Dissecting the Trade Effects of Europe's Economic Integration Agreements*

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Abstract

This paper is the first to *systematically* study the trade effects of economic integration agreements (EIAs) between the European Union - one of the driving forces behind the recent explosion of EIAs - and third countries. We thoroughly disentangle the *ex post* effects of these EIAs: 1) we allow for differential timing of effects of EIAs, 2) we look at the effects on total trade flows as well as on the margins, 3) we allow for heterogeneity across EIAs and 4) we estimate the effects of EIAs on trade flows for each EU country individually. We use a panel on imports and exports for the period of 1988-2013 and control for endogeneity of EIAs and multilateral resistance. We find that EIAs have complex and heterogeneous effects on trade flows between the EU and the rest of the world. EIAs have differential effects on trade, depending on the characteristics of the EIAs and the EU member state. We also find that EIAs have positive effects on EU exports, but less on imports, and that a zero effect on the total trade flows sometimes covers opposing effects on the intensive and extensive margins.

Keywords: Trade Agreements; European Union; Gravity model; Panel data; Intensive margin; Extensive margin; Exogeneity; Anticipation effects

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1 Introduction

In the past two decades, the number of economic integration agreements (EIA)[1] notified to the WTO has exploded. In 2014 alone, ten new free trade agreements entered into force[2]. This brings the total of active trade agreements notified to the WTO as of February 1, 2015 to a stunning 402. With the exception of Mongolia, all WTO members have signed at least one trade agreement.

Not only has the number of EIAs being signed and negotiated exploded in recent years, the economic literature investigating the impact of EIAs has grown equally fast. This has led to tremendous improvements in methodology. While earlier studies report very mixed results on the trade effects of EIAs (see Cipollina and Salvatici 2010 for a comprehensible meta-analysis), recent studies start to find more consistent numbers (see for example Baier and Bergstrand 2007; Magee 2008; Kohl 2014 and Baier, Bergstrand and Feng 2014).

Especially Europe has been a driving force behind the explosion of EIAs signed and negotiated in recent years. In 2012, 23% of all imports to the EU27 and 27% of all EU27 exports were mitigated by EIAs. When we also take into account trade agreements that had not yet entered into force or that were being negotiated, these numbers go up to 58% for imports and 70% for exports[3].

This makes one wonder about the exact impact of these EU trade agreements on trade flows. However, the trade effects of EIAs depend on the characteristics of the specific countries involved. It is therefore inadvisable to extrapolate international findings to the European context.

There exists a vast literature studying trade agreements in a European context. However, most papers look at the effect of the European Union itself (for example Micco, Stein and Ordoñez 2003; Baldwin, Frankel and Melitz 2006 and Kelejian, Tavlas and Petroulas 2012, amongst others, study the effect of the euro on intra-bloc trade; Magee 2008 and Geldi 2012, amongst others, study whether the EU is trade creating or trade diverting and Bussière, Fidrmuc and Schnatz 2008 and Spies and Marques 2009, amongst other, study the trade effects of enlargements of the EU).

A small number of studies have also touched upon the subject of the effects of the European trade agreements with third countries (see for example Bensassi, Márquez-Ramos and Martínez-Zarzoso 2012 on EuroMed trade agreements between certain EU member states and four North African countries; Persson and Wilhelmsson 2006 on EU trade preferences for developing countries; Camarero, Gómez and Tamarit 2012 on

[1] Baier, Bergstrand, Egger and McLaughlin (2008) define EIAs as "treaties between economic units in the case of international EIAs, between nations to reduce policy-controlled barriers to the flow of goods, services, capital, labour, etc". We distinguish three main types of EIAs, reflecting different intensities of trade integration: preferential trade agreements (PTA), free trade agreements (FTA) and custom unions and common markets (CU).

[2] rtais.wto.org

[3] Own calculations based on COMEXT data.

free trade agreements between the EU15 and Chile, Iceland, South-Korea, Mexico and Norway, amongst others). However, none of these papers have *systematically* studied the effects of the trade agreements between the European Union and third countries. Moreover, as Kohl (2014) points out, important methodological improvements applied at the generalist level are not always as rigorously applied in 'specialist' studies, making it difficult to compare results. This paper is intented to fill this gap.

In this paper we quantify *ex post* the effects of these agreements on trade flows between the European Union and the rest of the world. We use a panel on aggregate imports and exports between 27 EU countries and 203 third countries and territories for the period of 1988-2013. Following the empirical approach by Baier and Bergstrand (2007), we account for the endogeneity of EIAs by including three sets of fixed effects (importer-time, exporter-time and country pair) and alternatively, by differencing our data using five year intervals.

We contribute to the literature by thoroughly disentangling the heterogeneous effects of EIAs. We do this in several different ways. First, we allow for differential timing of effects, by including 5 and 10 year lags and calculating average treatment effects. Consistent with the literature, we find that medium-term and long-term reaction effects are important.

Secondly, we do not only look at the effects of all these factors on total trade flows, but we also consider the impact on the intensive and extensive margin. While there are already papers that explore differential timing of EIA effects or the effects of EIAs on the margins, Baier, Bergstrand and Feng (2014) and Florensa, Márquez-Ramos and Recalde (2015) are two of the only papers so far that allow for differential timing of different types of EIAs, while at the same time looking at the margins, controlling for endogeneity of EIAs and multilateral resistance. We find that no effects on the total trade flows sometimes cover opposing effects on the intensive and extensive margin. Both margins appear thus to be important for capturing the true trade effects of EIAs.

Thirdly, we dive deeply into the heterogeneity across EIAs. We start by considering various types of EIAs by including separate dummies for preferential trade agreements (PTAs), free trade agreements (FTAs) and customs unions and common market agreements (CUs). Then, we also look at the trade effect of each EIA separately. We find that EIAs have very heterogeneous effects on trade flows. Similar to Kohl (2014), we find that most separate EIAs have no impact on total trade flows. This is obscured when only looking at a general EIA dummy.

Finally, we estimate the effects of EIAs on trade flows for each EU country individually. As expected, we find that EIAs have heterogeneous effects on the different countries of the European Union.

The remainder of this paper is organized as follows. Section 2 discusses the gravity model and describes the empirical methodology used. Section 3 discusses the data, while section 4 presents the main results and findings. Section **??** presents two extensions to our baseline model and section ?? presents robustness checks dealing with endogeneity and changes over time in pair-specific unobservables. Section 7 concludes.

2 Methodology

2.1 The gravity model

In this paper, we use a panel gravity model with three sets of fixed effects, as proposed by Baier and Bergstrand (2007) and subsequently used by a large number of studies.

Since its introduction by Tinbergen (1962), the gravity model has become the most applied model for analyzing trade flows. In its most simple form, the gravity model states that trade flows between a country pair depend negatively on the distance between the two countries and positively on the mass of each country.

During the decades following Tinbergen's seminal work, many authors have come up with theoretical foundations for the gravity equation. Once a theoretical orphan, the gravity model is now a fully-fledged model with strong theoretical micro-foundations. Though estimating the trade elasticity is model-specific and different types of quantitative models (like Armington, Krugman, Ricardian and Melitz models) might yield different structural interpretations of it, Arkolakis, Costinot and Rodriguez-Clarez (2012) argue that the gravity equation offers a common way to estimate the trade elasticity and therefore a common estimator of the gains from trade, despite the different micro-level predictions of different quantitative trade models. They adopt a broad definition of the gravity model and suggest that a trade model satisfies the gravity equation if bilateral trade flows can be decomposed as follows:

$$\ln X_{ijt} = A_{it} + B_{jt} + \gamma \ln \tau_{ijt} + \upsilon_{ijt} \tag{1}$$

where $i, j = 1, ..., N$ countries; X_{ijt} denotes bilateral trade flows between country i and country j at time t; A_{it} denotes the characteristics of country i at time t; B_{jt} denotes the characteristics of country j at time t; γ denotes the partial elasticity of bilateral imports with respect to variable trade costs; τ_{ijt} denotes variable trade costs and υ_{ijt} denotes parameters that are country pair-specific but different from variable trade costs.

This general gravity model can easily be extended to accommodate a range of variables in which the researcher might be interested, explaining the popularity of the gravity model. One common extension is the inclusion of a dummy variable when two countries share an EIA, allowing to evaluate the trade effects of EIAs. The gravity equation then takes the following form:

$$\ln X_{ijt} = A_{it} + B_{jt} + \gamma \ln \tau_{ijt} + \zeta EIA_{ijt} + \upsilon'_{ijt} \tag{2}$$

with ζ denoting the trade effect of EIAs.

2.2 Pitfalls of the gravity model

Estimating equation (2) in order to recover ζ might seem fairly simple. There are, however, several econometric problems that have to be addressed when estimating the gravity equation empirically.

First, and for this paper most importantly, the EIA dummy suffers from an endogeneity problem. This potentially biases the gravity model when standard estimation methods are used. Contrary to what is normally assumed in empirical papers, the EIA dummy variable is not an exogenous variable: country pairs that conclude trade agreements are not randomly selected, but unobserved time-invariant bilateral variables influence simultaneously the presence of an EIA and the volume of trade. This endogeneity problem is extremely troublesome, as there does not exist a consensus in the literature as to the direction of the bias. Baier and Bergstrand (2007) find that unobserved heterogeneity most likely biases the coefficients of FTAs *downwards* in standard gravity equation estimations, while Magee (2003) argues that - building on the natural trading partner hypothesis - countries tend to conclude EIAs if they already have significant bilateral trade. This argument is consistent with Roy (2012), who finds that most positive and significant estimates of FTAs can be explained by positive selection of country pairs in trade agreements. The CUs in Roy's study, however, seem to be robust to selection on observables. If any, there is a negative selection effect of CUs.

Even though this endogeneity problem was already raised in 1993 by Trefler, Baier and Bergstrand (2002 and 2004) and Magee (2003) were the first to address it empirically - using instrumental variables with cross section data. However, due to the lack of reliable instruments, these studies have not been very successful in solving the endogeneity of EIAs, providing "at best mixed evidence of isolating the effect of FTAs on trade flows" as Baier and Bergstrand (2007) put it.

Baier and Bergstrand (2007) provide a more convincing solution to the endogeneity problem, using panel data. Panel data are extremely useful in the presence of unobserved time-invariant heterogeneity as it is possible to control for this unobserved heterogeneity and hence alleviate the endogeneity bias by using either country pair fixed effects or differencing the data[4]. Both solutions have since then been extensively used in empirical work.

Differencing panel data has one major advantage over using fixed effects: if the error terms are highly serially correlated, then estimating the model in differences will be more efficient than fixed effects for large T (Woolridge, 2002). However, fifth differencing also results in a loss of data as the fifth-differences estimator uses up the first five years of data. This becomes especially problematic when adding lags to our baseline model, as it results in additional loss of data and we only have a time span of 26 years. This is

[4]Baier and Bergstrand use five year intervals to difference their data, instead of the usual first differences. This is because trade flows typically change very slowly over time, making it very likely that first differenced data will not display much variation. We will call this fifth differences from now on.

why we will estimate our model using both methods.

Second, A_{it} and B_{jt} include the so-called multilateral price/resistance (MR) term (see for example Anderson and van Wincoop, 2003). There are different methods to estimate this unobserved MR term (see Feenstra 2004). A first option is to proxy the multilateral MR term by price index data (like GDP deflators). However, as not all costs of making transactions across borders are reflected in aggregate price indices, this estimation method will yield biased results.

A second option is to directly estimate the MR term. This requires solving a highly nonlinear system of N equations with a custom nonlinear least squares program. As this is computationally very burdensome, this is not feasible for datasets with a large number of country pairs and years such as ours.

A third alternative is to include country-time fixed effects. Though still computationally burdensome when working with large panel datasets[5], this has become the preferred method of many authors for solving the MR problem (including Baier and Bergstrand 2007).

Baier and Bergstrand (2009) provide a fourth alternative to control for the multilateral price/resistance term. By using a first-order Taylor expansion of the MR term, this approach provides coefficient estimates virtually identical to the fixed effects method. Compared to the other estimation methods, bonus vetus ordinary least squares (BVOLS), as Baier and Bergstrand call it, has two major advantages: first, it is computationally easier than estimating the MR term directly. Second, the use of BVOLS instead of the fixed effects specification avoids the incidental parameters problem. However, this method does not allow one to control for the endogeneity of EIAs. Since estimating the impact of EIAs correctly is crucial for our research, we therefore opt to use it and jt fixed effects in this paper.

Third, zero trade flows are very common in trade datasets when a global perspective is adopted. When using a loglinearized gravity equation, these zero observations are ignored, which can potentially bias the results. Two methods have been proposed in the literature to cope with this zero-trade-flow problem: including a selection equation and estimating the model multiplicatively using for example Poisson Pseudo Maximum Likelihood (as proposed by Silva and Tenreyro, 2006). However, due to the particular characteristics and quality of our data set, our sample does not count many zero trade flows (less than 11% for imports and 4% for exports). The potential bias stemming from zero trade flows is hence not a major concern. Moreover, it is computationally impossible to estimate a model with a large number of fixed effects using PPML because of convergence issues.

[5] Calculation times have luckily shortened tremendously since the introduction of the high-dimensional fixed effects command *reghdfe* for Stata by Guimaraes and Portugal (2010).

This brings us to the following baseline model

$$\ln X_{ijt} = \beta_0 + \beta_1 PTA_{ijt} + \beta_2 FTA_{ijt} + \beta_3 CU_{ijt} + \delta_{it} + \psi_{jt} + \eta_{ij} + \epsilon_{ijt} \tag{3}$$

with PTA_{ijt} (FTA_{ijt}) (CU_{ijt}) a dummy variable taking the value 1 when countries i and j have an active PTA (FTA) (CU) in year t; δ_{it} importer-time fixed effect; ψ_{jt} exporter-time fixed effect; η_{ij} country pair fixed effect and ϵ_{ijt} error term.

2.3 Dissecting the effects of EIAs

Our properly specified baseline model is, however, too simple to capture the complex trade effects of EIAs. Starting from our simple baseline model, we will therefore progressively dissect the heterogeneous effects of the European Union EIAs in a more precise manner. We hence let go of the frequently used empirical assumption of homogeneous trade effects of EIAs (see for example Rose 2000; Feenstra, Markusen and Rose 2001 and Frankel and Rose 2002). In this paper, we dissect the complexity of the effects of EIAs in four ways.

First of all, we are interested in the exact way trade agreements affect trade flows: do EIAs affect how much countries trade of a given good (the intensive margin) or rather how many goods are traded (the extensive margin)? Following Hummels and Klenow (2005), we will therefore decompose our trade flows into an intensive and an extensive margin, using highly disaggregated data.

Second, EIAs could also have very different effects depending on how long they have already been in place. EIAs are typically phased in over a period of five to ten years[6], and terms-of-trade changes take typically a few years before coming into effect, altering the effect of EIAs over time. Following Baier and Bergstrand (2007) and Baier, Bergstrand and Feng (2014), we include 5- and 10-year lags of our set of EIA variables in our estimation in order to pick up on these reaction effects.

Magee (2008) goes a step further, and includes a separate dummy per year that an EIA has entered into force. This makes it possible to evaluate how the effects of EIAs change over time. Including this many dummy variables in a model, however, raises the question of multicollinearity since it is very probable that several of these variables will be highly correlated.

Furthermore, several papers have provided some indication that EIAs not only have (lagged) reaction effects, but that there might also be an anticipation effect (these include Magee 2008; Freund and McLaren 1999; Mölders and Volz 2011 and Florensa, Márquez-Ramos and Recalde 2015). EIAs are typically negotiated for many years and several years might pass by between the signing of an agreement and its entering into force. It is thus not unthinkable that agents already anticipate the entering into force of an

[6]Dür et al. (2014) coded 587 agreements signed between 1945 and 2009 and find that it takes on average 5.7 years for the tariff cuts of an FTA to be fully implemented and 4.5 years for a CU. Partial trade agreements have a relatively short so-called “transition period” of just 1.7 years.

EIA. Anticipation effects and endogeneity issues are however closely related (and both are often mixed up). This is why we will deal with anticipation effects in the robustness check.

Third, we take the dissection of the European EIAs even further and look at the effects of each individual FTA and CU separately. We do this by swapping the FTA and CU dummies with a separate dummy for each agreement (the agreements included are listed in table 1).

Finally, and pushing the dissecting of the EIAs even further, we have a closer look at the effects of the EU EIAs on each EU country individually. EU EIAs are negotiated by the European Union, but most likely will not have a similar impact on all member states. The 27 economies of the European Union differ considerably and EIAs can have very different economic effects, depending on the characteristics of the signatories. We will therefore estimate our baseline model for the EU countries individually.

Following Herderschee and Qiao (2007), we do this by creating three sets of interaction terms with on the one hand our EIA dummies and on the other hand a dummy for the country for which we estimate the individual effect. Our fixed effects specification then becomes

$$\ln X_{ijt} = \beta_0 + \beta_1 PTA_{ijt} * I_j + \beta_2 FTA_{ijt} * I_j + \beta_3 CU_{ijt} * I_j + \delta_{it} + \psi_{jt} + \eta_{ij} + \epsilon_{ijt} \quad (4)$$

with I_j an indicator variable for country j.

3 Data

The data used in this paper cover bilateral import and export flows between the 27 member states of the European Union and the rest of the world (203 countries and territories) from 1988 through 2013. Table 7 in the Appendix lists the countries included in our dataset.

We have two main datasets. Data on bilateral trade flows come from the Eurostat database COMEXT. We opted for this database as it contains the most detailed and complete information on trade between the European Union and the rest of the world: both extra-EU imports and exports are available on the eight-digit level from 1988 to 2013 for a large number of countries[7]. Hence the panel has a maximum of $203 * 26 * 26 =$ 137 228 observations, of which 92 517 (67%) are non-missing.

For our dataset on trade agreements, we constructed a multichotomous index of EIAs. We used the same EIA classification as Baier and Bergstrand (based upon Frankel 1997 and Balassa 1987), but since the European Union did not conclude any economic

[7]The COMEXT database considers Belgium and Luxemburg, and Liechtenstein and Switzerland as one country. So when we refer to Belgium or Switzerland in this paper, we really mean Belgium and Luxemburg, and Switzerland and Liechtenstein. Moreover, we do not include Croatia in our sample, as Croatia became a member of the EU in mid 2013.

union agreements with third countries and because of the small number of two-way preferential trade agreements, we compiled the Baier and Bergstrand index into three categories: (1) one-way and two-way preferential trade agreement (PTA), (2) free trade agreement (FTA) and (3) customs union and common market (CU). Data on FTAs and CUs were collected from McGill (2014), Tuck (2014), WorldTradeLaw.net (2012), WTO (2014), EFTA (2014) and European Commission (2014). When data on entry into force of agreements exceptionally differed between sources, we used the data provided by the European Commission. Table 1 lists all the European Union free trade agreements and customs unions with third countries. For data on PTAs, we used Regulations of the EU Council concerning GSP schemes and European Commission (2014) as our main sources. Summary statistics on EIAs are provided in table 2.

Table 1: Trade Agreements in force between the EU and third countries for the period 1988-2013. The labels in parentheses refer to the EU classification of the agreement.

Date	Agreement	Type	Date	Agreement	Type
1971	EU-OCT	FTA (ASS)	2004	EU-Montenegro	FTA (SAA)
1973	EU-Liechtenstein	FTA (FTA)	2005	EU-Algeria	FTA (ASS)
1973	EU-Switzerland	FTA (FTA)	2006	EU-Albania	FTA (SAA)
1973	EU-Iceland	FTA (FTA)	2008	EU-Bosnia-Herzegovina	FTA (SAA)
1973	EU-Norway	FTA (FTA)	2009	EU-Swaziland	FTA (EPA)
1991	EU-Andorra	CU (CU)	2009	EU-Namibia	FTA (EPA)
1994	EU-Liechtenstein	CM (CM)	2009	EU-Lesotho	FTA (EPA)
1994	EU-Iceland	CM (CM)	2009	EU-Botswana	FTA (EPA)
1994	EU-Norway	CM (CM)	2009	EU-Cameroon	FTA (EPA)
1995	EU-Israel	FTA (ASS)	2009	EU-Zimbabwe	FTA (EPA)
1996	EU-Turkey	CU (CU)	2009	EU-Mauritius	FTA (EPA)
1997	EU-Faeroe Islands	FTA (FTA)	2009	EU-Seychelles	FTA (EPA)
1997	EU-Palestine	FTA (ASS)	2009	EU-Madagascar	FTA (EPA)
1998	EU-Tunisia	FTA (ASS)	2009	EU-Mozambique	FTA (EPA)
2000	EU-South Africa	FTA (ASS)	2009	EU-CARIFORUM	FTA (EPA)
2000	EU-Morocco	FTA (ASS)	2010	EU-Serbia	FTA (SAA)
2000	EU-Mexico	FTA (FTA)	2011	EU-South-Korea	FTA (NFTA)
2001	EU-Macedonia	FTA (SAA)	2011	EU-Papua New Guinea	FTA (EPA)
2002	EU-Jordan	FTA (ASS)	2013	EU-Nicaragua	FTA (ASS)
2002	EU-San Marino	CU (CU)	2013	EU-Panama	FTA (ASS)
2003	EU-Lebanon	FTA (ASS)	2013	EU-Colombia	FTA (FTA)
2003	EU-Chile	FTA (FTA)	2013	EU-Peru	FTA (FTA)
2004	EU-Egypt	FTA (ASS)	2013	EU-Honduras	FTA (ASS)

Date refers to the (provisional) entry into force of an agreement. EPA: Economic Partnership Agreement, FTA: Free trade agreement, NFTA: New Generation FTA, ASS: Association Agreement, SAA: Stabilisation and Association Agreement, CU: Customs Union, CM: Common Market. Generalised scheme of Preferences (GSP), GSP+ and Everything but Arms (EBA) have been ommitted from the list due to space constraints. These schemes contains OPTAs with virtually all developing countries since the 1970s.

Table 2: Summary statistics on EIAs.

EIA	Number	Percentage	Share of EIAs
No EIA	54 926	40.0%	
One-way PTA	64 508	47.0%	78.4%
Two-way PTA	2 782	2.0%	3.3%
FTA	13 158	9.6%	15.9%
CU	1 854	1.4%	2.3%
Total	137 228	100%	

4 Main results

4.1 Baseline model

Table 3 represents estimates of the effects of different types of EIAs on imports and exports respectively, based on equation (7). We ran all our regressions twice - once using bilateral import data and once using bilateral export data - as there is no reason for import and export flows to be symmetric. This is especially important when analyzing EIAs, as many trade agreements have very different stipulations for imports compared to exports. As the Breusch-Pagan test and the Wooldrigde test indicate the presence of severe heteroskedasticity and serial correlation in the data, respectively, we employ standard errors that are clustered by country pair.

First of all, note that the European Union only has three customs unions with third countries (Andorra, Turkey and San Marino) and three common market agreements (Liechtenstein[8], Norway and Iceland). Results for the CU dummies will therefore mainly be driven by Turkey, Norway and Iceland, and will have large standard errors due to the small sample size.

Looking at the first column of table 3, we see that CUs and FTAs have a bigger effect on trade flows than PTAs. This is consistent with Baier, Bergstrand and Feng (2014), who also find that deeper integration results in larger effects. This holds up for the import-side as well as the export-side. We see that PTAs have a negative effect on both imports and exports: PTAs reduce trade flows from third countries to the EU on average with $e^{(-0.26)} - 1 = -23\%$, while trade flows from the EU to third countries drop by 16% on average. This is surprising, as the goal of most PTAs is to increase imports from (poor) third countries to the EU. However, there is some evidence that exports eligible for preferential treatment do not always enter the EU market at a preferential rate, due to for example complex rules of origin procedures (see for example Manchin (2006) for a discussion of the preference utilisation rate of ACP countries). This unexploited potential of PTAs might explain why they have not succeeded in raising imports to the EU.

We see a different picture looking at the estimates for FTAs. These trade agreements do not have a statistically significant effect on imports, but do increase exports by 22%

[8] We ignore the common market agreement between Liechtenstein and the EU, as Liechtenstein and Switzerland are considered one country in our dataset.

on average. This suggests that the European Union leads a successful trade policy and succeeds in concluding strategic trade agreements that boost exports of EU firms, while at the same time not increasing increasing imports (and thus competition) to the European Union market. The EU succeeds in achieving the main goal of its trade policy: improving market access for its exporters.

In contrast to Baier, Bergstrand and Feng (2014), we do not find a larger effect of CUs on trade than FTAs. CUs have no statistically significant impact on imports or exports, though the coefficients are positive for both. There are two possible explanations for this. First of all, CUs might have an effect on trade, but fail to reach statistical significance due to the small number of CUs in our sample. Alternatively, EU CUs might simply not have (large) effects on trade flows. We find support for this explanation in two variables that look at the design of trade agreements. The first one describes the depth of EIAs and is provided by Dür et al. (2014)[9]. The second one describes the enforcability of EIAs and is provided by Kohl, Brakman and Garretsen (2015)[10]. Comparing the FTAs and CUs in our sample, we see that our CUs are less enforcable and not as deep as our FTAs[11].

4.2 Differential timing of EIAs

In column (2) and (3) of table 3, we added 5- and 10-year lags to the specifications[12]. Again like Baier, Bergstrand and Feng (2014), we see that trade agreements continue having effects on trade flows 5 or 10 years after the EIA has entered into force. As mentioned before, this is because of two reasons. First, many stipulations of trade agreements only enter into force after a certain period of time, since EIAs are typically phased-in over a period of five to ten years. Second, it takes time for the terms of trade to adjust to the new situation.

Taking a closer look, we see that PTAs have a contemporaneous effect on imports, as well as a 5-year lagged effect. The coefficient for the 10-year lag is not statistically significant. We find no lagged effects of PTAs on the export side. Similar to the

[9]Available in the DESTA database on http://www.designoftradeagreements.org/.

[10]Available on http://www.tristankohl.org/datasets.

[11]More specifically, the FTAs in our sample score on average 0.68 on enforcability and 3.6 on depth, while CUs score 0.5 and 1.8 (with lower scores indicating a more shallow and less enforcable EIA). For more info on these variables, see the respective websites. Sadly, both datasets only coded a little more than half of the FTAs in our sample.

[12]Note that when adding 5- and 10-year lags, only agreements enforced by 2008 or 2003 are considered.

Table 3: GLS estimation of the baseline model using fixed effects.

		(1)			(2)			(3)		
Import		X	IM	EM	X	IM	EM	X	IM	EM
PTA		-0.26***	-0.28***	0.02	-0.24***	-0.26***	0.01	-0.21**	-0.21**	-0.01
		(0.093)	(0.088)	(0.036)	(0.092)	(0.086)	(0.036)	(0.096)	(0.089)	(0.039)
Lag 5					-0.22***	-0.26***	0.04*	-0.20***	-0.23***	0.02
					(0.066)	(0.064)	(0.023)	(0.076)	(0.073)	(0.026)
Lag 10								-0.12	-0.10	-0.02
								(0.082)	(0.082)	(0.026)
FTA		-0.14	-0.13	-0.00	-0.12	-0.12	-0.00	-0.14	-0.13	-0.01
		(0.121)	(0.115)	(0.049)	(0.121)	(0.115)	(0.049)	(0.137)	(0.133)	(0.054)
Lag 5					-0.10	-0.23**	0.13***	-0.06	-0.15	0.09**
					(0.097)	(0.099)	(0.036)	(0.108)	(0.111)	(0.039)
Lag 10								-0.12	-0.16	0.03
								(0.118)	(0.123)	(0.038)
CU		0.09	-0.16	0.25***	0.06	-0.19	0.25***	0.08	-0.17	0.26***
		(0.184)	(0.169)	(0.080)	(0.182)	(0.167)	(0.079)	(0.212)	(0.180)	(0.092)
Lag 5					-0.05	-0.09	0.04	-0.08	-0.06	-0.01
					(0.130)	(0.122)	(0.051)	(0.144)	(0.133)	(0.057)
Lag 10								-0.24	-0.18	-0.06
								(0.185)	(0.179)	(0.065)
Total ATE	PTA							-0.54***	-0.53***	-0.00
								(0.166)	(0.158)	(0.062)
	FTA							-0.32	-0.44	0.12
								(0.282)	(0.290)	(0.104)
	CU							-0.23	-0.42	0.19
								(0.400)	(0.349)	(0.169)
Export										
PTA		-0.17**	-0.14**	-0.02	-0.17**	-0.15**	-0.03	-0.10	-0.07	-0.03
		(0.072)	(0.071)	(0.038)	(0.071)	(0.070)	(0.037)	(0.080)	(0.080)	(0.041)
Lag 5					0.08	0.03	0.06**	0.08	0.03	0.05*
					(0.051)	(0.046)	(0.024)	(0.061)	(0.055)	(0.027)
Lag 10								0.10*	0.09*	0.01
								(0.057)	(0.051)	(0.027)
FTA		0.20**	0.23***	-0.03	0.20**	0.24***	-0.03	0.26**	0.28***	-0.03
		(0.093)	(0.088)	(0.052)	(0.093)	(0.088)	(0.052)	(0.109)	(0.101)	(0.059)
Lag 5					0.13*	0.04	0.09**	0.16*	0.09	0.07*
					(0.075)	(0.065)	(0.041)	(0.082)	(0.072)	(0.041)
Lag 10								0.07	0.01	0.06
								(0.092)	(0.079)	(0.043)
CU		0.19	0.01	0.18**	0.19	0.01	0.18**	0.25	0.09	0.16*
		(0.146)	(0.140)	(0.079)	(0.145)	(0.139)	(0.078)	(0.161)	(0.165)	(0.087)
Lag 5					0.10	0.04	0.05	0.11	0.11	-0.00
					(0.099)	(0.093)	(0.052)	(0.109)	(0.107)	(0.056)
Lag 10								0.06	0.13	-0.07
								(0.147)	(0.138)	(0.069)
Total ATE	PTA							0.08	0.06	0.03
								(0.133)	(0.130)	(0.067)
	FTA							0.48**	0.38**	0.10
								(0.217)	(0.191)	(0.111)
	CU							0.42	0.34	0.09
								(0.301)	(0.303)	(0.163)
Fixed effects										
Country-year		yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair		yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair.time		no	no	no	no	no	no	no	no	no
Obs import		82661	82661	82661	73808	73808	73808	60638	60638	60638
Obs export		88803	88803	88803	79375	79375	79375	65473	65473	65473

Standard errors clustered on country pair in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Total average treatment effects (ATEs) are computed using a two-tailed joint significance test.

contemporaneous effects of FTAs and CUs, these deeper EIAs have no lagged effects on imports. FTAs do however have a lagged effect on export flows. [13]

In order to see the cumulative effects of EIAs over time, we calculated total average treatment effects (ATEs) using a two-tailed joint significance test[14]. We find that PTAs have strong and persistent negative treatment effects on imports (-42%), while FTAs have strong positive treatment effects on exports (+62%). All other EIAs have no (statistically significant) effects on trade flows in the long run.

We elaborate further on the differential timing of EIAs on the margins of trade in the next section.

4.3 Opposing effects on margins of trade

Each set in table 3 presents the results of running the same specification with three alternative dependent variables: bilateral import or export flows (X or ln X_{ijt} in equation (7)), the intensive margin (IM) and the extensive margin (EM).

We find that the contemporaneous effects for PTAs and FTAs are completely driven by the intensive margin. Looking at the lagged effects on the margins, we see that PTAs and FTAs have positive lagged effects on the extensive margin (for PTAs this is only on the export-side, while for FTAs this is true for both imports and exports). This is in line with the theoretical predictions of Ruhl (2008) and Arkolakis, Eaton and Kortum (2011) who argue that effects on the extensive margin are delayed due to fixed export costs and delayed consumer responses respectively. Changes in volume, however, do not require any start-up costs or changes in customer behavior. This is also confirmed empirically by Baier, Bergstrand and Feng (2014), who find that intensive margin effects of EIAs occur sooner than extensive margin effects.

This is in contrast to the effects of CUs, which are mainly driven by the extensive margin. This, along with the lack of lagged effects of CUs, can be explained by the particular structure of our data. As mentioned, results for CUs are mainly driven by Turkey, Norway and Iceland. All of these countries already had very close economic

[13] We also included 15-year lags in our estimation, but the coefficients for the different EIAs were not statistically significant and close to zero. This is in line with results of Baier, Bergstrand and Feng (2014) and Florensa, Márquez-Ramos and Recalde (2015) amongst others. Results have been omitted in order to save space, but can be retrieved upon request to the authors.

[14] This in contrast to Baier, Bergstrand and Feng (2014) who simply take the sum of the coefficients that are statistically significant.

ties with the EU before concluding a CU with the EU[15]. This probably sped up the adjustment of the terms of trade, as economic structures were already in place.

Furthermore, we also find that zero effects of EIAs on total trade flows are sometimes caused by opposing effects on the margins. This is for example the case for CUs on the import-side. The positive contemporaneous effects on the extensive margin are offset by a negative effect on the intensive margin.

4.4 Effects of individual EIAs

We now look at the different European Union EIAs separately. How does each FTA and CU influence trade flows between the EU27 and the rest of the world? For this, we swap the FTA and CU dummy in equation (7) by a separate dummy for each agreement[16].

The results are summarized in figure 1. The full regression output can be found in table 8 in the appendix. We see that the effects of the different FTAs and CUs between the EU27 and the rest of the world are very heterogeneous. Moreover, we see that many trade agreements have zero effect on trade: most trade agreements have no statistically significant effect on trade flows. Only 6 trade agreements have positive effects on imports and exports, while the trade agreement with Albania has negative and statistically significant effects on both imports and exports.

This is similar to Kohl (2014), who finds that of the 166 trade agreements in his sample, 64% have no statistically significant total treatment effect on trade flows. 27% have trade promoting effects and 10% have negative total treatment effects.

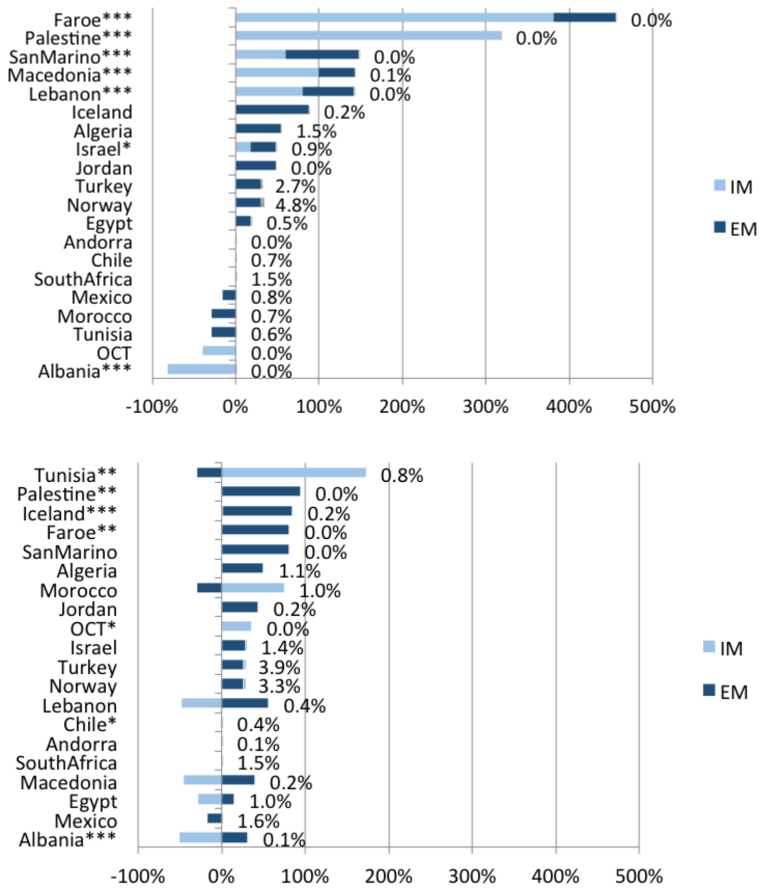
When we look at the margins, however, we see a different picture. The lack of significant effects of trade agreements on trade flows is partly explained by opposing effects on the intensive and extensive margin. For 7 (9) trade agreements, the positive effect on the extensive margin of imports (exports) is (partly) offset by negative effects on

[15]Norway and Iceland had an FTA with the EU before entering into a CU, while Turkey signed the Ankara Agreements in 1963, initiating a three-step process towards creating a CU which would help secure Turkey's full membership in the EEC.

[16]Note that we cannot estimate the individual effects of the agreements with Papua, CARIFORUM, Cameroon, Mauritius, Seychelles, Madagascar, Zimbabwe, Botswana, Lesotho, Namibia, Swaziland, Mozambique, Serbia, Montenegro, Bosnia and Herzegovina, Switzerland, South-Korea, Colombia, Peru, Honduras, Panama and Nicaragua because of collinearity. Most of these agreements only entered into force in the last year(s) of our sample, or are concluded with countries that have poor data availability. Therefore we group them together in a control variable. This control variable also absorbs all other EIAs that are not captured by the separate agreement dummies (namely PTAs and EIAs that were in place between third countries and EU countries, before they were part of the EU27).

[17]Computing total ATEs with 5- and 10-year lags would mean that we could only look at EIAs enforced by 2003.

Figure 1: Contemporaneous effects[17](in %) of individual EIAs on imports (top) and exports (bottom) using a GLS estimation with fixed effects. The percentage next to each bar indicates the share of each country in total extra-EU imports.



Note: The stars next to the agreements indicate statistical significance of the estimate for the total trade flow (*** p<0.01, ** p<0.05, * p<0.1). Only estimates for the margins which are statistically significant at the 10% treshold are shown in the graph. The full regression output can be found in table 8 in the appendix.

the intensive margin, while for 3 trade agreements, the negative effect on the extensive margin of imports and exports are (partly) offset by positive effects on the intensive margin.

4.5 Effects of EIAs on individual countries

Finally, we relax the assumption that trade agreements have a homogeneous impact on the countries that sign them and estimate the effects of PTAs, FTAs and CUs on each EU27 country separately. EIAs with European Union countries are negotiated by the European Union, but will most likely not have a similar impact on all member states. The 27 economies of the European Union differ considerably in terms of GDP, distance to third countries, sharing a common language with third countries, trade openness[18], and so on. EIAs can have very different economic effects, depending on the characteristics of the signatories (see for example Vicard (2009) for a study showing empirically that the effectiveness of an EIA in enhancing bilateral trade flows depends on both the economic characteristics of the country pair and the characteristics of all other members of the EIA).

Results are presented in figure 2. As expected, we find that EIAs have a heterogeneous impact on the different European Union countries. We see that for most EU27 countries, PTAs have no total treatment effects on total import or export flows. PTAs have strong negative and statistically significant effects on the imports of Belgium, Slovakia, Austria and Hungary, while they have a positive and statistically significant effect on the exports of Latvia and a small negative and statistically significant effect on the exports of Estonia and Greece.

FTAs have a negative and statistically significant effect on the imports of France, Italy, Belgium, Portugal, Ireland, the Netherlands, Finland and Cyprus, while they have a positive and statistically significant effect on the imports of Slovenia and Cyprus, and the exports of France, Spain, Italy, Greece and Slovakia. For CUs, we find positive effects on the imports of Slovenia and Cyprus, and negative effects on the imports of Spain, Sweden, Greece, UK, the Netherlands, Denmark, Belgium, Germany, France and Portugal. We also find large positive and statistically significant effects on the exports of Latvia, the Netherlands and Lithuania.

Again, we find quite some contrasting effects on the margins. Slovakia, Hungary, Romania and the Czech Republic for example experience a positive and statistically significant effect of FTAs on the extensive margin. However, the effect on total trade flows fails to reach statistical significance, indicating an effect on the intensive margin with a different sign.

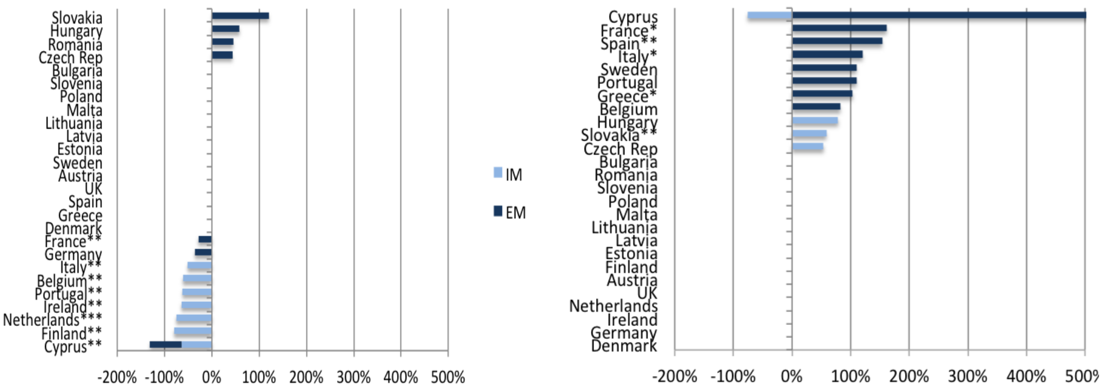
Finally, we see that EIAs have less statistically significant effects on EU countries on the export-side than on the import-side. However, the effects of EIAs on exports are larger and more often positive than on imports.

[18] Arribas, Perez and Tortosa-Ausina (2011) for example show that there are very large differences in trade openness across the members of the European Union, with Belgium, Luxembourg, Czech Republic, Hungary, The Netherlands and Slovakia the most open countries, and Spain, the UK and especially Greece the least open.

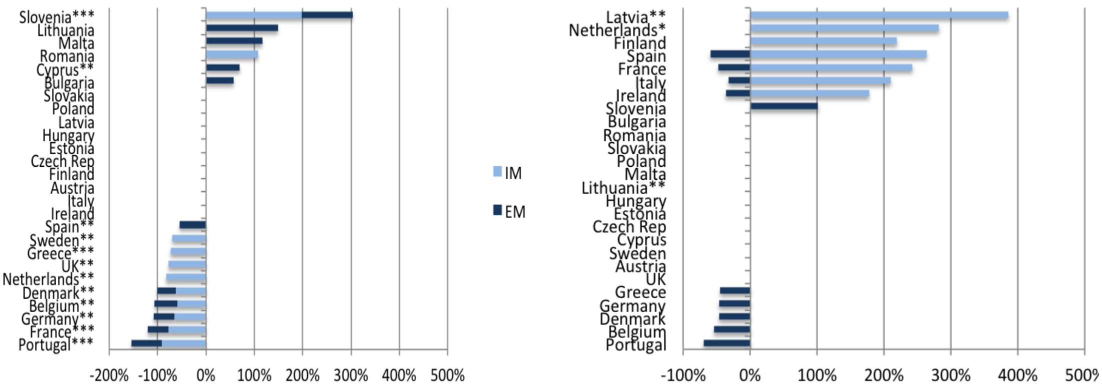
Figure 2: Total average treatment effects (ATEs) of EIAs (in %) on imports (left) and exports (right) of individual EU countries using a GLS estimation with fixed effects.

(a) Effects of PTAs.

(b) Effects of FTAs.



(c) Effects of CUs.



Note: The stars next to the agreements indicate statistical significance of the estimate for the total trade flow (*** p<0.01, ** p<0.05, * p<0.1). Only estimates for the margins which are statistically significant at the 10% threshold are shown in the graph. The full regression output can be retrieved upon request to the authors.

5 Extensions

The EU has many different motives for concluding EIAs, some more economically inspired, while others more politically inspired. These different motivations are reflected in the names of the different agreements: we distinguish between Generalised Scheme of Preferences (GSP), Economic Partnership Agreements, GSP+, Everything but Arms, Free Trade Agreements, New Generation Free Trade Agreements, Stabilisation and Association Agreements, Association Agreements, Customs Unions and Economic Market Agreements.

In order to check if this distinction also leaves a mark in the data, we collapse these different agreements into 6 categories. We then run our extended baseline model while swapping the PTA, FTA and CU dummies in equation (7) for this “EU classification” in addition to a control variable that absorbs all EIAs that are not captured by these dummies. Results can be found in table 4.

We find that the negative effects of PTAs on imports are mainly driven by GSP+ and Everything but Arms, and less by the regular GSP scheme and Economic Partnership Agreements. We also find strong contemporaneous positive effects of the Stabilisation and Association Agreements on imports, but these are offset in the long-run by strong negative lagged effects. Association Agreements and CUs have no statistically significant effect on imports.

On the export-side, we find again that the negative contemporaneous effects of PTAs are mainly driven by GSP+ and Everything but Arms. When also taking lagged effects into account, neither GSP+ and Everything but Arms nor GSP and EPAs have a significant total effect on exports. Furthermore, we find a negative contemporaneous effect of Stabilisation and Association Agreements on exports, but this is offset by postitive lagged effects, resulting in a positive total ATE on exports. Association Agreements and Customs Unions have positive contemporaneous effects on exports, while Association Agreements also have positive lagged effects on exports.

When computing the effects of EIAs by “EU classification” on individual member states, we obtain a similar picture. The effects of the different types of EIAs are not statistically significant for the majority of EU27 countries. For the rest, results are rather heterogeneous, with some countries experiencing positive total ATEs and some negative. EIAs have clearly more positive effects on exports than on imports.

Table 4: GLS estimation of a variation of the baseline model using fixed effects.

		Import						Export					
		(1)			(2)			(1)			(2)		
		X	IM	EM	X	IM	EM	X	IM	EM	X	IM	EM
GSP		0.05	-0.07	0.12***	0.08	-0.00	0.08	-0.06	-0.15*	0.09*	-0.00	-0.05	0.05
		(0.110)	(0.105)	(0.044)	(0.117)	(0.109)	(0.049)	(0.089)	(0.088)	(0.046)	(0.099)	(0.101)	(0.052)
Lag 5					-0.23**	-0.26***	0.03				0.05	-0.00	0.05
					(0.092)	(0.088)	(0.032)				(0.078)	(0.070)	(0.033)
Lag 10					-0.18**	-0.15	-0.03				0.12*	0.13**	-0.02
					(0.090)	(0.092)	(0.028)				(0.062)	(0.057)	(0.030)
PLUS		-0.52***	-0.50***	-0.02	-0.36***	-0.33***	-0.03	-0.22**	-0.20**	-0.02	-0.08	-0.10	0.01
		(0.131)	(0.124)	(0.052)	(0.138)	(0.126)	(0.057)	(0.101)	(0.100)	(0.052)	(0.110)	(0.110)	(0.058)
Lag 5					-0.38***	-0.43***	0.04				0.06	0.02	0.05
					(0.111)	(0.108)	(0.037)				(0.088)	(0.079)	(0.038)
Lag 10					-0.06	-0.11	0.05				0.21**	0.13	0.08*
					(0.133)	(0.135)	(0.046)				(0.092)	(0.080)	(0.046)
FTA		0.60*	0.45	0.15	0.65**	0.62**	0.03	0.40*	0.26	0.14	0.49**	0.48**	0.01
		(0.320)	(0.297)	(0.106)	(0.281)	(0.260)	(0.094)	(0.212)	(0.215)	(0.106)	(0.235)	(0.231)	(0.090)
Lag 5					0.16	0.08	0.08				0.13	0.02	0.11*
					(0.170)	(0.172)	(0.053)				(0.123)	(0.119)	(0.060)
Lag 10					-0.39**	-0.29*	-0.10*				0.01	0.10	-0.09*
					(0.155)	(0.156)	(0.051)				(0.116)	(0.116)	(0.048)
SAA		0.84**	0.49*	0.35***	0.60**	0.35	0.26***	-0.30*	-0.62***	0.32***	-0.14	-0.36**	0.22**
		(0.335)	(0.254)	(0.120)	(0.297)	(0.253)	(0.095)	(0.173)	(0.150)	(0.111)	(0.208)	(0.183)	(0.090)
Lag 5					-0.51***	-0.46***	-0.05				0.10	0.13	-0.04
					(0.175)	(0.170)	(0.078)				(0.176)	(0.132)	(0.083)
Lag 10					-0.94***	-0.65**	-0.28**				0.31	0.52	-0.21
					(0.311)	(0.320)	(0.139)				(0.370)	(0.330)	(0.141)
ASS		-0.08	-0.14	0.06	-0.09	-0.14	0.05	0.25*	0.19	0.06	0.34**	0.27*	0.06
		(0.191)	(0.182)	(0.076)	(0.212)	(0.203)	(0.086)	(0.144)	(0.135)	(0.081)	(0.166)	(0.156)	(0.092)
Lag 5					-0.22	-0.37**	0.15***				0.03	-0.03	0.07
					(0.167)	(0.171)	(0.058)				(0.129)	(0.111)	(0.059)
Lag 10					-0.16	-0.25	0.09				0.26*	0.15	0.11
					(0.225)	(0.233)	(0.069)				(0.152)	(0.130)	(0.073)
CU		0.19	-0.09	0.28***	0.22	-0.08	0.30***	0.18	-0.02	0.20**	0.28*	0.08	0.20**
		(0.196)	(0.178)	(0.085)	(0.221)	(0.185)	(0.097)	(0.149)	(0.145)	(0.082)	(0.163)	(0.168)	(0.089)
Lag 5					0.01	0.02	-0.01				0.09	0.07	0.01
					(0.148)	(0.134)	(0.059)				(0.110)	(0.111)	(0.059)
Lag 10					-0.29	-0.17	-0.12*				0.03	0.17	-0.14**
					(0.189)	(0.182)	(0.067)				(0.147)	(0.143)	(0.069)
Total ATE	GSP				-0.33*	-0.40**	0.07				0.16	0.08	0.08
					(0.193)	(0.183)	(0.074)				(0.158)	(0.158)	(0.080)
	PLUS				-0.80***	-0.87***	0.07				0.19	0.05	0.14
					(0.255)	(0.241)	(0.092)				(0.190)	(0.178)	(0.095)
	FTA				0.42	0.41	0.01				0.63**	0.59**	0.03
					(0.402)	(0.400)	(0.123)				(0.274)	(0.281)	(0.131)
	SAA				-0.84*	-0.77	-0.08				0.27	0.29	-0.03
					(0.481)	(0.502)	(0.189)				(0.561)	(0.490)	(0.201)
	ASS				-0.46	-0.75*	0.29*				0.63**	0.39	0.24
					(0.433)	(0.448)	(0.159)				(0.314)	(0.276)	(0.160)
	CU				-0.06	-0.23	0.17				0.39	0.32	0.07
					(-0.404)	(0.344)	(0.172)				(0.302)	(0.310)	(0.165)
Fixed effects													
Country-year		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair		yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair.time		no	no	no	no	no	no	no	no	no			
Observations		82661	82661	82661	60638	60638	60638	88803	88803	88803	65473	65473	65473

Standard errors clustered on country pair in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Total average treatment effects (ATEs) are computed using a two-tailed joint significance test. Constant and control are omitted because of space constraints. GSP: GSP scheme and Economic Partnership Agreements, PLUS: GSP+ scheme and Everything but Arms, FTA: free trade agreements and New Generation FTAs, SAA: Stabilisation and Association Agreements, ASS: Association Agreement, CU: Customs Union and Economic Market, control: all other EIAs.

Table 5: GLS estimation of a variation of the baseline model using fixed effects.

	Import						Export					
	(1)			(2)			(1)			(2)		
	X	IM	EM	X	IM	EM	X	IM	EM	X	IM	EM
NEIGHBOUR	0.44**	0.11	0.33***	0.42*	0.12	0.31***	0.39**	0.11	0.28***	0.48***	0.26	0.22**
	(0.217)	(0.204)	(0.091)	(0.243)	(0.216)	(0.103)	(0.158)	(0.154)	(0.089)	(0.178)	(0.188)	(0.096)
Lag 5				0.08	0.08	-0.00				-0.03	-0.07	0.04
				(0.148)	(0.143)	(0.056)				(0.107)	(0.109)	(0.059)
Lag 10				-0.27*	-0.18	-0.09				0.02	0.12	-0.10*
				(0.161)	(0.155)	(0.056)				(0.128)	(0.127)	(0.058)
EASTEU	0.33	0.14	0.19**	0.19	0.09	0.10	-0.67*	-0.84**	0.17**	-0.63	-0.71*	0.08
	(0.355)	(0.309)	(0.084)	(0.351)	(0.358)	(0.074)	(0.350)	(0.375)	(0.078)	(0.427)	(0.394)	(0.082)
Lag 5				-0.63**	-0.47***	-0.15				-0.09	0.08	-0.18
				(0.269)	(0.169)	(0.193)				(0.349)	(0.188)	(0.199)
EUROMED	0.34**	0.33**	0.02	0.26	0.26	-0.00	0.34***	0.31**	0.03	0.32***	0.33***	-0.02
	(0.158)	(0.149)	(0.060)	(0.176)	(0.167)	(0.060)	(0.122)	(0.128)	(0.064)	(0.118)	(0.127)	(0.065)
Lag 5				0.01	-0.03	0.04				0.08	0.05	0.03
				(0.136)	(0.136)	(0.042)				(0.110)	(0.104)	(0.044)
Lag 10				-0.35**	-0.27*	-0.08				0.02	0.13	-0.12**
				(0.142)	(0.141)	(0.051)				(0.108)	(0.099)	(0.053)
DISTANT	-0.10	-0.05	-0.05	-0.21*	-0.10	-0.10*	0.34*	0.41**	-0.07	0.40**	0.52***	-0.12**
	(0.140)	(0.132)	(0.056)	(0.125)	(0.123)	(0.056)	(0.178)	(0.166)	(0.058)	(0.178)	(0.168)	(0.059)
Lag 5				-0.06	-0.09	0.03				0.20	0.18	0.03
				(0.149)	(0.140)	(0.038)				(0.131)	(0.121)	(0.039)
Lag 10				-0.37**	-0.26	-0.11**				-0.14	-0.03	-0.10**
				(0.180)	(0.184)	(0.051)				(0.169)	(0.173)	(0.053)
FORCOL	-0.51*	-0.52*	0.00	-0.55	-0.46	-0.09	0.36*	0.34*	0.02	0.42*	0.41*	0.02
	(0.292)	(0.283)	(0.121)	(0.336)	(0.326)	(0.134)	(0.212)	(0.187)	(0.125)	(0.253)	(0.227)	(0.141)
Lag 5				-0.19	-0.35	0.16**				0.07	0.06	0.01
				(0.279)	(0.281)	(0.083)				(0.169)	(0.142)	(0.083)
Lag 10				0.27	0.01	0.26**				0.25	-0.02	0.28**
				(0.402)	(0.423)	(0.117)				(0.244)	(0.202)	(0.116)
Total ATE NEIGHBOUR				0.23	0.01	0.21				0.47	0.31	0.16
				(0.393)	(0.359)	(0.158)				(0.291)	(0.307)	(0.156)
EASTEU				-0.44	-0.38	-0.06				-0.73	-0.63	-0.10
				(0.313)	(0.398)	(0.223)				(0.741)	(0.535)	(0.245)
EUROMED				-0.08	-0.04	-0.05				0.41*	0.52**	-0.11
				(0.344)	(0.342)	(0.103)				(0.223)	(0.230)	(0.109)
DISTANT				-0.64*	-0.46	-0.18**				0.46*	0.66**	-0.20**
				(0.328)	(0.334)	(0.093)				(0.276)	(0.278)	(0.097)
FORCOL				-0.47	-0.81	0.34*				0.75*	0.45	0.30
				(0.560)	(0.592)	(0.200)				(0.389)	(0.334)	(0.197)
Fixed effects												
Country-year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair.time	no	no	no	no	no	no	no	no	no			
Observations	82661	82661	82661	60638	60638	60638	88803	88803	88803	65473	65473	65473

Standard errors clustered on country pair in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Total average treatment effects are calculated using a joint significance test. Constant and control are omitted because of space constraints. Most EASTEU agreements only entered into force after 2003, hence lag10 is omitted from the estimation. NEIGHBOUR: Iceland, Switzerland, Norway, Andorra, San Marino, Faroe. EASTEU: Macedonia, Montenegro, Albania, Serbia, and Bosnia and Herzegovina. EUROMED: Algeria, Turkey, Jordan, Lebanon, Morocco, Tunisia, Palestine. Egypt and Israel. DISTANT: South-Korea, Mexico, South-Africa, Colombia, Peru, Honduras, Nicaragua, Chile and Panama. FORCOL: Papua, CARIFORUM, Cameroon, Mauritius, Seychelles, Madagascar, Zimbabwe, Botswana, Lesotho, Namibia, Swaziland, Mozambique and OCT.

Another way of classifying the trade agreements is by geographical region. We distinguish five regions: trade agreements with (1) neighbouring countries, (2) Eastern European countries, (3) Euro-Mediterranean countries, (4) distant countries and (5) former African colonies. We again swap out the FTA and CU dummy in equation (7) by our new region dummies, while absorbing all other EIAs that are not captured by these dummies in a control variable. Results can be found in table 5.

We find that trade agreements with neighbouring countries and Euro-Mediterranean countries have a positive contemporaneous effect on imports and exports. For neighbouring countries, this is completely driven by the extensive margin, while on the other hand it is completely driven by the intensive margin for Euro-Mediterranean countries. Looking at the total treatment effects, we see that these positive effects are offset by negative lagged effects on the import side, but not on the export side.

Furthermore, we find that trade agreements with former African colonies have a negative contemporaneous effect on imports. The total treatment effect is not statistically significant, however. On the export-side, these trade agreements have large positive effects. We do not find statistically significant effects on imports for Eastern European or distant countries, but we find strong negative (positive) contemporaneous effects on the export-side for Eastern European (distant) countries. Total treatment effects are not statistically significant for Eastern European countries. For distant countries, we find a negative total treatment effect on the import-side, and a positive total treatment effect on the export-side.

6 Robustness checks

6.1 Strict exogeneity and anticipation effects

Generalised least squares (GLS) assumes strict exogeneity. If this assumption fails, the estimation will be biased. To test for strict exogeneity, Woolridge (2010) suggests including leads of the EIA variables in levels in the fixed effects and differences estimation. If the EIA variables are endogenous, then the leads will be significant and results for the fixed effects specification and differences specification will be different, since a violation of the strict exogeneity assumption will bias both estimators in a different way.

Results for the exogeneity test are presented in table 6. We computed the test with 5-year leads as well as with 1-year leads. We can see that PTAs and CUs are strictly exogenous on the import-side. However, the assumption of strict exogeneity is violated for FTAs on the import-side when using the fixed effects specification and including 5-year leads as well as when using the differences specification and including 1-year leads. On the export side, FTAs and CUs are strictly exogenous, but we now find a violation of the strict exogeneity assumption of the PTA dummy.

In order to assess how much our results are biased due to these violations of the strict exogeneity assumption, and also as a robustness check, we compute our extended baseline model using differences. Taking the fifth difference[19] of equation (7) eliminates the country pair fixed effects

$$\Delta_5 \ln X_{ijt} = \beta_0 + \beta_1 \Delta_5 PTA_{ijt} + \beta_2 \Delta_5 FTA_{ijt} + \beta_3 \Delta_5 CU_{ijt} + \Delta_5 \delta_{it} + \Delta_5 \psi_{jt} + \Delta_5 \epsilon_{ijt} \quad (5)$$

with Δ_5 fifth difference.

Comparing the coefficients for the baseline model obtained using the fixed effects specification in table 3 with the baseline model obtained using the differences specification in table 9 in appendix, we see that the results are very similar. This similarity also holds up for the coefficients of FTAs on the import-side and PTAs on the export-side. This suggests that the bias coming from endogeneity of FTAs on the import-side and PTAs on the export-side is not that important.

Moreover, differencing panel data has one major advantage over using fixed effects: it allows us to look at anticipation effects. When using differences, we can distinguish between anticipation effects and endogeneity; when testing endogeneity we include leads of the EIA variables in *levels*, while for anticipation effects, we include leads of the EIA varables in *differences*[20]. This is not possible when using our fixed effects specification.

Results are also presented in table 9. We find large negative and statistically significant anticipation effects for PTAs for both imports and exports, as well as for FTAs on the import-side. These anticipation effects are completely driven by the intensive margin. The number of goods traded thus decreases five years leading up to a trade agreement entering into force. This is not the case for FTAs and CUs on the export side. Here we see positive, but not statistically significant anticipation effects. Hence,

[19]Following Baier, Bergstrand and Feng (2014), we use fifth differences instead of first differences as trade flows typically change very slowly over time, making it very likely that first differenced data will not display much of variation.

[20]Florensa, Márquez-Ramos and Recalde (2015) do not make this distinction.

EU exporters do not delay trade until the trade agreements enters into force.

Table 6: Exogeneity test using both a GLS estimation with fixed effects and differences.

	Imports				**Exports**			
	Fixed effects		Differences		Fixed effects		Differences	
	(1a)	(1b)	(2a)	(2b)	(1a)	(1b)	(2a)	(2b)
PTA	-0.28***	-0.24**			-0.06	-0.04		
L5.PTA	0.02	-0.19**			0.11	0.08		
L10.PTA	-0.33***	-0.18**			0.10	0.10*		
FTA	-0.30**	-0.13			0.23*	0.37***		
L5.FTA	-0.22	-0.10			0.10	0.15*		
L10.FTA	-0.08	-0.13			0.01	0.07		
CU	-0.05	0.11			0.14	0.36*		
L5.CU	-0.48**	-0.11			-0.04	0.07		
L10.CU	-0.15	-0.21			-0.21	-0.02		
Δ_5PTA			-0.31***	-0.18*			-0.20**	-0.16**
Δ_5FTA			-0.26*	-0.18			0.19*	0.21**
Δ_5CU			-0.05	0.04			0.25	0.31**
F5.PTA	-0.15		0.34		-0.13		-0.07	
F5.FTA	-0.41*		-0.84		-0.04		0.20	
F5.CU	-0.43		0.05		0.09		-0.03	
F.PTA		0.00		0.27		-0.08		0.37*
F.FTA		-0.05		0.49*		-0.17		-0.29
F.CU		-0.04		0.71		-0.20		-0.29
Fixed effects								
Country-year	yes	yes	no	no	yes	yes	no	no
Pair	yes	yes	no	no	yes	yes	no	no
$\Delta_5$country-year	no	no	yes	yes	no	no	yes	yes
Observations	40112	56512	38488	53510	42714	60888	42379	59386

Standard errors clustered on country pair in parentheses. *** p<0.01, ** p<0.05, * p<0.1. When we include lags in our differences specification, only a little more than 17 000 (22 000) observations remain on the import-side (export-side). This is only 22% (25%) of our sample.

6.2 Changes over time of pair-specific unobservables

Neither our fixed effects specification nor differencing the data controls for changes over time in *pair-specific* unobservables. This could for example be the case when fixed or variable export costs fall due to technological improvement. To alleviate this problem partially, Trefler (2004) and Baier, Bergstrand and Feng (2014) use a random growth first-difference model. By including country pair-specific fixed effects in our differenced model, we can account for changes in pair specific unobservables that evolve smoothly over time.

This transforms our difference model in the following way:

$$\Delta_5 \ln X_{ijt} = \beta_0 + \beta_1 \Delta_5 PTA_{ijt} + \beta_2 \Delta_5 FTA_{ijt} + \beta_3 \Delta_5 CU_{ijt} + \Delta_5 \delta_{it} + \Delta_5 \psi_{jt} + \eta_{ij} + \Delta_5 \epsilon_{ijt} \quad (6)$$

Another option is to use our fixed effects specification and include country pair fixed effects interacted with a time trend. Our fixed effects specification then becomes

$$\ln X_{ijt} = \beta_0 + \beta_1 PTA_{ijt} + \beta_2 FTA_{ijt} + \beta_3 CU_{ijt} + \delta_{it} + \psi_{jt} + \eta_{ij} + \eta_{ij}.t + \epsilon_{ijt} \tag{7}$$

with t time trend.

Results are presented in table 10 and 11 in the appendix. First of all, note that the results for both the fixed effects specification and the differences specification are very similar. This again strengthens our belief that the possible bias stemming from endogeneity of the EIA dummies is very small.

Second, we see that the contemporaneous estimates for PTAs are no longer negative for both imports and exports. When controlling for changes in bilateral unobservables, PTAs have no contemporaneous effects on imports nor exports. However, when looking at the impact of PTAs in more detail, we find a negative and statistically significant impact of PTAs after 10 years on imports. This is entirely explained by the intensive margin. On the export-side, we find that PTAs have a positive and statistically significant contemporaneous effect on the extensive margin. We also find a positive and statistically significant impact after 10 years.

Third, we find that the strong contemporaneous effect of FTAs on exports is robust to changes in model specification. FTAs increase exports immediately with 40% when controlling for changes over time of pair-sepcific unobservables.

Fourth, the estimates for anticipation effects in our random growth model differ substantially from those of our differences specification. This is problematic, and more research is needed to measure these anticipation effects in a more precise manner.

7 Conclusion

This paper is the first to quantify *ex post* the trade effects of EIAs between the EU and third countries in a systematic manner. We used a panel data set on aggregate imports and exports between 27 European Union countries and 203 third countries and territories for the period of 1988-2013. We accounted for the multilateral price/resistance term and the endogeneity of EIAs by including three sets of fixed effects and, alternatively, by using fifth differences. We started by estimating a simple baseline model and then dissected the effects of EIAs in increasing detail.

Our results indicate that the impact of the European Union EIAs on trade is complex and heterogeneous and that capturing the effects of EIAs by means of a single dummy variable is inadequate. We find four main sources of heterogeneity.

First of all, EIAs do not have symmetric effects on imports and exports. We find large positive and statistically significant effects of EIAs on exports, but effects on imports are small or even negative. This suggests that the European Union leads a successful trade policy and succeeds in concluding strategic trade agreements that boost exports of European Union firms, while at the same time not increasing imports (and thus competition) to the EU market. This is a surprising finding, given the many fears and protests of producers in the European Union surrounding trade agreements.

Second, different types of EIAs have different effects on trade. We find that deeper EIAs like FTAs and CUs have larger effects on trade flows than the more shallow PTAs. Contrary to our expectations, we do not find that CUs have larger effects than FTAs. This is possibly because EU CUs are not as deep and enforceable as EU FTAs. We also compared the impact of each FTA and CU separately, and find that their effects are very heterogeneous.

Third, EIAs have heterogeneous effects on total trade flows, as well as on the intensive and extensive margins. Moreover, decomposing total trade flows into margins can yield interesting findings, as the intensive and extensive margins sometimes have equally large but opposite effects that cancel each other out, resulting in zero total trade flow effects. These contrasting effects might explain why Kohl (2014) finds that the majority of trade agreements do not have a significant effect on trade.

Fourth, EIAs do not affect all 27 member states of the European Union in the same way. Most countries are not impacted by the EU EIAs (10 to 20, depending on the EIA and trade flow specification), while the remaining of the countries experience negative and positive effects.

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Council Regulation 2501/2001/EC applying a scheme of generalised tariff preferences for the period from 1 January 2002 to 31 December 2004 (2001) OJ L346.

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9 Appendix

Table 7: List of partner countries in dataset

Afghanistan, Albania, Antarctica, Algeria, American Samoa, Andorra, Angola, Antigua Barbuda, Azerbaijan, Argentina, Australia, Bahamas, Bahrain, Bangladesh, Armenia, Barbados, Bermuda, Bhutan, Bolivia, Bosnia Herzegovina, Botswana, Bouvet Island, Brazil, Belize, British Indian OT, Solomon Islands, Br Virgin Islands, Brunei Darussalam, Myanmar, Burundi, Belarus, Cambodia, Cameroon, Canada, Cabo Verde, Cayman Islands, Central African Rep, Sri Lanka, Chad, Chile, China, Taiwan, Christmas Island, Cocos Islands, Colombia, Comoros, Mayotte, Congo, DR Congo, Cook Islands, Costa Rica, Cuba, Benin, Dominica, Dominican Republic, Ecuador, El Salvador, Equatorial Guinea, Ethiopia, Eritrea, Faroe Islands, Falkland Islands, S Georgia and Sandwich Islands, Fiji, French Polynesia, French ST, Djibouti, Gabon, Georgia, Gambia, Palestine, Ghana, Gibraltar, Kiribati, Greenland, Grenada, Guam, Guatemala, Guinea, Guyana, Haiti, Heard and McDonald Islands, Holy See (Vatican), Honduras, Hong Kong, Iceland, India, Indonesia, Iran, Iraq, Israel, Cte d'Ivoire, Jamaica, Japan, Kazakhstan, Jordan, Kenya, North-Korea, Korea, Kuwait, Kyrgyzstan, Laos, Lebanon, Lesotho, Liberia, Libya, Macao, Madagascar, Malawi, Malaysia, Maldives, Mali, Mauritania, Mauritius, Mexico, Mongolia, Moldova, Montenegro, Montserrat, Morocco, Mozambique, Oman, Namibia, Nauru, Nepal, Netherland Antilles, Aruba, New Caledonia, Vanuatu, New Zealand, Nicaragua, Niger, Nigeria, Niue, Norfolk Island, Norway, Northern Mariana Islands, United States Minor Outlying Islands, Micronesia, Marshall Islands, Palau, Pakistan, Panama, Papua New Guinea, Paraguay, Peru, Philippines, Pitcairn, Guinea-Bissau, Timor-Leste, Qatar, Russian Federation, Rwanda, St Helena, Ascension and Tristan, Saint Kitts and Nevis, Anguilla, Saint Lucia, Saint Pierre and Miquelon, Saint Vincent and the Grenadines, San Marino, Sao Tome and Principe, Saudi Arabia, Senegal, Serbia, Seychelles, Sierra Leone, Singapore, Viet Nam, Somalia, South Africa, Zimbabwe, Sudan, Suriname, Swaziland, Switzerland-Liechtenstein, Syrian Arab Republic, Tajikistan, Thailand, Togo, Tokelau, Tonga, Trinidad and Tobago, United Arab Emirates, Tunisia, Turkey, Turkmenistan, Turks and Caicos Islands, Tuvalu, Uganda, Ukraine, former Yugoslav rep Macedonia, E.ypt, Tanzania, United States, Virgin Islands U.S., Burkina Faso, Uruguay, Uzbekistan, Venezuela, Wallis and Futuna, Samoa, Yemen, Zambia

Table 8: GLS estimation of the effects per agreement using fixed effects.

	Imports			Exports		
	X	IM	EM	X	IM	EM
OCT	-0.48	-0.51*	0.04	0.35*	0.30	0.05
	(0.294)	(0.284)	(0.121)	(0.213)	(0.189)	(0.125)
Egypt	-0.08	-0.25	0.17***	-0.19	-0.33**	0.13**
	(0.425)	(0.413)	(0.051)	(0.134)	(0.131)	(0.053)
Iceland	0.44	-0.19	0.63***	0.62***	0.02	0.60***
	(0.339)	(0.313)	(0.103)	(0.239)	(0.233)	(0.103)
Norway	-0.29	-0.55**	0.26***	0.07	-0.16	0.23**
	(0.249)	(0.236)	(0.090)	(0.188)	(0.192)	(0.095)
Algeria	1.07	0.64	0.43***	0.25	-0.16	0.40***
	(1.856)	(1.890)	(0.067)	(0.196)	(0.184)	(0.065)
Andorra	-0.27	-0.18	-0.09	0.12	0.41	-0.29
	(0.478)	(0.407)	(0.282)	(0.394)	(0.330)	(0.225)
Turkey	0.46	0.20	0.26***	0.17	-0.07	0.23***
	(0.285)	(0.288)	(0.084)	(0.225)	(0.223)	(0.088)
Faroe	2.13***	1.57**	0.56**	0.84**	0.25	0.59***
	(0.664)	(0.683)	(0.218)	(0.357)	(0.432)	(0.211)
Palestine	1.82***	1.43**	0.39	1.41**	0.75	0.66***
	(0.702)	(0.704)	(0.252)	(0.672)	(0.705)	(0.221)
Macedonia	1.05***	0.69***	0.36***	-0.27	-0.60***	0.33***
	(0.325)	(0.238)	(0.125)	(0.183)	(0.156)	(0.116)
Jordan	0.48	0.09	0.39***	0.19	-0.17	0.36***
	(0.435)	(0.406)	(0.069)	(0.216)	(0.217)	(0.062)
SanMarino	1.11***	0.47	0.63***	0.31	-0.28	0.59***
	(0.378)	(0.398)	(0.137)	(0.339)	(0.312)	(0.183)
Chile	-0.46	-0.52	0.06	0.33*	0.30	0.03
	(0.311)	(0.320)	(0.062)	(0.194)	(0.190)	(0.065)
Lebanon	1.06***	0.59*	0.48***	-0.20	-0.64***	0.44***
	(0.306)	(0.307)	(0.072)	(0.181)	(0.175)	(0.074)
Albania	-1.54***	-1.72***	0.18	-0.43***	-0.70***	0.27**
	(0.402)	(0.345)	(0.150)	(0.158)	(0.189)	(0.105)
Israel	0.43*	0.16	0.27***	0.24	-0.01	0.25***
	(0.219)	(0.207)	(0.068)	(0.151)	(0.156)	(0.075)
Morocco	0.21	0.55	-0.34***	0.20	0.55***	-0.35***
	(0.353)	(0.352)	(0.128)	(0.208)	(0.193)	(0.133)
Tunisia	0.04	0.38*	-0.34**	0.65**	1.00***	-0.35**
	(0.294)	(0.230)	(0.144)	(0.305)	(0.350)	(0.145)
Mexico	-0.03	0.14	-0.17*	0.25	0.43	-0.18*
	(0.200)	(0.161)	(0.096)	(0.318)	(0.312)	(0.099)
SouthAfrica	0.08	-0.01	0.09	0.42	0.33	0.08
	(0.175)	(0.172)	(0.059)	(0.263)	(0.231)	(0.066)
Fixed effects						
Country-year	yes	yes	yes	yes	yes	yes
Pair	yes	yes	yes	yes	yes	yes
Pair.time	no	no	no	no	no	no
Observations	82661	82661	82661	88803	88803	88803

Standard errors clustered on country pair in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Constant and control are ommitted to save space.

Table 9: Estimation of the baseline model with lags and leads using differences.

		(1)			(2)			(3)			(4)	
Import	X	IM	EM	X	IM	EM	X	IM	EM	X	IM	EM
F5.Δ_5PTA										-0.41*	-0.48**	0.08
										(0.226)	(0.222)	(0.086)
Δ_5PTA	-0.16*	-0.16*	0.01	-0.21**	-0.23**	0.01	-0.25**	-0.24**	-0.01	-0.37***	-0.40***	0.04
	(0.094)	(0.088)	(0.037)	(0.096)	(0.090)	(0.039)	(0.108)	(0.102)	(0.044)	(0.099)	(0.093)	(0.040)
L5.Δ_5PTA				-0.16**	-0.17**	0.01	-0.26***	-0.26***	0.00			
				(0.068)	(0.067)	(0.022)	(0.085)	(0.083)	(0.029)			
L10.Δ_5PTA							-0.21**	-0.20**	-0.02			
							(0.089)	(0.090)	(0.029)			
F5.Δ_5FTA										-0.58*	-0.66**	0.08
										(0.299)	(0.283)	(0.106)
Δ_5FTA	-0.14	-0.07	-0.07	-0.15	-0.13	-0.02	-0.11	-0.07	-0.04	-0.35**	-0.31**	-0.04
	(0.117)	(0.113)	(0.047)	(0.133)	(0.131)	(0.053)	(0.167)	(0.169)	(0.065)	(0.141)	(0.138)	(0.054)
L5.Δ_5FTA				-0.04	-0.15	0.11***	0.01	-0.08	0.08			
				(0.103)	(0.104)	(0.036)	(0.150)	(0.151)	(0.051)			
L10.Δ_5FTA							-0.02	-0.02	0.00			
							(0.137)	(0.140)	(0.042)			
F5.Δ_5CU										-0.76	-1.06***	0.30
										(0.497)	(0.407)	(0.201)
Δ_5CU	0.10	-0.10	0.20**	0.08	-0.13	0.21**	0.21	-0.02	0.23**	-0.16	-0.40**	0.24***
	(0.201)	(0.176)	(0.081)	(0.207)	(0.183)	(0.085)	(0.266)	(0.219)	(0.110)	(0.212)	(0.199)	(0.083)
L5.Δ_5CU				0.03	0.01	0.02	-0.01	0.01	-0.02			
				(0.147)	(0.139)	(0.052)	(0.203)	(0.185)	(0.078)			
L10.Δ_5CU							-0.00	0.04	-0.04			
							(0.227)	(0.210)	(0.092)			
Export												
F5.Δ_5PTA										-0.32	-0.29	-0.03
										(0.194)	(0.183)	(0.084)
Δ_5PTA	-0.15**	-0.12*	-0.03	-0.12	-0.10	-0.02	-0.00	0.01	-0.01	-0.23***	-0.23***	-0.00
	(0.075)	(0.072)	(0.037)	(0.075)	(0.073)	(0.039)	(0.087)	(0.085)	(0.045)	(0.087)	(0.083)	(0.043)
L5.Δ_5PTA				0.08	0.06	0.02	0.14**	0.09	0.05*			
				(0.050)	(0.046)	(0.023)	(0.065)	(0.058)	(0.030)			
L10.Δ_5PTA							0.17***	0.16***	0.01			
							(0.060)	(0.055)	(0.030)			
F5.Δ_5FTA										0.21	0.04	0.17*
										(0.218)	(0.202)	(0.102)
Δ_5FTA	0.19**	0.25***	-0.06	0.27***	0.29***	-0.02	0.30***	0.31***	-0.02	0.21**	0.22**	-0.00
	(0.088)	(0.084)	(0.049)	(0.094)	(0.088)	(0.055)	(0.113)	(0.104)	(0.066)	(0.105)	(0.102)	(0.058)
L5.Δ_5FTA				0.17**	0.10	0.07*	0.18*	0.09	0.09*			
				(0.074)	(0.066)	(0.041)	(0.101)	(0.088)	(0.053)			
L10.Δ_5FTA							0.08	0.03	0.05			
							(0.097)	(0.083)	(0.048)			
F5.Δ_5CU										0.25	-0.08	0.33
										(0.369)	(0.318)	(0.214)
Δ_5CU	0.21	0.07	0.14*	0.26*	0.11	0.16*	0.39**	0.20	0.19	0.19	-0.02	0.20**
	(0.146)	(0.142)	(0.081)	(0.146)	(0.141)	(0.086)	(0.175)	(0.173)	(0.114)	(0.175)	(0.165)	(0.088)
L5.Δ_5CU				0.11	0.09	0.03	0.16	0.13	0.03			
				(0.106)	(0.102)	(0.053)	(0.142)	(0.138)	(0.079)			
L10.Δ_5CU							0.12	0.14	-0.02			
							(0.184)	(0.166)	(0.096)			
Fixed effects												
$\Delta_5$country-year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair	no	no	no	no	no	no	no	no	no	no	no	no
Obs import	57325	57325	57325	48890	48890	48890	36671	36671	36671	38488	38488	38488
Obs export	63718	63718	63718	54416	54416	54416	40833	40833	40833	42379	42379	42379

Standard errors clustered on country pair in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table 10: Estimation of the baseline model with lags and leads using a random growth model.

		(1)			(2)			(3)			(4)	
Import	X	IM	EM	X	IM	EM	X	IM	EM	X	IM	EM
F5.Δ_5PTA										-0.26	-0.00	-0.26*
										(0.399)	(0.369)	(0.124)
Δ_5PTA	0.20	0.13	0.07	0.22	0.14	0.08	0.24	0.18	0.06	0.19	0.12	0.07
	(0.172)	(0.155)	(0.061)	(0.169)	(0.156)	(0.065)	(0.185)	(0.170)	(0.070)	(0.168)	(0.180)	(0.062)
L5.Δ_5PTA				0.03	0.01	0.02	-0.01	0.00	-0.01	0.13	0.08	0.05
				(0.072)	(0.080)	(0.032)	(0.093)	(0.102)	(0.026)	(0.133)	(0.097)	(0.071)
L10.Δ_5PTA							-0.21*	-0.21**	0.00			
							(0.096)	(0.084)	(0.049)			
F5.Δ_5FTA										-0.69	-0.72	0.03
										(0.535)	(0.512)	(0.159)
Δ_5FTA	-0.06	-0.05	-0.01	-0.04	-0.06	0.02	0.02	0.00	0.02	-0.18	-0.15	-0.03
	(0.163)	(0.170)	(0.086)	(0.180)	(0.193)	(0.087)	(0.219)	(0.235)	(0.090)	(0.198)	(0.182)	(0.082)
L5.Δ_5FTA				0.05	-0.01	0.06*	0.15	0.08	0.07	-0.34	-0.41	0.07
				(0.124)	(0.123)	(0.034)	(0.145)	(0.139)	(0.047)	(0.237)	(0.238)	(0.068)
L10.Δ_5FTA							0.01	0.03	-0.02			
							(0.220)	(0.209)	(0.098)			
F5.Δ_5CU										0.07	-0.31	0.38*
										(0.392)	(0.342)	(0.190)
Δ_5CU	0.22	0.02	0.20	0.26	0.09	0.17	0.30	0.09	0.21	0.40*	0.21	0.20
	(0.187)	(0.179)	(0.123)	(0.205)	(0.196)	(0.140)	(0.229)	(0.221)	(0.158)	(0.198)	(0.156)	(0.141)
L5.Δ_5CU				0.07	0.13	-0.05	-0.02	0.06	-0.08	0.09	0.06	0.03
				(0.134)	(0.121)	(0.068)	(0.118)	(0.117)	(0.071)	(0.239)	(0.221)	(0.064)
L10.Δ_5CU							0.05	-0.01	0.06			
							(0.214)	(0.216)	(0.112)			
Export												
F5.Δ_5PTA										-0.12	0.25	-0.37***
										(0.296)	(0.296)	(0.116)
Δ_5PTA	0.13	0.01	0.12*	0.17	0.04	0.13**	0.22	0.12	0.10	0.15	0.08	0.07
	(0.140)	(0.137)	(0.057)	(0.126)	(0.132)	(0.060)	(0.178)	(0.163)	(0.072)	(0.188)	(0.210)	(0.060)
L5.Δ_5PTA				0.06	0.04	0.02	0.02	0.03	-0.00	0.07	0.06	0.01
				(0.045)	(0.042)	(0.031)	(0.049)	(0.051)	(0.033)	(0.084)	(0.074)	(0.070)
L10.Δ_5PTA							0.12*	0.06	0.06			
							(0.059)	(0.077)	(0.040)			
F5.Δ_5FTA										0.38	0.25	0.13
										(0.327)	(0.340)	(0.151)
Δ_5FTA	0.23	0.16	0.07	0.26*	0.18	0.08	0.34**	0.34**	0.00	0.23	0.17	0.05
	(0.148)	(0.146)	(0.089)	(0.135)	(0.137)	(0.089)	(0.138)	(0.141)	(0.098)	(0.128)	(0.136)	(0.059)
L5.Δ_5FTA				0.05	0.03	0.02	0.06	0.11	-0.05	0.16	0.06	0.11
				(0.063)	(0.077)	(0.046)	(0.077)	(0.089)	(0.036)	(0.140)	(0.158)	(0.118)
L10.Δ_5FTA							0.01	0.02	-0.01			
							(0.164)	(0.157)	(0.080)			
F5.Δ_5CU										-0.17	-0.36	0.19
										(0.328)	(0.234)	(0.159)
Δ_5CU	0.13	0.05	0.08	0.03	-0.03	0.06	0.10	0.03	0.07	-0.00	-0.07	0.07
	(0.137)	(0.145)	(0.100)	(0.136)	(0.133)	(0.109)	(0.137)	(0.107)	(0.090)	(0.107)	(0.159)	(0.141)
L5.Δ_5CU				-0.17	-0.14	-0.02	-0.16	-0.11	-0.05	-0.12	0.03	-0.15
				(0.122)	(0.106)	(0.075)	(0.128)	(0.108)	(0.072)	(0.168)	(0.190)	(0.118)
L10.Δ_5CU							-0.01	-0.03	0.02			
							(0.200)	(0.192)	(0.093)			
Fixed effects												
$\Delta_4$country-year	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes	yes
Obs import	66643	66643	66643	57735	57735	57735	44802	44802	44802	36028	36028	36028
Obs export	72942	72942	72942	63214	63214	63214	49032	49032	49032	39076	39076	39076

Standard errors clustered on country pair and year in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Control is omitted because of space constraints. In contrast to previous estimations, this model includes intra-EU trade.

Table 11: GLS estimation of the baseline model using fixed effects and a time trend.

		(1)			(2)			(3)	
Import	X	IM	EM	X	IM	EM	X	IM	EM
PTA	0.08	0.08	-0.00	0.05	0.04	0.01	0.03	0.06	-0.03
	(0.103)	(0.107)	(0.043)	(0.097)	(0.105)	(0.047)	(0.117)	(0.118)	(0.052)
Lag 5				-0.07	-0.08	0.01	-0.06	-0.05	-0.01
				(0.060)	(0.068)	(0.030)	(0.069)	(0.080)	(0.030)
Lag 10							-0.21	-0.19*	-0.02
							(0.122)	(0.099)	(0.050)
FTA	-0.02	-0.06	0.05	-0.03	-0.11	0.07	-0.02	-0.03	0.01
	(0.197)	(0.186)	(0.086)	(0.195)	(0.189)	(0.087)	(0.219)	(0.207)	(0.093)
Lag 5				-0.00	-0.07	0.06	0.05	-0.02	0.07
				(0.121)	(0.140)	(0.048)	(0.147)	(0.158)	(0.061)
Lag 10							-0.08	-0.10	0.03
							(0.190)	(0.200)	(0.089)
CU	0.16	-0.03	0.19	0.18	0.01	0.17	0.28	0.10	0.19
	(0.199)	(0.166)	(0.139)	(0.212)	(0.184)	(0.151)	(0.257)	(0.214)	(0.169)
Lag 5				0.07	0.09	-0.03	0.05	0.10	-0.06
				(0.108)	(0.108)	(0.066)	(0.117)	(0.121)	(0.066)
Lag 10							0.08	-0.01	0.09
							(0.184)	(0.190)	(0.117)
Export									
PTA	-0.02	-0.01	-0.00	0.01	-0.00	0.01	0.06	0.07	-0.01
	(0.090)	(0.081)	(0.043)	(0.085)	(0.080)	(0.044)	(0.103)	(0.089)	(0.050)
Lag 5				0.05	0.02	0.02	0.03	0.04	-0.01
				(0.057)	(0.048)	(0.036)	(0.056)	(0.058)	(0.030)
Lag 10							0.09	0.08	0.00
							(0.056)	(0.066)	(0.046)
FTA	0.21	0.10	0.11	0.20	0.09	0.11	0.25*	0.19	0.06
	(0.129)	(0.153)	(0.085)	(0.133)	(0.161)	(0.085)	(0.134)	(0.164)	(0.088)
Lag 5				-0.03	-0.03	0.00	-0.01	0.05	-0.06
				(0.078)	(0.088)	(0.052)	(0.086)	(0.095)	(0.044)
Lag 10							-0.07	-0.07	-0.01
							(0.130)	(0.119)	(0.071)
CU	0.16	0.10	0.06	0.09	0.04	0.05	0.13	0.07	0.06
	(0.178)	(0.148)	(0.119)	(0.197)	(0.152)	(0.125)	(0.181)	(0.156)	(0.106)
Lag 5				-0.18	-0.15	-0.03	-0.16	-0.09	-0.07
				(0.111)	(0.095)	(0.074)	(0.117)	(0.104)	(0.071)
Lag 10							-0.06	-0.08	0.02
							(0.151)	(0.158)	(0.095)
Fixed effects									
Country-year	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair	yes	yes	yes	yes	yes	yes	yes	yes	yes
Pair.time	yes	yes	yes	yes	yes	yes	yes	yes	yes
Obs import	89964	89964	89964	80655	80655	80655	66865	66865	66865
Obs export	95605	95605	95605	85748	85748	85748	71270	71270	71270

Standard errors clustered on country pair and year in parentheses. *** $p<0.01$, ** $p<0.05$, * $p<0.1$. Control is omitted because of space constraints. In contrast to previous estimations, this model includes intra-EU trade.