Smoke in the Water*

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Abstract

As the economic crisis deepens and widens, fears of a return to the protectionist spiral of the 1930s become more common. However, an important difference between the 1930s and today is the existence of the World Trade Organization and the legal limits it imposes on the protectionist responses members can pursue. The objective of this paper is threefold. First, to assess the extent to which applied tariff can legally be raised without violating tariff-bound obligations, and compare it with what is economically possible. Second, to examine what has been the protectionist response of individual countries when facing an economic crisis since the creation of the WTO. Finally, to predict how far the protectionist responses will go during the current crisis. Results suggest that the policy space left when looking at what is economically possible is indeed quite large. However, in the recent past very little of the available policy space has been used by countries suffering from an economic crisis. Our predictions for the current crisis are modest tariff hikes in the order of 8 percent.
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1. Introduction

During the great depression protectionism spread rapidly. By 1933 world trade was only a third of what it was in 1929. Part of this slump had to do with the decline in economic activity, but several studies estimate the contribution of protectionist forces somewhere between 25 to 50 percent of the total decline in world trade.[1]

The protectionist response started in the United States with the Smoot-Hawley Tariff Act passed in June 1930, which raised tariffs by 23 percent according to Irwin (1998). Many countries retaliate. According to Masden (2001), the world average effective tariff (the ratio of the value of import duties and import value) increased from 9 percent in 1929 to 20 percent by 1933, with values as high as 30 percent in Germany and the UK.

Several authors have warned of a similar –albeit more timid- trend developing as the current crisis deepens (Baldwin and Evenett, 2008 or 2009 and Gamberoni and Newfarmer 2009). Moreover, as suggested by Baldwin and Evenett, 2009, this time protectionism may be taking murkier forms making monitoring more difficult.

An important difference between what happened during the great depression and today, is the presence of a World Trade Organization that imposes some limits to the protectionist response.[2] One may argue that the WTO has been weakened by its failure to conclude the Doha Round it started in November 2001. However, in 1930 the only international commitment to which 1028 US based economists could refer to when asking president Hoover to veto the Smoot-Hawley Act was a 1927 League of Nations resolution announcing that "the time has come to put an end to an increase in tariffs and to move in the opposite direction''.[3]

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[1] Irwin (1998) suggests that a quarter of the decline in US trade may be due to tariff increases associated with the Smooth-Hawley Act (part of effective increase was due to declining prices associated with the depression in the presence of specific tariffs), whereas Masden (2001) attributes half of the decline to increases in tariff and non-tariff barriers.

[2] Bacchetta and Piermartini (2009) focus on the value of WTO's tariff bindings.

[3] See article on page 1 of the New York Times, May 5th 1930 : "1,028 Economists ask Hoover to Veto Pending Tariff Bill".

The objective of this paper is threefold. First, we want to assess the extent to which countries can respond to the crisis by increasing their tariffs without violating their WTO obligations. Second, to study the tariff response of countries which have been subject to economic crisis in the recent past, and finally to provide estimates of the tariff hikes we can expect in the current crisis.

2. Tariff water, smoke and deeper waters

The GATT and the Agricultural Agreement of the Uruguay Round impose a legal limit to the extent of tariff hikes by WTO members. This legal limit is called a bound tariff and is what is actually negotiated in the WTO.[4] The difference between the bound and the Most Favoured Nation (MFN) applied tariff, measures in principle the degree of flexibility available to each country within its WTO obligations. It is called tariff overhang or more commonly tariff water.[5]

Tariff water is generally low in OECD's manufacturing sector but can reach very high levels in some emerging economies, or in agriculture. In order to assess the importance that the protectionist legal response can take in different countries, we estimated the average tariff water in each country or region. To do so we follow Kee et al. (2009) aggregation methodology:

$$Water_c = \sum_{i \ni HS6} \frac{elasticity_{ic} \times imports_{ic}}{\sum_{i \ni HS6} elasticity_{ic} \times imports_{ic}} (B_{ic} - T_{ic}) \qquad (1)$$

where B_{ic} is the bound tariff on good i in country c, T is the MFN applied tariff on good i in country c, imports is the value of imports on good i in country c and elasticitiy is the

[4] During the Uruguay Round GATT's members agreeed to bind all tariff lines for agricultural products by the end of the negotiations. Moreover, since 1989 all new members to the GATT and then to the WTO were required to bind all their tariff lines on accession. This implies that binding coverage can be incomplete only for non agricultural products for countries that became members of the GATT before 1989.

[5] Recent studies focusing on the extent of tariff water include Archard (2008) or Boüet et Laborde (2008).

absolute value of the import demand elasticity on good i in country c. It is straightforward to see that Water is given by the difference between the weighted average bound tariff and the MFN applied tariff, where weights are given by the product of import demand elasticities and the value of imports.

Our estimates[6] suggest that world's tariff water is 11 percent, but is close to zero in the US and China, and higher than 70 percent in many least developed countries and small island states (see Table 1). There is also quite significant variance across sectors with world's agriculture tariff water at around 27 percent, whereas manufacturing tariff water is around 9 percent (see Appendix Table). Higher income levels are usually associated with lower MFN tariffs, but also lower levels of tariff water. The average tariff water is 7 percent among high income countries, and it doubles for middle income countries, and doubles once again for low income countries to reach 36 percent.

Given that on average world MFN tariffs are at around 5 percent, tariff water could potentially allow tariffs to triple without violating GATT's bound obligations. So potentially, we could have a protectionist reaction on tariff lines with positive water that is much stronger than the one observed during the great depression in the absence of GATT or WTO commitments. Thus, WTO tariff binding commitments would be of little value. However, a significant share of the policy space allowed by these high tariff bindings is potentially irrelevant as we discuss below.

2.1 Smoke in the water at the other end of Lake Geneva[7]

There are at least two reasons why these numbers may provide an overestimate of the extent of flexibility available. First, some of the bound tariffs may be above the prohibitive tariffs, and therefore although it is legally possible to increase tariffs above their prohibitive levels it would be economically meaningless to do so. We call this *useless water*. Second, an important share of world trade is not subject to MFN tariffs,

[6] Estimates are computed using observations for the latest available year, which is at best 2008.

[7] The song « Smoke on the water » was written by Deep Purple and refers to the fire that took place at the Montreux Casino during Frank Zappa's concert in the 1971 Festival. Montreux is at the opposite end of Lake Geneva from the WTO.

but is regulated by preferential agreements, making tariff bounds less relevant. We call this *deeper water*, as it captures the presence of deeper commitments to lower tariffs within preferential trade agreements.

Thus, there may be a lot of tariff water available, but once we control for useless and deeper water, only a fraction offers meaningful policy space. This meaningless policy space is what we call *smoke.* It is given by the sum of *useless* and *deeper water*.

All these concepts are formally defined below. *Useless water* is given by:

$$\text{Useless\_Water}_c = \sum_{i \ni HS6} \frac{\text{elasticity}_{ic} \times \text{imports}_{ic}}{\sum_{i \ni HS6} \text{elasticity}_{ic} \times \text{imports}_{ic}} \max\{0; B_{ic} - P_{ic}\} \qquad (2)$$

where P_{ic} is the prohibitive tariff of good i in country c. Note that *useless water* is bounded between 0 and Water. If *useless water*=*water* (i.e. $P_{ic}=T_{ic}$), then all legal flexibility granted by tariff binding is economically meaningless. If *useless water*=0 (i.e. $P_{ic} \geq B_{ic}$), then all legal flexibility is economically meaningful. The share of *useless water* in *water* determines the extent to which the legal flexibility granted by WTO agreements is economically irrelevant.

A problem with equation (2) is the determination of prohibitive tariffs. To calculate them we use a linear approximation around the equilibrium imports in each country. Start with the definition of the import demand elasticity, and note that a prohibitive tariff implies $\Delta m_i=-m_i$. Then solve for the prohibitive tariff recalling that the domestic price is given by $p_{ic} = p_i^w(1+P_{ic})$:

$$P_{ic} = T_{ic} + \frac{1+T_{ic}}{\text{elasticity}_{ic}} \qquad (3)$$

Thus the prohibitive tariff can be readily calculated using estimates of import demand elasticity at the six digit level of the Harmonized System for more than 100 countries in Kee et al (2008). They are then replaced in (2) to obtain a measure of *useless water*.

As mentioned earlier, preferential trade also makes bound tariffs, and *water* less relevant. To see this simply note that as MFN tariff increases, preferential trade is unaffected. If anything it increases. At the limit, if all trade is preferential, then an increase in the MFN applied tariff to the bound or prohibitive level is meaningless.

We suggest two corrections for this. First, the distribution of preferential imports across goods and its correlation with bound, applied and prohibitive tariffs matters. Thus the weights used in the weighted average need to take this into account. The idea is that if imports of good i are exclusively preferential, then the difference between bounds or prohibitive tariffs on the one hand, and MFN tariffs on the other hand, is irrelevant when it comes to measure the extent of flexibility available in the system. It is all *deeper water* that is beyond the legal scope of the WTO. *Deeper water* is then formally defined as:

$$\text{Deeper water}_c = \sum_{i \ni HS6} \frac{\text{elasticity}_{ic} \times \text{imports}_{ic}}{\sum_{i \ni HS6} \text{elasticity}_{ic} \times \text{imports}_{ic}} \left(\min\left(B_{ic}; P_{ic}\right) - T_{ic}\right) \frac{\text{imports}_{ic}^{pref}}{\text{imports}_{ic}} \qquad (4)$$

where $\text{imports}_{ic}^{pref}$ are preferential imports of good i by country c.

Finally, we define *smoke* as the sum of *useless* and *deeper water*:

$$\text{Smoke}_c = \text{Useless\_Water}_c + \text{Deeper\_Water}_c =$$
$$\sum_{i \ni HS6} \frac{\text{elasticity}_{ic} \times \text{imports}_{ic}}{\sum_{i \ni HS6} \text{elasticity}_{ic} \times \text{imports}_{ic}} \left[\max\left(0; B_{ic} - P_{ic}\right) + \left(\min\left\{B_{ic}; P_{ic}\right\} - T_{ic}\right) \frac{\text{imports}_{ic}^{pref}}{\text{imports}_{ic}} \right] \qquad (5)$$

Figure 1 illustrates the concepts we have introduced. *Water* is given by the difference between bound and MFN tariffs. *Useless water* is given by the share of *water* between

the bound and the prohibitive tariff. *Deeper water* is the share of the remaining water that is subject to preferential trade. What is left is called *policy space.*

Our estimates of the share of *useless water*, *deeper water* and *smoke* in total *water* are reported in Table 2. They suggest that around 28 percent of world's tariff water is *smoke*, and therefore does not represent truly available policy space. Around 75 percent of this is due to useless water (bounds above their prohibitive levels), and the remaining 25 percent due to *deeper water* (the presence of preferential trade). The prominence of useless water is particularly noticeable among low income and high income countries where it represents close to 90 percent of *smoke*. *Deeper water* represents more than 60 percent of *smok*e in middle income countries.

There are also some interesting differences across sectors. Around 67 percent of agriculture's tariff water is *smoke*, but only 18 percent in manufacturing. This suggests that there are some economic limits to the protectionist response in agriculture.

There are also striking differences across countries. Smoke represents less than 5 percent of tariff water in Benin, Botswana, China, Ghana, Guinea-Bissau, Macedonia, Chad, Thailand and Uganda, but it is more than 50 percent of tariff water in Australia, Chile, the European Union, Cambodia, Mexico, Namibia, Norway, Venezuela and Zimbabwe.

In any case, the economic irrelevance of tariff water due to the presence of *smoke* does not constraint in an economic significant way the protectionist response allowed by GATT's bindings. On average the remaining policy space still represents 62 percent of tariff water. And given that tariff water is about twice the existing levels of MFN protection, there is enough policy space left to more than double MFN protection.

3. Assessing the protectionist response in previous crisis

One important step on our way to assessing the protectionist response during the current crisis, is to look back and measure the protectionist response in previous crises (see also Eichengreen and Irwin, 2009). We concentrate ourselves on the recent past, with an *a*

priori that the creation of the WTO at the end of the Uruguay Round may have changed the scope for protectionist responses for member countries.[8]

Thus, our sample spans from 1995 to 2008 and it includes all countries reported in Tables 1 and 2. We identify economic crisis as an annual decline in real GDP. During the period we have on average 18 countries that suffer an economic crisis every year (this corresponds also to 18 percent of the countries in our sample). In the mid 2000s the number of economic crisis every year dropped to 5. It increased to 12 in 2008, and according to the Economist Intelligent Units predictions it will affect 71 countries of our sample in 2009. The worst year between 1995 and 2008 in terms of economic crisis is 1999, where 36 countries out of 97 suffered an economic crisis.

The equation to be estimated is given by:

$$\ln(t_{ict}) = \alpha_{ic} + \alpha_t + \beta_1 Crisis_{ct} + \varepsilon_{ict} \tag{6}$$

where β_1 is the impact of the crisis on log of MFN tariffs. With this semi-log specification, $e^{\beta_1} - 1$ is the percentage change in MFN tariffs during an economic crisis. We also try different specifications where we control for the size of the country (GDP), as well as the share of neighbors that are in an economic crisis according to our definition. Our preferred specification also includes an interaction between crisis on the one hand and economic size and the share of neighbors in an economic crisis to try to capture any potential heterogeneity. It is given by:

$$\begin{aligned} \ln(t_{ict}) = {} & \alpha_{ic} + \alpha_t + \beta_1 Crisis_{ct} + \beta_2 Neigh_{ct} + \beta_3 \ln(GDP)_{ct} \\ & + \beta_4 \ln(GDP)_{ct} * Crisis_{ct} + \beta_5 \ln Neigh_{ct} * Crisis_{ct} + \varepsilon_{ict} \end{aligned} \tag{7}$$

[8] One could test this hypothesis using earlier data, but tariff line data is only available for a few countries before 1995.

where Neigb is the share in GDP of the 10 closest neighbors of country c that had a crisis in year t.[9]

Results are reported in Table 3. The first column suggests that an economic crisis increases MFN tariffs on average by 2.0 percent. After controlling for the size of the country (large countries tend to have smaller tariffs), and the share of neighbors that are also in an economic crisis in the second column, the coefficient on crisis increases to 2.2 percent. In the third column we introduce the interaction term between crisis and size, and obtain a positive coefficient on the interaction term, signaling that large countries are more likely to increase their tariffs than small countries.[10] Note that the coefficient on crisis becomes negative, but the full derivative with respect to crisis that takes into account the interaction term is never negative and oscillates between 0 and 7 percent in the sample. It is equal to 3.2 percent at the mean of the sample.

Finally, in the fourth column we report the results of our preferred specification corresponding to equation (7) above. The coefficient on crisis is negative, but again after taking into account the interaction term with log of GDP, we have that the derivative of MFN tariffs with respect to crisis is always positive. At the mean of the sample the increase in MFN tariffs is 3.1 percent, and for the country with the largest GDP the increase is equal to 6.1 percent, and 0.6 percent for the smallest country. An additional interesting result is that if all 10 neighboring countries also get into an economic crisis (Share_Neighb=1), then the MFN tariff increases on average by 5.8 percent. The interaction between the share of neighbors in a crisis and the country itself having a crisis is quantitatively very small and is not statistically different from zero.

[9] Other sources of heterogeneity are also possible. For example Eichengreen and Irwin (2009) suggest that countries with a fixed exchange rate regime (and perfect capital mobility) are more likely to resort to a protectionist response during an economic crisis. The severity of the crisis may also matter. And therefore we could check for different types of economic crisis (e.g. declines in real GDP of more than 2 percentage points).

[10] This may be due to the fact that small countries are more likely to be under a strict structural adjustment program, and this is something that could be tested.

We also perform some robustness checks. Our results so far suggest that since 1995 up to 2008 increases in MFN tariffs during economic crisis have been modest, especially in small countries. The fifth column checks whether they have also been long lived, by introducing a lagged crisis variable. We obtain again that countries increase their tariff on average by 2 percent during the economic crisis, but that one year later this is reversed. This regression (column 5) also implicitly addresses the potential problem of endogeneity or reverse causality. Indeed, tariffs are not always higher in countries that are more subject to crisis, but they seem to rise in the year of the crisis, and decline one year later.

In column (6) we use an alternative definition of crisis to check for the robustness of the results. One may argue that in deep crisis protectionism responses will be stronger. Thus, in column (6) crisis is defined as a fall in real GDP of more than 3 percent. The results suggest again an increase in protectionism. Perhaps surprisingly the protectionism increase during strong recessions is smaller than in the presence of shallow recessions (although they are not statistically different from each other). Maybe countries in deep recessions are more likely to take the opportunity to engage in deeper institutional and policy reforms that will prevent large increases in protectionism.

Columns (7) reports results using group averages, and weighted least squares, where weights are given by group size. Indeed, given that crisis does not vary across products, the error can be correlated across HS6 digit lines within a country every year. Our previous standard error estimates are all corrected non-parametrically for the correlation in the error term within groups, and we have a sufficiently large number of clusters to ensure the asymptotic properties of this correction. Nevertheless we provide weighted least squares estimates using group averages as a robustness check. Column (7) provides results for the specification in column (1). The estimated increase in tariff is not statistically different from the one estimated in column (1), but it is not statistically different from zero either, suggesting that the increase can potentially be much lower than suggested in our previous estimates where we may have underestimated the variance of these estimates.

We explore two additional sources of response heterogeneity.[11] First in a world where a growing share of trade is undertaken in intermediate goods, one may expect the protectionist response to be smaller in intermediate goods. This is checked in column (9) where we introduced the interaction between crisis and a dummy that takes the value 1 when the good is not a final consumption good (this dummy does not enter the regression by itself because it is perfectly collinear with our country*product fixed effects). The interaction term is negative and statistically significant as expected.

Second, one may expect that the protectionist response depends on how much policy space is available, so we also introduce an interaction term between crisis and tariff water after correcting for smoke in column 9. The coefficient is small, negative and statistically insignificant, so policy space does not seem to be the constraint on countries protectionist response.[12] The last column introduces all these interaction terms together.

4. Estimating the 2009 protectionist response: fire in the sky?

We use the estimates reported in the fourth column of Table 3 to predict the percentage increases in MFN tariffs by country during the year 2009. GDP growth estimates are from the Economist Intelligence Unit.

Results are reported in Table 4. On average the economic crisis results in an increase in MFN tariffs of 8 percent. The smallest increase will occur in the Kyrgyz Republic and Togo with a moderate 1.1 percent increase in MFN tariffs. Note that of the ten countries with the lowest increase in protectionism, nine are located in SSA. The low increase in protectionism is partly explained by their small economic size, and also the fact that a small share of their neighbors is predicted to be in an economic crisis.

At the other end of the scale, we predict an increase in MFN tariff of around 10 percent in the United States, Canada and Australia. Note however, that these are countries with very

[11] We are grateful to Bernard Hoekman and Hakan Nordstrom for suggesting us these additional checks.

[12] Policy space does not enter the regression by itself because we only have it available for 2008 tariffs, and therefore it is perfectly correlated with the country*product fixed effects.

low MFN tariffs so the 10 percent increase will only lead to a moderate increase in absolute levels of protectionism. Moreover, for those countries water appears only in a limited number of tariff lines. The predicted increase in MFN tariffs is 8.3 percent in the European Union. Figure 2 plots the predicted percentage change in MFN tariffs against the log of GDP per capita.

5. Concluding Remarks

The amount of policy space left by WTO legal tariff bindings allows for an increase in MFN tariffs similar to what we observed during the great depression and this after controlling for the smoke in the tariff water, i.e., bindings above prohibitive levels and widespread regional trade agreements.

However, when looking at recent economic crisis, it seems that this large policy space has been rarely used by countries facing economic crisis. Large countries tend to increase their tariffs more than small countries when facing a crisis, and even more when the crisis also affects neighboring countries. Increases in intermediate goods' tariffs tend to be smaller than increases in final goods tariffs as one would expect in a world with a growing share of trade in intermediate goods. Also tariff increases do not seem to be constrained by the available policy space. Nevertheless, the overall increase in MFN tariffs remains modest.

Using these estimates for the period 1995-2008, we then predict the increases in MFN tariffs to be observed in 2009 depending on whether the country faces an economic crisis and the share of neighbors predicted to have an economic crisis. MFN tariff hikes oscillate between 1 and 10 percent, with the largest percentage increases in countries with relatively low levels of MFN tariffs in 2008.

Obviously, MFN tariffs are only one of many instruments in the protectionist toolbox. Baldwin and Evenett (2009) warned us of the increase in the use of murkier forms of protectionism like during the great depression, and a similar study on the evolution of other forms of protectionism is needed.

This will help us understand why countries are not using the policy space available during economic crisis. If it is the simple recognition that protectionism may not be the right response and that it can exacerbate the problem it is trying to correct, then we shouldn't be observing increases in murkier forms of protectionism. However, if the reason has to do with country reputation and fear of signaling beggar-thy-neighbor behavior to other countries, then increases in murkier and less transparent forms of protectionism are consistent with smallest increases in MFN tariffs.

Hopefully the first explanation is the correct one. But if murkier and less transparent forms of protectionism are spreading, then an adequate response by the international community would be to bring more transparency to the system.

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Appendix:

All data on MFN, PTA and bound tariffs as well as import values are from the World Integrated Trade Solution (WITS) based on the Trade Analysis and Information System (TRAINS). European Union data is only for extra-EU trade. The data on past GDP come from the World Bank's World Development Indicators. The 2009 forecasts of the GDP indicators are made by the Economist Intelligence Unit in their Country Analysis and Forecast section. The data on geodistances come from the CEPII research center.

The cross-section contains MFN and bound tariffs, at HS-6 level, import values and GDP per capita for 97(TBC) countries as well as for five regional aggregates, three income level aggregates and an overall average of all countries. For all except GDP per capita, the data is from the latest available year in TRAINS, while for the GDP per capita the year 2005 was used because it contained the least missing values.

The time series data set runs from 1995 to 2008 and counts with yearly MFN and bound tariff at HS-6 level with each country as reporter and the world as partner plus real GDP measures. Bilateral distance is used to identify the closest neighbors of each country.

Products under Preferential Trade Agreements (PTA) are those where the difference between the MFN tariff and effectively applied tariff is larger than 0.1 percent (to account for any rounding error). In this way each tariff line is labeled as having a PTA or not, the trade values are then aggregated for each country separately according to lines that are PTA and lines that are not under PTA.

When the bound tariff is smaller than the MFN, the bound was replaced by the MFN (17999 cases out of 477083 observations). In the case of an unbounded tariff line, the bound tariff is calculated by using the prohibitive tariff. In the data used in section 2, this occurred in 101761 tariff lines out of 477083 observations.

The crisis dummy capture a negative GDP growth (as recorded in the WDI) thus implying a year-to-year decline in GDP (in real terms).

The variable capturing crisis in neighboring countries is calculated as the share of crisis dummies in the closest 10 neighboring countries weighed by their GDP. (The partner's GDP are used to weigh both their distances from the country in order to rank the closest neighbors taking account of their economic size, and also when taking the share of crisis dummies of these 10 neighbors)

Figure 1: From water to policy space

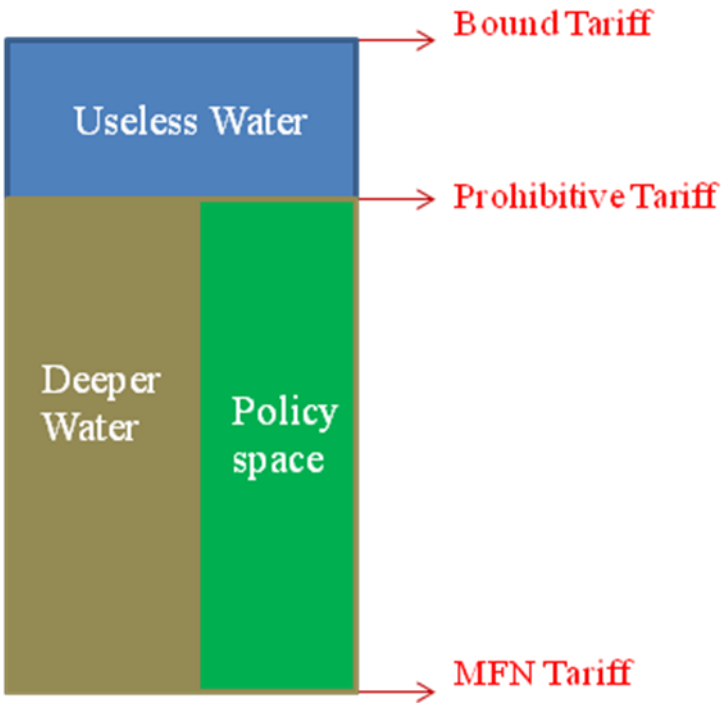

Figure 2: Predicted change in MFN tariffs

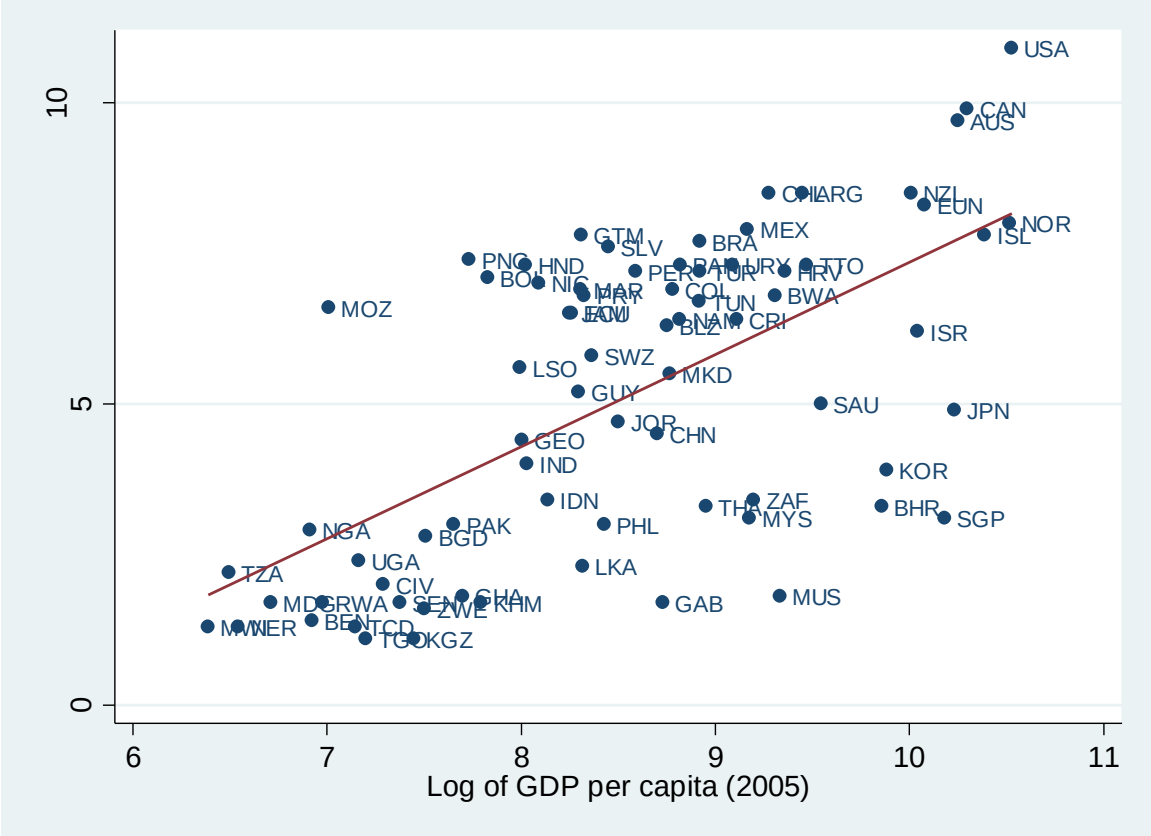

Table 1: Tariff water (Latest Available Year)

Country	MFN	Bound	Water
All Countries	0.05	0.15	0.11
High Income	0.04	0.11	0.07
Middle Income	0.08	0.24	0.16
Low Income	0.09	0.45	0.36
Antigua and Barbuda	0.14	0.69	0.55
Argentina	0.08	0.36	0.28
Australia	0.03	0.10	0.07
Bahrain	0.05	0.68	0.63
Bangladesh	0.12	0.94	0.81
Barbados	0.19	0.96	0.77
Belize	0.08	0.63	0.54
Benin	0.16	0.56	0.40
Bolivia	0.08	0.45	0.36
Botswana	0.11	0.23	0.12
Brazil	0.11	0.31	0.20
Brunei	0.10	0.43	0.33
Burkina Faso	0.09	0.61	0.52
Burundi	0.13	1.04	0.91
Cambodia	0.09	0.20	0.10
Cameroon	0.14	1.07	0.93
Canada	0.03	0.09	0.06
Central African Rep.	0.14	0.45	0.31
Chad	0.14	1.09	0.95
Chile	0.06	0.30	0.24
China	0.05	0.06	0.00
Colombia	0.14	0.50	0.36
Costa Rica	0.05	0.40	0.34
Cote d'Ivoire	0.11	0.51	0.40
Croatia	0.05	0.06	0.01
Dominica	0.12	0.73	0.62
Ecuador	0.10	0.25	0.15
El Salvador	0.07	0.36	0.29
European Union	0.05	0.08	0.03
Gabon	0.15	0.24	0.09
Georgia	0.01	0.08	0.07
Ghana	0.10	1.00	0.90
Grenada	0.12	0.58	0.46
Guatemala	0.07	0.44	0.37
Guinea	0.13	0.51	0.38
Guyana	0.12	0.60	0.47
Honduras	0.08	0.23	0.15
Iceland	0.02	0.26	0.24
India	0.10	0.37	0.27
Indonesia	0.06	0.35	0.28
Israel	0.04	0.36	0.32
Jamaica	0.08	0.55	0.46
Japan	0.02	0.20	0.18
Jordan	0.09	0.14	0.05
Korea, Rep.	0.08	0.28	0.20
Kyrgyz Republic	0.04	0.08	0.04

Country	MFN	Bound	Water
Lesotho	0.15	0.66	0.50
Macedonia, FYR	0.06	0.06	0.00
Madagascar	0.11	0.60	0.49
Malawi	0.33	1.41	1.08
Malaysia	0.04	0.21	0.17
Mali	0.11	0.47	0.36
Mauritania	0.10	0.39	0.29
Mauritius	0.03	0.85	0.81
Mexico	0.13	0.39	0.25
Mongolia	0.05	0.19	0.14
Morocco	0.19	0.43	0.24
Mozambique	0.08	0.73	0.65
Myanmar	0.06	0.64	0.58
Namibia	0.09	0.33	0.24
Nepal	0.14	0.30	0.16
New Zealand	0.02	0.11	0.09
Nicaragua	0.07	0.44	0.37
Niger	0.07	0.49	0.41
Nigeria	0.08	0.78	0.70
Norway	0.01	0.11	0.10
Oman	0.05	0.13	0.08
Pakistan	0.11	0.61	0.50
Panama	0.07	0.20	0.14
Papua New Guinea	0.01	0.31	0.30
Paraguay	0.06	0.38	0.32
Peru	0.04	0.36	0.32
Philippines	0.05	0.49	0.44
Qatar	0.05	0.17	0.12
Rwanda	0.16	0.91	0.75
Saudi Arabia	0.04	0.10	0.06
Senegal	0.10	0.29	0.19
Singapore	0.00	0.65	0.65
South Africa	0.07	0.30	0.24
Sri Lanka	0.09	0.67	0.58
St. Kitts and Nevis	0.14	0.80	0.66
St. Lucia	0.10	0.87	0.77
St. Vincent	0.12	0.77	0.65
Swaziland	0.09	0.32	0.23
Taiwan	0.06	0.07	0.01
Tanzania	0.11	0.99	0.88
Thailand	0.07	0.54	0.47
Togo	0.14	1.06	0.92
Trinidad and Tobago	0.23	0.61	0.38
Tunisia	0.20	0.68	0.48
Turkey	0.06	0.48	0.43
Uganda	0.10	1.02	0.92
United States	0.03	0.03	0.00
Uruguay	0.07	0.36	0.29
Venezuela	0.14	0.36	0.22
Zimbabwe	0.10	0.63	0.52

Table 2: Share of deeper water, useless water, and smoke in water (Latest Available Year)

Country	Deeper	Useless	Smoke
All countries	11.4	20.0	31.4
High Income	5.7	22.6	28.2
Middle Income	23.9	12.6	36.6
Low Income	3.1	27.2	30.2
Antigua and Barbuda	13.6	7.6	21.3
Argentina	21.0	22.8	43.8
Australia	39.7	21.0	60.8
Bahrain	7.4	1.1	8.5
Bangladesh	4.9	23.0	27.9
Barbados	8.7	22.0	30.7
Belize	29.5	4.8	34.2
Benin	4.9	0.5	5.4
Bolivia	43.7	6.6	50.2
Botswana	10.3	1.1	11.4
Brazil	16.4	30.5	46.8
Brunei	21.8	8.7	30.5
Burkina Faso	5.7	3.6	9.3
Burundi	46.7	3.2	49.9
Cambodia	14.0	38.7	52.7
Cameroon	4.7	1.4	6.1
Canada	17.5	5.3	22.7
Central African Rep.	0.1	1.3	1.3
Chad	0.2	1.2	1.4
Chile	56.0	7.4	63.4
China	4.7	0.3	5.0
Colombia	18.8	22.0	40.9
Costa Rica	2.1	17.9	20.0
Cote d'Ivoire	1.0	1.0	1.9
Croatia	24.3	0.2	24.6
Cuba	11.2	6.1	17.3
Dominica	36.1	4.8	40.9
Ecuador	21.3	1.2	22.5
El Salvador	12.1	18.8	30.9
European Union	11.9	41.7	53.6
Gabon	3.9	5.9	9.9
Georgia	5.5	5.3	10.8
Ghana	0.3	0.8	1.1
Grenada	21.9	4.5	26.4
Guatemala	13.7	20.0	33.7
Guinea-Bissau	0.0	0.1	0.1
Guyana	38.9	14.5	53.4
Honduras	18.0	2.0	20.1
Iceland	16.0	3.4	19.4
India	0.2	39.9	40.1
Indonesia	4.8	21.6	26.4
Israel	20.0	8.4	28.3
Jamaica	12.9	12.0	25.0
Japan	0.1	41.1	41.2
Jordan	23.8	1.1	24.9
Korea, Rep.	6.2	2.5	8.7
Kyrgyz Republic	52.2	0.0	52.2

Country	Deeper	Useless	Smoke
Lesotho	1.1	11.0	12.1
Macedonia, FYR	2.4	0.0	2.4
Madagascar	12.2	0.2	12.4
Malawi	40.9	2.3	43.1
Malaysia	17.1	16.6	33.6
Mali	6.8	1.1	7.9
Mauritania	0.0	46.7	46.7
Mauritius	8.9	4.5	13.4
Mexico	54.6	14.0	68.6
Mongolia	0.0	0.3	0.3
Morocco	34.7	14.8	49.4
Mozambique	7.2	23.5	30.7
Myanmar	11.3	29.4	40.6
Namibia	48.5	3.5	52.0
Nepal	6.8	5.3	12.2
New Zealand	37.3	13.8	51.0
Nicaragua	12.6	7.3	20.0
Niger	2.3	13.4	15.7
Nigeria	0.5	11.8	12.3
Norway	4.8	64.8	69.5
Oman	24.5	8.6	33.1
Pakistan	2.5	34.9	37.4
Panama	29.2	3.6	32.8
Papua New Guinea	0.2	5.3	5.5
Paraguay	33.0	2.4	35.4
Peru	18.3	28.0	46.2
Philippines	14.8	1.9	16.7
Qatar	14.8	9.7	24.5
Rwanda	14.2	28.9	43.0
Saudi Arabia	7.2	5.5	12.7
Senegal	0.5	14.7	15.2
Singapore	0.0	4.4	4.4
South Africa	8.7	13.6	22.3
Sri Lanka	14.9	0.5	15.4
St. Kitts and Nevis	12.5	5.6	18.1
St. Lucia	26.3	22.2	48.5
St. Vincent & Grenadines	23.0	7.0	30.0
Swaziland	0.1	29.2	29.3
Taiwan	0.3	4.4	4.7
Tanzania	11.9	2.1	14.0
Thailand	0.1	1.4	1.5
Togo	2.0	0.2	2.2
Trinidad and Tobago	1.7	6.4	8.1
Tunisia	12.7	0.9	13.6
Turkey	36.3	2.9	39.2
Uganda	5.6	0.4	6.1
United States	4.9	21.4	26.2
Uruguay	42.6	12.1	54.8
Venezuela, RB	19.9	36.1	56.0
Zimbabwe	39.7	19.8	59.5

Table 3: Protectionist responses during economic crisis

	Log MFN (1)	Log MFN (2)	Log MFN (3)	Log MFN (4)	Log MFN (5)	Log MFN (6)	*Log MFN (7)*	Log MFN (8)	Log MFN (9)	Log MFN (10)
Crisis	.0195	.022	-.114	-.089	.020	0.013	.016	-.111	-.111	-.082
	(.001)a	(.001)a	(.010)a	(.011)a	(.001)a	(0.003)a	(0.06)	(.011)a	(.011)a	(.011)a
LGDP		-.060	-.059	-.059				-.059	-.059	-.059
		(.001)a	(.001)a	(.001)a				(.001)a	(.001)a	(.001)a
LGDP*Crisis			.006	.005				.006	.006	.005
			(.001)a	(.001)a				(.001)a	(.001)a	(.001)a
Neigh		-.060		.058						-.059
		(.001)a		(.001)a						(.001)a
Neigh*crisis				.001						.001
				(.004)						(.004)
Lag Crisis					-.0245					
					(.001)a					
Interme*Crisis								-.006		-.006
								(.002)a		(.002)b
Water*Crisis									-.002	-.002
									(.001)	(.001)
Observations	3455453	3455453	3455453	3455453	3455500	3455453	770	3455453	3455453	3455453
Adjusted R^2	0.873	0.873	0.873	0.873	0.873	0.873	0.858	0.873	0.873	0.873

Standard errors are in parenthesis and are corrected for clustering across products and countries. a for $p < 0.01$, b for $p < 0.05$ and c stands for $p < 0.10$. All regressions include countryxproduct fixed effects, as well as year dummies.

Table 4: Predicting MFN tariff changes in 2009

Country	MFN Tariff	EIU forecast GDP growth 2009 (%)	Share of Neighbors with forecasted crisis	Predicted Effect on MFN (%)
All countries	0.05	-2.5	52.6	8.0
High Income	0.04	-4.3	64.7	8.3
Middle Income	0.08	1.7	25.4	5.8
Low Income	0.09	2.6	2.9	3.5
Argentina	0.08	-2.8	82.0	8.5
Australia	0.03	-1.2	100.0	9.7
Bahrain	0.05	2.4	22.5	3.3
Bangladesh	0.12	5.5	0.0	2.8
Belize	0.08	1.5	91.2	6.3
Benin	0.16	2.2	1.2	1.4
Bolivia	0.08	1.4	87.2	7.1
Botswana	0.11	0.2	84.8	6.8
Brazil	0.11	-1.5	63.3	7.7
Cambodia	0.09	-3.0	0.0	1.7
Canada	0.03	-2.2	99.2	9.9
Chad	0.14	-1.0	0.0	1.3
Chile	0.06	0.4	92.7	8.5
China	0.05	6.0	0.0	4.5
Colombia	0.14	-3.0	65.3	6.9
Costa Rica	0.05	-0.8	69.2	6.4
Cote d'Ivoire	0.11	3.0	1.1	2.0
Croatia	0.05	-1.8	82.7	7.2
Ecuador	0.10	-3.5	71.4	6.5
El Salvador	0.07	1.0	92.6	7.6
EU	0.05	-3.8	76.0	8.3
Gabon	0.15	2.8	1.2	1.7
Georgia	0.01	0.5	46.9	4.4
Ghana	0.10	5.2	1.0	1.8
Guatemala	0.07	1.2	93.6	7.8
Guyana	0.12	1.8	75.5	5.2
Honduras	0.08	-0.3	91.1	7.3
Iceland	0.02	-12.4	99.2	7.8
India	0.10	5.0	0.0	4.0
Indonesia	0.06	-1.3	0.0	3.4
Israel	0.04	0.1	51.6	6.2
Jamaica	0.08	-3.8	78.1	6.5
Japan	0.02	-6.4	0.0	4.9
Jordan	0.09	3.5	46.0	4.7
Korea, Rep.	0.08	-10.1	0.0	3.9
Kyrgyz Rep.	0.04	1.0	0.0	1.1
Lesotho	0.15	0.40	81.1	5.6

Country	MFN Tariff	EIU forecast GDP growth 2009 (%)	Share of Neighbors with forecasted crisis	Predicted Effect on MFN (%)
Macedonia, FYR	0.06	1.0	69.0	5.5
Madagascar	0.11	4.2	1.9	1.7
Malawi	0.33	8.2	1.8	1.3
Malaysia	0.04	-3.0	0.0	3.1
Mauritius	0.03	2.2	2.0	1.8
Mexico	0.13	-2.6	67.8	7.9
Morocco	0.19	2.3	71.9	6.9
Mozambique	0.08	4.8	81.6	6.6
Myanmar	0.06	0.3	52.3	8.1
Namibia	0.09	0.8	81.9	6.4
New Zealand	0.02	-3.2	97.9	8.5
Nicaragua	0.07	1.2	91.6	7.0
Niger	0.07	2.7	2.0	1.3
Nigeria	0.08	2.7	1.6	2.9
Norway	0.01	-1.2	79.2	8.0
Oman	0.05	2.5	0.0	2.3
Pakistan	0.11	1.0	0.0	3.0
Panama	0.07	-1.3	88.0	7.3
Papua N. Guinea	0.01	-0.5	100.0	7.4
Paraguay	0.06	-3.1	84.3	6.8
Peru	0.04	3.0	73.9	7.2
Philippines	0.05	-0.6	0.0	3.0
Qatar	0.05	10.8	23.0	4.4
Rwanda	0.16	5.5	7.8	1.7
Saudi Arabia	0.04	0.4	26.1	5.0
Senegal	0.10	3.5	1.0	1.7
Singapore	0.00	-7.5	0.0	3.1
South Africa	0.07	-1.6	2.1	3.4
Sri Lanka	0.09	2.6	0.0	2.3
Swaziland	0.09	0.3	81.4	5.8
Taiwan	0.06	-9.3	0.0	5.4
Tanzania	0.11	4.5	2.2	2.2
Thailand	0.07	-4.4	0.0	3.3
Togo	0.14	3.0	1.0	1.1
Trinidad Tobago	0.23	0.9	88.3	7.3
Tunisia	0.20	2.4	73.4	6.7
Turkey	0.06	-2.0	59.8	7.2
Uganda	0.10	4.0	9.5	2.4
United States	0.03	-3.1	95.4	10.9
Uruguay	0.07	-0.2	84.2	7.3
Zimbabwe	0.10	-4.7	0.0	1.6

Appendix Table

Country	Agriculture		Manufacturing	
	Smoke/ Water	Water	Smoke/ Water	Water
All countries	70.5	0.26	21.3	0.09
High Income	75.7	0.24	7.8	0.05
Middle Income	62.3	0.23	33.2	0.16
Low Income	52.1	0.72	27.1	0.33
Antigua & Barbuda	26.4	0.96	17.7	0.43
Argentina	83.3	0.24	42.1	0.28
Australia	62.0	0.05	60.7	0.07
Bahrain	33.3	0.36	7.9	0.64
Bangladesh	57.7	1.85	17.2	0.68
Barbados	28.5	0.74	31.3	0.78
Belize	5.6	0.89	41.9	0.49
Benin	7.0	0.47	5.1	0.39
Bolivia	86.7	0.30	46.4	0.37
Botswana	33.8	0.24	10.5	0.12
Brazil	86.8	0.31	40.8	0.19
Brunei	19.2	0.37	32.1	0.32
Burkina Faso	24.0	0.78	4.6	0.47
Burundi	62.4	0.75	48.2	0.93
Cambodia	68.9	0.30	30.7	0.06
Cameroon	14.0	0.71	4.8	0.98
Canada	52.8	0.07	19.0	0.06
Central African Rep.	1.6	0.12	1.3	0.35
Chad	13.2	0.60	0.2	1.01
Chile	91.4	0.23	60.4	0.24
China	18.5	0.00	4.8	0.00
Colombia	67.2	1.01	30.4	0.29
Costa Rica	31.0	0.23	19.2	0.36
Cote d'Ivoire	16.1	0.14	0.8	0.47
Croatia	25.8	0.03	24.2	0.01
Cuba	38.3	0.23	10.4	0.37
Dominica	41.7	1.01	40.5	0.52
Ecuador	40.1	0.16	19.6	0.15
El Salvador	45.6	0.29	28.0	0.29
European Union	65.6	0.23	24.8	0.01
Gabon	14.6	0.38	1.6	0.04
Georgia	31.4	0.08	5.6	0.07
Ghana	8.0	0.76	0.2	0.92
Grenada	35.1	0.70	22.4	0.40
Guatemala	46.1	0.57	31.3	0.35
Guinea	0.3	0.30	0.0	0.40
Guyana	55.7	0.71	52.4	0.42
Honduras	33.0	0.17	17.6	0.15
Iceland	28.3	0.31	18.5	0.23
India	73.4	0.68	38.0	0.26
Indonesia	42.0	0.43	24.5	0.27
Israel	48.0	0.65	23.8	0.29
Jamaica	26.1	0.74	24.6	0.41
Japan	88.4	0.70	0.1	0.11
Jordan	17.4	0.05	26.2	0.05

Country	Agriculture		Manufacturing	
	Smoke/ Water	Water	Smoke/ Water	Water
Kyrgyz Republic	60.0	0.07	48.8	0.03
Lesotho	46.7	1.93	7.2	0.46
Macedonia, FYR	16.2	0.00	1.4	0.00
Madagascar	19.9	0.34	11.8	0.51
Malawi	56.2	0.88	41.0	1.12
Malaysia	75.8	0.61	20.5	0.14
Mali	17.2	0.44	5.8	0.35
Mauritania	67.3	0.46	2.7	0.17
Mauritius	29.8	0.92	8.7	0.79
Mexico	91.1	0.26	65.7	0.25
Mongolia	1.6	0.13	0.1	0.14
Morocco	36.3	0.47	53.1	0.21
Mozambique	64.0	0.87	9.0	0.56
Myanmar	90.0	1.60	9.9	0.42
Namibia	85.7	0.41	40.9	0.21
Nepal	16.2	0.32	9.8	0.12
New Zealand	72.2	0.05	49.2	0.09
Nicaragua	58.1	0.40	10.5	0.36
Niger	48.7	0.83	9.5	0.38
Nigeria	34.7	1.13	5.1	0.63
Norway	84.4	0.66	3.9	0.02
Oman	33.8	0.11	33.1	0.08
Pakistan	56.9	1.04	35.3	0.47
Panama	18.1	0.09	34.0	0.14
Papua N. Guinea	7.5	0.26	5.1	0.31
Paraguay	89.8	0.17	33.4	0.33
Peru	73.3	0.35	35.5	0.31
Philippines	25.2	0.40	15.7	0.44
Qatar	37.7	0.16	22.9	0.12
Rwanda	39.3	0.40	43.3	0.80
Saudi Arabia	12.7	0.11	12.7	0.05
Senegal	3.4	0.16	17.2	0.20
Singapore	75.0	1.05	0.0	0.64
South Africa	46.2	0.36	19.7	0.23
Sri Lanka	13.4	0.30	15.5	0.63
St. Kitts and Nevis	24.5	0.87	15.9	0.61
St. Lucia	40.6	1.03	51.1	0.71
St. Vincent & Grenadines	36.2	1.04	26.3	0.53
Swaziland	17.6	0.34	31.0	0.22
Taiwan	39.5	0.02	0.2	0.01
Tanzania	30.7	0.91	12.0	0.87
Thailand	14.6	0.34	0.9	0.47
Togo	13.3	0.66	1.7	0.93
Trinidad Tobago	13.7	0.62	7.2	0.36
Tunisia	17.2	0.44	13.3	0.49
Turkey	44.2	0.22	38.9	0.45
Uganda	18.3	0.57	5.3	0.96
United States	43.5	0.01	6.0	0.00
Uruguay	86.3	0.25	51.6	0.29
Venezuela	65.2	0.46	53.9	0.20

Korea, Rep.	40.1	0.15	6.9	0.21	Zimbabwe	85.6	1.20	48.3	0.42