# Endogenous Trade Policy in a Global Value Chain: Evidence from Chinese Micro-level Processing Trade Data*

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**Abstract:** This paper exams endogenous trade policy in a global value chain by exploring the impact of exports of intermediate inputs of a country on its trade barriers on final products. We use Chinese transaction-level processing trade data and finds that, the more are a country's intermediate exports to China, the lower is the trade barrier this country imposes on the imports of the final product from China produced with these intermediates. The reason is that a low trade barrier on the final product increases the country's demand for Chinese final product, and thus increases Chinese demand for its intermediate inputs used in the production of that product. This impact exists for both the permanent tariffs (preferential and MFN tariffs) and temporary trade barriers (TTB, including anti-dumping and safeguards), is stronger for differentiated products than for commodities, and is stronger when intermediate export industries are more organized. For MFN tariffs and safeguards applied to all trade partners, this impact is higher when the share of a country imports of the final product from China (out of its total imports from the whole world) is higher, which implies it's more likely that the MFN tariffs and safeguards are set mainly against China.

**Key Words**: Input Export, Output Tariff
**JEL Numbers**: F10, F13, F14

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# 1. Introduction

***1.1 Overview*** This paper exams endogenous trade policy in a global value chain by exploring the impact of exports of intermediate inputs of a country on its trade barriers on final products. Our idea was to look at Chinese processing trade. Think, for example, of an iPad. We know that 90% of the value-added of an iPad consists of imported intermediates that enter the Chinese processing zone duty free. 10% is Chinese labor cost. The final good (the finished iPad) is imported by many countries. Now let's look at the tariffs that different countries impose on iPads. The hypothesis that we would like to test is that the more a country's intermediate inputs to go into an iPad, the lower will be its tariff on iPads. The reason is that a low tariff increases a country's imports of iPads and thus promotes exports of the intermediate inputs that go into the iPads. If this export-promotion effect is large, there is a strong reason for the country to lower its tariff. A country that does not produce any of the intermediates that go into the iPad should have no export-promotion incentive.

We use Chinese transaction-level trade data in the period of 2000-2006 to test this hypothesis. For each export or import transaction, the data record the firm, product (at HS8 level), country (destination of exports or source of imports), time (year and month), type of transaction (processing or ordinary trade), value, quantity, etc. We restrict our analysis to processing trade, more specifically, processing with imports, where Chinese firms import intermediates from foreign firms (processing imports), use them to produce final products, and then sell the final products to foreign firms (processing exports) - typically different from the foreign firms exporting the intermediates to them. We link the processing exports and processing imports by firm, which gives us a very disaggregate and direct input-output table for our empirical analysis. Then we analyze how processing imports of intermediate inputs from different countries impact their trade barriers on the final products that use these intermediate inputs.

We find that, the more are a country's intermediate exports to China, the lower is the trade barrier this country imposes on the imports of the final product from China produced with these intermediates, which shows that input export promotion could serve

as an incentive for lowering trade barriers on output.

An endogeneity problem might arise due to reverse causality: the negative relationship between intermediate exports of a foreign country and the trade barrier this country imposes on the final product might be due to the fact that the low trade barrier of the country on the final product indeed increases its imports of the final product from China and hence promotes its exports of the intermediate inputs to China (which is the premise of our whole story), instead of the other way around. To take care of this concern, we instrument the intermediate exports of a country to China with the country-product-year level transport cost between China and this country, which are calculated from the shipping rates in the U.S. Merchandise Import data and adjusted by distance. The IV estimation results confirm our hypothesis.

In addition, we find that the impact of input export on output trade barrier not only exists for the permanent tariffs (preferential and MFN tariffs), but also exists for temporary trade barriers (TTBs, including anti-dumping and safeguards). For temporary trade barriers, the more are a country's intermediate exports to China, the lower is the probability that this country files a TTB against China on the final product produced with these intermediates.

Since MFN tariffs and safeguards of foreign countries are applied not only to their imports from China, but also to imports from their other trade partners, people might wonder whether promotion of intermediate exports to China is indeed an important incentive for them to lower their MFN tariffs or revoke their safeguards towards all countries on final products, since they might not want their other trade partners to free ride on their tariff reduction. To take care of this concern, we control for the share of a country's imports of a final product from China (out of its total imports of the product from the world). We find that, the higher is this share (which implies the less severe is the free-riding problem, and it's more likely that the MFN tariffs and safeguards are mainly targeted against China), the higher is the export-promotion incentive when the country sets its MFN tariffs or safeguards on final products. This shows the export-promotion incentive indeed has its rational.

Moreover, we find that the impact of input exports on output trade barriers is stronger for differentiated final products than for commodities. This is because it is more likely that differentiated products being traded are specific to an importer-exporter pair. This gives the importer greater monopsony power, and so its trade barrier will have a greater effect on the exporting firm (since the exporting firm cannot easily substitute to a different importer), which in turn means the trade barrier will have a greater effect on the exporting firm's purchases of intermediates. Therefore, the influence of intermediate exports on final product trade barriers should be higher for differentiated goods than for homogeneous goods.

Finally, we find that the impact of input exports on output trade barriers is stronger when intermediate export sectors are more politically organized, which means they have more influence on lobbying the government for low trade barriers on final products. This further confirms the mechanism of our hypothesis.

***1.2 Literature*** The current paper joins a growing literature on political economy of trade policy, influence of international trade and investment on trade policy, global value chains and trade policy, as well as assembling trade.

In the political economy literature, trade policy, such as tariffs, tariffs suspensions and antidumping, is always regarded as endogenous. There mainly exist two effects, a quid pro quo effect and a pure information effect, through which individual firms influence government decisions on trade policy. Grossman and Helpman (1994) theoretically show that firms in organized sectors offer contributions to politicians as a quid pro quo for tariffs. Campaign contributions by political action committees have been interpreted as the evidence of this effect in some papers (e.g., Snyder, 1990; Goldberg and Maggi, 1999; Gawande and Bandyopadhyay, 2000). Recently, a growing number of empirical studies use lobbing expenditures as a proxy variable of firm level contributions (e.g., Gawande et al., 2006; Kee et al., 2007; Ludema and Mayda, 2009; Stoyanov, 2009; Igan et al., 2010). Some studies also highlight lobbying's information role (e.g. Grossman and Helpman, 2001; De Figueiredo and Cameron, 2008). Only few papers disentangle the information effect from the quid pro quo effect (e.g., Austen-Smith and Wright, 1994; Ludema, Mayda

and Mishra, 2016). In particular, Ludema, Mayda and Mishra (2016) use firm-level data on tariff suspension bills and lobbying expenditure during 1999-2006 and finds that the effect of verbal opposition is much larger.

Although lots of papers stress the endogeneity of trade policy in the political economy literature, few studies have analyzed the unique role of international trade or investment in trade policy determination. Based on cooperative trade agreements models, Bagwell and Staiger (1990) predict that new tariffs will increase with imports and decrease with the variance of imports. Bown and Crowley (2013) find that US import policy during 1997-2006 is consistent with this prediction.

Several actors in the economy impact the tariff set by a country on a given good, both for social-welfare considerations and for political-economy reasons. These different actors are: Consumers of the goods in the country; The firms from that country, which produce the good in that country; The firms from that country, which produce the good abroad and import it back and distribute it (see Blanchard and Matschke (2015)); The firms from that country, which use the good as an input, in order to produce some other good in the country (see Ludema, Mayda and Mishra (2016), Gawande and Bandyopadyhay (2000)); The firms from that country, which produce inputs that are used to produce the good abroad (this paper, as well as Blanchard, Bown and Johnson (2016)).

The latter three actors are related to the input-output relationships across borders, i.e., global value chains. More specifically, Blanchard (2007, 2010) demonstrate how overseas investment and cross-border ownership can affect countries' optimal tariff and multilateral tariff negotiation. Blanchard and Matschke (2013) find that a 10% increase in U.S. foreign affiliate exports to the U.S. is associated with a 4 percentage point increase in the rate of preferential duty-free access. Ludema, Mayda and Mishra (2016) show that both verbal opposition and lobbying expenditures of U.S. firms, which use the imported good as an input (in order to produce some other goods), reduce the likelihood of a tariff suspension on the imported good. Gawande and Bandyopadyhay (2000) show that, if sectors which use the imported good as an input (in order to produce some other goods) spend in PAC campaign contributions, then the tariff on the good is lower. Blanchard,

Bown and Johnson (2016) show that a country will not tax with a tariff the value added of its own firms, no matter where that value added is produced or used as an input; meanwhile, a country will not protect the value added of foreign firms. This is the closest study to our work. Their paper uses aggregate data from the World Input-Output Database (WIOD) to get the value-added content of final goods production, while our paper uses very disaggregated firm-level processing trade data to get that, which is a big advantage of our paper.

There is a large difference between our work and the literature mentioned above, as we mainly focus on the influence of value-added overseas assembling, rather than ordinary international trade or investment, on trade policy. However, most studies on overseas assembling and outsourcing examine how outsourcing decision would change with cost of a firm's home country and its competitor. They find that overseas assembling activities decline when the countries' costs rise (e.g., Feenstra et al., 2000; Swenson 2004, 2005). Some papers analyze the characteristics of processing trade in China and stress the low productivity of processing firms (e.g., Yu, 2015; Dai and Yu, 2013; Kee and Tang, 2016). Kee and Tang (2016) assess the domestic value-added in Chinese processing exports, which share the same interests with us in line of firm's value-added realization. However, none of these studies look at how processing trade impacts trade policy, as what we did in this paper.

The paper is organized as follows. Section 2 describes the trade and tariff data that we use in the analysis. Section 3 specifies our empirical model. Section 4 reports the empirical results. Section 5 concludes.

# 2. Data

***2.1 Trade Data*** The main dataset that we use in the empirical analysis is the Chinese transaction-level trade data in the period of 2000-2006. This dataset was collected by China's General Administration of Customs (CGAC). The dataset contains rich information for all Chinese export and import transactions. For each export or import transaction, the data records the firm, product (at HS8 level), country (destination of exports or source

of imports), time (year and month), value, quantity, custom, transportation mode, etc. More importantly, the data also records the type of each transaction, that is, whether an export or import transaction is ordinary trade or a certain type of processing trade.

There are various types of processing trade, and the most important two types are: (1) processing with imports (PWI), that is, Chinese firms import intermediate inputs from foreign firms, use them to produce final products, and then sell the final products to foreign firms (typically different from the foreign firms that export intermediate inputs to them); both the import and export prices are set based on the negotiations between transaction parties. (2) processing with assembly (PWA), that is, Chinese firms get intermediate inputs directly from foreign firms for free, assemble them to produce final products, and then return them back to the same foreign firms for sale; foreign firms pay Chinese firms a certain amount of processing fees. In both types of processing trade, the foreign intermediates are directly used in the production of exported final products, and hence the data contains an excellent disaggregated input-output table, which is perfect for testing our hypothesis.

We restrict our analysis to processing with imports (PWI). This is because, for processing with assembly (PWA), foreign firms that provide intermediate inputs to Chinese firms have to "purchase back" (actually not really "purchase back", but just get back with paying assembly fees) the final products from them in any case, and hence governments of foreign countries should have no incentive to lower the tariffs on final products to increase the imports of these products and in turn promote the exports of their intermediate inputs. Only for processing with imports (PWI), in which foreign countries that export intermediate inputs do not have the obligation to import the final products, the governments might have an export-promotion incentive to reduce the tariffs on final products to increase their imports.

Therefore, we only keep the transactions of processing with imports (PWI) for both the export data and the import data. We link the export data and import data by firm, so that we can analyze how exports of intermediate inputs of different countries impact their trade barriers on the final products that use these intermediate inputs.

Table 1a contains the summary statistics for our trade data. Panel A of the table reports Chinese total export value and number of export firms, as well as those for processing with imports (PWI) and their shares, in each year during the period of 2000-2006. The total export value increases from 249 to 969 billion dollars during the period, while the total export value of PWI increases from 97 to 415 billion dollars. The share of PWI exports out of the total exports is pretty stable at the range of 39-44 percent. The number of export firms increases from 62,771 to 171,205, while the number of export firms with PWI increases from 27,209 to 37,765. The share of export firms with PWI out of all export firms declined steadily from 43 to 22 percent.

Panel B reports the same numbers for Chinese imports. The total import value increases from 225 to 788 billion dollars during the period, while the total import value of PWI increases from 65 to 247 billion dollars. The share of PWI imports out of the total imports is pretty stable at the range of 27-31 percent. The number of import firms increases from 62,793 to 121,835, while the number of import firms with PWI increases from 28,435 to 39,579. The share of import firms with PWI out of all import firms declined steadily from 45 to 32 percent.

***2.2 Trade Barriers Data*** We also need to use trade barriers of foreign countries against Chinese exports in the empirical analysis. The trade barriers data we use include both the permanent tariffs (MFN and preferential tariffs) and the temporary trade barriers (TTB, including anti-dumping and safeguards measures).

The permanent tariffs (MFN and preferential tariffs) come from WITS (World Integrated Trade Solution) - TRAINS at the World Bank. The data records the tariffs for each "exporter-importer-product(HS6)-time(year)" cell. All tariffs are AV (ad-valorem, 99% of all cells) or AVE (ad-valorem equivalence, 1% of all cells). I chose the tariffs of foreign countries (as importers) against China by product (HS6) and time (year).

For each "importer(country)-product-time" cell, the dataset does not directly specify whether its tariff is MFN/preferential; instead, it gives 4 series of tariffs: MFN, PRF (preferential), AHS (applied), BND (MFN bound, which only has very rare observations). I compare the first 3 series for each cell, and decide the nature of tariff for the cell by

using the following rules: (1) if AHS=MFN, then the tariff for this cell is MFN (this type accounts for about 84% of all cells); (2) if AHS=PRF, the tariff for this cell is preferential (this type accounts for about 7% of all cells); (3) if AHS is missing but PRF is present, then the tariff for this cell is prefential (this type accounts for about 6% of all cells). These three types account for 97% of all cells. The other 3% includes several different and weired cases, which we do not use in the analysis. In the empirical analysis below, we will check whether the impact of intermediate export on final good tariffs exists for both preferential tariffs and MFN tariffs.

Table 1b reports the summary statistics of the tariff data. Panel A contains the number of product(hs6)-country cells and the mean tariff of these cells for all permanent tariffs, MFN tariffs and preferential tariffs for each year during the period 2001-2007, one year later than the period of our trade data.[1] The number of product(hs6)-country cells ranges from 136,998 to 234,721 for the full permanent tariff sample. MFN tariffs account for 90-95% of them (ranging from 129,364 to 220,308), and preferential tariffs only account for 5-10% of them (ranging from 6,459 to 18,846). The average tariffs range from 8.74-11.92% for all permanent tariffs, 8.98-12.47% for MFN tariffs, and much lower at 2.56-5.97% for preferential tariffs.

Panel B reports the 13 countries that offered preferential tariffs to China during the 2001-2007 period. For each country, the table reports the specific years, number of products (hs6), number of product(hs6)-year cells that these preferential tariffs were offered, as well as the source of these preferential tariffs. In terms of number of product(hs6)-year cells, the largest ones are from EU, Japan, Canada, New Zealand, and Turkey. The source of these preferential tariffs include GSP, China's regional trade agreements including China-ASEAN Free Trade Agreement and APEC, and China's bilateral trade agreements with countries such as Chile and Pakistan.

The temporary trade barriers (TTB, including anti-dumping and safeguards) come from the World Bank TTB Database, which was collected by Bown (2014). It records the TTB information of importing countries/regions at the importer(country) -product(HS6)-

[1]We report them in this way since, as we will see in our empirical specification, we will look at the impacts of exports of intermediates on the final good tariffs in the lagged period.

exporter(country)-year level, including whether a TTB is filed and imposed. We use the TTB information of 13 importing countries/regions against China on all products during the 2001-2007 period.

Panel C of Table 1b reports these 13 countries that filed TTBs against China. For each country, the table reports the number of product(hs6)-year cells for which a TTB case is filed or a TTB measure is imposed for all TTB measures, antidumping, and safeguards. For all TTB measures and antidumping, the top 5 countries/regions with the largest number of product(hs6)-year cells for which a TTB case is filed are U.S., EU, India, Peru, and Colombia. Safeguards were only filed or imposed by 7 countries: U.S., EU, Canada, Turkey, Indonesia, India, and Japan. Note that the relationship between TTB filing and TTB imposition is quite different across countries: for most countries (like U.S., EU, and India), TTB measures were eventually imposed for more than 80% of the TTB cases that are filed; while for some other countries (like Peru and Colombia), no TTB measures were imposed for any of the TTB cases that are filed.

# 3. Empirical Specification

The main purpose of the paper is to test the export promotion of intermediate inputs as an incentive for low trade barriers on final products. Our baseline empirical specification is:

$$TB_{ict} = \beta_1 lnEX_{ic(t-1)} + \beta_2 CON_{ic(t-1)} + FE + \varepsilon_{ict} \tag{1}$$

In this baseline specification, the dependent variable, $TB_{ict} \in \{T_{ict}, TTB_{ict}\}$, represents trade barriers that country $c$ imposes on imports of product $i$ (at HS6 level) from China in period t. It could be permanent tariff rates (ad valorem or ad valorem equivalence MFN or preferential tariff rates), $T_{ict}$, or a dummy variable indicating whether a temporary trade barrier is filed or imposed, $TTB_{ict}$.

The key regressor, $EX_{ic(t-1)}$, is country $c$'s export value of intermediate inputs that go to China's production of final product $i$ in period $t-1$. We construct this variable in

the following steps. First, we aggregate the transaction-level Chinese processing exports of PWI (processing with imports) to firm-product(hs6)-year level, $X_{fit}$, which is firm $f$'s exports of final product $i$ in year $t$. Second, we aggregate the transaction-level Chinese processing imports of PWI to firm-intermediate(hs6)-country-year level, $M_{fjct}$, which is firm $f$'s imports of intermediate $j$ from country $c$ in year $t$. Third, we merge the firm-product(hs6)-year level Chinese processing export data in the current year, $X_{fit}$, and the firm-intermediate(hs6)-country-year level Chinese processing import data in the lagged year, $M_{fjc(t-1)}$, by firms. The reason we merge the intermediate imports in the lagged year is that we assume the intermediate imports in a previous year will be used in the production of the final products that are exported in the current year.

Next, we split a firm's imports of an intermediate from each country in the lagged period, $M_{fjc(t-1)}$, among its exporting products in the current period, $X_{fit}$, according to the share of its export of each product out of its total exports of all products, to get the firm's imports of each intermediate from each country that are used in the production of each of the final product that it exports:

$$XM_{fijc(t-1)} = M_{fjc(t-1)} \times \frac{X_{fit}}{\sum_i X_{fit}} \tag{2}$$

which is firm $f$'s imports of intermediate $j$ from country $c$ in year $t-1$ that are used in the production of final product $i$ exported in year $t$. This variable essentially gives us a firm-level input-output table.

Finally, we aggregate this variable over firms and intermediates for each product(hs6)-country-year cell to get the imports of all intermediate from each country that are used in Chinese production of a final product:

$$EX_{ic(t-1)} = \sum_f \sum_j XM_{fijc(t-1)} \tag{3}$$

which is just our key regressor, country $c$'s export of intermediate inputs in period $t-1$ that go to China's production of final product $i$.

The key hypothesis that we would like to test is: $\beta_1 < 0$. That is, the more are

a country's intermediate exports to China, the lower is the (permanent or temporary) trade barrier this country would impose on the imports of the final product from China produced with these intermediates.

$CON_{ic(t-1)}$ in the specification represents product(hs6)-country-year level control variables, which we will specify later in various regressions. One common control variable that we would like to include in all regressions is the Herfindahl-Hirschman concentration index of countries exporting intermediate inputs that go to China's production of the final product, which is computed as

$$EXH_{i(t-1)} = \frac{\Sigma_c EX^2_{ic(t-1)}}{(\Sigma_c EX_{ic(t-1)})^2} \times 100 \tag{4}$$

We multiply the regular expression (with value between 0 and 1) by 100, so that we can interpret it in percent. The more concentrated are the countries exporting intermediates to China, the more likely they would cooperate with each other to lowere their trade barriers on the final products from China produced with these intermediates. Hence we expect its coefficient to be negative.

$FE$ in the specification stands for various fixed effects. $\varepsilon_{ict}$ is the error term.

Table 2 contains the summary statistics of the main variables used in the baseline specification in section 3 in the full permanent tariff sample and its two subsamples (preferential tariffs and MFN tariffs), as well as the TTB sample and its two subsamples (antidumping and safeguards). In the full permanent tariff sample, the average tariff on final products is 9.91 percent,[2] the average log of exports of intermediates is 1.67, and the intermediate exporter concentration index is 39.28 percent. The three numbers are 2.51, 4.73, and 41.08 in the preferential tariff sample, and 10.32, 1.50, and 39.18 in the MFN tariff sample. The average preferential tariff (2.51) is much lower than the average MFN tariffs (10.32). The TTB filing rate and imposition rate are low at 0.17% and 0.12%, respectively, for the full TTB sample, 0.11% and 0.06% for antidumping, and 0.06% and 0.05% for safeguards.

[2]Note that we have dropped the outliers by removing the top 1% of the permanent tariffs in the full sample (those greater than or equal to 50 percent) from all the three samples.

# 4. Empirical Results

In this section, we report the results of our empirical analysis. We first report the baseline OLS regression results. Then we address the endogeneity problem and report the IV regression results. Next, we address the externality issue of MFN tariffs and safeguards. Finally, we test the mechanism of our hypothesis by exploring how the impact of intermediate exports on trade barriers on final products depends on product differentiation and political organization variables.

***4.1. Baseline OLS Results*** We first report the baseline OLS regression results. Table 3a presents the baseline OLS regression results for permanent tariffs. The three panels, A, B, and C, report the results for the full permanent tariff sample, the preferential tariff sample, and the MFN tariff sample, respectively. The first four columns contain the results without any control variables but with various fixed effects: the first column includes product (hs6), country and year fixed effects; the second column uses the product-year and country fixed effects; the third column includes country-year and product fixed effects; the fourth column uses product-year and country-year fixed effects.[3] The fifth column and the last column add the intermediate exporter concentration index to the first column and the third column, since the index itself is at the product-year level and hence the product-year fixed effects in the second and fourth columns can not be included.

In panel *A* for the full sample, the results are very consistent with our conjecture in the sense that the estimates for coefficient of $lnEX_{ic(t-1)}$ are indeed negative (ranging from $-0.06$ to $-0.09$) and very significant (all at 0.1% level) under various fixed effects, without or with the intermediate exporter concentration index. In the 4th column that includes the most disaggregate fixed effects, the estimate is $-0.09$. This means that a 10 percent increase in a country's exports of intermediate inputs to China is associated with a tariff

[3]Note that we do not include product-country fixed effects, because the main variation of both the dependent variable, $T_{ict}$, and the key regressor, $EX_{ic(t-1)}$, comes at the product-country combination but not the year, and hence including product-country fixed effects would absorb most of the impacts of our key regressor.

reduction of 0.009 percentage points of this country on the imports of the final product from China using these intermediate inputs. The magnitude of the impact is small, given that the average tariff in the sample is 9.91 percent, but it is significant. Meanwhile, in the last two columns, the estimates for the coefficient of the intermediate exporter concentration index are also negative and significant, consistent with our conjecture. The estimate is $-0.001$ in the last column, indicating that a 10 percentage point increase in the intermediate exporter concentration index is associated with a tariff reduction of 0.01 percentage points of a country on the imports of the final product from China using these intermediate inputs.

We report the regression results for preferential tariffs (country-specific) in panel B and MFN tariffs (applied equally to all countries with MFN status) in panel C. The results for the MFN tariff sample are very close to those for the full permanent tariff sample in terms of the sign, magnitude, and significance of the coefficients. This is understandable since around 95% of the observations in the full sample consist of MFN tariffs. For the preferential tariff sample, the estimates for the coefficient of $lnEX_{ic(t-1)}$ are indeed negative and significant (stable at $-0.01$), but are much smaller than the corresponding ones for the MFN tariff sample. This is understandable since the average preferential tariff (2.51) is much smaller than the average MFN tariff (9.91).

Table 3b reports the baseline OLS regression results for temporary trade barriers (TTB), with the TTB filing dummy ($TTB_{ict}^{filed}$) as the dependent variable. The three panels, A, B, and C, report the results for the full TTB sample, the antidumping sample, and the safeguards sample, respectively. The format of the table is the same as that of Table 3a. The estimates for our key regressor are negative and significant in all specifications and all the three samples. In the full TTB sample and the antidumping sample, the estimates are stable at $-0.0001$. This means a 10 percent increase of a country's exports of intermediate inputs to China is associated with a decrease of 0.001 percentage points of the probability that this country files a TTB against the imports of the final product from China using these intermediate inputs.[4] The estimates in the safeguards sample are

[4]Note that average probability of TTB filing, shown in Table 2, is 0.0017, i.e., 0.17 percent.

in double size ($-0.0002$). None of the estimates for the exporter concentration index is significant.

We also run the baseline OLS regression with the TTB imposition dummy ($TTB_{ict}^{imposed}$) as the dependent variable. The results are qualitatively very similar to those in Table 3b and are omitted here.

***4.2. Endogeneity Problem and IV Estimates*** An endogeneity problem might arise due to reverse causality: The trade barrier of a country imposed on a final product imported from China ($TB_{ict}$) might be impacted by its intermediate export to China in the previous period ($EX_{ic(t-1)}$), but this intermediate export to China might also be impacted by the trade barrier of the country imposed on the final product imported from China in an even earlier period ($TB_{ic(t-2)}$); The trade barrier of the country imposed on the product imported from China in different periods might be serially correlated, given that trade barriers are typically stable over a certain period of time. Hence we need to solve this endogeneity problem and instrument for foreign countries' intermediate export to China ($EX_{ic(t-1)}$).

A valid instrument should satisfy two conditions: (1) it should be correlated with this export ($EX_{ic(t-1)}$), and (2) it should not be correlated with their trade barrier on the final product imported from China ($TB_{ict}$). The transport cost between China and foreign countries for intermediates used in product $i$ in period $t-1$, $TC_{ic(t-1)}$, should be a valid instrument that satisfies the two conditions mentioned above: (1) it should be correlated with this export, and (2) it should not be correlated with their trade barriers on the final product imported from China ($TB_{ict}$).[5]

We do not have direct data on transport cost between China and foreign countries, but we can construct this cost by using the information available from the U.S transport

[5]The natural trade partner hypothesis in the political economy of trade policy literature says that whether two countries sign a trade agreement, and hence their bilateral tariffs, depend on the distance between these two countries, and countries that are close to each other have a high probability to sign a trade agreement. We know distance is closely related to transport cost. Hence, this hypothesis somehow challenges the exclusion requirement of using the transport cost as a valid IV. However, as we would see below, our transport cost varies at the product-country-year level, which has much more variation than product and year invariant and country specific distance. Hence, we believe it is still a valid instrument.

cost data. US Imports of Merchandise Dataset from the U.S. Census Bureau has weight, value, transport charges (freight and insurance in total) by product (hs10)-country-time-mode, where "mode" is one of the transport modes - vessel or airplane. We construct China's transport cost $TC_{ict}$ with a three-step procedure:

First, we use U.S. import transport charges by product $j$ from country $c$ shipped by mode $m$ at time $t$ divided by the corresponding weight and distance (between U.S. and its trade partner $c$) to get product-country-mode-time specific shipping rates (in dollars per kilogram-mile), and then aggregate it over countries to the product-mode-time level:[6]

$$\begin{aligned} SR_{jcmt} =& \frac{C^{us}_{jcmt}}{W^{us}_{jcmt} \times D^{us}_{c}} \\ SR_{jmt} =& \frac{\sum_c SR_{jcmt}}{N_c} \end{aligned} \tag{5}$$

where $SR_{jcmt}$ and $SR_{jmt}$ stand for shipping rates at the $jcmt$ and $jmt$ level, respectively; $C^{us}_{jcmt}$ and $W^{us}_{jcmt}$ represent U.S. transport charges and weight at the $jcmt$ level, $D^{us}_{c}$ is distance between U.S. and country $c$, and $N_c$ is number of countries in the $jmt$ cell.

Second, we multiply this shipping rate by distance and weight of shipments of product $j$ by mode $m$ from all countries to China at the base period $t_{j0}$ (the first year that China imports product $j$) to get the Chinese equivalent of transport charges at $jcmt$ level. We then divide by the corresponding value of shipments to get an ad valorem transport cost, again at $jcmt$ level:

$$TC_{jcmt} = SR_{jmt} \times D^{chn}_{c} \times \frac{W^{chn}_{jmt_{j0}}}{V^{chn}_{jmt_{j0}}} \tag{6}$$

where $TC_{jcmt}$ is the ad valorem transport cost at $jcmt$ level; $D^{chn}_{c}$ is the distance between China and country $c$, $W^{chn}_{jmt_{j0}}$ and $V^{chn}_{jmt_{j0}}$ are weight and value, respectively, of shipments of product $j$ by mode $m$ from all countries to China in the base period $t_{j0}$.

Finally, to determine the ad valorem transport costs of inputs from country $c$ in a final good $i$, we take a weighted average of the ad-valorem transport cost of input $j$ from

[6]We aggregate the shipping rate over countries to the product-mode-time level, because the shipping rate should not depend on country characteristics, and the country variation of transport cost should only come from distance.

country $c$ by mode $m$ used in final good $i$, where weights are imports of input $j$ from all countries by mode $m$ as a share of imports of all inputs (used in final product $i$) from all countries by all modes in the base period $t_{i0}$ (the first year that China exports product $i$):[7]

$$TC_{ict} = \sum_{j \in j_i} \sum_{m} \left( TC_{jcmt} \times \frac{V^{chn}_{jmt_{i0}}}{\sum_{j \in j_i} \sum_{m} V^{chn}_{jmt_{i0}}} \right) \tag{7}$$

where $TC_{ict}$ is the ad valorem transport costs of inputs from country $c$ used in a final good $i$ in year $t$; $V^{chn}_{jmt_{i0}}$ is imports of input $j$ from all countries by mode $m$ in the base period $t_{i0}$. $TC_{ic(t-1)}$ is used as the IV for the exports of country-$c$ inputs used in final good $i$ at time $t-1$, $EX_{ic(t-1)}$.[8]

Table 4a reports the first stage IV estimation results for the three permanent tariff samples (full, preferential, and MFN tariffs) and the full TTB sample.[9] For all the four samples and in all specifications, the estimates for the coefficient of transport cost ($lnTC_{ic(t-1)}$) are negative and significant, indicating that transport cost indeed has a negative impact on foreign countries' intermediate export to China, as predicted by the Gravity model. Moreover, all the coefficients pass the weak IV test, indicating transport cost is a valid IV. In column 4 of panel A (full permanent tariff sample) that includes the most disaggregate fixed effects, the coefficient is $-1.75$, which means that a one percent increase of the transport cost between a foreign country and China is associated with a 1.75 percent decrease of the foreign county's intermediate exports to China. The estimate is $-1.65$ for MFN tariff sample, $-3.41$ for the preferential tariff sample, and $-2.04$ for the full TTB sample.

Table 4b presents the second stage IV regression results for the three permanent tariff

[7]Here the weights are constructed based on imports of inputs from all counties, rather than those from country $c$. This is because firms might change their source countries of each input used in the production of a specific final product, but the share of each input out of total inputs stands for the production technology and should not depend on source countries of inputs.

[8]We dropped the outliers by removing the top 5% and bottom 5% of all the transport costs, which are extremely small or large.

[9]The observations in the full TTB sample are the same as those in the antidumping sample and the safeguards sample. The only difference between them is TTB dummy, but not the intermediate exports. Hence the first stage IV regression of the intermediate exports on transport costs is the same across the full TTB sample, the antidumping sample, and the safeguards sample.

samples. In panel $A$ for the full permanent tariff sample, the estimates for coefficient of $lnEX_{ic(t-1)}$ are indeed negative (ranging from $-0.62$ to $-1.06$) and very significant (all at 0.1% level) in all specifications. In the 4th column that includes the most disaggregate fixed effects, the estimate is $-0.67$, much larger (in absolute value) than the corresponding OLS estimate ($-0.09$) in table 3a. This means that a 10 percent increase in a country's exports of intermediate inputs to China is associated with a tariff reduction of 0.067 percentage points of this country on the imports of the final product from China using these intermediate inputs. Similar to what we observed in the OLS estimates in table 3a, the estimates in panel $B$ for the preferential tariff sample (ranging from $-0.11$ to $-0.27$) are much smaller than the corresponding ones in panel $C$ for the MFN tariff sample (ranging from $-0.68$ to $-1.12$), since the average preferential tariff is much lower than the average MFN tariff. Overall speaking, the IV estimates are qualitatively very similar to but quantitatively much larger than the OLS estimates.

Table 4c reports the second stage IV regression results for the three TTB samples, with the TTB filing dummy ($TTB_{ict}^{filed}$) as the dependent variable. The three panels, A, B, and C, report the results for the full TTB sample, the antidumping sample, and the safeguards sample, respectively. In all specifications in all samples, the estimates for coefficient of $lnEX_{ic(t-1)}$ are indeed negative (ranging from $-0.0002$ to $-0.0019$) and significant. In the 4th column (with the most disaggregate fixed effects) of panel A, the estimate is $-0.0019$. This means a 10 percent increase of a country's exports of intermediate inputs to China is associated with a decrease of 0.019 percentage points[10] of the probability that this country files a TTB against the imports of the final product from China using these intermediate inputs.

We also run the IV regression with the TTB imposition dummy ($TTB_{ict}^{imposed}$) as the dependent variable. However, the estimates for the key regressor are messy and insignificant in most cases. This might be because, as indicated in section 2.2, the relationship between TTB filing and TTB imposition is quite different across countries: in some countries (like Peru and Colombia), no TTB measures were imposed for any of the TTB

[10]Note this is about 10% of the average probability of TTB filing (0.0017, i.e., 0.17 percent) shown in Table 2.

cases that are filed. In these cases, agreements between the trade partners might have been achieved after the initiation of the cases and hence no TTB measures were imposed. Therefore, we no longer see the impacts of intermediate exports on the TTB decisions.

***4.3. Accounting for MFN/Safeguards Externality*** Our key hypothesis has been verified with both preferential tariffs and MFN tariffs, and both antidumping and safeguards initiation. We know that MFN tariffs and safeguards of foreign countries are applied not only to their imports from China, but also to imports from their other trade partners (with MFN status in case of MFN tariffs). Hence people might wonder whether export promotion of the intermediate inputs of these countries to China is indeed an important incentive for them to lower their MFN tariffs or revoke safeguards initiation on final products imported from all trade partners: their imports of final products may mainly come from their other trade partners instead of China; other trade partners might free ride on their tariff reduction or safeguards revoking on final products, in the sense that these partners will export more of the final products to them, without importing many intermediate inputs from them.

To take care of this externality, we control for the share of a foreign country's imports of a final product from China out of its total imports of the product from the whole world in the lagged period. This share is calculated using the COMTRADE data from the WTO as

$$SIM_{ic(t-1)} = \frac{M^{china}_{ic(t-1)}}{M^{world}_{ic(t-1)}} \times 100 \tag{8}$$

where $M^{china}_{ic(t-1)}$ and $M^{world}_{ic(t-1)}$ are country $c$'s imports of product $i$ from China and from the world, respectively.[11] The higher is this share, the more likely that its MFN tariffs or safeguards protections are mainly set against China, the less severe should be the free-riding problem of its other trade partners, and hence the higher should be the export-promotion incentive when this country sets its MFN tariffs or safeguards. We add this share, $SIM_{ic(t-1)}$, and its interaction with our key regressor, $lnEX_{ic(t-1)} \times SIM_{ic(t-1)}$, in

[11]The share is multiplied by 100 to make its coefficient easier to be interpreted. Hence a share of 5% is shown as 5 in the data.

the baseline regression. In this regression, we do not have an a priori conjecture about the sign of the share itself, but we expect:

(1) The coefficient for our key regressor, $\beta_1 = 0$ or $\beta_1 < 0$. The reason is as follows. $\beta_1$ captures the export-promotion incentive (the impact of $EX_{ic(t-1)}$ on $TB_{ict}$) when country $c$ does not import any final product $i$ from China ($SIM_{ic(t-1)} = 0$). In this case, the country may not have the export-promotion incentive at all to reduce the trade barriers against Chinese exports of the final product. But on the other hand, if country $c$ exports a lot of intermediate inputs to China (high $EX_{ic(t-1)}$), it is likely it also exports a lot of these intermediate inputs to other countries (since, for example, it has a large endowment of these intermediates). Thus the country may still have an export-promotion incentive to lower the MFN tariff or revoke the safeguards on the final product - In this case, the purpose of its MFN tariff reduction or safeguards revoking is to increase its imports of the final product from other countries instead of China, and hence to promote its intermediate exports to these countries instead of China. Thus $\beta_1$ might still be negative even if country $c$ does not import any final product $i$ from China. In sum, we will not be surprised if $\beta_1$ is either insignificant ($\beta_1 = 0$) or negative ($\beta_1 < 0$).

(2) The coefficient for the interaction term, $\beta_{12} < 0$. That is, the higher is the share of a country's imports of the final product from China, the higher should be the incentive to lower MFN tariff or revoke safeguards on the final product (since the free-riding problem is less severe) in order to promote its exports of intermediate inputs to China. The reason has been explained above. This is the main hypothesis that we shall test in this section.

Meanwhile, we know that this share, $SIM_{ic(t-1)}$, is obviously endogenous, since it would be impacted by the our dependent variable, the country's tariff on the product. Hence, we need to instrument this share. [Note: Here we are considering MFN tariffs that are applied to all trade partners. It would impact the country's total imports of the product from China, but not the SHARE of imports of product from China. Hence it looks to me we don't have an endogeneity problem here, and do not need the instrument. What do you think?] The instrument we use is share of other counties's imports of this

product from China out of their total imports of the product from the whole world, which is computed as

$$SIM_{ic'(t-1)} = \frac{M^{china}_{ic'(t-1)}}{M^{world}_{ic'(t-1)}} \times 100 = \frac{M^{china}_{i(t-1)} - M^{china}_{ic(t-1)}}{M^{world}_{i(t-1)} - M^{world}_{ic(t-1)}} \times 100 \tag{9}$$

where $M^{china}_{ic'(t-1)}$ and $M^{world}_{ic'(t-1)}$ are, respectively, other countries's imports of product $i$ from China and from the world in period $t-1$. $M^{china}_{i(t-1)}$ and $M^{world}_{i(t-1)}$ are, respectively, all countries's imports of product $i$ from China and from the world in period $t-1$.

Table 5 reports the 2nd stage IV regression results of this specification for MFN tariffs in panel A and for safeguards filing in panel B. In both panels, the estimates of the coefficient for foreign countries' exports of intermediate inputs to China ($lnEX_{ic(t-1)}$) are negative but sometimes insignificant, as what we expected. The estimates of the coefficient for the interaction term ($lnEX_{ic(t-1)} \times SIM_{ic(t-1)}$) are always negative and significant ($\beta_{12} < 0$), which is consistent with our conjecture. The estimates range from $-0.009$ to $-0.003$ for MFN tariffs and $-0.00003$ to $-0.00002$ for safeguards. For MFN tariffs, the estimate is $-0.003$ in the 4th column with the most disaggregate fixed effects, which means that if the share of country $c$'s imports of the final product from China increases by 10 percentage points, its tariff on the final product will reduce by 0.003 percentage points MORE in response to a 10 percent increase of its intermediate exports to China.[12] For safeguards, the estimate is $-0.00003$ in the 4th column, which means that if the share of country $c$'s imports of the final product from China increases by 10 percentage points, the probability of a safeguards initiation on the final product will reduce by 0.003 percentage points MORE in response to a 10 percent increase of its intermediate exports to China.[13] The estimate for the coefficient of the intermediate exporter concentration index ($EXH_{i(t-1)}$) is negative and significant as before.

[12]Note that the average MFN tariff rate, shown in Table 2, is 10.32 percent. Meanwhile, the 4th column of Panel C in Table 4b shows that a 10 percent increase in a country's exports of intermediate inputs to China is associated with a tariff reduction of 0.073 percentage points (0.73%*10) of this country on the imports of the final product from China using these intermediate inputs.

[13]Note that average probability of safeguards filing, shown in Table 2, is 0.0006 (0.06 percent). Meanwhile, the 4th column of Panel C in Table 4c tells us that the probability of a safeguards initiation on the final product will reduce by 0.016 percentage points (0.0016*10) in response to a 10 percent increase of its intermediate exports to China.

***4.4. Accounting for Product Differentiation*** We now test the mechanism of our hypothesis by exploring how it depends on product differentiation. Intermediate export promotion could serve as an incentive for low trade barriers on final products, because low trade barriers on final products induce low domestic consumer prices and high domestic demand for foreign final products, and in turn high foreign demand for home intermediates. This impact should be larger for differentiated goods than for commodities. This is because it is more likely that differentiated products being traded are specific to an importer-exporter pair. This gives the importer greater monopsony power, and so its trade barrier will have a greater effect on the exporting firm (since the exporting firm cannot easily substitute to a different importer), which in turn means the trade barrier will have a greater effect on the exporting firm's purchases of intermediates. Therefore, the influence of intermediate exports on final product trade barriers should be higher for differentiated goods than for homogeneous goods.

To explore whether this is true, we add in the regressions an interaction term of our key regressor and a measure of product differentiation - Rauch classification. Rauch (1999) classifies products into two categories: those traded in organized markets or with reference prices are homogeneous goods, and the rest are differentiated products.[14] The original Rauch classification is at the 4-digit SITC (Standard International Trade Classification) level, and we assign a value of 0 to homogeneous goods and a value of 1 to differentiated products.[15] Then we use a SITC-HS concordance to transfer the value to a continuous variable at the 6-digit HS level, $Rauch_i$.[16] We interact this measure with our key regressor and include the interaction term in our baseline regression.

Table 6 reports the 2nd stage IV estimates for this regression.[17] In panel A for

[14]Rauch index is highly correlated with the inverse-elasticity of export supply, which measures the market power of importers, in Broda, Limao and Weinstein (2008), and has proved to be a reliable measure of market power of importers in other studies, e.g., Ludema and Mayda (2013).

[15]The original Rauch classification has two versions: a conservative version and a liberal version. What we used here is the conservative version. But the results are robust to the liberal version.

[16]More specifically, we use a concordance between 5-digit SITC codes and 10-digit HS codes to get a concordance between 4-digit SITC codes and 10-digit HS codes. Then we use the concordance to transfer the Rauch classification from 4-digit SITC level to 10-digit HS level, and aggregate it to the 6-digit HS level (by taking the average of all 10-digit HS products within the same 6-digit HS product).

[17]The first stage results are available upon request.

permanent tariffs, the estimates of the coefficient for this interaction term are all negative and significant, indicating that the impacts of intermediate exports of foreign countries on their tariffs on final products using these intermediates are higher for differentiated goods than for homogeneous goods, which is consistent with our expectation. For example, in the 4th column, the coefficient for this impact is $-0.47$ for homogeneous goods, but higher (in absolute value) at $-0.76$ $(-0.47-0.29)$ for differentiated goods. This is also the case in panel B for TTBs. In the 4th column, the coefficient for the interaction term is $-0.0015$ for homogeneous goods, but higher (in absolute value) at $-0.0026$ $(-0.0015-0.0011)$ for differentiated goods.

***4.5. Accounting for Political Organization*** We further test the mechanism of our hypothesis by exploring the channel of the mechanism. Intermediate exports of a country could serve as an incentive for low trade barriers on final products, because the exporting firms of intermediates in this country might lobby its government to lower trade barriers on final products and in turn promote their exports of intermediates. However, the domestic import-competing firms of the final products might lobby the government to raise the trade barriers to protect the home market. The influence of the intermediate exporting firms and import-competing firms of final products depends on how organized they are. We expect that the more organized they are, the higher impacts they have on the trade barriers on final products.

To test whether this is the case, we add measures of political organization of these two interest groups to the baseline regressions. Our political organization data were from WGTA (?). It records the number of political organizations in each of the 304 WGTA-industries in a total of 189 countries in the world. We use a concordance between WGTA-industries and 4-digit HS codes to get the number of political organizations in each 4-digit HS industry in these countries. From this, we get two measures of the political organizations: one is the political organization of the import-competing industry - the industry in country $c$ that produces final product (output) $i$, $POO_{ic}$; the other one is political organization of industries in country $c$ that export intermediates to China used

in final product $i$, $POI_{ic}$, which is computed as the weighted average of number of political organizations in each industry in the country that exports intermediates to China used in the final product:

$$POI_{ic} = \sum_{j \in j_i} \left( POI_{ijct_0} \times \frac{EX_{ijct_0}}{\sum_{j \in j_i} EX_{ijct_0}} \right) \tag{10}$$

where $POI_{ijct_0}$ is the number of political organizations in industry $j$ in country $c$ that exports intermediates to China used in final product $i$ in the base year $t_0$ (the first year of intermediate exports), and $EX_{ijct_0}$ is the corresponding export value of the intermediates. We then normalize the two political organization variables to 0 (if its original number is 0) or 1 (if its original number is equal to or greater than 1). We add these two variables and the interaction between our key regressor and input political organization, $EX_{ic(t-1)} \times POI_{ic}$, to our baseline regressions.

Table 7 reports the 2nd stage IV estimates for this regression.[18] In panel A for permanent tariffs, the estimate of coefficient for our key regressor, $EX_{ic(t-1)}$, is negative in all regressions and significant in the 4th column where we have the most disaggregate fixed effects. This indicates that even if there are no organized political organizations in the intermediate exporting sectors ($POI_{ic} = 0$), they still have impacts on final product tariffs. This might be because firms in these industries still lobby the government by themselves rather than through formal political organizations.

The estimate of the coefficient for the interaction term, $EX_{ic(t-1)} \times POI_{ic}$, is negative and significant in all regressions. This shows that more politically-organized intermediate export industries have a higher (in terms of absolute value) impact on final goods tariffs, which is consistent with our expectation.

The estimate of the coefficient for the political organization of intermediate exporting sectors, $POI_{ic}$, is positive and significant in all regressions. This indicates that when intermediate producing sectors do not export any intermediates to China ($EX_{ic(t-1)} = 0$), the political organizations in these sectors will lobby the government for high tariffs on the final products. This is because these sectors only sell the intermediates to domestic

[18] The first stage results are available upon request.

producers of final products, and hence they lobby the government to protect the final products industries to promote their own sales of intermediates.

On the other hand, the estimates of the coefficient for the political organization of final product import-competing industries, $POO_{ic}$, is insignificant in most regressions, but is positive and significant in the 4th column with the most disaggregate fixed effects. This shows that a more organized import competing industry will lobby for higher tariffs on final products. This is also consistent with our expectation.

In panel B for TTB initiation, the regression results are qualitatively the same as those in panel A for permanent tariffs.

# 5. Conclusion

This paper exams endogenous trade policy in a global value chain. We use Chinese micro-level processing trade data and explore the impacts of a country's intermediate inputs exports on its trade barriers on final goods. We find that, the more are a country's intermediate exports to China, the lower is the trade barrier this country imposes on the imports of the final product from China produced with these intermediates, since a low trade barrier increases the country's demand for Chinese final product, and hence increases Chinese demand for its intermediate inputs used in the production of that product. This impact of intermediate exports on trade barriers on final goods exists for both the permanent tariffs (preferential and MFN tariffs) and temporary trade barriers (anti-dumping and safeguards initiation). The impact is stronger for differentiated goods than for homogeneous goods, and is stronger when the input export industries are more organized. For MFN tariffs and safeguards applied to all countries, this impact is higher when the share of a country imports of the final product from China (out of its total imports from the whole world) is higher, which means the tariffs or safeguards are more likely to be set mainly against China. Both OLS and IV estimates confirm these findings.

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# Tables

**Table 1a. Summary Statistics of Trade Data**

A. Exports

| | Total | | PWI | | Share of PWI | |
|---|---|---|---|---|---|---|
| Year | value* | firms | value* | firms | value(%) | firms(%) |
| 2000 | 249 | 62,771 | 97 | 27,209 | 39 | 43 |
| 2001 | 291 | 68,487 | 115 | 27,535 | 40 | 40 |
| 2002 | 301 | 78,313 | 123 | 28,395 | 41 | 36 |
| 2003 | 438 | 95,688 | 188 | 30,668 | 43 | 32 |
| 2004 | 594 | 120,590 | 260 | 33,633 | 44 | 28 |
| 2005 | 762 | 144,031 | 333 | 36,205 | 44 | 25 |
| 2006 | 969 | 171,205 | 415 | 37,765 | 43 | 22 |

B. Imports

| | Total | | PWI | | Share of PWI | |
|---|---|---|---|---|---|---|
| Year | value* | firms | value* | firms | value(%) | firms(%) |
| 2000 | 225 | 62,793 | 65 | 28,435 | 29 | 45 |
| 2001 | 266 | 67,588 | 71 | 29,200 | 27 | 43 |
| 2002 | 273 | 76,378 | 81 | 30,138 | 30 | 39 |
| 2003 | 413 | 87,934 | 124 | 33,020 | 30 | 38 |
| 2004 | 561 | 102,242 | 168 | 36,383 | 30 | 36 |
| 2005 | 660 | 113,456 | 207 | 38,874 | 31 | 34 |
| 2006 | 788 | 121,835 | 247 | 39,579 | 31 | 32 |

$*$: in billion dollars.

**Table 1b. Summary Statistics of Tariff Data**

A. Permanent Tariffs: Summary

| | All | | MFN | | Preferential | |
|---|---|---|---|---|---|---|
| Year | Number of hs6-country | Mean Tariff | Number of hs6-country | Mean Tariff | Number of hs6-country | Mean Tariff |
| 2001 | 136,998 | 11.30 | 130,539 | 11.71 | 6,459 | 2.92 |
| 2002 | 158,116 | 11.92 | 149,160 | 12.47 | 8,956 | 2.77 |
| 2003 | 138,326 | 9.94 | 129,364 | 10.44 | 8,962 | 2.86 |
| 2004 | 140,949 | 10.23 | 132,105 | 10.74 | 8,844 | 2.56 |
| 2005 | 210,511 | 10.00 | 200,947 | 10.35 | 9,564 | 2.70 |
| 2006 | 232,650 | 9.34 | 220,308 | 9.71 | 12,342 | 2.67 |
| 2007 | 234,721 | 8.74 | 215,875 | 8.98 | 18,846 | 5.97 |

B. Preferential Tariffs

| Country | Years | Number of hs6 | Number of hs6-year | Source |
|---|---|---|---|---|
| Australia | 2001-2006 | 763 | 3,314 | GSP and APEC |
| Canada | 2002-2006 | 2,027 | 8,715 | GSP and APEC |
| Chile | 2006 | 3,011 | 3,011 | China-Chile FTA |
| EU | 2001-2006 | 3,742 | 12,521 | GSP |
| Indonesia | 2005-2006 | 92 | 177 | China-ASEAN FTA |
| Japan | 2001-2006 | 1,874 | 9,125 | GSP and APEC |
| Lao | 2005 | 5 | 5 | China-ASEAN FTA |
| New Zealand | 2002-2006 | 1,604 | 6,586 | GSP and APEC |
| Norway | 2002-2006 | 547 | 913 | GSP |
| Pakistan | 2006 | 399 | 399 | China-Pakistan FTA |
| Switzerland | 2001-2006 | 565 | 2,536 | GSP |
| Turkey | 2005-2006 | 2,699 | 5,005 | GSP |
| Vietnam | 2005-2006 | 114 | 170 | China-ASEAN FTA |

C. Temporary Trade Barriers

| | TTB | | Antidumping | | Safeguards | |
|---|---|---|---|---|---|---|
| Country | Filed | Imposed | Filed | Imposed | Filed | Imposed |
| Anustralia | 12 | 9 | 12 | 9 | 0 | 0 |
| Brazil | 15 | 14 | 15 | 14 | 0 | 0 |
| Canada | 59 | 30 | 36 | 30 | 23 | 0 |
| Colombia | 87 | 0 | 87 | 0 | 0 | 0 |
| EU | 131 | 124 | 67 | 61 | 64 | 63 |
| India | 108 | 95 | 101 | 92 | 7 | 3 |
| Indonesia | 21 | 14 | 11 | 11 | 10 | 3 |
| Japan | 1 | 0 | 0 | 0 | 1 | 0 |
| Korea | 12 | 12 | 12 | 12 | 0 | 0 |
| Peru | 94 | 0 | 94 | 0 | 0 | 0 |
| Poland | 4 | 0 | 4 | 0 | 0 | 0 |
| Taiwan | 2 | 0 | 2 | 0 | 0 | 0 |
| Turkey | 81 | 76 | 67 | 65 | 14 | 11 |
| U.S. | 176 | 146 | 70 | 44 | 106 | 102 |

**Table 2. Summary Statistics of Key Variables in Regression Samples**

($T_{ict}$ and $EXH_{i(t-1)}$ are in percent)

| A. All Permanent Tariffs | No. of Obs. | Mean | Std.Dev. |
|---|---|---|---|
| $T_{ict}$ | 996,819 | 9.91 | 10.121 |
| $lnEX_{ic(t-1)}$ | 996,819 | 1.67 | 3.90 |
| $EXH_{i(t-1)}$ | 853,686 | 39.28 | 23.58 |
| B. Preferential Tariffs | No. of Obs. | Mean | Std.Dev. |
| $T_{ict}$ | 52,501 | 2.51 | 3.29 |
| $lnEX_{ic(t-1)}$ | 52,501 | 4.73 | 5.56 |
| $EXH_{i(t-1)}$ | 43,610 | 41.08 | 24.23 |
| C. MFN Tariffs | No. of Obs. | Mean | Std.Dev. |
| $T_{ict}$ | 944,318 | 10.32 | 10.22 |
| $lnEX_{ic(t-1)}$ | 944,318 | 1.50 | 3.71 |
| $EXH_{i(t-1)}$ | 810,076 | 39.18 | 23.55 |
| D. All TTBs | No. of Obs. | Mean | Std.Dev. |
| $TTB_{ict}^{filed}$ | 1,748,744 | 0.0017 | 0.04 |
| $TTB_{ict}^{imposed}$ | 1,748,744 | 0.0012 | 0.03 |
| $lnEX_{ic(t-1)}$ | 1,748,744 | 1.661 | 3.89 |
| $EXH_{i(t-1)}$ | 1,463,084 | 39.07 | 23.49 |
| E. Antidumping | No. of Obs. | Mean | Std.Dev. |
| $AD_{ict}^{filed}$ | 1,748,744 | 0.0011 | 0.04 |
| $AD_{ict}^{imposed}$ | 1,748,744 | 0.0006 | 0.03 |
| $lnEX_{ic(t-1)}$ | 1,748,744 | 1.661 | 3.89 |
| $EXH_{i(t-1)}$ | 1,463,084 | 39.07 | 23.49 |
| F. Safeguards | No. of Obs. | Mean | Std.Dev. |
| $SG_{ict}^{filed}$ | 1,748,744 | 0.0006 | 0.04 |
| $SG_{ict}^{imposed}$ | 1,748,744 | 0.0005 | 0.03 |
| $lnEX_{ic(t-1)}$ | 1,748,744 | 1.661 | 3.89 |
| $EXH_{i(t-1)}$ | 1,463,084 | 39.07 | 23.49 |

**Table 3a. Baseline OLS Estimates, Permanent Tariffs**

Dependent Variable: $T_{ict}$

| A. All Permanent Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $lnEX_{ic(t-1)}$ | -.08*** | -.09*** | -.08*** | -.09*** | -.06*** | -.06*** |
| | [0.002] | [0.002] | [0.002] | [0.002] | [0.003] | [0.003] |
| $EXH_{i(t-1)}$ | | | | | -.001* | -0.001** |
| | | | | | [0.0006] | [0.0005] |
| No. of Obs. | 996,752 | 995,987 | 996,752 | 995,987 | 853,678 | 853,677 |
| $R^2$ | 0.59 | .60 | .61 | .62 | .60 | .62 |
| B. Preferential Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -.01*** | -.01*** | -.01*** | -.01*** | -.01*** | -.01*** |
| | [0.003] | [0.003] | [0.003] | [0.004] | [0.003] | [0.003] |
| $EXH_{i(t-1)}$ | | | | | -.0003 | -.0003 |
| | | | | | [0.0007] | [0.0007] |
| No. of Obs. | 52,163 | 45,247 | 52,163 | 45,247 | 43,306 | 43,306 |
| $R^2$ | .66 | .69 | .66 | .69 | .65 | .66 |
| C. MFN Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -.07*** | -.08*** | -.07*** | -.08*** | -.05*** | -.05*** |
| | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] | [0.003] |
| $EXH_{i(t-1)}$ | | | | | -.001 | -0.001* |
| | | | | | [0.0006] | [0.0006] |
| No. of Obs. | 944,248 | 943,427 | 944,248 | 943,427 | 810,068 | 810,067 |
| $R^2$ | 0.59 | .60 | .61 | .61 | .59 | .61 |
| Fixed Effects | $i+c+t$ | $it+c$ | $ct+i$ | $it+ct$ | $i+c+t$ | $ct+i$ |

Note: Standard errors are robust and clustered at the industry (hs4) and country level; *, **, and *** denote the 5, 1, and 0.1 percent of significance level, respectively.

**Table 3b. Baseline OLS Estimates, TTBs - Filing**

Dependent Variable: $TTB_{ict}^{filed}$

| A. All TTBs | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $lnEX_{ic(t-1)}$ | -0.0001*** | -0.0001*** | -0.0001*** | -0.0001*** | -0.0001*** | -0.0001*** |
| | [0.00001] | [0.00001] | [0.00001] | [0.00001] | [0.00001] | [0.00001] |
| $EXH_{i(t-1)}$ | | | | | 0.0000003 | 0.0000001 |
| | | | | | [0.000003] | [0.000003] |
| No. of Obs. | 1,748,684 | 1,748,327 | 1,748,670 | 1,748,313 | 1,463,084 | 1,463,071 |
| $R^2$ | 0.04 | 0.04 | 0.05 | 0.05 | 0.04 | 0.04 |
| B. Antidumping | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.0001*** | -0.0001*** | -0.0001*** | -0.0001*** | -0.0001*** | -0.0001*** |
| | [0.00001] | [0.00001] | [0.00001] | [0.00001] | [0.00001] | [0.00001] |
| $EXH_{i(t-1)}$ | | | | | 0.000001 | 0.000001 |
| | | | | | [0.000002] | [0.00002] |
| No. of Obs. | 1,748,684 | 1,748,327 | 1,748,670 | 1,748,313 | 1,463,084 | 1,463,071 |
| $R^2$ | 0.03 | 0.03 | 0.03 | 0.04 | 0.03 | 0.03 |
| C. Safeguards | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.0002*** | -0.0002*** | -0.0002*** | -0.0002*** | -0.0002*** | -0.0002*** |
| | [0.00001] | [0.00001] | [0.00001] | [0.00001] | [0.00001] | [0.00001] |
| $EXH_{i(t-1)}$ | | | | | 0.000001 | -0.000001 |
| | | | | | [0.000001] | [0.000001] |
| No. of Obs. | 1,748,684 | 1,748,327 | 1,748,670 | 1,748,313 | 1,463,084 | 1,463,071 |
| $R^2$ | 0.05 | 0.06 | 0.05 | 0.06 | 0.04 | 0.05 |
| Fixed Effects | $i+c+t$ | $it+c$ | $ct+i$ | $it+ct$ | $i+c+t$ | $ct+i$ |

Note: Standard errors are robust and clustered at the industry (hs4) and country level; *, **, and *** denote the 5, 1, and 0.1 percent of significance level, respectively.

**Table 4a. Baseline IV Estimates (1st stage), Permanent Tariffs and TTBs**

Dependent Variable: $lnEX_{ic(t-1)}$
Instrument for $lnEX_{ic(t-1)}$: $lnTC_{ic(t-1)}$

| A. All Permanent Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $lnTC_{ic(t-1)}$ | -0.36*** | -1.74*** | -0.36*** | -1.75*** | -0.35*** | -0.35*** |
| | [0.02] | [0.05] | [0.02] | [0.05] | [0.02] | [0.02] |
| $EXH_{i(t-1)}$ | | | | | -.01*** | -0.01*** |
| | | | | | [0.0003] | [0.0003] |
| No. of Obs. | 587,644 | 587,055 | 587,644 | 587,055 | 550,421 | 550,421 |
| Adjusted $R^2$ | 0.53 | 0.54 | .53 | 0.54 | 0.56 | .56 |
| B. Preferential Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnTC_{ic(t-1)}$ | -0.52*** | -3.29*** | -0.54*** | -3.41*** | -0.54*** | -0.56*** |
| | [0.11] | [0.40] | [0.11] | [0.41] | [0.12] | [0.12] |
| $EXH_{i(t-1)}$ | | | | | -.02*** | -.02*** |
| | | | | | [0.002] | [0.002] |
| No. of Obs. | 30,256 | 23,566 | 30,256 | 23,566 | 27,723 | 27,723 |
| Adjusted $R^2$ | 0.63 | .57 | .64 | 0.58 | .65 | .66 |
| C. MFN Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnTC_{ic(t-1)}$ | -0.33*** | -1.63*** | -0.33*** | -1.65*** | -0.32*** | -0.33*** |
| | [0.02] | [0.05] | [0.02] | [0.05] | [0.02] | [0.02] |
| $EXH_{i(t-1)}$ | | | | | -.01*** | -.01*** |
| | | | | | [0.0003] | [0.0003] |
| No. of Obs. | 557,102 | 556,451 | 557,102 | 556,451 | 522,350 | 522,350 |
| Adjusted $R^2$ | 0.52 | 0.53 | .52 | 0.53 | .55 | .55 |
| D. All TTBs | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnTC_{ic(t-1)}$ | -0.37*** | -2.03*** | -0.37*** | -2.04*** | -0.36*** | -0.36*** |
| | [0.02] | [0.04] | [0.02] | [0.04] | [0.02] | [0.02] |
| $EXH_{i(t-1)}$ | | | | | -0.01*** | -.01*** |
| | | | | | [0.0003] | [0.0003] |
| No. of Obs. | 920,514 | 920,227 | 920,514 | 920,227 | 862,863 | 862,863 |
| Adjusted $R^2$ | 0.51 | 0.52 | 0.01 | 0.52 | 0.54 | 0.54 |
| Fixed Effects | $i+c+t$ | $it+c$ | $ct+i$ | $it+ct$ | $i+c+t$ | $ct+i$ |

Notes: Standard errors are robust and clustered at the industry (hs4) and country level; *, **, and *** denote the 5, 1, and 0.1 percent of significance level, respectively.

**Table 4b. Baseline IV Estimates (2nd stage), Permanent Tariffs**

Dependent Variable: $T_{ict}$
Instrument for $lnEX_{ic(t-1)}$: $lnTC_{ic(t-1)}$

| A. All Permanent Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $lnEX_{ic(t-1)}$ | -0.95*** | -0.62*** | -0.98*** | -0.67*** | -1.05*** | -1.06*** |
| | [0.14] | [0.07] | [0.14] | [0.07] | [0.16] | [0.15] |
| $EXH_{i(t-1)}$ | | | | | -0.02*** | -0.02*** |
| | | | | | [0.002] | [0.002] |
| No. of Obs. | 587,644 | 587,055 | 587,644 | 587,055 | 550,421 | 550,421 |
| Centered $R^2$ | 0.54 | .59 | .56 | 0.61 | .53 | .55 |
| B. Preferential Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.27* | -0.14* | -0.24* | -0.11* | -0.23* | -0.21* |
| | [0.15] | [0.07] | [0.14] | [0.06] | [0.12] | [0.11] |
| $EXH_{i(t-1)}$ | | | | | -0.004* | -0.004* |
| | | | | | [0.002] | [0.002] |
| No. of Obs. | 30,256 | 23,566 | 30,256 | 23,566 | 27,723 | 27,723 |
| Centered $R^2$ | 0.60 | 0.66 | .62 | 0.67 0.62 | .63 | |
| C. MFN Tariffs | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.99*** | -.68*** | -1.03*** | -0.73*** | -1.11*** | -1.12*** |
| | [0.16] | [0.08] | [0.16] | [0.08] | [0.18] | [0.17] |
| $EXH_{i(t-1)}$ | | | | | -.02*** | -.02*** |
| | | | | | [0.003] | [0.003] |
| No. of Obs. | 557,102 | 556,451 | 557,102 | 556,451 | 522,350 | 522,350 |
| Centered $R^2$ | 0.54 | 0.58 | 0.55 | .60 | .52 | .54 |
| Fixed Effects | $i+c+t$ | $it+c$ | $ct+i$ | $it+ct$ | $i+c+t$ | $ct+i$ |

Notes: Standard errors are robust and clustered at the industry (hs4) and country level; *, **, and *** denote the 5, 1, and 0.1 percent of significance level, respectively.

**Table 4c. Baseline IV Estimates (2nd stage), TTBs - Filing**

Dependent Variable: $TTB_{ict}^{filed}$
Instrument for $lnEX_{ic(t-1)}$: $lnTC_{ic(t-1)}$

| A. All TTBs | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $lnEX_{ic(t-1)}$ | -0.0012* | -0.0019*** | -0.0011* | -0.0019*** | -0.0015** | -0.0013* |
| | [0.0007] | [0.0003] | [0.0007] | [0.00003] | [0.0007] | [0.0007] |
| $EXH_{i(t-1)}$ | | | | | -0.00002* | -0.00002* |
| | | | | | [0.00001] | [0.00001] |
| No. of Obs. | 920,514 | 920,227 | 920,514 | 920,227 | 862,863 | 862,863 |
| Centered $R^2$ | 0.05 | 0.05 | 0.06 | 0.06 | 0.04 | 0.05 |
| B. Antidumping | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.0002*** | -0.0003*** | -0.0002*** | -0.0003*** | -0.0003*** | -0.0003*** |
| | [0.0001] | [0.0001] | [0.0001] | [0.0001] | [0.0001] | [0.0001] |
| $EXH_{i(t-1)}$ | | | | | -0.00004*** | -.00003*** |
| | | | | | [0.00001] | [0.00001] |
| No. of Obs. | 920,514 | 920,227 | 920,514 | 920,227 | 862,863 | 862,863 |
| Centered $R^2$ | 0.003 | -0.02 | 0.01 | -0.02 | -0.01 | 0.003 |
| C. Safeguards | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.0010*** | -0.0016*** | -0.0009*** | -0.0016*** | -0.0012*** | -0.0010*** |
| | [0.0004] | [0.0002] | [0.0004] | [0.0002] | [0.0004] | [0.0004] |
| $EXH_{i(t-1)}$ | | | | | -0.00002*** | -0.00002*** |
| | | | | | [0.00001] | [0.00001] |
| No. of Obs. | 920,514 | 920,227 | 920,514 | 920,227 | 862,863 | 862,863 |
| Centered $R^2$ | 0.08 | 0.07 | 0.08 | 0.07 | 0.06 | 0.06 |
| Fixed Effects | $i+c+t$ | $it+c$ | $ct+i$ | $it+ct$ | $i+c+t$ | $ct+i$ |

Notes: Standard errors are robust and clustered at the industry (hs4) and country level; *, **, and *** denote the 5, 1, and 0.1 percent of significance level, respectively.

**Table 5. Accounting for MFN/Safeguards Externality, IV Estimates**

Dependent Variable: $TB_{ict}$
Instrument for $lnEX_{ic(t-1)}$: $lnTC_{ic(t-1)}$
Instrument for $SIM_{ic(t-1)}$: $SIM_{ic'(t-1)}$

| A. MFN Tariffs: $T_{ict}$ | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $lnEX_{ic(t-1)}$ | -0.02 | -0.01 | -0.03 | -0.02** | -0.10 | -0.11 |
| | [0.06] | [0.01] | [0.06] | [0.01] | [0.07] | [0.08] |
| $SIM_{ic(t-1)}$ | -1.36*** | -0.71*** | -1.51*** | -0.92*** | -1.60*** | -1.69*** |
| | [0.41] | [0.18] | [0.41] | [0.18] | [0.45] | [0.46] |
| $lnEX_{ic(t-1)} \times SIM_{ic(t-1)}$ | -0.007* | -0.004* | -0.009** | -.003* | -0.007* | -0.009* |
| | [0.004] | [0.002] | [0.004] | [0.002] | [0.004] | [0.004] |
| $EXH_{i(t-1)}$ | | | | | -0.02*** | -.02*** |
| | | | | | [0.006] | [0.006] |
| No. of Obs. | 554,443 | 553,828 | 554,443 | 553,828 | 519,884 | 519,884 |
| $R^2$ | 0.49 | 0.58 | 0.49 | 0.58 | 0.42 | 0.41 |
| B. Safeguards: $TTB_{ict}^{filed}$ | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.002*** | -0.003*** | -0.002*** | -0.003*** | -0.002*** | -0.003*** |
| | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] | [0.001] |
| $SIM_{ic(t-1)}$ | 0.00004 | 0.0001*** | 0.00003 | 0.0001*** | 0.0001 | 0.0001 |
| | [0.0002] | [0.00003] | [0.0002] | [0.00003] | [0.0002] | [0.0002] |
| $lnEX_{ic(t-1)} \times SIM_{ic(t-1)}$ | -0.00002* | -0.00003*** | -0.00002* | -0.00003*** | -0.00002* | -0.00002* |
| | [0.00001] | [0.00001] | [0.00001] | [0.00001] | [0.00001] | [0.00001] |
| $EXH_{i(t-1)}$ | | | | | -0.00003* | -0.00003* |
| | | | | | [0.00002] | [0.00002] |
| No. of Obs. | 615,750 | 615,336 | 615,750 | 615,336 | 575,114 | 575,114 |
| $R^2$ | 0.07 | 0.02 | 0.07 | 0.02 | 0.04 | 0.04 |
| Fixed Effects | $i+c+t$ | $it+c$ | $ct+i$ | $it+ct$ | $i+c+t$ | $ct+i$ |

Notes: Standard errors are robust and clustered at the industry (hs4) and country level; *, **, and *** denote the 5, 1, and 0.1 percent of significance level, respectively.

**Table 6. Accounting for Product Differentiation, IV Estimates**

Dependent Variable: $TB_{ict}$
Instrument for $lnEX_{ic(t-1)}$: $lnTC_{ic(t-1)}$

| A. Permanent Tariffs: $T_{ict}$ | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $lnEX_{ic(t-1)}$ | -0.73*** | -0.43*** | -0.76*** | -0.47*** | -0.70*** | -0.72*** |
| | [0.33] | [0.18] | [0.34] | [0.18] | [0.32] | [0.32] |
| $lnEX_{ic(t-1)} \times Rauch_i$ | -0.36*** | -0.27*** | -0.38*** | -0.29*** | -0.34*** | -0.35*** |
| | [0.15] | [0.11] | [0.17] | [0.12] | [0.14] | [0.14] |
| $EXH_{i(t-1)}$ | | | | | -0.02*** | -0.02*** |
| | | | | | [0.004] | [0.004] |
| No. of Obs. | 533,309 | 532,834 | 533,309 | 532,834 | 499,205 | 499,205 |
| Centered $R^2$ | 0.44 | 0.56 | .44 | 0.57 | .44 | .45 |
| B. TTBs: $TTB_{ict}^{filed}$ | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.0005 | -0.0014* | -0.0009 | -0.0015* | -0.0004 | -0.0001 |
| | [0.0016] | [0.0007] | [0.0016] | [0.0008] | [0.0015] | [0.0015] |
| $lnEX_{ic(t-1)} \times Rauch_i$ | -0.0022** | -0.0011** | -0.0024*** | -0.0011** | -0.0017** | -0.0019** |
| | [0.0009] | [0.0004] | [0.0009] | [0.0004] | [0.0007] | [0.0008] |
| $EXH_{i(t-1)}$ | | | | | -0.00002 | -0.00002 |
| | | | | | [0.00002] | [0.00002] |
| No. of Obs. | 836,812 | 836,591 | 836,812 | 836,591 | 784,092 | 784,092 |
| Centered $R^2$ | 0.04 | 0.03 | 0.05 | 0.04 | 0.03 | 0.04 |
| Fixed Effects | $i+c+t$ | $it+c$ | $ct+i$ | $it+ct$ | $i+c+t$ | $ct+i$ |

Notes: Standard errors are robust and clustered at the industry (hs4) and country level; *, **, and *** denote the 5, 1, and 0.1 percent of significance level, respectively.

**Table 7. Accounting for Political Organization, IV Estimates**

Dependent Variable: $TB_{ict}$
Instrument for $lnEX_{ic(t-1)}$: $lnTC_{ic(t-1)}$

| A. Permanent Tariffs: $T_{ict}$ | (1) | (2) | (3) | (4) | (5) | (6) |
|---|---|---|---|---|---|---|
| $lnEX_{ic(t-1)}$ | -0.45 | -1.25*** | -0.52 | -1.39*** | -0.44 | -0.51 |
| | [0.35] | [0.29] | [0.34] | [0.29] | [0.34] | [0.34] |
| $POI_{ic}$ | 7.41*** | 9.23*** | 6.94*** | 8.97*** | 7.42*** | 6.96*** |
| | [1.68] | [1.36] | [1.63] | [1.36] | [1.68] | [1.64] |
| $lnEX_{ic(t-1)} \times POI_{ic}$ | -0.71*** | -0.77*** | -0.64*** | -0.72*** | -0.71*** | -0.64*** |
| | [0.15] | [0.14] | [0.14] | [0.14] | [0.15] | [0.15] |
| $POO_{ic}$ | -0.20 | 0.24 | -0.18 | 0.30* | -0.20 | -0.18 |
| | [0.22] | [0.18] | [0.23] | [0.18] | [0.22] | [0.23] |
| $EXH_{i(t-1)}$ | | | | | -0.02** | -0.02** |
| | | | | | [0.01] | [0.01] |
| No. of Obs. | 125,051 | 122,999 | 125,036 | 122,984 | 125,051 | 125,036 |
| Centered $R^2$ | 0.58 | 0.45 | .60 | 0.45 | 0.59 | .60 |
| B. TTBs: $TTB_{ict}^{filed}$ | (1) | (2) | (3) | (4) | (5) | (6) |
| $lnEX_{ic(t-1)}$ | -0.0015 | -0.0028** | -0.0019 | -0.0032** | -0.0015 | -0.0020 |
| | [0.0017] | [0.0011] | [0.0018] | [0.0012] | [0.0017] | [0.0018] |
| $POI_{ic}$ | 0.0142* | 0.0315*** | 0.0120 | 0.0301*** | 0.0142* | 0.0121 |
| | [0.0083] | [0.0062] | [0.0085] | [0.0063] | [0.0083] | [0.0085] |
| $lnEX_{ic(t-1)} \times POI_{ic}$ | -0.0010 | -0.0027*** | -0.0007 | -0.0025*** | -0.0011 | -0.0008 |
| | [0.0008] | [0.0007] | [0.0008] | [0.0007] | [0.0008] | [0.0008] |
| $POO_{ic}$ | 0.0036*** | 0.0049*** | 0.0036*** | 0.0050*** | 0.0036*** | 0.0036*** |
| | [0.0009] | [0.0007] | [0.0010] | [0.0007] | [0.0009] | [0.0010] |
| $EXH_{i(t-1)}$ | | | | | -0.00004 | -0.00005 |
| | | | | | [0.00005] | [0.00005] |
| No. of Obs. | 188,245 | 186,636 | 188,218 | 186,609 | 188,245 | 188,218 |
| Centered $R^2$ | 0.15 | 0.11 | 0.15 | 0.11 | 0.15 | 0.15 |
| Fixed Effects | $i + c + t$ | $it + c$ | $ct + i$ | $it + ct$ | $i + c + t$ | $ct + i$ |

Notes: Standard errors are robust and clustered at the industry (hs4) and country level; *, **, and *** denote the 5, 1, and 0.1 percent of significance level, respectively.