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FIFTEENTH GENERAL REVIEW OF QUOTAS—FURTHER CONSIDERATIONS—ANNEXES

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Annex I. Additional Information on Global Economic and Financial Metrics and Related Resource Adequacy Indicators

1. Compared with the [2017 Paper](#) on resource adequacy, the updated metrics-based analysis considers also a new reference level for assessing Fund resource needs.¹ As requested by a few Directors, in addition to the simple average of previous quota ratios to economic indicators used as reference levels in the 2017 paper, staff assessed the impact of a weighted average of these ratios, giving greater weight to recent quota increases.² The reference period is 2015-19 considering the 2019 deadline for completion of the 15th Review. Results are based on data from the October 2017 WEO database.³ For this paper, the complementary analysis of quota resources needed to restore Fund resources is based on quotas and the NAB only. This responds to many Directors' remarks not to pre-suppose future discussions on the possible renewal of the BBAs.

2. In general, substantial increases in quotas would be required to restore ratios in line with the two reference levels. (Tables 1, 2a and 2b, Figure 1):

- **GDP.** The ratio of quotas to global GDP, a key indicator used in previous general quota reviews, is projected to decline by 2019 to close to the 13th Review levels (before the GFC). Restoring this ratio to the two reference levels—one based on the traditional simple average and the other based on the weighted average—in the period 2015-19 would require a quota increase of about 50 percent (Table 1, upper panel). A doubling of quotas would be required if instead of global GDP, the EMDCs' GDP is used in the analysis. Higher quota increases of about 80-100 percent would also be needed to restore the larger resource envelope of current quota plus NAB resources to global GDP (Table 1, lower panel).⁴
- **Trade and capital flows.** The decline in Fund quotas relative to global current payments and capital inflows to EMDCs is much steeper than relative to GDP, as past quota increases have not restored these ratios to reference levels. Restoring quotas to these indicators is relevant as an economy's potential financing needs are not captured by GDP alone, especially given higher economic and financial interconnectedness and financial deepening. Quota increases of about 75-135 percent are required to restore quotas relative to these indicators, depending on the

¹ The use of an outdated WEO BPM6 database generated errors in some of the traditional metrics analysis presented in the Adequacy of Fund Resources papers issued in March 2016 and August 2017. The corrected data do not affect the GDP-based metrics but lower the other measures, without altering the earlier papers' overall conclusions.

² Specifically, the paper uses a weighted average of the ratios at the time of the last four general quota reviews with quota increases (8th, 9th, 11th, and 14th Reviews). Weights are increasing over time, calculated as the inverse of the number of years since the quota review took place (normalized).

³ The numbers for August 2017 were revised with data from the April 2017 WEO to correct data errors for external variables generated by the use of the WEO BPM6 database.

⁴ The weighted average of reference ratios is higher than their simple average used in the 2017 paper as the 14th Review restored quotas relative to global GDP to 1.3 percent, slightly above the 1.2 percent in previous quota reviews.

reference level used (Table 1, upper panel).⁵ Higher quota increases between about 115-175 percent are needed to restore quota and NAB resources relative to these external variables (Table 1, lower panel).

- **Past borrowers' external financing needs (EFN).** Restoring quotas relative to projected EFN require much steeper quota increases than suggested by GDP. A more than doubling of quotas is required to restore the ratio of quotas-to-EFN under the most conservative reference level (Table 1, upper panel). Almost a trebling of quotas would be needed to restore quota and NAB resources relative to EFN (Table 1, lower panel).

Table 1. Quota Increases Required to Restore Fund Resources^{1/}

(Reference Period 2015-19)

A. Quota Increase Required to Restore Quotas Relative to Economic Indicators

Reference Ratios	Additional quotas required (in SDR billion)			Percent increase from current quotas		
	Revised Aug-17	Dec-17	Dec-17	Revised Aug-17	Dec-17	Dec-17
	Simple Avg. 2/	Simple Avg. 2/	Weighted Avg. 3/	Simple Avg. 2/	Simple Avg. 2/	Weighted Avg. 3/
GDP	222	229	251	47	48	53
Current Payments 4/	551	569	436	116	119	91
Capital Inflows to EMDCs 4/	635	640	355	133	134	74
EFN 4/	636	696	596	133	146	125
Average	511	533	410	107	112	86
Memorandum Items:						
GDP EMDCs		814	775		171	162
GDP EMDCs Excl. China		442	447		93	94

B. Quota Increase Required to Restore Quota and NAB Relative to Economic Indicators

Reference Ratios	Additional quotas required (in SDR billion)		Percent increase from current quotas	
	Dec-17	Dec-17	Dec-17	Dec-17
	Simple Avg. 2/	Weighted Avg. 3/	Simple Avg. 2/	Weighted Avg. 3/
GDP	388	462	81	97
Current Payments	784	673	164	141
Capital Inflows to EMDCs	846	545	177	114
EFN	985	901	206	189
Average	751	645	157	135

Source: IMF and WEO published databases (April 2017 and October 2017).

1/ Quotas needed to restore quota ratios to the reference ratios in upper panel. The lower panel presents quotas needed to maintain the envelope of quotas and NAB resources to the reference ratios. **Figures in the lower panel are not comparable with the 2017 paper as the resource envelope now excludes BBAs.**

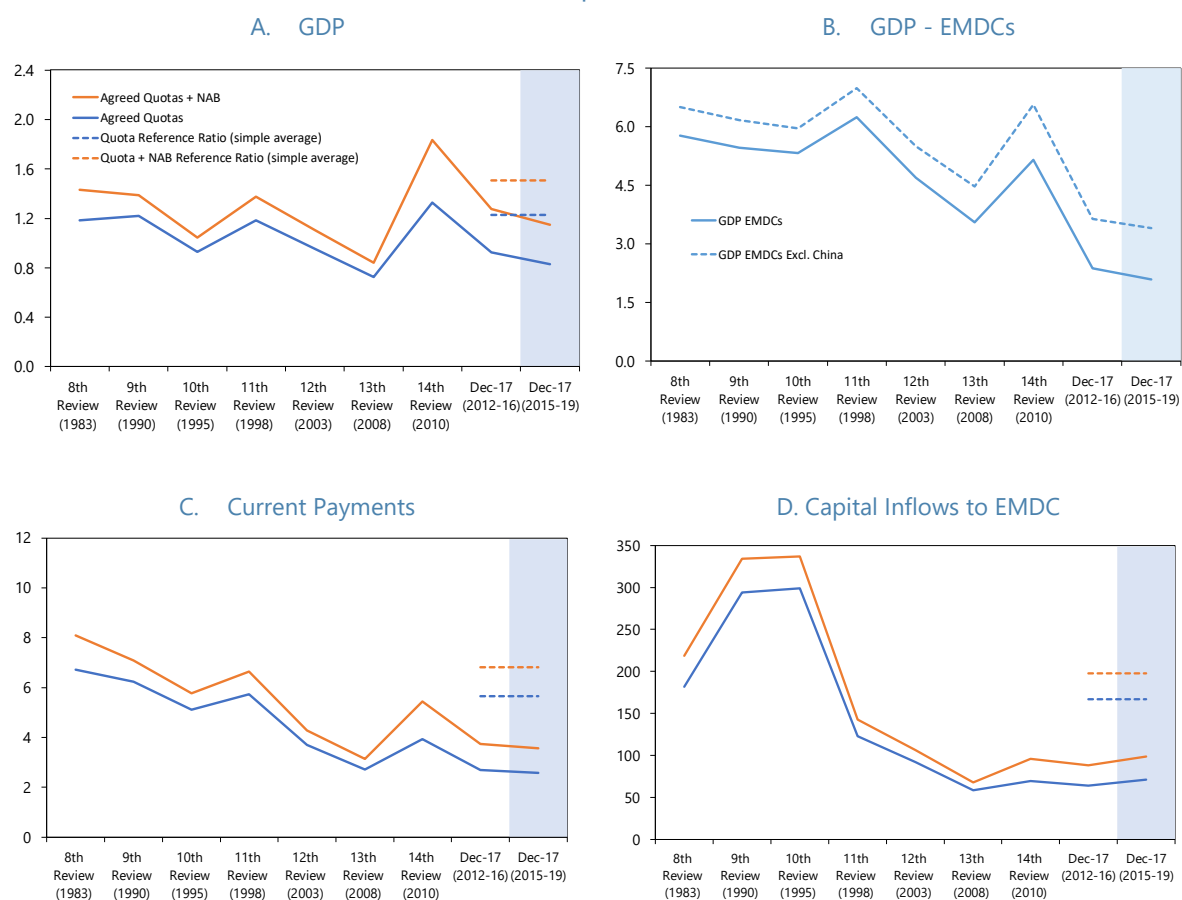
2/ Traditional reference ratio used in the 2017 paper, which is the simple average of ratios at the last general quota reviews with quota increases (8th, 9th, 11th and 14th Reviews).

3/ Weighted average of the 8th, 9th, 11th and 14th review ratios, with weights determined as the inverse of the number of years since the review (normalized). Thus, it gives larger weights to more recent reviews (weights of 0.11, 0.14, 0.20, and 0.55, respectively).

4/ Figures for August 2017 and December 2017 are based on April 2017 and October 2017 WEO published databases, respectively.

⁵ The weighted average of ratios to current payments and capital inflows to EMDCs are lower than the simple average ratios used in the 2017 paper, given that the rapid increase in these variables over the last two decades has reduced the most recent ratios sharply. Thus, quota increases needed to restore quotas to these ratios are lower.

Figure 1. Fund Resources Relative to Economic Indicators^{1/ 2/}
(In percent)



Source: WEO database and IMF staff calculations.

1/ The reference ratios for quotas and for quotas and the NAB are the simple average ratios at the last four General Reviews with quota increase (8th, 9th, 11th and 14th).

2/ Fund resources are defined as quotas and NAB only, and thus exclude the BBAs, unlike in the 2017 paper.

Table 2a. Size of Quotas and Economic Indicators
(In billions of SDRs unless otherwise indicated)

	Eighth Review 1983 1/	Ninth Review 1990 1/	Tenth Review 1995 1/	Eleventh Review 1998 1/	Twelfth Review 2003 1/	Thirteenth Review 2008 1/	Fourteenth Review 2010 1/	Current Revised Aug-17*	Current Dec-17	Projected Revised Aug-17*	Projected Dec-17
Size of Quota Increase, in Percent	47.5	50.0	0.0	45.0	0.0	0.0	100.0	n.a.	n.a.	n.a.	n.a.
1 Agreed Quotas 2/ 3/	90.0	135.2	146.1	212.0	213.7	217.6	477.0	477.0	477.0	477.0	477.0
2. Economic indicators and applicable data periods	<u>1976-80</u>	<u>1981-85</u>	<u>1986-90</u>	<u>1990-94</u>	<u>1995-99</u>	<u>2001-05</u>	<u>2004-08</u>	<u>2012-16</u>	<u>2012-16</u>	<u>2015-2019</u>	<u>2015-2019</u>
a. GDP	7,588	11,083	15,744	17,884	22,442	29,912	35,906	51,554	51,612	56,478	57,419
b. Current payments 4/	1,341	2,168	2,852	3,700	5,785	8,026	12,112	17,653	17,670	18,181	18,498
c. Capital inflows to EMDCs 5/	50	46	49	173	233	373	689	757	748	666	669
d. EFN 6/			200	269	450	552	963	2,074	2,123	1,734	1,828
3. Ratio of Quota resources to economic indicators (in percent)											
a. GDP	1.2	1.2	0.9	1.2	1.0	0.7	1.3	0.9	0.9	0.8	0.8
b. Current payments 4/	6.7	6.2	5.1	5.7	3.7	2.7	3.9	2.7	2.7	2.6	2.6
c. Capital inflows to EMDCs 5/	181.4	293.9	299.0	122.9	91.8	58.4	69.3	63.0	63.8	71.6	71.3
d. EFN 6/	n.a.	n.a.	73.1	78.8	47.5	39.4	49.5	23.0	22.5	27.5	26.1
4. Additional Quota resources needed to restore relative size of Fund at the time of past quota increases (in billions of SDR)											
<i>Based on data through 2016</i>											
a. GDP	135	153	2	135	14	-	209	1	-	-	-
b. Current payments 4/	709	625	428	536	176	2	219	0	-	-	-
c. Capital inflows to EMDCs 5/	879	1,720	1,759	442	209	-	41	-	-	-	-
d. EFN 6/	n.a.	n.a.	1,074	1,197	531	360	575	11	-	-	-

Source: Finance Department.

1/ Year in which the quota review was completed, i.e., when the Board of Governors' Resolution on quota increases was approved. The 10th Review did not provide for an increase in quotas, and the increase in actual quotas relative to the 9th Review is due to the increase in the number of members.

2/ Column for 12th Review includes China's ad hoc quota increase of SDR 1.682 billion in 2002.

3/ Column for 13th Review includes ad hoc quota increases for China, Mexico, Korea, and Turkey of SDR 3.809 billion in 2006.

4/ Defined as the average of the sum of payments on goods, services, income and current transfers. Figures for August 2017 and December 2017 are based on April 2017 and October 2017 WEO published databases, respectively.

5/ Defined as the average of the sum of inflows of direct, portfolio and other investment. Figures for August 2017 and December 2017 are based on April 2017 and October 2017 WEO published databases, respectively.

6/ Figures for August 2017 and December 2017 are based on April 2017 and October 2017 WEO published databases, respectively.

Table 2b. Size of Quotas + NAB and Economic Indicators
(In billions of SDRs unless otherwise indicated)

	Eighth Review 1983 1/	Ninth Review 1990 1/	Tenth Review 1995 1/	Eleventh Review 1998 1/	Twelfth Review 2003 1/	Thirteenth Review 2008 1/	Fourteenth Review 2010 1/	Current Revised Aug-17*	Current Dec-17	Projected Revised Aug-17*	Projected Dec-17
Size of Quota Increase, in Percent	47.5	50.0	0.0	45.0	0.0	0.0	100.0	n.a.	n.a.	n.a.	n.a.
1 Agreed Quotas + NAB 2/ 3/ 4/	108.5	153.7	164.6	246.0	247.7	251.6	659.4	659.4	659.4	659.4	659.4
2. Economic indicators and applicable data periods	<u>1976-80</u>	<u>1981-85</u>	<u>1986-90</u>	<u>1990-94</u>	<u>1995-99</u>	<u>2001-05</u>	<u>2004-08</u>	<u>2012-16</u>	<u>2012-16</u>	<u>2015-2019</u>	<u>2015-2019</u>
a. GDP	7,588	11,083	15,744	17,884	22,442	29,912	35,906	51,554	51,612	56,478	57,419
b. Current payments 5/	1,341	2,168	2,852	3,700	5,785	8,026	12,112	17,653	17,670	18,181	18,498
c. Capital inflows to EMDCs 6/	50	46	49	173	233	373	689	757	748	666	669
d. EFN 7/			200	269	450	552	963	2,074	2,123	1,734	1,828
3. Ratio of Quota resources to economic indicators (in percent)											
a. GDP	1.4	1.4	1.0	1.4	1.1	0.8	1.8	1.3	1.3	1.2	1.1
b. Current payments 5/	8.1	7.1	5.8	6.6	4.3	3.1	5.4	3.7	3.7	3.6	3.6
c. Capital inflows to EMDCs 6/	218.7	334.1	336.9	142.6	106.4	67.5	95.7	87.1	88.2	98.9	98.6
d. EFN 7/	n.a.	n.a.	82.3	91.5	55.0	45.6	68.5	31.8	31.1	38.0	36.1
4. Additional Quota resources needed to restore relative size of Fund at the time of past quota increases (in billions of SDR)											
<i>Based on data through 2016</i>											
a. GDP	79	56	-	51	-	-	288	1	-	-	-
b. Current payments 5/	770	593	360	516	97	-	303	1	-	-	-
c. Capital inflows to EMDCs 6/	976	1,839	1,859	407	136	-	56	-	-	-	-
d. EFN 7/	n.a.	n.a.	1,088	1,283	509	308	795	16	-	-	-

Source: Finance Department.

1/ Year in which the quota review was completed, i.e., when the Board of Governors' Resolution on quota increases was approved. The 10th Review did not provide for an increase in quotas, and the increase in actual quotas relative to the 9th Review is due to the increase in the number of members.

2/ Column for 12th Review includes China's ad hoc quota increase of SDR 1.682 billion in 2002.

3/ Column for 13th Review includes ad hoc quota increases for China, Mexico, Korea, and Turkey of SDR 3.809 billion in 2006.

4/ Include the GAB, the NAB, the 2009/10 Borrowing Agreements, 2012 Borrowing Agreements, and 2016 Borrowing Agreements.

5/ Defined as the average of the sum of payments on goods, services, income and current transfers. Figures for August 2017 and December 2017 are based on April 2017 and October 2017 WEO published databases, respectively.

6/ Defined as the average of the sum of inflows of direct, portfolio and other investment. Figures for August 2017 and December 2017 are based on April 2017 and October 2017 WEO published databases, respectively.

7/ Figures for August 2017 and December 2017 are based on April 2017 and October 2017 WEO published databases, respectively.

Annex II. Access-based Scenarios: Estimating the Demand for Fund Resources Through 2025

1. This Annex provides details on the various approaches used in the access-based scenarios.

The following applies to all approaches:

- **Horizon.** The potential calls for Fund financing are based on projections for 2025 from the Fall 2017 WEO baseline going through 2022 and simple staff extrapolations for 2023–25.¹
- **Fund lending capacity.** The Fund’s lending capacity is assessed as of 2025 and is assumed to comprise current quotas plus NAB (SDR 463 billion), assuming the renewal of the NAB for its current amount in SDR terms, beyond end-2022. This responds to many Directors’ remarks not to pre-suppose future discussions on the possible renewal of the BBAs.²
- **Color coding.** The results table follows the same color coding as in the 2017 paper: scenarios covered by quota alone are in dark green, scenarios covered by quota and NAB are in light green, and scenarios that are not covered do not have a color.
- **Program sizes.** Program sizes of 4 to 8 percent of GDP are presented as in the 2017 paper.³

Approach A—Past Top Borrowers Seeking Assistance During the Last Five Crises

2. Set of scenarios. These scenarios look at a potential crisis involving nine, six, or three countries of the past top borrowers seeking Fund financing at the same time. The top borrowers are selected from the list of all members that had a Fund GRA arrangement or requested outright disbursements since 1990, ranked by their 2025 GDP. With several past top borrowers having vulnerabilities, future crises could entail calls for Fund financing from at least the top three past borrowers, in contrast to the two top borrowers that received Fund financing during the GFC.

3. Results. Table 1 indicates that Fund resources based on quotas and the NAB do not even cover all scenarios where just the top three past borrowers avail themselves of Fund financing, and

¹ WEO forecasts for GDP and SDR/USD exchange rate until 2022. The GDP forecast is extended to 2025 assuming the same growth rate from 2021–2022. The SDR/USD exchange rate is extended assuming a constant exchange rate from 2022–2025.

² The lending capacity would be lower, assuming a buffer of SDR 50 billion to prevent the Fund’s lending capacity from declining to a point that can undermine confidence in the Fund’s ability to support its members. A buffer of SDR 50 billion would be about half of the revealed preference of Directors for a SDR 100 billion quota buffer, as implied in the activation thresholds for the NAB and bilateral borrowing. The 2010 paper ([Fourteenth General Review of Quotas—The Size of the Fund—Initial Considerations](#), 3/15/10) used a similar approach though with the assumption that only two-thirds of quotas would be utilized before borrowing is activated. Applying this approach would double the size of the buffer to SDR 106 billion.

³ The average program size based on historical crises is about 6 percent of GDP.

would not cover any scenario with the top six borrowers. Even fewer scenarios are covered if a minimal quota buffer of SDR 50 billion is factored in.

Table 1. Potential Calls on Fund Financing Under Approach A^{1/}					
(In SDR billions)					
Top Borrowers^{2/}	Arrangement Size^{3/}				
	as Percent of Member's 2025 GDP				
	4	5	6	7	8
a. Top 9	556	695	833	972	1,111
b. Top 6	465	582	698	814	931
c. Top 3	295	369	443	517	590

Source: Staff estimates based on the October 2017 WEO and financial data.

1/ Cells in dark green flag scenarios that can be covered by the Fund's quota resources; in light green, using current quota and NAB resources.

2/ The top borrowers are the largest members in terms of GDP that have had an arrangement since 1990. The size of the arrangement is a percentage the member's forecasted 2025 GDP.

3/ See Table 2 in the 2017 paper for a comparison with historical arrangement sizes.

Approach B— Panel Logit Scenarios

4. Set of scenarios. These scenarios update the results of the econometric model on potential calls on Fund financing under a global volatility shock scenario.⁴ Similarly to the 2017 paper, a global shock is triggered when the VIX index reaches an average level of 30 during the year of the shock. This level is below the average VIX level observed over the period 2008–09. Key differences from the 2017 paper are that the size of potential calls from the flagged countries is based on projected global GDP in 2025 rather than in 2017 and that the lending capacity is based on quota plus the NAB rather than quotas, the NAB, and BBAs.

5. Results. Table II.2 summarizes potential calls on Fund financing under the different scenarios and assumptions discussed above. Compared to the 2017 paper, the updated scenario shows considerably larger potential demand for Fund financing reflecting mainly the effect of extending the reference period from 2017 to 2025. Only one scenario can be covered with a lending capacity based on quota and NAB resources compared with four scenarios in the 2017 paper.

⁴ For a detailed explanation of the panel logit model see Annex II of [Adequacy of Fund Resources—Further Considerations](#) (7/31/2017).

Table 2. Potential Calls on Fund Financing Under Approach B^{1/ 2/}
(In SDR billions)

Scenarios ^{4/}	Arrangement Size as Percent of Member's GDP ^{3/}				
	4	5	6	7	8
with current lending capacity					
a. 1:1 Threshold (4.8 percent)	935	1,169	1,403	1,637	1,870
b. 2:1 Threshold (6.4 percent)	760	951	1,141	1,331	1,521
c. 3:1 Threshold (16.1 percent)	439	549	659	769	879

Source: Staff estimates based on data from Finance Department, WEO, IFS, WDI, BIS, Federal Reserve Bank of St Louis, U.S. Energy Information Administration, U.S. Federal Reserve, and the PRS Group.

1/ Cells in dark green indicate scenarios that can be covered by current quota resources; in light green those covered by current quota and NAB resources.

2/ Unlike the 2017 paper, the potential calls from the flagged countries is based on projected global GDP in 2025 rather than in 2017.

3/ See Table 2 and paragraph 17 of the 2017 paper to map these sizes to the historical distribution of arrangement sizes.

4/ These scenarios are based on the results of the logit approach under a global risk scenario where the VIX reaches 30.

Annex III. Global Shock Scenarios: Estimating Potential Calls for Fund Financing

1. This Annex provides details on the refinements to the global scenarios model, compared to the 2017 Paper on resource adequacy. Reflecting feedback during Directors' discussion in September, Section A assumes greater use of international reserves and other financing resources, and Section B considers a longer-term perspective. The general methodology to estimate the potential calls for Fund resources remains unchanged.¹ The Fund's lending capacity is assumed to comprise current quotas plus the NAB only, in response to many Directors' remarks not to pre-suppose future discussions on the possible renewal of the BBAs.

A. Assuming Greater Use of International Reserves and Bilateral Swap Lines

2. In calculating financing sources other than the Fund, the following assumptions were modified from the 2017 paper:

- **Self-Insurance.** The use of reserves has been expanded. In particular, reserves are now assumed to remain above 80 percent of the level suggested by the Fund's ARA metric for EMs, compared to 100 percent of ARA metric in the 2017 paper. In addition, a country can now use reserves subject to the maximum level of 40 percent relative to their initial level, compared to 25 percent in the 2017 paper. This assumption is broadly in line with the average plus one standard deviation of reserve usage for EMs and AMs during the GFC.
- **Bilateral Swap Arrangements.** Countries with active swap agreements with China are included in the analysis.² These countries are assumed to use their swap fully to meet potential financing demand. Beyond these active swap agreements, no additional bilateral borrowing is assumed.

3. The estimated potential calls for Fund resources decline modestly, compared to the baseline results in the 2017 paper. Table 1 and Figure 1A present the results of the simulation with the revised assumptions. The estimated potential calls for Fund resources range from SDR 133 billion to 1,065 billion, subject to pervasiveness and severity of the crisis, compared to a range from SDR 143 billion to SDR 1,391 billion in the 2017 paper.

¹ See the Annex III of [Adequacy of Fund Resources—Further Considerations](#) (7/31/2017) for further details.

² As of end-July 2017, 31 countries and the European Central Bank had active bilateral swap agreements with China, of which 26 countries are included in the country selection sample based on their vulnerability exercises. For further details, see [report](#).

Table 1. Potential Calls on Fund Financing Through 2017-18^{1/}
(In SDR billions)

	Crisis Intensity (percentile)			
	65th	75th	85th	90th
a. Extremely pervasive global systemic crisis	311	474	750	1,065
b. Very pervasive systemic crisis	308	448	654	876
c. Pervasive systemic crisis	268	355	517	692
d. Systemic crisis	133	184	243	288

Source: IMF staff estimates based on data from WEO and the People's Bank of China.

1/ Cells in dark green indicate scenarios that can be covered by current quota resources; in light green those covered by current quota and NAB resources.

B. Assuming a Longer-Term Perspective

4. In line with the methodology to estimate the potential calls for Fund resources in the baseline as described in Section A, the scenarios assume the following:

- **Vulnerable countries, shock intensities, and domestic adjustments are assumed to be the same as in the baseline (Section A).** Vulnerable countries facing BOP shocks in 2024-25—based on four systemic crisis scenarios—are assumed to be the same as identified by the staff's Winter 2017 Vulnerability Exercise. Crisis severities, based on the empirical distribution of financial crisis over the past 30 years using Kernel density distribution, are also assumed to be the same. Moreover, these countries are assumed to have the same level of domestic adjustment at 0.7 percent of GDP per annum over two years.
- **BOP variables used for estimating the demand for financing are assumed to grow in line with nominal GDP.** They include the current account balance, FDI, short-term and medium-term debt amortization and disbursements, deposits (for EMs only), and gross international reserves. Nominal GDP in 2024-25 for each member is extrapolated by assuming the same annual growth rate of nominal GDP as in 2022, taken from the Fall 2017 WEO.
- **The shares of RFAs and bilateral swaps to total demand for financing are assumed to be the same as the levels in the baseline.** This assumption requires financing by RFAs and BSAs to grow on average by almost 60 percent, compared to the baseline.

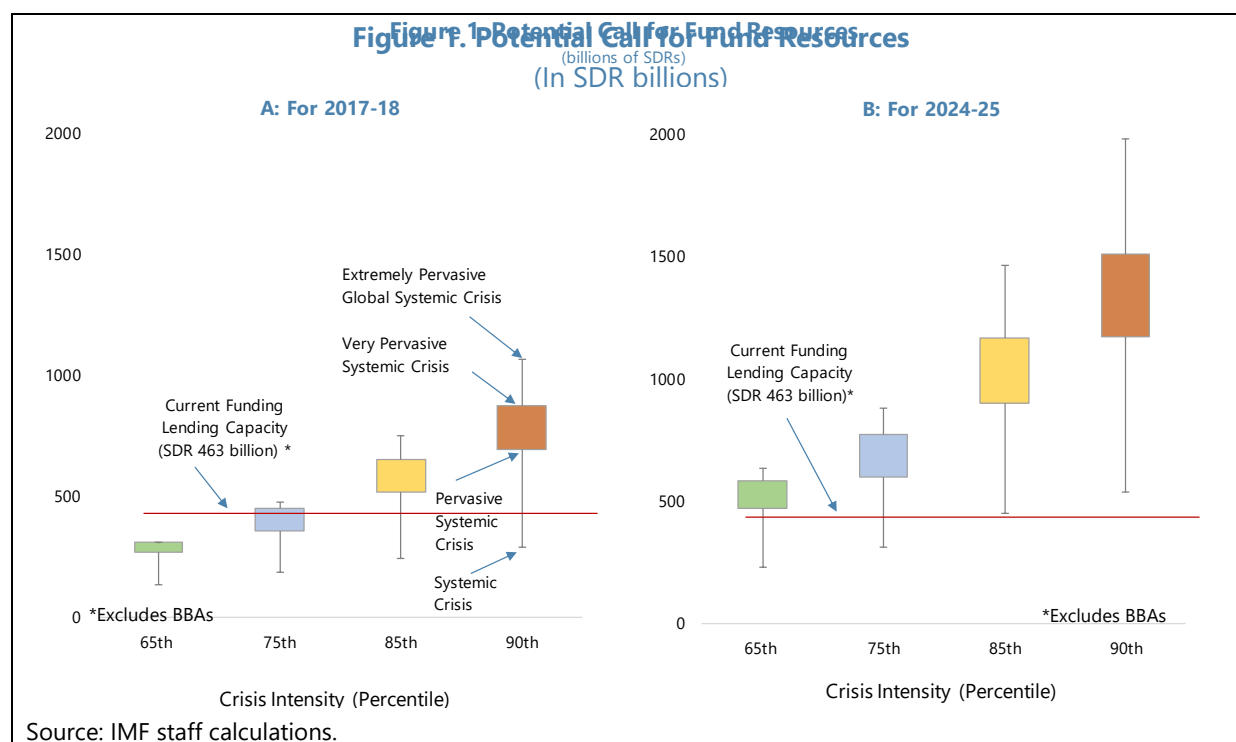
5. Compared to the baseline scenario, the estimates of potential calls for Fund resources in the middle of the next decade almost double. A larger global economy leads to significantly higher financing needs in 2024-25. Note that the supply for financing also increases. Given that reserves grow in line with GDP as do RFAs and BSAs, countries affected by the crisis will use more reserves and RFA and BSA financing. Reserves usage, on average, accounts for half of the total supply of financing sources. After taking into account the supply from RFAs and BSAs, resulting Fund financing ranges from SDR 231 billion to SDR 1,984 billion, equivalent to an 80 percent increase compared to the baseline (Table 2, Figure 1B).

Table 2. Potential Calls on Fund Financing Through 2024-25^{1/}
(In SDR billions)

	Crisis Intensity (percentile)			
	65th	75th	85th	90th
a. Extremely pervasive global systemic crisis	636	878	1,463	1,984
b. Very pervasive systemic crisis	583	774	1,165	1,513
c. Pervasive systemic crisis	470	598	900	1,173
d. Systemic crisis	231	309	450	538

Source: IMF staff estimates based on data from WEO.

1/ Cells in dark green indicate scenarios that can be covered by current quota resources; in light green those covered by current quota and NAB resources



6. The results are subject to caveats. First, as mentioned in the 2017 paper, the mechanical way of calculating the size of the Fund as a residual between the demand for financing and other non-Fund financing sources does not in any way pre-judge how countries access financing. Second, the set of vulnerable countries could change, as the global environment changes. Third, while the estimates capture the growth of the global economy, they are based on the 2017/18 openness of the world. With the global economy becoming increasingly more interconnected, the share of EMDCs in global trade could rise further and the financial openness gap between EMDCs and AMs could narrow. In particular, if EMs catch up in terms of financial openness to the level of AMs, then financing needs could be substantially larger. Finally, the estimation assumes that the share of RFAs and BSA to total demand for financing will be the same as the one in the baseline scenario.

Annex IV. Long-term Uncertainties

Using scenario planning techniques, staff constructed three hypothetical illustrative scenarios of what the world in 10 years could look like. The three scenarios explore how a hypothetical financial crisis could evolve, and how the GFSN would respond under different assumptions about the role of the fund as well as the future role of technology, power balance, and trust within the international monetary system (IMS).

1. **Circle of Trust:** Distributed ledger technologies (DLTs) are being increasingly used as a technology that improves the business environment and lowers transactions costs, starting to boost cross-border commerce and facilitating international cooperation. A hacked DLT code makes a commodity trading system collapse in a large commodity exporter, causing a crash in its stock exchange and a sharp decline in exports. Although this is quickly resolved, fears of contagion to other commodity exporters trigger substantial capital outflows. A loss of trust in the integrity of all DLT-based platforms, such as some interbank payments systems and cross-border trade, lead for those countries that are advanced in the technology to a sharp slowdown in economic activity that propagates fast because of high interconnectedness. Some commodity exporters' reserve buffers have continued to decline owing to a prolonged period of low commodity prices and as they have not yet fully diversified their economies. They are not part of sufficiently large RFAs, and the need for adjustment rules out short-term liquidity swap lines. An adequately resourced Fund helps contain the shock. The Fund provides the needed resources to the worst hit countries and extends precautionary credit lines to some others, helping countries cope with the economic slowdown, minimizing spillovers and contagion, and restoring confidence in the global economy.
2. **Twin Peaks:** Automation is progressing, and trust in political systems—and with it, support for the multilateral system—is eroding. Trade and financial integration has slowed, and countries see the Bretton Woods organizations less as being at the center of the IMS, but rather as one option in the GFSN, along with RFAs and development banks. Following a decade of unsustainable policies (aided by weakening global oversight), a large emerging market experiences severe fiscal stress. Consumption and investment fall, and its financial sector goes into crisis. This spills over to the entire region, given strong trade and financial ties, and ends up affecting global confidence. At the eve of the crisis, the Fund is under-resourced, given countries' increasing focus on regional solutions. Regional bodies are unable to deal with a crisis of this magnitude (both financially and to implement needed conditionality). It takes a year to get a multilateral agreement to provide the Fund with adequate resources, too late to prevent a global recession.
3. **Tech Race:** Governments and corporations are on the brink of a technological race, and Artificial Intelligence (AI) trading is starting to take off. However, trust in institutions is declining and support for regulation and global cooperation weakening, amid strong pressures to allow innovation to flourish. Some large economies invest heavily into R&D spending to join the tech race. This has increased debt and depleted buffers: while countries strive to achieve a current account surplus, reserves tend to be used up by frequent but small financial crises, stemming from the boom and bust of IT companies. A deep financial crisis is precipitated by a breakdown of

algorithmic trading in an advanced economy: a flaw in the code revealed that AI models have been mispricing the riskiness of some assets. Most of the big financial institutions and corporations are exposed, weakening private sector balance sheets. The uncertainty causes global liquidity to dry up and capital flows out of vulnerable AMs and EMs and into reserve currency economies, causing a crisis. The global financial safety net is weak: the Fund is only one-half its size a decade ago, bilateral swap agreements are difficult to achieve, and RFAs offer only short-term arrangements.

Annex V. Variability and Balance of Payments Difficulties

This Annex responds to a request at the September 1 meeting to examine if there is a link between variability and broader balance of payment difficulties using the latest available data. Previous analysis had explored the relationship between the variability variable used in the quota formula and broader balance of payments difficulties and found essentially no correlation. Following the methodology of previous analyses, balance of payment difficulties are proxied by two sets of measures, based on exchange market pressure and external sector vulnerability indicators. The findings indicate that the correlation between variability and these measures of balance of payments difficulties remains close to zero. In response to another request, this Annex also re-examines the correlation between variability and Fund arrangements using the latest available data and breaking the dataset into different country groups. The findings indicate that the correlation between variability and Fund arrangements is also close to zero.

1. This Annex presents further work on variability in response to requests at the September 1, 2017 meeting of the Committee of the Whole. Specifically, staff was asked to verify the correlation between variability and broader measures of balance of payment difficulties with updated data. Staff was also asked to examine whether the previous findings on the relationship between variability and actual use of Fund resources hold if the dataset is split into Advanced Economies (AEs) and Emerging Market and Developing Economies (EMDCs). This Annex responds to both requests in turn.

2. As in previous analyses, an index of exchange market pressure (“EMP”) was used as a proxy for balance of payment difficulties.¹ Following several studies, a country is characterized as having an episode of EMP when it experiences a sharp exchange rate depreciation and/or large decline in international reserves.² In the analysis below, the EMP index is calculated as the weighted average of the changes in exchange rates (national currency per US dollar) and the negative of the changes in international reserves using quarterly data from the IMF’s International Financial Statistics database for the period 1995–2015, extending the previous dataset by four years. Following the literature, the weights are set equal to the inverse of the standard deviations of the individual country time series. The EMP index is then transformed into a binary variable using thresholds based on 1, 1.5 and 2 standard deviations from the mean.³ These thresholds are motivated by the focus on balance of payments difficulties rather than currency crises per se which are typically perceived as more severe events.

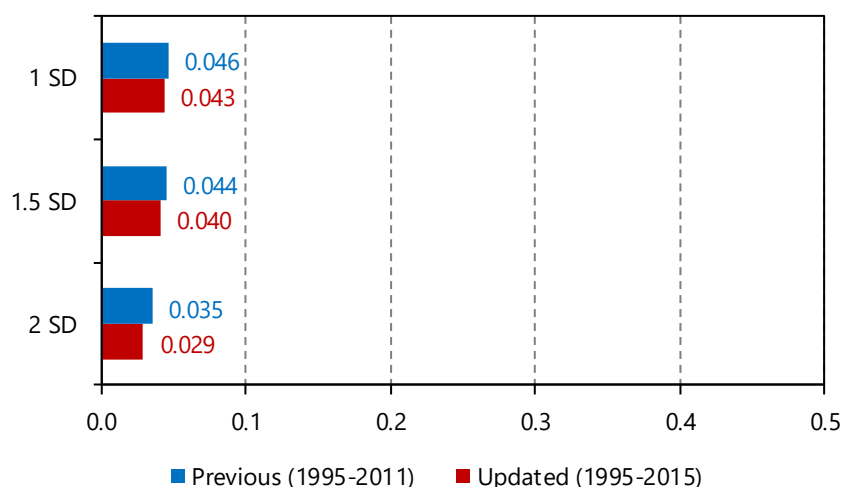
¹ See Annex IV in [Quota Formula – Data Update and Further Considerations – Annexes](#) (6/6/13).

² For example, see Kaminsky, G., Lizondo, S., Reinhart, C., *Leading Indicators of Currency Crises*, IMF Staff Papers, 45 (1), 1998, pp.1-48 and Sachs, J., Tornell, A., Velasco, A., *Financial Crises in Emerging Markets: The Lessons from 1995*, Brooking Papers on Economic Activity, 1, 1996, pp. 147-215.

³ To match the variability data, which are available on an annual basis, the EMP binary variables, which are quarterly, are aggregated. The annual EMP variable takes the value of one if at least one of the quarterly observations equals to one.

3. The correlation of variability with balance of payment difficulties, as proxied by the EMP binary variable, remains close to zero with the updated dataset. As in previous work, the original variability variable for each country is adjusted by subtracting the country's share in global GDP to remove the effect of economic size. As shown in Figure 1, the relationship between the adjusted variability variable and balance of payments difficulties measured by the various EMP measures remains very weak with correlations ranging between 0.029 and 0.043 in the updated dataset. Indeed, the relationship appears to be even weaker compared to previous analysis, which found correlations ranging between 0.035 and 0.046.

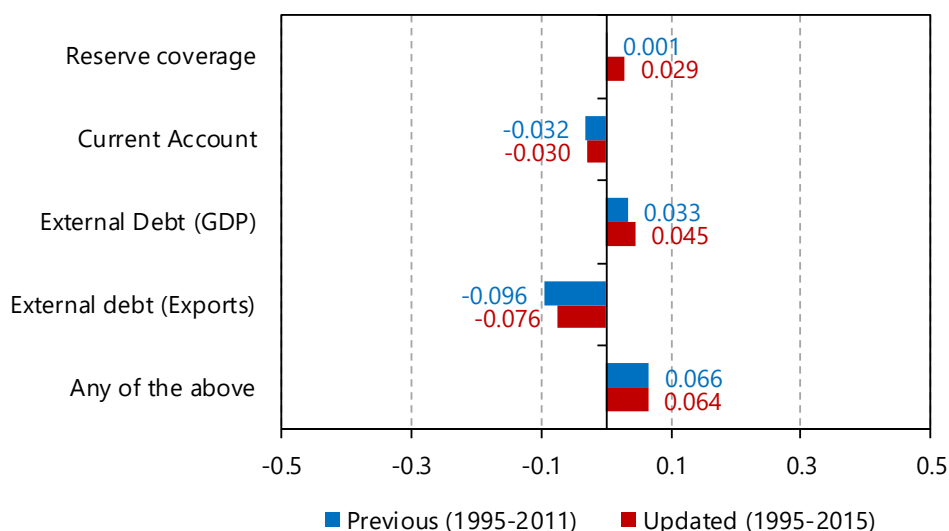
Figure 1. Point Biserial Correlation^{1/} between Adjusted Variability and Exchange Market Pressure



Source: IMF staff calculations based on WEO and IFS data.

1/ Since one of the variables is binary and the other one is continuous, the appropriate measure of association is the point biserial correlation coefficient (see Andres, J. *Point biserial correlation*, STATA Technical Bulletin STB-17, January 1994). The same methodology is used for the remainder of the Annex.

4. An examination of the correlation between adjusted variability and alternative ways of measuring balance of payments difficulties also shows a very weak relationship. Apart from measuring balance of payments' difficulties with the EMP index above, staff also proxied them by four external sector indicators used in the vulnerability exercise for EMs. These are: 1) reserves in percent of short-term debt at remaining maturity plus current account deficit; 2) current account balance (in percent of GDP); 3) external debt (in percent of GDP); and 4) external debt (in percent of exports). The ratios were converted into binary variables using the thresholds identified in the vulnerability exercise for EMs. Overall, the correlations of the individual vulnerability indicators with the variability measure remain either not significantly different from zero, or negative. An indicator variable which takes the value of 1 if the threshold is breached for any of the four vulnerability indicators does not appear to be correlated with variability either (Figure 2).

Figure 2. Point Bi-serial Correlation between Adjusted Variability and Indicators of External Sector Vulnerability

Source: IMF staff calculations based on WEO and IFS data.

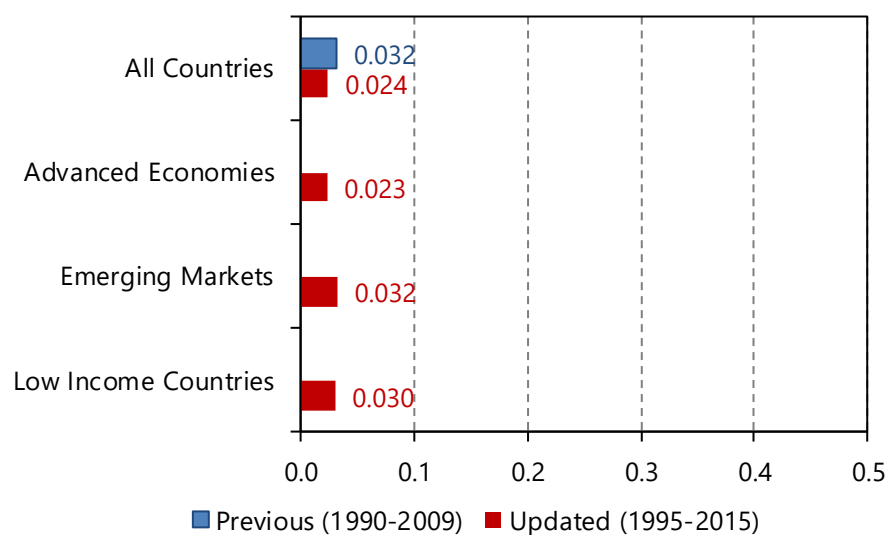
5. Staff analysis suggests also that the correlation between adjusted variability and approval of a Fund arrangement is weak, including when the analysis is conducted for different country groups. Following previous analysis,⁴ a binary variable takes on the value of 1 if a Fund arrangement was approved in any given year, and 0 otherwise for the period 1995-2015.⁵ The correlation between the binary variable and that of adjusted variability is 0.024. The fact that it is close to zero and is not statistically significant suggests that the relationship between adjusted variability and the demand for Fund resources is weak. Moreover, the correlation readings do not change considerably and remain close to zero and not statistically significant, when done separately for the three sub-samples of AEs, EMs and LICs. For these country groupings, the correlation between adjusted variability and the use of Fund resources ranges between 0.023 and 0.032 (Figure 3).

6. Overall, the results of the correlation analysis are consistent with earlier staff work that indicates that the current measure of variability does not capture its intended purposes in the formula.

⁴ See Appendix II in *Quota Formula Review – Initial Considerations – Supplementary Appendix* (2/10/12)

⁵ The binary variable was constructed using data covering all facilities (GRA and PRGT), including precautionary arrangements

Figure 3. Point Bi-serial Correlation between Adjusted Variability and Use of Fund Resources



Source: IMF staff calculations based on WEO, IFS, and FIN data.

Annex VI. Convergence between GDP Measured at Market and PPP Exchange Rates

Responding to a request at the September 1st meeting of the Committee of the Whole, this Annex discusses the convergence between GDP measured at market and PPP exchange rates.

1. The 2008 Quota and Voice Reform introduced PPP as part of a GDP blend variable to the quota formula. The blend gives a 60 percent weight to GDP at market prices and a 40 percent weight to GDP at PPP prices. It was argued that “this approach captures the central role of quotas in the Fund’s financial operations, for which GDP at market exchange rates is the most relevant, as well as the Fund’s non-financial activities, where PPP GDP can be viewed as a relevant way to capture the relative volume of goods and services produced by economies.”¹

2. It was agreed that the scope for retaining PPP GDP in the formula would be reviewed after 20 years. The inclusion of PPP GDP and compression in the formula had been one of the most difficult aspects of the deliberations, and the Board decided to include these elements in the formula for a period of 20 years (i.e., until 2028), after which the scope for retaining them would be reviewed “in light of progress toward convergence between market rate and PPP GDP in emerging market and developing countries, and the overall objective of ensuring adequate voice and participation for all members.”²

3. This Annex responds to a request at the September 1st, 2017 meeting of the Committee of the Whole that staff examine whether market and PPP GDP have been converging as anticipated at the time of introduction of the GDP blend variable. Based on the estimated relationship between per capita income and relative price levels and on the GDP growth rates prevailing at that time, it was noted that “about 40 of the most dynamic countries would be expected to converge to 80 percent of the US price level within 20 years.”³ More broadly, the agreement to review in 20 years the scope of retaining PPP in the formula was to take place in light of convergence between market and PPP GDP in EMDCs. This Annex examines to what extent PPP and market GDP have converged since 2008.

¹ See [Report of the Managing Director to the International Monetary and Financial Committee on Reform of Quota and Voice in the International Monetary Fund](#) (4/8/2008).

² *Ibid.*

³ See [Quota and Voice Reform—Key Elements of a Potential Package of Reforms](#) (2/26/2008, footnote 10)

How Much Convergence and How Broad Based?

4. The convergence of GDP evaluated at PPP exchange rates to GDP at market exchange rates (MER) is equivalent to the convergence of PPP exchange rates to market exchange rates (see Box 1).⁴ In turn, as the ratio of PPP exchange rates to market exchange rates (both expressed as national currency units per U.S. dollar) provides a measure of the general price level in a country relative to that in the United States, the convergence of PPP exchange rates to market exchange rates can be cast in terms of the convergence of national price levels to the U.S. price level.

Box 1. WEO Definitions of GDP Valued at Market Rates and PPP Rates

According to the World Economic Outlook, the PPP exchange rate of a country i (domestic currency per PPP U.S. dollars) is defined as:

$$PPPEX_i = \frac{NGDP_i}{PPPGDP_i},$$

where $NGDP$ is the GDP at current market prices in domestic currency and $PPPGDP$ is the GDP valued at current PPP U.S. dollars.

$NGDP$ can be converted to market U.S. dollars by using the definition:

$$NGDP_i = NGDPD_i * ENDA_i,$$

where $NGDPD$ is the GDP at current market prices in U.S. dollars and $ENDA$ is the period average market exchange rate (domestic currency per U.S. dollars).

By replacing $NGDP$ in the first definition and reorganizing, we arrive at the following definition for the ratio of the two GDPs in U.S. dollars (R):

$$R_i = \frac{NGDPD_i}{PPPGDP_i} = \frac{PPPEX_i}{ENDA_i}$$

This implies that the movements in the ratio R are governed by the relative movements of market exchange rates ($\Delta\%ENDA_i$) and PPP exchange rates, that is relative price levels ($\Delta\%PPPEX_i$):

$$\Delta\%R_i \cong \Delta\%PPPEX_i - \Delta\%ENDA_i$$

5. The theoretical literature postulates that relative cross-country price differences are related to differences in real per capita income. Harrod (1933), Balassa (1964) and Samuelson (1964) have argued that if labor is mobile intersectorally but not internationally, productivity in the tradables sector (where prices are determined internationally) determines wages in the nontradables sector and hence the national price level. Based on this line of reasoning, the Harrod-Balassa-Samuelson argument implies that higher productivity growth is associated with higher per capita income growth and, in turn, with higher relative price levels. However, temporary setbacks for this convergence can take place if fluctuations in market exchange rates are significant.

⁴ Note that convergence of PPP- and MER-based GDPs for individual countries comes from the convergence in prices and not real GDP (since the real GDP series embedded in the two series, MER GDP and PPP GDP, are identical). At the same time the Harrod-Balassa-Samuelson proposition implies that price convergence is closely and positively linked to convergence of real GDP per capita; see paragraph 5.

6. Data suggest modest convergence of market and PPP GDP for EMDCs as a whole between 2005 and 2011, with some reversal since then that was mainly due to strengthening of the US dollar (Figure 1). Convergence of real market exchange rates in emerging market economies toward their PPP rates could occur either through relatively higher domestic price inflation in these economies, or through nominal exchange rate appreciation, or (most likely) some combination of both. With regard to domestic price inflation, and drawing on the Harrod-Balassa-Samuelson proposition, the modest convergence until 2011 can be partly explained by the relatively higher per capita GDP growth rates in EMDCs compared to the U.S. and also to AEs as a whole.⁵ The reversal since then, most of which took place from 2014 to 2015, coincided with a notable appreciation of the US dollar (Figure 2): indeed, for all regional subgroupings within EMDCs, the market exchange rate depreciation against the U.S. dollar during this period has significantly offset movements of relative price levels, as measured by PPP exchange rates. Over the whole period, economies in the Western Hemisphere region showed the fastest convergence among EMDCs, followed by Asian EMDCs.

7. The relatively modest pace of price level convergence observed over the past decade is consistent with narrower-than-expected differentials in GDP growth rates. The analysis in 2007 was based on the assumption that real per-capita GDP in all non-US economies would grow on average $2\frac{3}{4}$ pp faster per annum than in the US over the next twenty years.⁶ In fact, the mean growth rate over the period 2005–2015 was only 1.5 pp higher for all non-US economies compared to the US (4.8 pp higher for the fastest growing quartile of EMDCs). Moreover, as mentioned earlier, the sizable depreciation of market exchange rates vis-à-vis the U.S. dollar in EMDCs in recent years added to the slow convergence in PPP and MER GDP levels for the period under review.

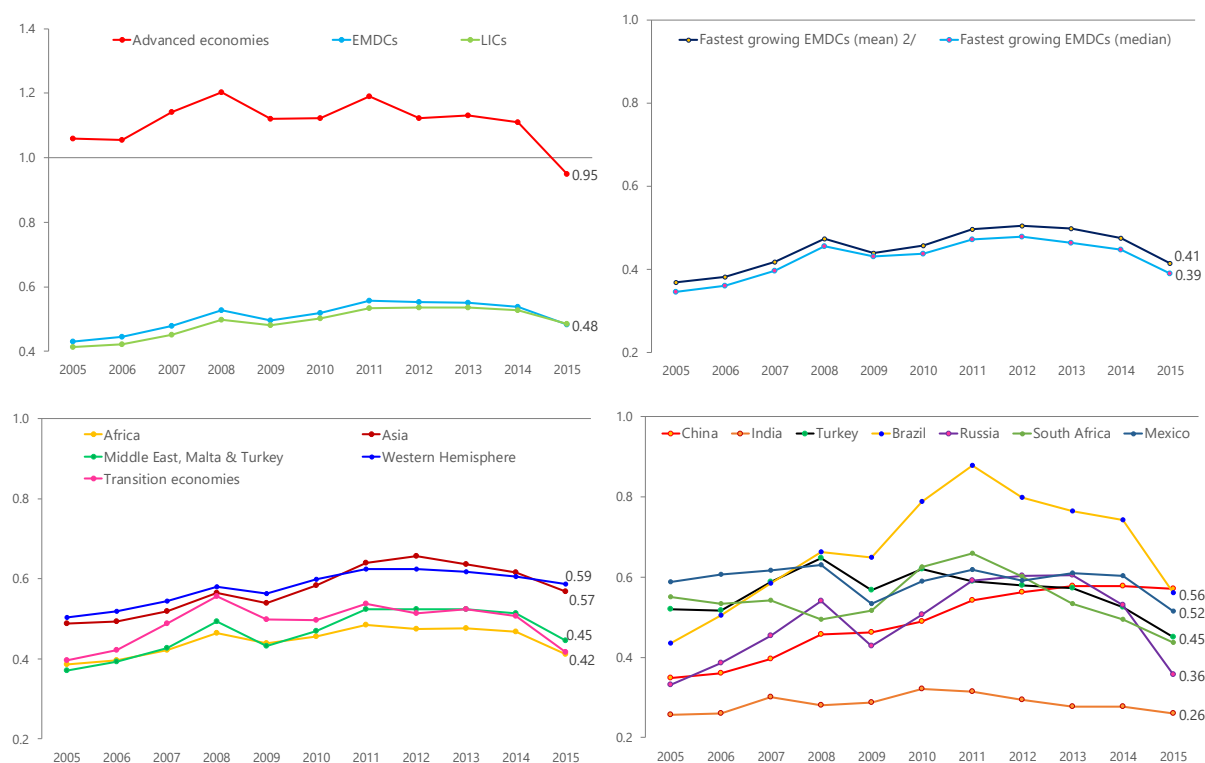
8. For EMDCs, convergence in 2005–2015 has been more broad-based compared to the previous decade. Table 1 shows that the number of EMDCs exhibiting convergence increased from 78 to 114 over the two decades 1995–2005 and 2005–2015. However, the overall rate of convergence during the latter period was modest: the data shows that the average price level for the whole EMDCs group converged from 43 percent of the US price level in 2005 to only 48 percent of the US price level by 2015.⁷ Nevertheless, this is faster than during the previous decade when the average price level for EMDCs remained broadly unchanged relative to the US price level.

⁵ From 2005 to 2011 real GDP per capita of EMDCs grew at an average rate of 3.1 percent, well above the per capita growth of the U.S. (0.4 percent) and AEs as a whole (0.2 percent).

⁶ See Appendix IV in *Quota and Voice Issues—Troika Working Group Report to Group of Twenty Deputies* (9/25/07).

⁷ Considering both AEs and EMDCs, the picture of convergence has not changed that much: while in 2005, 34 countries had already converged to at least 80 percent of the U.S. price level, by 2015, this number dropped to 30 (mostly due to the impact of the global financial crisis on some European countries).

Figure 1. Convergence of PPP and MER GDP Levels^{1/}
(MER-to-PPP GDP ratios)

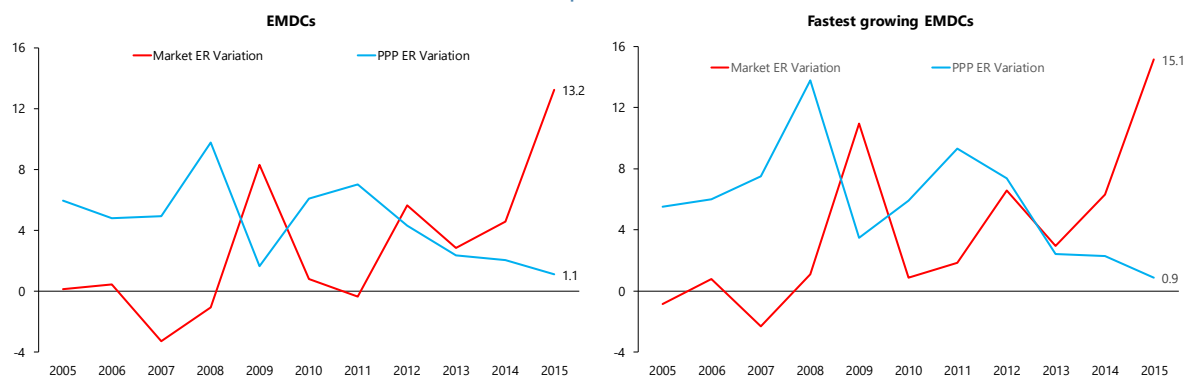


Source: IMF staff calculations based on WEO data.

1/ Simple average of individual country ratios between MER GDP and PPP GDP.

2/ Countries in the top quartile of average GDP per capita growth rates over the period 2005-2015.

Figure 2. Exchange Rate Variations Against the U.S. Dollar^{1/}
(in percent)



Source: IMF staff calculations based on WEO data.

1/ Simple average of individual country appreciation/depreciation rates. A positive value represents a depreciation of domestic currencies against the U.S. dollar.

Table 1. Change in MER-to-PPP GDP Ratios

	EMDCs		Converging EMDCs		Diverging EMDCs	
	1995-2005	2005-2015	1995-2005	2005-2015	1995-2005	2005-2015
Initial ratio	0.43	0.43	0.36	0.39	0.50	0.53
Final ratio	0.43	0.48	0.44	0.49	0.41	0.47
Average change	0.00	0.05	0.08	0.10	-0.09	-0.06
Median change	0.00	0.04	0.07	0.08	-0.06	-0.06
No. of countries ^{1/}	152	160	78	114	74	46

Source: IMF staff calculations based on WEO annual data.

1/ Countries with available PPP data.

9. Based on current trends, price convergence of EMDCs toward the US level appears likely to proceed only slowly. If market exchange rates were to be constant and relative price movements were to follow the trend shown over the past decade, by 2025 EMDCs would be expected to converge to a mean of 54 percent of the US price level (compared to a mean of 43 percent at the time of the 2008 Reform).

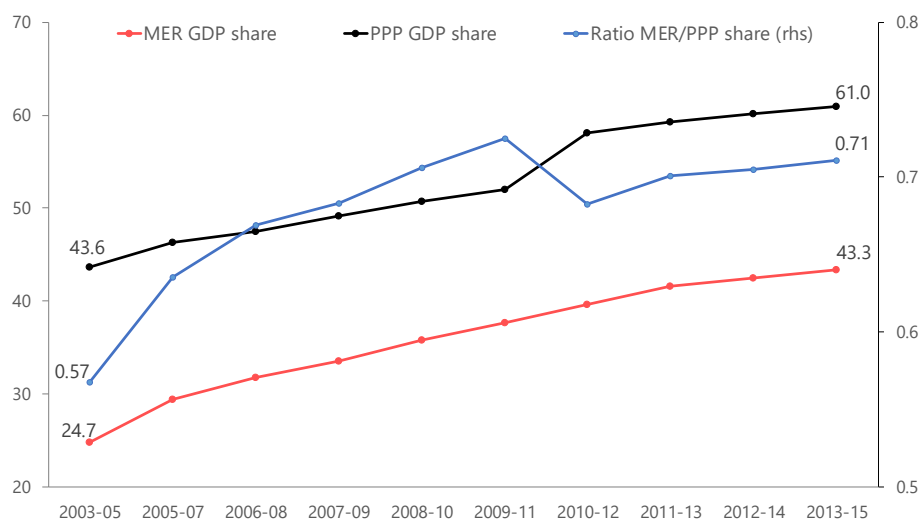
Implications for Calculated Quota Shares

10. While convergence between market and PPP price levels has been modest, the ratio of MER to PPP GDP shares for EMDCs as a whole has converged more markedly (Figure 3). Based on the data used in the quota formula, the ratio of MER to PPP GDP share (in global GDP) for EMDCs as a whole increased from 0.57 in 2005 to 0.71 percent in 2015 (i.e., from the 2008 quota data set to the 2017 quota data set). Given the modest convergence in price levels, the fact that, between 2005 and 2015, the GDP of EMDCs grew at an average rate that exceeded that of AEs by 2.9 percentage points has been the main driver for this result.⁸ This has translated into a slightly declining average boost in the GDP blend share of EMDCs due to the inclusion of PPP GDP,⁹ from 4.7 basis points in 2005 to 4.3 basis points in 2015.

⁸ As EMDCs' share in global MER GDP is smaller than their share in PPP GDP, the ratio of their MER to PPP GDP shares would increase in the absence of any convergence of their MER and PPP exchange rates, even if the growth rates of their PPP and market GDP are identical, but higher than those of the AEs as a whole. (For the sake of illustration, assuming an initial MER GDP share of 10 percent, PPP GDP share of 20 percent and corresponding MER to PPP GDP ratio of 0.5, and a uniform 100 increase in both PPP and MER GDP levels, would yield a new MER PPP share of 18.2 percent and a PPP share of 33.3 percent and corresponding MER to PPP GDP ratio of 0.55). Indeed, the difference in the size of the initial shares of EMDCs' MER and PPP GDP, and the fact that their GDP (both PPP and MER GDP) have grown faster than that of AEs, account for the bulk of the increase in the ratio of MER to PPP GDP share for EMDCs as a whole over 2005-2015.

⁹ Calculated as the average of differences between individual countries shares in the current GDP blend and their shares in MER GDP.

Figure 3. EMDCs: MER GDP and PPP GDP Shares, 2005-2015^{1/}
(in percent)



Source: IMF staff calculations based on data from quota data updates in 2008, 2009, 2010, 2011, 2012, 2013, 2014, 2015, 2016, and 2017.

^{1/} The Figure includes one structural break due to the switch in the 2014 data update to the 2011 ICP estimates (data for 2010-2012).

11. The results are subject to some caveats. For the purposes of assessing convergence, the sample period is relatively short since PPP GDP was introduced into the formula, covering only about a decade. Moreover, and especially over such limited time frames, price level convergence is sensitive to market exchange rate fluctuations, as illustrated by the impact of the notable appreciation of the US dollar from 2014 to 2015. More time will be needed to provide a fuller assessment of MER and PPP GDP convergence.

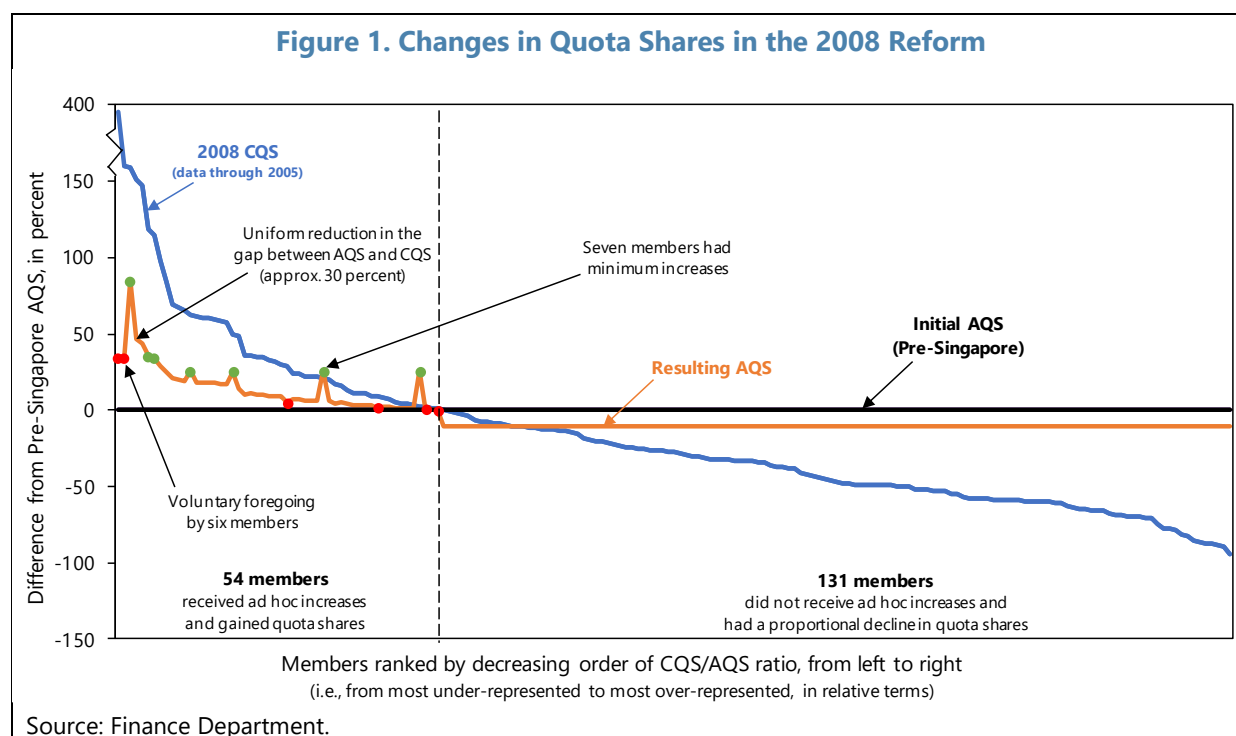
Annex VII. Realignment of Shares in Recent Quota Reforms

This Annex presents a description of the mechanisms used to distribute quota increases in the last two major quota reforms: the Quota and Voice Reform ("2008 Reform") and the 14th Review.

A. Quota Increases in the 2008 Reform¹

1. **The 2008 Reform comprised two rounds of increases.** The first round of increases, in 2006, resulted in a total quota increase of 1.8 percent. The second round raised quotas by a further 9.6 percent. The overall increase in the two rounds was 11.5 percent. Figure 1 illustrates the relative changes in quota shares after the two rounds.
2. **In the first round, agreed in 2006, quota increases were allocated to four members (China, Korea, Mexico, and Turkey) that were substantially underrepresented.** These members were under-represented according to the existing five-formula system and each of the four variables broadly considered by the Executive Board as appropriate for inclusion in a new quota formula. The quota increase reduced the gap between the AQS (as prevailing before the 2006 Annual Meetings in Singapore, or "Pre-Singapore") and the CQS (based on the five formulas) by one third.
3. **In the second round, agreed in 2008, quota increases were allocated to 54 members who were under-represented based on the new quota formula.** The gap between the "Pre-Singapore" AQS and CQS (based on the new formula) was reduced by the same uniform factor (of almost 30 percent) for all members eligible for an increase. For example, if the gap between AQS and CQS for an eligible member was 1 percentage point, that member would have an increase in its quota share of close to 0.3 percentage points. After the two rounds, members who were not eligible for an increase had a relative decline in quota shares of 10.3 percent.
4. **As part of the final agreement, the following elements were also adopted:**
 - *Foregoing:* Several under-represented advanced countries agreed to forego part of the quota increases that they were eligible for, to contribute to the broader reform. Ireland and Luxembourg agreed to a maximum nominal increase of 50 percent; Germany, Italy, Japan, and the United States agreed to have a smaller uniform reduction factor (less than 20 percent).
 - *Booster:* Three under-represented EMDCs that had shares in global PPP GDP substantially larger than their initial quota shares (by more than 75 percent) received a minimum nominal quota increase of 40 percent (Brazil, India, and Vietnam).
 - *Minimum increase:* The four countries that received the first round quota increase in 2006 were assured to receive in 2008 at least a minimum nominal quota increase of 15 percent.

¹ See [Report of the Managing Director to the International Monetary and Financial Committee on IMF Quota and Voice Reform](#) (4/8/08) and [Report of the Managing Director to the International Monetary and Financial Committee on IMF Quota and Voice Reform](#) (9/14/06).



B. Quota Increases in the 14th Review²

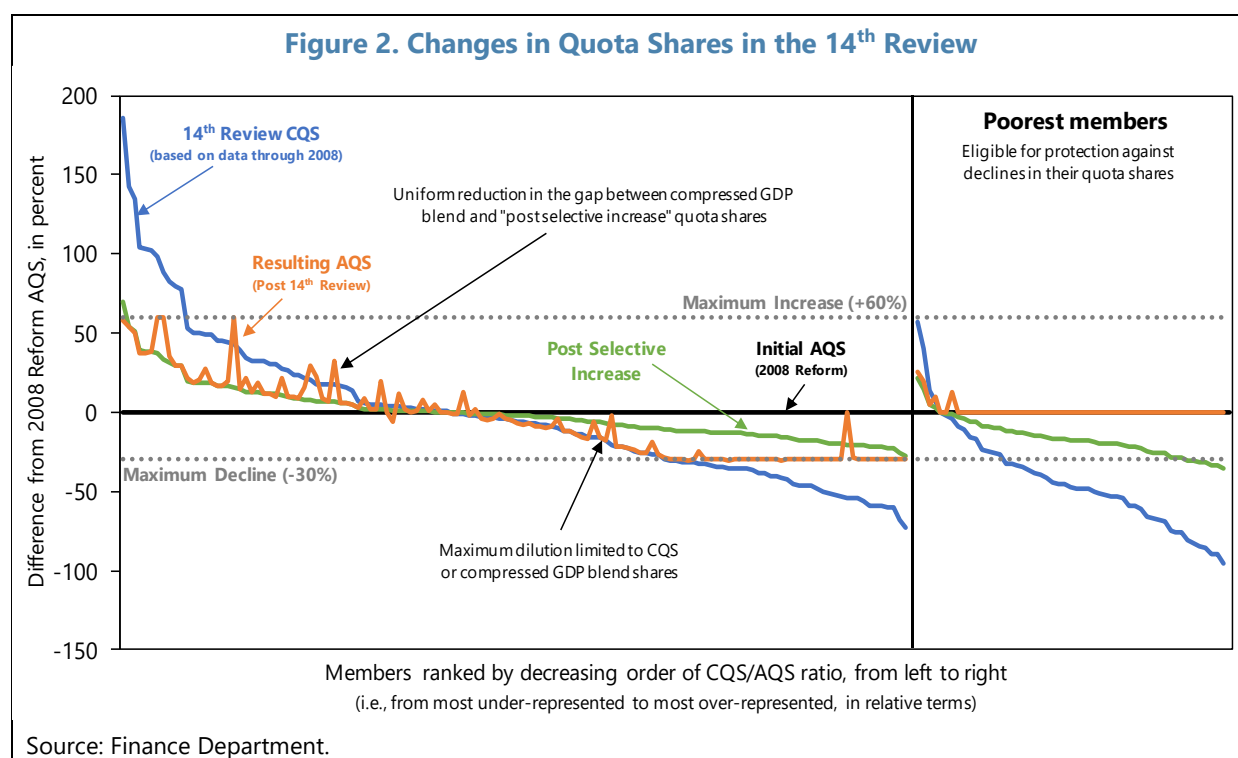
5. Compared with the 2008 Reform, the quota increase under the 14th Review, agreed in 2010, was much larger (100 percent) and involved a more complex allocation method. The increase was split into two main blocks: i) a formula-based selective increase (60 percent) and ii) an ad hoc increase to account for several non-formula considerations (40 percent). Figure 2 illustrates the resulting relative changes in quota shares.

6. The ad hoc increase was allocated mainly using a uniform proportional reduction mechanism. This was based on the gap between members' quota shares after the selective increase and their shares in the GDP blend variable (with a compression factor of 0.95). Advanced economies received half of the reduction factor applied to EMDCs, resulting in reduction factors of 27 and 54 percent, respectively.

² See [IMF Quota and Governance Reform—Elements of an Agreement](#) (10/31/10).

7. The ad hoc increase also included the following elements:

- The poorest countries were individually protected against a decline in their quota share.
- No member's nominal quota was increased by more than 220 percent (given the 100 percent total increase, this meant that no member's AQS increased by more than 60 percent).
- No member's AQS declined by more than 30 percent or by more than 0.85 percentage points.
- Members that were ineligible for the uniform reduction received some protections: i) those that were under-represented under the formula at least preserved the gain in quota shares from the selective increase, and ii) those that were over-represented under the formula were protected against falling below either their compressed GDP blend share or CQS, whichever was higher.
- The final distribution also included a voluntary foregoing by advanced economies to support the overall allocation and voluntary transfers between members.



Annex VIII. Protection of the Poorest and Smallest Members

The Board of Governors Resolution No. 66-2 on the 14th Review stated that steps shall be taken to protect the voice and representation of the poorest members under the 15th Review. The commitment to protect the voice and representation of the poorest members was reiterated in the Executive Board's report on the outcome of the 2013 Quota Formula Review and subsequent guidance by the IMFC and the Board of Governors.¹ At the Committee of the Whole (CoW) Meeting on September 1, 2017 Directors expressed continued commitment to protect the quota and voting share of poorest members under the 15th Review. Views varied on the precise definition of the poor countries to be protected, and many Directors called for protection also for small member states. Building on staff's earlier work, this Annex updates possible alternative lists of members that could qualify for protection, presents an additional list that would include also small developing states, and shows illustrative results of alternative lists and implications for the "cost of protection."

- 1. In the 14th Review, the definition of the poorest Fund members was based on PRGT-eligibility and per capita GNI.** Specifically, the poorest members were defined as PRGT-eligible countries with annual per capita GNI below the prevailing operational IDA cut-off in 2008 (US\$1,135) or below twice the IDA's cut-off for countries meeting the definition of a "small country" under the PRGT eligibility criteria. The countries covered included 52 members plus Zimbabwe, which was not PRGT-eligible at the time due to arrears. South Sudan, which subsequently joined the Fund, also met this criterion and was protected through the 14th Review quota increase in its membership resolution. The combined post-14th Review quota share² for these 54 countries is 3.3 percent.
- 2. Other options for defining the poorest members were also discussed at the time.** These included the full list of PRGT-eligible countries, as well as the list of LICs as defined in the IBRD's World Development Indicators with an annual per capita GNI of US\$975 or less. However, the definition described in the previous paragraph was the preferred approach. It was also decided that protection should be provided through ad hoc quota increases at the individual country level for the eligible countries in the group rather than for the group as a whole.
- 3. The August 2017 paper discussed options for defining the poorest members of the Fund.**³ These included (i) the definition used in the 14th Review, based on PRGT-eligibility and per capita GNI, but applying the updated FY 2017 IDA per capita GNI threshold of US\$1,185; (ii) the list

¹ See, e.g., the *Board of Governors Resolution No. 72-1 on the Fifteenth General Review of Quotas* (12/5/16); [Communiqué of the Thirty-Fifth Meeting of the IMFC](#), April 22, 2017, Washington, D.C.; and [Communiqué of the Thirty-Sixth Meeting of the IMFC](#), October 14, 2017, Washington, D.C.

² Post-14th Review quota shares are calculated assuming that all members have paid for quota increases under the 14th Review. As of December 18, 2017, only eight members had not paid for their quota increases. Marshall Islands, Palau, and Papua New Guinea had consented to, but not yet paid for their quota increases. Eritrea, Micronesia, Somalia, Sudan, and Syria had not consented to their quota increases under the 14th Review. Somalia and Sudan are currently not eligible to consent to their quota increases under the 11th and 14th General Reviews due to protracted arrears to the Fund in the General Resources Account.

³ See [Fifteenth General Review of Quotas—Quota Formula and Realigning Shares—Annexes](#) (8/3/17).

of all currently PRGT-eligible countries; (iii) the United Nations list of least developed countries (LDCs); and (iv) the WEO's list of Low Income Developing Countries (LIDCs).

4. Table 1 presents the lists of poorest Fund members based on the definitions discussed in the August 2017 paper. The lists are unchanged, except for the WEO LIDC list, which was updated in August 2017. In 2014, LIDCs had been defined as countries that (i) were designated PRGT-eligible in the 2013 PRGT eligibility review, and (ii) had a level of per capita GNI less than the PRGT income graduation threshold for non-small states (that is, twice the IDA operational threshold, or US\$2,390 in 2011 as measured by the World Bank's Atlas method), and also Zimbabwe. In 2017 the per-capita GNI threshold was raised to US\$2,700, after adjusting for median growth in GNI per capita among the original LIDC grouping of some 12 percent during 2011-16. Bolivia and Mongolia were thereby dropped from the LIDC grouping as they had 2016 GNI per capita that exceeded the income threshold level (by 14 percent and 31 percent, respectively). At the same time, Timor-Leste was added to the group, reflecting a significant fall in income levels (partly a consequence of large declines in oil prices). The current LIDC list includes 59 countries, all with a GNI per capita of less than US\$2,700, and with a combined AQS of 4.0 percent.

5. This Annex also presents the impact of protecting small developing states in addition to the poorest members. The IMF defines small states as developing countries that are Fund members with populations below 1.5 million.⁴ The Fund currently has 34 members that are small states. Among these, five members are PRGT-eligible and meet the IDA per capita GNI threshold, 15 members are PRGT-eligible but do not meet the IDA threshold, and 14 members are not PRGT-eligible. In line with a definition requested by many Directors at the September 1 CoW meeting, Table 1 presents an alternative list of protected members comprising PRGT-eligible countries and small developing states, including 84 member countries with a combined AQS of 3.6 percent. For the sake of comparison, a list comprising members that meet the updated 14th Review criteria and the small states would comprise 66 members with a combined AQS of 2.1 percent.

6. In all cases, the cost of protection is estimated to be relatively small. The cost of protection is calculated as the share of the total quota increase allotted for protection under various scenarios outlined in the main paper, and varies from 0.8 to 1.6 percent (see Table 2)

7. To illustrate the impact of adopting a broader definition of poorest members, additional simulations of quota increases are presented. Table 3 shows the results of selective increases with the same specifications as in the main paper (analogous to Table 6), but considering the widest definition of protected members: PRGT-eligible plus small developing states (84 members).

⁴ See [2017 Staff Guidance Note on the Fund's Engagement with Small Developing States](#) (12/12/17).

Table 1. Alternative Lists of Poorest Member Countries Qualifying for Protection

Country 1/	PRGT-eligible countries 2/	14 th Review List 3/	Updated IDA Cut-off List 4/	United Nations List	WEO LIDC List	PRGT-eligible plus small developing states
1 Afghanistan	x	x	x	x	x	x
2 Angola				x		
3 Antigua and Barbuda						x
4 Bahamas, The						x
5 Bangladesh	x	x		x	x	x
6 Barbados						x
7 Belize						x
8 Benin	x	x	x	x	x	x
9 Bhutan	x	x		x	x	x
10 Bolivia						
11 Burkina Faso	x	x	x	x	x	x
12 Burundi	x	x	x	x	x	x
13 Cabo Verde	x					x
14 Cambodia	x	x	x	x	x	x
15 Cameroon	x				x	x
16 Central African Rep.	x	x	x	x	x	x
17 Chad	x	x	x	x	x	x
18 Comoros	x	x	x	x	x	x
19 Congo, Dem. Rep. of	x	x	x	x	x	x
20 Congo, Rep. of	x				x	x
21 Côte d'Ivoire	x	x			x	x
22 Djibouti	x	x	x	x	x	x
23 Dominica	x					x
24 Eritrea	x	x	x	x	x	x
25 Ethiopia	x	x	x	x	x	x
26 Fiji						x
27 Gambia, The	x	x	x	x	x	x
28 Ghana	x	x			x	x
29 Grenada	x					x
30 Guinea	x	x	x	x	x	x
31 Guinea-Bissau	x	x	x	x	x	x
32 Guyana	x	x				x
33 Haiti	x	x	x	x	x	x
34 Honduras	x				x	x
35 Kenya	x	x			x	x
36 Kiribati	x	x		x	x	x
37 Kyrgyz Republic	x	x	x		x	x
38 Lao P.D.R.	x	x		x	x	x
39 Lesotho	x	x		x	x	x
40 Liberia	x	x	x	x	x	x
41 Madagascar	x	x	x	x	x	x
42 Malawi	x	x	x	x	x	x
43 Maldives	x					x
44 Mali	x	x	x	x	x	x
45 Marshall Islands	x					x
46 Mauritania	x	x		x	x	x
47 Mauritius						x
48 Micronesia	x					x
49 Moldova	x				x	x
50 Mongolia						
51 Montenegro						x
52 Mozambique	x	x	x	x	x	x
53 Myanmar	x	x	x	x	x	x
54 Nauru						x
55 Nepal	x	x	x	x	x	x
56 Nicaragua	x	x			x	x
57 Niger	x	x	x	x	x	x
58 Nigeria					x	
59 Palau						x
60 Papua New Guinea	x	x			x	x
61 Rwanda	x	x	x	x	x	x
62 Samoa	x					x
63 São Tomé and Príncipe	x	x	x	x	x	x
64 Senegal	x	x	x	x	x	x
65 Seychelles						x

Table 1. Alternative Lists of Poorest Member Countries Qualifying for Protection (concluded)

Country 1/	PRGT eligible countries 2/	14 th Review List 3/	Updated IDA Cut-off List 4/	United Nations List	WEO LIDC List	PRGT-eligible plus small developing states
66 Sierra Leone	x	x	x	x	x	x
67 Solomon Islands	x	x	x	x	x	x
68 Somalia	x	x		x	x	x
69 South Sudan	x	x	x	x	x	x
70 St. Kitts and Nevis						x
71 St. Lucia	x					x
72 St. Vincent and the Grenadines	x					x
73 Sudan	x	x		x	x	x
74 Suriname						x
75 Swaziland						x
76 Tajikistan	x	x			x	x
77 Tanzania	x	x	x	x	x	x
78 Timor-Leste	x		x	x	x	x
79 Togo	x	x	x	x	x	x
80 Tonga	x					x
81 Trinidad and Tobago						x
82 Tuvalu	x			x		x
83 Uganda	x	x	x	x	x	x
84 Uzbekistan	x	x			x	x
85 Vanuatu	x			x		x
86 Vietnam		x			x	
87 Yemen	x	x	x	x	x	x
88 Zambia	x	x		x	x	x
89 Zimbabwe	x	x	x		x	x
Number of members	70	54	37	47	59	84
Combined AQS of members in the list (percent)	3.3	3.3	1.7	2.4	4.0	3.6
Combined CQS of members in the list, based on the current formula and data through 2015 (percent)	2.3	2.5	1.1	1.8	3.3	2.5
Number of eligible countries for which AQS > CQS	57	44	30	36	46	69

1/ Small developing states, as defined by the IMF, are highlighted in bold.

2/ Effective May 31, 2017.

3/ Countries that were PRGT-eligible and met the IDA per capita GNI cut-off of US\$1,135 in 2008 (or twice that amount for small states, as defined by the IMF), plus Zimbabwe.

4/ Countries that are PRGT-eligible and meet the FY 2017 IDA per capita GNI cut-off of US\$1,185 (data through 2015) and twice that amount for small states, as defined by the IMF.

Table 2. Cost of Protection – Share of total Quota Increase Allotted for Protection (In percent)

Allocation Method	Formula	PRGT-eligible countries	14 th Review List	Updated IDA Cut-off List	United Nations List	WEO LIDC List	PRGT-eligible plus small developing states
Selective Increase	Formula 1.2	1.31	1.26	0.78	0.87	1.26	1.41
	Formula 3.2.c	1.27	1.22	0.75	0.85	1.22	1.37
	Midpoint Set C	1.42	1.35	0.84	0.92	1.37	1.56
Selective Increase with Ad Hoc Element Proportional to VFCS II (5 percent of total increase)	Formula 1.2	1.35	1.31	0.80	0.90	1.31	1.46
	Formula 3.2.c	1.31	1.27	0.78	0.88	1.27	1.42
	Midpoint Set C	1.46	1.40	0.86	0.95	1.41	1.60

Source: Finance Department.

Table 3. Illustrative Allocations – Selective Increase with Protection for the Group of PRGT-eligible Members and Small Developing States^{1/}
(In percent)

	14th Review	Current Formula	Formula 1.2	Overall Increase			Formula 3.2.c	Overall Increase			Midpoint Set C Formula	Overall Increase		
				50%	75%	100%		50%	75%	100%		50%	75%	100%
Advanced economies	57.6	50.2	49.8	54.8	54.0	53.4	49.2	54.6	53.7	53.1	49.9	54.8	54.0	53.4
Major advanced economies	43.4	35.7	36.4	40.9	40.1	39.6	37.7	41.3	40.7	40.3	38.3	41.5	41.0	40.6
United States	17.4	14.5	15.2	16.6	16.3	16.2	15.6	16.7	16.5	16.4	17.4	17.3	17.3	17.3
Japan	6.5	5.1	5.1	6.0	5.9	5.8	5.3	6.0	5.9	5.8	5.3	6.0	5.9	5.8
Germany	5.6	5.0	4.9	5.3	5.3	5.2	5.1	5.4	5.3	5.3	4.7	5.3	5.2	5.1
France	4.2	3.2	3.2	3.9	3.8	3.7	3.4	3.9	3.8	3.8	3.2	3.9	3.8	3.7
United Kingdom	4.2	3.6	3.4	3.9	3.9	3.8	3.6	4.0	3.9	3.9	3.4	3.9	3.8	3.8
Italy	3.2	2.4	2.4	2.9	2.8	2.8	2.5	2.9	2.9	2.8	2.4	2.9	2.8	2.8
Canada	2.3	2.0	2.1	2.2	2.2	2.2	2.2	2.3	2.2	2.2	2.0	2.2	2.2	2.2
Other advanced economies	14.3	14.5	13.4	13.9	13.8	13.7	11.5	13.3	13.0	12.8	11.5	13.3	13.0	12.8
Spain	2.0	1.8	1.7	1.9	1.9	1.8	1.8	1.9	1.9	1.9	1.7	1.9	1.9	1.8
Netherlands	1.8	2.1	1.9	1.8	1.8	1.9	1.2	1.6	1.6	1.5	1.5	1.7	1.7	1.7
Australia	1.4	1.4	1.5	1.4	1.4	1.4	1.5	1.4	1.4	1.4	1.5	1.4	1.4	1.4
Belgium	1.3	1.1	1.1	1.2	1.2	1.2	0.8	1.1	1.1	1.0	0.8	1.2	1.1	1.1
Switzerland	1.2	1.7	1.5	1.3	1.3	1.3	1.2	1.2	1.2	1.2	1.2	1.2	1.2	1.2
Sweden	0.9	0.9	0.8	0.9	0.9	0.9	0.8	0.9	0.9	0.9	0.7	0.9	0.8	0.8
Austria	0.8	0.7	0.7	0.8	0.8	0.7	0.6	0.8	0.7	0.7	0.6	0.7	0.7	0.7
Norway	0.8	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.6	0.7	0.7	0.7
Ireland	0.7	0.8	0.7	0.7	0.7	0.7	0.4	0.6	0.6	0.6	0.5	0.7	0.6	0.6
Denmark	0.7	0.6	0.6	0.7	0.6	0.6	0.5	0.7	0.6	0.6	0.5	0.6	0.6	0.6
EMDCs 2/	42.4	49.8	50.2	45.2	46.0	46.6	50.8	45.4	46.3	46.9	50.1	45.2	46.0	46.6
Africa	4.4	3.7	3.6	4.5	4.5	4.5	3.7	4.5	4.5	4.5	3.4	4.5	4.5	4.5
South Africa	0.6	0.5	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.6	0.6	0.6
Nigeria	0.5	0.7	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6	0.7	0.6	0.6	0.6
Asia	16.0	24.2	25.4	19.1	19.9	20.6	25.6	19.1	20.0	20.7	26.1	19.3	20.2	20.9
China 3/	6.4	12.6	13.3	8.6	9.3	9.8	13.7	8.8	9.5	10.0	14.3	8.9	9.7	10.2
India	2.7	3.1	3.4	3.0	3.0	3.1	3.5	3.0	3.1	3.1	3.8	3.1	3.2	3.2
Korea, Republic of	1.8	2.0	2.2	1.9	1.9	2.0	2.3	1.9	2.0	2.0	2.0	1.8	1.9	1.9
Indonesia	1.0	1.3	1.4	1.1	1.1	1.2	1.4	1.1	1.2	1.2	1.5	1.2	1.2	1.2
Singapore	0.8	1.3	1.2	0.9	1.0	1.0	0.7	0.8	0.7	0.7	0.9	0.8	0.8	0.8
Malaysia	0.8	0.8	0.7	0.8	0.8	0.7	0.8	0.8	0.8	0.8	0.7	0.7	0.7	0.7
Thailand	0.7	1.0	0.9	0.8	0.8	0.8	1.0	0.8	0.8	0.8	0.8	0.7	0.7	0.7
Middle East, Malta and Turkey	6.7	7.2	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.7	6.3	6.6	6.5	6.5
Saudi Arabia	2.1	1.7	1.5	1.9	1.8	1.8	1.5	1.9	1.8	1.8	1.3	1.8	1.8	1.7
Turkey	1.0	1.2	1.2	1.0	1.1	1.1	1.2	1.1	1.1	1.1	1.2	1.1	1.1	1.1
Iran, I.R. of	0.7	0.7	0.7	0.7	0.7	0.7	0.8	0.7	0.7	0.7	0.8	0.8	0.8	0.8
Western Hemisphere	7.9	7.4	7.6	7.8	7.8	7.8	7.8	7.9	7.9	7.9	7.8	7.9	7.9	7.9
Brazil	2.3	2.3	2.3	2.3	2.3	2.3	2.4	2.3	2.3	2.3	2.6	2.4	2.4	2.4
Mexico	1.9	1.7	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8	1.8
Venezuela, R.B. de	0.8	0.6	0.6	0.7	0.7	0.7	0.6	0.7	0.7	0.7	0.6	0.7	0.7	0.7
Argentina	0.7	0.6	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7	0.7
Transition economies	7.2	7.3	7.0	7.1	7.1	7.1	7.0	7.1	7.1	7.1	6.5	7.0	6.9	6.9
Russia	2.7	2.6	2.6	2.6	2.6	2.6	2.7	2.7	2.7	2.7	2.7	2.7	2.7	2.7
Poland	0.9	0.9	0.9	0.9	0.9	0.9	1.0	0.9	0.9	0.9	0.8	0.8	0.8	0.8
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Memorandum Items:														
EU-28	30.4	27.0	26.0	28.8	28.3	28.0	24.8	28.4	27.8	27.4	23.8	28.1	27.4	26.9
LICs 4/	3.3	2.3	2.2	3.4	3.4	3.4	2.3	3.4	3.4	3.4	2.1	3.4	3.4	3.4
Updated 14th Review Poorest 5/	1.7	1.1	1.0	1.7	1.8	1.8	1.1	1.7	1.8	1.8	1.0	1.7	1.8	1.8
PRGT-eligible plus Small States 6/	3.6	2.5	2.4	3.6	3.7	3.7	2.4	3.7	3.7	3.7	2.2	3.6	3.7	3.7

Source: Finance Department.

1/ All simulations show distributions based on the quota formula (i.e., selective increases) plus ad hoc increases where needed to protect the shares of PRGT-eligible members and small developing states.

2/ Including Czech Republic, Estonia, Korea, Latvia, Lithuania, Malta, Singapore, Slovak Republic, and Slovenia.

3/ Including China, P.R., Hong Kong SAR, and Macao SAR.

4/ Currently PRGT-eligible countries.

5/ Updated 14th Review list to include countries that are PRGT-eligible and meet the FY 2017 IDA per capita GNI cut-off of US\$1,185 (data through 2015) and twice that amount for small states, as defined by the IMF. Currently includes 37 member countries.

6/ Currently PRGT-eligible countries plus small developing states, includes 84 members.

Annex IX. Voluntary Financial Contributions

This Annex updates staff estimates of members' voluntary financial contributions to the Fund. The calculations cover the main forms of voluntary financial contributions. Building on staff's earlier work, it also updates the three alternative forms of aggregating voluntary financial contributions.

Background

1. **This update covers only members' voluntary financial contributions to the Fund.** For example, members' participation in the Financial Transactions Plan is not covered as this is an obligation of members that meet the relevant criteria. Similarly, the estimates include only financial contributions and do not attempt to capture members' in-kind contributions or financing provided by members bilaterally to other members in the context of the Fund's financial arrangements.
2. **As in the past, the voluntary financial contributions considered in this Annex include a broad range of contributions.** They cover Bilateral Borrowing Agreements (BBAs), multilateral support for Fund liquidity in the GRA through the New Arrangements to Borrow (NAB),¹ loan contributions to the PRGT (and its predecessors), subsidy contributions for concessional financing, and capacity development (CD). As discussed below, there are multiple ways of aggregating these different forms of financial contributions.

Update of the Three Aggregate Measures

3. **The Annex updates the three aggregate measures of voluntary financial contributions presented in Supplement 1 of the [August 2017 paper](#).** The main updates relate to the data on the 2016 BBAs, with relatively small updates to the other components. The aggregate measures of voluntary financial contributions are defined as follows:²
 - **VFCS I** – the simple average of member contribution shares to the following five voluntary financial contributions: i) NAB, ii) 2016 BBAs as of end-October 2017,³ iii) PRGT loans, iv) subsidies for concessional financing, and v) CD.
 - **VFCS II** – the same contributions as in VFCS I, but with fixed weights for the main forms of contributions. Specifically, VFCS II is a weighted average of member contributions to the NAB (0.3), 2016 BBAs as of end-October 2017 (0.3), PRGT loans and subsidies for concessional

¹ The GAB is not included in the illustrative aggregate measures of voluntary financial contributions because it does not add to the Fund's overall lending envelope, as outstanding drawings and available commitments under the NAB and the GAB may not exceed the total amount of NAB credit arrangements.

² See Box 1 for more details, and Table

1 for a summary of selected indicators of members' financial contributions to the Fund. Table 2 provides a summary of the distribution across broad country groups of these three aggregate measures of voluntary financial contributions.

³ 2016 BBAs comprise all the 35 creditors under the 2012 BBAs and five new creditors.

financing combined (0.2), and CD (0.2). The higher weight on NAB/bilateral resources reflects to some extent the large magnitude of resources provided compared to contributions to concessional financing and CD.

- **VFCS III** – the same contributions as in VFCS I, but using the greater of the 14th Review quota share or VFCS I share rebased to ensure that total shares add up to 100 percent. This metric recognizes members that have provided financial contributions in excess of their respective quota shares.

Box 1. Components of Voluntary Financial Contributions Shares

Aggregate measures of Voluntary Financial Contributions by member countries comprise five key components:

- All credit arrangements under the New Arrangements to Borrow (NAB) that were effective as of end-September 2017.
- All effective 2016 BBAs and pledges to the 2016 BBAs as of end-October 2017.
- All loan commitments by member countries to the PRG Trust (and its predecessors) cumulative from 1988 to end-September 2017.
- Cumulative subsidy contribution (as of end-September 2017) to various concessional financing initiatives, including:^{1/}
 - (i) the Poverty Reduction and Growth Facility and Exogenous Shocks Facility Trust, or PRGF-ESF Trust (1987);
 - (ii) the Trust for Special Poverty Reduction and Growth Operations for the Heavily Indebted Poor Countries and Interim ECF Subsidy Operations, or PRG-HIPC Trust (1999);
 - (iii) the Multilateral Debt Relief Initiative, or MDRI, and ESF (2005);
 - (iv) the PRGT Subsidy Accounts (2009); and
 - (v) the Catastrophe Containment and Relief Trust, or CCRT (2015); as well as
 - (vi) the distribution in 2012/13 of windfall profits from the sale of gold in 2009/10 to the PRGT Subsidy Account.
- Net disbursements for CD over the period FY1999-FY2018Q1.

^{1/} Years refer to start of new fundraising round (in some cases multi-year) approved by the Executive Board.

Table 1. Financial Contributions to the Fund: Selected Indicators
(In percent, unless otherwise indicated)

	14th Review	Share in Financial Contributions to				
	Quota Share	NAB with Rollback 1/	Bilateral Borrowing Agreements 2/	PRGT Loans 3/	Concessional Financing Subsidies 4/	Capacity Development 5/
Advanced Economies	57.6	75.0	66.3	88.6	79.8	84.5
Major advanced economies	43.4	57.9	44.0	67.5	59.7	59.7
United States	17.4	15.6	0.0	0.0	12.3	0.7
Japan	6.5	18.6	13.4	24.6	13.8	35.8
Germany	5.6	7.2	10.8	7.7	6.4	2.8
France	4.2	5.3	8.2	13.8	7.5	1.5
United Kingdom	4.2	5.3	2.9	9.4	9.6	9.9
Italy	3.2	3.8	6.1	7.3	5.0	0.9
Canada	2.3	2.1	2.6	4.8	5.1	8.3
Other advanced economies	14.3	17.1	22.3	21.1	20.1	24.8
Spain	2.0	1.9	3.9	4.4	1.3	0.5
Netherlands	1.8	2.5	3.5	4.1	3.2	4.1
Australia	1.4	1.2	1.4	0.0	1.2	3.7
Belgium	1.3	2.2	2.6	3.0	2.4	1.7
Switzerland	1.2	3.1	1.9	4.5	2.4	8.5
Sweden	0.9	1.3	2.3	1.4	3.0	0.9
Austria	0.8	1.0	1.6	0.0	1.4	0.1
Norway	0.8	1.1	1.9	2.1	1.4	2.3
Ireland	0.7	0.0	0.0	0.0	0.2	0.0
Denmark	0.7	0.9	1.4	1.7	1.4	0.8
Emerging Market and Developing Countries 6/	42.4	25.0	33.7	11.4	20.2	15.5
Africa	4.4	0.2	1.6	0.0	2.5	5.0
South Africa	0.6	0.2	0.4	0.0	0.7	0.0
Nigeria	0.5	0.0	0.0	0.0	0.4	0.0
Asia	16.0	14.0	17.5	8.1	7.7	3.2
China 7/	6.4	8.8	9.6	5.1	2.0	0.4
India	2.7	2.5	2.2	0.0	1.3	1.1
Korea	1.8	1.9	3.4	3.1	1.6	1.4
Indonesia	1.0	0.0	0.0	0.0	0.2	0.0
Malaysia	0.8	0.2	0.2	0.0	0.8	0.0
Singapore	0.8	0.4	0.9	0.0	0.6	0.0
Thailand	0.7	0.2	0.9	0.0	0.4	0.0
Middle East, Malta, and Turkey	6.7	3.3	4.5	1.8	4.2	5.5
Saudi Arabia	2.1	3.1	3.4	1.4	2.6	0.3
Turkey	1.0	0.0	1.1	0.0	0.4	0.0
Iran, Islamic Republic of	0.7	0.0	0.0	0.0	0.3	0.0
Western Hemisphere	7.9	4.3	5.1	1.4	2.9	1.6
Brazil	2.3	2.5	2.2	1.4	0.2	0.2
Mexico	1.9	1.4	2.2	0.0	1.2	0.7
Venezuela, R.B. de	0.8	0.0	0.0	0.0	0.0	0.0
Argentina	0.7	0.0	0.0	0.0	1.0	0.0
Transition economies	7.2	3.2	4.9	0.0	2.9	0.1
Russia	2.7	2.5	2.2	0.0	1.4	0.1
Poland	0.9	0.7	1.6	0.0	0.2	0.0
Total	100.0	100.0	100.0	100.0	100.0	100.0
Memorandum Item:						
EU28	30.4	33.6	47.6	52.7	44.3	24.1
LiCs 8/	3.3	0.0	0.0	0.0	0.9	2.8
Total contributions (in millions of SDRs) 9/		180,233	317,965	35,558	7,494	1,356

Source: Finance Department.

1/ All credit arrangements under the NAB that were effective as of end-September 2017.

2/ All effective 2016 BBAs and pledges to the 2016 BBAs as of end-October 2017.

3/ Cumulative loan commitments to the PRGF-ESF Trust as of end-September 2017.

4/ Total bilateral resources received or pledged since 1987 for subsidizing concessional lending, and HIPC, MDRI and CCRT debt relief, as of end-September 2017.

5/ Cash contributions to the IMF for technical assistance and training (excluding in kind contributions), FY1999-FY2018Q1.

6/ Including Czech Republic, Estonia, Korea, Latvia, Lithuania, Malta, Singapore, Slovak Republic, and Slovenia.

7/ Including China, P.R. Hong Kong SAR and Macao SAR.

8/ Currently PRGT-eligible countries.

9/ Except for capacity development, which is in millions of US dollars.

Table 2. Financial Contributions to the Fund: Aggregate Measures
(In percent)

	14th Review Quota Share	Calculated Quota Share (CQS)	Various aggregate measures		
			VFCS I 1/	VFCS II 2/	VFCS III 3/
Advanced Economies	57.6	50.2	78.9	76.7	67.8
Major advanced economies	43.4	35.7	57.8	55.7	51.0
United States	17.4	14.5	5.7	5.3	12.8
Japan	6.5	5.1	21.2	21.3	15.6
Germany	5.6	5.0	7.0	7.4	5.1
France	4.2	3.2	7.2	6.9	5.3
United Kingdom	4.2	3.6	7.4	6.3	5.4
Italy	3.2	2.4	4.6	4.5	3.4
Canada	2.3	2.0	4.6	4.1	3.4
Other advanced economies	14.3	14.5	21.1	21.0	16.8
Spain	2.0	1.8	2.4	2.6	1.8
Netherlands	1.8	2.1	3.5	3.4	2.6
Australia	1.4	1.4	1.5	1.6	1.1
Belgium	1.3	1.1	2.4	2.3	1.7
Switzerland	1.2	1.7	4.1	4.0	3.0
Sweden	0.9	0.9	1.8	1.6	1.3
Austria	0.8	0.7	0.8	0.9	0.6
Norway	0.8	0.7	1.8	1.8	1.3
Ireland	0.7	0.8	0.0	0.0	0.5
Denmark	0.7	0.6	1.2	1.2	0.9
Emerging Market and Developing Countries 4/	42.4	49.8	21.1	23.3	32.2
Africa	4.4	3.7	1.8	1.6	3.6
South Africa	0.6	0.5	0.3	0.2	0.5
Nigeria	0.5	0.7	0.1	0.0	0.4
Asia	16.0	24.2	10.1	11.7	12.1
China 5/	6.4	12.6	5.2	6.5	4.7
India	2.7	3.1	1.4	1.7	2.0
Korea	1.8	2.0	2.3	2.4	1.7
Indonesia	1.0	1.3	0.0	0.0	0.7
Malaysia	0.8	0.8	0.2	0.2	0.6
Singapore	0.8	1.3	0.4	0.4	0.6
Thailand	0.7	1.0	0.3	0.3	0.5
Middle East, Malta, and Turkey	6.7	7.2	3.9	3.9	5.3
Saudi Arabia	2.1	1.7	2.1	2.3	1.6
Turkey	1.0	1.2	0.3	0.3	0.7
Iran, Islamic Republic of	0.7	0.7	0.1	0.0	0.5
Western Hemisphere	7.9	7.4	3.1	3.5	5.8
Brazil	2.3	2.3	1.3	1.7	1.7
Mexico	1.9	1.7	1.1	1.3	1.4
Venezuela, R.B. de	0.8	0.6	0.0	0.0	0.6
Argentina	0.7	0.6	0.2	0.0	0.5
Transition economies	7.2	7.3	2.2	2.5	5.3
Russia	2.7	2.6	1.2	1.5	2.0
Poland	0.9	0.9	0.5	0.7	0.6
Total	100.0	100.0	100.0	100.0	100.0
Memorandum Item:					
EU28	30.4	27.0	40.4	39.4	32.3
LICs 6/	3.3	2.3	0.7	0.6	2.5

Source: Finance Department.

1/ Average of contribution shares in NAB, BBAs, PRGT loans, concessional financing subsidies, and capacity development.

2/ Weighted average of contribution shares with weights of 0.3 for NAB, 0.3 for BBAs, 0.2 for PRGT loans and concessional financing subsidies combined, and 0.2 for capacity development.

3/ Measure of "generous" contributions which uses the higher of 14th Review quota share or VFCS I share rebased to ensure that total shares add up to 100 percent.

4/ Including Czech Republic, Estonia, Korea, Latvia, Lithuania, Malta, Singapore, Slovak Republic, and Slovenia.

5/ Including China, P.R., Hong Kong SAR, and Macao SAR.

6/ Currently PRGT-eligible countries.