Global Value Chains and Product Differentiation:

Changing the Politics of Trade

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Abstract

Both global value chains and trade in differentiated goods have become increasingly important in the international economy. We argue that these two developments interact in changing the political economy of trade. For finished goods, product differentiation facilitates trade liberalization because the adjustment costs of liberalization are lower when countries trade varieties of the same good. By contrast, for goods that are used as inputs in the production process, product differentiation makes trade liberalization more difficult. We find support for this argument in two tests. On the one hand, we look at patterns of lobbying on US preferential trade agreements (PTAs). On the other hand, we use a dataset with highly disaggregated tariff data from 61 PTAs signed between 1995 and 2013. The paper contributes to the long-standing debates on endogenous tariff formation and the consequences of intra-industry trade, and a nascent literature on the relationship between global value chains and trade policy.

Key words: intra-industry trade, global value chains, preferential trade agreements, lobbying, tariffs.

Word count: 6,589 words
Version: 8 March 2018

Introduction

Over the past few decades, international trade has undergone two important developments: the globalization of production in the form of global value chains (GVCs) and the growth of trade in differentiated products. Most research suggests that these two developments have a major impact on the political economy of trade. GVCs make companies increasingly reliant on imports of intermediate goods, that is, goods that are sold for the purpose of serving as inputs for the production of other goods. Via this mechanism, GVCs have been depicted as facilitating trade liberalization (Chase, 2005; Manger, 2009; Blanchard and Matschke, 2014; Gawande, Hoekman, and Cui, 2015; Baccini, Pinto, and Weymouth, 2016), reducing industries' demand for the use of trade remedies (Jensen et al., 2015), and helping countries to achieve deep economic integration (Chase, 2005; Manger, 2009; Johns and Wellhausen, 2015; Kim, 2015). Similarly, the exchange of differentiated goods between countries, which leads to intra-industry (IIT) trade, has major consequences for the political economy of trade, by either strengthening support for trade liberalization (Lipson, 1982; Milner, 1997, 1999; Manger, 2012, 2015) or empowering narrow protectionist groups (Gilligan, 1997; Kono, 2009; Osgood, 2016).

While the consequences for trade policy of both trade in differentiated goods and GVCs have received considerable attention, our understanding of how the two developments interact in shaping the political economy of trade is still limited. We fill this gap by arguing that the effect of product differentiation on the politics of trade is conditional upon GVCs. For finished goods, trade in differentiated goods increases net support for trade liberalization. This is because product differentiation reduces direct competition between products, hence lowering the number of domestic companies that perceive foreign imports as a threat. For example, imports of small passenger cars only pose a limited threat to domestic producers of luxury cars. Conversely, for intermediate goods, trade in differentiated goods does not have the same effect of assuaging protectionist pressures. For a homogenous intermediate good, all

downstream companies – namely, the companies using the inputs in the production of another good – favor trade liberalization. By contrast, for a differentiated intermediate good, downstream companies will be divided in their trade policy preferences. In this case, only some of the companies that use the inputs will benefit from trade liberalization while others will face costs when shifting suppliers, either because they have to adjust their production process to the use of another variety of an intermediate good or because they find it difficult to find a foreign supplier of exactly the variety they need. Our expectation thus is that product differentiation (and hence IIT) increases support for trade liberalization for finished goods, but reduces support for trade liberalization for intermediate goods.

We test this argument using two datasets. On the one hand, we use data on trade policy lobbying in the United States. This data lets us test the argument that heterogeneity in trade preferences across firms in the same sector increases as a result of the combination of global value chains and product differentiation. The results show that when lobbying on differentiated goods in the presence of global value chains, firms are more likely to lobby alone than as part of a sectoral association. On the other hand, we use data on the extent of first-year tariff cuts in preferential trade agreements to test the argument that the ambition of trade liberalization is highest for differentiated goods in the presence of global value chains. Again, the results of this test support our argument.

These findings directly contribute to the theme of the special issue on the linkage between global value chains and (international) institutions. Concretely, they cast doubt on the expectation that global value chains always give rise to deep trade agreements. Instead, in the presence of product differentiation global value chains may even weaken the ambition of tariff cut commitments, a key aspect of these international institutions.

Global Value Chains, Product Differentiation, and Trade Policy

Over the past three decades, two major developments, namely the globalization of production and the rise of trade in differentiated goods, have shaped international trade. On the one hand, production processes are increasingly global (see the introduction to this special issue). With inputs for many goods and services being sourced abroad, trade in intermediate goods has surpassed trade in finished goods. On the other hand, trade in differentiated products has become increasingly important relative to trade in homogeneous goods (Milner, 1999, p. 94; Brülhart, 2009). Trade in differentiated goods often is of an intra-industry type, where a country exports to and imports from another country the same good or service.

Much recent research on trade policy has looked at one of these two developments. As of yet, however, we lack a good understanding of how the two developments interact in shaping the political economy of trade. Considering both global value chains and product differentiation, we can distinguish four types of goods for which the political economy of trade is likely to be different. A first category consists of finished goods that are fairly homogenous (case I). This is the case, for example, for many agricultural products that are destined for direct consumption. A second category includes finished goods that are characterized by substantial product differentiation (case II). Cars are an example of this type of good. A third category of products is constituted by intermediate goods that are quite homogenous (case III). Trade in synthetic rubber used in the tier production exemplifies this type of good. In the final category fall intermediate goods exhibiting high product differentiation (case IV). An example of this type of good is specialized optical glass. We discuss the political economy of trade for each of these four types of goods below, with a focus on case IV, which is our novel argument.

Case I (finished homogenous): For a finished good that is homogeneous, the political economy of trade depends on a country's comparative advantage. If the country is highly

competitive, it will export the good. As exporters, domestic producers will support the liberalization of domestic trade barriers in a unified manner, but only to the extent needed to gain better foreign market access in reciprocal negotiations. If the country is not competitive, however, it imports the good concerned. An increase in trade then reduces domestic price levels and drives less competitive domestic producers out of business. As a result, domestic producers will oppose trade liberalization. Their lobbying may be counteracted by interests that benefit from cheap imports, such as consumers, wholesalers, and retailers (Destler and Odell, 1987). In most cases, however, the pressure from import-competing producers outweighs the pressure from these free trade interests. Consumers often fail to organize because of collective action problems. Wholesalers and retailers, moreover, likely face greater uncertainty about the consequences of trade liberalization than domestic producers that face import competition (on the role of uncertainty in explaining protectionism, see Rodrik, 1995: 1479).

Case II (finished differentiated): Much research suggests that product differentiation reduces opposition to trade liberalization (Krugman, 1981; Lipson, 1982; Milner, 1997; Manger, 2012, 2015). In the presence of product differentiation, overall demand allows the co-existence of many different companies. Fewer companies then will face a threat from greater imports. With all other trade policy constituencies having the same preferences as for a finished good without product differentiation, the expectation here is that there is relatively greater net support for trade liberalization than in case I.

Case III (intermediate homogenous): The globalization of production via global value chains increases some firms' dependence on the import of intermediate goods for their production process. With these companies thus having a direct stake in trade policy choices, they become a relevant constituency in trade politics. The concrete expectation is for firms

that import intermediate goods to join exporters in advocating trade liberalization and opposing protectionist trade policies. When the good is of a homogenous type, downstream companies that source it domestically also benefit from liberalization, because the imports reduce price levels. Sectors hence should adopt a unified position in favour of trade liberalization. Keeping a country's comparative advantage constant, therefore, support for the liberalization of a homogenous good will be higher in the presence of GVCs (case III) than in the absence of them (case I).

Case IV (intermediate differentiated): Finally, in a situation with GVCs and product differentiation, downstream companies do not benefit equally from trade liberalization. Companies that source the good from abroad tend to benefit, as trade liberalization lowers the price they have to pay. Companies that source the good domestically, however, cannot expect lower prices for the varieties they use. Product differentiation means that even if some varieties of the good become cheaper, this does not necessarily extend to other varieties. Some downstream companies that source domestically may be able to switch to foreign suppliers, but the differentiated nature of the good is likely to make this costly. Beyond the usual costs involved in finding a new supplier, finding a foreign supplier that is capable of producing the exact variety of a differentiated good that is needed in the required quality is likely to be particularly difficult. This is because differentiated goods create a market in which inputs are relationship-specific, i.e. tailored to a specific production structure, creating a strong buyer-seller relationship (Nunn, 2007).

Alternatively, if the downstream company decides to switch to a new variety of an intermediate good, it will have to adjust the production process. The costs of either approach may exceed any gains these companies would reap from a lower-priced foreign variety, meaning that they are not interested in a liberalization of the intermediate good. In the United States, for example, the willingness to switch suppliers is higher in the apparel industry,

which imports relatively homogeneous goods, than in the high-tech sector, which relies on differentiated inputs (Interview with a business representative, 13 October 2015). The expectation is thus that downstream companies' support for the liberalization of trade in intermediates is stronger for homogeneous goods (case III) than for differentiated goods (case IV).

Whereas support for liberalization of trade in intermediates is lower for a differentiated good than a homogeneous good, opposition to liberalization is similar for both. When the good is differentiated, not all domestic producers directly compete with the imported varieties. However, because of the aforementioned strong buyer-seller relationship, they realize that trade liberalization will have negative effects on the downstream companies they supply. Even if the goods that these downstream companies produce are differentiated, cheaper inputs from abroad will allow some of them to gain market share at the cost of those that source at higher prices domestically. This, in turn, will lower demand for the goods produced by the domestic upstream industry, giving them an incentive to oppose trade liberalization. In other words, when it comes to preferences over trade liberalization, differentiated goods create incentives for collusion between upstream and downstream companies due to the strong buyer-seller relationship. With opposition to trade liberalization being similar and support for liberalization being lower, net support for liberalization is lower in case IV (intermediate good with product differentiation) than in case III (intermediate good without product differentiation).

We derive two expectations from this argument that can be tested empirically. First, with some firms supporting and others opposing trade liberalization in case IV, sectoral or broad-based business associations should find it difficult to formulate a position. By contrast, if there is no disagreement on PTAs among firms operating in an industry, we should see lobbying activities implemented by associations as a means to reduce the cost of lobbying.

We thus expect a greater share of the lobbying on differentiated goods in the presence of global value chains to be carried out by firms rather than associations (for other studies explaining firms' decision to lobby alone or via associations, see for example Bombardini and Trebbi, 2012; Madeira, 2016; Osgood, 2017). Our first hypothesis hence reads: *The likelihood of firms lobbying themselves rather than via sectoral associations is highest in the presence of both product differentiation and global value chains*.

Second, comparisons across the four cases suggest that support for trade liberalization should be strongest for goods captured by cases II (finished goods with product differentiation) and III (intermediate goods without product differentiation). In comparison, support for liberalization should be weaker for goods captured by cases I (finished goods without product differentiation) and IV (intermediate goods with product differentiation). We combine this expectation with the assumption that governments largely follow the relative strength of lobbying pressures when deciding trade policy outcomes (for this assumption, see also Chase, 2005; Dür, 2010; Manger, 2015). The greater support for trade liberalization on a good, therefore, the faster and more far-reaching the reduction of barriers to trade in that good should be. By contrast, the greater opposition to trade liberalization, the less ambitious trade liberalization should be. Our second hypothesis hence reads: *Whereas product differentiation results in a more ambitious liberalization of finished goods, it leads to a less ambitious liberalization of intermediate goods.* Table 1 summarizes this discussion.

Table 1: GVCs, product differentiation and the politics of trade

		Product differentiation	
		No	**Yes**
Global value chains	**No**	CASE I Domestic producers: depends on comparative advantage Retailers: free trade Downstream users: not active **Aggregate prediction: sectoral lobbying, position depends on comparative advantage**	CASE II Domestic producers: generally pro free trade Retailers: free trade Downstream users: not active **Aggregate prediction: some firm lobbying, considerable support for trade liberalization**
	Yes	CASE III Domestic producers: depends on comparative advantage Retailers: not active Downstream users: free trade **Aggregate prediction: sectoral lobbying, position depends on comparative advantage**	CASE IV Domestic producers: rather protectionist Retailers: not active Downstream users: split **Aggregate prediction: firm lobbying, considerable support for protectionism**

Testing Hypothesis I: The Impact of GVCs and Product Differentiation on Lobbying

Hypothesis 1 suggests disagreement among firms operating in the same industries in case of IIT and GVCs, since not all firms benefit in the same way as a result of preferential liberalization. To test this hypothesis, we use an original dataset on lobbying activities concerning all PTAs signed by the US after 1995.[1] We relied on the Lobbying Disclosure Database to collect all the lobbying reports related to the implementation bill of all US PTAs, excluding the ones signed before 1995 (the year in which the Lobbying Disclosure Act was passed). Data come from Kim (2017) and are made available at

[1] Further details on this data collection can be found in Baccini, Osgood, and Weymouth (2017).

https://www.lobbyview.org/#/. We identify almost 1,000 lobbying reports issued by 282 clients. In each report, we can find information on the name of the client (i.e. firm or association), the amount of money invested in the lobbying effort, the PTA(s) for which each client lobbied, and the other bills for which each client lobbied. These reports are the same for the Congress and the Senate. Using a plethora of online sources, we match each client to a NAICS 4-digit level industrial code.

Operationalization

To capture the dependent variable, namely disagreement among firms operating in the same industry, we use the share of total lobbying expenditures (by both firms and associations) undertaken by firms in a specific industry *i* for a specific PTA *j*. We label this variable *Lobby Separate*.

Our theoretical framework focuses on two predictors: the distinction between finished and intermediate goods and product differentiation. To operationalize intermediates, we rely on a classification of products developed by Francois and Pindyuk (2012) and Bekkers et al. (2012). This classification distinguishes among goods that are of "intermediate consumption", of "final consumption", or of "mixed use".[2] We use a dichotomous variable that is coded 1 for goods that are of either intermediate or mixed use. Since the original variable is at the 6-digit level of the Harmonized Commodity Description and Coding System (HS), we take the sum of intermediates at the NAICS 4-digit level, which is the level of aggregation of our outcome variable. To reduce the impact of outliers, we use the logarithm of this count variable (adding one so that we do not lose industries with no intermediates), a decision that does not affect our main result. We label this variable *Intermediates (sum)*.

For our second predictor, namely product differentiation, we rely on two different variables. First, we use IIT as a proxy. IIT should only be present for products that are close

[2] For further details on this classification, see Baccini, Osgood, and Weymouth (2017).

substitutes. To measure IIT, we calculated the Grubel Lloyd index of IIT ($1 - \frac{imports-exports}{imports+exports}$), following standard practice (Grubel and Lloyd, 1971; Gilligan, 1997; Kono, 2009). The Grubel Lloyd index takes on a value between 0 (a country either only imports or exports a good to another country) and 1 (a country imports exactly the same amount of a product as it exports).[3] We set IIT to zero in cases in which there is no trade between two countries, because otherwise we would miss these observations. Data come from the BACI database that is disaggregated at the 6-digit level of the HS.[4]

Since the original data for both product differentiation and IIT are measured at the HS 6-digit product level (roughly 5,000 products), but our dependent variable is measured at the NAICS 4-digit industry level (66 manufacturing industries), we perform the following data transformation similarly to our variable *Intermediates*. First, we create a dummy that scores one if intra-industry trade is positive for a given product at the 6-digit HS level. Second, we sum the number of products with positive intra-industry value in a given industry at the NAICS 4-digit level. The resulting count variable, which is a proxy for product differentiation, is our measure of IIT (*IIT (sum)*) at the NAICS 4-digit level.[5]

Given our operationalization of IIT and GVCs, it is important to account for variation in the number of goods across industries. Thus, in each model specification, we include a variable capturing the number of HS 6-digit products per NAICS 4-digit industry. This variable, which ranges between 3 and 515, is labelled *Number of Products*.

Moreover, in line with other studies (Baccini, Dür, and Elsig, 2017a; Osgood, 2017) we use a measure of product differentiation developed by Rauch (1999). Rauch (1999) categorized goods as homogenous, reference priced, and differentiated. Our variable

[3] In our dataset we have three entities, ASEAN, the EU, and CAFTA, which are treated as trade blocs in tariff schedules. For these blocs we first sum imports and exports of each member country with the trade partner. We then use these values to calculate the Grubel Lloyd index.
[4] We use average trade data over a four-year period, as trade flows can undergo considerable fluctuations. Our results do not change if we use 2-year or 6-year windows.
[5] Our results are similar if we use the average values of *Intermediates* and *IIT* to move from HS 6-digit to NAICS 4-digit.

Differentiated Goods scores one if a product is either reference priced or differentiated. This measure is at SITC 4-digit level and so we use a crosswalk to move to NAICS 4-digit. The categorization is time invariant and does not vary across countries. As such, the correlation between IIT and product differentiation is low, i.e. $\rho < .2$. We have no priors on which measure is preferable in this context. For us it would be reassuring if results are similar with both measures, given the well-known difficulties to operationalize product differentiation.

We include a few control variables to reduce the risk of omitted variable bias. Since we lose several observations when including controls, we add them only in some models. First, we include a variable capturing the number of issues on which clients lobby in addition to PTAs. Data come from Baccini, Osgood, and Weymouth (2017). Second, we incorporate the log of sales to account for the size of the industry, the 4-firm concentration ratio to account for collective action problems, and a measure of comparative advantage, which is a dummy scoring one if the difference between exports and imports is positive. All these variables come from the US economic census.

Model specification

We rely on ordinary least squares regressions with PTA fixed effects to account for the specific characteristics of the trade partners. In our main analysis, we use robust standard errors clustered by PTA. Results are similar if we cluster standard errors at the level of the industry or if we use bootstrapped standard errors. Furthermore, we obtain similar results if we use fractional response models, given that our outcome variable ranges between zero and one. Our sample only includes merchandise industries.

Results

Table 2 shows the results of this analysis. With one exception, the coefficients of the interaction terms are always positive and significant throughout all model specifications. This

implies that disagreement among firms is larger (i) in industries with high IIT and many intermediates compared to industries with low IIT and many intermediates and (ii) in industries with many differentiated goods and many intermediates compared to industries with homogenous goods and many intermediates. This is in line with our theory. When product differentiation increases for an intermediate good, not all firms will benefit from preferential liberalization in the same way. In this scenario, firms are more likely to lobby alone on PTAs rather than through associations, in which preferences are heterogeneous.

Table 2: The Impact of GVCs and IIT on Firm Lobbying

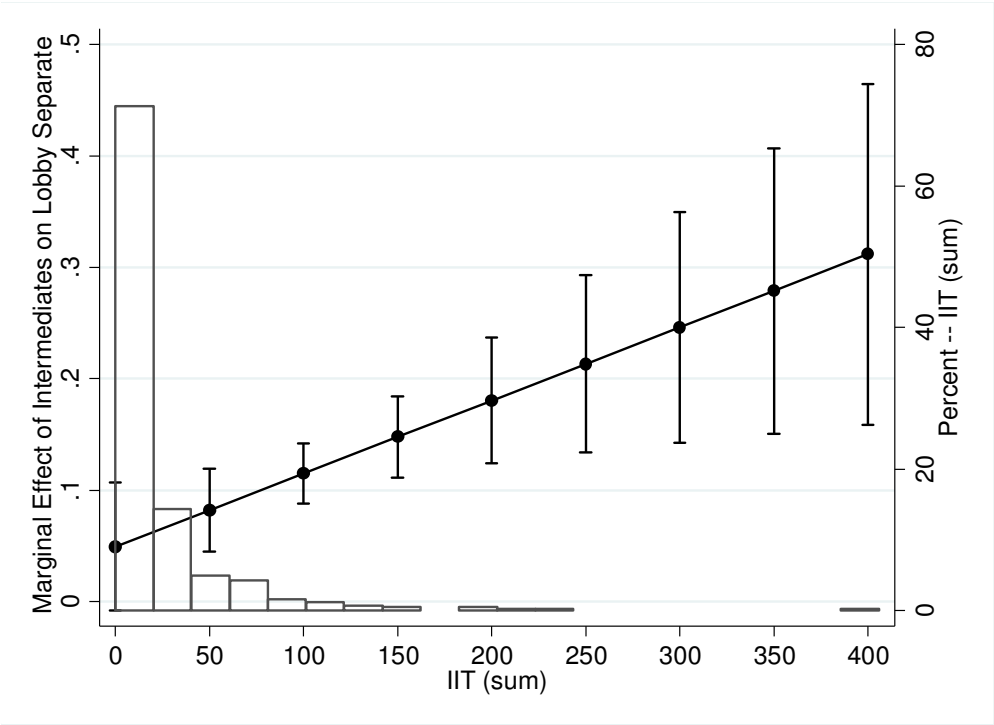
	(1)	(2)	(3)	(4)
	OLS	OLS	OLS	OLS
VARIABLES	Lobby Separate	Lobby Separate	Lobby Separate	Lobby Separate
Intermediates (sum)	0.1293***	0.0493	0.0919**	-0.0085
	(0.018)	(0.032)	(0.030)	(0.022)
IIT (sum)	-0.0005	-0.0027*		
	(0.001)	(0.001)		
Intermediates (sum)*IIT (sum)	0.0003**	0.0007**		
	(0.000)	(0.000)		
Differentiated Goods			0.1254	-0.2794***
			(0.155)	(0.091)
Intermediates (sum)*Different.			0.0109	0.1027***
Goods			(0.046)	(0.032)
Constant	0.4684***	-0.3797	0.5350***	-0.2412
	(0.059)	(0.298)	(0.104)	(0.222)
Controls	No	Yes	No	Yes
PTA fixed effects	Yes	Yes	Yes	Yes
Observations	425	348	387	331
R-squared	0.233	0.355	0.187	0.302

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Figure 1 shows the effect of the interaction terms graphically. The marginal effect of *Intermediates* on the probability of industrial disagreement increases as *IIT* becomes more important in industry *i.* More specifically, when there is no *IIT* in an industry, finished goods and intermediates do not differ in the way that they lobby for implementing PTA, i.e. the confidence interval of the point estimate crosses zero. On the contrary, when *IIT* is larger than 0.35 in industry *i*, intermediates are significantly more likely to face industrial disagreement,

i.e. some firms lobby alone and not through an association. The effect is not trivial, namely a 12 percent increase when *IIT* is equal to 0.45.[6] The bottom line is that preferential liberalization is politically more controversial in case of both IIT and GVCs, since the expected gains are uneven among actors operating in the same industry. Figure A1 in the Appendix shows a similar effect for product differentiation (Model 4).[7]

Figure 1 Marginal effect of *Intermediates* on *Lobby separate* for different numbers of differentiated products (Model 2)



Testing Hypothesis 2: The Impact of GVCs and Product Differentiation on Tariff Cuts

We rely on data from Baccini, Dür and Elsig (2017) to test Hypothesis 2. This dataset covers the tariff concessions included in 61 PTAs (for a detailed description of the data, see Baccini, Dür and Elsig, 2017). These PTAs were signed by the seven largest trading powers, namely

[6] These results are confirmed if we rely on a different proxy of industrial disagreement, namely an outcome variable capturing firms or associations opposing a PTA in an industry in which other firms or associations lobby in favor of the same PTA. Our analysis confirms that, in the presence of both product differentiation and GVCs, industries are more likely to experience industrial disagreement.

[7] Table A1 shows the results of the additive models, i.e. models without interaction terms, for the sake of transparency. Our findings are largely in line with Osgood (2017), who uses a similar model specification.

Australia, Canada, China, the EU, Japan, South Korea and the United States, over the period 1995 to 2013. The dataset, however, comprises the tariff concessions made by a total of 50 trading entities that signed up to these PTAs. In fact, the 61 PTAs contain 156 tariff schedules, as PTAs contain at least two tariff schedules: one for country A vis-à-vis country B and one for country B vis-à-vis country A. Plurilateral PTAs tend to include an even larger number of tariff schedules. In the ASEAN Australia New Zealand PTA, for example, Australia only has one tariff schedule for all ASEAN member states, but each of the latter has a separate schedule for Australia. For each of these tariff schedules, the dataset includes around 5000 tariff lines disaggregated at the 6-digit HS level.

Operationalization

We operationalize the second dependent variable, namely the ambition of trade liberalization on a good, by using the tariff cut in the first year of the agreement. The first-year tariff cut is a useful measure of the ambition of tariff cuts because in a PTA most tariffs are cut to zero eventually. However, governments can decide to make the cuts sooner or later, a decision that has a direct effect on firms' bottom line. A large first-year cut benefits domestic importers and foreign exporters; a small first-year cut benefits domestic import-competitors that can use the breathing space created by a postponement of trade liberalization to adjust their production.

The main explanatory variables are *Intermediates*, *IIT*, *Differentiated Goods*, and their interaction, which have been previously described, but this time we rely on their values at the 6-digit HS level. In our dataset, 77 percent of the tariff lines are coded 1 on *Intermediates*. In line with our argument, tariffs prior to the conclusion of PTAs are substantially lower for intermediate than for finished goods (means of 5.6 and 11.7, respectively), a fact that testifies to the importance of GVCs in the international trading system.

We also include several control variables in the models below. First, a dummy variable, which scores one in the case of zero trade, accounts for the fact that zero trade does

not happen "at random" (*IIT Missing*). Second, we control for the level of tariffs before the formation of PTAs (*tmin1*) to capture dependence between pre-PTA tariffs and preferential tariffs (ρ=0.73). Third, we include levels of exports and imports to distinguish the effect on preferential liberalization of GVCs and product differentiation from the effect on preferential liberalization of standard trade flows. Data on *Exports* and *Imports* come from BACI.[8] Fourth, we account for market size (*GDP*) and for the level of development of countries A and B (*GDP per capita*). Data come from the World Development Indicators database (World Bank, 2014).

Fifth, we control for the regime type of country A (*Democracy*), since the literature suggests that democracies are more open to trade than autocracies (Mansfield et al., 2000). Data on *Democracy* comes from the Polity IV dataset (Marshall et al., 2016). Finally, we include a dummy for WTO membership, which scores one if both countries are WTO members (*WTO*), given the well-documented relationship between PTAs and WTO regulated by Article XXIV. Table A2 in the appendix shows univariate statistics for all our variables.[9]

Model specification

We use a Heckman selection model to account for the selection effect arising from goods that face zero tariffs even before the formation of PTAs. Specifically, we first estimate a probit model that predicts which products have pre-PTA tariffs equal to zero (selection equation). We include all our explanatory variables and controls as well as a measure of country competitiveness at the 6-digit level as an instrument for the selection equation. Tariffs should be more likely to be zero in those industries in which countries are competitive. Data on

[8] We use their average value over a 4-year period prior to the signature of a PTA to mitigate the variability of 6-digit trade data.

[9] For ASEAN, the EU, and CAFTA we take the sum of member countries' GDP and their average value of GDPpc and democracy. For the WTO, we use the minimum value across all member countries, i.e. *WTO* scores 0 if at least one member country is not a WTO member.

country competitiveness comes from Hausmann, Hwang, and Rodrik (2007).[10] We use pre-PTA values of *Country Competitiveness*, i.e. values in 1992.

In the second stage (outcome equation), we run an OLS regression on the subsample of products that do not have pre-PTA tariffs equal to zero. To account for the fact that the error terms of the selection equation and of the outcome equation are correlated, we include the inverse Mills ratio on the right-hand side.

Our unit of analysis is country A–country B–product (at the 6-digit HS level). We rely on directed dyadic data, meaning that tariff cuts always refer to country A in our dataset. Our dataset does not include a time dimension. Indeed, we are interested only in *de jure* tariff cuts implemented in the first year in which PTAs enter into force. All the other time-varying independent variables take the value of the year prior to the signature of a PTA.[11] Our estimates use robust standard errors clustered by products at the 6-digit HS level.

Results

We begin by showing the results of the selection equations (see Table 3, Model 1). Our instrument, *Country Competitiveness,* has the expected positive sign and is statistically significant. Models 2 and 3 report the results of our main results, without and with country fixed effects respectively. In line with the hypothesis, the coefficients for the interaction between *Intermediates* and *IIT* are negative and statistically significant.

To facilitate the interpretation of the interaction terms, in Figure 2 we show the effect of the interaction graphically. Moving the value of *IIT* from zero to one is associated with a 5 percentage point decrease in the magnitude of tariff cuts on intermediates. By contrast, moving the value of *IIT* from zero to one increases the magnitude of tariff cuts on finished goods by 3 percentage points. The take-home message is clear: as IIT increases, cuts of

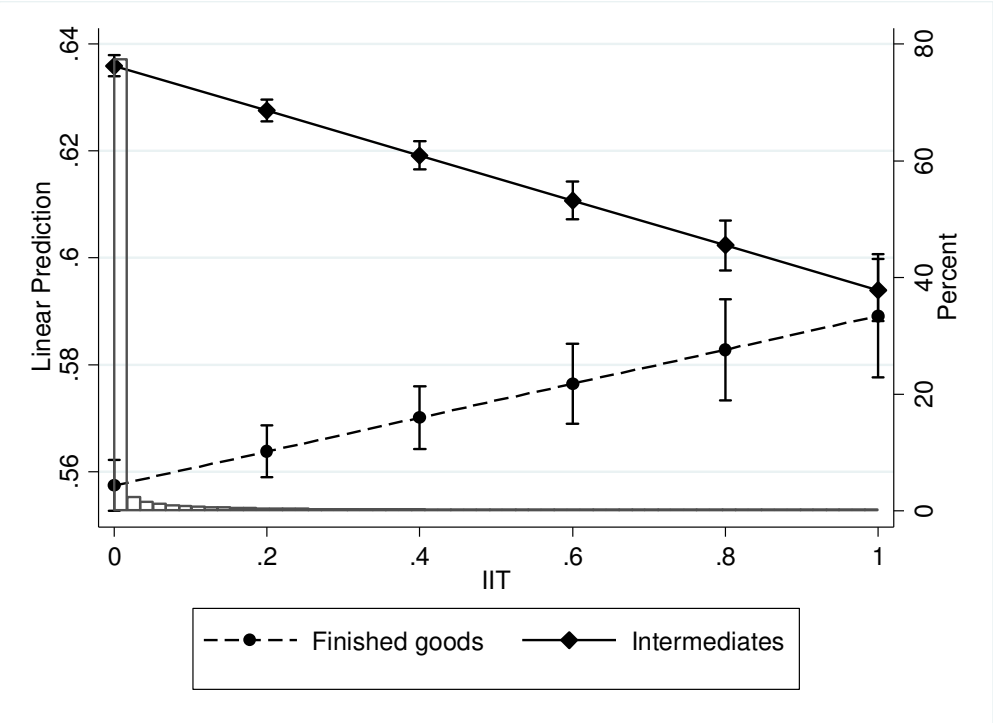
[10] We use the variable PRODY. This index "represents a weighted average of per-capita GDPs, where the weights correspond to the revealed comparative advantage of each country in good k." When we include this variable in the outcome equation, it is not statistically significant.

[11] Results hold if we take the value up to three years prior to the signature of a PTA.

Table 3: The Impact of GVCs and IIT on Tariff cuts

VARIABLES	(1) Probit tmin1=0	(2) OLS Tariff Cut	(3) OLS Tariff Cut	(4) OLS Tariff Cut	(5) OLS Tariff Cut
Intermediates	**0.3187*** **	**0.0857*** **	**0.1357*** **	**0.1464*** **	**02089*** **
	(0.021)	**(0.007)**	**(0.008)**	**(0.009)**	**(0.010)**
IIT	**-0.0672*** **	**0.0317*** **	**0.0163** **		
	(0.019)	**(0.007)**	**(0.007)**		
Differentiated Goods				**0.0658*** **	**0.0768** **
				(0.006)	**(0.006)**
Intermediates*IIT	**0.0939*** **	**-0.0736*** **	**-0.0251*** **		
	(0.022)	**(0.008)**	**(0.008)**		
Intermediates*Differentiated Goods				**-0.0824*** **	**-0.0890*** **
				(0.007)	**(0.007)**
IIT Missing	0.1018***	-0.0481***	-0.0258***	-0.0481***	-0.0258***
	(0.010)	(0.003)	(0.003)	(0.003)	(0.003)
lnGDPpc (country A)	0.5440***	0.1717***	0.2261***	0.1717***	0.2261***
	(0.003)	(0.008)	(0.014)	(0.008)	(0.014)
lnGDPpc (country B)	-0.0372***	0.0165***	0.0010	0.0165***	0.0010
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
lnGDP (country A)	-0.1888***	-0.0257***	-0.6203***	-0.0257***	-0.6203***
	(0.003)	(0.003)	(0.012)	(0.003)	(0.012)
lnGDP (country B)	-0.0066***	-0.0001	0.0050***	-0.0001	0.0050***
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
tmin1		-0.0014***	-0.0013***	-0.0014***	-0.0013***
		(0.000)	(0.000)	(0.000)	(0.000)
Exports	0.0177***	-0.0258***	-0.0184***	-0.0258***	-0.0184***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Imports	-0.0098***	0.0013***	-0.0012***	0.0013***	-0.0012***
	(0.002)	(0.000)	(0.000)	(0.000)	(0.000)
Regime	-0.0151***	0.0054***	-0.0013**	0.0054***	-0.0013**
	(0.000)	(0.000)	(0.001)	(0.000)	(0.001)
WTO	0.3626***	0.0162***	0.0494***	0.0162***	0.0494***
	(0.008)	(0.006)	(0.008)	(0.006)	(0.008)
Inverse Mills		0.0081	0.2159***	0.0081	0.2159***
		(0.020)	(0.028)	(0.020)	(0.028)
lnCountry Competitiveness	0.0936***				
	(0.017)				
Constant	-1.2737***	-0.4471***	12.7701***	-0.4471***	12.7701***
	(0.188)	(0.030)	(0.222)	(0.030)	(0.222)
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Country fixed effects	No	No	Yes	No	Yes
Observations	734,491	485,076	485,076	485,076	485,076
R-squared		0.390	0.452	0.390	0.452

Figure 2: Linear predictions of intermediates and finished goods on *Tariff cuts* with and without product differentiation (from Model 2)



preferential liberalization are greater for finished goods but smaller for intermediates, which are proxies for GVCs, a result in line with the previous analysis on lobbying activities in the US.

Furthermore, we run our main models using the measure of differentiated goods created by Rauch. The results are similar to the ones with IIT (Table 3, Models 4 and 5). Figure A2 in the Appendix shows the linear predictions of *Intermediates* and *Finished goods* for both homogenous and differentiated goods. The graphical results are in line with the ones of Figure 2, corroborating the evidence supporting our second hypothesis.[12]

Finally, since there are relatively few industries with values of IIT larger than zero, we replace our IIT variable with a dummy scoring one, if IIT is larger than 0. We report the results of this analysis in Figure A3, which is similar to Figure 2. We conclude by noting that

[12] For consistency with the first analysis, Table A2 in the Appendix reports the results of the additive models.

the coefficients for the control variables have the expected signs, which corroborates the validity of our analysis. Moreover, the *Inverse Mills Ratio* is significant, i.e. the error terms of the two equations are correlated, adding plausibility to the use of selection models.

Conclusion

The growing importance of trade in differentiated goods and GVCs begs the question of the consequences of these phenomena for the political economy of trade. We have proposed an argument that stresses different effects of product differentiation for intermediate and finished goods. Whereas for finished goods, product differentiation increases net support for trade liberalization, it has the opposite effect for intermediates.

We tested this expectation using two datasets. First, we showed that industrial disagreements over preferential trade liberalization are larger in case of differentiated intermediates than in case of differentiated finished goods. To implement this analysis, we used the entire universe of lobbying reports related to the implementation of US PTAs. Second, we tested out argument using tariff liberalization commitments in all PTAs formed by major trading entities between 1995 and 2013. Relying on this highly disaggregated dataset, we found robust and substantive evidence that tariff cuts of intermediates are smaller in case of product differentiation, whereas tariff cuts of finished goods are larger in case of product differentiation.

Our key contribution to the literature on trade policy concerns the role of GVCs in trade liberalization. Differently from previous studies arguing that GVCs unequivocally facilitate openness (Chase, 2005; Manger, 2009; Blanchard and Matschke, 2014; Johns and Wellhausen, 2015), we find that their effect depends on the structure of the market. When an industry relies on very specialized and differentiated inputs, it is more likely to have conflicting preferences over trade liberalization, since not every firm would benefit evenly

from tariff reduction. Our finding helps explain why, even in highly integrated markets, there are incentives to resist trade liberalization and to demand protectionist policies.

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Online Appendix

Figure A1: Marginal effect of intermediates without and with product differentiation (from Model 4)

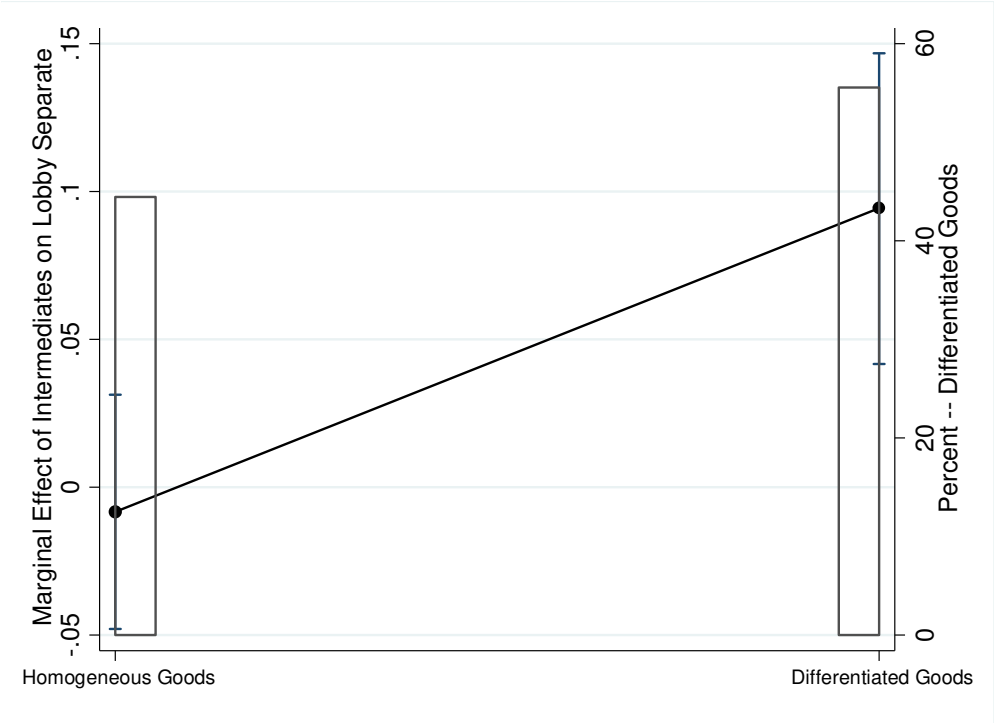

Figure A2: Intermediates and Product Differentiation

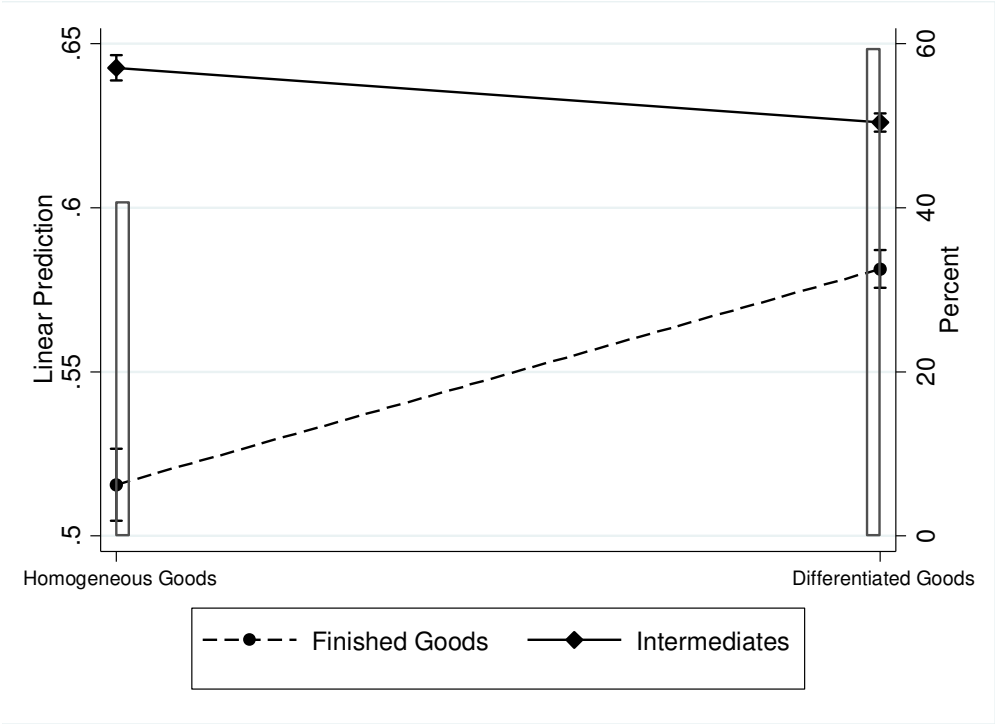

Figure A3: Intermediates and Product Differentiation

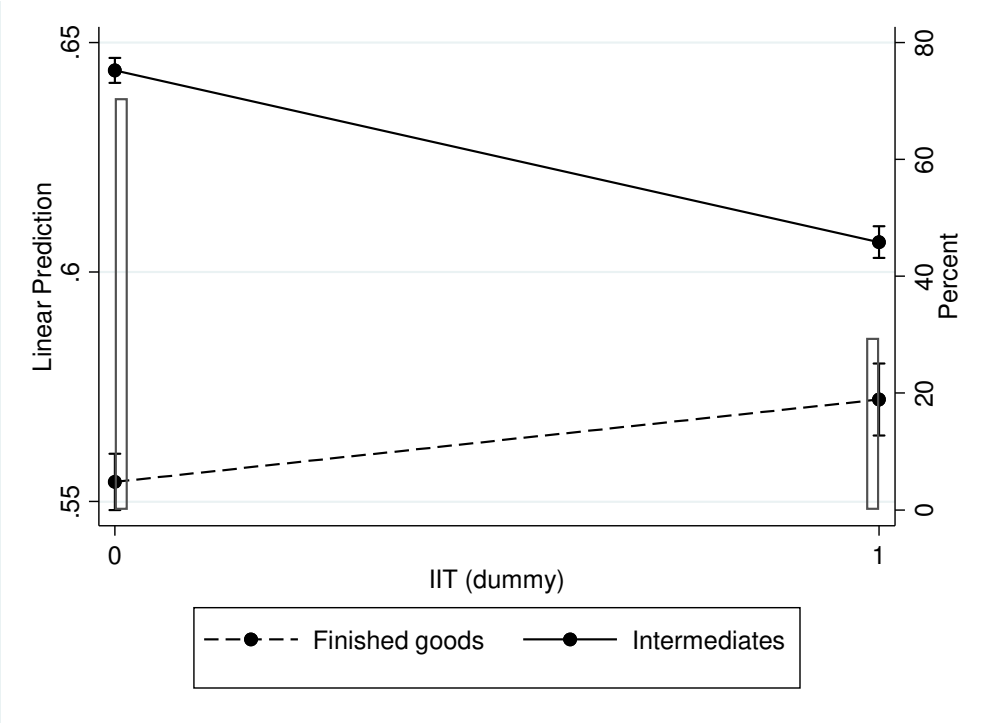

Table A1: The Impact of GVCs and IIT on Lobbying (additive models)

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
VARIABLES	Lobby Separate	Lobby Separate	Lobby Separate	Lobby Separate
IIT (sum)	0.0008*	0.0004		
	(0.000)	(0.001)		
Intermediates	0.1349***	0.0829***	0.0987***	0.0753**
	(0.017)	(0.026)	(0.016)	(0.025)
Differentiated Goods			0.1607***	0.0969**
			(0.038)	(0.035)
Issue Area		-0.0000		-0.0001
		(0.000)		(0.000)
Sale		0.0645***		0.0524***
		(0.011)		(0.008)
Conc4		0.0021*		0.0019*
		(0.001)		(0.001)
CA		-0.0182		-0.0085
		(0.032)		(0.030)
# of Products	-0.0013***	-0.0012***	-0.0008***	-0.0009***
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.4479***	-0.8136**	0.5172***	-0.5772**
	(0.056)	(0.329)	(0.073)	(0.248)
Controls	No	Yes	No	Yes
PTA fixed effects	Yes	Yes	Yes	Yes
Observations	425	348	387	331
R-squared	0.230	0.306	0.186	0.256

Robust standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A2: The Impact of GVCs and IIT on Tariff Cut (additive models)

	(1) OLS	(2) OLS	(3) OLS	(4) OLS
VARIABLES	TariffCut	TariffCut	TariffCut	TariffCut
IIT	-0.0190***	-0.0009		
	(0.003)	(0.003)		
Intermediates	0.0863***	0.1373***	0.0886***	0.1445***
	(0.007)	(0.008)	(0.007)	(0.009)
Differentiated Goods			0.0026	0.0084***
			(0.003)	(0.002)
IIT Missing	-0.0470***	-0.0251***	-0.0452***	-0.0217***
	(0.002)	(0.003)	(0.003)	(0.003)
lnGDPpc (country A)	0.1814***	0.2312***	0.1837***	0.2408***
	(0.008)	(0.013)	(0.008)	(0.014)
lnGDPpc (country B)	0.0158***	0.0006	0.0154***	-0.0001
	(0.001)	(0.001)	(0.001)	(0.001)
lnGDP (country A)	-0.0291***	-0.6215***	-0.0300***	-0.6243***
	(0.003)	(0.012)	(0.003)	(0.012)
lnGDP (country B)	-0.0002	0.0049***	-0.0004	0.0049***
	(0.000)	(0.000)	(0.000)	(0.000)
tmin1	-0.0014***	-0.0013***	-0.0014***	-0.0013***
	(0.000)	(0.000)	(0.000)	(0.000)
Exports	-0.0256***	-0.0183***	-0.0258***	-0.0179***
	(0.001)	(0.001)	(0.001)	(0.001)
Imports	0.0009**	-0.0014***	0.0005	-0.0015***
	(0.000)	(0.000)	(0.000)	(0.000)
Regime	0.0052***	-0.0015**	0.0051***	-0.0018***
	(0.000)	(0.001)	(0.000)	(0.001)
WTO	0.0225***	0.0530***	0.0234***	0.0592***
	(0.006)	(0.008)	(0.006)	(0.008)
Inverse Mills	0.0324	0.2293***	0.0384*	0.2531***
	(0.020)	(0.027)	(0.021)	(0.028)
Constant	-0.4689***	12.7437***	-0.4704***	12.6963***
	(0.030)	(0.221)	(0.031)	(0.223)
Year fixed effects	Yes	Yes	Yes	Yes
Country fixed effects	No	Yes	No	Yes
Observations	485,076	485,076	485,076	485,076
R-squared	0.390	0.452	0.390	0.452