# Purchasing Power Parities and Comparisons of GDP in IMF Quota Calculations

John B. McLenaghan

G24 Technical Group Meeting
Manila, Philippines
March 17-18, 2005

**Abstract**

*The governance of the IMF and the distribution of IMF quotas have come under much scrutiny in recent years. At issue is the question of the allocation of quotas and the attendant voting rights of member countries consistent with their relative size in, or contribution to, the world economy. Quota increases resulting from general quota reviews have fallen far short of the amounts needed to maintain their relationship to world GDP when the IMF came into being in 1945, and at the same time the distribution of quotas between the industrial and developing countries has been broadly maintained despite the enormous growth of the world economy over this period. However, on the basis of the formula that guides the IMF in deciding members' quotas in these reviews, giving prominence to GDP as the primary variable, the share of developing countries would be appreciably greater if GDP were to be converted by purchasing power parities (PPPs), rather than by market exchange rates .For most inter country comparisons, GDP converted by PPP is seen as the appropriate measure, and this view has been enhanced by the recent strengthening of the quality of PPP data within the International Comparison Program. Market exchange rates, which continue to serve as the conversion factor in IMF quota calculations of members' GDP, are regarded by statisticians and analysts alike as unsuitable because of their short term volatility. While a significant change in quota distribution involving a shift to the developing countries would require much more than a change in formula, the adoption of PPPs for the conversion of GDP would set that process in motion.*

## 1. Introduction

Issues of governance have assumed great importance for the IMF in recent years, in terms of its financial programs with member countries and with respect to its internal operations. With the vastly extended ambit of the support programs for a number of Asian countries in 1997 and 1998, and subsequently for emerging and developing countries in other regions, the need to address shortcomings of governance in member countries has assumed a prominent place in many of its programs. Concomitantly, a sharp light has been thrown on to the Fund itself in terms of aspects of its internal governance. Prominent among them has been the size and distribution of quotas allocated to member countries, and the related question of members' voting rights. In particular, much attention has been given in recent years to the limited voice assigned in the IMF's decision making processes to developing countries, both individually and as a group, and to redressing perceived imbalances in voting entitlements. 1_/

The formula adopted at the Bretton Woods Conference in 1944 for the establishment of countries' quotas and voting rights, itself a compromise of the at times conflicting views and priorities of those participating, remains as an ingredient in the IMF's quota determination. There have been adjustments to the original formula in subsequent quota reviews and a more comprehensive set of formulas has been adopted, although increases in quotas since the IMF was established have not relied on calculations derived from the formula. Importantly, the inherent rigidities of the quota determination procedure have ensured that the distribution of quotas across broad groupings of countries, geographically and by country grouping (e.g. developed and developing) has remained largely unchanged despite some selective quota increases and the large increase in the number of members. It can be shown that the vast and uneven growth of the world economy over the last 60 years has generated a much changed pattern of global resources, real and financial, and their distribution, than is portrayed by the Fund's present formulaic approach to quotas. Putting it another way, there can be little doubt that if the IMF were to be created today with the present membership of 184 countries on the basis of the each country's "share" of the global economy, the distribution of quotas across countries would certainly give rise to a much different outcome.

Within the present quota formula – there are, in fact, five component formulas used in the quota calculations – the weighting given to a country's GDP and its relationship to global GDP constitutes the most important measure. GDP converted at market exchange rates has been the preferred approach for quota calculations, notwithstanding the volatility of exchange rates. At the same time, it has been shown that adjusting GDP for purchasing power parity (PPP) to take account of changes in relative prices in many cases yields significantly different

1_/ See, for example, Ariel Buira, A New Voting Structure for the IMF, Washington DC, 2002

results in quotas for individual countries. The use of PPP adjusted GDP data rather than GDP data adjusted at market exchange rates has been seen by a number of observers as a preferred approach. Moreover, the IMF itself has made use of PPP adjusted GDP data in the regular reviews presented in its World Economic Outlook. Other international organizations, including the United Nations and the OECD, as well as the European Union, have incorporated GDP data calculated by the use of PPPs as a regular feature of their analyses. Nevertheless, the IMF has consistently viewed the existing arrangements based on the use of market exchange rate adjusted GDP as appropriate for quota calculations.

Against the background of IMF quotas and their determination, the primary objective of this paper is to assess the relative merits of market exchange rates and PPPs as a basis for conversion of GDP. Section 2 looks at the framework of calculating PPP and the issues that arise in making inter country comparisons of GDP, and discusses the criticisms that have been directed at both conversion techniques from a conceptual and practical standpoint. It then reviews the PPP program for the advanced countries of the OECD and discusses applications of PPP conversion of GDP by that organization and the IMF. Section 3 deals with the compilation of PPPs in the International Comparison Program and its place as an important tool in the international statistical system, while section 4 discusses the IMF's data dissemination standards as a relatively new instrument for improving countries' statistics. Section 5 compares GDP data adjusted for market exchange rates and PPPs for selected countries and country groupings. Sections 6 and 7 then turn to IMF quotas and the measurement of GDP as a key ingredient in the formula for quota calculations. Conclusions are in section 8.

## 2. Approaches to PPPs

The PPP between two countries (A and B) is defined as the rate at which the currency of A needs to be converted into the currency of B in order to enable a given amount of A's currency to purchase the same volume of goods and services in both countries. The methodology of purchasing power parities can be likened to country price indexes in an interspatial context, with similar requirements for data inputs. Country specific price indexes measure price changes over time, based on a representative basket of goods and services and using the expenditure pattern within the country concerned. For the calculation of PPPs, there is likewise a need for a representative basket of goods and services but for this purpose the basket applies to each of the countries incorporated in the calculation. Difficulties in PPP computations may arise because expenditure patterns across countries can vary markedly. Moreover, the larger the number of countries involved, the more complex are the issues of determining similar expenditure patterns and in specifying selected products to be included.

Proceeding from the establishment of a list of goods and services with the necessary specifications for pricing in each of the participating countries, the estimation of PPPs is linked to the expenditure patterns in the countries covered, using GDP as measured by final expenditure: household and government consumption, gross capital formation and net exports. These data are taken from the national accounts using the classifications of the UN System of National Accounts (SNA) so as to ensure conceptually consistent GDP data of different countries valued in their own currencies. For this purpose, so-called basic headings are chosen as a beginning point for determining expenditures on groups of commodities deemed representative of purchases made in countries for which a detailed specification of items can be identified. To the extent possible, participating countries provide average prices for the individual items specified. These prices are expressed in national currency and, ideally, are transaction prices. On the basis of the price data submitted by individual countries, unweighted bilateral price ratios, or parities, are combined using the expenditure data provided to determine purchasing power parities. PPPs thus derived are used to construct price indexes and as the basis for converting GDP volumes.

Because of its onerous data requirements, the calculation of PPPs from the production side of the national accounts has had only limited application, while because of statistical problems the derivation of PPPs from the income side of the national accounts is not recommended.

Perhaps the first major work on international price comparisons and the relative value of money in different countries was undertaken by Colin Clark, who compared the purchasing power of selected countries for a number of consumption goods. The results were published in 1940 in the first edition of his *Conditions of Economic Progress*. A first comprehensive effort to compile inter country comparisons of national incomes took place in the 1950s in the

Organization of the European Economic Community (OEEC, later, the OECD) under the direction of Irving Kravis and Milton Gilbert, who compared physical quantities and average values of more than 250 goods and services in four European countries and the United States. Expenditure on each item was then extrapolated with that of related goods and services to obtain total expenditure. Purchasing power parities were derived from the valuation of different currencies. Their methodology was applied in a refined form to a number of benchmark studies in the early to mid 1970s. 2_/

In 1982, the OECD reinstituted a program for the calculation of PPPs jointly with the Statistical Office of the European Community (Eurostat), employing an updated methodology, to compare national incomes and price levels for the European and other OECD member countries. Benchmark results under this program have been released at three yearly intervals since 1990 and, for the countries covered by the joint survey, PPPs for GDP are extrapolated both monthly and annually from the most recent benchmark year.

A report issued in 1997 reviewing the OECD/EUROSTAT PPP program (the Castles Report) noted that the use of market exchange rates as proxies for PPPs had become unacceptable as a result of major fluctuations in exchange rates, which had made them erratic currency converters for statistical purposes_3/ The report, in providing a strong endorsement of the usefulness of PPPs, pointed to empirical work which supported this conclusion and noted that it was impossible to make price or volume comparisons between countries without them. Furthermore, the report concluded that a fully functioning world statistical system would include, as a central element, the capacity to make such comparisons. At the same time, the report pointed to shortcomings in a number of areas of the program that impacted on the quality of its results which could be eliminated by assigning an appropriate level of resources for this important exercise. The conclusions of the report were accepted by the OECD and Eurostat.

The eighth joint comparison under this program is to take place in 2005 and will cover 45 countries which include those that have applied to join the European Union as well as certain countries of the former Soviet Union and the former Yugoslavia with which Eurostat and the OECD have a program of technical cooperation in statistics.

---

2_/ See Michelle Vachris and James Thomas, Monthly Labor Review, US Bureau of Labor Statistics, October, 1999.
3_/ Report by Ian Castles on his review of the OECD/Eurostat PPP program, OECD, Paris, 1997.

The international organizations are major users of PPPs. The OECD incorporates data on GDP converted by PPPs in much of its statistical and analytical work. For example, cross country comparisons of GDP per capita converted by PPPs are seen as a primary instrument for the purpose of measuring economic welfare. Measurement of the relative size of countries is likewise based on GDP valued at PPPs. The productivity of labor is another useful indicator that uses PPP-based volume comparisons of output, while PPPs are also applied to spatial comparisons of prices across countries.

Eurostat applies PPPs in the context of its budget allocations for its Structural Funds used to reduce economic disparities between EU member states. The list of regions for fund allocations is established on the basis of GDP per capita converted by PPP. PPP also provide the basis for monitoring price convergence in the European Union in the context of competition policy and consumer protection.

PPPs are used in the programs of a number of UN agencies and by the World Bank in measuring poverty reduction in the context of the UN's Millenium Development Goals.

The IMF has at times acknowledged the limitations of market exchange rates for converting GDP in the context of quotas for newly joining member countries. This was the case for the centrally planned economies that joined the IMF in the 1980s and 1990s, when official exchange rates were considered not to reflect market conditions, and a PPP conversion factor was adopted. In the case of Russia, GDP was converted partly at official exchange rates and partly on the basis of PPPs.4_/

In the Eleventh General Review of Quotas in 1996, the Executive Board of the IMF was asked to consider the circumstances of a number of countries whose GDP data adjusted by market exchange rates appeared to understate the substantial real economic growth achieved over several years. China and India were singled out in this context. As a result, the IMF staff at that time proposed the use of a version of a PPP exchange rate for the purposes of quota calculations However, the Executive Board decided in favor of the continuation of using market exchange rates, largely on the grounds of maintaining a uniform approach to conversion factors.

_____

4_/ Report to the IMF Executive Board of the Quota Formula Review Group, April, 2000.

In contrast to the approach taken for quota calculations, the IMF in its World Economic Outlook has made use of annual GDP calculations for countries as well as regional and industrial/developing and other country groupings, valued on the

basis of PPPs. The IMF is not a primary source of these data and it applies certain conventions depending on the data series, as follows:

- Country group composites for exchange rates, interest rates, and the growth rates of monetary aggregates are weighted by GDP converted to U.S. dollars at market exchange rates (averaged over the preceding three years) as a share of group GDP.

-Composites for other data relating to the domestic economy, whether growth rates or ratios, are weighted by GDP valued at purchasing power parities (PPPs) as a share of total world or group GDP.

For those series using PPP weights, the IMF's data calculations have been based on the surveys undertaken by the OECD and the International Comparison Program (see below). Where price survey data are not available, PPPs for the most recent years are based on estimates using the OECD/Eurostat data for the countries coming within the coverage of that program, and, for the remaining countries included, on the World Development Indicators prepared by the World Bank. For a small group of countries, mostly small economies, for which these sources are not available, an estimation procedure is utilized.

Where there is general acceptance of the quality and reliability of the data inputs, in particular expenditure weights and price data, PPPs have been viewed as most effective in terms of their application to aggregative analysis and research.

**3. The International Comparison Program**

The most comprehensive approach to the compilation of PPPs in terms of country coverage is that of the International Comparison Program which began as the International Comparison Project in the late 1960s under arrangements for joint work by the United Nations Statistical Office and the International Comparison Unit of the University of Pennsylvania, with initial support from the Ford Foundation and the World Bank.

The project began on a pilot basis with just 10 countries, and the first results for the years 1967 and 1970 were published in 1975. Subsequent phases of the program resulted in a substantial increase in country participation, and its frequency was adapted to a five year cycle. In its early stages the ICP was coordinated under the central direction of the University of Pennsylvania but a number of changes in organizational responsibility occurred as the program evolved. Mainly in order to reflect the increased country participation, the program and its overall management and structure moved to a regional basis. Drawing on the advanced work on PPPs undertaken by OECD/EUROSTAT for their respective member countries, and with oversight and funding support from the World Bank and other international agencies, the ICP established country

groupings by region, following which world comparisons were obtained by linking results across these groups.

By the late 1980s, however, there was a loss of momentum in the program, reflecting a questioning by some commentators of the value of the program in terms of its conceptual soundness, the quality of data inputs and the credibility of results. Perhaps more importantly, its heavy resource costs led to doubts about the program's viability. Many of the smaller developing countries remained outside of the program, and even for some of those participating, the program was seen more as a statistical activity meeting the needs of the international agencies than as one of immediate or even potential benefit to them.

Problems in the collection of the relevant price data from many developing countries have been a factor in criticism of the ICP and are illustrated by the uneven pattern of participation in the ICP. From the beginning phase based on limited participation in 1970, the first of the global comparisons took place in 1975. While there has been a steady progression in the number of industrial countries participating, marked variations have occurred in developing country participation (Table 1).

Table 1: ICP Surveys
(Number of Countries)

| Year | Developing | Industrialized | Total |
|---|---|---|---|
| 1970 | 4 | 6 | 10 |
| 1973 | 8 | 8 | 16 |
| 1975 | 21 | 13 | 34 |
| 1980 | 42 | 18 | 60 |
| 1985 | 42 | 22 | 64 |
| 1990 | 6 | 24 | 30 |
| 1993 | 93 | 24 | 117 |
| 1996 | 28 | 24 | 52 |

Source: ICP and OECD

Some of the data quality problems of PPP calculations identified in countries participating in the ICP have stemmed from the fact that data on private expenditure recorded in the national accounts are derived as a residual in many countries, making them difficult to validate. Another limitation of ICP data is that price surveys are designed to permit comparisons of goods of the same quantity and quality across countries but differences in these dimensions may be mistaken for price differences. There are also significant problems in determining prices of

services such as medical, education, housing and transportation. In addition to these concerns at the technical level, a major criticism of ICP has centered on the difficulty of generating commitments by countries to ensure good quality data inputs in the price surveys, and the accompanying problem of resources.

The conclusions of the Castles Report, with its strong endorsement of PPPs and their widespread application as a tool for international comparisons, were echoed in a second report issued in 1998 under the sponsorship of the World Bank, the IMF and the United Nations which evaluated the ICP 5_/ Although taking somewhat different approaches, both studies concluded that the availability of sound PPP data was essential for the purpose of international comparisons in a number of important policy making areas and for research. Indeed, they noted that a fully functioning world statistical system should include, as a key component, the capacity to make such comparisons.

In a frank and hard hitting report, Ryten noted that in a long and costly process that began in the 1980s, the international statistical community undertook an exhaustive revision of the United Nations System of National Accounts which, when it was adopted in 1993, provided a universal basis for statisticians to compile macroeconomic statistics. Ryten concluded that the enormous investment in the revision would only yield full returns when the (resulting) data permit comparisons of the rates of growth and levels of the broad aggregates of GDP. For this reason, he observed that "we must not find ourselves deterred by the existence of different currencies or become exclusively dependent on market exchange rates among them. Conceptually, theoretically and practically, the United Nations national accounts program will only be complete when it encompasses ICP." The report sounded a warning, however, that in view of questions about the quality of the program's output its future was questionable. It concluded that the most serious problem facing the ICP was a lack of credibility of its results, especially at the detailed level. This was linked to poor management and supervision of data collection, editing and processing at the country level, and a lack of coordination between national statistical offices and coordinating agencies at the regional level. On a broader plane, the program had languished because of insufficient funding and the lack of coordination at the global level. To address these problems as a matter of urgency, Ryten recommended sweeping changes in organization at all levels of the program, the establishment of a

---

5_/ United Nations Economic and Social Council, Report of the Consultant on the Evaluation of the International Comparison Programme, E/cn.3/1998/8. The report was prepared by a consultant expert, Jacob Ryten, and is referred to hereinafter as the Ryten Report.

research program to deal with quality issues, the institution of a major funding initiative, and firm commitments by national statistical offices to participate in the program.

The Ryten Report has proved to be a catalyst for change for the ICP. The positive acceptance of its conclusions and recommendations by the United Nations Statistical Commission at its 2000 session was followed by the implementation of far reaching improvements and structural change in the program. A governance structure for the ICP was established with a consortium of national, regional and international institutions coordinating the global program with the assistance of global executive board. (Annex 1) An international secretariat serving as a Global Office and with a Global manager operating within the World Bank was established to manage the program on a day to day basis. Substantial funding commitments have been made by a wide range of contributors, international organizations and national agencies, to ensure that ambitious operational targets are met.

.

All five ICP regions – Africa, Asia and the Pacific, the Commonwealth of Independent States (CIS), Latin America and West Asia – have mobilized staffing, funding and other resources to implement and monitor the next round of the ICP in 2003-2006. The overhauled operational structure of the ICP has been accompanied by a number of new support initiatives. They include the establishment of an ICP Technical Advisory Group to deal with technical and methodological issues, a revised ICP Handbook and the preparation of the ICP Operational Manual and Price Collectors Guide. The ICP Global Office is coordinating the global Ring Comparison, which is using the multilateral approach to link regional PPPs in order to generate global PPPs expressed in a common currency. For this sub program, a number of selected countries or areas from each region participate in a separate comparison program in order to provide a link between programs. In late 2004 the Technical Advisory Group reached agreement, on the basis of its research program, to obtain PPPs for the government, construction and housing sectors.

Data collection for most household consumption items for the 2003-2006 round of the ICP was scheduled to begin in the first quarter of 2005. For other items, as well as non household items including government compensation, equipment and construction, data collection will take place in the second half of 2005. Final PPPs for the 2005 reference period will be prepared in the first half of 2007 and will encompass the results of the global linking from the Ring Program. It is expected that 150 countries will participate in the current round of the ICP, including 45 countries that now form part of the OECD/EUROSTAT program. 6_/

_____

6_/ In addition to OECD countries, including the EURO area, this program includes a number of the former transition countries of Eastern Europe.

## 4. The IMF's Data Dissemination Standards

In 1996, in the wake of the first of the global financial crises of that decade, and recognizing the negative influences on the capital markets flowing from uncurrent, incomplete and poor quality statistics, the IMF established new standards for country data dissemination designed to improve information available to government policy makers and the financial markets. The first of two standards, the Special Data Dissemination Standard, or SDDS, was directed at countries already with a high degree of access to the international markets and which were likely, in large degree, to be undertaking, or prepared to undertake, commitments to these demanding standards, which were voluntary. In subscribing to the SDDS, IMF member countries undertook to compile and disseminate data for the main areas of economic statistics, in accordance with identified best practice. A key element in the implementation of the SDDS was the commitment of a subscribing country to register its implementation of the various elements of the standards with the IMF, which publishes the results on its Dissemination Standards Bulletin Board and which is available to data users via Internet access.

The General Data Dissemination Standard (GDDS), structured in the same fashion as the SDDS but with less demanding requirements, became operational in 2000. In directing the GDDS at countries whose statistical systems were less developed than those acceding to the SDDS, the IMF recognized that these countries would need assistance and time in order for them to reach a higher level of statistical capacity. Nevertheless, the IMF's Executive Board encouraged all members to subscribe to the standards, which like the SDDS were voluntary.

By early 2005, 53 countries, comprising all the industrial countries and the major emerging market countries, had subscribed to the SDDS. 58 countries were subscribers to the GDDS. Commitments to such rigorous statistical standards by a large, and still growing, proportion of the IMF's membership are a manifestation of the increased awareness of the importance of high quality statistics in policy formulation and analysis. At a specific level, these standards bring into prominence the increasing importance given by countries to implementing the United Nations SNA and to the global statistical commitment of the ICP.

## 5. Comparisons of GDP – adjusting for market exchange rates or PPPs

There is a considerable body of opinion which supports the view those inter-country comparisons of national expenditures or GDP when converted at market exchange rates are far from meaningful because they do not take into account price differences across countries. The volatility of market exchange rates, the propensity for them to have long periods of misalignment, and the very large declines that occur in foreign currency denominated GDP immediately after a large devaluation have all been cited as negative factors in the use of market exchange rates for adjusting GDP data

Calculations of GDP converted at market exchange rates in many instances exhibit marked differences from those based on PPP conversions. While these differences vary in their extent from country to country, they may be pronounced when comparisons are made by region or by selected groups of countries.

Table 2, below, compares GDP converted at .market exchange rates for high income countries and middle to low income countries for the years 1999 to 2003, and shows GDP converted by PPPs for these countries over the same period. For the latter group of countries the disparity between the two conversion series is marked, with GDP converted by PPPs more than three times greater than when converted by exchange rates. Note that for the high income countries, however, differences arising from the two methods of conversion are less than 5 per cent in any one year.

Table 2. GDP at Market Exchange Rates and GDP Based on PPP Valuations

| | 1999 | 2000 | 2001 | 2002 | 2003 |
|---|---|---|---|---|---|
| 1. High Income Countries in billions of current US dollars | 25,096 | 25,456 | 25,060 | 26,118 | 29,270 |
| 2. Low and Middle Income Countries in billions of current US dollars | 5,656 | 6,121 | 6,196 | 6,297 | 7,087 |
| 3. All countries | 30,752 | 31,577 | 31,256 | 32,415 | 36,357 |
| 1 as per cent of 3 | 81.6 | 80.6 | 80.2 | 806 | 80.5 |
| 5. High Income Countries PPP in billions of current international dollars | 24,385 | 25,719 | 26,623 | 27,456 | 28,591 |
| 6. Low and Middle Income Countries PPP in billions of current international dollars | 17,793 | 19,170 | 20,402 | 21,566 | 23,247 |
| 7. All countries | 42,178 | 44,889 | 47,025 | 49,022 | 51,813 |
| 5 as per cent of 7 | 57.1 | 57.3 | 56.5 | 56.1 | 55.2 |

Source: World Bank, World Development Indicators, 2003

Differences in GDP weights when converted at market exchange rates and at PPPs are also significant for individual countries and for certain regions. Table 3 shows the PPP weights for the IMF World Economic Outlook in 2000 in

comparison with the market exchange rate weights for the same year. For the major industrial economies, especially the United States and Japan, the PPP weights for that year are substantially below the weights derived from market exchange rates. For the regional groupings of developing countries, and the transition countries, on the other hand, PPP weights were appreciably above those derived from market rates. For China and India, there was a more than twofold increase in weights, from 3.3 per cent and 1.5 per cent, to 11.6 per cent and 4.6 per cent, respectively. Comparable data for 2003 show that the weights for China and India had raised to 12.6 per cent and 5.7 per cent of world GDP.

**Table 3. Comparisons of GDP Weights in The World Economic Outlook**

| | PPP Weights | Market Exchange Rate Weights |
|---|---|---|
| | (per cent of World GDP) | |
| **Advanced Economies** | 57.0 | 79.9 |
| Major industrial countries | 45.4 | 66.4 |
| - United States | 21.9 | 30.2 |
| -Japan | 7.4 | 15.1 |
| Other advanced economies | 11.6 | 1 3.5 |
| **Developing Countries** | 37.2 | 17.9 |
| Africa | 3.3 | 1.4 |
| Asia | 21.6 | 7.7 |
| -China | 11.6 | 3.3 |
| -India | 4.6 | 1.5 |
| Middle East & Europe | 3.9 | 2.6 |
| Western Hemisphere | 8.4 | 6.2 |
| **Transition Countries** | 5.7 | 2.2 |

Source: IMF, World Economic Outlook, May 2000 – Annex and Statistical Appendix

## 6. IMF Quotas and their Determination

The quota of each member of the IMF is , in essence, its capital contribution to the Fund, with one quarter of its allocated subscription to be paid in reserve assets, expressed in Special Drawing Rights, or SDRs, and the remaining portion to be paid in its own currency. The size of quotas is determined by the IMF's Board of Governors taking into account the relative economic weight of the country.

Quotas serve a number of purposes. First, they provide the major part of the IMF's reserve assets (although the IMF has found it necessary at times to access borrowed resources and administered resources to meet exceptional borrowing requirements of members). Second, quotas play a role in determining members' access to the IMF's resources, subject to limits set by the Executive Board and the Articles of Agreement. It should be noted, however, that waivers to these limits have increasingly been invoked in light of the exceptional demands on the IMF's resources to support its role in crisis management. To a large extent, such waivers have also recognized the lessened significance of quotas and of the IMF's available resources more generally in the face of the growth of capital flows and members' financing needs. Third, quotas play a crucial role in the determination of voting power in the IMF. As such, the size of a member's quota, and, for groupings of members, the aggregate of their quotas, is important in the IMF's decision making processes and representation on the Executive Board. While many decisions of the Board require a simple majority, there are some that require a majority of 70 per cent and 85 per cent of votes. Voting entitlements therefore play a crucial role in the determination of IMF policies and operations. A fourth function of quotas, now of limited operational significance, is in determining a member's share in a general allocation of Special Drawing Rights.

The Bretton Woods Conference agreed on a two-pronged approach to quotas. In the interest of recognizing the individual member states, each country was allocated 250 basic votes. And, to reflect differences in countries' economic significance and in their contributions to the IMF's financing needs, each member's quota was represented by a voting entitlement in the ratio of one vote per US$100,000 of quota (subsequently, one vote per SDR100,000). Since the Fund's inception, there has been no change in the number of basic votes allocated to each member, including newly accredited members. Thus, with increases in the size of quotas agreed at general reviews, the number of basic votes as a proportion of countries' voting entitlement has diminished appreciably 7_/.

---

7_/ The Articles of Agreement provide that a general review of quotas shall be undertaken at five year intervals. The twelfth review took place in 2003.

General reviews of quotas take place to consider the need for an overall increase in quotas and their distribution among members. Of the twelve reviews completed thus far, all but four have provided for an increase in total quotas. However, when increases in overall quotas have been approved and have been accompanied by a selective increase for certain members, the latter increase has been limited, both with regard to the size of the selective increase and to the number of countries affected. Thus, over the life of the IMF, the review process has not yielded much change in the distribution of quotas among members. Changes in the distribution of quotas, when they have occurred, have been implemented largely in response to developments of major significance, such as the accession to membership of the countries of the former Soviet Union.

The formula for quotas agreed at the Bretton Woods Conference incorporated a number of variables: national income, official reserves, current payments, export variability and the ratio of exports to national income. However, the formula itself played only a qualified role in the determination of quotas agreed by the 45 countries represented at the conference. In fact, the initial quotas and their distribution among the 45 participating countries, while taking the formula calculations into account, reflected a compromise reached by the major participating countries - the United States, the United Kingdom, France, China and Russia. 8_/The Bretton Woods formula gave the highest weighting among the component variables to national income but, starting in the 1960s, the IMF adopted a multi- formula approach using the same basic variables but with larger weights for other components, particularly external trade and the variability of exports. There are now five formulas that are applied in the review process and, among them, the modified Bretton Woods formula continues to give the largest weight to GDP (replacing GNI). The current quota formulas are detailed in Annex 2.

While the formulas have provided a guide to calculating quotas, in practice they have not been a definitive factor in determining the outcome of reviews, either in terms of a general increase in quotas or in adjusting quota shares. The Executive Board of the IMF has viewed quota calculations as one step, although an important one, in its reviews, but it has in general taken the opportunity to approve more or less equi-proportional increases in quotas and has not used them to achieve any meaningful rebalancing of quotas for individual countries or

_____

8_/ Several countries which were represented at the Bretton Woods Conference and received proposed quotas did not did not subscribe to the Articles of Agreement when the Fund commenced business in December, 1945, while a similar number that did not participate were part of the group of the 45 founding members.

groups of countries. Only in exceptional circumstances, such as the increase awarded to the quota for China in 2000 following the addition of Hong Kong SAR, have selective quota increases taken place.9_ /

## 7. Measurement of GDP in the IMF's Quota Formula

In 1999 the IMF Executive Board appointed an independent body of experts, the Quota Formula Review Group (QFRG), to review quota formulas. The QFRG was asked to assess quota formulas with respect to their adequacy to help determine members' calculated quotas that reasonably reflect members' relative position in the world economy, as well as their need for and contribution to the IMF's financial resources, against the background of changes in the functioning of the world economy and the international financial system and the increasing globalization of markets. The expert body was not asked to consider the question of the absolute level of quotas or their distribution among members.

In its report to the IMF Executive Board in 2000, the QFRG noted the great changes that had occurred in the world economy since the Bretton Woods conference. They included the extended openness of countries in terms of trade and capital flows; the expansion of capital markets and the rise of private capital flows, contrasting with a reduced reliance on official financing; greater exchange rate flexibility; a vast expansion of the world's population; and the increase in IMF membership to almost all countries.

The expert group considered a list of variables that could be included in a new formula or set of formulas for IMF quotas. In addition to those already incorporated, the QFRG identified a country's capital flows, external debt and population – all of which were seen as having some correlation with historical quotas. Other variables that entered into this review included GDP converted at PPP exchange rates, measures of the openness of an economy, per capita income, access to capital markets and the variability of exchange rates.

While this paper does not discuss the methods of assessing the quota formulas used by the QFRG, it can be noted that its report emphasized that the IMF's resources reflect creditor positions in the IMF, which are based on quotas and represent a component of each member's official reserves. The QFRG concluded that a quota formula that is applicable to potential creditor countries should rely on variables that represent those members' ability to contribute to the IMF. The report noted that for debtor countries the use of IMF resources is correlated with variables that measure their economic vulnerability, such as weakness in the

---

9_/ Following the transfer of responsibility for Hong Kong to China from the United Kingdom, there was no change in the latter country's quota.

balance of payments. It was the ability of a country to contribute to the IMF that provided an underpinning to the choice of variables included in the formula calculations and the QFRG concluded that the single most important variable for measuring ability to contribute is GDP.

A minority of the QFRG favored a measure of GDP for quota calculations using PPP-based exchange rates. They considered that market exchange rates do not necessarily equalize prices of tradable goods across countries, even after allowing for transport costs and quality differences. They pointed to an index number problem which resulted in an understatement of GDP in developing countries when market exchange rates are used for conversion. Although for a prolonged period real growth rates in these countries had been significantly higher than those in the industrialized countries, the developing countries had been shown to have a much lower GDP when market exchange rates are applied for conversion. This to a large extent reflects the high incidence of non-tradables in the developing economies.

While acknowledging the merits of PPP based GDP for welfare measurement across countries in terms of per capita income, the majority view of the QFRG was that this measure was not appropriate for indicating a country's ability to contribute to "international endeavors". The IMF's role as a financial institution and its need of financial resources for the support of members requiring financial assistance were seen to be of overriding importance in this context. The ability to contribute was therefore considered to be determined by the capacity to provide funds at market exchange rates.

There was also a view presented by the majority of the QFRG that as a measure of a member's ability to contribute to the IMF, the use of PPP adjusted GDP would produce some anomalous results. The QFRG instanced China and India as countries which, on a PPP based GDP calculation, would be required to contribute significantly more than Japan and France, respectively, an outcome that was seen as improbable. However, one only needs to recall the substantial growth of China and India in the five years since the release of the report, and to note the shift in their relative positions in world GDP, even when measured by market exchange rates, to view these examples as adding support to the position of the minority position. Moreover, it can be noted that consideration of the ability of members to contribute to the Fund did not encompass official reserves which were excluded because they "may fluctuate and may reflect international short term borrowing." However, the large and sustained increases in official reserve holdings of these two countries in recent years, and of other emerging and developing countries more generally, are clearly not of a transitory nature (Table 4). As such, the assessment of just what should constitute a member's ability to contribute to the IMF is in need of review.

Table 4: Official Reserves
in billions of SDRs

| | 2000 | 2001 | 2002 | 2003 | 2004(Nov) |
|---|---|---|---|---|---|
| All countries | 1,589 | 1,742 | 1,889 | 2,156 | 2,474 |
| Industrial countries | 684 | 717 | 757 | 846 | 930 |
| Developing countries | 906 | 1026 | 1,132 | 1309 | 1544 |
| Africa | 42 | 52 | 54 | 62 | 79 |
| Asia | 550 | 633 | 720 | 842 | 1009 |
| Europe | 99 | 114 | 140 | 170 | 208 |
| Middle East | 93 | 99 | 98 | 101 | 105 |
| Western Hemisphere | 121 | 127 | 119 | 132 | 140 |
| Addendum: Developing countries as per cent of all countries | 57.2 | 59.1 | 60.1 | 60.71 | 62.4 |

1_/ Includes gold valued at SDR 35 per ounce

Source: IMF, *International Financial Statistics,* various issues

Other concerns in the compilation and use of PPPs were cited by the majority view of the QFRG. First, for the non –ICP countries included in the IMF's World Economic Outlook, the ICP estimates are extended through the use of regression techniques based on ICP benchmark countries. Since these two groups of countries are likely to differ, the regression results could have large residual errors. There was also the familiar problem that the price surveys undertaken should relate to goods of the same quantity and quality across all countries. This

was seen to be difficult to validate in practice. These concerns, it should be noted, did not impede the use of PPPs in the IMF's World Economic Outlook.

The report also considered the problems of data quality in PPP calculations to be a major impediment to their use in GDP conversions, but noted that data deficiencies could be eliminated over time. While conceding that short run variations in market exchange rates were at times a major problem in GDP conversion, the QFRG nevertheless recommended the retention of the conversion of GDP by market exchange rates, with an amended approach that called for averaging GDP data over a three year period.

In an added comment on the report of the QFRG and data quality, the staff of the IMF noted that data on GDP converted at market exchange rates included in quota calculations were drawn from the IMF's statistical publication *International Financial Statistics (IFS),* which reported data submitted to the IMF by national statistical agencies on an official basis and which were, in principle, compiled in accordance with the United Nations System of National Accounts. In accepting these data for the quota calculations, the IMF staff observed that GDP data in the IMF's World Economic Outlook based on PPPs were not necessarily calculated on a consistent basis and included, where necessary, staff estimates. However, it can be noted that in 2000 less than 60 countries submitted GDP data for *IFS* in accordance with the revised methodology of the 1993 SNA. Data submitted by the remaining countries continued to adhere to the 1968 edition of the SNA. In the years since the issuance of that report, of course, an appreciably larger number of countries have doubtless adopted the newer methodology.

In accepting the report of the QFRG, the IMF Executive Board endorsed the position that a member's ability to contribute remained of paramount importance and that exchange rate conversions should continue to apply to GDP in the calculations. However, the inappropriateness of market exchange rates for GDP conversion is amply demonstrated by the extraordinary volatility of the major currencies over the period since the issuance of this report, as evidenced by the sharp adjustments that have occurred in the Euro/US dollar rate from the time of the Euro's introduction in 1999. Furthermore, the application of a three year average of market rates as an alternative conversion factor, as suggested by the QFRG, is clearly counter to the report's position on determining a country's ability to contribute. Moreover, when a member is allocated an increase in quotas which it deems unacceptable, it has the option to reject the increase and to retain its previously determined quota. 10_/

_____

10_/ These issues were discussed in detail by Ariel Buira in "A Critique of the Cooper Report on the Adequacy of IMF Quota Formulas", Oxford University Discussion Paper No.74, 2001.

Let us consider further the meaning of "ability to contribute". At any time when quotas are increased and members are required to subscribe to the new, higher level of quotas, they do so by providing to the IMF 25 per cent of the increase in the form of foreign exchange, gold or SDRs. As quotas have declined over time to little more than 1 per cent of global GDP, the requirement to fund such an increase is now clearly of diminished significance to the vast majority of members. This is clearly the case for a large number of the emerging market countries as was seen in the data on official reserves presented in Table 4.

For the general quota reviews and the sporadic selective increases that have been approved, the reality has been that significant changes in quota shares have been viewed by the Executive Board, and eventually by the IMF's Board of Governors, as too politically sensitive an issue to warrant substantive action. Although the IMF Executive Board itself has recognized that quota shares have become misaligned, indicating a need for action to enable the developing countries to assume a more appropriate role in the IMF's governance, there is as yet no preparedness on the part of the industrial countries to accede to in a reduction in their voting power.

**7. Conclusions**

Inter country price comparisons and the methodology of PPPs are well documented and well tested. Early empirical work of note stemming from the studies of Kravis and Gilbert at the OEEC was directed at a limited range of products and a limited number of countries. From this modest beginning there emerged the full scale price comparison exercises for the advanced economies and the development of PPPs by the OECD/EUROSTAT, and the comprehensive multilateral initiative of the ICP encompassing a large number of developing countries, operating on a regional basis under the direction of the United Nations.

Problems in the operation of the ICP that surfaced in the early 1990s cast doubt on the credibility of the program's results at that time and led to calls for change by statisticians and data users. Responding to these concerns, the UN Statistical Commission at its 2000 session approved a reorganization of the program on a global basis, placed its management under the responsibility of the World Bank and established substantially enhanced funding arrangements for data collection, research and software development. With these reforms in place, the 2003/2006 ICP round should provide the most comprehensive and robust results to date. In this setting, the ICP can be expected to take its place as a major component of the international statistical system.

PPPs now have a firmly established place among analysts and other data users as an important instrument of analysis and policy development involving calculations of GDP for inter country comparisons of volume and growth, poverty assessment and comparisons of productivity across countries .There is a

recognized body of opinion that argues strongly for the use of PPPs, and against the choice of GDP adjusted by market exchange rates. Exchange rate conversions, because of their short term volatility, propensity to long periods of misalignment and, in the case of countries experiencing large currency depreciation, the likelihood of an early and large decline in foreign currency denominated GDP, are seen as inappropriate for GDP comparisons in many areas. The OECD, as a compiler of PPPs for the industrialized and advanced emerging market economies, as well as a primary user in its research and published work, supports the use of PPPs for GDP comparisons across countries. So too does the IMF in its World Economic Outlook, for which it relies on the OECD and World Bank/ ICP data on PPPs for benchmark years, with estimates compiled by the IMF staff for intervening years obtained by regression. Increasingly, PPPs have found a place in academic research and in the private sector.

The IMF continues to assign a major role to GDP as the primary variable in quota calculations and it has remained committed to the use of market exchange rates for GDP conversion. In doing so, the IMF's Executive Board has taken the position that this approach is consistent with the role of quotas in meeting the financing requirements of the IMF which needs to be aligned with a member's ability to contribute. However, with quotas now representing less than 1 per cent of world GDP, and in light of the large and sustained increases in official reserves for many countries, an increase in quotas, with a corresponding subscription of 25 per cent of that increase, should not prove burdensome for most developing countries choosing to accept them.

Recall that at the commencement of the IMF the quota formula served only as a guide to the determination of the level of quotas and their distribution. The outcome was essentially one of political compromise, especially among the major countries. Subsequent general quota reviews and the large increases in quotas that followed have for the most part served to maintain the broad pattern of quota distribution and voting entitlements as between the industrial countries and developing countries, with only limited recognition given to the emerging economies and their substantially enhanced share of the global economy. Despite calls for an improved share of quotas and voting rights for developing countries, including from within the IMF itself, they have remained largely unchanged.

The IMF has recognized the shortcomings of using market exchange rates for the conversion of GDP for country comparisons and has applied PPP converted data in its World Economic Outlook, a position that stands in contrast with its approach to quota calculations. The general recognition of PPPs as the appropriate means of conversion of GDP and the prospective improvement in the availability and quality of PPPs from the results of the 2003-2006 ICP round provide a strong case for a change in this approach.

ANNEX 1

International Comparison Program
Participating Organizations

- African Development Bank (AfDB)
- Arab Fund for Economic and Social Development (AFESD)
- Asian Development Bank (ADB)
- Australian Agency for International Development (Aus/AID)
- Australian Bureau of Statistics (ABS)
- Bureau of Economic Analysis Foundation, Moscow
- Canadian International Development Agency (CIDA)
- Economic Commission for Africa (ECA)
- Eurostat
- Federal State of Statistical Service of the Russian Federation (Rosstat)
- Interstate Statistical Committee, Commonwealth of Independent States
- International Labor Organization (ILO)
- International Monetary Fund (IMF)
- Norwegian Agency for Development Cooperation (NORAD)
- Office for National Statistics, UK (ONS)
- Organization for Economic Cooperation and Development (OECD)
- Statistics Canada (Stat Canada)
- Statistical Institute for Asia and Pacific
- United Nations Economic and Social Commission for Asia and Pacific (UN ESCAP)
- United Nations Economic Commission for Europe (UN ECE)
- United Nations Economic and Social Commission for Western Asia
- (UN ESCWA)
- United Nations Economic Commission for Latin America and the Caribbean (UN ECLAC)
- United Nations Development Program (UNDP)
- United Nations Educational, Scientific and Cultural Organization (UNESCO)
- World Bank
- World Health Organization (WHO)

ANNEX 2

## IMF Quota Formulas

The present five quota formulas, with the Bretton Woods formula listed first, are:

$CQ = (0.01Y + 0.025R + 0.05P + 0.2276VC)(1 + C/Y)$,
$CQ = (0.0065Y + 0.0205125R + 0.078\text{P} + 0.4052VC)(1 + C/Y)$,
$CQ = (0.0045Y + 0.03896768R + 0.07P + 0.76976VC)(1 + C/Y)$,
$CQ = 0.005Y + 0.042280464R + 0.044\ (P + C) + 0.8352VC$,
$CQ = 0.0045Y + 0.05281008R + 0.039\ (P + C) + 1.0432VC$,

where $CQ$ = calculated quota;
$Y$ = GDP at current market prices for a recent year;
$R$ = twelve-month average of gold and foreign exchange reserves, including 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; and
$VC$ = variability of current receipts.

For each of the four non–Bretton Woods formulas, quota calculations are multiplied by an adjustment factor so 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 or the average of the lowest two of the remaining four calculations (after adjustment).

**ANNEX 3**

**Countries or areas participating in ICP 2003-2006**

| | *Africa* | *Latin America* | *Asia-Pacific* | *CIS* | *Western Asia* | *Eurostat-OECD PPP Programme* |
|---|---|---|---|---|---|---|
| 1 | Algeria | Argentina | Bangladesh | Armenia | Bahrain | Albania |
| 2 | Angola | Bolivia | Bhutan[a] | Azerbaijan | Egypt | Australia |
| 3 | Benin | Brazil | Brunei Darussalam | Belarus | Jordan | Austria |
| 4 | Botswana | Chile | Cambodia[a] | Georgia | Iraq[b] | Belgium |
| 5 | Burkina Faso | Colombia | China | Kazakhstan | Kuwait | Bosnia and Herzegovina |
| 6 | Burundi[c] | Ecuador | Hong Kong SAR of China | Kyrgyzstan | Lebanon | Bulgaria |
| 7 | Cameroon | Paraguay | India | Moldova, Republic of | Oman | Canada |
| 8 | Cape Verde | Peru | Indonesia | Russian Federation[d] | Palestine[b] | Croatia |
| 9 | Central African Republic[c] | Uruguay | Iran, Islamic Republic of | Tajikistan | Qatar | Cyprus |
| 10 | Chad[c] | Venezuela, Bolivarian Republic of | Fiji[a] | Turkmenistan | Saudi Arabia | Czech Republic |
| 11 | Democratic Republic of the Congo | | Lao People's Democratic Republic[a] | Ukraine | Syrian Arab Republic | Denmark |
| 12 | Congo[c] | | Malaysia | Uzbekistan | United Arab Emirates | Estonia |
| 13 | Côte d'Ivoire | | Maldives[a] | | Yemen[a] | Finland |
| 14 | Djibouti[c] | | Mongolia | | | France |
| 15 | Egypt[d] | | Myanmar | | | Germany |
| 16 | Equatorial Guinea | | Nepal | | | Greece |
| 17 | Ethiopia | | Pakistan | | | Hungary |

| | *Africa* | *Latin America* | *Asia-Pacific* | *CIS* | *Western Asia* | *Eurostat-OECD PPP Programme* |
|---|---|---|---|---|---|---|
| 18 | Gabon | | Philippines | | | Iceland |
| 19 | Gambia[a] | | Singapore | | | Ireland |
| 20 | Ghana | | Sri Lanka | | | Israel |
| 21 | Guinea[a] | | Taiwan Province of China | | | Italy |
| 22 | Guinea-Bissau[c] | | Thailand | | | Japan |
| 23 | Kenya | | Viet Nam | | | Korea, Republic of |
| 24 | Lesotho[a] | | | | | Latvia |
| 25 | Liberia[c] | | | | | Lithuania |
| 26 | Madagascar | | | | | Luxembourg |
| 27 | Malawi | | | | | Macedonia, the former Yugoslav Republic of |
| 28 | Mali | | | | | Malta |
| 29 | Mauritania[a] | | | | | Mexico |
| 30 | Mauritius | | | | | Netherlands |
| 31 | Morocco | | | | | New Zealand |
| 32 | Mozambique | | | | | Norway |
| 33 | Namibia | | | | | Poland |
| 34 | Niger[a] | | | | | Portugal |
| 35 | Nigeria | | | | | Romania |
| 36 | Rwanda | | | | | Russian Federation |
| 37 | Senegal | | | | | Serbia and Montenegro |

| | *Africa* | *Latin America* | *Asia-Pacific* | *CIS* | *Western Asia* | *Eurostat-OECD PPP Programme* |
|---|---|---|---|---|---|---|
| 38 | Seychelles[a] | | | | | Slovakia |
| 39 | Sierra Leone | | | | | Slovenia |
| 40 | Somalia | | | | | Spain |
| 41 | South Africa | | | | | Sweden |
| 42 | Sudan[a] | | | | | Switzerland |
| 43 | Swaziland | | | | | Turkey |
| 44 | Tanzania, United Republic of | | | | | United Kingdom |
| 45 | Togo[a] | | | | | United States |
| 46 | Tunisia | | | | | |
| 47 | Uganda | | | | | |
| 48 | Zambia | | | | | |
| 49 | Zimbabwe | | | | | |
| 50 | Libyan Arab Jamahiriya | | | | | |
| **Total (153)** | **50** | **10** | **23** | **12** | **13** | **45** |

[a] Participating in consumption surveys only.
[b] Under discussion.
[c] Participating on trial basis.
[d] Counted in two lists.

## References


Buira, Ariel, A New Voting Structure for the IMF, Washington DC, 2002

_____ A Critique of the Cooper Report on the Adequacy of IMF Quota Formulas, Dept. Of Economics Discussion Paper Series, No. 74, Oxford University, 2001

Clark, Colin, Conditions of Economic Progress, 1st Ed., MacMillan and Co.

Gulde, Anne Marie and Shulze-Ghattas, Marianne, Purchasing Power Parity Weights for the World Economic Outlook, IMF Staff Studies for the World Economic Outlook, December, 1993

Heston, Alan and Summers, Robert , PPPs and Price Parities in Benchmark Studies and the Penn World Tables, 1997

IMF, Report to the Executive Board of the Quota Formula Review Group, April 2000

_____ Staff Commentary on the External Review of the Quota Formulas. June, 2000

_____ External Review of Quota Formulas, April, 2001

_____ Alternative Quota Formulas –Further Considerations, May, 2002

_____Financial Organization and Operations of the IMF, Pamphlet Series No. 45, 6th edition, 2001

OECD, Review of the OECD-EUROSTAT PPP Program , 1997

_____ The EUROSTAT – OECD PPP Programme, A Shared Commitment, February, 2005

Ryten, Jacob, Report on the Evaluation of the International Comparison Program, UN Statistical Commission., November, 1998

Taylor, Alan and Taylor, Mark, "The Purchasing Power Parity Debate", NBER Working Paper No. 10607, June, 2004

United Nations Statistical Division, Handbook of the International Comparison Programme, 1992

United Nations Statistical Commission, Report of the World Bank on measures to improve the effectiveness of the International Comparison Programme, December, 1999

_____ Report of the World Bank on the International Comparison Programme, December, 2004

Vachris, Michelle and Thomas, James, International Price Comparisons Based on Purchasing Power Parity, Monthly Labor Review, US Bureau of Labor Statistics, October, 1999

Van Houtven, Leo, IMF Decision Making, Institutional Oversight, Transparency and Accountability, IMF Pamphlet Series No.53, August, 2002

Wagner, Nancy, A Review of PPP-Adjusted GDP Estimation and its Potential Use for the Fund's Operational Purposes, IMF Working Paper WP/95/18, 1995

World Bank, World Development Report, 2003