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## The Trade Effects of the EU-South Korea Free Trade Agreement: Heterogeneity across Time, Country Pairs, and Directions of Trade within Country Pairs

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# The Trade Effects of the EU-South Korea Free Trade Agreement: Heterogeneity across Time, Country Pairs, and Directions of Trade within Country Pairs\*

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September 30, 2021

## Abstract

The EU-South Korea FTA is a prominent example of so-called “second-generation” regional trade agreements. I combine up-to-date gravity approaches (Egger et al., 2020, Baier et al., 2019) to identify heterogeneity in partial trade effects across time (anticipation and lagged adjustment), country pairs, and across trading directions within pairs (exports versus imports), drawing on a novel dataset (Monteiro, 2020). First, the EU-South Korea FTA has a negative effect on trade before the agreement enters into force, in contrast to the notion of anticipation effects other FTAs have. Second, the sign of the cumulative trade effect depends on whether only significant or all coefficients are considered. Third, exports of EU countries to Korea rise on average, while imports of EU countries from Korea are not significantly or even negatively affected. Fourth, there is substantial asymmetry in the trade effects across country pairs, not only in the cumulative effect, but also in the adjustment process. Finally, there is substantial heterogeneity within pairs across trading directions.

*JEL-Classification: F13, F14, F15*

*Keywords: International Trade, Structural Gravity, EU-South Korea Free Trade Agreement*

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# 1 Introduction

The world trading system has witnessed a proliferation of regional trade agreements (RTA) since the 1990s. While for a long time these agreements have been “regional” not only in a trade-policy, but also in a geographic sense, they now span along global value chains and involve countries in different regions of the world, forming what Bhagwati has called “spaghetti bowls”(Bhagwati, 1995). Moreover, they include chapters on barriers to trade other than tariffs, thus forming what is now generally referred to as “deep” agreements (WTO+ agreements).

Due to the initiative “Global Europe: Competing in the world” of 2006, the European Union (EU) is an important driver of this trend. The EU has recently signed several RTAs with countries all over the world. The EU-South Korea Free Trade Agreement is the first RTA under the “Global Europe” initiative and can serve as a prominent example of these second-generation RTAs that cover tariffs, regulatory barriers, services, intellectual property rights, and bilateral investment.<sup>1</sup> The trade negotiations were launched in May 2007. The EU-South Korea FTA was initialled by both sides in October 2009, signed in October 2010, provisionally applied as of July 2011, and fully entered into force in December 2015 (Lakatos and Nilsson, 2017).

The EU has recently signed similar agreements with Columbia and Peru (2013), Central America (2013), Canada (2017), Japan (2019), Singapore (2019), and Vietnam (2020), and has started negotiating similar agreements with Australia, New Zealand, and India. Likewise, South Korea followed a deep economic integration approach. Shortly before its agreement with the EU entered into force, South Korea entered agreements with India and the Association of Southeast Asian Nations (ASEAN) countries (both in 2010), almost at the same time an agreement with Peru (2011), and in the years thereafter agreements with the United States of America (2012), Turkey (2013), Australia (2014), Canada, China, Vietnam, and New Zealand (all in 2015), Colombia (2016), Central America (2019), and the UK (2021; substitute for the EU-South Korea FTA after the UK left the EU).

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<sup>1</sup>The World Trade Organization (WTO) classifies the following types of RTAs, defined under the General Agreement on Tariffs and Trade (GATT) and the General Agreement on Trade in Services (GATS): Customs Union (CU), Economic Integration Agreement (EIA), Free Trade Agreement (FTA), and Partial Scope Agreement (PSA). RTAs can be combinations of different types. In fact, the EU South-Korea FTA is classified as “FTA & EIA”.

Against this background, in this paper I answer the questions: *How do the trade effects of the EU-South Korea FTA differ across different phases of the agreement (pre- and post-agreement), and how does the adjustment process differ across country pairs within the agreement, and across directions of trade within country pairs?*

According to Baier and Bergstrand (2007), an RTA – they use the term free trade agreement (FTA) – on average increases two member countries' trade by about 100% after 10 years. This estimate is derived from a dataset that covers the period 1960-2000 (in 5-year intervals) and trade between 96 countries. Under the assumption of symmetric trade costs, they properly control for multilateral resistance terms (Anderson and van Wincoop, 2003). However, this study suffers from a number of deficiencies. It does not account for heteroscedasticity in the error term and zeros in international trade (Santos-Silva and Tenreyro, 2006), nor does it allow for trade diversion from domestic trade flows (Yotov, 2012), or for anticipation effects (Egger et al., 2020).<sup>2</sup> Moreover, by construction, their estimation cannot account for the more recent FTAs such as the EU-South Korea FTA.

Using a dataset with information on both international and intra-national trade for 69 trading partners and the years 1986-2006 and estimating by Poisson Pseudo Maximum Likelihood (PPML), Baier et al. (2019) find an average trade-creating effect of 34%, accounting for 5-year lagged effects. Their analysis is restricted to RTAs that were formed in the 1980s and the 1990s.<sup>3</sup> Interestingly, they provide detailed evidence on differences in the effects not only across agreements, but also within agreements both across pairs and within pairs across directions of trade. Egger et al. (2020) use the same dataset, but mainly focus on the average RTA and identify different phases that characterize the impact of FTAs on bilateral trade.

I combine these approaches to quantify the heterogeneity of the effects of the EU-Korea FTA across time (pre- and post-agreement), country pairs, and directions of trade (imports vs. exports) within country pairs. In order to do so, I construct dummy variables that switch from 0 to 1 for each country pair involving an EU member country and South Korea in 2011,

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<sup>2</sup>The presence of domestic trade flows is also important to be able to identify trade diversion effects of FTAs (Dai et al., 2014).

<sup>3</sup>As they include a 5-year lag, they can include RTAs that entered into force until 2001. In an estimation with pair fixed effects, identification comes from the year when the agreement enters into force.

the year when the FTA was provisionally applied for the first time. These dummy variables capture the effects of all *bilateral* trade cost changes induced by the agreement, including changes in bilateral tariffs and in non-tariff measures (NTM). Some measures such as Sanitary and Phytosanitary Measures (SPS) are applied to only some trading partners, which implies that these measures have an inherent bilateral dimension. Moreover, even NTMs that are in principle applied to all trading partners may unfold bilateral effects as the composition of bilateral trade differs.

All regressions include zero flows, are estimated by PPML, and include four sets of fixed effects: I use exporter-and-time fixed effects and importer-and-time fixed effects to control for exporter- and importer-specific observed and unobserved characteristics such as technology, aggregate expenditure, and outward and inward multilateral resistance terms. Moreover, I include (directed) pair-specific fixed effects to control for time-invariant country-pair specific characteristics. Pair dummies are also thought to mitigate the potential problem of endogenous selection into FTAs (Baier and Bergstrand, 2007). Finally, I account for common globalization effects with a set of time-varying border dummy variables, separating domestic from international transactions (Bergstrand et al., 2015). I rely on a novel dataset provided by the WTO (Monteiro, 2020) that contains information on international as well as on intra-national trade flows, as recommended by the recent gravity literature (Yotov et al., 2016).

All regressions include controls for the average RTA other than the EU-South Korea FTA. Following Baier and Bergstrand (2007), in addition to the contemporaneous effect as of 2011 (the date of provisional application), I also consider delayed effects. Trade effects are delayed when concessions are phased in over some years (Baier and Bergstrand, 2007) and when adjustment of firms to the situation is sluggish. Sluggish adjustment arises in models where foreign market entry costs are sunk (Das et al., 2007; Alessandria and Choi, 2014) or the structure of export costs involves risk (Alessandria et al., 2021). Empirical evidence indicating sluggish adjustment is provided by Hooper et al. (2000) and Gallaway et al. (2003).

Additionally, I account for anticipation effects (Egger et al., 2020). Such effects arise during the negotiation and initialling period when firms start to adjust their behavior in anticipation of the implementation of the agreement (Breinlich, 2014; Moser and Rose, 2014) and when

uncertainty about future negative trade policy shocks is resolved.<sup>4</sup> Handley and Limão (2015) argue that 75% of the increase in Portugal's exports to the EU following the 1986 enlargement can be explained by removing trade policy uncertainty. Similarly, Handley and Limão (2017) provide evidence for anticipation effects also for China's accession to the WTO in 2001.

As suggested by Egger et al. (2020), I use data for all years (consecutive-year data) and estimate FTA coefficients for all years within a window around the date of entry into force.<sup>5</sup> In order to compute the cumulative effect, I use two different methods. First, in line with Baier et al. (2019), I compute the sum of *all* coefficients.<sup>6</sup> Second, I sum over all *significant* coefficients, which represents the endpoint of the dynamic adjustment process visualized in Egger et al. (2020). It is important to note that all these effects are “partial” as they only capture the effect of bilateral trade cost changes on bilateral trade, holding characteristics of the exporting and the importing country (i.e. wages, multilateral resistance terms) constant.

I find that the EU-South Korea features a significantly negative trade effect one year prior to the agreement, in contrast to the notion of anticipation effects (see Egger et al., 2020). Moreover, there are no positive trade effect in the five years after the agreement entered into force. One reason could be that the trade effects of the EU-South Korea FTA are dominated by trade diversion effects of other agreements. Moreover, the average effect might mask heterogeneity across directions of trade. Following Civic Consulting and Ifo Institute (2018), I allow the effects to differ across directions of trade. Indeed, exports from EU countries to South Korea increase, while the effect on exports from South Korea to EU countries seems to be insignificant or even negative.

Following Baier et al. (2019), I explore heterogeneity across country pairs within the EU-South Korea FTA. I find huge heterogeneity across country pairs, not only in the cumulative trade effects, but also over the entire adjustment process. The cumulative trade effects are significantly positive for trade between South Korea and Croatia, Czech Republic, Hungary,

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<sup>4</sup>As long as the text of the agreement has been finalized during the negotiation period, there is still uncertainty about the exact formulation of the concessions.

<sup>5</sup>Egger et al. (2020) argue that using bigger intervals would miss out details of the adjustment process.

<sup>6</sup>Baier et al. (2019) use interval data and only sum over the contemporaneous and some lagged effects, but do not take anticipation effects into account.

Latvia, Lithuania, Poland, Slovakia, and Slovenia. They are also significantly positive for trade between South Korea and France and Portugal, but significantly negative for trade between South Korea and Denmark and Ireland. For other countries, the picture is less clear because the cumulative effect is insignificant or the different ways of computing cumulative effects lead to opposite signs.

Again following Baier et al. (2019), I also explore differences in trade effects within country pairs across directions of trade. Once more, I account for heterogeneity across time. In this regression, the different methods to compute cumulative trade effects typically yield similar effects, which signals that heterogeneity across directions within country pairs should be accounted for. The cumulative trade effects on exports from Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia to South Korea and the effects on exports of South Korea to these countries have the same signs, albeit the magnitudes differ across directions of trade for some of these countries. The same holds true – with a negative sign – for Denmark and Ireland, albeit some directional effects do not show up significantly. For other countries, the signs differ across directions. One example is Germany. German exports to South Korea increase, while Korean exports to Germany decline.

Heterogeneity in the trade effects across time, pairs, and directions within pairs can be rationalized by models with non-constant trade elasticities (see section 2), but also by the sectoral composition of bilateral trade and other factors (see the concluding section for a detailed discussion).

I am not the first to look into the trade effects of the EU-South Korea FTA. In a report to the European Commission, Civic Consulting and the Ifo Institute (2018) discuss the concessions and the effects of the EU-Korea FTA in great detail. They find a positive trade effect on both EU exports to and EU imports from Korea. The latter is estimated to be smaller than the former. I find a similar pattern, the difference being that in my estimations the effect on imports of EU countries is not statistically significant. The empirical analysis in Civic Consulting and Ifo Institute (2018) is based on information from the World Input Output Database (WIOD) (Timmer et al., 2015). This dataset covers the period 2000-2014, so the post-agreement period by construction only covers three years. According to the empirical

results in Baier and Bergstrand (2007) and Egger et al. (2020), however, the total time to reach the full impact of FTAs on trade is about ten years. Moreover, as the dataset aims at providing detailed input-output tables, country coverage is limited to 43 countries.<sup>7</sup> The report additionally presents descriptive firm-level evidence for Belgium and Spain and computes general equilibrium trade diversion effects using the ifo model. Using a gravity approach, Chowdhry and Felbermayr (2021) focus on a single country (France) and on the firm-level and explore the effects of the EU-Korea FTA mainly on the different margins of French exports of goods. I additionally explore heterogeneity in trade effects across country pairs of EU members and South Korea and across trade directions within pairs.

Grübler and Reiter (2021) particularly aim at disentangling the effects of tariffs and non-tariff measures (NTMs). I am interested in the joint effect of tariffs and NTMs. In the estimations, I control for non-discriminatory NTMs by means of exporter-and-time- and importer-and-time fixed effects. Grübler and Reiter (2021) also use the WIOD for robustness checks.

Juust et al. (2020) use a sample of 36 countries for the period 2005-2015. Thus, the number of trading partners is very small. Moreover, the dataset only covers two years prior to the launch of the trade negotiations. They also find differential effects on EU exports to and imports from Korea. In their regressions, they focus on the transition periods 2011-2013 and 2011-2015. I consider the period from 1980-2016 (and RTAs until 2021) and estimate directional effects within country pairs.

Using product level data, Lakatos and Nilsson (2017) show that, compared to the period before negotiations began, the EU-South Korea FTA had a positive impact on trade during the start of negotiations (June 2007) and after the initialling of the agreement (Sept 2009). While their dataset contains detailed (8-digit) product-level information on trade between EU countries and South Korea, I consider trade at the aggregate (manufacturing) level, but include other countries as well in order to be able to properly control for country-specific effects and other free trade agreements. Moreover, I also account for delayed effects. In my specifications, I do not find evidence for positive anticipation effects.

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<sup>7</sup>Similarly, Felbermayr et al. (2018) use estimates of the EU-Korea FTA effect based on WIOD as an input into the ex-ante analysis of the EU-Japan FTA.



The remainder of the paper is organized as follows. In sections 2 and 3, respectively, the structural gravity framework and the data are presented. Section 4 contains the econometric specifications and results. The final section tries to explain the observed heterogeneity in the trade effects.

## 2 Structural gravity framework

The theoretical gravity equation of international trade has first been derived from the properties of the expenditure systems under the assumption that goods are differentiated by country of origin (Anderson, 1979). It can also be obtained from a multi-country, multi-sector Ricardian trade model (Eaton & Kortum, 2002), a model featuring an endowment economy and product differentiation by country of origin (Anderson & van Wincoop, 2003), and from models with monopolistically competitive firms that are either homogeneous (Feenstra, 2004) or heterogeneous (Chaney, 2008). For the standard gravity equation to arise in the latter setting, the firm-level productivities have to be assumed to be Pareto-distributed.

Following Baier et al. (2019), in its general form the gravity equation reads

$$X_{ij} = \frac{A_i (w_i \tau_{ij})^{-\theta}}{\sum_{\ell} A_{\ell} (w_{\ell} \tau_{\ell j})^{-\theta}} \times E_j, \quad (1)$$

where  $X_{ij}$  is the value of exports from an origin country  $i$  to a destination country  $j$  and  $E_j$  is the total expenditure by purchasers in  $j$  on goods across all different origins, including goods produced domestically in  $j$ . The share of  $j$ 's expenditure allocated specifically to products from any one origin  $i$  directly depends on: (i)  $A_i$ , the overall quality of the production technologies available in  $i$ ; (ii)  $w_i$ , the wage in  $i$ , and (iii)  $\tau_{ij}$ , the “iceberg” trade cost required to send goods from  $i$  to  $j$ . Goods from different origins are assumed to be imperfectly substitutable: production and trade costs are subject to a constant trade elasticity  $\theta > 1$ . All cost factors only weigh on trade *relative* to the overall degree of competition in  $j$ 's import market, which is reflected by the summation term in the denominator.

Gravity-like equations can be derived under different sets of assumptions, but not all of them fit into the multiplicative form illustrated in (1). Examples are gravity equations derived

from linear demand systems (Ottaviano et al. 2002; Spearot, 2013) or translog expenditure functions (Feenstra 2003; Novy, 2013; and Chen and Novy, 2021). Also in models with endogenous marketing costs, the effect of trade liberalization on small firms differs from the one on large firms, which makes the response of aggregate trade dependent on the composition of firms (Arkolakis, 2010). Irarrazabal et al. (2015) explore the gravity equation – at the firm-level – in the presence of additive trade costs. Moreover, Adão et al. (2020) allow for a flexible parametrization of the productivity distribution in a monopolistic competition model with firm heterogeneity. In all these models, trade elasticities are not constant.

In dynamic trade models, agents are often assumed to adjust behavior over time, which potentially renders trade elasticities time-varying (Alessandria et al., 2021). In the present paper, I stick to the model with a constant trade elasticity in the theory part, but explore heterogeneity in trade effects across time, country pairs, and directions of trade within pairs in the empirical part.<sup>8</sup>

In line with Baier et al. (2019), I assume the following specification of the trade cost term:

$$\ln \tau_{ij,t}^{-\theta} = Z_{ij} \delta + \alpha FTA_{ij,t} + \sum_s \alpha_{F,s} FTA_{ij,t+s} + \sum_k \alpha_{L,k} FTA_{ij,t-k} + u_{ij,t}, \quad (2)$$

where  $Z_{ij}$  is a set of time-invariant controls for the general level of trade costs between  $i$  and  $j$  with coefficient vector  $\delta$  and  $FTA_{ij,t}$  is a dummy variable that indicates whether the two trading partners  $i$  and  $j$  are member of the same FTA at time  $t$ . The FTA dummies capture the liberalization effects of both tariff and non-tariff barriers. More precisely, the coefficient  $\alpha$  captures the contemporaneous FTA effect, while the coefficients  $\alpha_{F,s}$  and  $\alpha_{L,k}$  capture the anticipation (*Forward*) and delayed (*Lagged*) effects by looking  $s$  years ahead and  $k$  years back, respectively.

Equation (2) can flexibly capture anticipation and delayed effects. Egger et al. (2020) have empirically shown that the effect of the FTAs begins about three years prior to their entry into force and reach their full impact after ten years. While equation (2) only contains a single FTA

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<sup>8</sup>Head and Mayer (2014) conclude that “the main reason to insist on the multiplicative form in the definition of gravity is historical usage. It is therefore possible that future work would abandon the multiplicative form and redefine gravity to allow other functional forms.” (p. 138).

dummy, in the regressions below I will include an extra dummy for the EU-South Korea FTA and “purge” the FTA dummy from the EU-South Korea FTA. Thus, I can identify the effect of the average FTA other than the EU-South Korea FTA as well as the effect of the EU-South Korea FTA. Due to trade data restrictions that will be discussed below, I can only consider up to five years of lagged adjustment in case of the EU-South Korea FTA ( $k = 5$ ). The anticipation period contains four years ( $s = 4$ ).

The empirical gravity equation becomes

$$X_{ij,t} = \exp \left( \eta_{it} + \psi_{jt} + \gamma_{ij} + \alpha FTA_{ij,t} + \sum_s \alpha_{F,s} FTA_{ij,t+s} + \sum_k \alpha_{L,k} FTA_{ij,t-k} + \sum_t B_t \right) + \varepsilon_{ijt}, \quad (3)$$

where  $\eta_{it}$  is a set of exporter-and-time fixed effect absorbing  $\ln A_i w_i^{-\theta}$  and controlling for all time-varying exporter-specific characteristics,  $\psi_{jt}$  is a set of importer-and-time fixed effect absorbing  $\ln E_j / \sum_\ell A_\ell w_\ell \tau_{\ell j}^{-\theta}$  and controlling for all time-varying importer-specific characteristics,  $\gamma_{ij}$  is a (directional) pair fixed effect capturing  $Z_{ij}$  and absorbing all time-invariant country-pair specific characteristics, including those that could explain selection into an FTA, and  $\sum_t B_t$  is a set of dummies equal 1 for international trade observations (as opposed to *internal* trade,  $X_{ii}$ ) at each time  $t$ , capturing the process of globalization over time, as all countries trade more with each other and less with their own internal markets (Baier et al, 2015). The variable  $\varepsilon_{ijt}$  reflects the measurement error in trade and absorbs the error term in the trade cost function.

Variants of equation (3) will be estimated using PPML. PPML is recommended for use in gravity applications (Yotov et al., 2016). While the implicit assumption of this specification is that the variance of  $\varepsilon_{ijt}$  is proportional to the conditional mean of  $X_{ij,t}$ , it has been shown that PPML generates relatively robust results even when this assumption is not satisfied and/or the data features many zero trade values (Santos-Silva & Tenreyro, 2006). PPML typically outperforms linear (and other) specifications (Head & Mayer, 2014; Egger & Staub, 2016). An elegant feature is that PPML produces estimates in which, summing across all partners, actual and estimated total trade flows are identical (Arvis & Shepherd 2013; Fally, 2015). Standard errors are clustered at the level of the country pair. Recent work suggests multi-way clustering at the exporter, importer, and year dimension (Egger and Tarlea, 2015), but this

approach requires at least 50 units in each dimension. While the dataset has more than 50 exporters and importers, the number of time periods is limited to 36. Thus, I refrain from multi-way clustering.

### 3 Data

Data on international and intra-national trade flows come from the WTO Structural Gravity Database (Monteiro, 2020). It covers the period 1980-2016 and includes 186 trading partners. Belgium and Luxembourg do not appear as separate countries, but are summarized as “Belgium-Luxembourg”.<sup>9</sup> For most of the countries, international trade flows are available for all years. Information for intra-national trade is not necessarily available for every year.<sup>10</sup>

Information on RTAs comes from Mario Larch’s Regional Trade Agreements Database (Egger and Larch, 2008, updated version). I create dummy variables for the EU-South Korea FTA and “purge” the FTA dummy from this FTA. Hence, the RTA dummy presents the average effect of all FTAs other than the EU-South Korea FTA, while the EU-South Korea dummy represents the effect of the EU-South Korea FTA. The most recent year in the RTA database is 2019. In order to increase the number of lags and leads of the RTA dummies that can be included into the analysis, I update the RTA database to the years 2020 and 2021 using information from the WTO Regional Trade Agreements Database.<sup>11</sup>

In the final dataset, I can include up to 5-year lags and leads, respectively, of the EU-South Korea FTA dummy in the same regression ( $s^{\max} = 5, k^{\max} = 5$ ). The maximum number of the lag is determined by the difference between 2016 (the most recent year for which trade data are available) and the date of entry into force (2011 in the case of the EU-South Korea FTA). Updating the RTAs to 2021 guarantees that the year 2016 is in the sample when a 5-year lead is included. Given that the trade negotiations between the EU and South Korea were launched

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<sup>9</sup>The alpha-3 country ISO code of the conglomerate “Belgium-Luxembourg” is BLX.

<sup>10</sup>For country and year coverage, see Monteiro (2020).

<sup>11</sup>For the year 2021, I only include RTAs that entered into force and appeared in the Database by July 7, 2021; see Table A1 in the Appendix for a list of RTAs that entered into force in 2020 and 2021. Most of the 42 agreements that entered into force in 2021 are agreements that involve the UK and substitute for agreements the UK formerly had under the umbrella of the EU, which has no effect on the coding of the RTA dummy.

in the year 2007, the 5-year lead should be insignificant. A positive and significant coefficient 5-year lead would signal selection into the agreement. All leads up to the 4-year lead capture potential anticipation effects.

Croatia joined the EU only in 2013 (and immediately entered the EU-South Korea FTA), so in regressions where I include country pairs separately, I can only include a 3-year lag for Croatia.

## 4 Econometric specifications and results

### 4.1 Heterogeneity across time

In order to identify the trade effect of the EU-South Korea FTA, I augment equation (3) by adding a specific dummy for this agreement and purging the FTA dummy from this agreement. The estimation equation reads

$$\begin{aligned}
 X_{ij,t} = & \exp \left( \eta_{i,t} + \psi_{j,t} + \gamma_{ij} + \alpha FTA_{ij,t} + \sum_s \alpha_{F,s} FTA_{ij,t+s} + \sum_k \alpha_{L,k} FTA_{ij,t-k} + \sum_t B_t \right) \\
 & \times \exp \left( \beta EUK_{ij,t} + \sum_s \beta_{F,s} EUK_{ij,t+s} + \sum_k \beta_{L,k} EUK_{ij,t-k} \right) + \varepsilon_{ijt}. \quad (4)
 \end{aligned}$$

The *FTA* dummy captures the effect of all FTAs other than the EU-South Korea FTA, while the dummy *EUK* captures the effect of the EU-South Korea FTA.<sup>12</sup> Along with the contemporaneous effects, I account for four leads ( $s = 4$ ) and five lags ( $k = 5$ ). Thus, for the EU-South Korea FTA, I estimate ten coefficients:  $\beta$ ,  $\beta_{F,1} \dots \beta_{F,4}$ , and  $\beta_{L,1} \dots \beta_{L,5}$ .

Table 1 shows the results.<sup>13</sup> Note that for the sake of readability, coefficients for different points in time are organized in columns. For each coefficient, the table shows the point estimate (first row) and the corresponding p-value (second row). For a more standard representation of the estimation results, see column (1) of Table A2 in the Appendix. For the Other FTAs, there is no significant effect four years before the agreement enters into force. There are

<sup>12</sup>For the sake of the focus on the EU-South Korea FTA, I ignore heterogeneity in the group of other (mainly first-generation) FTAs.

<sup>13</sup>Replication files are available upon request from the author

Table 1: Heterogeneity across time

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Leads				Cont.	Lags					Cumul. Effect	
	t+4	t+3	t+2	t+1	t	t-1	t-2	t-3	t-4	t-5	Sign.	All
Other FTA	-0.035 0.202	0.039 0.001	0.022 0.342	0.038 0.002	0.006 0.635	0.082 0.001	0.032 0.113	0.002 0.895	0.024 0.030	0.079 0.019	0.263	0.289 0.000
EUKOR	0.056 0.201	0.029 0.443	0.073 0.078	-0.152 0.000	0.023 0.636	-0.002 0.960	0.041 0.205	0.037 0.172	0.040 0.219	0.031 0.438	-0.079	0.176 0.056

*Notes:* This table shows the results of estimating equation (4). Coefficients for different points in time are organized in columns. First row: point estimate. Second row: p-value. Columns (11) and (12) show the sum of the *significant* and *all* coefficients, respectively. Estimation method: Poisson Pseudo Maximum Likelihood. All regressions include exporter-and-time, importer-and-time, and asymmetric pair effects, interactions between dummies for international transactions and year dummies (all not shown). The EU-South Korea FTA is excluded from the dummy for common membership in any Other FTA. Standard errors clustered at asymmetric country pairs. # of obs. 919,041, # of pairs: 41,712, # of exporter $\times$ year interactions: 7,662, # of importer $\times$ year interactions: 7,648.

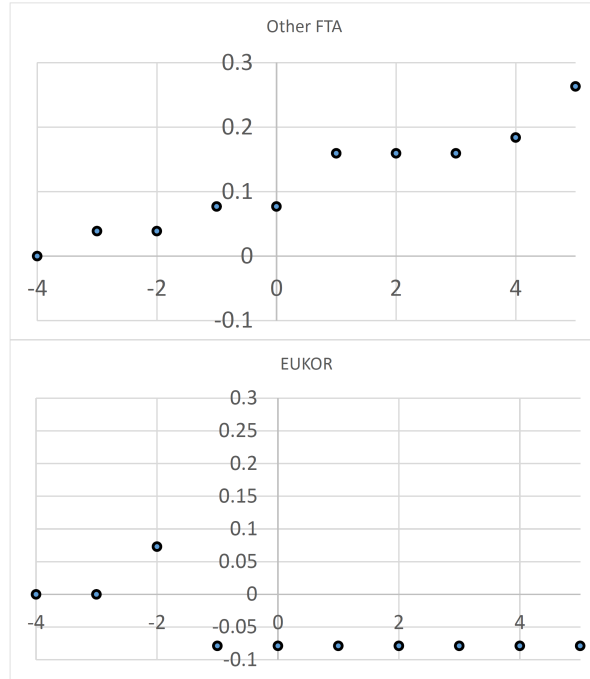
anticipation effects that show up three years and one year prior to the agreement. The contemporaneous effect is not statistically significant. There is evidence for phasing in and/or sluggish adjustment: There are significant trade effects one year, four years, and five years after the agreement entered into force.

The sum of the significant coefficients is shown in column (11). Accounting for anticipation and lagged effects, the cumulative trade-creating effect of other FTAs after five years amounts to  $\exp(0.263) - 1 \approx 30\%$ . This result is in line with Baier et al. (2019) who find the effect to be 34% after five years and with Egger et al. (2020). Following Egger et al. (2020), Figure 1 takes an event-study perspective on the coefficients and displays the cumulative trade effects from lead 4 to lag 5 on the basis of the results presented in Table 1 (treating insignificant effects as zeros). It also starts four years prior to the agreement ( $t = -4$ ), but displays cumulative annual responses, and only includes the lagged effects up to lag 5 ( $t = 5$ ). The pattern is similar to the one found in Egger et al. (2020), although the present analysis cannot account for effects with lags larger than 5 years.

The sum of all coefficients,  $\beta + \beta_{F,1} + \dots + \beta_{F,4} + \beta_{L,1} + \dots + \beta_{L,5}$  and the p-value is shown in column (12).<sup>14</sup> The sum amounts to 0.289 and is estimated with a p-value of 0.000. This estimate implies a trade effect of 33.5% after five years, which is of similar magnitude as the effect computed on the basis of all significant coefficients and even closer to the findings in

<sup>14</sup>In STATA, linear combinations can be computed using the `lincom` command.

Figure 1: Cumulative partial trade effects



*Notes:* This figure shows the cumulative effects (sum of significant coefficients) obtained from estimating equation (4) and shown in Table 1.  $-4$  refers to the anticipation effect four years ( $\beta_{F,4}$  in equation (4)) before the EU-South Korea FTA entered into force, and 5 to the cumulative effect five years after entry into force.

Baier et al. (2019) and Egger et al. (2020).

The pattern is very different when it comes to the EU-South Korea FTA. There seems to be a positive anticipation effect two years prior to the agreement, but this effect is dominated by a negative effect that arises one year prior to the agreement. There are no further positive trade effects. The sum of the significant coefficients is therefore negative; see column (11) in Table 1 and Figure 1. The sum of all coefficients, in contrast, is positive and significant at the 10% level; see column (12). It implies a cumulative effect of  $\exp(0.176) - 1 \approx 19.2\%$ . Thus, the two alternative measures lead to very different conclusions about the cumulative effect of the average trade effect of the EU-South Korea FTA.

One limitation of the analysis is that the EU-South FTA most likely has not reached its full impact by 2016, but the conclusion that the adjustment process to the EU-South Korea FTA differs from the one found in the literature is not affected by this qualification. Another limitation is that the average effect may mask heterogeneity across pairs or across directions

within pairs.

Before I return to these issues in the subsequent subsections, I address the potential endogeneity problem. In order to do so, I estimate equation (4) with an additional 5-year lead. For the EU-South Korea FTA, this 5-year lead should be insignificant, because the potential agreement was only announced four years before it entered into force. Indeed, the 5-year lead of the EU-South Korea FTA is insignificant; see Table 2 and column (2) of Table A2 in the Appendix. The 5-year lead for Other FTAs is significant, but bears a negative sign, as in Egger et al. (2020).<sup>15</sup> The accumulated trade effects are not affected.

Table 2: Additional lead

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
	Leads					Cont.	Lags					Cumul. Effect	
	t+5	t+4	t+3	t+2	t+1	t	t-1	t-2	t-3	t-4	t-5	Sign.	All
Other FTA	-0.053 0.075	0.012 0.333	0.038 0.001	0.022 0.350	0.038 0.002	0.006 0.647	0.082 0.001	0.032 0.113	0.002 0.898	0.024 0.031	0.078 0.020	0.209	0.282 0.000
EUKOR	0.006 0.902	0.048 0.102	0.031 0.403	0.072 0.080	-0.152 0.000	0.023 0.632	-0.002 0.957	0.041 0.203	0.036 0.183	0.041 0.213	0.031 0.436	-0.079	0.175 0.061

*Notes:* This table shows the results of estimating equation (4). Coefficients for different points in time are organized in columns. First row: point estimate. Second row: p-value. Columns (11) and (12) show the sum of the *significant* and *all* coefficients, respectively. Estimation method: Poisson Pseudo Maximum Likelihood. All regressions include exporter-and-time, importer-and-time, and asymmetric pair effects, interactions between dummies for international transactions and year dummies (all not shown). The EU-South Korea FTA is excluded from the dummy for common membership in any Other FTA. Standard errors clustered at asymmetric country pairs. # of obs. 919,041, # of pairs: 41,712, # of exporter×year interactions: 7,662, # of importer×year interactions: 7,648.

Finally, I estimate equation (4) restricting the number of FTA controls to the contemporaneous effect, a 4-year lead, and a 5-year lag. The result is reported in column (3) of Table A2 in the Appendix. In the restricted regression, the contemporaneous effect of Other FTAs shows up significantly, and the 5-year lag effect is larger compared to the results in the standard specification. The cumulative effect, measured as the sum of all coefficients, is virtually the same. The advantage of the standard specification is that it draws a more detailed picture of the adjustment process. The contemporaneous effect and the 4-year lead of the EU-South Korea FTA are insignificant also in the restricted specification. However, the 5-year lag picks up a significant effect. The cumulative effect is again virtually the same.

<sup>15</sup>The underlying assumption is that the other FTAs were typically announced less than five years before entry into force.



## 4.2 Heterogeneity across directions of trade

The estimates obtained in the previous subsection represent the effect of the EU-South Korea FTA on bilateral trade between EU member countries and South Korea. Now, I allow the effect to differ across directions of trade  $d$ . This strategy accounts for the possibility that exports of EU member countries to South Korea might be differently affected than exports of South Korea to EU member countries. More specifically, I run the following regressions

$$X_{ij,t} = \exp \left( \eta_{i,t} + \psi_{j,t} + \gamma_{ij} + \alpha FTA_{ij,t} + \sum_s \alpha_{F,s} FTA_{ij,t+s} + \sum_k \alpha_{L,k} FTA_{ij,t-k} + \sum_t B_t \right) \times \exp \left( \sum_d \left( \beta^d EUK_{ij,t} + \sum_s \beta_{F,s}^d EUK_{ij,t+s} + \sum_k \beta_{L,k}^d EUK_{ij,t-k} \right) \right) + \varepsilon_{ijt}. \quad (5)$$

Again, along with the contemporaneous effect, I account for four leads and five lags. Thus, for the EU-South Korea FTA I estimate twenty coefficients (ten in each direction).

Table 3: Heterogeneity across directions

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Leads				Cont.	Lags					Cumul. Effect	
	t+4	t+3	t+2	t+1	t	t-1	t-2	t-3	t-4	t-5	Sign.	All
Other FTA	-0.035 0.200	0.039 0.001	0.022 0.341	0.038 0.002	0.006 0.643	0.082 0.001	0.032 0.113	0.002 0.898	0.024 0.029	0.079 0.020	0.263	0.289 0.000
Exports to South Korea	0.069 0.368	0.063 0.109	0.050 0.258	-0.136 0.032	0.132 0.000	0.034 0.451	0.027 0.411	0.063 0.080	0.047 0.139	0.011 0.807	0.059	0.359 0.003
Imports from South Korea	0.041 0.656	0.007 0.912	0.089 0.208	-0.161 0.013	-0.057 0.443	-0.037 0.547	0.043 0.470	0.013 0.771	0.035 0.586	0.051 0.461	-0.161	0.025 0.851

*Notes:* This table shows the results of estimating equation (4). Coefficients for different points in time are organized in columns. First row: point estimate. Second row: p-value. Columns (11) and (12) show the sum of the *significant* and *all* coefficients, respectively. Estimation method: Poisson Pseudo Maximum Likelihood. All regressions include exporter-and-time, importer-and-time, and asymmetric pair effects, interactions between dummies for international transactions and year dummies (all not shown). The EU-South Korea FTA is excluded from the dummy for common membership in any Other FTA. Standard errors clustered at asymmetric country pairs. # of obs. 919,041, # of pairs: 41,712, # of exporter×year interactions: 7,662, # of importer×year interactions: 7,648.

Table 3 shows the results. Allowing for asymmetry in the effects on exports and imports does not affect the trade effects of other FTAs, which remain the same in all years; compare Tables 1 and 3. There are differences, however, in the adjustment to the EU-South Korea FTA across directions. In contrast to the finding for average trade, there is no significant effect two years prior to the agreement. The negative effect in the year prior to the agreement, however, shows up significantly for both directions. Thus, there seems to be a postponement of trade

one year prior to the agreement. While this (negative) effect is completely offset in the year of the agreement and turns into a positive effect three years after the agreement when it comes to exports of EU countries to South Korea, for exports of South Korea to EU countries there does not seem to be such an offsetting effect. Thus, the sum of the significant coefficients is positive for exports of EU countries to South Korea, but negative for Korean exports to EU countries. The sum of *all* coefficients for exports of EU countries to South Korea is even larger and implies an increase in trade by  $\exp(0.359) - 1 \approx 41\%$ , while the effect on Korean exports to EU member countries is way smaller and not statistically significant.

Asymmetries in the effects across directions have also been recognized by Civic Consulting and Ifo Institute (2018). They report a trade effect of 54% on exports of EU countries to South Korea and a trade effect of 15% on Korean exports to EU countries. I do not find a significant positive effect on Korean exports to EU countries.

### 4.3 Heterogeneity across country pairs

For the moment, I do away with the direction of trade and return to equation (4). However, following Baier et al. (2019), I estimate separate coefficients for each country pair  $p$  including an EU member country – either as an exporter or as an importer – and South Korea. The estimation equation reads

$$\begin{aligned}
X_{ij,t} = & \exp\left(\eta_{i,t} + \psi_{j,t} + \gamma_{ij} + \alpha FT A_{ij,t} + \sum_s \alpha_{F,s} FT A_{ij,t+s} + \sum_k \alpha_{L,k} FT A_{ij,t-k} + \sum_t B_t\right) \\
& \times \exp\left(\sum_p \left(\beta^p EUK_{ij,t} + \sum_s \beta_{F,s}^p EUK_{ij,t+s} + \sum_k \beta_{L,k}^p EUK_{ij,t-k}\right)\right) + \varepsilon_{ijt}, \quad (6)
\end{aligned}$$

Again, along with the contemporaneous effect, I account for four leads ( $s = 4$ ) and five lags ( $k = 5$ ). Thus, for each country pair  $p$ , I estimate ten coefficients. Croatia (HRV) joined the EU and hence the EU-South Korea Agreement in 2013. Hence, for Croatia only three lags can be included in the regression. In total, the number of coefficients  $\beta^p$ ,  $\beta_{F,s}^p$ , and  $\beta_{L,k}^p$  amounts to  $26 \times 10 + 8 = 268$ .<sup>16</sup>

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<sup>16</sup>Recall that Belgium and Luxembourg are merged to Belgium-Luxembourg in the trade data, such that in total there are 27 EU member countries.

Table 4: Heterogeneity across country pairs

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Leads				Cont.	Lags					Cumul. Effect	
	t+4	t+3	t+2	t+1	t	t-1	t-2	t-3	t-4	t-5	Sign.	All
Other FTA	-0.035 0.202	0.039 0.001	0.022 0.342	0.038 0.002	0.006 0.625	0.082 0.001	0.032 0.114	0.002 0.894	0.024 0.030	0.080 0.018	0.263	0.290 0.000
AUT	0.141 0.111	-0.063 0.523	0.068 0.394	0.006 0.949	0.002 0.992	-0.029 0.602	-0.203 0.000	0.202 0.154	-0.005 0.928	0.146 0.235	-0.203	0.294 0.085
BGR	-0.005 0.943	-0.269 0.047	-0.339 0.000	0.512 0.000	0.309 0.001	-0.734 0.000	-0.088 0.697	-0.026 0.821	0.097 0.174	0.160 0.050	-0.361	0.351 0.141
BLX	0.164 0.183	0.187 0.000	-0.055 0.409	-0.302 0.000	0.089 0.266	0.087 0.001	-0.044 0.784	0.097 0.000	-0.161 0.059	0.155 0.051	0.063	0.130 0.267
CYP	0.146 0.044	0.182 0.172	0.068 0.007	0.006 0.000	0.002 0.001	-0.029 0.743	-0.203 0.969	0.202 0.000	-0.005 0.062	0.146 0.007	0.096	0.294 0.655
CZE	0.699 0.000	-0.165 0.019	0.235 0.000	-0.039 0.725	0.284 0.000	0.182 0.000	-0.040 0.020	0.011 0.654	0.145 0.022	0.126 0.067	1.465	1.256 0.000
DEU	0.088 0.000	0.187 0.000	0.100 0.000	-0.136 0.000	-0.046 0.697	0.009 0.861	0.065 0.000	0.005 0.905	0.059 0.128	0.105 0.053	0.408	0.209 0.322
DNK	-0.319 0.148	0.113 0.114	0.047 0.753	-0.123 0.000	-0.181 0.130	0.081 0.068	0.570 0.157	0.389 0.001	-0.193 0.220	-0.801 0.049	-0.454	-0.497 0.027
ESP	0.059 0.280	-0.144 0.003	-0.119 0.330	-0.170 0.000	-0.009 0.537	0.142 0.003	-0.007 0.934	0.334 0.033	0.102 0.012	0.093 0.301	0.265	0.140 0.398
EST	0.233 0.357	0.105 0.467	-0.362 0.115	0.196 0.164	-0.095 0.718	0.390 0.028	0.392 0.047	-0.090 0.303	-0.626 0.000	0.016 0.828	0.155	-0.232 0.245
FIN	-0.064 0.568	0.420 0.013	-0.549 0.215	-0.252 0.000	-0.051 0.683	0.184 0.000	-0.099 0.733	-0.039 0.060	-0.139 0.048	-0.067 0.397	0.175	-0.839 0.070
FRA	-0.108 0.129	0.074 0.004	0.041 0.100	-0.207 0.000	0.388 0.000	-0.370 0.005	0.213 0.000	-0.042 0.732	-0.021 0.507	-0.081 0.260	0.138	0.391 0.000
GBR	-0.108 0.129	-0.080 0.124	-0.065 0.329	0.002 0.984	-0.043 0.293	-0.025 0.756	0.074 0.073	0.158 0.000	0.214 0.043	-0.106 0.131	0.447	0.046 0.462
GRC	-0.393 0.000	-0.197 0.000	1.074 0.000	-1.014 0.000	0.139 0.000	0.572 0.000	-0.535 0.003	0.132 0.008	0.366 0.000	0.591 0.006	0.736	0.164 0.219
HRV	-0.386 0.000	0.598 0.000	-0.498 0.000	-0.198 0.192	-0.030 0.462	0.495 0.014	1.214 0.000	0.449 0.000			1.873	1.149 0.000
HUN	0.687 0.000	-0.177 0.085	0.399 0.030	0.010 0.751	-0.482 0.000	-0.174 0.016	0.564 0.000	-0.349 0.000	-0.086 0.658	0.008 0.861	0.468	0.573 0.086
IRL	-0.090 0.379	-0.115 0.256	-0.217 0.079	-0.307 0.000	-0.096 0.000	0.105 0.004	-0.066 0.021	0.253 0.001	-0.290 0.005	0.559 0.000	-0.059	-0.369 0.002
ITA	-0.083 0.010	-0.083 0.313	0.081 0.000	-0.173 0.013	0.103 0.000	0.000 0.996	0.043 0.049	0.073 0.000	0.084 0.010	-0.038 0.270	0.129	0.007 0.906
LTU	-0.296 0.116	0.101 0.032	0.172 0.016	0.061 0.374	-0.081 0.226	-0.006 0.884	0.167 0.000	0.346 0.000	0.310 0.000	0.521 0.056	1.618	1.302 0.000
LVA	0.730 0.043	-0.026 0.947	-0.167 0.020	-0.234 0.004	0.682 0.000	-0.158 0.006	-0.448 0.001	0.067 0.652	0.050 0.602	0.276 0.453	0.406	0.930 0.021
MLT	0.538 0.000	0.762 0.000	0.164 0.123	-0.302 0.024	0.168 0.052	0.214 0.016	-1.411 0.000	0.219 0.037	0.807 0.000	-0.943 0.000	0.052	0.002 0.990
NLD	0.104 0.379	0.192 0.033	-0.070 0.202	-0.045 0.687	-0.112 0.225	-0.005 0.968	0.114 0.001	-0.017 0.537	-0.003 0.970	-0.030 0.682	0.305	0.131 0.570
POL	0.595 0.000	0.064 0.044	0.369 0.000	-0.281 0.000	-0.172 0.001	0.024 0.627	0.060 0.205	-0.053 0.472	-0.185 0.000	0.148 0.032	0.538	0.545 0.023
PRT	-0.189 0.016	-0.013 0.658	0.336 0.000	0.492 0.000	-0.401 0.000	-0.560 0.005	0.166 0.000	0.192 0.168	0.221 0.000	-0.062 0.476	0.064	0.740 0.000
ROM	0.308 0.000	-0.112 0.350	0.082 0.355	-0.227 0.000	0.084 0.622	0.264 0.008	-0.028 0.587	0.098 0.424	0.030 0.562	0.023 0.804	0.345	0.259 0.355
SVK	1.447 0.000	0.105 0.021	0.267 0.000	-0.057 0.251	-0.176 0.000	0.178 0.000	-0.056 0.015	-0.074 0.041	-0.121 0.000	-0.155 0.009	1.416	1.182 0.000
SVN	0.841 0.000	0.697 0.000	-0.440 0.000	0.064 0.132	0.655 0.000	0.204 0.000	0.026 0.379	0.093 0.000	0.105 0.001	0.003 0.957	2.155	2.045 0.000
SWE	-0.224 0.000	0.041 0.491	-0.050 0.712	-0.047 0.151	0.273 0.006	-0.226 0.001	0.019 0.722	0.063 0.093	-0.034 0.501	0.287 0.000	0.173	0.330 0.124

Notes: This table shows the results of estimating equation (6), where  $p$  is a pair of an EU member country (listed in the table) and South Korea. For each pair  $p$ , coefficients for different points in time are organized in columns. First row: point estimate. Second row: p-value. Croatia (HRV) joined the EU/the EU-South Korea FTA in 2013, such that only up to 3 lags can be included. Following Egger et al. (2020) and Baier et al. (2019), respectively, columns (11) and (12) show the sum of the significant and all coefficients. Estimation method: Poisson Pseudo Maximum Likelihood. All regressions include exporter-and-time, importer-and-time, and asymmetric pair effects, interactions between dummies for international transactions and year dummies (all not shown). The EU-South Korea FTA is excluded from the dummy for common membership in any Other FTA. Standard errors clustered at asymmetric country pairs. # of obs. 919,041, # of pairs: 41,712, # of exporter $\times$ year interactions: 7,662, # of importer $\times$ year interactions: 7,648.

Table 4 shows the results of this estimation. In order to enhance the readability of the table, for each pair  $p$  the estimated coefficients  $\beta^p$ ,  $\beta_{F,s}^p$ , and  $\beta_{L,k}^p$  are organized in columns.

The table displays the point estimate in the first row of a pair and the p-value in the second row. The table also shows the two measures of the cumulative effect, the sum of significant coefficients in column (11) and the sum of all coefficients and its significance level in column (12).

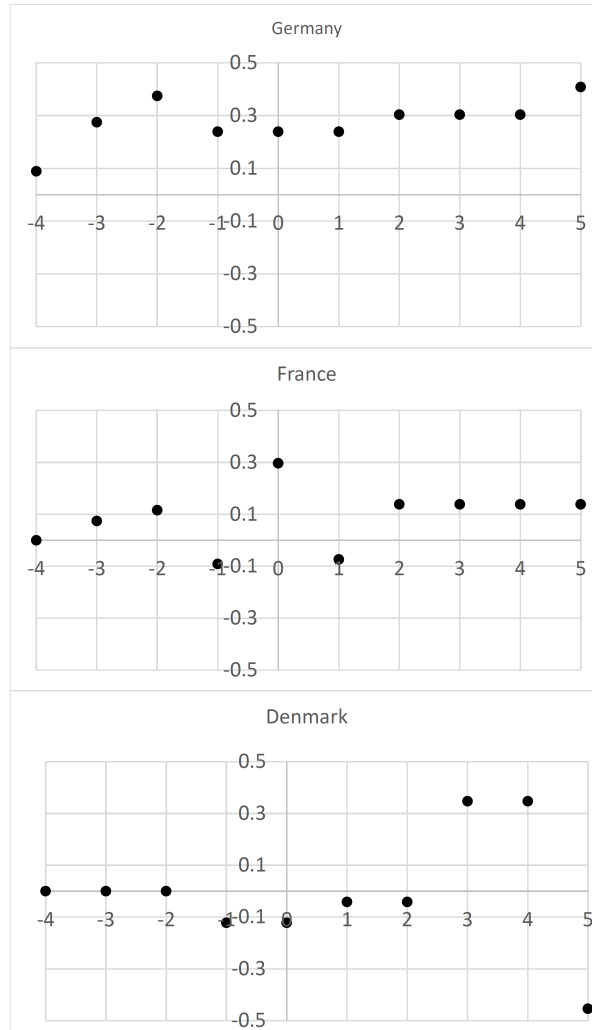
Table 4 reveals strong heterogeneity in the adjustment process to the EU-South Korea FTA. For 10 out of the 27 pairs, anticipation already yields a significant positive effect four years prior to the agreement; see column (1). However, this effect is significantly negative for 5 pairs. The contemporaneous effect is significantly positive for 10 pairs, significantly negative for 5 pairs, and insignificant for 12 pairs. While for Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia the two different measures of the cumulative effect yield qualitatively and quantitatively similar results, for the other pairs the magnitudes differ. For Austria and Finland, the two aggregation measures even yield opposite signs, as in the analysis of average trade.<sup>17</sup> For some pairs (including Germany), the sum of significant coefficients is positive, while the sum of all coefficients is not statistically significant.

Differences in the adjustment can also be seen in Figure 2 which presents the cumulative effects for selected pairs, starting from the 4-year lead. For Germany, we see an “overshooting” in the trade effect two years prior to the agreement, which is corrected afterwards. A relatively high growth appears between four and five years after the agreement. For France, there seems to be an “overshooting” both two years prior to the agreement and during entry into force, while there has not been a high-growth phase towards the end (yet). For Denmark, there are positive cumulative effects after three and four years after entry into force, but these effects are dominated by a sharp decline in bilateral trade flows five years after the agreement.

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<sup>17</sup>There are even more countries for which the signs of the two measures differ, but the sums of all coefficients are not necessarily significant.

Figure 2: Cumulative partial trade effects for selected countries



*Notes:* This figure shows the cumulative effects (sum of significant coefficients) obtained from estimating equation (6) and shown in Table 4 for some countries (Germany, France, and Denmark).  $-4$  refers to the anticipation effect four years before the EU-South Korea FTA entered into force, and  $5$  to the cumulative effect five years after entry into force.

#### 4.4 Heterogeneity across directions of trade within country pairs

In this subsection, I still consider country pairs spanned by EU member countries and South Korea, but now I allow trade effects to differ across directions of trade within pairs. Letting  $d$

denote the directions of trade, the estimation equation becomes

$$\begin{aligned}
X_{ij,t} = & \exp \left( \eta_{i,t} + \psi_{j,t} + \gamma_{ij} + \alpha FTA_{ij,t} + \sum_s \alpha_{F,s} FTA_{ij,t+s} + \sum_k \alpha_{L,k} FTA_{ij,t-k} + \sum_t B_t \right) \\
& \times \exp \left( \sum_p \sum_d \left( \beta^{p,d} EUK_{ij,t} + \sum_s \beta_{F,s}^{p,d} EUK_{ij,t+s} + \sum_k \beta_{L,k}^{p,d} EUK_{ij,t-k} \right) \right) + \varepsilon_{ijt}. \quad (7)
\end{aligned}$$

For all country pairs but the one involving Croatia, I estimate twenty coefficients (ten in each direction).<sup>18</sup> With 27 EU member countries, this amounts to  $26 \times 20 + 16 = 536$  coefficients.

Table 5 shows the results of estimating equation (7). The basic structure is the same as in Table 4, but instead of showing the effect on average bilateral trade, it displays the effects on exports of EU countries to South Korea in columns (1) to (12) and the effects on imports of EU countries from South Korea in columns (13) to (24).

The following observations stand out. First, there is substantial heterogeneity in the timing of effects across directions within pairs. For most of the pairs for which the exports from the EU member to South Korea rise four years before entry into force, the imports of the EU member from South Korea do not change significantly. Second, for the directional effects, the two methods to compute cumulative effects (sum of significant coefficients vs. sum of all coefficients) yield almost always the same sign (with exports of South Korea to Latvia being the exception, but the sum of all coefficients yields an insignificant effect), and also the magnitudes match closely. This lends support to the idea of accounting for heterogeneity across directions within pairs.

Third, for Croatia, Czech Republic, Hungary, Latvia, Lithuania, Poland, Slovakia, and Slovenia, effects on exports of South Korea to these countries have the same signs, albeit the magnitudes differ across directions of trade for some of these countries. The same holds true – with a negative sign – for Denmark and Ireland, albeit some directional effects do not show up significantly. For other countries, the signs differ across directions. One example is Germany. German exports to South Korea increase, while Korean exports to Germany decline.

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<sup>18</sup>Recall that Croatia only joined the EU and thus the EU-South Korea FTA in 2013.



## 5 Concluding remarks

In this paper, I document substantial heterogeneity in the partial effects of the EU-South Korea FTA across time, country pairs, and directions within country pairs on bilateral trade in goods. It would be very interesting to explore the determinants of this heterogeneity.

In section 2, I have argued that in models that do not predict a multiplicative gravity equation, trade elasticities are not necessarily constant. For given aggregate trade, the trade elasticity may depend on the composition of firms (Arkolakis, 2010; Spearot, 2013). Moreover, in dynamic trade models, differences in trade elasticities would reflect differences in the bilateral (directional) adjustment processes.

Models with constant trade elasticities can also accommodate heterogeneity in trade effects across directions within pairs. First, the sectoral composition of bilateral trade flows differs across pairs and across imports and exports within pairs. Through the lens of a framework with constant trade elasticities, the estimated coefficients compound the elasticity of trade costs in the FTA with the elasticity of bilateral trade in trade costs. In an Armington (1969) or a Krugman (1980) setting, the latter is governed by the elasticity of substitution between varieties.<sup>19</sup> In the Melitz (2003)-cum-Pareto model, this is the shape parameter of the Pareto distribution. These parameters are likely to differ across sectors. Hence, when the sectoral composition of trade flows differs across directions within pairs, the trade effects will differ as well. These differences, however, should disappear when the gravity equation is estimated at a detailed product level.

Second, only some product standards are harmonized within the EU, while others are subject to mutual recognition, leaving room for differences in national regulations. Dismantling this protection in the EU-South Korea FTA can be expected to generate different trade effects (on the import side from the export side, and in one country from the other).

Third, Kehoe and Ruhl (2013) argue that country pairs trading a smaller range of product varieties before the trade negotiations start have more potential for higher trade growth thereafter, which can also explain heterogeneity across directions within pairs (Baier et al.,

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<sup>19</sup>Rauch (1999) offers a categorization into differentiated and homogeneous goods.



2019).

Finally, Baier et al. (2019) argue that differences in trade effects can also be explained by differences in market power. As all EU member countries follow the same trade policy, differences in market power can only explain differences in trade effects across directions within pairs, but not across EU members.

Some cumulative effects appear to be negative. This might be explained by the fact that the adjustment process to the EU-South Korea FTA has not yet been completed. According to Baier and Bergstrand (2007) and Egger et al. (2020), the total time for the average FTA to reach the full impact of FTAs on trade is about 10 years. Due to availability of data on intra-national trade, I can only account for up to 5-year lagged effects. However, the negative cumulative effect is mainly driven by a negative anticipation effect. One reason could be that trade creation is dominated by trade diversion caused by other FTAs. As highlighted in the introduction, both the EU and South Korea enter a lot of trade agreements in the relevant period. In the regressions, these agreements are captured by the other FTA dummy. It would be reasonable, however, to allow the trade effects of these new agreements to differ from the average effect as well, and to include separate controls for these agreements. Moreover, it would be interesting to control for trade diversion. While this is not feasible in properly specified gravity equations using international trade only, Dai et al. (2014) show how to do so when intra-national trade flows are available. Finally, the EU-South Korea FTA might also cause trade diversion among EU member countries.

Negative partial trade effects do not necessarily imply welfare losses. First, imports are subject to lower trade costs (tariffs and non-tariff barriers), which constitutes a welfare gain. Second, the analysis looks at gross trade and ignores input-output linkages across countries. The EU countries, however, trade intermediate goods with each other. The “Factory Europe” (World Bank Group et al. 2017, Figure 6) can benefit as a whole, if (cheaper) intermediate products from Korea enter the EU in Eastern European countries. A proper welfare analysis takes these cross-country input-output linkages into account. Civic Consulting and Ifo Institute (2018) use their estimates to perform a counterfactual analysis that aims at quantifying welfare effects. However, their estimates ignore anticipation and delayed effects and neither

account for heterogeneity across country pairs nor across directions of trade within pairs.

I leave the exploration of the determinants of heterogeneity, accounting for trade diversion effects, and the identification of welfare effects in the presence of anticipation/delayed effects and heterogeneity across pairs/directions within pairs to further research.

## References

- [1] Adão, Rodrigo, Costas Arkolakis, Sharat Ganapati (2020). Aggregate Implications of Firm Heterogeneity: A Nonparametric Analysis of Monopolistic Competition Trade Models. *NBER Working Paper* No. 28081
- [2] Alessandria, George and Horag Choi (2014). Establishment heterogeneity, exporter dynamics, and the effects of trade liberalization. *Journal of International Economics* 94(2): 207-223.
- [3] Alessandria, George, Horag Choi, and Kim Ruhl (2021). Trade Adjustment Dynamics and the Welfare Gains from Trade. *Journal of International Economics* 131, in print.
- [4] Anderson, James E. (1979). A Theoretical Foundation for the Gravity Equation. *American Economic Review* 69(1): 106-116.
- [5] Anderson, James E. and Eric van Wincoop (2003). Gravity with Gravitas. *American Economic Review* 93(1): 170-192.
- [6] Arkolakis, Costas (2010). Market Penetration Costs and the New Consumers Margin in International Trade. *Journal of Political Economy* 118(6): 1151-1199.
- [7] Armington, Paul S. (1969). A Theory of Demand for Products Distinguished by Place of Production. *International Monetary Fund Staff Papers* 16(1): 159-178.
- [8] Arvis, Jean-François and Ben Shepherd (2013). The Poisson Quasi-maximum Likelihood Estimator: A Solution to the ‘Adding Up’ Problem in Gravity Models. *Applied Economics Letters* 20(6): 515-519.
- [9] Baier, Scott L. and Jeffery H. Bergstrand (2007). Do Free Trade Agreements Actually Increase Members’ International Trade? *Journal of International Economics* 71(1): 72-95.
- [10] Baier, Scott L., Yoto V. Yotov, and Thomas Zylkin (2019). On the Widely Differing Effects of Free Trade Agreements: Lessons from Twenty Years of Trade Integration. *Journal of International Economics* 116: 206-226.
- [11] Bergstrand, Jeffrey, Mario Larch, and Yoto Yotov (2015). Economic Integration Agreements, Border Effects, and Distance Elasticities in the Gravity Equation. *European Economic Review* 78(C): 307-327.
- [12] Bhagwati, Jagdish (1995). US Trade Policy: The Infatuation with Free Trade Agreements. In: Jagdish Bhagwati and Anne O. Krueger (eds). *The Dangerous Drift to Preferential Trade Agreements*. Washington, DC: AEI Press.
- [13] Breinlich, Holger (2014). Heterogeneous Firm-Level Responses to Trade Liberalization: A Test Using Stock Price Reactions. *Journal of International Economics* 93(2): 270-285.
- [14] Chaney, Thomas (2008). Distorted Gravity: The Intensive and Extensive Margins of International Trade. *American Economic Review* 98(4): 1707-21.
- [15] Chen, Natalie and Dennis Novy (2021). Gravity and Heterogeneous Trade Cost Elasticities. *CEPR Discussion Paper* 16318.

- [16] Chowdhry, Sonali and Gabriel Felbermayr (2021). Trade Liberalization along the Firm Size Distribution: The Case of the EU-South Korea FTA. *CESifo Working Paper* 8951.
- [17] Civic Consulting and Ifo Institute (2018). *Evaluation of the Implementation of the Free Trade Agreement between the EU and its Member States and the Republic of Korea*. European Commission: Directorate-General for Trade.
- [18] Dai, Mian, Yotov V. Yotov, and Thomas Zylkin (2014). On the Trade-diversion Effects of Free Trade Agreements. *Economics Letters* 122: 321-325.
- [19] Das, Sanghamitra, Mark J. Roberts, James R. Tybout (2007). Market Entry Costs, Producer Heterogeneity, and Export Dynamics. *Econometrica* 75(3): 837-873.
- [20] Eaton, Jonathan and Samuel Kortum (2002). Technology, Geography, and Trade. *Econometrica* 70(5): 1741-1779.
- [21] Egger, Peter and Mario Larch (2008). Interdependent Preferential Trade Agreement Memberships: An Empirical Analysis. *Journal of International Economics* 76(2): 384-399.
- [22] Egger, Peter, Mario Larch, and Yoto V. Yotov (2020). Gravity-Model Estimation with Time-Interval Data: Revisiting the Impact of Free Trade Agreements. *CESifo Working Papers* 8553.
- [23] Egger, Peter and Kevin E. Staub (2016). GLM Estimation of Trade Gravity Models with Fixed Effects. *Empirical Economics* 50(1): 137-175.
- [24] Egger, Peter and Filip Tarlea (2015). Multi-way Clustering Estimation of Standard Errors in Gravity Models. *Economics Letters* 134: 144-147.
- [25] Fally, Thibault (2015). Structural Gravity and Fixed Effects. *Journal of International Economics* 97(1): 76-85.
- [26] Feenstra, Robert C. (2003). A Homothetic Utility Function for Monopolistic Competition Models, without Constant Price Elasticity. *Economics Letters* 78(1): 79-86.
- [27] Feenstra, Robert C. (2004). *Advanced International Trade: Theory and Evidence*. Princeton University Press.
- [28] Felbermayr, Gabriel, Fukunari Kimura, Toshihiro Okubo, and Marina Steininger (2018). Quantifying the EU-Japan Economic Partnership Agreement. *CESifo Working Paper* 7241.
- [29] Fontagné, Lionel, Gianluca Orefice, Roberta Piermartini, Nadia Rocha (2015). Product Standards and Margins of Trade: Firm-level Evidence. *Journal of International Economics* 97(1): 29-44.
- [30] Gallaway, Michael P., Christine A. McDaniel, and Sandra A. Rivera (2003). Short-run and Long-run Industry-level Estimates of U.S. Armington Elasticities. *North American Journal of Economics and Finance* 14: 49-68.
- [31] Grübler, Julia and Oliver Reiter (2021). Non-Tariff Trade Policy in the Context of Deep Trade Integration: An Ex-Post Gravity Model Application to the EU-South Korea Agreement. *East Asian Economic Review* 25(1): 33-71.

- [32] Handley, Kyle and Nuno Limão (2015). Trade and Investment under Policy Uncertainty: Theory and Firm Evidence. *American Economic Journal: Economic Policy* 7(4): 189-222.
- [33] Handley, Kyle and Nuno Limão (2017). Policy Uncertainty, Trade, and Welfare: Theory and Evidence for China and the United States. *American Economic Review* 107(9): 2731-2783.
- [34] Hopper, Peter, Karen Johnson, and Jaime Marquez (2000). Trade Elasticities for the G-7 Countries. *Princeton Studies in International Economics* 87.
- [35] Juust, Mathias, Priit Vahter and Urmas Varblane (2020). Trade Effects of the EU-South Korea Free Trade Agreement in the Automotive Industry. *Journal of East-West Business*. DOI: 10.1080/10669868.2020.1732511.
- [36] Kehoe, Timothy J. and Kim J. Ruhl (2013). How Important is the New Goods Margin in International Trade? *Journal of Political Economy* 121(2): 358-392.
- [37] Krugman, Paul (1980). Scale Economies, Product Differentiation, and the Pattern of Trade. *American Economic Review* 70(5): 950-959.
- [38] Melitz, Marc J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity. *Econometrica* 71(6): 1695-1725.
- [39] Monteiro, Jose-Antonio (2020). Structural Gravity Dataset of Manufacturing Sector: 1980-2016. World Trade Organization, Geneva.
- [40] Moser, Christoph and Andrew K. Rose (2014). Who Benefits From Regional Trade Agreements? The View From the Stock Market. *European Economic Review* 68: 31-47.
- [41] Novy, Dennis (2013). International Trade without CES: Estimating Translog Gravity. *Journal of International Economics* 89(2): 271-282
- [42] Ottaviano, Gianmarco, Takatoshi Tabuchi, and Jacques-François Thisse (2002). Agglomeration and Trade Revisited. *International Economic Review* 43(2): 409-435.
- [43] Rauch, James E. (1999). Networks Versus Markets in International Trade. *Journal of International Economics* 48(1): 7-35.
- [44] Santos-Silva, João M. C. and Silvana Tenreyro (2006). The Log of Gravity. *Review of Economics and Statistics* 88(4): 641-658.
- [45] Spearot, Alan C. (2013). Variable Demand Elasticities and Tariff Liberalization. *Journal of International Economics* 89(1): 26-41.
- [46] World Bank Group, IDE-JETRO, OECD, UIBE, and World Trade Organization (2017). *Global Value Chain Development Report 2017: Measuring and Analyzing the Impact of GVCs on Economic Development*. World Bank.
- [47] Yotov, Yoto V. (2012) A Simple Solution to the Distance Puzzle in International Trade. *Economics Letters* 117(3): 794-798.
- [48] Yotov, Yoto V., Roberta Piermartini, José-Antonio Monteiro, and Mario Larch (2016). *An Advanced Guide to Trade Policy Analysis: The Structural Gravity Model*. UNCTAD and WTO.

## A Additional tables

Table A1: RTAs entering into force in 2020 and 2021

Agreement	Coverage	Type
<b>2020</b>		
EU - Pacific States - Accession of Solomon Islands	Goods	FTA
EU - Vietnam	Goods & Services	FTA & EIA
Hong Kong - Australia	Goods & Services	FTA & EIA
Indonesia - Australia	Goods & Services	FTA & EIA
Pacific Agreement on Closer Economic Relations Plus (PACER Plus)	Goods & Services	FTA & EIA
Peru - Australia	Goods & Services	FTA & EIA
United States-Mexico-Canada Agreement (USMCA/CUSMA/T-MEC)	Goods & Services	FTA & EIA
<b>2021</b>		
China - Mauritius	Goods & Services	FTA & EIA
EU - United Kingdom	Goods & Services	FTA & EIA
India - Mauritius	Goods & Services	FTA & EIA
Ukraine - Israel	Goods	FTA
United Kingdom - Albania	Goods & Services	FTA & EIA
United Kingdom - Cameroon	Goods	FTA
United Kingdom - Canada	Goods & Services	FTA & EIA
United Kingdom - CARIFORUM States	Goods & Services	FTA & EIA
United Kingdom - Central America	Goods & Services	FTA & EIA
United Kingdom - Chile	Goods & Services	FTA & EIA
United Kingdom - Colombia	Goods & Services	FTA & EIA
United Kingdom - Côte d'Ivoire	Goods	FTA
United Kingdom - Eastern and Southern Africa States	Goods	FTA
United Kingdom - Ecuador and Peru	Goods & Services	FTA & EIA
United Kingdom - Egypt	Goods	FTA
United Kingdom - Faroe Islands	Goods	FTA
United Kingdom - Georgia	Goods & Services	FTA & EIA
United Kingdom - Ghana	Goods	FTA
United Kingdom - Israel	Goods	FTA
United Kingdom - Japan	Goods & Services	FTA & EIA
United Kingdom - Jordan	Goods	FTA
United Kingdom - Kenya	Goods	FTA
United Kingdom - Korea, Republic of	Goods & Services	FTA & EIA
United Kingdom - Kosovo	Goods	FTA
United Kingdom - Lebanon	Goods	FTA
United Kingdom - Mexico	Goods & Services	FTA & EIA
United Kingdom - Moldova, Republic of	Goods & Services	FTA & EIA
United Kingdom - Morocco	Goods	FTA
United Kingdom - North Macedonia	Goods & Services	FTA & EIA
United Kingdom - Norway and Iceland	Goods	FTA
United Kingdom - Pacific States	Goods	FTA
United Kingdom - Pacific States - Accession of Samoa	Goods	FTA
United Kingdom - Pacific States - Accession of Solomon Islands	Goods	FTA
United Kingdom - Palestine	Goods	FTA
United Kingdom - SACU and Mozambique	Goods	FTA
United Kingdom - Serbia	Goods & Services	FTA & EIA
United Kingdom - Singapore	Goods & Services	FTA & EIA
United Kingdom - Switzerland - Liechtenstein	Goods	FTA
United Kingdom - Tunisia	Goods	FTA
United Kingdom - Turkey	Goods	FTA
United Kingdom - Ukraine	Goods & Services	FTA & EIA
United Kingdom - Vietnam	Goods & Services	FTA & EIA

Source: WTO Regional Trade Agreement Database. Accessed July 7, 2021.

Table A2: Heterogeneity across time

	(1)	(2)	(3)		(1) cont'd	(2) cont'd	(3) cont'd
Other FTA	0.006 (0.012)	0.006 (0.012)	0.146*** (0.028)	INTER1989	0.321*** (0.026)	0.323*** (0.026)	0.314*** (0.026)
L.Other FTA	0.082*** (0.024)	0.082*** (0.024)		INTER1990	0.436*** (0.028)	0.436*** (0.028)	0.435*** (0.028)
L2.Other FTA	0.032 (0.020)	0.032 (0.020)		INTER1991	0.448*** (0.026)	0.448*** (0.026)	0.452*** (0.026)
L3.Other FTA	0.002 (0.014)	0.002 (0.014)		INTER1992	0.457*** (0.026)	0.457*** (0.026)	0.459*** (0.027)
L4.Other FTA	0.024** (0.011)	0.024** (0.011)		INTER1993	0.495*** (0.027)	0.495*** (0.027)	0.501*** (0.028)
L5.Other FTA	0.079** (0.034)	0.078** (0.034)	0.123*** (0.039)	INTER1994	0.590*** (0.027)	0.590*** (0.027)	0.589*** (0.027)
F.Other FTA	0.038*** (0.012)	0.038*** (0.012)		INTER1995	0.614*** (0.028)	0.615*** (0.029)	0.617*** (0.028)
F2.Other FTA	0.022 (0.023)	0.022 (0.023)		INTER1996	0.625*** (0.030)	0.626*** (0.030)	0.629*** (0.030)
F3.Other FTA	0.039*** (0.011)	0.038*** (0.011)		INTER1997	0.742*** (0.033)	0.743*** (0.033)	0.746*** (0.033)
F4.Other FTA	-0.035 (0.028)	0.012 (0.012)	0.012 (0.033)	INTER1998	0.812*** (0.034)	0.813*** (0.034)	0.816*** (0.034)
F5.Other FTA		-0.053* (0.030)		INTER1999	0.807*** (0.037)	0.808*** (0.037)	0.809*** (0.037)
EUKOR	0.023 (0.049)	0.023 (0.049)	0.002 (0.056)	INTER2000	0.967*** (0.037)	0.969*** (0.037)	0.969*** (0.037)
L.EUKOR	-0.002 (0.039)	-0.002 (0.038)		INTER2001	0.977*** (0.037)	0.978*** (0.038)	0.979*** (0.037)
L2.EUKOR	0.041 (0.032)	0.041 (0.032)		INTER2002	0.984*** (0.041)	0.985*** (0.041)	0.985*** (0.041)
L3.EUKOR	0.037 (0.027)	0.036 (0.027)		INTER2003	0.956*** (0.042)	0.958*** (0.042)	0.958*** (0.042)
L4.EUKOR	0.040 (0.033)	0.041 (0.033)		INTER2004	1.017*** (0.042)	1.018*** (0.042)	1.020*** (0.042)
L5.EUKOR	0.031 (0.040)	0.031 (0.040)	0.100** (0.043)	INTER2005	1.058*** (0.043)	1.058*** (0.043)	1.059*** (0.043)
FEUKOR	-0.152*** (0.040)	-0.152*** (0.041)		INTER2006	1.123*** (0.043)	1.124*** (0.043)	1.127*** (0.043)
F2.EUKOR	0.073* (0.041)	0.072* (0.041)		INTER2007	1.116*** (0.044)	1.117*** (0.044)	1.118*** (0.044)
F3.EUKOR	0.029 (0.037)	0.031 (0.037)		INTER2008	1.151*** (0.044)	1.152*** (0.044)	1.153*** (0.044)
F4.EUKOR	0.056 (0.043)	0.048 (0.029)	0.071 (0.055)	INTER2009	1.063*** (0.047)	1.064*** (0.047)	1.067*** (0.047)
F5.EUKOR		0.006 (0.046)		INTER2010	1.141*** (0.048)	1.142*** (0.048)	1.143*** (0.048)
INTER1981	0.027** (0.011)	0.027** (0.011)	0.027** (0.011)	INTER2011	1.191*** (0.048)	1.192*** (0.048)	1.194*** (0.048)
INTER1982	0.007 (0.018)	0.007 (0.018)	0.008 (0.018)	INTER2012	1.193*** (0.048)	1.195*** (0.048)	1.195*** (0.048)
INTER1983	0.051*** (0.019)	0.051*** (0.019)	0.052*** (0.019)	INTER2013	1.198*** (0.049)	1.199*** (0.049)	1.201*** (0.049)
INTER1984	0.130*** (0.023)	0.134*** (0.024)	0.131*** (0.023)	INTER2014	1.204*** (0.049)	1.206*** (0.049)	1.207*** (0.049)
INTER1985	0.178*** (0.024)	0.177*** (0.024)	0.173*** (0.023)	INTER2015	1.218*** (0.050)	1.220*** (0.050)	1.221*** (0.050)
INTER1986	0.156*** (0.022)	0.156*** (0.022)	0.155*** (0.022)	INTER2016	1.042*** (0.063)	1.043*** (0.063)	1.046*** (0.062)
INTER1987	0.178*** (0.022)	0.179*** (0.022)	0.180*** (0.022)	Other FTA	0.289*** (0.061)	0.282*** (0.063)	0.282*** (0.060)
INTER1988	0.261*** (0.023)	0.262*** (0.023)	0.265*** (0.024)	EUKOR	0.176* (0.092)	0.170* (0.087)	0.173* (0.092)

Notes: This table shows the results of estimating equation (4) with (i) five annual lags and four annual leads (columns (1)), (ii) five annual lags and five annual leads (column (2)), and (iii) a five-year lag and a four-year lead (column (3)). The sum of all coefficients is shown at the bottom. Estimation method: Poisson Pseudo Maximum Likelihood. All regressions include exporter-and-time, importer-and-time, and asymmetric pair effects (all not shown). The EU-South Korea FTA is excluded from the dummy for common membership in any Other FTA. Standard errors in parentheses and clustered at asymmetric country pairs. # of obs. 919,041, # of pairs: 41,712, # of exporter×year interactions: 7,662, # of importer×year interactions: 7,648.