On the Degree of Openness of an Open Economy

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One of the main subjects of the Pure Theory of International Trade has been the study of Comparative Advantage, that is, the determination of trade patterns. Ricardo focused on relative cost differences based on technology, whereas the conventional Heckscher-Ohlin model shows that even with identical technologies and constant returns, relative costs can differ if factor proportions differ. Other authors have focused on economies of scale as another determining factor of comparative advantage.

A related concept that has received much less attention from theorists is that of the degree of openness of an economy. In this case the relevant question is not **what** does a country export or import but **how much** does a country export and import in relation to its GDP? Throughout this paper I shall use the ratio TGDP=(Exports+Imports)/GDP as the measure for openness of the economy.

Adam Smith was probably the first one to consider the effects of market size on specialization and therefore on volumes exchanged. The theory of commercial policy also establishes a relation between protection and volume of trade. This suggests that trade to GDP ratios are market determined variables subject to conventional theoretical analysis and empirical verification.

Frequently, judgements on commercial policies of countries are made based on the comparison of volume of trade to GDP ratios. These comparisons and policy recommendations are usually done without resort to any theory stating which are the factors determining the degree of openness of an economy.

We normally see statements of the kind "the US is not as open as they say since it exports only 11% of GDP whereas Germany exports 29%", or "Argentina is a closed economy since it only exports 11% of GDP while its less protectionist neighbor, Chile, exports 28%". The protectionists, on the other hand, use the same data to say "Argentina is already a very open economy since her export ratio is the same as the US". A theoretical framework is clearly needed in order to make country comparisons of TGDP ratios.

Table 1: The world's most open and most closed economies in 1996

		GDP (US$ billion)	GDP pc (US$)	(X+M)/GDP	X/GDP
1	MYANMAR	101.0	2199	0.035	0.01
2	BRAZIL	749.3	4746	0.160	0.07
3	ARGENTINA	272.3	7731	0.215	0.10
4	JAPAN	4186.7	33291	0.218	0.11
5	BURUNDI	0.8	135	0.230	0.06
6	UNITED STATES	7674.0	28928	0.235	0.11
7	INDIA	392.4	418	0.244	0.10
8	PERÚ	57.5	2401	0.301	0.13
9	IRAN	134.5	2200	0.307	0.17
	WORLD	27678.9	5514	0.436	0.22
97	ESTONIA	4.2	2868	1.504	0.69
98	CONGO, REP.OF	2.4	883	1.581	0.70
99	ANTIGUA	0.5	7759	1.644	0.78
100	BAHREIN	5.8	9679	1.725	0.92
101	PANAMA	8.2	3053	1.824	0.90
102	MALAYSIA	98.7	4801	1.842	0.93
103	MALTA	3.3	9028	1.870	0.87
104	SWAZILAND	1.1	1191	1.998	0.85
105	EQUATORIAL GUINEA	0.3	642	2.495	0.68
106	SINGAPORE	100.9	27955	2.967	1.55

Source: IFS CD-ROM.

Table 1 shows basic data for the world's extremes in terms of openness. The extreme variability of openness ratios is quite evident. While Malaysia exports are 93% of her GDP, Myanmar's exports are just 1.5%. Of course, commercial policy is one determining factor in explaining some of these observed differences: Myanmar is more protectionist than Malaysia. However, we observe that the US, India and Argentina have similar exports to GDP ratios (around 11%) while the first country is relatively non-protectionist and the last two are very protectionists. We conclude that protectionism alone cannot explain openness. It is clear, however, that more proteccionism should be associated with less openness.

The other variable we want to focus on is country size. Small economic units must specialize in producing few goods in order to attain optimal scale and be competitive. They must therefore export those goods in exchange for the imports of the goods they do not produce.

The smallest economic unit, a household, sells most of his endowment (labor) and buys (imports) most of his consumption. A household is a small economic unit and has a very high degree of trade openness. On the other hand, the planet earth is the largest economic unit and the net exports are zero so that it is completely closed.

The conclusion of the above argument is that the smaller the country the more open it should be. Also, for a given size, the degree of openness will be smaller the larger is the degree of protection. We want to test empirically these propositions using cross sectional data for as many countries as possible on a given year. We expect the trade to GDP ratio to be both negatively related to size and to a measure of protectionism.

We measure country size by dollar GDP. We do not have an empirical measure of protection but I suggest using per-capita GDP as a (negatively related) proxy. Richer countries tend to be less protectionist and on the other hand protectionist countries tend to impoverish themselves (according to the accepted body of theory on the gains from trade).

The hypothesis we shall be testing is therefore that the trade to GDP ratio is negatively related to dollar GDP and positively related to per-capita GDP.

The data has been obtained from the IFS CD-ROM data bank. The chosen year 1996 was the nearest one for which we found data for a large number of countries. We had complete data for 106 countries.

The data exhibits enormous variability. The TGDP ratio ranges from a minimum of 3.5% for Myanmar to a highest 296% for Singapore. This abnormally high number is due to a large extent to the fact that Singapore exports have a very high import component, which is always the case in the Maquila exports, popular in many Central American and Asian countries. Unfortunately the available data refers to gross exports and not to the more correct measure that would be the national value added of exports. It is clear to us that Singapore is an outlier.

GDP value ranges from 7674 billion in the USA to a lowest 236 million in Dominica. The data shows that Japan and US are among the 9 most closed economies in the world, together with Myanmar, India, Iran and Burundi. Argentina and Brazil are also among the "Group of 9" which is suggestive given that both countries have recently joined the free trade area of Mercosur.

We have run an OLS regression of the TGDP ratio on the logarithms of dollar GDP (in thousands) and per-capita dollar GDP.

The regression results, shown in Table 2, fully agree with our theoretical hypothesis. The coefficients have the expected signs and are significantly different from zero at almost any confidence level. The adjusted R square is 0.37, quite high given the nature of the variables involved.

Table 2: Regression Results

TGDP = 1.105 - 0.154 log(GDP) + 0.166 log(GDPperC)

OLS // Dependent Variable is TGDP= (X+M)/GDP
No.observations: 106
Period: 1996
Source: IMF Databank CD-ROM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.105390	0.217503	5.082188	0.0000
LGDP	-0.154303	0.019397	-7.955140	0.0000
LGDPPC	0.166497	0.030448	5.468235	0.0000

R-squared	0.387580	Mean dependent var.	0.867351
Adjusted R-squared	0.375689	S.D. dependent var.	0.497442
S.E. of regression	0.393046	Akaike info criterion	-1.839764
Sum squared resid	15.91196	Schwarz criterion	-1.764384
Log likelihood	-49.89998	F-statistic	32.59266
Durbin-Watson stat	0.683675	Prob(F-statistic)	0.000000

With the regression at hand, we can now judge more properly the different degrees of openness observed. For example, the regression suggests that Argentina should have a trade to GDP ratio of 66% instead of the observed 21%. This can be interpreted as meaning that for her size and wealth, Argentina is more protectionist than what would be normal for the total group of nations, a result that many of us always believed to be the case.

Observing the data we see that on the higher end of the actual TGDP ratios there are very high values that suggest the existence of a significant maquila sector. In order to study the possibility that our results are biased by the inclusion of gross trade data instead of the more relevant net data, we have eliminated the TGDP ratios larger than 1.5 (a total of 10 observations). The regression results using the truncated data set show that the elasticity coefficients are slightly lower in value but retain the expected signs and the high level of statistical significance. The corrected R square only improves marginally. These results confirm the strength of the theoretical hypothesis being presented.

Table 3: Regression with truncated data

TGDP = 1.105 - 0.154 log(GDP) + 0.166 log(GDPperC)

OLS // Dependent Variable is TGDP= (X+M)/GDP
No.observations: 96
Period: 1996
Source: IFS Databank CD-ROM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.016820	0.1500	6.766848	0.0000
LGDP	-0.118457	0.0141	-8.394953	0.0000
LGDPPC	0.121040	0.0214	5.648511	0.0000

R-squared	0.434	Mean dependent var.	0.755
Adjusted R-squared	0.422	S.D. dependent var.	0.345
S.E. of regression	0.262	Akaike info criterion	-2.646
Sum squared resid	6.392	Schwarz criterion	-2.566
Log likelihood	-6.178	F-statistic	35.77
Durbin-Watson stat	0.824	Prob(F-statistic)	0.000000

Conclusions

In many instances, the desirability for implementing changes in trade policy is discussed using international comparisons of trade to GDP ratios (TGDP). We argue here that TGDP ratios are market determined variables that depend on several parameters, among them the existence of a maquila industry, the degree of protection and market size. Using regression analysis for 1996 data on 106 countries we find strong empirical support for a positive relation between per capita GDP and TGDP based on the assumption that GDP per capita and protection are negatively related. Our data also shows a strong negative association between GDP (size) and trade openness as could be predicted by Adam Smith's say: "The division of labor is limited by the extent of the market".

Data Sources:

Data from IFS CD-ROM for the year 1996
Codes

Population	99ZZF
GDP (current prices)	99BZF
Exchange Rate	DEZF
Exports	70DZF
Imports	71DZF