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IMF Quotas at Year 2030

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NON-TECHNICAL SUMMARY

In September 18, 2006, the Board of Governors of the International Monetary Fund adopted a resolution requesting that the Executive Board reaches an agreement on a new quota formula before the annual meetings of 2007 and no later than the Spring 2008 meetings. It was agreed that the new formula should be simpler and more transparent, and that it should better reflect the positions of the various member states in the world economy.

The process of formula revision is a long and complicated one. Indeed, the formulas currently in use are dated 1983. In 1999, a group of experts chaired by Richard Cooper proposed a dramatic simplification of the existing, complicated system based on five different formulas. This proposal launched a lively discussion and intense work by Fund's staff. The bottom line of the discussions is that it is extremely difficult to produce a simple formula that does not lead to higher concentration of quotas (hence, on voting rights) in advanced industrial countries, with even lower representation of low-income countries than is presently the case.

Once agreed on, the new formula(s) will unlikely be reconsidered for a number of years. Therefore, it is useful to simulate the impact of alternative formulas not only in the short run, but also in the longer run where the distribution of income, trade flows and capital flows across IMF member countries will surely differ from the present situation. It should be reminded here that a 2% GDP growth differential between two countries leads to a 22% income differential after 10 years and a 49% differential after 20 years.

To simulate quota formulas forward, a number of projection tools are needed. Here we rely on long-run GDP projections provided by Poncet (2006) and on CEPII's computable general equilibrium MIRAGE to simulate various quota formulas up to year 2030, for 49 countries or zones.

Although these scenarios should be considered with great caution given the heroic assumptions they derive from, they provide useful benchmarks.

The results for the United States, the Eurozone, China and Sub-Saharan Africa in 2030 can be summarised as follows:

- The share of the United States is highest with an uncompressed formula with a high weight on GDP and preferably without volatility and reserves; it is lowest with a formula based on population instead of GDP. With the except of the population formula, this country manages in keeping a high quota share at the 2030 horizon.

- The quota share of the Eurozone can be as high with a compressed formula as with an uncompressed one; excluding intra-Eurozone flows is detrimental by up to 4 percentage points in 2030; population may not be worse than GDP in purchasing power parity, depending on the formula chosen. However there is little the Eurozone can do against an approximately 6 percentage points decline of its quota share from 2001 to 2030.
- The share of China is highest with a formula based on population or GDP in purchasing power parity; it is lowest with compressed formulas. Chinese share is bound to double or even triple from 2001 to 2030, but in a quite different way depending on the formula.
- The share of Sub-Saharan Africa is higher with compression, but the highest share is by far that obtained with population instead of GDP; using GDP in purchasing power parity does not produce a significant rise in the quota share.

On the whole, the present discussions around IMF quotas reflect existing inconsistencies between the three purposes of the quotas – contribution to the Fund, access to resources, voting rights – not to mention the design of good policy incentives for member countries. The reduced role of the Fund as a provider of financial assistance may have contributed in moving the focus to the third purpose at the expense of the first two. If this is the case, a deep change in the formulas, such as the inclusion of population and the dropping out of variables that risk producing wrong incentives, such as variability or reserves, may deserve some attention.

ABSTRACT

We simulate IMF quota shares at the 2030 horizon for 49 countries or zones, based on long-run projections for GDP, trade and foreign direct investment. Several formulas are simulated and the impact of excluding intra-Eurozone flows is studied. We find that substituting population for GDP is the only way of significantly raising the quota share of Sub-Saharan African countries. The US and Chinese shares are higher with uncompressed formulas relying heavily on GDP. In all cases, China doubles or triples its quota share from 2001 (our base year) to 2030 while the US one is roughly stable. Conversely, the Eurozone's quota share is bound to decline by around 6 percentage points and removing intra-Eurozone flows leads to an additional drop by 3 to 4 percentage points.

JEL Classification: F33.
Key Words: long-run projections, quotas shares, International Monetary Fund.

RESUME NON TECHNIQUE

Le 18 septembre 2006, le Conseil général du Fonds Monétaire international a adopté une résolution demandant au Conseil d'administration de trouver un accord sur une nouvelle formule de calcul des quotes-parts si possible avant les réunions de l'automne 2007 et au plus tard pour les réunions du printemps 2008. Il a été convenu que la nouvelle formule devra être plus simple, plus transparente, et qu'elle devra mieux refléter les positions des différents Etats membres dans l'économie mondiale.

Le processus de révision des formules de quotes-parts est long et compliqué. Les formules actuellement utilisées datent de 1983. En 1999, un groupe d'experts présidé par l'économiste américain Richard Cooper a proposé une simplification drastique de l'inextricable système actuel fondé sur cinq formules différentes. Cette proposition a alors déclenché des discussions animées et un intense travail de la part du personnel du Fonds. Les discussions butent sur la difficulté à exhiber une formule simple qui n'entraîne pas une forte concentration des quotes-parts (et donc, des droits de vote) dans les pays industriels avancés, avec une représentation encore plus faible qu'aujourd'hui des pays à faible revenu.

Lorsqu'un accord sera trouvé, il ne sera vraisemblablement pas remis en cause avant de nombreuses années. C'est pourquoi il est utile de simuler l'impact de différentes formules non seulement à court terme, mais aussi à long terme, lorsque la répartition du revenu, des échanges commerciaux et des flux de capitaux entre Etats membres du FMI se sera complètement transformée. Il faut ici rappeler qu'un différentiel de croissance de 2% entre deux pays entraîne un écart de revenu de 22% au bout de 10 ans et de 49% au bout de 20 ans.

Pour projeter les quotes-parts des Etats membres selon différentes formules, plusieurs outils sont nécessaires. On utilise ici les projections de PIB à long terme réalisées par Poncet (2006) et le modèle d'équilibre général calculable MIRAGE pour simuler différentes formules de quotes-parts à l'horizon 2030, pour 49 pays ou zones.

Bien que ces scénarios doivent être considérés avec précaution en raison des hypothèses héroïques qui les sous-tendent, ils fournissent des points de repère utiles.

Les résultats pour les Etats-Unis, la zone euro, la Chine et l'Afrique sub-saharienne peuvent être résumés comme suit:

- La quote-part des Etats-Unis est maximum avec une formule non compressée dans laquelle le PIB a un poids important, de préférence mais d'où la volatilité et les réserves sont exclues ; elle est minimum avec une formule fondée sur la population au lieu du PIB. Sauf avec la formule fondée sur la population, les Etats-Unis parviennent à maintenir leur quote-part à l'horizon 2030.

- La part de la zone euro peut être aussi élevée avec une formule compressée qu'avec une formule non compressée; l'exclusion des flux intra-zone euro fait perdre de l'ordre de 4 points de pourcentage à la zone en 2030; une formule avec le PIB en parité de pouvoir d'achat n'est pas forcément plus favorable que si c'est la population qui est utilisée. Cependant, aucune formule ne permet réellement de contrer une baisse de la part de la zone de l'ordre de 6 points de pourcentage entre 2001 (année de base) et 2030.
- La part de la Chine est maximisée avec une formule fondée sur la population ou le PIB en parité de pouvoir d'achat ; elle est minimisée avec des formules compressées. Selon la formule retenue, la part de la Chine double ou même triple entre 2001 et 2030.
- La part de l'Afrique sub-saharienne est plus élevée avec des formules compressées, mais la part le plus élevée est de loin obtenue avec une formule fondée sur la population ; l'utilisation de PIB en parité de pouvoir d'achat n'élève pas significativement la part de la zone.

Au total, les discussion autour des quotes-parts reflètent certaines contradictions entre leurs trois fonctions – fixer les contributions des Etats membres au Fonds, leur accès aux ressources, leurs droits de vote – sans parler de leur rôle d'incitation à pratiquer de bonnes politiques économiques. Le rôle déclinant du FMI comme pourvoyeur d'assistance financière pourrait avoir contribué à déplacer l'attention des deux premières fonctions des quotes parts vers la troisième. Si tel est le cas, une réforme en profondeur des formules, consistant en particulier à tenir compte de la population et à ne pas trop tenir compte de variables pouvant produire de mauvaises incitations, comme la variabilité ou les réserves, pourrait être sérieusement envisagée.

RESUME

Nous simulons les quotes-parts au FMI à l'horizon 2030 pour 49 pays ou zones, à partir de projections de PIB, commerce et investissement direct étranger. Plusieurs formules sont simulées et on examine l'impact, sur les quotes parts, de l'exclusion des flux de commerce intra-zone euro. Les résultats montrent que le seul moyen de véritablement accroître la quote-part de l'Afrique sub-saharienne est de substituer la population au PIB dans la formule de quote-part. Les quotes-parts des Etats-Unis et de la Chine sont maximisées avec des formules reposant en grande partie sur le PIB. Dans tous les cas, la Chine double ou même triple sa quote-part entre 2001 (année de base) et 2030 alors que les Etats-Unis parviennent à maintenir la leur stable. Par contre, la part de la zone euro ne peut que diminuer de l'ordre de 6 points de pourcentage à cet horizon, et l'exclusion des flux intra-one euro entraîne une perte supplémentaire de l'ordre de 3 ou 4 points de pourcentage.

Classification *JEL* : F33
Mots-clefs : projections à long terme, quotes-parts, Fonds Monétaire International.

IMF QUOTAS AT YEAR 2030

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1. INTRODUCTION

In September 18, 2006, the Board of Governors of the International Monetary Fund adopted a resolution requesting that the Executive Board reaches an agreement on a new quota formula by the annual meetings of 2007 or no later than the Spring 2008 meetings. It was agreed that the new formula should be simpler and more transparent, and that it should better reflect the positions of the various member states in the world economy.

IMF quotas are considered a strategic issue by member countries since they determine financial contributions, but also access rights to IMF financing and voting rights.[2] The latter function has become especially topical with the demand of low and medium-income countries to acquire a bigger say in the decision process.

The quotas are determined on the basis of a complicated system of formulas dated 1983. Already in 1997, the Executive board of the IMF had recommended a change in the formulas. Consistently, a group of experts chaired by Richard Cooper was asked in 1999 to make a proposal. The so-called Cooper formula, which only relies on GDP and on the variability of current receipts and net long-term capital flows, launched a lively discussion and intense work by Fund's staff. The bottom line of the discussions is that it is extremely difficult to produce a simple formula that does not lead to higher concentration of quotas in industrial countries, with even lower representation of low-income countries than is presently the case.

The process of formula revision is evidently a long and complicated one. As already mentioned, the formulas currently in use are dated 1983. Once agreed on, the new formula(s) will unlikely be reconsidered for a long time. Therefore, it is useful to simulate the impact of alternative formulas not only in the short run, but also in the longer run where the distribution of income, trade flows and capital flows across IMF member countries will surely differ from the present situation. It should be reminded here that a 2% GDP growth differential leads to a 22% income differential after 10 years and a 49% differential after 20 years. Hence, the distribution of quotas in, say, 2030, will unlikely mimick that of 2007.

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[2] Voting rights are not exactly proportional to quota shares due to basic votes. See below.

To simulate quota formulas forward, a number of projection tools are needed. Here we rely on long-run GDP projections provided by Poncet (2006) and on CEPII's computable general equilibrium MIRAGE to simulate various quota formulas up to year 2030, for 49 countries or zones. The paper is organised as follows. In Section 2, the numerous options for new formulas are discussed with reference to the objectives of the quotas. Section 3 presents the methodology followed for simulating quota formulas up to 2030. Section 4 reports and discusses the main results from the simulations. Section 5 concludes.

2. GENERAL PRINCIPLES

Quotas serve three purposes (see IMF, 2006):

1. they determine the financial contribution of each member country;
2. they determine SDR allocations and members' access to Fund resources;[3]
3. together with basic votes, they determine the voting rights of member states in the Fund.

These three objectives clearly overlap. For instance, it is natural to grant large voting rights to large shareholders. However, the current willingness to raise the representation of developing countries in Fund's decisions (objective 3) partly contradicts the idea of large shareholders retaining the bulk of allocated quotas (objective 1). In addition, access to Fund resources (objective 2) is not constant over time and basically unpredictable (cf. the failure of early-warning indicators of balance of payment crises).

Here we successively discuss the variables to be included in the formulas and the functional forms of the formulas themselves.

2.1 The variables

Existing quota formulas (detailed in Box 1) rely on four economic variables: GDP, openness, variability, official reserves. Here we start from the present definition of these variables and discuss how each variable could be amended or whether it could be removed from the formulas.

[3] Although in some cases, the Fund provided financial assistance to some members irrespective of their quotas.

Box 1 – The present formulas

Since 1983, the quota Q of each member country at the IMF has been calculated on the basis of five formulas, where Y stands for GDP at current market prices for a recent year, R is the twelve-month average of official reserves for a recent year, $C_{payments}$ is the annual average of current payments for a recent five-year period, $C_{receipts}$ is the average annual current receipts for a recent five-year period, and V is the variability of current receipts, defined as one standard deviation from the centred five-year moving average, for a recent 13-year period:

$Q_0 = (0.01\ Y + 0.025\ R + 0.05\ C_{payments} + 0.2276\ V)(1 + C_{receipts}/Y)$ (Bretton Woods formula)

$Q_1 = (0.0065\ Y + 0.0205125\ R + 0.078\ C_{payments} + 0.4053\ V)(1 + C_{receipts}/Y)$

$Q_2 = (0.0045\ Y + 0.03896768\ R + 0.07\ C_{payments} + 0.76976\ V)(1 + C_{receipts}/Y)$

$Q_3 = 0.005\ Y + 0.042280464\ R + 0.044(C_{payments} + C_{receipts}) + 0.8352\ V$

$Q_4 = 0.0045\ Y + 0.05281008\ R + 0.039(C_{payments} + C_{receipts}) + 1.0432\ V$

Formulas Q_1 to Q_4 are rescaled by an adjustment factor in order for the sum of all quotas across member states to be equal to the one with Q_0. Then, the calculated quota for each member state, Q, is :

$Q = Max(Q_0, Avg(Q_i, Q_j))$ Where Q_i, Q_j are the two lowest figures obtained from Q_1 to Q_4 after adjustment.

Finally, ad hoc adjustments are made so that the final quotas rarely correspond to this calculation. The voting right of each member is equal to a 250 basic vote plus one vote for each SDR 100,000 of quota. Following the increasing needs of the IMF, quotas have regularly been raised since 1944 without any increase in basic votes. Mechanically, the voting shares of small or less-developed countries have been declining (see Mirakhor and Zaidi, 2006).

GDP

All existing and contemplated formulas include GDP as one major component, and it was decided in Singapore in 2006 that more should be put on this variable in the new formula. Indeed, GDP is the most comprehensive measure of economic size. Hence it is consistent with the three objectives of quotas: a country with large GDP will have higher ability to contribute to the Fund (objective 1), higher needs in case of a crisis (objective 2), and higher legitimacy to weigh on Fund's decisions (objective 3).

In existing formulas, GDP is taken at current market prices and market exchange rates for a recent year, and recent discussions seem to have converged on a three-year average in order to cancel out temporary fluctuations of GDP and exchange rates. It has sometimes been argued that GDP should be included using purchasing power parity (PPP) exchange rates rather than current ones in order to better reflect size (Mirakhor and Zaidi, 2006) and the future ability of member countries to contribute to the Fund (Truman, 2006). Using PPP measures would help raising the share of developing and emerging countries compared to advanced economies. However three counter-arguments can be brought forward:

(i) The ability to contribute to the Fund is more likely to be indexed on GDP at current exchange rates than at PPP rates. For instance, consider a depreciation of the local currency. Then, the ability to contribute is reduced due to the depreciation: GDP at current exchange rates is consistent with objective 1. Concerning borrowings (objective 2), the link between the exchange rate and the needs for financial assistance is less clear-cut. This is because a weak currency may either have a positive or a negative impact on the balance of payments, depending on the sensitiveness of net exports and on the extent of indebtedness in foreign currencies. However empirical research on balance of payment crises generally shows that an overvalued exchange rate has a positive impact on the probability of crisis (see, for instance, Berg and Pattillo, 1999), hence on the probability of asking for Fund's assistance. This is another argument for indexing quotas on GDPs at current exchange rates.

(ii) PPP exchange rates rely on the international price comparison (IPC) program of the OECD, Eurostat, CIS and the World Bank, covering 115 countries. The data for the remaining 69 countries are estimated by the World Bank or by the IMF and they do not rely on country surveys. Even for those countries covered by the ICP, there are problems of comparability (see Box 2).[4]

(iii) In order to increase the share of developing countries in the quotas and, more generally, the democratic legitimacy of the IMF, it would be more appropriate to rely on population rather than GDP in PPP to calculate quota shares. This possibility, advocated by Camdessus (2005), would better fit the idea of each individual having a say in global decision making (one person-one vote principle), given that the consequences of ill-governance are suffered by each individual. Another possibility would be to distinguish objective 3 from objectives 1 and 2 by raising the amount of basic votes. However basic votes can raise the voting share of very small countries but are unable to redistribute voting shares across relatively large ones.

Box 2 – Measuring PPP

Purchasing power parity (PPP) exchange rates are theoretical, nominal exchange rates that would equalise the price of a given consumption basket across countries. They are widely used to compare living standards across countries: because the same consumption basket is cheaper in developing countries, the same dollar of revenue entitles households to buy more goods, and this should be accounted for in international comparisons.

In order to calculate PPP exchange rates, a set of comparable consumption price *levels* is needed. The International Comparison Program (ICP) of the World Bank provides comparable price levels for a basket of 155 items based on surveys in 115 countries. The surveys are carried out every three years by the OECD, Eurostat and the Community of

[4] The current IPC program, due by end 2007, will provide upgraded data for 147 countries (not all IMF members). However 41 IMF member countries will still not be covered by the survey.

Independent States (CIS) in a total of 52 countries, and every five years by the World Bank in coordination with various agencies in 63 developing and emerging countries. The consumption basket is assumed to be similar across all countries, which is a very strong assumption. It can be argued that only price differences, not purchasing power differences can be measured this way. Another strong assumption is that the goods are exactly the same across countries, neglecting quality differences.

For 60 countries, PPP exchange rates do not rely on a country survey. They are rather estimated by World Bank staff based on regional averages and econometric relationships.

Finally, the data is not available for the remaining 10 member countries.

One illustration of the difficulty in measuring PPP is given in the OECD Economic Survey on China (2005). The OECD staff reports the PPP exchange rate of the yuan against the US dollar varying from 0.88 to 4.25 for year 1990.

Openness

Openness is currently included in the five quota formulas, and generally contemplated in proposed formulas.[5] It is viewed as an indicator of member's involvement and stake in the global economy. It is presently based on the absolute sum of current payments (goods, services, income and private transfers) averaged over a five-year recent period, and of current receipts calculated the same way. Given the dramatic increase in capital flows compared to trade flows, it has been suggested to extend the notion of openness to capital flows. For instance, the needs for financial assistance may not be proportional to current payments, but rather to the whole liability side of the balance of payments. Indeed, the financial crises of the late 1990's and early 2000's have shown that capital repatriation is a major component of financial crises, raising the needs for financial assistance. Symmetrically, the willingness to contribute to global financial stability could be proportional to the amount of foreign assets held by a given member country.

Measuring financial openness however raises at three tricky questions: (i) use gross or net amounts; (ii) use flow or stock variables; (iii) include all financial flows (foreign direct investment, portfolio and "other") or only some of them.

(i) Net capital flows are a measure of excess national saving over investment. It is not a measure of involvement in the global financial market. For instance, a balanced current account does not preclude a country being hurt by a crisis either at home (in case of massive capital withdrawal or a sudden drop in terms of trade) or abroad (if a large foreign country defaults on its debt). Hence openness should rely on gross current receipts and payments and gross capital flows or stocks. However this involves over-stating the quota of financial centres.

(ii) Theoretically, the extent of a member country's involvement in the global financial markets depends on its asset and liability stocks rather than flows. This is

[5] The "Cooper" formula is a major exception. See Cooper and Truman (2007).

because the whole stock needs to be refinanced over time. However data availability imposes to rely on flows rather than stocks (IMF, 2006).

(iii) Third-generation models of financial crises would suggest focusing on short-run capital flows, i.e. on "portfolio" and "other" flows. However there are several difficulties in doing this. First, "other" flows include trade credit that is already included as exports and imports in the openness variable. Second, they include operations on derivative markets that may either reduce the vulnerability of a member country to a financial crisis or lead to over-stating the quota of countries with a financial centre. Third, short-term flows are volatile, which could lead to quota instability.

On the whole, a sensible and feasible way would be to include gross FDI and portfolio outflows and inflows in the measure of openness. Note that introducing openness as a ratio to GDP would be more appropriate than having them in levels, due to the high correlation between balance of payment flows and GDP.

It has been suggested that intra-Eurozone flows should be removed from the calculation of the area's quota because those flows are not going to trigger any balance-of-payments crisis. Given the high level of integration in this area, such exclusion would likely make a big difference in terms of quota share, which would leave room for less developed countries to reap higher shares. This scheme would be consistent with a single representation of the Eurozone at the IMF (through a single constituency), which raises a number of political difficulties since two Eurozone members (Germany, France) have their own administrator at the IMF and four have an administrator representing a constituency that also includes non-Eurozone members. Advocates of a Eurozone single seat argue that the drop in the voting share would be over-compensated by the co-ordination of Eurozone voices (Bini-Smaghi, 2006).

Variability

Variability is included in quota formulas in order to capture the vulnerability of member countries to balance-of-payment crises, hence their potential borrowing needs (objective 2). Variability is defined as the standard deviation of current receipts from the centered five-year moving average, for a recent 13-year period. This variable is viewed as a complement to openness since some relatively closed economies (say, Brazil) may nevertheless be vulnerable to crises due to the instability of current receipts and of capital inflows.

To stay consistent with the openness variable, variability should include the instability of capital flows. However the variability of capital inflows may not correctly measure the vulnerability of a country, if inflows and outflows are positively correlated. Hence it has been suggested that variability be calculated on the sum of current receipts and net capital inflows, as the standard deviation from a three-year rather than five-year moving average.

However such measure is likely to show up very close to the variability of current receipts and payments.[6]

More fundamentally, weighing variability in the quota formula amounts to "rewarding" member countries whose policies are inappropriate, leading to high instability. This problem points to some inconsistency between objective 2 (the needs for Fund's financings) and objective 3 (the say in IMF decisions), with possible moral hazard for large countries. The same kind of problem arises in the case of foreign exchange reserves.

Reserves

Official reserves are included in existing quota formulas because they represent the ability of a member country to contribute to the Fund (objective 1). However, large reserves can also be viewed as a protection against currency crises, reducing the needs to ask for financial assistance from the Fund (objective 2). In addition, excess reserve accumulation is often viewed as one cause of currency disorders and should not be encouraged, in the same way as instability should not be encouraged (whereas supporting world GDP and trade growth are IMF goals).

In fact, the literature on optimal reserves suggests that the level of reserves should be endogenous to the other variables included in quota formulas. Econometric studies (see Aizenman and Lee, 2005) show that openness explains the bulk of cross-country variance of reserve holdings. This is an additional reason for limiting the role of reserves in quota formulas through low or zero weight, or through a cap.

2.2. Functional forms

IMF (2006) lists a number of desirable properties for the functional form or the quota formulas: simplicity, transparency, homogeneity, monotonicity, non-convexity. Existing formulas lack simplicity since five different formulas are used to calculate quotas. They lack transparency because the quota share of one country cannot be calculated unless all quotas are known. However, each formula is homogenous of degree one since doubling all variables included in the formulas in one country results in doubling the corresponding quota. Hence, doubling all variables in all countries does not change the distribution of quotas. Conversely, existing formulas are not all monotonous in each variable. In the Bretton Woods formula, for instance, a rise in GDP, other things equal, reduces the quota up to a certain threshold, because the openness ratio declines.

In Box 3, the mathematical properties of multiplicative, linear and compressed linear formulas in levels and in shares are compared in the case of the "Japanese formula" (GDP 50%, openness 50%). All formulas are satisfactory as far as monoticity and non-convexity are concerned: a rise in, say, GDP (or in the GDP share in world GDP), always raises the quota (or the quota share), and the rise is never higher than the increase in GDP (or GDP share).

[6] See dos Reis (2005).

As evidenced in the box, a trade-off needs to be made between transparency (which favours a multiplicative or linear formula in shares) and the willingness to reduce quota inequalities across countries (for which the compressed linear formula is powerful).

It should be reminded here that the original justification for compressing the linear formula is that the variables included in the formulas are likely to be positively correlated: if the same countries have large GDP and large current transactions, then including both variables has a magnifying impact on the quotas of large countries. However, as evidenced in the box, a similar result can be obtained with a compressed multiplicative formula where a 1%, simultaneous increase of all variables, raises the quota (or quota share) by λ%, with $0 < \lambda < 1$. A compressed multiplicative formula would allow to obtain transparency and concavity at the same time.[7]

Box 3 – The mathematical properties of various formulas

Here we consider the so-called "Japanese formula" which accounts for GDP (50%) and openness (50%). Let us denote Y_i the GDP of country i, and y_i its share in world GDP Y. Similarly, C_i denotes the sum of current receipts and current payments of country i, and c_i the share of current receipts and payments in world receipts and payments C. We have $y_i = Y_i/Y$ and $c_i = C_i/C$.

The following table summarises the various ways of writing the Japanese formula, where λ is the compression factor ($0 < \lambda < 1$) and $k > 0$ is a re-scaling factor:

	In levels	In shares
Multiplicative	$Q_i = Y_i^{0.5} C_i^{0.5}$	$q_i = y_i^{0.5} c_i^{0.5}$
Linear	$Q_i = 0.5\ Y_i + 0.5\ C_i$	$q_i = 0.5\ y_i + 0.5\ c_i$
Compressed linear	$Q_i = (0.5\ Y_i + 0.5\ C_i)^{\lambda}$	$q_i = k(0.5\ y_i + 0.5\ c_i)^{\lambda}$

All six formulas are monotonous in the sense that a rise in one variable included in the formula always increases the quota or the quota share. Indeed, all partial derivatives are positive. None of these formulas is convex, i.e. the impact of a rise in, say, GDP, never has a higher impact on the quota for higher initial GDP.

The two multiplicative and two linear formulas are homogenous of degree 1: doubling the level or share on all variables results in doubling the quota level or share. In turn, the compressed linear formula is homogenous of degree λ. This means that a simultaneous, 1% increase in Y and C results in an increase in Q by λ.%. This is an interesting property for increasing the quota share of smaller countries.

[7] A second way of accounting for the high correlation between GDP and openness would be to introduce openness as a ratio (current receipts and payments over GDP). A third solution, proposed by Cooper and Truman (2007), would be to cap quota shares to 60% of GDP shares.

The multiplicative and linear formulas in shares are the most transparent ones because it is immediately possible to derive the quota share from the GDP or current transactions share. In the multiplicative formula in shares, a 1% increase in the share of country *i* in world GDP results in a 0.5% increase in its quota share, other things equal: $\frac{dq_i}{q_i} = 0.5\frac{dy_i}{y_i} + 0.5\frac{dc_i}{c_i}$

In the linear formula, a 1 percentage point increase in country *i's* share in world GDP results in a 0.5 percentage point increase in its quota share, other things equal: $dq_i = 0.5dy_i + 0.5dc_i$. Conversely, the impact of a 1 percentage point increase in the GDP share depends on the initial quota share in the compressed linear formula: $dq_i = k\lambda q_i^{\frac{\lambda-1}{\lambda}}(0.5dy_i + 0.5dc_i)$. Since 0 < λ < 1, the impact of a 1 percentage point increase in the GDP share is larger the lower the initial quota share.

Finally, a compressed multiplicative formula in shares seems to combine the transparency of a multiplicative formula in shares with the advantages of compression. Indeed, with $q_i = k\left(y_i^{0.5}c_i^{0.5}\right)^{\lambda}$, a 1% increase in the GDP share leads to a rise in the quota share by 0.5λ%: $\frac{dq_i}{q_i} = 0.5\lambda\frac{dy_i}{y_i} + 0.5\lambda\frac{dc_i}{c_i}$. Hence this is a much transparent formula; to the extent that λ < 1, it allows smaller countries to benefit from relatively higher quota shares, compared to their shares in world GDP.

3. SIMULATION METHODOLOGY

In this section, we present our methodology for simulating quota shares for year 2001 (our baseline) as well as for 2005, 2010, 2020 and 2030. We rely on the long-run GDP projections of Poncet (2006) and on long-run trade and FDI projections provided by CEPII's CGE model Mirage (see Bchir et al., 2002, Decreux and Valin, 2007). Then, a number of assumptions are made to simulate openness, variability and official reserves. The methodology is detailed in Appendix A. The world is disaggregated into 45 countries and 4 country groups[8], and we discuss the impact of merging Eurozone countries into a single seat, in terms of quota shares.

3.1. GDP, trade and FDI at year 2030

a. GDP

We rely on long-term scenarios for world economic growth developed in Poncet (2006). These scenarios are based on an augmented Solow growth model. In this framework, growth stems from three driving sources: the labour force, capital accumulation and total factor productivity (TFP). Labour force growth is based on the latest demographic

[8] The list is given in Appendix A. The Eurozone and EU27 groups are aggregated of already identified countries whereas the sub-Saharan Africa and rest of the world group are aggregates of non-modelled countries. This choice is dictated by data limitations (bilateral FDI).

projections from the United Nations and on the assumption of stable unemployment rates and constant hours worked per employee. Capital accumulation relies on the closed-economy assumption of investment rates equal to savings rates, the latter being projected based on an econometric estimation over 1965-2005.[9]

As for TFP growth, we rely on the recent generalization of the Nelson-Phelps catch-up model of technology diffusion by Benhabib and Spiegel (2005). In this model, human capital raises total factor productivity growth through its influence on the rate of catch-up and on own innovation. Poncet (2006) estimates the TFP growth model on panel data over 1965-2005.

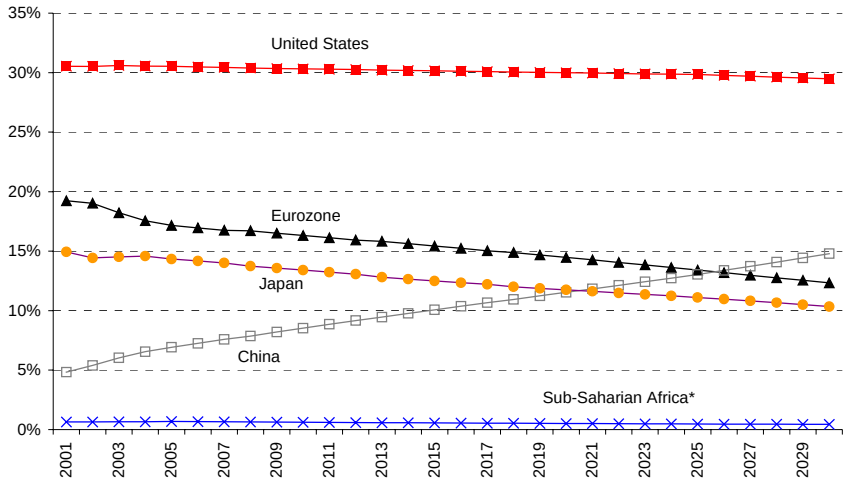
These projections of GDP in volume are complemented by projections of real exchange rates based on a simple, Balassa-Samuelson effect: a 1% reduction in the TFP gap to the United States is supposed to involve a 1% appreciation of the real exchange rate, which is consistent with non-tradable sectors to account for half of the economic activity.

The projected evolution of GDP at current relative prices for five countries or zones is reported in Figure 1. Two striking features emerge from this figure. First, the shares of the United States and of Sub-Saharan Africa[10] remain stable over the three decades, around 30% for the former and around 0.5% for the latter. Second, there is a drop in Eurozone and Japanese shares, by 6.9 and 4.6 percentage points in 30 years, respectively. Conversely, the share of China rises by 10 percentage points and exceeds that of both the Eurozone and Japan in 2030.

[9] Empirical estimates point to the importance of GDP level and growth as determinants of savings rates. This closed-economy assumption may be less restrictive than it seems due to the Feldstein-Horioka puzzle pointing to a high correlation between savings and investment rates. It is clearly a conservative view of world growth. Indeed, world growth may be higher with capital flowing from low return to high return countries.

[10] In all the paper, the Sub-Saharian Africa group excludes South Africa.

Figure 1 – GDP shares in five countries or zones, 2001-2030



Source: Poncet (2006). * excluding South Africa.

Table A.1 in Appendix details the evolution of GDP at constant and at current relative prices for every country or zone. The inclusion of real exchange-rate variations in our simulations is crucial as evidenced through the comparison between China and India: although both countries have similar growth paths at constant prices, only China experiences a strong real appreciation due to the rise in GDP per capita. Table A.1 is helpful to understand the implication of introducing GDPs in PPP in the quota formulas, since GDP growth in PPP is the same as GDP growth in volume.[11] For the Eurozone and especially the United States, there is little difference between GDP growth in volume and at current real exchange rates. This is not the case for China whose GDP is multiplied by 5 in PPP and 8 at current real exchange rates.

b. Trade and FDI

The evolution of trade and Foreign Direct Investment (FDI) compatible with GDP and population growth rates is computed with the Mirage model. Mirage is a multi-region, multi-sector computable general equilibrium model devoted to trade policy analysis. It incorporates FDI. The detailed structure of Mirage is presented in Bchir et al. (2002) and updated in Decreux and Valin (2007).

[11] GDP growth in PPP is based on a constant real exchange rate; GDP growth in volume is based on constant prices in domestic currency, which amounts to constant prices and constant nominal exchange rates.

Foreign owned firms are treated as domestic firms in all respects. The only difference is that the capital revenue goes back to the source country. Non-FDI capital flows are assumed to be exogenous as a percentage of world GDP. The real exchange rate adjusts so that the current account is equal to the financial account, setting to zero the capital account as well as errors and omissions.

Computable general equilibrium models are not well disposed towards long term prospective as regards growth rates. Here, GDP simulations are taken from Poncet (2006), and TFP growth is adjusted accordingly in Mirage to make the model match Poncet's projections.

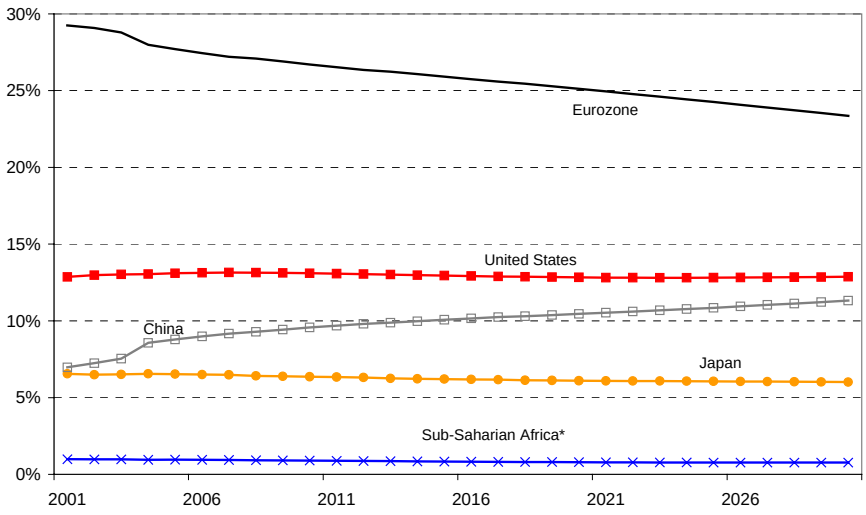
For the present study, only two sectors are identified - goods and services - whereas 49 countries or regions are detailed. Mirage allows to assume that some sectors are imperfectly competitive with increasing returns to scale whereas others are perfectly competitive. With only two sectors, introducing such a differentiation is irrelevant, so that both sectors are assumed perfectly competitive in the present study. In the absence of further information, FDI bilateral stocks and flows have been distributed between the two production sectors, proportionally to initial capital stocks. They are ultimately aggregated again in one bilateral figure for the value of inward and outward FDI stocks and flows.

Two alternative tariff scenarios are considered. The first one corresponds to a conservative scenario where no liberalisation is undertaken until 2030. In contrast, the second scenario is based upon a relatively ambitious assumption, since tariffs are assumed to be reduced by 60%, linearly from 2007 to 2030, through a combination of unilateral liberalisation regional agreements, bilateral negotiations or multilateral liberalisation rounds. Note that TFP growth rates are kept the same in both scenarios.

The simulated export share of five countries or zones (including intra-zone flows) over 2001-2030 is reported in Figure 2 for the conservative scenario. As for GDP, the export share of United States remains stable over the period. That of Sub-Saharan Africa declines slightly from 1% in 2001 to 0.8% in 2030. The Eurozone's share falls by 6 percentage points whereas the Chinese one rises by 4 p.p.. In 2030, however, the export share of the Eurozone remains largely above the US one, but this is due to the inclusion of intra-Eurozone flows that account for 44% of Eurozone exports in 2001 and 38% in 2030. Removing intra-Eurozone flows, the United States and the Eurozone have similar export shares in 2001 (15%), but in 2030 the Eurozone falls to 10%, well below the US share (14%).

Figure 3 shows the share of the same countries and zones in world FDI outflows from 2001 to 2030, including intra-Eurozone flows. The graph evidences a decline in European and Japanese shares whereas those of China and of the United States are rising and that of Sub-Saharan Africa declines slightly. Removing intra-Eurozone flows, we find the same pattern as for export shares: the share of the Eurozone is close to that in the United States in 2001 (14.3%, against 15.5% for the United States), but it falls to 10.8% in 2030 whereas the share of the United States rises to 22.6%.

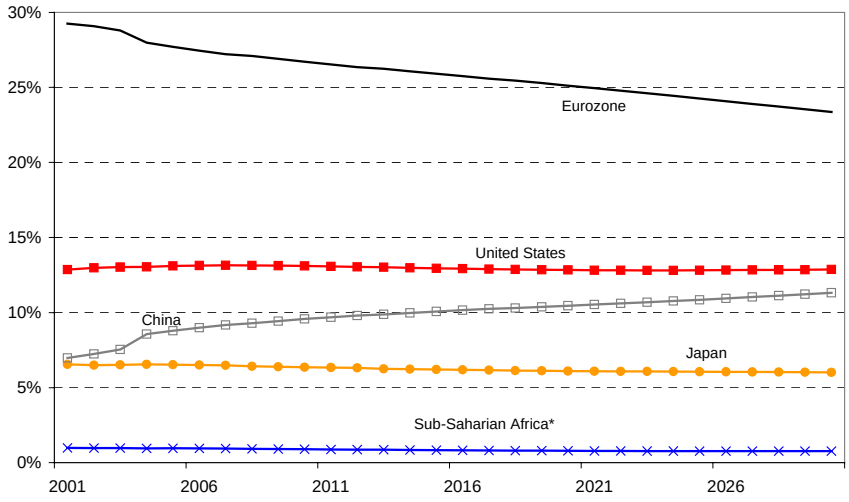
Figure 2 – Export shares in five countries or zones, 2001-2030 (conservative scenario)



Source: Mirage simulations. * excluding South Africa.

Figure 3 – FDI shares in five countries or zones, 2001-2030

(conservative scenario)



Source: MIRAGE simulations. * excluding South Africa.

From Figure 1 to 3, it is easy to guess that any quota formula based on GDP and openness is likely to engineer a downward trend of the Eurozone and Japanese quota shares, a rise in the Chinese one and possibly of the US one, and finally, a stability or fall in the share of Sub-Saharan Africa at a very low level.

We now detail the variables included in the quota formulas.

3.3. The variables to be included in the formulas

a. Openness

We use two alternative measures of openness: current receipts and payments, and an extended measure of openness that includes foreign direct investment and portfolio flows.

Current receipts and payments

Openness is defined as the sum of current receipts and payments. Exports and imports of goods and services are derived from Mirage simulations. In order to compute the other components of current receipts and payments, we assume a constant relationship between, on the one hand, income and private transfers, and on the other hand, trade in goods and services. We therefore rely on region or country-specific multiplier coefficients, noted m_I *and* m_T, computed as the average ratio between income and private transfers, respectively, and trade in goods and services, for the 2000-2004 period. The multiplier coefficients are displayed in Table A.2 in Appendix A. Current account receipts $C_{receipts}$ are obtained by augmenting exports of goods and services (provided by Mirage) by a factor $(1 + m_I + m_T)$; similarly, current payments $C_{payments}$ are based on imports:

$$C_{receipts} = (1 + m_T + m_I)\, X \qquad (1a)$$

and $$C_{payments} = (1 + m_T + m_I)\, \mathrm{M} \qquad (1b)$$

Where X and M denote exports and imports of goods and services, respectively. Finally we note $C = C_{receipts} + C_{payments}$

FDI and portfolio flows

FDI inflows and outflows are provided by Mirage simulations. For portfolio flows, we assume a constant relationship between FDI and portfolio flows. We therefore rely on region and country-specific multiplier coefficients m_p computed as the ratio of inward and outward portfolio investments on total inward and outward FDI over the period 2000-2004. Country specific multipliers are displayed in Table A.2 in Appendix A. Financial openness (receipts and payments), F, is then obtained by augmenting FDI inflows and outflows (provided by Mirage) by a factor $(1 + m_P)$:

$$F = (1 + m_P)\,(FDI_{in} + FDI_{out}) \qquad (2)$$

Where FDI_{in} and FDI_{out} denote FDI inflows and outflows, respectively.

Our measure of openness is either C (current openness) or $C+F$ (current + financial openness).

b. Variability

It is worth noticing that the structure of a model like Mirage does not allow to say anything about trade and FDI volatility, which needs to be estimated otherwise.

Variability is defined as the standard deviation of the sum of current receipts and net capital inflows from the centred three-year moving average, for a 13-year period before the year of computation of the quotas (2006-2020 for the year 2020, and 2016-2030 for the year 2030). We rely on region and country-specific multiplier coefficients m_V computed as the ratio of variability (as observed over the period 1991-2004) over the average sum of current receipts and FDI-plus-portfolio net inflows over the same period. Region-specific multipliers are displayed in Table A.2 in Appendix A. Variability V is then obtained by multiplying m_V with current receipts and net capital flows that are projected along the lines described above:

$$V = m_V\,(C_{receipts} + F_{in} - F_{out}) \qquad (3)$$

where $C_{receipts} = (1 + m_I + m_T)\,X$, $F_{in} = (1 + m_p)\,FDI_{in}$

and $F_{out} = (1 + m_p)\,FDI_{out}$

c. Reserves

Official reserves are defined as the sum of foreign exchange, SDR holdings, reserve position in the Fund, and monetary gold valued at SDR 35/ ounce. Reserves are projected by assuming a constant relationship between reserves and imports of goods and services. We therefore rely on region and country-specific multiplier coefficients m_R computed as the average ratio between reserves and imports of goods and services over the period 1995-2003. Region-specific multiplier coefficients are displayed in Table A.2 in Appendix A. Reserves are then obtained by multiplying m_R with the imports of goods and services provided by Mirage:

$$R = m_R\,M \qquad (4)$$

Reserves can alternatively be capped in order not to exceed three months of imports:

$$Rcapped = \mathrm{Min}(m_R, 0.25)\,M \qquad (5)$$

3.3. Country groups

Four country groups are included in our simulations: the Eurozone, the EU27, Sub-Saharan Africa, and the Rest of the world. The Eurozone and EU27 are simple aggregations of their corresponding countries that are identified separately in the simulations. However some simulations are performed while removing intra-Eurozone flows from the definition of openness. In the Sub-Saharan Africa and Rest of the world cases, the detail of the countries is not identified in the simulations, which raises a problem when using compressed formulas.

a. Eurozone

Two sets of simulations are successively performed, whether intra-Eurozone flows are included or not.

Mirage provides us with bilateral FDI and trade flows. We therefore have direct projections of intra and extra-Eurozone FDI and trade in goods and services. We then assume that the share of intra-Eurozone flows in total income, transfers and portfolio flows of each country is the same as the share of intra-Eurozone flows for FDI and trade in goods and services. This assumption is based on the computation of very similar figures in the beginning of the 2000's. In 2001, as an illustration, the share of intra Eurozone flows for FDI and trade in goods and services[12] was 55.9% for the whole area, while the share of intra Eurozone flows for income, transfers and portfolio flows was 54.9%. Denoting m_E the share of intra-Eurozone trade and FDI flows for each Eurozone country (derived from Mirage projections), we have:

$$C_{extra} = (1 - m_E)\, C \tag{6}$$

and: $C_{extra} + F_{extra} = (1 - m_E)\,(C + F)$ (7)

where C_{extra} and $(C_{extra} + F_{extra})$ stand for current and extended openness vis-à-vis non-Eurozone countries, respectively.

The measure of variability is adapted accordingly, assuming a constant relationship m_V between variability and extra-Eurozone current and financial openness :

$$V_{extra} = m_V\,(C_{extra} + F_{extra}) \tag{8}$$

Where V_{extra} represents the variability of receipts and payments against the rest of the world[13].

[12] Receipts and payments are aggregated.

[13] Hence it is assumed here that intra and extra- Eurozone flows bear the same variability as measured through their coefficients of variation.

b. Sub-Saharan Africa and Rest of the world

Sub-Saharan Africa and the rest of the world account for 0.6 and 7.0% respectively of world GDP in 2001. Aggregating the corresponding countries is neutral for uncompressed formulas because the quota share of the aggregate is the sum of individual countries' quota shares. This is no longer the case for compressed formulas. Because it was impossible to detail all 185 IMF member countries in our calculations, we assumed identical countries in each aggregate (either Sub-Saharan Africa, or Rest of the world) and proceeded as follows: (i) calculate the variables to be included in the formula for the aggregate, (ii) divide each variable by the number of countries in the aggregate, (iii) calculate (compressed) quota shares for each country, and (iv) sum up the quota shares across the countries of the aggregate.

3.4. The basic database

Table 1 reports the share of our 49 countries or zones in the world total for the various variables included in the formulas in 2001 (base year), 2020 and 2030 under the no-liberalisation scenario and relying on both intra- and extra-Eurozone flows. As already evidenced in Figure 1, the share of the Eurozone in terms of GDP declines from 19.3 to 12.4% over the 30-year period while the United States maintains its share around 30% and China triples its share from 4.8 to 14.8%. Similar evolutions (erosion of the share of the Euro-zone share, stability of that of the US and rise of that of China), though not of the same magnitude, apply to trade flows, current account openness, current and financial openness, volatility and reserves. Those evolutions are crucial to understand the reduction in the predicted quotas for the Eurozone and the rapid increase in that of China.

Generally the share of a given country for the different variables evolves in the same direction over time. At one point of time, however, the shares of a given country generally differ markedly depending on the variable considered. For instance, the Eurozone's share is larger for openness than for GDP and volatility; that of the United States is higher for GDP than for openness and especially volatility. For China, the share in reserves is high in 2001, but over time it raises at a slower pace than does the GDP share.

Table 1: Projected evolution of shares in world total (in %) between 2001 and 2030

	Current GDP			Current account openness			Current and fi. Openness			Volatility			Reserves		
	2001	2020	2030	2001	2020	2030	2001	2020	2030	2001	2020	2030	2001	2020	2030
Total Euro zone	**19,3%**	**14,5%**	**12,4%**	**30,5%**	**26,3%**	**24,4%**	**33,7%**	**29,2%**	**27,4%**	**19,2%**	**16,0%**	**14,7%**	**25,3%**	**20,7%**	**18,9%**
SSA	0,6%	0,5%	0,4%	1,0%	0,9%	0,9%	0,9%	0,8%	0,8%	0,3%	0,3%	0,3%	1,5%	1,5%	1,5%
Argentina	0,8%	0,6%	0,5%	0,5%	0,4%	0,4%	0,5%	0,5%	0,5%	0,8%	0,8%	0,8%	0,6%	0,6%	0,5%
Australia	1,2%	1,3%	1,2%	1,1%	1,1%	1,2%	1,0%	1,1%	1,1%	0,5%	0,5%	0,5%	1,4%	1,5%	1,5%
Austria	0,6%	0,5%	0,4%	1,3%	1,1%	0,9%	1,2%	1,1%	1,0%	0,7%	0,6%	0,5%	1,5%	1,2%	1,1%
Belgium and Luxembourg	0,8%	0,6%	0,5%	3,2%	2,8%	2,6%	3,3%	2,8%	2,6%	1,6%	1,3%	1,2%	1,5%	1,2%	1,1%
Brazil	1,9%	1,1%	0,8%	1,0%	1,0%	0,9%	1,0%	0,9%	0,9%	1,5%	1,3%	1,2%	1,5%	1,2%	1,1%
Bulgaria	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,2%	0,2%	0,1%
Canada	2,3%	2,1%	2,0%	3,5%	3,4%	3,3%	3,1%	3,1%	3,0%	1,0%	0,9%	0,9%	2,3%	2,2%	2,2%
China	**4,8%**	**11,5%**	**14,8%**	**5,1%**	**7,8%**	**8,5%**	**4,4%**	**6,6%**	**7,4%**	**2,7%**	**3,9%**	**4,2%**	**6,8%**	**10,2%**	**11,3%**
Cyprus	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,0%	0,1%	0,1%	0,1%	0,1%	0,1%
Czech Republic	0,2%	0,2%	0,1%	0,5%	0,5%	0,5%	0,5%	0,5%	0,4%	0,3%	0,3%	0,3%	0,9%	0,8%	0,7%
Denmark	0,5%	0,4%	0,3%	0,9%	0,8%	0,7%	1,1%	0,9%	0,9%	0,9%	0,8%	0,7%	1,2%	1,0%	0,9%
Estonia	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%
Finland	0,4%	0,3%	0,3%	0,7%	0,6%	0,6%	0,7%	0,7%	0,6%	0,3%	0,3%	0,3%	0,8%	0,7%	0,7%
France	4,2%	3,1%	2,6%	5,2%	4,4%	4,1%	5,6%	4,8%	4,5%	3,8%	3,1%	2,9%	3,7%	2,9%	2,7%
Germany	5,9%	4,4%	3,7%	8,5%	7,1%	6,5%	9,6%	7,9%	7,2%	4,3%	3,4%	3,0%	6,4%	5,2%	4,6%
Greece	0,4%	0,4%	0,3%	0,5%	0,5%	0,5%	0,5%	0,5%	0,5%	0,5%	0,4%	0,4%	0,9%	0,8%	0,8%
Hungary	0,2%	0,1%	0,1%	0,5%	0,4%	0,4%	0,4%	0,4%	0,4%	0,3%	0,2%	0,2%	0,7%	0,6%	0,6%
India	1,5%	2,6%	3,3%	0,9%	1,2%	1,3%	0,8%	1,0%	1,1%	0,5%	0,6%	0,7%	1,3%	1,6%	1,8%
Indonesia	0,5%	0,8%	1,0%	0,8%	1,0%	1,1%	0,7%	0,8%	0,9%	0,4%	0,4%	0,5%	0,9%	1,2%	1,4%
Ireland	0,3%	0,4%	0,4%	1,4%	1,5%	1,5%	2,0%	2,1%	2,2%	0,9%	0,9%	0,9%	0,7%	0,7%	0,7%
Italy	3,4%	2,3%	1,8%	4,1%	3,4%	3,0%	3,7%	3,1%	2,8%	2,3%	1,9%	1,6%	3,5%	2,7%	2,4%
Japan	14,9%	11,7%	10,3%	6,1%	5,7%	5,6%	5,7%	5,3%	5,1%	5,2%	4,6%	4,4%	8,5%	7,7%	7,4%
Korea	1,7%	3,0%	3,8%	2,2%	3,0%	3,4%	1,9%	2,5%	2,9%	1,2%	1,6%	1,7%	3,3%	4,4%	5,0%
Latvia	0,0%	0,0%	0,0%	0,1%	0,0%	0,0%	0,1%	0,1%	0,0%	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%
Lithuania	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%
Malta	0,0%	0,0%	0,0%	0,1%	0,0%	0,0%	0,1%	0,0%	0,0%	0,0%	0,0%	0,0%	0,1%	0,1%	0,1%
Mexico	1,8%	1,3%	1,0%	2,1%	2,2%	2,2%	1,8%	2,1%	2,1%	0,7%	0,8%	0,8%	2,9%	2,5%	2,3%
Netherlands	1,2%	0,9%	0,8%	2,4%	2,2%	2,2%	4,0%	3,6%	3,6%	2,1%	1,9%	1,8%	1,5%	1,2%	1,2%
New Zealand	0,2%	0,2%	0,2%	0,2%	0,3%	0,3%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,3%	0,4%	0,4%
Norway	0,5%	0,5%	0,5%	0,8%	0,8%	0,8%	0,8%	0,8%	0,8%	0,5%	0,5%	0,5%	1,0%	1,0%	0,9%
Poland	0,5%	0,5%	0,5%	0,7%	0,6%	0,6%	0,6%	0,6%	0,5%	0,5%	0,4%	0,4%	1,1%	1,0%	1,0%
Portugal	0,3%	0,2%	0,2%	0,6%	0,5%	0,4%	0,6%	0,5%	0,5%	0,2%	0,2%	0,2%	0,9%	0,7%	0,7%
ROW	7,0%	8,1%	8,8%	9,2%	10,1%	10,7%	9,2%	10,3%	10,9%	43,4%	46,4%	48,0%	12,4%	14,1%	14,8%
Romania	0,1%	0,1%	0,1%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,1%	0,1%	0,1%	0,3%	0,3%	0,3%
Russia	0,9%	1,4%	1,4%	1,2%	1,5%	1,5%	1,0%	1,3%	1,3%	1,1%	1,3%	1,3%	1,5%	1,9%	1,9%
Saudi Arabia	0,6%	0,6%	0,6%	1,0%	1,0%	1,0%	0,8%	0,8%	0,8%	0,6%	0,6%	0,6%	1,3%	1,3%	1,2%
Singapore	0,3%	0,4%	0,4%	1,5%	1,9%	1,9%	1,4%	1,7%	1,7%	1,0%	1,1%	1,1%	2,6%	3,0%	3,0%
Slovakia	0,1%	0,1%	0,1%	0,2%	0,2%	0,2%	0,2%	0,2%	0,1%	0,1%	0,1%	0,1%	0,3%	0,3%	0,3%
Slovenia	0,1%	0,0%	0,0%	0,2%	0,1%	0,1%	0,1%	0,1%	0,1%	0,0%	0,0%	0,0%	0,2%	0,2%	0,2%
South Africa	0,4%	0,3%	0,2%	0,5%	0,5%	0,5%	0,5%	0,7%	0,6%	0,3%	0,4%	0,4%	0,4%	0,4%	0,3%
Spain	1,8%	1,5%	1,3%	2,4%	2,1%	2,0%	2,3%	2,0%	1,9%	2,4%	2,0%	1,8%	3,7%	3,1%	2,8%
Sweden	0,7%	0,7%	0,6%	1,3%	1,2%	1,1%	1,2%	1,1%	1,1%	0,8%	0,7%	0,7%	1,3%	1,2%	1,1%
Switzerland	0,8%	0,5%	0,4%	1,8%	1,5%	1,4%	1,8%	1,5%	1,3%	1,3%	1,0%	0,9%	2,0%	1,5%	1,3%
Thailand	0,4%	0,8%	1,0%	0,9%	1,4%	1,6%	0,8%	1,3%	1,5%	0,4%	0,5%	0,6%	1,3%	1,9%	2,2%
United Kingdom	4,6%	3,9%	3,5%	6,4%	5,8%	5,6%	6,8%	6,2%	6,1%	5,0%	4,4%	4,2%	3,4%	3,1%	3,0%
USA	**30,5%**	**30,0%**	**29,5%**	**16,8%**	**16,9%**	**17,2%**	**16,7%**	**17,1%**	**17,5%**	**8,9%**	**8,8%**	**8,8%**	**10,8%**	**10,5%**	**10,6%**
UE 27	**26,4%**	**20,7%**	**17,9%**	**41,7%**	**36,5%**	**34,2%**	**45,0%**	**39,7%**	**37,5%**	**27,5%**	**23,3%**	**21,6%**	**35,3%**	**29,7%**	**27,3%**

Source: authors' calculations.

3.5 The formulas

The projections detailed in the previous sub-sections are combined in a number of different quota formulas in shares. More specifically, we simulate the formulas for 49 countries or zones by combining the following assumptions:

- Trade: a conservative scenario or a liberalisation scenario;
- Eurozone: excluding or not intra-Eurozone trade and capital flows;
- Openness: covering current transactions or also covering financial flows;
- Formulas: seven different formulas (Cooper, "Japanese", "Finnish", and four additional formulas detailed in Box 4);
- Functional forms: multiplicative, linear, compressed linear (using a compression coefficient of 0.9);
- Years: 2001 (base year), 2010, 2020, 2030.

Box 4 – The simulated formulas (linear forms)

« Cooper »: Q = 2/3 Y + 1/3 V
« Japanese »: Q = 0.5 Y + 0.5 C
« Finnish »: Q = 0.5 Y + 0.3 C + 0.2 V
« GDP »: Q = 2/3 Y + 1/3 C
« Variability »: Q = 0.5 Y + 0.4 C + 0.1 V
« Reserves »: Q = 0.5 Y + 0.3 C + 0.15 V + 0.05 R
« CapReserves »: Q = 0.5 Y + 0.3 C + 0.15 V + 0.05 Rcapped

4. THE RESULTS

As a benchmark, we start with a set of simulated quota shares based on the present procedure detailed in Box 1. The resulting quota share is labelled "present". We then proceed in successive steps:

For 2001 (base year), 2010, 2020, 2030:

- Study the evolution of quotas with present formulas and with two simple, compressed formulas ("Japanese" and "GDP") under the no-liberalisation scenario.

For year 2030:

- Compare the liberalisation scenario with the conservative one for the same two compressed formulas ("Japanese", and "GDP"), with various measures of openness;
- Compare different functional forms (multiplicative, linear and compressed) ;
- Discuss the openness variable;
- Discuss the openness variable based on the Cooper, Japanese and Finnish formulas compressed;
- Discuss the impact of substituting population to GDP in the formulas, following a democratic view of IMF governance.

4.1. Present formulas

Table 2 compares calculated quota shares of a selection of countries or zones in 2001 and in 2030, based on the present methodology of the Fund (the results are detailed for all 49 countries or zones in Appendix B, table B.1). Actual shares in 2007 are also reported in the first column. There are relatively large discrepancies between calculated and actual quota shares. Specifically, the United States and Russia appear over-represented compared to calculated quota shares, whereas the Eurozone and Japan are under-represented. Despite the Singapore ad hoc adjustment of 2006, China and Korea are still under-represented.

Not surprisingly given the evolutions observed in Figures 1 to 3, present formulas deliver a large fall in the Eurozone calculated share from 2001 to 2030 (-10 percentage points), to the benefit of China (+10 percentage points) and the United States (+14 percentage points). The Indian share is multiplied by 3.5 but it remains at a relatively low level of 3.3% in 2030. This is due to Indian growth not being accompanied by strong real exchange rate appreciation over the three decades. Indeed, GDP per capita does not increase rapidly compared with China whose growth relies less on labour, more on productivity, in our scenario.

Finally, the share of Sub-Saharan Africa remains very low throughout the three decades, due to our conservative scenario in terms of GDP and trade growth for this region.[14]

[14] This first scenario should be only considered as illustrative, especially since the United States have announced that it would not seek for a higher quota share compared to the present situation which already grants it with a veto right for those decisions requiring a 85% majority.

Table 2: Projected quota shares based on present formulas

%	Actual shares in 2007[(a)]	Calculated shares	
		2001 (base year)	2030
USA	17.08	16.4	30.2
Japan	6.12	7.8	10.6
Eurozone	22.78	23.3	13.5
France	4.94	4.0	2.7
Germany	5.98	6.2	3.8
UK	4.94	4.5	3.6
Korea	1.35	1.9	3.9
Mexico	1.45	1.6	1.1
China	3.72	4.6	15.2
Brazil	1.40	1.3	0.8
India	1.91	0.9	3.3
Russia	2.73	1.1	1.4
Sub-Saha	4.56	0.8	0.7

(a) Source: IMF (2006). Accounting for the Singapore ad hoc increase in quotas for China, Korea, Mexico and Turkey.
Source: authors' calculations.

4.2. Two basic projections

Here we select two basic formulas that only rely on GDP and openness: the « Japanese » one, and the additive, uncompressed « GDP » formula. Their implications for our 49 countries or zones over the next three decades are discussed under the no-liberalisation scenario. We use the current definition of openness and do not exclude intra-Eurozone flows. The results are detailed in Table B.2 in Appendix B. In Table 3 below, we compare the results for 2001 (our base year), 2010, 2020 and 2030 for a selection of countries.

Table 3: Projected quota shares with « Japanese » and « GDP » formulas
(uncompressed, conservative scenario, including intra-Eurozone flows, current openness)

%	Actual quota share in 2007[(a)]	2001 (base year)		2010		2020		2030	
		Japanese	"GDP"	Japanese	"GDP"	Japanese	"GDP"	Japanese	"GDP"
USA	17.08	23.7	26.0	23.6	25.8	23.4	25.6	23.3	25.4
Japan	6.12	10.5	12.0	9.7	10.9	8.7	9.7	8.0	8.8
Eurozone	22.78	24.8	22.9	22.1	20.1	20.3	18.4	18.3	16.3
France	4.94	4.7	4.5	4.1	4.0	3.7	3.5	3.3	3.1
Germany	5.98	7.2	6.8	6.2	5.8	5.7	5.3	5.1	4.7
UK	4.94	5.5	5.2	5.1	4.8	4.9	4.6	4.6	4.2
Korea	1.35	1.9	1.8	2.4	2.3	3.0	3.0	3.6	3.7
Mexico	1.45	1.9	1.9	1.8	1.7	1.7	1.6	1.6	1.4
China	3.72	5.0	4.9	7.8	8.0	9.7	10.3	11.7	12.7
Brazil	1.40	1.4	1.6	1.2	1.3	1.0	1.0	0.8	0.8
India	1.91	1.2	1.3	1.6	1.7	1.9	2.1	2.3	2.6
Russia	2.73	1.1	1.0	1.4	1.3	1.5	1.4	1.4	1.4
Sub-Saha	4.56	0.8	0.8	0.8	0.7	0.7	0.6	0.7	0.6

[(a)] Source: IMF (2006). Source: authors' calculations.

Compared to present formulas, the United States and Japan get much higher shares with the "Japanese" and even more with the "GDP" formula, in 2001. In 2030, however, the to countries reap higher shares with the present formulas than with the "Japanese" and "GDP" ones. Strikingly, the US share remains broadly stable from 2001 to 2030 with both the "Japanese" and the "GDP" formulas, whereas it rises by 14 percentage points with the present formulas.

Conversely, the Eurozone gains very little with the "Japanese" or with the "GDP" fomula in 2001, but the gain in 2030 is sizeable (almost 5 percentage points with the "Japanese" formula). In fact, the Japanese formula allows the drop in the Eurozone's share to be limited to 6.5 percentage points, compared to 10 percentage points with present formulas.

Like the United States, China and India are favoured by the "GDP" and "Japanese" formulas in the short run, but by the present formulas in 2030. The share of Sub-Saharan African countries altogether remains below 1% and even declines in all three scenarios.

Interestingly, the weight given to GDP (1/2 in the « Japanese » formula, 1/3 in the « GDP » one) is of secondary importance as far as the evolution of quota shares is concerned. This is due to the very large correlation between GDP and openness (more than 80%), the size effect being dominant.

4.3. Liberalisation

Here we compare the quota shares obtained in 2030 for the alternative scenarios of liberalisation, concentrating on the « Japanese » formula, which weights GDP and openness equally. Intra-Eurozone trade and FDI flows are either included or excluded. The results are summarised in Table 4.

Table 4: The impact of further trade liberalisation on quota shares in 2030
(« Japanese » formula, uncompressed, current openness)

%	Conservative scenario		Liberalisation scenario	
	With intra-Eurozone flows	Without intra-Eurozone flows	With intra-Eurozone flows	Without intra-Eurozone flows
USA	23.3	24.2	23.5	24.2
Japan	8.0	8.3	8.2	8.4
Eurozone	18.3	14.4	17.8	14.3
France	3.3	2.6	3.3	2.6
Germany	5.1	4.2	5.0	4.2
UK	4.6	4.9	4.5	4.7
China	11.7	12.1	12.1	12.5
India	2.3	2.4	2.6	2.7
Sub-Saha	0.7	0.7	0.7	0.8

Source: authors' calculations.

Further trade liberalisation has limited impact on quota shares because it involves an increase in all trade flows simultaneously. In contrast, excluding intra-Eurozone flows leads to a marked fall in the Eurozone share (-3.5 or -3.9 percentage points in 2030, depending on whether there is further liberalisation or not). However this fall is more than offset by the move from present formulas to the "Japanese" one (see previous section).

It has sometimes been argued that removing intra-Eurozone flows would free quota shares for emerging and less developed countries. Here, the gains are mechanically spread over all other countries, including advanced countries. However, even allocating the extra quotas to emerging and less developed countries would fall short of solving their problem of representation, given the limiting amount of quota shares.

4.4. Variability instead of openness

As already mentioned, there is high correlation between GDP and openness. To circumvent this problem and still account for the risk of a balance-of-payment crisis, the « Cooper » formula substitutes variability for openness. The results obtained with this formula are compared with the basic, uncompressed « GDP » one in Table 5. Strikingly, all countries and zones under review experience a fall in their quota share when variability is substituted for openness, because in our calculations, variability is concentrated in the "Rest of the World" country group. Interestingly, though, the all in quota shares is more pronounced for the United States and the Eurozone than for other countries.

Table 5: « Cooper » and « GDP » formulas compared, 2030
(uncompressed, conservative scenario, including intra-Eurozone flows, current openness)

%	"Cooper"	"GDP"
USA	22.6	25.4
Japan	8.4	8.8
Eurozone	13.1	16.3
France	2.7	3.1
Germany	3.5	4.7
UK	3.8	4.2
China	11.3	12.7
India	2.4	2.6
Sub-Saharan Africa	0.4	0.6

[(a)] Source: IMF (2006).
Source: authors' calculations.

4.5. More sophisticated formulas

Here we discuss the impact of including variability and official reserves together with GDP and openness in the formulas. We also study the properties of the three functional forms: multiplicative, linear, and compressed linear (with a "standard" compression coefficient of 0.9). Table 6 below summarises the results that are detailed in Appendix B (Tables B3a and B3b).

Table 6: Impact of functional forms on various formulas in 2030
(Conservative scenario, intra-Eurozone flows included, current openness)

	"GDP"			"Variability"			"Reserves"			"CapReserves"		
	Mult.	Addit.	Comp.	Mult.	Addit.	Comp.	Mult.	Addit.	Comp.	Mult.	Addit.	Comp.
USA	25,6%	25,4%	20,7%	22,8%	22,5%	18,1%	21,4%	21,5%	17,3%	21,9%	21,7%	17,5%
Japan	8,8%	8,8%	7,9%	8,0%	7,9%	7,0%	8,5%	8,1%	7,2%	8,2%	7,9%	7,0%
Eurozone	15,8%	16,3%	17,1%	17,5%	17,4%	17,7%	16,7%	16,2%	16,5%	17,1%	16,6%	16,9%
France	3,1%	3,1%	3,1%	3,4%	3,2%	3,1%	3,2%	3,0%	2,9%	3,3%	3,1%	3,0%
Germany	4,7%	4,7%	4,5%	4,9%	4,8%	4,5%	4,7%	4,4%	4,1%	4,8%	4,5%	4,2%
UK	4,3%	4,2%	4,1%	4,7%	4,4%	4,2%	4,4%	4,2%	3,9%	4,6%	4,2%	4,0%
China	12,8%	12,7%	11,1%	11,3%	11,2%	9,7%	11,7%	11,6%	9,9%	11,3%	11,1%	9,6%
India	2,5%	2,6%	2,7%	21,0%	2,2%	2,3%	2,1%	2,2%	2,3%	2,1%	2,2%	2,2%
SSA	0,6%	0,6%	1,0%	0,6%	1,0%	1,0%	0,6%	0,6%	1,0%	0,6%	0,6%	1,0%

Source: authors' calculations**.**

For the Eurozone, the formula that yields the highest quota is "Variability". Raising the weight on GDP ("GDP") or introducing capped official reserves ("CapReserves") reduces the share of the Eurozone, albeit to a small extent. The share of the Eurozone ranges from 15.9 to 17.7%, across the various formulas.

Because it is done on a country-by-country basis, compression raises the share of the Eurozone by 0.3 to 0.8 percentage point in 2030 while it reduces that of the United States by 4.3 to 4.7 percentage points. The impact for Sub-Saharan Africa is a rise by 0.4 percentage points, which is substantial for the zone but does not allow it to exceed 1% of quotas.

For the United States, the best formula is clearly « GDP » (multiplicative or additive), which leads to a share exceeding 25% when uncompressed. The United States has convergent interests with China, which reaches a 12.7% share with « GDP » uncompressed. The US and China need a high weight on GDP and an uncompressed formula to maximise their quota share.

4.6. Openness

We now turn to the measure of openness. As already discussed in Section 4.3, the share of the Eurozone declines by 3.5 to 3.9 percentage points when intra-Eurozone flows are excluded from the calculations. Here we discuss whether this figure varies across formulas and whether they are dependent on the scope of openness (whether this measure includes financial flows or not).

Table B.4 in Appendix B studies the impact of the various measures of openness on the quotas obtained in 2030 with two compressed formulas – « GDP » and « CapReserves ». The results are summarised in Table 7.

Table 7: The impact of including financial openness on two formulas
(Conservative scenario, compressed formulas)

	"GDP"				"CapReserves"			
	Current openness		Including financial flows		Current openness		Including financial flows	
	Including intra-euro	Excluding intra-euro	Including intra-euro	Excluding intra-euro	Including intra-euro	Excluding intra-euro	Including intra-euro	Excluding intra-euro
USA	20,7%	21,1%	20,7%	21,2%	17,5%	17,9%	171,5%	18,0%
Japan	7,9%	8,1%	7,8%	8,0%	7,0%	7,2%	6,9%	7,1%
Eurozone	17,1%	14,6%	18,1%	15,4%	16,9%	14,0%	17,7%	14,7%
France	3,1%	2,7%	3,2%	2,8%	3,0%	2,5%	3,1%	2,6%
Germany	4,5%	4,0%	4,7%	4,1%	4,2%	3,7%	4,4%	3,8%
UK	4,1%	4,3%	4,2%	4,5%	4,0%	4,2%	4,1%	4,3%
China	11,1%	11,3%	10,8%	11,0%	9,6%	9,8%	9,3%	9,5%
India	2,7%	2,7%	2,6%	2,6%	2,2%	2,3%	2,2%	2,2%
SSA	1,0%	1,1%	1,0%	1,0%	1,0%	1,1%	1,0%	1,0%

Source: authors' calculations.

The impact of excluding intra-Eurozone flows is similar whether financial flows are included or not in the definition of openness. Note that the drop in the Eurozone's share is slightly lower than with the "Japanese" formula which relies less heavily on openness and is not compressed (see Table 4).

When financial flows are included in the measure of openness, the Eurozone gains up to one percentage point, compared with the traditional measure of openness. China loses up to 0.4 percentage point, and the impact is generally small for other countries.

The same simulations are then carried out for the « Japanese » and « Finnish » formulas (Table B.5 in Appendix B and Table 8 below). The impact, for the Eurozone's quota share, of excluding intra-Eurozone flows, culminates at 4.2 percentage points with the « Japanese » formula when financial flows are included. Indeed, the Japanese formula with financial flows and including intrazone flows leads to a Eurozone share of almost 20% in 2030, compared to 23.5% for the United States.

Table 8: The impact of including financial openness on Japanese and Finnish formulas, including intra-Eurozone flows
(Conservative scenario)

%	« Japanese »		« Finnish »	
	Current openness	Incl. Financial flows	Current openness	Incl. financial flows
USA	23.3	23.5	21.7	21.8
Japan	8.0	7.7	7.7	7.6
Eurozone	18.3	19.8	16.4	17.3
France	3.3	3.6	3.1	3.2
Germany	5.1	5.5	4.4	4.7
UK	4.6	4.8	4.3	4.4
China	11.7	11.1	10.8	10.4
India	2.3	2.2	2.2	2.1
Sub-Saha	0.7	0.6	0.6	0.5

Source: authors' calculations.

4.7. PPP and population

Our final exercise consists in comparing two simple formulas (« Japanese », and uncompressed « GDP », with current measure of openness and including intra-Eurozone flows) for various measures of GDP. The first four columns of Table 9 report the results obtained for 2001 and 2030 when GDP is converted at current exchange rates. These columns match the results already reported in Table 2. The last four columns report the results obtained when PPP GDP is used (hence the real exchange rate is held constant from 2001 to 2030) Not surprisingly, using PPP rather than current exchange rates reduces the quota share of advanced economies while rising that of emerging and developing ones. Japan is the most affected advanced economy in the short term, with a drop in its quota share by as much as 6.8 percentage points with the « GDP » formula.[15] The same year, the US share falls by 3.8-4.2 percentage points while the Eurozone loses only 0.6-0.8 percentage point. The share of China rises by 3.8-4.6 percentage points in 2001 whereas that of India increases by 2.1-2.3 percentage points. This represents a 176-190% relative increase for China and over 200% for India, compared to the formulas using current exchange rates.

In 2030, the United States loses up to 4.7 percentage points compared to a scenario at current exchange rates, and the Eurozone's loss is very limited. On the whole, PPP is more detrimental to the US than to the Eurozone at any time until 2030, because the United States is the leading economy whose currency must not appreciate over time. The share of Sub-Saharan Africa increases by only 0.4-0.7 percentage point in 2030, which represents a 60-80% increase but does not bring the share at a significant level.

From 2001 to 2030, the increase in the Chinese share is 7.6-7.7 percentage points in the « GDP » formula, whether GDP is measured at current exchange rates or in PPP. Although the PPP formula produces a smaller increase in the share in relative terms between 2001 and 2030, in absolute terms the rise is the same due to higher initial share. India succeeds in reaping a higher share than Germany, the UK or France in 2030, and it plays equally with Japan at that horizon. The gain for Sub-Saharan Africa remains very limited.

[15] The yen is overvalued compared to PPP in 2001.

Table 9: Two simple formulas with different measures of GDP
(uncompressed, conservative scenario, including intra-Eurozone flows, current openness)

%	GDP at current real exchange rates				GDP at PPP exchange rates			
	2001		2030		2001		2030	
	Japanese	«GDP»	Japanese	"GDP"	Japanese	"GDP"	Japanese	"GDP"
USA	23.7	26.0	23.3	25.4	19.9	21.8	18.8	20.7
Japan	10.5	12.0	8.0	8.8	7.0	5.2	5.3	5.8
Eurozone	24.8	22.9	18.3	16.3	24.2	22.1	17.9	15.6
France	4.7	4.7	3.3	3.1	4.4	4.3	3.2	3.0
Germany	7.2	6.9	5.1	4.7	6.8	6.4	4.9	4.3
UK	5.5	5.3	4.6	4.2	5.0	4.5	4.2	3.7
China	5.0	5.1	11.7	12.7	8.8	9.7	15.5	17.4
India	1.2	1.3	2.3	2.6	3.5	3.4	5.5	5.3
Sub-Saha	0.8	0.8	0.7	0.6	1.3	1.5	1.1	1.3

Source: authors' calculations.

Two alternative methods have been suggested to raise the quota share of developing countries: compression, and the use of PPP GDPs. The first three columns of Table 10 evaluate these two methods for the « GDP » formula with current measure of openness and including intra-Eurozone flows, in 2030. Strikingly, the quota share of Sub-Saharan Africa is the same whether compression or PPP is used. PPP is clearly favourable to Chinese and Indian shares and unfavourable to advanced economies. The US share is the same with PPP GDP as for a compressed formula, whereas for the Eurozone compression appears more favourable.

We now contrast these two classical ways of raising the share of developing countries with the more radical solution that consists in substituting population for GDP. The results are reported in the last column of Table 10 and detailed in Table B.6 of Appendix B. The impact of using population instead of GDP is dramatic for the SSA grouping and, to a lesser extent, for India, with a share as high as 7% and 9.4% respectively in 2030. Symmetrically, the shares of the United States and of the Eurozone are lowered to around 9% and that of Japan shrinks to 2.9%.

Table 10: Variations around the « GDP » formula in 2030
(conservative scenario, including intra-Eurozone flows, current openness)

	Current exchange rate, uncompressed	Current exchange rate, compressed	PPP exchange rate, uncompressed	Population instead of GDP
USA	25.4	20.7	20.7	9.0
Japan	8.8	7.9	5.8	2.9
Eurozone	16.3	17.1	15.6	8.7
France	3.1	3.1	3.0	1.7
Germany	4.7	4.5	4.3	2.4
UK	4.2	4.1	3.7	1.9
China	12.7	11.1	17.4	17.8
India	2.6	2.7	5.3	9.4
Sub-Saha	0.6	1.0	1.3	7.0

Source: authors' calculations.

Of course, these simulations are rather extreme since they are performed with a formula that relies heavily on GDP. Unreported simulations show that the impact of using population instead of GDP is less dramatic with the Japanese formula, with the Eurozone's share staying around 14% whereas that of Sub-Saharan Africa remains around 7% and that of the United States is at 11% in 2030.[16]

5. CONCLUSION

In this paper, we have argued that a dynamic view on quota formulas should be adopted: since new formulas are likely to be used for a long time, it is important to figure out what kind of quota distribution could prevail in the future given different population growth rates, catch-up speeds and trade integration. A number of scenarios are then proposed for 49 countries or zones from 2001 (our base year) to 2030, based on a standard, growth scenario as well as CEPII's CGE model of trade and foreign direct investment. Although these scenarios should be considered with great caution given the heroic assumptions they derive from, they provide useful benchmarks.

The results for the United States, the Eurozone, China and Sub-Saharan Africa are summarised in Figures 4 to 7 for year 2030. From these figures, it is clear that, if they all want a large quota share, the four groups have divergent interests:

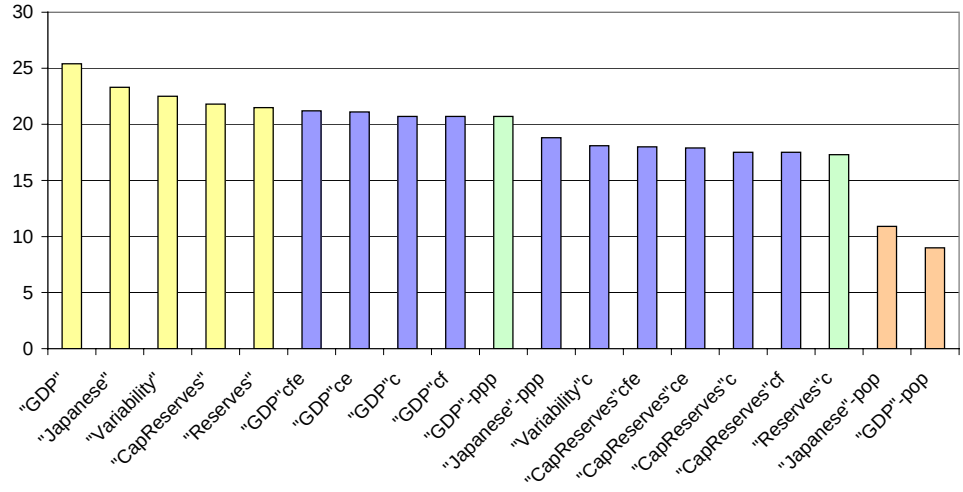
- The share of the United States is highest with an uncompressed formula with a high weight on GDP and preferably without volatility and reserves; it is lowest with a formula based on population instead of GDP. With the except of the population formula, this country manages in keeping a high quota share at the 2030 horizon.
- The quota share of the Eurozone can be as high with a compressed formula as with an uncompressed one; excluding intra-Eurozone flows is detrimental by up to 4 percentage points in 2030; population may not be worse than GDP in purchasing power parity, depending on the formula chosen. However there is little the Eurozone can do against an approximately 6 percentage points decline of its quota share from 2001 to 2030.
- The share of China is highest with a formula based on population or GDP in purchasing power parity; it is lowest with compressed formulas. Chinese share is bound to double or even triple from 2001 to 2030, but in a quite different way depending on the formula.
- The share of Sub-Saharan Africa is higher with compression, but the highest share is by far that obtained with population instead of GDP; using GDP in purchasing power parity does not produce a significant rise in the quota share.

[16] In that case, the share of China « only » reaches 13.3% in 2030.

On the whole, the present discussions around IMF quotas reflect existing inconsistencies between the three purposes of the quotas – contribution to the Fund, access to resources, voting rights – not to mention the design of good policy incentives for member countries. The declining role of the Fund as a provider of financial assistance may have contributed in moving the focus to the third purpose at the expense of the first two. If this is the case, a deep change in the formulas, such as the inclusion of population and the dropping out of variables that risk producing wrong incentives, such as variability or reserves, may deserve some attention.

Figure 4

Quota share of the United States in 2030 (%)

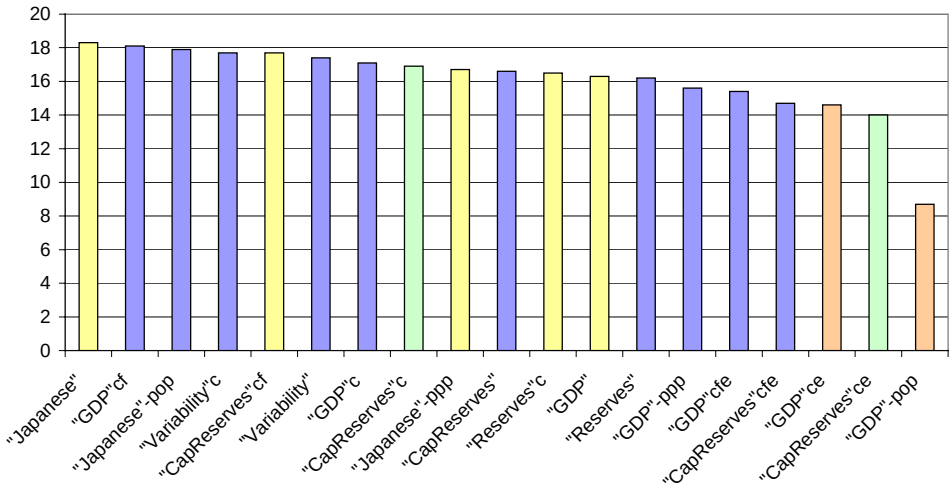


Source: CEPII (2007).

Notes: « Japanese », « GDP », « Variability », « Reserves », « CapReserves »: Benchmark (uncompressed, current openness, including intra-Eurozone flows); c-suffix : compressed ; f-suffix : financial openness ; e-suffix : excluding intra-Eurozone flows ; ppp-suffix : GDP in PPP ; pop-suffix : population instead of GDP.

Figure 5

Quota share of the Eurozone in 2030 (%)

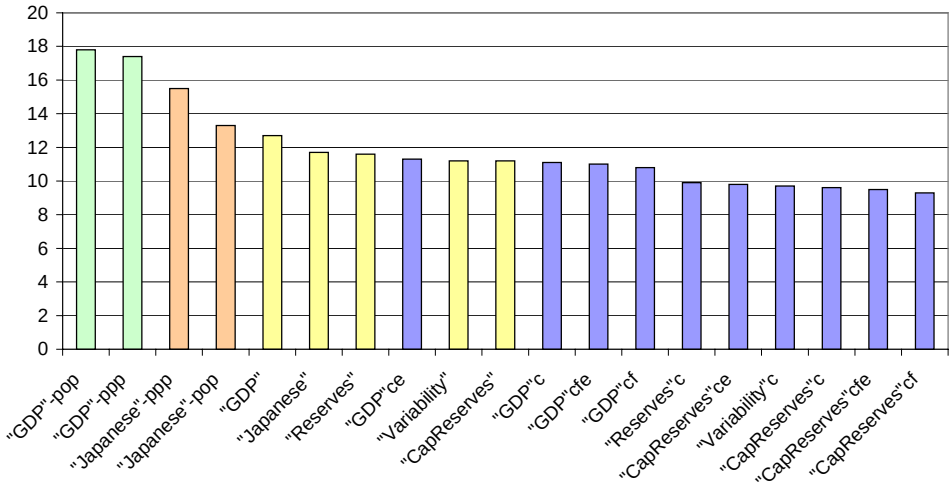


Source: CEPII (2007).

Notes: See Figure 4.

Figure 6

Quota share of China in 2030 (%)

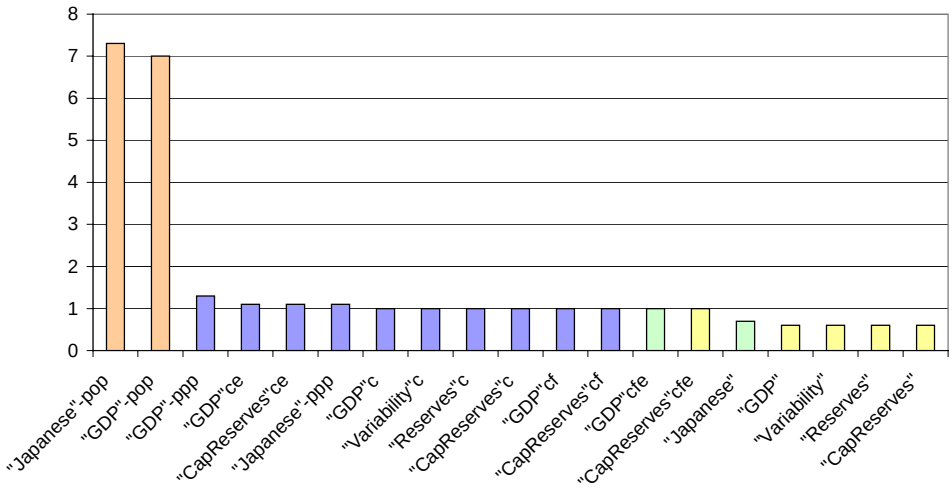


Source: CEPII (2007).

Notes: See Figure 4.

Figure 7

Quota share of Sub-Saharian Africa in 2030(%)



Source: CEPII (2007).

Notes: See Figure 4.

REFERENCES

Aizenman, J. and J. Lee., 2005, « International Reserves: Precautionary versus Mercantilist Views, Theory and Evidence, » IMF working paper 5198.

Bénassy-Quéré, A., and C. Bowles, 2002, "The European voice at the IMF," *La Lettre du CEPII* no 216, October.

Benhabib, J., and M. M. Spiegel, 1994, "The Role of Human Capital in Economic Development: Evidence from Aggregate Cross-Country Data," *Journal of Monetary Economics*, 34, 143-173.

Berg, A. et C. Patillo, 1999, « Are currency crises predictable ? a test, » *IMF Staff Papers*, 46 (2).

Bchir, M. H., Decreux, Y., Guérin, J.-L. & Jean, S., 2002. "MIRAGE, un modèle d'équilibre général calculable pour l'évaluation des politiques commerciales". *Économie Internationale* 89-90, 109-53.

Bini-Smaghi, 2006, "IMF Governance and the Political Economy of a Consolidated European Seat", in Truman, E.M., ed., *Reforming the IMF for the 21st Century*, Institute for International Economics, Special Report 19, Washington CD.C.

Camdessus, M., 2005, *International Financial Institutions: Dealing with New Global Challenges*, Washington: Per Jacobsson Foundation.

Cooper, R.N., & Truman, E.M., 2007, "The IMF quota formula: Linchpin of Fund reform", *Policy Briefs in International Economics*, Peter G. Petersen Institute for International Economics.

Decreux, Y. and Valin, H, 2007, MIRAGE, Updated Version of the Model for Trade Policy Analysis. Focus on Agriculure and Dynamics. CEPII working paper forthcoming.

Dos Reis, L., 2005, "Measuring vulbnerability: capital flows volatility in the quota formulas", in Buira, A., ed., *Reforming the Governance of the IMF and the World Bank*, London: Anthem Press.

International Monetary Fund, 2004, Quotas – Updated calculations, Mimeo, August 27.

International Monetary Fund, 2006, Quotas – Further thoughts on new quota formula, mimeo, November 22.

Mirakhor, A., and I. Zaidi, 2006, "Rethinking the governance of the International Monetary Fund", IMF working paper 273.

Poncet, S., 2006, "The long term growth prospects of the world economy: horizon 2050", CEPII Working Paper 2006-16.

Truman, E.M., 2006, "Rearranging IMF chairs and shares: the sine qua non of IMF reform", in Truman, E.M., ed., *Reforming the IMF for the 21st Century*, Institute for International Economics, Special Report 19, Washington CD.C.

APPENDIX A: METHODOLOGY

A.1 Country coverage

49 countries or zones: Argentina, Australia, Austria, Belgium and Luxembourg, Brazil, Bulgaria, Canada, China, Cyprus, Czech Republic, Denmark, Estonia, EU27, Eurozone, Finland, France, Germany, Greece, Hungary, India, Indonesia, Ireland, Italy, Japan, Korea, Latvia, Lithuania, Malta, Mexico, Netherlands, New Zealand, Norway, Poland, Portugal, Romania, Russian Federation, Saudi Arabia, Singapore, Slovak Rep., Slovenia, South Africa, Spain, Sub-Saharan Africa (39 countries), Sweden, Switzerland, Thailand, United Kingdom, United States, Rest of the world (86 countries).

A.2 GDP

GDP projections are based on Poncet (2006). It is assumed that a 1% increase in TFP relative to the United States translates into a 1% real appreciation against the US dollar. The resulting GDPs at constant and current relative prices are reported in Table A.1.

A.3 FDI

To generate bilateral FDI scenarios through the MIRAGE model, we need a comprehensive database of bilateral FDI flows and stocks for our base year (2001). We proceeded in several steps.

First, we use the *OECD International Direct FDI Statistics Yearbook (2005*). This document draws up the OECD countries' statements of annual bilateral inward and outward flows and stocks of foreign direct FDI. We collect these data from 1995 to 2003 for each OECD country. Unsurprisingly, there are many missing values in the database obtained.

- For those country pairs where **at least one** flow or stock was reported during the sample period, we proceeded in 6 steps:

1. Construct a corrected FDI flow series from FDI flows and stocks from the following relationships:

$$FC_t = F_t$$
$$S_t = (1 - \tau) S_{t-1} + F_t$$
$$FC_t = S_t - (1 - \tau) S_{t-1}$$

Table A.1: Projected evolution of GDP at constant and variable real exchange rates

	Constant real exchange rates			Variable real exchange rates		
	2000	2015 (2000=100)	2030 (2000=100)	2000	2015 (2000=100)	2030 (2000=100)
Total Eurozone	5 820 900	131	164	5 820 900	123	151
Sub-Sahar. Africa	195 000	155	216	195 000	139	165
Argentina	284 000	132	174	284 000	107	122
Austria	194 000	131	156	194 000	123	141
Belgium and Lux.	248 000	136	173	248 000	128	153
Brazil	601 000	129	150	601 000	103	97
Bulgaria	12 600	149	181	12 600	166	209
Canada	725 000	156	221	725 000	147	202
China	1 370 000	265	495	1 370 000	357	802
Cyprus	8 820	168	267	8 820	172	286
Czech Republic	55 700	151	202	55 700	146	195
Denmark	158 000	131	164	158 000	125	151
Estonia	5 150	177	239	5 150	211	315
Finland	120 000	143	192	120 000	140	183
France	1 310 000	129	162	1 310 000	123	147
Germany	1 870 000	128	159	1 870 000	121	149
Greece	112 000	152	197	112 000	161	217
Hungary	46 700	148	190	46 700	160	204
India	465 000	218	420	465 000	245	521
Indonesia	150 000	203	401	150 000	223	483
Ireland	94 900	204	316	94 900	195	282
Italy	1 080 000	124	141	1 080 000	114	125
Japan	4 750 000	129	164	4 750 000	128	162
Korea	512 000	205	386	512 000	242	554
Latvia	7 180	177	206	7 180	195	226
Lithuania	11 400	156	190	11 400	164	200
Malta	3 560	123	152	3 560	104	123
Mexico	581 000	141	189	581 000	115	131
Netherlands	371 000	134	185	371 000	118	164
Other countries	2 790 000	169	268	2 790 000	191	294
Poland	167 000	151	201	167 000	164	221
Portugal	106 000	125	163	106 000	114	149
Romania	37 000	157	205	37 000	191	261
Russian Federation	260 000	214	307	260 000	259	388
Saudi Arabia	491 000	158	224	491 000	135	168
Singapore	91 600	191	304	91 600	198	344
Slovakia	20 300	152	185	20 300	160	196
Slovenia	19 000	148	170	19 000	131	138
South Africa	128 000	137	171	128 000	128	142
Spain	563 000	145	183	563 000	136	170
Sweden	240 000	142	189	240 000	141	180
Thailand	123 000	213	421	123 000	261	621
United Kingdom	1 440 000	143	196	1 440 000	138	183
USA	9 820 000	151	226	9 820 000	149	223
EU27	8 053 310	135	172	8 053 310	128	161

Source : Poncet (2006).

where F_t , FC_t, S_t and τ refer respectively to flows in year t, corrected flows in t, stocks at the end of t and the depreciation rate fixed at $\tau = 0.06$ to be homogeneous with the assumptions made in MIRAGE.

2. Interpolate missing values between two observed figures.

3. Fill other missing values by applying the growth rate of total inward or outward FDI stocks or flows as reported in *UNCTAD Major FDI Indicators* (online database).

4. Come back to step 1 to reconstruct stocks or flows.

5. Use the average values between 1999 and 2003 for our base 2001 year.

6. Finally, replace negative gross flows and stocks by zeros.

- For country pairs with **no information at any date**, we allocated the total amount of FDI flows and stocks data (available on the UNCTAD online database) proportionally to trade. Again, we proceeded in several steps:

1) For each country i, calculate the share of imports from those countries from which bilateral inward FDI data is missing.

2) Calculate FDI flows and stocks to be allocated across residual partners by subtracting the sum of FDI inflows available in our bilateral database from the total amount of FDI inflows reported in the UNCTAD database.

   For some countries, the sum of reported bilateral flows exceeded total inflows reported by UNCTAD. Then, we assumed unreported bilateral inflows to be zero and corrected reported bilateral FDI flows and stocks in order to match the total amount reported by UNCTAD. The correction consists in reducing bilateral flows by a fixed factor which is the ratio between the total amount reported by UNCTAD and the sum of reported bilateral flows.

3) Replace missing bilateral inflows or stocks by the share (calculated in step 1) of each partner in the residual FDI inflow or stock (as calculated in step 2).

A.4 Current receipts and payments

The MIRAGE model simulates the evolution of exports and imports of goods and services. In order to calculate current receipts and payments, we rely on a constant relationship between current receipts and exports, and between current payments and imports, based on the *IMF Balance of Payments Statistics Yearbook* (2005).

We proceeded as follows:

1) Convert all data into dollar millions.

2) Create an aggregate for China which includes data from the mainland, Macao and Honk-Kong. Create aggregates for Sub-Saharan Africa and the Rest of the world.

3) Calculate the following ratios:

$$m_I = \frac{1}{5}\sum_{t=2000}^{2004} \frac{\left|I_{in}\right|_t + \left|I_{out}\right|_t}{\left|X\right|_t + \left|M\right|_t},\ m_T = \frac{1}{5}\sum_{t=2000}^{2004} \frac{\left|T_{in}\right|_t + \left|T_{out}\right|_t}{\left|X\right|_t + \left|M\right|_t}$$

where *I* refers to income receipts (in) or income payments (out), *T* to current transfers, *X* to exports and *M* to imports.[17]

A.5 Portfolio-to-FDI ratios

The ratio of portfolio flows to FDI is calculated in a similar way for each country or zone:

$$m_P = \frac{1}{5}\sum_{t=2000}^{2004} \frac{\left|port\_in\right|_t + \left|port\_out\right|_t}{\left|fdi\_in\right|_t + \left|fdi\_out\right|_t}$$

where *port_in* and *port_out* refer to portfolio inflows and outflows respectively; *fdi_in* to FDI inflows and *fdi_out* to FDI outflows

A.6 Variability

The variability of current receipts plus net capital inflows is defined as their standard deviation from the centred three-year moving average, for a 13-year period (1992-2004). In our simulations, variability is assumed to be constant as a percentage of current receipts plus net capital inflows.

For each country or zone and each year from 1992 to 2004, we calculate the following moving average:

$$MA_t = \frac{1}{3}\left(x_{t-1} + x_t + x_{t+1}\right)$$

[17] We alternatively calculated the ratio of current receipts and payments to FDI inflows and outflows, but this ratio happened to be highly unstable.

where x_t refers to the sum of current receipts, net FDI inflows and net portfolio inflows in year t. Then, the standard deviation of x_t from MA_t writes:

$$V = \sqrt{\frac{1}{13}\sum_{t=1992}^{2004}\left(x_t - MA_t\right)^2}$$

Finally, we assume the following ratio to be constant over time:

$$m_V = \frac{V}{\frac{1}{5}\sum_{t=2000}^{2004} x_t}$$

The m_T, m_P and m_V coefficients are reported in Table A.2, together with the m_R coefficient (for official reserves)

Table A.2: Multiplier coefficients

country	***Reserves/ imports*** m_R	Volatility/ openness m_V	Transfers/ trade m_T	Income/ trade m_I	Portfolio/ FDI m_P
Argentina	0,68	0,07	0,02	0,30	2,34
Australia	0,23	0,02	0,03	0,17	1,48
Austria	0,20	0,02	0,04	0,13	4,42
Belgium and Lux.	0,09	0,02	0,05	0,35	0,91
Brazil	0,64	0,06	0,02	0,17	0,26
Bulgaria	0,39	0,03	0,04	0,09	0,25
Canada	0,12	0,01	0,01	0,11	0,84
China	0,85	0,02	0,01	0,11	0,59
Cyprus	0,39	0,03	0,04	0,13	1,19
Czech Republic	0,39	0,02	0,02	0,08	0,88
Denmark	0,32	0,03	0,07	0,16	3,69
Estonia	0,18	0,02	0,02	0,07	0,77
Finland	0,24	0,02	0,04	0,19	2,89
France	0,13	0,03	0,07	0,18	2,30
Germany	0,14	0,02	0,04	0,16	6,02
Greece	0,40	0,03	0,09	0,09	12,25
Hungary	0,35	0,03	0,02	0,07	0,64
India	0,60	0,02	0,12	0,07	0,63
Indonesia	0,47	0,02	0,02	0,08	2,71
Ireland	0,11	0,02	0,06	0,39	9,32
Italy	0,16	0,02	0,07	0,15	3,14
Japan	0,80	0,03	0,02	0,13	5,30
Korea	0,44	0,02	0,04	0,04	2,38
Latvia	0,24	0,02	0,10	0,07	0,98
Lithuania	0,23	0,01	0,02	0,05	0,84
Malta	0,54	0,02	0,06	0,24	2,12
Mexico	0,23	0,02	0,03	0,06	0,21
Netherlands	0,10	0,02	0,03	0,18	3,11
New Zealand	0,27	0,03	0,03	0,14	1,52
Norway	0,53	0,02	0,04	0,14	6,31
Poland	0,46	0,03	0,04	0,06	0,69
Portugal	0,32	0,01	0,10	0,16	3,17
Romania	0,25	0,02	0,06	0,04	0,27
Russian Federation	0,32	0,04	0,02	0,10	0,62
Saudi Arabia	0,39	0,03	0,11	0,05	54,28
Singapore	0,52	0,03	0,00	0,09	0,85
Slovakia	0,29	0,03	0,02	0,03	0,76
Slovenia	0,34	0,01	0,03	0,04	0,59
South Africa	0,16	0,02	0,02	0,11	2,22
Spain	0,27	0,04	0,06	0,14	1,58
Sub-Saharan Africa	0,40	0,01	0,10	0,08	0,08
Sweden	0,20	0,03	0,04	0,19	0,99
Switzerland	0,42	0,03	0,10	0,36	1,44
Thailand	0,49	0,02	0,01	0,05	0,81
United Kingdom	0,11	0,03	0,06	0,43	1,71
USA	0,10	0,02	0,04	0,24	2,08
Rest of the World	0,70	0,18	0,14	0,09	1,72

APPENDIX B: RESULT TABLES

Table B.1. : Projected quota shares based on present formulas

	Actual shares on 2007	Calculated shares	
		2001 (base year)	2030
Total Zone Euro	**22,78**	**23,30**	**13,50**
United States	**17,08**	**16,44**	**30,21**
Argentina	0,97	0,55	0,48
Australia	1,49	0,88	1,26
Austria	0,86	1,02	0,38
Belgium and Luxembourg	2,25	2,29	0,52
Brazil	1,40	1,26	0,81
Bulgaria	0,29	0,10	0,04
Canada	2,93	2,47	2,01
China	**3,72**	**4,26**	**15,17**
Cyprus	0,06	0,06	0,03
Czech Republic	0,38	0,51	0,15
Denmark	0,76	0,81	0,33
Estonia	0,03	0,07	0,02
Finland	0,58	0,46	0,30
France	4,94	4,01	2,66
Germany	5,98	6,24	3,83
Greece	0,38	0,47	0,34
Hungary	0,48	0,45	0,13
India	1,91	0,91	3,34
Indonesia	0,96	0,61	1,00
Ireland	0,39	1,03	0,37
Italy	3,24	3,11	1,86
Japan	6,12	7,77	10,61
Korea	1,35	1,93	3,90
Latvia	0,06	0,05	0,02
Lithuania	0,07	0,07	0,03
Malta	0,05	0,06	0,01
Mexico	1,45	1,64	1,05
Netherlands	2,37	1,96	0,84
New Zealand	0,41	0,19	0,21
Norway	0,77	0,65	0,45
Poland	0,63	0,61	0,51
Portugal	0,40	0,44	0,22
Romania	0,47	0,17	0,13
Russian Federation	2,73	1,08	1,39
Saudi Arabia	3,21	0,81	0,59
Singapore	0,40	1,96	0,43
Slovakia	0,16	0,19	0,05
Slovenia	0,11	0,13	0,04
South Africa	0,86	0,38	0,25
Spain	1,40	2,24	1,32
Sub-Saharan Africa	4,56	0,78	0,70
Sweden	1,10	0,96	0,59
Switzerland	1,59	1,30	0,43
Thailand	0,50	0,81	1,05
United Kingdom	**4,94**	**4,54**	**3,64**

Table B.2: Evolution over time
No liberalisation / Current transactions openness / Additive form (« GDP »)

	2001 (base year)		2005		2010		2020		2030	
	Japanese	« GDP »	Japanese	« GDP »	Japanese	« GDP »	Japanese	« GDP »	Japanese	« GDP »
Total Zone Euro	**24,8%**	**22,9%**	**22,9%**	**21,0%**	**22,1%**	**20,1%**	**20,3%**	**18,4%**	**18,3%**	**16,3%**
Argentina	0,6%	0,7%	0,6%	0,6%	0,6%	0,6%	0,5%	0,5%	0,4%	0,5%
Australia	1,2%	1,2%	1,2%	1,2%	1,2%	1,2%	1,2%	1,2%	1,2%	1,2%
Austria	1,0%	0,8%	0,9%	0,8%	0,8%	0,7%	0,8%	0,7%	0,7%	0,6%
Belgium and Luxembourg	2,0%	1,6%	1,9%	1,5%	1,9%	1,5%	1,7%	1,3%	1,5%	1,2%
Brazil	1,4%	1,6%	1,4%	1,5%	1,2%	1,3%	1,0%	1,0%	0,8%	0,8%
Bulgaria	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%
Canada	2,9%	2,7%	2,8%	2,6%	2,8%	2,6%	2,8%	2,6%	2,6%	2,4%
China	**5,0%**	**4,9%**	**6,7%**	**6,8%**	**7,8%**	**8,0%**	**9,7%**	**10,3%**	**11,7%**	**12,7%**
Cyprus	0,0%	0,0%	0,1%	0,0%	0,1%	0,0%	0,1%	0,0%	0,1%	0,1%
Czech Republic	0,4%	0,3%	0,4%	0,3%	0,4%	0,3%	0,3%	0,3%	0,3%	0,3%
Denmark	0,7%	0,6%	0,7%	0,6%	0,6%	0,6%	0,6%	0,5%	0,5%	0,5%
Estonia	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Finland	0,5%	0,5%	0,5%	0,5%	0,5%	0,5%	0,5%	0,4%	0,5%	0,4%
France	**4,7%**	**4,5%**	**4,4%**	**4,2%**	**4,1%**	**4,0%**	**3,7%**	**3,5%**	**3,3%**	**3,1%**
Germany	7,2%	6,8%	6,5%	6,0%	6,2%	5,8%	5,7%	5,3%	5,1%	4,7%
Greece	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%
Hungary	0,3%	0,3%	0,3%	0,3%	0,3%	0,3%	0,3%	0,2%	0,3%	0,2%
India	1,2%	1,3%	1,4%	1,6%	1,6%	1,7%	1,9%	2,1%	2,3%	2,6%
Indonesia	0,6%	0,6%	0,7%	0,6%	0,7%	0,7%	0,9%	0,8%	1,1%	1,0%
Ireland	0,9%	0,7%	0,9%	0,7%	0,9%	0,7%	0,9%	0,7%	0,9%	0,7%
Italy	3,8%	3,6%	3,4%	3,3%	3,2%	3,1%	2,8%	2,7%	2,4%	2,2%
Japan	10,5%	12,0%	10,2%	11,6%	9,7%	10,9%	8,7%	9,7%	8,0%	8,8%
Korea	1,9%	1,8%	2,1%	2,0%	2,4%	2,3%	3,0%	3,0%	3,6%	3,7%
Latvia	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Lithuania	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,0%	0,0%	0,0%
Malta	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%	0,0%
Mexico	1,9%	1,9%	1,8%	1,8%	1,8%	1,7%	1,7%	1,6%	1,6%	1,4%
Netherlands	1,8%	1,6%	1,6%	1,4%	1,6%	1,4%	1,6%	1,3%	1,5%	1,3%
New Zealand	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%
Norway	0,7%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%
Poland	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,6%	0,5%
Portugal	0,5%	0,4%	0,4%	0,4%	0,4%	0,3%	0,3%	0,3%	0,3%	0,3%
Rest of the World	8,1%	7,7%	8,4%	8,0%	8,6%	8,3%	9,1%	8,8%	9,8%	9,4%
Romania	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%	0,2%
Russian Federation	1,1%	1,0%	1,2%	1,2%	1,4%	1,3%	1,5%	1,4%	1,4%	1,4%
Saudi Arabia	0,8%	0,7%	0,8%	0,7%	0,8%	0,7%	0,8%	0,7%	0,8%	0,7%
Singapore	0,9%	0,7%	0,9%	0,7%	1,0%	0,8%	1,1%	0,9%	1,2%	0,9%
Slovakia	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%
Slovenia	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%	0,1%
South Africa	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,4%	0,3%
Spain	2,1%	2,0%	2,0%	1,9%	2,0%	1,9%	1,8%	1,7%	1,6%	1,5%
Sub-Saharan Africa	0,8%	0,8%	0,9%	0,8%	0,8%	0,7%	0,7%	0,6%	0,7%	0,6%
Sweden	1,0%	0,9%	1,0%	0,9%	1,0%	0,9%	0,9%	0,8%	0,9%	0,8%
Switzerland	1,3%	1,1%	1,2%	1,0%	1,1%	1,0%	1,0%	0,9%	0,9%	0,7%
Thailand	0,7%	0,6%	0,8%	0,7%	0,9%	0,8%	1,1%	1,0%	1,3%	1,2%
United Kingdom	5,5%	5,2%	5,3%	5,0%	5,1%	4,8%	4,9%	4,6%	4,6%	4,2%
United States of America	**23,7%**	**26,0%**	**23,7%**	**26,0%**	**23,6%**	**25,8%**	**23,4%**	**25,6%**	**23,3%**	**25,4%**
UE27	**34,0%**	**31,5%**	**32,0%**	**29,4%**	**30,8%**	28,3%	28,5%	25,9%	26,1%	23,3%

Table B.3a : Functionnal forms

No liberalisation / Current openness / Intra-Eurozone trade included / Year 2030

	"GDP"			"Variability"			"Reserves"			"CapReserves" 4		
	Mult.	Addit.	Comp.	Mult.	Addit.	Comp.	Mult.	Addit.	Comp.	Mult.	Addit.	Comp.
Total Eurozone	**15,85%**	**16,32%**	**17,12%**	**17,50%**	**17,36%**	**17,72%**	**16,72%**	**16,16%**	**16,51%**	**17,11%**	**16,59%**	**16,91%**
Argentina	0,47%	0,45%	0,55%	0,51%	0,48%	0,57%	0,55%	0,51%	0,60%	0,54%	0,50%	0,59%
Australia	1,26%	1,21%	1,33%	1,20%	1,14%	1,23%	1,16%	1,09%	1,18%	1,19%	1,12%	1,21%
Austria	0,52%	0,56%	0,67%	0,60%	0,61%	0,71%	0,58%	0,57%	0,66%	0,59%	0,60%	0,69%
Belgium and Luxembourg	0,91%	1,20%	1,32%	1,15%	1,40%	1,49%	1,05%	1,24%	1,32%	1,08%	1,26%	1,35%
Brazil	0,85%	0,82%	0,94%	0,94%	0,88%	0,98%	1,00%	0,92%	1,02%	0,98%	0,90%	1,00%
Bulgaria	0,05%	0,06%	0,09%	0,06%	0,06%	0,09%	0,06%	0,06%	0,09%	0,06%	0,06%	0,09%
Canada	2,44%	2,42%	2,49%	2,42%	2,40%	2,42%	2,20%	2,17%	2,19%	2,26%	2,22%	2,24%
China	**12,78%**	**12,70%**	**11,08%**	**11,32%**	**11,23%**	**9,70%**	**11,72%**	**11,59%**	**9,91%**	**11,29%**	**11,15%**	**9,57%**
Cyprus	0,05%	0,05%	0,08%	0,06%	0,06%	0,08%	0,06%	0,06%	0,08%	0,06%	0,06%	0,08%
Czech Republic	0,23%	0,27%	0,34%	0,28%	0,30%	0,37%	0,28%	0,29%	0,36%	0,28%	0,30%	0,37%
Denmark	0,44%	0,46%	0,56%	0,52%	0,53%	0,62%	0,53%	0,52%	0,60%	0,54%	0,53%	0,62%
Estonia	0,03%	0,03%	0,05%	0,04%	0,04%	0,06%	0,03%	0,03%	0,05%	0,04%	0,04%	0,05%
Finland	0,39%	0,41%	0,50%	0,43%	0,43%	0,51%	0,41%	0,40%	0,47%	0,42%	0,41%	0,49%
France	**3,13%**	**3,09%**	**3,11%**	**3,40%**	**3,22%**	**3,15%**	**3,25%**	**3,02%**	**2,95%**	**3,33%**	**3,08%**	**3,01%**
Germany	4,68%	4,67%	4,51%	4,96%	4,79%	4,50%	4,66%	4,41%	4,15%	4,77%	4,52%	4,24%
Greece	0,38%	0,37%	0,46%	0,41%	0,39%	0,47%	0,43%	0,39%	0,47%	0,43%	0,40%	0,48%
Hungary	0,19%	0,22%	0,29%	0,23%	0,25%	0,31%	0,23%	0,24%	0,30%	0,23%	0,25%	0,31%
India	2,51%	2,62%	2,68%	2,11%	2,23%	2,26%	2,14%	2,24%	2,26%	2,10%	2,22%	2,24%
Indonesia	1,06%	1,03%	1,15%	1,05%	0,99%	1,09%	1,04%	0,97%	1,06%	1,03%	0,97%	1,06%
Ireland	0,60%	0,74%	0,85%	0,76%	0,87%	0,97%	0,71%	0,78%	0,88%	0,72%	0,80%	0,90%
Italy	2,23%	2,21%	2,30%	2,38%	2,28%	2,31%	2,27%	2,12%	2,15%	2,32%	2,18%	2,20%
Japan	8,77%	8,77%	7,94%	8,05%	7,86%	7,04%	8,49%	8,14%	7,21%	8,21%	7,89%	7,01%
Korea	3,81%	3,68%	3,63%	3,64%	3,44%	3,35%	3,67%	3,41%	3,30%	3,66%	3,44%	3,32%
Latvia	0,03%	0,03%	0,05%	0,03%	0,03%	0,05%	0,03%	0,03%	0,04%	0,03%	0,03%	0,05%
Lithuania	0,04%	0,04%	0,06%	0,04%	0,04%	0,06%	0,04%	0,04%	0,06%	0,04%	0,04%	0,06%
Malta	0,01%	0,01%	0,02%	0,01%	0,02%	0,03%	0,01%	0,02%	0,03%	0,01%	0,02%	0,03%
Mexico	1,38%	1,43%	1,55%	1,48%	1,49%	1,57%	1,40%	1,36%	1,44%	1,43%	1,42%	1,50%
Netherlands	1,18%	1,28%	1,41%	1,42%	1,47%	1,56%	1,36%	1,37%	1,45%	1,39%	1,40%	1,48%
New Zealand	0,24%	0,23%	0,30%	0,25%	0,23%	0,30%	0,25%	0,23%	0,29%	0,25%	0,23%	0,29%
Norway	0,56%	0,56%	0,67%	0,61%	0,58%	0,68%	0,62%	0,58%	0,67%	0,61%	0,58%	0,67%
Poland	0,55%	0,53%	0,64%	0,57%	0,53%	0,62%	0,59%	0,54%	0,63%	0,58%	0,54%	0,63%
Portugal	0,28%	0,28%	0,36%	0,30%	0,29%	0,36%	0,29%	0,28%	0,35%	0,29%	0,29%	0,36%
Rest of the World	**9,76%**	**9,44%**	**13,25%**	**12,20%**	**13,49%**	**17,86%**	**13,98%**	**15,89%**	**20,55%**	**13,61%**	**15,56%**	**20,16%**
Romania	0,16%	0,15%	0,21%	0,16%	0,16%	0,21%	0,16%	0,15%	0,20%	0,16%	0,16%	0,21%
Russian Federation	1,46%	1,41%	1,53%	1,53%	1,42%	1,51%	1,54%	1,39%	1,47%	1,56%	1,42%	1,50%
Saudi Arabia	0,72%	0,71%	0,83%	0,77%	0,74%	0,84%	0,77%	0,72%	0,81%	0,77%	0,73%	0,82%
Singapore	0,72%	0,91%	1,03%	0,91%	1,07%	1,17%	0,94%	1,10%	1,19%	0,93%	1,09%	1,18%
Slovakia	0,08%	0,09%	0,13%	0,10%	0,10%	0,14%	0,10%	0,10%	0,14%	0,10%	0,10%	0,14%
Slovenia	0,05%	0,06%	0,09%	0,06%	0,07%	0,10%	0,06%	0,06%	0,09%	0,06%	0,07%	0,09%
South Africa	0,32%	0,32%	0,41%	0,36%	0,35%	0,43%	0,35%	0,33%	0,40%	0,36%	0,34%	0,41%
Spain	1,54%	1,51%	1,63%	1,71%	1,61%	1,69%	1,73%	1,59%	1,65%	1,76%	1,65%	1,71%
Sub-Saharan Africa	0,57%	0,59%	1,01%	0,61%	0,61%	1,02%	0,60%	0,60%	0,99%	0,60%	0,61%	1,01%
Sweden	0,75%	0,77%	0,89%	0,84%	0,81%	0,92%	0,81%	0,76%	0,86%	0,83%	0,79%	0,88%
Switzerland	0,65%	0,74%	0,85%	0,79%	0,85%	0,95%	0,79%	0,81%	0,91%	0,79%	0,82%	0,92%
Thailand	1,25%	1,23%	1,36%	1,27%	1,23%	1,33%	1,26%	1,21%	1,30%	1,25%	1,21%	1,29%
United Kingdom	4,30%	4,24%	4,13%	4,70%	4,45%	4,22%	4,45%	4,17%	3,95%	4,56%	4,24%	4,01%
United States of America	**25,59%**	**25,39%**	**20,67%**	**22,78%**	**22,50%**	**18,13%**	**21,36%**	**21,50%**	**17,28%**	**21,88%**	**21,75%**	**17,46%**
EU27	**22,82%**	**23,34%**	**24,74%**	**25,19%**	**24,80%**	**25,59%**	**24,16%**	**23,24%**	**23,99%**	**24,70%**	**23,82%**	**24,54%**

Table B.3b Functionnal forms

No liberalisation / Current openness / Intra-Eurozone trade included / Year 2020

	"Variability"			"Reserves"			"CapReserves"		
	multiplicative	additive	compressed	multiplicative	additive	compressed	multiplicative	additive	compressed
Total Eurozone	**19,61%**	**19,29%**	**19,47%**	**18,79%**	**18,04%**	**18,20%**	**19,20%**	**18,50%**	**18,62%**
Argentina	0,57%	0,54%	0,63%	0,62%	0,58%	0,67%	0,61%	0,56%	0,65%
Australia	1,20%	1,14%	1,24%	1,16%	1,09%	1,18%	1,19%	1,13%	1,21%
Austria	0,71%	0,71%	0,81%	0,69%	0,67%	0,76%	0,70%	0,70%	0,79%
Belgium and Luxembourg	1,30%	1,56%	1,64%	1,19%	1,37%	1,45%	1,22%	1,40%	1,48%
Brazil	1,13%	1,06%	1,16%	1,22%	1,11%	1,20%	1,19%	1,09%	1,18%
Bulgaria	0,07%	0,07%	0,10%	0,07%	0,07%	0,10%	0,07%	0,07%	0,10%
Canada	2,54%	2,51%	2,52%	2,32%	2,28%	2,29%	2,37%	2,33%	2,34%
China	**9,53%**	**9,27%**	**8,17%**	**9,87%**	**9,61%**	**8,37%**	**9,50%**	**9,20%**	**8,05%**
Cyprus	0,05%	0,05%	0,08%	0,05%	0,05%	0,08%	0,05%	0,06%	0,08%
Czech Republic	0,30%	0,32%	0,40%	0,30%	0,31%	0,39%	0,30%	0,32%	0,39%
Denmark	0,59%	0,58%	0,68%	0,60%	0,57%	0,66%	0,60%	0,59%	0,68%
Estonia	0,04%	0,04%	0,06%	0,04%	0,04%	0,06%	0,04%	0,04%	0,06%
Finland	0,46%	0,45%	0,53%	0,44%	0,42%	0,50%	0,45%	0,43%	0,52%
France	**3,80%**	**3,58%**	**3,47%**	**3,64%**	**3,37%**	**3,26%**	**3,72%**	**3,44%**	**3,32%**
Germany	5,58%	5,37%	4,99%	5,26%	4,96%	4,62%	5,39%	5,09%	4,72%
Greece	0,44%	0,41%	0,50%	0,46%	0,42%	0,50%	0,46%	0,43%	0,51%
Hungary	0,26%	0,27%	0,34%	0,26%	0,26%	0,33%	0,26%	0,27%	0,34%
India	1,77%	1,84%	1,91%	1,81%	1,85%	1,90%	1,77%	1,83%	1,88%
Indonesia	0,87%	0,83%	0,93%	0,87%	0,81%	0,91%	0,86%	0,81%	0,91%
Ireland	0,77%	0,88%	0,98%	0,72%	0,80%	0,89%	0,74%	0,81%	0,91%
Italy	2,83%	2,68%	2,68%	2,70%	2,51%	2,50%	2,76%	2,58%	2,56%
Japan	8,64%	8,62%	7,64%	9,15%	8,93%	7,83%	8,83%	8,66%	7,63%
Korea	3,02%	2,85%	2,82%	3,05%	2,83%	2,79%	3,03%	2,85%	2,80%
Latvia	0,04%	0,04%	0,05%	0,04%	0,03%	0,05%	0,04%	0,04%	0,06%
Lithuania	0,05%	0,05%	0,07%	0,05%	0,05%	0,07%	0,05%	0,05%	0,07%
Malta	0,02%	0,02%	0,03%	0,02%	0,02%	0,03%	0,02%	0,02%	0,03%
Mexico	1,63%	1,59%	1,67%	1,55%	1,48%	1,56%	1,59%	1,54%	1,61%
Netherlands	1,49%	1,52%	1,61%	1,42%	1,43%	1,50%	1,46%	1,46%	1,53%
New Zealand	0,24%	0,22%	0,28%	0,24%	0,22%	0,27%	0,24%	0,22%	0,28%
Norway	0,64%	0,61%	0,71%	0,66%	0,61%	0,70%	0,65%	0,61%	0,70%
Poland	0,62%	0,57%	0,67%	0,64%	0,58%	0,67%	0,63%	0,59%	0,67%
Portugal	0,32%	0,32%	0,39%	0,31%	0,30%	0,37%	0,32%	0,32%	0,39%
Rest of the World	11,36%	12,73%	16,96%	13,05%	15,09%	19,61%	12,68%	14,74%	19,21%
Romania	0,17%	0,16%	0,22%	0,17%	0,16%	0,21%	0,17%	0,17%	0,22%
Russian Federation	1,55%	1,44%	1,53%	1,57%	1,42%	1,50%	1,58%	1,45%	1,52%
Saudi Arabia	0,79%	0,76%	0,85%	0,79%	0,74%	0,83%	0,79%	0,75%	0,84%
Singapore	0,89%	1,06%	1,16%	0,92%	1,10%	1,19%	0,90%	1,08%	1,17%
Slovakia	0,11%	0,12%	0,16%	0,11%	0,11%	0,15%	0,11%	0,12%	0,16%
Slovenia	0,07%	0,08%	0,11%	0,07%	0,08%	0,11%	0,07%	0,08%	0,11%
South Africa	0,41%	0,39%	0,47%	0,39%	0,37%	0,44%	0,40%	0,38%	0,45%
Spain	1,92%	1,81%	1,87%	1,94%	1,78%	1,84%	1,98%	1,85%	1,90%
Sub-Saharan Africa	0,66%	0,65%	1,08%	0,65%	0,64%	1,05%	0,65%	0,65%	1,07%
Sweden	0,91%	0,88%	0,98%	0,88%	0,83%	0,92%	0,90%	0,85%	0,95%
Switzerland	0,93%	0,97%	1,07%	0,94%	0,94%	1,04%	0,93%	0,95%	1,04%
Thailand	1,02%	1,00%	1,10%	1,01%	0,99%	1,08%	1,00%	0,98%	1,08%
United Kingdom	5,01%	4,73%	4,46%	4,76%	4,45%	4,19%	4,87%	4,53%	4,25%
United States of America	**22,71%**	**22,63%**	**18,23%**	**21,35%**	**21,66%**	**17,39%**	**21,84%**	**21,90%**	**17,57%**
EU27	**27,90%**	**27,28%**	**27,87%**	**26,83%**	**25,66%**	**26,21%**	**27,38%**	**26,28%**	**26,79%**

Table B.4. : "GDP" and "CapReserves"compressed with different mesures of openness
No liberalisation / Year 2030

	"GDP" (compressed)				"CapReserves" (compressed)			
	Current openness		Including financial flows		Current openness		Including financial flows	
	Total trade	Without intra-EZ	Total trade	Without intra-EZ	Total trade	Without intra-EZ	Total trade	Without intra-EZ
Total Eurozone	**17,12%**	**14,63%**	**18,08%**	**15,41%**	**16,91%**	**14,01%**	**17,74%**	**14,70%**
Argentina	0,55%	0,57%	0,56%	0,58%	0,59%	0,61%	0,60%	0,62%
Australia	1,33%	1,38%	1,32%	1,36%	1,21%	1,25%	1,20%	1,24%
Austria	0,67%	0,54%	0,67%	0,55%	0,69%	0,54%	0,69%	0,55%
Belgium and Luxembourg	1,32%	0,98%	1,34%	0,99%	1,35%	0,97%	1,36%	0,98%
Brazil	0,94%	0,98%	0,93%	0,97%	1,00%	1,04%	0,99%	1,03%
Bulgaria	0,09%	0,09%	0,08%	0,09%	0,09%	0,10%	0,09%	0,09%
Canada	2,49%	2,60%	2,40%	2,51%	2,24%	2,34%	2,16%	2,26%
China	**11,08%**	**11,32%**	**10,77%**	**10,99%**	**9,57%**	**9,80%**	**9,29%**	**9,52%**
Cyprus	0,08%	0,08%	0,08%	0,08%	0,08%	0,09%	0,09%	0,09%
Czech Republic	0,34%	0,36%	0,32%	0,34%	0,37%	0,39%	0,35%	0,37%
Denmark	0,56%	0,59%	0,61%	0,65%	0,62%	0,65%	0,66%	0,70%
Estonia	0,05%	0,06%	0,05%	0,06%	0,05%	0,06%	0,05%	0,06%
Finland	0,50%	0,45%	0,51%	0,46%	0,49%	0,44%	0,50%	0,45%
France	**3,11%**	**2,68%**	**3,24%**	**2,79%**	**3,01%**	**2,50%**	**3,13%**	**2,60%**
Germany	4,51%	3,99%	4,71%	4,14%	4,24%	3,67%	4,42%	3,80%
Greece	0,46%	0,42%	0,48%	0,43%	0,48%	0,42%	0,49%	0,43%
Hungary	0,29%	0,30%	0,27%	0,28%	0,31%	0,33%	0,29%	0,31%
India	2,68%	2,72%	2,61%	2,65%	2,24%	2,28%	2,18%	2,22%
Indonesia	1,15%	1,19%	1,09%	1,12%	1,06%	1,10%	1,01%	1,04%
Ireland	0,85%	0,74%	1,08%	0,92%	0,90%	0,76%	1,09%	0,92%
Italy	2,30%	2,01%	2,22%	1,96%	2,20%	1,86%	2,13%	1,83%
Japan	7,94%	8,10%	7,81%	7,97%	7,01%	7,18%	6,89%	7,07%
Korea	3,63%	3,74%	3,48%	3,58%	3,32%	3,42%	3,18%	3,28%
Latvia	0,05%	0,05%	0,05%	0,05%	0,05%	0,05%	0,05%	0,05%
Lithuania	0,06%	0,07%	0,06%	0,07%	0,06%	0,07%	0,06%	0,07%
Malta	0,02%	0,02%	0,03%	0,03%	0,03%	0,03%	0,03%	0,03%
Mexico	1,55%	1,62%	1,50%	1,58%	1,50%	1,57%	1,45%	1,53%
Netherlands	1,41%	1,15%	1,85%	1,50%	1,48%	1,17%	1,87%	1,47%
New Zealand	0,30%	0,31%	0,29%	0,30%	0,29%	0,31%	0,28%	0,29%
Norway	0,67%	0,70%	0,68%	0,71%	0,67%	0,69%	0,68%	0,71%
Poland	0,64%	0,66%	0,61%	0,63%	0,63%	0,65%	0,60%	0,63%
Portugal	0,36%	0,28%	0,37%	0,29%	0,36%	0,27%	0,37%	0,28%
Rest of the World	**13,25%**	**13,72%**	**13,32%**	**13,85%**	**20,16%**	**21,04%**	**20,22%**	**21,15%**
Romania	0,21%	0,22%	0,21%	0,22%	0,21%	0,21%	0,20%	0,21%
Russian Federation	1,53%	1,59%	1,45%	1,50%	1,50%	1,56%	1,43%	1,48%
Saudi Arabia	0,83%	0,86%	0,75%	0,79%	0,82%	0,86%	0,76%	0,79%
Singapore	1,03%	1,10%	0,97%	1,04%	1,18%	1,24%	1,12%	1,19%
Slovakia	0,13%	0,14%	0,12%	0,13%	0,14%	0,15%	0,13%	0,14%
Slovenia	0,09%	0,10%	0,08%	0,09%	0,09%	0,10%	0,09%	0,09%
South Africa	0,41%	0,42%	0,47%	0,50%	0,41%	0,43%	0,47%	0,49%
Spain	1,63%	1,39%	1,61%	1,38%	1,71%	1,40%	1,69%	1,39%
Sub-Saharan Africa	1,01%	1,06%	0,98%	1,03%	1,01%	1,05%	0,98%	1,02%
Sweden	0,89%	0,93%	0,87%	0,92%	0,88%	0,93%	0,87%	0,92%
Switzerland	0,85%	0,90%	0,84%	0,89%	0,92%	0,97%	0,90%	0,96%
Thailand	1,36%	1,41%	1,31%	1,37%	1,29%	1,35%	1,25%	1,31%
United Kingdom	4,13%	4,30%	4,25%	4,46%	4,01%	4,19%	4,11%	4,32%
United States of America	**20,67%**	**21,12%**	**20,73%**	**21,24%**	**17,46%**	**17,90%**	**17,52%**	**18,01%**
EU27	**24,74%**	**22,59%**	**25,76%**	**23,49%**	**24,54%**	**22,00%**	**25,44%**	**22,78%**

Table B.5: Existing blueprints with different measures of openness
No liberalisation / Year 2030

	Cooper		Japanese		Japanese with financial openness		Finnish		Finnish with financial openness	
	Total trade	Without intra-EZ	Total trade	Without intra-EZ	Total trade	Without intra-EZ	Total trade	Without intra-EZ	Total trade	Without intra-EZ
Total Zone Euro	**13,10%**	**11,41%**	**18,32%**	**14,42%**	**19,84%**	**15,64%**	**16,39%**	**13,03%**	**17,30%**	**13,77%**
Argentina	0,56%	0,58%	0,45%	0,47%	0,46%	0,49%	0,51%	0,54%	0,52%	0,55%
Australia	1,00%	1,01%	1,20%	1,26%	1,17%	1,24%	1,07%	1,12%	1,06%	1,10%
Austria	0,41%	0,35%	0,66%	0,48%	0,66%	0,49%	0,57%	0,42%	0,57%	0,43%
Belgium and Luxembourg	0,74%	0,57%	1,54%	1,03%	1,57%	1,05%	1,27%	0,86%	1,28%	0,87%
Brazil	0,94%	0,97%	0,84%	0,89%	0,83%	0,88%	0,91%	0,95%	0,90%	0,95%
Bulgaria	0,04%	0,05%	0,07%	0,07%	0,06%	0,07%	0,06%	0,06%	0,06%	0,06%
Canada	1,60%	1,62%	2,65%	2,82%	2,50%	2,67%	2,16%	2,27%	2,07%	2,18%
China	**11,27%**	**11,35%**	**11,66%**	**12,10%**	**11,07%**	**11,49%**	**10,80%**	**11,11%**	**10,44%**	**10,75%**
Cyprus	0,04%	0,04%	0,06%	0,07%	0,06%	0,07%	0,05%	0,06%	0,06%	0,06%
Czech Republic	0,18%	0,19%	0,33%	0,35%	0,30%	0,32%	0,28%	0,30%	0,26%	0,28%
Denmark	0,45%	0,46%	0,53%	0,57%	0,60%	0,65%	0,52%	0,55%	0,56%	0,60%
Estonia	0,03%	0,03%	0,04%	0,04%	0,04%	0,04%	0,03%	0,04%	0,03%	0,04%
Finland	0,29%	0,27%	0,46%	0,40%	0,47%	0,41%	0,39%	0,34%	0,40%	0,35%
France	**2,68%**	**2,34%**	**3,34%**	**2,63%**	**3,56%**	**2,82%**	**3,09%**	**2,46%**	**3,23%**	**2,58%**
Germany	3,51%	3,20%	5,14%	4,24%	5,49%	4,51%	4,44%	3,72%	4,65%	3,88%
Greece	0,35%	0,31%	0,39%	0,33%	0,42%	0,35%	0,38%	0,32%	0,39%	0,33%
Hungary	0,16%	0,16%	0,27%	0,29%	0,24%	0,26%	0,23%	0,25%	0,22%	0,23%
India	2,40%	2,41%	2,30%	2,36%	2,19%	2,26%	2,17%	2,21%	2,10%	2,15%
Indonesia	0,81%	0,82%	1,05%	1,11%	0,96%	1,01%	0,93%	0,97%	0,87%	0,91%
Ireland	0,55%	0,47%	0,92%	0,77%	1,26%	1,02%	0,81%	0,67%	1,01%	0,82%
Italy	1,75%	1,57%	2,41%	1,94%	2,29%	1,87%	2,14%	1,75%	2,06%	1,70%
Japan	8,37%	8,46%	7,98%	8,27%	7,74%	8,04%	7,74%	7,97%	7,60%	7,83%
Korea	3,12%	3,16%	3,61%	3,79%	3,35%	3,52%	3,28%	3,40%	3,12%	3,24%
Latvia	0,02%	0,02%	0,03%	0,03%	0,03%	0,04%	0,03%	0,03%	0,03%	0,03%
Lithuania	0,03%	0,03%	0,05%	0,05%	0,05%	0,05%	0,04%	0,04%	0,04%	0,04%
Malta	0,01%	0,01%	0,02%	0,02%	0,02%	0,02%	0,01%	0,02%	0,02%	0,02%
Mexico	0,96%	0,97%	1,63%	1,74%	1,55%	1,67%	1,34%	1,42%	1,30%	1,38%
Netherlands	1,14%	0,94%	1,52%	1,13%	2,20%	1,65%	1,43%	1,08%	1,84%	1,39%
New Zealand	0,20%	0,20%	0,24%	0,26%	0,22%	0,24%	0,22%	0,23%	0,21%	0,22%
Norway	0,46%	0,47%	0,61%	0,65%	0,63%	0,68%	0,55%	0,58%	0,56%	0,60%
Poland	0,47%	0,48%	0,55%	0,58%	0,51%	0,54%	0,51%	0,54%	0,49%	0,51%
Portugal	0,20%	0,17%	0,32%	0,21%	0,33%	0,22%	0,27%	0,18%	0,27%	0,19%
Rest of the World	21,87%	22,82%	9,76%	10,31%	9,85%	10,48%	17,22%	18,12%	17,27%	18,22%
Romania	0,12%	0,12%	0,17%	0,18%	0,16%	0,17%	0,15%	0,15%	0,14%	0,15%
Russian Federation	1,34%	1,37%	1,44%	1,52%	1,31%	1,38%	1,40%	1,46%	1,32%	1,38%
Saudi Arabia	0,57%	0,58%	0,78%	0,83%	0,67%	0,72%	0,69%	0,73%	0,63%	0,67%
Singapore	0,64%	0,67%	1,15%	1,25%	1,06%	1,16%	0,99%	1,06%	0,94%	1,01%
Slovakia	0,07%	0,07%	0,11%	0,12%	0,10%	0,10%	0,10%	0,10%	0,09%	0,09%
Slovenia	0,04%	0,04%	0,07%	0,08%	0,07%	0,07%	0,06%	0,06%	0,05%	0,06%
South Africa	0,29%	0,30%	0,36%	0,38%	0,44%	0,48%	0,34%	0,36%	0,39%	0,42%
Spain	1,47%	1,23%	1,62%	1,25%	1,59%	1,24%	1,60%	1,23%	1,58%	1,22%
Sub-Saharan Africa	0,39%	0,39%	0,67%	0,72%	0,64%	0,69%	0,55%	0,58%	0,53%	0,56%
Sweden	0,62%	0,63%	0,86%	0,92%	0,84%	0,90%	0,77%	0,81%	0,76%	0,80%
Switzerland	0,59%	0,61%	0,89%	0,96%	0,87%	0,95%	0,80%	0,86%	0,79%	0,85%
Thailand	0,89%	0,90%	1,33%	1,42%	1,26%	1,35%	1,13%	1,19%	1,09%	1,14%
United Kingdom	3,76%	3,85%	4,59%	4,88%	4,80%	5,15%	4,30%	4,53%	4,43%	4,69%
United States of America	**22,58%**	**22,76%**	**23,34%**	**24,23%**	**23,50%**	**24,51%**	**21,66%**	**22,30%**	**21,75%**	**22,46%**
UE27	**19,14%**	**17,58%**	**26,06%**	**22,67%**	**27,72%**	**24,11%**	**23,53%**	**20,57%**	**24,53%**	**21,43%**

Table B.6: Comparison with formula based on population shares instead of GDP shares
No liberalisation / Additive forms ("GDP") / Current openness / Intra-Eurozone trade included / Year 2030

	In shares of GDP		In shares of population	
	Japanese	"GDP"	Japanese	"GDP"
Total Zone Euro	**18,32%**	**15,85%**	**14,04%**	**8,65%**
Argentina	0,45%	0,47%	0,51%	0,68%
Australia	1,20%	1,26%	0,73%	0,59%
Austria	0,66%	0,52%	0,52%	0,26%
Belgium and Luxembourg	1,54%	0,91%	1,36%	0,46%
Brazil	0,84%	0,85%	1,82%	2,39%
Bulgaria	0,07%	0,05%	0,09%	0,11%
Canada	2,65%	2,44%	1,89%	1,12%
China	**11,66%**	**12,78%**	**13,31%**	**17,80%**
Cyprus	0,06%	0,05%	0,05%	0,03%
Czech Republic	0,33%	0,23%	0,31%	0,24%
Denmark	0,53%	0,44%	0,40%	0,19%
Estonia	0,04%	0,03%	0,03%	0,02%
Finland	0,46%	0,39%	0,35%	0,17%
France	**3,34%**	**3,13%**	**2,44%**	**1,74%**
Germany	5,14%	4,68%	3,77%	2,38%
Greece	0,39%	0,38%	0,30%	0,25%
Hungary	0,27%	0,19%	0,26%	0,21%
India	2,30%	2,51%	9,44%	9,39%
Indonesia	1,05%	1,06%	2,29%	3,00%
Ireland	0,92%	0,60%	0,77%	0,22%
Italy	2,41%	2,23%	1,83%	1,35%
Japan	7,98%	8,77%	3,56%	2,94%
Korea	3,61%	3,81%	2,01%	1,38%
Latvia	0,03%	0,03%	0,03%	0,03%
Lithuania	0,05%	0,04%	0,05%	0,05%
Malta	0,02%	0,01%	0,02%	0,01%
Mexico	1,63%	1,38%	1,94%	2,31%
Netherlands	1,52%	1,18%	1,21%	0,59%
New Zealand	0,24%	0,24%	0,17%	0,12%
Norway	0,61%	0,56%	0,42%	0,18%
Poland	0,55%	0,55%	0,53%	0,63%
Portugal	0,32%	0,28%	0,27%	0,23%
Rest of the World	9,76%	9,76%	17,87%	23,85%
Romania	0,17%	0,16%	0,23%	0,30%
Russian Federation	1,44%	1,46%	1,50%	1,89%
Saudi Arabia	0,78%	0,72%	0,76%	0,83%
Singapore	1,15%	0,72%	0,97%	0,24%
Slovakia	0,11%	0,08%	0,11%	0,11%
Slovenia	0,07%	0,05%	0,07%	0,05%
South Africa	0,36%	0,32%	0,50%	0,64%
Spain	1,62%	1,54%	1,23%	0,99%
Sub-Saharan Africa	0,67%	0,57%	7,35%	7,05%
Sweden	0,86%	0,75%	0,63%	0,31%
Switzerland	0,89%	0,65%	0,72%	0,27%
Thailand	1,33%	1,25%	1,29%	1,43%
United Kingdom	4,59%	4,30%	3,22%	1,93%
United States of America	**23,34%**	**25,59%**	**10,89%**	**9,01%**
UE27	**26,06%**	**22,82%**	**27,37%**	**21,28%**

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