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Non-Tariff Barriers, Integration, and the Trans-Atlantic Economy

Peter Egger
ETH Zurich, CESifo, and CEPR

Joseph Francois
University of Bern and CEPR

Miriam Manchin
University College London

Douglas Nelson
Tulane University

Abstract: We examine the potential impact of T-TIP through trade cost reductions, applying a mix of econometric and computational methods to develop estimates of the benefits (and costs) for the EU, US, and third countries. Econometric results point to an approximate 80 percent growth in bilateral trade with an ambitious trade agreement. However, at the same time, CGE estimates highlight distributional impacts across countries and factors not evident from econometrics alone. Translated through our CGE framework, while bilateral trade increases roughly 80 percent, there is a fall of about 2.5 percent in trade with the rest of the world in our central case. The estimated gains in annual consumption range between 1 and 2.25 percent for the US and EU respectively. A purely discriminatory agreement would harm most countries outside the agreement, while the direction of third-county effects hinges critically on whether NTB reductions end up being discriminatory or not. Within the US and EU, while labor gains across skill categories, the impact on farmers is mixed.

Keywords: T-TIP, regional trade agreement, NTBs, regulatory convergence, gravity model, CGE model

JEL codes: F14, F17, F47

1. Introduction

Trade policy research has long treated large-scale liberalization exercises as a focus of interest.[1] Whether multilateral negotiations or preferential trade agreements (PTAs), the main instrument involved was the tariff. Not only were tariff schedules relatively easy to negotiate, they were relatively easy to analyze quantitatively (the former fact at least in part a function of the latter). The success of the GATT/WTO process in cutting tariffs produced negotiating rounds that lasted longer and were considerably more fraught as remaining tariffs were more deeply embedded in domestic political structures and, at least for the industrial countries that had been most successful in reducing tariffs, the focus turned increasingly to non-tariff barriers to trade (NTBs; some of which were still border barriers, but many of which are rooted in domestic regulatory commitments). With the apparent failure of the Doha round, there has been an increasing emphasis on negotiating PTAs involving extensive commitments on non-tariff, as well as tariff, barriers. Thus, PTAs differ not only in the so-called preference margins they grant (in terms of the number of products covered and the depth of cuts in applied rates) but also the commitments on issues beyond tariffs. The current Figures 1a and 1b illustrate the rapid increase in the number of PTAs (Figure 1a), and the rapid increase in the depth of such agreements (Figure 1b).[2]

The difficulty with providing a systematic analysis of such deep agreements (as well as with negotiating them) is that most of the objects of negotiation cannot be directly represented as a policy-induced, tariff-like, ad-valorem price-wedge. Since tariffs simply generate a wedge between domestic prices and the world price that can be analyzed in a relatively straightforward manner with well-established methods, NTBs work differently through, e.g., labeling rules, differential application of competition policy, or uncertainties associated with implementation of administered protection. In this paper, we present a method for estimating magnitudes of actionable trade costs in terms of their *ad valorem* equivalents (AVEs), covering both tariff and non-tariff barriers to trade. That is, we provide estimates of *ad valorem* tariffs that would have the same effects as non-tariff barriers (NTBs). With those in hand, we are able to evaluate the effects of a PTA involving a substantial reduction of such costs using standard computational general equilibrium methods.

This approach rests on three pillars. First, in addition to measures of tariffs, we estimate levels of non-tariff, policy and natural trade costs by way of a so-called gravity model of bilateral international trade. This yields the impact of the depth of existing PTAs on trade volumes. Second, we take these estimates to gauge potential changes in ad-valorem trade costs associated with the formation of the Trans-Atlantic Trade and Investment Partnership (T-TIP). Third, we employ estimated trade cost changes in a multi-sector, multi-country computable general equilibrium (CGE) model to quantify the associated responses of key economic indicators across T-TIP participants and outsider (third) countries. Our analysis leads us to conclude that responses to the formation of T-TIP by the insider countries will be

[1] By the early 1980s, computational general equilibrium methods had developed to the point where they could be usefully applied to the prospective evaluation of the Tokyo round of GATT negotiations (e.g. Baldwin *et al.*, 1980; Brown and Whalley, 1980; Deardorff and Stern, 1981; Dixon *et al.*, 1984). Since then, virtually every contemplated trade policy change of any magnitude has seen evaluation using computational general equilibrium methods, from NAFTA to the Uruguay Round to the current discussion of T-TIP.

[2] These figures are both from Dür *et al.* (2014): our 1a is Figure 1 of that article, our 1b is figure 5. We will be using the depth index later in our analysis.

modest but not insignificant: about 0.9% in real consumption for the US and about 2.1% for the EU as a whole with goods liberalization. Services liberalization adds slightly, but likelihood of services liberalization is weak, based on past agreements. Effects on nonmembers tend to be negative and in the same ballpark, with the direction of third-county effects hinging critically on whether NTB reductions end up being discriminatory or not.

In the next section we briefly describe T-TIP. Section 3 presents our approach towards estimating trade costs and gauging the scope for reduction in those costs. Section 4 presents an analysis of the welfare effects of T-TIP that would be associated with the aforementioned trade cost reductions in the proposed computational model. By way of a conclusion, section 5 provides a discussion of the political economy of deep PTAs.

2. The Transatlantic Trade and Investment Partnership (T-TIP)

While a North Atlantic free trade area has been suggested for some time (see, e.g. Baldwin and Francois, 1997), the combination of minimal progress on the Doha round with the major recession and collapse of international trade associated with the 2007-2008 financial crisis has increased interest in a major trade agreement between the EU and the US. According to the online edition of Der Spiegel, well before the emergence of the financial crisis, Chancellor Merkel explicitly suggested a US-EU agreement as a backup in case the Doha round fails (Spiegel, 2006). This was consistent with both EU and US policy of seeking bilateral PTAs, usually with extensive non-tariff commitments. Thus, faced with continuing lack of progress in the Doha round, and ongoing recession in the US, President Obama announced that the US and EU would commence talks on a "comprehensive Transatlantic Trade and Investment Partnership" in his 2013 State of the Union Address. The talks have proceeded through 7 rounds, alternating between Brussels and Washington, beginning in July 2013 with the most recent round at the end of September 2014.

The attraction of such an agreement seems obvious, in part, simply because of the magnitudes involved. From Table 2-1, in 2011, together the two T-TIP partners accounted for 46 percent of global GDP and almost 60 percent of world trade. Yet most of this trade is not actually trans-Atlantic trade. Rather, despite their collective shares of world production and trade, trade flows between the two blocks are relatively low compared to their trade with other regions. This is again illustrated in the data in Table 2 1, but perhaps better visualized with Figure 2-1. Focusing first on directions of trade, the US has far more trade with Asia than it does with Europe. Asia counts for almost 60 percent of US exports and imports. Similarly, the region accounts for roughly 39 percent of EU exports and imports. Other upper and middle-income countries (Canada and Mexico primarily for the US, and EFTA and the Euro-Med economies for the EU) account for most of the remaining trade.

To appreciate the context of T-TIP, both for the EU and US, but also for third countries, it is also useful to focus on trade intensity, reported in Figure 2-1 as trade scaled by partner GDP. For example, EU and US trade with the world is valued at roughly 13 percent of global GDP. This means that for each $100 billion in global income, we see $13.3 billion in trade involving the EU and/or the US. In the case of Asia, for every $100 billion in GDP, there is $9.9 billion in trade (exports and imports) with the US, and $7.6 billion in trade with the EU.

Asian trade with the EU and US combined is therefore worth 17.6 percent of Asian GDP.[3] Stark asymmetries are evident, especially with low-income countries. For the latter, while trade with the US and EU is worth 18.3 percent of their GDP, it is worth roughly 0.2 percent of EU and US GDP.

Viewed in this context, though the EU and the US account for high shares of GDP and trade, in a sense the flows between them seem relatively low. For example, while in Asia each $100 billion in exports is associated with $17.6 billion in trade with the EU and/or the US, a similar figure for the EU and US themselves tells us that for each $100 billion in transatlantic GDP, we see only $2.7 billion in trade in goods and services. In other words, scaled by GDP, the EU and US both have much more intense trade relationships with other countries and regions than they do with each other. Much of this is may be explained by economic structure. Both economies are mature, with high GDP shares derived from services: 75 percent of the EU value added is in services; 82.3 percent of US value added is in services. As services are less traded, this helps explain the lower bilateral flows. Such factors should be controlled for when we turn to gravity modeling, as otherwise we may mislead ourselves into thinking low trade intensity means high trade barriers. Yet even controlling for such factors, at this stage we should already note the sense reflected in the negotiating mandate that transatlantic trade underperforms. The logic is that with shifts in technology and organization of production toward more global and regional value chains that cross international borders, behind the border issues whose trade cost impacts were once second or third order are increasingly important. Without necessarily changing policy, what were once domestic regulatory issues have emerged as potential sources of NTB-related trade costs in a world of international production and associated returns to scale. To some extent, the US has dealt with these changes in NAFTA with respect to its North American partners (especially for motor vehicles). The same holds for Europe in the context of the EU single market. The T-TIP is approached with the combined NAFTA and EU single market experience helping to frame the current negotiations on regulatory divergence and mutual recognition of standards.

This raises an interesting question: is the relatively modest trade between the US and the EU, i.e. relative to their trade with the rest of the world, a function of economic fundamentals or policy-induced distortions? Even in the case of tariffs, it would appear that there are still non-trivial gains to be had from liberalization (see Figure 2-2). However, the real gains are expected to be in the reduction of non-tariff barriers. Among the areas both parties agree are negotiating priorities are: public procurement; rules of origin; administration of administered protection (e.g. antidumping and countervailing duty); and trade in services.[4] In addition to these areas, there is considerable interest in regulatory harmonization in technical barriers to trade (TBT), sanitary and phytosanitary (SPS) restrictions, intellectual property (including geographical indications), and financial regulation.[5] As with any negotiation, it will be easier to reach agreement on some of these issues than others. A recent survey of stakeholders by the Atlantic Council and the Bertelsmann Foundation (Barker and Workman, 2013) summarized their results on prospects for these different objectives that we reproduce as Figure 2-3. Since our goal is to develop estimates of the gains to be had from such a

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[3] We are fully aware that scaling trade by GDP is not the same thing as quantifying the impact on GDP. It does however provide a useful metric for comparison.

[4] Succinct summaries of negotiating objective can be found: for the US at http://www.ustr.gov/about-us/press-office/press-releases/2014/March/US-Objectives-US-Benefits-In-the-T-TIP-a-Detailed-View; and for the EU at http://trade.ec.europa.eu/doclib/docs/2014/july/tradoc_152699.pdf.

[5] This reflects growing belief, and some evidence, that harmonization may reduce trade costs substantially. See for example Reyes (2011).

liberalization, we will need estimates of the trade costs induced by non-tariff barriers in a form that will permit analysis similar to that of tariff costs. That is, we seek estimates of what is broadly achievable and then what is more plausibly actionable. We describe our approach in the next section.

3. Quantifying the scope for trade cost reductions in T-TIP

We turn next to quantifying possible trade cost reductions under T-TIP. For tariffs this is relatively straightforward. For NTBs, on the other hand, it is less so. Therefore, we start with the easier task of describing tariffs, then move on to estimates of NTB reductions for goods in past PTAs, and, in particular, to estimates specific to the EU-US context. We save the most speculative for last – quantifying NTB reductions for services.

3.1 Tariffs

For a quantification of tariff changes associated with T-TIP, we have to assess (weighted) levels of tariff barriers for each goods sector in a first step. The maximum tariff margin that could be granted through T-TIP reciprocally between the EU and the US is the weighted sector-level applied tariff for non-PTA members charged on imports by the EU and the US.[6] We employ this margin in the quantitative analysis as an estimate of the tariff preferences extended to members of T-TIP.

Though both US and EU average (MFN and applied) tariffs are similar, there is heterogeneity when we break down tariff protection by sector. From Figure 2-2, the most striking cases are motor vehicles and processed foods. The EU tariffs on these products are substantially higher than corresponding US tariffs, and indeed far higher than the trade-weighted average MFN tariff for goods overall. For motor vehicles,[7] the EU applies an average tariff (7.9 per cent) that is over seven times higher than the one of the US. For processed food products, EU average tariffs (15.8 per cent) are more than three times higher than US average tariffs. Though primary agriculture appears relatively open, this is misleading. Protection in this sector takes the form of a wide variety of NTBs, as will be seen in the next subsection.

3.2 NTBs on goods

We now turn to the trickier question of possible trade cost reductions linked to NTBs to goods transactions. As noted above, such cost savings may follow from such things as cross-recognition of standards (a process where industry plays a central role) to acceptance of regulations (a process where regulators need to find common ground and essentially trust the approach taken by comparable agencies on the opposite side of the pond) or even to joint regulation and development of joint standards. None of this can be considered as easy. While examples such as "run drug trials once and not twice" might seem obvious places to start, as we discuss in the conclusion, differences in the social/political approach to risk and consumer protection render even the obvious into something more complex and murky.[8]

[6] Notice that, in the absence of a current trade agreement between the EU and the US, the applied tariff rate is the same as the most-favored nation (MFN), or "bound", rate for both the EU and the US.

[7] The motor vehicles sector includes also parts and components.

[8] We invite the reader to look through firm survey responses to regulation in the ECORYS (2009) annex material, "Annex VI Business survey results", which provides examples on an industry basis of sources of cost differences when the same firms operate in multiple regulatory regimes.

One place to look, in terms of estimating possible reductions in NTBs to goods transactions through T-TIP, is the magnitude of NTB reductions through PTAs in the past. The EU itself, for example, has been engaged in a decades long exercise of reducing NTBs not unlike the goals stated for T-TIP. We have also seen other PTAs, ranging from shallow tariff-only free trade areas (FTAs) to relatively deep and comprehensive agreements, such as the NAFTA. The NTB reductions associated with those earlier agreements may provide some guidance as to what one might expect from T-TIP, if it ends up looking like the deeper end of existing PTAs.

In formal terms, NTB reductions to goods transactions associated with PTA membership can be estimated as follows. We may specify a so-called gravity model of bilateral trade, where we model bilateral trade flows as a function of (exporter- and importer-) country-specific fixed effects, a set of bilateral (geographical, cultural, historical, etc.) non-policy barriers to goods trade, the log tariff margin granted by a country pair (not necessarily only within PTAs), and PTA depth measures. Of these three policy measures, only the latter two pertain to economic policy, and the NTB effect of trade agreements corresponds to the joint impact of PTAs (or FTAs) conditional on tariffs and the depth of PTAs. Hence, NTB effects of PTAs must be associated with and can be estimated as effects beyond tariff reductions (see Egger and Larch, 2011).

In order to estimate ad-valorem-equivalent (AVE) measures of PTA-induced NTB reductions, we estimate a gravity model of bilateral goods trade on a cross-section of data for the year 2011 for each sector, using the same level of aggregation as in the computational model, and comparable to earlier ECORYS (2009) aggregates.[9] Bilateral sector-level trade flows are modeled as an exponential function of a log-linear index of five ingredients: exporter-specific factors (measuring the supply potential of exporting countries), importer-specific factors (measuring the demand potential of importing countries), and the aforementioned three classes of bilateral factors (measuring “natural” or non-policy trade impediments in a broad sense, tariff impediments, and NTBs). We estimate exporter-specific and importer-specific factors as country fixed effects and parameterize bilateral factors in the log-linear index as a function of observable country-pair-specific variables. Estimating the model for each sector separately ensures that (i) neither trade (or demand or substitution or Armington) elasticities are forced to be the same across sectors (see Broda and Weinstein (2006) for evidence of a substantial variability of those across sectors; see Egger *et al.* (2012) for evidence of the variability of trade elasticities between goods and services), and (ii) that NTBs are permitted to vary across sectors (see Cadot and Malouche, 2012; ECORYS, 2009, for evidence of substantial variability of NTBs across sectors). The explanatory variables used in the gravity equations are summarized in Table 3-1.

We parameterize non-policy barriers to goods trade in logs as a linear function of log bilateral shipping distances, common border, common language, and former colonial ties. We also include a measure of political distance based on measures from the political science literature (polity).[10]

[9] A mapping from these sectors for NACE is provided in the on-line annex.

[10] Shipping distances are based on actual shipping routes (Francois and Rojas-Romagosa, 2014), other natural geo-historical trade cost measures are from the CEPII database (Mayer and Zignago, 2011), and polity comes from the Quality of Governance (QoG) expert survey dataset (Teorell *et al.*, 2011). We use the pairwise similarity of polity, reflecting evidence that homophily is important in explaining direct (economic and) political linkages (De Benedictis and Tajoli, 2011).

For measuring tariff barriers, we include the bilateral tariff margin granted in free trade agreements. This margin is measured as the difference between the most-favored nation (MFN) rate, which is subsumed under the importer-specific fixed effect, and the rate used by a specific trade partner. This measure actually represents the negative of the preference margin.

In order to estimate the extent of NTB reductions associated with PTAs conditional on natural (non-policy) and tariff barriers, we include two variables – a binary indicator variable for intra-EU relationships and an integer-valued variable for depth of non-EU PTAs based on data from Dür, Baccini and Elsig (2014)—called DESTA. This depth-of-trade agreement variable takes on integer values ranging between unity for shallow agreements and seven for deep agreements. Estimating a separate parameter on an EU membership indicator variable permits a special status of EU membership among all considered PTAs. It differentiates between the legal and institutional harmonization associated with EU membership, which clearly goes beyond the liberalization of policies in other PTAs.

Table 3-2 summarizes the relevant trade-cost-function parameters of the gravity model regressions. In those regressions, we treat FTA (or, more generally, PTA) membership and depth of FTAs as endogenous (choice) variables in a control function approach. The approach is outlined in more detail in the Appendix and so are the first-stage (probit) regressions which are used to estimate the control-function terms (see Egger *et al.*, 2011).[11] Across all regressions presented in the table, the explanatory power – measured by the correlation coefficient between the model and the data, dubbed the pseudo-R^2 – is generally quite high (exceptions being primary/food sectors). The results suggest that overall, as well as at the sector-level, goods trade (in most sectors) rises (trade costs decline) with a larger preference margin granted in trade agreements with a greater depth of an agreement, and with EU membership. Note from Table 3-1 that we have used the DESTA database to identify PTA depth. The parameter on the (negative) tariff margin reflects what is referred to as the elasticity of trade with respect to tariffs.[12] With reference to the new trade literature on monopolistic competition and economies of scale, we would refer to sectors with a larger (smaller) negative value of that elasticity as more (less) competitive. Accordingly, we would say that the results suggest that the competitive pressure is particularly high in primary energy production, other machinery, and motor vehicles.

A deep trade agreement directly benefits (recall that the presented parameters measure only direct or partial effects) almost all sectors more than a shallow agreement, except in motor vehicles and electrical machinery. In the case of the EU and US, estimated effects under a deep FTA are limited to fewer sectors: primary agriculture; processed foods; beverages and tobacco; chemicals and pharmaceuticals; motor vehicles; and other machinery. For all goods,

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[11] From a general perspective, such an approach relies on some instrumental variables which help splitting the variation in an endogenous variable – e.g., the integer-valued depth-of-agreement measure – into two components: one that contains exogenous variation only and one that contains also endogenous variation. In the present analysis, we assume joint normality of the endogenous variables and we base the control function on generalized Mills' ratios that are obtained from an ordered probit model of depth-of-trade agreements. Since intra-EU relationships are associated with a depth measure of seven, and tariff margins granted in agreements are correlated with the depth of agreements, a flexible function of depth-integer-specific Mills' ratios is capable of controlling for the endogeneity of all trade policy measured included in the analysis.

[12] This is often estimated at being between -3.5 and -7 for aggregate trade flows and varies largely across sectors. See for example Broda and Weinstein (2006). We estimate the models in share terms (normalized by importer expenditures) and employ the Papke and Wooldridge (1996) estimator for logit estimation with structural zeros (slso see Baum, 2008).

EU membership, with all its provisions that are directly and indirectly related to goods trade, exhibits a direct semi-elasticity of 0.575, or $100\times(e^{0.575}-1) \approx 78$ percent. On a volume basis, the direct gains from EU integration are particularly large for: primary food; processed foods; beverages and tobacco; chemicals; metals; and motor vehicles.

Similarly, the direct semi-elasticity associated with shifting from no agreement to a deep agreement, which is our experiment for T-TIP, is $7 \times 0.087 = 0.609$, or $100\times(e^{0.609}-1) \approx 84$ percent. (In the CGE exercise that follows, bilateral trade volumes increase by 78 to 82 percent for EU exports to the US and US exports to the EU.) Notice that the estimated volume effect for an exporter to the EU of switching from no agreement at all to a deep agreement with the EU is similar to the estimated EU volume effect.

Based on the tariff and FTA coefficients in Table 3-2, we translate the estimated trade volume effects into trade cost estimates. Table 3-3 summarizes the ad-valorem equivalents (AVEs) of NTBs in columns A and B. To see what these AVEs are, let the generic ad-valorem tariff parameter be *a* and the coefficient on any non-tariff measure be *b*. Moreover, denote the average value of any generic non-tariff trade cost by *c*. Then, the AVE$\equiv100\times(e^{-bc/a}-1)$ measures the necessary percentage point adjustment of tariffs that is equivalent to eliminating the respective NTB cost. In the table, the trade cost indicator *c* is either EU Membership or a deep trade agreement with the EU or the US. In essence the term *bc* is the trade volume effect, and dividing it by the tariff coefficient gives the comparable tariff rate that would yield the same volume effect. In Table 3-3 we have computed two tariff-equivalents, one for cost-savings from EU membership (i.e., the deepest trade agreement in our sample) and one for estimated cost reductions following from the deepest observed FTAs.[13] The results suggest that the tariff-equivalent effects of intra-EU (non-tariff) preferences are largest for primary agriculture and processed foods; beverages and tobacco; chemicals; metals; and motor vehicles. For the most part, intra-EU cost savings are (sometimes much) higher than under deep FTAs. As evidenced by the difference between the two columns, if barriers are not removed in an FTA, then we will not observe cost reductions, even if there are actually substantial underlying barriers. In other words, just because we do not see volume effects in FTAs does not mean that NTBs are not there. Nor can we assume that deep FTAs achieve the full range of potential cost reductions.

Columns C and D in Table 3-3 provide another basis for analysis. These are from the ECORYS (2009) study of transatlantic NTBs. Those estimates are also gravity based, from a similar estimation framework to the one reported in Table 3-2. The critical difference is that the estimates in columns C and D are based on firm survey based pairwise rankings of market access conditions across markets (scored 0-100). On that basis, relative access conditions were found to vary systematically for intra-EU vs extra-EU trade (meaning EU trade with third countries). Converting those volume effects into trade cost equivalents, and applying additional information from the firm responses (the share of total NTB related costs that could realistically be removed by a mix of cross recognition and regulatory convergence) yields the results summarized in columns C and D. Essentially, columns A and B are estimates of what has been accomplished in existing trade agreements. Columns C and D, following a similar methodology, focus instead on possible cost savings in the trans-Atlantic context. For most sectors where we have available estimates in the second set of columns, the estimates are generally quite similar, especially if we focus on the intra-EU estimates as a benchmark. Interestingly, though tariffs on primary agriculture were shown above to be

[13] For petro-chemicals we use the (significant) estimated trade elasticitiy for all goods.

relatively low, from the estimates in Table 3-3 the impact of NTBs on this set of goods is actually quite dramatic. In addition, there is clear evidence of substantial cost savings in the context of both deep PTAs and the EU itself.

NTBs on services

Finally, we now turn to services. This is a difficult area both in PTAs and in the WTO, where services are covered by the General Agreement on Trade in Services, aka the GATS. (see Francois and Hoekman, 2010 for a general discussion of measurement problems). Fortunately, new sets of data have been released based on relatively detailed analysis of regulatory regimes in services, combined with assessments of how GATS and PTA commitments in services compare to policies actually in place. We will work in this section with estimates of trade restrictions in services from the World Bank (Borchert *et al.*, 2014), AVEs for trade barriers in services based on the World Bank data (Jafari, 2014), and assessments of GATS bindings and how these compare to PTA services commitments from the WTO (Roy, 2011 database updated 2013). Hence, in contrast to the previous subsection, where we estimated AVEs of NTBs to goods transactions ourselves, we employ AVEs of NTBs to services transactions from other sources listed above.

Table 3-4 provides summary information for services for the EU and the US. The first two columns provide estimated AVEs of market access restrictions in services on the basis of the World Bank's STRI database (Jafari, 2014) and are comparable to estimates from other sources. They represent actual levels of market access. These pertain to trade in services in a traditional sense. The numbers are AVEs on cross-border trade in services. Such trade may require establishments abroad. Indeed the World Bank's STRI database includes both restrictions on setting up foreign establishments and direct restrictions on cross border trade (modes 1 & 3; see Francois and Hoekman 2010). Essentially, the trade cost estimates in the table pertain to how the combination of mode 1 & 3 restrictions map into cross border trade. Also working with the World Bank's STRI data, van der Marel and Shepherd (2013) conclude that there is substantial heterogeneity in regulations and so in their impact on services trade. Columns C and D provide a different perspective. These provide scores from 0 to 100, where 0 means no binding commitments have been made and 100 means full commitments have been made to bind policies linked to market access for particular sectors. From columns C and D, many sectors are relatively unbound both in the GATS, but also in terms of the deepest commitments made by either the EU or the US within PTAs. There are exceptions, such as the distribution sector, construction, and communications. Yet from columns A and B these sectors are relatively open anyway. A similar message is provided by Borchert *et al.* (2011), who note that in general GATS commitments provide little in terms of binding commitments relative to actual policy. Where we see the highest protection in Table 3-4, in professional and business services, both the EU and US are highly protective, and they are reticent to make actual commitments in these sectors. Yet, from column E, business and professional services are the single most important set of services, in terms of trans-Atlantic trade. As such, while we see little evidence of actual liberalization under the GATS or PTAs, there is great potential given the size of barriers (the AVEs in columns A and B) and the services trade shares (column E). On the US side, other standouts are banking and insurance (high barriers, little evidence of actual binding commitments) and maritime services (same story).

How do we interpret the data in Table 3-4? Based on past experience, neither the US nor the EU has shown a willingness to make binding commitments to open service sectors where protection actually matters. This does not mean we cannot speculate on a situation where we depart from past behavior. However, this means we will be embarking on numerical speculation, even more so than usual, when projecting services NTB cost reductions in our numerical modeling.

4. A Numerical Model of T-TIP

Overview of the model

We utilize a computational model that belongs to a class of models known as computable general equilibrium (CGE) models.[14] There is a single representative or composite household in each region. Household income is allocated to government, personal consumption, and savings. In each region the composite household owns endowments of the factors of production and receives income by selling the services of these factors to firms. It also receives income from tariff revenue and rents accruing from import/export quota licenses. Part of the income is distributed as subsidy payments to some sectors, primarily in agriculture.

Taxes are included at several levels in the model. Production taxes are placed on intermediate or primary inputs, or on output. Tariffs are levied at the border. Additional internal taxes are placed on domestic or imported intermediate inputs, and may be applied at differential rates that discriminate against imports. Where relevant, taxes are also placed on exports, and on primary factor income. Finally, where relevant (as indicated by social accounting data) taxes are placed on final consumption, and can be applied differentially to consumption of domestic and imported goods.

On the production side, in all sectors, firms employ domestic production factors (capital, labor and land) and intermediate inputs from domestic and foreign sources to produce outputs in the most cost-efficient way that technology allows. In some sectors, perfect competition is assumed, with products from different regions modeled as imperfect substitutes based on CES preferences (known as the Armington assumption).

Manufacturing and business services are modeled with monopolistic competition. Monopolistic competition involves scale economies that are internal to each firm, depending on its own production level. An important property of the monopolistic competition model is that increased specialization at intermediate stages of production yields returns due to specialization, where the sector as a whole becomes more productive the broader the range of specialized inputs. In models of this type, part of the impact of policy changes in final consumption follows from changes in available choices (the variety of goods they can choose from). Similarly firms are affected by changes in available choices (varieties) of intermediate inputs. Changes in available varieties also involve changes in available foreign varieties, in addition to domestic ones. As a result, changes in consumer and firm input choices will

[14] There are strong similarities to the recent class of structurally estimated general equilibrium models (see Arkolakis *et al.*, 2012 for an overview). However, unlike some of these models (e.g. Eaton and Kortum, 2002; Helpman *et al.*, 2008), we do not assume that all observed deviations in actual trade from predicted trade (not explained by pairwise distance or by size of markets) results from unobserved trade costs (for more discussion on these points, see De Melo and Tarr, 1992; Francois *et al.*, 2013; Francois and Shiells, 1994; Hertel, 1997; Hertel, 2013). We might consider most structurally estimated and then simulated trade models as nothing else than overly simplistic CGE models relative to what had been done in multi-country large-open-economy CGE modelling in the last two decades.

"spill-over" between countries as they trade with each other.[15] Finally, the model also includes a medium-term closure, meaning that capital stocks are linked to underlying equilibrium levels of investment.[16]

The model calibration is based on data that are collected in the Global Trade Analysis Project (GTAP) database. Tariffs and tariff revenues are explicit in that database and, therefore, can be directly incorporated into the model used here. However, NTBs affecting goods and services trade, as well as cost savings linked to trade facilitation, are not explicit in the database and we need to incorporate those as ad-valorem-equivalents (AVEs) as obtained from the estimates as outlined in Section 3.[17] In formal terms, most NTBs affect the efficiency of production for sale in specific markets. Where NTBs instead involve higher prices because of rents, we model this as additional mark-ups (higher prices) accruing to firms. A reduction of NTBs then involves a surrendering of the associated rents. From firm and regulator surveys (see ECORYS 2009) a good rule of thumb is a 50:50 split of the AVEs for NTBs into market-serving costs and rents.

The closest to our study in terms of methodology and underlying data is CEPR (2013). The latter uses very similar underlying data and methodology in its estimates and reports real income changes in its Annex.

Specifying the experiment

With a computational model in hand, the next step is specifying the policy experiment. We base these on values in Figure 3-1 and Tables 3-3 and 3-4. For goods, we assume full tariff elimination. In addition, we use the AVE estimates of reductions of NTBs to goods trade associated with deep FTAs. As outlined above, the situation is trickier when it comes to services.

In order to specify a scenario for NTBs on services transactions, we combine two thoughts. A pessimist might consider it plausible that an agreement will be signed that includes services but where, as in past agreements, nothing actually happens in terms of market access conditions for services. This is a view consistent with the pattern of values reported in Table 3-4. An optimist might be more inclined to give negotiators the benefit of the doubt. There is a clearly stated policy objective of improving market access in services. (i.e. "This time will be different.") Yet in some sectors (distribution in the US) we already have essentially free trade, and in others we are close (communications services). We choose to be cautiously optimistic. Based on statements of negotiators, worries about the maneuvering of financial institutions to undercut regulation through T-TIP, and the deep commitments already made under Basel III, we do not expect real liberalization in finance (banking and insurance) under T-TIP even with an optimistic assessment. However, being cautious optimists, for other sectors we have opted to include 50% reduction of AVEs from Table 3-4 for the remaining sectors (excluding finance), reflecting the rough rule of thumb that half of these AVEs might be eliminated with a real, deep set of commitments on services (meaning half of these costs

[15] Critically, when we move from one to many sectors with general equilibrium constraints on overall resources, shifting resources out of some sectors and into others leads to impacts on variety/scale effects at sector level that we miss in a single-sector model, in the sense that when one sector gains another loses. See Francois and Nelson (2002) for further discussion on this point.

[16] In this sense the model follows the structure in Baldwin *et al.* (1997) and Francois *et al.* (2005).

[17] The original Francois (1999; Francois, 2001) approach to the inclusion of iceberg-type costs in GTAP has become a standard feature of the GTAP model with Hertel *et al.* (2001).

are actionable). To reiterate a point made earlier, our AVEs for services reflect the combined impact of restrictions on all modes on cross-border trade, and we are not claiming to model variations in liberalization by mode.[18] Rather, we model an effective liberalization across modes sufficient to reduce the overall AVE for cross-border trade by half.

In what follows we will separate services from goods, so that the more cynical readers can also focus on a sub-experiment that excludes services liberalization. The trade cost shocks (the tariffs and tariff equivalents for NTBs to be eliminated) is summarized in Table 4-1.

Simulated effects from T-TIP implementation

Table 4-2 summarizes our estimates of national income changes, measured as changes in real household consumption (meaning nominal household incomes by region are deflated by changes in prices), under our core T-TIP scenario. In the table, we provide a breakdown along the elements of the scenario (tariffs, goods NTBs, and services NTBs) and also across regions. Each cell provides a point "estimate" of comparative static effects that is consistent with the parameter point estimates in Table 3-3 and with the average shocks in Table 4-1. Table 4-2 also reports "confidence intervals" around these point "estimates" which are associated with the 95-percent confidence intervals of the parameters in Table 3-3 for goods and, in the absence of parameter estimates, we take zero and thrice AVE as the boundaries of the range (centered around the mid-point AVE) for services. (Indeed also for goods, we set a lower bound of zero for goods NTB cost reductions as well). The two values in squared brackets and separated by a tilde below the average effects refer to the range of general-equilibrium-consistent responses pertaining to the associated range of partial effects.

For both the US and the EU, the primary action comes from goods liberalization rather than services. This is seen by comparison of columns D and E. Indeed, for goods, NTBs dominate by far the benefits of tariff reductions. In our goods only scenario (column D), the EU gains 2.61 percent in terms of annual real consumption on average (with a range of 0.83 to 3.56), and the US gains roughly 0.91 percent on average (with a range of 0.35 to 1.68 percent). Within the EU, we also break out the impact on the larger EU economies. Here we see that these larger states gain somewhat less than the overall EU gains. While Germany gains 1.27 on average, some of the larger Member States (Spain, France) gain far less than Germany or the UK. These represent increases in annual levels of consumption where we have essentially assumed the agreement had already been in place in 2011. Column F provides a different view. Here we use a discount function *V*(F), where we assume a gradual phase in, so that 10% of the change is realized in year one, 20% in year 2, etc., and full realization of this change is realized by year 10. We further assume to start from an economy otherwise like that in 2011, we use a discount rate of 3.5%, and we focus on 20 years of changed real income changes. On this basis, the projected agreement yields a stream of income gains worth a lump sum or one-time payment of 24.0 percent of GDP for the EU, and 10.3 percent for the US. Strikingly, the accumulated costs for third countries, especially for EFTA members, Turkey, and the Asia-Pacific partners of the US (the TPP grouping) is comparable, in terms of accumulated losses, to US gains. What we see, therefore, from columns D, E, and F is that a classic, fully discriminatory approach to T-TIP could

[18] The trade negotiators (lawyers) that set up the General Agreement on Trade in Services at the WTO chose to define trade as including foreign affiliate sales and temporary migrant income as trade. Being economists, we choose the narrower balance of payments based definition.

potentially be very costly for third countries. The patterns across countries hinge on the trade and production structures and underlying NTBs.[19]

There are expectations of possible trade cost reductions for third countries from T-TIP. They are collectively referred to as "regulatory convergence spillovers" or "NTB reduction spillovers." Indeed, *if* the US and the EU launch a process of regulatory streamlining and mutual recognition, *and if* this process proves to be relatively non-discriminatory, there may be ancillary benefits to third countries. This means, for example, that Turkey might find it somewhat easier to access the US market if the EU and US rules and standards move closer together and/or are streamlined due to T-TIP. In effect, it may become easier to access the combined EU-US market, in terms of regulatory barriers, than it was for the two distinct markets. Apart from informal discussion with industry and negotiators, where firms do seem to believe such potential benefits are lurking in the shadows, we have little basis for knowing exactly how large such spillovers might be (or even if they will be realized). Even so, in Table 4-3 we report estimated impacts of such spillovers, defined as improved market access for third countries exporting to the EU and US. What we have done, starting from the results reported in Table 4-3 is to further assume that 20% of the NTB cost reductions realized by US firms accessing the EU, and EU firms accessing the US, also accrue to third countries (for example Japan) accessing those same EU and US markets.

A comparison of column F in Table 4-2 with column I in Table 4-3 illustrates a relatively important point. The form that mutual recognition of standards and regulatory cooperation might take under T-TIP is rather central to the whole affair. With some NTB harmonization between the EU and US leading to an effective reduction in costs for third countries, benefits might, potentially, then be expected for third countries, especially for upper and middle-income countries. This is one possible negotiation path that, if followed, also yields the highest gains for the US and EU. However, it certainly is not the only path possible, and indeed a more protectionist approach might be more responsive to lobbying interests and hence more likely. Under such an alternative approach, if the solution for a negotiated reduction of differences in regulatory systems is to establish some sort of deliberately discriminatory country of origin based mutual recognition mechanism for conformity assessments under divergent national regulations, third country exporters would be worse off. The official narrative assumes that such spillover benefits will be realized. The magnitudes involved suggest that regardless of assumptions, it is in the interest of third countries to be rather aggressive in ensuring that non-tariff aspects of T-TIP actually are not structured to be deliberately exclusive and discriminatory.

Tables 4-4 and 4-5 go beyond average (factor owner) effects per economy and considers effects on labor income by skill class (low, medium, and high) and other primary factors (land, other natural resources) relative to capital income. As with Table 4-2, we report average (or point estimate) effects as well as confidence bounds in this table. In general terms, the results in that table indicate that the effects vary both quantitatively and even qualitatively for relative labor demand across skill groups. For example, the table suggests similar gains for workers across skill categories in the United States, while in the EU there is relatively more gain for lower skilled workers. There is a striking difference in returns to land owners (farmers) between the US and EU. We estimate a strong gain for US land owners, but strong losses for EU land owners. Especially hard hit is farmer income from land in the United Kingdom, Italy, and Germany but

[19] The online annex material includes tables with mappings between bilateral trade patterns and the NTBs included in out experiment definitions in Table 4-1. It also includes tables on the value added composition of trans-Atlantic trade.

not in Spain or France. Overall, workers in the EU are predicted to gain more than skilled workers in the United States from the conclusion of a T-TIP along the lines of the discriminatory scenario spelled out in Table 4-1 and 4-2. In addition, as in welfare effects, the magnitude of estimated effects on specific factor incomes (classes of labor, land owners) hinges on the extent to which an agreement is close to purely de facto discriminatory.

Table 4-6 provides a summary of trade volume effects under the basic, full discrimination scenario presented in Tables 4-2 and 4-4. Bilaterally, trade volumes between the EU and US increase by between 78 percent (EU exports to the US) and 82 percent (US exports to the EU). This is more or less identical to our point estimates from the econometric results discussed in Section 3. For other regions, strong negative effects (from trade diversion) are estimated for EFTA, Japan, the TPP countries, and Turkey. Other Asia Pacific and low-income exporters actually benefit somewhat in exports to the transatlantic block and to the world as a whole.

Modeling comparison to other work on T-TIP

Felbermayr, Heid, Larch, and Yalcin (2014, henceforth FHLY) provide a broad overview of related work to the present matter. Since their paper is published in the same, we provide a more limited comparison here to our own estimates here.

While our results (exclusive of spillovers) indicate a 2.27% increase for the EU and 0.97% for the US in real incomes, CEPR (2013) estimates in its multi-sector CGE study a lower impact with EU GDP increasing by 0.48% and US GDP by 0.39%. The lower estimated effects are due to different scenario assumptions. While we assume that liberalization would go all the way to its potential, CEPR (2013) assumes only a 50% reduction of what a full liberalization would imply. In addition to lower ambition (in essence a shallower agreement), the CEPR (2013) study only covers NTBs for a much narrower set of sectors than we examine here (excluding primary products, other machinery, and other manufacturing, which accounts for one third of bilateral trade).

CEPII (2013) estimates the impact of a transatlantic trade liberalization using a different multi-sector CGE model from ours with quite different underlying NTB AVEs. CEPII (2013) uses lower NTB estimates for agriculture and underlying NTB estimates for manufacturing are higher in the EU than in the US unlike in ECORYS (2009) estimates which are also used in this study. CEPII (2013) estimates a 0.3% increase in GDP both for the EU and the US over the long-run in their basic scenario and 0.5% increase for both economies with harmonization spillovers.[20]

While the multi-sector studies presented by both CEPII (2013), CEPR (2013), and the present paper come to a relatively similar set of conclusions about modest effects of T-TIP on the covered economies, FHLY arrive at significantly higher GDP increases in their single-(goods-only-) sector model. Since the FHLY paper is published in the same volume and addresses a similar set of issues, there is merit in comparing methodology here with FHLY. Some key differences are as follows: (i) first, we present estimates of key parameters

[20] One study that has grained a great deal of traction in the policy debate is Capaldi (2014). That study uses the UN Global Policy Model. (See Cripps and Izurieta 2014 for documentation.) That model is a structural macro model with a number of disequilibrium features. The model does not include tariffs, other trade costs. Logically, also it does not include the basis for gains from trade when such costs are reduced. Rather, the study simply takes trade volume effects from studies like those discussed here, and imposes these onto a basic macro model. Without a basis for gains (or losses) from actual trade liberalization, at best such an exercise simply identifies the usual second terms of trade effects implied by changes in the current account under various CGE based T-TIP assessments. It does not actually provide an estimate oft he impact of T-TIP.

determining trade costs for goods based on the underlying data, while FHLY instead use parameter estimates from other papers (e.g. Egger, Larch, Staub and Winkelmann, 2011 henceforth ELSW) that were obtained from different model parameterizations and different data than in FHLY. For services, we do rely on estimates from the literature, while FHLY do not look at services liberalization at all; (2) second, the countries that constitute a nascent T-TIP are members of prior PTAs (respectively, the EU or the NAFTA) that are unusually deep relative to the "normal" or average PTA observed "in the wild." This suggests the nature, scope, and direct effects of T-TIP will not be comparable with those of an average PTA, but to deep ones. While we pay attention to this point by distinguishing between attributable tariff and NTB consequences of T-TIP that are relevant for the countries to be involved rather than for the average country pair in TTIP, FHLY assume that the effects of previous PTAs on average can proxy for the scope of T-TIP; (iii) third, while we treat NTBs as involving a mix of cost raising and rent generating barriers, most of the literature (including FHLY) treats NTBs as pure costs[21]; (iv) fourth, here an economy's overall production potential is variable. The model includes input-output linkages across sectors, linkages between investment and installed capital stock across sectors, and reallocation of different skill sets of labor across sectors. The study by FHLY assumes that input-output linkages are absent, so that an economy's overall production potential is fixed; (v) in our multi-sector framework, we distinguish goods from services, while FHLY do not.[22]

5. Broader political economy issues related to T-TIP

The results reported above are based, in part, on some rough judgments about actionability. As explained in section 3, these judgments reflect our beliefs about the political constraints facing deep liberalization in certain specific non-tariff barriers based on our informal evaluation of the past experience with liberalization in specific sectors and on the results of the surveys reported in the ECORYS (2009) study. As we have already noted several times, the legal and institutional structures that in the context of trade policy are reasonably seen as non-tariff barriers are adopted for a wide variety of reasons (only some of which have anything whatever to do with their effects on trade). As such, for many NTBs, removing them is not possible because, for example, they require constitutional changes, unrealistic legislative changes, or unrealistic technical changes. Removing NTBs may also be difficult

[21] According to firm and regulatory survey data (see ECORYS, 2009), this practice overstates the potential cost savings from overall NTB reductions (perhaps by roughly 40 percent to 50 percent).

[22] The FHLY assumption that all of an economy's activity is associated with goods production can bias results, as has been shown by Egger, Larch and Staub (2012). There are three reasons for this. First, there is a gap between a country's GDP and its total income generated from goods sales from and income from working in the goods sector. This gap is larger for more developed economies, where the services sector accounts for more than 70% of an economy's size. Egger, Larch, and Staub (2012) show that not calibrating economies properly to their true size and ignoring services leads to largely biased trade cost estimates as well as to largely biased comparative static effects. In the model quantification, this problem shows inter alia in exaggeratedly large domestic production of goods (since all of a country's GDP that is not traded is by definition erroneously classified as domestic goods sales, then). Second, earlier work has demonstrated that trade (or demand) elasticities (see, e.g. Broda and Weinstein, 2006) and levels of NTBs (Cadot and Malouche, 2012; ECORYS, 2009; Egger *et al.*, 2012) vary substantially across sectors. Moreover, earlier work shows that trade elasticity levels are a key statistic for gauging quantitative effects of trade liberalization (Arkolakis *et al.*, 2012). Hence, the two key statistics that are needed to properly project welfare effects of trade liberalization – domestic sales shares and the elasticity of trade – vary substantially over sectors.

politically, for example because there is a lack of sufficient economic benefit to support the effort; because the set of regulations is too broad; or because consumer preferences or language preclude a change. Indeed even where public perception is not congruent with scientific evidence, we need to keep in mind that it's the public that votes, not the evidence. By way of a conclusion, we offer some reflections on political economic issues of direct relevance to the outcome of the T-TIP negotiations. We begin with traditional political economy issues related to the distributive politics of T-TIP, then we consider the role of unemployment/adjustment, and finally discuss some non-traditional issues.

Consider first distributive politics. There is now a sizable literature, in economics and political science, on the ways political struggles over the returns to trade (and the losses realized by particular households and sectors in both the short- and long-run) affect the outcomes of domestic trade politics and, more relevant for the purposes of this paper, the outcomes of trade negotiations (e.g. Grossman and Helpman, 1995a; Grossman and Helpman, 1995b; Ornelas, 2005a). The usual goal of political economy papers in general is to explain deviations from optimal policies, so it is not surprising that most of this work emphasizes how politics cause deviations from "Liberal trade" (Krishna, 1998; Levy, 1997; Ornelas, 2005b).[23] Certainly in the case of T-TIP there is no shortage of special interests in both the US and Europe seeking to use the negotiations to either increase access to foreign markets or reduce access to domestic markets. In this paper we identify sectors that may gain and lose from liberalization of trade between the US and the EU, and it should not surprise us to discover that those sectors are actively lobbying their governments on those issues.[24]

At the same time, contemporary negotiations between the EU and the US take place in a context that offers interesting differences relative to expectations based on standard models. Most obviously, a substantial amount of trade between the US and the EU takes place in differentiated intermediate goods along the lines of Ethier (1982). At least since the classic paper of Balassa (1966), intra-industry trade (IIT) has been seen as less disruptive than inter-industry trade (Brülhart, 2002; Dixon and Menon, 1997; Menon and Dixon, 1997) and while this inference is not as well-grounded theoretically as we tend to think (Lovely and Nelson, 2000; Lovely and Nelson, 2002), there appears to be empirical support for the claim.[25] Thus, just as integration among the early members of what became the EU was eased by the relatively low adjustment costs to liberalization of trade, the sizable role of IIT in US-EU trade may similarly reduce adjustment cost-driven distributive politics. Similarly, the opportunity to rationalize nationally organized production on an international basis in sectors like motor vehicles, steel, and chemicals should produce support for integration where opposition is predicted in standard models. Consistent with this observation, the European motor vehicle industry is strongly behind the T-TIP (they have been primary drivers of political support, so to speak) while they were adamantly opposed to the EU-Korea agreement and are opposed to an EU-Japan agreement as well. While in the case of T-TIP, most of the same firms operate on both sides of the Atlantic and see opportunity for

[23] Though Ethier (Ethier, 1998; Ethier, 2001) and Ornelas (Ornelas, 2005a; Ornelas, 2008) are exceptions here.
[24] For example, US cultural industries seek strong intellectual property protections and increased access to European markets, while European producers in these sectors seek exemptions to protect national culture. An interesting case we note below is the US financial sector, which seeks regulatory harmonization not only to increase its presence in Europe but, perhaps more importantly, to secure reduced domestic regulation.
[25] Though, consistent with Lovely and Nelson (2000; Lovely and Nelson, 2002), Trefler (2004) finds that rationalization effects dominate in the long-run, but that short-term adjustment induced by rationalization involve non-trivial costs in the short-run.

rationalization, while in the case of EU-Korea or EU-Japan agreements the situation is closer to the classic one of opposing firms.[26]

While the prominent role of intra-industry trade may lead us to expect lower adjustment costs and, thus, less dramatic political resistance to liberalized trade between the US and the EU than, say, between the US and China, short-run costs may still be substantial. That is, analysis of the sort presented in this paper is comparative static in nature--we compare two long-run equilibria, not the transition between those equilibria.[27] Trade economists are well aware that, in standard competitive models, the main source of long-run gain from trade is specialization and that (loosely speaking) the only way to secure large gains from trade is for policy to induce large adjustments in production structure (Ethier, 2009). This of course implies that, in standard competitive models, policies changes associated with large gains from trade will also be associated with potentially large transitional costs (mostly in the form of unemployment, forgone wages, and mobility costs—including such things as loss of asset value from housing). While there is not a lot of research on this question, the best efforts suggest that the costs are non-trivial. For example, Jacobson, LaLonde and Sullivan (Jacobson *et al.*, 1993a; 1993b) estimate that an average displaced worker loses $80,000 in lifetime earnings and Kletzer (2001) estimates that the average displaced worker suffers a 13% pay cut as a result of trade displacement.[28] We have already noted that research on intra-industry trade suggests that these costs may be mitigated when similar countries (i.e. the US and the EU) liberalize due to the major role of, presumptively less disruptive, intra-industry trade. Unfortunately, more recent theoretical and empirical work on trade with heterogeneous firms qualifies this last presumption, making this an issue of some concern when evaluating the effects of a major exercise in liberalization like the T-TIP.

In the standard model (as well as in models of monopolistic competition), firms are presumed to be identical. Recent empirical research suggests that this assumption is dramatically falsified (Bernard *et al.*, 2007; Bernard *et al.*, 2012). Starting with Melitz (2003), a sizable body of theory and empirical research has developed based on the insight that firms are heterogeneous and studying how that heterogeneity interacts with international trade (Melitz and Redding, 2015; Redding, 2011). In fact, this leads to an interesting form of complexity: on the one hand, heterogeneous firm models provide an additional source of gains from trade as more efficient firms displace less efficient firms, thus raising productivity (Melitz and Redding, 2013; Melitz and Trefler, 2012); on the other hand, the firm-level adjustment means that there is explicit attention to short-run adjustment on the firm margin that is associated with at least transitional unemployment as (within sector) inefficient firms close and efficient firms expand. A number of recent papers have analysed adjustment to a shock which is quite relevant to the T-TIP case—the US-Canada free trade agreement (and its extension via NAFTA). Starting especially with Trefler (2004) and applying firm-level data, these papers have examined the effect of integration with the US on Canada (e.g. Baggs, 2005; Baggs and Brander, 2006; Breinlich and Cuñat, 2010; LaRochelle-Côté, 2007; Lileeva, 2008; Lileeva

[26] See for example Ramsey (2012) and Clark (2014). Lobbying is actually more complex, as Asian manufacturers also produce in the EU, and both Toyota and Hyundai are members of the European automakers association (ACEA).

[27] This comment also applies to analyses, like that by Felbermayr *et al.* (2013), which incorporates equilibrium unemployment. While the effect of policy on the long-run equilibrium level of unemployment (like the effect on long-run equilibrium income distribution) is of considerable relevance to welfare analysis, its relevance to political economic analysis is considerably more doubtful.

[28] Davidson and Matusz (2004) is a convenient summary of results in this area, while Davidson and Matusz (2010) collects the authors' important work extending standard models to incorporate unemployment.

and Trefler, 2010). The main result here is that, in the short run relatively inefficient firms exit, creating unemployment; but in the long run productivity rises and unemployed workers are absorbed. Note well that this is precisely in the context of models of the Krugman sort (except with heterogeneous firms). That is, even though rationalization may dominate intersectoral adjustment, the within sector, short-run effects will still be negative and, potentially, substantially negative. From a political perspective, the short-run negative effects may be every bit as significant as the long-run efficiency effects. Countries with well-functioning welfare states should find it easier to liberalize in the face of such shocks than countries that lack such institutions.

Turning to less standard political economic issues, distributive politics encourage us to treat opposition to liberalization as cynical special pleading. However, especially when we turn from straightforwardly protectionist barriers to trade to harmonization of regulations that are deeply rooted in domestic understandings of identity, the good life, national safety, et cetera, this inference becomes increasingly strained, even as self-interested groups re-purpose such arguments to their own advantage. Thus, while purely trade policy-related negotiations have become increasingly fraught as a result of domestic political opposition (witness the lengthening periods to resolution of multilateral trade agreements and the difficulty of American presidents in securing trade promotion authority), as soon as we consider issues like regulatory harmonization with some kind of non-trivial dispute resolution process, concerns about surrender of sovereignty are added to standard distributional conflicts. It is tempting to treat all such resistance as thinly veiled rent seeking, but this is not really a useful way to understand the underlying politics.[29] Consider three cases of relevance to T-TIP: regulation of cultural goods; food safety regulation; and financial regulation. In all of these cases, there are fundamental differences between parties engaged in the T-TIP negotiations.

Culture is inherently difficult to identify, but it goes to the heart of national identity. US firms currently dominate the global cultural marketplace. It is easy to see arguments for globalization as thinly veiled special pleading for US television and filmmakers, music and print publishers, et cetera. It is just as easy to see arguments against globalization as thinly veiled special pleading for national (read "non US") producers of the same goods. However, "culture wars" in the US make clear just how strong are claims about the link between culture and identity (Huntington, 2005). Especially in moments of economic uncertainty, "culture" and identity become strong instruments indeed in the political arena. The politics of culture will always be difficult and unpredictable precisely because they are not anchored in material interests but elicit strong responses at the ballot box.

Food safety regulation does not turn on quite such strongly intangible concerns, but still produces very different responses. Food safety is, of course, a shared value between citizens and governments of both the EU and the US, and yet the approaches are fundamentally different. The problem is that many technologies have uncertain future effects and, if the effects are at least plausibly sufficiently large, it is necessary to weigh the gains from admitting such goods into the food system against (possibly low probability) costs. US law emphasizes immediate scientific process. If chlorine washed chicken and genetically

[29] This is not to say that such rent seeking is not an essential part of the politics of trade policy. It certainly is. The point is to recognize that when opponents of liberalization refer to sovereignty concerns, it is precisely because they tap into powerful notions of community norms that they are effective. Treating them as simply bad faith is neither good politics, nor good analysis. The inherent difficulty of incorporating such concerns in systematic analysis makes it all the more important that we recognize them where they may provide cause for us to be careful in our policy recommendations.

modified organisms cannot be shown to be dangerous with a high degree of certainty, there is a presumption that they should be permitted to enter the market. The European approach emphasizes instead the precautionary principle—i.e. to the extent that we might reasonably suppose that they constitute risks to the food system, proponents of sales of chlorine washed chicken or GMOs must prove that they are safe with a high degree of certainty. These are both reasonable, but debatable, principles for evaluating uncertain prospects (Gollier *et al.*, 2000; Sunstein, 2005). The statement that "both countries agree on the goal of food safety" only goes so far in resolving a fundamental legal difference about how to evaluate policies in pursuit of that goal. In addition, of course, parties facing redistributive effects from any harmonization can use legitimate differences between weighting of type-1 and type-2 error as tools in rent seeking.

Finally, it is widely understood, especially in the aftermath of the 2007-2008 global economic crisis that optimal regulation of the financial sector involves a trade-off of the gains from efficiency against the (potentially catastrophic, if low probability) losses from financial crisis. The appropriate policy is affected not only by aggregate attitudes toward risk, but also by uncertainty about both sources of and appropriate responses to instability. Of particular relevance to T-TIP, the US has recently become more aggressive in response to financial risk. This leads to concerns about both what the appropriate policy is and active use of negotiations (especially by US financial institutions) to undermine domestic regulation (Johnson and Schott, 2013).

While non-distributive issues of the sort we have just discussed may be essentially noise in characterizing the broad dimensions of, say, trade politics considered over some sizable period of time, but when we turn to the prospects for a particular policy choice (say, T-TIP) they should bulk much larger in our calculations. Unfortunately, the role of non-distributive issues in the framing of political-economic processes is severely understudied for such an important consideration. Building on Schattschneider's (1960) classic characterization of democratic politics, William Riker (1986) developed a systematic analysis of the way political entrepreneurs can use valence issues to change political outcomes.[30] In our context, the point is that outcomes from the political process around T-TIP are highly uncertain precisely because they are linked to public politics via emotionally powerful notions of identity, patriotism, et cetera. This also serves as a warning about the interpretation of our welfare results. That is, to the extent that culture, risk preference, and the like enter into our welfare (and there is certainly plenty of evidence that they do), our welfare results based essentially on national income may be well wide of the mark.

Finally, it is probably worth noting that political economic context independent of trade policy can have a strong effect on final outcomes for T-TIP. For example, for reasons completely unrelated to T-TIP, it seems exceptionally unlikely that the current administration will be granted trade promotion authority ("fast track") by the current Congress, or the one that will replace it. Recent extensions of trade promotion authority have generally involved cross-aisle cooperation of a sort that has disappeared in American politics. If, as seems likely at this point, a Republican Congress faces a Democratic President, completion of T-TIP seems exceptionally unlikely.

[30] For a survey of Riker's work in this area and work that has built on those insights, see McLean (2002).

6. Summary and Policy Conclusions

In this paper, we have examined the scope for negotiated changes in policy to lead to changes in transatlantic trade flows. Building on econometric estimates of trade volume effects under T-TIP, we employ a CGE model to gauge the distribution of effects such an agreement might have across third countries and regions, and on primary factor incomes. In this context, we also address the role that effective non-discriminatory reductions in trade costs may play in determining the pattern of outcomes. For third countries, the extent to which T-TIP is discriminatory has the potential to turn losses to gains. Phrased differently, a purely discriminatory agreement clearly harms most countries outside the agreement.

Early in the paper, we noted that North Atlantic trade is, in a sense, smaller than one might expect given the relative size of the two regions. This raised the question of the role of policy barriers in explaining the fact. Our econometric results suggest that the effect of potentially actionable barriers is non-trivial, pointing to an approximate 80 percent growth in bilateral trade with an ambitious trade agreement and a fall of about 2.5 percent with the rest of the world. However, at the same time, our CGE estimates highlight distributional impacts across countries and factors not evident from the econometrics alone. Translated through our CGE framework, in our central case, estimated gains in annual consumption range between 1 percent and 2.25 percent for the US and EU respectively.[31] Similar losses stand out for regions with strong trade linkages to the US and EU, including Turkey, EFTA, and the Asia-Pacific economies that make up the T-TIP camp. Within the US and EU, we see that while labor stands to gain (across skill categories), as do farmers (land owners) in the US, farmers in the EU stand to lose in our central scenario.

From a policy perspective, then, because the economics show a moderate gain for the T-TIP partners, and only quite modest income distribution effects within T-TIP, the economics argue in favor of the policy. However, as we argue in the previous section, as T-TIP contemplates potentially large changes in NTBs that are associated with more complex understandings of the implications of globalization. As these have the potential to raise political risks for national leaders, the relatively modest gains suggest that we may see caution. Furthermore, these factors suggest greater difficulty in getting to a maximal agreement.

[31] Of course, for some countries external to T-TIP, the changes in trade can be more substantial, e.g.: EFTA trade with T-TIP falls by 6.7%; trade with Japan falls by 4.2%; and TPP falls by $.8%.

APPENDIX – gravity estimates of NTB cost reductions

Empirical model outline

In this appendix, we describe the basic procedure to control for endogeneity in selection into trade agreements. For the gravity estimates reported in Section 3 of the paper, we follow Santos Silva and Tenreyro (2006) and Egger *et al.* (2011) in employing a generalized-linear exponential-family model for estimating gravity models. One merit of such models is that, unlike ordinary least squares on the log-transformed model, they obtain consistent parameters in the presence of heteroskedasticity even if it is unknown whether the disturbance term is log-additive or level-additive. Furthermore, in line with Terza (1998, 2009), Greene (2002, 2012), Terza *et al.* (2008), and Egger *et al.* (2011), we apply a control-function approach which, under a set of assumptions summarized below, is capable of absorbing the endogeneity problem and obtaining consistent parameter estimates, including the partial treatment effects of interest.

Formally, we employ imports of country *j* from country *i*, X_{ij}, as the dependent variable and specify it as an exponential function of a linear index of the form

(A1) $X_{ij} = \exp\left(d_{ij}a_d + t_{ij}a_t + e_i + m_j + c(z_{ij})\right)u_{ij}$

where d_{ij} is a PTA-depth measure (a scalar or a vector, depending on the specification), t_{ij} is a vector of observable (log) trade-cost measures (such as log distance, ….), $(a_d', a_t')'$ is a conformable parameter vector, $\{e_i, m_j\}$ catch-all measures of exporter- and importer-specific factors (estimated as parameters on i-specific and j-specific binary indicator variables, respectively. Moreover,

(A2) $c\left(z_{ij}\right) = h_{ij}a_h = \left(h_{1,ij}, \dots, h_{D,ij}\right)a_h,$

is a control function which is derived from the assumption of multivariate normality of the disturbances between the processes of selecting into depth δ=1,…,D and the stochastic term about X_{ij}. The application here represents an innovation on the existing literature, which generally focuses on binary selection in the case of trade agreements.

The control function absorbs the potential endogeneity bias (i.e., the correlation of d_{ij} with the disturbances). After introducing a binary indicator variable $1[d_{ij} = \delta]$ which is one if the statement in square brackets is true and zero else, the elements $h_{\delta,ij}$ for δ=1,…,D are defined as follows.

(A3) $h_{\delta,ij} = \frac{\phi(z_{ij}a_{\delta,z})(1-1[d_{ij}=\delta]\Phi(z_{ij}a_{\delta,z}))}{\Phi(z_{ij}a_{\delta,z})}$

These are referred to as inverse Mills' ratios (for $d_{ij} = \delta$) in the literature (see, e.g. Wooldridge, 2010). They depend on the density, $\phi(z_{ij}a_{\delta,z})$, and the cumulative distribution function, $\Phi(z_{ij}a_{\delta,z})$, which, in a reduced form, depends on common observable characteristics, z_{ij}, and the depth-specific parameter vector $a_{\delta,z}$.

Notice that the assumption about multivariate normality is specific here, since selection into states δ is mutually exclusive (a country-pair can only apply a single level of depth δ of an agreement). This means that we can think of the variance-covariance matrix for each country-pair *ij* where we order the data such that the terms for the *D* latent variables generating $h_{\delta,ij}$ appear at the top and the stochastic term for X_{ij} appears at the bottom. Apart from diagonal elements throughout, this matrix would then contain only non-zero elements in the bottom row and the right column.

A somewhat different approach to the control function could be based on an ordered probit model about $d_{ij} = \delta$ rather than individual probit models for each state δ. This approach would be somewhat more parsimonious in terms of the number of parameters to be estimated. In contrast to the aforementioned approach, this procedure would be based on δ-specific elements $h_{\delta,ij}$ for δ=1,…,D which are defined as

(A4) $h_{\delta,ij} = \frac{\phi(\mu_{\delta-1} - z_{ij}a_z) - \phi(\mu_\delta - z_{ij}a_z)}{\Phi(\mu_\delta - z_{ij}a_z) - \Phi(\mu_{\delta-1} - z_{ij}a_z)}$

Notice that $\mu_{\delta-1}$ and μ_δ are depth-specific, implicitly-determined threshold values which determine whether country-pair *ij* is in regime $\delta - 1$ versus δ. Hence, in contrast to $h_{\delta,ij}$ estimated from individual probit models as in (A3) above and say *DK* parameters (where *K* is the number of parameters per probit equation), their counterparts in (A4) are estimated based on only *D*+*K-1* parameters (where the *K-1* are the parameters on $\{\mu_1, \dots, \mu_D\}$, excluding μ_0, which is part of the *D* parameters in the base model).

Basic assumptions

The control-function approach outlined above rests on three basic assumptions. First, that the disturbances of the latent variables determining selection into a particular depth of trade agreements and the outcome equation (for X_{ij}) are multivariate normal, whereby the stochastic terms for each country-pair ij are drawn independently from but identically to those of other pairs. In the present case, they are bivariate normal for each and every level of depth, δ. Second, the universe of instruments collected in z_{ij} (which includes all determinants of the outcome model except for the elements in h_{ij} and some additional identifying regressors, see Cameron and Trivedi (2005)) should be independent of the multivariate error terms (i.e., the instruments should be exogenous). Third and finally, the variances of the latent processes determining selection-into-agreement-depth are normalized to unity.

The first stage is estimated by probit models on each level of depth of a PTA, {1,…,7} separately. Hence, we estimate seven individual probits, allowing the parameters to vary between the equations. This strategy corresponds to a model where we estimate the probability

(A5) $\Phi(z_{ij}a_{\delta,z} + \varepsilon_{\delta,ij} \geq 0)$,

where $\varepsilon_{\delta,ij}$ is a disturbance term about which bivariate normality is assumed with the disturbance term in the trade equation in logs, ln (u_{ij}), whereby $\Phi(\cdot)$ can be estimated by probit for each level of δ={1,…,7}.

We specify z_{ij} as to include log distance, land adjacency, two indicators of common language (ethnology-based and official), common colonizer, colonial relationship, the combined economic mass of countries i and j in terms of log GDP, a trade embeddedness index for the two countries i and j (measuring the overlap in the trade partner network) and a full set of exporter as well as importer country indicator variables.

First-stage model results

The results of the first-stage probit models are summarized in Table A.1 for all seven levels of PTA depths. The results suggest that having a PTA of any level of depth tends to become less likely the more (geographically or culturally) distant two economies are, the larger two economies are, and the more overlapping their trade partner network is. We use the three principal components of four political variables (one on the absolute difference in the functioning of government index published by Economic Freedom House; one on the absolute difference in the civil liberties index published by Economic Freedom House; one on the absolute difference in the political freedom index published by Economic Freedom House; and one on the absolute difference in the corruption perceptions index published by Transparency International).

The three associated principal components vary at the country-pair level, and we include them in both the first-stage (agreement-depth-selection) models and the second-stage (gravity) models.

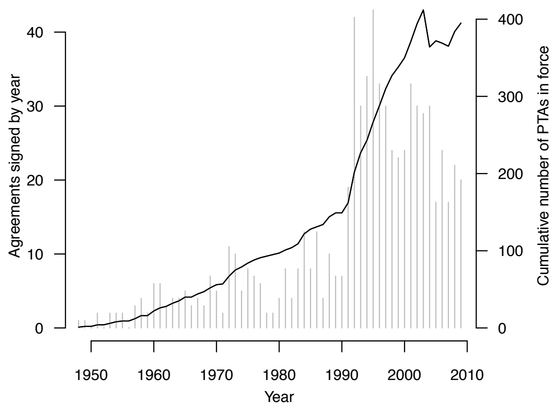
The probit model results for each agreement-depth level are reported in Table A.1, where we refer to the main political variable components by PCA1-PCA3.

Some robustness checks for the empirical models

The purpose of this Appendix is to show some alternative regression results regarding both the (first-stage) selection-into-deeper-agreements model and the (second-stage) gravity model.

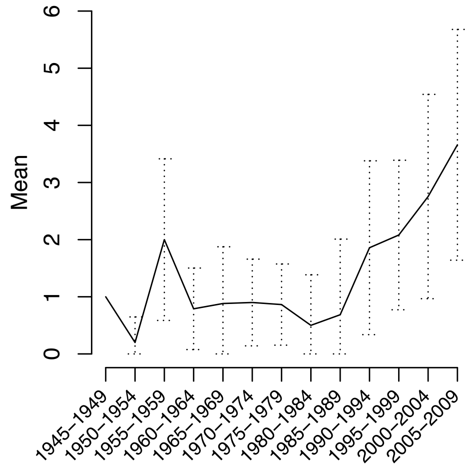
Regarding the first-stage agreement-depth selection model, we choose an alternative specification which includes a different set of political determinants from the one employed in the outset. We summarize alternative (second-stage) gravity-model results in Table A.2. This table includes six alternative gravity-model specifications that differ in terms of the political/institutional control variables used. The first four Columns A-D of this table include the four political/institutional variables one at a time ("polity index" is the absolute difference in the political freedom index published by Economic Freedom House; "functioning of government index" is the absolute difference in the functioning of government index published by Economic Freedom House; "corruption index" is the absolute difference in the corruption perceptions index published by Transparency International; and "civil liberties index" is the absolute difference in the civil liberties index published by Economic Freedom House). Column E includes the aforementioned three principal components of the set of political/institutional variables. The associated results for the economic variables are very similar across all columns. The last column excludes our endogeneity corrections, and comparison of columns E and F show the impact this exclusion has on the estimated effect of FTA depth.

Figure 1a: PTAs over time



Source: Dür et al (2014)

Figure 1b: Depth of FTAs over time



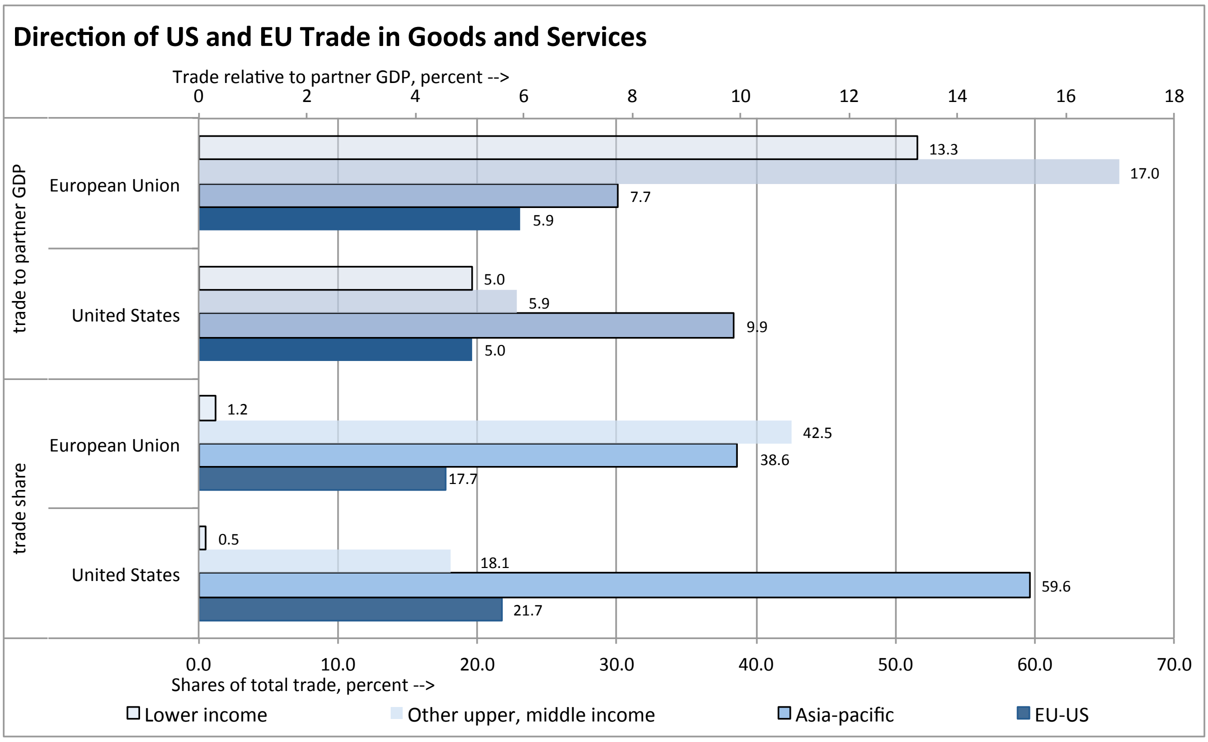
Depth indexed 0-7. Source Dür et al (2014). Vertical bars indicate standard deviations.

Table 2-1 GDP and Trade Orientation, 2011

	US	EU	EU & US
EU-US GDP			
billion dollars	14,991	17,645	32,636
share of world GDP	21.3	25.1	46.3
Trade with world			
billion dollars	4,096	5,036	8,241
share of world trade	29.4	36.2	59.3
share of own GDP	27.3	28.5	25.3
share of world GDP	5.8	7.2	13.0
Trade between EU & US			
billion dollars	891	891	891
share of own GDP	5.9	5.0	2.7
share of partner GDP	5.0	5.9	2.7
share of world trade	6.4	6.4	6.4
share of own trade	21.7	17.7	10.8
Trade with Asia, Pacific			
billion dollars	2,443	1,945	4,388
share of own GDP	16.3	11.0	13.4
share of partner GDP	9.9	7.7	17.6
share of world trade	17.6	14.0	31.5
share of own trade	59.6	38.6	53.2
Trade with other upper & middle income countries			
billion dollars	740	2,142	2,882
share of own GDP	4.9	12.1	8.8
share of partner GDP	5.9	17.0	22.8
share of world trade	5.3	15.4	20.7
share of own trade	18.1	42.5	35.0
Trade with low income countries			
billion dollars	22	58	80
share of own GDP	0.1	0.3	0.2
share of partner GDP	5.0	13.3	18.3
share of world trade	0.2	0.4	0.6
share of own trade	0.5	1.2	1.0

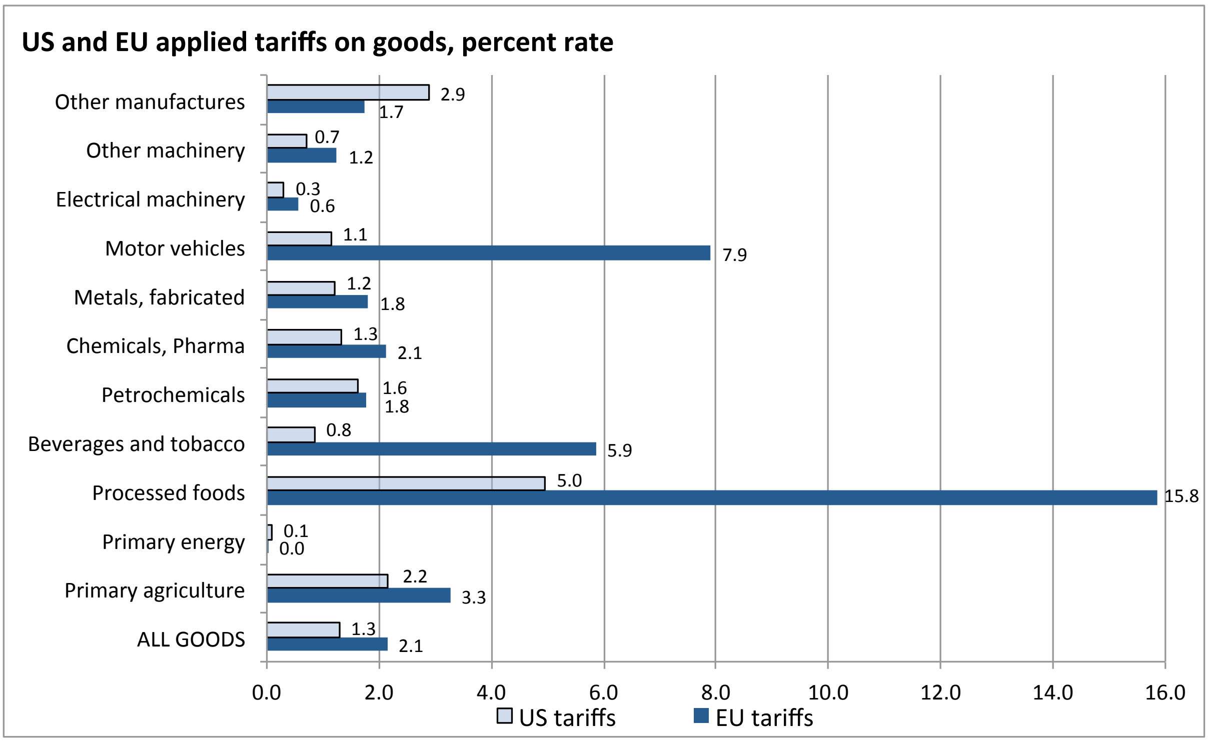
note: trade excludes intra-EU flows. sources: IMF, COMTRADE, GTAP9.

Figure 2-1 Composition of Trade by Destination



note: trade excludes intra-EU flows. sources: IMF, COMTRADE, GTAP9.

Figure 2-2 Applied (MFN) tariffs on trans-Atlantic trade



Source: WTO integrated database and the World Bank/UNCTAD WITS database.

Values reported are for 2011 and are trade-weighted.

Figure 2-3

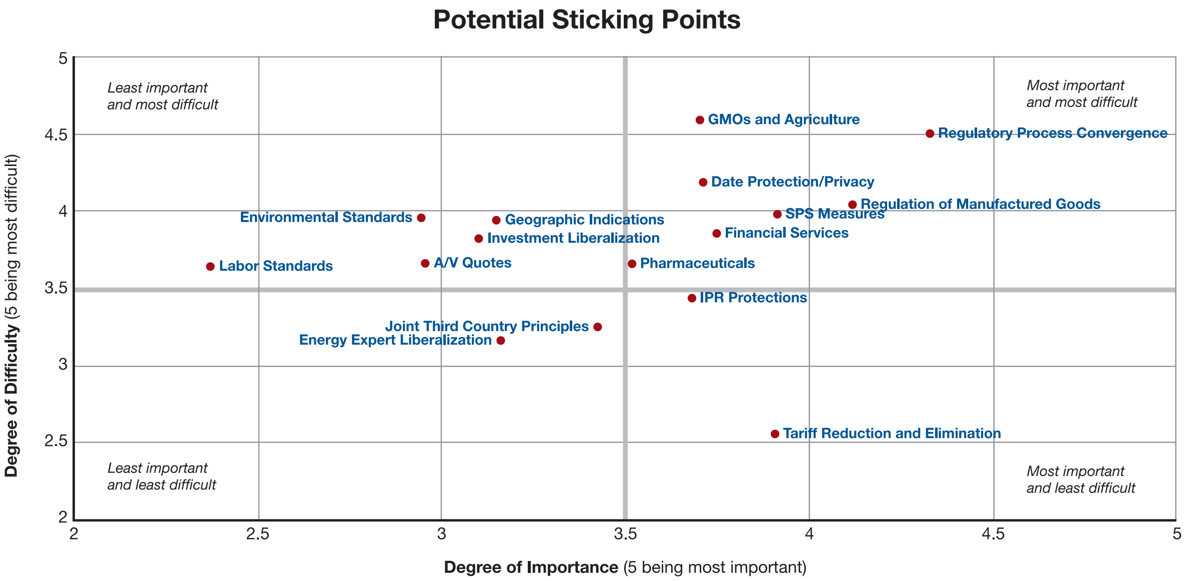


Table 3-1

Explanatory variables used in gravity modeling

name	description
ln(1+tariff)	log of the tariff (preference margin vis-à-vis MFN)
ln(distance)	log of shipping distance in km
polity index	index of political similarity (democratic institutions)
common colony	dummy for shared colonial history
common language	dummy for shared common ethnic language
contiguous	dummy for common border
colony	dummy for former colonial relationship
EU	dummy for intra-EU trade
FTA depth	ranges from 1 to 7 based on DESTA scores

Table 3-2 Second Stage Gravity-Based Coefficient Estimates

	All Goods	Primary Food	Energy	Processed Food
ln(1+tariff)	-4.743 (-2.87)***	-7.159 (-2.99)***	-7.947 (-2.26)**	-3.795 (-2.85)***
ln(distance)	-0.78 (-20.36)***	-0.753 (-10.94)***	-0.988 (-12.48)***	-0.796 (-16.63)***
polity index	0.37 (2.48)**	-0.25 (-0.96)	0.716 (1.62)§	-0.247 (-1.07)
Common Colony	0.32 (2.13)**	0.458 (1.72)*	0.066 (0.24)	0.49 (2.46)**
common language	0.467 (5.67)***	0.679 (5.39)***	0.504 (3.09)***	0.714 (7.19)***
common border	0.497 (5.10)***	0.56 (4.06)***	0.565 (3.09)***	0.58 (5.03)***
former colony	0.626 (5.48)***	0.347 (1.66)*	0.839 (4.04)***	0.735 (5.44)***
European Union	0.575 (4.54)***	1.61 (6.18)***	-0.001 (-0.00)	1.499 (7.87)***
FTA depth	0.087 (3.74)***	0.15 (3.25)***	0.169 (2.90)***	0.158 (4.87)***
N	10,721	10,341	4,581	10,539
Pseudo R2	0.8093	0.683	0.594	0.7663

§ p<0.15;* p<0.1; ** p<0.05; *** p<0.01. z-ratios in parentheses. GLM estimates.

Table 3-2 Second Stage Gravity-Based Coefficient Estimates (continued)

	Beverages and Tobacco	Petro-chemicals	Chemicals, Pharmaceuticals	Metals, Fabricated Metals
ln(1+tariff)	-4.293	-1.907	-3.557	-3.895
	(-3.80)***	(-0.27)	(-1.80)*	(-1.43)§
ln(distance)	-0.8	-1.172	-0.754	-0.857
	(-12.35)***	(-14.90)***	(-18.30)***	(-19.54)***
polity index	-0.956	0.09	0.057	0.302
	(2.71)***	(0.25)	(0.31)	(1.43)§
common colony	1.012	0.314	0.214	0.215
	(3.99)***	(1.29)	(1.35)	(1.21)
common language	0.538	0.619	0.398	0.472
	(4.09)***	(3.71)***	(4.45)***	(5.19)***
common border	0.71	0.642	0.593	0.684
	(4.91)***	(3.59)***	(5.04)***	(6.69)***
former colony	0.701	0.496	0.666	0.537
	(4.60)***	(2.47)**	(5.11)***	(4.95)***
European Union	1.498	0.27	0.889	1.268
	(5.16)***	(0.86)	(5.90)***	(8.25)***
FTA depth	0.215	0.173	0.11	0.086
	(4.57)***	(2.88)***	(3.64)***	(2.93)***
N	9,928	9,646	10,447	10,528
Pseudo R2	0.694	0.6562	0.8095	0.7824

§ $p<0.15$; * $p<0.1$; ** $p<0.05$; *** $p<0.01$. *z*-ratios in parentheses. GLM estimates.

Table 3-2 Second Stage Gravity-Based Coefficient Estimates (continued)

	Motor Vehicles	Electrical Machinery	Other Machinery	Other Goods
ln(1+tariff)	-7.29	-3.563	-8.209	-8.482
	(-3.21)***	(-0.75)	(-1.62)§	(-5.67)***
ln(distance)	-0.596	-0.648	-0.665	-0.806
	(-8.58)***	(-9.93)***	(-15.41)***	(-19.59)***
polity index	-0.042	-0.114	0.127	0.711
	(-0.18)	(-0.63)	(0.72)	(3.88)***
common colony	0.553	0.467	0.489	0.274
	(1.75)*	(2.22)**	(2.14)**	(1.89)*
common language	0.265	0.641	0.418	0.529
	(2.12)**	(5.55)***	(4.85)***	(5.15)***
common border	0.807	0.083	0.48	0.702
	(5.77)***	(0.57)	(4.29)***	(6.33)***
former colony	0.38	0.782	0.646	0.739
	(2.14)**	(4.19)***	(5.74)***	(4.94)***
European Union	1.299	0.631	0.133	0.468
	(5.89)***	(3.31)***	(0.74)	(2.81)***
FTA depth	0.184	0.009	0.071	0.043
	(3.82)***	()0.25	(2.51)**	(1.42)§
N	10,042	10,233	10,742	10,786
Pseudo R2	0.8302	0.8224	0.8521	0.8311

§ $p<0.15$; * $p<0.1$; ** $p<0.05$; *** $p<0.01$. *z*-ratios in parentheses. GLM estimates.

Table 3-3 AVE (ad valorem equivalent) estimates for NTB reductions

	A	B	C	D	E
	intra-EU AVE savings	deep EU-US RTA AVE savings	ECORYS (2009) AVEs EU vs US	ECORYS (2009) AVEs US vs EU	Share of bilateral trade
GOODS	12.89 [7.13 ~ 18.95]	13.7 [6.3 ~ 21.61]	na	na	70.6
Primary agriculture	25.22 [16.6 ~ 34.48]	15.8 [5.99 ~ 26.51]	na	na	0.6
Primary energy	-0.01 [27.95 ~ -31.11]	16.05 [4.94 ~ 28.33]	na	na	0.6
Processed foods	48.44 [34.53 ~ 63.78]	33.83 [19.02 ~ 50.49]	25.4	25.4	5.4
Beverages and tobacco	41.76 [24.16 ~ 61.85]	41.99 [22.17 ~ 65.02]	25.4	25.4	1.3
Petrochemicals	7.89 [-9.25 ~ 28.26]	24.17 [7.16 ~ 43.88]	na	na	1.5
Chemicals, Pharmaceuticals	20.62 [13.33 ~ 28.36]	29.09 [12.51 ~ 48.11]	10.2	11.4	19.1
Metals, fabricated metals	38.48 [28.17 ~ 49.61]	16.71 [5.25 ~ 29.43]	5.3	9	4.1
Motor vehicles	19.51 [12.63 ~ 26.81]	19.32 [8.98 ~ 30.65]	14	14.2	5.7
Electrical machinery	19.37 [7.49 ~ 32.57]	1.78 [-11.39 ~ 16.92]	6	6.8	3.0
Other machinery	1.63 [-2.64 ~ 6.09]	6.24 [1.34 ~ 11.38]	0	0	23.5
Other manufactures	5.67 [1.68 ~ 9.82]	3.61 [-1.34 ~ 8.81]	na	na	5.8

Table 3-4 AVEs (ad valorem equivalent) and market access in services

	A	B	C	D	E
	AVEs of current policies		GATS, and best RTA		Share of bilateral trade
	EU	US	EU	US	
SERVICES	12.79	12.94	55.3, 64.4	55.4, 55.4	29.4
Construction	na	na	70.8, 83.3	83.3, 83.3	0.4
Air transport	25.00	11.00	66.3, 72.5	5.0, 28.8	3.1
Maritime	1.71	13.00	47.6, 63.1	0.0, 44	0.1
Other Transport	29.73	0.00	57.1, 71.4	42.9, 64.3	3.1
Distribution	1.40	0.00	71.9, 87.5	100, 100	1.0
Communications	1.10	3.50	75.0, 78.1	78.3, 78.3	1.1
Banking	1.45	17.00	42.7, 42.7	29.2, 33.3	5.0
Insurance	6.55	17.00	57.5, 57.5	40.0, 50.0	2.7
Professional and business	35.43	42.00	58.8, 62.5	57.5, 62.5	8.1
Personal, recreational	na	na	47.6, 50.9	91.5, 91.5	1.3
Public services	na	na	32.5, 36.7	19.2, 31.7	3.5

Source: WTO and World Bank. See text.

Table 4-1 Midpoint trade cost reductions in T-TIP scenario

	AVE % cost reductions		tariffs	
	EU NTBs	US NTBs	EU tariffs	US tariffs
GOODS	13.7	13.7	2.1	1.3
Primary agriculture	15.8	15.8	3.3	2.2
Primary energy	16.1	16.1	0.0	0.1
Processed foods	33.8	33.8	15.8	5.0
Beverages and tobacco	42.0	42.0	5.9	0.8
Petrochemicals	24.2	24.2	1.8	1.6
Chemicals, Pharmaceuticals	29.1	29.1	2.1	1.3
Metals, fabricated metals	16.7	16.7	1.8	1.2
Motor vehicles	19.3	19.3	7.9	1.1
Electrical machinery	1.8	1.8	0.6	0.3
Other machinery	6.2	6.2	1.2	0.7
Other manufactures	3.6	3.6	1.7	2.9
SERVICES	9.9	6.7		
Construction	4.6	2.5		
Air transport	12.5	5.5		
Maritime	0.9	6.5		
Other Transport	14.9	0.0		
Distribution	0.7	0.0		
Communications	0.6	1.8		
Banking	0.0	0.0		
Insurance	0.0	0.0		
Professional and business	17.7	21.0		
Personal, recreational	4.4	2.5		
Public services	*	*		

Note: For construction we have started from values reported by ECORYS as the recent World Bank AVE estimates for services do not cover construction. Goods and Services aggregates are all trade weighted based on bilateral trade flows.

TABLE 4-2 Income Effects with a Discriminatory, Preferential Agreement
Real income (household utility from private consumption), percent change

	A	B	C	D=A+B	E=A+B+C	F=V(E)
	tariffs	NTBs goods	NTBs services	total goods only liberalization	total goods and services liberalization	discounted total as present value
United States	0.11	0.8	0.06	0.91	0.97	10.25
	[0.08 ~ 0.13]	[0.26 ~ 1.54]	[0 ~ 0.13]	[0.35 ~ 1.68]	[0.35 ~ 1.81]	[3.66 ~ 19.12]
European Union	0.15	1.91	0.2	2.06	2.27	24.02
	[0.13 ~ 0.17]	[0.7 ~ 3.39]	[0 ~ 0.49]	[0.83 ~ 3.56]	[0.83 ~ 4.04]	[8.75 ~ 42.85]
of which:						
Germany	0.06	1.21	0.16	1.27	1.43	15.17
	[0.05 ~ 0.08]	[0.41 ~ 2.36]	[0 ~ 0.39]	[0.46 ~ 2.45]	[0.46 ~ 2.83]	[4.91 ~ 30]
France	0.07	1.18	0.08	1.25	1.33	14.09
	[0.06 ~ 0.08]	[0.36 ~ 2.27]	[0 ~ 0.2]	[0.42 ~ 2.35]	[0.42 ~ 2.55]	[4.4 ~ 27.02]
United Kingdom	0.12	1.51	0.19	1.63	1.82	19.29
	[0.1 ~ 0.13]	[0.56 ~ 2.68]	[0 ~ 0.45]	[0.66 ~ 2.81]	[0.66 ~ 3.26]	[7.02 ~ 34.55]
Italy	0.07	1.29	0.1	1.36	1.46	15.5
	[0.06 ~ 0.08]	[0.42 ~ 2.47]	[0 ~ 0.25]	[0.48 ~ 2.54]	[0.48 ~ 2.79]	[5.12 ~ 29.53]
Spain	0.04	0.54	0.17	0.58	0.75	7.94
	[0.03 ~ 0.05]	[0.09 ~ 1.25]	[0 ~ 0.41]	[0.12 ~ 1.29]	[0.12 ~ 1.7]	[1.29 ~ 18.03]
EFTA	-0.23	-2.34	-0.01	-2.58	-2.58	-27.37
	[-0.24 ~ -0.19]	[-1.28 ~ -2.68]	[0 ~ 0]	[-1.52 ~ -2.88]	[-1.52 ~ -2.87]	[-16.09 ~ -30.45]
Turkey	-0.15	-0.57	-0.03	-0.72	-0.75	-7.93
	[-0.11 ~ -0.2]	[-0.22 ~ -0.96]	[0 ~ -0.07]	[-0.33 ~ -1.16]	[-0.33 ~ -1.23]	[-3.5 ~ -13.02]
Other Europe	0	-0.15	-0.01	-0.15	-0.16	-1.72
	[0 ~ 0]	[-0.06 ~ -0.25]	[0 ~ -0.02]	[-0.07 ~ -0.25]	[-0.07 ~ -0.27]	[-0.72 ~ -2.82]
Mediterranean	-0.01	-0.22	0	-0.23	-0.23	-2.39
	[-0.01 ~ -0.01]	[-0.08 ~ -0.41]	[0 ~ 0]	[-0.09 ~ -0.42]	[-0.09 ~ -0.42]	[-0.99 ~ -4.41]
Japan	-0.03	-0.15	0	-0.19	-0.19	-2
	[-0.03 ~ -0.04]	[-0.07 ~ -0.24]	[0 ~ -0.01]	[-0.1 ~ -0.29]	[-0.1 ~ -0.3]	[-1.03 ~ -3.14]
China	-0.1	-0.17	0	-0.27	-0.27	-2.85
	[-0.05 ~ -0.08]	[-0.03 ~ -0.12]	[0 ~ -0.01]	[-0.08 ~ -0.2]	[-0.08 ~ -0.21]	[-0.85 ~ -2.21]
Other TPP countries	-0.19	-1.04	0.01	-1.23	-1.23	-12.98
	[-0.14 ~ -0.24]	[-0.41 ~ -1.72]	[0 ~ 0.01]	[-0.55 ~ -1.96]	[-0.55 ~ -1.95]	[-5.85 ~ -20.65]
Other Asia	0.1	0.31	-0.03	0.41	0.38	4.05
	[0.06 ~ 0.11]	[0.13 ~ -0.09]	[0 ~ -0.06]	[0.2 ~ 0.03]	[0.2 ~ -0.04]	[2.09 ~ -0.39]
Other Middle Income	-0.01	-0.09	0	-0.1	-0.11	-1.12
	[-0.01 ~ -0.01]	[-0.02 ~ -0.21]	[0 ~ 0]	[-0.03 ~ -0.22]	[-0.03 ~ -0.22]	[-0.3 ~ -2.38]
Low Income	0.02	0.12	0.01	0.15	0.15	1.63
	[0.02 ~ 0.03]	[0.07 ~ 0.18]	[0 ~ 0.02]	[0.09 ~ 0.2]	[0.09 ~ 0.22]	[0.95 ~ 2.34]

Table 4-3
Income Effects from Spillovers
Real income (household utility from private consumption), percent change

	F	G	H=E+F+G	I=V(H)
	Spillovers to high income	Spillovers to middle and low income	total inclusive of spillovers	discounted total as present value
United States	0.01 [-0.01 ~ 0.14]	0.15 [0.05 ~ 0.18]	1.13 [0.39 ~ 2.12]	11.93 [4.15 ~ 22.48]
European Union	0.14 [0 ~ 0.3]	0.56 [0.21 ~ 0.77]	2.97 [1.03 ~ 5.12]	31.41 [10.94 ~ 54.22]
of which				
Germany	0.53 [0.24 ~ 0.71]	0.36 [0.12 ~ 0.54]	2.32 [0.83 ~ 4.08]	24.57 [8.78 ~ 43.25]
France	0.03 [-0.06 ~ 0.14]	0.52 [0.18 ~ 0.79]	1.88 [0.54 ~ 3.48]	19.9 [5.75 ~ 36.86]
United Kingdom	0.1 [0.01 ~ 0.18]	0.3 [0.11 ~ 0.45]	2.22 [0.78 ~ 3.9]	23.57 [8.24 ~ 41.27]
Italy	0.06 [-0.05 ~ 0.18]	0.71 [0.28 ~ 1.07]	2.23 [0.71 ~ 4.03]	23.63 [7.5 ~ 42.73]
Spain	0.08 [0 ~ 0.11]	0.54 [0.22 ~ 0.78]	1.37 [0.34 ~ 2.59]	14.51 [3.59 ~ 27.48]
EFTA	3.39 [2.06 ~ 3.97]	-0.25 [-0.12 ~ -0.47]	0.56 [0.43 ~ 0.63]	5.89 [4.51 ~ 6.66]
Turkey	2.74 [1.27 ~ 4.22]	-0.19 [-0.04 ~ -0.44]	1.8 [0.9 ~ 2.55]	19.09 [9.53 ~ 27.02]
Other Europe	0.45 [0.15 ~ 0.71]	-0.13 [-0.04 ~ -0.21]	0.15 [0.04 ~ 0.24]	1.61 [0.43 ~ 2.52]
Mediterranean	-0.21 [-0.08 ~ -0.28]	0.51 [0.17 ~ 0.82]	0.08 [0 ~ 0.12]	0.84 [-0.02 ~ 1.3]
Japan	0.32 [0.16 ~ 0.48]	-0.04 [-0.02 ~ -0.08]	0.09 [0.04 ~ 0.1]	0.92 [0.47 ~ 1.03]
China	0.19 [0.04 ~ -0.02]	0.34 [0.07 ~ 0.55]	0.26 [0.03 ~ 0.32]	2.72 [0.33 ~ 3.4]
Other TPP countries	1.42 [0.69 ~ 1.76]	-0.14 [-0.06 ~ -0.13]	0.05 [0.08 ~ -0.32]	0.54 [0.81 ~ -3.41]
Other Asia	-0.82 [-0.45 ~ -0.68]	-0.03 [-0.02 ~ 0.85]	-0.47 [-0.27 ~ 0.13]	-4.94 [-2.9 ~ 1.4]
Other Middle Income	-0.13 [-0.07 ~ -0.17]	0.17 [0.06 ~ 0.3]	-0.06 [-0.04 ~ -0.09]	-0.64 [-0.4 ~ -0.99]
Low Income	-0.24 [-0.13 ~ -0.35]	0.11 [0.02 ~ 0.17]	0.02 [-0.03 ~ 0.04]	0.24 [-0.27 ~ 0.46]

Table 4-4 Percent change in factor incomes relative to capital income, Preferential Agreement

	lower skilled labor	medium skilled labor	highly skilled labor	land income	natural resource income
United States	0.92 [0.37 ~ 1.74]	1.05 [0.41 ~ 2.01]	1.00 [0.39 ~ 1.88]	3.87 [1.73 ~ 5.87]	-0.21 [-0.09 ~ -1.24]
European Union	2.46 [0.9 ~ 4.51]	2.25 [0.83 ~ 4.12]	2.37 [0.88 ~ 4.32]	-1.33 [-0.64 ~ -2.14]	-2.23 [-0.64 ~ -4.57]
of which:					
Germany	2.44 [0.9 ~ 4.48]	1.97 [0.72 ~ 3.64]	1.93 [0.7 ~ 3.58]	-4.79 [-2.37 ~ -7.5]	-7.62 [-2.55 ~ -14.4]
France	1.76 [0.56 ~ 3.48]	1.52 [0.48 ~ 3]	1.43 [0.45 ~ 2.84]	1.21 [0.47 ~ 2.05]	-1.16 [-0.09 ~ -2.85]
United Kingdom	1.93 [0.74 ~ 3.44]	1.98 [0.74 ~ 3.57]	1.99 [0.75 ~ 3.59]	-3.94 [-2.03 ~ -5.92]	0.75 [0.13 ~ 1.43]
Italy	1.5 [0.48 ~ 3.02]	1.5 [0.48 ~ 2.99]	1.47 [0.47 ~ 2.94]	-1.92 [-0.88 ~ -3.29]	-3.96 [-1.21 ~ -7.77]
Spain	0.88 [0.15 ~ 2.01]	0.94 [0.21 ~ 2.03]	0.9 [0.17 ~ 2.03]	0.4 [0.16 ~ 0.28]	0.69 [0.59 ~ 0.07]
EFTA	-0.32 [-0.24 ~ -0.41]	-0.56 [-0.43 ~ -0.62]	-0.74 [-0.56 ~ -0.83]	1.93 [0.9 ~ 3.53]	-0.38 [0.74 ~ -2.28]
Turkey	-0.14 [-0.14 ~ -0.02]	-0.52 [-0.3 ~ -0.62]	-0.54 [-0.31 ~ -0.64]	1.82 [0.73 ~ 2.98]	-0.03 [0.55 ~ -1.77]
Other Europe	0.07 [-0.02 ~ 0.29]	-0.09 [-0.07 ~ -0.06]	-0.05 [-0.05 ~ 0.04]	0.32 [0.04 ~ 0.7]	-2.3 [-0.44 ~ -5.23]
Mediterranean	-0.17 [-0.11 ~ -0.16]	-0.16 [-0.08 ~ -0.23]	-0.16 [-0.08 ~ -0.22]	0.75 [0.12 ~ 1.61]	-1.78 [-0.4 ~ -3.9]
Japan	-0.25 [-0.13 ~ -0.35]	-0.14 [-0.08 ~ -0.18]	-0.18 [-0.1 ~ -0.25]	1.92 [0.81 ~ 3.18]	2.01 [0.96 ~ 3]
China	-0.15 [-0.08 ~ -0.18]	-0.16 [-0.08 ~ -0.2]	-0.17 [-0.09 ~ -0.23]	0.83 [0.36 ~ 1.14]	-0.7 [0.05 ~ -2.35]
Other TPP countries	-1.23 [-0.59 ~ -1.86]	-1.08 [-0.52 ~ -1.64]	-1.07 [-0.51 ~ -1.6]	3.42 [1.42 ~ 5.33]	1.72 [1.22 ~ 1.06]
Other Asia	0 [0.02 ~ -0.36]	0.22 [0.14 ~ -0.15]	0.22 [0.14 ~ -0.2]	0.02 [-0.09 ~ 0.78]	-2.04 [-0.79 ~ -2.16]
Other Middle Income	-0.02 [-0.03 ~ 0.02]	-0.05 [-0.02 ~ -0.07]	-0.06 [-0.03 ~ -0.08]	0.51 [0.06 ~ 1.17]	-1.64 [-0.38 ~ -3.59]
Low Income	0.12 [0.03 ~ 0.27]	0.1 [0.06 ~ 0.19]	0.13 [0.07 ~ 0.25]	0.24 [0.05 ~ 0.45]	-1.34 [-0.34 ~ -2.78]

Note that the model employs a Ramsey closure for the savings-investment market (see Francois et al 1997), so that the values in the table are also real factor income changes.

Table 4-5 Percent change in factor incomes relative to capital income, inclusive of partial MFN element (spillovers) to NTB reductions, as in Table 4-3

	lower skilled labor	medium skilled labor	highly skilled labor	land income	natural resource income
United States	1.49 [0.48 ~ 2.94]	1.28 [0.47 ~ 2.39]	1.26 [0.48 ~ 2.29]	4.77 [1.88 ~ 8.02]	-6.54 [-2.16 ~ -10.44]
European Union	3.38 [1.2 ~ 5.73]	3.16 [1.14 ~ 5.43]	3.26 [1.17 ~ 5.58]	-2.86 [-1.73 ~ -3.75]	-8.89 [-3.13 ~ -14.1]
of which:					
Germany	3.16 [1.18 ~ 5.39]	2.73 [1.04 ~ 4.7]	2.68 [1 ~ 4.62]	-6.17 [-3.39 ~ -8.94]	-15.95 [-5.55 ~ -26.34]
France	2.64 [0.81 ~ 4.8]	2.35 [0.74 ~ 4.25]	2.21 [0.69 ~ 4.02]	0.37 [-0.47 ~ 1.42]	-7.26 [-2.73 ~ -11.16]
United Kingdom	2.61 [0.96 ~ 4.44]	2.64 [0.95 ~ 4.55]	2.62 [0.95 ~ 4.53]	-6.48 [-3.63 ~ -9.27]	-5.43 [-2.03 ~ -8.01]
Italy	2.51 [0.81 ~ 4.47]	2.55 [0.84 ~ 4.55]	2.47 [0.8 ~ 4.43]	-3.88 [-2.01 ~ -5.86]	-11.55 [-4.03 ~ -18.73]
Spain	1.66 [0.4 ~ 2.98]	1.71 [0.51 ~ 3.11]	1.67 [0.45 ~ 3.08]	-2.17 [-1.31 ~ -2.92]	-6.48 [-2.28 ~ -10.25]
EFTA	0.48 [0.25 ~ 0.88]	0.51 [0.3 ~ 0.69]	0.5 [0.33 ~ 0.62]	1.92 [0.39 ~ 3.3]	-3.38 [-1.31 ~ -6.16]
Turkey	1.73 [0.76 ~ 2.72]	2.27 [1.1 ~ 3.28]	2.34 [1.13 ~ 3.39]	-1.86 [-1.34 ~ -1.81]	-9.46 [-4.38 ~ -13.99]
Other Europe	0.29 [0.05 ~ 0.61]	0.22 [0.04 ~ 0.41]	0.24 [0.04 ~ 0.47]	1.16 [0.39 ~ 2.06]	-2.32 [-0.43 ~ -5.07]
Mediterranean	0.3 [0.06 ~ 0.62]	0.27 [0.03 ~ 0.46]	0.29 [0.02 ~ 0.51]	1.41 [0.57 ~ 2.55]	-2.73 [-0.54 ~ -5.32]
Japan	0.06 [0.04 ~ 0.01]	0.1 [0.05 ~ 0.13]	0.08 [0.04 ~ 0.09]	0.48 [0.04 ~ 1.66]	-0.17 [-0.18 ~ 0.59]
China	0.03 [-0.02 ~ -0.14]	0.13 [0 ~ 0]	0.17 [0 ~ 0.08]	0.07 [0.05 ~ 1.24]	-3.15 [-0.67 ~ -4.55]
Other TPP countries	0 [0.05 ~ -0.38]	0.03 [0.06 ~ -0.3]	0.06 [0.06 ~ -0.25]	1.82 [0.43 ~ 4.88]	-2.59 [-0.96 ~ -3.08]
Other Asia	-0.42 [-0.23 ~ 0]	-0.43 [-0.29 ~ 0.21]	-0.48 [-0.32 ~ 0.25]	1.45 [0.59 ~ 1.5]	-0.12 [0.48 ~ -3.79]
Other Middle Income	0.16 [0.03 ~ 0.31]	-0.01 [-0.03 ~ 0]	-0.04 [-0.05 ~ -0.02]	2.43 [0.87 ~ 4.21]	-2.25 [-0.52 ~ -4.46]
Low Income	0.31 [0.03 ~ 0.63]	0.11 [-0.01 ~ 0.15]	0.15 [-0.02 ~ 0.27]	0.69 [0.28 ~ 1.31]	-1.75 [-0.28 ~ -3.58]

Note that the model employs a Ramsey closure for the savings-investment market (see Francois et al 1997), so that the values in the table are also real factor income changes.

Table 4-6
Percent change in exports by region

	exports to EU,US	total exports
United States	82.45	18.49
European Union	78.00	14.47
EFTA	-6.72	-4.07
Turkey	-1.13	-1.12
Other Europe	-0.15	-0.32
Mediterranean	-0.36	-0.45
Japan	-4.24	-1.14
China	0.50	-0.06
TPP countries	-4.77	-3.01
Other Asia	2.00	1.66
Other Middle Income	0.05	-0.21
Low Income	2.71	0.78

Note: excludes intra-EU trade

Table A1. Probit selection equations modeling the probability of having a PTA with a particular level of depth

	1	2	3	4	5	6	7
Trade embeddedness index for 2009	6.212**	5.249***	14.017***	15.321***	-20.686***	-0.884	10.220
	(2.281)	(4.504)	(3.663)	(4.629)	(-3.126)	(-0.151)	(1.161)
Log bilateral distance	-0.295***	-0.808***	-0.925***	-0.335***	-0.617***	-0.539***	-1.347***
	(-3.585)	(-17.966)	(-12.110)	(-5.480)	(-6.417)	(-6.429)	(-10.826)
Land contiguity	0.414*	-0.858***	-0.009	-0.174	-0.581**	-0.403	-0.674*
	(1.804)	(-5.828)	(-0.037)	(-0.756)	(-2.014)	(-1.345)	(-1.841)
Common language ethnology	0.301	0.169	-0.014	-0.345	-1.250***	-0.364	0.701*
	(0.867)	(1.184)	(-0.058)	(-1.517)	(-3.911)	(-0.922)	(1.878)
Common official language	0.974**	0.037	0.437*	0.905***	1.573***	-0.363	-0.703*
	(2.444)	(0.243)	(1.709)	(3.926)	(4.493)	(-0.972)	(-1.818)
Common colonizer	0.508**	-0.446***	-0.298	0.416	-0.664*		-2.215*
	(2.035)	(-3.668)	(-0.990)	(1.463)	(-1.750)		(-1.671)
Colonial relationship	1.834***	0.787***	-0.049	-0.123	-0.531	0.087	-1.035***
	(3.468)	(3.305)	(-0.134)	(-0.417)	(-0.906)	(0.175)	(-2.606)
Economic mass of exporter and importer together (in log GDPs)	-0.005	0.040***	0.082***	-0.027	0.015	-0.015	0.067**
	(-0.196)	(3.611)	(3.548)	(-1.423)	(0.341)	(-0.656)	(2.246)
PCA1	-0.395***	0.005	0.202***	0.402***	-0.119*	0.212**	2.435
	(-4.608)	(0.164)	(2.868)	(9.362)	(-1.872)	(2.163)	(1.170)
PCA2	-0.516***	0.163***	-0.083	-0.034	-0.233**	-0.221**	-0.615
	(-3.191)	(2.731)	(-0.861)	(-0.440)	(-2.552)	(-2.290)	(-0.694)
PCA3	-0.499***	-0.240***	-0.508**	-0.003	0.040	0.668***	1.362
	(-2.893)	(-2.851)	(-2.209)	(-0.019)	(0.182)	(2.794)	(0.854)
N	1,406	7,734	3,842	3,530	2,400	3,089	1,406
PseudoR2	0.4185	0.5023	0.6504	0.4898	0.6316	0.4702	0.7553

* $p<0.1$; ** $p<0.05$; *** $p<0.01$ notes: PCA1, PCA2, PAC3 are first three weighted components from principal components analysis of differences in polity, civil society, corruption, and functioning of government indexes. Probit regressions include country fixed effects.

Table A2. Sensitivity analysis for stage 2 gravity regressions. Total merchandise trade.

	A	B	C	D	E	F
ln(1+tariff)	-4.743	-4.659	-4.608	-4.629	-4.672	-4.799
	(-2.87)***	(-2.87)***	(-2.84)***	(-2.84)***	(-2.87)***	(-2.99)***
ln(distance)	-0.780	-0.776	-0.783	-0.777	-0.780	-0.762
	(-20.36)***	(-20.37)***	(-20.40)***	(-20.25)***	(-20.72)***	(-21.98)***
common colony	0.320	0.310	0.299	0.312	0.307	0.313
	(2.13)**	(2.05)**	(1.97)**	(2.06)**	(2.01)**	(2.04)**
common language	0.467	0.464	0.465	0.463	0.478	0.465
	(5.67)***	(5.65)***	(5.71)***	(5.60)***	(5.81)***	(5.64)***
common border	0.497	0.488	0.464	0.486	0.473	0.484
	(5.10)***	(4.93)***	(4.83)***	(4.97)***	(4.88)***	(4.93)***
former colony	0.626	0.628	0.614	0.630	0.620	0.625
	(5.48)***	(5.48)***	(5.32)***	(5.51)***	(5.39)***	(5.36)***
European Union	0.575	0.545	0.451	0.560	0.532	0.527
	(4.54)***	(4.30)***	(3.49)***	(4.36)***	(4.11)***	(4.62)***
FTA depth	0.087	0.086	0.076	0.088	0.079	0.093
	(3.74)***	(3.70)***	(3.18)***	(3.82)***	(3.34)***	(5.79)***
polity index	0.370					
	(2.48)**					
functioning of government index		0.130				
		(0.93)				
corruption index			-0.295			
			(-2.29)**			
civil society index				0.202		
				(1.19)		
PCA1					0.012	0.008
					(0.67)	(0.47)
PCA2					-0.080	-0.073
					(-2.84)***	(-2.61)***
PCA3					-0.028	-0.029
					(-0.31)	(-0.32)
N	10,721	10,720	10,721	10,721	10,721	10,721
PseudoR2	0.8093	0.8087	0.8090	0.8088	0.8093	0.8093

* p<0.1; ** p<0.05; *** p<0.01. PCA1, PCA2, PAC3 are first three weighted components from principal components analysis of differences in polity, civil society, corruption, and functioning of government indexes. In main text, we report results for specification A.

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