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Exempted Sectors in Free Trade Agreements

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ABSTRACT

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Almost all participants in free trade agreements (FTAs) exclude at least a few products or sectors from complete tariff removal on the exports of their FTA partners. The positive tariffs that remain within an FTA are often the highest tariffs that the countries apply on an MFN basis. It seems plausible that such exclusions may be chosen because the domestic producers of these products are viewed as especially vulnerable to competition from imports from the partner country. In brief, they are especially “sensitive sectors.” We develop this idea theoretically and then test it empirically on data from 37 countries in 240 importer-exporter pairs within FTAs. We find support for the sensitive-sector hypothesis only in the high-income countries. We find low-income countries, in contrast, to exempt sectors where bilateral tariff removal would be more likely trade diverting and therefore harmful. Our explanation for this, supported empirically, is not that they are following the advice of trade economists, but rather that they are avoiding loss of tariff revenue and also being influenced by the greater bargaining power of richer and/or larger partners in their FTAs.

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I. Introduction

Almost all participants in free trade agreements (FTAs) exclude at least a few products or sectors from complete tariff removal on the exports of their FTA partners. The positive tariffs that remain within an FTA are often the highest tariffs that the countries apply on an MFN basis. This paper documents this practice across a large number of FTAs and attempts to explain how these exempted sectors are selected.

One explanation that seems plausible is that such exclusions are chosen because the domestic producers of these products are viewed as especially vulnerable to competition from imports from the partner country. In brief, they are especially “sensitive sectors.” We find evidence for this explanation, but only in a subset of countries, primarily the most developed countries. To the extent that exempted sectors are sensitive, their exclusion from tariff reduction eliminates products for which the FTA would otherwise have been “trade creating,” in terminology of Viner (1950). Therefore

^{*}We have benefited from discussions of this topic with Ibrahim Gunay, Chris Magee, and participants at the 27th International Conference of The International Trade and Finance Association, Poznan, in 2017.

this exemption of sensitive sectors reduces the likelihood that the FTA will be beneficial in terms of overall welfare. However, since we find evidence for exempted sectors being sensitive only in developed countries, other explanations for their selection must be sought.

Additional explanations include the following: Countries may exclude sectors out of concern for lost tariff revenue, especially if the benefits from including these sectors would be small. Countries may also succumb to pressure from their FTA partners *not* to exclude sectors that they would otherwise exempt, based on the interest of those partners if they are large and powerful, leaving sectors to be excluded only if they are of little interest to the partner country.

Using a simple partial equilibrium theoretical model of an FTA, we first examine how these several motivations for exempting sector play out in that model, and how they relate to the effects that the FTA will have on welfare as captured by Viner's (1950) concepts of trade creation and trade diversion. Based on that analysis, we perform empirical analysis of available data on FTAs and their exempted sectors.

II. Theory

Appendix A sets out and solves a partial equilibrium model of trade and tariffs among three countries, A, B, and C, with country A importing from the other two. Suppose that country A initially levies an MFN tariff, t , on both B and C, then forms an FTA with only B so that its tariff on B is eliminated. From the solution in Appendix A, we get the prices of the good in country A before and after the formation of the FTA:

$$p_0^A = \frac{\gamma}{\beta} + \frac{(b^B + b^C)t}{\beta} \quad (1)$$

$$p_1^A = \frac{\gamma}{\beta} + \frac{b^C t}{\beta} \quad (2)$$

where $b^i, i = A, B, C$, is the slope of country i 's export supply or import demand, $\beta = \sum_i b^i$, and $\gamma = \sum_i b^i a^i$ with a^i the autarky price in country i . From this the change in price in country A is simply

$$\Delta p^A = p_1^A - p_0^A = -\frac{b^B t}{\beta} \quad (3)$$

Note that this result, and those below that follow from it, depends on the assumption of the model in Appendix A that both countries B and C export positive quantities to country A in both equilibria.

It is the price change in (3) that primarily determines how much the FTA disrupts the domestic industry producing this product in country A. This depends primarily on the size of the tariff, but also on b^i/β , which under additional assumptions laid out in Appendix A is simply country B's share in the world economy.

Trade Creation and Diversion

We can use the model solution (A-14) in Appendix A to find the change in country A's imports due to the FTA:

$$M_0^A = \frac{b^A [b^B (a^A - a^B - t) + b^C (a^A - a^C - t)]}{\beta} \quad (4)$$

$$M_1^A = \frac{b^A [b^B (a^A - a^B) + b^C (a^A - a^C - t)]}{\beta} \quad (5)$$

$$\Delta M^A = M_1^A - M_0^A = \frac{b^A b^B t}{\beta} \quad (6)$$

This increase in imports of country A is a measure of Viner's (1950) "trade creation," the beneficial portion of the effect of the FTA on the importing country. We denote it TC , and note that it depends almost solely on the price change in (3):

$$TC = \Delta M^A = \frac{b^A b^B t}{\beta} = -b^A \Delta p^A \quad (7)$$

Thus the beneficial effect of the FTA is directly related to the price change that disrupts the competing domestic industry. This is because the gain from an FTA, like any comparative-advantage-based gain from trade, arises from replacing domestic production with lower-cost imports. Thus the more that a country stands to gain from an FTA in a sector, the more those working in that sector will resist the FTA and request that they be exempted from its tariff reductions.

We can also use the solutions (A-15) and (A-16) to get the changes in exports from countries B and C:

$$X_0^B = \frac{b^B [b^A (a^A - a^B - t) + b^C (a^C - a^B)]}{\beta} \quad (8)$$

$$X_1^B = \frac{b^B [b^A (a^A - a^B) + b^C (a^C + t - a^B)]}{\beta} \quad (9)$$

$$\Delta X^B = X_1^B - X_0^B = \frac{b^B (b^C + b^A) t}{\beta} > 0 \quad (10)$$

$$X_0^C = \frac{b^C [b^A (a^A - a^C - t) + b^B (a^B - a^C)]}{\beta} \quad (11)$$

$$X_1^C = \frac{b^C [b^A (a^A - a^C - t) + b^B (a^B - a^C - t)]}{\beta} \quad (12)$$

$$\Delta X^C = X_1^C - X_0^C = -\frac{b^C b^B t}{\beta} < 0 \quad (13)$$

As must be true, $\Delta X^B = \Delta M^A - \Delta X^C$. That is, the increase in exports from partner country B combines the increase in imports of country A and the reduction in imports from country C. The latter is Viner's "trade diversion," the trade that country A was doing before but that is now coming from partner country B instead of country C. As Viner taught us, trade diversion is harmful to the importing country

A because it is substituting a higher cost source for a lower cost source. But note too that this trade diversion, though harmful to country A as a whole, has no adverse effect on A's competing producers. They are harmed only by trade creation.

Letting TD denote trade diversion, we have

$$TD = -\Delta X^C = \frac{b^C b^B t}{\beta} = -b^C \Delta p^A \quad (14)$$

Thus the harmful aggregate effect of the FTA in this industry also depends on its price change, but here it is scaled by b^C , which reflects the size of the economy outside of the FTA. Together these also allow us to compare trade creation and trade diversion:

$$\frac{TC}{TD} = \frac{b^A}{b^C} \quad (15)$$

It is not the case that TC and TD directly measure the associated welfare effects, so we cannot infer the net welfare effect of an FTA in a sector from whether $TC/TD > 1$. However, the valid message is that the country is more likely to gain from the FTA in the sector the higher is b^A (and thus the larger is country A) and the smaller is b^C (and thus the smaller is the rest-of-world).

Domestic Markets and Injury

Letting $S^A = s^A(p^A - c^A)$ be the domestic supply function in country A, as in (A-18a) in Appendix A, the change in producer surplus is

$$\Delta PS^A = S_0^i \Delta p^i + \frac{s_0^i}{2} (\Delta p^i)^2 \quad (16)$$

Using (7) this becomes

$$\Delta PS^A = -S_0^A \frac{TC}{b^A} + \frac{s_0^A}{2} \left(\frac{TC}{b^A} \right)^2 < 0 \quad (17)$$

where the sign follows from keeping supply non-negative.¹ As expected, holding S_0^A fixed, the loss of producer surplus increases with increasing trade creation:

$$\frac{d\Delta PS^A}{dTC} = -\frac{S_0^A}{b^A} + 2\frac{s^A}{2} \frac{TC}{b^{A^2}} = -\frac{S_0^A}{b^A} - \frac{s^A \Delta p^A}{b^A} = -\frac{S_1^A}{b^A} < 0 \quad (18)$$

Tariff Revenue

The change in country A's tariff revenue includes both the reduced revenue from reduced imports from country C and the complete loss of the original tariff revenue from country B. This is

$$\Delta R^A = t\Delta X^C - tX_0^B = -t(TD + X_0^B) \quad (19)$$

Thus country A stands to lose all of the tariff that it initially collects on imports from country B, plus the tariff rate times the quantity of trade diversion. For any given values of initial trade, the loss of tariff revenue increases with trade diversion.

Selection of Exempted Sectors

From this we see two alternative rationales for exempting sectors from the tariff cuts of an FTA. If the country is most concerned about the disruption that will be caused to domestic industry, then it will exempt those sectors where the effects of the FTA will be most trade creating. These are the sectors we have described as “sensitive sectors” in earlier work. Such concern about industry disruption could be based on concern for the well-being of disrupted workers and firms, or it may be a reflection of their political influence.

¹An equivalent version of (17) is $\Delta PS^A = -S_1^A \frac{TC}{b^A} - \frac{s^A}{2} \left(\frac{TC}{b^A}\right)^2$, which is clearly negative for $S_1^A \geq 0$, but which varies with S_1^A and thus with the size of the tariff.

Alternatively, countries may be more concerned about the role of tariff revenue in the government budget. If so, (19) suggests that they will seek to exempt those sectors where the FTA is more likely to divert trade than to create it. And in addition, they will avoid exempting sectors where tariff revenue from the partner country is initially high, because of a high tariff rate and/or a high level of exports from that country.

In our empirical analysis below, we use a simple predictor of trade creation and trade diversion, in addition to other variables, to sort out how these motives appear to have influenced the selection of exempted sectors in FTAs.

Predictor of Trade Creation vs. Trade Diversion

To obtain a simple and intuitive predictor of the extent of trade creation vs. diversion for use in our empirical analysis, we can first define two elasticities. Let η^A be (minus) the elasticity of demand for imports and ε^C be the elasticity of supply of exports by country C, then:

$$\eta^A = -\frac{dM^A}{dp^A} \frac{p^A}{M^A} = b^A \frac{p^A}{b^A(a^A - p^A)} = \frac{p^A}{(a^A - p^A)} \quad (20)$$

$$\varepsilon^C = \frac{dX^C}{dp^C} \frac{p^C}{X^C} = b^C \frac{p^C}{b^C(p^C - a^C)} = \frac{p^C}{(p^C - a^C)} \quad (21)$$

Then

$$\frac{TC}{TD} = \frac{b^A}{b^C} = \frac{M^A}{X^C} \frac{p^C - a^C}{a^A - p^A} = \frac{M^A}{X^C} \frac{\eta^A}{\varepsilon^C} \frac{p^C}{p^A} = \frac{M^A}{X^C} \frac{\eta^A}{\varepsilon^C} (1 + t) \quad (22)$$

We see from this expression that the extent of trade creation relative to trade diversion is inversely related to the ratio $\frac{X^C}{M^A}$, which is the share of non-FTA trade in the product. This is an intuitive measure of the potential for trade creation relative

to trade diversion because if the third country share were very small, an FTA is likely to cause substantial trade creation but does not have much scope for causing trade diversion. By contrast, when the third country share is large, there is a much greater scope for an FTA to cause trade diversion. We will therefore focus our analysis on this simple predictor of trade creation relative to trade diversion.

III. Empirical Specification

Motivated by the theory from Section II, we are interested in studying whether products are more likely to be excluded from an FTA when there is a greater potential for trade creation vs. trade diversion. We will specifically consider an empirical specification that takes the following form:

$$E_{ijp} = \beta_1 + \beta_2 r_{ijp} + \delta_{ij} + \varepsilon_{ijp},$$

where E_{ijp} is a binary variable that records whether product p is an excluded product in an FTA between importer i and exporter j . The main independent variable of interest is r_{ijp} , our measure of the extent of trade creation relative to diversion in this product.

Following (22), r_{ijp} is defined as the share of non-FTA imports by country i from country j of the product as a fraction of total imports by country i from country j of the product. This measure excludes from both the numerator and denominator imports from countries in FTAs that were either already in place prior to the agreement between importer i and exporter j , or that are concurrent. Since the decision to exclude a product is itself likely to affect the trade flows between two partners, we calculate r_{ijp} using trade flows prior to the FTA between i and exporter j . We specifically use an average of the

three years preceding the FTA so as to also help smooth out fluctuations related to business cycles.

In addition to r_{ijp} , our specification also includes importer-exporter fixed effects, δ_{ij} , which ensure that our regression estimates compare products *within* a given importer-exporter pair. With these fixed effects, our regression estimates will effectively capture an average of the relationship between the third country share and the likelihood of a product being excluded in each of the country-pairs we study. In addition to importer-exporter fixed effects, we will also consider robustness tests that also include product fixed effects.

Given the broad range of countries and FTAs that are present in our sample, it will be useful to examine any potential heterogeneity in the effects that we identify through our baseline specification. To do this, we will make use of interaction terms so that we have empirical specifications of the following form:

$$E_{ijp} = \beta_1 + \beta_2 r_{ijp} + \beta_2 (r_{ijp} \times \mathbf{X}_{ijp}) + \delta_{ij} + \varepsilon_{ijp},$$

where \mathbf{X}_{ijp} is a vector of characteristics that we interact with r_{ijp} . As this notation suggests, these characteristics could potentially depend on the importer, exporter and product, though they may also vary in only one of those dimensions (e.g. only at the importer level). These interaction terms will shed light on the determinants of the relationship between r_{ijp} and E_{ijp} .

IV. Data

For our empirical analysis, we require data on tariff rates under preferential trade agreements. While standard sources of trade data such as the UNCTAD TRAINS and the

WTO-IDB should in principle contain this information, these data tend to have very incomplete coverage of FTAs and often report MFN tariff rates as the applied tariff even when there are in reality separate preferential tariffs. We overcome these limitations of the standard sources of tariff data by using a unique global tariff database from CEPII (Guimbard et al., 2012) that provides bilateral tariff rates at the six-digit HS product level for a large number of countries while exhaustively taking into account preferential trade agreements. These data are available in the form of three-year averages for 2000-2002, 2003-2005, 2006-2008 and 2009-2011.

In determining whether a product is excluded from an FTA or not, we simply consider whether the applied tariff rate is positive in the latest available period, i.e. in 2009-2011. We will focus on FTAs that entered into force in 2005 or earlier so that these agreements have had at least some time to phase in. It is possible that some of the products that we identify as excluded are provisioned to eventually move towards a zero tariff rate under the FTA. Our data do not allow us to distinguish between such cases and cases where the tariff rate will remain positive in perpetuity, but it seems reasonable to consider a product that will retain a positive tariff for a relatively long period of time to still be an excluded product in a somewhat broader sense of the term.

In addition to tariff data, our analysis also requires trade data at the six-digit HS-level. While the HS trade data from UNCOMTRADE technically are available starting in 1988, they only become available for a broad set of countries in the early to mid 1990s. With this in mind, we use trade data from 1995 onward. We specifically use a version of UNCOMTRADE from CEPII that uses a statistical procedure to weight either the importer- or the exporter-reported data according to an estimated reliability level. Dealing

with mirror data in this relatively thorough manner is likely to be useful for us, given that we have a broad range of countries covered in our database, including some that may have less precisely reported trade data.

Since we use trade data averaged over three years prior to an FTA coming into force, our sample will then only include FTAs that enter into force in 1998 or later. As discussed above, in order to give some time for an agreement to phase in, we also only include agreements up to 2005. We also impose several additional restrictions. First, we only include importers and exporters that have a population of at least 1 million during the entire 1995-2005 period. Second, we drop observations where exporter j does not export to importer i at all in the product in question, since there would then be no possibility of trade creation or trade diversion as defined in our theoretical framework. We drop the E.U. member countries as importers because of their common external tariffs, but we include them as exporters. For other customs unions, we still include each country separately because these customs unions have not fully implemented common external tariffs and so there is still likely to be substantial variation in tariffs at the level of an importing country. We also drop observations where the MFN tariff was already equal to zero when the FTA came into force since the FTA would then cause neither trade creation nor diversion. In order to determine MFN tariff rates, we use data from TRAINS, which contains information on several years predating the period in which we have tariff data from CEPII. Finally, we drop importer-exporter pairs where no product is

excluded from the tariff cuts and also those where more than 50% of products are excluded.

Table 1 provides some summary statistics on our final sample, which includes a total of 37 importing countries and 240 importer-exporter pairs. Our sample includes a wide range of countries and includes a reasonable mix of high-, middle- and low-income countries. We can see from Table 1 that the fraction of excluded products in this sample ranges from about 0.03 for Malawi to 0.44 for the Philippines. While some countries have an agreement with a single partner, others have agreements with several dozen.

V. Results

We can now turn to the main results from our empirical analysis. Table 1 shows the results from the baseline analysis. From Column 1, we see that for the entire sample of countries, the effect of the third country share on the likelihood of a product being sensitive is positive and significant. The magnitude of the estimates imply that moving from a third-country share of 0 to 1 would increase the probability of a product being exempted by about 6.5% percentage points. Recalling from (22) that the third-country share is positively related to trade diversion, this result suggests that a product is more likely to be exempted when there is a greater scope for trade diversion rather than creation.

This result masks considerable heterogeneity across countries. Columns 2 and 3 repeat this analysis on samples of high-income (OECD) countries and non-high-income countries. We see that there is a substantial *negative* effect for high-income countries and a positive effect for other countries. The negative effect is consistent with the discussion

in Deardorff (2017), who suggests that excluded products are ones that are *sensitive* and so are the ones where there is a greater scope for trade creation rather than diversion.

Columns 4, 5 and 6 repeat this analysis using a slightly different measure of the third country share. In this case, we include all exporters that will enter into an FTA with the importer in the same year as the exporter under consideration in the denominator when calculating the third country share. This specification helps account for cases where an importer may provide the same market access to all exporters entering into an FTA in the same year. This might be the case especially when multiple exporters are part of the same trade agreement. Since the third country share measured this way less often takes a value of 1, it also allows us to test the robustness our analysis on a somewhat larger number of importer-exporter-product combinations. As we see from Columns 4-5, these results are very consistent with those from Columns 1-3.

Our results in Table 1 raise the question of why products with high third country shares are less likely to be exempted only in high-income countries. We consider two potential reasons for this. First, developing countries tend to rely on tariffs as a source of government revenue to a much greater extent than do developed countries. That being the case, these governments may have a stronger incentive to keep positive tariffs on trade diverting sectors so as to avoid the unnecessary loss of government revenue shown in (19). A second potential reason is that developing countries may have less bargaining power when forming FTAs, and so generally have to open up rather than protect

industries where substantial trade creation is more likely. We explore these hypotheses in the regressions reported in Table 3.

As described in Section III, the approach we take is to include interaction terms of the third country share with various country characteristics. The first column of Table 3 essentially repeats the split sample analysis from Table 2 but by including an interaction between the third country share and a high income indicator rather than considering high- and non-high-income countries separately. These estimates are consistent with Table 2 in implying a negative effect for high income countries and a positive one for the rest of the sample.

The second column of Table 3 introduces an interaction term between the third country share and a variable that indicates whether a country is or is not highly reliant on tariff revenue. We code a country as having a high tariff reliance if it obtains more than 5% of government revenue through trade taxes. We obtain information on tariff reliance from the IMF's World Revenue Longitudinal Database. Our estimates indicate a more positive effect of the third country share on the probability of a product being excluded when the country relies more on tariff revenue. This is consistent with the idea that countries that rely more on tariffs might have a stronger incentive to avoid causing substantial trade diversion. The magnitude or significance of the high-income interaction does not change substantially, however, suggesting that these tariff revenue considerations do not fully account for the differential effect for high-income countries.

The third and fourth columns include interactions of the third country share with whether the partner country is high income and whether the partner (i.e. the exporter) is larger than the importer, respectively. Both a high income partner and a larger partner

should be expected to have higher negotiating power and so allow us to explore the bargaining power explanation for our results discussed above. Consistent with this hypothesis, we see that the coefficients on these terms are positive and significant. This means that countries are less likely to protect trade creating sectors when their partner is richer or relatively large. Since a greater degree of trade creation vs. trade diversion is desirable from a welfare perspective, these results are somewhat ironic in suggesting that countries with more negotiating power are likely to end up with less beneficial – or more possibly harmful -- trade agreements as a result.

The last column reports the results of a regression that simultaneously includes all of the interaction terms. We see that our overall results are consistent with what we find when we include each interaction term separately. Taken together, these results imply a substantial variation across countries in the relationship between the third country share and whether a product is excluded or not. This variation is consistent with the importance of both negotiating power and tariff revenue considerations.

Table 4 repeats some of our key regressions with product fixed effects in addition to the importer-exporter fixed effects. These fixed effects allow us to control for factors that make certain products more likely to cause trade creation vs. diversion across a range of importer-exporter pairs. It would therefore control for variations in the demand or export supply elasticities to the extent that these are similar for a product across destinations, and hence bring us closer to directly capturing the trade creation relative to trade diversion expression given by (22). We can see from Table 4 that the inclusion of

these additional fixed effects does not substantially affect any of the results we described earlier.

VI. Conclusions

In the paper we set out to understand the extent to which countries leave some tariffs positive in FTAs, exempting them from the GATT/WTO requirement that most tariffs be removed. Our initial expectation was that countries would exempt sectors where they expected the FTA to be primarily trade creating, since that would cause disruption of the domestic import-competing industry and harm to firms and workers there. Thus exempted sectors would be primarily what we called “sensitive.”

Our empirical analysis, based on data from 37 importing countries and 240 importer-exporter pairs within FTAs, found the opposite when we did not control for country characteristics. Separating the sample into high- and low-income countries, and also by controlling of country income in an interaction term, we found the expected tendency for exempted sectors to be trade creating in high-income countries, but the opposite in low-income countries. To explain the latter, we also included variables to indicate government reliance on tariff revenue and differences in country size that might reflect bargaining power. The results of both suggested that poor countries exempt sectors where loss of tariff revenue would be a concern and where the bargaining power of FTA partners would be important.

The perhaps surprising implication of all of this is that high income countries tend to undermine the overall beneficial effects of their FTAs by exempting sensitive sectors from the tariff cuts, but that low-income countries do the opposite, and may even do so in

response to pressure brought upon them by their richer or larger FTA partners. Thus it seems to be more likely that the small, poor countries gain more, or are more likely to gain at all, from the FTAs that they enter into because of their different choice of exempted sectors.

Table 1: Descriptive Statistics

Importer	Fraction Exc. Products	# of Partners	Earliest FTA	Latest FTA
ALB	0.09	7	2002	2004
AUS	0.24	2	2005	2005
BIH	0.15	5	2002	2004
CAN	0.06	1	2002	2002
CHE	0.10	9	1999	2005
CHL	0.05	26	2002	2004
CRI	0.24	3	2002	2002
DOM	0.09	5	2001	2002
DZA	0.06	14	1998	1999
GTM	0.14	2	2001	2001
HND	0.14	2	2001	2001
HRV	0.11	30	1998	2004
IDN	0.01	1	1999	1999
IND	0.20	1	2001	2001
ISR	0.14	9	1998	2004
JPN	0.20	2	2002	2005
KOR	0.19	1	2004	2004
LKA	0.21	2	2001	2005
MAR	0.11	14	1998	1999
MDA	0.11	4	2004	2004
MEX	0.06	28	1998	2004
MKD	0.30	28	2000	2004
MOZ	0.06	7	2000	2000
MUS	0.06	3	2000	2001
MWI	0.03	1	2000	2000
MYS	0.28	1	1999	1999
NIC	0.07	2	1998	2002
NOR	0.24	9	1999	2005
NZL	0.16	2	2001	2005
PAN	0.26	2	2003	2004
PHL	0.44	1	1999	1999
SLV	0.28	3	2001	2003
SRB	0.16	5	2004	2004
UKR	0.18	1	2001	2001
USA	0.10	3	2001	2005
VNM	0.43	1	1999	1999
ZMB	0.23	3	2000	2001

Table 2: Baseline Regressions

	(1)	(2)	(3)	(4)	(5)	(6)
	Dependent Variable: Excluded Product Indicator					
Third country share	0.065*** (0.007)	-0.176*** (0.031)	0.075*** (0.007)			
Third country share (combined)				0.056*** (0.008)	-0.177*** (0.033)	0.060*** (0.008)
Observations	112,378	34,198	78,180	243,822	37,739	206,083
R-squared	0.209	0.073	0.258	0.190	0.075	0.206
Importer-Exporter FE	Yes	Yes	Yes	Yes	Yes	Yes
Sample	All	High Inc.	Not High Inc.	All	High Inc.	Not High Inc.

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 3: Regressions with Interaction Terms

	(1)	(2)	(3)	(4)	(5)
	Dependent Variable: Excluded Product Indicator				
Third country share	0.075*** (0.007)	0.067*** (0.008)	0.034*** (0.008)	0.001 (0.008)	-0.040*** (0.010)
Third country share x high income	-0.251*** (0.032)	-0.243*** (0.033)	-0.244*** (0.032)	-0.224*** (0.032)	-0.204*** (0.032)
Third country share x high tariff reliance		0.030** (0.015)			0.079*** (0.016)
Third country share x high income partner			0.066*** (0.012)		0.066*** (0.015)
Third country share x exporter larger				0.106*** (0.011)	0.077*** (0.013)
Observations	112,378	112,378	112,378	111,603	111,603
R-squared	0.210	0.210	0.210	0.212	0.212
Importer-Exporter FE	Yes	Yes	Yes	Yes	Yes
Sample	All	All	All	All	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 4: Regressions with Product Fixed Effects

	(1)	(2)	(3)	(4)
	Dependent Variable: Excluded Product Indicator			
Third country share	0.053*** (0.006)	-0.124*** (0.028)	0.062*** (0.006)	-0.027*** (0.010)
Third country share x high income				-0.165*** (0.028)
Third country share x high tariff reliance				0.058*** (0.015)
Third country share x high income partner				0.049*** (0.014)
Third country share x exporter larger				0.060*** (0.012)
Observations	112,295	33,825	77,965	111,521
R-squared	0.399	0.405	0.447	0.403
Importer-Exporter FE	Yes	Yes	Yes	Yes
Product FE	Yes	Yes	Yes	Yes
Sample	All	High Income	Not High Income	All

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

References

- Deardorff, Alan V. 2017. "Sensitive Sectors in Free Trade Agreements," in process, May 17.
- Guimbard, H., Jean, S., Mimouni, M. & Pichot, X. 2012. "MacMap-HS6 2007, an exhaustive and consistent measure of applied protection in 2007", *International Economics*, Q2, 2012, p. 99-122.
- Viner, Jacob. 1950. *The Customs Union Issue*, New York: Carnegie Endowment for International Peace.

Appendix A: Three Country Model

The Model

This is a partial equilibrium model of three countries, A, B, and C, trading a homogeneous good subject potentially to bilateral tariffs. Unspecified domestic supply and demand functions in each country, i , are linear, giving rise to linear functions for each country's supply of exports, X^i , and demand for imports, M^i :

$$X^i = b^i(p^i - a^i), \quad i = A, B, C, \quad p^i \geq a^i \quad (\text{A-1})$$

$$M^i = b^i(a^i - p^i), \quad i = A, B, C, \quad p^i \leq a^i \quad (\text{A-2})$$

where a^i is the autarky price in country i and b^i is the slope parameter, positively related to the elasticities of supply of exports and demand for imports. From (A-1, A-2)

$$X^i \geq 0 \quad \Rightarrow \quad p^i = a^i + X^i/b^i \quad (\text{A-3})$$

$$M^i \geq 0 \quad \Rightarrow \quad p^i = a^i - M^i/b^i \quad (\text{A-4})$$

We assume that initial conditions are such that both countries B and C export positive amounts to A, both under an initial MFN tariff and also under an FTA between A and B. Let t^i be the specific tariff levied by Country A on imports from Country i , $i = B, C$. Thus we assume that

$$a^A > a^i + t^i, \quad i = B, C \quad (\text{A-5})$$

Therefore there will be positive exports from both countries to A and the following must hold:

$$p^i = p^A - t^i, \quad i = B, C \quad (\text{A-6})$$

In equilibrium

$$M^A = X^B + X^C \quad (\text{A-7})$$

Given exogenous tariffs and the parameters a^i , b^i , substituting (A-1) and (A-2) into (A-7) gives three equations (two in (A-6) and one in (A-7)) for the three unknown prices in each country.

Solution of the Model:

Substituting (A-1), (A-2), and (A-6) into (A-7):

$$b^A(a^A - p^A) = b^B(p^A - t^B - a^B) + b^C(p^A - t^C - a^C) \quad (\text{A-8})$$

which rearranges to

$$(b^A a^A + b^B a^B + b^C a^C) + (b^B t^B + b^C t^C) = (b^A + b^B + b^C) p^A \quad (\text{A-9})$$

Let

$$\beta = b^A + b^B + b^C \quad (\text{A-10a})$$

$$\gamma = b^A a^A + b^B a^B + b^C a^C \quad (\text{A-10b})$$

Then in equilibrium

$$p^A = \frac{\gamma}{\beta} + \frac{b^B t^B + b^C t^C}{\beta} \quad (\text{A-11})$$

Note that the a^i are the autarky prices in the respective countries. From (A-10) and (A-11), if tariffs are both zero, then prices (in all countries, since they are then equal) are a weighted average of the autarky prices, since γ/β is the sum of the a^i each multiplied by its respective b^i as a fraction of the sum of the all b^i 's. Since the b^i tell the quantity of each country's trade for a given gap between trade price and autarky price, they mainly reflect the countries' sizes.

Solving for the other prices as well as quantities, we have:

$$p^B = \frac{\gamma}{\beta} + \frac{b^B t^B + b^C t^C}{\beta} - t^B = \frac{\gamma}{\beta} + \frac{b^C t^C}{\beta} - \frac{\beta - b^B}{\beta} t^B \quad (\text{A-12})$$

$$p^C = \frac{\gamma}{\beta} + \frac{b^B t^B + b^C t^C}{\beta} - t^C = \frac{\gamma}{\beta} + \frac{b^B t^B}{\beta} - \frac{\beta - b^C}{\beta} t^C \quad (\text{A-13})$$

$$M^A = b^A(a^A - p^A) = \frac{b^A[b^B(a^A - a^B - t^B) + b^C(a^A - a^C - t^C)]}{\beta} \quad (\text{A-14})$$

$$X^B = b^B(p^B - a^B) = \frac{b^B[b^A(a^A - a^B - t^B) + b^C(a^C + t^C - a^B - t^B)]}{\beta} \quad (\text{A-15})$$

$$X^C = b^C(p^C - a^C) = \frac{b^C[b^A(a^A - a^C - t^C) + b^B(a^B + t^B - a^C - t^C)]}{\beta} \quad (\text{A-16})$$

Note that, as must be, (A-15) and (A-16) add to (A-14).

Finally we use (A-15) and (A-16) to calculate country A's revenue from its tariffs:

$$\begin{aligned} R^A &= t^B X^B + t^C X^C \\ &= t^B \frac{b^B(b^A(a^A - a^B - t^B) + b^C(a^C + t^C - a^B - t^B))}{\beta} \\ &\quad + t^C \frac{b^C(b^A(a^A - a^C - t^C) + b^B(a^B + t^B - a^C - t^C))}{\beta} \end{aligned} \quad (\text{A-17})$$

Domestic Markets

For some purposes it is helpful to relate these results to the domestic supply, S^i , and demand, D^i , functions that underlie (A-1, A-2). Suppose that these are linear as follows, for all $i = A, B, C$:

$$S^i = s^i(p^i - c^i), \quad p^i \geq c^i \quad (\text{A-18a})$$

$$D^i = d^i(m^i - p^i), \quad p^i \leq m^i \quad (\text{A-18b})$$

where $s^i, d^i > 0$ are slope parameters and $c^i, m^i > 0$ are intercepts. Equating these, we get the autarky price.

$$a^i = p^{iA} = \frac{s^i c^i + d^i m^i}{s^i + d^i}, \quad (\text{A-19})$$

And letting $X^i = S^i - D^i = -M^i$ we get

$$b^i = s^i + d^i, \quad (\text{A-20})$$

Country Size

To deal with country size, we add the following assumption about the composition of industries in each country: Let the industry in each country be composed of a large number n^i of competitive suppliers, each with the same supply curve $\sigma(p^i - c^i)$. Thus the slope parameter of all firms in all countries is the same, σ , and the firms differ across countries only in their cost intercepts, c^i . The industry domestic supply curve is therefore

$$S^i = n^i \sigma(p^i - c^i), \quad p^i \geq c^i \quad (\text{A-21})$$

Assume too that demanders in all countries also share a single slope parameter, δ , and differ across countries only in their intercepts, m^i . And assume that the numbers of demanders in each country are a common multiple, Γ , of n^i . Then the industry domestic demand curve is

$$D^i = \Gamma n^i \delta(m^i - p^i), \quad p^i \leq m^i \quad (\text{A-22})$$

With these assumptions, the derivation of autarky equilibrium and trade supplies and demands in (A-18 – A-20) above is valid, with

$$s^i = n^i \sigma \quad (\text{A-23})$$

and

$$d^i = \Gamma n^i \delta \quad (\text{A-24})$$

From (A-19), the autarky price in country i is

$$a^i = \frac{n^i \sigma c^i + \Gamma n^i \delta m^i}{n^i \sigma + \Gamma n^i \delta} = \frac{\sigma c^i + \Gamma \delta m^i}{\sigma + \Gamma \delta} \quad (\text{A-25})$$

which is independent of the numbers of firms and demanders, and thus independent of industry/country size.

The slope parameter, b^i , of the export and import functions, however, does depend on country size. From (A-20), (A-23), and (A-24),

$$b^i = n^i (\sigma + \Gamma \delta) \quad (\text{A-26})$$

and the b^i differ across countries only by size. Let the units of measurement of goods, money, firms, and demanders be chosen so that $\sigma + \Gamma \delta = 1$. Then we can interpret $b^i = n^i$ as measuring the size of country i . And without that normalization we can interpret b^i / β as

$$b^i / \beta = \frac{n^i (\sigma + \Gamma \delta)}{\sum_j n^j (\sigma + \Gamma \delta)} = \frac{n^i}{\sum_j n^j} = \theta^i \quad (\text{A-27})$$

where θ^i is country i 's share of the world economy.