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Supplement 1

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May 1, 2000

To: Members of the Executive Board

From: The Secretary

Subject: **External Review of the Quota Formulas—Annex**

Attached is an Annex to the paper on the External Review of the Quota Formulas (EBAP/00/52, 5/1/00), which is scheduled for a seminar discussion on a date to be determined.

Mr. Roncesvalles (ext. 37800) and Mr. Papaioannou (ext. 37799) are available to answer technical or factual questions relating to this paper. Mr. Tweedie (ext. 36944) is also available to answer technical or factual questions on Annex Note 2.

Att: (1)

Other Distribution:
Department Heads

**REPORT TO THE IMF EXECUTIVE BOARD OF THE
QUOTA FORMULA REVIEW GROUP**

ANNEX

April 28, 2000

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NOTE 1. THE NONLINEAR ELEMENT IN THE EXISTING QUOTA FORMULAS

1. The nonlinear element in the existing quota formulas consists of the multiplicative term of one plus a measure of the openness ratio (current receipts over GDP), applied to the result of a linear equation containing GDP, reserves, current payments, and variability of current receipts as variables. The original motivation underlying the nonlinear form of the Bretton Woods formula was to approximate a preconceived structure of actual quotas by raising the quotas of countries with very open economies. However, for countries with a very high ratio of current receipts to GDP, *increases* in GDP not generated by exports lead to *decreases* in their calculated quotas. As can be seen in the Table 1.1, this negative relationship between changes in calculated quota and changes in GDP is more likely the smaller is a member's economy, and the higher its ratio of exports to GDP.¹ The relationship also holds if the GDP figure is artificially low because of measurement problems. Of the 182 members at the time of the Eleventh Review, 87 are subject to this negative relationship.

2. For a significant number of countries, the nonlinear element in the Bretton Woods formula generates results that appear to be unduly high. If the formula determined actual quotas, a country with very high export-to-GDP ratio that is a creditor in the IMF, such as Botswana, would be expected to support IMF operations up to four times more (as a percentage of GDP) than another creditor member, such as Spain, whose export ratio is close to the average for all members. Moreover, a significant number of countries are similar to Botswana in having calculated quotas that reflect the perverse effect of the nonlinear element. Among them, for example, are Ireland, Luxembourg, Malaysia, San Marino, and Singapore. These countries' calculated quota shares at the time of the Eleventh Review exceeded their then existing quota shares by more than 50 percent.

3. There is no particular rationale for positing a nonlinear relationship between a country's GDP and its quota, at least not of the type exhibited by the Bretton Woods formula.² Statistical work conducted by the IMF staff in past quota reviews (in 1969, 1973,

¹ Using the reduced Bretton Woods formula, an increase in GDP (Y) leads to a decline in

quota, Q , i.e., $\frac{\partial Q}{\partial Y} < 0$, when $\frac{C}{Y} > \left[\frac{0.01Y}{(0.025R + 0.05P + 0.2276VC)} \right]$ where C is current

receipts, R is reserves, P is current payments, and VC is variability of current receipts. The partial elasticity also tends to be more negative the smaller the contribution of GDP to the calculated quota (see Table 1.2).

² The relationship in the existing formula is such that the second partial derivative of quota to GDP is positive, i.e., the higher the GDP, the faster the rise (or smaller the fall) in quota. This is the opposite of a nonlinear, positive, asymptotic relationship, in which the extreme observations of GDP tend to have a *lesser* effect on the calculated quota, which might conceivably have some economic rationale. Such a functional form would be suggested by

(continued...)

1982, 1987, and 1994) has also shown that it is possible to approximate actual quotas about as well, overall, by using formulas that did not contain the openness ratio as a multiplier. As might be expected, the versions of the formula without the ratio tended to give a higher coefficient to external trade variables as a means of reflecting the influence of an economy's openness on the actual quota. Thus, the issue of whether to retain the nonlinear element in the formula is mainly a matter of form, though, as noted above, the nonlinear formula tends to raise the calculated quotas of the relatively small countries with very open economies. Dropping the ratio avoids the more extreme results observed from nonlinear formulas, whereas including the openness ratio as a separate variable in a linear quota formula would not avoid the problems of nonlinearity incorporated in the existing Bretton Woods formula. A further advantage of dropping the ratio is relative simplicity of the formula.

diminishing (but positive) "returns" on a country's ability to contribute resources the higher its national income. The second partial derivative of quota with respect to GDP in this case is negative.

Table 1.1. Relationship Between Calculated Quotas and Variables Entering into the Quota Formulas

	Partial Elasticity of the Calculated Quota with respect to: 1/					<i>Memo:</i>	
	GDP	Reserves	Current	Current	Variability	Equation for Calculated Quota	Ratio of Current Receipts to GDP
			Payments	Receipts			
United States	0.47	0.02	0.34	0.10	0.07	BW	0.11
Japan	0.56	0.04	0.27	0.09	0.04	BW	0.10
Germany	0.02	0.05	0.43	0.25	0.25	Sch. IV and M7	0.28
France	0.18	0.02	0.51	0.21	0.08	BW	0.27
United Kingdom	0.11	0.03	0.55	0.24	0.07	BW	0.31
Italy	0.19	0.03	0.50	0.20	0.08	BW	0.25
Saudi Arabia	0.05	0.03	0.26	0.21	0.45	Sch. M4 and M7	0.48
Canada	0.09	0.02	0.29	0.26	0.34	Sch. M4 and M7	0.33
Russia	0.01	0.01	0.31	0.21	0.46	Sch. III and M4	0.28
Netherlands	-0.12	0.06	0.63	0.37	0.07	BW	0.57
China	0.35	0.08	0.38	0.14	0.05	BW	0.16
Belgium	-0.20	0.03	0.66	0.40	0.10	BW	0.67
India	0.45	0.08	0.33	0.09	0.05	BW	0.10
Switzerland	0.01	0.10	0.53	0.29	0.07	BW	0.41
Australia	0.25	0.04	0.46	0.16	0.09	BW	0.19
Spain	0.18	0.08	0.49	0.19	0.07	BW	0.24
Brazil	0.50	0.10	0.23	0.07	0.11	BW	0.08
Venezuela	-0.03	0.06	0.29	0.21	0.47	Sch. III and M4	0.34
Mexico	0.35	0.05	0.39	0.11	0.11	BW	0.12
Sweden	0.00	0.08	0.57	0.28	0.07	BW	0.39
Argentina	0.54	0.07	0.24	0.06	0.08	BW	0.07
Indonesia	-0.02	0.06	0.52	0.18	0.27	Sch. III and IV	0.22
Austria	-0.01	0.06	0.57	0.29	0.08	BW	0.41
South Africa	0.24	0.01	0.50	0.20	0.05	BW	0.24
Nigeria	-0.03	0.01	0.24	0.19	0.59	Sch. III and M4	0.32
Norway	-0.04	0.08	0.42	0.29	0.25	Sch. III and M4	0.42
Denmark	-0.04	0.04	0.62	0.32	0.06	BW	0.48
Korea	0.03	0.07	0.42	0.24	0.24	Sch. IV and M7	0.26
Iran	-0.04	0.02	0.43	0.17	0.41	Sch. III and IV	0.21
Malaysia	-0.25	0.17	0.56	0.41	0.12	BW	0.69
Kuwait	-0.13	0.03	0.22	0.25	0.64	Sch. III and M4	0.59
Ukraine	-0.07	0.00	0.36	0.25	0.46	Sch. III and M4	0.44
Poland	0.03	0.04	0.46	0.25	0.22	Sch. III and M4	0.29
Finland	0.08	0.08	0.28	0.25	0.31	Sch. M4 and M7	0.34
Algeria	-0.01	0.03	0.30	0.21	0.47	Sch. III and M4	0.32
Iraq	-0.08	0.01	0.22	0.15	0.70	Sch. III and IV	0.18
Libya	-0.05	0.05	0.30	0.13	0.57	Sch. III and IV	0.15
Thailand	0.04	0.13	0.52	0.24	0.06	BW	0.32
Hungary	-0.02	0.09	0.43	0.26	0.25	Sch. III and M4	0.37
Pakistan	0.21	0.04	0.50	0.17	0.08	BW	0.21

Table 1.1. (continued). Relationship Between Calculated Quotas and Variables
Entering into the Quota Formulas

	Partial Elasticity of the Calculated Quota with respect to: 1/					<i>Memo:</i>	
	GDP	Reserves	Current	Current	Variability	Equation for Calculated Quota	Ratio of Current Receipts to GDP
			Payments	Receipts			
Romania	0.02	0.03	0.26	0.14	0.55	Sch. III and M4	0.21
Turkey	0.00	0.04	0.58	0.18	0.20	Sch. III and IV	0.22
Egypt	-0.01	0.14	0.37	0.24	0.27	Sch. III and M4	0.34
Israel	0.10	0.07	0.56	0.22	0.06	BW	0.28
New Zealand	0.04	0.06	0.47	0.24	0.20	Sch. III and M4	0.27
Philippines	0.10	0.10	0.30	0.26	0.24	Sch. M4 and M7	0.29
Portugal	0.09	0.16	0.28	0.26	0.21	Sch. M4 and M7	0.35
Singapore	-0.38	0.23	0.55	0.50	0.10	BW	1.01
Chile	-0.05	0.17	0.54	0.20	0.14	Sch. III and IV	0.25
Ireland	-0.23	0.06	0.68	0.42	0.07	BW	0.73
Greece	0.24	0.10	0.45	0.15	0.06	BW	0.18
Czech Republic	-0.04	0.06	0.37	0.24	0.36	Sch. III and M4	0.37
Colombia	0.28	0.12	0.38	0.15	0.07	BW	0.18
Bulgaria	-0.14	0.02	0.32	0.26	0.54	Sch. III and M4	0.59
Peru	0.36	0.12	0.34	0.10	0.09	BW	0.11
United Arab Emirates	-0.09	0.07	0.29	0.29	0.44	Sch. III and M4	0.54
Morocco	0.10	0.13	0.29	0.27	0.21	Sch. M4 and M7	0.32
Bangladesh	0.29	0.12	0.39	0.13	0.07	BW	0.15
Congo, Dem. Republic of	-0.03	0.01	0.38	0.19	0.45	Sch. III and M4	0.31
Zambia	-0.06	0.03	0.43	0.23	0.38	Sch. III and M4	0.38
FRY (Serbia/Montenegro)	-0.05	0.01	0.22	0.17	0.66	Sch. III and M4	0.32
Sri Lanka	-0.01	0.10	0.46	0.24	0.20	Sch. III and M4	0.32
Belarus	0.02	0.00	0.18	0.19	0.61	Sch. M4 and M7	0.95
Ghana	0.08	0.07	0.58	0.22	0.05	BW	0.28
Kazakistan	0.03	0.02	0.23	0.17	0.55	Sch. M4 and M7	0.56
Croatia	-0.08	0.03	0.36	0.26	0.44	Sch. III and M4	0.45
Slovak Republic	-0.07	0.03	0.39	0.27	0.39	Sch. III and M4	0.45
Zimbabwe	0.07	0.07	0.30	0.25	0.31	Sch. M4 and M7	0.38
Trinidad and Tobago	-0.08	0.01	0.30	0.25	0.52	Sch. III and M4	0.48
Vietnam	0.05	0.07	0.42	0.21	0.26	Sch. IV and M7	0.22
Cote d'Ivoire	0.06	0.00	0.33	0.25	0.36	Sch. M4 and M7	0.48
Sudan	0.07	0.00	0.31	0.07	0.54	Sch. III and IV	0.08
Uruguay	0.29	0.06	0.42	0.15	0.08	BW	0.18
Ecuador	0.04	0.06	0.37	0.19	0.34	Sch. III and M4	0.23
Syrian Arab Republic	0.11	0.03	0.37	0.11	0.38	Sch. III and IV	0.12
Tunisia	-0.05	0.04	0.61	0.30	0.10	BW	0.43
Angola	0.02	0.01	0.22	0.19	0.55	Sch. M4 and M7	0.88
Luxembourg	-0.37	0.00	0.73	0.52	0.12	BW	1.08
Uzbekistan	-0.13	0.07	0.35	0.28	0.43	Sch. III and M4	0.58
Jamaica	-0.22	0.06	0.63	0.40	0.13	BW	0.67

Table 1.1. (continued). Relationship Between Calculated Quotas and Variables
Entering into the Quota Formulas

	Partial Elasticity of the Calculated Quota with respect to: 1/					<i>Memo:</i>	
	GDP	Reserves	Current	Current	Variability	Equation for Calculated Quota	Ratio of Current Receipts to GDP
			Payments	Receipts			
Kenya	0.08	0.07	0.28	0.25	0.33	Sch. M4 and M7	0.36
Qatar	-0.09	0.03	0.32	0.25	0.48	Sch. III and M4	0.48
Myanmar	0.88	0.01	0.08	0.01	0.02	BW	0.01
Yemen, Republic of	0.09	0.01	0.38	0.11	0.42	Sch. III and IV	0.12
Slovenia	-0.09	0.02	0.42	0.30	0.34	Sch. III and M4	0.51
Dominican Republic	-0.01	0.02	0.46	0.26	0.27	Sch. III and M4	0.34
Brunei Darussalam	-0.21	0.02	0.22	0.38	0.60	Sch. III and M4	1.07
Guatemala	0.26	0.07	0.45	0.15	0.07	BW	0.18
Panama	-0.05	0.04	0.42	0.26	0.33	Sch. III and M4	0.40
Lebanon	0.00	0.19	0.44	0.13	0.24	Sch. III and M4	0.19
Tanzania	0.09	0.06	0.36	0.14	0.35	Sch. M4 and M7	0.17
Oman	-0.08	0.03	0.36	0.25	0.45	Sch. III and M4	0.46
Cameroon	-0.04	0.00	0.44	0.25	0.35	Sch. III and M4	0.37
Uganda	0.39	0.05	0.38	0.07	0.11	BW	0.08
Bolivia	0.08	0.05	0.41	0.16	0.30	Sch. III and M4	0.17
El Salvador	-0.01	0.07	0.58	0.18	0.18	Sch. III and IV	0.22
Jordan	-0.22	0.10	0.60	0.38	0.14	BW	0.62
Bosnia-Herzegovina	-0.50	0.01	0.71	0.60	0.19	BW	1.52
Costa Rica	0.09	0.10	0.31	0.27	0.24	Sch. M4 and M7	0.34
Afghanistan, Islamic State of	0.05	0.06	0.49	0.10	0.30	Sch. III and IV	0.11
Senegal	-0.05	0.01	0.64	0.29	0.12	BW	0.40
Azerbaijan	0.02	0.00	0.18	0.19	0.61	Sch. M4 and M7	0.98
Gabon	-0.15	0.01	0.36	0.30	0.48	Sch. III and M4	0.65
Georgia	0.03	0.00	0.26	0.17	0.54	Sch. M4 and M7	0.55
Lithuania	-0.07	0.03	0.33	0.25	0.46	Sch. III and M4	0.44
Cyprus	0.07	0.12	0.28	0.26	0.28	Sch. M4 and M7	0.44
Namibia	-0.23	0.03	0.63	0.42	0.16	BW	0.72
Bahrain	-0.34	0.07	0.60	0.45	0.22	BW	0.83
Ethiopia	0.01	0.08	0.48	0.14	0.30	Sch. III and IV	0.16
Papua New Guinea	0.07	0.01	0.27	0.27	0.37	Sch. M4 and M7	0.45
Bahamas, The	0.05	0.03	0.27	0.25	0.40	Sch. M4 and M7	0.53
Nicaragua	0.07	0.04	0.39	0.14	0.37	Sch. M4 and M7	0.24
Honduras	0.07	0.05	0.31	0.24	0.32	Sch. M4 and M7	0.37
Liberia	-0.05	0.00	0.46	0.26	*0.32	Sch. III and M4	0.39
Latvia	-0.10	0.04	0.34	0.26	0.45	Sch. III and M4	0.50
Moldova	0.03	0.02	0.18	0.18	0.59	Sch. M4 and M7	0.80
Madagascar	0.16	0.02	0.55	0.18	0.09	BW	0.22
Iceland	0.04	0.05	0.57	0.27	0.08	BW	0.36
Mozambique	-0.04	0.06	0.72	0.21	0.06	BW	0.26
Guinea	0.10	0.03	0.30	0.21	0.36	Sch. M4 and M7	0.25

Table 1.1. (continued). Relationship Between Calculated Quotas and Variables Entering into the Quota Formulas

	Partial Elasticity of the Calculated Quota with respect to: 1/					<i>Memo:</i>	
	GDP	Reserves	Current Payments	Current Receipts	Variability	Equation for Calculated Quota	Ratio of Current Receipts to GDP
Sierra Leone	0.04	0.03	0.42	0.20	0.32	Sch. III and M4	0.23
Malta	-0.38	0.18	0.61	0.50	0.08	BW	1.00
Mauritius	-0.17	0.10	0.61	0.37	0.09	BW	0.60
Paraguay	-0.02	0.09	0.50	0.18	0.25	Sch. III and IV	0.22
Mali	-0.01	0.08	0.60	0.24	0.08	BW	0.32
Suriname	-0.53	0.01	0.58	0.61	0.34	BW	1.53
Armenia	-0.40	0.00	0.64	0.49	0.27	BW	0.96
Guyana	-0.35	0.14	0.59	0.47	0.16	BW	0.89
Kyrgyz Republic	0.02	0.01	0.22	0.18	0.57	Sch. M4 and M7	0.86
Cambodia	0.45	0.05	0.30	0.06	0.14	BW	0.06
Tajikistan	-0.61	0.00	0.65	0.66	0.31	BW	1.98
Congo, Republic of	0.02	0.00	0.21	0.15	0.62	Sch. M4 and M7	0.73
Haiti	0.04	0.01	0.45	0.12	0.38	Sch. III and IV	0.13
Somalia	0.11	0.02	0.67	0.11	0.08	BW	0.12
Rwanda	0.07	0.03	0.36	0.13	0.41	Sch. M4 and M7	0.20
Burundi	0.08	0.12	0.44	0.11	0.25	Sch. III and M4	0.12
Turkmenistan	0.01	0.06	0.28	0.20	0.44	Sch. III and M4	0.27
Togo	0.06	0.07	0.30	0.22	0.35	Sch. M4 and M7	0.41
Nepal	0.17	0.14	0.46	0.16	0.06	BW	0.19
Fiji	0.05	0.07	0.25	0.23	0.40	Sch. M4 and M7	0.54
Malawi	0.05	0.02	0.30	0.18	0.45	Sch. M4 and M7	0.40
Macedonia, FYR	0.06	0.03	0.28	0.25	0.38	Sch. M4 and M7	0.49
Barbados	-0.12	0.03	0.38	0.30	0.40	Sch. III and M4	0.57
Niger	-0.01	0.04	0.45	0.20	0.33	Sch. III and M4	0.28
Estonia	-0.10	0.06	0.35	0.26	0.44	Sch. III and M4	0.50
Mauritania	-0.12	0.02	0.65	0.32	0.13	BW	0.48
Botswana	-0.14	0.28	0.35	0.29	0.21	Sch. III and M4	0.62
Benin	-0.05	0.04	0.43	0.24	0.33	Sch. III and M4	0.37
Burkina Faso	0.09	0.12	0.32	0.21	0.27	Sch. M4 and M7	0.27
Chad	0.06	0.07	0.32	0.16	0.39	Sch. M4 and M7	0.31
Central African Republic	0.00	0.11	0.46	0.18	0.26	Sch. III and M4	0.24
Lao, People's Dem. Republic	0.10	0.04	0.46	0.16	0.24	Sch. III and M4	0.16
Mongolia	-0.16	0.02	0.38	0.27	0.50	Sch. III and M4	0.62
Swaziland	-0.34	0.08	0.66	0.47	*0.13	BW	0.89
Albania	0.02	0.04	0.30	0.13	0.51	Sch. III and M4	0.18
Lesotho	-0.34	0.11	0.63	0.44	0.15	BW	0.80
Equatorial Guinea	-0.16	0.00	0.71	0.31	0.14	BW	0.44
Gambia, The	-0.31	0.11	0.57	0.44	0.19	BW	0.80
Belize	-0.12	0.02	0.42	0.29	0.39	Sch. III and M4	0.55
San Marino	-0.45	0.08	0.63	0.56	0.18	BW	1.29

Table 1.1. (concluded). Relationship Between Calculated Quotas and Variables Entering into the Quota Formulas

	Partial Elasticity of the Calculated Quota with respect to: 1/					Memo:	
	GDP	Reserves	Current	Current	Variability	Equation for Calculated Quota	Ratio of Current Receipts to GDP
			Payments	Receipts			
Vanuatu	0.04	0.09	0.24	0.20	0.44	Sch. M4 and M7	0.56
Djibouti	0.05	0.08	0.28	0.18	0.41	Sch. M4 and M7	0.41
Eritrea	-0.07	0.11	0.37	0.25	0.33	Sch. III and M4	0.43
St. Lucia	-0.22	0.05	0.69	0.40	0.08	BW	0.66
Guinea-Bissau	0.01	0.01	0.46	0.14	0.37	Sch. III and M4	0.19
Antigua and Barbuda	-0.36	0.03	0.74	0.50	0.10	BW	1.02
Grenada	0.05	0.05	0.26	0.22	0.42	Sch. M4 and M7	0.54
Samoa	-0.25	0.13	0.60	0.39	0.14	BW	0.64
Solomon Islands	0.04	0.03	0.28	0.21	0.43	Sch. M4 and M7	0.54
Cape Verde	-0.06	0.08	0.61	0.28	0.09	BW	0.39
Comoros	0.05	0.12	0.27	0.22	0.33	Sch. M4 and M7	0.48
St. Kitts and Nevis	-0.17	0.07	0.67	0.36	0.07	BW	0.57
Seychelles	-0.13	0.03	0.65	0.35	0.11	BW	0.53
St. Vincent and the Grenadines	0.04	0.06	0.29	0.23	0.38	Sch. M4 and M7	0.59
Dominica	-0.13	0.04	0.68	0.34	0.08	BW	0.51
Maldives	-0.34	0.04	0.72	0.48	0.10	BW	0.92
Sao Tome and Principe	0.05	0.07	0.40	0.10	0.38	Sch. M4 and M7	0.24
Tonga	0.05	0.10	0.25	0.21	0.40	Sch. M4 and M7	0.49
Bhutan	-0.06	0.16	0.45	0.23	0.22	Sch. III and M4	0.37
Kiribati	-0.42	0.65	0.24	0.46	0.07	BW	0.87
Micronesia, Fed. States of	-0.13	0.09	0.69	0.28	0.06	BW	0.39
Marshall Islands	-0.21	0.04	0.69	0.35	0.14	BW	0.53
Palau, Republic of	-0.31	-0.14	0.20	-0.01	0.09	Sch. III and M4	0.38

1/ Note: The elasticity of the calculated quota CQ with respect to a variable X is defined as:

$$\epsilon = \frac{\partial \text{CQ}}{\partial X} \times \frac{X}{\text{CQ}}$$

where all other variables entering into the quota formulas are held constant. The figures shown indicate the impact on the calculated quota of a one percent change of a given variable.

Table 1.2. Relative Contribution of Variables to Calculated Quotas 1/
(in percent of calculated quotas)

	GDP	Reserves	Current Payments	Current Receipts	Variability of Current Receipts	Ratio of Current Receipts to GDP
United States	51.5	1.4	31.0	0.0	6.1	10.0
Japan	58.8	3.6	24.1	0.0	4.0	9.4
Germany	11.3	4.9	36.3	14.3	22.4	10.8
France	30.5	1.7	40.3	0.0	6.3	21.2
United Kingdom	26.3	2.6	42.1	0.0	5.3	23.7
Italy	31.1	2.8	39.9	0.0	6.0	20.2
Saudi Arabia	5.0	3.0	25.7	21.0	45.3	0.0
Canada	9.2	2.2	28.9	26.1	33.6	0.0
Russia	9.6	1.1	26.0	10.7	42.0	10.7
Netherlands	15.1	4.0	40.1	0.0	4.3	36.5
China	41.8	7.2	32.2	0.0	4.7	14.1
Belgium	12.1	2.0	39.6	0.0	6.1	40.2
India	49.2	7.3	29.5	0.0	4.8	9.2
Switzerland	21.0	7.2	37.8	0.0	4.8	29.3
Australia	34.6	3.2	39.1	0.0	7.5	15.7
Spain	29.7	6.3	39.1	0.0	5.4	19.4
Brazil	52.7	9.1	20.9	0.0	9.9	7.3
Venezuela	7.0	5.3	23.5	9.6	42.2	12.4
Mexico	40.6	4.4	34.5	0.0	9.7	10.8
Sweden	20.1	5.5	41.0	0.0	5.1	28.2
Argentina	56.5	6.8	22.9	0.0	7.6	6.3
Indonesia	13.2	4.6	42.4	0.0	21.7	18.1
Austria	19.8	4.5	40.7	0.0	5.8	29.1
South Africa	35.0	0.8	40.4	0.0	4.3	19.6
Nigeria	6.4	0.8	19.9	8.1	53.5	11.3
Norway	8.2	7.3	33.0	13.8	22.1	15.6
Denmark	18.7	3.0	41.9	0.0	4.2	32.3
Korea	11.4	6.8	36.4	13.4	21.8	10.2
Iran	11.1	2.0	35.7	0.0	33.8	17.4
Malaysia	9.0	9.8	33.1	0.0	7.1	40.9
Kuwait	3.0	2.6	16.0	7.1	53.2	18.1
Ukraine	5.8	0.1	27.7	10.3	40.5	15.6
Poland	12.0	3.8	38.5	13.8	20.0	12.0
Finland	8.4	8.0	27.8	25.3	30.5	0.0
Algeria	8.0	2.5	24.9	10.1	42.7	11.7

Table 1.2. (continued). Relative Contribution of Variables to Calculated Quotas 1/
(in percent of calculated quotas)

	GDP	Reserves	Current Payments	Current Receipts	Variability of Current Receipts	Ratio of Current Receipts to GDP
Iraq	6.2	0.9	18.5	0.0	58.9	15.4
Libya	7.2	4.1	26.3	0.0	49.4	13.0
Thailand	21.3	10.1	39.7	0.0	4.6	24.3
Hungary	8.7	7.8	34.3	12.8	22.3	14.1
Pakistan	31.8	3.5	41.0	0.0	6.3	17.5
Romania	8.4	2.5	23.0	6.9	50.8	8.4
Turkey	14.5	3.3	47.6	0.0	16.3	18.3
Egypt	8.7	12.5	30.3	11.7	24.0	12.8
Israel	24.6	5.2	43.9	0.0	4.3	22.0
New Zealand	12.3	5.2	39.3	13.5	18.0	11.7
Philippines	10.3	9.9	29.6	26.4	23.8	0.0
Portugal	8.6	16.0	28.4	26.1	20.9	0.0
Singapore	5.9	11.2	27.5	0.0	5.1	50.3
Chile	12.0	13.6	43.2	0.0	11.5	19.8
Ireland	11.0	3.3	39.6	0.0	4.0	42.1
Greece	32.7	8.6	38.5	0.0	5.0	15.1
Czech Republic	7.5	5.7	29.4	11.2	32.4	13.8
Colombia	36.2	10.1	32.4	0.0	6.3	14.9
Bulgaria	3.2	1.5	23.3	7.6	45.1	19.2
Peru	40.9	11.1	30.3	0.0	8.2	9.6
United Arab Emirates	5.8	5.8	21.1	12.7	37.4	17.2
Morocco	9.9	13.1	29.1	27.2	20.8	0.0
Bangladesh	36.9	10.2	33.6	0.0	5.9	13.3
Congo, Dem. Republic of	6.7	0.9	31.2	8.2	40.8	12.1
Zambia	6.0	2.3	34.0	9.1	33.8	14.8
FRY (Serbia/Montenegro)	4.8	0.5	17.8	6.2	59.2	11.4
Sri Lanka	9.5	8.8	38.0	12.2	18.4	13.1
Belarus	2.2	0.4	18.3	18.6	60.5	0.0
Ghana	23.2	5.4	45.3	0.0	4.1	21.9
Kazakstan	3.5	2.0	22.7	16.9	55.0	0.0
Croatia	5.7	2.2	27.8	10.3	38.0	16.0
Slovak Republic	6.4	2.4	30.1	11.4	33.7	16.1
Zimbabwe	7.4	7.3	30.0	24.6	30.6	0.0
Trinidad and Tobago	5.2	0.9	23.0	9.9	44.9	16.0
Vietnam	12.2	6.5	36.6	12.3	23.4	9.1

Table 1.2. (continued). Relative Contribution of Variables to Calculated Quotas 1/
(in percent of calculated quotas)

	GDP	Reserves	Current Payments	Current Receipts	Variability of Current Receipts	Ratio of Current Receipts to GDP
Cote d'Ivoire	5.9	0.2	32.8	24.8	36.4	0.0
Sudan	13.3	0.4	28.8	0.0	50.6	7.0
Uruguay	37.5	5.3	35.2	0.0	6.7	15.3
Ecuador	11.1	5.5	31.8	10.4	31.4	9.8
Syrian Arab Republic	19.9	2.8	32.5	0.0	33.8	11.0
Tunisia	17.6	3.1	42.7	0.0	6.8	29.9
Angola	2.5	1.2	22.4	19.0	54.8	0.0
Luxembourg	7.2	0.1	35.1	0.0	5.7	52.0
Uzbekistan	4.0	6.3	25.3	9.2	36.2	19.1
Jamaica	10.6	3.5	38.0	0.0	8.1	40.0
Kenya	7.8	7.1	27.8	24.6	32.6	0.0
Qatar	5.0	2.7	24.5	9.7	41.7	16.4
Myanmar	87.9	1.0	7.5	0.0	2.2	1.3
Yemen, Republic of	17.2	0.9	33.7	0.0	37.4	10.7
Slovenia	6.4	1.9	31.4	13.0	29.5	17.9
Dominican Republic	9.7	1.9	36.9	13.3	24.6	13.7
Brunei Darussalam	2.7	1.5	12.9	11.7	44.6	26.6
Guatemala	34.9	5.9	38.2	0.0	5.8	15.2
Panama	7.2	3.4	33.4	11.6	29.3	15.2
Lebanon	7.2	17.5	38.8	5.5	22.2	8.8
Tanzania	9.4	6.3	35.8	13.9	34.5	0.0
Oman	5.4	2.3	27.5	9.9	38.7	16.2
Cameroon	7.5	0.0	35.4	11.2	31.4	14.5
Uganda	42.6	4.9	35.1	0.0	10.0	7.4
Bolivia	13.3	4.6	36.8	9.1	28.2	8.0
El Salvador	13.6	5.6	47.8	0.0	14.9	18.1
Jordan	9.7	6.1	37.4	0.0	8.7	38.1
Bosnia-Herzegovina	3.8	0.4	28.2	0.0	7.4	60.3
Costa Rica	8.8	9.7	30.6	26.5	24.3	0.0
Afghanistan, Islamic State of	14.1	5.1	43.6	0.0	27.0	10.3
Senegal	17.0	0.6	45.4	0.0	8.4	28.6
Azerbaijan	2.2	0.0	17.7	18.8	61.2	0.0
Gabon	3.8	0.6	25.5	9.8	39.4	20.9
Georgia	3.4	0.1	25.8	16.6	54.0	0.0
Lithuania	5.9	2.6	25.4	10.3	40.6	15.2

Table 1.2. (continued). Relative Contribution of Variables to Calculated Quotas 1/
(in percent of calculated quotas)

	GDP	Reserves	Current Payments	Current Receipts	Variability of Current Receipts	Ratio of Current Receipts to GDP
Cyprus	6.7	12.2	27.8	25.8	27.5	0.0
Namibia	10.7	1.8	36.6	0.0	9.0	41.9
Bahrain	5.8	3.7	33.1	0.0	12.2	45.3
Ethiopia	12.7	6.8	40.9	0.0	25.8	13.9
Papua New Guinea	6.9	1.3	27.3	27.1	37.3	0.0
Bahamas, The	5.4	3.4	26.7	25.0	39.6	0.0
Nicaragua	6.5	4.0	39.1	13.9	36.5	0.0
Honduras	7.4	5.5	31.0	23.9	32.2	0.0
Liberia	7.7	0.1	36.5	12.2	28.3	15.2
Latvia	5.0	3.8	25.4	9.9	39.1	16.9
Moldova	2.6	2.1	18.3	18.1	58.9	0.0
Madagascar	27.6	1.6	45.5	0.0	7.6	17.7
Iceland	22.0	3.7	42.0	0.0	5.6	26.7
Mozambique	13.0	4.6	56.8	0.0	4.9	20.6
Guinea	9.7	2.7	30.0	21.1	36.5	0.0
Sierra Leone	11.5	2.5	35.8	10.7	29.4	10.1
Malta	6.0	9.2	30.8	0.0	4.1	49.9
Mauritius	12.3	6.6	38.4	0.0	5.4	37.4
Paraguay	12.8	7.4	40.8	0.0	20.8	18.2
Mali	17.4	6.4	45.9	0.0	6.3	24.0
Suriname	2.8	0.5	22.8	0.0	13.4	60.5
Armenia	4.5	0.2	32.5	0.0	13.9	48.9
Guyana	6.2	7.2	31.4	0.0	8.3	47.0
Kyrgyz Republic	2.3	1.0	22.3	17.5	56.9	0.0
Cambodia	48.1	4.4	28.6	0.0	13.2	5.7
Tajikistan	1.6	0.0	21.7	0.0	10.3	66.5
Congo, Republic of	2.3	0.3	21.0	14.7	61.6	0.0
Haiti	13.9	1.2	39.8	0.0	33.4	11.6
Somalia	19.8	2.0	59.7	0.0	7.4	11.1
Rwanda	7.1	3.1	35.9	12.7	41.2	0.0
Burundi	12.1	11.3	40.5	5.8	24.2	6.2
Turkmenistan	9.3	5.8	23.9	10.2	40.3	10.4
Togo	6.1	6.5	30.2	21.9	35.2	0.0
Nepal	28.0	12.0	38.8	0.0	5.2	16.0
Fiji	4.9	6.9	25.4	23.1	39.6	0.0

Table 1.2. (continued). Relative Contribution of Variables to Calculated Quotas 1/
(in percent of calculated quotas)

	GDP	Reserves	Current Payments	Current Receipts	Variability of Current Receipts	Ratio of Current Receipts to GDP
Malawi	5.2	1.6	29.8	18.3	45.1	0.0
Macedonia, FYR	5.9	2.8	28.2	25.2	38.0	0.0
Barbados	5.0	2.9	27.9	11.3	33.9	19.0
Niger	8.0	3.5	38.0	8.9	29.9	11.7
Estonia	4.8	4.8	26.5	9.5	37.4	17.1
Mauritania	13.4	1.4	43.9	0.0	9.0	32.3
Botswana	4.0	23.6	24.8	9.8	17.9	19.9
Benin	7.2	3.9	34.2	10.7	29.7	14.3
Burkina Faso	8.6	11.5	31.8	20.7	27.4	0.0
Chad	5.9	6.8	32.5	15.8	39.1	0.0
Central African Republic	8.3	9.8	39.9	7.9	23.6	10.6
Lao, People's Dem. Republic	15.3	3.6	41.3	9.6	22.4	7.8
Mongolia	2.8	1.8	26.6	6.9	41.3	20.7
Swaziland	6.8	4.4	34.7	0.0	7.0	47.0
Albania	7.9	3.8	26.5	5.8	48.1	7.8
Lesotho	5.8	6.0	35.2	0.0	8.5	44.5
Equatorial Guinea	10.3	0.1	49.6	0.0	9.5	30.6
Gambia, The	7.2	6.2	31.7	0.0	10.5	44.5
Belize	4.8	1.8	31.1	10.4	32.8	19.0
San Marino	4.7	3.3	27.7	0.0	7.9	56.4
Vanuatu	4.0	8.6	24.0	19.5	43.9	0.0
Djibouti	5.0	7.9	28.3	18.1	40.7	0.0
Eritrea	6.2	9.7	29.0	10.6	29.1	15.4
St. Lucia	10.7	2.9	41.5	0.0	5.0	39.9
Guinea-Bissau	8.2	1.3	40.1	6.4	35.0	9.0
Antigua and Barbuda	6.7	1.4	36.8	0.0	4.8	50.4
Grenada	4.7	5.2	25.7	22.2	42.2	0.0
Samoa	8.2	7.6	36.7	0.0	8.5	38.9
Solomon Islands	4.4	3.4	28.4	20.7	43.1	0.0
Cape Verde	15.7	5.8	44.0	0.0	6.7	27.8
Comoros	5.3	11.9	27.3	22.1	33.4	0.0
St. Kitts and Nevis	12.2	4.3	42.6	0.0	4.7	36.3
Seychelles	13.8	2.0	42.4	0.0	6.9	34.8
St. Vincent and the Grenadines	4.4	5.8	28.6	22.9	38.3	0.0
Dominica	13.5	2.5	45.1	0.0	5.1	33.8

Table 1.2. (concluded). Relative Contribution of Variables to Calculated Quotas 1/
(in percent of calculated quotas)

	GDP	Reserves	Current Payments	Current Receipts	Variability of Current Receipts	Ratio of Current Receipts to GDP
Maldives	7.0	2.1	37.4	0.0	5.3	48.0
Sao Tome and Principe	4.7	7.2	40.5	9.9	37.7	0.0
Tonga	4.8	9.9	24.9	20.8	39.6	0.0
Bhutan	6.2	14.2	35.7	9.3	20.0	14.6
Kiribati	2.1	35.0	12.7	0.0	3.7	46.4
Micronesia, Fed. States of	10.9	6.7	50.0	0.0	4.5	27.9
Marshall Islands	8.3	2.9	45.4	0.0	8.9	34.5
Palau, Republic of	5.4	8.1	34.6	8.3	28.6	15.1

1/ The contribution to the calculated quota is the variable times its coefficient, expressed in relation to the member's calculated quota. The contribution of the ratio of current receipts to GDP is the contribution of the nonlinear element to the calculated quotas, i.e., the extent to which the calculated quota is raised by the application of the multiplier (unity plus the ratio of current receipts to GDP).

NOTE 2. THE DEMAND FOR INTERNATIONAL RESERVES—A REVIEW OF THE LITERATURE

4. Most studies have concluded that the demand for international reserves can be explained as a relatively stable long-run function of a few variables. This conclusion appears to have held despite estimated structural shifts in the demand for reserves associated with the collapse of the Bretton Woods regime in the early 1970s and the debt crisis in the early 1980s. Much of this work dates back to the 1970s and 1980s, however, and relatively little has been done in recent years. Accordingly, it is unclear to what extent reserve holding behavior may have changed in response to the broad-based shift to more flexible exchange rate regimes, the increasing importance for emerging market economies of borrowing on international capital markets, and the periodic exchange market crises of the 1990s.

Early work

5. Early empirical work focussed on establishing rough proportions between reserves and other broad economic aggregates.³ For example, Harrod (1953) and IMF (1958) assumed a direct functional relationship between reserves and the level of imports, or more generally between the demand for reserves and the total volume of international transactions. Harrod (1961) concluded that the stock of international reserves was inadequate by pointing to a sharp secular decline in the reserves-import ratio. Triffin (1960) argued, also based on the assumption of proportionality between reserves and the volume of trade, that the demand for reserves would grow faster than the supply unless the United States ran a deficit that would ultimately undermine confidence in the dollar. One critic of this approach was Machlup (1966), who questioned the existence of any relationship between reserve demand and a set of identifiable variables. At a theoretical level, Olivera (1969) argued that the demand for reserves should be a function of the variance of annual changes in the level of imports, implying that the demand for reserves would have an elasticity of 0.5 with respect to the volume of transactions.

Optimizing approach to the demand for reserves

6. Heller (1966) was first to derive the optimal level of reserves from a cost-benefit approach. He stressed the precautionary motive for holding international reserves, rather than the transactions motive that had at least implicitly lain behind much of the earlier work. The benefit from holding reserves stemmed from the ability to avoid a reduction in output in cases of a balance of payments deficit. This benefit needed to be balanced against the cost of holding liquid international reserves. While the empirical specification of Heller's model was relatively crude, his framework of presenting the demand for reserves as a rational optimizing decision process formed the basis for much of the work that was to follow. Heller

³ Among several early literature surveys are Niehans (1970), Grubel (1971), Williamson (1973), and Claassen (1974). See references below.

identified three parameters determining the demand for reserves: (i) the cost of adjusting to an external imbalance; (ii) the opportunity cost of holding reserves; and (iii) the probability that a need for reserves of a given magnitude would arise. He hypothesized that the cost of adjustment was inversely related to the marginal propensity to import, on the grounds that, the higher was the propensity to import, the smaller would be the required compression of aggregate expenditure. The opportunity cost was defined as the difference between the social rate of return on capital and the average yield on liquid reserves. Reflecting measurement difficulties, this cost was assumed to be the same (5 percent) for all countries. The probability of a reserve need was given by the variability of external payments, which Heller estimated using the mean absolute first difference of historical trend-adjusted annual reserves. This probability was viewed as independent of the actual level of reserves.⁴

7. Kelly (1970) modeled optimal reserves for a government seeking to maximize utility subject to the trade-off between the opportunity cost of holding reserves on the one hand, and the output variability associated with exogenous shocks that could be neutralized by reserve changes on the other. Using data for 46 countries over the period 1953–65, he tested a model employing the standard deviation of exports as a proxy for payments variability, and the average propensity to import as an indicator of the degree of output fluctuation needed to restore external balance in response to an export shock (with the adjustment coming through imports). Two proxies were used for the opportunity cost of holding reserves: per capita income, on the grounds that poorer countries had a greater need for capital and therefore a higher opportunity cost; and net foreign indebtedness, as an indicator of past capital scarcity. The results for both pooled and cross-sectional data suggested that reserve holdings could be explained as a relatively stable function of the variables chosen, with export variability appearing as the main determinant. However, for the propensity to import and per capita income variables, different signs were obtained depending on whether the regressions were run for the whole sample or for specific country groupings or annual cross-sectional data, while the sign on the net foreign liability variable did not fit the assumed model.

8. Both Heller and Kelly assumed a negative relationship between reserves and the marginal propensity to import on theoretical grounds. In practice, however, these and subsequent empirical studies have typically used the average propensity to import (M/Y), either as a proxy for the marginal propensity or as an explanatory variable in its own right. The expected sign of the average propensity to import is ambiguous. To the extent that it is viewed as a proxy for the marginal propensity to import, the assumed negative relationship with reserves reflects a presumption that adjustment to external disequilibrium takes place primarily through output compression, rather than expenditure-switching (Williamson, 1973). To the extent that it reflects an economy's openness, and therefore its vulnerability to external shocks, on the other hand, a positive relationship with reserve demand might be

⁴ Later work by Clark (1970a), and Frenkel and Jovanovic (1981) linked the probability of reserve depletion explicitly to the level of reserves.

expected (Cooper (1968)). Similarly, Frenkel (1974a) developed a theoretical price-adjustment model under which the effect of openness on reserve holdings was positive for plausible values of the elasticity of money demand.

9. Frenkel (1974b) tested the hypothesis of a positive relationship between reserves and openness for a group of 55 countries covering the period 1963–67. In addition to the propensity to import, Frenkel included as explanatory variables a measure of external variability, and the level of imports as a scale variable. Based on cross-sectional estimates, he found evidence of a stable demand function, where reserve holdings were positively related to the variability of international receipts and payments, the volume of imports, and the relative size of the foreign trade sector. He also found evidence that the behavior of the developed countries differed significantly from that of the developing countries, with external variability appearing more important for the developed countries, and the scale variable more important for the developing countries.

10. Heller and Khan (1978) extended this work to examine the stability of the reserve demand function for six different country groups. Their database covered the period 1964–76, enabling them to assess the impact on reserve demand of the move to more flexible exchange rates following the collapse of the Bretton Woods system in 1973. The specification of the reserve demand function included the same three variables used by Frenkel, though a two-step procedure was used to calculate the measure of external variability. They concluded that, for industrial countries, there was a downward shift in the demand for reserves following the shift to a floating rate system, whereas for the non-oil developing countries the demand for reserves appeared if anything to have increased.⁵ They attributed the latter finding to the fact that most developing countries maintained pegged exchange rate regimes following the collapse of Bretton Woods, and that, for these countries, overall uncertainty and payments variability had increased. They also found preliminary evidence that, after the structural change in 1973, the function explaining reserve behavior remained stable for both industrial and developing countries in the subsequent period of managed floating. The parameter estimates varied significantly across country groups but generally pointed to an elasticity of reserves with respect to imports of somewhat less than unity and a significant negative coefficient on the measure of openness (in contrast to Frenkel). The variability measure had a higher weight for the industrial countries than for the developing countries.

Disequilibrium models of the demand for reserves

11. The above-mentioned studies generally assumed that actual reserve holdings adjusted to desired holdings during the observation period, such that reserve demand was constantly in equilibrium. Other studies allowed explicitly for a gradual adjustment of actual to desired

⁵ The timing of the structural break for the developing countries preceded the collapse of Bretton Woods, and was attributed to the commodity price boom in 1972–73.

reserve holdings, based on stock adjustment models.⁶ While these studies yielded differing results as regards the speed of adjustment to equilibrium, they generally followed a standard specification of the determinants of the demand for reserves and confirmed the results of the equilibrium models regarding the existence of a stable long-run demand function.

12. Early empirical work on this subject (see, for example, Clark (1970b) and Iyoha (1976)) generally found that the speed of adjustment was very slow, raising questions about the usefulness of the optimizing approach to the demand for reserves. However, Bilson and Frenkel (1979a and 1979b) developed a two-stage process under which the long-run demand for reserves was estimated based on an average of cross-sectional data (where the explanatory variables were assumed to be the same as in the earlier studies referred to above), and the resulting desired reserve stocks were used to estimate a stock adjustment equation. The model was estimated for 22 developed countries and 32 developing countries covering the period 1964–72. They found evidence of a quite rapid adjustment of actual to desired holdings (40–50 percent of the divergence being made up within a year), with developed countries generally adjusting more rapidly than developing countries.⁷ They also found evidence for developed countries that the speed of adjustment was more rapid for reserve deficiencies than for excess reserves, and for developing countries that the speed of adjustment was positively related to the absolute size of the divergence between actual and desired reserves. There was tentative evidence for developing countries that the speed of adjustment had increased following the shift to a managed floating rate regime.

13. Frenkel (1983) extended this work to allow for the effects of domestic monetary disequilibrium on the stock adjustment process for reserves. Based on estimates for a group of 22 developed countries, he found that actual changes in reserves were influenced by both the central bank's excess demand for reserves and the private sector's excess demand for money.⁸ He also found that speeds of adjustment to disequilibrium reserve holdings were relatively high, and appeared to have increased following the change in exchange rate regime. Frenkel also re-estimated a conventional long-run demand for reserves function for a group of 22 developed countries covering the period 1963–79 and 32 developing countries for the period 1963–77, confirming earlier findings of a stable reserve demand function though with some evidence that the demand for reserves had declined following the move to

⁶ Clark (1970a) developed a theoretical model of the optimal trade-off between the level of reserves and the speed of adjustment, under which the cost of holding reserves increases with the stock of reserves, and the cost of adjustment increases with the speed of adjustment.

⁷ Based on data for 32 developing countries, Edwards (1980) found evidence that the speed of adjustment may be even higher, virtually all taking place within one year.

⁸ Edwards (1984) also sought to integrate the demand for reserves with the monetary approach to the balance of payments, arguing that actual reserve changes were a function of both discrepancies between actual and desired reserves and domestic monetary disequilibria.

a more flexible rate regime. He also found that developed countries' demand for reserves differed significantly from that of developing countries, and that the behavior of developed countries underwent a more drastic change after 1972 than that of developing countries.

14. In order to assess whether the general finding of a relatively stable demand for reserves had been affected by the debt crisis in the early 1980s, Lizondo and Mathieson (1987) re-estimated a representative sample of models from previous studies⁹ and extended the data period covered to 1984. For the period 1963–79, they confirmed the findings of earlier studies using equilibrium models that, apart from some evidence of instability or structural shifts in reserve demand associated with the move to greater exchange rate flexibility in the early 1970s, this demand had been a relatively stable function of a scale variable, the average propensity to import, and the variability of external payments. Their re-estimates of earlier disequilibrium models also generally confirmed the original results that there had been a structural change in the stock adjustment processes for reserve accumulation during the 1972–73 period for developed countries.

15. When they extended the data period, Lizondo and Mathieson found that the financial market disturbances of the early 1980s had resulted in changes in the structure of the demand for reserves of comparable magnitude to those that accompanied the collapse of the Bretton Woods system. Specifically, the average demand for reserves for both developed and developing countries was estimated to have fallen by about 30 percent. Sensitivity of the demand for reserves to payments imbalances appeared to have increased; sensitivity to openness had increased for developing countries but declined for developed countries; and the long run income or scale elasticity remained close to one. Although they did not model the effects of changes in access to international capital markets explicitly, Lizondo and Mathieson hypothesized that, for the developing countries, the decline may have reflected the sharp curtailment (and higher implicit cost) of access to market financing, whereas for the developed countries, the more likely explanation was the growing importance of borrowing from international capital markets, which permitted countries to economize on their gross reserve holdings.

The opportunity cost of reserve holdings

16. The opportunity cost of holding reserves has generally been recognized as a potentially important determinant of the demand for reserves. However, early studies failed to find a significant coefficient for this variable, and subsequent studies (including most of those referred to above) generally excluded it from their estimation. To address this deficiency, Frenkel and Jovanovic (1981) developed a stochastic model of the optimal stock of reserves that included the forgone earnings on reserve holdings (proxied by the

⁹ Results were estimated using two examples of equilibrium models (Heller and Khan (1978) and Frenkel (1983)), and two examples of disequilibrium models (Bilson and Frenkel (1979a) and Frenkel (1983)).

government bond yield) as one of the determinants. They tested the model using pooled cross-section and time series data for 22 developed countries covering the period 1971–75, and obtained a negative coefficient for the interest rate variable, in line with the predictions of the model.

17. Edwards (1985) argued that the appropriate measure of the opportunity cost of reserves is the net cost, given by the gross foregone income minus the return obtained from holding reserves. Using the spread of a country's borrowing cost over LIBOR to approximate this net cost of reserves, he obtained a significant negative regression coefficient on the net cost variable for a group of 17 developing countries based on data for 1976–80. Landell-Mills (1989) extended this work using data for 1978–86 for three country groups—non-reserve-center industrial countries, developing countries that did not develop debt-servicing problems after 1982, and developing countries that did encounter subsequent debt-servicing problems. For the full sample, she found that the demand for reserves was positively related to the scale variable, and negatively related to the propensity to import and the opportunity cost of holding reserves (the external variability measure yielded mixed results). However, when the regression was run for the three country groups separately, the opportunity cost measure was significant only for the group of countries with subsequent debt-servicing difficulties.¹⁰

18. Ben-Bassat and Gottlieb (1992a) argued that the insignificant results obtained by many studies for the opportunity cost variable had stemmed from a failure to measure it in accordance with its theoretical foundations, i.e., as the difference between the yield on reserves and the marginal productivity foregone from an alternative investment in fixed capital. They argued that capital productivity generally exceeds borrowing costs (owing to market imperfections, asset risk and, mainly, because of controls on international capital movements), such that the use of the cost of external borrowing as a proxy would tend to bias the opportunity cost estimate downward. They found significant results in a model estimated for Israel, where the opportunity cost of reserve holding was proxied by the difference between the yield on reserves (a weighted average of returns on dollar and deutsche mark deposits) and the rate of return on capital, calculated as the ratio of business profits to gross capital stock (the criterion rate of return for public works contracts was substituted during periods of economic slowdown). In a second paper (Ben-Bassat and Gottlieb (1992b)), they introduced the notion of sovereign risk into the considerations for precautionary reserve demand, whereby the cost and probability of reserve depletion may be viewed as equivalent to the cost and probability of default on external debt. Specifically, they estimated a model of optimal reserves for Israel as a function of the output loss from external default (based on the experience of 13 countries that defaulted between 1960–82), several variables that affect the

¹⁰ For the latter group, credit was rationed after 1982 and therefore no market rate for new borrowings was available. Accordingly, the results reflected data from 1978–82.

probability of default, and the opportunity cost of holding reserves. They obtained satisfactory results, which, they argued, explained reserve demand better than conventional models.

Reserve demand and the exchange rate

19. As discussed, most empirical studies have found that, contrary to earlier expectations, the move to greater exchange rate flexibility following the collapse of Bretton Woods does not appear to have led to a fundamental change in the pattern of reserve holding behavior. Frenkel (1983) argued that the observed stability in reserve demand across regimes may reflect the fact that the "fixed" exchange rate period was largely characterized by "adjustable peg" regimes while "floating exchange rates" had in fact been "managed rates." Relatively few empirical studies have explicitly sought to examine the effect of different exchange rate behavior on the demand for reserves. Edwards (1983) found using data from the Bretton Woods period that developing countries that had occasionally used devaluation as a means of correcting payments imbalances appeared to have a lower demand of reserves than countries that had maintained a fixed rate for long periods. Bahmani-Oskooee and Malixi (1987) included a measure of exchange rate variability into a conventional reserve demand function and obtained a significant negative coefficient for a sample of 13 developed countries covering the period 1976–85.¹¹ However, more work would seem to be needed to assess what effect, if any, the shift to more flexible exchange rate arrangements since the early 1980s has had on reserve holding behavior. In a theoretical paper on this subject, Grimes (1993) develops a model of central bank reserve holding behavior under a floating rate regime. He argues that the empirical observation that behavior has not changed significantly with flexible rates may indicate either that the opportunity cost of holding reserves is negligible or, more plausibly, that central banks are extremely risk averse regarding reserve shortfalls.

Concluding remarks

20. The demand for international reserves has been the subject of considerable theoretical and empirical work, though much of it dates back to the 1970s and 1980s and relatively little cross-country work has been done in recent years.¹² In general, this work has concluded that it is possible to identify a relatively stable long-run demand for reserves function, based on a

¹¹ In a subsequent paper (Bahmani-Oskooee and Malixi (1988)), they found similar results for 28 developing countries, though the negative coefficient on the exchange rate variable was smaller than for the developed countries.

¹² Two more recent studies are Lehto (1994), who tested a model for 56 countries using data for 1974–91, and Islam, Khan and Islam (1994), who estimated the demand for reserves for three Central American countries covering the period 1960–89.

small number of variables. This conclusion has held despite estimated structural shifts in the demand for reserves associated with the collapse of the Bretton Woods regime in the early 1970s and the debt crisis in the early 1980s.

21. Most studies have followed a fairly standard specification of the determinants of the demand for reserves. Reserve holdings appear to be positively related to a scale variable (either aggregate output or imports) and to external payments variability. The ratio of imports to output has also typically been included as an explanatory variable and found to be significant, though the sign of the coefficient is ambiguous both from a theoretical standpoint, and in terms of the empirical results. The opportunity cost of reserves has also been identified as an important theoretical determinant of reserve holding, but difficulties in obtaining a satisfactory measure have restricted its use in past empirical work. However, some studies that have specifically focussed on this variable have obtained significant coefficients with the expected sign. Empirical studies that have differentiated between country groups have generally identified significant differences in reserve-holding behavior, for example between industrial and developing countries, suggesting that it is necessary to go beyond highly aggregated data to obtain meaningful results.

22. In the absence of more recent cross-country studies, it is difficult to know whether the broad findings of this earlier work still hold. A cursory look at trends in the ratio of reserves to imports (see attached figure) suggests that, in the aggregate, the level of global reserves has continued to grow broadly in line with the volume of international trade, with some evidence of an upward trend in the reserve to import ratio among the developing countries over the past decade. However, reserve holding behavior appears to have diverged significantly across countries and country groups. Whether earlier models can do an adequate job of capturing this diversity of behavior is unclear. Attempts to update earlier work also need to take account of the substantial changes in exchange rate regimes that have taken place in recent years, increased capital market integration, and the growing importance of access to private market financing for many developing countries.¹³ The impact of recent exchange market crises on reserve-holding behavior is also a topic for further study.

¹³ For example, Huang (1995) notes that traditional inventory models of reserve holding do not allow for the potential role of international reserves as an indicator of creditworthiness. Eichengreen and Frankel (1996) argue that there can be no presumption that the advent of capital mobility either raises or lowers the demand for reserves.

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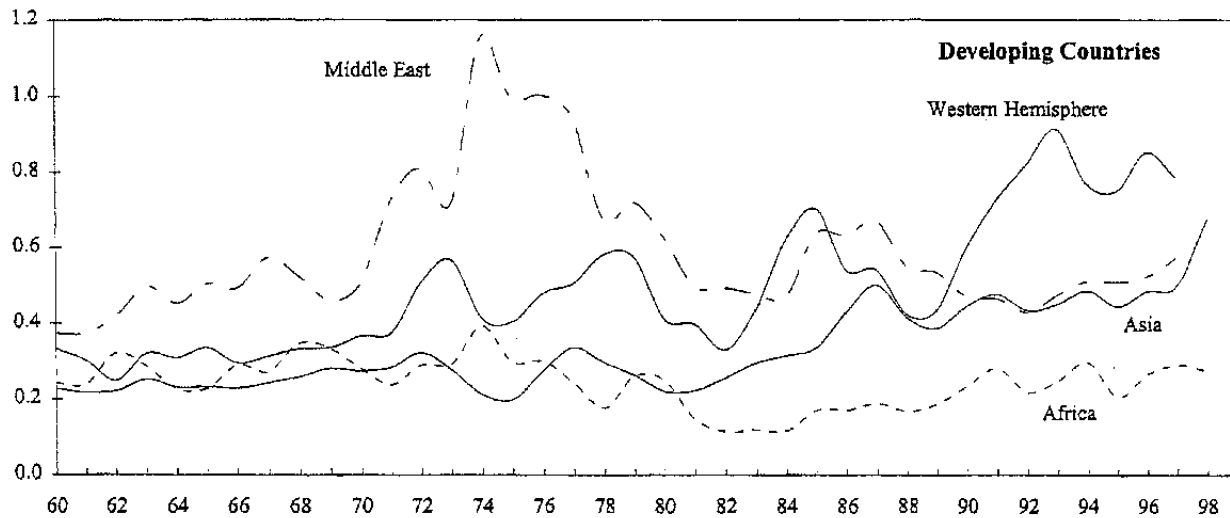
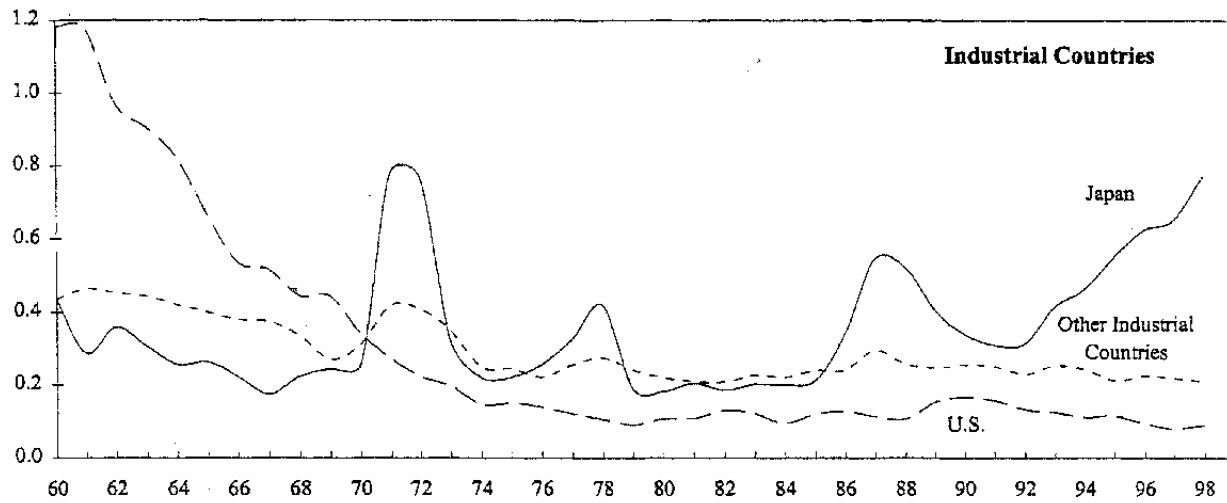
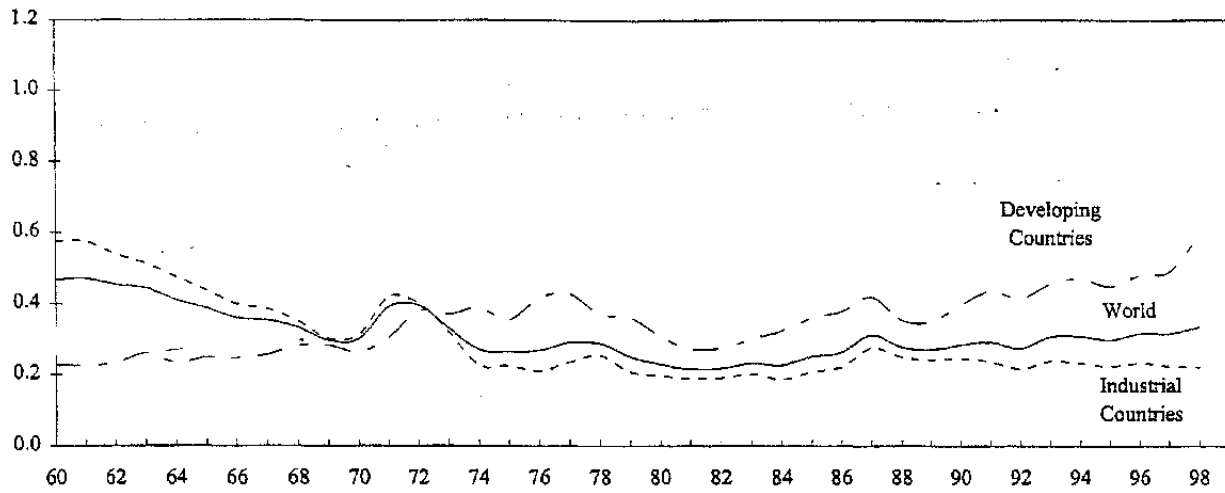
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Figure 2.1 Total Reserves to Imports Ratios 1/
1960 to 1998



Source: International Financial Statistics.

1/ Both total reserves and imports are in U.S. dollars.

NOTE 3. THE ROLE OF QUOTAS IN DETERMINING VOTING POWER

23. This note describes the provision for voting power in the IMF and compares it with those in other international financial institutions.

24. The provision for voting power in the IMF adopted at the Bretton Woods Conference in 1944 was a compromise between two alternative bases for determining voting power, one related solely to member (quota) contributions—1 vote per SDR 100,000 of quota, and another based on the principle of equality of states—250 votes per member (the basic votes). It was also considered that having basic votes would give each member, no matter how small, a degree of voting power that would give it a sense of participation in the affairs of the IMF.¹⁴ Gold also cited another reason underlying the agreement at Bretton Woods on having basic votes: the IMF was the first major international organization with regulatory as well as financial functions, and basic votes would be an appropriate reflection of the regulatory aspect of the IMF.

25. The distribution of quotas in the IMF is skewed in that a relatively few countries are quite large and account for the bulk of quotas, and the larger number of members have relatively small quotas. As of December 31, 1999, 36 members with above-average quotas account for 83 percent of total quotas, and the remaining (146) members have less than 17 percent of total quotas (Table 3.1). The provision of basic votes was aimed at increasing the participation of countries with relatively smaller quotas in the IMF's decision-making process, i.e., the effect of basic votes is to shift a part of voting power of the larger members to the smaller countries. As can be seen in Table 3.1, the voting power of members with above-average quotas is 1.4 percentage points lower than their aggregate share in total quotas, while the voting power of countries with below-average quotas is correspondingly 1.4 percentage points above their combined share in quotas. The 1.4 percentage point shift attributable to basic votes at present may be compared with the effect of basic votes as determined by the initial quotas agreed at Bretton Woods. At the inception of the IMF, the voting power of members with above average quotas was 7.1 percent lower than their 86.9 percent share in total quotas, while the voting power of countries with below-average quotas was correspondingly 7.1 percent higher than their 13.1 percent share in quotas.

26. The size of basic votes has remained unchanged at 250 since the establishment of the IMF, and any change in the size of basic votes requires an amendment of the Articles of Agreement. The total number of basic votes falls in relation to total votes whenever quotas are increased, but it can rise with the accession to IMF membership of countries with smaller-than-average quotas. The relative importance of basic votes rose from 11.3 percent in 1945 to 15.6 percent in 1958 because no major quota increases had yet been agreed, while

¹⁴ See J. Gold, "The Origins of Weighted Voting Power in the Fund," *Finance and Development*, March 1981, pp. 25–28.

the IMF membership expanded to 68 (see Table 3.2). With subsequent quota increases, and despite the rise in the number of relatively small members since 1958, the relative importance of basic votes has fallen more or less steadily to just above 2 percent by 1999. Restoring the relative importance of basic votes to say, 10 percent of total votes, or a scale equal to that approximately prevailing at the IMF's inception, would require that the size of basic votes be increased by five-fold—from 250 per member to above 1,250 per member.

27. The effect of a general increase in quotas, i.e. resulting from a general quota review, with the size of basic votes unchanged, is to raise the relative voting power of the large members and to reduce the voting power of the smaller members. To avoid this effect would require that the size of basic votes be increased proportionately with the overall increase in quotas. Only one international financial institution, the Asian Development Bank (see below), has such a feature in its voting system.

28. It may be noted that other international financial institutions, such as those under the World Bank Group, except the IDA, and the regional development banks, provide for voting systems that are similar to that of the IMF, though there are differences across these institutions with respect to the size of the basic votes element in relation to the total of votes. In particular, the voting structure of the World Bank and most of its affiliated institutions closely resembles that of the IMF. Those of the International Development Association (IDA) and the African Development Bank (AfDB) provide for significantly larger sizes of the basic votes element in the total voting power, compared with the IMF, while the European Bank for Reconstruction and Development (ERBD) does not provide for any basic votes. The Asian Development Bank (AsDB) provides for automatic changes in the size of basic votes so as to maintain the relative importance of such votes at 20 percent of total votes. Box 3.1 summarizes the voting provisions of other major international financial institutions. Box 3.2 summarizes the evolution of the relative importance of basic votes in these other institutions.

29. The distribution of quotas and voting power among the IMF members as of April 21, 2000 is given in Table 3.3. Table 3.4 provides summary information on the shares in quotas and votes of industrial and developing countries from 1944 to date.

Table 3.1. Distribution of Voting Power

	No. of members (1)	Percentage share in total quotas (2)	Percentage share in total votes (3)	"Effect " of basic votes, col. (3) - col. (2)
<u>A. As of December 31, 1999</u>				
Members with above-average quotas	36	83.1	81.7	-1.4
Members with below-average quotas	146	16.9	18.3	+1.4
Total	182	100.0	100.0	--
<u>B. At inception of the IMF 1/</u>				
Members with above-average quotas	10	86.9	79.8	-7.1
Members with below-average quotas	34	13.1	20.2	+7.1
Total	44	100.0	100.0	--

1/ On the basis of quotas in Schedule A of the Articles of Agreement (excluding Denmark).

Table 3.2. Relative Importance of Basic Votes in the IMF

	Number of Members	Total Votes	Basic Votes	
			Number	As a percentage of total votes
Schedule A 1/	45 2/	99,390	11,250	11.3
1958	68	108,930	17,000	15.6
1965	101	179,928	25,250	14.0
1970	114	236,315	28,500	12.1
1976	127	318,380	31,750	10.0
1978	135	418,074	33,750	8.1
1983	145	646,848	36,250	5.6
1990 3/	152	939,076	38,000	4.0
1999 4/	182	2,161,114	45,500	2.1

1/ Schedule A refers to Schedule A in the Articles of Agreement, as agreed at the Bretton Woods Conference in July 1944, which entered into force on December 27, 1945.

2/ Includes the votes of Denmark whose initial quota was not specified in Schedule A and the former Soviet Union, which did not become a member of the Fund.

3/ Including Cambodia, which did not participate in the Ninth General Review.

4/ Including Islamic State of Afghanistan, Brunei Darussalam, Democratic Republic of Congo, Haiti, Iraq, Lao PDR, Liberia, Marshall Islands, St. Vincent and the Grenadines, Somalia, and Sudan (which have not consented to the increase in their quotas proposed under the Eleventh General Review). Of these, Islamic State of Afghanistan, Democratic Republic of Congo, Iraq, Liberia, Somalia, and Sudan have overdue obligations in the General Resources Account and are currently ineligible to consent.

Table 3.3. IMF Quotas and Voting Power
April 21, 2000

Member	Quota		Votes	
	Millions of SDRs	Percent of Total 1/	Number 2/	Percent of Total
Afghanistan, Islamic State of	120.4	0.06	1,454	0.07
Albania	48.7	0.02	737	0.03
Algeria	1,254.7	0.60	12,797	0.60
Angola	286.3	0.14	3,113	0.15
Antigua and Barbuda	13.5	0.01	385	0.02
Argentina	2,117.1	1.01	21,421	1.00
Armenia	92.0	0.04	1,170	0.05
Australia	3,236.4	1.54	32,614	1.52
Austria	1,872.3	0.89	18,973	0.89
Azerbaijan	160.9	0.08	1,859	0.09
Bahamas, The	130.3	0.06	1,553	0.07
Bahrain	135.0	0.06	1,600	0.07
Bangladesh	533.3	0.25	5,583	0.26
Barbados	67.5	0.03	925	0.04
Belarus	386.4	0.18	4,114	0.19
Belgium	4,605.2	2.19	46,302	2.16
Belize	18.8	0.01	438	0.02
Benin	61.9	0.03	869	0.04
Bhutan	6.3	0.003	313	0.01
Bolivia	171.5	0.08	1,965	0.09
Bosnia and Herzegovina	169.1	0.08	1,941	0.09
Botswana	63.0	0.03	880	0.04
Brazil	3,036.1	1.44	30,611	1.43
Brunei Darussalam	150.0	0.07	1,750	0.08
Bulgaria	640.2	0.30	6,652	0.31
Burkina Faso	60.2	0.03	852	0.04
Burundi	77.0	0.04	1,020	0.05
Cambodia	87.5	0.04	1,125	0.05
Cameroon	185.7	0.09	2,107	0.10
Canada	6,369.2	3.03	63,942	2.98

Table 3.3. (continued). IMF Quotas and Voting Power
April 21, 2000

Member	Quota		Votes	
	Millions of SDRs	Percent of Total 1/	Number 2/	Percent of Total
Cape Verde	9.6	0.005	346	0.02
Central African Republic	55.7	0.03	807	0.04
Chad	56.0	0.03	810	0.04
Chile	856.1	0.41	8,811	0.41
China	4,687.2	2.23	47,122	2.20
Colombia	774.0	-0.37	7,990	0.37
Comoros	8.9	0.004	339	0.02
Congo, Dem. Rep. of the 3/	291.0	0.14	0	0.00
Congo, Republic of	84.6	0.04	1,096	0.05
Costa Rica	164.1	0.08	1,891	0.09
Cote d'Ivoire	325.2	0.15	3,502	0.16
Croatia	365.1	0.17	3,901	0.18
Cyprus	139.6	0.07	1,646	0.08
Czech Republic	819.3	0.39	8,443	0.39
Denmark	1,642.8	0.78	16,678	0.78
Djibouti	15.9	0.01	409	0.02
Dominica	8.2	0.003	332	0.02
Dominican Republic	218.9	0.10	2,439	0.11
Ecuador	302.3	0.14	3,273	0.15
Egypt	943.7	0.45	9,687	0.45
El Salvador	171.3	0.08	1,963	0.09
Equatorial Guinea	32.6	0.02	576	0.03
Eritrea	15.9	0.01	409	0.02
Estonia	65.2	0.03	902	0.04
Ethiopia	133.7	0.06	1,587	0.07
Fiji	70.3	0.03	953	0.04
Finland	1,263.8	0.60	12,888	0.60
France	10,738.5	5.11	107,635	5.02
Gabon	154.3	0.07	1,793	0.08
Gambia, The	31.1	0.01	561	0.03
Georgia	150.3	0.07	1,753	0.08
Germany	13,008.2	6.19	130,332	6.08
Ghana	369.0	0.18	3,940	0.18
Greece	823.0	0.39	8,480	0.40
Grenada	11.7	0.01	367	0.02

Table 3.3. (continued). IMF Quotas and Voting Power
April 21, 2000

Member	Quota		Votes	
	Millions of SDRs	Percent of Total 1/	Number 2/	Percent of Total
Guatemala	210.2	0.10	2,352	0.11
Guinea	107.1	0.05	1,321	0.06
Guinea-Bissau	14.2	0.01	392	0.02
Guyana	90.9	0.04	1,159	0.05
Haiti	60.7	0.03	857	0.04
Honduras	129.5	0.06	1,545	0.07
Hungary	1,038.4	0.49	10,634	0.50
Iceland	117.6	0.06	1,426	0.07
India	4,158.2	1.98	41,832	1.95
Indonesia	2,079.3	0.99	21,043	0.98
Iran, Islamic Republic of	1,497.2	0.71	15,222	0.71
Iraq	504.0	0.24	5,290	0.25
Ireland	838.4	0.40	8,634	0.40
Israel	928.2	0.44	9,532	0.44
Italy	7,055.5	3.36	70,805	3.31
Jamaica	273.5	0.13	2,985	0.14
Japan	13,312.8	6.33	133,378	6.23
Jordan	170.5	0.08	1,955	0.09
Kazakhstan	365.7	0.17	3,907	0.18
Kenya	271.4	0.13	2,964	0.14
Kiribati	5.6	0.003	306	0.01
Korea	1,633.6	0.78	16,586	0.77
Kuwait	1,381.1	0.66	14,061	0.66
Kyrgyz Republic	88.8	0.04	1,138	0.05
Lao PDR	39.1	0.02	641	0.03
Latvia	126.8	0.06	1,518	0.07
Lebanon	203.0	0.10	2,280	0.11
Lesotho	34.9	0.02	599	0.03
Liberia	71.3	0.03	963	0.04
Libya	1,123.7	0.53	11,487	0.54
Lithuania	144.2	0.07	1,692	0.08
Luxembourg	279.1	0.13	3,041	0.14
Macedonia, FYR	68.9	0.03	939	0.04
Madagascar	122.2	0.06	1,472	0.07
Malawi	69.4	0.03	944	0.04

Table 3.3. (continued). IMF Quotas and Voting Power
April 21, 2000

Member	Quota		Votes	
	Millions of SDRs	Percent of Total 1/	Number 2/	Percent of Total
Malaysia	1,486.6	0.71	15,116	0.71
Maldives	8.2	0.004	332	0.02
Mali	93.3	0.04	1,183	0.06
Malta	102.0	0.05	1,270	0.06
Marshall Islands	2.5	0.001	275	0.01
Mauritania	64.4	0.03	894	0.04
Mauritius	101.6	0.05	1,266	0.06
Mexico	2,585.8	1.23	26,108	1.22
Micronesia, Fed. States of	5.1	0.002	301	0.01
Moldova	123.2	0.06	1,482	0.07
Mongolia	51.1	0.02	761	0.04
Morocco	588.2	0.28	6,132	0.29
Mozambique	113.6	0.05	1,386	0.06
Myanmar	258.4	0.12	2,834	0.13
Namibia	136.5	0.06	1,615	0.08
Nepal	71.3	0.03	963	0.05
Netherlands	5,162.4	2.46	51,874	2.42
New Zealand	894.6	0.43	9,196	0.43
Nicaragua	130.0	0.06	1,550	0.07
Niger	65.8	0.03	908	0.04
Nigeria	1,753.2	0.83	17,782	0.83
Norway	1,671.7	0.80	16,967	0.79
Oman	194.0	0.09	2,190	0.10
Pakistan	1,033.7	0.49	10,587	0.49
Palau	3.1	0.001	281	0.01
Panama	206.6	0.10	2,316	0.11
Papua New Guinea	131.6	0.06	1,566	0.07
Paraguay	99.9	0.05	1,249	0.06
Peru	638.4	0.30	6,634	0.31
Philippines	879.9	0.42	9,049	0.42
Poland	1,369.0	0.65	13,940	0.65
Portugal	867.4	0.41	8,924	0.42
Qatar	263.8	0.13	2,888	0.13
Romania	1,030.2	0.49	10,552	0.49
Russia	5,945.4	2.83	59,704	2.79

Table 3.3. (continued). IMF Quotas and Voting Power
April 21, 2000

Member	Quota		Votes	
	Millions of SDRs	Percent of Total 1/	Number 2/	Percent of Total
Rwanda	80.1	0.04	1,051	0.05
St. Kitts and Nevis	8.9	0.004	339	0.02
St. Lucia	15.3	0.01	403	0.02
St. Vincent and the Grenadines	8.3	0.003	333	0.02
Samoa	11.6	0.01	366	0.02
San Marino	17.0	0.01	420	0.02
São Tomé and Príncipe	7.4	0.004	324	0.02
Saudi Arabia	6,985.5	3.32	70,105	3.27
Senegal	161.8	0.08	1,868	0.09
Seychelles	8.8	0.004	338	0.02
Sierra Leone	103.7	0.05	1,287	0.06
Singapore	862.5	0.41	8,875	0.41
Slovak Republic	357.5	0.17	3,825	0.18
Slovenia	231.7	0.11	2,567	0.12
Solomon Islands	10.4	0.005	354	0.02
Somalia	44.2	0.02	692	0.03
South Africa	1,868.5	0.89	18,935	0.88
Spain	3,048.9	1.45	30,739	1.43
Sri Lanka	413.4	0.20	4,384	0.20
Sudan 3/	169.7	0.08	0	0.00
Suriname	92.1	0.04	1,171	0.05
Swaziland	50.7	0.02	757	0.04
Sweden	2,395.5	1.14	24,205	1.13
Switzerland	3,458.5	1.65	34,835	1.63
Syrian Arab Republic	293.6	0.14	3,186	0.15
Tajikistan	87.0	0.04	1,120	0.05
Tanzania	198.9	0.09	2,239	0.10
Thailand	1,081.9	0.51	11,069	0.52
Togo	73.4	0.03	984	0.05
Tonga	6.9	0.003	319	0.01
Trinidad and Tobago	335.6	0.16	3,606	0.17
Tunisia	286.5	0.14	3,115	0.15
Turkey	964.0	0.46	9,890	0.46
Turkmenistan	75.2	0.04	1,002	0.05
Uganda	180.5	0.09	2,055	0.10

Table 3.3. (concluded). IMF Quotas and Voting Power
April 21, 2000

Member	Quota		Votes	
	Millions of SDRs	Percent of Total 1/	Number 2/	Percent of Total
Ukraine	1,372.0	0.65	13,970	0.65
United Arab Emirates	611.7	0.29	6,367	0.30
United Kingdom	10,738.5	5.11	107,635	5.02
United States	37,149.3	17.68	371,743	17.3
Uruguay	306.5	0.15	3,315	0.15
Uzbekistan	275.6	0.13	3,006	0.14
Vanuatu	17.0	0.01	420	0.02
Vietnam	329.1	0.16	3,541	0.17
Venezuela	2,659.1	1.27	26,841	1.25
Yemen, Republic of	243.5	0.12	2,685	0.13
Zambia	489.1	0.23	5,141	0.24
Zimbabwe	353.4	0.17	3,784	0.18
TOTALS	210,251.4	100.00	2,142,907	100.00
General Department. and Special Drawing Rights Department				

1 At the present time all 182 members are participants in the Special Drawing Rights Department.

2 Voting power varies on certain matters pertaining to the General Department with use of the Fund's resources in that Department.

3 The Democratic Republic of the Congo and Sudan's voting rights were suspended effective June 2, 1994 and August 9, 1993, respectively, pursuant to Article XXVI, Section 2 (b) of the Articles of Agreement.

Table 3.4. Shares in Quotas and Votes, and Composition
Of Voting Power Over Past Quota Reviews

(in percent of total quotas or votes, except as indicated) 1/

	Bretton Woods 2/ (1944)	Fifth Review (1970)	Sixth Review (1976)	Seventh Review (1978)	Eighth Review (1983)	Ninth Review (1990)	Eleventh Review (1998)	Eleventh Review (December 31, 1999) 3/
Industrial Countries								
Actual or then existing quotas	64.5	71.4	69.3	63.8	62.2	63.1	60.6	61.7
Total voting power	60.5	65.2	64.2	60.1	59.5	61.1	58.2	60.7
<i>Of which:</i>								
Quota related	57.2	63.0	62.6	58.9	58.7	60.6	58.8	60.4
Basic	3.3	2.2	1.6	1.2	0.8	0.6	0.4	0.3
<i>Number of participating Countries</i>	13	22	22	22	22	22	24	24
Developing Countries								
Actual or then existing quotas	35.5	28.6	30.7	36.2	37.8	36.9	39.4	38.3
Total voting power	39.5	34.8	35.8	39.9	40.5	38.9	40.8	39.3
<i>Of which:</i>								
Quota related	31.5	25.2	27.8	33.4	35.7	35.4	38.2	37.5
Basic	8.0	9.6	8.0	6.5	4.7	3.4	2.6	1.8
<i>Number of participating Countries</i>	32	92	105	113	123	130	158	158

1/ The data shown till the Eleventh Review, 1998 refer to quotas when the quota reviews were conducted, i.e., before the coming into effect of the increases proposed under the given quota review. The data for December 31, 1999 refer to quotas resulting from the Eleventh General Review, with 171 members accounting for 99.0 percent of quotas having consented to their proposed quota increases as of that date.

2/ The figures shown are based on the quotas listed for the 45 countries included in Schedule A of the Articles of Agreement, including a quota of \$68 million for Denmark. However, not all the countries listed in Schedule A joined the IMF shortly after the Bretton Woods Conference, e.g., the Baltic countries, Russia, and the other countries of the former Soviet Union, which are classified among the developing countries in the figures shown.

3/ Including Islamic State of Afghanistan, Brunei Darussalam, Democratic Republic of Congo, Haiti, Iraq, Lao PDR, Liberia, Marshall Islands, St. Vincent and the Grenadines, Somalia, and Sudan (which have not consented to the increase in their quotas proposed under the Eleventh General Review). Of these, Islamic State of Afghanistan, Democratic Republic of Congo, Iraq, Liberia, Somalia, and Sudan have overdue obligations to the IMF and are ineligible to consent to quota increases.

Box 3.1. VOTING STRUCTURE AND BASIC VOTES IN OTHER INTERNATIONAL FINANCIAL ORGANIZATIONS

- The **International Bank for Reconstruction and Development's** Articles of Agreement provide that each member country has 250 basic votes plus one additional vote for each share of stock held by the member (Article V, Section 3 (a)).
- The **International Finance Corporation's** Articles of Agreement provide that each member has 250 basic votes plus one additional vote for each share of stock held (Article IV, Section 3 (a)).
- The **International Development Association's** Articles of Agreement provide that the initial subscriptions of original members carry 500 votes plus one additional vote for each \$5,000 of the initial subscription. Initial subscriptions of other than original members and additional subscriptions of all members carry such voting rights as the Board of Governors determines. The voting rights system has been based on the following basic principles since 1970:
 - (1) The voting power of each Part I (developed) member corresponds to its share of combined cumulative Part I and Part II resources contributed to IDA.
 - (2) The relative voting power of Part II members as a group is protected by authorizing subscriptions carrying votes at a nominal cost payable entirely in local currency.
 - (3) An equal number of additional membership votes is allocated to all members to preserve the relative voting power of smaller members.Membership (basic) votes and subscription votes have been allocated accordingly in each replenishment since then.
- The **Multilateral Investment Guarantee Agency's** Schedule A to the Convention which established MIGA in 1988 provides that each member is to have 177 "membership votes" plus one "subscription vote" for each share of its stock held by it (Article 39 (a)). The number of membership votes was computed so as to ensure that if all countries that were members of the World Bank when the Convention was negotiated, in fact, joined the Agency, developing countries as a group would have the same voting power as developed countries as a group.
- The **European Bank for Reconstruction and Development's** Articles of Agreement provide that "The voting power of each member shall be equal to the number of its subscribed shares in the capital stock of the Bank" (Article 29).
- The **Inter-American Development Bank's** Articles of Agreement provide that each member has 135 votes plus one vote for each share of ordinary capital stock of the Bank held by that country. Effective July 31, 1995, Article VIII, Section 4(b) has been amended such that no increase in the subscription of any member, to the ordinary capital, shall become effective if this would reduce the voting power of (a) the regional developing members below 50.005 percent, (b) of the United States below 30.0 percent, and (c) of Canada below 4.0 percent of the total voting power of all member countries, leaving the voting power available for nonregional members at up to 15.995%, including 5.001% for Japan.
- The **African Development Bank's** Articles of Agreement provide that each member has 625 basic votes, and, in addition, one vote for each share of the capital stock of the Bank held by that member (Article 35, paragraph 1). The "uniform" voting power of 625 basic votes per member was calculated on the basis of an equal division of the 20,000 shares representing the then-authorized capital of the Bank by the 32 then-existing potential members of the Bank.
- The **Asian Development Bank's** Articles of Agreement provide that each member's voting power is determined by the sum of its basic votes and proportional votes (Article 33, paragraph 1) equal to each member's number of shares of the Bank's capital stock held by that member. However, the number of basic votes is subject to change as it is based on an equal distribution among all the members of 20 percent of the aggregate sum of the basic votes and proportional votes of all members. Basic votes would increase as additional shares were subscribed and decrease with additional members, thus keeping the relative importance of basic votes constant over time.

BOX 3.2. BASIC VOTES AS PERCENTAGE OF TOTAL VOTING POWER

	At the inception of the Organization 1/	As of 1970	At Present	Memo: Basic Votes per Member
IMF	11.3	12.1	2.1 2/	250
World Bank Group:				
IBRD	11.0	10.9	2.8 3/	250
IFC	12.3	18.0	1.8 4/	250
MIGA	20.9	--	20.3 5/	177
IDA	14.5	20.8 6/	21.9 7/	24,400
AfDB	49.4	47.1	3.0 8/	625
AsDB	20.0	20.0	20.0	Moving
IDB	3.2	1.3	0.1 9/	135

1/ Based on the countries listed as the original members of the respective institutions.

2/ As of December 1999.

3/ As of June 30, 1999.

4/ As of June 30, 1999.

5/ As of June 30, 1999.

6/ After the Third Replenishment of IDA in 1971.

7/ As of February 10, 2000. Membership (basic) votes for each replenishment are allocated upon effectiveness of the replenishment for subscribing members. Not all members subscribe all authorized subscriptions, and authorized membership votes are therefore higher than allocated membership votes for those members. With the effectiveness of the Twelfth Replenishment of IDA, 27, 100 membership votes have been authorized for each member; if all are allocated, membership votes will be 28.7% of the total.

8/ As of December 31, 1998.

9/ As of December 31, 1998.

NOTE 4. CONVERGENCE OVER TIME OF ACTUAL QUOTAS TOWARD CALCULATED QUOTAS

30. This note provides statistical data on the movement over time of actual quotas in relation to calculated quotas. In general, two types of comparisons between actual and calculated quotas have been made. One is based on "normalized" calculated quotas, i.e., comparisons based on actual quotas and calculated quotas, where the latter has been scaled down (or normalized) so that their total equals that of actual quotas. The second comparison is that between the absolute levels of actual and calculated quotas, which would capture the extent to which the total or average of actual quotas has tended to lag behind calculated quotas.

31. Table 4.1 shows the average deviations of calculated quotas from agreed quotas at the conclusion of the last seven quota reviews. The upper panel of Part 1 of the table shows the deviations on the basis of calculated quotas for each review that have been scaled or "normalized" to sum to the total of the quotas actually agreed to in each respective quota review. These deviations between actual and calculated quotas peaked at the end of the Seventh Review, reflecting the preponderant equiproportional element in most of the quota reviews up to that time.

32. Under the Eighth Review, the weight of calculated quotas in the distribution of quota increases was relatively large, and, as a result, the average discrepancy between calculated quotas and agreed quotas, on a normalized basis, fell to 53 percent. Under the Ninth Review, the average discrepancy widened somewhat, to 59 percent, when the equiproportional element was set at 60 percent, not far below the historical norm of having equiproportional increases equal to 70 percent of the total quota increase. The normalized deviation for industrial countries was kept relatively low as a result of ad hoc re-arrangements that equalized the quota shares of Japan and Germany, and of France, and the United Kingdom. The average deviation between actual and calculated quotas for all members widened under the Tenth Review with the absence of a quota increase in that review. Under the Eleventh Review, the average deviation between calculated and actual quotas was reduced to about the level observed at the end of the Eighth Review, partly as a result of a significant adjustment of the quota shares of industrial countries.

33. The non-normalized data show a similar pattern of divergence over time, but they also show that the absolute size of the divergence of calculated from actual (or agreed) quotas has remained substantial since the time of the Seventh Review.

34. The table also shows that about a fourth of the total membership (in terms of the number of countries) tended to have excesses or positive deviations of calculated over actual quota shares. Furthermore, the quota share or voting power of such members that would gain quota share, as actual quotas were adjusted toward calculated quotas, was generally less than

the voting power of the members that would tend to lose quota share. This situation largely explains the tendency of the membership to agree on a relatively large equiproportional element in quota increases, which limited the changes in quota shares.

35. At each general quota review, the reduction of the discrepancy between shares in actual and calculated quotas may be measured by the "adjustment coefficient." For an individual member, the adjustment coefficient measures the extent of reduction of the initial gap between actual quota share and calculated quota share. For the membership as a whole, the adjustment coefficient is defined as the average reduction in the differences between members' shares in calculated and actual quotas.¹⁵ Although the adjustment coefficient was devised in 1982/83 at the time of the Eighth Review, an ex post calculation of the historical adjustment coefficients indicates that this coefficient has tended to be significantly higher in recent quota reviews in comparison with earlier reviews.

36. Because the adjustment coefficient is a "flow" or rate-of-change concept, it should also be viewed in relation to the extent of (cumulative) convergence between actual and calculated quota shares over time. For the latter concept, a convergence index has been calculated and shown in the attached table. The convergence index is defined as 100 percent minus the aggregate of positive (or negative) deviations between calculated and proposed (actual) shares. The convergence index measures the extent to which the relative distributions of actual and calculated quotas have become aligned over time, even as the distribution of calculated quotas was subject to change in between general quota reviews. As can be seen in the table, the convergence index was relatively high at the end of the Fifth and Ninth Reviews (almost 90 percent), and somewhat lower at around 85 percent at the end of the other quota reviews. It would appear that the amount of "work" needed to maintain a convergence index of 85-90 percent has, in recent quota reviews, required a palpable

¹⁵ The specific formula for calculating the adjustment coefficient is:

$$\frac{[\sum (S_p^i)^2]^{1/2} - [\sum (S_c^i - S_n^i)^2]^{1/2}}{[\sum (S_c^i - S_p^i)^2]^{1/2}} \times 100$$

where S_c = calculated quota share, S_p = "present" or then-existing quota share and S_n = new quota share. This measure compares (a) the average (root-mean-square) deviation of shares in new quotas from shares in calculated quotas with (b) the average (root-mean-square) deviation of shares in then-existing quotas from shares in calculated quotas.

For an individual member i , the adjustment coefficient is:

$$\frac{S_n^i - S_p^i}{S_c^i - S_p^i} \times 100$$

adjustment of relative shares in quotas, and that an even greater amount of selectivity in quota increases would seem to be needed to raise the convergence index closer to 100 percent.

Table 4.1. Deviations of Calculated Quotas from Quotas Agreed
Under Past Quota Reviews
(in percent, except as indicated)

	Fifth Review	Sixth Review	Seventh Review	Eighth Review	Ninth Review	Tenth Review	Eleventh Review
1. Average (root-mean-squared error)							
<u>Normalized 1/</u>							
All members	33.2	60.3	77.6	52.6	59.0	64.6	54.1
Industrial countries	22.3	29.5	32.7	27.0	26.8	57.6	44.0
Major oil exporting countries	23.8	45.0	89.3	66.9	69.2	62.9	43.3
Non-oil developing countries	36.2	66.9	82.7	54.5	62.1	65.9	56.3
<u>Non-normalized 2/</u>							
All members	31.3	75.6	133.8	140.5	163.8	221.6	153.7
Industrial countries	27.9	66.4	99.4	160.6	167.5	325.2	237.4
Major oil exporting countries	23.5	46.3	204.2	266.1	283.7	309.8	137.0
Non-oil developing countries	32.8	80.4	129.4	114.0	145.4	188.1	136.6
2. Total of positive (negative) deviations between proposed and calculated quota shares							
All members	10.8	14.7	16.8	14.4	10.1	14.6	14.4
No. of members with positive deviations	18	22	31	33	34	36	39
Quota shares of members with positive deviations	58.3	56.3	42.0	39.9	58.4	43.1	40.8
No. of members with negative deviations	94	102	102	110	118	140	144
Quota share of members with negative deviations	41.7	43.6	61.3	60.1	41.6	56.9	59.2

Table 4.1. (concluded). Deviations of Calculated Quotas from Quotas Agreed Under Past Quota Reviews (in percent, except as indicated)

	Fifth Review	Sixth Review	Seventh Review	Eighth Review	Ninth Review	Tenth Review	Eleventh Review
3. Adjustment coefficient, 3/ All members	11.5	5.4	1.7	19.3	28.0	0.0	14.4
4. Convergence index, 4/ All members	89.2	85.3	83.2	85.6	89.9	85.4	85.6

1/ The figures shown are based on comparisons between quotas proposed as a result of the Review indicated and quotas calculated in connection with the same review, after applying a scale factor to the calculated quotas (normalizing) so that they aggregate to the same size Fund as agreed under the Review.

2/ The average comparisons shown are based on quotas calculated for the given Review, without the adjustment described in Footnote 1. These figures also indicate the extent to which quotas in general have lagged over time behind the calculated quotas.

3/ The specific formula for the adjustment coefficient is:

$$\frac{\{\text{SQRT}[\text{SUM}((\text{CQ}-\text{PQ})^2)]\} - \{\text{SQRT}[\text{SUM}((\text{CQ}-\text{PropQ})^2)]\}}{\{\text{SQRT}[\text{SUM}((\text{CQ}-\text{PQ})^2)]\}} \times 100$$

where CQ is the calculated quota share, PQ is the present quota share and PropQ is the proposed quota share.

4/ The convergence index is defined as 100 percent minus the total of positive deviations, between proposed and calculated quota shares.

NOTE 5. CONVERSION OF GDP INTO A COMMON CURRENCY

37. The existing formulas relate quotas, expressed in SDRs, with countries' GDPs (and other variables) that have been converted into a common currency (the SDR).¹⁶ This note reviews the IMF's basic practice of using market exchange rates to convert local-currency GDP data into a common currency, and discusses an alternative conversion method of using PPP exchange rates.

Limitations of market exchange rates

38. It may be noted that the acceptance of GDP valued or converted at market exchange rates has not been without reservations. As early as 1950, the IMF staff noted that prices of nontradable goods and services produced and consumed in one country did not have a simple relationship with prices of similar goods and services in other countries, which made problematic the interpretation of national income figures translated into a common currency. Criticism of market exchange rates has also focused on their observed volatility, including overshooting, on relatively long periods of "misalignments," and on very large declines in foreign-currency denominated GDP just after a large devaluation.¹⁷ In the quota reviews, inter-country comparisons of GDP necessarily involved the difficult question of the extent to which an exchange rate was over- or undervalued.

39. The effect of exchange rate volatility is illustrated in Table 5.1, which expresses Japan's GDP as a percent of U.S. GDP for 1985-96, obtained by using annual average and five-yearly average exchange rates and PPPs over the same period. The movements of the exchange rate-based GDPs show large fluctuations, but the PPP-based comparison gives a more or less constant figure of around 40 percent during the 1990s. The fluctuations in the exchange rate-based figures were much greater, though the size of such fluctuations would be smaller if exchange rates over several years were used for GDP conversion. Nonetheless, it is market-exchange-rate-based GDP that determines Japan's relative capacity to invest abroad.

¹⁶ Before the SDR became the IMF's unit of account, the numeraire currency in the formula was the U.S. dollar.

¹⁷ These observations mainly reflect the imperfect relationship between changes in relative inflation rates between two countries and changes in the exchange rate between the currencies of the two countries. For a survey of the empirical literature in this area, see Ronald MacDonald, "Long Run Exchange Rate Modeling: A Survey of the Recent Evidence," *IMF Staff Papers*, 1995, Vol. 42, 3, pp. 437-89.

Table 5.1. Ratio of Japan's GDP to U.S. GDP (Percent)

Conversion method	1985	1990	1993	1996
Annual average exchange rate	33	54	67	62
Five-yearly average exchange rate	39	59	65	61
PPPs	35	41	41	40

Source: OECD Website "Purchasing Power Parities."

40. Exceptions to the practice of using market exchange rates for converting GDP have been made on pragmatic grounds. For example, when countries with centrally planned economies joined the IMF in the 1980s and early 1990s, their official exchange rates were not considered to be reflective of market forces, and some adaptation of a PPP conversion factor was typically used. In the case of Russia, market-determined exchange rates were not available, and GDP in 1980 was converted partly on the basis of official exchange rates (this applied to the GDP of the energy and extractive sectors), and on using a PPP relationship.¹⁸ At the time of the Eleventh General Review of Quotas in 1996–97, it was recognized that the use of market exchange rates appeared to substantially undervalue the GDPs of 23 countries, and the use of such exchange rates effectively ignored the substantial real economic growth achieved by some of them, including, notably, China and India. A version of a relative PPP exchange rate was suggested by IMF staff for the purpose of the quota calculations.¹⁹ After considerable discussion, the IMF Executive Board decided to use only market exchange rates, mainly on the grounds of having a uniform rule for conversion factors. Some of the affected countries made no objection to market exchange rates.²⁰

¹⁸ The method used for the rest of Russia's GDP was to use the "commercial" exchange rates of four other centrally planned economies to infer a U.S. dollar value for Soviet ruble. This approach gave a significantly depreciated rate relative to the official rate and to a large extent equalized the internal and external prices of tradable goods.

¹⁹ The suggested approach was to convert GDP by keeping the real exchange rates of the relevant countries constant against the SDR using a relevant base year. The approach helped neutralize the impact of exchange rate changes on inter-country GDP comparisons.

²⁰ Among the affected countries were those of the former Soviet Union, whose calculated quotas exhibited the perverse effect of the nonlinear element of the existing quota formulas. Using a relative PPP conversion factor would have *raised* these countries' GDPs but *lowered* their calculated quotas.

PPP-based conversion factors

41. PPP conversion rates have been suggested as an alternative method of converting GDP as a means of dealing with the limitations of market exchange rates.

Uses of PPP

42. The IMF's *World Economic Outlook* publications uses GDP weights obtained by PPP methods to calculate regional and global growth rates and inflation.²¹ Other uses of PPP conversion factors generally pertain to exercises that involve comparisons of countries' standards of living and real per capita incomes.²² It may be noted that PPPs have generally not been used for conversion of international transactions valued at market prices, such as current account and capital flows.²³ The use of PPP for the IMF's operational purposes has also been questioned.²⁴

Data collection, methods, and quality

43. The most comprehensive source of PPP data, the International Comparison Program (ICP), estimates PPPs from the expenditure side of national income accounts on the basis of price surveys for benchmark years.²⁵ Though participation by countries is not consistent, eight rounds of surveys have been undertaken so far, in five-yearly phases. The latest phase (1993-96) is the first worldwide survey and covers 120 countries (see Table 5.2).²⁶ The 1993

²¹ See Ann Marie Gulde and Marianne Schulze-Ghattas "Purchasing Power Parity Based Weights for the World Economic Outlook" in *Staff Studies for the World Economic Outlook* (Washington: IMF, 1993). See also IMF, *World Economic Outlook*, (Washington: IMF, May 2000 (forthcoming)).

²² See Sultan Ahmad, "International Comparison of Incomes: Why Should One Bother Using PPP Conversion?" unpublished, World Bank.

²³ See Gulde and Schulze-Ghattas (1993).

²⁴ For a discussion, see Nancy Wagner "A Review of PPP-Adjusted GDP Estimation and its Potential Use for the Fund's Operational Purposes," IMF Working Paper 95/18.

²⁵ The ICP began in the late 1960s as a joint venture of the United Nations and the International Comparison Unit of the University of Pennsylvania, with initial support from the Ford Foundation and the World Bank. More recently, Eurostat and OECD have assumed important roles in conducting the associated work in their countries.

²⁶ The first three surveys were coordinated centrally from the University of Pennsylvania in a single global framework. From 1980, the work has been organized by regional coordinators (OECD for OECD countries, Economic Commission for Europe (ECE) and Austrian Central Statistical Office for East European countries, Eurostat for African and Caribbean countries,

(continued...)

surveys did not include over 50 countries with populations of more than a million, of which half are in Africa. The 1990 round of surveys included only 30 countries, mainly from OECD and some East European countries; and the 1985 survey did not have any of the 16 Latin American countries that participated in the previous 1980 survey. By now, country coverage of ICP surveys is almost complete in the industrialized countries but it remains incomplete, discontinuous, and uncertain in the developing regions. European Union (EU) countries have integrated the ICP surveys with their regular activities and conduct them on an annual basis.

Table 5.2. Coverage of ICP surveys (*number of countries*)

Year	Total	Developing	Industrialized
1970	10	4	6
1973	16	8	8
1975	34	21	13
1980	60	42	18
1985	64	42	22
1990	30	6	24
1993	117	91	26
1996	52	28	24

Source: "Handbook of the International Comparison Program," UN Studies in Methods, ST/ESA/STAT/SER.F/62, pp. 67-69 (for the years 1970-85); Sultan Ahmed, "International Comparison of Incomes: Why Should One Bother Using PPP Conversion," World Bank, unpublished, 1997 (for 1990); and World Bank, "Countries in ICP," unpublished, April 14, 2000, p. 16 (for the years 1993 and 1996).

44. The ICP surveys collect or construct two types of data: (a) prices of around 400 closely specified types of goods and services, controlling for quality and seasonal price differences, which are subsequently aggregated into 150-250 basic headings, and (b) GDP expenditures divided into these basic headings. From a list of 1000-2000 specifications (depending on the region), each country supplies prices of 3-5 items per basic heading. PPPs are computed as the average ratios of prices of comparable items in each basic heading, which are aggregated to higher levels using GDP expenditure weights. The PPP rates corresponding to total GDPs are used to convert values in national currencies to a common currency.

UNSTAT for Asian countries) and the regional results are linked together for global comparison (by UNSTAT in 1980 and Eurostat in 1985). In the 1993 round of surveys, 36 of the countries are not included in the regular UN program but in the World Bank program administered by Caricom (for the Caribbean countries), ECLAC (for Latin American countries), ESCAP (for Asian countries) and ESCWA (for Middle East countries). The World Bank program links the regional results to make them globally consistent and does the projection exercises to develop estimates for the countries not covered in the surveys.

45. The ICP estimates derived from the *expenditure approach* to GDP is acknowledged by the World Bank, Eurostat and OECD to provide a conceptually sound and practically feasible way to generate appropriate and operationally meaningful PPPs across countries on a regular basis in a reasonably cost-effective manner.²⁷ PPP computation from the *production side* has extensive data requirements and has been attempted for only a few dozen countries. The estimates differ significantly from those based on the expenditure approach. This method involves pricing comparable items of production and comparable units of inputs, and comparing gross outputs once by deflating by relative prices of outputs and then by relative prices of inputs to arrive at relative values of net output.

46. Because it has not been possible to separate out the implicit unit price and quantity elements, the PPP computation from the *income side* of national accounts has not been attempted.

47. The ICP uses the Geary-Khamis aggregation method that is based on a "statistical" approach to index number construction, as opposed to the "functional" approach.²⁸ In this method, each PPP index is calculated as the ratio of total expenditure on a basket of goods and services valued at the country's own prices to total expenditure on the same basket valued at international prices.²⁹ International prices are calculated as a weighted average of domestic prices of the countries being compared, where the domestic prices are converted into a common currency (usually the U.S. dollar or the international dollar³⁰) using the country's PPP index and where the weights reflect each country's share in the total quantity of each good. Thus, the international prices and the PPPs are determined as the solution of a

²⁷ See OECD, "Purchasing Power Parities and Real Expenditures, 1996 Results (1999 Edition)", 2000.

²⁸ A functional approach for making comparisons would be based on a theoretical structure with economic underpinnings, whereas a statistical approach emphasizes the index construction and its associated statistical properties. See R.C. Geary, "A Note on the Comparison Between Exchange Rates and Purchasing Power of Currencies Between Countries," *Journal of the Royal Statistical Society*, Series A, Vol. 121, Part I, 1958, pp. 97-99; and Salem H. Khamis, "A New System of Index Numbers for National and International Purposes," *Journal of the Royal Statistical Society*, Series A, Vol. 135, Part 1, 1972, pp. 96-121.

²⁹ The method is also used in IMF calculations with certain modifications. An alternative approach is the Elteto-Koves-Szulc aggregation method (for details, see Nancy Wagner, (1995) and OECD, (1999)).

³⁰ International dollar estimates use the average international price structure while U.S. dollar estimates are dependent upon the U.S. price structure.

system of simultaneous equations, one for each country and each commodity, minus one redundant equation which sets the PPP of the numeraire country at unity.

48. The results of the ICP surveys form the primary database used for certain purposes by the IMF and World Bank. Presently, the IMF has a data base of PPP valuation of country GDP for 178 countries for 1961–99, based on ICP survey data, estimates from the Penn World Table Mark 5 (PWT5.6),³¹ and staff estimates (see Tables 5.3–5.6). The World Bank database covers 161 countries,³² constructed from statistical analysis based on the 82 countries for which primary price and expenditure data were available.

49. The IMF extends the ICP estimates to non-ICP countries using regression techniques. The regression equation has PPP-based GDP per capita (in log form) as the dependent variable, and exchange rate-based per capita GDP (in log form), openness to trade, and regional dummies as the explanatory variables. The regression results are subject to a number of difficulties. For example, they are based on data for ICP benchmark countries which may not be representative of the non-ICP countries. The regression results also generally have large residual errors for developing countries.

50. The basic survey data that underlie the ICP calculations of PPP suffer from quality problems because developing countries have traditionally given less attention to the expenditure side of national accounts. For example, private expenditure in these countries is derived as a residual because direct data are usually not available. Consequently, some of the ICP data were obtained in an ad hoc manner, and little attention was given to verification and validation of the basic data. The quality of detailed lower-level expenditure data is also uneven because some products and, particularly, services are difficult to specify clearly, and tend to vary significantly in quality across countries. The data quality problem is particularly acute for prices of items not sold at market prices, such as medical, educational, housing and transportation services.

Some conceptual issues

51. The usefulness of PPP calculations based on expenditures rests on the absence of distortions in domestic prices and on the assumption that countries consume and produce more or less the same goods and services. In particular, the effect on relative price levels of the two countries being compared of taxes, tariffs, transport costs, governmental regulations, and trade restrictions would have to be neutral. If these assumptions do not hold, PPP-based

³¹ This is an extensive time series database derived from the ICP studies by Robert Summers and Alan Heston of the University of Pennsylvania.

³² See Appendix Table 5.7 for availability of the PPP-based country data in the World Bank database. The 82-country group does not cover 35 countries with significantly reduced data coverage which also participated in the 1993 ICP survey.

GDPs would not necessarily result in comparisons that reflect countries' relative shares in global real output. In this case, there would be no effective arbitrage mechanism that would validate the law of one price (the same good in different countries being priced the same in a given currency), even if exchange rates were fundamentally well behaved.

52. It is empirically established that market exchange rates converge only slowly toward PPPs.³³ The analytical basis of this finding rests not only on the existence of transportation costs and tariff and non-tariff barriers to trade, but also on a number of theoretical considerations, including, principally, Balassa's productivity difference model. Over time, market exchange rates tend to settle at levels that equate the international prices of tradable goods produced in different countries, i.e., the law of one price holds for tradable goods. Compared with developed countries, the production of tradable goods in developing countries is characterized by higher productivity, when compared with the production of nontradables. This productivity difference translates into: (a) a higher price of tradables relative to that of nontradables in developing countries than in developed countries; and (b) higher real wages and profits in the tradable sectors, and a higher ratio of real wages in the tradable sector to those in the nontradable sector in developing countries than in developed ones. As long as the nontradable sector in the developing countries remains a substantial part of the domestic economy, the valuation of GDP of this sector at market exchange rates tends to lag its valuation at PPP exchange rates.

³³ For a relatively recent appraisal of the PPP literature, see Kenneth Rogoff, "The Purchasing Power Parity Puzzle," *Journal of Economic Literature*, Vol. 34, June 1996, pp. 647-68, and Heston and Summers (1996). Balassa uses a "productivity difference model" and, for labor-abundant developing countries, Bhagwati examines differences in factor endowments and imperfect international labor mobility to provide a theoretical justification for the divergence between exchange rates and PPPs (B. Balassa, "The Purchasing Power Parity Doctrine: A Reappraisal," *Journal of Political Economy*, Vol. 72, December 1964, pp. 584-96; and J.N. Bhagwati, "Why are Services Cheaper in Poor Countries?," *Economic Journal*, Vol. 94, June 1984, pp. 279-86).

Table 5.3. Comparison of PPP-Based GDP and Exchange Rate-Based GDP for Individual Countries, 1994

Country	Share in Total* (Percent)		Rank	
	PPP-Based	Exchange Rate-Based	PPP-Based	Exchange Rate-Based
UNITED STATES	21.55	26.70	1	1
CHINA,P.R.: MAINLAND	8.76	2.05	2	9
JAPAN	8.49	17.75	3	2
GERMANY	5.17	7.92	4	3
INDIA	3.95	1.17	5	15
FRANCE	3.49	5.11	6	4
ITALY	3.46	3.88	7	6
UNITED KINGDOM	3.33	3.92	8	5
RUSSIA	3.14	1.02	9	16
BRAZIL	2.87	3.08	10	7
CANADA	2.02	2.13	11	8
MEXICO	2.01	1.60	12	11
SPAIN	1.77	1.91	13	10
INDONESIA	1.72	0.67	14	23
KOREA	1.54	1.52	15	12
AUSTRALIA	1.11	1.28	16	14
THAILAND	1.065	0.547	17	25
ARGENTINA	0.995	0.974	18	18
IRAN, I.R. OF	0.955	0.250	19	40
TURKEY	0.945	0.495	20	28
TAIWAN PROV. OF CHINA	0.933	0.912	21	19
NETHERLANDS	0.931	1.330	22	13
SOUTH AFRICA	0.828	0.514	23	26
POLAND	0.746	0.373	24	33
COLOMBIA	0.742	0.309	25	35
PHILIPPINES	0.668	0.243	26	41
BELGIUM	0.652	0.882	27	20
UKRAINE	0.644	0.091	28	58
SAUDI ARABIA	0.588	0.455	29	30
PAKISTAN	0.547	0.198	30	45
VENEZUELA, REP. BOL.	0.546	0.221	31	42
SWITZERLAND	0.529	0.989	32	17
SWEDEN	0.516	0.783	33	21
AUSTRIA	0.514	0.756	34	22
EGYPT	0.487	0.199	35	44
CHILE	0.442	0.193	36	46
CHINA,P.R.: HONG KONG	0.417	0.495	37	27
MALAYSIA	0.407	0.282	38	37
ROMANIA	0.403	0.114	39	56
GREECE	0.398	0.374	40	32
PORTUGAL	0.387	0.334	41	34
CZECH REPUBLIC	0.365	0.156	42	51
DENMARK	0.360	0.575	43	24
ALGERIA	0.360	0.159	44	49
BANGLADESH	0.333	0.135	45	53
NORWAY	0.307	0.465	46	29
VIETNAM	0.296	0.062	47	62
PERU	0.292	0.190	48	48

Table 5.3. (continued). Comparison of PPP-Based GDP and Exchange Rate-Based GDP for Individual Countries, 1994

Country	Share in Total* (Percent)		Rank	
	PPP-Based	Exchange Rate-Based	PPP-Based	Exchange Rate-Based
NIGERIA	0.285	0.090	49	59
HUNGARY	0.277	0.159	50	50
FINLAND	0.276	0.378	51	31
MOROCCO	0.265	0.115	52	55
ISRAEL	0.251	0.283	53	36
KAZAKHSTAN	0.237	0.044	54	73
SINGAPORE	0.212	0.264	55	39
LIBYA	0.209	0.120	56	54
NEW ZEALAND	0.179	0.192	57	47
BELARUS	0.173	0.018	58	98
IRELAND	0.171	0.207	59	43
ECUADOR	0.164	0.063	60	61
UZBEKISTAN	0.138	0.025	61	88
BULGARIA	0.137	0.037	62	75
SYRIAN ARAB REPUBLIC	0.130	0.058	63	65
CONGO, DEM. REP. OF	0.127	0.022	64	93
SLOVAK REPUBLIC	0.124	0.052	65	69
MYANMAR	0.124	0.281	66	38
UNITED ARAB EMIRATES	0.122	0.145	67	52
TUNISIA	0.122	0.059	68	64
SRI LANKA	0.119	0.044	69	72
GUATEMALA	0.115	0.049	70	70
SUDAN	0.114	0.027	71	86
DOMINICAN REPUBLIC	0.097	0.041	72	74
KENYA	0.092	0.027	73	85
KUWAIT	0.087	0.093	74	57
URUGUAY	0.083	0.062	75	63
GHANA	0.079	0.020	76	96
CROATIA	0.075	0.055	77	67
TURKMENISTAN	0.075	0.014	78	107
ZIMBABWE	0.073	0.026	79	87
SLOVENIA	0.073	0.054	80	68
ETHIOPIA	0.073	0.021	81	94
CAMEROON	0.070	0.030	82	79
COSTA RICA	0.066	0.031	83	77
COTE D IVOIRE	0.065	0.029	84	82
LEBANON	0.064	0.034	85	76
NEPAL	0.064	0.017	86	101
OMAN	0.062	0.049	87	71
LITHUANIA	0.059	0.016	88	104
BOLIVIA	0.059	0.023	89	92
UGANDA	0.056	0.014	90	108
PANAMA	0.054	0.029	91	81
PARAGUAY	0.051	0.030	92	80
AZERBAIJAN	0.049	0.005	93	137
TANZANIA	0.046	0.018	94	100
EL SALVADOR	0.046	0.031	95	78
GEORGIA	0.045	0.003	96	150

Table 5.3. (continued). Comparison of PPP-Based GDP and Exchange Rate-Based GDP for Individual Countries, 1994

Country	Share in Total* (Percent)		Rank	
	PPP-Based	Exchange Rate-Based	PPP-Based	Exchange Rate-Based
JORDAN	0.043	0.023	97	91
ANGOLA	0.043	0.015	98	106
SENEGAL	0.039	0.014	99	110
LUXEMBOURG	0.037	0.056	100	66
MADAGASCAR	0.037	0.011	101	118
LATVIA	0.036	0.014	102	109
HONDURAS	0.035	0.013	103	111
CAMBODIA	0.035	0.009	104	121
GUINEA	0.034	0.013	105	112
PAPUA NEW GUINEA	0.034	0.020	106	95
YEMEN, REPUBLIC OF	0.033	0.085	107	60
QATAR	0.032	0.028	108	84
BOTSWANA	0.030	0.016	109	103
MOZAMBIQUE	0.030	0.009	110	122
MOLDOVA	0.029	0.005	111	136
KYRGYZ REPUBLIC	0.028	0.004	112	141
MAURITIUS	0.028	0.012	113	116
BAHRAIN	0.028	0.018	114	99
JAMAICA	0.027	0.024	115	89
BURKINA FASO	0.027	0.007	116	127
ESTONIA	0.027	0.009	117	120
HAITI	0.026	0.007	118	126
ZAMBIA	0.026	0.013	119	115
CYPRUS	0.025	0.028	120	83
MACEDONIA, FYR	0.025	0.013	121	114
NICARAGUA	0.024	0.007	122	130
TRINIDAD AND TOBAGO	0.024	0.019	123	97
ALBANIA	0.024	0.007	124	125
NIGER	0.023	0.006	125	133
NAMIBIA	0.023	0.011	126	117
GABON	0.023	0.016	127	105
LIBERIA	0.022	0.008	128	124
ARMENIA	0.020	0.002	129	153
TAJKISTAN	0.020	0.003	130	149
MALI	0.019	0.007	131	128
BENIN	0.019	0.006	132	135
CHAD	0.019	0.004	133	139
MALAWI	0.017	0.004	134	140
TOGO	0.016	0.004	135	144
LAO PEOPLE'S DEM.REP	0.016	0.006	136	134
ICELAND	0.016	0.024	137	90
BURUNDI	0.014	0.004	138	146
MALTA	0.013	0.010	139	119
CENTRAL AFRICAN REP.	0.013	0.003	140	148
CONGO, REPUBLIC OF	0.013	0.007	141	131
MAURITANIA	0.011	0.004	142	143
FIJI	0.0094	0.0070	143	129
NETHERLANDS ANTILLES	0.0092	0.0082	144	123

Table 5.3. (concluded). Comparison of PPP-Based GDP and Exchange Rate-Based GDP for Individual Countries, 1994

Country	Share in Total* (Percent)		Rank	
	PPP-Based	Exchange Rate-Based	PPP-Based	Exchange Rate-Based
RWANDA	0.0091	0.0028	145	151
BAHAMAS, THE	0.0091	0.0130	146	113
MONGOLIA	0.0090	0.0026	147	152
SWAZILAND	0.0087	0.0040	148	142
LESOTHO	0.0084	0.0032	149	147
BARBADOS	0.0083	0.0066	150	132
SIERRA LEONE	0.0078	0.0035	151	145
GUYANA	0.0066	0.0020	152	156
DJIBOUTI	0.0050	0.0018	153	159
GAMBIA, THE	0.0049	0.0014	154	162
SURINAME	0.0048	0.0048	155	138
GUINEA-BISSAU	0.0035	0.0009	156	168
CAPE VERDE	0.0033	0.0016	157	161
BHUTAN	0.0031	0.0010	158	164
BELIZE	0.0027	0.0021	159	154
SOLOMON ISLANDS	0.0026	0.0011	160	163
COMOROS	0.0025	0.0007	161	173
ST. LUCIA	0.0024	0.0020	162	157
MALDIVES	0.0023	0.0009	163	167
SEYCHELLES	0.0022	0.0018	164	160
ANTIGUA AND BARBUDA	0.0019	0.0019	165	158
VANUATU	0.0017	0.0008	166	171
SAMOA	0.0016	0.0007	167	174
EQUATORIAL GUINEA	0.0014	0.0005	168	176
GRENADA	0.0013	0.0010	169	165
ST. VINCENT & GREN.	0.0013	0.0009	170	166
TONGA	0.0012	0.0006	171	175
DOMINICA	0.0009	0.0008	172	170
ST. KITTS AND NEVIS	0.0009	0.0008	173	169
SAO TOME & PRINCIPE	0.0005	0.0002	174	178
KIRIBATI	0.0003	0.0001	175	179
BRUNEI DARUSSALAM		0.0166		102
ERITREA		0.0021		155
MICRONESIA, FED.STS.		0.0007		172
MARSHALL ISLANDS		0.0004		177

Source: IMF database

* Note: Total refers to the countries in the table

Table 5.4. Comparison of PPP-Based GDP and Exchange Rate-Based GDP for Individual Countries, by WEO Classification, 1994

Country	Share in Total* (Percent)		Rank	
	PPP-Based	Exchange Rate-Based	PPP-Based	Exchange Rate-Based
<i>Major Industrial Countries</i>	47.49	67.41		
UNITED STATES	21.55	26.70	1	1
JAPAN	8.49	17.75	3	2
GERMANY	5.17	7.92	4	3
FRANCE	3.49	5.11	6	4
ITALY	3.46	3.88	7	6
UNITED KINGDOM	3.33	3.92	8	5
CANADA	2.02	2.13	11	8
<i>Other Advanced Economies</i>	10.15	12.61		
SPAIN	1.77	1.91	13	10
KOREA	1.54	1.52	15	12
AUSTRALIA	1.11	1.28	16	14
NETHERLANDS	0.931	1.330	22	13
BELGIUM	0.652	0.882	27	20
SWITZERLAND	0.529	0.989	32	17
SWEDEN	0.516	0.783	33	21
AUSTRIA	0.514	0.756	34	22
GREECE	0.398	0.374	40	32
PORTUGAL	0.387	0.334	41	34
DENMARK	0.360	0.575	43	24
NORWAY	0.307	0.465	46	29
FINLAND	0.276	0.378	51	31
ISRAEL	0.251	0.283	53	36
SINGAPORE	0.212	0.264	55	39
NEW ZEALAND	0.179	0.192	57	47
IRELAND	0.171	0.207	59	43
LUXEMBOURG	0.037	0.056	100	66
ICELAND	0.016	0.024	137	90
<i>Countries in Transition</i>	6.978	2.298		
RUSSIA	3.14	1.02	9	16
POLAND	0.746	0.373	24	33
UKRAINE	0.644	0.091	28	58
ROMANIA	0.403	0.114	39	56
CZECH REPUBLIC	0.365	0.156	42	51
HUNGARY	0.277	0.159	50	50
KAZAKHSTAN	0.237	0.044	54	73
BELARUS	0.173	0.018	58	98
UZBEKISTAN	0.138	0.025	61	88
BULGARIA	0.137	0.037	62	75
SLOVAK REPUBLIC	0.124	0.052	65	69
CROATIA	0.075	0.055	77	67
TURKMENISTAN	0.075	0.014	78*	107
SLOVENIA	0.073	0.054	80	68
LITHUANIA	0.059	0.016	88	104
AZERBAIJAN	0.049	0.005	93	137
GEORGIA	0.045	0.003	96	150
LATVIA	0.036	0.014	102	109

Table 5.4. (continued). Comparison of PPP-Based GDP and Exchange Rate-Based GDP for Individual Countries, by WEO Classification, 1994

Country	Share in Total* (Percent)		Rank	
	PPP-Based	Exchange Rate-Based	PPP-Based	Exchange Rate-Based
MOLDOVA	0.029	0.005	111	136
KYRGYZ REPUBLIC	0.028	0.004	112	141
ESTONIA	0.027	0.009	117	120
MACEDONIA, FYR	0.025	0.013	121	114
ALBANIA	0.024	0.007	124	125
ARMENIA	0.020	0.002	129	153
TAJKISTAN	0.020	0.003	130	149
MONGOLIA	0.0090	0.0026	147	152
<i>Developing Countries</i>	35.383	17.686		
CHINA,P.R.: MAINLAND	8.76	2.05	2	9
INDIA	3.95	1.17	5	15
BRAZIL	2.87	3.08	10	7
MEXICO	2.01	1.60	12	11
INDONESIA	1.72	0.67	14	23
THAILAND	1.065	0.547	17	25
ARGENTINA	0.995	0.974	18	18
IRAN, I.R. OF	0.955	0.250	19	40
TURKEY	0.945	0.495	20	28
TAIWAN PROV.OF CHINA	0.933	0.912	21	19
SOUTH AFRICA	0.828	0.514	23	26
COLOMBIA	0.742	0.309	25	35
PHILIPPINES	0.668	0.243	26	41
SAUDI ARABIA	0.588	0.455	29	30
PAKISTAN	0.547	0.198	30	45
VENEZUELA, REP. BOL.	0.546	0.221	31	42
EGYPT	0.487	0.199	35	44
CHILE	0.442	0.193	36	46
CHINA,P.R.:HONG KONG	0.417	0.495	37	27
MALAYSIA	0.407	0.282	38	37
ALGERIA	0.360	0.159	44	49
BANGLADESH	0.333	0.135	45	53
VIETNAM	0.296	0.062	47	62
PERU	0.292	0.190	48	48
NIGERIA	0.285	0.090	49	59
MOROCCO	0.265	0.115	52	55
LIBYA	0.209	0.120	56	54
ECUADOR	0.164	0.063	60	61
SYRIAN ARAB REPUBLIC	0.130	0.058	63	65
CONGO, DEM. REP. OF	0.127	0.022	64	93
MYANMAR	0.124	0.281	66	38
UNITED ARAB EMIRATES	0.122	0.145	67	52
TUNISIA	0.122	0.059	68	64
SRI LANKA	0.119	0.044	69*	72
GUATEMALA	0.115	0.049	70	70
SUDAN	0.114	0.027	71	86
DOMINICAN REPUBLIC	0.097	0.041	72	74
KENYA	0.092	0.027	73	85

Table 5.4. (continued). Comparison of PPP-Based GDP and Exchange Rate-Based GDP for Individual Countries, by WEO Classification, 1994

Country	Share in Total* (Percent)		Rank	
	PPP-Based	Exchange Rate-Based	PPP-Based	Exchange Rate-Based
KUWAIT	0.087	0.093	74	57
URUGUAY	0.083	0.062	75	63
GHANA	0.079	0.020	76	96
ZIMBABWE	0.073	0.026	79	87
ETHIOPIA	0.073	0.021	81	94
CAMEROON	0.070	0.030	82	79
COSTA RICA	0.066	0.031	83	77
COTE D IVOIRE	0.065	0.029	84	82
LEBANON	0.064	0.034	85	76
NEPAL	0.064	0.017	86	101
OMAN	0.062	0.049	87	71
BOLIVIA	0.059	0.023	89	92
UGANDA	0.056	0.014	90	108
PANAMA	0.054	0.029	91	81
PARAGUAY	0.051	0.030	92	80
TANZANIA	0.046	0.018	94	100
EL SALVADOR	0.046	0.031	95	78
JORDAN	0.043	0.023	97	91
ANGOLA	0.043	0.015	98	106
SENEGAL	0.039	0.014	99	110
MADAGASCAR	0.037	0.011	101	118
HONDURAS	0.035	0.013	103	111
CAMBODIA	0.035	0.009	104	121
GUINEA	0.034	0.013	105	112
PAPUA NEW GUINEA	0.034	0.020	106	95
YEMEN, REPUBLIC OF	0.033	0.085	107	60
QATAR	0.032	0.028	108	84
BOTSWANA	0.030	0.016	109	103
MOZAMBIQUE	0.030	0.009	110	122
MAURITIUS	0.028	0.012	113	116
BAHRAIN	0.028	0.018	114	99
JAMAICA	0.027	0.024	115	89
BURKINA FASO	0.027	0.007	116	127
HAITI	0.026	0.007	118	126
ZAMBIA	0.026	0.013	119	115
CYPRUS	0.025	0.028	120	83
NICARAGUA	0.024	0.007	122	130
TRINIDAD AND TOBAGO	0.024	0.019	123	97
NIGER	0.023	0.006	125	133
NAMIBIA	0.023	0.011	126	117
GABON	0.023	0.016	127	105
LIBERIA	0.022	0.008	128	124
MALI	0.019	0.007	131*	128
BENIN	0.019	0.006	132	135
CHAD	0.019	0.004	133	139
MALAWI	0.017	0.004	134	140
TOGO	0.016	0.004	135	144

Table 5.4. (concluded). Comparison of PPP-Based GDP and Exchange Rate-Based GDP for Individual Countries, by WEO Classification, 1994

Country	Share in Total* (Percent)		Rank	
	PPP-Based	Exchange Rate-Based	PPP-Based	Exchange Rate-Based
LAO PEOPLE'S DEM.REP	0.016	0.006	136	134
BURUNDI	0.014	0.004	138	146
MALTA	0.013	0.010	139	119
CENTRAL AFRICAN REP.	0.013	0.003	140	148
CONGO, REPUBLIC OF	0.013	0.007	141	131
MAURITANIA	0.011	0.004	142	143
FIJI	0.0094	0.0070	143	129
NETHERLANDS ANTILLES	0.0092	0.0082	144	123
RWANDA	0.0091	0.0028	145	151
BAHAMAS, THE	0.0091	0.0130	146	113
SWAZILAND	0.0087	0.0040	148	142
LESOTHO	0.0084	0.0032	149	147
BARBADOS	0.0083	0.0066	150	132
SIERRA LEONE	0.0078	0.0035	151	145
GUYANA	0.0066	0.0020	152	156
DJIBOUTI	0.0050	0.0018	153	159
GAMBIA, THE	0.0049	0.0014	154	162
SURINAME	0.0048	0.0048	155	138
GUINEA-BISSAU	0.0035	0.0009	156	168
CAPE VERDE	0.0033	0.0016	157	161
BHUTAN	0.0031	0.0010	158	164
BELIZE	0.0027	0.0021	159	154
SOLOMON ISLANDS	0.0026	0.0011	160	163
COMOROS	0.0025	0.0007	161	173
ST. LUCIA	0.0024	0.0020	162	157
MALDIVES	0.0023	0.0009	163	167
SEYCHELLES	0.0022	0.0018	164	160
ANTIGUA AND BARBUDA	0.0019	0.0019	165	158
VANUATU	0.0017	0.0008	166	171
SAMOA	0.0016	0.0007	167	174
EQUATORIAL GUINEA	0.0014	0.0005	168	176
GRENADA	0.0013	0.0010	169	165
ST. VINCENT & GREN.	0.0013	0.0009	170	166
TONGA	0.0012	0.0006	171	175
DOMINICA	0.0009	0.0008	172	170
ST. KITTS AND NEVIS	0.0009	0.0008	173	169
SAO TOME & PRINCIPE	0.0005	0.0002	174	178
KIRIBATI	0.0003	0.0001	175	179
BRUNEI DARUSSALAM		0.0166		102
ERITREA		0.0021		155
MARSHALL ISLANDS		0.0004		177
MICRONESIA, FED.STS.		0.0007		172

Source: IMF database

* Note: Total refers to the countries in the table

Table 5.5. Ranking of Countries by PPP Valuation of GDP
(reference year 1994) (IMF-WEO estimates)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
UNITED STATES	1	1	1	1	1	1	1	1	1	1
CHINA,P.R.: MAINLAND	3	3	3	3	2	2	2	2	2	2
JAPAN	2	2	2	2	3	3	3	3	3	3
GERMANY	5	4	4	4	4	4	4	4	4	4
INDIA	8	8	6	5	5	5	5	5	5	5
FRANCE	6	6	7	7	6	7	6	6	6	6
ITALY	7	7	8	8	7	6	7	7	8	8
UNITED KINGDOM	9	9	9	9	8	8	8	8	7	7
RUSSIA	4	5	5	6	9	9	10	10	10	10
BRAZIL	10	10	10	10	10	10	9	9	9	9
CANADA	11	11	12	11	11	11	11	11	11	11
MEXICO	12	12	11	12	12	12	13	12	12	12
SPAIN	13	13	13	13	13	14	14	14	13	13
INDONESIA	15	14	14	14	14	13	12	13	14	15
KOREA	16	15	15	15	15	15	15	15	15	14
AUSTRALIA	17	17	16	16	16	17	17	16	16	16
THAILAND	22	21	20	18	17	16	16	17	20	19
ARGENTINA	23	23	22	20	18	21	21	20	19	20
IRAN, I.R. OF	21	20	18	19	19	20	20	21	21	21
TURKEY	18	19	19	17	20	18	18	18	17	18
TAIWAN PROV.OF CHINA	24	24	23	22	21	19	19	19	18	17
NETHERLANDS	19	18	21	21	22	22	22	22	22	22
SOUTH AFRICA	20	22	24	24	23	23	23	23	24	24
POLAND	25	25	25	25	24	24	24	24	23	23
COLOMBIA	27	26	26	26	25	25	25	25	25	25
PHILIPPINES	26	28	28	27	26	26	26	26	26	26
BELGIUM	28	27	27	28	27	27	27	27	27	27
UKRAINE	14	16	17	23	28	31	36	37	37	37
SAUDI ARABIA	30	29	29	29	29	28	29	28	29	30
PAKISTAN	36	34	32	32	30	29	28	29	28	28
VENEZUELA, REP. BOL.	33	31	30	30	31	30	30	30	30	35
SWITZERLAND	29	30	31	31	32	33	32	35	35	34
SWEDEN	31	32	33	34	33	32	31	32	33	31
AUSTRIA	34	33	34	33	34	34	33	34	34	33
EGYPT	35	35	35	35	35	35	35	33	32	29
CHILE	44	42	37	36	36	36	34	31	31	32
CHINA,P.R.:HONG KONG	42	41	40	37	37	38	38	38	38	38
MALAYSIA	47	45	43	41	38	37	37	36	36	36
ROMANIA	32	36	39	39	39	39	39	41	46	46
GREECE	38	37	36	38	40	40	40	39	39	39
PORTUGAL	40	38	38	40	41	41	41	40	40	40
CZECH REPUBLIC	37	40	42	43	42	42	42	42	45	45
DENMARK	43	43	44	44	43	44	44	43	42	43
ALGERIA	39	39	41	42	44	43	43	44	41	41
BANGLADESH	48	46	45	45	45	45	45	45	43	42
NORWAY	49	49	47	46	46	47	47	47	47	47
VIETNAM	54	54	51	48	47	46	46	46	44	44
PERU	52	52	53	52	48	48	48	48	48	48
NIGERIA	50	50	48	47	49	49	49	49	50	50
HUNGARY	45	47	49	50	50	51	51	51	51	51
FINLAND	46	48	50	51	51	50	50	50	49	49
MOROCCO	53	51	52	53	52	53	53	53	53	53
ISRAEL	55	56	54	54	53	52	52	52	52	52
KAZAKHSTAN	41	44	46	49	54	55	55	55	57	57
SINGAPORE	64	60	57	57	55	54	54	54	54	54
LIBYA	56	55	56	55	56	56	56	57	56	56

Table 5.5. (continued). Ranking of Countries by PPP Valuation of GDP
(reference year 1994) (IMF-WEO estimates)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
NEW ZEALAND	60	59	58	58	57	58	58	58	58	58
BELARUS	51	53	55	56	58	60	60	59	59	59
IRELAND	63	61	59	59	59	57	57	56	55	55
ECUADOR	65	62	60	60	60	59	59	60	60	61
UZBEKISTAN	59	58	62	61	61	63	65	64	65	65
BULGARIA	58	63	63	62	62	61	69	72	71	71
SYRIAN ARAB REPUBLIC	74	69	67	64	63	62	64	65	63	66
CONGO, DEM. REP. OF	57	57	61	63	64	67	68	70	72	72
SLOVAK REPUBLIC	61	64	64	66	65	65	63	62	62	62
MYANMAR	72	74	68	68	66	64	62	61	61	60
UNITED ARAB EMIRATES	66	66	65	65	67	66	61	63	66	67
TUNISIA	70	68	66	67	68	69	66	66	64	63
SRI LANKA	75	72	71	69	69	68	67	67	67	64
GUATEMALA	73	71	69	70	70	70	71	69	69	69
SUDAN	76	73	70	71	71	71	70	68	68	68
DOMINICAN REPUBLIC	78	78	73	72	72	72	72	71	70	70
KENYA	77	76	74	74	73	73	73	73	73	73
KUWAIT	89	107	86	75	74	74	74	74	75	77
URUGUAY	85	82	78	76	75	76	75	77	74	76
GHANA	86	83	80	77	76	75	78	78	77	74
CROATIA	68	77	77	79	77	77	77	76	76	78
TURKMENISTAN	67	67	72	73	78	83	90	96	97	93
ZIMBABWE	83	80	82	82	79	80	80	80	82	82
SLOVENIA	80	81	83	81	80	79	79	79	79	79
ETHIOPIA	84	84	85	80	81	78	76	75	78	75
CAMEROON	79	79	79	78	82	81	81	81	80	80
COSTA RICA	90	90	87	85	83	85	86	87	86	86
COTE D IVOIRE	87	86	84	84	84	82	82	82	81	81
LEBANON	103	92	91	89	85	84	83	83	83	85
NEPAL	91	89	89	86	86	86	84	84	85	84
OMAN	95	93	90	88	87	87	87	85	87	88
LITHUANIA	69	75	76	83	88	90	89	88	88	89
BOLIVIA	94	91	92	90	89	89	88	89	89	87
UGANDA	96	95	94	91	90	88	85	86	84	83
PANAMA	101	97	93	92	91	91	91	90	90	90
PARAGUAY	97	96	95	94	92	92	92	93	92	91
AZERBAIJAN	71	70	75	87	93	98	99	97	96	97
TANZANIA	98	99	96	95	94	94	95	94	94	94
EL SALVADOR	106	103	100	96	95	93	96	95	95	96
GEORGIA	62	65	81	93	96	96	94	91	91	92
JORDAN	108	108	102	99	97	97	97	98	99	100
ANGOLA	88	88	88	97	98	95	93	92	93	95
SENEGAL	104	101	101	100	99	99	98	99	98	98
LUXEMBOURG	113	110	105	103	100	100	101	100	101	101
MADAGASCAR	105	104	103	101	101	102	103	106	105	105
LATVIA	81	85	98	105	102	104	106	104	103	108
HONDURAS	109	109	104	102	103	103	102	103	102	103
CAMBODIA	116	114	109	108	104	101	100	102	106	107
GUINEA	112	112	108	107	105	105	105	107	107	104
PAPUA NEW GUINEA	124	120	115	109	106	107	108	112	113	112
YEMEN, REPUBLIC OF	110	111	106	106	107	106	104	105	108	106
QATAR	114	113	107	110	108	108	107	101	100	99
BOTSWANA	119	116	112	112	109	109	109	109	109	109
MOZAMBIQUE	117	115	120	115	110	110	110	108	104	102
MOLDOVA	82	87	97	98	111	113	122	123	129	132
KYRGYZ REPUBLIC	92	94	99	104	112	118	115	114	114	114

Table 5.5. (continued). Ranking of Countries by PPP Valuation of GDP
(reference year 1994) (IMF-WEO estimates)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
MAURITIUS	123	121	119	117	113	111	111	111	110	110
BAHRAIN	126	125	121	119	114	115	114	115	115	115
JAMAICA	118	119	117	116	115	116	118	122	124	124
BURKINA FASO	120	118	116	118	116	112	112	113	112	111
ESTONIA	102	102	110	114	117	114	113	110	111	113
HAITI	107	106	111	111	118	117	117	116	116	119
ZAMBIA	115	117	118	113	119	123	121	119	123	121
CYPRUS	127	128	124	123	120	119	119	118	118	118
MACEDONIA, FYR	99	105	114	120	121	124	125	125	125	129
NICARAGUA	121	123	122	122	122	121	120	117	117	117
TRINIDAD AND TOBAGO	122	122	123	124	123	122	123	120	120	120
ALBANIA	111	127	130	126	124	120	116	124	119	116
NIGER	125	124	127	125	125	127	126	126	122	122
NAMIBIA	131	130	126	129	126	126	127	127	126	125
GABON	128	126	128	127	127	125	124	121	121	123
LIBERIA	129	129	129	128	128	128	128	128	128	128
ARMENIA	93	98	125	131	129	129	129	130	127	126
TAJIKISTAN	100	100	113	121	130	134	137	137	137	138
MALI	132	133	132	130	131	130	130	129	130	127
BENIN	135	135	134	133	132	131	131	131	131	130
CHAD	136	134	133	135	133	133	133	133	133	133
MALAWI	134	132	135	132	134	132	132	132	132	131
TOGO	133	136	136	139	135	135	134	134	135	135
LAO PEOPLE'S DEM.REP	141	141	139	138	136	136	135	135	134	134
ICELAND	137	138	138	136	137	137	136	136	136	136
BURUNDI	138	137	137	137	138	140	143	143	143	143
MALTA	143	142	142	141	139	138	138	139	139	139
CENTRAL AFRICAN REP.	139	140	141	142	140	139	141	140	140	140
CONGO, REPUBLIC OF	140	139	140	140	141	141	140	141	141	141
MAURITANIA	144	144	143	143	142	143	142	142	142	142
FIJI	149	149	147	146	143	144	144	144	144	144
NETHERLANDS ANTILLES	148	146	145	145	144	146	149	149	149	148
RWANDA	130	131	131	134	145	142	139	138	138	137
BAHAMAS, THE	145	145	146	144	146	147	147	147	146	146
MONGOLIA	142	143	144	147	147	145	145	145	145	145
SWAZILAND	150	150	148	148	148	148	148	148	147	147
LESOTHO	151	151	150	149	149	149	146	146	148	150
BARBADOS	147	147	149	150	150	150	150	150	150	149
SIERRA LEONE	146	148	151	151	151	151	152	152	152	152
GUYANA	154	154	152	152	152	152	151	151	151	151
DJIBOUTI	152	153	154	153	153	154	155	155	155	156
GAMBIA, THE	155	155	155	155	154	155	154	154	154	154
SURINAME	153	152	153	154	155	153	153	153	153	153
GUINEA-BISSAU	156	156	156	156	156	156	156	156	161	160
CAPE VERDE	157	163	166	157	157	157	157	159	158	158
BHUTAN	158	157	157	158	158	158	158	157	157	157
BELIZE	160	158	158	159	159	159	159	160	159	159
SOLOMON ISLANDS	161	160	160	161	160	160	160	161	162	162
COMOROS	159	159	159	160	161	163	163	165	165	165
ST. LUCIA	162	161	161	162	162	162	162	163	163	163
MALDIVES	164	164	163	164	163	162	161	162	160	161
SEYCHELLES	163	162	162	163	164	164	164	164	164	164
ANTIGUA AND BARBUDA	165	165	164	165	165	165	166	166	166	166
VANUATU	166	166	165	166	166	166	167	167	167	167
SAMOA	167	167	167	167	167	167	168	168	168	168
EQUATORIAL GUINEA	170	171	170	168	168	168	165	158	156	155

Table 5.5. (concluded). Ranking of Countries by PPP Valuation of GDP
(reference year 1994) (IMF-WEO estimates)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
GRENADA	169	168	169	170	169	170	170	170	169	169
ST. VINCENT & GREN.	168	169	168	169	170	169	169	169	170	170
TONGA	171	170	171	171	171	171	171	171	171	171
DOMINICA	172	172	172	172	172	172	173	173	173	173
ST. KITTS AND NEVIS	173	173	173	173	173	173	172	172	172	172
SAO TOME & PRINCIPE	174	174	174	174	174	174	174	174	174	174
KIRIBATI	175	175	175	175	175	175	175	175	175	175

Source: IMF database

Table 5.6. IMF-WEO Estimates of PPP Valuation of Country GDP
(Billions of U.S. dollars)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
1 ALBANIA	8.63	6.42	6.09	6.85	7.65	8.51	9.45	8.94	9.77	10.70
2 ALGERIA	107.35	109.64	113.81	114.29	115.41	122.47	129.47	133.07	140.96	149.64
3 ANGOLA	16.77	17.45	17.65	13.24	13.70	15.58	17.72	19.21	19.39	19.36
4 ANTIGUA AND BARBUDA	0.47	0.50	0.52	0.56	0.61	0.59	0.64	0.68	0.72	0.75
5 ARGENTINA	210.42	240.36	270.84	295.49	319.32	316.85	340.52	374.26	393.35	387.11
6 ARMENIA	-15.12	13.70	6.63	5.86	6.30	6.88	7.41	7.77	8.43	8.85
7 AUSTRALIA	289.73	296.81	311.02	331.61	355.62	379.01	401.45	423.83	450.60	476.97
8 AUSTRIA	138.04	147.58	152.79	157.70	164.85	171.20	177.82	185.32	193.61	200.49
9 AZERBAIJAN	29.74	30.53	24.10	19.03	15.61	14.06	14.50	15.60	17.36	18.29
10 BAHAMAS, THE	2.70	2.72	2.72	2.84	2.93	3.00	3.18	3.34	3.48	3.74
11 BAHRAIN	6.38	6.90	7.59	8.45	8.83	9.21	9.67	10.13	10.46	10.89
12 BANGLADESH	81.03	87.23	93.36	99.87	106.76	114.77	122.88	131.40	139.32	147.76
13 BARBADOS	2.53	2.51	2.42	2.50	2.66	2.79	2.96	3.09	3.28	3.42
14 BELARUS	69.60	71.06	65.56	62.60	55.48	50.77	53.20	60.25	66.02	65.66
15 BELGIUM	181.26	190.38	197.39	199.72	209.17	218.62	225.53	236.15	245.99	254.65
16 BELIZE	0.67	0.71	0.80	0.85	0.88	0.93	0.97	1.02	1.06	1.10
17 BENIN	4.69	5.07	5.39	5.73	6.11	6.52	7.01	7.54	7.97	8.49
18 BHUTAN	0.75	0.80	0.86	0.92	0.99	1.08	1.17	1.26	1.33	1.44
19 BOLIVIA	14.64	15.93	16.54	17.72	18.94	20.24	21.58	22.86	24.22	25.86
20 BOTSWANA	7.35	8.16	8.59	9.00	9.50	10.16	11.06	12.11	12.99	13.85
21 BRAZIL	746.14	779.26	791.81	853.05	921.94	981.33	1026.41	1081.01	1092.68	1114.49
22 BULGARIA	48.49	44.26	41.91	42.39	44.03	45.95	41.71	39.41	41.28	42.52
23 BURKINA FASO	6.99	7.94	8.31	8.47	8.75	9.29	10.03	10.68	11.48	12.29
24 BURUNDI	4.31	4.68	4.81	4.65	4.57	4.33	4.04	4.13	4.36	4.64
25 CAMBODIA	7.68	8.67	9.28	10.24	11.19	12.31	13.41	13.77	14.07	14.85
26 CAMEROON	22.98	22.86	22.64	22.52	22.42	23.65	25.29	27.02	28.72	30.43
27 CANADA	551.01	558.93	576.20	605.25	647.18	679.29	703.55	743.48	775.61	816.18
28 CAPE VERDE	0.85	0.58	0.48	0.93	1.07	1.12	1.17	1.22	1.27	1.36
29 CENTRAL AFRICAN REP.	3.75	3.86	3.69	3.80	4.07	4.41	4.34	4.66	4.95	5.29
30 CHAD	4.61	5.26	5.50	5.55	5.99	6.17	6.52	6.90	7.45	7.64
31 CHILE	93.47	104.32	119.66	131.46	141.88	160.31	175.37	191.78	200.66	201.61
32 CHINA, P.R.: MAINLAND	1593.77	1799.12	2099.01	2446.28	2812.44	3174.01	3542.84	3918.60	4274.11	4645.73
33 CHINA, P.R.: HONG KONG	96.80	105.13	114.13	124.37	133.85	142.03	151.13	161.33	154.86	160.31
34 COLOMBIA	181.76	191.66	203.72	220.44	238.19	255.92	265.98	277.86	282.83	287.04
35 COMOROS	0.72	0.70	0.78	0.83	0.80	0.78	0.79	0.81	0.83	0.85
36 CONGO, DEM. REP. OF	54.19	51.30	46.92	41.67	40.90	42.06	43.22	41.43	39.83	38.40
37 CONGO, REPUBLIC OF	3.72	3.94	4.13	4.20	4.05	4.30	4.66	4.65	4.87	4.97
38 COSTA RICA	15.60	16.49	18.15	19.82	21.14	22.11	22.39	23.60	25.36	27.03
39 COTE D'IVOIRE	18.50	19.14	19.50	19.99	20.81	22.76	24.75	26.65	28.41	30.43
40 CROATIA	30.54	26.20	23.64	22.32	24.13	26.33	28.42	30.77	31.85	31.68
41 CYPRUS	6.15	6.39	7.15	7.39	7.99	8.63	8.99	9.36	9.95	10.50
42 CZECH REPUBLIC	119.53	109.37	108.06	111.59	117.02	127.20	134.49	137.17	135.55	137.57
43 DENMARK	95.26	99.85	103.31	106.97	115.50	121.55	127.88	133.98	139.55	143.41
44 DJIBOUTI	1.53	1.59	1.62	1.60	1.59	1.56	1.53	1.57	1.60	1.65
45 DOMINICA	0.25	0.26	0.27	0.28	0.29	0.30	0.31	0.32	0.34	0.36
46 DOMINICAN REPUBLIC	23.92	24.97	27.55	29.14	31.05	33.23	36.30	39.92	43.32	47.06
47 ECUADOR	41.12	44.64	47.24	49.48	52.72	55.13	57.22	60.20	61.16	57.72
48 EGYPT	135.23	135.33	142.81	148.92	156.43	163.70	175.10	186.97	199.35	214.46
49 EL SALVADOR	10.44	11.18	12.27	13.53	14.64	15.91	16.50	17.48	18.25	18.89
50 EQUATORIAL GUINEA	0.32	0.32	0.38	0.42	0.45	0.54	0.70	1.22	1.50	1.76
51 ESTONIA	12.01	11.43	9.15	8.63	8.65	9.22	9.76	10.98	11.55	11.78
52 ETHIOPIA	19.96	19.67	19.06	22.19	23.44	25.41	28.70	30.89	30.93	33.58
53 FIJI	2.37	2.49	2.66	2.83	3.01	3.15	3.31	3.49	3.67	3.89
54 FINLAND	85.35	83.03	82.12	83.80	88.73	94.18	99.82	107.15	114.47	120.36
55 FRANCE	974.65	1017.57	1055.07	1073.77	1119.00	1163.24	1197.75	1241.60	1299.05	1354.65
56 GABON	6.00	6.58	6.51	6.84	7.23	7.89	8.45	9.04	9.34	9.33

Table 5.6. (continued). IMF-WEO Estimates of PPP Valuation of Country GDP
(Billions of U.S. dollars)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
57 GAMBIA, THE	1.20	1.26	1.35	1.47	1.56	1.54	1.65	1.69	1.88	1.99
58 GEORGIA	45.30	37.21	20.98	16.07	14.54	15.21	17.11	19.31	20.10	20.81
59 GERMANY	1378.86	1496.82	1563.45	1587.93	1659.37	1724.02	1769.05	1824.51	1885.78	1940.80
60 GHANA	19.12	20.83	22.10	23.83	25.25	26.95	28.41	30.10	31.84	34.09
61 GREECE	110.65	117.93	121.32	122.58	127.66	133.12	138.83	145.65	152.82	160.29
62 GRENADA	0.35	0.37	0.38	0.39	0.41	0.43	0.45	0.48	0.51	0.55
63 GUATEMALA	28.38	30.41	32.57	34.76	36.92	39.58	41.49	43.90	46.59	49.13
64 GUINEA	8.57	9.07	9.60	10.34	10.98	11.70	12.47	13.28	14.05	14.98
65 GUINEA-BISSAU	0.90	0.98	1.01	1.06	1.11	1.19	1.27	1.36	0.99	1.08
66 GUYANA	1.44	1.57	1.73	1.92	2.13	2.29	2.52	2.72	2.71	2.80
67 HAITI	9.36	10.14	8.99	9.01	8.44	9.00	9.41	9.68	10.09	10.44
68 HONDURAS	8.97	9.57	10.33	11.27	11.35	12.09	12.76	13.61	14.46	15.41
69 HUNGARY	91.76	83.58	82.77	84.49	88.77	92.06	95.02	101.02	107.42	113.38
70 ICELAND	4.34	4.56	4.53	4.70	4.98	5.15	5.54	5.95	6.31	6.76
71 INDIA	959.54	1008.48	1073.33	1157.89	1267.31	1397.86	1529.48	1640.66	1754.65	1884.06
72 INDONESIA	370.45	417.14	456.93	503.22	552.54	610.71	671.60	715.17	624.63	630.76
73 IRAN, I.R. OF	228.92	261.73	283.79	297.54	306.49	322.03	346.06	362.21	372.82	382.15
74 IRELAND	43.32	45.61	48.14	50.73	54.78	61.26	67.22	75.65	83.38	91.01
75 ISRAEL	58.25	63.64	69.46	73.74	80.50	87.83	93.67	97.76	100.85	104.13
76 ITALY	967.92	1014.49	1044.30	1062.84	1109.14	1165.91	1197.68	1235.61	1266.91	1300.63
77 JAMAICA	7.57	7.89	8.21	8.54	8.80	9.01	9.03	9.02	9.08	9.26
78 JAPAN	2324.40	2494.09	2574.04	2651.32	2724.53	2823.56	3020.82	3119.93	3077.56	3146.69
79 JORDAN	9.18	9.71	11.60	12.61	13.86	14.70	15.12	15.58	16.10	16.66
80 KAZAKHSTAN	102.66	94.45	91.38	85.20	76.03	71.28	72.96	75.65	74.63	74.61
81 KENYA	25.66	26.91	27.27	28.10	29.45	31.41	33.31	34.57	35.51	36.79
82 KIRIBATI	0.09	0.10	0.10	0.10	0.11	0.12	0.12	0.13	0.14	0.14
83 KOREA	338.41	382.11	411.59	445.84	492.77	548.17	595.96	636.21	606.14	670.53
84 KUWAIT	16.49	10.06	18.22	25.12	27.80	28.68	29.82	31.06	32.11	32.23
85 KYRGYZ REPUBLIC	15.27	14.54	12.79	11.11	9.06	8.75	9.55	10.67	11.01	11.48
86 LAO PEOPLE'S DEM.REP	3.54	3.81	4.17	4.53	5.00	5.47	5.95	6.44	6.85	7.40
87 LATVIA	21.15	19.43	12.87	11.08	11.55	11.84	12.45	13.48	14.16	14.66
88 LEBANON	11.15	15.93	17.00	18.68	20.60	22.41	23.73	25.09	26.15	27.07
89 LESOTHO	2.08	2.23	2.39	2.54	2.69	2.91	3.25	3.44	3.30	3.35
90 LIBERIA	5.77	6.14	6.39	6.71	7.00	7.34	7.68	8.02	8.33	8.68
91 LIBYA	56.87	65.84	64.44	66.23	67.02	67.69	70.32	73.35	76.15	79.29
92 LITHUANIA	30.50	29.73	23.91	20.57	18.95	19.99	21.32	23.26	24.73	25.22
93 LUXEMBOURG	8.52	9.28	10.03	11.17	11.87	12.55	13.23	14.10	15.08	15.84
94 MACEDONIA, FYR	12.33	10.58	8.53	7.96	7.98	8.05	8.27	8.53	8.88	8.65
95 MADAGASCAR	10.98	10.63	10.99	11.52	11.76	12.21	12.71	13.40	14.08	14.93
96 MALAWI	4.84	5.44	5.15	5.80	5.31	6.26	6.95	7.42	7.73	8.18
97 MALAYSIA	82.48	93.40	103.90	117.24	130.73	146.64	164.28	179.61	168.10	181.26
98 MALDIVES	0.51	0.57	0.62	0.67	0.73	0.80	0.87	0.94	1.00	1.08
99 MALI	5.26	5.39	5.97	5.98	6.25	6.79	7.19	7.80	8.17	8.85
100 MALTA	3.06	3.35	3.65	3.90	4.18	4.58	4.82	5.08	5.30	5.56
101 MAURITANIA	2.82	3.00	3.11	3.37	3.60	3.84	4.10	4.37	4.57	4.83
102 MAURITIUS	6.57	7.23	7.74	8.47	9.02	9.54	10.22	10.96	11.70	12.52
103 MEXICO	506.47	545.67	577.69	604.76	644.74	617.88	661.84	719.78	761.47	796.16
104 MOLDOVA	21.11	18.00	12.93	13.12	9.21	9.28	8.71	8.97	8.30	8.00
105 MONGOLIA	3.20	3.00	2.78	2.77	2.89	3.14	3.28	3.47	3.63	3.81
106 MOROCCO	68.61	75.82	74.34	75.56	85.14	81.23	92.76	92.38	99.38	101.50
107 MOZAMBIQUE	7.59	8.23	7.73	8.63	9.47	10.09	11.00	12.45	14.11	15.71
108 MYANMAR	29.11	29.90	33.50	36.44	39.73	43.50	47.41	51.57	55.83	60.63
109 NAMIBIA	5.41	5.91	6.61	6.65	7.25	7.65	8.02	8.30	8.54	8.92
110 NEPAL	15.34	16.59	17.50	19.45	20.54	22.10	23.42	24.25	25.52	27.19
111 NETHERLANDS	248.63	262.86	273.98	283.47	298.76	312.15	327.44	345.52	362.54	380.08
112 NETHERLANDS ANTILLES	2.47	2.60	2.75	2.84	2.97	3.03	3.01	3.15	3.28	3.43

Table 5.6. (continued). IMF-WEO Estimates of PPP Valuation of Country GDP
(Billions of U.S. dollars)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
113 NEW ZEALAND	46.91	47.66	49.12	52.99	57.32	60.87	63.93	66.36	66.92	69.65
114 NICARAGUA	6.85	7.07	7.25	7.43	7.84	8.34	8.88	9.43	10.02	10.68
115 NIGER	6.52	6.91	6.60	6.87	7.30	7.65	8.05	8.46	9.28	9.60
116 NIGERIA	74.78	81.95	85.93	90.17	91.50	95.88	103.89	108.85	112.23	114.42
117 NORWAY	77.04	82.12	86.63	91.39	98.44	104.40	111.54	118.24	122.16	125.22
118 OMAN	14.17	15.53	17.22	18.77	19.90	21.31	22.33	24.15	25.16	25.82
119 PAKISTAN	131.69	143.56	158.15	165.52	175.56	188.50	201.59	207.45	216.83	226.88
120 PANAMA	12.14	13.73	15.18	16.44	17.26	17.94	18.71	19.86	20.90	22.09
121 PAPUA NEW GUINEA	6.52	7.38	8.43	10.10	10.77	10.67	11.25	10.82	11.36	12.23
122 PARAGUAY	13.23	14.02	14.58	15.59	16.41	17.55	18.10	19.04	19.94	21.04
123 PERU	69.47	73.89	74.28	81.14	93.71	102.73	107.22	116.81	118.98	123.77
124 PHILIPPINES	182.15	187.21	191.90	201.22	214.47	229.55	247.11	264.15	265.84	278.43
125 POLAND	207.66	199.62	209.23	222.96	239.38	261.51	282.43	306.65	325.16	342.21
126 PORTUGAL	106.68	112.77	117.44	118.89	124.25	129.98	137.14	144.72	152.13	159.03
127 QATAR	8.49	8.74	9.76	9.98	10.43	10.53	11.80	13.85	15.63	17.92
128 ROMANIA	139.44	125.52	116.93	121.88	129.38	141.60	149.83	141.81	133.01	130.26
129 RUSSIA	1511.86	1476.22	1214.94	1117.63	1008.54	987.23	971.35	996.00	962.55	1000.77
130 RWANDA	5.60	5.54	6.03	5.68	2.93	3.97	4.68	5.37	5.95	6.53
131 SAMOA	0.44	0.45	0.48	0.50	0.51	0.55	0.60	0.62	0.63	0.66
132 SAO TOME & PRINCIPE	0.13	0.14	0.14	0.15	0.15	0.16	0.16	0.17	0.17	0.18
133 SAUDI ARABIA	153.32	171.79	180.40	184.06	188.90	193.83	200.15	208.91	214.70	213.47
134 SENEGAL	11.11	11.44	11.94	11.99	12.60	13.58	14.54	15.52	16.60	17.92
135 SEYCHELLES	0.56	0.59	0.65	0.71	0.72	0.73	0.78	0.82	0.85	0.88
136 SIERRA LEONE	2.63	2.50	2.31	2.37	2.51	2.30	2.46	2.00	2.04	2.19
137 SINGAPORE	42.82	47.41	51.62	59.76	67.96	75.08	82.22	91.12	92.51	98.56
138 SLOVAK REPUBLIC	45.38	39.45	37.60	37.18	39.82	43.48	47.20	51.12	53.99	55.19
139 SLOVENIA	22.76	21.43	20.69	21.84	23.49	24.97	26.32	27.99	29.42	31.00
140 SOLOMON ISLANDS	0.62	0.66	0.74	0.78	0.84	0.92	0.94	0.95	0.97	1.03
141 SOUTH AFRICA	237.23	242.74	242.69	252.27	265.90	280.04	297.04	309.53	314.89	323.42
142 SPAIN	494.44	522.72	537.68	545.49	568.77	597.55	623.39	657.38	691.49	727.75
143 SRI LANKA	27.92	30.19	32.17	35.31	38.07	41.02	43.37	46.91	49.84	53.61
144 ST. KITTS AND NEVIS	0.21	0.23	0.24	0.26	0.28	0.30	0.32	0.35	0.36	0.38
145 ST. LUCIA	0.60	0.64	0.70	0.73	0.76	0.81	0.84	0.87	0.90	0.95
146 ST. VINCENT & GRENES.	0.35	0.36	0.40	0.41	0.41	0.45	0.46	0.48	0.51	0.54
147 SUDAN	27.16	30.04	32.29	34.07	36.63	39.06	41.65	45.18	48.00	51.40
148 SURINAME	1.51	1.61	1.71	1.59	1.54	1.68	1.83	1.96	2.02	2.15
149 SWAZILAND	2.28	2.42	2.50	2.66	2.81	2.95	3.12	3.29	3.39	3.51
150 SWEDEN	151.03	154.38	155.47	156.10	165.67	175.48	181.00	187.29	194.49	204.35
151 SWITZERLAND	154.86	158.81	162.03	165.58	169.96	174.46	178.24	184.24	190.24	195.34
152 SYRIAN ARAB REPUBLIC	28.05	31.07	35.12	37.87	41.64	44.99	46.65	47.98	51.18	51.97
153 TAIWAN PROV. OF CHINA	207.89	231.14	252.11	275.23	299.38	324.20	348.89	378.67	401.92	428.30
154 TAJIKISTAN	12.27	11.78	8.56	7.81	6.27	5.60	5.45	5.64	6.01	6.43
155 TANZANIA	12.72	13.42	13.79	14.33	14.86	15.72	16.73	17.61	18.42	19.41
156 THAILAND	223.76	250.07	276.13	307.30	341.85	380.22	410.18	409.69	373.16	393.87
157 TOGO	4.94	5.07	4.97	4.27	5.09	5.55	6.20	6.58	6.59	6.90
158 TONGA	0.30	0.33	0.34	0.36	0.38	0.41	0.41	0.40	0.40	0.41
159 TRINIDAD AND TOBAGO	6.75	7.17	7.20	7.29	7.70	8.18	8.65	9.07	9.58	10.39
160 TUNISIA	29.82	32.03	35.28	37.02	39.05	40.82	44.49	47.68	50.65	54.76
161 TURKEY	252.08	262.68	281.88	311.58	303.28	334.74	364.59	398.72	414.66	426.01
162 TURKMENISTAN	32.94	32.45	31.40	29.02	24.06	22.55	21.20	15.97	16.97	20.41
163 UGANDA	13.75	14.35	15.11	16.82	18.09	20.42	22.47	24.04	25.66	27.86
164 UKRAINE	380.69	351.73	298.25	262.76	206.85	185.41	169.93	167.51	166.59	164.80
165 UNITED ARAB EMIRATES	33.89	35.10	36.83	37.48	39.11	42.38	47.51	49.45	50.24	51.75
166 UNITED KINGDOM	916.70	933.47	954.14	1002.44	1068.47	1121.75	1171.63	1232.91	1275.42	1317.70
167 UNITED STATES	5690.66	5870.06	6196.51	6513.33	6917.66	7257.03	7661.58	8139.56	8589.87	9059.28
168 URUGUAY	19.78	21.10	23.25	24.59	26.70	26.79	28.73	30.68	32.44	32.25

Table 5.6. (concluded). IMF-WEO Estimates of PPP Valuation of Country GDP
(Billions of U.S. dollars)

Country	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999
169 UZBEKISTAN	48.28	49.66	45.10	45.25	44.26	44.79	46.35	48.27	50.45	52.27
170 VANUATU	0.45	0.48	0.49	0.52	0.54	0.57	0.60	0.63	0.65	0.68
171 VENEZUELA, REP. BOL.	138.80	157.47	170.61	175.66	175.12	185.95	189.00	203.48	204.50	193.22
172 VIETNAM	63.26	69.32	76.94	85.38	94.88	106.15	118.21	129.96	136.10	142.96
173 YEMEN, REPUBLIC OF	8.82	9.15	9.80	10.36	10.52	11.67	12.55	13.42	13.95	14.90
174 ZAMBIA	7.85	8.11	8.15	8.93	8.34	8.14	8.83	9.29	9.22	9.72
175 ZIMBABWE	20.48	22.34	20.76	21.60	23.57	23.91	26.13	27.42	28.19	28.96

Source: IMF database

Table 5.7. World Bank PPP Valuation of GDP—Availability of Benchmark Data 1980–96

Country	Source	1980	1985	1990	1993	1996
1 ALBANIA	ICP					X
2 ALGERIA	E					
3 ANGOLA	E					
4 ANTIGUA AND BARBUDA	RIA				RIA	
5 ARGENTINA	ICP/RIA	X			RIA	
6 ARMENIA	ICP				X	X
7 AUSTRALIA	ICP		X	X	X	X
8 AUSTRIA	ICP	X	X	X	X	X
9 AZERBAIJAN	ICP				X	X
10 BAHAMAS, THE	ICP/RIA		X		RIA	
11 BAHRAIN	RIA				RIA	
12 BANGLADESH	ICP		X		X	
13 BARBADOS	ICP/RIA		X		RIA	
14 BELARUS	ICP				X	X
15 BELGIUM	ICP	X	X	X	X	X
16 BELIZE	RIA				RIA	
17 BENIN	ICP		X		X	
18 BERMUDA	RIA				RIA	
19 BHUTAN	NA					
20 BOLIVIA	ICP/RIA	X			RIA	
21 BOTSWANA	ICP	X	X		X	
22 BRAZIL	ICP/RIA	X			RIA	
23 BULGARIA	ICP				X	X
24 BURKINA FASO	E					
25 BURUNDI	E					
26 CAMBODIA	E					
27 CAMEROON	ICP	X	X		X	
28 CANADA	ICP	X	X	X	X	X
29 CAPE VERDE	E					
30 CENTRAL AFRICAN REP.	E					
31 CHAD	E					
32 CHILE	ICP/RIA	X			RIA	
33 CHINA, P.R.: MAINLAND	ICP				L	
34 CHINA, P.R.: HONG KONG	ICP	X	X		X	
35 COLOMBIA	ICP	X				
36 COMOROS	E					
37 CONGO, DEM. REP. OF	E					
38 CONGO, REPUBLIC OF	ICP		X		X	
39 COSTA RICA	ICP	X				
40 COTE D IVOIRE	ICP	X	X		X	
41 CROATIA	ICP				X	X
42 CYPRUS	NA					
43 CZECH REPUBLIC	ICP				X	X
44 DENMARK	ICP	X	X	X	X	X
45 DJIBOUTI	NA					
46 DOMINICA	RIA				RIA	
47 DOMINICAN REPUBLIC	ICP	X				
48 ECUADOR	ICP/RIA	X			RIA	
49 EGYPT	ICP		X		X	
50 EL SALVADOR	ICP	X				
51 EQUATORIAL GUINEA	NA					
52 ESTONIA	ICP				X	X
53 ETHIOPIA	ICP	X	X			
54 FIJI	ICP				X	
55 FINLAND	ICP	X	X	X	X	X
56 FRANCE	ICP	X	X	X	X	X
57 GABON	ICP				X	

Table 5.7. (continued). World Bank PPP Valuation of GDP—Availability of Benchmark Data
1980-96

Country	Source	1980	1985	1990	1993	1996
58 GAMBIA, THE	E					
59 GEORGIA	ICP				X	X
60 GERMANY	ICP	X	X	X	X	X
61 GHANA	E					
62 GREECE	ICP	X	X	X	X	X
63 GRENADA	ICP/RIA		X		RIA	
64 GUATEMALA	ICP	X				
65 GUINEA	ICP				X	
66 GUINEA-BISSAU	NA					
67 GUYANA	E					
68 HAITI	E					
69 HONDURAS	ICP	X				
70 HUNGARY	ICP	X	X	X	X	X
71 ICELAND	ICP			X	X	X
72 INDIA	ICP	X	X			
73 INDONESIA	ICP	X			X	
74 IRAN, I.R. OF	ICP		X		X	
75 IRELAND	ICP	X	X	X	X	X
76 ISRAEL	ICP	X				X
77 ITALY	ICP	X	X	X	X	X
78 JAMAICA	ICP/RIA		X		RIA	
79 JAPAN	ICP	X	X	X	X	X
80 JORDAN	RIA				RIA	
81 KAZAKHSTAN	ICP				X	X
82 KENYA	ICP	X	X		X	
83 KIRIBATI	NA					
84 KOREA	ICP	X	X		X	
85 KUWAIT	E					
86 KYRGYZ REPUBLIC	ICP				X	X
87 LAO PEOPLE'S DEM.REP	RIA				RIA	
88 LATVIA	ICP				X	X
89 LEBANON	RIA				RIA	
90 LESOTHO	E					
91 LIBERIA	NA					
92 LIBYA	NA					
93 LITHUANIA	ICP				X	X
94 LUXEMBOURG	ICP	X	X	X	X	X
95 MACEDONIA, FYR	ICP					X
96 MADAGASCAR	ICP	X	X		X	
97 MALAWI	ICP	X	X		X	
98 MALAYSIA	RIA				RIA	
99 MALDIVES	E					
100 MALI	ICP	X	X		X	
101 MALTA	E					
102 MAURITANIA	E					
103 MAURITIUS	ICP		X		X	
104 MEXICO	RIA/ICP				RIA	X
105 MOLDOVA	ICP				X	X
106 MONGOLIA	ICP					X
107 MOROCCO	ICP	X	X		X	
108 MOZAMBIQUE	E					
109 MYANMAR	NA					
110 NAMIBIA	E					
111 NEPAL	ICP		X		X	
112 NETHERLANDS	ICP	X	X	X	X	X
113 NETHERLANDS ANTILLES	NA					
114 NEW ZEALAND	ICP		X	X	X	X

Table 5.7. (continued). World Bank PPP Valuation of GDP—Availability of Benchmark Data
1980-96

Country	Source	1980	1985	1990	1993	1996
115 NICARAGUA	E					
116 NIGER	E					
117 NIGERIA	ICP	X	X		X	
118 NORWAY	ICP	X	X	X	X	X
119 OMAN	RIA				RIA	
120 PAKISTAN	ICP	X	X		X	
121 PALESTINE	RIA				RIA	
122 PANAMA	ICP/RIA	X			RIA	
123 PAPUA NEW GUINEA	NA					
124 PARAGUAY	ICP	X				
125 PERU	ICP/RIA	X			RIA	
126 PHILIPPINES	ICP	X	X		X	
127 POLAND	ICP	X	X	X	X	X
128 PORTUGAL	ICP	X	X	X	X	X
129 QATAR	RIA				RIA	
130 ROMANIA	ICP			X	X	X
131 RUSSIA	ICP				X	X
132 RWANDA	ICP		X			
133 SAMOA	E					
134 SAO TOME & PRINCIPE	NA					
135 SAUDI ARABIA	RIA				RIA	
136 SENEGAL	ICP	X	X		X	
137 SEYCHELLES	NA					
138 SIERRA LEONE	ICP		X		X	
139 SINGAPORE	ICP				X	
140 SLOVAK REPUBLIC	ICP				X	X
141 SLOVENIA	ICP				X	X
142 SOLOMON ISLANDS	E					
143 SOUTH AFRICA	E					
144 SPAIN	ICP	X	X	X	X	X
145 SRI LANKA	ICP	X	X		X	
146 ST. KITTS AND NEVIS	RIA				RIA	
147 ST. LUCIA	ICP/RIA		X		RIA	
148 ST. VINCENT & GRENES.	RIA				RIA	
149 SUDAN	E					
150 SURINAME	ICP		X			
151 SWAZILAND	ICP		X		X	
152 SWEDEN	ICP		X	X	X	X
153 SWITZERLAND	ICP			X	X	X
154 SYRIAN ARAB REPUBLIC	RIA				RIA	
155 TAIWAN PROV.OF CHINA	NA					
156 TAJIKISTAN	ICP				X	X
157 TANZANIA	ICP	X	X		X	
158 THAILAND	ICP		X		X	
159 TOGO	E					
160 TONGA	NA					
161 TRINIDAD AND TOBAGO	ICP/RIA		X		RIA	
162 TUNISIA	ICP	X	X		X	X
163 TURKEY	ICP		X	X	X	
164 TURKMENISTAN	ICP				X	X
165 UGANDA	E					
166 UKRAINE	ICP				X	X
167 UNITED ARAB EMIRATES	RIA				RIA	
168 UNITED KINGDOM	ICP	X	X	X	X	X
169 UNITED STATES	ICP	X	X	X	X	X
170 URUGUAY	ICP/RIA	X			RIA	
171 UZBEKISTAN	ICP				X	X

Table 5.7. (concluded). World Bank PPP Valuation of GDP—Availability of Benchmark Data
1980-96

Country	Source	1980	1985	1990	1993	1996
172 VANUATU	E					
173 VENEZUELA	ICP/RIA	X			RIA	
174 VIETNAM	ICP				X	
175 YEMEN, REPUBLIC OF	RIA				RIA	
176 FR YUGOSLAVIA	ICP	X	X	X		
177 ZAIRE	ICP					
178 ZAMBIA	ICP	X	X		X	
179 ZIMBABWE	ICP	X	X		X	
180 FR CZECHOSLOVAKIA				X		
181 FR USSR				X		
TOTAL		60	64	30	117	52

Source: World Bank

Note: X - International Comparison Program (ICP) full scale survey

RIA - Reduced information approach World Bank

L - Limited survey in two regions

E - World Bank staff estimates

NA - Data not available

NOTE 6. CAPITAL ACCOUNT VARIABLES IN THE QUOTA FORMULAS

Introduction

53. The IMF's Executive Board has, since the early 1970s, discussed the issue of using capital account variables as a component of the Fund's quota formulas. The Board's consideration of this issue took into account not only a priori considerations that have a bearing on the merits of the variables included in the quota formulas, but also the problems posed by the lack of comprehensive and comparable data on transactions in the capital and financial accounts for many members.³⁴ Issues of methodology relating to the close correlation of capital account variables with the existing GDP and current account variables also arose and were difficult to resolve. As a consequence, capital account variables have not been incorporated into the quota formulas, though the issue of such incorporation has remained a topic of significant debate in the general reviews of quotas. This note provides background information on the staff's analysis and calculations, as well as on the views of the Executive Board, on the issue of incorporating capital account variables as a component of the quota formulas. Annex Note 7 describes the available data on countries' capital account transactions, as well as the data on current account transactions used in the existing quota formulas.

Staff analysis

54. The staff has argued that, in principle, capital flows have a role to play in the quota formulas. In the Sixth Review, the staff noted, for example, that shifts in long-term capital flows might produce a need for Fund drawings just as much as fluctuations in merchandise trade.³⁵ As a proxy for long-term capital flows, for which comprehensive data were lacking, the absolute value of current account balances was suggested by the staff in the Sixth, Eighth, and Tenth Reviews. Current account balances were viewed as giving a broad indication of a member's cyclical and structural position in world payments and, hence, of its ability to contribute to the Fund's resources or its need for Fund financing. More generally, however, the volume of capital account transactions would provide an important indication of developments in a member's *overall* external payments position, and of the relative importance of members' currencies in the international monetary system, which are not fully captured in the existing components of the quota formulas.³⁶ These missing elements have

³⁴ In this note, the terms "capital account" and "capital account transactions" refer to those defined in the Fund's Balance of Payments manual as "capital and financial account" transactions.

³⁵ SM/73/275, 12/10/73, "Statistical Formulas Explaining Present Fund Quotas."

³⁶ See EB/CQuota/87/3 (12/7/87), "Ninth General Review of Quotas—Further Consideration of Variables in the Quota Formulas," pp. 16–19.

grown in significance, especially since the mid-1980s, as capital account liberalization undertaken by many countries was accompanied by a surge of capital flows, and as the volatility of capital transactions has added to their external vulnerability. The staff has also considered that a member's relative ability to access the capital markets is inversely related to its need for Fund financing.³⁷

55. Nevertheless, the staff also cautioned at the time of the Ninth Review that the capital account could be regarded to a large extent as a mirror image of the current account in that, for many countries, the long-term capital account tends to have a corresponding counterpart in the data on current transactions. Furthermore, it was recognized that short-term capital movements tend to be reflected in the changes in the level of members' reserves, which is already a variable in the quota formulas. The issue of including capital account variables in the quota formulas therefore raised questions as to whether they contributed significant new information to the method of calculating quotas.

56. Partly because of the linkages between the current and capital account transactions in the balance of payments of member countries, the past discussions of the issue of the inclusion of capital account variables in the quota formulas tended to be cast in pragmatic terms. For example, if capital account transactions were mirrored in or highly correlated with current account transactions, including the former variable in the quota formulas could be seen as redundant. However, if the distribution of capital account transactions or access to private capital markets by members were correlated with that of their existing quotas, including capital account variables in the quota formulas might produce results that were closer to the actual distribution of quotas. Consequently, a revised formula might find support amongst some Executive Directors who felt that the deviations between actual and calculated quotas were attributable, in a significant way, to imperfections in the quota formulas. In the end, however, the lessened availability and lower quality of data on capital account transactions, compared with those of data on current account transactions, were particularly relevant practical considerations underlying the Executive Board's conclusion to use only the current account variables and exclude the capital account variables in the quota formulas.

Staff calculations and the views of Executive Directors

57. For illustrative purposes, the staff undertook a large number of calculations relating to the incorporation of capital account variables into the quota formulas in the context of several past general quota reviews. The earliest calculations were attempted in 1973, using regression methods as a means of approximating the then existing quotas to derive a number of statistical formulas containing variables other than those already included in the quota formulas. Data on capital payments and variability of capital receipts were available at that time for 79 members (out of 109) for the period ended 1967. The staff found that the

³⁷ EB/CQuota/94/2 (2/28/94), "The Working of the Quota Formulas," pp. 43-44.

correlation of capital account variables with then-existing quotas compared reasonably well with that of the more traditional variables such as current account transactions and national income. Thus, including capital account variables in the estimated equation for the sub-sample of countries for which data were available reduced the average error of the estimated equation by about 7½ percentage points. In other words, capital account variables increased significantly the explanatory power of equations that were estimated in an effort to replicate the then-existing quotas.

58. When the Executive Board discussed the staff calculations in April 1974, Directors generally hesitated to make any changes to the method of calculating quotas, which had last been modified in 1963 at the time of the Fourth Review. The Executive Board agreed to continue to use the then existing quota formulas for the purpose of the Sixth Review, although a few Directors appeared to be more open to consideration of new variables. One Director suggested, in particular, that the "availability of other sources of credit" should be taken into account, given that the developed countries had much better chances of borrowing than did the less developing countries, and that the latter countries were expected in the future to use the Fund's resources more heavily.

59. Quota formulas were intensively discussed in 1982/83 at the time of the Eighth General Review of Quotas. Executive Directors did not, at that time, pursue the issue of introducing capital account variables into the quota formulas largely because their discussion moved in the direction of modifying the coefficients of the existing variables in the quota formulas, especially that of the variability of current receipts, rather than toward changes that would involve adding new variables into the formulas.³⁸

60. In view of the increasing importance of capital transactions in the international monetary system, suggestions were made by a number of Executive Directors in 1987 at the time of the Ninth Review to include a measure of capital flows in the quota formulas. The capital account had become the subject of increasing attention as the Fund dealt with the imbalances of the major industrial countries and the problems of debtor countries, and it was noted that capital transactions had received little attention in the quota formulas.

61. New attempts were made by the staff, in connection with both the Ninth and Tenth Reviews, to incorporate capital account variables in statistical quota formulas. These attempts yielded unacceptable results in that the estimated coefficients for the current account and capital account variables were negative, which posed difficulties of interpretation, except as a result of multicollinearity among the explanatory variables. The staff interpreted these results as a reflection of the substitutability of the GDP, current account, and capital account variables as potential variables in quota formulas. In addition, the staff noted that despite improvements in data availability and quality, capital transactions are in principle recorded

³⁸ EB/CQuota/87/4 (12/21/87), "Ninth General Review of Quotas—Issues Arising in Connection with the Eighth General Review of Quotas," pp.1-4.

as flows of or as changes in identified external assets and liabilities, with varying degrees of netting and coverage across countries and individual capital account items. As a consequence, the use of capital account data in the quota calculations could lead to uneven results among members. The staff concluded that, on these technical and practical grounds, there did not seem to be a strong case for including a capital account variable in the quota formulas. The Executive Board generally accepted this conclusion when it discussed the matter in January 1988 and March 1994. It was felt that the relative financial importance of countries was difficult to capture in the quota formulas, and that this affected only a few major industrial countries and some relatively small developing countries that operated offshore financial markets. A number of Directors were also concerned that the use of capital account or financial variables would tend to reduce the calculated quota shares of the developing countries, and consequently these Directors did not support the inclusion of a capital account variable in the quota formulas. Some Directors, however, felt it would be worthwhile to continue to pursue the possibility of including capital flows in the quota formulas, with one Director noting that international financial flows had grown exponentially since the 1970s.

62. As regards a variable representing members' access to capital markets, the staff found in 1994 a strong negative correlation between members' actual quotas and their relative access to capital markets. The latter variable was defined qualitatively by classifying countries according to four groupings—industrial countries with unlimited access to capital markets, other industrial countries, developing countries with general access, and developing countries with limited access. However, access to capital markets was seen as akin to such “needs-based” variables as poverty indexes or external debt indicators, and Directors generally did not favor the inclusion in the quota formulas of needs-based variables. It was argued that the particular needs for Fund resources of members with low per capita incomes were being addressed by the availability of resources under the Fund's low-interest-cost facilities (Trust Fund loans, the Structural Adjustment Facility, and the Enhanced Structural Adjustment Facility). Nevertheless, Directors representing the developing countries strongly supported the use of a variable in the quota formulas that would recognize a member's difficulty in achieving access to international capital markets as a factor that could increase the member's need to use the Fund's resources.

NOTE 7. BALANCE OF PAYMENTS DATA USED IN THE QUOTA FORMULAS

63. This note (i) explains the major categories of data in the Balance of Payments statistics of the IMF, (ii) describes the status of data quality, availability, and coverage for members; and (iii) presents some brief comments on the data on current and capital account transactions.

A. Data Categories

64. In the Balance of Payments statistics³⁹, the "analytic presentation" gives the flow figures of members' current account transactions and changes in capital, financial account positions and net errors, and omissions. The current account shows inflows and outflows, or imports and exports of goods, services, factor income, and current transfers. Transactions that are generally referred to as capital account transactions are covered by the capital and financial accounts, which are subdivided into capital transfers (acquisition or disposal of nonproduced, nonfinancial assets) and financial flows that involve changes in the financial assets or claims of residents on nonresidents, and changes in the financial liabilities of residents to nonresidents.

65. The financial account consists of four broad categories: (i) direct investment, defined as an acquisition by a nonresident (resident) of a lasting interest in a domestic (foreign) enterprise; (ii) portfolio investment, which includes equity securities and debt securities, with the latter subdivided into bonds and notes, money market instruments, and financial derivatives; (iii) other investment, which includes trade credits, loans, currency and deposits, and other financial transactions, excluding use of the IMF credit; and (iv) reserve assets and related items (see below).

66. Reserve assets consist of those external assets that are readily available to and controlled by monetary authorities for direct financing of payments imbalances, for indirectly regulating the magnitude of such imbalances through intervention in exchange markets to affect the currency exchange rate, and/or for other purposes—such as to maintain confidence in the currency and the economy, to satisfy domestic legal requirements, or to serve as a basis for foreign borrowing. Reserve assets, as defined in the latest (fifth) edition of the Balance of Payments manual, include monetary gold, SDRs, reserve position in the IMF, foreign exchange assets (consisting of currency and deposits and securities), and other claims. Related items include transactions involving use of IMF credit, and other loans and exceptional financing, such as debt restructuring or rescheduling not included elsewhere.

³⁹ In this note, Balance of Payments statistics refer to those compiled and published by the IMF in its *Balance of Payments Yearbook*.

67. The standard practice is to show a separate item for net errors and omissions. Labeled by some compilers as a balancing item or statistical discrepancy, this item is intended as an offset to the overstatement or understatement of the other recorded components in the balance of payments.

68. As a matter of convention, current receipts are shown with a positive sign, and payments with a negative sign. In the financial accounts, an increase in residents' claims on nonresidents, i.e., a net acquisition of foreign assets, is shown with a negative sign, whereas an increase in residents' liabilities to the rest of the world, or a net acquisition by foreigners of claims on residents, is shown with a positive sign. Consequently, a positive net errors and omissions figure implies a net unrecorded inflow of funds (i.e., unrecorded exports, an unrecorded decline in the country's net asset position, or an unrecorded increase in the net liability position of residents vis-à-vis nonresidents).

B. Coverage, Availability, and Data Quality

69. The coverage, availability and quality of the balance of payments data have improved in the past decade as more countries have adopted and implemented international guidelines for compilation of these data. Presently, the data from 158 countries are of adequate quality and accepted by the IMF for publication on a regular basis. The IMF also publishes technical reviews of balance of payments methodologies, compilation practices and data sources for 140 member countries.

70. At the time of the Eleventh General Review of Quotas, data for current receipts and payments through 1994 were used in the quota formulas. Balance of Payments data supplied for publication in the IMF's Balance of Payments Yearbook were not available for 53 countries (out of the 183 countries that participated in the quota review). These gaps were filled in by information provided by area department desk economists, based on official information, and by staff estimates (EB/CQuota/97/7, 11/20/97, page 1, footnote 2, and EB/CQuota/97/6, 11/11/97, pages 2-3). For comparison, there are about 55 members that do not regularly provide data on capital and financial account transactions for publication in the Balance of Payments statistics of the IMF. It should be noted, however, that the combined quota share (under the Eleventh General Review of Quotas) of these countries is about 5 percent of total quotas. The extent of further work involving area department desk economists and staff estimation to complete the capital and financial account database needed for quota calculations is therefore comparable with that undertaken with respect to current account transactions, and may be summarized in Table 7.1.

Table 7.1. Total Number of Countries Without Data in Balance of Payments Statistics

	1990	1991	1992	1993	1994
Capital Transfers: Credit	48	52	49	47	50
: Debit	49	52	51	48	55
Direct Investment: Abroad	45	49	49	48	52
: in Reporting countries	41	43	40	34	33
Portfolio Investment: Assets	48	52	51	49	52
: Liabilities	47	49	48	47	51
Other Investment: Assets	41	43	40	35	34
: Liabilities	40	42	39	33	31
Net Errors and Omissions	40	42	39	33	31

71. For illustrative purposes, preliminary staff estimates have been made to fill in gaps in data in the capital and financial accounts. For this purpose, staff has classified the countries without data into six categories: developed countries, developing net creditor countries, developing net debtor countries—official borrowers, developing net debtor countries—private borrowers, developing net debtor countries—diversified borrowers, and economies in transition (WEO classification). The gaps were then filled by applying the average ratio of capital and financial account receipts to current account receipts for the countries with available data (Table 7.2) The adoption of the three sub-groups classification within the net debtor developing countries group was suggested by the fact that the average ratios of capital receipts to current receipts for the three subgroups vary significantly.

72. It should be noted that despite the recent improvements in data availability, problems remain with respect to incomplete coverage and misclassification of transactions, particularly in the recording of cross-border transactions. These factors have contributed to the existing significant discrepancies in global balance of payments. Conceptually, the combined surpluses and combined deficits in the current accounts of all countries should offset each other, leaving no net balance (or discrepancy) in the global current or capital accounts. In practice, however, global discrepancies are recorded each year, primarily because of incomplete coverage, inaccurate recording of transactions by countries and/or different timing of cross-border transactions, and omission of countries for which data are unavailable. For example, there are known classification problems in the recording of capital transfers and current transfers because not all countries have implemented the BPM5 classification. In

addition, countries use different methods and sources to compile their data, which can result in inconsistent classifications of transactions among countries and in global asymmetries of corresponding accounts.

73. The recent liberalization of financial markets and the proliferation of financial instruments have outpaced the traditional methods of capturing many portfolio and other investment flows thereby exacerbating the problem of accurately recording the rapidly growing volume of cross-border activity in portfolio securities. In many countries, the methods for recording portfolio and other investment flows have largely relied on reports of domestic financial institutions on international financial flows that pass through them. The increasing portfolio and other investment flows that bypass domestic financial channels, e.g., flows through nonresident or offshore financial institutions, are often not captured in countries' balance of payments. In addition, as countries' financial activities become more globalized, cross-border financial transactions also increasingly represent capital flows among worldwide offices and branches of a country's financial institutions.

74. These developments complicate the identification of financial transactions between residents and non-residents, the basic concept underlying the balance of payments accounts, and exacerbate the difficulty of estimating investment income, especially when investment flows (particularly portfolio investment) themselves are not easily captured. As a result of such classification problems, the imbalances among the components of the financial account remain significant. Nonetheless, the overall statistical discrepancies in the current and financial accounts of countries have improved in recent years.

C. Measures of External Transactions for Use in the Quota Formulas

75. In the original Bretton Woods formula, the values of external trade and payments used for determining the initial quotas of new members were defined as average imports, exports and the maximum variation in exports for the average preceding five-year period. In the subsequent revisions of the Bretton Woods formula, the coverage of trade and payments data was extended to current receipts, current payments and the variability of current receipts instead of exports, imports and the variability of exports. After the last modification of the quota formulas in 1962-63, the annual average current payments and receipts, over a recent five-year period, and the variability of current receipts, defined as one standard deviation from the five-year moving average over a recent 13-year period, were included in the formulas.

76. The attached Tables 7.3 and 7.4 provide information on the capital and financial account transactions of members for 1990-94, as reported in the Balance of Payments statistics database, and on the variability of the capital and financial account receipts variable. The capital and financial account receipts (credit) variable is defined as the average of the sum of capital account, credit, direct investment in the reporting country, portfolio investment liabilities, and other investment liabilities for the period 1990-94, while the capital and financial account payments (debit) variable is defined as the average of the sum

of capital account, debit, direct investment abroad, portfolio investment assets, and other investments assets, for the period 1990–94. The variability of the capital account receipts is calculated for the period 1982–94, using the same measure as for calculating the variability of current receipts.

77. As indicated in Table 7.3, the total of capital account receipts for the whole membership for the period 1990–94 amounts to about 20 percent of total current account receipts. However, relative to current account receipts, capital receipts are higher for the group of developed countries (about 22 percent) than for the net debtor countries (18 percent) (see also Table 7.2). Among the individual countries, this ratio varies widely, being significantly higher than the average for the United Kingdom, Belgium, and Argentina, for example, and very low for Japan, Saudi Arabia, Switzerland, and India. The average ratio of capital payments to current account payments is 20 percent for the IMF as a whole during 1990–94, and individual ratios of capital payments to current account payments tend to be higher for creditor countries, such as Switzerland and Spain. Countries with significant international financial activities (e.g., the United States and the United Kingdom) tend to have large flows of both capital receipts and payments.

78. Table 7.4 shows that the variability of capital account receipts is on average about 130 percent of the variability of current account receipts for the IMF as a whole, but the variability of total receipts (current and capital) is only about twice the variability of current receipts. This reflects the negative covariability between current receipts and capital receipts. The variability of capital receipts is, for example, very high for the United Kingdom, Belgium, and The Bahamas, countries with large international banking transactions. The relative size of variability of capital receipts tends to be low for countries with large fluctuations in their current receipts, e.g., the major oil producing countries such as Saudi Arabia, Nigeria, or Kuwait.

Table 7.2. Average Ratios of Capital and Financial Account Credit (BOP Data) to Current Account Receipts (Quota Data) for Developed, Developing, and Transition Economies, by Analytical Groups, 1982-94 1/

Analytical groups	1982	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992	1993	1994
Developed countries	0.18	0.16	0.21	0.22	0.28	0.33	0.25	0.33	0.27	0.16	0.20	0.29	0.19
Net creditor countries	0.09	0.06	0.07	0.01	0.04	0.01	0.04	0.03	0.00	0.00	0.01	0.05	0.01
Net debtor countries													
Private financing	0.22	0.12	0.12	0.10	0.09	0.09	0.07	0.05	0.13	0.18	0.21	0.33	0.26
Official financing	0.35	0.29	0.16	0.19	0.16	0.23	0.21	0.26	0.17	0.21	0.19	0.20	0.22
Diversified financing	0.25	0.22	0.18	0.12	0.18	0.16	0.14	0.16	0.15	0.15	0.15	0.15	0.13
Economies in transition	0.05	0.03	0.02	0.02	0.04	0.02	0.02	0.03	0.06	0.03	0.08	0.17	0.17
All members *	0.19	0.15	0.13	0.11	0.13	0.14	0.12	0.14	0.13	0.12	0.14	0.20	0.16

1/ The analytical groups presented reflect the WEO classification. In each group, the average ratio is calculated as the ratio of the sum of the capital and financial account credit to the sum of the current account receipts for all countries in the group with available and estimated data.

Table 7.3. Availability of Current and Capital and Financial Account Data, 1990-94
(in millions of SDRs)

	Current	Current	Capital and financial account		External	External	Ratios	
	receipts 1/ 2/	payments 3/ 2/	credit 4/ 2/	debit 5/ 2/	receipts	payments	(5)/(1)	(6)/(2)
	(quota database)	(quota database)	(BoP statistics)	(BoP statistics)	(1)+(3)	(2)+(4)	(7)	(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
United States	537,492.8	583,039.9	143,656.2	82,779.9	681,148.9	665,819.9	1.3	1.1
Germany	398,394.9	383,642.1	79,943.4	73,441.2	478,338.2	457,083.4	1.2	1.2
Japan	341,088.9	268,259.3	527.1	56,699.4	341,616.0	324,958.7	1.0	1.2
United Kingdom	222,245.6	229,428.8	95,573.3	85,108.5	317,818.8	314,537.3	1.4	1.4
France	250,108.9	245,578.1	48,984.9	51,078.2	299,093.8	296,656.3	1.2	1.2*
Saudi Arabia	40,129.2	49,287.9	698.0	-9,002.3	40,827.2	40,285.6	1.0	0.8
Italy	179,451.1	182,032.0	43,117.2	32,189.6	222,568.4	214,221.6	1.2	1.2
Canada	124,213.5	138,012.6	29,256.0	15,256.6	153,469.6	153,269.2	1.2	1.1
Russia	54,084.1	50,121.5	3,839.5	3,690.6	57,923.7	53,812.1	1.1	1.1
Netherlands	134,236.8	123,819.9	17,452.5	23,152.6	151,689.3	146,972.5	1.1	1.2
China	62,088.9	58,254.6	12,411.5	3,009.4	74,500.5	61,264.0	1.2	1.1
Belgium	107,978.3	104,945.3	61,711.1	20,772.9	169,689.4	125,718.2	1.6	1.2
India	20,639.2	24,557.2	2,759.1	526.8	23,398.3	25,084.1	1.1	1.0
Switzerland	75,508.4	65,732.1	7,753.3	22,947.6	83,261.7	88,679.7	1.1	1.3
Australia	42,145.1	51,212.4	12,733.1	4,251.5	54,878.2	55,463.9	1.3	1.1
Brazil	31,262.4	31,332.6	7,615.8	2,896.8	38,878.2	34,229.4	1.2	1.1
Venezuela	13,882.7	12,855.1	1,969.1	1,611.9	15,851.8	14,467.0	1.1	1.1
Spain	81,303.2	88,682.1	34,879.3	23,203.3	116,182.4	111,885.4	1.4	1.3
Mexico	35,729.6	49,934.9	20,385.8	1,745.5	56,115.4	51,680.4	1.6	1.0
Sweden	54,392.1	56,492.7	14,134.5	7,592.7	68,526.6	64,085.5	1.3	1.1
Argentina	13,318.7	15,939.4	5,682.8	1,137.6	19,001.5	17,077.0	1.4	1.1
Indonesia	27,235.7	29,541.4	3,751.3	136.1	30,987.0	29,677.5	1.1	1.0
South Africa	20,647.6	19,611.3	723.9	381.0	21,371.5	19,992.2	1.0	1.0
Nigeria	9,157.4	8,552.8	1,257.5	1,990.6	10,414.9	10,543.4	1.1	1.2
Austria	56,863.9	56,817.3	7,244.8	5,812.2	64,108.7	62,629.5	1.1	1.1
Norway	36,394.0	32,974.0	21.8	683.8	36,415.7	33,657.8	1.0	1.0
Iran, I.R. of	15,664.7	17,832.3	2,260.8	-80.9	17,925.5	17,751.4	1.1	1.0
Denmark	48,389.8	45,678.1	5,745.3	7,398.0	54,135.1	53,076.1	1.1	1.2
Ukraine	11,259.9	11,540.0	1,067.1	531.0	12,327.0	12,071.0	1.1	1.0
Kuwait	10,219.4	8,676.8	117.5	-472.4	10,336.9	8,204.4	1.0	0.9

Table 7.3. (continued). Availability of Current and Capital and Financial Account Data, 1990-94
(in millions of SDRs)

	Current	Current	Capital and financial account		External	External	Ratios	
	receipts 1/ 2/ (quota database)	payments 3/ 2/ (quota database)	credit 4/ 2/ (BoP statistics)	debit 5/ 2/ (BoP statistics)	receipts (1)+(3)	payments (2)+(4)	(5)/(1)	(6)/(2)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Poland	18,477.0	19,600.5	2,888.5	1,249.2	21,365.6	20,849.6	1.2	1.1
Algeria	9,263.0	8,649.2	1,044.2	257.2	10,307.1	8,906.5	1.1	1.0
Finland	23,389.2	25,709.1	5,924.3	2,431.3	29,313.5	28,140.4	1.3	1.1
Malaysia	35,035.4	37,176.3	3,794.5	-215.5	38,829.9	36,960.7	1.1	1.0
Libya	4,006.5	7,296.5	15.9	-666.2	4,022.4	6,630.3	1.0	0.9
Korea	68,655.9	70,997.8	8,550.1	4,468.4	77,206.0	75,466.2	1.1	1.1
Pakistan	7,605.3	9,279.7	1,940.6	257.7	9,545.9	9,537.4	1.3	1.0
Hungary	10,600.6	10,801.4	1,560.4	-29.2	12,160.9	10,772.2	1.1	1.0
Romania	4,355.8	5,493.1	923.3	21.2	5,279.1	5,514.3	1.2	1.0
Egypt	12,150.0	11,936.6	999.4	543.1	13,149.4	12,479.7	1.1	1.0
Israel	14,599.8	18,435.9	2,730.1	1,445.6	17,329.9	19,881.5	1.2	1.1
New Zealand	9,749.6	10,764.5	2,689.3	1,066.1	12,439.0	11,830.6	1.3	1.1
Turkey	20,494.3	22,321.7	2,651.3	1,149.6	23,145.6	23,471.3	1.1	1.1
Philippines	13,057.2	14,685.4	2,677.9	338.5	15,735.1	15,023.9	1.2	1.0
Chile	8,982.1	9,740.3	2,084.5	67.4	11,066.6	9,807.7	1.2	1.0
Czech Republic	9,825.3	9,771.9	1,913.3	973.1	11,738.6	10,745.0	1.2	1.1
Greece	12,148.1	16,111.2	3,046.5	0.0	15,194.6	16,111.2	1.3	1.0
Thailand	32,147.2	37,319.7	8,306.5	935.8	40,453.7	38,255.4	1.3	1.0
Colombia	8,414.4	8,593.1	962.0	274.6	9,376.4	8,867.6	1.1	1.0
Portugal *	21,250.0	23,101.6	4,799.9	4,181.1	26,049.9	27,282.8	1.2	1.2
Ireland	26,519.0	26,278.3	3,831.8	5,244.1	30,350.9	31,522.4	1.1	1.2
Peru	3,708.5	5,209.0	1,387.9	189.6	5,096.4	5,398.6	1.4	1.0
Bulgaria	3,993.2	4,681.6	394.2	-110.5	4,387.4	4,571.1	1.1	1.0
Morocco	6,696.6	7,143.5	869.0	9.2	7,565.7	7,152.6	1.1	1.0
Congo, Dem. Rep.	1,248.9	1,803.3	220.1	67.8	1,469.0	1,871.0	1.2	1.0
Bangladesh	2,747.7	3,258.1	498.9	123.3	3,246.5	3,381.4	1.2	1.0
United Arab Emirates	13,931.4	8,787.3	140.4	-913.5	14,071.8	7,873.8	1.0	0.9
Zambia	845.5	1,196.6	237.4	85.6	1,082.9	1,282.2	1.3	1.1
Singapore	50,173.9	45,785.4	10,446.7	7,584.2	60,620.6	53,369.5	1.2	1.2
FRY (Serbia/Montenegro)	3,368.7	3,680.5	191.0	-71.4	3,559.7	3,609.1	1.1	1.0

Table 7.3. (continued). Availability of Current and Capital and Financial Account Data, 1990-94
(in millions of SDRs)

	Current receipts 1/ 2/ (quota database) (1)	Current payments 3/ 2/ (quota database) (2)	Capital and financial account		External receipts (1)+(3) (5)	External payments (2)+(4) (6)	Ratios	
			credit 4/ 2/ (BoP statistics) (3)	debit 5/ 2/ (BoP statistics) (4)			(5)/(1) (7)	(6)/(2) (8)
Sri Lanka	2,628.5	3,112.4	537.4	-19.5	3,166.0	3,092.9	1.2	1.0
Belarus	3,231.4	3,167.5	171.4	98.2	3,402.7	3,265.7	1.1	1.0
Ghana	1,013.1	1,407.7	123.9	35.0	1,137.0	1,442.6	1.1	1.0
Croatia	4,493.8	4,583.8	187.7	-4.5	4,681.5	4,579.3	1.0	1.0
Zimbabwe	1,541.5	1,880.3	301.4	5.4	1,842.9	1,885.7	1.2	1.0
Slovak Republic	4,310.2	4,311.7	447.9	308.6	4,758.1	4,620.4	1.1	1.1
Kazakhstan	4,668.2	6,264.3	279.3	177.5	4,947.6	6,441.8	1.1	1.0
Trinidad and Tobago	1,605.1	1,414.3	-32.0	48.6	1,573.1	1,462.9	1.0	1.0
Vietnam	2,421.2	2,722.6	439.1	86.0	2,860.3	2,808.5	1.2	1.0
Cote d' Ivoire	2,509.9	3,320.4	662.5	-7.6	3,172.4	3,312.8	1.3	1.0
Sudan	428.5	921.4	443.7	50.3	872.2	971.7	2.0	1.1
Uruguay	2,051.5	2,130.7	261.2	248.0	2,312.7	2,378.7	1.1	1.1
Ecuador	2,704.8	3,158.4	544.0	16.1	3,248.8	3,174.5	1.2	1.0
Syrian Arab Republic	3,867.6	3,794.4	794.7	917.9	4,662.3	4,712.3	1.2	1.2
Angola	2,625.7	3,093.5	556.9	99.0	3,182.6	3,192.5	1.2	1.0
Tunisia	4,658.9	5,305.7	796.7	215.4	5,455.6	5,521.0	1.2	1.0
Jamaica	1,972.0	2,129.2	178.7	-5.9	2,150.7	2,123.3	1.1	1.0
Uzbekistan	2,299.4	2,400.0	157.2	91.8	2,456.5	2,491.8	1.1	1.0
Kenya	1,802.7	2,034.7	108.0	-0.7	1,910.7	2,034.0	1.1	1.0
Qatar *	2,488.3	2,395.0	24.9	-234.7	2,513.2	2,160.3	1.0	0.9
Myanmar	739.4	946.0	221.6	24.1	961.0	970.1	1.3	1.0
Yemen, Republic of	1,897.2	2,296.0	362.4	81.7	2,259.6	2,377.7	1.2	1.0
Dominican Republic	2,483.8	2,619.6	150.9	-14.9	2,634.6	2,604.6	1.1	1.0
Guatemala	1,628.1	1,987.2	362.1	-37.2	1,990.2	1,950.0	1.2	1.0
Slovenia	5,113.2	4,675.4	137.3	150.0	5,250.5	4,825.4	1.0	1.0
Brunei Darussalam	3,279.3	1,367.0	32.1	-139.0	3,311.4	1,228.0	1.0	0.9
Panama	2,174.2	2,381.9	710.0	86.1	2,884.2	2,467.9	1.3	1.0
Tanzania	532.0	1,365.7	502.6	-9.8	1,034.6	1,355.9	1.9	1.0
Lebanon	1,206.6	3,246.9	148.2	78.0	1,354.7	3,324.9	1.1	1.0
Luxembourg	12,375.4	11,138.6	2,595.2	2,176.8	14,970.6	13,315.4	1.2	1.2

Table 7.3. (continued). Availability of Current and Capital and Financial Account Data, 1990-94
(in millions of SDRs)

	Current	Current	Capital and financial account		External	External	Ratios	
	receipts 1/ 2/	payments 3/ 2/	credit 4/ 2/	debit 5/ 2/	receipts	payments	(5)/(1)	(6)/(2)
	(quota database)	(quota database)	(BoP statistics)	(BoP statistics)	(1)+(3)	(2)+(4)	(7)	(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Cameroon	1,607.1	1,939.2	286.8	-53.7	1,893.9	1,885.6	1.2	1.0
Uganda	292.6	608.0	164.0	6.0	456.7	614.0	1.6	1.0
Bolivia	715.3	1,095.5	289.6	22.4	1,004.9	1,117.9	1.4	1.0
El Salvador	1,253.5	1,485.8	45.5	-0.6	1,299.0	1,485.2	1.0	1.0
Jordan	2,584.7	3,247.4	362.0	-279.2	2,946.8	2,968.3	1.1	0.9
Bosnia-Herzegovina	2,255.5	2,212.0	84.7	51.5	2,340.2	2,263.6	1.0	1.0
Oman	4,158.8	4,395.5	104.0	53.2	4,262.8	4,448.7	1.0	1.0
Costa Rica	2,003.3	2,311.2	160.3	0.9	2,163.6	2,312.1	1.1	1.0
Senegal	1,082.0	1,440.4	310.4	30.6	1,392.3	1,470.9	1.3	1.0
Azerbaijan	1,265.5	1,189.4	60.5	32.7	1,326.0	1,222.2	1.0	1.0
Georgia	481.6	749.0	27.7	26.5	509.3	775.5	1.1	1.0
Gabon	1,906.7	1,872.4	65.2	60.7	1,971.9	1,933.1	1.0	1.0
Lithuania	1,695.1	1,590.5	122.4	72.6	1,817.5	1,663.0	1.1	1.0
Cyprus	2,279.4	2,453.0	450.2	85.7	2,729.7	2,538.7	1.2	1.0
Namibia	1,474.5	1,395.8	120.1	192.8	1,594.6	1,588.6	1.1	1.1
Ethiopia	585.7	870.3	242.7	72.9	828.4	943.3	1.4	1.1
Nicaragua	315.4	889.9	362.0	3.5	677.4	893.3	2.1	1.0
Papua New Guinea	1,685.2	1,698.4	347.9	520.2	2,033.1	2,218.6	1.2	1.3
Honduras	884.6	1,150.6	199.7	36.1	1,084.3	1,186.6	1.2	1.0
Bahamas, The	1,272.3	1,357.9	898.6	859.7	2,170.9	2,217.6	1.7	1.6
Latvia	1,266.3	1,230.3	87.2	47.9	1,353.4	1,278.2	1.1	1.0
Madagascar	447.4	685.8	159.9	9.6	607.3	695.5	1.4	1.0
Moldova	792.0	801.7	81.0	25.8	873.1	827.6	1.1	1.0
Iceland	1,581.7	1,658.5	108.8	52.0	1,690.5	1,710.6	1.1	1.0
Mozambique	259.5	874.3	292.6	0.0	552.1	874.3	2.1	1.0
Bahrain	2,809.0	3,898.4	368.5	133.4	3,177.5	4,031.8	1.1	1.0
Guinea	591.8	840.0	73.4	21.9	665.1	861.9	1.1	1.0
Sierra Leone	150.6	191.0	30.6	11.0	181.2	202.0	1.2	1.1
Mauritius	1,459.8	1,531.0	53.7	31.5	1,513.5	1,562.5	1.0	1.0
Paraguay	1,214.7	1,296.8	47.1	23.9	1,167.6	1,320.7	1.0	1.0

Table 7.3. (continued). Availability of Current and Capital and Financial Account Data, 1990-94
(in millions of SDRs)

	Current	Current	Capital and financial account		External	External	Ratios	
	receipts 1/ 2/ (quota database)	payments 3/ 2/ (quota database)	credit 4/ 2/ (BoP statistics)	debit 5/ 2/ (BoP statistics)	receipts (1)+(3)	payments (2)+(4)	(5)/(1)	(6)/(2)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Mali	382.0	641.2	207.1	13.6	589.1	654.8	1.5	1.0
Suriname	417.1	446.8	-29.6	2.1	387.5	448.9	0.9	1.0
Malta	1,879.6	1,940.4	164.0	68.5	2,043.6	2,008.9	1.1	1.0
Armenia	434.4	661.3	18.8	16.5	453.2	677.9	1.0	1.0
Guyana	335.0	383.5	97.5	13.3	432.6	396.9	1.3	1.0
Cambodia	102.1	199.8	18.8	5.3	120.9	205.1	1.2	1.0
Kyrgyz Republic	670.9	854.3	29.5	20.8	700.4	875.2	1.0	1.0
Haiti	168.9	275.1	20.0	9.5	188.9	284.7	1.1	1.0
Tajikistan	709.2	976.8	38.2	28.5	747.3	1,005.3	1.1	1.0
Rwanda	106.5	301.2	40.7	-6.0	147.2	295.2	1.4	1.0
Congo, Republic of	898.7	1,283.4	331.5	6.7	1,230.3	1,290.1	1.4	1.0
Burundi	88.8	236.8	50.1	1.0	138.9	237.8	1.6	1.0
Togo	277.7	383.4	55.3	-8.3	332.9	375.1	1.2	1.0
Nepal	536.8	780.5	137.7	-118.8	674.4	661.7	1.3	0.8
Fiji	678.4	746.5	88.8	27.8	767.2	774.3	1.1	1.0
Malawi	362.8	592.7	87.6	-4.2	450.4	588.6	1.2	1.0
Macedonia, FYR	972.0	1,087.5	75.6	50.8	1,047.6	1,138.3	1.1	1.0
Barbados	687.7	642.1	33.8	24.7	721.5	666.8	1.0	1.0
Niger	301.7	490.4	53.1	18.6	354.8	509.1	1.2	1.0
Turkmenistan	1,404.5	1,248.6	91.2	55.0	1,495.7	1,303.5	1.1	1.0
Mauritania	336.4	464.5	-94.9	-130.7	241.5	333.8	0.7	0.7
Estonia	801.3	847.8	132.6	108.4	933.9	956.2	1.2	1.1
Benin	394.3	480.7	80.2	19.2	474.5	499.9	1.2	1.0
Burkina Faso	355.7	546.8	69.3	1.3	425.0	548.1	1.2	1.0
Chad	177.9	366.3	47.7	-5.1	225.7	361.2	1.3	1.0
Central African Rep.	141.8	272.1	67.7	19.6	209.5	291.7	1.5	1.1
Lao People's Dem. Rep.	168.7	275.7	67.5	5.5	236.2	281.2	1.4	1.0
Mongolia	297.7	437.8	106.9	19.6	404.6	457.4	1.4	1.0
Botswana	1,782.1	1,702.8	109.2	44.5	1,891.3	1,747.3	1.1	1.0
Swaziland	658.6	754.2	57.2	62.9	715.9	817.1	1.1	1.1

Table 7.3. (continued). Availability of Current and Capital and Financial Account Data, 1990-94
(in millions of SDRs)

	Current	Current	Capital and financial account		External	External	Ratios	
	receipts 1/ 2/	payments 3/ 2/	credit 4/ 2/	debit 5/ 2/	receipts	payments	(5)/(1)	(6)/(2)
	(quota database)	(quota database)	(BoP statistics)	(BoP statistics)	(1)+(3)	(2)+(4)	(7)	(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Albania	253.4	439.1	83.0	35.2	336.3	474.4	1.3	1.1
Equatorial Guinea	36.9	80.8	16.1	1.6	53.1	82.4	1.4	1.0
Lesotho	435.1	661.3	38.4	47.0	473.6	708.4	1.1	1.1
Gambia, The	168.6	184.7	17.1	-0.3	185.7	184.4	1.1	1.0
Belize	210.6	238.1	17.9	3.1	228.6	241.2	1.1	1.0
Vanuatu	84.4	103.6	30.4	12.2	114.7	115.8	1.4	1.1
Eritrea	163.8	169.9	19.2	3.8	183.0	173.7	1.1	1.0
Djibouti	141.0	220.5	28.4	0.0	169.4	220.5	1.2	1.0
St. Lucia	236.4	276.8	39.2	-4.3	275.5	272.5	1.2	1.0
Guinea-Bissau	31.9	76.2	55.4	0.0	87.3	76.2	2.7	1.0
San Marino	549.0	502.7	114.5	97.4	663.6	600.0	1.2	1.2
Antigua and Barbuda	353.2	381.9	34.8	12.9	388.0	394.8	1.1	1.0
Grenada	98.6	114.0	29.5	4.4	128.1	118.3	1.3	1.0
Samoa	61.1	85.5	11.5	0.0	72.4	85.5	1.2	1.0
Solomon Islands	110.5	151.2	11.4	0.6	121.9	151.8	1.1	1.0
Cape Verde *	93.4	136.4	12.7	3.7	106.1	140.0	1.1	1.0
St. Kitts and Nevis	88.8	109.0	20.8	-1.7	109.6	107.3	1.2	1.0
Comoros	61.8	76.1	14.1	0.3	75.9	76.5	1.2	1.0
Dominica	77.3	101.0	22.6	-2.9	99.8	98.2	1.3	1.0
St. Vincent and Grens.	99.0	123.5	27.8	0.8	126.8	124.4	1.3	1.0
Seychelles	181.7	208.9	36.2	7.7	218.0	216.7	1.2	1.0
Maldives	155.6	178.8	11.6	0.3	167.1	179.1	1.1	1.0
Sao Tome and Principe	8.4	34.1	3.4	0.9	11.8	35.0	1.4	1.0
Tonga	55.9	66.7	0.8	-1.2	56.7	65.5	1.0	1.0
Bhutan	67.5	98.4	12.0	3.7	79.5	102.1	1.2	1.0
Kiribati	24.3	34.6	4.4	1.3	28.7	35.9	1.2	1.0
Micronesia, Fed. States of	55.6	131.3	10.1	4.5	65.7	135.8	1.2	1.0
Marshall Islands	34.2	70.8	6.2	2.5	40.4	73.3	1.2	1.0
Palau, Republic of	2,255.5	2,212.0	4.3	1.3	2,259.8	2,213.3	1.0	1.0

Table 7.3. (concluded). Availability of Current and Capital and Financial Account Data, 1990-94
(in millions of SDRs)

	Current	Current	Capital and financial account		External	External	Ratios	
	receipts 1/ 2/	payments 3/ 2/	credit 4/ 2/	debit 5/ 2/	receipts	payments	(5)/(1)	(6)/(2)
	(quota database)	(quota database)	(BoP statistics)	(BoP statistics)	(1)+(3)	(2)+(4)	(7)	(8)
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Iraq	4,438.3	5,409.7	547.5	138.3	4,985.8	5,548.0	1.1	1.0
Afghanistan, I.S. of	188.6	381.2	23.3	9.7	211.9	390.9	1.1	1.0
Liberia	207.5	236.3	37.0	8.4	244.5	244.7	1.2	1.0
Somalia	42.8	206.7	7.6	7.4	50.4	214.1	1.2	1.0
Total	3,665,690.0	3,702,349.3	766,715.6	558,869.2	4,432,405.6	4,261,218.5	1.2	1.2

Source: The database used for Quota calculations and the Balance of Payments database.

Estimated data appear in shaded areas.

1/ Current receipts: average for 1990-94 of the sum of Good: exports f.o.b., Services: credit, Income: credit and current private transfers: credit; divided by the average SDR value for the same years.

2/ US dollar figures were converted into SDRs by dividing them by the average SDR value for the corresponding year.

3/ Current payments: average for 1990-94 of the sum of Good: imports f.o.b., Services: debit, Income: debit and current private transfers: debit; divided by the average SDR value for the same years.

4/ Capital and financial account credit: average for 1990-94 of the sum of capital account: credit, direct investment in the underlying country, portfolio investment liabilities, and other investment liabilities; divided by the average SDR value for the same years.

5/ Capital and financial account debit: average for 1990-94 of the sum of capital account: debit, direct investment abroad, portfolio investment assets, and other investment assets; divided by the average SDR value for the same years.

Table 7.4. Variability of Current and Capital Account Receipts, 1982-94
(in millions of SDRs except as indicated)

	Variability	Variability	Variability	Ratios		
	current ac.	capital acc.	current &	(2)/(1)	(3)/(1)	((3)-(1))/(2)
	receipt	receipts	capital acc.			
(quota database)	(BoP statistics)	receipts		(4)	(5)	(6)
	(1)	(2)	(3)			
United States	25,272.4	27,575.4	32,940.6	1.1	1.3	-0.8
Germany	13,981.5	14,101.6	18,698.9	1.0	1.3	-0.7
Japan	9,844.2	27,107.6	28,314.2	2.8	2.9	-0.9
United Kingdom	6,337.4	29,915.2	32,560.2	4.7	5.1	-0.6
France	8,361.5	21,364.7	26,683.6	2.6	3.2	-0.4
Saudi Arabia	3,827.4	735.5	3,808.5	0.2	1.0	-0.2
Italy	6,039.5	7,234.0	12,008.8	1.2	2.0	-0.2
Canada	7,084.9	3,857.1	8,931.0	0.5	1.3	-0.3
Russia	7,762.8	817.4 1/2	8,053.1	0.1	1.0	-0.1
Netherlands	2,915.2	4,280.4	5,699.8	1.5	2.0	-0.5
China	1,850.6	3,040.0	4,072.1	1.6	2.2	-0.4
Belgium-Luxembourg	0.0	24,795.7	24,795.7			
Belgium	3,541.1	24,461.5	25,897.6	6.9	7.3	-0.6
India	880.6	531.8	1,253.0	0.6	1.4	-0.2
Switzerland	1,837.9	1,664.8	2,760.0	0.9	1.5	-0.4
Australia	2,154.4	2,082.3	3,362.6	1.0	1.6	-0.4
Brazil	3,260.7	2,556.6	4,232.4	0.8	1.3	-0.5
Venezuela	2,213.1	1,121.9	2,447.3	0.5	1.1	-0.4
Spain	2,692.2	4,243.3	6,159.2	1.6	2.3	-0.3
Mexico	3,091.8	3,412.5	4,790.4	1.1	1.5	-0.6
Sweden	1,555.1	7,972.8	8,969.5	5.1	5.8	-0.4
Argentina	1,158.5	2,162.4	2,273.3	1.9	2.0	-0.9
Indonesia	1,918.9	961.2	1,527.3	0.5	0.8	-0.7
South Africa	461.0	978.2	1,360.1	2.1	3.0	-0.2
Nigeria	2,211.5	850.4	2,100.2	0.4	0.9	-0.4
Austria	1,778.7	1,469.8	1,948.7	0.8	1.1	-0.7
Norway	2,117.5	1,315.7	2,022.9	0.6	1.0	-0.7
Iran, I.R. of	2,140.4	1,246.9	1,995.7	0.6	0.9	-0.7
Denmark	1,003.4	2,797.6	2,831.0	2.8	2.8	-1.0
Ukraine	1,616.2	227.2 1/2	1,713.8	0.1	1.1	-0.1
Kuwait	2,771.3	243.4	2,818.2	0.1	1.0	-0.1
Poland	976.9	453.3	1,043.0	0.5	1.1	-0.4
Algeria	1,422.7	766.2	1,482.9	0.5	1.0	-0.5
Finland	1,249.5	2,032.9	3,093.7	1.6	2.5	-0.2
Malaysia	1,752.5	741.7	1,892.6	0.4	1.1	-0.3

Table 7.4. (continued). Variability of Current and Capital Account Receipts, 1982-94
(in millions of SDRs except as indicated)

	Variability	Variability	Variability	Ratios		
	current ac. receipt	capital acc. receipts	current & capital acc. receipts	(2)/(1)	(3)/(1)	((3)-(1)-(2)) (1)
	(quota database) (1)	(BoP statistics) (2)	(3)	(4)	(5)	(6)
Libya	1,737.3	393.3	1,770.3	0.2	1.0	-0.2
Korea	2,504.9	2,482.3	3,457.5	1.0	1.4	-0.6
Pakistan	310.9	314.8	438.3	1.0	1.4	-0.6
Hungary	675.5	552.3	816.8	0.8	1.2	-0.6
Romania	1,162.7	748.8	774.4	0.6	0.7	-1.0
Egypt	906.2	371.8	983.3	0.4	1.1	-0.3
Israel	396.8	591.4	682.6	1.5	1.7	-0.8
New Zealand	472.9	1,365.6	1,374.5	2.9	2.9	-1.0
Turkey	966.3	1,576.2	1,913.9	1.6	2.0	-0.7
Philippines	520.0	369.8	673.9	0.7	1.3	-0.4
Chile	327.5	700.7	828.1	2.1	2.5	-0.6
Czech Republic	1,033.1	612.0	1,608.4	0.6	1.6	0.0
Greece	463.1	581.3	648.1	1.3	1.4	-0.9
Thailand	949.7	1,052.7	1,865.3	1.1	2.0	-0.1
Colombia	368.1	527.7	389.8	1.4	1.1	-1.4
Portugal	753.1	1,312.4	1,539.9	1.7	2.0	-0.7
Ireland	586.4	898.2	1,222.9	1.5	2.1	-0.4
Peru	308.1	420.2	657.7	1.4	2.1	-0.2
Bulgaria	868.8	319.2	899.3	0.4	1.0	-0.3
Morocco	225.5	317.9	436.4	1.4	1.9	-0.5
Congo, Dem. Rep.	225.8	62.9	261.4	0.3	1.2	-0.1
Bangladesh	124.8	58.5	90.9	0.5	0.7	-0.7
United Arab Emirates	1,497.3	136.1	1,470.2	0.1	1.0	-0.1
Zambia	113.9	427.2	526.7	3.7	4.6	-0.1
Singapore	1,869.6	1,864.5	3,226.6	1.0	1.7	-0.3
FRY (Serbia/Montenegro)	1,172.4	1,171.5	1,171.5	1.0	1.0	-1.0
Sri Lanka	144.3	59.5	150.5	0.4	1.0	-0.4
Belarus	463.8	36.5 1/	473.1	0.1	1.0	-0.1
Ghana	28.3	40.9	44.5	1.4	1.6	-0.9
Croatia	602.1	47.6	642.9	0.1	1.1	0.0
Zimbabwe	84.5	85.0	101.4	1.0	1.2	-0.8

Table 7.4. (continued). Variability of Current and Capital Account Receipts, 1982-94
(in millions of SDRs except as indicated)

	Variability	Variability	Variability	Ratios		
	current ac.	capital acc.	current &	(2)/(1)	(3)/(1)	((3)-(1)-(2)) (1)
	receipt	receipts	capital acc.			
(1)	(2)	(3)	(4)	(5)	(6)	
Slovak Republic	463.4	142.2	595.3	0.3	1.3	0.0
Kazakhstan	670.0	59.5 1/	687.9	0.1	1.0	-0.1
Trinidad and Tobago	264.5	88.1	285.4	0.3	1.1	-0.3
Vietnam	102.7	34.5	128.0	0.3	1.2	-0.1
Cote d' Ivoire	162.8	248.0	169.1	1.5	1.0	-1.5
Sudan	205.2	164.9	278.7	0.8	1.4	-0.4
Uruguay	88.8	152.3	207.4	1.7	2.3	-0.4
Ecuador	298.9	292.9	201.1	1.0	0.7	-1.3
Syrian Arab Republic	499.8	193.5	451.5	0.4	0.9	-0.5
Angola	334.4	137.5	387.6	0.4	1.2	-0.3
Tunisia	184.8	121.0	188.8	0.7	1.0	-0.6
Jamaica	99.6	115.4	186.2	1.2	1.9	-0.3
Uzbekistan	330.0	33.5 1/	341.5	0.1	1.0	-0.1
Kenya	105.5	102.6	126.4	1.0	1.2	-0.8
Qatar	390.0	29.0	388.3	0.1	1.0	-0.1
Myanmar	60.1	67.2	103.6	1.1	1.7	-0.4
Yemen, Republic of	322.0	36.0	333.2	0.1	1.0	-0.1
Dominican Republic	167.3	91.5	240.3	0.5	1.4	-0.1
Guatemala	66.2	112.2	128.8	1.7	1.9	-0.7
Slovenia	421.5	35.4	433.9	0.1	1.0	-0.1
Brunei Darussalam	454.1	39.6	449.5	0.1	1.0	-0.1
Panama	200.7	108.8	249.6	0.5	1.2	-0.3
Tanzania	58.3	88.1	87.8	1.5	1.5	-1.0
Lebanon	177.6	55.5	224.1	0.3	1.3	-0.1
Luxembourg	394.2	520.6	853.3	1.3	2.2	-0.2
Cameroon	164.7	287.9	253.8	1.7	1.5	-1.2
Uganda	38.0	77.3	68.0	2.0	1.8	-1.2
Bolivia	80.5	95.4	88.7	1.2	1.1	-1.1
El Salvador	58.7	66.0	82.4	1.1	1.4	-0.7
Jordan	165.4	311.2	301.9	1.9	1.8	-1.1
Bosnia-Herzegovina	127.6	72.1	1,969.3	0.6	15.4	13.9
Oman	593.4	219.4	529.5	0.4	0.9	-0.5
Costa Rica	81.2	40.9	85.2	0.5	1.0	-0.5
Senegal	58.8	47.7	40.4	0.8	0.7	-1.1
Azerbaijan	181.6	12.9 1/	184.4	0.1	1.0	-0.1

Table 7.4. (continued). Variability of Current and Capital Account Receipts, 1982-94
(in millions of SDRs except as indicated)

	Variability	Variability	Variability	Ratios		
	current ac.	capital acc.	current &	(2)/(1)	(3)/(1)	((3)-(1)-(2))
	receipt	receipts	capital acc.			(1)
(quota database)	(BoP statistics)	receipts				
	(1)	(2)	(3)	(4)	(5)	(6)
Georgia	69.1	5.9 1/	70.8	0.1	1.0	-0.1
Gabon	277.7	160.2	239.3	0.6	0.9	-0.7
Lithuania	243.3	26.1 1/	252.7	0.1	1.0	-0.1
Cyprus	107.5	52.6	140.1	0.5	1.3	-0.2
Namibia	75.6	37.6	63.8	0.5	0.8	-0.7
Ethiopia	69.4	34.9	54.4	0.5	0.8	-0.7
Nicaragua	36.7'	127.9	140.3	3.5	3.8	-0.7
Papua New Guinea	102.5	197.0	230.0	1.9	2.2	-0.7
Honduras	52.8	69.6	99.1	1.3	1.9	-0.4
Bahamas, The	89.1	2,153.5	2,126.8	24.2	23.9	-1.3
Latvia	181.8	18.6 1/	188.2	0.1	1.0	-0.1
Madagascar	25.2	34.7	37.0	1.4	1.5	-0.9
Moldova	113.7	17.3 1/	121.4	0.2	1.1	-0.1
Iceland	48.6	62.6	85.2	1.3	1.8	-0.5
Mozambique	16.6	203.0	206.1	12.2	12.4	-0.8
Bahrain	316.1	223.0	290.3	0.7	0.9	-0.8
Guinea	45.2	12.7	53.0	0.3	1.2	-0.1
Sierra Leone	15.1	42.2	49.8	2.8	3.3	-0.5
Mauritius	47.1	26.8	56.1	0.6	1.2	-0.4
Paraguay	83.8	91.6	134.8	1.1	1.6	-0.5
Mali	19.3	25.0	30.2	1.3	1.6	-0.7
Suriname	57.4	64.2	49.4	1.1	0.9	-1.3
Malta	56.7	36.5	84.5	0.6	1.5	-0.2
Armenia	62.3	4.0 1/	63.0	0.1	1.0	-0.1
Guyana	22.2	31.4	50.0	1.4	2.3	-0.2
Cambodia	20.3	4.4	23.9	0.2	1.2	0.0
Kyrgyz Republic	96.3	6.3 1/	97.4	0.1	1.0	-0.1
Haiti	29.3	18.9	39.4	0.6	1.3	-0.3
Tajikistan	101.8	8.1 1/	103.9	0.1	1.0	-0.1
Rwanda	15.3	12.9	23.5	0.8	1.5	-0.3
Congo, Republic of	166.0	115.1	128.1	0.7	0.8	-0.9
Burundi	13.6	17.3	23.1	1.3	1.7	-0.6
Togo	19.7	17.6	30.0	0.9	1.5	-0.4
Nepal	22.8	27.8	43.3	1.2	1.9	-0.3
Fiji	51.3	43.4	83.4	0.8	1.6	-0.2

Table 7.4. (continued). Variability of Current and Capital Account Receipts, 1982-94
(in millions of SDRs except as indicated)

	Variability	Variability	Variability	Ratios		
	current ac.	capital acc.	current &	((3)-(1)-(2))		
	receipt	receipts	capital acc.	(2)/(1)	(3)/(1)	(1)
	(quota database)	(BoP statistics)	receipts			
	(1)	(2)	(3)	(4)	(5)	(6)
Malawi	39.6	29.2	58.0	0.7	1.5	-0.3
Macedonia, FYR	64.8	15.4	74.3	0.2	1.1	-0.1
Barbados	74.8	26.5	83.7	0.4	1.1	-0.2
Niger	37.0	18.7	47.5	0.5	1.3	-0.2
Turkmenistan	201.6	19.4 1/	207.9	0.1	1.0	-0.1
Mauritania	20.9	54.2	55.3	2.6	2.6	-0.9
Estonia	115.0	28.2 1/	129.8	0.2	1.1	-0.1
Benin	40.0	25.3	46.8	0.6	1.2	-0.5
Burkina Faso	20.8	54.9	73.7	2.6	3.5	-0.1
Chad	19.5	22.5	24.4	1.2	1.3	-0.9
Central African Rep.	15.4	15.1	25.0	1.0	1.6	-0.4
Lao People's Dem. Rep.	14.4	13.9	23.0	1.0	1.6	-0.4
Mongolia	65.1	166.0	222.0	2.5	3.4	-0.1
Botswana	117.6	45.4	145.0	0.4	1.2	-0.2
Swaziland	33.5	19.5	39.5	0.6	1.2	-0.4
Albania	76.5	78.9	144.5	1.0	1.9	-0.1
Equatorial Guinea	3.4	8.9	8.0	2.6	2.4	-1.2
Lesotho	35.1	13.3	34.0	0.4	1.0	-0.4
Gambia, The	13.5	9.2	15.4	0.7	1.1	-0.5
Belize	24.1	6.3	26.5	0.3	1.1	-0.2
Vanuatu	8.4	43.3	45.2	5.2	5.4	-0.8
Eritrea	16.3	2.1	18.4	0.1	1.1	0.0
Djibouti	14.0	9.7	19.6	0.7	1.4	-0.3
St. Lucia	7.3	5.5	9.1	0.8	1.3	-0.5
Guinea-Bissau	6.4	15.9	13.7	2.5	2.5	-1.0
San Marino	31.6	22.6	39.4	0.7	1.2	-0.5
Antigua and Barbuda	10.8	26.5	23.2	2.4	2.1	-1.3
Grenada	8.3	7.3	14.0	0.9	1.7	-0.2
Samoa	4.3	3.2	3.7	0.7	0.8	-0.9
Solomon Islands	10.1	6.2	8.9	0.6	0.9	-0.7
Cape Verde	4.6	4.4	7.3	1.0	1.6	-0.4
St. Kitts and Nevis	2.6	7.5	8.0	2.9	3.1	-0.8
Comoros	4.1	3.5	5.1	0.8	1.2	-0.6
Dominica	2.5	3.6	3.5	1.4	1.4	-1.1
St. Vincent and Grens.	7.3	3.9	4.7	0.5	0.6	-0.9

Table 7.4. (concluded). Variability of Current and Capital Account Receipts, 1982-94
(in millions of SDRs except as indicated)

	Variability current ac. receipt (quota database) (1)	Variability capital acc. receipts (BoP statistics) (2)	Variability current & capital acc. receipts (3)	Ratios		
				(2)/(1)	(3)/(1)	$\frac{((3)-(1)-(2))}{(1)}$ (6)
Seychelles	7.5	5.7	9.8	-0.8	1.3	-0.5
Maldives	5.6	5.2	9.0	0.9	1.6	-0.3
Sao Tome and Principe	1.4	2.8	2.9	2.0	2.1	-1.0
Tonga	4.7	3.9	3.3	0.8	0.7	-1.1
Bhutan	5.3	2.1	7.0	0.4	1.3	-0.1
Kiribati	2.2	0.7	2.0	0.3	0.9	-0.4
Micronesia, Fed. States of	2.6	1.0	3.3	0.4	1.3	-0.1
Marshall Islands	3.1	0.8	3.6	0.3	1.2	-0.1
Palau, Republic of	2.4	0.6	3.6	0.2	1.5	0.2
Iraq	2,181.0	59.7 2/	2,110.0 4/	0.0	1.0	-0.1
Afghanistan, I.S. of	29.9	65.1	38.3 4/	2.2	1.3	-1.9
Liberia	17.6	4.0 3/	33.3 5/	0.2	1.9	0.7
Somalia	5.6	24.7	21.9 5/	4.4	3.9	-1.5
Total	173,230.8	233,165.4	321,688.9	1.3	1.9	-0.5

Estimated data appear in shaded areas.

1/ The variability of capital account receipts for each of the former Soviet Union republics is calculated as a share of the total variability for the group of the 15 republics, with weights being the ratio of each republic's capital and financial account receipts to the total of these receipts during 1990-94

2/ The variability of capital account receipts for Iraq has been calculated as the simple standard deviation of estimated capital account receipts based on the average ratio of capital and financial account debit to current account payments for the group of net debtor countries, diversified financing

3/ The variability of capital account receipts for Liberia has been calculated as the simple standard deviation of estimated capital account receipts based on the average ratio of capital and financial account debit to current account payments for the group of net debtor countries, official financing.

4/ The variability of current plus capital account receipts for Iraq and Afghanistan is calculated by applying the average covariance between current and capital account receipts for the countries with available data in the group of developing, net debtor countries, diversified financing, to the formula for the variance of current account receipts plus capital account receipts for these two countries.

5/ The variability of current plus capital account receipts for Liberia and Somalia is calculated by applying the average covariance between current and capital account receipts for the countries with available data in the group of developing, net debtor countries, official financing, to the formula for the variance of current account receipts plus capital account receipts for these two countries.

NOTE 8. MEASURES OF VARIABILITY IN COUNTRIES' EXTERNAL TRANSACTIONS

79. This note describes the existing and alternative measures of variability of a country's external transactions for use in the quota formulas.

A. Original and Existing Measure of Variability

80. The definition of variability in the original Bretton Woods formula was the difference between the highest and the lowest yearly exports in a five-year period (1934–38). Because this concept also reflected the trend of exports, variability was redefined in 1963 to measure deviations from some normal or trend level. This new measure was also used to calculate shortfalls stemming from export fluctuations in connection with the IMF's Compensatory Financing Facility (CFF) established at the time.⁴⁰

81. The export shortfall in the CFF was measured as the difference between the value of exports in the shortfall year and its medium-term trend value, where trend was defined as the five-year arithmetic average centered on the shortfall year (using projected values for the two future years).⁴¹ In the quota formulas, the same arithmetic five-year average is used for trend, and variability is measured as one standard deviation from this five-year moving average drawn from a 13-year sample period.

B. Alternative Methods of Measuring Variability of a Time Series

82. The existing measure of variability in the quota formulas gives distorted results in the event of discrete and large changes which do not represent fluctuations around trend, such as occurred when oil prices rose sharply in the 1970s and 1980s. Such discontinuities, as well as extreme observations, tend to be magnified by the standard deviation measure based on a slow-moving average. Because of these criticisms, alternative methods of measuring variability were discussed extensively in 1981 (see Box 8.1).

⁴⁰ The CFF provides financing to members experiencing balance of payments difficulties arising from export shortfalls, insofar as they were temporary and largely attributable to circumstances beyond the member's control. The facility was intended to be of special benefit to primary exporting countries. It was later broadened to cover import *excesses* for food and oil. In 1988 it was renamed the Contingent and Compensatory Financing Facility (CCFF), when the facility was broadened to cover *future* shortfalls (the contingency element). In 2000, the contingency element was discontinued and the facility reverted to the CFF.

⁴¹ In 1979, the trend was redefined as the five-year geometric average centered on the shortfall year.

83. Some of the alternative methods reduced the effect of discontinuities in the time series, but they also tended to produce lower variability figures compared with the existing method. For example, using a faster three-year moving average results in lower measured variability because the relative weight of the central observation is higher. In the case of the mean absolute deviation method, variability is also reduced because this method gives lesser weight to extreme deviations. Further alternative methods of measuring variability were based on the CFF shortfall method, and were found to be very sensitive to the manner in which the "post-shortfall" or extrapolated components of the moving average were calculated. None of the alternative methods considered received sufficient support from the IMF Executive Board, and it was agreed that any shortcomings of the variability measure could be considered in the context of reducing the coefficient of variability in the quota formulas.

84. A further variant on the present method of measuring variability is to calculate trend using a regression equation over the entire sample period.⁴² The calculated standard deviation from trend would be greater than under the existing measure of variability, mainly because deviations would no longer be computed relative to a (five-year) trend in which an observation has a greater weight than in the trend regression (which is computed around the mean of the entire sample).

C. Other Economic Indicators of External Vulnerability

85. Other economic indicators of external vulnerability may also be considered. These can be grouped into four sources of vulnerability : (a) variability of other elements in the current account; (b) exchange rate variability; (c) income terms of trade; and (d) variability of current receipts and net long-term capital flows.

Other elements in the current account

86. A country's payments position is also vulnerable to shocks other than those affecting exports of goods and services. For example, external vulnerability based on food or energy import costs can be measured along the same lines as the current variability measure.⁴³ Alternatively, the relative share of such goods in a country's total imports could be a basis for a vulnerability indicator.⁴⁴

⁴² The explanatory variable in the equation includes time and also possibly the lagged dependent variable. See, for example, Teizo Taya, "Measurement of Export Instability," September 1980 (IMF, unpublished).

⁴³ Later amendments of the CFF permitted the IMF to extend financing because of unexpected shifts in food and energy imports, import prices, and interest rates.

⁴⁴ Data for such a measure are available from the WTO and UN for some 84 reporting countries, though with a lag of 2-3 years.

87. Another source of external vulnerability is debt service payments, which, particularly for floating-interest-rate debt, fluctuate because of changes in interest and exchange rates. In the CCFF, unexpected increases in net interest costs were measured using benchmark international interest rates (such as LIBOR). However, the unexpected deviations in interest costs stemming from changes in the risk premium and unanticipated external borrowing were not covered.⁴⁵ Variability of interest costs was measured net of interest earnings on foreign assets. The definition of variability of net interest costs could follow the deviation from trend approach, or alternatively, the variability of the benchmark international interest rate could be used, weighted by the size of a country's net indebtedness.

Exchange rate volatility

88. Exchange rate volatility has been defined in the economic literature in various ways. One approach is to define exchange rate volatility as the error in a model that determines the exchange rate. Measures of exchange rate volatility have also been devised without relying on exchange rate models. Examples include the absolute percentage change of the exchange rate; the average absolute difference between the previous forward rate and the current spot rate; the variance of the spot rate around its trend; a moving average of the standard deviation of the exchange rate; and the standard deviation of the percentage changes around the mean observed during a subperiod.⁴⁶

89. The introduction of exchange rate variability in the quota formulas was previously explored by IMF staff in 1994. Exchange rate volatility was measured as the standard deviation of a nation's real effective exchange rate from a normal level, represented by a five-year moving average, over a 13-year period. The measure was scaled in order to avoid distorted results for countries of very different size that have the same degree of exchange rate variability.⁴⁷

90. The particular measurement explored by IMF staff was similar to the measurement method for variability of current receipts. Effective exchange rates were used instead of bilateral rates in order to capture the average effect of exchange rates using trade shares as weights. The index was measured in real terms in order to avoid the influence of domestic inflation that might be captured in the movement of the nominal exchange rate (but not the

⁴⁵ Unanticipated changes in debt servicing costs due to exchange rate changes were also not covered.

⁴⁶ Michael D. McKenzie, "The Impact of Exchange Rate Volatility on International Trade Flows," *Journal of Economic Surveys*, Vol. 13, No. 1 (February 1999), pp. 71-106).

⁴⁷ An index, $1+V/A$, was first calculated where V is the real effective exchange rate variability, and A the average level of the real effective exchange rate over the sample period. Exchange rate variability was then defined as the index times current receipts.

real exchange rate). Using the real rate would, however, disregard the possible channels of disruption that run from changes in the nominal exchange rate to changes in indebtedness and debt servicing burden.

Income terms of trade

91. The present measure of variability based on current receipts could be broadened so that it also takes account of variations in import prices. Such external vulnerability could be captured by the instability in the income terms of trade, which is measured as nominal export earnings deflated by an import-price index. The income terms of trade measures the purchasing power of exports on foreign markets.⁴⁸ A deterioration in the income terms of trade indicates that the country would face difficulties maintaining its volume of imports. The income terms of trade differ from the commodity terms of trade (the ratio of export to import prices) in that the volume of exports is also taken into account in the former but not the latter. When export prices fall relative to import prices, the immediate effect is a worsening in the balance between export earnings and import payments. However, such a decline in export prices may be accompanied by an increase in the volume of exports, which may be rising secularly. Under these circumstances, a deterioration in the terms of trade would not necessarily be accompanied by a worsening balance between current receipts and payments. Thus, the combination of a terms of trade effect and a change in the volume of exports is measured by the income terms of trade.

92. A number of measurement issues arise in connection with data on the income terms of trade. First, income terms of trade are generally defined for merchandise trade only. The extent to which reliable and timely price data for imports of services are available for all countries would need to be explored if the concept is used to include services. Second, the income terms of trade are expressed as an index, and the deflator data should be on a common base period for all countries.

Variability of current receipts and net long-term capital flows

93. The existing variability measure based on current receipts could be expanded to cover also net long-term capital flows. This augmented indicator of vulnerability could also reflect changes in capital flows that are generally considered to be beyond the country's control.⁴⁹

⁴⁸ See Teame Ghirmay, Subhash C. Sharma, and Richard Grabowski, "Export Instability, Income Terms of Trade Instability and Growth: Causal Analyses," *The Journal of International Trade and Economic Development* 8 (June 1999), pp. 209-29. Long-term developments in the income terms of trade of developing countries have been studied in, e.g., Enzo R. Grilli and Maw Cheng Yang, "Primary Commodity Prices, Manufactured Goods Prices, and the Terms of Trade of Developing Countries: What the Long Run Shows," *The World Bank Economic Review* 2 (January 1988), pp. 1-48.

⁴⁹ This measure of variability can be compared with the existing measure of variability. From the Balance of Payments identity

(continued...)

The greater part of a country's short-term capital flows is assumed to depend on domestic policies, mainly on interest rate changes, and hence subject to control by the country's authorities.⁵⁰

94. The compilation of data on long-term capital flows is, however, not straightforward. The IMF's Balance of Payments (BOP) Manual (fifth edition) does not accord major importance to maturity distinction as a classification criterion and not all categories in the capital and financial account are reported by maturity. Therefore, for the purpose of making quota calculations, a practical convention for defining long-term capital flows is needed.

95. The BOP Manual also retains the traditional distinction between long- and short-term investment, which is based on the formal criterion of original contractual maturity, only for assets and liabilities in the category of "other investment" in the capital and financial accounts. Long-term investment is defined as investment with an original contractual maturity of more than one year or with no stated maturity (e.g., equity securities). Short-term investment, which includes currency, is investment payable on demand or with an original contractual maturity of one year or less. In the categories of "direct investment," "portfolio investment" or "reserve assets," long- and short-term investments are not formally distinguished.

$$C - P + NCF = \Delta R$$

where C is current receipts, P is current payments, NCF is net capital flows, and ΔR is the change in reserves. If NCF is decomposed in net short-term capital flows, NCF_S , and net long-term capital flows, NCF_L , the identity can be rewritten as

$$C - P + (NCF_S + NCF_L) = \Delta R$$

or

$$C + NCF_L = P - NCF_S + \Delta R$$

The variability of the left-hand side is likely to be greater than the variability of C alone that is used under the existing five-formula system. The variability of $(C + NCF_L)$ is defined as $VC + VNCF_L - 2 Cov(C, NCF_L)$, where VC and $VNCF_L$ represent variability of current receipts and variability of net long-term capital flows, respectively.

⁵⁰ A small part of short-term capital flows (i.e., autonomous component) may be attributed to factors outside the realm of domestic government policy, such as inertia (including herd behavior) and normal interbank flows. The extent of this autonomous component should be empirically testable.

96. For quota calculation purposes, long-term capital flows may be defined to include:⁵¹ (i) direct investment; (ii) from portfolio investments, the total of "equity securities" but only "bonds and notes" from "debt securities" (i.e., we exclude "money market instruments" and "financial derivatives"); (iii) from "other investment," where the distinction between short- and long-term investments is made, the short-term component of "trade credits" and "loans," and the total of "currency and deposits" and "other assets". (The items, "net error and omissions" and "reserves and related items," are not included in long-term capital flows.)

⁵¹ Using the categories defined in the IMF's BOP Manual, it should be noted that the distinction between short- and long-term direct investment flows becomes increasingly difficult because it depends on arbitrary enterprise decisions on intercompany flows. It is also widely recognized that innovations in the financial markets (e.g., floating rate notes, rollovers, etc.) have diminished the usefulness of the traditional maturity distinction between long- and short-term investments. For example, a creditor and a debtor could have different views as to whether a particular instrument represents access to medium-term financing even though it is nominally a short-term instrument. Also, in many instances, original maturity may have no bearing on the length of time that an instrument will be held.

Box 8.1. Existing and Alternative Measures of Variability of a Time Series

1. The existing measure of variability of a time series Z_t is as follows:

VO: Standard deviation from a five-year moving average. Mathematically, variability is

$$V = \left[\frac{1}{N-4} \sum_{t=3}^{N-2} (Z_t - \bar{Z}_t)^2 \right]^{1/2} \quad (1)$$

where $\bar{Z}_t = \frac{1}{5} \sum_{i=t-2}^{t+2} Z_i$ and N is the number of observations.

2. The following alternative definitions of variability were considered by the IMF staff in 1981:

VS: Standard deviation from a three-year moving average. This is the same as the present definition except that the averaging period is shortened from five years to three years.

V1: Mean absolute deviation from a five-year centered moving average.

V2: Shortfall from a centered moving average. Under this procedure, only negative deviations are considered, and the average of their absolute values is taken as the measure of variability.

V3: Shortfall from a moving average set at the fifth year. This is the same as V2, except that the five-year moving average is not centered.

V4: Shortfall from a centered geometric moving average used in the Compensatory Financing Facility (CFF) formula, except that judgmental forecasts are substituted by extrapolations. The extrapolation makes use of the growth rate of the past three years over the preceding three years.

V5: The smaller of the shortfall between the one calculated under V4 above and the negative discrepancy between current receipts for the year in question and the average for the preceding two years.

V6: Shortfall from a moving average determined by an in-sample extrapolation formula. Under this procedure, the moving average is calculated in a similar manner as in V4, except that extrapolations for the fourth and fifth years are made by applying the average compound growth rate covering the whole length of the preceding years rather than two to three years immediately preceding the centered year.

Box 8.1 (continued). Existing and Alternative Measures of Variability of a Time Series

Mathematically, these alternative definitions can be formalized as follows: the variability V of a time series Z_t is defined under alternative VS as the standard deviation of the time series from the three-year moving average, i.e.,

$$V = \left[\frac{1}{N-2} \sum_{t=2}^{N-1} (Z_t - \bar{Z}_t)^2 \right]^{1/2} \quad (2)$$

where $\bar{Z}_t = \frac{1}{3} \sum_{i=t-1}^{t+1} Z_i$ and N is the number of observations.

Under V1,

$$V = \frac{1}{N-4} \sum_{t=3}^{N-2} |Z_t - \bar{Z}_t| \quad (3)$$

where $\bar{Z}_t = \frac{1}{5} \sum_{i=t-2}^{t+2} Z_i$. For alternatives V2, V3, V4, and V6, variability is defined as:

$$V = \frac{1}{T} \sum_t SF_t \quad (4)$$

where $SF_t = |Z_t - \bar{Z}_t|$ if $Z_t < \bar{Z}_t$ and $SF_t = 0$ otherwise, T is the number of years for which there are shortfalls, and \bar{Z}_t is defined differently under each alternative.

Under V2, \bar{Z}_t is defined as in (3) above.

Under V3, $\bar{Z}_t = \frac{1}{5} \sum_{i=t-4}^t Z_i$.

Under V4, \bar{Z}_t is defined by defined by the CFF formula; i.e.,

$$\bar{Z}_t = (Z_{t-2} \cdot Z_{t-1} \cdot Z_t \cdot Z_{t+1} \cdot Z_{t+2})^{1/5} \quad (5)$$

where $Z_{t+1}^* \cdot Z_{t+2}^*$ is estimated based on the geometric average growth rate of the past three years over the preceding three years; i.e.,

$$(Z_{t+1}^* \cdot Z_{t+2}^*)^{1/2} = \frac{(Z_{t-2} \cdot Z_{t-1})^{1/2} (Z_{t-2} \cdot Z_{t-1} \cdot Z_t)^{1/3}}{(Z_{t-5} \cdot Z_{t-4} \cdot Z_{t-3})^{1/3}} \quad (6)$$

Box 8.1. (concluded). Existing and Alternative Measures of Variability of a Time Series

Under V5, \bar{Z}_t is defined as in (5) above and SF_t is defined as:

$$SF_t = \text{Min} (A_t, B_t) \quad (7a)$$

where

$$A_t = \begin{cases} |Z_t - \bar{Z}_t|, & \text{if } Z_t < \bar{Z}_t \\ 0, & \text{if } Z_t \geq \bar{Z}_t \end{cases} \quad (7b)$$

and

$$B_t = \begin{cases} |Z_t - \frac{1}{2}(Z_{t-2} + Z_{t-1})|, & \text{if } Z_t < \frac{1}{2}(Z_{t-2} + Z_{t-1}) \\ 0, & \text{if } Z_t \geq \frac{1}{2}(Z_{t-2} + Z_{t-1}) \end{cases} \quad (7c)$$

Under V6, \bar{Z}_t is defined as in (5) above except that

$$Z_{t+1}^* = \frac{1}{3} \cdot (Z_{t-2} + Z_{t-1} + Z_t) \cdot (1 + \alpha_{t-1})^2 \quad (8a)$$

$$Z_{t+2}^* = Z_{t+1}^* \cdot (1 + \alpha_{t-1}) \quad (8b)$$

where α_{t-1} is the average compound growth rate from the first year of the sample to year t-1.

NOTE 9. THE IMPLICATIONS OF THE EUROPEAN UNION FOR DATA ON EXTERNAL TRANSACTIONS IN THE QUOTA FORMULAS

97. Historically, data on current account transactions have been adjusted to exclude some receipts and payments that would have resulted in unduly large measurements of the size of the external sector. Entrepôt trade and interest flows for countries with significant international or offshore banking activity are examples (see Box 9.1). The adjustment includes only the domestic value added component of these transactions. The question arises as to whether to extend such treatment to the current account transactions of countries that form free trade access or customs unions, notably as in the 15 countries of the European Union (the EU-15).⁵² The distinguishing feature of the EU-15 relevant to the issue of whether to adjust the current account data is the extent to which the gross flows that are used for quota calculations have risen in relation to the domestic value added of trade in goods and services among these countries (“intrade”).

98. The elimination of formal trade barriers was a central goal of the creation of the European Union. By 1996, neither tariff nor non-tariff barriers had any significant effect on trade in goods, and important progress had been made on trade in services. Legislative barriers to the free movement of capital and persons had also largely been eliminated. Consequently, intra-community trade has grown more rapidly than trade with countries outside the community. By 1997, the share of total trade (average of imports and exports of goods) accounted for by intra-EU trade increased to 61.2 percent, up by 2.6 percentage points from 1985.⁵³

99. Based on the ongoing shifts in the structure and size of trade within the EU and with the rest of the world, there would seem to be a case for treating intra-EU trade on the same basis as entrepôt trade and international banking interest. A similar approach could be recommended for other countries with free trade arrangements, e.g., Canada, Mexico, and the United States in the North American Free Trade Agreement. Implementing such an approach would, however, require estimates of the domestic value-added component of such trade. The compilation of such data requires information to ascertain the import content of exports, or, alternatively, an analysis of the extent to which imports are very highly correlated with exports.

⁵² The European Union creates an area without internal frontiers, in which the free movement of goods, persons, services and capital is ensured in accordance with the provisions of the Treaty of Rome in 1957 which established the European Economic Community, as amended by the Single European Act of 1986.

⁵³ Between the periods 1986–91 to 1992–96, there was also an increase in the share of foreign direct investment in European Union countries that originated from within the Union itself.

100. The effect on the calculated quotas of EU countries of excluding all of the intratrade flows within the EU—i.e., not taking into account any domestic value added of such trade—is illustrated in Table 9.1.⁵⁴ The hypothetical calculated quotas would be substantially reduced. In aggregate, the EU-15 countries' share would be reduced by 9.2 percentage points (from about 37.1 percent to about 28.0 percent). The largest declines in percentage points are for Germany, the Netherlands, France, and Belgium.

101. The question may also be raised as to whether it would be reasonable to determine a single calculated quota for the EU-15 countries on the basis of aggregated data. Under the IMF Articles of Agreement, the basis for membership, and therefore the assignment of a quota, is an entity's status as a country (Article II, Section 2). Therefore, unless a group of members becomes a single country, those members would each continue to have individual quotas. More fundamentally, the creation of the economic union, and of the European Monetary Union with its single currency, does not preclude an individual member from running into balance of payments difficulties and requesting appropriate Fund financing.

102. If problems were to emerge with the availability or quality of balance of payments data for individual countries, this could lead to difficulties in calculating their individual quotas. With the advent of monetary union in 1999, the national statistical authorities of the eleven members of EMU are expected to continue to provide GDP, reserves, and balance of payments data at the national levels, including balance of payments data covering transactions with other EMU member states. However, the loss of currency-based information for intra-EMU transactions (especially from 2002 when national currencies will be eliminated) will render certain data sources unusable for example, on capital movements within the EMU and pose certain statistical problems (see Box 9.2). The loss of currency information will, of necessity, lead to greater reliance on survey data, which will likely entail a corresponding loss of accuracy.

⁵⁴ Of course, in the case of a merger of territories into one country, the conventional definition of a country's external transactions would preclude the inclusion of trade between such territories. In the quota calculations for merging territories (Vietnam in 1976, Germany, and the Republic of Yemen in 1990), trade between the merging territories was excluded in the data used for the combined entity.

Box 9.1. Adjustments to Current Account Data in Quota Reviews

Current transactions data used in quota calculations are adjusted for those countries with significant offshore banking activity or entrepôt trade:

1. *International Banking Interest*

The practice was established in the Eighth General Review in 1983 adjusting international banking interest (IBI) flows so that they are included on a net, rather than a gross basis in the current transactions data, for those countries with significant international and/or offshore banking activity. IBI flows are interest payments (i) by nonresidents on their borrowings from domestic banks, and (ii) by domestic banks on their borrowings from nonresidents. The inclusion of only net flows is based on the premise that when nonresident deposits with resident banks are used to make loans to nonresidents, only the net interest earnings are indicative of the relative size of the country's external transactions. That is, inclusion of flows on a gross basis would unduly inflate the data used in quota calculations.¹ Inclusion of interest on a net basis requires, in practice, deducting the lower of interest paid and interest earned from the gross data on current receipts and payments. In other words, the "value added" component of IBI is retained in the data for quota calculations. The countries for which IBI adjustments have been made include: Bahrain, the Bahamas, Belgium, Canada, France, Germany, Italy, Japan, Luxembourg, the Netherlands, Panama, Singapore, Sweden, Switzerland, the United Kingdom, and the United States.

2. *Entrepôt trade*

Analogous to the adjustments for IBI, entrepôt trade is included in current transactions data only on a net basis for those countries with significant entrepôt trade. The practice is to retain the value added of a country's re-exports trade in the country's current receipts by deducting entrepôt imports from both gross exports and imports. The countries for which entrepôt trade adjustments have been made include: Bahrain, Brunei Darussalam, Djibouti, Israel, Paraguay, San Marino, and Switzerland.

1/ See "Ninth General Review—Revised Quota Calculations," EB/CQuota/87/5, 12/22/87, pages 1-2.

Box 9.2. Intra-European Balance of Payments Statistics¹

The introduction of the euro with the start of the third stage of European Monetary Union (EMU) at the beginning of 1999 has posed some difficulties for collecting intra-European balance of payments statistics. At present, the euro and national currencies of EMU members are being used in parallel. It is no longer necessarily possible to distinguish intra-EMU transactions by currency, which makes identification of transactions by country of origin or destination difficult.² These difficulties will be exacerbated when national currencies are eliminated at the beginning of 2002.

It may be noted that the most reliable source of information on goods transactions—customs data—has not been available for intra-European Union (EU-15) trade, and therefore intra-EMU trade, since 1993, because of the elimination of customs requirements within the European Single Market. Thus, since that time, most EU-15 intratrade data has been estimated from information on the underlying financial transactions (primarily from the banking system),³ or from surveys which are usually less reliable than customs-based data.

More generally, the effects of losing currency-based information include:

- Data on credit card transactions would no longer distinguish intra-EMU trade.
- The practice of centralized clearing of accounts by multinational enterprises, which prevents statisticians from accurately observing the source and destination of balance of payments flows, has become more prevalent.
- The introduction of euro notes in 2002 will eliminate an important source of information on certain intra-EMU transactions which are thought to be substantially cash-based, such as tourism.

Furthermore, with EMU's centralized monetary policy, intra-EMU financial flows may have little practical policy implications, which could lessen the priority to be placed on producing the intra-EMU financial accounts in countries' balance of payments statistics.

¹ This information is based, in part, on unpublished papers presented at the Twelfth Meeting of the IMF Committee on Balance of Payments Statistics in Santiago, Chile, October 27–29, 1999, as well as on the 1999 Annual Report of the IMF Committee on Balance of Payments Statistics (forthcoming).

² For instance, errors and omissions in Germany's balance of payments were noticeably larger than normal in early 1999.

³ Most EU-15 countries rely on a reporting system which fails to capture underlying flows that take place outside the country, except for countries with exchange controls. Such flows may be significant. Another difficulty is that the reporting system records underlying transactions on a cash basis, whereas balance of payments data should be on an accrual basis.

Table 9.1. Actual and Calculated Quotas for the EU-15 Countries and Other Members

	Actual Quotas		Calculated Quotas		Hypothetical Calculated Quotas		Change in Shares (In percentage points)
	Amount	Share	Amount	Share	Amount	Share	
	(In millions of SDRs)	(In percent)	(Including EU-15 intratrade) 1/ (In millions of SDRs)	(In percent)	(Excluding EU-15 intratrade) 2/ (In millions of SDRs)	(In percent)	
	(1)	(2)	(3)	(4)	(5)	(6)	(6)-(4)
EU-15 3/	64,339.5	30.3	202,449.3	37.1	133,673.4	28.0	-9.156
Germany	13,008.2	6.135	49,132.1	9.007	33,899.1	7.090	-1.917
France	10,738.5	5.065	30,435.0	5.580	21,243.6	4.443	-1.136
United Kingdom	10,738.5	5.065	27,227.4	4.992	19,437.4	4.066	-0.926
Italy	7,055.5	3.328	22,804.1	4.181	15,881.3	3.322	-0.859
Netherlands	5,162.4	2.435	15,442.1	2.831	8,066.8	1.687	-1.144
Belgium	4,605.2	2.172	13,248.5	2.429	6,582.0	1.377	-1.052
Spain	3,048.9	1.438	11,343.3	2.080	7,861.5	1.644	-0.435
Sweden	2,395.5	1.130	6,886.0	1.262	4,722.8	0.988	-0.275
Austria	1,872.3	0.883	6,972.5	1.278	4,420.8	0.925	-0.354
Denmark	1,642.8	0.775	5,450.0	0.999	3,635.9	0.760	-0.239
Finland	1,263.8	0.596	3,463.0	0.635	2,362.0	0.494	-0.141
Portugal	867.4	0.409	3,046.1	0.558	1,686.3	0.353	-0.206
Ireland	838.4	0.395	3,320.4	0.609	1,803.3	0.377	-0.232
Greece	823.0	0.388	2,091.0	0.383	1,476.1	0.309	-0.075
Luxembourg	279.1	0.132	1,587.8	0.291	594.6	0.124	-0.167
United States	37,149.3	17.521	94,099.0	17.251	94,099.0	19.682	2.430
Japan	13,312.8	6.279	55,658.4	10.204	55,658.4	11.642	1.438
Saudi Arabia	6,985.5	3.295	7,159.1	1.312	7,133.9	1.492	0.180
Canada	6,369.2	3.004	17,830.8	3.269	17,769.0	3.717	0.448
Russia	5,945.4	2.804	10,052.3	1.843	10,229.4	2.140	0.297
China	4,687.2	2.211	9,042.6	1.658	9,042.6	1.891	0.234
India	4,158.2	1.961	4,156.0	0.762	4,156.0	0.869	0.107
Switzerland	3,458.5	1.631	8,697.2	1.594	8,697.2	1.819	0.225
Other members	65,623.4	31.0	136,314.3	25.0	137,642.0	28.8	3.799
By WEO group:							
Advanced economies:	133,990.9	63.195	411,706.7	75.479	343,097.5	71.763	-3.716
Major industrial economies	98,372.0	46.396	297,186.9	54.484	257,987.8	53.961	-0.523
Other advanced economies	35,618.9	16.799	114,519.7	20.995	85,109.7	17.802	-3.193
Developing countries	61,922.5	29.205	104,840.4	19.221	105,671.5	22.102	2.882
Net creditors	10,775.0	5.082	15,785.9	2.894	15,922.7	3.330	0.436
Net debtors	51,147.5	24.123	89,054.5	16.327	89,748.8	18.772	2.445
of which: HIPC or least developed countries	7,567.4	3.569	7,210.5	1.322	7,264.7	1.519	0.198
Transition economies	16,115.6	7.601	28,912.1	5.301	29,331.9	6.135	0.835
Total	212,029.0	100.0	545,459.1	100.0	478,100.9	100.0	

1/ As used at the eleventh general review.

2/ Intratrade data are from the IMF's Direction of Trade Statistics database and include merchandise trade data only.

3/ The sum of the EU-15 countries' individual quotas.