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Should TPP Be Formed? On the Potential Economic, Governance, and Conflict-Reducing Impacts of the Trans-Pacific Partnership Agreement

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The proposed Trans-Pacific Partnership (TPP) is a free trade agreement among 12 Pacific Rim countries whose joint gross domestic products (GDPs) account for 36 percent of world GDP and whose mutual trade accounts for approximately 24 percent of world trade. As for most proposed free trade agreements (FTAs), trade economists have provided *ex ante* computable general equilibrium (CGE) estimates to predict the trade, employment, and real per capita income effects of this agreement, such as ITC (2016). This paper-intended to complement these studies-examines the potential impacts of TPP *beyond* such traditional CGE estimates, taking a broader economic, governance, and historical perspective. First, we contrast these traditional CGE trade and welfare estimates that treat all firms within an industry as homogeneous with more recent CGE analyses that allow firms' productivities to be heterogeneous. We show that the latter models' trade predictions are much more consistent with *ex post* empirical evidence of average trade effects of FTAs. Second, empirical evidence now strongly confirms the existence of FTA "contagion." We review this evidence and show that predictive models of the evolution of FTAs indicate that the TPP should be formed. With China now having formed 12 FTAs and negotiating five new ones (including a sixteen member Asia-Pacific FTA), the United States would likely face considerable trade diversion without the TPP. Third, we examine empirical evidence on the likely further economic growth implications of FTAs by reducing firms' uncertainty over trade relations and trade policies. Fourth, we examine empirical evidence on the additional impact of FTAs on consolidating democratic institutions in countries. The TPP would likely help consolidate some of the less mature democracies. Fifth, we examine empirical evidence on the reductions of conflicts (and enhanced peace) between countries owing to the formations of FTAs. We conclude the paper noting that the potential net benefits to member countries of the proposed TPP extend *well* beyond the real income gains to households based upon traditional CGE models.

Key words: International Trade, Economic Integration Agreements, Gravity Equation, Welfare
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"*Comprehensive rules are the most distinctive aspect of the TPP*." (Petri and Plummer (2016), p. 5)

I. INTRODUCTION

The proposed Trans-Pacific Partnership (TPP) is a free trade agreement (FTA) among 12 Pacific Rim countries whose joint gross domestic products (GDPs) account for approximately 36 percent of world GDP and whose mutual trade accounts for approximately 24 percent of world trade. For the United States, the 11 potential TPP partners already account for 45 percent of U.S. exports.[1] Moreover, the United States already has in place FTAs with 6 of these 11 countries.[2] Other TPP countries also have FTAs in place with several countries. Hence, TPP is designed to expand trade-policy liberalization among a larger number of countries, to deepen the degree of trade-policy liberalization by lowering non-tariff trade barriers and other fixed trade costs (including liberalizing trade in services and lowering foreign direct investment (FDI) barriers), and to improve harmonization of trade and FDI policies. The likely most substantive contribution of the TPP is to reduce an overwhelming array of *fixed costs* that firms face in exporting goods and services to foreign markets. The "comprehensive rules" noted above in Petri and Plummer (2016) should reduce such export fixed costs. In other words, in stark contrast to most previous FTAs, the TPP is unique and unprecedented in two dimensions. First, the TPP will *improve the rules of international trade and FDI* to allow all countries' firms to trade on a fairer and more transparent footing. Second, *by lowering variable and fixed trade costs*, the TPP will enable a greater number of firms to export to foreign markets.

Prior to any new FTA formation, academic, business, and government economists typically conduct *ex ante* computable general equilibrium (CGE) analyses of the (expected) economic benefits and costs to nations' trade, employment, and real gross domestic products (GDPs) and national incomes. Such models provide quantitative predictions of the effects of an agreement, typically using multi-sector, multi-country

[1] The 12 countries of TPP are Australia, Brunei (formally, Brunei Darussalam), Canada, Chile, Japan, Malaysia, Mexico, New Zealand, Peru, Singapore, the United States, and Vietnam. The TPP was signed in October 2015. However, it has not been ratified by the U.S. Congress.

[2] These six countries are Australia, Canada, Chile, Mexico, Peru, and Singapore.

frameworks with factors of production (such as labor) adjusting between industries (and some models even allow net employment increases or decreases). While several such CGE models have been implemented for TPP and their predictions summarized and contrasted,[3] two prominent CGE analyses are those by Petri and Plummer (2016) and the U.S. International Trade Commission, ITC (2016). Petri and Plummer (2016) is an updated version of Petri, Plummer, and Zhai (2011) and suggests that annual exports of the United States would increase by about 9 percent from TPP (by year 2030, relative to the baseline), while annual U.S. real GDP would increase 0.5 percent (in their analysis, employment is unchanged, assuming full employment). In contrast, ITC (2016), a study mandated by the U.S. Trade Priorities Act following President Obama's notification, used a CGE model and found-under some different, and more traditional, assumptions-that annual U.S. exports to the world would grow only 1 percent (though by 5.6 percent with TPP members) and annual U.S. imports would grow similarly (relative to the baseline). ITC (2016) also predicted that U.S. real GDP would increase only 0.2 percent, which is 40 percent of the 0.5 percent impact in the Petri and Plummer (2016) study.[4] While many observers claim that such impacts are small (cf., *Wall Street Journal*, May 16, 2016), in this era of annual real GDP growth rates among developed countries of 2 percent, additional annual growth of 0.2-0.5 percent is substantive and should not be discounted.[5]

This paper-intended to complement these studies-examines the potential impacts of TPP *beyond* traditional CGE estimates, taking a broader economic, governance, and historical perspective. We do this by bringing to the fore *five issues* that traditional CGE models ignore; consequently, we will argue that traditional predicted CGE estimates of the trade and real income effects of TPP, such as those in ITC (2016), should be interpreted as a likely *floor* in terms of potential benefits. In section 2, we address an important shortcoming of traditional CGE models, which model all firms within any industry as *identical* in terms of their productivity levels. In reality, considerable evidence from the past 20 years confirms enormous heterogeneity in productivity levels among every industry's firms. Allowing for such heterogeneity in CGE estimates amplifies the trade and economic welfare

[3] For a useful analysis contrasting these various predictions, see Ciuriak (2016).

[4] See ITC (2016), p. 31, Table ES.9.

[5] In the Petri-Plummer estimates, the additional annual real income effect of US$131 billion is about *50 percent* of the annual contribution of U.S. private investment expenditures to U.S. real GDP growth.

benefits of trade liberalizations. Moreover, the latter estimates are much more consistent with now well-established *ex post* statistical empirical evidence on the "actual" trade effects of FTAs. Second, in section 3, we examine strong empirical evidence that the world faces FTA "contagion," meaning that every new FTA in the world changes relative prices, inducing more FTAs. With China's increasing number of FTAs and exploration into a new regional FTA for Asia and the Pacific (excluding the United States), the United States faces a considerable degree of potential trade diversion. Accordingly, in this context of FTA contagion, we examine empirically *ex ante* whether TPP should be formed.[6] Third, in section 4, we examine empirical evidence on the positive impact on economic growth from FTAs through an additional channel, the channel of reduced uncertainty among firms regarding trade and trade policies. Fourth, in section 5, we examine empirical evidence on the additional positive impact of FTAs on the consolidation of democracy in a wide sample of countries. Fifth, in section 6, we examine empirical evidence on the positive impact of FTAs on reducing international conflicts and enhancing peace between countries. Section 7 provides conclusions.

II. FIRM-PRODUCTIVITY HETEROGENEITY

The *ex ante* quantitative economic analysis of the partial-and general-equilibrium effects on trade and economic welfare (or real incomes) of trade-policy changes has a 40 year history, starting with notable papers by Shoven and Whalley (1974) and Deardorff and Stern (1974). Based upon market-clearing principles, these large-scale, multi-sector, multi-country, computable general equilibrium (CGE) models have long guided the analysis of predicted economic impacts of trade-policy liberalizations. Designed initially for predicting the impacts of multilateral reductions in *ad valorem* tariff rates (under several rounds of General Agreement on Tariffs and Trade (GATT) negotiations) on highly disaggregated bilateral trade flows in models typically with Armington preferences, perfect competition, and homogenous firms within industries, these models have provided guidance to expected industries' trade, employment, and output impacts of price changes associated with *ad*

[6] As noted earlier, the 12 members of TPP signed the agreement in October 2015, but the U.S. Congress has not ratified it. We use the term "formed" as synonymous with "entered into force," which requires appropriate ratifications.

valorem tariff-rate (and sometimes, *ad valorem* equivalent non-tariff barrier) cuts. The models captured well in principle input-output linkages, labor mobility between industries, and long-run general-equilibrium effects associated with precisely measured price changes. ITC (2016) is one such analysis.

The purpose of this section of the paper is threefold. In sub-section 1, we first compare and contrast the *ex ante* trade and welfare estimates from the two most prominent traditional CGE analyses of the U.S. trade and welfare effects of TPP, ITC (2016) and Petri and Plummer (2016). Noting that one of the major distinctions between those two models concerns an assumption regarding homogeneity versus heterogeneity of firms' productivity levels, in sub-section 2 we examine the conclusions of some other recent CGE models regarding the quantitative importance of incorporating the heterogeneity of firms' productivities for trade and welfare impacts of trade liberalizations. In sub-section 3, we examine recent developments in the estimation of consistent and precise average *ex post* (partial) "treatment" effects of FTAs. The combination of the proliferation in the number of FTAs over the past half century (generating a large number of observations), along with econometric advances and rigorous theoretical foundations for international trade gravity equations, has led to convincing *ex post* evidence that "actual" bilateral trade effects of FTAs typically are *much larger* than traditional CGE estimates project *ex ante*. We argue that the likely most important reason is that traditional CGE estimates typically ignore the empirically substantiated entrance of more productive firms into exporting following an FTA formation.

1. CGE Estimates of Trade and Welfare Impacts of TPP

As mentioned, formations of FTAs typically have been preceded by CGE analyses of their potential trade, output, and employment effects. While several CGE analyses of TPP's effects have been conducted (cf., Ciuriak (2016) for a useful survey), the two most prominent CGE analyses are ITC (2016) and Petri and Plummer (2016). The Executive Summary in ITC (2016) highlights the major differences in predicted major outcomes between the two models (see Table ES.9). The ITC study predicts an increase in U.S. exports of only 1 percent and an increase in U.S. real income of 0.2 percent. By contrast, the Petri-Plummer study predicts an increase in U.S. exports of 9 percent-*nine times* that of the ITC study.

The Petri-Plummer study's increase in U.S. real income is 0.5 percent, which is *2.5 times* that of the ITC study. Why such large differences?

ITC (2016, pp. 41-42) provides a clear and useful identification of the four main assumptions that explain the differences between the two studies' estimates. The first and second rationales deal with a common theme, *the higher degree of disaggregation* in the ITC model. It is important to know that an important goal of the ITC study is to provide all industries in the United States with estimated effects on their trade, output and employment of TPP, which is done for all proposed U.S. FTAs. Faced with a 105-day limit to provide an economic analysis of FTA effects on all U.S. industries' trade, output and employment, the ITC is constrained to use a well-established, highly disaggregated model, in this case a version of the Global Trade Analysis Project (GTAP) model. One of the differences between the two studies is that the ITC model allows identifying sector-specific economic conditions as well as *sector-specific TPP trade-policy changes* (as described in the proposed treaty). The second difference is that the ITC model allows sector-specific quantification of investment provisions. Hence, this tends to reduce trade and output effects relative to other, more aggregated studies, such as Petri and Plummer (2016). However, the ITC and Petri-Plummer studies both account for the fact that many of the TPP trade and investment provisions are already covered by existing FTAs.

The third and fourth differences also tend to reduce the trade and output effects of TPP in ITC (2016), and these two differences likely largely explain the two models' differences in estimates. As mentioned, faced with a 105-day limit to provide an economic analysis for all U.S. industries, the ITC is constrained to use established models. Moreover, the use of a well-established model also provides for comparison to economic estimates for other U.S. FTAs. The GTAP-based ITC model is an excellent benchmark for a TPP economic analysis. However, because this model ignores recent important developments in the trade literature, the estimates from the ITC approach toward analysis of *any* proposed FTA should be seen as a floor. Specifically, the third difference is that the Petri-Plummer model allows for *spillovers* of TPP nontariff policy changes to *non-member countries*. The rationale for this is quite plausible. As mentioned in the introductory quote and introduction, the most distinctive-and novel and precedent-setting-aspect of the TPP is establishing a set of "comprehensive rules." The establishment of such rules reduces fixed costs of trade. With each of the TPP countries reducing such costs, members will also benefit from increasing trade with non-members by the

non-rival nature of such barriers. The Petri-Plummer model's assumption that 20 percent of this trade-cost reduction would apply to non-members is feasible and would then augment the Petri-Plummer results relative to the ITC ones.[7]

Perhaps even more important is the *fourth* distinction between the two studies. The ITC model uses the standard assumption that all firms within each industry are assumed *homogeneous* in their productivities. Yet, the most noteworthy advance in the international trade literature over the past 15 years has been accounting for the *heterogeneity* in firms' productivities, as summarized in detail in a chapter in the new *Handbook of International Economics*, cf., Melitz and Redding (2014).[8] Under certain assumptions, it is now widely recognized that average productivity will increase in countries that liberalize trade policies (such as via FTAs), as a greater number of firms in the industry can now profitably export, and such firms tend to be more productive. The ITC study, using a traditional CGE model with firm homogeneity, precludes this channel. Moreover, the Petri and Plummer (2016) model, an update of the Petri, Plummer, and Zhai (2011) model, incorporates firm heterogeneity, likely explaining a considerable portion of the larger trade and income effects of the proposed TPP. In sub-section 2 below, we provide further quantitative evidence that this "extensive margin" of trade-absent in the ITC model and most traditional CGE analyses-is quantitatively important.

2. Further Quantitative Evidence on the Extensive-Margin Trade Impacts

The purpose of the previous section was to highlight that the quantitative differences between the ITC TPP impacts and the Petri-Plummer TPP impacts could be explained substantively by the standard omission of a "productivity" impact in the traditional CGE approach in ITC (2016). In this section, we draw upon two very recent CGE studies that actually separate out *quantitatively* the additional impacts on trade and welfare of firm-productivity heterogeneity as a

[7] Such an assumption has precedent in studies evaluating the liberalization of non-tariff measures and foreign direct investment barriers between the United States and the European Union in anticipation of the proposed Trans-Atlantic Trade and Investment Partnership, cf., Berden, Francois, Tamminen, Thelle, and Wymenga (2009).

[8] Together, the three chapters of the *Handbook of International Economics*, Volume 4 mentioned in this paper cover succinctly and expertly the topics of firm heterogeneity, gravity equations, and the new quantitative trade models, which our analysis in sub-sections 2 and 3 below will incorporate.

result of trade liberalizations. The first study, Zhai (2008), adapts a traditional CGE model to account for monopolistic competition-scale economies as well as firm-heterogeneity effects. The second study, Costinot and Rodriguez-Clare (2014), uses a "New Quantitative Trade" model approach to show quantitatively the relative contributions of variety, scale economies, and firm-heterogeneity for trade and welfare as a result of a trade-policy liberalization.

Zhai (2008) is the methodological study undergirding Petri and Plummer (2016) and Petri, Plummer, and Zhai (2011). In this paper, the author modifies a standard CGE model (such as ITC (2016)) to include heterogeneity in firms' productivities in the spirit of Melitz (2003). Since the Melitz model is set in the context of a world with monopolistically competitive firms allowing increasing returns to scale (whereas ITC (2016) assumes perfect competition and constant returns to scale), an additional channel augmenting trade and welfare effects of trade liberalizations is economies of scale. The structure of the simulations allows the author to turn on and off the roles of productivity-heterogeneity (along with scale economies) and compare results between a traditional (so-called, Armington) CGE model versus the newer Melitz model allowing productivity heterogeneity. There are several important findings. First, Zhai (2008) shows that the trade increase from a 50 percent cut in tariffs is roughly 40 percent larger *with* firm heterogeneity compared to without firm heterogeneity. Second, he shows that the real income gain from the same tariff cut is 100 percent larger with firm heterogeneity than without it. Third, since an important aspect of the Melitz model is the presence of fixed export costs, the author shows that a 50 percent decline in export fixed costs (say, associated with a trade liberalization) leads to a substantial increase in welfare, by increasing the number of firms that can now profitably export. Thus, the Zhai (2008) findings provide quantitative support that much-perhaps, most-of the larger Petri-Plummer welfare gains from TPP can be explained by the absence in ITC (2016) of allowing firm heterogeneity.

Further support comes from Costinot and Rodriguez-Clare (2014). This chapter, also in the new *Handbook of International Economics*, provides a detailed explanation of macro-level numerical general equilibrium trade and welfare effects of trade-policy liberalizations founded upon rigorous theoretical foundations for the gravity equation, referred to as the "New Quantitative Trade" model approach. These models are more appealing on three levels. First, they have rigorous microeconomic foundations that are more appealing than the *ad hoc* Armington assumption in

traditional CGE models such as ITC (2016). Second, they have a tighter connection between theory and actual data. Third, these "mid-sized" models are more transparent than traditional large scale CGE models. After explaining the theoretical foundations behind such models, Costinot and Rodriguez-Clare (2014) perform several simulations of trade-policy liberalizations using actual trade and output data. Among several findings, they find that-without intermediates trade flows-the effect of a 40 percent tariff cut has roughly the same impact on welfare under perfect competition with Armington preferences, monopolistic competition with scale economies and homogeneous firms, and monopolistic competition with scale economies and heterogeneous firms. However, in the presence of intermediates trade (such as in a traditional CGE model), the welfare gains of the same tariff cut under monopolistic competition with scale economies and homogeneous firms is 100 percent larger than in the case of perfect competition with Armington preferences. Moreover, the welfare gains of the same tariff cut under monopolistic competition with scale economies and *heterogeneous* firms is 40 percent larger than in the case of monopolistic competition with scale economies and homogeneous firms. Consequently, the model with monopolistic competition, scale economies and firm heterogeneity can have a welfare gain from a tariff cut of *2.8 times* that from a traditional CGE model with perfect competition, no increasing returns to scale, and firm homogeneity. Recall from above that the U.S. welfare gain from TPP from Petri and Plummer (2016) was *2.5 times* that from ITC (2016).[9]

Thus, these two papers together suggest--using numerical *ex ante* general equilibrium models-that welfare gains from incorporating firm heterogeneity (along with monopolistic competition and scale economies) can magnify by more than 100 percent those from traditional CGE models. In the next section, we examine recent statistical analyses of past FTA formations and enlargements that show that extensive margin trade effects from FTAs may account for *more than half* of the

[9] Three other studies also shed similar light on this issue. Kehoe (2005) found in an examination of post-NAFTA trade of Canada, Mexico, and the United States that actual trade increased by significantly more than that suggested by several CGE models predictions. Kehoe and Ruhl (2013) provided empirical evidence that the extensive margin of trade provided a considerable portion of post-NAFTA trade, which was not predicted by the traditional CGE models. Finally, Kim and Shikher (2015) provide bilateral trade-flow *ex ante* estimates of a proposed Korea-China FTA comparable to those in Costinot and Rodriguez-Clare (2014), except Kim and Shikher (2015) use a new CGE model based upon the Eaton and Kortum (2002) model.

actual trade impacts of FTAs, and thus explain why traditional *ex ante* CGE trade impacts from trade liberalizations have *underestimated considerably* actual trade changes.[10]

3. Ex Post Empirical Estimates of Average FTA Effects

The *ex post* analysis of the impacts of FTAs on trade flows has a 50-year history. Tinbergen (1962) and Linnemann (1966) were the first two studies that used data and regression analysis to "explain" the variation in actual bilateral trade flows of goods between pairs of countries using the country-pairs' GDPs, bilateral distance, and other proxies for impediments to bilateral trade, such as lack of a common language or a common border. Beginning with the 1962 paper by Nobel laureate Jan Tinbergen, for 50 years researchers have tried to estimate *ex post* the partial ("average treatment") effect of various FTAs on the trade flows (i.e., to estimate the (so-called) "actual" effect).[11] Surprisingly, the impacts were small (around 5 percent); we will return to that result later. Because the regression specification related the logarithm of bilateral trade flows positively to the logs of the countries' GDPs and negatively to the log of their bilateral distance, the similarity to Newton's Law of Gravity inspired this bilateral trade regression equation to be referred to as the "gravity equation in international trade."

In the 1970s, two studies surfaced that used the gravity equation to focus on time series of cross-sectional estimates of partial effects of FTAs. Aitken (1973) found economically and statistically significant estimates of effects of common membership in the European Economic Community (EEC) and in the European Free Trade Area (EFTA) on European trade flows, beginning with the years of entry into force. Similarly, Sapir (1981) found economically and statistically significant effects of increased trade from membership in the Generalized System of Preferences (GSP).

[10] For brevity, I have not discussed "distributional impacts," such as between skilled and unskilled labor's real returns. These distributional impacts are discussed in ITC (2016) and in Petri and Plummer (2016). However, it is worth noting that both factors' real returns rise in ITC (2016); skilled labor's return rises 0.2% and unskilled labor's return also rises 0.2%. In Petri and Plummer (2016), all three factors' returns rise: skilled labor (0.6%), unskilled labor (0.4%), and capital (0.4%).

[11] Tinbergen (1962) examined the impact of the BENELUX (Belgium-Netherlands-Luxembourg customs union) agreement and of common membership in the British Commonwealth.

Both studies raised the visibility of the gravity equation, but its widespread acceptance was diminished by an absence of rigorous microeconomic theoretical foundations.

However, several papers surfaced between 1979 and 1990 that introduced formal theoretical microeconomic foundations for the gravity equation in international trade relating (log-linearly) bilateral trade flows to pairs of countries' GDPs, bilateral distance, and a host of dummy variables capturing factors augmenting or diminishing trade, cf., Anderson (1979), Bergstrand (1985), Bergstrand (1989), Bergstrand (1990), and Helpman and Krugman (1985). Following the proliferation in numbers of FTAs among countries starting in 1990, two major developments subsequently occurred in the gravity equation literature. First, several papers surfaced that demonstrated that-since FTAs were endogenous decisions by policymakers-econometric evaluation of FTAs' (partial) treatment effects on members' trade needed to account for this endogeneity to obtain consistent and precise treatment estimates, cf., Baier and Bergstrand (2004), Baier and Bergstrand (2007), Baier, Bergstrand, Egger, and McLaughlin (2008), Baier and Bergstrand (2009), and Baier, Bergstrand, and Feng (2014). Second, the gravity equation-by providing estimates of the crucial "trade-cost elasticity" (for instance, the elasticity of substitution in consumption or the index of firm-productivity heterogeneity)-became a central element in the calculation of the general equilibrium welfare effects of trade costs or trade-policy liberalizations, cf., Eaton and Kortum (2002), Anderson and van Wincoop (2003), Arkolakis, Costinot, and Rodriguez-Clare (2012), Head and Mayer (2014), and Costinot and Rodriguez-Clare (2014). In fact, Arkolakis, Costinot, and Rodriguez-Clare (2012) showed theoretically that the general equilibrium welfare effect of a trade-policy liberalization could be estimated using two "sufficient statistics," the share of a country's expenditures on domestically produced goods and the "trade-cost elasticity" estimated using a gravity equation, in the context of a wide array of the "New Quantitative Trade" models.

Head and Mayer (2014) provide a comprehensive *ex post* analysis of partial treatment effects on trade from FTAs and estimates of the welfare gains from a typical FTA. Using a meta-analysis approach, the authors provide median and mean estimates of the partial treatment effects on trade of FTAs from 108 structural gravity empirical analyses; the median and mean estimates are referred to as "Partial Trade Impacts" (PTIs). The median (mean) coefficient estimate is 0.28 (0.36); these imply PTIs of 32 and 43 percent, respectively. Baier, Bergstrand, and Clance (2015a) find an average partial effect of 0.47, implying a PTI of 60 percent.

Armed with a PTI, Head and Mayer (2014) explain how to calculate also the general equilibrium trade impact (GETI)-that accounts for endogenous adjustment of all prices, trade flows, and wage rates-and the welfare effect. The latter are constructed in a manner consistent with Arkolakis, Costinot, and Rodriguez-Clare (2012) above. For instance, Head and Mayer (2014), Table 3.6 shows that the welfare gain from the FTA with the median PTI impact (32 percent) is 1.1 percent.[12] Note that this real income effect is about twice that found in Petri and Plummer (2016).[13]

It is important to note also that the PTIs from properly estimated gravity equations are likely to capture increases in both the *intensive margin* as well as the *extensive margin* of trade. Given the importance of the extensive margin response to trade-policy liberalizations as discussed above, we report some recent *ex post* estimates of FTA formations (as well as other types of trade agreements) on members' trade that provide supporting evidence to the previous discussion. (Recall that in ITC (2016) the *ex ante* effect of TPP on members' trade is only 6 percent.) Table 1 provides estimates that were generated during the research related to Baier, Bergstrand, and Clance (2015a) and Baier, Bergstrand, and Clance (2016). Holding constant all other factors influencing bilateral trade by the appropriate choice of fixed effects (based upon a structural gravity model allowing firm heterogeneity and export fixed costs in the spirit of Melitz (2003)), Table 1 provides coefficient estimates (average partial effects) of six different types of economic integration agreements, ranging from the least-integrated One-Way Preferential Trade Agreements (such as Generalized System of Preferences agreements) to the most-integrated Economic Unions (such as the Eurozone). Specifically, the six types are One-Way PTAs (OWPTA), Two-Way PTAs (TWPTA), FTAs (FTA), Customs Unions (CU), Common Markets (CM), and Economic Unions (ECU). For instance, the coefficient estimate of 0.47 for FTAs for aggregate trade implies that a typical FTA increased aggregate trade for members by 60 percent (i.e., $60 = [e^{0.47}-1] \times 100$). As expected intuitively, the aggregate trade flow impacts among members generally increase with higher degrees of economic integration, as shown in column (3). Evidence suggests that it is likely that these large member trade

[12] A detailed description of the approach is in the Appendix.

[13] The higher *ex post* welfare effect estimates in Head and Mayer (2014) reflect that earlier FTAs had much larger trade effects than later FTAs, as self-selection of country-pairs into FTAs reflected that the largest gain FTAs were formed first. For confirmation, see Baier, Bergstrand, and Clance (2015a).

effects are due both to variable tariff rate cuts and decreases in policy-based export fixed costs, cf., Limao (2016).

Table 1.

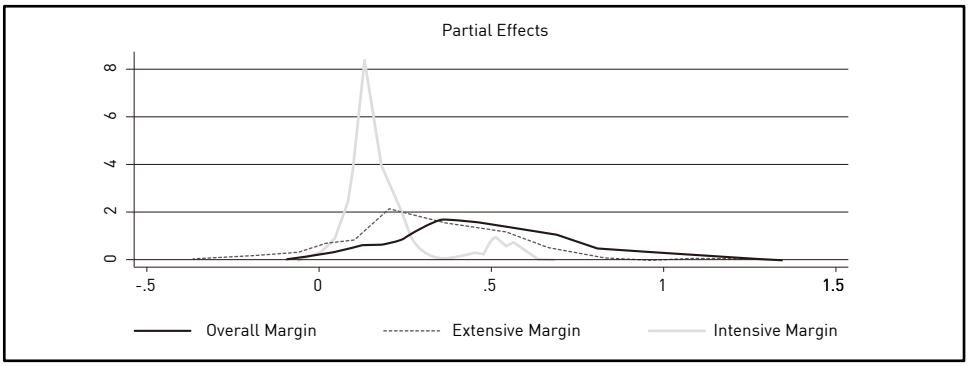
(1) Variables	(2) Expected Sign Trade	(3) Trade	(4) Expected Sign Intensive	(5) Intensive	(6) Expected Sign Extensive	(7) Extensive
$OWPTA_t$	+	-0.06** (-2.33)	+	-0.04 (-1.50)	+	-0.02 (-0.77)
$TWPTA_t$	+	0.10*** (3.39)	+	0.07*** (2.59)	+	0.03 (10.78)
FTA_t	+	0.47*** (19.42)	+	0.17*** (7.43)	+	0.30*** (10.93)
CU_t	+	0.96*** (16.75)	+	0.30*** (5.36)	+	0.66*** (9.98)
CM_t	+	1.02*** (24.17)	+	0.67*** (16.22)	+	0.35*** (7.14)
ECU_t	+	0.84*** (14.53)	+	0.67*** (11.98)	+	0.17*** (2.57)
Fixed Effects						
Exporter-Year		Yes		Yes		Yes
Importer-Year		Yes		Yes		Yes
Country-Pair		Yes		Yes		Yes
R^2		0.912		0.821		0.824
N		70,173		70,173		70,173

Notes: *, **, and ***denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Cutoff for nontraded goods is $1,000,000; this affects the sample size.

Moreover, columns (5) and (7) show that the intensive-margin and extensive-margin impacts, respectively, also generally increase with the degree of economic integration. First, while none of those results are surprising, they have not been provided before using virtually all economic integration agreements covering 1960-2010, based upon the Baier-Bergstrand Economic Integration Agreement Data Base. Second, note that-for FTAs and Customs Unions-the *extensive-margin* effects explain *two-thirds* of the aggregate trade flow impacts. Consequently, as noted above, ignoring the extensive-margin impacts of new firms exporting as a result of trade-policy liberalizations will very likely understate considerably the trade-flow and economic welfare effects of FTAs. Finally, Figure 1 provides the distribution of all the FTA coefficient estimates once allowed to vary by country-pair. Two interesting results are worth noting. First, virtually all the *ex post* intensive-margin effects (dashed line) are positive and the vast majority of extensive

-margin effects (dotted-dashed line) are positive. Second, the figure confirms visually that the average extensive-margin effect exceeds the average intensive-margin effect.

Figure 1. Heterogeneous FTA Effects



These results are consistent with the larger *ex ante* TPP trade-flow and welfare effects in Petri and Plummer (2016) relative to those in ITC (2016), where the former study allowed extensive margin effects. It is also important to remember our introductory quote from Petri and Plummer (2016) that "Comprehensive rules are the most distinctive aspect of the TPP" (p. 5). Comprehensive rules help to reduce export fixed costs, which only increase trade via the extensive margin. Yet even ITC (2016) notes that TPP "would generally establish trade-related disciplines that strengthen and harmonize regulations, increase certainty, and decrease trade costs for firms that trade and invest in the TPP region. Interested parties particularly emphasized the importance of TPP chapters addressing intellectual property rights (protections), customs and trade facilitation, investment, technical barriers to trade, sanitary and phytosanitary standards, and state-owned enterprises" (p. 21). Yet many of these behind-the-border barriers that would be reduced-and that are distinctive contributions of TPP that reduce export fixed costs-cannot be adequately captured in standard CGE models; as noted in ITC (2016), they are "difficult to quantify" (p. 25).[14]

[14] This shortcoming of standard CGE models is noted also in a recent report on U.S. free trade agreements by the U.S. Congressional Budget Office (2016). That report notes, "The structure of stylized models requires researchers to convert all nontariff provisions associated with a trade agreement into an equivalent tariff reduction on specific goods or services. In other words, all nontariff provisions need to be described in the model as if those provisions affect prices systematically.

III. FTA CONTAGION

The past quarter century has seen the continued expansion of economic globalization in the form of increased international trade and investment flows. The past quarter century has also seen the continued expansion in the number of FTAs (and other forms of economic integration agreements), cf., Limao (2016). This expansion has been labeled FTA "competitive liberalization," "interdependence," and even "contagion." The importance of this issue is that decisions by governments on whether or not to form (or expand) an FTA does *not* occur in a vacuum. It seems at every juncture when the United States debates an imminent vote on forming a new FTA that the debate tends to underplay what has been transpiring in the world of FTAs and, more importantly, *where the world is headed in terms of FTAs*. This section is concerned with documenting empirical evidence on the dynamic environment of FTAs. Whether or not TPP is adopted by countries should depend upon the economic implications of forming or not forming the FTA in a world of-in reality-FTA "contagion." The issue of "domino effects" in regionalism was first raised by Baldwin (1995, 1997). Frankel (1997) addressed this issue as well. The immediate concern with respect to the proposed TPP is that-in the presence of clear evidence of China's increasing number of FTAs around the Pacific Rim and in Asia-the potential trade diversion for the United States from *not* moving ahead with TPP would be *significant*.

The purpose of this section is threefold. First, we document statistical evidence that the majority of FTAs are between countries whose economic characteristics are such that-on net-the FTA is welfare improving for those countries (i.e., provides increases in per capita real incomes). Second, we document the existence of *contagion* in FTAs. That is, there is systematic statistical evidence that-every time an FTA is formed in the world-relative prices change, tending to cause countries that face likely trade diversion as a result to either form a new agreement or join an existing one. Third, the degree of contagion in FTAs is so systematic that one can even predict with reasonable accuracy-based upon readily available

However, some effects of nontariff provisions cannot be represented appropriately as a change in tariff rates, making it hard for those models to capture the economic effects of those nontariff provisions. Therefore, that required conversion adds another layer of uncertainty to quantitative estimates of FTAs' economic effects" (p. 28).

country-pair geographic, economic, and political characteristics-the actual *timing* of an FTA formation or expansion based upon FTAs' interdependence (either in-sample o*r* out-of-sample).

First, based conceptually upon a standard, two-good, two-factor, multi-country model of international trade in the spirit of Frankel (1997), Baier and Bergstrand (2004) was the first paper to show for a single year that the probability of two countries having an FTA was higher the larger and more similar in economic size (GDP) were the two countries, the closer they were to each other and the more distant they were from the rest-of-the-world (i.e., most FTAs were "natural" trading blocs), and the larger the difference in their relative factor endowments. Moreover, they demonstrated that each of these characteristics was consistent with larger net welfare gains for the countries from an FTA. Finally, the model predicted correctly 85 percent of the 286 FTAs existing among 1431 pairings of 54 countries in year 1996 and 97 percent of the remaining 1145 pairs with no FTAs. In essence, the country-pairs with higher probabilities of FTAs were the ones that *should have* FTAs, based upon the geographic and economic characteristics consistent with net welfare gains from an FTA.

Second, while Baier and Bergstrand (2004) showed for a single year which country-pairs should have an FTA, the absence of a panel data set with time-series and cross-section data precluded identifying over time if the formation of an FTA between two countries was "caused" (in the statistical sense of "causality") by contagion from other FTAs. Egger and Larch (2008) were the first to show empirically using panel data that pre-existing FTAs increase the probability that a country-pair will enter a bilateral FTA (either form a new one or enter an existing one), and that this effect diminishes with distance. Thus, FTA contagion exists, supporting the idea of domino effects in FTAs as Baldwin (1995) conjectured. The presence of contagion was confirmed in subsequent studies, cf., Chen and Joshi (2010), Baldwin and Jaimovich (2012), and Baier, Bergstrand, and Mariutto (2014).

Third, the strong empirical evidence in favor of FTA contagion, driven by competitive liberalizations, bears relevance for the importance of TPP. Although the United States has FTAs with several large economies in the Pacific Rim-Australia, Canada, Korea, and Mexico-the United States currently lacks FTAs with two of the largest economies in the world: China and Japan. TPP includes Japan in the FTA; however, China is not included. In the context of FTA contagion, China currently has FTAs with four Pacific Rim countries (Chile, Costa Rica, South Korea,

and Peru) and one with Pakistan. China also has bilateral FTAs under negotiation with Australia and Norway. More importantly, China has an FTA under negotiation with Japan and Korea, is negotiating an FTA with the Gulf Cooperation Council, and is among the 16 countries negotiating the potentially largest FTA in Asia and the Pacific, the Regional Comprehensive Economic Partnership (RCEP). With negotiations begun in 2013, RCEP would be an FTA among the ten members of ASEAN, Australia, China, India, Japan, Korea, and New Zealand. The sixteen countries would have 40 percent of the world's population and 24 percent of world GDP. Such an agreement would likely cause *considerable* diversion of exports from the United States, hurting U.S. standards of living as well as U.S. political influence in Asia and the Pacific Rim. The formation of TPP provides necessary leverage to ultimately implement an FTA between the United States and China.

While we do not provide any empirical predictions in this paper of potential trade diversion for the United States from China's increased activity with FTAs in Asia and the Pacific Rim, we do provide some *ex ante* predictions of whether TPP should be formed or not, based upon a representative empirical model of FTA "contagion." As noted above, several papers have provided robust empirical evidence that FTA contagion exists, whereby countries join existing FTAs or form new ones based upon potential trade diversion from previously-formed FTAs. In particular, Bergstrand, Egger, and Larch (2016) provide one such empirical model that predicts in-sample and out-of-sample the actual *timing* of FTA enlargements or formations based upon FTA contagion, or "domino effects." The model can predict correctly in-sample 72 percent of the 1,560 FTA formations among the 10,518 pairings of 146 countries between 1950-2006 (within a 10-year window up to the formation "event").[15]

Based upon the same probability cutoff values as noted in the paper, the model predicted that the United States should have formed an FTA with all 11 proposed TPP members by 1997.[16] Thus, according to a set of robust empirical findings that

[15] In other words, the model can predict correctly 72 percent of the 1,560 events among 335,450 observations in-sample. Using an abbreviated sample through 2000, the model also predicted out-of-sample 82 percent of the events between 2001-2006.

[16] Noting the year of actual entry-into-force (EIF) in parentheses, the FTA with Canada was predicted in 1976 (EIF 1989), Mexico in 1994 (EIF 1994), Singapore in 1995 (EIF 2004), Chile in 1996 (EIF 2004), Australia in 1996 (EIF 2005), and Peru in 1996 (EIF 2009). The other five proposed TPP members were predicted to form FTAs with the United States between 1995-1997.

the path of FTAs in the world is subject to "contagion," these findings suggest that the TPP should be formed, based upon expected trade-diversion impacts of preceding FTAs. In light of rapid developments by China to pursue bilateral and "mega" regional trade agreements and based upon this empirical evidence, it would be prudent for the United States to ratify TPP.[17]

IV. THE ROLE OF FTAs IN REDUCING TRADE-POLICY UNCERTAINTY

One of the notable features of the traditional CGE models discussed earlier is that the trade and real income benefits are estimated using models that *assume complete certainty*. There is nothing in such models to reflect that FTAs-by providing institutional commitments-may also reduce *uncertainty*. Uncertainty is a tax on economic agents, delaying and often diminishing efficient allocations of resources. This overlooked aspect of the benefits of FTAs has been examined systematically in a series of recent papers by Kyle Handley and Nuno Limao, cf., Handley (2014), Handley and Limao (2013), and Handley and Limao (2015). They have explored theoretically and empirically how trade policies reduce uncertainty, creating an *additional* channel augmenting the volume of trade and numbers of exporters, beyond estimates provided by standard CGE models.[18] In fact, some of the observed large *ex post* effects of FTAs on trade discussed earlier may well be explained partly by the reduction in uncertainty among firms from the formation of an FTA.

For instance, Handley and Limao (2015) examine specifically the role of FTAs in reducing uncertainty, which consequently augments trade impacts of FTAs. The theoretical framework is one where firms are heterogeneous and face fixed costs of exporting to various markets. As noted earlier, there is now considerable evidence from various strands of the trade literature that there are significant fixed costs of exporting to various markets. To the extent that the formation of an FTA can also

[17] Much evidence on FTA contagion suggests that most FTAs are building blocs toward more comprehensive trade-policy liberalizations. TPP would appear to balance usefully continued progress on RCEP. Yet a feasible FTA path in the long-run may be a comprehensive FTA in Asia-Pacific as Chinese-U.S. trade and investment continue to deepen.

[18] Even Petri and Plummer (2016) do not include this channel because-like all such CGE models-their model assumes certainty.

reduce uncertainty about tariffs and non-tariff barriers in the future, there is a larger incentive for firms to undertake the "sunk" costs associated with exporting, just as with any investment decision. Using a novel econometric methodology to isolate independently the channel of reduced uncertainty from an FTA from other channels of FTA influence, Handley and Limao (2015) show empirically that FTAs reduce trade uncertainty. The empirical application is to the case of Portugal before its accession to the European Community (EC) in 1986. Using detailed firm-level data, their evidence suggested that Portuguese exporters, before EC accession, had positive probabilities of losing pre-existing preferential tariffs. The EU accession eliminated these positive probabilities of losses. By joining the EC, there was growth in the number of exporters. The contribution to Portuguese growth from reducing trade-policy uncertainty of the accession was substantive. As one measure, the authors note that Portuguese exports to Spain and to the EC in 1987 were 14.7 percent of Portugal's GDP. However, their empirical evidence implied that-if trade-policy uncertainty had been held at its 1985 (pre-accession) level-Portuguese exports to Spain and to the EC in 1987 would have been only 11.5 percent of Portugal's GDP.

In the same spirit, Handley (2014) provides empirical evidence that the reduction in trade-policy uncertainty from the WTO's binding trade-policy commitments was substantive. Without this reduction in policy uncertainty, the growth of numbers of new export product varieties would have been 7 percent lower between 1993 and 2001.

V. THE ROLE OF FTAs IN CONSOLIDATING DEMOCRACIES

In this section, we summarize some statistical evidence that the participation in an FTA by a country can help to *consolidate* democracy in that country. There is historical anecdotal evidence that several newly formed democracies joined established FTAs (in some cases, customs unions or common markets) to help secure these new democracies. For example, following the death of Francisco Franco in Spain in 1975, Spain and Portugal evolved into democracies. Both countries acceded to the European Community in 1986, noting that Spain incurred a failed attempted coup in February 1981. Also, after the fall of the Iron Curtain in Europe and the dissolution of the Soviet Union in 1991, newly formed democracies in Central and Eastern Europe applied for membership in the European Community.

There is now increasing systematic empirical evidence that FTAs help to consolidate democracies. Liu and Ornelas (2014), for instance, provide both a clear theoretical rationale and some strong empirical evidence. While the previous section of the paper described a framework where governments maximize their citizens' welfare, Liu and Ornelas (2014) describe a theoretical framework whereby governments still weigh households' welfare but also face lobbying pressures (often called economic rents) from importers. Empirical evidence suggests that more authoritarian regimes tend to put greater weight on lobbying pressures (i.e., protectionism), cf., Mansfield, Milner, and Rosendorff (2000). In the theoretical model of Liu and Ornelas (2014), groups motivated mainly by economic rents will have lower incentives to seek power if FTAs exist and the cost of eliminating the agreement is too high. FTAs with foreign governments impose a commitment device to reduce the likelihood of future protectionist policies. Since FTAs reduce the amount of future protectionist rents, authoritarian actors have less incentive to seek power. Consequently, an incumbent unstable democracy has an incentive to reduce authoritarian threats by forming FTAs. This is the logic behind Spain and Portugal's accession into the European Community as well as for former Soviet-controlled nations in Central and Eastern Europe to accede into the European Community once the Soviet Union dissolved.

Liu and Ornelas (2014) evaluate their theory using a time-series of cross-sections of FTA formations for 116 countries over the period 1960-2007. Employing duration analysis, as in Bergstrand, Egger, and Larch (2016), they find that more formations of FTAs reduce the probability of a country experiencing a failure of democracy. Moreover, they find evidence that a higher probability of democratic failure induces participation in FTAs. To put some numbers on the economic significance of their results, consider the quantitative effect of a one standard deviation increase in their FTA formation variable. A one standard deviation increase in the share of imports with FTAs decreases the probability of a failure of a democratic regime by 1.7 percentage points, which is not trivial since the average probability of an elimination of a democratic regime is 2.5 percentage points. Their

empirical results are robust to reverse causality, alternative specifications, alternative measures of democratic transitions, and different control variables.[19]

It is important to note that several of the proposed TPP members historically have arguably had "weak" democracies. Such countries include Brunei, Malaysia, and Vietnam, according to Freedom House indexes. Consequently, it is possible that TPP could help enhance the probability of democratic success in each of these countries. Moreover, the United States sacrificed more than 50,000 American lives to fight a war in Vietnam to try to advance democracy in that country. Now, with democracy trying to find a footing, why would the United States not want to try to help advance democracy in Vietnam 40 years after the costly war ended?[20]

VI. THE ROLE OF FTAs IN REDUCING INTERNATIONAL CONFLICTS

Many economists and political scientists have argued for decades that one of the most valuable policy decisions in the post-World War II era was the creation of the (original) European Economic Community (EEC). Many economists saw the potential net trade creation benefits of the EEC, as first vindicated in Aitken (1973) cited earlier as well as a plethora of (properly estimated) subsequent empirical gravity studies (cf., Baier, Bergstrand, Egger, and McLaughlin (2008), Tables 5 and 6). However, others saw the EEC's creation as an opportunity to eliminate war between France and Germany...forever. This monumental event-while just one observation-provides a powerful anecdote that FTAs tend to decrease international conflicts and enhance world peace.

While this message is an impressive one, it is-in reality-just one observation. There is no guarantee that every FTA will tend to reduce conflicts. Moreover, the notion that more trade leads to more peace may not necessarily hold. There are competing factors at play, especially in general equilibrium. Clearer theoretical frameworks and stronger statistical evidence are warranted.

[19] Anticipating concerns that the FTA formation variable may be endogenous, in a robustness analysis the authors use an exogenous instrument for FTA participation, which is based upon the existence of FTA contagion, discussed earlier.

[20] It is important to note that the TPP includes a labor-rights chapter, including steps to promote independent unions and commitments to make labor regulations in Vietnam consistent with those in the United States.

In this spirit, a series of recent papers by Philippe Martin, Thierry Mayer, and Mathias Thoenig provide rigorous theoretical insights and empirical evidence on the idea that FTAs tend to reduce international conflicts, cf., Martin, Mayer, and Thoenig (2008a), Martin, Mayer, and Thoenig (2008b), and Mayer and Thoenig (2016). First, Martin, Mayer, and Thoenig (2008a) examined the impact of bilateral trade of two countries and the probability of a bilateral military conflict. The novel approach of Martin, Mayer, and Thoenig (2008a) is to distinguish changes in bilateral trade openness from *multilateral* trade openness. Countries have experienced greater bilateral openness through policies such as bilateral FTAs. However, such policies have often been implemented concurrently with measures to increase overall trade openness, i.e., the greater globalization of an economy. With this context, Martin, Mayer, and Thoenig (2008a) explored carefully theoretically and empirically these potentially contrasting effects. First, greater bilateral trade openness between two countries increases the relative cost of a bilateral conflict, and should reduce the probability of a bilateral conflict. Using state-of-the-art econometric methods, their empirical evidence confirmed this hypothesis that-all other factors constant-increased bilateral trade openness *did* reduce the likelihood of a bilateral conflict. This then suggests that a bilateral FTA should tend to reduce bilateral conflicts. Second, globalization *in general* of a country can lead to *more* bilateral conflicts. Conceptually, in the spirit of modern theoretical foundations for gravity equations discussed earlier, more (multilateral) globalization derives from a fall in a country's "multilateral price (resistance) index," which tends to increase multilateral trade-but at the expense of bilateral trade, cf., Anderson and van Wincoop (2003). Put simply, an increase in bilateral trade openness (such as through an FTA) will raise the relative cost of a bilateral conflict and reduce its probability, but it lowers the relative costs of a bilateral conflict with *third countries* and may increase the likelihood of military conflicts. In this context, TPP may tend to reduce the likelihood of military conflicts with the members, but *could* increase the probability of a military conflict with a third country not in TPP-such as China.

In a related study, Martin, Mayer, and Thoenig (2008b) address conceptually and empirically the relationships between international trade and (domestic internal) *civil war*. Essentially, the hypothesis is this: more international trade (say, due to an FTA) will tend to raise the relative cost of an international conflict, and thus reduce the probability of an international war. However, more international trade tends to reduce *intranational* trade. A reduction in intranational trade makes the

relative cost of intranational conflict lower, increasing the likelihood of civil war. The authors examine empirically this hypothesis. Because there are competing factors at work, they isolate the effect of trade openness on "high-intensity" civil wars versus "low-intensity" civil wars. Historically, the literature has shown that increased trade openness reduces civil war likelihoods. However, the concern econometrically is an endogeneity issue, which the authors here address. In doing so, they find evidence that the traditional results that more trade openness reduces the probability of civil war holds-but only for "high-intensity" civil wars. They do find evidence that increased openness raises the probability of civil conflict, but only for "low-intensity" conflicts.

Recently, Mayer and Thoenig (2016) examined *specifically* the role of FTAs for influencing international trade and international conflicts between members and then between members and nonmembers. This recent, and not yet published, study actually brings much of the analysis and discussion of this paper together. First, Mayer and Thoenig (2016) provide an *ex post* analysis of the trade and economic welfare effects of the East African Community (EAC) trade agreement using a "New Quantitative Trade" model, in the spirit of Head and Mayer (2014). Second, they then explore the impact of the EAC agreement on the likelihood of military conflicts among member countries and on the likelihood of military conflicts between member and non-member countries.

Regarding the first goal, the authors find that the EAC increased members' trade by *204 percent.* While that number may appear large, there is a rational economic explanation for the result. In their study, they separate three partial trade impacts (PTIs): the average effect of all FTAs (41 percent), the additional PTI of membership in the EAC *customs union* launched in 2005 (121 percent), and the additional PTI associated with the 2010 deepening of the agreement (42 percent). Such numbers accord well with the analysis of *ex post* agreements summarized earlier in section II. 3. Moreover, using the Head and Mayer (2014) methodology for calculating general equilibrium welfare effects, as detailed in the Appendix, the authors found that the EAC increased members' economic welfare by 0.5 of one percent of real GDP.

The second goal was to estimate *ex post* the effect on the probabilities of military conflicts within their countries, among members, and then between members and non-members. First, the authors found that the probability of an intranational military conflict increased due to EAC (as suggested by our earlier discussion) by 0.8-4.7 percent (depending upon the country). Second, they found that the probability

of an international military conflict among EAC members *decreased* by 10.8-13.0 percent, consistent with expectations. Third, they found that the probability of an international military conflict between members and neighboring non-EAC-members increased by 0.01 to 4.5 percent.

Thus, there is evidence that-while FTAs may well reduce the likelihood of military conflicts between members following the FTA formation-there may be negative externalities created for intranational conflicts as well as for international conflicts between FTA members and non-members.

VII. CONCLUSIONS

The purpose of this paper has been to offer five reasons for why the expected net benefits for the United States from the TPP may be larger than the gains articulated in typical CGE analyses by economists, such as in ITC (2016). First, most of the "New Quantitative Trade" models that have surfaced in recent years, and summarized in Head and Mayer (2014) and Costinot and Rodriguez-Clare (2014), argue that the gains from an FTA may turn out to be *much larger* than traditional CGE models predict largely due to recent models incorporating an "extensive margin" of trade; ITC (2016) omits by construction additional exports of new firms and products (extensive margin) in response to an FTA due both to lower tariff rates and also lower export fixed costs. We showed here that FTAs typically increase members' trade by about 60 percent-which is *10 times* the ITC (2016) *ex ante* estimate of 6 percent from TPP. Second, there is now strong empirical evidence from studies over the last decade that FTA *contagion* exists; every time a new FTA is formed, all relative prices in the world change, causing countries' governments to form new (or enlarge existing) FTAs. We showed that-based upon one such model explaining FTA contagion-TPP should have been formed in the late 1990s, implying considerable foregone real income gains for member countries' households. Third, we discussed that there is now considerable empirical evidence supporting that additional gains from FTAs-ignored in typical CGE analyses-include helping to reduce firms' uncertainty regarding future trade policies, helping to consolidate (new or unstable) democracies, and helping to reduce international conflicts among member countries.

We take this opportunity to conclude by quoting the still relevant conclusions of an article published nearly a decade ago, Baier, Bergstrand, Egger, and McLaughlin

(2008), "Do Economic Integration Agreements Actually Work? Issues in Understanding the Causes and Consequences of the Growth of Regionalism" (pp. 492-493):

> What do these empirical results mean for better understanding the "latest wave" of regional trade and cooperation agreements? National policy makers around the world, operating in an increasingly competitive global environment, face strong pressure from their national constituents (firms, households) to maximize these constituents' economic status (profits and consumer welfare, respectively). Such policy makers are likely making decisions about trade policies in a competitive environment. The proliferation of bilateral and regional FTAs in the world economy likely mirrors the proliferation of bilateral and regional trade in the world economy. The world market for goods and services is met efficiently by bilateral trade flows. Correspondingly, there has likely emerged a world "market" for bilateral and regional trade policies/institutions to facilitate the bilateral exchange of products, owing largely to the gains from specialization and the welfare benefits of product diversity for final goods producers (i.e., product differentiation in intermediates) and consumers (i.e., product differentiation in final goods).
>
> The vast bulk of FTAs are among countries: (1) that are close in distance and consequently share low bilateral transaction costs, but are also remote from the rest of the world; (2) that are large and similar in economic size and consequently benefit from greater specialization in production and greater variety in terms of consumption; and (3) that differ in relative factor endowments, benefitting from the exchange of traditional comparative advantages. Our probit estimates of the determinants of FTAs confirmed this. Hence, the vast bulk of FTAs are among countries that trade extensively; that is, countries that have formed FTAs have chosen well.
>
> Traditional *ex ante* estimates of the trade and economic welfare gains from FTAs have often suggested relatively modest economic benefits. Much anecdotal evidence from policy makers suggests that the anticipated economic gains are much larger than traditional CGE models have implied. However, sufficient time has now passed-and econometric and theoretical developments advanced-such that policy makers can now examine with more precision the *ex post* effects of FTAs on trade patterns. The evidence in this paper suggests that the trade effects of membership in the EEC/EC/EU have been much larger than those suggested by *ex ante* considerations *and* much larger than even earlier empirical estimates using cross-sectional gravity equations suggested (cf., Frankel (1997)). One reason is that the approach taken here does not require measurement of the "complex and elaborate" barriers (beyond tariff cuts) that FTA agreements often liberalize. The results here suggest that EEC/EC/EU membership over the past 40 years (1960-2000) is of an economically significant

magnitude and even larger than that postulated a decade ago in Bayoumi and Eichengreen's excellent analysis of EEC effects between 1957 and 1972 (cf., Bayoumi and Eichengreen (1997)).

Policy makers beyond Europe have likely drawn lessons from the apparent success of the major economic integration agreement experiment of 1957, the Treaty of Rome. They have likely pursued similar expected trade enhancements from bilateral and regional FTAs. And the evidence in this paper suggests that their "economic expectations" have largely been correct. Our results suggest that other FTAs that have formed over the 1960-2000 period have also yielded "average treatment effects" of nearly the same magnitudes as the trade effects of EEC/EC/EU membership.... Naturally, the deeper integration of the EU has likely boosted the trade effects of that particular agreement relative to most other agreements, which have been FTAs.

Our overall message is twofold. First, *ex post* empirical evidence is consistent with the notion that policy makers are operating in a competitive environment, pursuing economic integration agreements in "natural cases" where the members already trade extensively (based upon bilateral, multilateral and world levels of GDP and trade costs). Second, after accounting for the pitfalls associated with the "endogeneity of country pairs that select into FTAs," the vast bulk of FTAs have tended to augment members' trade by about 100 percent over a 15-year period. This is consistent with anecdotal evidence from policy makers that the economic benefits from FTAs are much larger than conventional *ex ante* economic analyses have previously suggested.

Appendix

Head and Mayer (2014) provide a transparent summary of the methodology for computing welfare changes using a standard new quantitative trade model in the case of using dummy variables for trade-cost changes. An important advantage of using FTA dummies and partial treatment effects to capture FTA liberalizations is that *ad valorem* tariff-rate reductions from FTAs are poorly measured and reductions in policy export fixed costs from FTAs are even more difficult to measure, especially for the scope of countries often considered.[21]

The theoretical models in Head and Mayer (2014) and Baier, Bergstrand, and Clance (2016) yield structural gravity equations. Let any variable (say, v) with a hat denote the ratio of the new equilibrium value divided by the initial equilibrium value (i.e.,$\hat{v} = v'/v$), as in Head and Mayer (2014); denote this ratio as the "change." We know that in this class of new quantitative trade models the change in the share of country *j*'s expenditures on country *i*'s goods $(\hat{\lambda}_{ij})$ can be expressed as:

$$\hat{\lambda}_{ij} = \frac{\hat{Y}_i^{\epsilon}\hat{\phi}_{ij}}{\sum_{k=1}^{N}\lambda_{kj}\hat{Y}_k^{\epsilon}\hat{\phi}_{kj}} \tag{1}$$

where Y_i denotes nominal gross output of country *i*, $\hat{\phi}_{ij} = \exp(\beta_{ij})$ where β_{ij} is the estimated heterogeneous partial treatment effect estimated as in Baier, Bergstrand, and Clance (2016), and $\epsilon < 0$ is an *ad valorem* trade-cost elasticity.

Factor-market clearing implies that $\hat{Y}_i = \frac{Y_i'}{Y_i} = \left(\frac{1}{Y_i}\right)\sum_{k=1}^{N}\lambda_{ik}'X_k'$, where X_i denotes total expenditures in *i*. In the presence of trade imbalances, then $Y_i \neq X_i$; however, for simplicity, we will assume, as in section 2 of Costinot and Rodriguez-Clare (2014), $Y_i = X_i$ for all $i = 1, ..., N$. Substituting equation (1) into the factor-market clearing equation yields:

[21] The severe limitations associated with computing *ad valorem* values of non-tariff measures are discussed extensively in Anderson, Bergstrand, Egger, and Francois (2008), methodology used for the early European Commission study of the potential economic effects of a reduction in non-tariff measures for an envisioned Transatlantic Trade and Investment Partnership, cf., Berden, Francois, Tamminen, Thelle, and Wymenga (2009).

$$\hat{Y}_i = \frac{1}{Y_i} \sum_{j=1}^{N} \frac{\lambda_{ij} \hat{Y}_i^{\epsilon} \hat{\phi}_{ij}}{\sum_k \lambda_{kj} \hat{Y}_k^{\epsilon} \hat{\phi}_{kj}} \hat{Y}_j Y_j \quad (2)$$

Following Head and Mayer (2014), the method for calculating general equilibrium welfare changes for country *j* for any one FTA between *i* and *j* is:

1. Retrieve the estimates of heterogenous $\hat{\phi}_{ij}$ from panel regressions, cf., Baier, Bergstrand, and Clance (2016).

2. Using the initial bilateral trade-share matrix (λ_{ij}), a value for initial gross output in each country (Y_i), the estimated $\hat{\phi}_{ij}$, and a chosen value for ϵ, solve the *N* system of equations (2) to derive the *N* values of $\hat{Y}_i$. Substituting these $\hat{Y}_i$, the estimated $\hat{\phi}_{ij}$, and the value of ϵ into equation (1), solve for the $\hat{\lambda}_{ij}$. Iterate using a dampening factor until the $\hat{\lambda}_{ij}$ stop changing.

3. The general equilibrium welfare change for *j* is $\hat{\lambda}_{jj}^{1/\epsilon}$.[22]

Three important caveats are noted. First, in the case of reciprocal bilateral FTAs (such as most FTAs, common markets, etc.), one has to account simultaneously for the trade-cost change $\hat{\lambda}_{ji}$ in computing the general equilibrium welfare change. Second, one needs initial values of gross output; GDP is unfortunately a "value added" measure of national output. As Head and Mayer (2014) note, although aggregate bilateral international trade flow data are readily available, only few data sets provide data on gross output, and usually for a small number of countries, short time series, and often just for limited sectors (e.g., manufacturing). Use exogenous values of *intranational* distances and relevant dummies (i.e., common language, etc.) to "impute" intranational trade from a gravity equation, from which gross output is the sum of all intranational trade and exports. Third, choose a value for ϵ; Head and Mayer (2014) use -5.

[22] The variable-trade-cost elasticity (ϵ) is the relevant elasticity for the welfare calculation since the variations in $\hat{Y}_i$ and $\hat{Y}_k$ are generated by nominal wage-rate changes.

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