial openness and GDP based on conversion at PPP rather than market exchange rates. Financial openness is considered to reflect the increasing importance of financial transactions and possible financial risks in the global economy. GDP in PPP terms is considered to achieve a more "equitable" distribution of quotas in the Fund by benefiting lower-income economies.

Other variables under discussion are financial contributions to the Fund and population. Linked to the openness variable is the issue of whether intra-currency union flows should be excluded.

4.2.1 FINANCIAL OPENNESS

In the first decades of the IMF, trade flows were much larger than international financial transactions, which were hampered by countries' capital controls. Therefore the inclusion of a financial variable in the formula was not an issue. However, financial globalisation has increased considerably over the past three decades and now has an important bearing on exchange rate behaviour and the international adjustment mechanism (Lane and Milesi-Ferretti 2005). Financial integration matters both for the countries concerned and for the IMF; the interaction between international financial flows and domestic stability has become an increasingly central issue for Fund surveillance and lending.

35 Some have suggested valuing gold at market price in line with international statistical standards. This would mean a more than ten-fold increase in the value of reserves in gold (in June 2007 gold prices were about SDR 430 or US$ 650 per ounce).

36 An interesting early analysis of international reserves and the IMF quota formula can be found in Hawkings and Rangarajan (1970).

Against this background, the question arises as to whether, for the purpose of calculating quotas, the concept of openness should be broadened to cover not only the current account but also the financial account. One can argue that financial openness is relevant to the multiple roles of the quota, as its extent has a bearing on the potential need of a country for Fund resources, its contribution to the Fund and its stake in the global economy. Furthermore, as the likely new definition of variability will also include a financial component, a parallel modification of the openness variable could also be justified.

As the importance of global capital markets for the Fund and its member countries is undisputed, what factors would argue against the inclusion of a financial openness variable in the quota formula? The main difficulties are linked to data quality and availability problems. Although some improvements have been achieved over recent years, the issue still remains problematic. The two main concepts used to measure financial openness, i.e. flows or stocks, both have their merits and drawbacks.

A flow measure could include the absolute sum of gross[37] inflows and outflows of FDI, portfolio investment and "other investment" within a given period of time. Compared with a stock measure, valuation is less of a problem. But the accuracy of financial account data in many countries is not sufficiently timely and reliable. Moreover, for those countries where data are not available through the IMF's International Financial Statistics (IFS),[38] "gap-filling" would be required, as for other variables when data is lacking. However, such gap-filling is more difficult for financial variables that are highly volatile.

A stock-based measure – i.e. the sum of gross external assets and liabilities reported as part of a country's International Investment Position (IIP) in the IFS – might give a more accurate picture of a country's integration in international capital markets.[39] Such a measure would show the extent of investment in a country by non-residents and of investments abroad by the residents of the same country. However, the country coverage is, while improving, still not sufficient to allow quota calculations for the whole membership. In the period 2000-04, only 106 countries reported full or partial data on their IIP to the IMF, and of those only 85 were considered full reporters. Here too, gap filling is a problem. In addition, exchange rate movements pose a particular problem for the valuation of stocks. There is as yet no harmonised methodology on this issue, including on the treatment of differences between book value and market price valuation. In terms of compatibility with the other variables, a flow measure of financial openness would logically fit better with most: GDP, current payments, current receipts and variability of current receipts are more closely related to financial flows. Conversely, the IIP is more closely related to national wealth than to GDP.

As an alternative, the income component of the current account could be used as a proxy for the IIP,[40] with the advantage that the data is already used today, since investment income is included as part of current receipts and payments in the existing openness variable.

In addition to data issues, one has to bear in mind that financial globalisation – although it has increased in most member countries – has moved furthest in advanced economies. Emerging markets and developing countries have seen more moderate increases, with benign worldwide financial conditions and abundant liquidity having supported the process in recent years. The smallest increases have been experienced by low-income countries.[41]

37 Net flows are not a useful indicator of a member's involvement. Some authors prefer value-added over gross flow data, but these are not readily available.

38 Data on flows would be partially available for 171 countries, of which 149 countries reported data for at least one year in the period between 2001 and 2005. Net FDI flows are reported more widely.

39 See Lane and Milesi-Ferretti (2005).

40 The correlation between investment income and the IIP is very high, at 0.98 for 81 comprehensive reporters; advanced countries account for 82% of the total.

41 These differences in financial openness across the Fund's membership can be explained by different capital control regimes, as well as by a range of persistent factors, including different degrees of institutional quality, domestic financial development, as well as geographic and historical linkages.

The share of advanced countries in financial account flows in the years 2000-04 amounted to 88%. The IIP concept tends to favour countries with a longer-term track record in international capital markets, which have therefore been able to build up a larger stock of assets and liabilities. Hence a flow-based measure would be preferable for emerging markets and developing countries, which are in the process of investment accumulation. Among the IIP reporting countries, advanced economies account for over 90% of the global totals, in part reflecting the fact that non-reporting countries are mainly developing countries. Some members with important international financial centres (e.g. Ireland, Luxembourg and the United Kingdom) have a particularly high IIP, which does not reflect exclusively their domestic economy but also its role as a financial intermediary. As regards total investment income, advanced economies account for about 83%. For this concept too, countries with important international financial centres have a relatively high share. This situation means that advanced economies in particular, plus a few emerging markets, would benefit from the inclusion of financial openness in the quota calculations, while other countries, especially low-income countries, would tend to lose.

4.2.2 GDP IN PPP TERMS VERSUS GDP AT MARKET EXCHANGE RATES

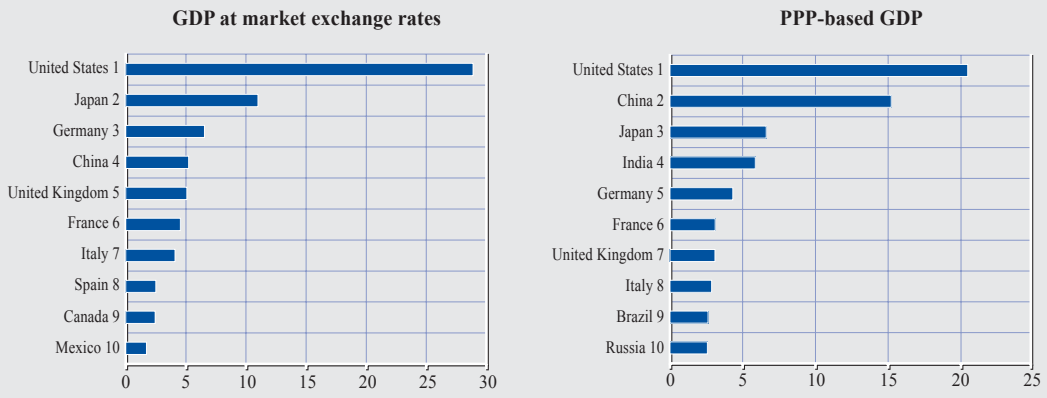
As mentioned above, differences of views exist about whether, for the purpose of quota calculations, national GDP figures should be converted into SDR at market exchange rates (MER) or using PPP. This issue has a considerable impact on the distribution of quota shares since the distribution of PPP-based GDP differs substantially from that based on market exchange rates (see Chart 12).

If PPP-based GDP were the only variable in a new quota formula, the calculated quota share of advanced countries would fall from 68% (resulting from the existing five formulae) to 52%, while that of emerging and developing countries would increase to 48% from 32% under the five formulae.

Which is the better measure for a cross-country comparison? If there were no frictions in world trade (e.g. tariffs or transport costs) prices would be the same everywhere after correcting for exchange rates, and the MER and PPP adjustments would yield the same result. But frictions are large, particularly in the service sector. In reality, therefore, MER and PPP approaches generate substantial differences in terms of relative income levels and rankings. Both approaches have advantages and

Chart 12 GDP based on market exchange rates versus PPP: the top ten economies

(in percentages of world GDP)



Source: Authors' calculation.

disadvantages, meaning that no universally correct approach exists.

PPP-based GDP is often seen as preferable when relative welfare levels of countries are to be compared. For instance, it is used in the IMF's World Economic Outlook as a measure of the volume of goods and services produced by a country and in cross-country comparisons. This approach is intended to provide accurate estimates of real incomes in countries with widely varying price structures. It is achieved by estimating the cost of a given basket of goods in a benchmark year in either the prices of another country or at some synthetic measure of world prices. A PPP approach thus assigns a single price to the same good or service regardless of where it is produced. This gives a higher value to production in the non-tradables sector in developing countries than would be implied by a market exchange rate conversion factor.

But PPP has important drawbacks in terms of data quality and availability. PPP-based GDP data of sufficient quality to be used for quota calculations are only available for a subset of the IMF membership. Data problems include long lags in the availability of data; gaps in the participation in surveys that force heavy reliance on estimation and raise questions about the validity of the data for these countries (primarily small developing countries); and lack of a common survey methodology across countries, so that the surveys are not necessarily fully comparable. In addition, the comparison of prices might neglect differences in the quality of goods.

The current round of the International Comparison Program (ICP) represents a major undertaking to upgrade the quality of PPP-based GDP data. Its objective is to provide a consistent database for the 147 countries (not all of them Fund members) participating in the voluntary program. The completion of this project is scheduled for end-2007 and is likely to lead to significant changes in PPP-based GDP estimates for individual countries. But estimates will still be required for 41 Fund members not participating.

The main benefit of using market exchange rates is that these data are observable and available in a timely manner. The main disadvantage is linked to the fact that exchanges rates can exhibit changes which are unrelated to underlying trends in countries' GDP, because currencies are traded also for purposes other than trade in goods or services. If the value of a country's currency falls by, say, half against the US dollar, the country's GDP measured in dollars will also halve, but this does not necessarily imply that the citizens of that country produced less in that period or became any poorer.

Also, market exchange rates reflect only tradable goods. As non-tradables' price levels tend to be relatively low in lower-income countries, calculations based on market exchange rates will typically understate the income levels of poorer countries relative to higher-income countries (Balassa-Samuelson effect). By the same token, a PPP-based comparison of GDP levels that uses price data biased towards high-income countries will typically overstate GDP levels of low-income countries due to the higher cost of non-tradables in higher-income countries.

In view of these differences between the two concepts, the question arises as to which would be better suited to the purpose of quota calculations. Approaching this question from the perspective of the roles of quotas, one can distinguish between the financial operations of the Fund and the non-financial activities.

GDP converted at market exchange rates can be seen as the more relevant measure of a member's ability to contribute to the Fund's resources and of its weight in the global financial system, as this concept reflects the international market value of resources generated by an economy. Likewise, it is more relevant to a member's potential need to borrow from the Fund: trade and capital flows are transacted in market

exchange rates, which in turn determine balance of payment problems.

Some argue that a case could be made for PPP-based GDP being more relevant for the Fund's non-financial activities, i.e. surveillance and capacity building, since it is used for cross-country comparison of goods and services produced by economies and would thus represent a better measure of countries' weight in the global economy (Mirakhor and Zaidi 2006).

Any decision on the appropriate conversion factor will need to balance these considerations. Political realities will also necessarily imply that countries look at the outcome of the two concepts in terms of effect on the distribution of quotas among members. In that context, it will have to be kept in mind that PPP will not necessarily always be beneficial for emerging markets; as they graduate from emerging to advanced status, market exchange rates will become more advantageous for them, too.

As a possible compromise between the different considerations, some have argued in favour of a blended variable which includes both concepts. But here also, a decision has to be taken on the weights of the two concepts, which is largely a question of judgement.

4.2.3 CONTRIBUTIONS TO SUBSIDISED LENDING

Rather than looking at the ability of countries to contribute, one could recognise their willingness to do so and consider actual financial contributions to subsidised lending schemes. In the current discussions, the idea was expressed to include contributions to the Poverty Reduction and Growth Facility (PRGF) or the New Arrangements to Borrow (NAB) as variables in the formula.

In the past, there have been cases when financial contributions have been taken into account in determining increases in members' quotas both within and outside general quota reviews.[42] However, financial contributions were never formally included in the quota formulae; they constituted additional considerations for deciding on selective or ad hoc increases.

Should the current reform discussion be used to include financial contributions in the new formula? Many practical difficulties have to be acknowledged. Which types of contribution should be considered, since members have contributed in a variety of forms, and over what period? Is a loan to the PRFG Trust of the same quality as a contribution to the subsidy account? Moreover, participation in facilities such as the NAB is not open to all members, and a certain degree of circular causation would be in place as the distribution of quotas has in turn a certain bearing on contributions to subsidised lending. For all these reasons, it would be challenging to include such a variable in the quota formula. At the same time, the issue itself clearly deserves more prominence, to show the link between rights and responsibilities in an institution such as the Fund.

To illustrate the above considerations, Table 21 provides an overview of the main contributors to the PRGF, which is the IMF's low-interest lending facility for low-income countries. This facility, which involves concessional lending to currently about 80 low-income countries, is financed through Trust funds, to which members provide contributions. Japan and European economies are the main contributors at present, several of them providing a proportion of the financing well above their quota shares in the Fund. The share of the Fund's largest member, the United States, falls far short of its quota share in the institution.

4.2.4 EXCLUDING INTRA-CURRENCY UNION FLOWS

Excluding intra-euro area trade from the openness variable of the euro area countries is often suggested by non-European observers. Their main argument is that the euro has formed a new currency area and, as for other currency

42 Examples are the ad hoc quota increases for Italy in 1964 and Saudi Arabia in 1981, the selective increases for oil-exporting countries in the sixth review, and the ad hoc increase for Japan in the ninth review.

Table 21 Contributions of selected IMF members to facilities supporting low-income countries

(SDR millions, as of end-2006)

	PRGF-ESF Trust	PRGF-HIPC Trust	Sum of both Trusts	Contribution share (percentages)	Actual quota share (percentages)	Contribution to Trusts relative to quota share
Total	**3,185.7**	**1,561.6**	**4,747.3**	**100.0**	**100.0**	
Major industral countries	**2,115.2**	**880.5**	**2,995.7**	**63.1**	**45.2**	**far above**
Canada	210.4	48.8	259.2	5.5	2.9	well above
France	369.3	82.2	451.5	9.5	4.9	well above
Germany	178.5	127.2	305.7	6.4	6.0	broadly in line
Italy	131.5	63.6	195.1	4.1	3.2	above
Japan	648.4	144.0	792.4	16.7	6.1	well above
United Kingdom	419.7	82.2	501.9	10.6	4.9	well above
United States	157.3	332.6	489.9	10.3	17.1	far below
Other advanced countries	**890.2**	**299.7**	**1,189.9**	**25.1**	**17.0**	**above**
Australia	15.5	24.8	40.3	0.8	1.5	far below
Austria	59.4	14.3	73.7	1.6	0.9	above
Belgium	105.6	35.3	140.9	3.0	2.1	above
Denmark	63.7	18.5	82.2	1.7	0.8	well above
Finland	40.9	8.0	48.9	1.0	0.6	above
Greece	36.0	6.3	42.3	0.9	0.4	above
Ireland	7.6	5.9	13.5	0.3	0.4	broadly in line
Korea	59.7	15.9	75.6	1.6	1.3	above
Luxembourg	12.8	0.7	13.5	0.3	0.1	above
Netherlands	128.5	45.4	173.9	3.7	2.4	above
Norway	42.3	18.5	60.8	1.3	0.8	above
Portugal	4.0	6.6	10.6	0.2	0.4	below
Spain	17.7	23.3	41.0	0.9	1.4	below
Sweden	174.0	18.3	192.3	4.1	1.1	well above
Switzerland	101.0	37.0	138.0	2.9	1.6	well above
Fuel exporting countries	**20.4**	**114.3**	**134.7**	**2.8**	**8.4**	**far below**
Rest of the World	**148.1**	**224.1**	**372.2**	**7.8**	**29.4**	**far below**

Source: IMF, "Update on the financing of the Fund's concessional assistance and debt-relief to low-income member countries", 4 April 2007.
Note: The abbreviations in the table stand for Poverty Reduction and Growth Facility (PRGF), External Shock Facility (ESF) and Highly-Indebted Poor Countries (HIPC).

areas (generally countries), intra-euro area trade should be excluded. This argument puts the euro area at the level of a country, which obviously stretches the political reality of European integration and does not fit with the member-country-based representation in the Fund. On a more economic level, it is sometimes argued that growing specialisation and integration within a currency union leads to an increase in gross flows between the members of the currency union, which tends to overstate the real degree of openness of these countries. Moreover, since flows within a currency union take place in the same currency, there is no exchange rate risk and hence less need for access to Fund resources.

Excluding intra-euro area trade flows from the openness variable for the euro area countries would reduce their calculated quota share by over 9 percentage points under the current five-formula approach.[43] The same exercise for all EU countries results in a reduction of the calculated quota share of up to 12 percentage points. These are considerable quantities; however, when it comes to a reduction of the calculated quota share, it has to be kept in mind that the euro area has a reserve buffer in terms of under-representation of around 5 percentage points.

43 The figures in this paragraph are based on data which take 2004 as the most recent year.

Table 22 Regional currency unions and countries using the same legal tender

Monetary unions	IMF member countries	Actual quota share	Calculated quota share
Euro area	Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Slovenia, and Spain	22.89	27.50
Eastern Caribbean Currency Union (ECCU)	Antigua and Barbuda, Dominica, Grenada, St. Kitts and Nevis, St. Lucia, and St. Vincent and the Grenadines[1)]	0.03	0.02
Central African Economic and Monetary Union (CEMAC)	Cameroon, the Central African Republic, Chad, the Republic of the Congo, Equatorial Guinea, and Gabon	0.26	0.17
West African Economic and Monetary Union (WEAMU)	Benin, Burkina Faso, Côte d'Ivoire, Guinea-Bissau, Mali, Niger, Senegal, and Togo	0.39	0.14
Other groupings using the same legal tender:			
Euro	Euro area, San Marino, and Montenegro	22.91	27.53
US dollar	United States, El Salvador, Panama, Ecuador, Timor-Leste, Palau, Marshall Islands, Micronesia, and general acceptance in Bahamas, Barbados, and Belize	17.50	16.53
Indian rupee	India, and Bhutan	1.91	1.29
Australian dollar	Australia, Kiribati	1.49	1.21
Rand	South Africa, Lesotho, Swaziland, and Namibia	0.96	0.51
Singapore dollar/ Brunei dollar	Singapore and Brunei	0.50	1.98

Source: Authors' calculation; see also Winkler et al. (2004) for a comprehensive overview of cases of dollarisation/euroisation.
1) In addition, the ECCU includes two dependent territories of the United Kingdom, namely Anguilla and Montserrat.

However, such an operation cannot be limited to one currency area alone. For reasons of consistency and equal treatment, the exclusion of intra-currency union trade would need to apply to all monetary unions, even if, as is most likely, only the case of the euro area would have a significant effect on the Fund. Other regional currency unions recognised by the IMF include the Eastern Caribbean Currency Union, the Central African Economic and Monetary Union and the West African Economic and Monetary Union (see Table 22). Excluding intra-currency area trade from the openness variable for these small and/or lower-income countries would punish their efforts to increase regional integration to the extent that a common currency raises intra-region trade (this impact differing from union to union).

More generally, it is difficult to determine whether currency unions in general are an important driver of intra-currency area trade. And it has to be recognised that increased intra-regional trade and vertical integration are by no means a phenomenon limited to currency unions. As argued above (see the section on the openness variable), extending the production chain across borders is one of the central features of globalisation. More specifically, increased integration is also relevant to other trading regimes, such as free trade areas, customs unions or common markets. Given the large number of such arrangements worldwide – as at December 2006 as many as 368 regional trading arrangements had been notified to the World Trade Organization (WTO) – virtually all IMF members take part in a regional integration scheme.[44] Hence the difficult question would be where to draw the line for the purpose of quota calculations. Finally, data availability might also be an issue, since the directions of international exchange statistics for services, income and transfers are more difficult to ascertain than for trade.

44 In addition, countries introducing a foreign currency as their own legal tender replicate the characteristics of a currency union. Even specific cross-border arrangements like the maquiladora programme between the United States and Mexico give rise to specialisation and considerable re-exports.

The argument that currency union membership would lower the need for Fund assistance might be true for the specific case of the euro area since it seems highly unlikely that euro area countries would have recourse to the Fund. However, in principle they remain entitled to such assistance like any other Fund member and like a number of Caribbean and African countries that received Fund support while participating in a currency union. Having the same currency eliminates exchange rate-driven disturbances of the balance of payments but does not preclude other potential sources of risk, e.g. macroeconomic, political or liability-related risks. Reserve pooling arrangements among currency union members are also not unique to currency unions (see for instance the Chiang Mai initiative). Moreover, if the argument that the absence of exchange rate risk leads less need for Fund support were to hold generally, the question arises whether it would need to apply not only to currency union members but also to economies using the same legal tender. Even though their monetary governance framework differs fundamentally from that of currency unions, an exchange rate risk with trading partners using the same currency can be considered as excluded.

4.2.5 POPULATION

Population as a variable was discussed in the early days of Bretton Woods. It would obviously make the Fund more "democratic" but is not straightforward to square with the notion of a financial institution. Yet, through the notion of basic votes, of which the same number is given to all members, the Fund shows a conceptual opening for a democratic representation, although basic votes are not related to population.

The introduction of a population variable has the potential to lead to massive changes in the quota distribution. A radical switch from the status quo to a representation based solely on population would mean that of the largest 20 IMF members only 9 countries would remain in this group, which would then be led by India and China. If all quotas were to be distributed according to countries' shares in world population, advanced economies would have a share of only 15%, whereas they currently hold around 60% of actual quotas. Conversely, the share of developing countries, which is currently roughly 40% of actual quotas, would rise to 85%.

Interestingly, population is distributed almost as unequally among IMF members as GDP based on market exchange rates. China and India (the top two) together account for 38% of the world's population, whereas the top 10 makes up 60%. The respective figures for the GDP variable are 40% and 70%. This indicates that even a population variable would be no substitute for basic votes because it too would lead to a concentration of quotas on a few members, albeit on a different group compared with current variables.

Of course, even proponents of this concept would probably only argue for a limited role for population in a quota formula. Interestingly, however, population is relatively closely correlated with GDP based on PPP (0.69). Various quota formula simulations show that population can provide a relatively close proxy for PPP-based GDP.[45] Nine out of the top 15 countries in terms of population (see Table 23) also appear in the top 15 ranking of PPP-based GDP.

This correlation can be used in further discussions in two ways: one could argue that in view of this link population, as a non-economic variable, should not be further considered and PPP-based GDP should be favoured instead. Or one could turn the argument around, suggesting that given the data problems of PPP-based GDP and the fact that population data are generally available, the latter should be used in a new formula. But all in all it would not be straightforward to let population size

45 A scenario in which population were given a weight of 5% and market-rate-based GDP a weight of 45% would closely mirror the results of a scenario with a blended GDP variable at a 50% weight, of which 25% would be PPP and 75% market-rate-based GDP.

Table 23 The 15 members with the largest population size

		Population		PPP	Actual quota share
		millions	percentages	percentages	percentages
1	China	1,323	20.6	15.2	3.7
2	India	1,103	17.2	5.9	1.9
3	United States	298	4.6	20.5	17.1
4	Indonesia	223	3.5	1.6	1.0
5	Brazil	186	2.9	2.6	1.4
6	Pakistan	158	2.5	0.7	0.5
7	Russia	143	2.2	2.6	2.7
8	Bangladesh	142	2.2	0.5	0.2
9	Nigeria	132	2.1	0.3	0.8
10	Japan	128	2.0	6.6	6.1
11	Mexico	107	1.7	1.8	1.4
12	Germany	83	1.3	4.3	6.0
13	Philippines	83	1.3	0.7	0.4
14	Vietnam	83	1.3	0.4	0.2
15	Ethiopia	77	1.2	0.1	0.1
	per memoriam:				
	Euro area	310	4.9	15.4	22.9

Source: Authors' calculation.
Note: All figures refer to 2005.

determine the institutional governance of an institution dealing with monetary stability of the world economy.

4.3 WEIGHTS OF INDIVIDUAL VARIABLES

Not only the choice of variables, but also the choice of their respective weights in a new formula is a decision that is not straightforward. Since different variables favour different countries, there are not only conceptual but also distributional issues involved.

The IMF's Board of Governors has given some guidance, requiring that "consideration be given" to placing "significantly higher weight on members' gross domestic product" and ensuring that "other variables, in particular the openness of members' economies, also play an important role." Given that openness today has a far higher weight than GDP (see Chapter 3) it is not evident whether the weight assigned to GDP should be larger or smaller than that assigned to openness. Other variables are not mentioned explicitly but the use of the plural suggests that there is at least one more variable beyond GDP and openness to be considered. Hence the menu of options includes the use of two to four variables, if, to limit complexity, the number is not to rise above the current level.

The decision on the weights to be assigned to the variables is ultimately a matter of judgement and political compromise. Given that countries' shares in the various variables differ significantly (see Table 24), so will their preferences. A higher GDP share is advantageous only for the group of G7 countries, whereas openness generally favours advanced economies. A higher weight for variability has a varied impact on the different groups, and reserves clearly favour the emerging markets.

These potential gains and losses also illustrate that it will be difficult to design a new formula that does not contain all the four variables included in the current system. This also explains why in Chapter 2 one of the illustrative formulae comprised all four variables.

Table 24 Shares in variables compared with respective calculated quota shares

Grouping	Status quo: calculated quota share	GDP share	Higher?	Openness share	Higher?	Variability share	Higher?	Reserves share	Higher?
Euro area	27.50	22.83		32.11	H	23.67		5.02	
Total EU	37.77	31.00		43.74	H	31.26		11.42	
G7	45.90	62.64	H	47.72	H	43.27		29.54	
other EU	18.24	10.71		19.75	H	17.87		7.14	
other G20	19.10	17.78		17.64		18.66		40.66	H
Rest of the world	16.77	8.86		14.89		20.19	H	22.65	H
Sum:	100	100		100		100		100	
ROW of which:									
ROW: Other Advanced	3.19	2.07		3.44	H	3.49	H	3.31	H
ROW: Developing	13.58	6.80		11.45		16.71	H	19.34	H
African Constit.-19	1.32	0.99		1.16		1.70	H	1.61	H
African Constit.-24	0.41	0.26		0.38		0.66	H	0.31	

Source: Authors' calculation.
Note: An "H" indicates that a variable share is higher than the respective calculated quota share.

4.4 THE MATHEMATICAL SHAPE OF A NEW FORMULA

The Singapore resolution states that a new quota formula should provide a simpler and more transparent means of capturing members' relative positions in the world economy. What does this imply in practical terms for the design of the new formula? It can be read as saying that the formula should provide for an intuitive and stable relationship between the variables and the calculated quota shares. Translated into mathematical terms, this implies that a new formula should have the following technical properties:

- *Homogeneity:* a uniform change for all members in all variables (such as a doubling of amounts) should leave members' calculated quota shares unchanged.

- *Monotonicity:* if the value of one variable in the formula increases, the formula outcome should also increase.

- *Non-convexity:* the outcome should not increase over-proportionally if the value of an underlying variable rises. The marginal impact of a variable on the quota should be either constant or decline as the variable increases.

The current five-formula system does not fulfil these requirements. As mentioned above, fast growing countries can have a lower calculated quota share if their GDP is rising faster than their exports. In addition, a doubling of all variables would not be neutral in the current system, as it would not leave the quota distribution unchanged.

One first question that needs to be addressed is the issue of whether variables should enter the formula in absolute levels, as in the existing five formulae, or be expressed as shares. A formula with variables in levels has some drawbacks. The relative importance of the variables is less transparent and difficult to interpret since the coefficients of the variables cannot be interpreted as true weights and therefore may change over time.[46] The use of variables in shares is more transparent, as their coefficients explicitly represent the weights of the individual variables and remain stable over time. Thus, the importance of a variable is directly observable. Given these considerations, variables in shares seem to be preferable for the new quota formula.

46 The implicit weights are a result of multiplications of coefficients and the sum of a variable over all members and normalised over all variables, which means that they change over time and are not directly observable.

Table 25 Linear and multiplicative formulae

Linear formula	Multiplicative formula
$Q_i = \alpha A_i + \beta B_i + \gamma C_i + \delta D_i$	$Q_i = k\, A_i^{\alpha} B_i^{\beta} C_i^{\gamma} D_i^{\delta}$

Notation: Q_i: calculated quota share of country i; A_i, B_i, C_i, D_i: variable shares for country i (assuming four variables); α, β, γ, δ: Variable weights, which are positive and add up to 1; k: Rescaling factor to ensure that calculated quota shares for all countries add up to 100%.

In principle, both linear and multiplicative formulae which use variable shares have the above-mentioned properties and are thus preferable to the current five-formula system (see Table 25).

A *linear formula*, in which individual variables are added, has many advantages. It is straightforward and intuitive, and the coefficients can be interpreted as weights (provided that they are positive and sum to unity). Hence members' relative positions are directly observable. Moreover, the coefficients have an easy interpretation, as they represent the percentage point impact on the calculated quota share of a given percentage point change in the member's share of the variable in question. The elasticity of a calculated quota share in respect to a variable share is always positive but varies across the membership.

A *multiplicative formula*, which is homogenous of the degree α+β+γ+δ, features constant elasticities of variables across members; i.e. a percentage increase in a variable would have the same proportional impact on the calculated quota share for all members. However, the interpretation of the exponents as weights is less straightforward than in the case of a linear formula,[47] partly because of a rescaling factor k, which is necessary to ensure that quota shares sum to unity. Therefore the calculated quota share of a country depends on the distribution of variable shares among the other members. This implies that a country's calculated quota share can be altered by a change in other members' variable shares and the resulting necessary change in k, even if its own variable shares remain unchanged. This does not happen with a linear formula. In addition, a greater dispersion of individual shares leads to a lower calculated quota share, since the result of multiplication is higher when values are similar.

4.5 THE ISSUE OF COMPRESSION

Any formula that gives GDP at market exchange rates a higher weight than today is bound to significantly raise the calculated share of the United States and some other advanced economies, and to lower that of smaller and poorer countries. Likewise, a formula with a high weight for PPP-based GDP would create new outliers, i.e. especially China, whose weight in the global economy reaches 15% on this measure. One way to avoid outliers with very high calculated quota shares and to rebalance the quota distribution somewhat would be to use a compression factor. Compression would shift calculated quota shares from countries with higher shares to those with lower shares. Although it affects members' relative sizes, it would maintain their relative positions and hence leave their ranking unchanged.

Technically, compression can be used for any linear or multiplicative formula by applying a positive exponent smaller than unity. For example, consider the linear formula $Qi = \alpha A_i + \beta B_i + \gamma C_i + \delta D_i$. With compression, it becomes $Qi = k\,(\alpha A_i + \beta B_i + \gamma C_i + \delta D_i)^c$, where the exponent c indicates the degree of compression. The lower this compression factor c, the higher the compression effect, i.e. the more compressed the distribution. It means

47 In case of a multiplicative formula, the coefficients reflect the weights for a percentage change after a logarithmic transformation of the variable.

that when one of the variables A, B, C or D increases by 1, the quota share increases only by 1^c which is less than 1 for c<1. The rescaling factor k guarantees that all Q_i add up to 100%.[48]

To see the effect of compression in the context of the IMF quota formula reform, consider the following formula with and without compression:

without compression:
(1) $Q = (0.5\ Y + 0.3\ O + 0.15\ VC + 0.05\ R)$

with compression:
(2) $Q = k\ (0.5\ Y + 0.3\ O + 0.15\ VC + 0.05\ R)^{0.9}$

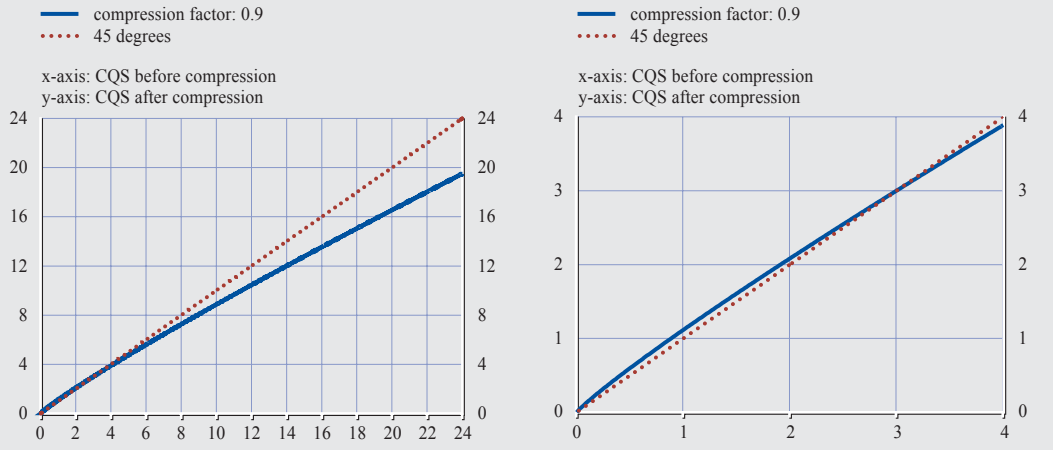
The effect of compression for IMF members with the formula above is shown in Chart 13.

As can be seen from the charts above, compression leads to a hump-shaped distribution of quota shares, with countries below a certain quota share – in this example just above 3.0% – benefiting from the compression, and the others losing share. In other words, the calculated quota shares of the members move towards each other, hence the term "compression". Moreover, it is important to note that larger countries with high quota shares see a considerable reduction (especially the United States) while the smaller countries gain only marginally. This is explained by the fact that the mass of the calculated quota shares is redistributed from very few members (with the formula in this example only eight countries have a calculated quota share larger than 3%) to 177 members whose share is below this threshold.

Such rebalancing of quota shares through compression would follow the same reasoning as the justification of basic votes, namely that in an institution such as the IMF the relationship between a member's economic size and its quota or voting share should not be purely linear. Compression would reduce the dispersion of members' quota shares and could thus

48 A special case is that of c=0.5, which corresponds to the square-root formula developed by Lionel Penrose in 1946. We do not pursue this further here, as it is based on representation of citizens, not countries. Penrose found that the effective voting power of a citizen, i.e. the probability of being decisive in a vote, roughly corresponds to $1/\sqrt{(N)}$, with N being the population of the country. It has therefore been suggested that, in a multi-country setting, each country should receive a weight of $\sqrt{N}$ to ensure an equal representation of citizens across countries.

Chart 13 Calculated quota shares before and after compression



Source: Authors' calculation.
Note: The 45 degree line in both charts shows the distribution of quota shares without compression. The other curve gives the distribution with compression. The right-hand panel is a magnified section of the left-hand panel.

contribute to enhancing the cohesion of the Fund. In terms of beneficiaries, compression would increase the quota shares of all developing and emerging market countries, with the notable exception of China, which is one of the countries having a quota share above 3% and likely to lose with compression.

A comparison with income taxation may illustrate the different effects of basic votes and compression. Basic votes compare to a lump-sum tax-exempt amount, while compression compares to the progressiveness of the tax schedule. For low-income earners whose income either falls entirely into the exemption range or is close to it the exemption threshold is of paramount importance in determining their after-tax income position. For high-income earners, in contrast, it makes little difference whether the exemption threshold is moved; the bulk of their tax liability arises from income above this threshold being taxed progressively, and the top marginal tax rate will generally be most important variable in determining their after-tax income position.

Hence, just as both an exemption and a progressive tariff are part of tax schedules in most countries, compression and basic votes not only have their separate justification but can also be combined to derive voting shares from economic weight. Both are simple, transparent and well-understood tools to introduce equity considerations into members' voice in an organisation.

It is also interesting to note that virtually all organisations employ one or both these tools to achieve a greater balance in representation than "pure" underlying variables would suggest (see Table 26). For the ECB, its capital key is strictly proportional to underlying variables, yet each member of the ECB's Governing Council has one vote.

4.6 THE ISSUE OF BASIC VOTES

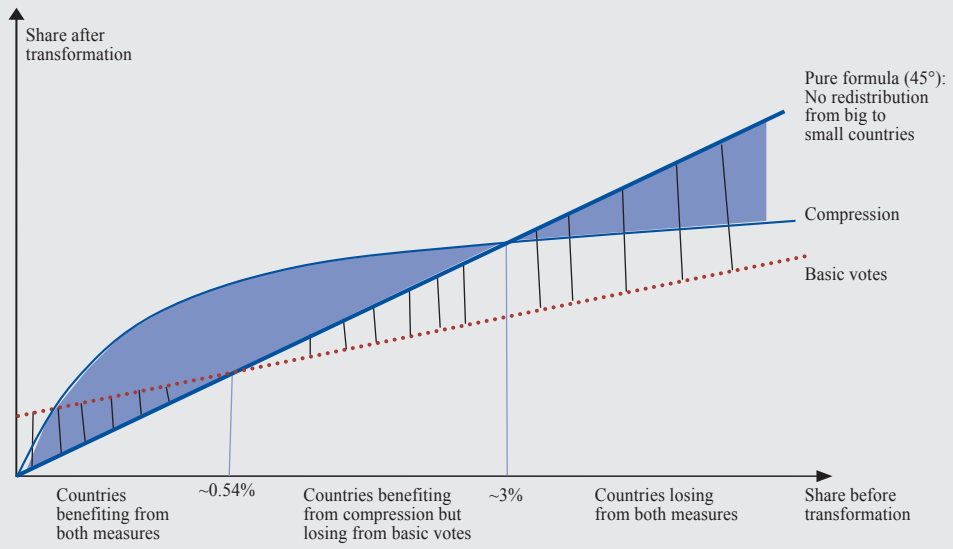
Ensuring an adequate voice for low-income countries has been regarded as a central element of the Singapore reform package. Since it was recognised that quota increases would lead to an erosion of the voting shares of low-income countries, the entering into effect of the second-round increases was made dependent on the amendment of the Articles of Agreement to raise the number of basic votes. The precise size of the increase was left open, since it will also depend on the amount of the quota increase.

Table 26 Equity considerations in selected institutions and in the area of taxation

Institution/policy area	Tool	Comment
IMF Executive Board	Basic votes	Small impact (currently only 2% of votes)
EU Council	More votes per head for smaller countries	
EU Parliament	More seats per head for smaller countries	A minimum level of 5 and a maximum level of 99 seats provide for a greater number of seats per head for smaller countries.
ECB capital key	none	The shares of the national central banks in the ECB's capital key are weighted according to the shares of the respective Member States in the total population and the GDP of the EU, in equal measure.
ECB Governing Council	One person, one vote	Governing Council members vote in their personal capacity.
ECB Governing Council (following euro area enlargement)	Rotation scheme	See "The adjustment of voting modalities in the Governing Council", ECB Monthly Bulletin, May 2003.
Taxation	Minimum exempt income and progressive income tax	A combination of the two instruments has a significant impact on the after-tax income distribution. Minimum exempt income is a significant share of average low incomes, and the marginal tax ratio rises considerably with rising incomes in most countries.

Source: Authors' compilation.

Chart 14 Redistribution effects of compression and basic votes



Source: Authors' compilation.

The resolution merely stipulates that basic votes should be at least doubled and sufficient to preserve the existing voting shares of low-income countries as a group. It also calls on the Executive Board to ensure that the share of basic votes in total votes remains constant in future.

An increase in basic votes would benefit those countries whose quota share is below the average quota share.[49] How does the redistribution of shares via basic votes compare that achieved by compression? Chart 14 shows both measures. Compression leads to a hump-shaped curve which intersects with the bisector at around 3% – depending on the formula and the characteristics of the members. The blue area right of the intersection is redistributed to the left; hence countries with a share larger than 3% give part of their share to countries below 3%. The introduction of basic votes leads to a different redistribution pattern with a considerably lower threshold. The dotted line crosses the bisector at around 0.54%, meaning that countries above this give up share (see shaded area) in favour of countries with smaller shares. Thus, a combination of compression and basic votes leads to three different groups of countries: the group of members with the smallest shares are beneficiaries of both measures; members with intermediate-sized shares profit from compression only; and countries with larger shares lose from both redistribution instruments.

Table 27 lists the voting shares of EU countries after different increases in basic votes to illustrate the impact of basic votes; all scenarios are based on the current distribution of actual quota. It can be seen that countries below an actual quota share of 0.54% win while the others lose; the higher the basic votes are the more pronounced the effect. A look at the two aggregates reveals that both the euro area and the total EU are contributors rather than recipients in the redistribution.

49 With 185 members the average quota share is 100/185 = 0.54.

Table 27 Voting shares of EU countries after different increases in basic votes

	Actual quota share	Voting share	Voting shares after an increase in basic votes to...			
	status quo (250 basic votes)		500	1,000	1,500	2,200
Euro area	22.89	22.56	22.24	21.65	21.09	20.39
Germany	5.98	5.87	5.76	5.55	5.36	5.12
France	4.94	4.84	4.76	4.59	4.44	4.24
Italy	3.24	3.19	3.13	3.03	2.94	2.82
Netherlands	2.37	2.33	2.30	2.23	2.17	2.08
Belgium	2.12	2.08	2.05	1.99	1.94	1.87
Spain	1.40	1.38	1.37	1.33	1.30	1.27
Austria	0.86	0.85	0.85	0.84	0.82	0.81
Finland	0.58	0.58	0.58	0.58	0.58	0.57
Portugal	0.40	0.40	0.40	0.41	0.41	0.42
Ireland	0.39	0.39	0.39	0.40	0.40	0.41
Greece	0.38	0.38	0.38	0.39	0.40	0.40
Luxembourg	0.13	0.14	0.15	0.16	0.17	0.19
Slovenia	0.11	0.12	0.12	0.14	0.16	0.17
Total EU	32.36	31.99	31.64	30.97	30.35	29.56
United Kingdom	4.94	4.84	4.76	4.59	4.44	4.24
Sweden	1.10	1.09	1.08	1.06	1.04	1.01
Denmark	0.76	0.75	0.75	0.74	0.73	0.72
Poland	0.63	0.63	0.63	0.62	0.62	0.62
Hungary	0.48	0.48	0.48	0.48	0.48	0.49
Romania	0.47	0.47	0.48	0.48	0.48	0.48
Czech Republic	0.38	0.38	0.38	0.39	0.40	0.40
Bulgaria	0.29	0.30	0.30	0.31	0.32	0.33
Slovakia	0.16	0.17	0.18	0.19	0.21	0.22
Lithuania	0.07	0.08	0.09	0.10	0.12	0.14
Cyprus	0.06	0.07	0.08	0.10	0.12	0.14
Latvia	0.06	0.07	0.08	0.10	0.11	0.13
Malta	0.05	0.06	0.07	0.09	0.10	0.12
Estonia	0.03	0.04	0.05	0.07	0.09	0.11

Source: Authors' calculation.
Note: To replicate the share of basic votes in total votes at the IMF's inception and in the late 1950s, approximately 1,500 and 2,200 basic votes respectively would be needed today.

4.7 HOW WILL A NEW FORMULA CHANGE ACTUAL QUOTAS?

Agreement on a new formula will not change anything in the distribution of actual quota shares in the Fund as long as no actual adjustments take place. For this reason, the Singapore reform package included a commitment to a second round of ad hoc quota increases "with a view to achieving a significant further alignment of members' quotas with their relative positions in the world economy, based on the new quota formula." Since it is well understood that this second ad hoc increase will not be sufficient to address all misalignments, it was also envisaged in Singapore that later general quota reviews would focus on the objective of realigning members' positions.[50] But at the same time, the traditional logic of ensuring that the Fund has sufficient liquidity – or conversely that there is a liquidity need that justifies a quota increase – will come back to the forefront in the context of these general reviews. Given that the two rounds of quota increases in the context of the Singapore resolution will further augment the Fund's already comfortable liquidity situation, it is not evident that the next general review – which will take place between 2008 and 2013 – will also conclude with a quota increase. This uncertainty in terms of the timing and of outcome of any future correction to the quota

50 The report of the Executive Board to the Board of Governors also mentions that it plans to consider, as part of the reform programme, whether to amend the Articles of Agreement so as to clearly specify this objective in the Articles themselves.

distribution explains the importance being placed on the second ad hoc quota increase to be agreed at the latest by the Annual Meetings 2008.

The details of this second round of quota increases were deliberately left open in Singapore. There was an understanding that the rebalancing of quota shares should be "significant" and that a broader range of countries could be included. In addition, the International Monetary and Financial Committee (IMFC) Statement of 14 April 2007 gave another indication, stating that the second ad hoc increase should result in a "higher share for *dynamic economies*, many of which are emerging markets economies, whose weight and role in the global economy have increased". This language has to be seen as a compromise in the sense that it does not refer to emerging market economies *as a group* as these had wished.

Against this background, policy-makers need to reach agreement on a full set of issues. How large should the second-round increase be in comparison with total IMF quotas, given that the first round amounted to 1.8%? How many countries should benefit? If all under-represented countries were to benefit, this would imply either a large total quota increase or a tiny correction of countries' under- and over-representation. If only a subgroup were to benefit, how many countries should be chosen, on the basis of which criteria, and how much of countries' under-representation should be corrected?[51]

An important issue will also be what to do with those countries which are currently over-represented but might be qualified as "dynamic economies", such as India or Brazil. If they are not part of the group that receives a quota increase, their quota shares will automatically fall. On the other hand, any quota increase they were to receive would limit the amount available for others.

Another issue relates to advanced economies, specifically whether they are prepared to forego all or part of the quota increase they would be entitled to. The United States has repeatedly announced its willingness to limit the increase it requests to that which would achieve the level of its quota share prior to the Singapore resolution, i.e. 17.4%. At the same time it has invited others to follow its example – which is an implicit acceptance of an ad hoc increase for under-represented European countries back to their pre-Singapore level. This issue is even mentioned in the report of the Executive Board to the Board of Governors, which states that "Large advanced economies that already have a sizable voting power in the Fund and that prove to be eligible for ad hoc increases in the second round may be willing to consider foregoing, or at least limiting, the increases that they request. This would augment the quota increases available for other under-represented members for a given aggregate increase in quotas".

In any case, the second-round quota increase is not likely to fully eliminate the issue of under-representation, because this would necessitate a very high total quota increase as long as over-represented countries do not give up quotas.[52] Since countries cannot be forced to give up quotas, and are not likely to do so, the under-represented countries would need to be given much higher quotas than the gap between their calculated and actual quota shares suggests in order to bring down the actual quota shares of over-represented countries to the latter's respective calculated quota shares. This would imply the need for a total quota increase which could – depending on the formula and hence the calculated quota shares – be as high as 800% if

51 The criteria used for the selection of the countries that benefited in the first round of ad hoc increases were the individual variables used in the formulae. The four countries were the only ones that were both substantially under-represented on the basis of the existing formulae and their shares in GDP, openness, variability and reserves.

52 The elimination of all under-representation implies also the elimination of all over-representation. If all over-represented countries were to give up quotas, which would be reallocated to those under-represented, obviously no increase would be necessary.

Table 28 Costs of insurance against "collateral damage" as a result of a quota increase

No	Formula	Insurance cost (%)
1	$Q_1 = (0.5\ GDP + 0.5\ Openness)^{0.9}$	4.51
2	$Q_2 = (0.5\ GDP + 0.3\ Openness + 0.15\ Variability + 0.05\ Reserves)^{0.9}$	0.65
3	$Q_3 = (0.4\ GDP + 0.4\ Openness + 0.2\ GDP\ at\ PPP)^{0.9}$	5.22

Source: Authors' calculation.
Note: A second-round quota increase for all under-represented members amounting to 5% of total quota is assumed. For a discussion of these formulae see Chapter 2.

under-representation were to be completely eliminated.

It should also be borne in mind that any significant quota increase for under-represented countries leads to a new problem – a kind of "collateral damage" – namely that formerly over-represented countries might become under-represented, thus increasing the number of under-represented countries. While their absolute quotas would be unchanged, their quota shares would fall as a consequence of the quota increase given to others. To mitigate this problem, an "insurance" mechanism could be established that retained part of the total quota increase and allotted it to those countries that would otherwise become under-represented after the ad hoc increase.[53] The cost of the insurance in terms of necessary quota is small (see Table 28). In the case of our illustrative formula No 1 and a second-round ad hoc increase of 5%, the insurance cost is 4.5%, i.e. 4.5% of the quota increase is diverted to countries which would otherwise switch from being over-represented to under-represented as a result of the ad hoc increase. This insurance mechanism could guarantee that the number of under-represented members does not increase – which would be a paradoxical outcome of an operation aiming to diminish under-representation – and would thus also contribute to enhancing the acceptability of the quota allocation.

4.8 SUMMARY

This chapter has offered an analysis of the various avenues for reform. Starting with the rationale of the quota system, it has reviewed existing and possible new variables for a formula to determine quota shares and has discussed weights, functional form and special issues, including PPP conversion, compression and basic votes.

The chapter has shown that of the existing four variables,[54] the justification for two of them has weakened. Including reserves is more difficult to justify in a world where accumulation has taken place to at times "excessive levels" by countries' own admission, and at times as a result of misaligned currencies. Variability is more difficult to justify in a framework where transparency is crucial. Moreover, it does not unambiguously favour less developed or "vulnerable" countries but also the large and advanced economies heavily involved in international trade and finance, which are unlikely to draw on Fund financial support. Hence the justification for including variability as a reflection of vulnerability and potential access to IMF resources has also weakened.

The chapter has explored options for new variables, in particular financial openness and PPP conversion rates. Financial openness clearly seems a desirable concept, reflecting growing global financial integration and a continued role for the IMF in financial issues ranging from capital account liberalisation via financial sector assessment programmes to global financial stability analysis. The main

53 If not all under-represented countries belonged to the group of beneficiaries of the quota increase, one could think – in addition – of a second insurance mechanism which would guarantee that the quota increase did not worsen the situation of any under-represented country.

54 The two separate variables "current payments" and "current receipts" are understood as one variable in principle.

problem in this area, however, remains data availability and comparability, which require considerable technical work. Moreover, policy-makers need to be aware that an inclusion of financial variables in openness would shift further quotas to advanced economies. Even emerging market economies are only beginning to play a more significant role in international financial integration, and developing economies matter very little so far. Hence, if one wanted to avoid a further concentration of quotas among advanced economies, one would have to use other levers to offset the quota shift towards these economies arising from financial openness in the formula.

One of these possible levers is to use PPP conversion rates to compare GDP internationally. This would clearly shift quota towards emerging and developing economies but has a weak conceptual bearing in an international financial institution. The chapter has also explored the features of two other parameters to boost the representation of smaller and/or low-income countries, an existing one – basic votes – and a new one: compression. Both are simple and transparent, both are well established concepts (corresponding to income thresholds and progressive tax schedules, respectively, in public finance) which can be employed to alter the outcome of strong principle and market-based variables, and the two can be combined.

With this analysis, the chapter has aimed to illustrate the key choices for policy-makers; the three illustrative formulae previewed in Chapter 2 are consistent with possible main avenues of reform.

5 CONCLUSIONS

Quota discussions are among the most difficult issues for the Fund membership to deal with. It is probably no exaggeration when observers speak of a "rancorous history of IMF quota negotiations" (Truman, 2006, p.71). These discussions involve to a large extent distributional issues that are inherently politically sensitive. In a system in which countries strive for influence relative to others, quota reviews are a zero-sum game and by definition leave part of the membership dissatisfied. With such dissatisfaction, there is a risk that countries disengage from the Fund and thus from the framework of international monetary cooperation. Over the long run, this may weaken the status of the IMF and the stability and efficiency of the global economy, to the extent that the institutional framework for dealing with macroeconomic challenges arising from globalisation is no longer robust.

The difficulty of quota discussions results from a combination of two factors: first, an objective framework that is criticised for being excessively complex and not transparent; second, subjective judgement reflected in past quota adjustments that is criticised for being unfair, especially to non-advanced economies, by not closing sufficiently, or sufficiently rapidly, the gaps that have emerged in representation. The problem of intransparency and political quarrelling over quotas has accompanied the IMF since its inception. The economist who developed the first formula at the Bretton Woods Conference wrote that already at the Bretton Woods conference "more than half of the delegates strongly objected to the quotas for their countries, and several demanded to know how the quotas had been calculated" (Mikesell, 1994, p. 35-36).

Quota discussions, which are comparable to internal restructuring in organisations, are also difficult internally, absorbing considerable resources. Executive Board time is spent on a matter that does not directly serve the outside world but is by definition inward-looking. An institution that is meant to provide a public service to the outside world is bound up in itself every five years for sometimes a year or more with the issues of quotas and internal representation.

These considerations beg the question of whether quota discussions are necessary at all. Is it necessary that the Fund discusses on an almost continuous basis how shares and voting weights are attributed to its members, reviewing both the formula and the adjustments to the formula results? Would it be preferable to devise a simple, transparent formula that balances economic and equity considerations clearly, with adjustments being made to actual weights of members as economic developments warrant? Hence the open question is whether the current review also offers a more far-reaching opportunity, namely to find rules of representation and voice that are accepted beyond question and that can work lastingly. Today, this possibility may seem remote. For the Fund to make a step in this direction, it would take a formula that is not only simple and transparent but also balances efficiency and equity considerations by construction. Perhaps the outcome of the Quota Review Group of 1999/2000 was not accepted because it focused too much on efficiency and thereby unduly favoured the developed world and the largest economies in particular. A market-based approach that includes a clear element of fairness – such as compression and a considerable increase in basic votes – could be a step in the right direction.

If such a framework is combined with significant quota increases for under-represented countries, the Fund may – gradually – move to a situation in which ad hoc quota adjustments will no longer be needed. This would take political discussions out of the institution and free resources for more important tasks involved in contributing to the stable and efficient functioning of the global economy.

The purpose of this paper has been to shed some light on the many technical aspects of the quota

debate, by analysing the intricacies of under and over-representation at the Fund under the status quo and by analysing various solutions for a new formula.

The paper started with the anecdote of Columbus' egg. There exists also a slightly different version, which is somewhat less well documented and perhaps less authentic, but no less charming. This anecdote has it that Columbus was planning his discovery voyage and was trying to raise financial support for the trip. But he was having trouble convincing people that his project had a chance of success. So by way of demonstration, he picked up an egg. "Is it possible to set this egg down on its tip?" he asked. "Of course not, everyone knows that!" people replied. Columbus set the egg down hard on its tip, using enough force to break the shell a little so that the egg stood up on the flattened tip. – "Oh, you mean like that? That's easy!" – "Yes", Columbus replied, "it's easy once you know it. It's a little harder to trust in something that hasn't been discovered yet."

This paper does not claim to have found the answer or the egg – it merely hopes to signal a few possible routes on the voyage towards the discovery of a new – simple and transparent, efficient and fair – formula for representation at the IMF.

Basic data [1)]

(percentages of the total for all IMF members)

		Actual quota share	Calculated quota share	Voting share	GDP	Openness	Variablity	Reserves	PPP
1	United States	17.076	16.284	16.732	28.893	15.048	20.728	2.061	20.467
2	Japan	6.119	7.011	6.003	11.003	5.313	6.870	22.279	6.615
3	Germany	5.979	6.850	5.866	6.550	8.662	6.024	1.415	4.313
4	France	4.936	4.129	4.844	4.544	5.015	3.157	1.000	3.112
5	United Kingdom	4.936	5.240	4.844	5.088	6.312	2.383	1.046	3.095
6	China	3.719	6.137	3.652	5.227	5.612	3.384	19.448	15.217
7	Italy	3.243	3.317	3.187	4.105	3.996	1.830	0.817	2.872
8	Saudi Arabia	3.211	1.030	3.155	0.636	0.874	0.814	0.677	0.576
9	Canada	2.928	3.065	2.878	2.455	3.369	2.282	0.923	1.856
10	Russia	2.733	1.702	2.687	1.462	1.491	2.183	3.953	2.571
11	Netherlands	2.373	2.897	2.335	1.459	3.428	1.318	0.295	0.861
12	Belgium	2.117	2.270	2.084	0.855	2.592	1.877	0.256	0.553
13	India	1.911	1.287	1.883	1.661	1.089	0.863	3.632	5.868
14	Switzerland	1.590	1.485	1.568	0.862	1.737	1.478	1.151	0.405
15	Australia	1.488	1.205	1.468	1.537	1.168	1.035	1.045	1.063
16	Mexico	1.449	1.841	1.430	1.719	1.945	2.061	1.798	1.793
17	Spain	1.401	2.237	1.384	2.507	2.712	1.742	0.290	1.825
18	Brazil	1.396	1.069	1.378	1.563	0.896	1.887	1.561	2.627
19	Korea	1.346	2.512	1.329	1.706	2.307	2.413	5.506	1.652
20	Venezuela	1.222	0.427	1.208	0.266	0.294	0.658	0.624	0.256
21	Sweden	1.101	1.172	1.089	0.831	1.369	0.949	0.585	0.454
22	Argentina	0.973	0.368	0.964	0.382	0.350	0.939	0.617	0.856
23	Indonesia	0.956	0.737	0.947	0.636	0.696	0.996	0.872	1.602
24	Austria	0.861	1.129	0.854	0.701	1.412	0.731	0.214	0.466
25	South Africa	0.859	0.459	0.852	0.513	0.481	0.515	0.440	0.947
26	Nigeria	0.806	0.359	0.800	0.176	0.254	0.423	0.657	0.287
27	Norway	0.768	0.860	0.764	0.635	0.864	1.115	1.188	0.328
28	Denmark	0.755	1.040	0.751	0.590	1.016	1.341	0.983	0.318
29	Iran	0.688	0.435	0.685	0.385	0.362	0.267	1.061	0.908
30	Malaysia	0.683	1.374	0.680	0.290	1.120	1.207	1.983	0.474
31	Kuwait	0.635	0.355	0.633	0.154	0.253	0.357	0.235	0.077
32	Ukraine	0.631	0.301	0.629	0.162	0.293	0.351	0.371	0.545
33	Poland	0.629	0.779	0.627	0.634	0.801	0.951	1.064	0.826
34	Finland	0.581	0.529	0.580	0.451	0.649	0.636	0.282	0.275
35	Algeria	0.577	0.340	0.576	0.210	0.216	0.474	1.322	0.392
36	Turkey	0.548	0.751	0.547	0.742	0.734	1.573	1.114	0.927
37	Iraq	0.546	0.278	0.546	0.059	0.166	0.634	0.321	0.059
38	Libya	0.517	0.243	0.517	0.073	0.140	0.385	0.868	0.111
39	Thailand	0.497	0.909	0.498	0.395	0.913	1.096	1.294	0.903
40	Hungary	0.477	0.489	0.479	0.244	0.547	0.458	0.462	0.283
41	Pakistan	0.475	0.196	0.477	0.258	0.193	0.315	0.281	0.653
42	Romania	0.474	0.248	0.475	0.190	0.249	0.264	0.480	0.311
43	Egypt	0.434	0.253	0.436	0.214	0.237	0.387	0.495	0.505
44	Israel	0.427	0.544	0.429	0.302	0.516	0.596	0.735	0.263
45	New Zealand	0.411	0.239	0.414	0.234	0.263	0.238	0.204	0.170
46	Philippines	0.404	0.473	0.407	0.218	0.471	0.707	0.405	0.682
47	Portugal	0.399	0.481	0.402	0.424	0.577	0.421	0.143	0.349
48	Singapore	0.396	1.929	0.399	0.260	1.284	1.974	3.073	0.203
49	Chile	0.394	0.326	0.397	0.233	0.307	0.383	0.431	0.316
50	Ireland	0.385	1.660	0.389	0.444	1.599	2.967	0.061	0.277

1) Actual quota shares are post-Singapore increase; calculated quota shares are based on the current five-formula approach; voting shares assume that every member is eligible to vote; GDP is converted at market exchange rates and averages data from 2003-05; openness takes in current payments and receipts and averages data from 2001-05; variability includes fluctuations in exports and net capital flows over the period 1993 to 2005; reserves refer to a 12- month average for 2005; PPP is the country's GDP share converted at PPP as an average for the period 2003-2005. For further explanations see main text.

Basic data (cont'd)

(percentages of the total for all IMF members)

		Actual quota share	Calculated quota share	Voting share	GDP	Openness	Variablity	Reserves	PPP
51	Greece	0.378	0.485	0.382	0.632	0.508	0.884	0.026	0.415
52	Czech Republic	0.377	0.585	0.380	0.266	0.615	0.577	0.769	0.311
53	Colombia	0.356	0.219	0.360	0.246	0.204	0.272	0.373	0.561
54	Bulgaria	0.294	0.125	0.299	0.058	0.123	0.169	0.220	0.117
55	Peru	0.293	0.149	0.299	0.172	0.130	0.262	0.358	0.275
56	United Arab Emirates	0.281	0.508	0.287	0.264	0.436	0.415	0.566	0.213
57	Morocco	0.270	0.165	0.276	0.120	0.168	0.123	0.425	0.230
58	Bangladesh	0.245	0.099	0.251	0.144	0.109	0.049	0.077	0.500
59	Congo, Kinshasa	0.245	0.023	0.251	0.016	0.022	0.030	0.004	0.075
60	Zambia	0.225	0.027	0.231	0.014	0.022	0.072	0.013	0.018
61	Serbia	0.215	0.085	0.222	0.055	0.071	0.135	0.125	0.073
62	Sri Lanka	0.190	0.070	0.197	0.051	0.078	0.064	0.061	0.141
63	Belarus	0.178	0.116	0.185	0.058	0.119	0.126	0.029	0.120
64	Ghana	0.170	0.042	0.177	0.022	0.042	0.065	0.040	0.090
65	Kazakhstan	0.168	0.189	0.176	0.105	0.171	0.228	0.204	0.200
66	Croatia	0.168	0.149	0.176	0.085	0.157	0.179	0.231	0.091
67	Slovakia	0.164	0.247	0.172	0.100	0.243	0.174	0.420	0.143
68	Zimbabwe	0.162	0.023	0.170	0.015	0.021	0.021	0.001	0.056
69	Trinidad and Tobago	0.154	0.064	0.162	0.030	0.055	0.065	0.103	0.030
70	Vietnam	0.151	0.235	0.159	0.112	0.254	0.118	0.222	0.405
71	Côte d'Ivoire	0.149	0.060	0.158	0.038	0.061	0.048	0.039	0.047
72	Sudan	0.145	0.046	0.153	0.055	0.044	0.047	0.045	0.136
73	Uruguay	0.141	0.048	0.149	0.034	0.039	0.161	0.067	0.055
74	Ecuador	0.139	0.083	0.147	0.075	0.091	0.343	0.037	0.095
75	Syrian Arab Republic	0.135	0.114	0.143	0.254	0.081	0.109	0.003	0.120
76	Tunisia	0.132	0.106	0.140	0.067	0.120	0.095	0.108	0.138
77	Angola	0.132	0.156	0.140	0.052	0.111	0.280	0.055	0.066
78	Luxembourg	0.128	1.369	0.137	0.081	0.801	1.994	0.008	0.053
79	Uzbekistan	0.127	0.043	0.135	0.025	0.038	0.080	0.077	0.083
80	Jamaica	0.126	0.048	0.134	0.023	0.053	0.073	0.057	0.020
81	Kenya	0.125	0.037	0.133	0.041	0.039	0.064	0.043	0.080
82	Qatar	0.121	0.136	0.130	0.080	0.125	0.191	0.114	0.041
83	Myanmar	0.119	0.031	0.128	0.026	0.030	0.050	0.020	0.155
84	Yemen	0.112	0.110	0.121	0.032	0.054	0.284	0.151	0.033
85	Slovenia	0.107	0.148	0.116	0.078	0.159	0.088	0.219	0.073
86	Dominican Republic	0.101	0.090	0.110	0.062	0.108	0.092	0.039	0.109
87	Brunei Darussalam	0.099	0.050	0.108	0.014	0.039	0.077	0.013	0.016
88	Guatemala	0.097	0.066	0.106	0.069	0.069	0.071	0.097	0.096
89	Panama	0.095	0.048	0.104	0.035	0.050	0.109	0.028	0.039
90	Lebanon	0.093	0.182	0.103	0.052	0.147	0.269	0.304	0.041
91	Tanzania	0.091	0.034	0.101	0.028	0.031	0.016	0.056	0.044
92	Oman	0.089	0.145	0.099	0.063	0.118	0.154	0.110	0.068
93	Cameroon	0.085	0.032	0.095	0.038	0.033	0.107	0.022	0.072
94	Uganda	0.083	0.025	0.092	0.018	0.020	0.037	0.035	0.071
95	Bolivia	0.079	0.023	0.088	0.022	0.025	0.034	0.028	0.043
96	El Salvador	0.079	0.060	0.088	0.039	0.064	0.064	0.045	0.053
97	Jordan	0.078	0.080	0.088	0.028	0.079	0.081	0.145	0.046
98	Bosnia-Herzegovina	0.078	0.064	0.087	0.021	0.052	0.086	0.063	0.039
99	Costa Rica	0.075	0.078	0.085	0.046	0.082	0.092	0.059	0.075
100	Afghanistan	0.074	0.041	0.084	0.015	0.025	0.064	0.046	0.050
101	Senegal	0.074	0.024	0.084	0.019	0.023	0.029	0.035	0.034
102	Azerbaijan	0.074	0.050	0.084	0.023	0.045	0.047	0.028	0.058
103	Gabon	0.071	0.041	0.081	0.018	0.030	0.062	0.014	0.016
104	Georgia	0.069	0.019	0.079	0.013	0.018	0.028	0.012	0.025
105	Lithuania	0.066	0.101	0.076	0.055	0.101	0.101	0.095	0.079

Basic data (cont'd)

(percentages of the total for all IMF members)

		Actual quota share	Calculated quota share	Voting share	GDP	Openness	Variablity	Reserves	PPP
106	Cyprus	0.064	0.063	0.074	0.037	0.070	0.084	0.102	0.029
107	Namibia	0.063	0.023	0.073	0.013	0.022	0.022	0.009	0.025
108	Bahrain	0.062	0.142	0.072	0.028	0.101	0.236	0.048	0.026
109	Ethiopia	0.061	0.024	0.071	0.022	0.026	0.047	0.036	0.096
110	Papua New Guinea	0.060	0.028	0.070	0.010	0.024	0.038	0.017	0.024
111	Bahamas	0.060	0.026	0.070	0.014	0.027	0.023	0.019	0.011
112	Nicaragua	0.060	0.020	0.070	0.011	0.023	0.030	0.017	0.035
113	Honduras	0.060	0.038	0.070	0.019	0.039	0.035	0.057	0.036
114	Liberia	0.059	0.005	0.069	0.001	0.004	0.024	0.001	0.001
115	Latvia	0.058	0.058	0.068	0.033	0.063	0.046	0.057	0.047
116	Moldova	0.057	0.018	0.067	0.006	0.017	0.022	0.014	0.014
117	Madagascar	0.056	0.016	0.066	0.012	0.016	0.024	0.013	0.027
118	Iceland	0.054	0.039	0.064	0.033	0.045	0.043	0.026	0.017
119	Mozambique	0.052	0.025	0.062	0.014	0.023	0.023	0.028	0.043
120	Guinea	0.049	0.009	0.059	0.009	0.009	0.014	0.003	0.032
121	Sierra Leone	0.048	0.004	0.058	0.003	0.003	0.010	0.003	0.008
122	Malta	0.047	0.053	0.057	0.013	0.046	0.047	0.067	0.013
123	Mauritius	0.047	0.030	0.057	0.015	0.031	0.029	0.039	0.027
124	Paraguay	0.046	0.037	0.056	0.018	0.030	0.065	0.033	0.047
125	Mali	0.043	0.014	0.053	0.012	0.015	0.018	0.023	0.024
126	Suriname	0.042	0.010	0.053	0.003	0.008	0.018	0.003	0.005
127	Armenia	0.042	0.013	0.053	0.009	0.014	0.014	0.017	0.023
128	Guyana	0.042	0.010	0.052	0.002	0.008	0.009	0.006	0.006
129	Kyrgyz Republic	0.041	0.010	0.051	0.005	0.009	0.016	0.014	0.018
130	Cambodia	0.040	0.031	0.051	0.013	0.032	0.021	0.026	0.056
131	Tajikistan	0.040	0.011	0.050	0.005	0.012	0.014	0.005	0.014
132	Congo, Brazzaville	0.039	0.032	0.049	0.011	0.027	0.045	0.009	0.007
133	Haiti	0.038	0.012	0.048	0.009	0.013	0.025	0.003	0.026
134	Somalia	0.038	0.002	0.048	0.001	0.002	0.002	0.001	0.001
135	Rwanda	0.037	0.006	0.047	0.004	0.005	0.017	0.009	0.020
136	Burundi	0.035	0.003	0.046	0.002	0.002	0.006	0.003	0.009
137	Turkmenistan	0.035	0.046	0.045	0.035	0.035	0.076	0.122	0.063
138	Togo	0.034	0.008	0.044	0.005	0.008	0.013	0.007	0.016
139	Nepal	0.033	0.020	0.043	0.018	0.020	0.030	0.040	0.066
140	Fiji	0.032	0.011	0.043	0.007	0.011	0.007	0.011	0.009
141	Malawi	0.032	0.006	0.042	0.005	0.007	0.009	0.003	0.013
142	Macedonia, FYR	0.032	0.027	0.042	0.013	0.025	0.037	0.026	0.026
143	Barbados	0.031	0.014	0.042	0.007	0.015	0.020	0.015	0.008
144	Niger	0.030	0.007	0.041	0.007	0.007	0.012	0.006	0.018
145	Estonia	0.030	0.072	0.041	0.029	0.076	0.051	0.047	0.036
146	Mauritania	0.030	0.007	0.040	0.004	0.007	0.010	0.000	0.012
147	Botswana	0.029	0.051	0.040	0.020	0.040	0.065	0.162	0.030
148	Benin	0.028	0.009	0.039	0.010	0.008	0.006	0.018	0.015
149	Burkina Faso	0.028	0.010	0.038	0.012	0.008	0.016	0.014	0.028
150	Chad	0.026	0.024	0.036	0.010	0.018	0.076	0.006	0.021
151	Central African Republic	0.026	0.003	0.036	0.003	0.003	0.008	0.004	0.008
152	Laos	0.024	0.007	0.035	0.006	0.007	0.013	0.006	0.020
153	Mongolia	0.023	0.010	0.034	0.004	0.011	0.013	0.009	0.009
154	Swaziland	0.023	0.020	0.034	0.006	0.019	0.027	0.008	0.010
155	Albania	0.022	0.027	0.033	0.017	0.024	0.025	0.036	0.028
156	Lesotho	0.016	0.011	0.027	0.003	0.010	0.013	0.013	0.009
157	Equatorial Guinea	0.015	0.041	0.026	0.011	0.037	0.060	0.040	0.030
158	Gambia	0.014	0.002	0.025	0.001	0.002	0.004	0.002	0.005
159	Montenegro	0.013	0.009	0.024	0.005	0.008	0.011	0.005	0.005
160	Belize	0.009	0.006	0.020	0.003	0.006	0.007	0.003	0.004

Basic data (cont'd)

(percentages of the total for all IMF members)

		Actual quota share	Calculated quota share	Voting share	GDP	Openness	Variablity	Reserves	PPP
161	San Marino	0.008	0.020	0.019	0.003	0.016	0.017	0.010	0.003
162	Vanuatu	0.008	0.003	0.019	0.001	0.002	0.005	0.002	0.001
163	Djibouti	0.007	0.003	0.018	0.002	0.003	0.009	0.002	0.003
164	Eritrea	0.007	0.008	0.018	0.002	0.006	0.019	0.001	0.007
165	St. Lucia	0.007	0.004	0.018	0.002	0.004	0.004	0.003	0.002
166	Guinea-Bissau	0.007	0.004	0.018	0.001	0.001	0.011	0.002	0.002
167	Antigua and Barbuda	0.006	0.006	0.017	0.002	0.005	0.003	0.003	0.002
168	Grenada	0.005	0.003	0.017	0.001	0.003	0.003	0.003	0.001
169	Samoa	0.005	0.002	0.016	0.001	0.002	0.004	0.003	0.002
170	Solomon Islands	0.005	0.003	0.016	0.001	0.002	0.003	0.002	0.002
171	Cape Verde	0.004	0.004	0.016	0.002	0.005	0.006	0.004	0.005
172	Comoros	0.004	0.001	0.015	0.001	0.001	0.001	0.002	0.002
173	St. Kitts and Nevis	0.004	0.002	0.015	0.001	0.002	0.002	0.002	0.001
174	Seychelles	0.004	0.005	0.015	0.002	0.006	0.009	0.001	0.002
175	St. Vincent/Grenadines	0.004	0.002	0.015	0.001	0.002	0.003	0.002	0.001
176	Dominica	0.004	0.002	0.015	0.001	0.002	0.003	0.001	0.001
177	Maldives	0.004	0.005	0.015	0.002	0.005	0.005	0.006	0.004
178	Timor-Leste	0.004	0.007	0.015	0.001	0.003	0.008	0.014	0.001
179	São Tomé and Principe	0.003	0.000	0.015	0.000	0.000	0.001	0.001	0.000
180	Tonga	0.003	0.001	0.014	0.000	0.001	0.002	0.001	0.001
181	Bhutan	0.003	0.004	0.014	0.002	0.003	0.005	0.011	0.005
182	Kiribati	0.003	0.003	0.014	0.000	0.001	0.001	0.012	0.000
183	Micronesia	0.002	0.002	0.014	0.001	0.002	0.003	0.001	0.001
184	Marshall Islands	0.002	0.001	0.013	0.000	0.001	0.002	0.000	0.000
185	Palau	0.001	0.001	0.013	0.000	0.001	0.003	0.000	0.000

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