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Global trade in final goods and intermediate inputs: impact of FTAs and reduced "Border Effects"

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Abstract

International trade in manufacturing goods has risen strongly over the past decades, contributing to the expansion of global value chains (GVCs). This paper studies how two factors contributed to this rise since 1970: (i) declining "border effects" that are arguably related to the ICT revolution that started around 1985, and (ii) the implementation of Free Trade Agreements that have gotten deeper over time. We take advantage of the identification of the time dimension in a panel setting to capture the emergence of GVCs by disentangling domestic and international trade in final goods and intermediate inputs. According to our results, diminished border effects account for the bulk of the increase in international trade in manufactured goods. The cost of a national border is estimated to have fallen by around 10% per year for total manufacturing trade since the 1970s. The decline has been 13% per year for exports of final goods and 8% for intermediate inputs, highlighting the importance of reduced border effects for enabling international trade in the age of GVCs. Moreover, we show that it is important to control for *different* border effects for final goods and intermediate inputs when estimating the trade impact of FTAs in gravity equations. With this enhancement, our results suggest that FTAs increase trade by 54% after ten years. We also find evidence that FTAs that are more recent have a greater trade effect than those signed in earlier periods.

***JEL codes*:** F13, F14, F15, F23

***Keywords*:** Border effect, Free trade agreements, international trade, global value chains.

Non-technical summary

The world has experienced an unprecedented rise in global trade over the past decades. Exports and imports as a share of global GDP rose from 27% in 1970 to 61% in 2008 and reached 58% in 2018. Over this period, the increasing fragmentation of production across countries, with trade in intermediate goods, led to the expansion of complex supply chains. This process was made possible thanks to advances in information and communication technology (ICT), reduced transport costs, and trade liberalization agreements. In this paper, we study these reduced trade frictions and their implications for trade in final and intermediate goods in the manufacturing sector.

We use the concept of "the border effect" to capture the trade costs related to international trade and compare them to domestic trade costs. While there is evidence that the reduction of border effects and the introduction of FTA expanded international trade, few have jointly examined their differential impacts on trade, and no one has to our knowledge explored the implications for trade in final goods and intermediate inputs. We provide an answer to this question by using data over a longer period (1970-2009). Our results are important because they provide a sense as to how important these effects have been in recent decades and the timing of the changes. One essential ingredient in our analysis is the use of data for domestic and international trade. By combining both types of data, we capture globalization developments in a very detailed manner.

According to our results, reduced border effects have been the prime driver of the increase in international trade in manufacturing goods since the 1970s. We estimate that the cost of a national border has fallen by around 10 % per year since 1970 for total exports, whereas it has declined by 13% for exports of final goods and 8% for intermediate inputs. The fact that international trade in final goods benefited more from the lowering of trade costs is likely due to the portion of imports of intermediate inputs from earlier steps of the supply chain, which generates a positive cascade effect. We identify a differential impact of reduced border effects on the two types of goods that coincides with the ICT Revolution that started in the period 1986-1990 and drove the expansion of global value chains. The bundle of technological advances during this period offers a deep motivation and timing for the reduction in trade costs and diminished border effects.

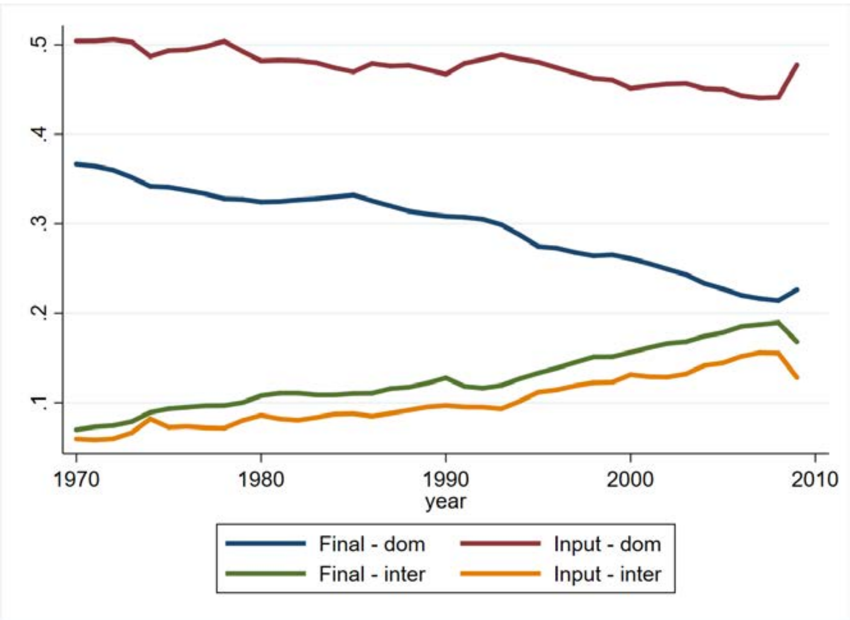
We also take the opportunity to show that trade agreements have changed in nature

over the decades. We find evidence that FTAs that are more recent have a greater trade effect than those signed in earlier periods. In a world where policy-related trade costs have fallen, other trade barriers become more important. Lowering these trade barriers have likely less to do with traditional trade policies and more to do with productivity-enhancing technological innovations that allow goods to flow more freely across borders. How efficient goods can move through these systems to their final destinations is a key determinant of trade opportunities. As supply chains become more globally dispersed, the quality of logistics services can determine whether a country can successfully participate in the global economy.

1 Introduction

The world has experienced an unprecedented rise in global trade over the past decades. Exports and imports as a share of global GDP rose from 27% in 1970 to 61% in 2008. While the trade share of GDP has declined slightly to 58% in 2018, it is markedly higher than in the previous five decades.[1] Rising fragmentation of production across countries over this period led to the expansion of complex value chains and spurred further global integration. This process was named the "second unbundling" by Baldwin (2016) and was made possible thanks to advances in technology such as information and communication technology (ICT), reduced transport costs and trade liberalization (Baldwin, 2012).[2] Figure (1) provides a clear view of the rapid expansion of global trade, both in final goods and intermediate inputs *relative* to domestically traded goods.

Figure 1: Share of international and domestic trade in manufacturing by type of good



Note: total output is divided into international and domestic trade flows in final and intermediate inputs.
Source: Input-output tables from Johnson and Noguera (2017). See section 3 for details.

Since in particular the middle of the 1990s, both goods types have risen much faster than their domestic counterparts.[3] However, international trade in final goods has expanded much

[1] The source for this figures is the World Bank's World Development Indicators (WDI).
[2] Baldwin (2016) refers to the separation of production and consumption as globalization's first unbundling.
[3] As will become clearer later in the paper, using both international trade and domestic trade data follows

more quickly than intermediate inputs relative to domestic sales. How can we explain this phenomenon?

First, trade costs that are not related to trade liberalization (Melitz, 2003) can be gauged through the concept of the border effect. It was first documented by McCallum (1995) who showed a significant home bias in Canadian-US trade.[4] The bias is usually considered to embody a host of factors, such as preferences (Morey, 2016). It has been also understood as the inherent costs of moving a good or service across a border. For example, Anderson and van Wincoop (2003) used international border dummies to control for international trade costs relative to domestic trade costs in a cross-sectional gravity equation with international and domestic sales.[5]

Second, trade liberalization and Free Trade Agreements (FTAs) have brought policy-related trade costs to a fraction of what they were in the past and thus stimulated international trade. Although they are still unduly high in some sectors, markets, and countries, the overall picture is one of marked decline over time. However, it was not until fairly recently that economists could actually claim reliable empirical support for the strong positive effect of FTAs.[6] Baier and Bergstrand (2007) addressed the econometric issues common in the earlier literature and showed that the quantitative estimates of the average effect of an FTA on bilateral trade is positive, strong (around 100 percent) and significant.[7]

While these two factors; the reduction of border effects and the introduction of FTAs have expanded international trade, few have jointly examined their differential impacts on trade and no one has to our knowledge explored the implications for trade in final goods and intermediate inputs.[8] We provide an answer to this question by estimating separately the border effect and the effect of FTAs for final goods and intermediate inputs over a

more strictly the structural gravity theory, which requires both types for gravity estimations.

[4]This finding gave rise to the puzzle of "home bias in trade" mentioned by Obstfeld and Rogoff (2000).

[5]But the empirical estimates of the size of the border effect varies, and some even question the existence of it (Gorodnichenko and Tesar, 2009).

[6]In a meta-analysis, Cipollina and Salvatici (2010) find a range of estimates between 12 percent and 285 percent.

[7]Bergstrand et al. (2015) include a useful discussion on the preferred specification of the empirical gravity equation to obtain reliable empirical estimates of FTAs and border effects. It should include exporter-year, importer-year and country-pair fixed effects to control for endogenous prices, multilateral resistance terms, and time-invariant pair-specific effects. It should be estimated with a Poison Pseudo Maximum Likelihood estimator and include domestic as well as international trade flows and international border dummies to capture declining bilateral trade costs

[8]Bergstrand et al. 2015 explore the role of diminished border effects jointly with FTAs for total trade between 1990-2002. However, their limited time sample does not capture the trend decline in border effects and they do not disentangle trade in final goods and intermediate inputs.

longer period (1970-2009). Our results are important because they provide a sense as to how important the reduction in different barriers to international trade have been in recent decades.

One essential ingredient in our analysis is the use of data for domestic and international trade. By combining both types of data, we capture globalization developments as we evaluate the effects of reduced barriers to international trade *relative* to the effects of domestic trade costs. We apply state-of-the-art and theory-consistent empirical gravity methods (Yotov et al., 2016) to provide precise estimates of the two trade effects. According to our results, reduced border effects have been the prime driver of the increase in international trade in manufacturing goods since the 1970s. We estimate that the cost of a national border has fallen by around 10 % per year since 1970 for total exports, whereas it has declined by 13% for exports of final goods and 8% for intermediate inputs.[9] Bergstrand et al. (2015) also estimate that the cost of a national border have decreased by around 2.5% per year between 1990-2002 for total trade. However, they only consider a short period when the "second unbundling" of globalization was already under way. Moreover, they do not consider that the border effect might be different for trade in final goods or intermediate inputs. It is important to distinguish between these different types of goods with the continuous rise of trade in global value chains (Feenstra 1998 and Baldwin and Taglioni 2014).

That international trade in final goods have benefited more from the lowering of trade costs is likely due to bilateral gross final goods trade embodying a larger portion of gross imports of intermediate inputs from earlier steps of the supply chain than intermediate inputs themselves.[10] These final goods must bear the full burden of trade costs (due to technological hindrances) added in previous steps in production.[11] The differential impact of reduced border effects on the two types of goods coincides with the ICT Revolution that started in the period 1986-1990 and drove the "second unbundling" of globalization and the expansion of global value chains (Baldwin, 2016). The bundle of technological advances during this period offers a deep motivation and timing for the reduction in trade costs and diminished border effects.[12]

[9] That trade costs have fallen more for final goods than intermediate inputs is also found by Antras and Chor (2018).

[10] Interemdiate goods also emby intermediate goods from previews trade flows.

[11] Rouzet and Miroudot (2013) show that tariffs and other trade costs accumulate and that even small trade costs can have adverse consequences when inputs are part of complex value chains that finally constitute final products.

[12] The ICT revolution lowered transport costs and was based on low computing and data storage costs,

With our new estimates, we take the opportunity to test some procedures and revisit assumptions made in the literature estimating the impact of FTAs. For instance, we show that it is important to control for the *different* border effects for final goods and intermediate inputs. Our estimates that control for the border effect and domestic trade suggest that an FTA raises international trade by 54% after 10 or more years. But trade agreements have changed in nature over the decades. Rodrik (2018) illustrates this by comparing the length of the FTA between US and Israel that went into force in 1985 and the FTA between the US and Singapore that went into effect in 2004. Therefore, we also focus on the evolution of the FTA effect and find evidence that FTAs that are more recent have a greater trade effect than those signed in earlier periods.

In a world where policy related trade costs have fallen, other trade barriers become more important. Lowering these trade barriers have likely less to do with traditional trade policies and more to do with productivity enhancing technological innovations that allow goods, tasks and services to flow more freely across borders. How efficient goods can move through these systems to their final destinations is a key determinant to a country's trade opportunities. As supply chains become more globally dispersed, the quality of a country's logistics services can determine whether it can participate in the global economy.

The rest of the paper is structured as follows: Section (2) introduces the structural framework that we use and derive our empirical approach. Section (3) outlines the data used. Section (4) presents and discusses our results and Section (5) performs a number of robustness checks. Section (6) concludes.

2 Framework and empirical approach

Our empirical approach is derived from a structural gravity equation able to capture the different two trade barriers we are analyzing. The impact of the border effect and FTAs is studied with a PPML estimator that properly maintains the structural approach of the gravity equation and uses a high dimensional set of fixed effects that controls for the potential

advances in the transmission of information, and the reorganization of production with new working methods and workplace organizations. This made it easier, cheaper, faster, and safer to coordinate separate complex activities spatially. The key here is not cost per se. Air shipments have been getting cheaper, but the speed is associated with certainty and this matters. When things go wrong in an international production network, air cargo allows the off-shoring firms to fix it in days. Finally, one should not forget about the strong reduction in transportation costs due of the introduction of the container in the 1960s that grew in importance in the 1970s and 1980s.

confounding factors that could bias the results. Also, the inclusion of the large set of fixed effects will make possible to track the evolution of the effect on trade of FTAs over time.

2.1 Structural gravity

Structural gravity models are widely used in the trade literature and Head and Mayer (2014) show that the model is consistent with a very large number of theoretical foundations. To guide our analysis, we extend the gravity equation in Arkolakis et al. (2012) to account for different kinds of trade barriers (structural parameters) and their effect on trade in final goods and intermediate inputs. Value X_{ij}^k of country j's total imports in good k from country i is equal to:

$$X_{ij}^k = \chi_{ij}^k \left(\frac{\tau_{ij,FTA}^k \quad w_i^k}{P_j^k} \right)^{1-\sigma^k} \quad E_j^k \tag{1}$$

where E_j^k is the total expenditure in good $k \in \{final,\ input\}$ in destination country j and P_j^k is the associated price index for good k in country j.[13] w_i represent the exporter's wage and any comparative advantage factor.[14] Regarding the trade barriers, the term $\tau_{ij,FTA}^k \geq 1$ are the iceberg trade costs between country i and country j, that is those that are altered by an FTA. It includes not only tariff but also non-tariff measures that can hamper international trade.

The trade cost terms χ^k is a function of, and only of, structural parameters distinct from $\tau_{ij,FTA}^k$. It includes all kinds of trade frictions (not related with tariffs and non-tariff measures that are imposed on traded goods in the destination) that reduce international trade in comparison to domestic flows. This is the border effect. Reductions in both trade cost terms, τ^k and χ^k, are expected to have a positive effect on trade. Note that the good type dimension, $k \in \{final,\ input\}$, is considered because all terms are potentially different for each type of good. It will be important for the subsequent analysis to make clear how effects are captured in relative terms to domestic trade flows. Putting the previous equation

[13] Note that it is important to distinguish between final goods and intermediate inputs when controlling for this total expenditure in destination (Baldwin and Taglioni, 2014). While for final goods it is related to total final demand at the sector level, for intermediate inputs it is related to the total expenditure on intermediate inputs, also at the sector level.

[14] These terms represent inward and outward multilateral resistances in a general equilibrium framework, as in Anderson and van Wincoop (2003).

in relative terms to total domestic sales we get:

$$\frac{X_{ij}^k}{X_{jj}^k} = \frac{\chi_{ij}^k}{\chi_{jj}^k} \left(\tau_{ij,FTA}^k \frac{w_i^k}{w_j^k} \right)^{1-\sigma^k} \tag{2}$$

An interesting question would be to determine whether, and i so to what extent, trade barrier parameters τ^k and χ^k are correlated. The acceleration of cross-border trade usually leads a country to engage in more formal trade alliances with its key trading partners. As Baier and Bergstrand (2007) explain, trade policy is not an exogenous variable. Rather, countries likely select endogenously into FTAs, perhaps for reasons unobservable to the econometrician and possibly correlated with the level of trade and other factors affecting trade barriers.

2.2 Empirical approach

We estimate the structural gravity equation as follows:

$$X_{ij,t} = \exp\left(\sum_{s=0}^{10+} \beta_{fta,t-s} FTA_{ij,t-s} + \eta_{i,t} + \psi_{j,t} + \overrightarrow{\gamma_{ij}} \right) + \varepsilon_{ij,t} \tag{3}$$

where $X_{ij,t}$ is the bilateral exports from country i to country j at time t.[15] $FTA_{ij,t-s}$ is an indicator that takes the value one if a country-pair has a FTA, or stronger economic integration agreement, in place in a given year t. We include up to ten lags ($s = 10+$) of the FTA indicator to capture the dynamics of this effect, with the $\beta_{fta,t-10+}$ coefficient capturing the "long-term effect" (after 10 or more years).[16] We also use a rich set of fixed effects that control for many confounding factors that can bias the FTA-coefficient: importer-time fixed effects, $\psi_{j,t}$, which captures the time-varying expenditure term in the destination trading partner (E_j^k); while the exporter-time, $\eta_{i,t}$, captures the time-varying comparative advantage term of the origin country (w_i).[17] These fixed effects also absorb any price deflator index and exchange rate fluctuations over time (P_j^k).[18]

[15] We omit the sector index since we focus on the manufacturing sector.

[16] Typically, FTAs are phased in over 5 to 10 years (Baier and Bergstrand, 2007). The lagged effects on bilateral trade flows also stem from the fact that trade responds slowly to terms-of-trade changes.

[17] These importer-time and exporter-time fixed effects capture the multilateral resistance terms of a general equilibrium framework, as in Anderson and van Wincoop (2003).

[18] Baldwin and Taglioni (2014) discuss in detail the mistakes to be avoided in gravity equation estimations, like implications of inappropriate deflation of nominal trade values. Their most preferred econometric specification is one with non-deflated trade values. As they explain, in addition to accounting for the multilateral resistances in a dynamic setting, fixed effects also eliminate any problems arising from the incorrect deflation

Finally, the country-pair fixed effects, $\overrightarrow{\gamma_{ij}}$, control for the potential endogeneity of FTAs that arises from the fact that country pairs signing FTAs might be more likely to trade in the first place.[19] Moreover, the fact that we include all these fixed effects eliminates concerns about potentially autocorrelated errors in a panel regression. Note that after the inclusion of these fixed effects, the only variability that we use stems from the country-pair time-varying factors like the effect of the introduction FTAs.

We estimate Equation (3) with a Poisson-Pseudo Maximum Likelihood (PPML) estimator. It allows for zero trade flows across countries and avoids inconsistent estimations as a consequence of the log-linearizing the error term (Silva and Tenreyro, 2006).[20] The use of high dimensional fixed effects specification in the PPML estimation is possible thanks to the algorithm developed by Zylkin (2017).

There is one last potential econometric issue that needs to be considered. The literature estimating the impact of FTAs effect has usually followed the argument made by Cheng and J.Wall (2005) that "fixed-effects estimations are sometimes criticized when applied to data pooled over consecutive years on the grounds that dependent and independent variables cannot fully adjust in a single year's time". To avoid this critique, Baier and Bergstrand (2007) use 5-year intervals, Anderson and Yotov (2016) use 4-year intervals, and Trefler (1993) uses 3-year intervals. We use consecutive year's data to guarantee the precision of all our estimations. Nevertheless, to make our results comparable and to make sure that such an econometric issue does not affect our results, we also report all our results using 5-year intervals data. We show that relaxing the constraint of using year interval data (limiting the number of observations we can use) does not affect our results. It is very likely that Cheng and J.Wall (2005)'s argument was justified when the econometric specifications did not include lags.[21]

Since we cover a longer period than Bergstrand et al. (2015) and relax the heavy restriction recommended by Cheng and J.Wall (2005) to use data in three or five years interval,

of trade.

[19]The main contribution made by Baier and Bergstrand (2007) was to show that not including the country-pair fixed effect bias the FTA coefficient towards zero.

[20]The log-linearization of zeros is infeasible, and the expected value of the log-linearized error will, in general, depend on the covariates, and hence OLS will be inconsistent. Using robust or clustered standard errors affect the estimated standard errors, but it does not effect at all on the estimates of the parameters. Therefore, the log-linear model will generally be invalid with or without the robust or clustered standard errors. PPML, on the other hand, delivers estimates of the parameters that are consistent under general conditions. See Silva and Tenreyro (2006) for more details.

[21]Remember that we allow the FTA variable to have a lagged effect of up to 10 years, similar to the more recent contributions to the literature.

we can look at the timing of the diminished border effects and gain some additional insights into its drivers.

2.2.1 Trade in final goods and intermediate inputs

The emergence of global value chains in the past decades has been characterized by the increasing importance of trade in intermediate inputs. Caliendo and Parro (2015), building on the work of Eaton and Kortum (2002), is an example of a structural gravity model which incorporates trade in intermediate inputs in the evaluation of the welfare effects of tariff changes. In our case, we are interested in the overall impact of reduced border effects and FTAs, both tariffs and non-tariff measures. As will be explained in more detail in the data section, we use international input-output tables that naturally differentiate between trade in final goods and intermediate inputs.

To carry out the analysis, we estimate Equation (3) using data for each type of trade. This is required to test the significant differences of the effects for both final goods and intermediate inputs. Therefore, we use data for both types of goods in the same estimation by extending our econometric approach and interacting the FTA variable with a dummy for a given type of good (intermediates in our case), as follows:

$$
\begin{aligned}
X_{ij,t}^{k} = \exp\Bigg(& \sum_{s=0}^{10+} \beta_{fta,t-s} FTA_{ij,t-s} + \sum_{s=0}^{10+} \beta_{fta-input,t-s} FTA_{ij,t-s} * Input_{ij,t} \\
& + \eta_{i,t}^{k} + \psi_{j,t}^{k} + \overrightarrow{\gamma_{ij}^{k}} \Bigg) + \epsilon_{ij,t}^{k}
\end{aligned} \tag{4}
$$

Note that Equation (4) expands the set of fixed effects accordingly to the observation unit, which now is bilateral trade flows in a given type of good and year. All fixed effects are also allowed to vary by type of good (finals goods or intermediate input) identified by k. Therefore, the origin-time fixed effects become origin-type-time effects, the destination-time fixed effects become destination-type-time effects, and pair-specific terms become origin-destination-type specific. This is particularly important for the destination-time fixed effect that captures the total expenditure in the destination, and it is expected to be different for final goods and intermediate inputs (Baldwin and Taglioni, 2014).

2.2.2 The border effect and use of domestic trade data

On top of using bilateral international trade data, we also include domestic sales. Fally (2015) explains that the gravity model is micro-consistent to the extent that domestic and international trade flows sum up to output for each source country and sum up to expenditures for each destination country. Otherwise, the multilateral resistance indexes implied by the fixed-effects with Poisson-Pseudo Maximum Likelihood (PPML) would not satisfy the structural gravity constraints based on actual output and expenditures. In other words, the equivalence between structural gravity and gravity with fixed-effects and a PPML-estimator would not hold.

In addition, Bergstrand et al. (2015) argue that estimations of the FTA-effect may be biased upward due to inadequate control for time-varying exogenous unobservable changes in bilateral export costs. Fixed export costs are especially important considering their prominence in the "New New" trade theory (see for instance Melitz 2003). Bergstrand et al. (2015) find evidence of this bias and report a declining effect of "international borders" on world trade.

But the motivation for also including domestic trade data is stronger in our case. It is not only about being consistent with the theoretical foundations of the gravity equation and controlling for time-varying exogenous unobservable changes in bilateral export costs. We use it as the identification strategy to estimate the potentially different effect of the reduction of trade barriers (other than those altered by FTAs) on final goods and intermediate inputs. To make this point clear, we review our econometric specification to consider both FTAs and the border effect:[22]

$$
\begin{aligned}
X_{ij,t}^{k} = \exp\Bigg(& \sum_{s=0}^{10+} \beta_{fta,t-s} FTA_{ij,t-s} + \sum_{s=0}^{10+} \beta_{fta-input,t-s} FTA_{ij,t-s} * Input_{ij,t} \\
& + \sum_{t \neq t_0}^{T} \beta_{b,t} B_{i \neq j,t} + \sum_{t \neq t_0}^{T} \beta_{b,t} B_{i \neq j,t} * Input \\
& + \eta_{i,t}^{k} + \psi_{j,t}^{k} + \overrightarrow{\gamma_{ij}^{k}} \Bigg) + \epsilon_{ij,t}^{k}
\end{aligned}
\tag{5}
$$

First, note that in Equation (5) we include a set of $T-1$ (time iteration) terms of a border

[22] domestic trade flow data is naturally available in international input-output tables used for global value chains analysis. See the data section for more details.

dummy that takes the value one if the bilateral trade flow is between different countries and for a given year.[23] T is the total number of years available in the sample and the border dummy itself is not included in the regression because it is a non-time-varying characteristic captured by the country-pair fixed effects. All the $B_{ij,t}$ terms account for average (across all pairs of different countries) changes in unobservable bilateral (fixed and variable) export costs, that are not associated with FTAs.

Also note that with the inclusion of domestic trade flows, international trade barriers' effects are measured relative to domestic trade flows. This leads us to wonder about the nature of the trade barriers included in the border effect, and what factors could have led to its change. ICT advances are arguably behind the fragmentation of production across countries by allowing to move ideas across countries, leading to the increasing importance of intermediate inputs in international trade. Nevertheless, Baldwin (2016) does not consider the potentially different effect of ICT advances on trade in final goods and intermediate inputs.

While final goods are produced to be consumed, intermediate inputs are designed to be part of further production processes that might require certain specificities and more importantly, a certain degree of coordination between the different stages of production. Therefore, we conjecture that while we should expect a positive effect of a reduction in the border effect on both types of trade, final goods could have benefited more from the same reductions at the bilateral level. As explained in the motivation section, this is not in contradiction with the well-known expansion of global value chains, since the effect of FTAs and the border effect reduction is expected to be positive for both final goods and intermediate inputs.

To capture the potential different effect from reduction in trade frictions on final goods and intermediate inputs, we also include the $T-1$ interaction of the border-time dummies with a intermediate input dummy, $Input_{i \neq j}$, as we did with the FTA indicator to capture the other potentially different effect on intermediate inputs from FTAs.

[23] The border dummy for the first year of the sample is always omitted.

3 Data

3.1 Trade in final goods and intermediate inputs

Quantifying reductions in trade barriers and identifying the timing that have been driving the expansion of global trade and global value chains, while also differentiating between final goods and intermediate inputs, is very demanding in terms of the data. Our analysis requires coverage as long back in time as possible. Moreover, we also require international and domestic trade flows. Global input-output tables that track trade between, as well as within, countries have recently been made available by different sources (see for instance initiatives like WIOD, OECD-TiVA, and EORA). Unfortunately, the time coverage of these data often starts in the mid-1990s and is thus too limited to capture the long-term factors we are interested in. Therefore, we need input-output tables covering a longer period.

Fortunately, Johnson and Noguera (2017) have constructed a database of input-output tables covering the 1970-2009 period. Their data construction effort is distinguished from related work in that they provide a long historical perspective on the rise of global supply chains by covering a long period and with broad a country scope, 43 countries reduced to 37 after dropping Check Republic, Estonia, Russia, Slovakia, and Slovenia.[24] Our sample size is similar to studies like Bergstrand et al. (2015), with the difference that they cover the period 1990-2002 and we focus on the period 1970-2009. Given that we build on the existing literature, we also replicate several results in the literature before proceeding to address our research questions for comparability and consistency.

3.2 Free Trade Agreements

We use data on economic integration agreements assembled by Scott Baier and Jeffrey Bergstrand, covering the 1960-2009 period.[25] This database is designed to allow users to quickly sort, file, and use information regarding the economic integration of bilateral country pairings. Table (1) shows the Economic Integration Agreements classification. We follow the literature in the way to define a FTA for comparison purposes. Therefore, a FTA is defined as an economic integration agreement in which trade barriers are eliminated (or substantially

[24]These countries are dropped due to not being covered over the whole period. The RoW region is also dropped.

[25]This database is available in "https://www3.nd.edu/ jbergstr/#Links". We use the September 2015 revision.

so) among members, and where non-members are treated differently. Our FTA indicator, therefore, takes the value one if a country pair has a FTA or stronger economic agreement, similar to the literature.[26]

Also note that since our trade data ends in 2009, only FTA's that been in place 10 or more years before 2009 are included. Table (2) shows the list of FTAs that are taken into account in this paper. Figure (**??**) keeps track of the number of country pairs covered by a FTA, giving a good idea of the liberalization trend initiated at the beginning of the 1990s.

Table 1: Economic Integration Agreements

IIA Ranking	Type of Agreement	Type of Agreement	Definition
1	NR-PTA	Non Reciprocal Preferential Trade Arrangement	Preferential terms and customs concessions given by developed nations to developing countries
2	PTA	Preferential Trade Arrangement	Preferential terms to members vs non-members
3	FTA	Free Trade Areas	Trade barriers eliminated (or substantially so) among members; treat non-members differently
4	CU	Customs Union	Same as FTA; but treat non-members the same
5	CM	Common Market	Same as CU; but also includes free movement of labor/capital
6	EUN	Economic union	Same as CM, but also monetary and Fiscal Policy coordination; further harmonization of taxes/regulation/monetary system

Later in this paper, when we explore the evolution of the trade effect of FTAs, we will disentangle the intra-EU effect from the average FTA. Therefore, it is important to remember that most agreements in categories 4, 5 and 6 are those among EU members.

4 Results

4.1 Estimated impact of reduced border effects

We start by presenting our estimates of the impact of reduced border effects, per year, from 1970 in Table (3). These estimates control for exporter-year, importer-year and country-pair fixed effects, as well as FTAs. We will return to the trade effect of FTAs later in this section. Column 1 shows that the reduction of border effects had increased total manufacturing exports by 278% $[e^{1.334} - 1]$ relative to domestic sales by 2009. This means that the cost of a national border has decreased by around 10% per year (100 x $[1 - (1/e^{1.334})^{1/12}]$).

The result for total goods exports does not differentiate between final goods or intermediate inputs. The evolution of the border effect - and the reduction of international trade

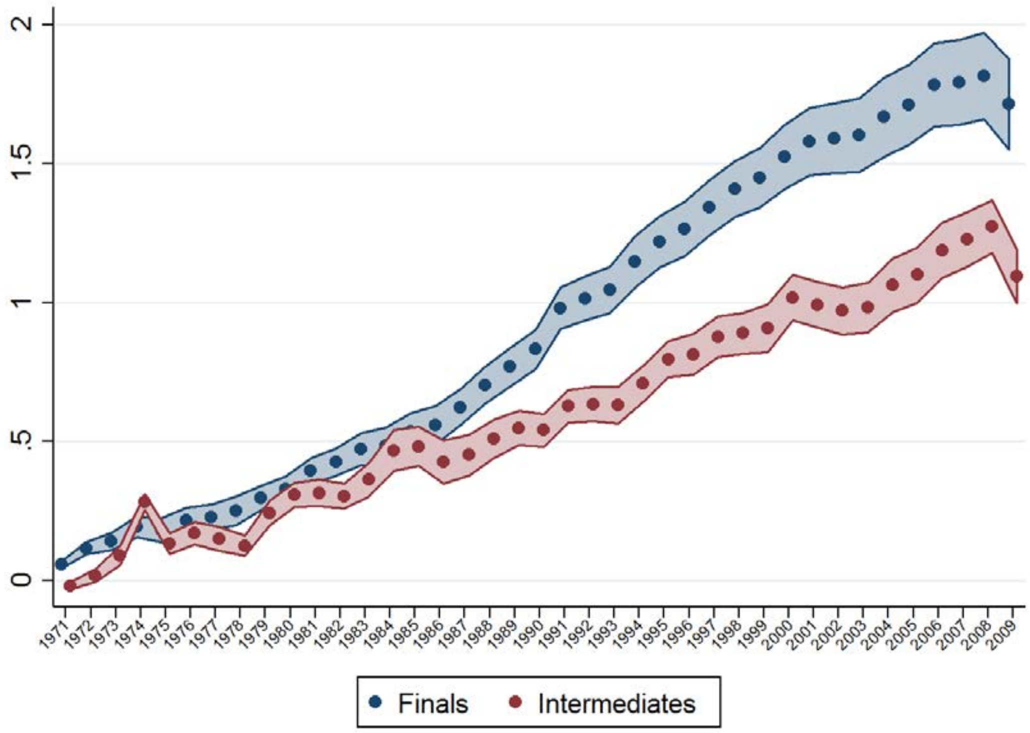
[26] See Baier and Bergstrand (2007) and the subsequent literature.

Table 2: Free Trade Agreements 1970-1999

Year	Country pair		Year	Country pair		Year	Country pai		Year	Country pai	
before 1970	CHE	AUT	1973	SWE	IRL	1992	ITA	HUN	1994	ROU	NOR
before 1970	DNK	AUT	1973	SWE	ITA	1992	NLD	HUN	1994	SWE	HUN
before 1970	DNK	CHE	1973	SWE	NLD	1992	POL	BEL	1994	SWE	POL
before 1970	GBR	AUT	1974	FIN	BEL	1992	POL	DEU	1994	SWE	ROU
before 1970	GBR	CHE	1974	FIN	DEU	1992	POL	DNK	1994	USA	MEX
before 1970	GBR	DNK	1974	FIN	DNK	1992	POL	ESP	1996	CHL	ARG
before 1970	NOR	AUT	1974	FRA	FIN	1992	POL	FRA	1996	CHL	BRA
before 1970	NOR	CHE	1974	GBR	FIN	1992	POL	GBR	1997	CHL	CAN
before 1970	NOR	DNK	1974	IRL	FIN	1992	POL	GRC	1997	ISR	CAN
before 1970	NOR	GBR	1974	ITA	FIN	1992	POL	HUN	1997	ROU	HUN
before 1970	PRT	AUT	1974	NLD	FIN	1992	POL	IRL	1997	ROU	POL
before 1970	PRT	CHE	1975	ISR	BEL	1992	POL	ITA	1997	TUR	ISR
before 1970	PRT	DNK	1975	ISR	DEU	1992	POL	NLD	1998	ISR	HUN
before 1970	PRT	GBR	1975	ISR	DNK	1992	PRT	HUN	1998	MEX	AUT
before 1970	PRT	NOR	1975	ISR	FRA	1992	PRT	POL	1998	MEX	BEL
before 1970	SWE	AUT	1975	ISR	GBR	1992	TUR	CHE	1998	MEX	DEU
before 1970	SWE	CHE	1975	ISR	IRL	1993	ISR	AUT	1998	MEX	DNK
before 1970	SWE	DNK	1975	ITA	ISR	1993	ISR	CHE	1998	MEX	ESP
before 1970	SWE	GBR	1975	NLD	ISR	1993	ISR	FIN	1998	MEX	FIN
before 1970	SWE	NOR	1981	GRC	AUT	1993	NOR	ISR	1998	MEX	FRA
before 1970	SWE	PRT	1981	GRC	CHE	1993	ROU	BEL	1998	MEX	GBR
1973	BEL	AUT	1981	ISR	GRC	1993	ROU	DEU	1998	MEX	GRC
1973	CHE	BEL	1981	NOR	GRC	1993	ROU	DNK	1998	MEX	IRL
1973	DEU	AUT	1981	PRT	GRC	1993	ROU	ESP	1998	MEX	ITA
1973	DEU	CHE	1983	NZL	AUS	1993	ROU	FRA	1998	NLD	MEX
1973	FRA	AUT	1986	ESP	AUT	1993	ROU	GBR	1998	POL	ISR
1973	FRA	CHE	1986	ESP	CHE	1993	ROU	GRC	1998	PRT	MEX
1973	IRL	AUT	1986	FIN	AUT	1993	ROU	IRL	1998	SWE	MEX
1973	IRL	CHE	1986	FIN	CHE	1993	ROU	ITA	1998	TUR	HUN
1973	ITA	AUT	1986	FIN	ESP	1993	ROU	NLD	1998	TUR	ROU
1973	ITA	CHE	1986	GRC	FIN	1993	ROU	PRT			
1973	NLD	AUT	1986	ISR	ESP	1993	SWE	ISR			
1973	NLD	CHE	1986	NOR	ESP	1993	TUR	AUT			
1973	NOR	BEL	1986	NOR	FIN	1993	TUR	FIN			
1973	NOR	DEU	1986	PRT	FIN	1993	TUR	NOR			
1973	NOR	FRA	1986	PRT	ISR	1993	TUR	SWE			
1973	NOR	IRL	1986	SWE	ESP	1994	HUN	AUT			
1973	NOR	ITA	1986	SWE	FIN	1994	HUN	CHE			
1973	NOR	NLD	1986	USA	ISR	1994	HUN	FIN			
1973	PRT	BEL	1989	USA	CAN	1994	MEX	CAN			
1973	PRT	DEU	1992	HUN	BEL	1994	NOR	HUN			
1973	PRT	FRA	1992	HUN	DEU	1994	POL	AUT			
1973	PRT	IRL	1992	HUN	DNK	1994	POL	CHE			
1973	PRT	ITA	1992	HUN	ESP	1994	POL	FIN			
1973	PRT	NLD	1992	HUN	FRA	1994	POL	NOR			
1973	SWE	BEL	1992	HUN	GBR	1994	ROU	AUT			
1973	SWE	DEU	1992	HUN	GRC	1994	ROU	CHE			
1973	SWE	FRA	1992	IRL	HUN	1994	ROU	FIN			

costs it entails - could potentially have had a differential effect on these different types of goods over time (Zylkin, 2015).

Figure 2: Reduced border effects for total exports, final goods and intermediate inputs



Columns 2 and 3 in Table (3) show a different evolution of the border effect for final goods and intermediate inputs. Figure (2) show the results graphically. From around 1985, we observe a stronger effect on final goods than on intermediate inputs. By the end of the sample in 2009, diminished border effects are estimated to have expanded exports of final manufacturing goods by 453% $[e^{1.714} - 1]$ relative to domestic final goods sales, while the rise of intermediate inputs had been 197% $[e^{1.093} - 1]$. The cost of a national border for final goods has thus decreased by 13% per year since 1970 (100 x $[1 - (1/e^{1.714})^{1/12}]$), whereas the decline has been 8% for intermediate inputs and (100 x $[1 - (1/e^{1.093})^{1/12}]$).

Why have diminished border effects led to a smaller increase in international trade in intermediate inputs than in final goods? This is arguably related to the fact that these two types of goods are different in nature. While final goods are produced to be consumed, intermediates are designed to be further processed in subsequent production processes. Therefore, intermediate inputs require more coordination in production and are thus *less* impacted by reduced trade costs than final goods that bear the full cost of previous steps in production.[27]

The greater impact of lower trade costs on final goods than intermediate inputs is also found by Antras and Chor (2018). It is not inconsistent with the emergence of international supply chains, since these results show that intermediate inputs have been increasingly traded, generating production linkages across countries. It is, we believe, merely a reflection of final goods consisting of an increasingly complex chain of intermediate inputs and is in line with the reasoning of for example Yi (2010).

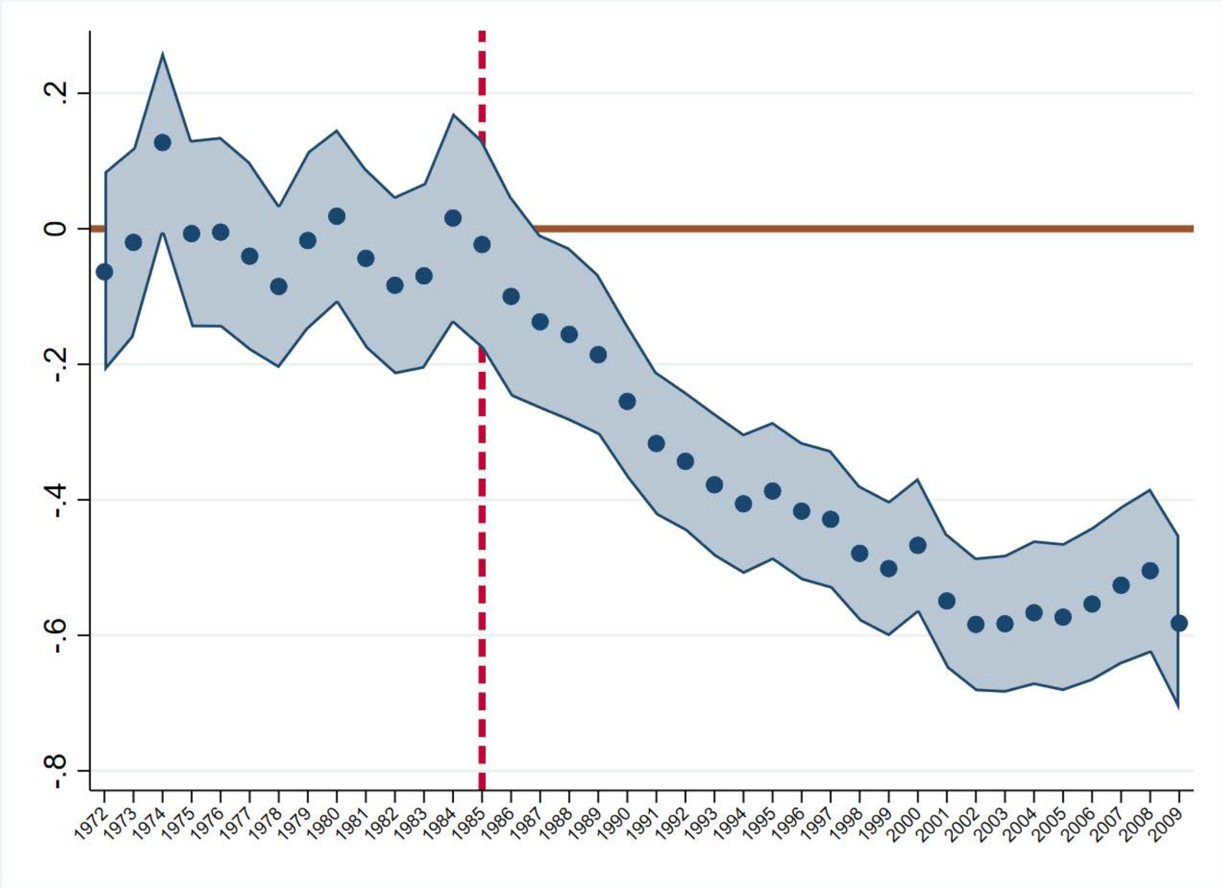
Figure (3) plots the impact of the reduced border effect on intermediate inputs obtained from a regression the uses trade in final goods and intermediate inputs in the same estimation. From this figure, we can confirm that the evolution of the border effect is not different between the two goods types until the mid-1980s when it starts to be greater for the final goods. From then and until the beginning of the 2000s, the reduction of trade frictions (other than those lowered by FTAs) stimulated final goods much more strongly. From the beginning of the 2000s and onward, the reduction in the border effect has once again affected final goods and intermediate inputs to the same extent.

It is particularly interesting that this different border effect coincides with the Information and Communication (ICT) revolution that allowed the emergence of global value chains, see Figure (4). The ability to send ideas down cables for almost no cost to almost anywhere triggered a host of reformations in work practices, management practices, and relationships among firms and their suppliers and customers (Baldwin, 2016). Working methods and product designs shifted to make production more modular and thus easier to coordinate at distance. The Telecom and Internet revolutions triggered a suite of information management innovations that made it easier, cheaper, faster, and safer to coordinate separate complex activities spatially. Email, editable files, and more specialized web-based coordination software packages revolutionized people's ability to manage multifaceted procedures across great distances. While the steam revolution took decades to transform globalization, the ICT revolution took years.

The ICT revolution was however not the only significant change in the time frame we cover Baldwin (2016). Continuous technological improvements in ships, trains, and trucks

[27] Rouzet and Miroudot (2013) show that tariffs and other trade costs cumulate and that even small trade costs can have adverse consequences when inputs are part of complex value chains that finally constitute final products.

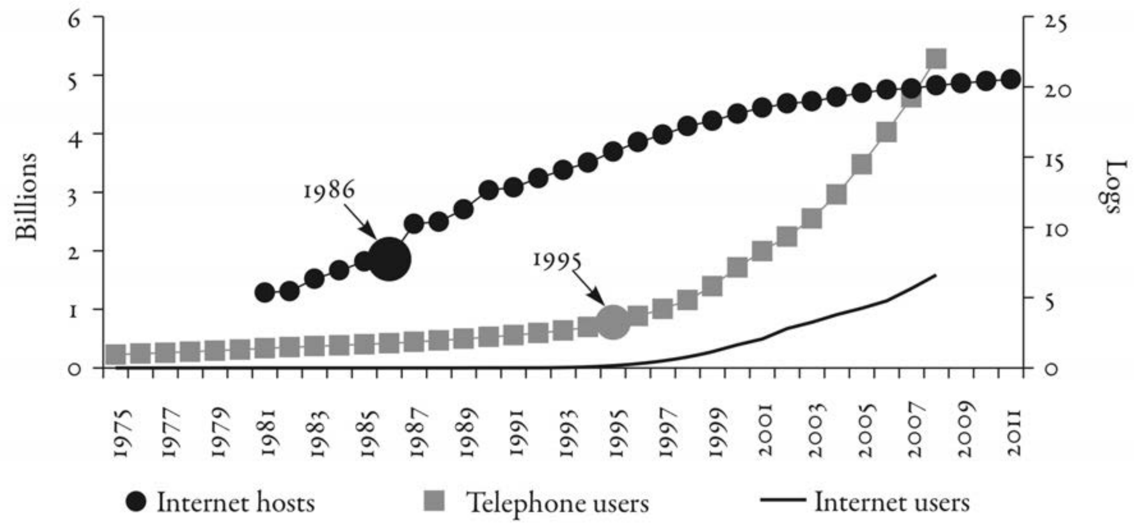
Figure 3: Different border effect for final goods and intermediate inputs



Note: The horizontal line at 0 is included as reference for an intuitive evaluation of the effect at hand. The vertical line in 1985 is year that the literature identifies as the starting year for the ICT revolution and is carefully discussed in the next figure.

reduced the cost of moving goods but failed to overcome the age-old problem of loading and unloading. A big breakthrough on this front came in the 1960s and grew exponentially in the 1970s and 1980s with the "containerization". Also, the development of air cargo stimulated the development of international production networks. Airfreight first became commercially viable, but it did not get going until the mid-1980s with the rise of international logistics firms. Indeed, the development of reliable air cargo services mirrors the rise of global value chains for rather obvious reasons.

Air cargo allowed manufacturers to know that intermediate inputs could flow among distant factories almost as surely as they flow among factories within a nation. Hummels and Schaur (2013) show that fully 40 percent of the parts and components imported into the



Source: Baldwin (2016).

Figure 4: Indicators of the ICT Revolution

United States are imported by air. They model exporters' choice between fast, expensive air cargo and slow, cheap ocean cargo, which depends on the price elasticity of demand and the value that consumers attach to fast delivery. The key here is not the cost. While air shipments have been getting cheaper, air cargo even today is many times more expensive than sea freight. The critical attraction of sending things by air is speed. European freight sent by sea, for example, takes an average of twenty days to reach U.S. ports and a month to reach Japan. Air shipments take a day or less.

With the basic facts and timing of the ICT revolution and air cargo developments in hand, we have turned to the quantitative impact that these changes likely brought by making careful use of the border effect and by distinguishing between trade in final goods and intermediate inputs. Lowering the trade barriers embodied in the border effect concept have likely less to do with traditional trade policies and more to do with productivity-enhancing technological innovations that allow goods, tasks, and services to flow more freely across borders.

4.2 Impact of FTAs

We proceed by presenting our empirical estimates for the trade-enhancing effect of FTAs and how they are affected when we control for border effects. Column 1-3 in Table (4) shows the results from the estimation considering total trade flows. Columns 4 to 7 show the results using data for both final goods and intermediate inputs, which doubles the sample size. For each of the two specifications, we first omit domestic trade flows, then introduce them, but without controlling for the border effect. Lastly, we control for the border effect. Also note that we include lagged effects of the FTAs of up to 10 years, with the 10-year lag indicating 10 years or more after the introduction of the FTA between the country pair.

The results point to large gains to international trade from FTA's: a 54% $[e^{0.434} - 1]$ increase in bilateral trade over 10 years in our preferred specification in column 7. There are only minor differences between the estimation with total trade and the one with trade in final goods and intermediate inputs as seen in columns 3 and 7. Nevertheless, the estimation differentiating trade in final goods and intermediate inputs yields some additional interesting results: (i) the FTA effect is larger when one also considers domestic trade flows. This clarifies the need to include the domestic sales in gravity equations.

When these trade flows are considered, but we do not control for the border effect, the impact of FTAs is 362% $[e^{1.531} - 1]$ increase in bilateral trade. (ii) Once one controls for the border effect, the coefficient returns to a more feasible level of 95% $[e^{0.667} - 1]$, pointing towards the fact that FTAs and other factors embodied in the border effect also affect international trade and are correlated with the FTAs.Bergstrand et al. (2015) show these same results, but without reporting the impact of FTAs without including the domestic trade flows. We think this is important because it is not about an overestimation of the effect as Bergstrand et al. (2015) conclude, but about the need to properly control for the border effect once domestic trade flows are included.

Finally, it turns out that one needs to control for a different border effect for final goods and intermediate inputs (comparing columns 6 and 7). With such different border effects, the FTA impact is further reduced to the 54% $[e^{0.434} - 1]$ increase in bilateral trade we find most plausible. This shows that the different factors that are affecting international and domestic trade are also having a different effect for the two types of goods (finals and intermediates), whereas the effect of FTAs is not different for final goods and intermediate inputs when we use the whole 1970-2009 sample.

An important change in the international trade system took place when GATT members launched the Uruguay Round in 1986, the same year that some of the leading GATT members also started massive regional trade liberalization initiatives (Martin and Messerlin, 2007). Specifically, three liberalization initiatives were launched in 1986. The United States and Canada started talks on a free trade agreement that finished in 1989 (this eventually turned into the North American Free Trade Agreement also encompassing Mexico or NAFTA). The year 1986 also saw Europe both deepen and widen trade liberalization, which was by then called the European Union (EU). Spain and Portugal were admitted as new members, and the EU embarked on a deep liberalization of many other economic barriers in the context of the Single Market program.

The Uruguay Round lasted from 1986 to 1994 and GATT's early multilateral negotiations ("rounds") dealt mostly with new rules and the admission of new members. From the Kennedy Round onward, the rounds returned to tariff cutting, but also touched on increasingly complex trade barriers — things like technical barriers to trade, investment rules, government purchases, and the like. As part of the Uruguay Round final agreement, the GATT became the WTO in 1995. Apart from changing the name, the deal institutionalized the GATT's judicial role in dispute settlement and added some basic rules for international investment, regulations, intellectual property, and services.

The 1980s was a particularly important period of trade liberalization initiatives. Moreover, the depth and content of FTAs have changed over time. Therefore, we recursively estimate the regressions by dropping the starting year of the sample and always keeping the end year in 2009. This means that we identify the effect of only those FTAs signed after the starting year. Table (5) shows the results for the estimations with starting years between 1970 until 1997. We see two important results: (i) The FTA-effect seems to have strengthened over time. In 1970, the effect is 54% $[e^{0.434} - 1]$ as mentioned before, and it gradually increases up to an effect of 97% $[e^{0.678} - 1]$. This is in line with the idea that new FTAs have evolved by deepening trade integration.[28] Additionally, it seems that there is a significantly smaller effect of FTA on trade in intermediate inputs towards the end of the sample (the mid-1990s).

To get further insights into the trend of a stronger impact of FTAs, we focus on the intra-EU effect. The reason for this is that the European Union has pursued deeper integration since its first steps and it could be the main driver of the observed evolution. The year 1986 was a particularly important year for initiatives liberalizing trade. Europe both deepened

[28]Note that the FTA's effect is estimated only with the new FTAs signed after the starting year. They are comparable thanks to the high dimensional fixed effects included. See the empirical approach section for more details.

and widened its pan-European economic integration within the European Union (EU). Spain and Portugal were admitted as new members and the EU embarked on the reduction of many other economic barriers in the context of the Single Market program (see for instance Mongelli et al. (2005) on the different stages of integration). Now that EU-membership is being renegotiated in the context of 'Brexit', it is interesting to see what the average trade effect of joining the EU might be.

We apply our general methodology to capture the potentially different trade effects of the European Union (EU) compared to the average FTA-effect. We define a dummy variable for the EU in the same way as the FTA variable. It takes value 1 when the bilateral trade flow is between two EU countries. This variable thus captures the additional effect of the EU on bilateral intra-EU trade.

The results capture several important insights: (i) The EU has a larger effect on bilateral trade, beyond that of the average FTA effect. (ii) By 1994 however, the difference between the EU's effect and the average FTA-effect has become smaller. At the same time, the effect of average FTAs has increased strongly, meaning that the total EU-effect has also increased over time. The previous result of a larger effect of FTAs on trade in intermediate inputs towards the end of the sample is also present in these results. Nevertheless, for the intra-EU trade, this difference is already significant since the beginning of the 1970s.

5 Robustness checks and review of the literature standards

5.1 Working with data in intervals and the role of HDFEs

The trade literature estimating the impact of FTA's has usually followed the recommendation of Cheng and J.Wall (2005) to use data in intervals of three to five years. To make sure that our results are comparable with those in the literature, we report the previous results using data in 5-year intervals. Table (7) reports the results for the full sample 1970-2009, in which the domestic trade flows and the control for border effect as progressively introduced, and the result for the rolling starting year respectively. Table (8) reports the "rolling" estimation on the initial year of the sample. Finally, table (9) reports the results disentangling the intra-EU trade effect from the average FTA.

We find that our results hold and maintain our conclusions. Moreover, when using 5-year intervals the interpretation of the coefficients is less precise due to the time-windows.

There is no clear reason to drop a large number of observations now that efficient PPML algorithms are available.

Since the contribution of Baier and Bergstrand (2007), the gravity literature estimates of the effect of trade barriers on bilateral trade include country-pair fixed effects. They used a log-linear OLS, but after Silva and Tenreyro (2006)'s work, the PPML estimator became the benchmark, as we explained before. Nevertheless, for large samples, computational issues have limited the choice of the estimator, forcing researchers to use the log-linear OLS or the PPML without country-pair fixed effects. More recently, Larch et al. (2019) have addressed this gap, unveiling an iterative PPML estimator, which flexibly accounts for multilateral resistance, pair-specific heterogeneity, and correlated errors.

This has opened the door to the use of High-Dimensional Fixed Effects (HDFE) in PPML estimations. This implies that a more robust and unbiased estimate can be obtained. Nevertheless, this might raise the question of whether there is an "overfitting problem".[29] In PPML there is not an equivalent way to obtain a measure of the goodness of fit of a model as the R^2 in OLS, and that is why it is not usually reported in the literature using the PPML estimator. Although, there exists a pseudo-R^2 for PPML computed as the square of the correlation between the dependable variable and the fitted values. Introducing the different sets of fixed effects one by one and reporting this pseudo-R^2 provides two important insights: (i) an approximation of the goodness of fit of the model, (ii) an approximation to an analysis of variance (ANOVA). Rather than allowing to partition the observed variance in the dependent variable into the different explanatory variables and fixed effects, we can only compute the pseudo-R^2 when the different sets of variables are included in the estimation. Results are reported in table (10).

So far we have estimated the impact of border effects and FTAs on trade with asymmetric country-pair fixed effects. Therefore, one basic exercise we can do to reduce the number of fixed effects included is to estimate this effect with symmetric country-pair fixed effects. This cuts the number of country-pair fixed effects roughly in half. An over-fitting bias in fixed effects estimations generally creates a problem by yielding standard errors that are too small. Given that the degree of precision is roughly the same (see columns 1 and 2), we conclude that it is unlikely that our estimates suffer from an over-fitting issue.

[29]Note that the only set of fixed effects that is not included is the country-pair-time effect since it is the dimension at which the FTA effect is estimated.

5.2 More robust standard errors

Note that so far in this paper, results have been reported with standard errors clustered by exporter and importer, in line with the literature. Nevertheless, we think it is also important to consider the potential correlation of errors across time. There, we now cluster errors by exporter-importer-year. Table (11) reports the same results as in table (4), showing that our results are robust to this specification. If any, table (11) shows that the differential effect of FTAs in trade in intermediate inputs emerges at the end of the period.

6 Concluding remarks

Reductions in trade barriers over the past decades have been made possible through the implementation of Free Trade Agreements (FTAs) and technological progress, which in turn have greatly stimulated international trade. In this paper, we examined the role of reduced trade barriers from two dimensions: (i) diminishing border effects and (ii) the implementation of FTAs. Our results show that the former factor has significantly expanded trade in the manufacturing sector and accounts, according to our estimates, for the bulk of the increase in international trade in manufacturing goods from the 1970s. The cost of national border has according to our estimates fallen by around 10% per year for total manufacturing goods exports.

Diminished border effects have had a greater impact on final products than intermediate inputs. For final goods, the increase has been an astounding 453%, relative to domestic sales since 1970 compared to a 197% rise for intermediate inputs. This represents a reduction in the cost of a national border of 13% per year for final goods and 8% for intermediate inputs.

We argue that this differential impact is related to the fact that final goods and intermediates inputs are of different nature. While final goods are produced to be consumed, intermediates inputs are designed to be further processed in subsequent production processes. Therefore, intermediate inputs require more coordination in production and are thus less impacted by reduced trade costs embodied in the border effect than final goods that bear the full cost of previous steps in production. These results give some indication as to how important reductions in border effects have been for international trade and the emergence of global value chains.

We have also observed a strengthening effect of FTAs over time. Therefore, we have focused on the trade effect of specific institutional arrangements such as the European Union. With it, we have shown implicitly what could be the trade effect of leaving such an agreement. Joining the EU has had a significant additional effect on intra-EU trade among its member states: it more than doubles the effect of an average FTA, when we consider the whole sample. Future research should take care of further clarifying the strengthening effect of FTA over time and the difference between final and intermediate inputs.

We conjecture that the greater trade impact of FTAs on final goods, after disentangling the intra-EU effect, is related to the fact that developing countries became more important in intermediate inputs trade over the period in question. This is something we plan to study more in detail in future research. It would also be interesting to further clarify the interaction between reductions of the border effect and FTAs. One could arguably anticipate that FTAs allowed international trade to expand, and global value chains to emerge, by the setting the rules that govern international commerce (Blanchard et al., 2016).

Another interesting avenue for future research would be to see how reductions of the border effect and introduction of FTAs interact with the decline in manufacturing employment in some developed economies to give some insight into the role of technological and trade-related displacement of employment.

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Tables

	(1) Totals	(2) Final	(3) Intermediate
1971	0.007	0.056***	-0.021***
	(0.006)	(0.007)	(0.007)
1975	0.144***	0.181***	0.132***
	(0.020)	(0.023)	(0.019)
1980	0.310***	0.329***	0.307***
	(0.020)	(0.023)	(0.022)
1985	0.502***	0.536***	0.480***
	(0.032)	(0.033)	(0.036)
1990	0.650***	0.832***	0.539***
	(0.029)	(0.036)	(0.031)
1995	0.948***	1.218***	0.796***
	(0.034)	(0.047)	(0.033)
2000	1.209***	1.524***	1.018***
	(0.041)	(0.059)	(0.042)
2005	1.334***	1.712***	1.099***
	(0.053)	(0.074)	(0.051)
2009	1.334***	1.714***	1.093***
	(0.056)	(0.083)	(0.049)
Observations	49000	49000	49000
Control for FTAs	Yes	Yes	Yes

Note: *, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors clustered by exporter-importer, are reported in parentheses. The years denote the border effect on international exports, relative to domestic sales for each year relative to 1970.

Table 3: Border effect (1970-2009)

	(1) Total	(2) Total	(3) Total	(4) Both	(5) Both	(6) Both	(7) Both
FTA lag 0	0.083**	0.440***	0.174***	0.071	0.554***	0.277***	0.193**
	(0.033)	(0.075)	(0.067)	(0.045)	(0.096)	(0.085)	(0.080)
FTA lag 1	0.129***	0.544***	0.236***	0.119**	0.645***	0.325***	0.238**
	(0.036)	(0.101)	(0.087)	(0.051)	(0.113)	(0.096)	(0.098)
FTA lag 2	0.140***	0.607***	0.254**	0.141***	0.741***	0.374***	0.263**
	(0.040)	(0.108)	(0.103)	(0.055)	(0.114)	(0.106)	(0.109)
FTA lag 3	0.185***	0.686***	0.294***	0.181***	0.837***	0.431***	0.311***
	(0.039)	(0.107)	(0.096)	(0.054)	(0.113)	(0.099)	(0.103)
FTA lag 4	0.206***	0.761***	0.350***	0.203***	0.933***	0.509***	0.372***
	(0.040)	(0.106)	(0.092)	(0.055)	(0.111)	(0.094)	(0.097)
FTA lag 5	0.223***	0.839***	0.389***	0.226***	1.023***	0.559***	0.408***
	(0.043)	(0.107)	(0.098)	(0.057)	(0.104)	(0.091)	(0.094)
FTA lag 6	0.244***	0.910***	0.409***	0.250***	1.097***	0.585***	0.440***
	(0.044)	(0.115)	(0.105)	(0.058)	(0.110)	(0.096)	(0.101)
FTA lag 7	0.261***	0.914***	0.394***	0.265***	1.112***	0.582***	0.425***
	(0.046)	(0.104)	(0.098)	(0.060)	(0.102)	(0.092)	(0.096)
FTA lag 8	0.265***	0.979***	0.411***	0.251***	1.182***	0.603***	0.432***
	(0.049)	(0.096)	(0.098)	(0.065)	(0.094)	(0.092)	(0.096)
FTA lag 9	0.288***	1.024***	0.427***	0.272***	1.220***	0.612***	0.430***
	(0.051)	(0.094)	(0.097)	(0.069)	(0.090)	(0.090)	(0.099)
FTA lag 10 +	0.312***	1.248***	0.385***	0.292***	1.531***	0.667***	0.434***
	(0.055)	(0.123)	(0.129)	(0.071)	(0.119)	(0.121)	(0.131)
Input FTA lag 0				0.009	-0.191***	-0.183***	-0.035
				(0.036)	(0.041)	(0.035)	(0.030)
Input FTA lag 1				-0.003	-0.180***	-0.173***	-0.019
				(0.040)	(0.035)	(0.026)	(0.033)
Input FTA lag 2				-0.022	-0.243***	-0.236***	-0.039
				(0.040)	(0.034)	(0.022)	(0.033)
Input FTA lag 3				-0.016	-0.270***	-0.264***	-0.051
				(0.042)	(0.035)	(0.024)	(0.033)
Input FTA lag 4				-0.023	-0.308***	-0.303***	-0.059*
				(0.044)	(0.034)	(0.023)	(0.031)
Input FTA lag 5				-0.038	-0.331***	-0.330***	-0.060*
				(0.046)	(0.032)	(0.023)	(0.033)
Input FTA lag 6				-0.046	-0.341***	-0.343***	-0.084**
				(0.046)	(0.037)	(0.026)	(0.035)
Input FTA lag 7				-0.045	-0.355***	-0.359***	-0.080**
				(0.048)	(0.034)	(0.026)	(0.037)
Input FTA lag 8				-0.011	-0.361***	-0.367***	-0.062
				(0.049)	(0.033)	(0.025)	(0.041)
Input FTA lag 9				-0.014	-0.349***	-0.356***	-0.030
				(0.051)	(0.035)	(0.028)	(0.045)
Input FTA lag 10 +				0.004	-0.485***	-0.516***	-0.099*
				(0.052)	(0.046)	(0.037)	(0.052)
Observations	47520	49000	49000	95040	98000	98000	98000
Domestic trade flows	No	Yes	Yes	No	Yes	Yes	Yes
Control for border		No	Yes		No	Yes	Yes
Control for border-inputs					No	No	Yes

Note: *, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors clustered by exporter-importer, are reported in parentheses.

Table 4: FTA's Effect on bilateral trade (1970-2009)

	(1) 1970	(2) 1973	(3) 1976	(4) 1979	(5) 1982	(6) 1985	(7) 1988	(8) 1991	(9) 1994	(10) 1997
FTA lag 0	0.193**	0.205***	0.217***	0.222***	0.220***	0.228***	0.308***	0.170***	0.277***	0.105*
	(0.080)	(0.078)	(0.076)	(0.076)	(0.070)	(0.055)	(0.030)	(0.030)	(0.047)	(0.061)
FTA lag 1	0.238**	0.254***	0.266***	0.272***	0.272***	0.281***	0.367***	0.271***	0.320***	0.226**
	(0.098)	(0.098)	(0.096)	(0.095)	(0.090)	(0.074)	(0.032)	(0.040)	(0.052)	(0.108)
FTA lag 2	0.263**	0.272**	0.284***	0.290***	0.290***	0.299***	0.389***	0.324***	0.351***	0.265***
	(0.109)	(0.109)	(0.108)	(0.107)	(0.102)	(0.087)	(0.044)	(0.042)	(0.054)	(0.094)
FTA lag 3	0.311***	0.319***	0.331***	0.336***	0.337***	0.346***	0.436***	0.354***	0.361***	0.347***
	(0.103)	(0.102)	(0.101)	(0.100)	(0.095)	(0.080)	(0.042)	(0.045)	(0.070)	(0.107)
FTA lag 4	0.372***	0.377***	0.390***	0.395***	0.397***	0.405***	0.514***	0.416***	0.374***	0.347***
	(0.097)	(0.095)	(0.094)	(0.093)	(0.089)	(0.074)	(0.039)	(0.045)	(0.066)	(0.106)
FTA lag 5	0.408***	0.417***	0.429***	0.435***	0.435***	0.444***	0.547***	0.446***	0.382***	0.428***
	(0.094)	(0.095)	(0.094)	(0.093)	(0.089)	(0.075)	(0.042)	(0.045)	(0.078)	(0.144)
FTA lag 6	0.440***	0.451***	0.464***	0.469***	0.469***	0.478***	0.584***	0.504***	0.394***	0.399***
	(0.101)	(0.100)	(0.098)	(0.098)	(0.094)	(0.081)	(0.049)	(0.044)	(0.080)	(0.151)
FTA lag 7	0.425***	0.440***	0.452***	0.458***	0.460***	0.469***	0.564***	0.481***	0.473***	0.515***
	(0.096)	(0.095)	(0.094)	(0.094)	(0.091)	(0.079)	(0.057)	(0.051)	(0.088)	(0.163)
FTA lag 8	0.432***	0.447***	0.460***	0.465***	0.467***	0.476***	0.562***	0.481***	0.536***	0.529***
	(0.096)	(0.096)	(0.095)	(0.096)	(0.093)	(0.084)	(0.069)	(0.066)	(0.101)	(0.189)
FTA lag 9	0.430***	0.438***	0.451***	0.457***	0.459***	0.468***	0.550***	0.475***	0.529***	0.612***
	(0.099)	(0.098)	(0.097)	(0.099)	(0.097)	(0.089)	(0.077)	(0.078)	(0.110)	(0.211)
FTA lag 10 +	0.434***	0.424***	0.437***	0.445***	0.456***	0.469***	0.473***	0.496***	0.536***	0.678***
	(0.131)	(0.134)	(0.134)	(0.135)	(0.134)	(0.125)	(0.100)	(0.105)	(0.115)	(0.216)
Input FTA lag 0	-0.035	-0.032	-0.045	-0.049	-0.048	-0.043	-0.024	-0.124***	-0.162***	-0.107*
	(0.030)	(0.032)	(0.032)	(0.031)	(0.030)	(0.027)	(0.031)	(0.025)	(0.040)	(0.061)
Input FTA lag 1	-0.019	-0.015	-0.025	-0.029	-0.026	-0.021	-0.001	-0.091***	-0.194***	-0.250**
	(0.033)	(0.034)	(0.034)	(0.033)	(0.032)	(0.029)	(0.032)	(0.029)	(0.050)	(0.107)
Input FTA lag 2	-0.039	-0.033	-0.042	-0.046	-0.043	-0.038	-0.017	-0.087**	-0.242***	-0.284***
	(0.033)	(0.033)	(0.033)	(0.033)	(0.033)	(0.032)	(0.033)	(0.034)	(0.057)	(0.097)
Input FTA lag 3	-0.051	-0.047	-0.057*	-0.061*	-0.058*	-0.051	-0.039	-0.105***	-0.245***	-0.289***
	(0.033)	(0.034)	(0.034)	(0.034)	(0.034)	(0.034)	(0.035)	(0.040)	(0.072)	(0.105)
Input FTA lag 4	-0.059*	-0.055*	-0.064**	-0.068**	-0.065**	-0.057*	-0.053	-0.117***	-0.254***	-0.355***
	(0.031)	(0.032)	(0.032)	(0.032)	(0.033)	(0.034)	(0.035)	(0.038)	(0.063)	(0.092)
Input FTA lag 5	-0.060*	-0.055*	-0.064*	-0.068**	-0.064*	-0.057	-0.048	-0.072	-0.230***	-0.418***
	(0.033)	(0.033)	(0.033)	(0.034)	(0.036)	(0.041)	(0.042)	(0.044)	(0.081)	(0.134)
Input FTA lag 6	-0.084**	-0.084**	-0.093**	-0.097***	-0.092**	-0.084*	-0.084*	-0.090**	-0.214***	-0.350***
	(0.035)	(0.036)	(0.036)	(0.037)	(0.039)	(0.045)	(0.047)	(0.046)	(0.078)	(0.127)
Input FTA lag 7	-0.080**	-0.077**	-0.085**	-0.088**	-0.084**	-0.077*	-0.070	-0.091*	-0.234***	-0.402***
	(0.037)	(0.038)	(0.038)	(0.039)	(0.041)	(0.046)	(0.050)	(0.049)	(0.085)	(0.137)
Input FTA lag 8	-0.062	-0.059	-0.066	-0.069	-0.064	-0.057	-0.051	-0.066	-0.269***	-0.387***
	(0.041)	(0.042)	(0.043)	(0.044)	(0.046)	(0.053)	(0.058)	(0.060)	(0.087)	(0.147)
Input FTA lag 9	-0.030	-0.024	-0.031	-0.035	-0.030	-0.022	-0.012	-0.036	-0.279***	-0.409**
	(0.045)	(0.046)	(0.047)	(0.048)	(0.051)	(0.057)	(0.065)	(0.071)	(0.097)	(0.171)
Input FTA lag 10 +	-0.099*	-0.101*	-0.110**	-0.114**	-0.112*	-0.104*	-0.051	-0.051	-0.250**	-0.465***
	(0.052)	(0.053)	(0.054)	(0.055)	(0.057)	(0.063)	(0.066)	(0.067)	(0.105)	(0.180)
Observations	98000	90650	83300	75950	68600	61250	53900	46550	39200	31850

Note: *, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors clustered by exporter-importer, are reported in parentheses. The year in each column denotes the starting year in the sample.

Table 5: The FTA's effect evolution

	(1) 1970	(2) 1973	(3) 1976	(4) 1979	(5) 1982	(6) 1985	(7) 1988	(8) 1991	(9) 1994
FTA lag 10 +	0.270**	0.266**	0.277**	0.282**	0.292**	0.312***	0.323***	0.393***	0.565***
	(0.122)	(0.123)	(0.122)	(0.122)	(0.120)	(0.112)	(0.084)	(0.095)	(0.117)
Input FTA lag 10 +	-0.086*	-0.096*	-0.108**	-0.118**	-0.129**	-0.141**	-0.107	-0.100	-0.284***
	(0.049)	(0.050)	(0.051)	(0.053)	(0.056)	(0.065)	(0.075)	(0.077)	(0.108)
EU lag 10 +	0.354***	0.340***	0.335***	0.335***	0.335***	0.327***	0.246***	0.262***	0.285***
	(0.071)	(0.071)	(0.069)	(0.068)	(0.066)	(0.066)	(0.065)	(0.058)	(0.062)
Input EU lag 10 +	-0.215***	-0.232***	-0.234***	-0.241***	-0.254***	-0.260***	-0.249***	-0.277***	-0.339***
	(0.045)	(0.048)	(0.048)	(0.049)	(0.050)	(0.052)	(0.051)	(0.047)	(0.043)
Observations	90800	83990	77180	70370	63560	56750	49940	43130	36320

Note: *, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors clustered by exporter-importer, are reported in parentheses. The year in each column denotes the starting year in the sample. Out of the 40 lags included in the estimations, only the long-run effect of FTAs (10+ lag) is report due to space constraints.

Table 6: European Union effect on trade in finals and intermediates

	(1) Total	(2) Total	(3) Total	(4) Both	(5) Both	(6) Both	(7) Both
FTA lag 0	0.071*	0.514***	0.191**	0.072	0.668***	0.337***	0.200*
	(0.042)	(0.101)	(0.084)	(0.058)	(0.130)	(0.110)	(0.103)
FTA lag 5	0.185***	0.937***	0.406***	0.201***	1.174***	0.632***	0.414***
	(0.055)	(0.131)	(0.116)	(0.072)	(0.133)	(0.117)	(0.119)
FTA lag 10 +	0.154**	1.077***	0.288**	0.110	1.394***	0.604***	0.327**
	(0.070)	(0.131)	(0.139)	(0.090)	(0.134)	(0.135)	(0.148)
Input FTA lag 0				-0.001	-0.264***	-0.262***	-0.022
				(0.047)	(0.054)	(0.049)	(0.041)
Input FTA lag 5				-0.061	-0.435***	-0.439***	-0.053
				(0.055)	(0.033)	(0.023)	(0.039)
Input FTA lag 10 +				0.037	-0.556***	-0.586***	-0.090
				(0.067)	(0.046)	(0.037)	(0.059)
Observations	8784	9080	9080	17568	18160	18160	18160
pseudo-R^2	0.996	0.999	1.000	0.996	0.999	1.000	1.000
Domestic trade flows	No	Yes	Yes	No	Yes	Yes	Yes
Control for border		No	Yes		No	Yes	Yes
Control for border-input					No	No	Yes

Note: *, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors clustered by exporter-importer, are reported in parentheses.

Table 7: FTA's Effect with data in 5-year intervals (1970-2005)

	(1) 1974	(2) 1979	(3) 1984	(4) 1989	(5) 1994
FTA lag 0	0.200*	0.219**	0.238***	0.381***	0.261***
	(0.103)	(0.100)	(0.089)	(0.045)	(0.064)
FTA lag 5	0.414***	0.435***	0.456***	0.655***	0.493***
	(0.119)	(0.117)	(0.109)	(0.060)	(0.094)
FTA lag 10 +	0.327**	0.352**	0.388***	0.543***	0.562***
	(0.148)	(0.146)	(0.138)	(0.100)	(0.112)
Input FTA lag 0	-0.022	-0.049	-0.067*	-0.116**	-0.136**
	(0.041)	(0.040)	(0.040)	(0.047)	(0.061)
Input FTA lag 5	-0.053	-0.080**	-0.097**	-0.101	-0.218***
	(0.039)	(0.039)	(0.042)	(0.067)	(0.081)
Input FTA lag 10 +	-0.090	-0.125**	-0.146**	-0.068	-0.254**
	(0.059)	(0.060)	(0.065)	(0.094)	(0.102)
Observations	18160	15890	13620	11350	9080

Note: *, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors clustered by exporter-importer, are reported in parentheses. The year in each column denotes the starting year in the sample.

Table 8: The evolution of the FTA's Effect with data in intervals

	(1) 1974	(2) 1979	(3) 1984	(4) 1989	(5) 1994
FTA lag 0	0.187*	0.211**	0.243***	0.387***	0.270***
	(0.102)	(0.100)	(0.090)	(0.046)	(0.064)
FTA lag 5	0.410***	0.435***	0.469***	0.666***	0.503***
	(0.119)	(0.117)	(0.110)	(0.060)	(0.094)
FTA lag 10 +	0.276*	0.308**	0.358***	0.557***	0.574***
	(0.141)	(0.140)	(0.134)	(0.101)	(0.112)
Input FTA lag 0	-0.012	-0.040	-0.070*	-0.120**	-0.149**
	(0.040)	(0.039)	(0.040)	(0.048)	(0.060)
Input FTA lag 5	-0.047	-0.075**	-0.104**	-0.110	-0.233***
	(0.037)	(0.037)	(0.041)	(0.068)	(0.081)
Input FTA lag 10 +	-0.053	-0.090*	-0.126**	-0.080	-0.271***
	(0.052)	(0.054)	(0.060)	(0.094)	(0.102)
EU lag 0	0.166***	0.167***	0.164***	0.208***	0.221***
	(0.051)	(0.050)	(0.051)	(0.049)	(0.046)
EU lag 5	0.152**	0.153**	0.153**	0.219***	0.238***
	(0.067)	(0.066)	(0.068)	(0.073)	(0.068)
EU lag 10 +	0.359***	0.356***	0.365***	0.272***	0.296***
	(0.076)	(0.073)	(0.070)	(0.072)	(0.067)
Input EU lag 0	-0.142***	-0.148***	-0.165***	-0.183***	-0.251***
	(0.044)	(0.042)	(0.042)	(0.041)	(0.039)
Input EU lag 5	-0.155***	-0.161***	-0.179***	-0.235***	-0.307***
	(0.045)	(0.045)	(0.046)	(0.050)	(0.045)
Input EU lag 10 +	-0.273***	-0.277***	-0.306***	-0.267***	-0.342***
	(0.047)	(0.048)	(0.049)	(0.051)	(0.047)
Observations	18160	15890	13620	11350	9080

Note: *, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors clustered by exporter-importer, are reported in parentheses. The year in each column denotes the starting year in the sample. The Input-FTA and EU lags capture the additional effect with respect to the FTA lags. The Input-EU lags captures an additional effect with respect to the EU lags.

Table 9: European Union effect on trade in finals and intermediates

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
FTA lag 0	0.193**	0.190**	0.394			0.554***	0.749*
	(0.080)	(0.079)	(0.276)			(0.096)	(0.390)
FTA lag 1	0.238**	0.242**	0.420			0.645***	0.915**
	(0.098)	(0.096)	(0.263)			(0.113)	(0.385)
FTA lag 2	0.263**	0.268**	0.465*			0.741***	0.995***
	(0.109)	(0.107)	(0.257)			(0.114)	(0.378)
FTA lag 3	0.311***	0.316***	0.526**			0.837***	1.067***
	(0.103)	(0.101)	(0.255)			(0.113)	(0.379)
FTA lag 4	0.372***	0.376***	0.600**			0.933***	1.159***
	(0.097)	(0.095)	(0.251)			(0.111)	(0.390)
FTA lag 5	0.408***	0.413***	0.694***			1.023***	1.264***
	(0.094)	(0.093)	(0.246)			(0.104)	(0.396)
FTA lag 6	0.440***	0.445***	0.721***			1.097***	1.360***
	(0.101)	(0.099)	(0.244)			(0.110)	(0.390)
FTA lag 7	0.425***	0.433***	0.701***			1.112***	1.369***
	(0.096)	(0.095)	(0.240)			(0.102)	(0.384)
FTA lag 8	0.432***	0.438***	0.676***			1.181***	1.467***
	(0.097)	(0.095)	(0.240)			(0.094)	(0.387)
FTA lag 9	0.430***	0.436***	0.648***			1.220***	1.521***
	(0.099)	(0.098)	(0.230)			(0.090)	(0.383)
FTA lag 10+	0.435***	0.440***	0.168*			1.531***	2.303***
	(0.131)	(0.129)	(0.093)			(0.119)	(0.131)
Input FTA lag 0	-0.035	-0.030	-0.058			-0.191***	-0.203
	(0.030)	(0.028)	(0.405)			(0.041)	(0.559)
Input FTA lag 1	-0.019	-0.020	-0.069			-0.180***	-0.246
	(0.033)	(0.031)	(0.384)			(0.035)	(0.550)
Input FTA lag 2	-0.039	-0.041	-0.124			-0.243***	-0.298
	(0.033)	(0.031)	(0.377)			(0.034)	(0.540)
Input FTA lag 3	-0.051	-0.054*	-0.107			-0.270***	-0.273
	(0.033)	(0.032)	(0.369)			(0.035)	(0.543)
Input FTA lag 4	-0.059*	-0.062*	-0.134			-0.308***	-0.326
	(0.031)	(0.032)	(0.365)			(0.034)	(0.562)
Input FTA lag 5	-0.060*	-0.065*	-0.144			-0.331***	-0.341
	(0.033)	(0.035)	(0.359)			(0.032)	(0.564)
Input FTA lag 6	-0.085**	-0.091**	-0.140			-0.340***	-0.356
	(0.035)	(0.037)	(0.355)			(0.037)	(0.554)
Input FTA lag 7	-0.080**	-0.088**	-0.151			-0.355***	-0.345
	(0.037)	(0.039)	(0.349)			(0.034)	(0.540)
Input FTA lag 8	-0.062	-0.069	-0.149			-0.361***	-0.343
	(0.041)	(0.043)	(0.351)			(0.033)	(0.541)
Input FTA lag 9	-0.030	-0.038	-0.150			-0.348***	-0.354
	(0.045)	(0.047)	(0.339)			(0.035)	(0.536)
Input FTA lag 10+	-0.099*	-0.104**	-0.385***			-0.485***	-0.475**
	(0.052)	(0.053)	(0.133)			(0.046)	(0.190)
Pair FEs	Asym	Sym	No	Asym	No	Asym	No
Borders	Yes	Yes	Yes	Yes	Yes	No	No
Observations	98000	98000	98000	98000	98000	98000	98000
pseudo-R^2	1.000	1.000	0.991	1.000	0.991	0.999	0.356

Note: *, **, and *** denote $p < 0.10$, $p < 0.05$, and $p < 0.01$, respectively. Standard errors clustered by exporter-importer, are reported in parentheses. The pseudo-R^2 is reported as 1 when pseudo-$R^2 > 0.999$

Table 10: The role of HDFEs and pseudo-R^2 (1970-2009)

	(1) 1970	(2) 1973	(3) 1976	(4) 1979	(5) 1982	(6) 1985	(7) 1988	(8) 1991	(9) 1994	(10) 1997
FTA lag 0	0.193*	0.205**	0.217**	0.222**	0.220**	0.228**	0.309***	0.169	0.281***	0.105*
	(0.100)	(0.099)	(0.100)	(0.102)	(0.105)	(0.111)	(0.117)	(0.119)	(0.098)	(0.060)
FTA lag 1	0.238**	0.254**	0.266***	0.272***	0.272***	0.281***	0.367***	0.271**	0.323***	0.225***
	(0.103)	(0.100)	(0.100)	(0.102)	(0.104)	(0.104)	(0.099)	(0.131)	(0.052)	(0.034)
FTA lag 2	0.263**	0.272**	0.284***	0.290***	0.290***	0.299***	0.389***	0.324***	0.355***	0.265***
	(0.110)	(0.108)	(0.108)	(0.109)	(0.109)	(0.106)	(0.084)	(0.114)	(0.048)	(0.034)
FTA lag 3	0.311***	0.319***	0.330***	0.336***	0.337***	0.346***	0.437***	0.354***	0.364***	0.347***
	(0.104)	(0.100)	(0.099)	(0.099)	(0.097)	(0.090)	(0.081)	(0.110)	(0.048)	(0.021)
FTA lag 4	0.372***	0.377***	0.390***	0.395***	0.397***	0.405***	0.514***	0.415***	0.377***	0.347***
	(0.099)	(0.095)	(0.094)	(0.094)	(0.093)	(0.087)	(0.073)	(0.102)	(0.034)	(0.028)
FTA lag 5	0.408***	0.417***	0.429***	0.435***	0.435***	0.444***	0.547***	0.446***	0.385***	0.428***
	(0.103)	(0.101)	(0.100)	(0.101)	(0.101)	(0.098)	(0.085)	(0.098)	(0.032)	(0.037)
FTA lag 6	0.440***	0.451***	0.464***	0.469***	0.469***	0.478***	0.585***	0.504***	0.398***	0.399***
	(0.110)	(0.107)	(0.106)	(0.108)	(0.108)	(0.105)	(0.080)	(0.079)	(0.056)	(0.062)
FTA lag 7	0.425***	0.440***	0.452***	0.458***	0.460***	0.469***	0.564***	0.480***	0.477***	0.514***
	(0.112)	(0.108)	(0.108)	(0.110)	(0.110)	(0.107)	(0.084)	(0.061)	(0.069)	(0.106)
FTA lag 8	0.432***	0.447***	0.460***	0.465***	0.467***	0.476***	0.562***	0.480***	0.540***	0.529***
	(0.117)	(0.113)	(0.113)	(0.115)	(0.113)	(0.108)	(0.093)	(0.067)	(0.085)	(0.156)
FTA lag 9	0.430***	0.438***	0.451***	0.457***	0.459***	0.468***	0.550***	0.475***	0.533***	0.612***
	(0.124)	(0.120)	(0.121)	(0.122)	(0.120)	(0.115)	(0.099)	(0.069)	(0.075)	(0.158)
FTA lag 10+	0.435**	0.424**	0.437**	0.445**	0.456**	0.469***	0.473***	0.495***	0.541***	0.678***
	(0.184)	(0.182)	(0.182)	(0.182)	(0.179)	(0.168)	(0.139)	(0.106)	(0.094)	(0.184)
Input FTA lag 0	-0.035	-0.032	-0.045	-0.049	-0.048	-0.044	-0.025	-0.124*	-0.165***	-0.101**
	(0.050)	(0.051)	(0.052)	(0.052)	(0.052)	(0.055)	(0.072)	(0.065)	(0.057)	(0.049)
Input FTA lag 1	-0.019	-0.015	-0.025	-0.029	-0.026	-0.021	-0.001	-0.091	-0.197***	-0.244***
	(0.050)	(0.051)	(0.052)	(0.052)	(0.052)	(0.053)	(0.068)	(0.066)	(0.038)	(0.042)
Input FTA lag 2	-0.039	-0.033	-0.041	-0.046	-0.043	-0.038	-0.018	-0.087	-0.246***	-0.278***
	(0.049)	(0.048)	(0.048)	(0.049)	(0.050)	(0.051)	(0.061)	(0.066)	(0.055)	(0.096)
Input FTA lag 3	-0.051	-0.047	-0.056	-0.061	-0.058	-0.052	-0.040	-0.105	-0.249***	-0.283***
	(0.049)	(0.050)	(0.050)	(0.051)	(0.052)	(0.053)	(0.055)	(0.072)	(0.074)	(0.042)
Input FTA lag 4	-0.059	-0.055	-0.064	-0.068	-0.065	-0.058	-0.054	-0.117*	-0.257***	-0.349***
	(0.052)	(0.054)	(0.055)	(0.056)	(0.058)	(0.060)	(0.056)	(0.071)	(0.048)	(0.057)
Input FTA lag 5	-0.060	-0.055	-0.064	-0.068	-0.064	-0.058	-0.049	-0.072	-0.233**	-0.412***
	(0.052)	(0.055)	(0.056)	(0.058)	(0.061)	(0.064)	(0.050)	(0.072)	(0.095)	(0.022)
Input FTA lag 6	-0.085	-0.084	-0.093	-0.097	-0.092	-0.085	-0.084	-0.090	-0.217***	-0.343***
	(0.058)	(0.063)	(0.064)	(0.066)	(0.070)	(0.074)	(0.062)	(0.076)	(0.070)	(0.043)
Input FTA lag 7	-0.080	-0.077	-0.085	-0.088	-0.084	-0.077	-0.070	-0.091	-0.237***	-0.396***
	(0.056)	(0.063)	(0.063)	(0.065)	(0.068)	(0.071)	(0.060)	(0.078)	(0.091)	(0.102)
Input FTA lag 8	-0.062	-0.059	-0.066	-0.069	-0.064	-0.057	-0.051	-0.066	-0.272***	-0.381**
	(0.052)	(0.057)	(0.058)	(0.060)	(0.062)	(0.063)	(0.049)	(0.070)	(0.087)	(0.153)
Input FTA lag 9	-0.030	-0.024	-0.031	-0.035	-0.030	-0.022	-0.012	-0.036	-0.283***	-0.403**
	(0.051)	(0.054)	(0.054)	(0.055)	(0.055)	(0.056)	(0.042)	(0.063)	(0.082)	(0.163)
Input FTA lag 10+	-0.099	-0.101	-0.110	-0.114	-0.112	-0.105	-0.051	-0.050	-0.254***	-0.458**
	(0.071)	(0.071)	(0.070)	(0.072)	(0.070)	(0.069)	(0.059)	(0.069)	(0.077)	(0.198)
Observations	98000	90650	83300	75950	68600	61250	53900	46550	39200	31850

Note: *, **, and *** denote p < 0.10, p < 0.05, and p < 0.01, respectively. Standard errors clustered by exporter-importer-year, are reported in parentheses. The year in each column denotes the starting year in the sample.

Table 11: FTA effect on trade with more robust standard errors

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