CHAPTER 3: TRADE OPENNESS, INCOME LEVELS, AND ECONOMIC GROWTH, 1980–1998

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Governments often restrict the freedom of their citizens to trade with foreigners. Tariffs, quotas, licenses, marketing restrictions, exchange rate controls, and regulations that limit the movement of capital are some of the policies that retard voluntary exchange across national boundaries. Such policies reduce economic freedom. This chapter develops a measure of cross-country differences in the freedom of individuals to engage in international exchange.

Economic theory indicates that with freedom of exchange individuals will be able to produce a larger output and achieve a higher income level than would otherwise be possible. Other things constant, one would expect that individuals will attain higher levels of income when they live in countries with greater freedom of international exchange. Freedom of international exchange also promotes entrepreneurial and innovative activities that are the engine of economic growth. This chapter will investigate the linkage between the openness of international trade on the one hand and income levels and growth rates on the other.

The chapter will also analyze the changes in openness during the last two decades. Have trade barriers been rising or falling? Which countries have reduced their trade barriers the most? Which have experienced the largest increases in trade as a share of the economy? The final section will provide answers to these questions.

CONSTRUCTION OF A TRADE OPENNESS INDEX (TOI)

The Trade Openness Index (TOI) is designed to measure the degree to which policies interfere with international exchange. The TOI has four general components: (a) tariff rates, (b) the black-market exchange rate premium, (c) restrictions on capital movements, and (d) the actual size of the trade sector compared to the expected size.

Tariff data were obtained for various years during the 1980 to 1998 period. Three factors were incorporated into the tariff rating: the level of taxes on international trade as a share of the trade sector, the mean tariff rate, and the standard deviation of tariff rates. Higher ratings were assigned to countries with smaller revenues from taxes on international trade as a share of the trade sector, lower mean tariff rates, and a smaller standard deviation of tariffs. The data for each of these three dimensions were transformed to a scale from 0 to 10 that reflects the actual data.[2]

When countries impose exchange rate controls and thereby restrict the convertibility of the domestic currency, a black market will emerge for foreign exchange. The size of the black-market exchange-rate premium is indicative of the restrictiveness of the exchange rate controls. Thus, countries with higher black-market premiums were assigned lower ratings.[3]

Capital market restrictions will also reduce the volume of international exchange. Descriptive information on capital markets supplied by the International Monetary Fund was used to place countries in various categories and assign ratings

from 0 to 10. The greater the restrictions on capital movements into and out of the country, the lower the country's rating.[4]

Factors other than trade policy will influence the size of a country's trade sector. The larger a country in terms of population and geographic size, the greater the opportunity for realization of economies of scale within the domestic market. This suggests countries that are more populous and cover a larger geographic area are likely to have less international trade as a share of their economy. Countries with a lengthy coastline may have lower transport costs that will enhance their volume of international trade. Location relative to concentrations of world demand may also influence the size of a country's trade sector. In order to account for this factor, we developed a Distance Adjusted Demand Scalar (DADS) that measures the relative distance of each country from the distribution of world demand.[5]

The population, geographic size, miles of coastline, and DADS variables were incorporated into a regression equation and used to derive the expected size of the trade sector for the countries of the Economic Freedom Index. The regression was run across time periods and dummy variables were used to adjust for general changes in trade as a share of GDP through time. The country's actual trade sector was then compared with the expected size. A large actual size of the trade sector relative to the expected size would suggest that trade barriers are small. Thus, the larger the actual size relative to the expected, the higher the rating for this component.

The ratings for each of these four components–tariffs, black-market exchange premiums, capital market restrictions, and the actual size of the trade sector relative to the expected–were averaged and used to derive a Trade Openness Index (TOI) for various years during the period from 1980 to 1998. In order to achieve a high TOI rating a country must have low (and relatively uniform) tariffs, a convertible currency, few restrictions on the mobility of capital, and a large trade sector (given its size and location). Each of these factors imply greater freedom to trade with foreigners. Thus, higher TOI ratings are indicative of greater freedom of exchange across national boundaries.

THE TRADE OPENNESS INDEX (1998)

It was possible to derive the TOI for 109 countries in 1998. Exhibit 3-1 presents these ratings ranked from high to low. Table 3-1 of the appendix to this chapter presents the underlying data and ratings for each of the four components.

In 1998, the highest ranked countries were Hong Kong, Singapore, Estonia, Belgium, Ireland, Netherlands, Germany, Luxembourg, and United Kingdom. The TOI indicates that the trade policies of these countries were the most open in the world at that time. At the other end of the spectrum, the trade policies of Myanmar, Sierra Leone, Iran, Burundi, Algeria, Syria, Papua New Guinea, Bangladesh, Croatia, and Albania were the least open in 1998.

THE ECONOMICS OF LONG TERM OPENNESS

Current trade policy may be a misleading indicator of openness over a more lengthy period. The structure of trade policy over a long time period is vitally important. It takes time for markets to adjust to changes in the openness of an economy. It also takes time for a change in policy to acquire credibility. Initially, decision makers may be unsure whether a policy change is temporary or permanent. Until credibility is acquired, the response of traders, entrepreneurs, investors, and other decision makers will be limited.

As policies of openness are maintained over a lengthy time period, decision makers will eventually be convinced that the more liberal policies can be counted on to persist in the future. As this happens, trade will expand and the laws of economics will come into play. Resources will move toward the production of goods and services that

Exhibit 3-1: Trade Openness Index (1998)

Country	Rank	Index
Hong Kong	1	10.0
Singapore	1	10.0
Estonia	3	9.4
Belgium	4	9.0
Ireland	5	8.7
Netherlands	5	8.7
Germany	7	8.6
Luxembourg	8	8.4
UK	8	8.4
Costa Rica	10	8.3
Czech Rep.	10	8.3
Italy	10	8.3
Korea, South	10	8.3
Nicaragua	14	8.2
Sweden	14	8.2
Philippines	16	8.1
Spain	16	8.1
Switzerland	16	8.1
Austria	19	8.0
Lithuania	19	8.0
Panama	19	8.0
Australia	22	7.9
China	22	7.9
Denmark	22	7.9
Israel	22	7.9
Mexico	22	7.9
Bolivia	27	7.8
Finland	27	7.8
Paraguay	27	7.8
Portugal	27	7.8
USA	31	7.7
Canada	32	7.5
Norway	32	7.5
Peru	32	7.5
Honduras	35	7.4
Uruguay	35	7.4
Argentina	37	7.3
France	38	7.2
Slovak Rep.	38	7.2
Taiwan	38	7.2
Thailand	38	7.2
Botswana	42	7.1
Bulgaria	42	7.1
Ecuador	42	7.1
Latvia	42	7.1
Malaysia	42	7.1
Mauritius	42	7.1
Namibia	42	7.1
Zambia	42	7.1
Congo, Rep.	50	7.0
Greece	50	7.0
Guatemala	50	7.0
Hungary	50	7.0
Kenya	50	7.0
New Zealand	50	7.0
Dominican Rep.	56	6.9
Chile	57	6.8
Iceland	57	6.8
El Salvador	59	6.6
Oman	59	6.6
South Africa	59	6.6
Trinidad Tob.	59	6.6
Venezuela	59	6.6
Jamaica	64	6.5
Japan	64	6.5
Jordan	64	6.5
Poland	67	6.4
Bahrain	68	6.3
Egypt	68	6.3
Kuwait	68	6.3
Slovenia	68	6.3
Ukraine	68	6.3
Indonesia	73	6.2
Fiji	74	6.1
Colombia	75	6.0
Malta	75	6.0
Sri Lanka	75	6.0
Cote d'Ivoire	78	5.9
Turkey	79	5.8
Belize	80	5.7
Tunisia	81	5.6
Zimbabwe	81	5.6
Morocco	83	5.4
Cameroon	84	5.2
Mali	84	5.2
Cyprus	86	5.1
Madagascar	86	5.1
Malawi	86	5.1
Pakistan	89	4.9
Russian Fed.	89	4.9
India	91	4.8
Nepal	91	4.8
Senegal	91	4.8
Brazil	94	4.7
Barbados	95	4.6
Niger	95	4.6
Romania	97	4.5
Central Afr. Rep.	98	4.3
Tanzania	99	4.2
Albania	100	4.0
Croatia	101	3.9
Bangladesh	102	3.8
Pap. N. Guinea	103	3.5
Syria	104	3.3
Algeria	105	2.8
Burundi	106	2.3
Iran	107	1.7
Sierra Leone	108	1.3
Myanmar	109	0.0

can be supplied domestically at a low cost and away from those that can be supplied only at a high cost. If a good or service can be obtained more economically through trade, it makes sense to trade for it rather than to produce it domestically. When trading partners use more of their time and resources producing things they do best, they are able to produce a larger joint output and achieve a higher standard of living than would otherwise be possible. Economists refer to this as the *law of comparative advantage.*

In addition, open international markets encourage both innovation and efficient production. Increasingly, economic growth involves intellectual power, innovation, and the application of technology. Observation of, and interaction with, individuals employing different technologies often induces others to emulate successful approaches.

International competition also helps keep domestic producers on their toes and provides them with a strong incentive to improve the quality of their products.

Openness may also exert an indirect effect: it may encourage countries to adopt sound institutions and policies. If they do not, both labor and capital will move toward a more favorable environment. Neither domestic nor foreign investors will want to place their funds in countries characterized by hostility toward business, monetary instability, legal uncertainty, high taxes, and low-quality public services. When labor and capital are free to move elsewhere, it will be costly to adopt policies that penalize success and exploit factors of production. Thus, openness provides political decision makers with a strong incentive to avoid policies that undermine growth.

OPENNESS, INCOME, AND GROWTH (1980–1998)

Economic theory indicates that persistently open economies will be able to derive more output from their domestic resources, be more innovative and dynamic, and have a greater incentive to choose policies more consistent with investment and growth.[6] Therefore, economies that are open over lengthy time periods should achieve more rapid growth rates and higher levels of per-capita GDP than those that are persistently closed. In order to test this proposition, we constructed the Trade Openness Index for the period from 1980 to 1998.

Trade Openness (1980–1998)
The data were assembled and the TOI was derived for the periods, 1980–1982, 1985–1987, 1990–1992, and 1995–1997. The three-year time intervals of these estimates reduce the likelihood that an unusual change or temporary aberration during a single year will distort a country's rating. The ratings for these four periods were used, along with the 1998 figure, to estimate the average TOI during the period from 1980 to 1998.[7] Data were available to construct this average TOI for 91 countries. This average rating is an indicator of openness over the 19 year period.

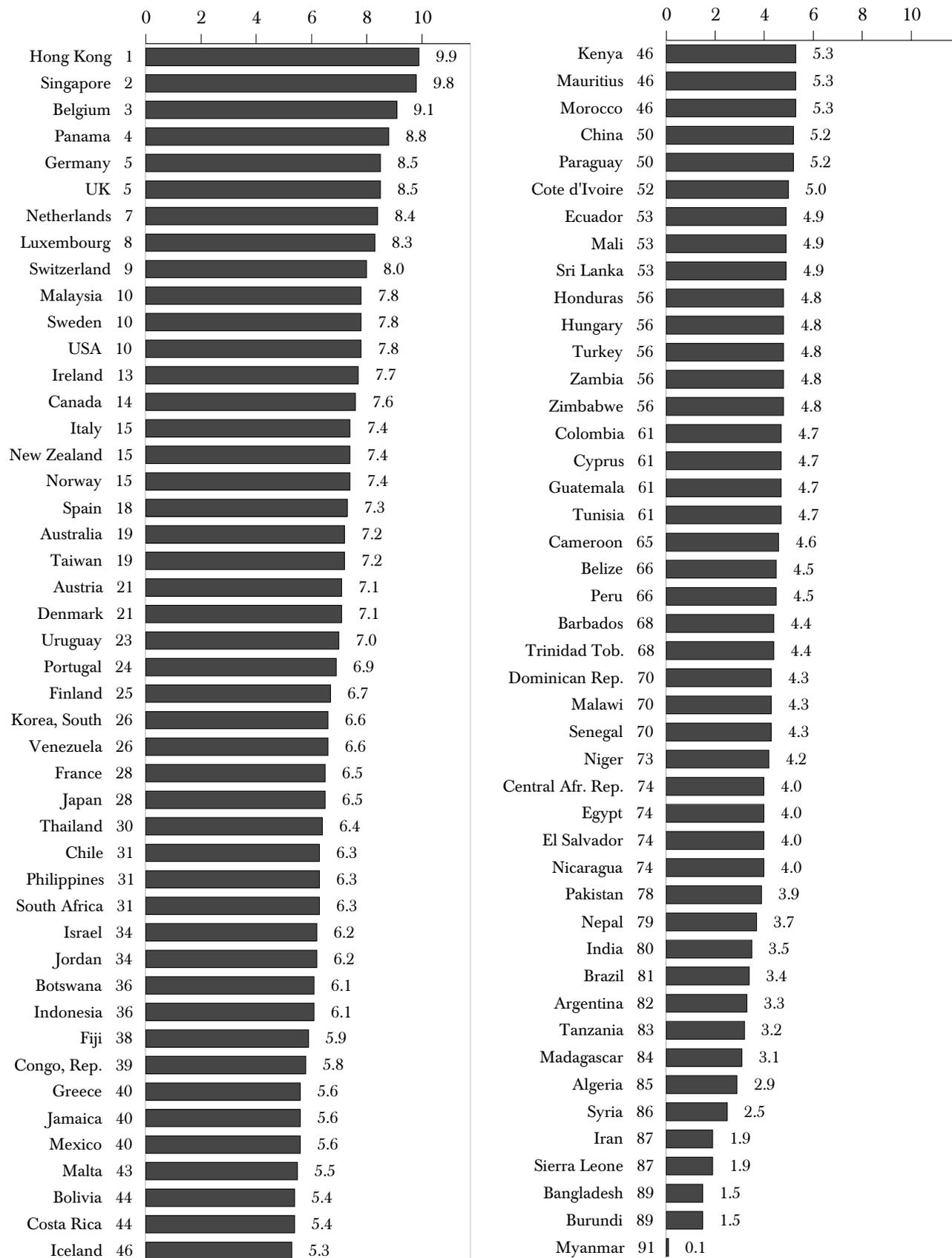Exhibit 3-2 presents the average TOI rating during the period from 1980 to 1998 for each of the 91 countries arrayed from high to low. Table 3-2 of the Appendix contains the country ratings for each of the five periods. The top-rated countries of Exhibit 3-2 had persistently high ratings throughout the period from 1980 to 1998, while those at the bottom had persistently low ratings. Hong Kong, Singapore, Belgium, Panama, Germany, United Kingdom, Netherlands, Luxembourg, and Switzerland head the list. The United States ranks 10, tied with Malaysia and Sweden. Ireland ranked 13 followed closely by Canada, New Zealand, Norway, and Italy. The TOI indicates that all of these economies were relatively open during the period.

At the other end of the spectrum, the TOI indicates that Myanmar, Bangladesh, Burundi, Iran, Sierra Leone, Syria and Algeria were the least open economies during the period from 1980 to 1998. Argentina, Brazil, India, Nepal, and Pakistan were also among the countries with low average ratings for this period.

Openness, Income, and Growth: Simple Comparisons
If trade makes a difference, the countries with persistently high openness ratings should have higher per-capita incomes and grow more rapidly than those with persistently low ratings. As Exhibit 3-3

Exhibit 3-2:   Trade Openness Index (1980-1998)

Rank	Country	Index
1	Hong Kong	9.9
2	Singapore	9.8
3	Belgium	9.1
4	Panama	8.8
5	Germany	8.5
5	UK	8.5
7	Netherlands	8.4
8	Luxembourg	8.3
9	Switzerland	8.0
10	Malaysia	7.8
10	Sweden	7.8
10	USA	7.8
13	Ireland	7.7
14	Canada	7.6
15	Italy	7.4
15	New Zealand	7.4
15	Norway	7.4
18	Spain	7.3
19	Australia	7.2
19	Taiwan	7.2
21	Austria	7.1
21	Denmark	7.1
23	Uruguay	7.0
24	Portugal	6.9
25	Finland	6.7
26	Korea, South	6.6
26	Venezuela	6.6
28	France	6.5
28	Japan	6.5
30	Thailand	6.4
31	Chile	6.3
31	Philippines	6.3
31	South Africa	6.3
34	Israel	6.2
34	Jordan	6.2
36	Botswana	6.1
36	Indonesia	6.1
38	Fiji	5.9
39	Congo, Rep.	5.8
40	Greece	5.6
40	Jamaica	5.6
40	Mexico	5.6
43	Malta	5.5
44	Bolivia	5.4
44	Costa Rica	5.4
46	Iceland	5.3

Rank	Country	Index
46	Kenya	5.3
46	Mauritius	5.3
46	Morocco	5.3
50	China	5.2
50	Paraguay	5.2
52	Cote d'Ivoire	5.0
53	Ecuador	4.9
53	Mali	4.9
53	Sri Lanka	4.9
56	Honduras	4.8
56	Hungary	4.8
56	Turkey	4.8
56	Zambia	4.8
56	Zimbabwe	4.8
61	Colombia	4.7
61	Cyprus	4.7
61	Guatemala	4.7
61	Tunisia	4.7
65	Cameroon	4.6
66	Belize	4.5
66	Peru	4.5
68	Barbados	4.4
68	Trinidad Tob.	4.4
70	Dominican Rep.	4.3
70	Malawi	4.3
70	Senegal	4.3
73	Niger	4.2
74	Central Afr. Rep.	4.0
74	Egypt	4.0
74	El Salvador	4.0
74	Nicaragua	4.0
78	Pakistan	3.9
79	Nepal	3.7
80	India	3.5
81	Brazil	3.4
82	Argentina	3.3
83	Tanzania	3.2
84	Madagascar	3.1
85	Algeria	2.9
86	Syria	2.5
87	Iran	1.9
87	Sierra Leone	1.9
89	Bangladesh	1.5
89	Burundi	1.5
91	Myanmar	0.1

shows, this was indeed the case. The $23,387 GDP per person of the 12 most open economies was more than seven times the comparable figure for the 12 least open economies.[8] The per-capita GDP of the 12 most open economies grew at an annual rate of 2.5% during the period from 1980 to 1998, compared to 0.3% per year for the 12 least open economies. All 12 of the open economies had positive growth rates and all but one grew at an annual rate of 1.2% or more. In contrast, four of the least open economies experienced reductions in per-capita GDP and only four of the 12 achieved a growth rate in excess of 1%. These striking differences suggest that openness exerts a major impact on growth and prosperity.

Exhibit 3-4 illustrates the linkage between openness and both the level and growth rate of per-capita GDP for the entire set of 90 countries (Germany was excluded due to unification) with TOI ratings for the period from 1980 to 1998. The countries were arrayed from highest to lowest based on their average TOI rating and the distribution was divided into quintiles. The top group was made up of the 18 countries with the highest TOI (1980–1998) ratings, the second group the 18 countries with the next highest ratings, and so on.

As Graph A of Exhibit 3-4 shows, the quintile with the highest TOI ratings had an average per-capita GDP of $22,306, 60% greater than the level of the second-highest quintile. In turn, the average per-capita income of the second quintile was more than twice that of the third. Similarly, the income level of the fourth and fifth quintile were lower than that of the quintile immediately above. Clearly, there was a strong relationship between openness over a lengthy time period and per-capita GDP.

Graph B of Exhibit 3-4 illustrates the relationship between the average TOI rating for the period from 1980 to 1998 and the annual growth rate of real per-capita GDP during the same period. The top quintile of countries with the highest TOI ratings achieved an average annual growth rate of 2.4% during the period from 1980 to 1998. The GDP growth of the next quintile of countries averaged 2.0%. The average growth rate of the third quintile fell to 1.3%, while the two lowest quintiles grew at an annual rate of only 0.5%. These figures suggest that more open economies are able to achieve higher rates of economic growth.

Openness, Income and Growth: Regression Analysis

Exhibits 3-3 and 3-4 show that there is a strong positive relationship between trade liberalization as measured by the TOI index and per-capita real GDP and its growth. However, this simplified analysis does not provide information on the statistical significance of the relationships. Neither does it reveal whether openness exerts an independent impact.[9] We now turn to an investigation of these issues.

Of course, factors other than trade openness influence income levels and growth rates. Both economic theory and prior research indicate that the stability of the price level and security of property rights are two key policy variables that influence economic performance. Measures of cross-country differences for these two variables were developed for the 90 countries with TOI ratings for the period from 1980 to 1998. The measure of price level variability is the standard deviation of the inflation rate for five-year periods from 1980 to 1998. The property rights variable is the rule-of-law rating from the *Country Risk Guide*. Using survey information supplied by experts familiar with conditions in various countries, this publication has provided rule-of-law ratings annually since 1982. We averaged the ratings for 1982, 1985, 1990, 1995, and 1998 to derive each country's rule-of-law rating for the period from 1980 to 1998. Both variables were converted to a scale from 0 to 10.[10]

Exhibit 3-5 uses regression analysis to investigate the linkage between trade openness, variability of inflation, and the security of property rights, on the one hand, and 1998 GDP per capita, on the other. The first two equations are for all 90 countries for which we were able to derive the TOI for the period from 1980 to 1998. As Equation 1 shows, the simple relationship between TOI and per-capita GDP is exceedingly strong. The R-squared indicates that TOI alone explains 55% of the cross-country variation in 1998 GDP per person. Equation 2 adds the inflation variability and property right variables into the model. All three of the variables are significant at the 90% level of confidence or higher and the R-squared indicates that the model explains 78% of the 1998 cross-country variation in GDP per person.

Exhibit 3-3: GDP per Person and the Growth of Nations with the Highest and Lowest 1980–1998 Trade Openness Indexes

	TOI (1980-98)	Real PPP GDP per capita 1998	Average annual growth rate of real GDP* per capita 1980–1998
Hong Kong	9.9	$24,120	4.1%
Singapore	9.8	$30,621	5.2%
Belgium	9.1	$24,415	1.8%
Panama	8.8	$7,705	1.5%
UK	8.5	$22,258	1.7%
Netherlands	8.4	$23,444	1.6%
Luxembourg	8.3	$37,795	2.5%
Switzerland	8.0	$28,493	0.9%
USA	7.8	$31,485	1.6%
Malaysia	7.8	$10,187	3.4%
Sweden	7.8	$20,852	1.2%
Ireland	7.7	$19,267	4.3%
Top 12:	8.5	$23,387	2.5%
India	3.5	$1,831	3.7%
Brazil	3.4	$6,560	0.4%
Argentina	3.3	$10,877	0.5%
Tanzania	3.2	$709	–0.1%
Madagascar	3.1	$978	–2.6%
Algeria	2.9	$5,033	0.1%
Syria	2.5	$3,258	1.3%
Sierra Leone	1.9	$530	–3.3%
Iran	1.9	$6,209	0.1%
Burundi	1.5	$527	–1.4%
Bangladesh	1.5	$1,155	1.8%
Myanmar	0.1	$1,333	3.3%
Bottom 12:	2.4	$3,250	0.3%

Notes: Germany is omitted from this analysis due to discontinuity in the income data resulting from unification.
*Real GDP data are in 1998 US dollars and are calculated using the purchasing-power-parity method.

Some argue that high-income countries are in a better position to reduce their trade barriers than those with lower incomes. According to this view, the relationship illustrated by Equations 1 and 2 runs from high-income status to openness. In order to shed light on this view, the 21 countries (including Germany) that the World Bank classified as "high-income industrial" in 1980 were deleted from the data set. This left 70 countries that were classified as "less developed" in 1980. Equations 3 and 4 of Table 3-2 present these results. Even after the high-income countries are omitted, the TOI continues to explain a large share (42% in the simple model) of the cross-country variation in GDP per capita. In the three-variable model of Equation 4, both the TOI and rule-of-law variables are

Exhibit 3-4: Trade Openness, Income, and Growth

Graph A

Real GDP per person (1998 PPP dollars) vs. Trade Openness Index (1980-1998) Quintiles:
Bottom $2,916; 4th $4,974; 3rd $6,397; 2nd $13,984; Top $22,306

Graph B

Avg. Annual Growth Rate of Real GDP per person vs. Trade Openness Index (1980-1998) Quintiles:
Bottom 0.5%; 4th 0.5%; 3rd 1.3%; 2nd 2.0%; Top 2.4%
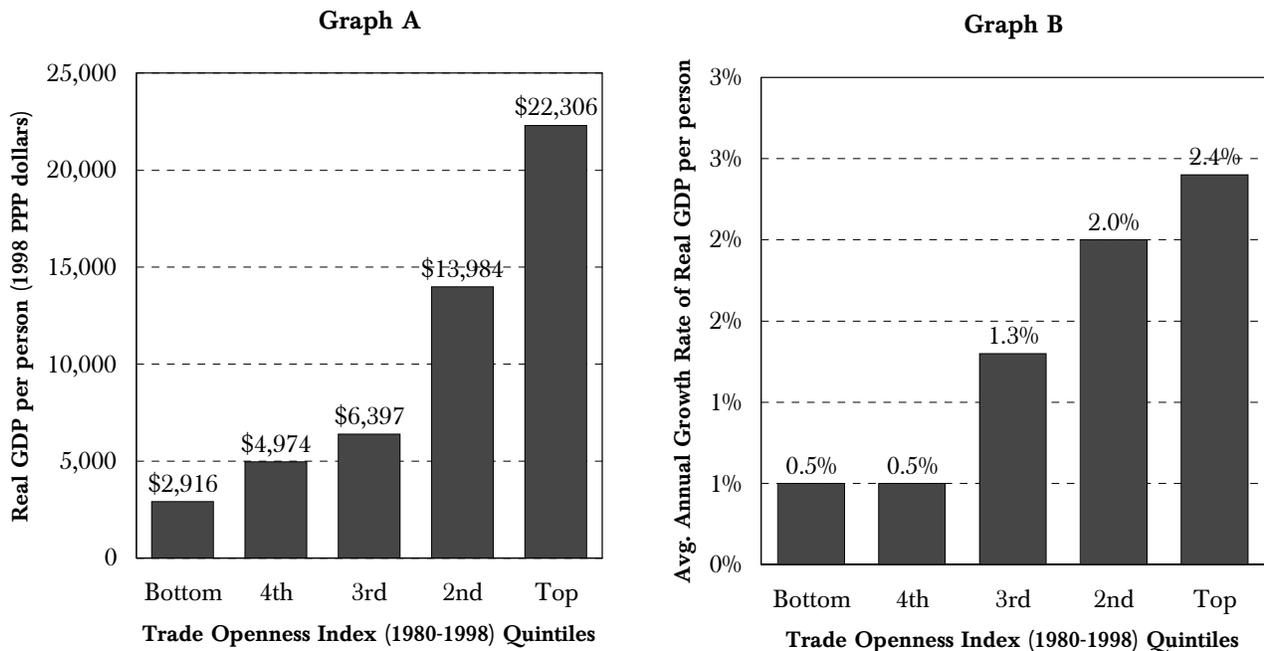
Exhibit 3-5: Trade Openness, Monetary Stability, Property Rights, and Income

Dependent variable: real GDP[a] per capita 1998
(*t*-statistic is in parentheses)

	Complete set[b]		Low- and middle-income countries[c]		Small population countries[d]	
	(1)	(2)	(3)	(4)	(5)	(6)
Trade Openness Index (1980-98)	3.63 (10.41)*	1.69 (5.30)*	2.15 (7.08)*	1.58 (5.42)*	4.03 (9.72)*	1.95 (4.98)*
Inflation variability rating		0.39 (1.82)***		0.19 (0.95)		0.36 (1.32)
Property rights rating 1980		2.21 (9.22)*		1.38 (5.07)*		2.18 (7.35)*
Intercept	−9.86	−15.67	−4.48	−9.98	−12.68	−17.27
n	90	90	70	70	66	66
Adj R-Squared	.55	.78	.42	.58	.59	.80

*   significant at 99% level;   ** significant at 95% level;   *** significant at 90% level

(a)   Real GDP numbers are derived using the purchasing power parity (PPP) method and are in 1998 US dollars.

(b)   The complete set (90 countries) includes the countries listed in Exhibit 3-2 except Germany, which was omitted because of discontinuity in income data resulting from unification.

(c)   There are 70 low-income and middle-income countries. Countries classified as high-income industrial by the World Bank in 1980 were omitted.

(d)   There are 66 small-population countries (fewer than 20 million people in 1980).

significant but the inflation variable is not. This indicates that some of the explanatory power of inflation variability observed in Equation 2 stems from its correlations with high-income status.

As we previously discussed, there is reason to believe that it is more important for small countries to maintain open economies than their larger counterparts. Equations 5 and 6 include only the 66 countries in our data base that have a population of less than 20 million. The R-squares for Equations 5 and 6 are larger than for the parallel equations for the other data sets. This is consistent with the view that openness is more important for smaller countries than for larger ones. The three-variable model of Equation 6 explains 80% of the variation in per-capita GDP across countries. Once again, the significance of both the openness and rule of law variables remains high, while the inflation variable continues to be insignificant at acceptable levels of confidence.

Exhibit 3-6 focuses on growth; the dependent variable for all equations is the average annual growth rate of per-capita real GDP during the period from 1980 to 1998.[11] In addition to openness, price stability and country size (both population and area) are included in the more comprehensive model. The rule-of-law variable is not included here because it was not significant in any of the equations. Population and area are incorporated primarily as control variables. A larger population may create greater opportunity for the realization of economies of scale within the domestic market. Thus, we expect the sign of this variable to be positive. The sign of the area variable is more ambiguous. The observed negative sign may indicate that transaction costs in the domestic market are higher when the population is spread over a larger geographic area.

Equation 1 of Exhibit 3-6 looks at the simple relationship between the TOI measure of openness and the growth rate of real per-capita GDP during the period from 1980 to 1998 for the entire data set of 90 countries. The t-ratio for the TOI is highly significant and the R-squared indicates that openness explains 12% of the cross-country variation in growth. When the inflation variability, population, and area variables are added to the model (Equation 2), all of the variables are significant at the 95% level or higher and the explanatory power increases to 0.35.

The coefficient of the openness variable (0.21) of Equation 2 indicates that a one unit change in TOI, if maintained over a lengthy period, would increase long-term growth by two-tenths of a percent. This is a sizeable amount. For example, it implies that a country like India, which had a TOI rating of 3.5 during the period from 1980 to 1998 could increase its long-term growth by about 1% annually if it were as open as Germany and the United Kingdom (countries with TOI ratings of 8.5 during the period from 1980 to 1998).

Some have argued that the relationship between openness and growth merely reflects the fact that high-income countries are more open and that they also grow more rapidly and that, thus, the relationship may be spurious. In order to see if this is the case, we omitted the high-income industrial economies and ran the model once again. The omission of the high-income countries exerted little impact on the simple relationship between openness and growth (Equation 3 versus Equation 1). As Equation 4 shows, all of the variables remain significant and have the expected sign. Both the t-ratio for TOI and the R-squared for the broader model increased when the high-income countries were omitted. Furthermore, the size of the openness coefficient increased from 0.21 in Equation 2 to 0.35 in Equation 4. This indicates that openness actually exerts a larger impact on the growth of developing countries than is true for high-income industrial nations.

Equations 5 and 6 of Exhibit 3-6 apply the growth model to small countries (population less than 20 million). The results are similar to those for developing countries (Equations 3 and 4). In the broad model, TOI remains significant at the 99% level. The TOI coefficient of 0.39 indicates that a one unit change in the openness measure is associated with approximately a four-tenths of a percent increase in the long-term growth of small countries. Just as we had anticipated, the difference in the size of the openness coefficient between Equations 2 and 6 indicates that trade openness is particularly important when countries are small. The R-squared of Equation 6 indicates that TOI and inflation variability, along with the size variables (population and area) explain slightly more than half (51%) of the variation in growth of per-capita GDP over the period from

Exhibit 3-6: Trade Openness, Monetary Stability, Size, and Income Growth

	Dependent variable: annual growth rate of real GDP[a] per capita (*t*-statistic is in parentheses)					
	Complete set[b]		Low- and middle-income countries[c]		Small population countries[d]	
	(1)	(2)	(3)	(4)	(5)	(6)
Trade Openness Index (1980-98)	0.38 (3.69)*	0.21 (2.07)**	0.46 (3.26)*	0.35 (2.89)*	0.61 (5.08)*	0.39 (3.82)*
Inflation variability rating		0.30 (3.67)*		0.34 (3.71)*		0.31 (3.82)*
Log of population in 1980 (millions)		0.50 (3.45)*		0.69 (3.83)*		–0.01 (0.05)
Log of land area (thousands of square kilometers)		–0.29 (2.55)**		–0.33 (2.27)**		–0.19 (1.77)***
Intercept	–0.78	–1.47	–1.12	–2.90	–2.42	–1.73
n	90	90	70	70	66	66
Adj R-Squared	.12	.35	.12	.43	.33	.51

* significant at 99% level; ** significant at 95% level; *** significant at 90% level

(a) Real GDP numbers are derived using the purchasing power parity (PPP) method and are in 1998 US dollars.

(b) The complete set (90 countries) includes the countries listed in Exhibit 3-2 except Germany, which was omitted because of discontinuity in income data resulting from unification.

(c) There are 70 low-income and middle-income countries. Countries classified as high-income industrial by the World Bank in 1980 were omitted.

(d) There are 66 small-population countries (fewer than 20 million people in 1980).

1980 to 1998. Except for population all of the variables were significant. The compression of the population measure for this data set undoubtedly contributed to its insignificance.

In summary, the results show that economies that are more open over lengthy periods of time grow faster and achieve higher per-capita income levels than economies that are more closed. Openness continues to exert a positive independent impact on economic performance even after the effects of inflation variability, rule of law (when significant), and the country size control variables are taken into account. Furthermore, the results are robust. The positive impact of openness is true for developing countries and small nations, as well as for the entire set of 90 countries. In fact, the positive effects are somewhat larger for developing economies and small countries than for the entire data set.

CHANGES IN OPENNESS (1980–1998)

Has there been a change in trade openness during the last two decades? Exhibit 3-7 illustrates the path of the mean Trade Openness Index (TOI) for the 91 countries for which data could be obtained throughout the period from 1980 to 1998. The mean TOI increased steadily, rising from 4.7 in 1980–1982 to 5.5 in 1990–1992 and 6.5 in 1998. Only 11 of the 91 countries had a lower TOI rating in 1998 than 1980 and six of these were countries with high initial ratings that experienced only a minimal decline (0.2 or less). Only one country, Venezuela, had a reduction of more than 1.0 on the 10-point rating scale. These findings indicate that trade openness has increased substantially during the last two decades.

The Trade Openness Index merely reflects the underlying trends with regard to tariff rates, non-tariff trade barriers, and the restrictiveness of

Exhibit 3-7: Change in Trade Openness, 1980 through 1998

	1980-1982	1990-1992	1998	Change between 1980 & 1998
TOI (period average)	4.7	5.5	6.5	+1.8
Subcomponents				
Tariff measures				
Tax revenues on trade as a % of Trade Sector*				
mean observation	6.1	5.0	4.3	−1.8
mean rating	6.0	6.8	7.3	+1.3
Mean tariff rate				
median observation	18.8	18.6	10.6	−8.2
mean rating	5.2	6.0	7.6	+2.4
Standard deviation of tariff rates				
median observation	**	11.3	7.9	-3.4
mean rating	**	4.5	6.2	+1.7
Composite tariff measure	5.6	5.8	6.8	+1.2
Black market exchange rate				
median observation	18.0	2.9	0.0	−18.0
mean rating	5.7	7.8	9.0	+3.3
Capital controls				
mean rating	2.6	3.3	5.2	+2.6
Trade Sector* (actual vs. expected)				
mean rating	5.1	5.0	5.2	+0.1

Notes: Medians are used when observations include extreme outliers that bias a mean representation of the average.

* "Trade sector" is defined as [(imports + exports) / GDP].

** The period change measure for the standard deviation of tariffs is based on the change between 1990/1992 and the 1998 data. Insufficient data were available to make comparisons with 1980/1982.

exchange rate and capital market controls. Exchange controls deter trade because they limit the ability of individuals to acquire currencies desired by trading partners in other nations. The black-market exchange-rate premium is indicative of the restrictiveness of these controls. As Exhibit 3-7 shows, the median black-market exchange rate declined sharply during the 1980s, and continued to fall during the 1990s. The mean rating for this subcomponent rose from 5.7 in 1980 to 7.8 in 1990-1992, and 9.0 in 1998.

Among the 91 countries in our study, 42 had average black-market exchange-rate premiums of 25% or more during the period 1980–1982. By 1990–1992, the number had fallen to 15, and by 1998 it declined to only 7. These figures illustrate

the dramatic reduction in the restrictiveness of exchange rate controls during the last two decades. The upward trend of the average country rating for this subcomponent is reflective of these changes.

The trend for tariffs is similar. As Exhibit 3-7 shows, revenues derived from taxes imposed on international trade fell from an average of 6.1% during 1980–1982 to 4.3% in 1998. The median observation of the mean tariff rate declined from 18.8% in 1980–1982 to 10.6% in 1998. The standard deviation of the tariff rate has also declined. This combination of factors–lower taxes on international trade and more uniform tariff structure–has led to a higher composite rating for the tariff component.

The capital market rating indicates the restrictiveness of regulations limiting the movement of

direct investment and financial capital across national boundaries. The mean rating for the 91 countries for this component increased from 2.6 during 1980–1982 to 3.3 in 1990–1992 and 5.2 in 1998. This indicates that barriers limiting capital movements fell slightly during the 1980s and more sharply during the 1990s.

The size of the trade sector component is based on a comparison between the actual and expected size of the trade sector as a share of the economy. As we discussed previously, the expected size is influenced by population, area, miles of coastline, and location relative to world demand. Over time, the expected size is also adjusted for the growth of world trade. This means that the mean rating for this component will remain constant across time periods. Nonetheless, there is evidence that the trade sector of most countries has been increasing as a share the economy. Trade as a share of GDP grew between 1980–1982 and 1996–1998 in 59 of the 91 countries covered by this study. The mean increase between these two periods was 17.4%.

In summary, during the last two decades black-market exchange rates have fallen, tariffs have been reduced, capital controls liberalized, and the volume of international trade as a share of the economy has increased. All of these factors indicate that trade barriers are lower and most economies are more open today than was true in 1980. The upward trend in the Trade Openness Index is consistent with this view.

Countries with the Largest Increases in Trade Openness

Which countries have experienced the largest increases in openness? The changes in the TOI over time can be used to address this question. Exhibit 3-8 (top frame) indicates the 10 countries with the largest increases in TOI between 1980–1982 and 1995–1997. Mexico, Nicaragua, Argentina, Costa Rica, and Paraguay head this list. The TOI of these countries increased by 5 points or more during the period. The TOIs of Bolivia, China, Trinidad and Tobago, Honduras, and Ecuador also increased substantially. Some of these countries–Mexico and Costa Rica, for example–achieved steady increases throughout the period. In other instances–Nicaragua and Ar-

gentina–most of the increases have taken place during the last decade.

Interestingly, nine of the 10 countries with the largest increases in TOI are located in Latin America. The "import-substitution" view of trade dominated the region in the early 1980s. The low TOI ratings for 1980–1982 in this region merely confirm this point. However, many Latin American countries moved away from import-substitution and began liberalizing their trade sectors during the latter half of the 1980s and, particularly, during the 1990s. This change explains why the region is so dominant among the countries with large increases in TOI since 1980.

All 10 countries with the largest increases in the TOI had low ratings at the beginning of the period. This is not surprising since the low initial ratings provided ample opportunity for improvement. Exhibit 3-8 (bottom frame) also presents data on the increased openness of countries with at least an initial rating of 5.0. Even though these countries were relatively open in the early 1980s, they have nonetheless achieved substantial TOI increases during the last 15 years. This group is headed by the Philippines, Sweden, France, Portugal, and Australia.

In essence, the countries of Exhibit 3-8 deserve "gold stars" for their increases in openness. How did their more open policies affect trade? Exhibit 3-9 provides the answer. Many of them recorded huge increases in the size of the trade sector. For example, Mexico's international trade rose from 23.7% of GDP in 1980–1982 to 64.5% in 1998, an increase of 172%. The trade sector of Argentina doubled while that of China tripled as a share the economy during the 15-year period. The average increase in trade as a share of GDP for the 10 countries with the largest increases in openness was 75.2%, more than four times the average increase of the 90 countries covered by this study.

The countries with initial TOI ratings of 5.0 or more that opened their economies the most also registered impressive increases in trade. The trade sectors of every one of these countries rose relative to GDP. On average, their trade increased 34.8% as a share the economy during the 15-year period, twice the average of the entire group. Exhibit 3-9 illustrates clearly that there is a strong and consistent linkage between removal of trade barriers and increases in the volume of international trade.

Exhibit 3-8: Countries with the Largest Increase in Trade Openness between 1980–1982 and 1995–1997

	TOI 1980-1982	TOI 1985–1987	TOI 1990–1992	TOI 1995–1997	Increase in TOI between 1980–1982 and 1995–1997
Mexico	1.8	4.8	7.0	7.5	5.7
Nicaragua	1.5	0.6	4.7	6.9	5.4
Argentina	1.5	1.0	2.0	6.9	5.3
Costa Rica	2.6	4.0	5.8	7.9	5.3
Paraguay	2.6	3.7	5.8	7.5	5.0
Bolivia	2.4	4.9	5.9	7.1	4.8
China	3.0	5.0	4.0	7.3	4.3
Trinidad & Tob.	2.8	3.0	3.4	7.1	4.2
Honduras	3.1	2.3	5.3	7.3	4.2
Ecuador	2.9	3.8	5.2	6.8	3.9

Countries with TOI (1980–1982) greater than or equal to 5

Philippines	5.2	5.6	6.0	7.4	2.2
Sweden	6.4	7.5	8.3	8.6	2.1
France	5.0	6.5	7.0	7.0	2.0
Portugal	5.9	6.3	7.0	7.8	1.9
Australia	6.1	7.0	7.4	7.8	1.7
Austria	6.4	6.5	7.0	7.9	1.5
Finland	6.4	6.3	5.7	7.8	1.4
Ireland	7.2	7.3	7.2	8.5	1.4
Spain	6.6	6.9	7.4	7.9	1.3
Congo, Rep.	5.5	5.3	5.2	6.7	1.2

Note: TOI 1998 is omitted in order to avoid bias that might result from a single non-smoothed data point.

Another way of viewing openness would be to focus on changes in the size of the trade sector directly. Exhibit 3-10 takes this approach. This exhibit shows the 10 countries with the largest increases in trade as a share of the economy between 1980–1982 and 1998. Four of these countries–China, Mexico, Philippines, and Argentina–were included among those with the largest increases in TOI. Turkey, Dominican Republic, Ne-pal, Thailand, Malaysia, and Zimbabwe are also included among the "top ten." This latter group of countries either had a high rating throughout the period (Malaysia) or a sizeable increase in TOI during the period from 1980 to 1998. This evidence, along with the huge increases in trade, indicate that these countries have also become more open in recent years.

Exhibit 3-9: Increases in Trade Openness and Changes in the Size of the Trade Sector

	Increase in TOI between 1980–1982 and 1995–1997	Trade Share* 1980–1982	Trade Share* 1990–1992	Trade Share* 1998	Increase in relative size of Trade Share* between 1980–1982 and 1998
Mexico	5.7	23.7%	38.3%	64.5%	172.2%
Nicaragua	5.4	67.5%	71.4%	113.7%	68.5%
Argentina	5.3	11.5%	15.0%	23.3%	102.6%
Costa Rica	5.3	63.3%	76.0%	99.8%	57.7%
Paraguay	5.0	44.0%	72.7%	73.4%	66.8%
Bolivia	4.8	37.7%	47.0%	48.6%	28.9%
China	4.3	12.9%	26.8%	39.0%	202.3%
Trinidad Tob.	4.2	89.4%	70.9%	97.7%	9.3%
Honduras	4.2	80.3%	76.1%	97.9%	21.9%
Ecuador	3.9	50.6%	60.1%	61.5%	21.5%
			Average of this group of countries:		75.2%
		Average of the entire group of 90 TOI (80-98) countries**			17.4%

Countries with TOI (1980–1982) greater than or equal to 5

Philippines	2.2	52.0%	60.8%	115.6%	122.3%
Sweden	2.1	60.8%	59.5%	81.3%	33.7%
France	2.0	44.3%	45.1%	49.6%	12.0%
Portugal	1.9	63.0%	76.2%	67.5%	7.1%
Australia	1.7	33.9%	34.6%	41.4%	22.1%
Austria	1.5	74.0%	79.0%	90.3%	22.0%
Finland	1.4	67.1%	47.6%	69.8%	4.0%
Ireland	1.4	108.4%	111.3%	157.0%	44.8%
Spain	1.3	33.8%	37.5%	56.8%	68.0%
Congo, Rep.	1.2	120.1%	97.9%	134.9%	12.3%
			Average of this group of countries:		34.8%
		Average of the entire group of 90 TOI (80-98) countries:**			17.4%

Note: *Trade share is defined as ((imports + exports) / GDP).

  ** There are 90 countries because Germany is omitted due to discontinuity resulting from unification.

Exhibit 3-10: Increases in the Size of the Trade Sector and Trade Openness

	Increase in Relative Size of Trade Share 1980–1982 to 1998	Trade Share 1980–1982	Trade Share 1990–1992	Trade Share 1998	Increase in TOI 1980–1982 to 1995–1997
Turkey	209.9%	17.1%	30.9%	53.0%	+3.7
China	202.3%	12.9%	26.8%	39.0%	+4.3
Mexico	172.2%	23.7%	38.3%	64.5%	+5.7
Philippines	122.3%	52.0%	60.8%	115.6%	+2.2
Dominican Rep.	114.3%	48.1%	77.8%	103.1%	+3.6
Argentina	102.6%	11.5%	15.0%	23.3%	+5.4
Nepal	89.8%	30.3%	31.6%	57.5%	+1.3
Thailand	85.9%	54.5%	75.5%	101.3%	+1.0
Malaysia	83.7%	112.6%	150.6%	206.9%	+0.1
Zimbabwe	68.5%	55.6%	63.6%	93.7%	+1.7
				Average of this group of countries:	+2.9
				Average of the entire group of 90 TOI (80-98)** countries:	+1.6

Note: Trade share is defined as ((imports + exports) / GDP).

Note: Germany is omitted from the TOI 1980–1998 set due to discontinuity in income data, leaving 90 countries.

SUMMARY AND CONCLUSION

A Trade Openness Index (TOI) was constructed for both 1998 and the period from 1980 to 1998. The TOI measures the extent that a country has a fully convertible currency (no black-market exchange rate), low and relatively uniform tariffs, few restrictions on the movement of capital, and a large trade sector (given its size and location).

The index was used to analyze cross-country differences in openness and their impact on economic performance. The analysis of this chapter indicates that:

- Hong Kong, Singapore, Belgium, Panama, Germany, United Kingdom, and Netherlands were the most open economies during 1980-98. The United States ranked in position 10 (tied with Sweden and Malaysia). At the other end of the spectrum, Myanmar, Bangladesh, Burundi, Iran, Sierra Leone, Syria and Algeria were the most closed. (See Exhibit 3-2.)

- Economics indicates that more open economies will grow more rapidly and achieve higher living standards because openness stimulates (a) gains from specialization and trade, (b) innova-

tion and efficient production, and (c) adoption of sound policies. Our findings are consistent with this view: persistently open economies had higher levels of per-capita income and grew more rapidly than those that were more closed. (See Exhibits 3-3, 3-4, 3-5 and 3-6.)

- Our estimates indicate that a one-unit increase in the TOI over a lengthy time period increases growth by two-tenths of a percent. This indicates that, for example, if India were as open as the United Kingdom, its long-term growth rate would be increased by approximately 1%. (See Exhibit 3-6.)

- Openness is particularly important for developing economies and less populous nations.

- The average TOI rating rose substantially during period from 1980 to 1998, indicating that the world economy became more open. Mexico, China, Ireland, and the Philippines were among the countries registering both a sizable increase in TOI and a huge increase in trade as a share of GDP. (See Exhibits 3-7, 3-8, 3-9, and 3-10.)

NOTES

(1) This chapter contains statistical analysis that was previously published in *Openness, Growth, and Trade Policy*, a staff report of the Joint Economic Committee of the United States Congress, December 2000. This report by Gwartney and Skipton is available at http://www.senate.gov~jec/.

(2) In most cases, the taxes on international trade were less than 15% of the trade sector (imports plus exports). As this ratio rose from 0% to 15%, the assigned rating declined from 10 (indicating that no taxes were levied on international trade) to 0 (indicating that trade taxes were equal to, or greater than, 15% of the trade sector). The mean tariff rate generally ranged from 0% (no tariffs) to 50% (exceedingly high tariffs). As the mean tariff rate increased from 0% to 50% or greater, the assigned rating fell proportionally from 10 to 0. As the standard deviation of tariff rates increased from 0% (indicating that a flat tariff rate applies to all imports) to 25% (or more), the rating for this component declined proportionally from 10 to 0. See the Appendix to Chapter 1 of this publication for additional details.

(3) As the black-market premium rose from 0% to 50% (and above), the assigned rating for this component fell proportionally from 10 (indicating full convertibility without restrictions) to 0. For additional details, see the Appendix to Chapter 1 of this publication.

(4) If domestic investments by foreigners and foreign investments by citizens are unrestricted, the country is given a rating of 10. When these investments are restricted only in a few industries (for example, banking, defense, and telecommunications), countries are assigned a rating of 8. When investments are permitted, but regulatory restrictions slow the mobility of capital, a country is given a rating of 5. When either domestic investments by foreigners or foreign investments by citizens require approval from government authorities, a country receives a rating of 2. A rating of 0 is assigned when both domestic investments by foreigners and foreign investments by citizens require government approval. See Appendix to Chapter 1 of this publication for additional details.

(5) The DADS variable for each country was derived by using the great-circle algorithm to adjust the real purchasing power parity GDP for distance from the potential trading partner. Countries that make up more than 99% of the world's GDP were used to derive the variable. The DADS provides an estimate for how close each country is to the mass of the world's GDP. This scalar will be large for countries that are located close to centers of world demand and small for those that are far from major GDP concentrations. The demand scalar analysis indicates that several European countries (Luxembourg, Belgium, Netherlands, etc.) are located most favorably relative to the distribution of the world's GDP. In contrast, New Zealand, Australia, Fiji, and Argentina are least favorably located relative to the concentrations of demand around the world. With time, increasing trade in services and lower transport and communications cost may significantly reduce the importance of distance as a determinant of trade. However, regression analysis indicates that distance as measured by the DADS variable continues to exert a statistically significant impact on the size of the trade sector in the 1990s.

(6) International trade also enhances living standards by making it possible for consumers to choose among a more diverse bundle of goods. When trade is stifled, the domestic market will often be too small for firms to supply a broad set of goods at a low cost. Thus, trade barriers will mean more limited selection. This factor has been easily observable in countries like Mexico, Poland, Czech Republic, and China, that have become more open in recent years. Interestingly, GDP ignores the

welfare gains accompanying the availability of a broader selection of goods. Thus, GDP and its growth rate generally understate the benefits derived from increased trade and a more open economy. For an excellent discussion of this point, see Michael Cox and Richard Alm, *The Right Stuff: America's Move to Mass Customization: 1998 Annual Report* (Dallas, TX: Federal Reserve Bank of Dallas, 1998), http://www.dallasfed.org/htm/pubs/annual/arpt98.html.

(7) Because they cover a shorter period, the 1998 data were weighted only half as much as the data for each of the four other periods.

(8) Germany was excluded from this analysis because of the difficulties involved in comparing per capita GDP before and after unification.

(9) As we noted previously, countries that adopt more open trade policies may also be more likely to follow policies consistent with price stability, protection of property rights, and reliance on markets for the allocation of goods and resources. This makes it more difficult to determine the independent impact of openness.

(10) See the Appendix to Chapter 1 of this publication for details concerning how the original data were converted to a scale of 0 to 10.

(11) For an excellent analysis of the link between international trade and growth, see Jeffrey A. Frankel and David Romer, Does Trade Cause Growth? *American Economic Review* (June 1999): 379–99.

Appendix: Tables to Chapter 3