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Why are safeguards needed in a trade agreement?

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Abstract: This paper reviews the theoretical and empirical literature on the use of safeguards in a trade agreement. It then analyzes the available data on the use of safeguards by WTO members to examine two hypotheses in the economics literature, that safeguards improve welfare by facilitating tariff reductions and that safeguards improve welfare by providing insurance against adverse economic shocks. I find that countries which undertook larger tariff reductions during the Uruguay Round conducted more safeguards investigations after the WTO was established. This suggests that the presence of a safeguard clause in the WTO agreement may have facilitated greater tariff reductions during the Uruguay Round. I find no evidence that safeguards are used more intensively by countries exposed to more aggregate economic uncertainty. It thus seems unlikely that safeguards provide insurance against aggregate economic shocks.

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1. Introduction

Economists have a love-hate relationship with the idea of contingent policies in general and the use of safeguards in a trade agreement in particular. On the one hand, because the economic environment is constantly bombarded with sudden and unexpected changes in everything from technology, to individual preferences, to the weather, it makes sense to give the parties to a trade agreement some flexibility to change the terms of the agreement when something unexpected occurs. On the other hand, depending on the rules of the agreement, it is not clear that the benefits of flexibility outweigh their costs. If too much flexibility is allowed, the credibility of the agreement could be undermined, and the agreement might provide few or no benefits.

In this paper, I review the economics literature, both theoretical and empirical, on the use of safeguards in a trade agreement. Are they necessary? Do they improve welfare? After outlining the theoretical arguments in favor of and against the use of safeguards as a welfare-improving component of a trade agreement, I turn to the empirical literature on the use of safeguards and, because there is little empirical research on safeguards, other forms of contingent protection.

The paper's main contribution is to analyze the available data on the use of safeguards by WTO members to examine two hypotheses in the economics literature. First, that the presence of a safeguard option in a trade agreement facilitates greater tariff reductions during the negotiation of a trade agreement. Second, that safeguards improve welfare by acting as a form of insurance against an unexpected change in the economic environment. More specifically, imposing a safeguard during a period when the volume of imports is unexpectedly high can be thought of as an insurance payout in which the safeguard mitigates the adverse consequences of an unexpected import surge.

An ideal test of the hypothesis that safeguards facilitate tariff reductions would be to conduct a counterfactual experiment in which we compare the tariff reductions undertaken by one group of countries under the auspices of a trade agreement with no safeguard provision against the reductions undertaken by a second group that participates in a trade agreement with a safeguard option. Unfortunately, conducting this type of experiment in the real world is not possible. Instead, I conduct an empirical exercise in which I develop an econometric model that exploits variation across countries that participated in the Uruguay Round to try to infer if the presence of a safeguard option in a trade agreement can facilitate greater tariff reductions. The empirical model relates the number of safeguards investigations initiated by WTO members to the magnitude of tariff reductions undertaken during the Uruguay Round and two measures of economic uncertainty: the volatility of the aggregate economy and the variability of the exchange rate.

The analysis provides some evidence in support of the hypothesis that safeguards facilitate greater tariff liberalizations. I find that countries which undertook larger tariff reductions during the Uruguay Round conducted more safeguards investigations after the WTO was established. The evidence is strongest when the analysis is restricted to developing countries. When we include both developed and developing countries in the analysis, the findings vary across different specifications of the model. Interestingly, within this mixed pool of developed

and developing countries, omitting the steel industry from the analysis results in a strong relationship between the frequency of safeguards and the magnitude of the tariff reductions. In summary, it appears that developing countries which undertook large tariff reductions during the Uruguay Round tended to utilize safeguards more frequently under the WTO regime. While this type of exercise cannot provide definitive proof of the safeguards-as-facilitator-of-tariff-reductions hypothesis, the empirical findings are supportive of the hypothesis.

I find no evidence that the frequency of safeguards increases with increasing aggregate economic uncertainty. There is no statistically significant relationship between the number of safeguards investigations conducted by WTO members and the variance of GDP, consumption or aggregate import growth, or the variance of the nominal exchange rate. The empirical analysis finds no evidence to support the hypothesis that safeguards provide insurance aggregate uncertainty. However, this analysis should not be construed as a definitive rejection of the safeguards-as-insurance hypothesis. It is often difficult to find clear relationships between microeconomic policies like safeguards and macroeconomic variables like GDP. Future research that utilizes measures of economic uncertainty at the detailed sector or product-level could yield different results.

The paper is organized as follows. Section 2 provides general information on safeguards. Section 3 reviews the economics literature on safeguards. The empirical model relating safeguards use to tariff reductions is presented in section 4. Section 5 describes the data used in the empirical exercise. Results from the empirical analysis are presented in section 6. Section 7 concludes.

2. Background: What is a safeguard?

A safeguard is a temporary import restraint that is used to protect a domestic import-competing industry from foreign competition.[3] Under the GATT/WTO system, when countries negotiate reciprocal tariff concessions, they commit themselves to maximum "binding" tariffs. These commitments restrict, to a considerable extent, a domestic policymaker's authority to unilaterally raise its tariffs at some later date. The GATT of 1947 included two provisions under which countries could reintroduce protective trade policies. Countries remained free to temporarily raise a tariff above the maximum tariff binding or introduce a temporary quantitative restriction under the Article XIX "safeguard" provision. Countries wishing to permanently raise their bindings could do so under Article XXVIII. The GATT of 1994 provides for the use of safeguards under the Agreement on Safeguards (AS).

The text of the AS states that safeguards may be used when there is an increase in imports, either absolute or relative to domestic production, which is causing or threatens to cause injury to the domestic import-competing industry. Sykes (2007) notes that various WTO Appellate Bodies have resurrected two other requirements for safeguards that were present in Article XIX, but which were essentially ignored between 1947 and 1999. These are that safeguards may be used in response to "unforeseen developments" and if the imposing country previously

[3] Bown and Crowley (2005) provide a good overview of the economics of safeguards.

committed to a "tariff concession" on the product in question. While the vagueness of these conditions might make their usefulness doubtful from a policy perspective, these requirements make sense from an economic viewpoint. Prominent arguments in favor of safeguards are that they can facilitate greater tariff concessions and that they provide insurance against unforeseen developments.

Safeguards are temporary measures that face a basic time limit of four years. Under exceptional circumstances, protection can be extended to eight years. Importantly, after a safeguard has been in place for three years, affected exporting partners can retaliate against the safeguard by withdrawing substantially equivalent tariff concessions. Thus, safeguards-imposing countries have an incentive to abide by the time limits.

The AS states that safeguard measures should be nondiscriminatory, or MFN, but many countries use discriminatory safeguards, especially in the context of exemptions for regional trade agreement members. This practice is contentious and frequently challenged before the WTO's dispute settlement body. Pauwelyn (2004) discusses this unresolved issue.

Lastly, safeguards are included among the trade policies known as "trade remedies," "administered protection," or "contingent protection." Safeguards are distinct from other trade remedies - antidumping duties and countervailing duties - in that they are intended to be used to prevent or reduce injury to an import-competing sector that is not competitive with foreign goods. While each trade remedy has a different set of criteria that should be satisfied before the policy can be imposed, there is some overlap in these criteria which means that, in practice, these policies are to some degree substitutable. Consequently, when analyzing safeguards, it is important to be cognizant of these alternative policies and how they may be interacting with or substituting for safeguards.

3. Previous economic research

Economic arguments explaining the inclusion of safeguards in trade agreements are founded in an analysis of the effects of safeguards on welfare. This literature can be divided into arguments based solely on efficiency, that is, arguments that safeguards improve the sum total welfare of all members of a trade agreement. More precisely, efficiency arguments assume that the welfare of each individual is weighted equally and then demonstrate that even though some individuals may experience gains and others may experience losses as a result of a policy change, the sum total change in welfare is positive. Political economic or distributional arguments, in contrast, accept that safeguards do not necessarily improve total welfare. Rather, they assign some actors, e.g. governments, firms, workers, more weight than others in welfare calculations. They then show that this specially weighted measure of welfare is improved by a policy change. Often these weights are thought to reflect political power. Even though safeguards may reduce measures of worldwide welfare in which each individual merits equal weight, safeguards are understood to be included in the trade agreement because those who benefit wield enough political power to see that the policy is included in the trade agreement.

3.1 Do safeguards in a trade agreement improve worldwide welfare?

Safeguards add flexibility to trade agreements. Theoretically, this flexibility can improve welfare by making the trade agreement more responsive to a constantly changing economic environment. Alternatively, it can reduce welfare by undermining the credibility of the agreement. Both arguments have been made in the economics literature. As an empirical question, the issue is unresolved.

3.1.1 Safeguards facilitate greater trade liberalizations

Perhaps the most widely cited argument in favor of safeguards is that they can facilitate greater tariff liberalizations by governments during trade negotiations. Because a government has an escape valve if a tariff reduction causes pain to its producers, it has more freedom to make larger and potentially more risky tariff reductions. Because there are large gains from permanent tariff reductions and relatively small costs from imposing temporary safeguards in a few sectors, the world gains by having safeguards in a trade agreement, even if they are not used. Jackson (1997) provides an intuitive discussion of this.

Ethier (2002) asks: how does the interaction between unilateralism and multilateralism affect the pace of trade liberalization? His central concern is to analyze a trading system like the GATT/WTO which is characterized by the general practice of negotiating tariff reductions to benefit all members and the occasional use of temporary unilateral tariff increases through safeguards or antidumping duties. He develops a multi-country model in which countries grow at different rates. He shows, first, the pace of trade liberalization is constrained by the slowest growing countries in the world. He then illustrates how allowing these countries to temporarily raise their tariffs can accelerate the pace of worldwide trade liberalization. The key insight is that when countries negotiate tariff reductions, they do not know if their growth will be fast or slow. In a trade agreement that does not allow temporary tariff increases, countries fear their growth will be slow and will negotiate only small tariff reductions. When safeguards are added to the trade agreement, countries negotiate large tariff reductions because they know that if they turn out to have slow growth, they can temporarily increase their tariffs.

Klimenko, Ramey, and Watson (forthcoming) arrive at a similar result by examining the question of why the WTO's Dispute Settlement Body (DSB) exists. In their paper, they show that when countries regularly renegotiate their tariffs, as in the WTO's trade rounds, a DSB is necessary for the trade agreement to survive. A DSB makes it possible for countries to punish each other for violations. Because countries want to avoid punishment, they will not violate the trade agreement when it includes a DSB. As an extension to their paper, they also show that if the DSB allows countries to temporarily raise their tariffs (as is the case with safeguard measures) in response to some unexpected change in the economic environment, they will negotiate larger tariff reductions initially.

How can the theories of the role that safeguards play in facilitating tariff reductions be verified empirically? In some ways this is an impossible task - how can we prove that countries negotiate lower tariffs when a safeguard is part of a trade agreement when all the trade agreements in existence include safeguards. In section 4 I present an empirical model of the relationship between safeguards and tariff reductions by WTO members that attempts to quantify this relationship by using cross-country variation in safeguards use and tariff

reductions. My results are generally supportive of the hypothesis that safeguards facilitate tariff reductions. An interesting study of India's trade policies by Bown and Tovar (2007), which exploits cross-product variation in the magnitude of tariff reductions, finds that safeguards and antidumping duties are applied more frequently to products that experienced large tariff cuts in the 1990s. Thus, their findings appear generally consistent with the idea that an "escape clause" in a trade agreement can facilitate greater tariff reductions ex ante.

3.1.2 Safeguards provide insurance

Another economic argument in favor of the inclusion of safeguards in a trade agreement is that they act as a form of insurance against adverse economic shocks. When an unexpected change in the economy occurs (e.g. a price falls, the volume of imports rises, etc.), imposing a safeguard can partially mitigate the effect of the change (by stemming the price fall, restricting imports, etc.) and, thus, acts as something similar to an insurance payout.

Bagwell and Staiger (1990) explore how price fluctuations affect large players in a trade agreement - countries like the US, EU and Japan who have markets that are so large, their safeguard measures can significantly alter world prices. They argue that due to the self-enforcing nature of the trade agreement, in periods of large import volumes, a safeguard measure acts as a pressure valve to enable countries to sustain cooperation by temporarily raising tariffs. In the absence of a safeguard clause, countries would not be able to sustain cooperation, and the result would be a costly trade war of high levels of tariff retaliation.

Fisher and Prusa (2003) show that small countries, which can not affect world prices, can use safeguards to insure themselves against international price shocks. In their multi-sector model, imposing a safeguard in the face of a negative world price shock improves national welfare by improving the welfare of the import-competing sector.

While I am aware of no empirical research on the use of safeguards as insurance, two empirical papers from the literature on antidumping can offer insights into the relationship between economic shocks and contingent trade protection. Knetter and Prusa (2003) estimate a negative binomial model of the relationship between the number of antidumping investigations initiated in four countries - Australia, Canada, the European Union and the United States - and macroeconomic factors. They find that a one standard deviation real appreciation of the importing country's currency increases filings by 33% and a one standard deviation fall in the importing country's real GDP growth increases filings by 23%. One interpretation of these results is that domestic import-competing firms use antidumping duties to maintain their market shares and profits in the face of adverse economic shocks.

Staiger and Wolak (1994) estimate a negative binomial model of antidumping investigations using a panel of US industries. They find that industries are more likely to file petitions for antidumping protection when the market share of imports is high and the industry's capacity utilization is low. This behavior is consistent with two ideas. First, industries in the US respond to the incentive structure of US antidumping law. Second, industries use antidumping policy to insure themselves against positive import shocks and negative shocks to the demand for their products.

3.1.3 Safeguards undermine the credibility of a trade agreement

Staiger and Tabellini (1987) provide an argument against safeguards by showing that safeguards could reduce the credibility of a trade agreement. If governments are not fully committed to liberal trade, the productive factors in their economies may not efficiently reallocate because firms expect their governments to utilize safeguards in the future. Because productive factors are not efficiently allocated in a trade agreement with a safeguard, but would be in a trade agreement that did not include a safeguard, there is a relative welfare loss associated with the inclusion of the safeguard in a trade agreement.

Staiger and Tabellini (1999) compare tariff policies made under two different policy environments - the US escape clause and the Tokyo Round GATT negotiations over sectoral exclusions - to empirically investigate the question of whether GATT rules help governments make trade policy commitments to their private sectors. While they do not find direct evidence that US safeguards undermine the US government's ability to commit to a particular trade policy, they find evidence using the Tokyo Round exclusions data that supports the claim that GATT rules do give governments commitment power. This finding indirectly provides support for the hypothesis that the inclusion of safeguards in a trade agreement can erode a government's ability to commit to liberalization.

3.2 Do safeguards in a trade agreement improve national welfare?

An alternative set of arguments for why safeguards are needed in a trade agreement is that they improve national welfare for politically powerful countries or that they improve the welfare of politically powerful agents in politically powerful countries. Without the participation of these powerful countries, the agreement might not be formed. These papers founded on strong assumptions about redistribution[4] do not try to explain why safeguards are needed in a trade agreement. Instead, they offer explanations for why safeguards are included in trade agreements.

3.2.1 Infant industry arguments

Several theoretical papers (Matsuyama, 1990; Miyagiwa and Ohno, 1995, 1999; Crowley, 2006) explore how safeguards benefit import-competing firms that are technologically behind their foreign competitors. These papers examine the consequences of using a temporary safeguard to induce domestic firms to adopt newer, more efficient production technologies.[5]

Matsuyama (1990) and Miyagiwa and Ohno (1995) provide theoretical support for the WTO's practice of setting a strict termination date for safeguard protection and allowing exporting

[4] Note that redistribution in political economy models can be a redistribution from a weak or impoverished group to a strong or wealthy group.

[5] Economists have long understood that a government subsidy is better than a tariff for helping a firm adopt a new technology. A direct subsidy can achieve the same result as a safeguard, but because it doesn't increase the price consumers will face, it's less costly to society as a whole. Dixit and Norman (1980), Caves, Frankel and Jones (2002), Krugman and Obstfeld (2000) are a few standard textbooks that make this point.

countries to retaliate against safeguard measures that extend beyond this limit. Miyagiwa and Ohno (1995) find that safeguards provide an incentive for protected firms to innovate quickly only if the cost of the new technology is falling over time and the termination date for safeguard protection is credibly enforced by foreign retaliation. One implication of their paper is that the exact length of time that a safeguard must be in place in order to induce a domestic firm to acquire a new technology will depend critically on how quickly the cost of the new technology is falling. Thus, the WTO's three year time limit will provide too much protection in some cases and not enough in others. The cases in which it provides too little protection are particularly troubling. The safeguard will force consumers to pay very high prices but will not yield any benefit to the economy.

Crowley (2006) finds a nondiscriminatory safeguard tariff can accelerate technology adoption by a domestic import-competing firm, but will slow-down technology adoption by foreign exporting firms. Because an MFN safeguard tariff can delay a foreign firm's adoption of new technology, its worldwide welfare costs may exceed its benefits.

There is little empirical evidence on the effect of safeguards on technology adoption and it is not very encouraging. A 1982 study by the US government's administrative body that reviews safeguard petitions, the US International Trade Commission (USITC), found that most safeguards failed to promote positive adjustment to import competition. Rather than assisting companies in upgrading their facilities, in most cases safeguards merely slowed an industry's inevitable decline. There are some exceptions; Harley-Davidson, a motorcycle producer, received safeguard protection in 1983 and successfully retooled its plants. However, successful cases are the exception to the rule. A review of US safeguard cases since 1974 shows that some industries seek and receive protection repeatedly - for example, stainless alloy tool steel was granted safeguard protection in 1976 and again in 1983.

Recent empirical work by Konings and Vandenbussche (2007) on antidumping protection in the European Union finds evidence that antidumping measures are associated with improvements in the total factor productivity of firms that are technologically lagging behind. However, they also find that the total factor productivity growth of the most efficient firms falls under antidumping protection. This suggests that the use of safeguards to promote technological improvement would be a costly policy at best.

3.2.2 Adjustment cost arguments

Another group of theoretical papers shows how firms in declining industries can utilize political support to maintain protection. Hillman (1982), Brainard and Verdier (1994, 1997) and Magee (2002) all examine the use of tariff protection to allow a dying industry to collapse slowly, rather than quickly. Because these papers all assume that there are high costs to quickly scaling back production, they find that a temporary tariff that can slow an industry's decline can improve an importing country's welfare. However, this type of policy also slows the reallocation of capital and labor into other industrial sectors in which they would be more productive. This loss of productivity is an indirect welfare cost on the country imposing the safeguard measure.

In summary, a number of explanations have been put forward in the economics literature to explain the use of safeguards in a trade agreement. In my opinion, the two most compelling are that the presence of a safeguards provision facilitates greater tariff reductions and that safeguards can provide insurance against economic shocks. There is no empirical research that proves or disproves the first hypothesis. The idea that safeguards could provide insurance against economic shocks finds some support in the empirical work on antidumping of Knetter and Prusa (2003) and Staiger and Wolak (1994). In the next section, I present an empirical model to examine both hypotheses.

4. Empirical model

This section presents an empirical model of the number of safeguards investigations by countries that participate in a trade agreement. The model relates the number of safeguards investigations conducted by trade agreement members to tariff reductions negotiated under the trade agreement, the variance of the macroeconomic environment, the variance of the exchange rate, and country size.

This model will allow us to answer the following questions: did WTO members that undertook greater tariff liberalizations during the Uruguay Round use more safeguards than other countries? Does aggregate uncertainty, measured as the variance of GDP, consumption or import growth, affect the frequency with which safeguards are used? Is a more volatile nominal exchange rate associated with more safeguard investigations?

The number of safeguards investigations conducted in a particular time period is a non-negative count variable which exhibits over dispersion. That is, the variance of the number of investigations exceeds the mean (see table 2). This type of count data can be generated by a negative binomial distribution. In this model, the number of safeguards investigations, y_i, follows a Poisson process after conditioning on the explanatory variables, x_i, and an unobserved variable, u_i. Specifically,

$y_i \sim Poisson(\mu_i^*)$ where

$\mu_i^* = \exp(x_i\beta + u_i)$ and $e^{ui} \sim gamma(1/\alpha, 1/\alpha)$

I estimate the relationship between the number of safeguards investigations, tariff reductions and aggregate uncertainty using maximum likelihood.

In the Poisson model, it is assumed that the incidence rate r_j (the rate per unit time at which events occur) is a function of the explanatory variables:

$r_j = \exp(\beta_0 + \beta_1 x_{1j} + ... + \beta_k x_{kj})$

In interpreting the coefficient estimates from this model, it is useful to calculate incidence rate ratios (IRRs), the ratio of counts predicted by the model when the variable of interest is some magnitude above its mean value and all other variables are at their means to the counts

predicted when all variables are at their means. The incidence rate ratio for a one standard deviation change in x_i is given by:

$$IRR_i = \exp(\beta_i) = \frac{\exp(\beta_0 + \beta_1 x_1 + ... + \beta_i (x_i + stddev(x_i)) + ... + \beta_k x_k)}{\exp(\beta_0 + \beta_1 x_1 + ... + \beta_i x_i + ... + \beta_k x_k)}$$

Theoretical research in the economics literature suggests that safeguards may improve worldwide welfare by encouraging countries to undertake larger tariff liberalizations when negotiating a trade agreement. In order to test this hypothesis, we would need data from a counterfactual experiment in which a country negotiated tariff reductions as part of an identical trade agreement that included safeguards and as part of a trade agreement that did not include safeguards. Unfortunately, we are not able to observe this.

Consequently, I try to infer something about the role of safeguards in trade agreements by looking at the cross-sectional variation across WTO members in the number of safeguards investigations conducted during the five year period, 1995 - 2000 and the ten year period, 1995-2005, and the magnitude of tariff reductions arising from the Uruguay Round negotiations. A finding that the number of safeguards investigations is increasing in the magnitude of the tariff reduction undertaken during the Uruguay Round would lend support to the hypothesis that the presence of safeguards in a trade agreement facilitates greater tariff liberalizations.

Other research suggests that safeguards may improve global welfare by providing insurance in the face of economic shocks. I look for evidence that supports this hypothesis by estimating the relationship between the number of safeguards investigations and the variance of the growth rate of real GDP, real consumption, real aggregate imports and the variance of the exchange rate. A finding that countries which have more variability in their economic aggregates or exchange rate also have more safeguards investigations would provide support to the hypothesis that safeguards improve global welfare by providing insurance.

Lastly, because the number of safeguards investigations is likely to increase with the scope of economic activity, I include a control for country size, the level of real GDP.

5. Data

Data on the number of safeguard investigations initiated in each year, 1995 through 2005, by each WTO member were collected from the annual "Report (year) of the Committee on Safeguards to the Council for Trade in Goods." Two measures of safeguards investigations are used. The first measure counts an investigation into any group of products initiated on a given day as a unique investigation. The second measure defines a unique investigation as each 6 digit HS product investigated by a country. According to Finger, et. al., most Uruguay Round tariff concessions were implemented by 1999. The total number of safeguards investigations conducted during the period 1995-2000 serve as a measure of use during the transition to the new, lower tariff levels while the total number of safeguards investigations conducted during the period 1995-2005 serve as a measure which combines use associated with the transition with use after full implementation of the new tariff rates. Although I have data on the number

of investigations by all WTO members, the empirical analysis is restricted to those 62 countries which joined the WTO in 1995, participated in the Uruguay Round, and for which tariff reduction data are available. See table 1 for a list of countries. The analysis uses data on the number of investigations rather than the number of preliminary or final safeguard measures imposed for two reasons. First, previous empirical work on antidumping by Staiger and Wolak (1994) suggests that investigations alone reduce imports. Second, not all safeguard investigations reported to the WTO had their ultimate outcomes fully reported.

To examine the relationship between the number of safeguards investigations and tariff concessions agreed to during the Uruguay Round, the ideal tariff data is the change in the MFN bound tariff negotiated during the Uruguay Round. Unfortunately, this data is not easily available or, in the case of a product that had an unbounded tariff prior to the Round, this change is not well-defined. In this paper, I use two measures of tariff changes, both of which are derived from *applied* tariff rates. Data on the magnitude of Uruguay Round tariff reductions come from two sources. The primary source is the book *The Uruguay Round: Statistics on Tariff Concessions Given and Received* (World Bank, 1996) by J. Michael Finger, Merlinda Ingco and Ulrich Reincke. From this source, I use the variable "tariff reduction" from the Group G1 Tables on Concessions granted. This variable is the import-weighted average at the tariff line level of the reduction in the applied MFN tariff rate, where the reduction is defined as $(\tau_{\text{pre UR}} - \tau_{\text{post UR}})/ (1 + .5(\tau_{\text{pre UR}} - \tau_{\text{post UR}}))$. This variable was available for 34 countries (see table 1). To augment this, I turn to a secondary source, the *World Development Indicators* (WDI) CD Rom (World Bank, 2006). From this, I calculated the average applied ad valorem tariff rates in 1994 and 2000 (or closest year available) using data on the nominal value of imports and total trade taxes. I then constructed an average tariff reduction variable using the formula of Finger, et. al. to augment the data series on tariff reductions. Unfortunately, this average tariff reduction measure does not embody the detailed product weights used by Finger, et. al. and may confound unilateral tariff reductions or tariff reductions under regional trade agreements with reductions agreed to as part of the Uruguay Round. As an alternative measure of the tariff reduction, I also constructed the simple difference in pre and post Uruguay Round average applied tariff rates from the WDI.

An important caveat about using applied tariff rates is that, during the Uruguay Round, many developing countries bound their tariffs on some products at rates much higher than the (pre and/or post) applied level. Consequently, for these countries, there is no need to use a safeguards measure to temporarily protect against imports of these products so long as the tariff increase remains below the bound level. For these countries, we may not observe any relationship between the change in the applied tariff rate and the number of safeguards used. Moreover, many developing countries which had not previously bound their tariffs at any level offered tariff commitments during the Uruguay Round. In these cases, the reduction in the bound tariff is not well defined. Further, because I do not have data on the pre and post Uruguay Round bound tariff rates, I don't know if the changes in the applied tariff rates are larger or smaller than the changes in the bound rates.

Macroeconomic data on real GDP, consumption and imports come from the OECD whenever available and the IFS otherwise. For each variable, I calculated the annual growth rate for the

years 1995 through 2005. The variance of the growth rates over two periods, 1995-2000 and 1995-2005, serve as measures of aggregate uncertainty.

Quarterly nominal exchange rate data (end of period domestic currency/US dollar) come from the OECD when available and the IFS otherwise.[6] The variance of the logged level of the quarterly nominal exchange rate between 1995 and 2000 and between 1995 and 2005 are the two measures of exchange rate uncertainty used.

The measure of country size, the logged level of PPP-adjusted real GDP (chain-weighted measure) in 2000, comes from the Penn World Tables Version 6.1.

Summary statistics for all variables are reported in table 2.

6. Empirical results

The negative binomial model of safeguards investigations by WTO members indicates that developing countries which undertook large tariff reductions during the Uruguay Round conducted more safeguards investigations after the establishment of the WTO. This provides some support for the hypothesis that safeguards facilitate greater tariff concessions during trade agreement negotiations. However, when the sample is expanded to include developed and developing countries, the results are mixed with some specifications confirming the relationship between tariff reductions and safeguards investigations and others finding no statistically significant relationship. The model finds no evidence of a statistically significant relationship between safeguards investigations and aggregate economic shocks, measured as the variance of GDP growth or the variance of the logged exchange rate. This implies that it is unlikely that safeguards provide insurance against aggregate economic uncertainty.

Tables 3 and 4 present results from the negative binomial model of safeguards investigations between 1995 and 2000. Tables 5 and 6 present results for investigations between 1995 and 2005.

Results in table 3 columns 1 through 3 present evidence on the relationship between the magnitude of tariff reductions and the number of safeguards investigations conducted between 1995 and 2000. Tariff reductions enter the model as positive numbers so that a positive coefficient on a tariff reduction variable implies that a larger tariff reduction is associated with more safeguards investigations. Beginning with column 1, the coefficient on the absolute reduction in the tariff, 14.98, can be restated as an IRR of 4.46 in response to a 10 percentage point increase in the tariff reduction variable, or as an IRR of 1.9 in response to a one standard deviation increase in this variable. That is, if the magnitude of tariff reductions were to increase by 10 percentage points, the predicted number of safeguards investigations would increase by a factor of four and a half. If the magnitude of tariff reductions were to increase by one standard deviation (4.3 percentage points), the predicted number of safeguards investigations would increase by a factor of 1.9.

[6] Real exchange rate data were available for too few countries to conduct a useful analysis.

Turning to column 2 of table 3, which uses a percentage change measure of the tariff reductions, the coefficient estimate of 5.72, while positive, has a low IRR of 1.3 for a one standard deviation increase and is not statistically different from zero. Column 3 attempts to discern if the difference between results using the absolute reduction in the tariff versus the percent reduction is due to differences in the measurement of the variable or differences in the samples. In this column, the model is estimated on the relatively small sample of countries for which the WDI tariff reduction data is available, but uses the percent reduction measure which combines data from Finger, et. al with that from the WDI. Here, the coefficient on the tariff reduction of 18.28 is large and statistically significant. Transforming this coefficient yields an IRR of 6.2 in response to a 10% increase in the tariff reduction or an IRR of 2.7 in response to a one standard deviation (0.055) increase in the tariff reduction. This suggests that if countries had undertaken greater tariff liberalizations during the Uruguay Round, we would see six times as many or two and a half times as many safeguards, depending on the magnitude of the additional reduction.

Columns 4 through 6 of table 3, which also control for the variance of real GDP growth between 1995 and 2000, present results on the magnitude of tariff reductions that are qualitatively and quantitatively similar to those in columns 1 through 3. In all specifications, the estimate on the variance of GDP growth is not statistically different from zero. Similar statistically insignificant results are obtained if one uses consumption or aggregate import growth. To quantify the results, in column 4, the IRR for a one standard deviation increase in the tariff reduction variable is 3.4 while the IRR for a one standard deviation increase in the variance of GDP growth is 2.9 although the IRR for the GDP growth variable is not statistically different from 1.

Table 4 builds on the results in table 3 by including controls for the variance of the exchange rate and country size. Overall, the results confirm the basic findings presented in table 3. In the small sample of 41 countries, tariff reductions are associated with more safeguards investigations, but there is no clear or statistically significant pattern between the variance of GDP growth or the nominal exchange rate and safeguards investigations. As expected, larger countries (measured by PPP adjusted GDP) conduct more safeguards investigations.

Tables 5 and 6 present results that are qualitatively and quantitatively similar to those in tables 3 and 4 using data on a longer time period, 1995-2005.

Table 7 adds additional insight into the relationship between tariff reductions and safeguards. The dependent variable in table 7 counts the number of 6 digit HS products that were subject to a safeguard investigation between 1995 and 2005. Because most safeguard investigations cover groups of 6 digit products, this variable is a more precise measure of how much protection is sought by a country through safeguards. It also tells us how robust our previous results are to a slight change in the definition of a key variable – the number of safeguard investigations.

The left-hand panel of table 7 (columns 1 through 4) utilizes a dependent variable that counts every 6 digit HS product investigated as a separate safeguard investigation. The results are qualitatively and quantitatively the same as those presented in tables 3 through 6. From column 2, the IRR associated with the tariff reduction coefficient of 24.682 tells us that if the

magnitude of the tariff reduction during the Uruguay Round had been one standard deviation larger (that is, if average tariffs had been reduced by an additional 5.5 percentage points), then we would have observed 3.9 times as many products investigated for safeguard protection over the period 1995 through 2005.

Turning to the right-hand panel of table 7 (columns 5 through 8), the dependent variable counts all products subject to a safeguard investigation between 1995 and 2005 with the *exclusion* of steel products. Notably, this excludes the products investigated in the U.S. Global Steel Safeguard of 2001. Interestingly, in column 7 the effect of average tariff reductions on safeguard use is large and statistically significant in the 62 country sample of industrialized and developing countries. The IRR associated with an additional one standard deviation reduction (4.7 percentage point reduction) in the tariff is 2.1. That is, if an industrialized or developing country had reduced its average tariff by an additional 4.7 percentage points, we would expect that that country would have conducted twice as many safeguard investigations into non-steel products.

The puzzle of why the coefficient on the tariff reduction variable is large and statistically significant in the small 41 country sample, but small and insignificant in the larger 62 country sample in tables 3-6 and in the left-hand panel of table 7 can be somewhat resolved by looking at the countries and products used in the estimation. Table 1 presents the countries, the number of safeguards investigations conducted by product group and by individual 6 digit HS product, and the tariff reduction data available from the two sources, Finger et. al. and the WDI. Notably, many large industrialized countries, Australia, the European Communities, Japan and the United States, do not have tariff data available in the WDI and, consequently, are omitted from the smaller 41 country sample. As these countries are relatively heavy users of safeguards, but engaged in only small average tariff reductions during the Uruguay Round, it is unsurprising that their inclusion in the sample leads to small and statistically insignificant estimates on the tariff reduction variable. Because the smaller 41 country sample consists almost entirely of developing countries, one interpretation of the empirical results is to say that the inclusion of safeguards in the GATT facilitated greater tariff reductions by developing countries. The results in the right-hand panel of table 7 suggest that steel products are unique in their policy treatment in industrialized countries. For non-steel products, the results in table 7 are consistent with a hypothesis that the presence of a safeguard option in the GATT facilitated greater tariff reductions during the Uruguay Round.

7. Conclusion

Safeguards have been part of the GATT-WTO system for over 50 years. While the arguments in favor of them are theoretically appealing, empirically we do not know if safeguards are a welfare-improving policy tool. The fact that they are used only rarely suggests that the direct costs associated with distortions in the sectors in which they are used are probably small. However, there are potentially large costs associated with an inefficient allocation of resources that occurs because governments' commitments to trade liberalizations are not credible. On the other hand, the potentially large benefits of safeguards, the additional trade and more efficient allocation of resources arising from greater tariff reductions, cannot easily be quantified.

This paper has shown, using data on developing countries, that countries which undertook greater tariff liberalizations during the Uruguay Round undertook more safeguards investigations after the establishment of the WTO. This is suggestive that the inclusion of safeguards played a role in facilitating greater tariff reductions during the Uruguay Round. Moreover, this result is robust to a larger sample that includes industrialized and developing countries, but which excludes safeguard investigations into steel products. In finding that there is no relationship between the number of safeguards investigations conducted and the variance of macroeconomic aggregates, the paper suggests that safeguards are not providing insurance against macroeconomic shocks. This is surprising in light of the empirical research on antidumping.

Although the theoretical and empirical research discussed in this paper could lead one to conclude that the benefits of safeguards likely outweigh their costs, that conclusion might be premature. While safeguards have been used relatively rarely to date, that could change. Perhaps the best argument against including safeguards in a trade agreement is the concern that they could evolve into a protectionist tool like the antidumping duty, a policy instrument that was conceived to serve an economically sound objective, but that today simply enriches import-competing producers at a high cost to consumers.

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Table 1: Safeguard investigations by WTO member

	No. of investigations initiated between 1995 and 2000	No. of investigations initiated between 1995 and 2005	No. of 6 digit product investigations initiated between 1995-2000	No. of 6 digit product investigations initiated between 1995-2005	No. of 6 digit product investigations excl. steel, initiated 1995-2000	No. of 6 digit product investigations excl. steel, initiated 1995-2005	Percent tariff reduction (Source: Finger et al.)	Percent tariff reduction (Source: WDI)
Argentina	3	5	44	46	44	46	4.2%	.
Australia	1	1	1	1	1	1	8.0%	.
Bahrain	0	0	0	0	0	0	.	0.0%
Brazil	1	3	15	16	15	16	1.1%	.
Bulgaria	1	7	1	27	1	4	.	5.8%
Canada	0	2	0	3	0	3	4.7%	1.0%
Colombia	1	3	4	6	4	6	3.6%	.
Congo Dem	0	0	0	0	0	0	.	1.0%
Costa Rica	0	1	0	2	0	2	.	4.4%
Cote d'Ivoire	0	0	0	0	0	0	.	19.8%
Croatia	0	0	0	0	0	0	.	1.3%
Czech Republic	3	9	34	70	34	37	1.4%	.
Dominican Republic	0	0	0	0	0	0	.	9.9%
El Salvador	3	3	25	25	25	25	3.8%	.
Estonia	0	1	0	6	0	0	.	0.7%
European Communities	0	4	0	97	0	8	3.1%	.
Ghana	0	0	0	0	0	0	.	-1.2%
Guatemala	0	0	0	0	0	0	.	2.8%
Hungary	0	4	0	76	0	6	2.8%	.
Iceland	0	0	0	0	0	0	15.8%	.
India	11	16	14	46	14	46	16.5%	16.3%
Indonesia	0	2	0	9	0	9	11.1%	2.0%
Jamaica	0	1	0	2	0	2	12.5%	1.3%
Japan	3	3	3	3	3	3	2.7%	.
Jordan	2	11	4	18	4	16	.	5.7%
Kenya	0	0	0	0	0	0	.	-2.6%
Korea	4	4	16	16	16	16	8.5%	1.2%
Kuwait	0	0	0	0	0	0	.	-0.5%
Kyrgyz Republic	0	0	0	0	0	0	.	0.3%

Table 1 Continued

	No. of investigations initiated between 1995 and 2000	No. of investigations initiated between 1995 and 2005	No. of 6 digit product investigations initiated between 1995-2000	No. of 6 digit product investigations initiated between 1995-2005	No. of 6 digit product investigations excl. steel, initiated 1995-2000	No. of 6 digit product investigations excl. steel, initiated 1995-2005	Percent tariff reduction (Source: Finger et al.)	Percent tariff reduction (Source: WDI)
Latvia	1	2	6	26	6	26	.	2.0%
Lesotho	0	0	0	0	0	0	.	1.1%
Malaysia	0	0	0	0	0	0	7.3%	2.4%
Maldives	0	0	0	0	0	0	.	-1.2%
Malta	0	0	0	0	0	0	.	7.4%
Mauritius	0	0	0	0	0	0	.	6.3%
Mexico	0	1	0	9	0	9	0.9%	.
Namibia	0	0	0	0	0	0	.	-1.9%
New Zealand	0	0	0	0	0	0	7.8%	.
Nicaragua	0	0	0	0	0	0	.	8.0%
Norway	0	0	0	0	0	0	3.4%	.
Oman	0	0	0	0	0	0	.	0.2%
Pakistan	0	1	0	25	0	25	.	13.4%
Panama	0	0	0	0	0	0	.	-0.8%
Papua New Guinea	0	0	0	0	0	0	.	3.2%
Paraguay	0	0	0	0	0	0	.	-1.6%
Peru	0	1	0	292	0	292	12.8%	2.6%
Philippines	0	6	0	11	0	11	7.9%	8.9%
Poland	1	5	1	53	1	4	4.2%	.
Romania	0	0	0	0	0	0	1.8%	.
Singapore	0	0	0	0	0	0	14.9%	.
Slovak Republic	2	3	10	11	10	11	1.4%	.
Slovenia	1	1	6	6	6	6	.	5.4%
Sri Lanka	0	0	0	0	0	0	11.8%	5.6%
St. Kitts and Nevis	0	0	0	0	0	0	.	-1.2%
Switzerland	0	0	0	0	0	0	1.4%	0.2%
Thailand	0	0	0	0	0	0	14.9%	.
Tunisia	0	0	0	0	0	0	6.9%	13.2%
Turkey	0	5	0	13	0	13	6.5%	.
United States	9	10	21	193	16	18	2.9%	.
Uruguay	0	0	0	0	0	0	9.4%	2.4%
Venezuela	3	6	24	55	1	30	2.6%	-0.6%

Table 2: Summary Statistics

	62 country sample	41 country sample
Number of safeguard investigations initiated between 1995 and 2000	0.806 (1.974)	0.561 (1.871)
Number of safeguard investigations initiated between 1995 and 2005	1.952 (3.216)	1.512 (3.31)
No. of 6 digit HS product investigations initiated between 1995 and 2000	2.344 (0.666)	1.732 (0.778)
No. of 6 digit HS product investigations initiated between 1995 and 2005	10.448 (3.149)	13.268 (7.245)
No. of 6 digit HS product investigations, excluding steel products, initiated between 1995 and 2000	2.12 (0.635)	1.171 (0.544)
No. of 6 digit HS product investigations, excluding steel products, initiated between 1995 and 2005	6.336 (2.467)	12.049 (7.176)
$\tau_{pre} - \tau_{post}$	0.031 (0.043)	0.031 (0.043)
% change in $\tau_{pre} - \tau_{post}$	0.066 (0.047)	0.049 (0.055)
Var(GDP growth$_{1995\text{-}2000}$)	0.001 (0.001)	0.001 (0.002)
Var(GDP growth$_{1995\text{-}2005}$)	0.001 (0.001)	0.001 (0.001)
Var(log of nominal exchange rates$_{1995\text{-}2000}$)	0.161 (0.504)	0.181 (0.596)
Var(log of nominal exchange rates$_{1995\text{-}2005}$)	0.392 (1.482)	0.355 (1.540)
Logged level of PPP adjusted GDP in 2000	4.532 (1.938)	3.887 (1.706)
Number of observations	62	41

Table 3: Maximum Likelihood Estimates of the Negative Binomial Model

Explanatory Variables	Dependent Variable: Number of investigations initiated between 1995 and 2000					
Absolute tariff reduction (Source: WDI)	14.98 (10.23)			22.28** (11.30)		
Percent reduction in tariff (Source: Finger et al. & WDI)		5.72 (6.40)	18.28* (9.59)		5.69 (6.48)	18.92** (8.99)
Variance of real GDP growth between 1995 and 2000				542.53 (438.07)	-85.32 (231.47)	278.49 (360.74)
Constant	-1.34** (0.63)	-0.55 (0.46)	-1.97*** (0.76)	-2.39** (0.98)	-0.45 (0.53)	-2.40*** (0.91)
Observations	41	62	41	41	62	41

Notes: ***, ** and * denote variables statistically different from zero at the 1, 5 and 10 percent levels, respectively. The numbers in parentheses are standard errors.

Table 4: Maximum Likelihood Estimates of the Negative Binomial Model

Explanatory Variables	Dependent Variable: Number of investigations initiated between 1995 and 2000					
Absolute tariff reduction (Source: WDI)	22.55** (11.11)	3.53 (11.08)	-0.50 (12.76)			
Percent reduction in tariff (Source: Finger et al. & WDI				5.52 (6.41)	-1.71 (5.65)	-1.72 (5.66)
Variance of real GDP growth between 1995 and 2000	628.02 (477.94)	60.27 (313.07)	-153.15 (450.89)	-11.31 (260.89)	-74.50 (185.74)	-79.47 (217.73)
Variance of the log of the nominal exchange rate between 1995 and 2000	-0.91 (1.63)		0.90 (1.45)	-0.59 (0.89)		0.04 (0.98)
Logged level of PPP adjusted real GDP in 2000		0.59** (0.28)	0.70** (0.33)		0.50*** (0.15)	0.50*** (0.15)
Constant	-2.40** (0.96)	-3.62*** (1.21)	-3.78*** (1.25)	-0.46 (0.53)	-2.60*** (0.81)	-2.60*** (0.81)
Observations	41	33	33	62	53	53

Notes: ***, ** and * denote variables statistically different from zero at the 1, 5 and 10 percent levels, respectively. The numbers in parentheses are standard errors.

Table 5: Maximum Likelihood Estimates of the Negative Binomial Model

Explanatory Variables	Dependent Variable: Number of investigations initiated between 1995 and 2005					
Absolute tariff reduction (Source: WDI)	16.44* (8.49)			20.29** (8.83)		
Percent reduction in tariff (Source: Finger et al. & WDI)		4.91 (5.34)	17.32** (8.09)		4.99 (5.26)	18.20** (7.76)
Variance of real GDP growth between 1995 and 2005				364.78 (283.99)	70.51 (168.69)	248.49 (243.16)
Constant	-0.34 (0.45)	0.40 (0.36)	-0.74 (0.55)	-0.93 (0.61)	0.31 (0.41)	-1.10* (0.63)
Observations	41	62	41	41	62	41

Notes: ***, ** and * denote variables statistically different from zero at the 1, 5 and 10 percent levels, respectively. The numbers in parentheses are standard errors.

Table 6: Maximum Likelihood Estimates of the Negative Binomial Model

Explanatory Variables	Dependent Variable: Number of investigations initiated between 1995 and 2005					
Absolute tariff reduction (Source: WDI)	20.15** (8.75)	10.48 (8.75)	7.17 (9.42)			
Percent reduction in tariff (Source: Finger et al. & WDI)				4.86 (5.22)	-0.70 (4.50)	-0.55 (4.50)
Variance of real GDP growth between 1995 and 2005	421.21 (302.75)	194.04 (222.07)	-213.32 (500.59)	160.42 (192.64)	84.84 (137.43)	154.29 (169.72)
Variance of the log of the nominal exchange rate between 1995 and 2005	-0.34 (0.66)		1.87 (2.08)	-0.40 (0.39)		-0.28 (0.40)
Logged level of PPP adjusted real GDP in 2000		0.31 (0.19)	0.37* (0.20)		0.36*** (0.11)	0.35*** (0.11)
Constant	-0.92 (0.60)	-1.54* (0.83)	-1.50* (0.81)	0.32 (0.41)	-1.10* (0.59)	-1.09* (0.59)
Observations	41	33	33	62	53	53

Notes: ***, ** and * denote variables statistically different from zero at the 1, 5 and 10 percent levels, respectively. The numbers in parentheses are standard errors.

Table 7: Maximum Likelihood Estimates of the Negative Binomial Model

Explanatory Variables	Dependent Variable: Number of 6 digit HS products investigated between 1995 and 2005				Dependent Variable: No. of 6 digit HS products investigated excluding steel products between 1995 and 2005			
Percent reduction in tariff (Source: Finger et al. WDI)	6.973 (8.229)	24.682** (10.676)	6.981 (8.284)	28.322*** (9.862)	14.991 (6.914)	26.605*** (9.610)	15.359** (6.747)	28.324*** (9.535)
Variance of real GDP growth between 1995 and 2005			-50.197 (258.266)	621.387 (471.036)			160.706 (264.095)	376.416 (496.951)
Constant	2.533*** (0.539)	0.703 (0.695)	2.584*** (0.607)	-0.322 (0.878)	1.400*** (0.468)	0.342 (0.646)	1.190** (0.554)	-0.187 (0.878)
Observations	62	41	62	41	62	41	62	41

Notes: ***, ** and * denote variables statistically different from zero at the 1, 5 and 10 percent levels, respectively.
The numbers in parentheses are standard errors.

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