Beggar-thy-Neighbor Effects of Exchange Rates? A Study of the Renminbi

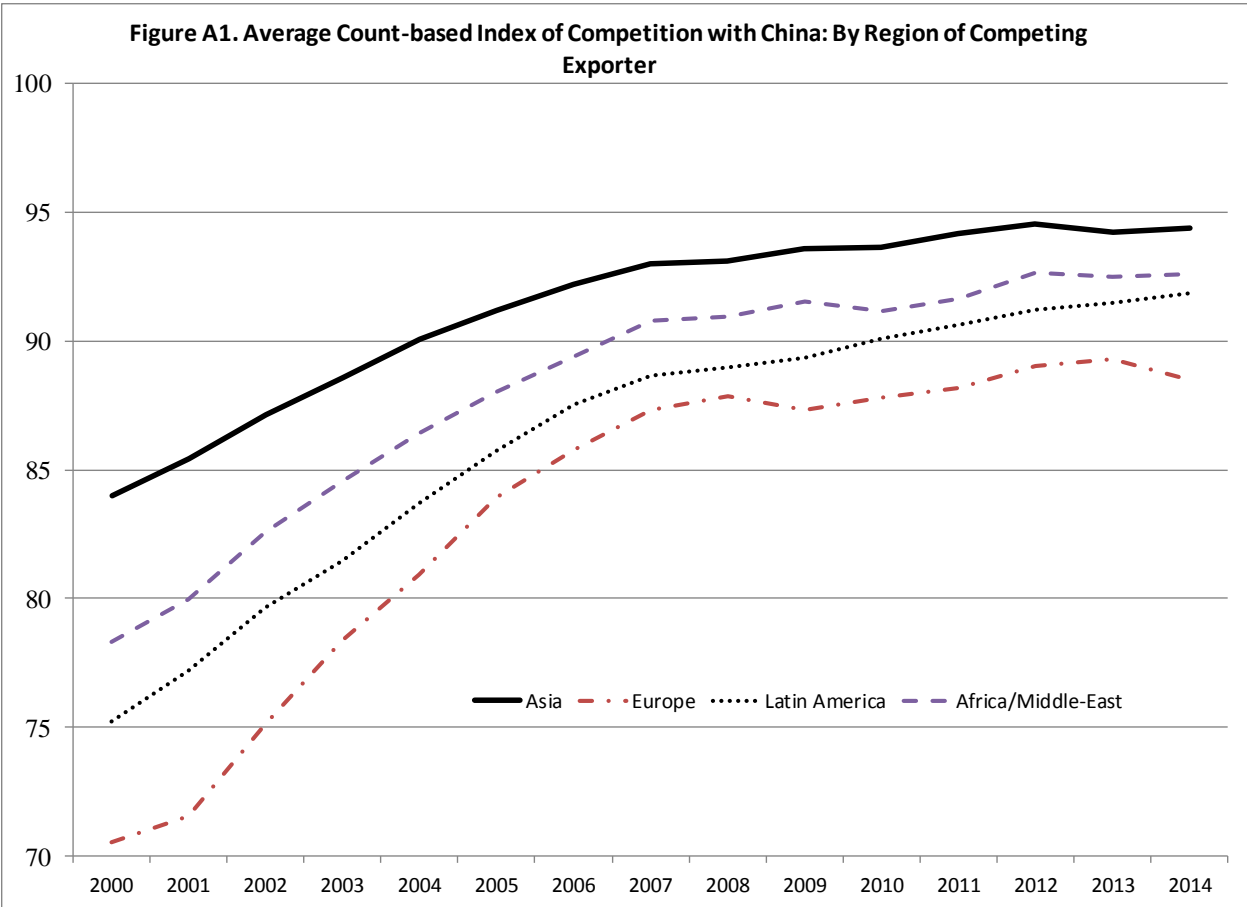Aaditya Mattoo (Development Research Group, World Bank),

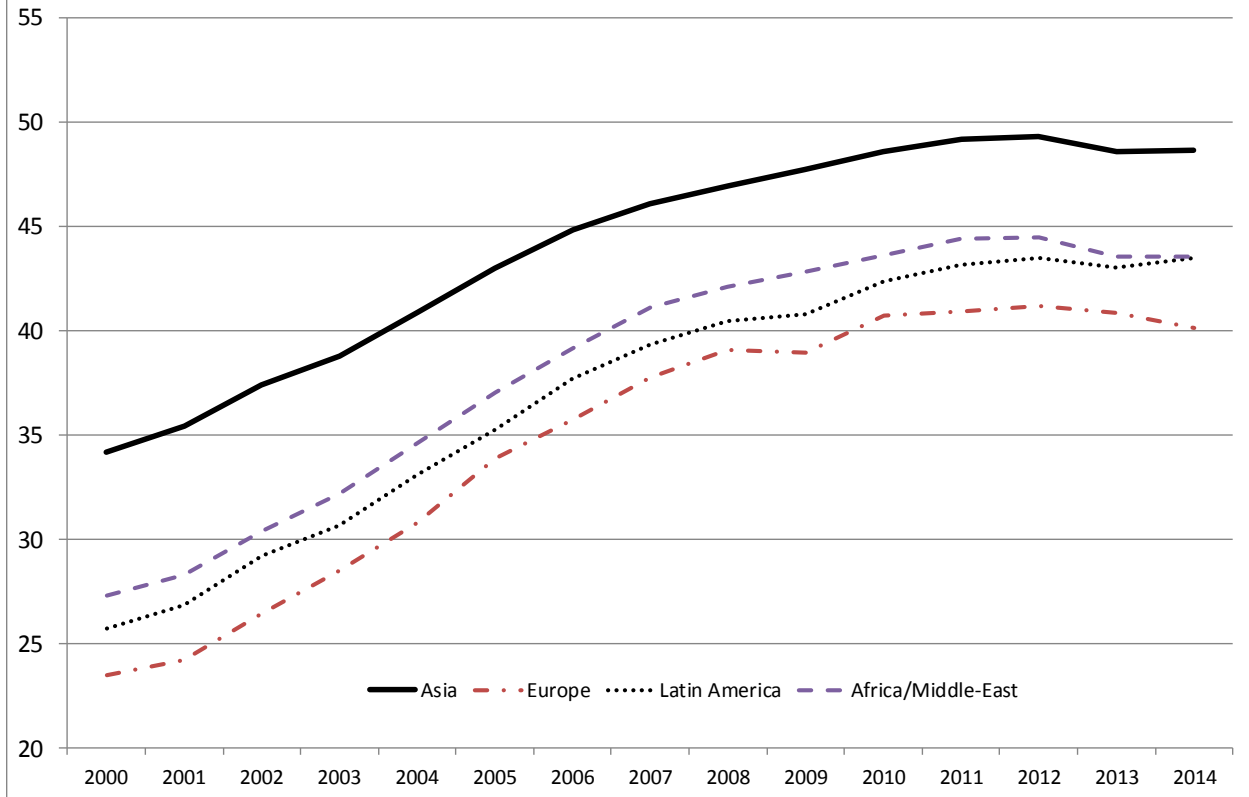Prachi Mishra (Reserve Bank of India and IMF), and

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Center for Global Development)

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Online Appendix

Figure A1. Average Count-based Index of Competition with China: By Region of Competing Exporter
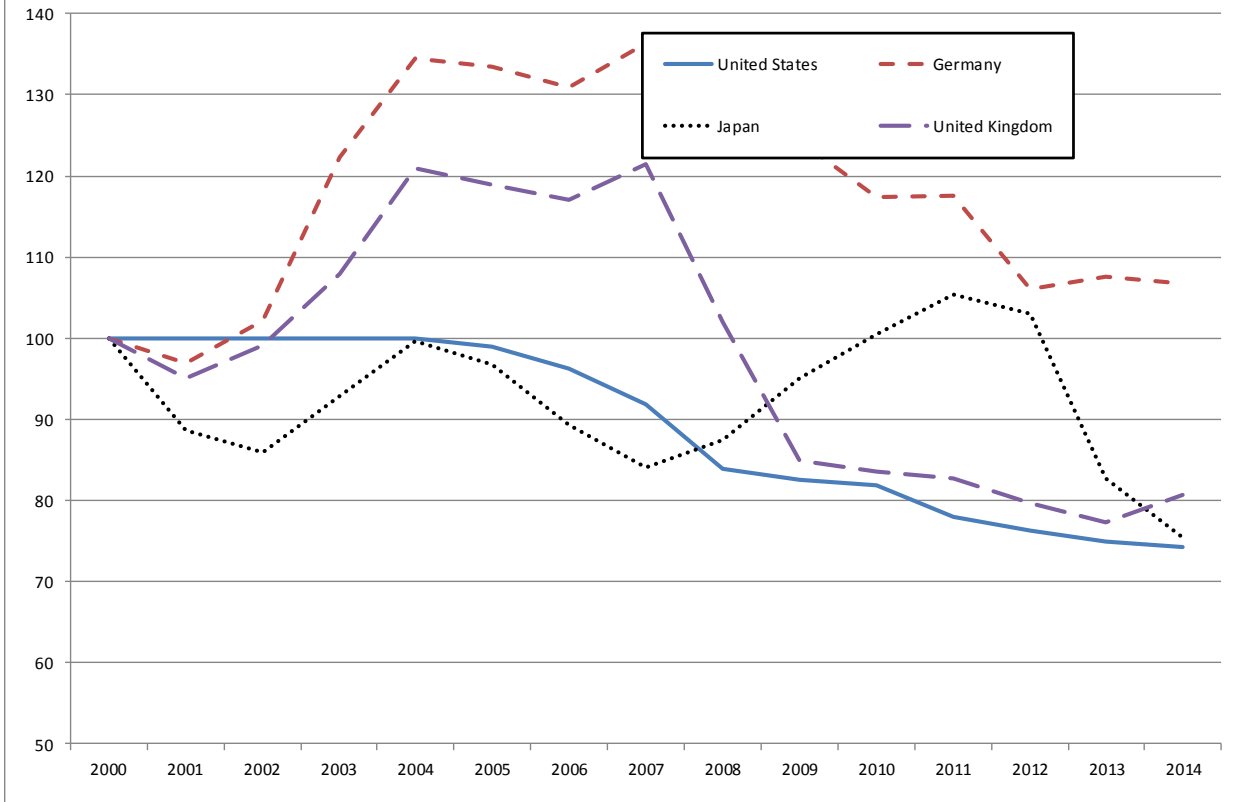
Figure A2. Average Value-based Index of Competition with China: By Region of Competing Exporter

Figure A3: China's nominal bilateral exchange rate, 2000-14
(index, 2000=100; increase denotes depreciation)

	Value-based index		Count-based index	
Country	2000	2014	2000	2014
Vietnam	0.40	0.51	0.90	0.96
Cambodia	0.39	0.55	0.96	0.97
Nepal	0.39	0.54	0.91	0.98
Bangladesh	0.39	0.51	0.91	0.96
Philippines	0.39	0.53	0.89	0.96
Swaziland	0.36	0.54	0.84	0.95
Samoa	0.36	0.57	0.92	0.96
Myanmar	0.35	0.49	0.93	0.96
Sri Lanka	0.35	0.46	0.87	0.94
Fiji	0.35	0.47	0.86	0.95
Mauritius	0.34	0.49	0.89	0.96
Lao PDR	0.34	0.47	0.94	0.96
Indonesia	0.34	0.49	0.83	0.94
Pakistan	0.34	0.48	0.86	0.95
Malaysia	0.33	0.50	0.83	0.95
Thailand	0.33	0.48	0.82	0.94
Kiribati	0.33	0.50	0.94	0.93
Haiti	0.33	0.48	0.87	0.97
Dominica	0.33	0.43	0.86	0.95
Cape Verde	0.33	0.50	0.71	0.93
Mongolia	0.33	0.54	0.88	0.98
El Salvador	0.32	0.52	0.90	0.98
Panama	0.32	0.47	0.80	0.94
St. Lucia	0.32	0.43	0.93	0.94
St. Kitts and Nevis	0.31	0.52	0.93	0.98
Niger	0.31	0.52	0.86	0.98
Cameroon	0.31	0.49	0.79	0.93
Madagascar	0.31	0.42	0.86	0.94
Sierra Leone	0.31	0.51	0.85	0.98
Dominican Republic	0.31	0.46	0.85	0.93
India	0.30	0.45	0.78	0.91
Tunisia	0.30	0.47	0.84	0.95
Marshall Islands	0.30	0.45	0.85	0.96
Kenya	0.29	0.43	0.81	0.92
Bolivia	0.29	0.42	0.77	0.92
Mexico	0.29	0.47	0.79	0.94
Honduras	0.29	0.46	0.84	0.95
Guatemala	0.29	0.43	0.82	0.93
Syrian Arab Republic	0.29	0.42	0.81	0.93
Mali	0.29	0.46	0.80	0.95
Micronesia, Fed. Sts.	0.29	0.55	0.98	0.97
Sao Tome and Principe	0.28	0.47	0.80	0.92
Morocco	0.28	0.43	0.79	0.93
Lesotho	0.28	0.49	0.88	0.93
Tonga	0.28	0.46	0.83	0.89
Egypt, Arab Rep.	0.27	0.42	0.78	0.92
Senegal	0.27	0.41	0.74	0.89
South Africa	0.27	0.44	0.75	0.92
Afghanistan	0.27	0.44	0.83	0.92
Somalia	0.27	0.43	0.82	0.95
Costa Rica	0.27	0.45	0.80	0.94
Palau	0.27	0.53	0.87	0.92
Burkina Faso	0.27	0.39	0.79	0.92
Romania	0.27	0.42	0.76	0.89
Maldives	0.27	0.47	0.91	0.92
Jordan	0.27	0.44	0.78	0.93
Seychelles	0.27	0.45	0.79	0.95
Gambia, The	0.27	0.43	0.82	0.89
Mozambique	0.26	0.41	0.78	0.93
Albania	0.26	0.43	0.81	0.93

Table A1. Index of Competition by Exporting Country

Table A1. Index of Competition by Exporting Country (contd.)				
Peru	0.26	0.39	0.76	0.90
Georgia	0.26	0.45	0.79	0.94
Zimbabwe	0.26	0.39	0.75	0.89
Botswana	0.26	0.49	0.85	0.93
Ecuador	0.25	0.41	0.76	0.91
Bulgaria	0.25	0.41	0.75	0.89
Rwanda	0.25	0.44	0.77	0.93
Brazil	0.25	0.43	0.72	0.91
Guinea-Bissau	0.25	0.46	0.73	0.93
Jamaica	0.25	0.40	0.81	0.93
Turkey	0.25	0.42	0.71	0.90
Lebanon	0.25	0.41	0.77	0.92
Togo	0.25	0.35	0.76	0.89
Suriname	0.25	0.40	0.81	0.94
Tajikistan	0.24	0.44	0.76	0.93
Colombia	0.24	0.46	0.74	0.93
Eritrea	0.24	0.44	0.77	0.96
Solomon Islands	0.24	0.41	0.75	0.88
Guinea	0.24	0.47	0.75	0.92
Namibia	0.24	0.47	0.78	0.91
Papua New Guinea	0.24	0.44	0.75	0.91
Ghana	0.24	0.39	0.73	0.90
Bosnia and Herzegovina	0.24	0.42	0.80	0.95
Poland	0.23	0.39	0.67	0.85
Central African Republic	0.23	0.46	0.75	0.93
Lithuania	0.23	0.38	0.73	0.86
Malawi	0.23	0.35	0.83	0.93
Nicaragua	0.23	0.43	0.76	0.92
Gabon	0.23	0.44	0.83	0.92
Paraguay	0.23	0.37	0.75	0.89
Latvia	0.23	0.40	0.74	0.89
Comoros	0.23	0.36	0.68	0.86
Grenada	0.23	0.36	0.74	0.87
Belarus	0.22	0.37	0.74	0.91
Tanzania	0.22	0.39	0.79	0.91
Ukraine	0.22	0.40	0.69	0.90
Burundi	0.22	0.32	0.80	0.89
Macedonia, FYR	0.22	0.40	0.77	0.93
Belize	0.22	0.41	0.79	0.93
Argentina	0.22	0.42	0.69	0.90
Ethiopia(excludes Eritrea)	0.22	0.37	0.78	0.92
Russian Federation	0.22	0.39	0.63	0.86
Bhutan	0.22	0.49	0.81	0.96
Guyana	0.22	0.38	0.81	0.91
Cote d'Ivoire	0.22	0.35	0.70	0.87
Mauritania	0.22	0.38	0.74	0.86
Benin	0.21	0.38	0.77	0.92
Chile	0.21	0.39	0.68	0.87
Congo, Dem. Rep.	0.21	0.44	0.78	0.94
Djibouti	0.21	0.42	0.77	0.94
Zambia	0.21	0.43	0.72	0.94
Armenia	0.20	0.40	0.83	0.93
Uruguay	0.20	0.40	0.67	0.87
Uganda	0.20	0.37	0.78	0.89
Vanuatu	0.20	0.40	0.79	0.91
. Vincent and the Grenadine	0.19	0.46	0.73	0.97
Kyrgyz Republic	0.19	0.38	0.70	0.93
Kazakhstan	0.18	0.39	0.67	0.90
Moldova	0.17	0.36	0.70	0.89
Liberia	0.17	0.48	0.67	0.95
Uzbekistan	0.17	0.34	0.68	0.90

Table A2. Robustness to Dropping Outliers, Alternative Clustering and Indices of Competition

Dependent variable = log(exports) at (exporter,importer, 4-digit product, year) level

	[1]	[2]	[3]	[4]	[5]	[6]	[7]
	drop outliers	cluster exp*imp*year	cluster exp*produc t*year	cluster imp*produc t*year	index of competition -- 2001	index of competition -- 2002	Finger-Krenin Index
Count-based index of competition							
Index of competition with China*log(exchange rate of importer with respect to China)	-0.229***	-0.270***	-0.270***	-0.270***	-0.390***	-0.413***	
	[0.002]	[0.001]	[0.001]	[0.001]	[0.002]	[0.002]	
Value-based index of competition							
Index of competition with China*log(exchange rate of importer with respect to China)	-0.414***	-0.376***	-0.376***	-0.376***	-0.368***	-0.360***	-0.367***
	[0.004]	[0.001]	[0.003]	[0.003]	[0.004]	[0.003]	[0.002]
N	75,50,626	77,86,042	77,86,042	77,86,042	77,86,042	77,86,042	77,86,042

Notes. See notes to Table 1 in the draft for definitions of the count-based and value-based indices of competition. Exchange rate of importer wrt China is measured as renminbi/importer currency, deflated by the Chinese CPI. In column [1], the top and bottom fifth percentile of the observations are dropped. In columns [2]-[4], we make alternative assumptions on clustering the standard errors. In columns [5] and [6], the index of competition is measured in 2001 and 2002 respectively. In Column [7], we use the Finger-Krenin index of export similarity. The index of competition except in columns [5] and [6] is measured in the year 2000. The regression sample includes years from 2000-2014. All regressions include exporter*importer*time, exporter*product*time, importer*product*time, and exporter*importer*product fixed effects. Standard errors denoted in parentheses are clustered at the importer*exporter*product level (except in columns [3]-[5]) . ***, ** and * denote statistical significance at the 1, 5 and 10 percent respectively.

Table A3. Robustness to Alternative Exchange Rate Measures

Dependent variable = log(exports) at (exporter,importer, 4-digit product, year) level

	Count-based index of competition			Value-based index of competition		
	[1]	[2]	[3]	[4]	[5]	[6]
	Nominal effective exchange rate	Real effective exchange rate	Real effective exchange rate (PWT)	Nominal effective exchange rate	Real effective exchange rate	Real effective exchange rate (PWT)
Index of competition with China*log(exchange rate of importer with respect to China)	-0.462***	-0.480***	-0.530***	-0.705***	-0.660***	-0.870***
	[0.002]	[0.002]	[0.004]	[0.005]	[0.005]	[0.009]
N	77,86,042	77,86,042	53,73,389	77,86,042	77,86,042	53,73,389

Notes. See notes to Table 1 in the draft for definitions of the value-based and count-based indices of competition. In columns [1] and [4], nominal effective exchange rate of China (2005=100) from the IMF is used. In columns [2] and [5], real effective exchange rate of China (2005=100) from the IMF is used. Note that real and nominal effective exchange rates have been recaled so that an increase denotes depreciation. In columns [3] and [6], the measure of the real exchange rate is the price level of GDP (series p) from the Penn World Tables (version 7), which is the ratio of GDP at market exchange rates to GDP at purchasing power parity exchange rates. The price level is expressed relative to that of the United States. An increase in the price level denotes an appreciation of the real exchange rate, but we have rescaled the variable so that an increase denotes a depreciation. The regression sample in columns [1]-[2], and [4]-[5], include years from 2000-2014. The regressions in columns [3] and [6] include years 2000-2010, based on the available data on the price level of GDP from the Penn World Tables. All regressions include exporter*importer*time, exporter*product*time, importer*product*time, and exporter*importer*product fixed effects. Standard errors denoted in parentheses are clustered at the importer*exporter*product level. ***, ** and * denote statistical significance at the 1, 5 and 10 percent respectively.

Table A4. Robustness By Region of Exporter

Dependent variable = log(exports) at (exporter,importer,4-digit product, year) level

	Count-based index				Value-based index			
	Asia	Europe	LAC	MENA+SSA	Asia	Europe	LAC	MENA+SSA
Index of competition with China*log(exchange rate of importer with respect to China)	-0.292***	-0.326***	-0.246***	-0.241***	-0.434***	-0.548***	-0.301***	-0.172***
	[0.003]	[0.004]	[0.005]	[0.006]	[0.007]	[0.010]	[0.011]	[0.012]
N	25,51,409	21,53,699	16,74,895	11,38,266	25,51,409	21,53,699	16,74,895	11,38,266

Notes. The region of the exporter is defined based on the World Bank country classification. See notes to Table 1 in the draft for definitions of the count-based and value-based indices of competition. Exchange rate of importer wrt China is measured as renminbi/importer currency, deflated by the Chinese CPI. The index of competition in all the columns is measured in the year 2000. The regression sample includes years from 2000-2008. LAC denotes Latin America and the Caribbean; MENA denotes the Middle East and North Africa; SSA denotes Sub-Saharan Africa. All regressions include exporter*importer*time, exporter*product*time, importer*product*time, and exporter*importer*product fixed effects. Standard errors denoted in parentheses are clustered at the importer*exporter*product level. ***, ** and * denote statistical significance at the 1, 5 and 10 percent respectively.

Table A5. Exports from Developing Countries and Chinese Exchange Rates: Product Types

Dependent variable = log(exports) at (exporter,importer, 4-digit product, year) level

	Count-based index		Value-based index	
	Consumer	Primary, capital and intermediate	Consumer	Primary, capital and intermediate
	[1]	[2]	[3]	[4]
Index of competition with China*log(exchange rate of importer with respect to China)	-0.273***	-0.232***	-0.455***	-0.417***
	[0.002]	[0.002]	[0.011]	[0.010]
N	25,29,098	46,86,948	25,29,098	46,86,948

Goods are classified by skill-intensity based on Peneder (2001); by end-use based on Pula, Gabor and Peltonen (2009). See notes to Table 1 in the draft for definitions of the count-based and value-based indices of competition. Exchange rate of importer wrt China is measured as renminbi/importer currency, deflated by the Chinese CPI. The index of competition in all the columns is measured in the year 2000. The regression sample includes years from 2000-2008. All regressions include exporter*importer*time, exporter*product*time, importer*product*time, and exporter*importer*product fixed effects. Standard errors denoted in parentheses are clustered at the importer*exporter*product level. ***, ** and * denote statistical significance at the 1, 5 and 10 percent respectively.

Table A6. Summary Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Nominal Exports ('000 USD)	77,86,042	2426.137	44513.310	0.001	2.150E+07
Index of competition with China (value-based measure)	77,86,042	0.398	0.331	0.000	1.000
Index of competition with China (count-based measure)	77,86,042	0.882	0.306	0.000	1.000
Nominal exchange rate (renminbi / importer currency)	77,86,042	4.388	3.956	0.000	15.222
Log (renminbi/importer currency exchange rate, deflated by Chinese CPI)	77,86,042	-4.291	2.433	-12.835	-1.725

Table A7. List of countries

Exporting countries		Importing countries
Afghanistan	Macedonia, FYR	Algeria
Albania	Madagascar	Argentina
Argentina	Malawi	Australia
Armenia	Malaysia	Austria
Bangladesh	Maldives	Belarus
Belarus	Mali	Belgium
Belize	Marshall Islands	Brazil
Benin	Mauritania	Canada
Bhutan	Mauritius	Chile
Bolivia	Mexico	Colombia
Bosnia and Herzegovina	Micronesia, Fed. Sts.	Czech Republic
Botswana	Moldova	Denmark
Brazil	Mongolia	Egypt, Arab Rep.
Bulgaria	Morocco	Finland
Burkina Faso	Mozambique	France
Burundi	Myanmar	Germany
Cambodia	Namibia	Greece
Cameroon	Nepal	Hong Kong, China
Cape Verde	Nicaragua	Hungary
Central African Republic	Niger	India
Chile	Pakistan	Indonesia
Colombia	Palau	Ireland
Comoros	Panama	Israel
Congo, Dem. Rep.	Papua New Guinea	Italy
Costa Rica	Paraguay	Japan
Cote d'Ivoire	Peru	Kazakhstan
Djibouti	Philippines	Korea, Rep.
Dominica	Poland	Malaysia
Dominican Republic	Romania	Mexico
Ecuador	Russian Federation	Morocco
Egypt, Arab Rep.	Rwanda	Netherlands
El Salvador	Samoa	New Zealand
Eritrea	Sao Tome and Principe	Nigeria
Ethiopia(excludes Eritrea)	Senegal	Norway
Fiji	Seychelles	Pakistan
Gabon	Sierra Leone	Philippines
Gambia, The	Solomon Islands	Poland
Georgia	Somalia	Portugal
Ghana	South Africa	Qatar
Grenada	Sri Lanka	Romania
Guatemala	St. Kitts and Nevis	Russian Federation
Guinea	St. Lucia	Saudi Arabia
Guinea-Bissau	St. Vincent and the Grenadines	Singapore
Guyana	Suriname	Slovak Republic
Haiti	Swaziland	South Africa
Honduras	Syrian Arab Republic	Spain
India	Tajikistan	Sweden
Indonesia	Tanzania	Switzerland