

The Principal Components Approach to Quota Formulation at the IMF: 2011 Economic Size and Quota Formula Update

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The Principal Components Approach to Quota Formulation at the IMF: 2011 Economic Size and Quota Formula Update

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Abstract

This paper updates economic size rankings and quota formulas derived from the principal components approach to quota formulation at the IMF developed by Nguéma-Affane (2008). Using available annual sets of quota data up to 2011, the paper shows that the top 10 countries remained broadly stable in 2009-2011, with one notable development: China is now the largest economy since 2009 followed by the United States, Japan and Germany. Quota shares mirror this development, notably the downward trend of the quota shares of advanced economies. China is incontestably experiencing the highest gain in quota shares consistent with its continuous economic dynamism. The paper also explores the impact of removing openness and/or variability from the dataset used for the purpose of the PCAp. It shows that the variables openness and variability play the same role as they reinforce the size dimension through their strong correlation with GDP. However they contribute very little to the significance of the economic size indicator.

¹ Advisor to the Executive Director, International Monetary Fund (IMF). The views expressed in this paper are my own and should not be attributed to the IMF, its Executive Directors and the countries they represent, or its Management. I thank my colleagues in the Executive Director Office for their comments on earlier versions. I am solely responsible for any errors and omissions. Comments are welcome.

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Abbreviations

AE	Advanced Economy
Corr	Correlation
Cov	Covariance
G7	Group of Seven
GDP	Gross Domestic Product
EMDC	Emerging Market and Developing Country
IMF	International Monetary Fund
NATESI	Indicator of Economic Size
OPEN	Openness
PC	Principal Component
PC1	First Principal Component
PCA	Principal Components Analysis
РСАр	Principal Components Approach to Quota Formulation at the IMF
PCDR	Post Catastrophe Debt Relief
PRGT	Poverty Reduction and Growth Trust
RES	Reserves
VAR	Variability

I. Introduction

In a paper published in 2008, Nguéma-Affane developed an original approach to quota formulation at the International Monetary Fund (IMF): the principal components approach (PCAp). The originality of this approach, which is based on the principal components analysis (PCA), is three-fold. First, no judgment is made about the weights of the variables, which are generated by the PCA. Second, it enables the establishment of an indicator of economic size (NATESI) of IMF members using the variables in the institution's quota formula. This indicator is then used to rank countries by economic size. Third, it enables the determination of quota formulas based on the variables' weights generated by the PCA. Since then, the quota formula framework has evolved with notably the adoption of a new quota formula (see Annex I) and an expansion of the membership.

The purpose of this paper is to update rankings and review quota formulas under the PCAp using most recent available quota data. The paper is organized as follows. Section II will present the protocol used to undertake this update. A data analysis will be conducted in Section III. The update of NATESI will be done in Section IV. The review of quota formulas will be undertaken in Section V. The removal of one or more variables is considered in Section VI. Section VII concludes.

II. Update protocol

The update protocol will broadly follow the methodology used in the original paper over successive years. In particular, it will be done in three steps:

- 1. Assessment of the prerequisites for a PCAp
- 2. Update of NATESI rankings
- 3. Review of the PCA quota formulas

Assessment of the prerequisites for a PCAp

A data analysis is conducted to ascertain that the conditions for updating the NATESI Indicator and reviewing the PCA quota formulas are met. This analysis will determine whether the PCA will be running on the correlation or covariance matrix. In this regard, a special attention will be given to the difference between the variances of the variables. Then once the PCA is performed, the first principal component (PC1) will be examined. Firstly, the correlations between the original variables and the first principal component will be evaluated to assess the importance of their contributions to its formation. Secondly, the share of the total variance in different datasets explained by the first principal component will determine whether it could be considered as an indicator of economic size.

Update of NATESI rankings

Assuming the data analysis is conclusive, NATESI rankings will be derived from the scores of countries on the first principal component. An analysis of rankings will then be made, notably to determine whether changes in top rankings are consistent with observed economic developments of the countries concerned. The stability of top rankings will be established by using two temporal perspectives: a forward-looking temporal perspective and a backward-looking temporal perspective. The forward-looking temporal perspective is applying variables' weights derived from a PCA on less recent datasets (datasets of years n-1, n-2,...) to the most recent dataset (dataset of year n). The backward-looking temporal perspective is applying variables' weights derived from a PCA on the latest dataset (dataset of year n) to those of previous years (datasets of years n-1, n-2,...). A set of top rankings using both perspectives. Changes within these top groupings will be examined to determine whether they are of structural or temporary nature. In particular, like in the original paper, temporal paths will be drawn to show the most important developments.

Review of PCA quota formulas

PCA-generated weights of variables will be analyzed and used to derive annual PCA quota formulas and calculate quota shares. An examination of the weights will be undertaken and an analysis of quota shares of individual countries and country groupings will be made, with notably a comparison to actual quota shares.

III. Data analysis

Datasets

Annual data from the Fund for the years 2005 and 2007 to 2011 will be used for the purpose of this paper.²

Data analysis

Table 1 presents the descriptive statistics of the four variables in shares of the IMF quota formula: Income (GDP), Openness (OPEN), Variability (VAR) and Reserves (RES). Since the variables, which are shares of grand totals, are in the same range and measured on the same scale and there are no significant differences between the variances of the four variables in all six years of interest, we can perform the PCA on the covariance matrix.

A look at the correlation matrix in Table 2 shows that GDP, OPEN and VAR are highly correlated to each other in 2011 with a correlation coefficient higher than 0.90. RES is clearly less correlated to these three variables. This feature is the same in all years of interest.

² See IMF (2009, 2012a, 2012b, 2012c and 2013). No data from 2006 is available in IMF documents.

	2005	2007	2008	2009	2010	2011
Number of countries	186	186	187	187	188	188
GDP						
Mean	0.538	0.538	0.535	0.535	0.532	0.532
Standard deviation	2.225	2.102	2.047	2.012	1.978	1.967
Maximum	26.471	24.723	23.899	23.000	22.189	21.573
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
OPEN						
Mean	0.538	0.538	0.535	0.535	0.532	0.532
Standard deviation	1.581	1.543	1.505	1.485	1.468	1.463
Maximum	15.046	14.141	13.635	13.349	13.072	12.989
Minimum	0.000	0.000	0.000	0.000	0.000	0.000
VAR						
Mean	0.538	0.538	0.535	0.535	0.532	0.532
Standard deviation	1.742	1.705	1.566	1.366	1.451	1.452
Maximum	20.724	19.936	17.57	14.051	15.491	15.803
Minimum	0.001	0.001	0.001	0.001	0.001	0.000
RES						
Mean	0.538	0.538	0.535	0.535	0.532	0.532
Standard deviation	2.240	2.265	2.276	2.451	2.475	2.567
Maximum	22.277	24.381	25.832	29.336	30.483	32.198
Minimum	0.000	0.000	0.000	0.000	0.000	0.000

Table 1 – Descriptive statistics of variables, 2005 and 2007-2011

Table 2 – Matrices of covariances and correlations, 2011

Cov	GDP	OPEN	VAR	RES	Corr	GDP	OPEN	VAR	RES
GDP	3.848				GDP	1.000			
OPEN	2.635	2.129			OPEN	0.915	1.000		
VAR	2.698	2.014	2.096		VAR	0.951	0.960	1.000	
RES	2.73	1.948	1.586	6.553	RES	0.515	0.496	0.429	1.000

Results of the PCA

Table 3 shows that the correlations between each variable and the first principal component (PC1) are high, consistent with the correlation matrix. Therefore the four variables can be retained for the purpose of the analysis. In addition, we can see, by squaring the correlations, that the first principal component explains a large share of the variances of each variable (more than 65 percent in the last two years).

	2005	2007	2008	2009	2010	2011
GDP	0.963	0.953	0.936	0.905	0.911	0.906
OPEN	0.929	0.925	0.911	0.886	0.891	0.884
VAR	0.942	0.934	0.928	0.870	0.871	0.846
RES	0.655	0.668	0.708	0.789	0.808	0.836

Table 3 – Correlations between the variables and PC1, 2005 and 2007-2011

The first principal component explains a large share, at least 72 percent, of the total variance in the dataset in all years of interest. The second principal component accounts for at least 22 percent. Both components therefore account for a minimum of 97 percent of the total variance in the five years of interest. We can conclude that differences between countries *as per* the four original variables are accurately captured by these two components, which are linear combinations of the original variables.

DC	2005		2007		2008		2009		2010		2011	
FC	Value	Share										
1	11.538	0.748	10.819	0.733	10.202	0.728	10.154	0.723	10.496	0.738	10.904	0.746
2	3.507	0.227	3.591	0.243	3.445	0.246	3.562	0.253	3.425	0.241	3.436	0.235
3	0.278	0.018	0.278	0.019	0.264	0.019	0.267	0.019	0.247	0.017	0.224	0.015
4	0.100	0.006	0.073	0.005	0.103	0.007	0.070	0.005	0.055	0.004	0.062	0.004
Total	15.424	1.000	14.761	1.000	14.013	1.000	14.054	1.000	14.222	1.000	14.626	1.000

Table 4 - Variances of principal components, 2005 and 2007-2011

Since the first principal component explains more than 72 percent of the total variance and is highly correlated with the four original variables, it clearly displays an overall size dimension. Therefore, like in the original paper, this component could be interpreted as reflecting economic size in the global economy. The second component which is highly correlated with RES displays a contrast between the biggest economies with respect to that variable. In particular, it opposes economic powers with large reserves such as China, Japan and Russia, to other powers with low reserves, such as United States, Germany, France and United Kingdom. We conclude that the first component continues to serve as the indicator of economic size (NATESI).

IV. Update of NATESI rankings

Scores on the first PC are used to rank countries. Table 5 shows the top 10 countries in all years of interest. Interestingly, the top 10 countries are from the same set of 13 countries (2011 top 10 countries plus Canada, Italy and Korea) and the top 20 countries are drawn from a group of 23 countries (2011 top 20 counties plus Belgium, Ireland and Turkey). Also noteworthy is that the top 4 countries (China, Germany, Japan, and the United States) are the same in all years.

	2011	2010	2009	2008	2007	2005
1	China	China	China	United States	United States	United States
2	United States	United States	United States	China	China	Japan
3	Japan	Japan	Japan	Japan	Japan	China
4	Germany	Germany	Germany	Germany	Germany	Germany
5	Russia	Russia	Russia	Russia	United Kingdom	United Kingdom
6	United Kingdom	United Kingdom	United Kingdom	United Kingdom	France	France
7	India	France	France	France	Russia	Korea
8	Saudi Arabia	India	Saudi Arabia	India	Korea	Italy
9	France	Saudi Arabia	India	Korea	Italy	Russia
10	Brazil	Italy	Italy	Saudi Arabia	India	Canada

Table 5 – NATESI - Top 10 rankings, 2005 and 2007-2011

More striking is the fact that China is taking over from the United States as the largest economy since 2009. This can be seen by looking at their temporal paths in Graph 1. The United States (1) and Japan (2) are moving leftward indicating a decline in relative economic size. China (3) is moving in the opposite direction as its relative economic size grows.



Graph 1 – Temporal paths, 2005 and 2007-2011

These findings suggest a relative stability in the top rankings over years, which could be further explored by using the forward-looking and backward-looking temporal perspectives. Table 6 shows that both perspectives yield the same top 12 countries in 2009-2011 although with some differences in terms of rankings³. It also shows stable subsets of different size within that set of 12 countries, regardless of the temporal perspective employed. One subset is comprised of Brazil, Italy, and Korea on the last three places. Only Brazil seems to exhibit a stable ranking at the 10th place under the forward-looking perspective. A second stable subset encompasses India, France and Saudi Arabia with India, standing consistently at the 7th place under the forward-looking perspectives definitely put United Kingdom, Russian Federation, Germany and Japan at the 6th, 5th, 4th and 3rd places respectively. Likewise, China's claim for the top spot is evident under both approaches and hence relegating the United States at the second top spot.

Interestingly, the top 12 countries are the same when using the temporal perspectives in 2008-2010 (see Annex II). A notable difference between the two ranking stability analyses is the confirmation of the relative positions of China, United States, Russia and United Kingdom. Also noteworthy is the exit of Italy from the top 10 in favor of Brazil.

Forw	ard-looking	g temporal	perspective	Backward-looking temporal perspective						
	2011		_	_	2011 weights					
2009 weights	2010 weights	2011 weights	Countries	Countries	2011	2010	2009			
1	1	1	China	China	1	1	1			
2	2	2	United States	United States	2	2	2			
3	3	3	Japan	Japan	3	3	3			
4	4	4	Germany	Germany	4	4	4			
5	5	5	Russia	Russia	5	5	5			
6	6	6	United Kingdom	United Kingdom	6	6	6			
7	7	7	India	India	7	7	9			
9	9	8	Saudi Arabia	Saudi Arabia	8	8	7			
8	8	9	France	France	9	9	8			
10	10	10	Brazil	Brazil	10	10	12			
12	12	11	Korea	Korea	11	12	11			
11	11	12	Italy	Italy	12	11	10			

Table 6 – Stability of top rankings, 2009-2011 1/

1/ Countries between two double-lines constitute a stable set of countries using both perspectives.

³ The choice of the years 2009, 2010 and 2011 for ranking stability purposes stems from the application of the forward-looking temporal perspective with the 2005, 2007 and 2008 PCA weights. The top 12 rankings are only the same in all three years 2009, 2010 and 2011.

There is less stability in the depths of NATESI rankings because quota shares are smaller and close. Top gains and losses are mainly recorded by emerging markets and developing countries (EMDCs) (Table 7). The large swings in rankings is explained by either strong dynamism or economic contraction due to, among others, instability and conflict.

			U	1	0	,	
	Country	Ranking	Gain		Country	Ranking	Loss
1	Turkmenistan	73	43	1	Zimbabwe	139	-69
2	Equatorial Guinea	98	39	2	Zambia	115	-52
3	Congo	101	34	3	Somalia	185	-51
4	Iceland	68	33	4	Sierra Leone	160	-39
5	Mongolia	126	32	5	Guyana	159	-32
6	Mauritius	113	28	6	Liberia	142	-32
7	Botswana	96	27	7	Côte d'Ivoire	103	-29
8	Bolivia	90	25	8	Guinea	145	-26
9	Albania	122	22	9	Ghana	91	-24
10	Algeria	27	19	10	Burundi	162	-23

Table 7 - NATESI rankings - Top 10 gains and losses, 2011

			Gain/Loss(-)
Ranking	IMF	NATESI	under
			NATESI
1	United States	China	2
2	Japan	United States	-1
3	China	Japan	-1
4	Germany	Germany	0
5	France	Russia	4
6	United Kingdom	United Kingdom	-1
7	Italy	India	1
8	India	Saudi Arabia	4
9	Russia	France	-4
10	Brazil	Brazil	0
11	Canada	Korea	5
12	Saudi Arabia	Italy	-5
13	Spain	Singapore	12
14	Mexico	Canada	-3
15	Netherlands	Switzerland	4
16	Korea	Netherlands	-1
17	Australia	Spain	-4
18	Belgium	Mexico	-4
19	Switzerland	Thailand	13
20	Turkey	Australia	-3

Table 8 – IMF and NATESI rankings, 2011

Comparison with actual rankings

As already noted, a notable difference between NATESI rankings and actual IMF rankings is that China occupies the top spot before the United States (2^{nd}) , Japan (3^{rd}) and Germany (4^{th}) in NATESI rankings, whereas it only occupies the third place in actual rankings (Table 8). These four countries form the only stable set of countries in the top rankings. Eighteen countries in the IMF top 20 countries are in NATESI top 20 countries in 2011. Belgium and Turkey would exit the top 20 in favor of Singapore and Thailand, the two countries with the highest jumps in that top group (+13 and +12 respectively). Other remarkable gains in rankings are Korea (+5), Russia (+4), Saudi Arabia (+4) and Switzerland (+4). The biggest losses are Italy (-5), France, Mexico and Spain (-4 each).

It is worth recalling that in the original paper, the NATESI ranked China at the 3rd place using 2004 data of the old variables in the IMF quota formula. Using the 2005 dataset with updated variables, NATESI still ranks China third, whereas it was at the 6th place in the IMF rankings. China finally moved to the third spot after the 2010 quota reform using the 2008 data. NATESI would rank that country second with the same data set. China's relative position has improved in the following years not only under NATESI, but also when using the IMF quota formula which ranks it second. There is therefore a broad consistency between the two approaches with respect to China's economic size. Future quota reviews should reflect this development.

V. Review of the PCA quota formulas

The weights of the original variables in the PC1 are presented in Table 9. There is a clear opposite evolution of the weights of GDP, OPEN and VAR on the one hand and that of RES on the other hand. The weights of GDP, OPEN and RES have been declining steadily in successive years of interest, while that of RES has been increasing. GDP had the highest weight in the 2005, 2007 and 2008 datasets. RES has the highest weight since 2009. This is consistent with the fact that RES has the highest variance in those years whereas this was the case for GDP in previous years. The growing contribution of RES to the first principal component also explains the differences between the IMF and NATESI rankings.

	2005	2007	2008	2009	2010	2011
GDP	0.319	0.306	0.302	0.291	0.283	0.276
OPEN	0.218	0.218	0.216	0.210	0.205	0.201
VAR	0.244	0.244	0.229	0.190	0.198	0.190
RES	0.218	0.232	0.254	0.309	0.314	0.333

Table 9 – Weights of variables in the first principal component, 2005 and 2007-2011

Individual quota shares

A look at Table 10 shows that 8 of the top 10 gains in quota shares concern countries in the top 20 rankings. Four of the top gains are from Asian EMDCs, with China registering the highest increase in quota shares. While Japan is the only G7 country to register higher quota share, the other G7 countries in the top 10 countries have all lost quota shares.

Country	PCA quotas	Gain	Country	PCA quotas	Loss
China	16.762	10.372	United States	12.077	-5.321
Japan	7.740	1.279	France	2.535	-1.690
Singapore	1.771	0.955	Germany	4.197	-1.386
Russia	3.298	0.593	United Kingdom	3.064	-1.161
Saudi Arabia	2.642	0.547	Italy	2.186	-0.973
Thailand	1.207	0.534	Canada	1.738	-0.573
Algeria	0.848	0.437	Spain	1.549	-0.450
Korea	2.232	0.433	Venezuela	0.361	-0.419
Switzerland	1.640	0.430	Belgium	0.988	-0.356
Luxembourg	0.481	0.204	Mexico	1.532	-0.336

Table 10 – PCA quota shares - Top 10 gains and losses, 2011.

Most importantly, the temporal trend of PCA quota shares of top countries is similar to that of their IMF formula quota shares. However annual changes in PCA shares are on average higher than those in IMF formula shares. For example, the United States experiences a continuous decline in its quota share from 2005 to 2011. Under the PCAp, the US quota share would be below 15 percent in 2011 whereas the IMF quota formula continues to yield a quota share above that benchmark. China has an inverse, faster trend under the PCAp and its quota share is above the 15 percent benchmark in 2011.

Country groupings and constituencies

The changes in the quota shares of top ranking countries explain those in quota shares of country groupings and constituencies (Table 11). In particular, quota shares of advanced economies (AEs) register a downward trend with IMF formula shares consistently higher than PCA shares which stand below 50 percent in 2009-2011. The same downward trend is observed when AEs are combined with European EMDCs. The upward trend in EMDCs quota shares is driven by that of Asian EMDCs.

A notable outcome is that the quota shares of PRGT and PCDR groupings in both formulas are always lower than their post-2010 reform quota shares. A related outcome is that the post-2010 quota shares of the two African constituencies (occupied currently by The Gambia and Togo) that include many low-income countries are significantly higher than quota shares calculated with both the Fund and PCA formulas.

Post-2010 Fund PCA Fund			20	10	2009		2008		2007		2005	
Reform formula formula <th< th=""><th></th><th>Post-2010</th><th>Fund</th><th>PCA</th><th>Fund</th><th>PCA</th><th>Fund</th><th>PCA</th><th>Fund</th><th>PCA</th><th>Fund</th><th>PCA</th></th<>		Post-2010	Fund	PCA								
Weights of variables GDP OPEN 0.500 0.281 0.500 0.291 0.500 0.216 0.300 0.216 0.300 0.216 0.300 0.216 0.300 0.216 0.300 0.216 0.300 0.216 0.300 0.216 0.300 0.216 0.300 0.216 0.300 0.224 0.500 0.214 0.500 0.224 Compression factor 0.950		Reform	formula									
GOP OPEN 0.500 0.233 0.500 0.291 0.500 0.302 0.500 0.312 0.500 0.218 0.300 0.218 VAR 0.150 0.158 0.150 0.158 0.150 0.150 0.150 0.229 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.234 Compression factor 0.950 0.212 0.512 0.500 0.512 0.500 0.512 0.500	Weights of variables	;										
GOP 0.500 0.283 0.500 0.291 0.500 0.305 0.300 0.216 0.300 0.226 0.300 0.226 0.300 0.226 0.300 0.226 VAR 0.150 0.190 0.150 0.214 0.050 0.218 0.050 0.226 0.050 0.226 0.050 0.226 0.050 0.226 0.050 0.226 0.050 0.256 0.250 0.950 </td <td></td>												
OPEN 0.300 0.205 0.300 0.210 0.300 0.218 0.300 0.218 VAR 0.150 0.159 0.150 0.150 0.229 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.224 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.244 0.150 0.245 0.150 0.245 0.150 0.245 0.150 0.245 0.150 0.245 0.150 0.245 0.150 0.245 0.150 0.150 0.245 0.150 0.150 0.150 0.150 0.150 0.150 0.150 0.150 0.150 0.150 0.150 0.150 0.151 1.151 1.150 0.150 0.151 1.151 1.150 1.150 1.150 1.151<	GDP		0.500	0.283	0.500	0.291	0.500	0.302	0.500	0.306	0.500	0.319
VAR 0.150 0.150 0.150 0.229 0.150 0.224 0.150 0.244 0.150 0.244 RES 0.050 0.314 0.050 0.350 0.950 </td <td>OPEN</td> <td></td> <td>0.300</td> <td>0.205</td> <td>0.300</td> <td>0.210</td> <td>0.300</td> <td>0.216</td> <td>0.300</td> <td>0.218</td> <td>0.300</td> <td>0.218</td>	OPEN		0.300	0.205	0.300	0.210	0.300	0.216	0.300	0.218	0.300	0.218
RES 0.050 0.314 0.050 0.309 0.050 0.254 0.050 0.232 0.050 0.218 Compression factor 0.950	VAR		0.150	0.198	0.150	0.190	0.150	0.229	0.150	0.244	0.150	0.244
Compression factor 0.950 <td>RES</td> <td></td> <td>0.050</td> <td>0.314</td> <td>0.050</td> <td>0.309</td> <td>0.050</td> <td>0.254</td> <td>0.050</td> <td>0.232</td> <td>0.050</td> <td>0.218</td>	RES		0.050	0.314	0.050	0.309	0.050	0.254	0.050	0.232	0.050	0.218
Compression factor 0.950 <td></td>												
Quota shares, in percent Advanced Economies (AEs) 57,637 56,050 47.371 57,496 48.379 58.224 50.065 60.431 53,788 63,767 58.317 EMOC S 42.857 43.950 52.629 42.504 51.621 41.776 49.995 39.569 46.212 38.233 41.683 EMOC Aria 4.488 3.279 3.646 3.730 3.166 3.705 3.600 2.767 13.89 EMOC Carige 7.225 7.712 8.667 7.708 8.756 7.667 9.057 7.038 8.668 4.772 5.436 EMOC Middle East 6.742 6.214 7.440 6.228 8.157 6.160 7.957 7.021 6.629 6.893 AEs and EMDC Europe 64.862 63.762 56.057 65.266 57.137 65.911 9.9122 67.444 62.056 69.955 65.264 PRGT 3.995 2.650 2.626 2.599 2.690 2.581 2.762	Compression factor		0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950	0.950
Quota shares, in percent Advanced Economies (AEs) 57.637 56.050 47.371 57.496 48.379 58.224 50.065 60.431 53.788 63.767 58.317 EMDCs 42.357 43.950 52.629 42.2507 41.953 3.075 3.640 2.796 3.189 EMDC Arrica 4.438 3.279 3.078 3.640 2.796 3.189 EMDC Curope 7.22 6.867 7.704 8.58 7.667 9.076 5.321 6.0684 6.196 EMDC Curope 7.22 6.226 8.157 6.100 7.105 7.587 7.021 6.529 6.526 EMDC Western Hemisphere 7.907 7.162 7.028 6.947 6.531 59.122 67.434 62.056 69.955 65.281 Other EMDCs 35.132 36.238 43.943 34.734 42.863 340.89 40.878 32.566 37.944 30.045 34.719 PCDR 3.063 1.837 1.750												
Advanced Economies (AEs) 57.637 56.050 47.371 57.496 48.379 58.224 50.065 60.431 53.788 63.767 58.317 EMDC S. 42.397 43.950 52.629 42.594 51.621 41.776 49.935 39.569 46.212 66.233 11.683 EMDC Asia 16.046 19.599 25.322 18.3272 23.977 17.752 21.994 11.244 11.614 19.512 EMDC Corope 7.225 7.712 8.687 7.770 8.758 7.667 5.005 5.371 6.068 4.772 54.865 EMDC Midle East 6.742 62.016 6.931 7.051 7.157 6.875 7.021 6.629 6.893 Afs and EMDC Europe 64.862 63.762 56.057 65.266 7.137 65.911 59.122 67.434 62.066 69.955 65.281 Other EMDCs 3.063 1.831 1.750 1.774 1.772 1.826 1.212 1.525 1.806 2.525 2.806 2.214 2.364 PCDR 3.063	Quota shares, in percent											
Advanced Economies (AEs) 57.637 56.050 47.371 57.496 48.379 58.248 50.065 60.431 53.788 63.767 88.317 EMDCS 44.383 3.279 3.698 3.231 3.798 3.143 3.709 3.075 3.640 2.276 3.189 EMDC Airica 4.438 3.279 3.698 3.231 3.798 3.146 3.730 3.075 3.640 2.276 3.189 EMDC Carlos 7.225 7.712 8.687 7.770 8.758 7.687 9.057 7.003 8.268 6.189 6.964 EMDC Vestem Hemisphere 7.907 7.446 7.082 6.947 6.531 7.051 6.652 6.935 65.281 Other EMDCs 35.132 36.238 43.943 3.4.74 4.263 3.0.89 40.878 32.566 37.944 30.045 34.79 PCDR 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.561 1.641 Australa 3.669 3.779 3.867 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>												
EMDC S 42 59 52.629 42.504 51.621 41.76 49.935 39.569 46.212 36.233 41.683 EMDC Aria 16.046 19.599 25.323 18.327 23.977 17.732 21.994 17.244 21.216 15.847 19.212 EMDC Europe 7.225 7.712 8.687 7.703 8.758 7.687 9.057 7.003 8.268 6.169 5.371 6.688 4.772 5.436 EMDC Middle East 6.742 6.612 6.947 6.331 7.051 7.157 6.875 7.021 6.629 6.893 AEs and EMDC Europe 64.862 63.762 56.057 7.164 42.663 34.089 40.878 32.566 37.944 30.045 34.199 PCDR 3.063 1.837 1.750 1.771 1.762 1.800 1.722 1.825 1.561 1.413 1.526 1.411 1.536 1.331 1.488 Austraia 3.168 3.555 <td>Advanced Economies (AEs)</td> <td>57.637</td> <td>56.050</td> <td>47.371</td> <td>57.496</td> <td>48.379</td> <td>58.224</td> <td>50.065</td> <td>60.431</td> <td>53.788</td> <td>63.767</td> <td>58.317</td>	Advanced Economies (AEs)	57.637	56.050	47.371	57.496	48.379	58.224	50.065	60.431	53.788	63.767	58.317
EMDC Africa 4.438 3.279 3.698 3.231 3.798 3.146 3.790 3.075 3.640 2.796 3.189 EMDC Arisa 16.046 19.599 7.225 7.712 8.687 7.770 8.758 7.667 9.057 7.003 8.268 6.189 6.964 EMDC Curope 7.225 7.712 8.687 7.770 8.758 7.617 7.575 7.021 6.668 4.772 5.426 EMDC Western Hemisphere 7.907 16.729 6.731 15.157 7.021 6.526 5.911 59.122 67.434 62.056 69.955 65.281 Other EMDCs 3.563 3.663 1.837 1.750 1.771 1.722 1.820 1.722 1.825 1.664 PCDR 3.063 1.837 1.750 1.771 1.722 1.825 1.565 1.604 Australia 3.469 3.779 3.301 4.04 3.889 4.309 3.461 3.447 3.317	EMDCs	42.357	43.950	52.629	42.504	51.621	41.776	49.935	39.569	46.212	36.233	41.683
EMOC Asia 16.046 19.599 25.323 18.327 23.977 17.732 21.994 17.244 21.216 15.847 19.212 EMOC Curope 7.257 7.712 8.687 7.700 8.787 9.057 7.003 8.268 6.189 6.964 6.964 EMOC Western Hemisphere 7.907 7.146 7.082 6.947 6.931 7.051 7.157 6.675 7.021 6.629 6.893 AEs and EMOC Europe 64.862 63.762 56.057 65.266 57.137 6.687 33.043 34.734 42.863 34.089 40.878 32.566 37.94 30.045 34.719 PCDR 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.664 Austraila 3.649 3.779 3.867 3.785 3.879 3.901 4.044 3.889 4.309 3.952 4.486 Austraila 3.649 3.779 3.867 3.785	EMDC Africa	4.438	3.279	3.698	3.231	3.798	3.146	3.730	3.075	3.640	2.796	3.189
EMDC Europe 7.225 7.712 8.687 7.770 8.758 7.687 9.057 7.003 8.268 6.189 6.949 EMDC Midel East 6.742 6.214 7.400 6.228 8.157 6.667 7.996 5.371 6.6875 7.021 6.629 6.893 AEs and EMDC Europe 64.862 63.762 56.057 65.266 57.137 65.911 59.122 67.434 62.056 69.955 65.281 Other EMDCs 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.565 1.604 PCDR 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.565 1.604 Australia 3.669 3.797 3.301 4.044 3.889 4.307 3.461 Canada 3.197 3.222 2.660 3.2613 2.788 2.440 2.563 2.479 3.663 3.335 3.662	EMDC Asia	16.046	19.599	25.323	18.327	23.977	17.732	21.994	17.244	21.216	15.847	19.212
EMBC Middle East 6.742 6.214 7.840 5.228 8.157 6.160 7.996 5.371 6.068 4.772 5.466 EMDC Western Hemisphere 7.907 7.146 7.082 6.947 6.931 7.051 7.157 6.875 7.021 6.629 6.893 AEs and EMDC Europe 64.862 63.762 56.057 65.266 57.137 65.911 59.122 67.434 62.056 69.955 65.248 Other EMDCs 3.063 1.837 1.750 1.774 1.771 1.762 1.820 1.722 1.825 1.665 1.604 Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Australia 3.649 3.779 3.867 3.785 3.879 3.901 4.044 3.889 4.309 3.952 4.466 Anstralia 3.158 3.555 3.322 2.578 2.691 2.613 2.788 <	EMDC Europe	7.225	7.712	8.687	7.770	8.758	7.687	9.057	7.003	8.268	6.189	6.964
EMDC Western Hemisphere 7.907 7.146 7.082 6.947 6.931 7.051 7.157 6.875 7.021 6.629 6.893 AEs and EMDC Europe Other EMDCs 35.132 36.238 43.943 34.734 42.863 34.089 40.878 32.566 37.944 69.955 65.281 PRGT 3.995 2.650 2.626 2.599 2.690 2.581 2.806 2.525 2.806 2.214 2.364 PCDR 3.063 1.837 1.750 1.771 1.762 1.820 1.722 1.825 1.555 1.311 1.488 Austria 3.469 3.779 3.867 3.785 3.469 3.301 4.044 3.889 4.309 3.952 4.486 Austria 3.158 3.555 3.322 3.783 3.466 3.371 3.663 3.371 3.663 3.271 3.686 3.311 3.486 3.011 3.663 3.262 1.413 3.686 3.313 3.461 3.325 <td>EMDC Middle East</td> <td>6.742</td> <td>6.214</td> <td>7.840</td> <td>6.228</td> <td>8.157</td> <td>6.160</td> <td>7.996</td> <td>5.371</td> <td>6.068</td> <td>4.772</td> <td>5.426</td>	EMDC Middle East	6.742	6.214	7.840	6.228	8.157	6.160	7.996	5.371	6.068	4.772	5.426
AEs and EMDC Europe Other EMDCs 64.862 35.132 63.762 36.238 56.057 43.943 65.266 34.744 57.137 42.863 65.911 34.089 59.122 40.878 67.434 32.566 62.056 37.944 69.955 30.045 55.281 34.719 PRGT 3.995 2.650 2.626 2.599 2.600 2.581 2.806 2.525 2.806 2.214 2.364 PCDR 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.565 1.604 Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Austria 3.158 3.555 3.320 3.779 3.867 3.775 3.303 3.461 3.447 3.317 3.468 China 3.909 2.660 3.202 2.788 3.463 3.306 3.335 3.466 3.335 3.463 3.335 3.462 3.607 China 3.223 3.417 3.435 <	EMDC Western Hemisphere	7.907	7.146	7.082	6.947	6.931	7.051	7.157	6.875	7.021	6.629	6.893
AEs and EMDC Europe 64.862 63.762 56.057 65.266 77.137 65.911 59.122 67.434 62.056 69.955 65.281 Other EMDCs 35.132 36.238 43.943 34.734 42.863 34.089 40.878 32.256 37.944 30.045 34.719 PROT 3.995 2.650 2.626 2.599 2.690 2.581 2.806 2.525 2.806 2.214 2.364 PCDR 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.565 1.604 Australia 3.158 3.555 3.322 3.579 3.901 4.044 3.889 4.309 3.952 4.486 Australia 3.158 3.555 3.322 3.579 3.355 3.466 3.330 3.461 3.447 3.317 3.468 Canada 3.197 3.222 2.660 3.220 2.738 3.466 3.335 3.3463 3.365												
Other EMDCs 35.132 36.238 43.943 34.734 42.863 34.089 40.878 32.566 37.944 30.045 34.719 PRGT 3.995 2.650 2.626 2.599 2.690 2.581 2.806 2.525 2.806 2.214 2.364 PCDR 3.063 1.837 1.750 1.774 1.771 1.762 1.820 1.722 1.825 1.565 1.604 Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Australia 3.649 3.779 3.867 3.785 3.879 3.901 4.044 3.889 4.309 3.952 4.486 Austria 3.158 3.555 3.322 2.578 2.660 3.300 3.461 3.447 3.317 3.486 China 6.390 9.413 13.998 8.628 13.086 3.071 3.663 3.335 3.862 3.640 <td>AEs and EMDC Europe</td> <td>64.862</td> <td>63.762</td> <td>56.057</td> <td>65.266</td> <td>57.137</td> <td>65.911</td> <td>59.122</td> <td>67.434</td> <td>62.056</td> <td>69.955</td> <td>65.281</td>	AEs and EMDC Europe	64.862	63.762	56.057	65.266	57.137	65.911	59.122	67.434	62.056	69.955	65.281
PRGT 3.995 2.650 2.626 2.599 2.690 2.581 2.806 2.525 2.806 2.214 2.364 PCDR 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.565 1.604 Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Australia 3.158 3.555 3.322 3.579 3.355 3.466 3.30 3.461 3.447 3.317 3.468 Canada 3.197 3.229 2.660 3.320 2.738 3.486 3.071 3.663 3.33 3.862 3.660 China 6.330 9.413 13.98 8.628 13.086 7.917 10.886 7.475 9.905 6.389 8.048 Egypt 2.891 2.932 3.439 2.961 3.616 2.988 3.722 2.690 3.322 2.323	Other EMDCs	35.132	36.238	43.943	34.734	42.863	34.089	40.878	32.566	37.944	30.045	34.719
PRGT 3.995 2.650 2.626 2.599 2.690 2.581 2.806 2.525 2.806 2.214 2.364 PCDR 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.565 1.664 Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Australia 3.158 3.555 3.867 3.785 3.879 3.901 4.044 3.889 4.309 3.952 4.466 Austria 3.158 3.555 3.322 3.579 3.355 3.466 3.30 3.461 3.447 3.317 3.468 Brail 2.902 2.661 2.775 2.565 2.691 2.613 2.788 2.440 2.563 2.179 2.188 Canada 3.197 3.223 3.417 3.435 3.493 3.453 3.366 3.278 3.377 3.420												
PRGT 3.995 2.650 2.626 2.599 2.690 2.581 2.806 2.525 2.806 2.214 2.364 PCDR 3.063 1.837 1.750 1.774 1.771 1.762 1.820 1.722 1.825 1.664 Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Australia 3.649 3.779 3.867 3.785 3.879 3.901 4.044 3.889 4.309 3.952 4.466 Canada 3.197 3.229 2.661 2.775 2.565 2.691 2.613 2.788 3.466 3.301 3.663 3.317 3.468 Canada 3.197 3.229 2.660 3.202 2.738 3.465 3.071 3.636 3.322 2.232 2.828 Canada 3.223 3.417 3.435 3.493 3.453 3.266 3.278 3.377 3.420 3.463 3.645 Eypt 2.891 2.923 3.437 3.486												
PCDR 3.063 1.837 1.750 1.794 1.771 1.762 1.820 1.722 1.825 1.565 1.604 Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Austria 3.158 3.555 3.322 3.579 3.867 3.901 4.044 3.89 4.309 3.952 4.466 Brazil 2.902 2.661 2.775 2.565 2.691 2.613 2.788 3.440 3.137 3.463 3.362 3.662 3.603 3.417 3.463 3.645 3.306 3.177 0.866 7.475 9.905 6.389 8.048 Denmark 3.223 3.417 3.435 3.493 3.453 3.366 3.278 3.377 3.420 3.463 3.645 Egypt 2.891 2.932 3.439 2.961 3.616 2.988 3.722 2.600 3.322 2.323 2.816 Gambia 2.556 1.673 3.855 1.818 1.867 1.8	PRGT	3.995	2.650	2.626	2.599	2.690	2.581	2.806	2.525	2.806	2.214	2.364
Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Australia 3.649 3.779 3.867 3.785 3.879 3.901 4.044 3.889 4.309 3.952 4.486 Australia 3.158 3.555 3.322 3.579 3.355 3.466 3.330 3.461 3.447 3.1317 3.468 Canada 3.197 3.229 2.660 3.320 2.738 3.486 3.071 3.636 3.335 3.862 3.640 China 6.390 9.413 13.998 8.628 13.086 7.917 10.866 7.475 9.905 6.389 8.048 Egypt 2.891 2.932 3.439 2.961 3.616 2.988 3.722 2.690 3.322 2.323 2.816 France 4.225 3.603 2.673 3.787 2.833 3.789 2.984 4.212 3.662 4.015 3.356 Garmay 5.583 5.677 4.420 5.782	PCDR	3.063	1.837	1.750	1.794	1.771	1.762	1.820	1.722	1.825	1.565	1.604
Argentina 1.496 1.478 1.561 1.413 1.526 1.411 1.536 1.373 1.505 1.331 1.488 Australia 3.649 3.779 3.867 3.785 3.879 3.901 4.044 3.889 4.309 3.952 4.486 Australa 3.158 3.555 3.322 3.579 3.355 3.466 3.330 3.461 3.447 3.317 3.468 Brazil 2.902 2.661 2.775 2.565 2.691 2.613 2.788 2.440 2.563 2.179 2.188 Canada 3.197 3.229 2.660 3.320 2.738 3.486 3.071 3.636 3.335 3.862 3.640 China 6.390 9.413 13.998 8.628 13.086 7.917 10.886 7.477 9.905 6.389 8.048 Denmark 3.223 3.417 3.435 3.493 3.616 2.988 3.722 2.690 3.322 2.323 2.816 Gambia 2.556 1.873 1.855 1.818												
Argentina1.4961.4781.5611.4131.5261.4111.5361.3731.5051.3311.488Austria3.6493.7793.8673.7893.8793.0114.0443.8894.3093.9524.486Austria3.1583.5553.3223.5793.5553.6643.303.413.4473.1173.468Brazil2.9022.6612.7752.5652.6912.6132.7882.4402.5632.1792.188Canada3.1973.2292.6603.202.7383.4863.0713.6683.3353.8623.640China6.3309.4131.3988.62813.0867.71710.8667.4759.9056.3898.048Denmark3.2233.4173.4353.4933.4533.3663.2783.3773.4203.4633.645Egypt2.8912.9323.4392.9613.6162.9883.7222.6003.3222.3232.816Gambia2.5561.8731.8551.8181.8671.8352.0011.7661.9411.5541.662Gambia2.5561.8731.8551.8181.8671.8352.0011.7661.9411.5541.662Iran2.1091.9162.3291.8792.4091.6002.2041.782.1221.7152.019Iran2.1091.9162.3291.8792.4												
Australia3.6493.7793.8673.7853.8793.9014.0443.8894.3093.9524.486Austria3.1583.5553.3223.5753.3553.4663.3303.4613.4473.3173.468Brazil2.9022.6612.7752.5652.6912.6132.7882.4002.5632.1792.188Canada3.1973.2292.6603.3202.7383.4863.0713.6363.3353.8623.640China6.3909.41313.9988.62813.0867.91710.8867.4759.9056.3898.048Denmark3.2233.4173.4353.4933.6663.2783.3773.4203.4633.645Egypt2.8912.9323.4392.9613.6162.9883.7222.6003.3224.8636.626Germany5.5835.6774.4205.7824.4805.6784.4955.8884.8686.2265.329India3.0982.9072.8622.7182.8092.6662.8592.4492.5612.2662.342Iran2.1091.9162.3291.8792.4091.8002.2201.7884.6005.3144.019Japan6.4616.1537.4576.4295.8876.4935.4595.1245.6873.3222.6633.3992.4495.4595.1245.6875.491 <td< td=""><td>Argentina</td><td>1.496</td><td>1.478</td><td>1.561</td><td>1.413</td><td>1.526</td><td>1.411</td><td>1.536</td><td>1.373</td><td>1.505</td><td>1.331</td><td>1.488</td></td<>	Argentina	1.496	1.478	1.561	1.413	1.526	1.411	1.536	1.373	1.505	1.331	1.488
Austria3.1583.5553.3223.5793.3553.4663.3303.4613.4473.3173.468Brazil2.0922.6612.7752.5652.6912.6132.7882.4402.5632.1792.188Canada3.1973.2292.6603.3202.7383.4863.0713.6363.3353.8623.640China6.3909.41313.9988.6281.7087.97110.8867.4759.9056.898.608Denmark3.2233.4173.4353.4933.4533.3663.2783.3773.4203.4633.645Egypt2.8912.9323.4392.9613.6162.9883.7222.6903.3222.3232.816Gambia2.5551.8731.8551.8181.8671.8352.0111.7661.9411.5541.662Germany5.5835.6774.4205.7824.4805.6784.4955.8884.8686.2265.329India3.0982.9072.8622.7182.8092.6662.8592.4492.5612.2662.342Iran2.1091.9162.3291.8751.8791.8091.8093.7774.2233.3934.5553.777Japan6.4616.1537.4556.2597.896.4937.7866.9878.4908.0301.003Mexico5.3555.1524.3475.06	Australia	3.649	3.779	3.867	3.785	3.879	3.901	4.044	3.889	4.309	3.952	4.486
Brazil 2.902 2.661 2.775 2.565 2.691 2.613 2.788 2.440 2.563 2.179 2.188 Canada 3.197 3.229 2.660 3.20 2.78 3.486 3.071 3.636 3.335 3.862 3.640 China 6.390 9.413 13.998 8.628 13.086 7.917 10.886 7.475 9.905 6.389 8.048 Denmark 3.223 3.417 3.435 3.493 3.366 3.278 3.377 3.420 3.463 3.645 Egypt 2.891 2.932 3.439 2.961 3.616 2.988 3.722 2.690 3.322 2.323 2.816 Gambia 2.565 1.873 1.855 1.818 1.867 1.835 2.001 1.766 1.941 1.554 6.626 Garmany 5.583 5.677 4.420 5.782 4.480 5.678 4.495 5.888 4.868 6.226 5.329 India 3.098 2.907 2.862 2.718 2.409 1.662	Austria	3.158	3.555	3.322	3.579	3.355	3.466	3.330	3.461	3.447	3.317	3.468
Canada3.1973.2292.6603.3202.7383.4863.0713.6363.3353.8623.640China6.3909.41313.9988.62813.0867.17710.8867.4759.9056.3898.648Denmark3.2233.4173.4353.4933.4533.3663.2783.3773.4203.643Egypt2.8912.9323.4392.9613.6162.9883.7222.6903.3222.3232.816France4.2253.6032.6733.7872.8333.7892.9584.2123.6624.0153.355Gambia2.5561.8731.8551.8181.8671.8352.0011.7661.9411.5541.662Germany5.5835.6774.4205.7824.4805.6784.4955.8884.8686.2265.329Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.712.109Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.4616.1537.4556.2597.8896.4937.7456.9878.4005.3144.971Nexico5.3555.1524.3475.2064.3915.1714.485.0444.6005.3144.971Japan6.4616.1537.4556.2567.5495.44<	Brazil	2.902	2.661	2.775	2.565	2.691	2.613	2.788	2.440	2.563	2.179	2.188
China6.3909.41313.9988.62813.0867.91710.8867.4759.9056.3898.048Denmark3.2233.4173.4353.4933.4533.3663.2783.3773.4203.4633.645Egypt2.8912.9323.4392.9613.6162.9883.7222.6903.3222.3232.816France4.2253.6032.6733.7872.8333.7892.9584.2123.6624.0153.355Gambia2.5561.8731.8551.8181.8671.8352.0011.7661.9411.5541.662Germany5.5835.6774.4205.7824.4805.6784.4955.8884.8686.2265.329India3.0982.9072.8622.7182.8092.6662.8592.4492.5612.2662.342Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.7152.019Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.4616.1537.4556.2955.4994.9835.4595.1244.6675.557Russia2.7052.6453.3322.6633.3692.9383.9842.4533.2422.0532.401Singapore4.1824.8985.8094.5895.447	Canada	3.197	3.229	2.660	3.320	2.738	3.486	3.071	3.636	3.335	3.862	3.640
Denmark3.2233.4173.4353.4933.4533.3663.2783.3773.4203.4633.465Egypt2.8912.9323.4392.9613.6162.9883.7222.6903.3222.3232.816France4.2253.6032.6733.7872.8333.7892.9584.2123.6624.0153.355Gambia2.5561.8731.8551.8181.8671.8352.0011.7661.9411.5541.662Germany5.5835.774.205.7224.4805.6784.4955.8884.8686.2265.329India3.0982.9072.8622.7182.8092.6662.8592.4492.5612.2662.342Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.7152.019Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.4616.1537.4556.2597.8896.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.4595.4933.2422.0532.401Singapore1.4232.6633.369 <t< td=""><td>China</td><td>6.390</td><td>9.413</td><td>13.998</td><td>8.628</td><td>13.086</td><td>7.917</td><td>10.886</td><td>7.475</td><td>9.905</td><td>6.389</td><td>8.048</td></t<>	China	6.390	9.413	13.998	8.628	13.086	7.917	10.886	7.475	9.905	6.389	8.048
Egypt2.8912.9323.4392.9613.6162.9883.7222.6903.3222.3232.816France4.2253.6032.6733.7872.8333.7892.9584.2123.6624.0153.355Gambia2.5561.8731.8551.8181.8671.8352.0011.7661.9411.5541.662Germany5.5835.6774.4205.7824.4805.6784.4955.8884.8686.2265.329India3.0982.9072.8622.7182.8092.6662.8592.4492.5612.2662.342Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.7152.019Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.4616.1537.4556.2597.8896.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.8775.4933.9842.4353.2422.0532.401Saudi Arabia2.0951.4232.5631.4702.7021.3372.3620.8500.7790.8350.819Singapore4.1824.8985.8094.58<	Denmark	3.223	3.417	3.435	3.493	3.453	3.366	3.278	3.377	3.420	3.463	3.645
France4.2253.6032.6733.7872.8333.7892.9584.2123.6624.0153.355Gambia2.5561.8731.8551.8181.8671.8352.0011.7661.9411.5541.662Germany5.5835.6774.4205.7824.4805.6784.4955.8884.8686.2265.329India3.0982.9072.8622.7182.8092.6662.8592.492.5612.2662.342Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.7152.019Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.377Japan6.4616.1537.4556.2597.8896.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.4595.1245.6875.557Russia2.7052.6453.3322.6633.6692.9383.9842.4353.2422.0632.013Singapore4.1824.8885.8094.5895.4474.6025.4554.6935.6494.6935.6494.6035.519Switzerland2.6542.857<	Egypt	2.891	2.932	3.439	2.961	3.616	2.988	3.722	2.690	3.322	2.323	2.816
Gambia2.5561.8731.8551.8181.8671.8352.0011.7661.9411.5541.662Germany5.5835.6774.4205.7824.4805.6784.4955.8884.8686.2265.329India3.0982.9072.8622.7182.8092.6662.8592.4492.5612.2662.342Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.7152.019Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.4616.1537.4556.2597.8896.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.4595.1245.6875.557Russia2.7052.6453.3322.6633.692.9383.9842.4353.2422.0332.011Singapore4.1824.8885.8094.5855.4474.6025.4554.6935.6494.5035.519Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5560.571 <td>France</td> <td>4.225</td> <td>3.603</td> <td>2.673</td> <td>3.787</td> <td>2.833</td> <td>3.789</td> <td>2.958</td> <td>4.212</td> <td>3.662</td> <td>4.015</td> <td>3.355</td>	France	4.225	3.603	2.673	3.787	2.833	3.789	2.958	4.212	3.662	4.015	3.355
Germany5.5835.6774.4205.7824.4805.6784.4955.8884.8686.2265.329India3.0982.9072.8622.7182.8092.6662.8592.4492.5612.2662.342Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.7152.019Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.6136.1537.4556.2957.886.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.4595.1245.6875.557Russia2.7052.6453.3322.6633.3692.9383.9842.4353.2422.0532.401Singapore4.1824.8985.8094.585.4774.6025.4554.6935.6494.5035.519Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5450.5710.5410.5910.5040.5270.5443.7144.4293.554United Kingdom4.2254.0713	Gambia	2.556	1.873	1.855	1.818	1.867	1.835	2.001	1.766	1.941	1.554	1.662
India3.0982.9072.8622.7182.8092.6662.8592.4492.5612.2662.342Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.7152.019Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.4616.1537.4556.2597.8896.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.064.315.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.4595.1245.6875.557Russia2.7052.6453.3322.6633.3692.9383.9842.4353.2422.0532.401Singapore4.1824.8885.8094.5835.4474.6025.4554.6935.6494.5035.519Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5450.5710.5410.5710.5410.5910.5040.527United Kingdom4.2254.0713.2384.2973.3484.6623.9024.5843.7144.4293.554United States1.8381.8361.606111.620 </td <td>Germany</td> <td>5.583</td> <td>5.677</td> <td>4.420</td> <td>5.782</td> <td>4.480</td> <td>5.678</td> <td>4.495</td> <td>5.888</td> <td>4.868</td> <td>6.226</td> <td>5.329</td>	Germany	5.583	5.677	4.420	5.782	4.480	5.678	4.495	5.888	4.868	6.226	5.329
Iran2.1091.9162.3291.8792.4091.8002.2201.7882.1821.7152.019Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.4616.1537.4556.2597.8896.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.2422.6635.557Russia2.7052.6453.3322.6633.3692.9383.9842.4353.2422.0532.401Saudi Arabia2.0951.4232.5631.4702.7021.3372.3620.8500.7790.8350.819Singapore4.1824.8985.8094.5895.4474.6025.4554.6935.6494.5035.519Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5450.5560.5710.5400.5710.5410.5910.5040.527United Kingdom4.2254.0713.2384.2973.3484.6623.9024.5843.7144.4293.554United States1.58311.58311.6061<	India	3.098	2.907	2.862	2.718	2.809	2.666	2.859	2,449	2.561	2.266	2,342
Italy4.1744.1053.2004.3643.4594.0893.1774.2233.3934.5553.777Japan6.4616.1537.4556.2597.8896.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.4595.1245.6875.557Russia2.7052.6453.3322.6633.3692.9383.9842.4353.2422.0532.401Saudi Arabia2.0951.4232.5631.4702.7021.3372.3620.8500.7790.8350.819Singapore4.1824.8985.8094.5895.4474.6025.4554.6935.6494.5035.519Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5450.5560.5710.5400.5710.5410.5910.5040.527United Kingdom4.2254.0713.2384.2973.3484.6623.9024.5843.7144.4293.554United States17.39815.83111.5616.06111.62016.98713.23817.81614.43818.98815.93	Iran	2,109	1,916	2.329	1.879	2,409	1.800	2,220	1.788	2,182	1.715	2.019
Japan6.4616.1537.4556.2597.8896.4937.7866.9878.4908.03010.003Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.4595.1245.6875.557Russia2.7052.6453.3322.6633.3692.9383.9842.4353.2422.0532.401Saudi Arabia2.0951.4232.5631.4702.7021.3372.3620.8500.7790.8350.819Singapore4.1824.8985.8094.5895.4474.6025.4554.6935.6494.5035.519Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5450.5560.5710.5400.5710.5410.5910.5040.527United Kingdom4.2254.0713.2384.2973.3484.6623.9024.5843.7144.4293.554United States17.39815.83111.5616.06111.62016.98713.23817.81614.43818.98815.703	Italy	4,174	4.105	3.200	4.364	3.459	4.089	3.177	4,223	3.393	4.555	3.777
Mexico5.3555.1524.3475.2064.3915.1714.4485.2044.6005.3144.971Netherlands5.2645.8765.4826.0225.5875.4494.9535.4595.1245.6875.557Russia2.7052.6453.3322.6633.3692.9383.9842.4353.2422.0532.401Saudi Arabia2.0951.4232.5631.4702.7021.3372.3620.8500.7790.8350.819Singapore4.1824.8985.8094.5895.4474.6025.4554.6935.6494.5035.513Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5450.5560.5710.5400.5710.5410.5910.5040.527United Kingdom4.2254.0713.2384.2973.3484.6623.9024.5843.7144.4293.554United States17.39815.83111.5516.06111.62016.98713.23817.81614.43818.98815.703	lanan	6 461	6 153	7 455	6 259	7 889	6 493	7 786	6 987	8 490	8 030	10 003
Metherlands5.2645.8765.4826.0225.8775.4494.9535.4511.0601.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0501.0511.0511.0501.051 <td>Mexico</td> <td>5 355</td> <td>5 152</td> <td>4 347</td> <td>5 206</td> <td>4 391</td> <td>5 171</td> <td>4 448</td> <td>5 204</td> <td>4 600</td> <td>5 314</td> <td>4 971</td>	Mexico	5 355	5 152	4 347	5 206	4 391	5 171	4 448	5 204	4 600	5 314	4 971
Netricitation3.4243.6043.4243.6343.4243.6343.4243.634Russia2.0952.6453.3322.6633.3692.9383.9842.4353.2422.0532.401Saudi Arabia2.0951.4232.5631.4702.7021.3372.3620.8500.7790.8350.819Singapore4.1824.8985.8094.5895.4474.6025.4554.6935.6494.5035.519Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5450.5560.5710.5400.5710.5410.5910.5040.527United Kingdom4.2254.0713.2384.2973.3484.6623.9024.5843.7144.4293.554United States17.39815.83111.55616.06111.62016.98713.23817.81614.43818.98815.703	Netherlands	5 264	5.876	5 482	6.022	5 587	5 449	4 953	5 459	5 124	5 687	5 557
Nation2.105 <th< td=""><td>Russia</td><td>2 705</td><td>2 645</td><td>2 222</td><td>2 662</td><td>3 360</td><td>2 938</td><td>2 084</td><td>2 435</td><td>3 747</td><td>2 052</td><td>2 401</td></th<>	Russia	2 705	2 645	2 222	2 662	3 360	2 938	2 084	2 435	3 747	2 052	2 401
Singapore4.1824.8985.8094.5895.4474.6025.4556.6935.6494.5035.519Switzerland2.6542.8573.2772.7852.8742.8172.9392.7632.9612.5132.683Togo1.0050.5480.5450.5560.5710.5400.5710.5410.5910.5040.527United Kingdom4.2254.0713.2384.2973.3484.6623.9024.5843.7144.4293.554United States17.39815.83111.55616.06111.62016.98713.23817.81614.43818.98815.703	Saudi Arabia	2.705	1 472	2 562	1 470	2 702	1 227	2 367	0 850	0 779	0.835	0 810
Singpore 4.02 4.03 5.035 4.03 5.049 4.03 5.144 Switzerland 2.654 2.857 3.277 2.785 2.874 2.817 2.939 2.763 2.961 2.513 2.683 Togo 1.005 0.548 0.545 0.556 0.571 0.540 0.571 0.591 0.504 0.527 United Kingdom 4.225 4.071 3.238 4.297 3.348 4.662 3.902 4.584 3.714 4.429 3.554 United States 17.398 15.831 11.556 16.061 11.620 16.987 13.238 17.816 14.438 18.988 15.703	Singanore	4 197	1.423	5 800	4 520	5 447	4 602	5 455	4 603	5.649	4 502	5 510
Sinternation Z.054 Z.057 Z.175 Z.054 Z.057 Z.165 Z.057 Z.165	Switzerland	2 654	2 857	3 277	2 725	2 87/	2 817	2 920	2 762	2 961	2 512	2 683
Vision 4.225 4.071 3.238 4.297 3.348 4.662 3.902 4.584 3.714 4.429 3.554 United Kingdom 4.225 4.071 3.238 4.297 3.348 4.662 3.902 4.584 3.714 4.429 3.554 United States 17.398 15.831 11.556 16.061 11.620 16.987 13.238 17.816 14.438 18.988 15.703	Togo	1 005	2.037	0.5/5	0.556	0 571	0.540	0 571	0.541	0 501	0.504	2.005
United Kingdom 4.223 4.071 5.256 4.027 5.346 4.002 5.302 4.364 5.714 4.429 5.354 United States 17.398 15.831 11.556 16.061 11.620 16.987 13.238 17.816 14.438 18.988 15.703	Linited Kingdom	1.005	4 071	2 720	4 207	3 3/10	1 667	3 003	1 501	3 714	1 120	3 554
	United States	17 399	15 821	11 556	16.061	11 620	16 927	13 232	17 816	14 439	18 999	15 702
		1.550	15.051	11.555	10.001	11.020	10.507	10.200	17.010	11.430	10.500	13.703

Table 11- Quota shares of country groupings and constituencies, 2005 and 2007-2010

VI. Additional consideration

The IMF report on the outcome of the quota review formula indicates that there is a considerable support for dropping variability from the formula (IMF, 2013a). This is based on the difficulties of identifying a superior variability measure and the little empirical evidence of a relationship between variability and actual demand for Fund resources⁴.

⁴ Seeking a relationship between variability and actual demand for Fund resources is arguable since variability is intended to reflect potential demand for Fund resources.

In order to assess the impact of removing one or more variables, we apply the PCAp to remaining variable sets. Table 12 shows that dropping variability or openness or both variables does not change the conclusion that the first principal component could serve as an indicator of economic size. In particular, the proportion of variances explained by the first PC is even higher when dropping either VAR or OPEN or both. This outcome indicates that the inclusion of either variable is not adding information on the first component. However, it increases the correlation of the first component with GDP.

		-		PCA formula			
	Actual	Fund formula	No variable dropped	OPEN dropped	VAR dropped	OPEN and VAR dropped	
Proportion of variance explai	ned bv PC						
PC1			0.746	0.748	0.761	0.793	
PC2			0.235	0.243	0.222	0.207	
Weights of variables							
GDP		0.500	0.276	0.331	0.322	0.383	
OPEN		0.300	0.201		0.232		
VAR		0.150	0.190	0.221			
RES		0.050	0.333	0.448	0.446	0.617	
Quota shares, in percent							
AEs	57.637	54.717	45.706	41.304	42.290	35.938	
EMDC Africa	4.438	3.382	3.781	3.974	3.657	3.882	
EMDC Asia	16.046	20.643	26.880	29.760	30.429	34.853	
EMDC Europe	7.225	7.632	8.496	8.724	8.242	8.509	
EMDC Middle East	6.742	6.370	7.934	8.580	8.024	8.885	
EMDC Western Hemisphere	7.907	7.257	7.202	7.658	7.359	7.933	
PRGT	3.995	2.775	2.699	2.707	2.506	2.476	
PCDR	3.063	1.949	1.839	1.840	1.692	1.660	

Table 12 – Impact of dropping variables from the quota formula, 2011

NATESI rankings would change in the top 20 countries, as shown in Table 13. EMDCs will have better rankings and represent half of the top 10 countries. Distributions of quota shares would reflect these developments. In particular, the quota shares of advanced countries would decline.

	No variable	OPEN	VAR	OPEN and VAR
	dropped	dropped	dropped	dropped
China	1	1	1	1
United States	2	2	2	3
Japan	3	3	3	2
Germany	4	6	4	9
Russia	5	4	5	4
United Kingdom	6	9	9	11
India	7	8	6	7
Saudi Arabia	8	5	8	5
France	9	11	10	12
Brazil	10	7	7	6
Korea	11	10	11	8
Italy	12	12	12	15
Singapore	13	13	14	13
Canada	14	16	15	17
Switzerland	15	14	13	10
Netherlands	16	19	19	29
Spain	17	18	17	22
Mexico	18	15	16	14
Thailand	19	17	18	16
Australia	20	22	21	25

Table 13 - NATESI Rankings with and without OPEN and VAR, 2011

VII. Conclusion

The paper updated the indicator of economic size and reviewed the PCA quota formulas under the principal components approach to quota formulation at the Fund. Using the most available datasets related to the IMF quota formula, the paper concludes that advanced economies are steadily losing relative economic size in favor of emerging markets and developing countries between 2005 and 2011. China is taking over from the United States as the largest economy and is the country experiencing the biggest gain in quota shares. These findings are consistent with recent economic developments of the major economic powers. The removal of one or more variables from the quota formula was also explored. The application of the PCAp shows that this would favor EMDCs in terms of ranking and quota shares.

In light of the robust results of the application of the PCAp, and given that no hypothesis has been formulated in the paper, we continue to believe that this approach is objective in determining relative economic sizes and guiding quota share realignment at the IMF.

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Annex I - The IMF Quota Formula⁵

The current quota formula was agreed in 2008. It includes four variables (GDP, openness, variability, and reserves), expressed in shares of global totals, with the variables assigned weights totaling to 1.0. The formula also includes a compression factor that reduces dispersion in calculated quota shares. The formula is:

$$CQS = (0.5*GDP + 0.3*OPEN + 0.15*VAR + 0.05*RES)^{K}$$

where:

CQS = calculated quota share;

GDP = a blend of GDP converted at market rates and PPP exchange rates averaged over a three-year period. The weights of market-based and PPP GDP are 0.60 and 0.40, respectively;

OPEN = the annual average of the sum of current payments and current receipts (goods, services, income, and transfers) for a five year period;

VAR = variability of current receipts and net capital flows (measured as the standard deviation from a centered three-year trend over a thirteen year period);

RES = twelve month average over one year of official reserves (foreign exchange, SDR holdings, reserve position in the Fund, and monetary gold);

and K = a compression factor of 0.95. The compression factor is applied to the uncompressed calculated quota shares which are then rescaled to sum to 100.

⁵ Adapted from Box 1 in IMF (2011)

Annex II – Stability of top rankings in 2008-2010

Table A shows that both perspectives yield the same top 17 countries in 2008-2010 although with some differences in terms of rankings⁶. It also shows stable subsets of different size within that set of 17 countries, regardless of the temporal perspective employed. One subset is comprised of Mexico, Netherlands, Singapore and Spain on the 14th to the 17th place. Only Mexico seems to exhibit a stable ranking at the 17th place under the forward-looking perspective. Canada firmly holds the 13th place under both perspectives. A third stable subset encompasses Brazil, India, Italy, Korea and Saudi Arabia with India, Korea and Brazil standing consistently at the 8th, 11th and 12th respectively under the forward-looking perspective. France is consistently holding the 7th place over 2008-2010. A fifth subset comprises Russia and United Kingdom for the 5th and 6th places with both perspectives yielding quasi-opposite rankings. Both perspectives definitely put Germany and Japan at the 4th and 3rd places respectively. The last subset comprises China and the United States for the two top spots. China's the top position is evident under the forward-looking approach and strong under the backward approach.

			7 1	. 0,					
Forw	ard-looking	g temporal	perspective	Backward-looking temporal perspective					
	2010		_	_	2010 weights				
2008 weights	2009 weights	2010 weights	Countries	Countries	2010	2009	2008		
1	1	1	China	China	1	1	2		
2	2	2	United States	United States	2	2	1		
3	3	3	Japan	Japan	3	3	3		
4	4	4	Germany	Germany	4	4	4		
6	5	5	Russia	Russia	5	5	5		
5	6	6	United Kingdom	United Kingdom	6	6	6		
7	7	7	France	France	7	7	7		
8	8	8	India	India	8	9	8		
10	9	9	Saudi Arabia	Saudi Arabia	9	8	9		
9	10	10	Italy	Italy	10	10	12		
11	11	11	Brazil	Brazil	11	12	11		
12	12	12	Korea	Korea	12	11	10		
13	13	13	Canada	Canada	13	13	13		
16	14	14	Singapore	Singapore	14	16	14		
14	15	15	Spain	Spain	15	14	16		
15	16	16	Netherlands	Netherlands	16	15	17		
17	17	17	Mexico	Mexico	17	17	15		

Table A – Stability of top rankings, 2008-2010 1/

1/ Countries between two double-lines constitute a stable set of countries using both perspectives. Countries between a thick line and a double-line or another thick line constitute a stable group of countries of countries under the related perspective.

⁶ Here, the top 17 rankings are the same in all three years.

Rank	Country	2011	2010	2009	2008	2007	2005	Rank	Country	2011	2010	2009	2008	2007	2005
1	United States	2	2	2	1	1	1	95	Costa Rica	93	90	88	113	89	82
2	Japan	3	3	3	3	3	2	96	Uganda	109	105	101	94	95	113
3	China	1	1	1	2	2	3	97	Jordan	/9	79	79	81	/8	78
4	Germany	4	4	4	4	4	4	98	Latvia	85	81	84	/9	85	95
2	France United Kingdom	9	6	6	, c	5	5	100	Sopogal	99	105	104	107	107	104
7	Italy	12	10	10	12	9	8	100	Iceland	68	77	81	71	88	109
8	India	7	8	9	8	10	11	102	Cyprus	112	110	96	66	90	83
9	Russia	5	5	5	5	7	9	102	Brunei	114	112	111	108	91	108
10	Brazil	10	11	12	11	11	14	104	Ethiopia	102	100	107	109	108	101
11	Canada	14	13	13	13	12	10	105	El Salvador	108	99	99	101	100	90
12	Saudi Arabia	8	9	8	10	29	29	106	Cameroon	107	107	100	97	96	92
13	Spain	17	15	14	14	13	13	107	Bosnia & Herzegovina	106	97	95	96	97	91
14	Mexico	18	17	17	15	14	12	108	Papua New Guinea	120	123	119	115	116	123
15	Netherlands	16	16	15	17	16	15	109	Nicaragua	129	130	131	129	126	124
16	Korea	11	12	11	9	8	7	110	Liberia	142	143	141	142	155	153
17	Australia	20	20	18	18	18	20	111	Honduras	111	108	103	102	101	103
18	Belgium	23	21	19	21	20	17	112	South Sudan	105	109	188	188	187	187
19	Switzerland	15	18	20	19	17	18	113	Madagascar	134	126	122	130	130	128
20	Turkey	21	22	22	20	19	22	114	Estonia	100	88	87	92	93	96
21	Indonesia	22	25	28	2/	25	28	115	Bolivia	90	92	92	98	105	111
22	Boland	20	24	24	29	2/	20	110	Mozambiguo	124	124	121	110	121	122
23	Austria	24	23	23	24	24	27	117	Gabon	119	117	121	110	115	122
25	Singanore	13	14	16	16	15	16	110	Guinea	145	156	134	151	150	143
26	Norway	28	28	30	28	26	25	120	Georgia	121	121	124	126	127	127
27	Venezuela	48	45	44	39	41	40	121	Sierra Leone	160	160	158	159	159	160
28	Malaysia	25	26	26	23	22	21	122	Paraguay	104	102	106	106	110	102
29	Iran	30	31	32	31	31	33	123	Botswana	96	94	89	90	84	84
30	Ireland	31	30	27	22	21	19	124	Namibia	132	132	132	133	135	130
31	Denmark	29	29	29	37	28	24	125	Mali	128	127	123	114	113	129
32	Thailand	19	19	21	25	23	23	126	Bahamas, The	136	136	137	134	131	125
33	Argentina	34	34	34	34	34	32	127	Guyana	159	157	156	158	158	157
34	South Africa	38	40	41	36	36	37	128	Kyrgyz Republic	133	134	135	136	138	139
35	Nigeria	44	42	40	35	35	45	129	Cambodia	117	113	113	120	124	120
36	Greece	52	49	46	40	38	36	130	Tajikistan	140	138	144	138	144	142
37	Finland	47	46	45	43	43	39	131	Moldova	127	128	128	132	133	131
38	United Arab Emirates	33	33	31	26	33	43	132	Malta	125	125	126	121	109	99
39	Czech Republic	40	37	35	99	37	34	133	Haiti	138	139	142	145	143	136
40	Portugal	54	52	51	53	50	44	134	Somalia	185	185	184	184	183	181
41	Coloribla	50	51	52	52	52	52	135	Coligo	101	101	102	123	112	1/1
42	Equat	41	44	47	41	40	41	130	Equatorial Guinea	131	140	133	133	132	145
45	Pakistan	59	57	58	57	53	50	138	Nenal	119	118	114	117	122	114
45	Ukraine	42	41	43	42	44	49	130	Burundi	162	159	162	170	170	168
46	Algeria	27	27	25	30	32	35	140	Togo	154	153	154	154	151	150
47	Hungary	39	39	38	48	47	42	141	Mauritius	113	122	125	127	125	116
48	Kuwait	55	55	54	55	54	54	142	Macedonia	123	120	118	122	119	119
49	Israel	35	35	37	44	42	38	143	Chad	130	129	127	119	118	115
50	Romania	43	43	42	47	48	51	144	Albania	122	119	116	125	120	118
51	Chile	46	48	49	50	51	47	145	Malawi	155	154	130	116	117	155
52	Iraq	45	50	50	49	59	53	146	Niger	148	147	147	149	145	148
53	Libya	36	38	36	38	39	48	147	Suriname	150	152	152	152	148	151
54	Peru	53	54	55	56	56	55	148	Armenia	131	131	129	131	132	133
55	Luxembourg	37	36	39	45	46	31	149	Mauritania	147	150	150	155	153	158
56	New Zealand	60	61	60	59	60	56	150	Benin	135	135	133	128	128	140
5/	Viotaam	51	55	55	51	49	50	151	Control African Ron	157	157	159	157	150	154
50	Svrian Arab Republic	50	50	50	53	70	71	152	Lao P D R	144	146	1/0	146	105	102
60	Bangladesh	67	67	68	70	71	69	155	Fili	156	155	155	150	154	140
61	DRCongo	81	116	115	84	129	126	155	Barbados	149	145	145	144	140	135
62	Slovak Republic	62	62	62	58	57	57	156	Kosovo	141	140	138	139	141	138
63	Zambia	115	115	117	111	114	112	157	Swaziland	146	141	140	135	137	132
64	Bulgaria	65	65	64	64	66	64	158	Mongolia	126	133	136	140	139	144
65	Morocco	63	63	61	62	61	58	159	Lesotho	153	149	148	148	147	147
66	Angola	57	58	57	60	63	67	160	Gambia, The	172	172	170	172	171	173
67	Ghana	91	96	110	105	104	98	161	Montenegro	143	144	143	141	134	152
68	Qatar	58	59	63	65	62	68	162	SanMarino	152	151	146	147	149	141
69	Croatia	66	66	66	103	64	62	163	Eritrea	168	169	164	157	156	154
70	Zimbabwe	139	142	151	143	142	137	164	Djibouti	169	168	168	32	169	166
/1	Ecuador	76	73	73	69	67	63	165	Guinea-Bissau	163	161	1/2	1/3	1//	167
72	Belarus	70	59	70	/3	72	75	166	Belize	167	166	160	163	162	161
73	Côte d'Ivoire	103	106	105	99	102	74 07	167	Vanuatu	157	102	157	150	101	150
75	Lebanon	61	60	59	61	58	61	169	Cane Verde	165	164	159	162	160	165
76	Sudan	89	89	93	93	98	89	170	Sevenelles	164	165	165	164	163	163
77	Slovenia	77	74	74	75	74	66	171	St. Lucia	173	173	167	168	168	169
78	SriLanka	82	85	90	87	87	81	172	Maldives	158	163	161	165	164	164
79	Uzbekistan	74	76	76	82	86	87	173	Solomon Islands	170	174	178	178	174	177
80	Tunisia	75	72	71	74	73	72	174	Bhutan	161	158	171	160	157	159
81	Oman	69	68	67	68	69	70	175	Antigua and Barbuda	174	170	166	168	167	171
82	Kenya	97	93	94	91	92	93	176	Comoros	180	180	180	177	180	182
83	Myanmar	94	95	97	100	106	105	177	Grenada	178	176	176	175	173	172
84	Yemen	88	83	78	72	68	65	178	Samoa	177	175	174	167	176	175
85	Dominican Republic	86	87	86	181	79	79	179	São Tomé and Príncipe	182	181	179	180	184	186
86	I rinidad and Tobago	84	82	80	86	83	86	180	Longa	181	183	182	183	181	183
87	Linnauja	/1	70	72	/6	/5	76	181	St. NITTS and Nevis	176	178	173	179	178	180
88	Guatemala	80	84	82	80	80	80	182	Dominica	100	107	1/5	1/0	170	170
09 00	Tanzania	87	80 104	100	65 110	111	107	103	Kirihati	171	171	160	171	1/9	170
90	Bahrain	83	204	205	77	76	73	104	Micronesia	184	184	183	187	181	178
92	Azerbaijan	78	78	77	83	94	100	185	Marshall Islands	187	187	186	186	186	185
93	Jamaica	110	111	108	104	103	94	187	Palau	186	186	185	185	185	184
94	Panama	92	91	91	89	82	88	188	Tuvalu	188	188	187	187	187	187

Annex Table - NATESI Rankings, 2005 and 2007-2011