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Undoing Europe in a New Quantitative Trade Model*

Abstract

We employ theory-grounded sectoral gravity models to estimate the effects of various steps of European product market integration on trade flows. We embed these estimates into a static Ricardian quantitative trade model featuring 43 countries and 50 goods and services sectors. Paying attention to the role of non-tariff trade barriers and of intra- and international value added networks, we simulate lower bounds to the trade, output, and welfare effects of different disintegration scenarios. Bootstrapping standard errors, we find statistically significant welfare losses of up to 23% of the 2014 baseline, but we also document a strong degree of heterogeneity across EU insiders. Effects on EU outsiders are often insignificant. The welfare effects from the Single Market dominate quantitatively, but the gains from Schengen and Eurozone membership are substantial for many countries as well. Percentage losses are more pronounced for more central EU members, while larger and richer countries tend to lose less. The effects of income transfers reveal some surprising patterns driven by terms-of-trade adjustments.

JEL Code: F13, F14, F17.
Keywords: Structural gravity, European trade integration, general equilibrium, quantitative trade models.

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1 Introduction

Europe has been the world's major playground for regional economic integration since World War II. Following the end of communism in the early 1990s, the Union has expanded from 12 to 28 members. The European Single Market was established in 1993, the Schengen Agreement that ended formal border controls between many European countries entered into force in 1995, and the Eurozone was created in 1999. However, the resulting network is complex as not all EU members are part of all agreements and EU outsiders participate in some of them. South America or the ASEAN region also have similarly complex overlapping arrangements, but the depth of integration is much weaker; see Duer et al. (2014).

In this paper, we carry out simulation experiments that are meant to shed light on the economic benefits arising from various steps of European integration. Based on econometric evaluations of various existing arrangements, we simulate the economic consequences of "undoing Europe". For this purpose, we use a computable general equilibrium (CGE) framework of the type that Ottaviano (2014) has characterized as "New Quantitative Trade Model"(NQTM) and that Costinot and Rodriguez-Clare (2014) have recently reviewed.

While the NQTMs themselves may not be all that new, the novelty resides in the recent formal comprehension of their common policy-relevant implications. In particular, all NQTMs give rise to a theoretical foundation of what can be described as the statistical bedrock of modern trade models: the gravity equation that relates observed bilateral trade flows to fundamentals such as trade costs, and the absorptive as well as productive capacities of countries. This is crucial for the structural estimation of model parameters and ensures the empirical fit of the model. Moreover, the equilibrium conditions of NQTMs can be expressed in exact hat algebra, i.e., in discrete changes relating two equilibria (e.g., a baseline equilibrium and a counterfactual one). Besides obvious computational advantages, this property facilitates model calibration as certain parameters that could be measured only with substantial measurement error drop out from the system.

We go two steps further than the toolbox outlined in Costinot and Rodriguez-Clare (2014). First, we structurally estimate almost all relevant model parameters on the same data that describes our baseline. Second, we bootstrap standard errors for all endogenous outcome variables. We extend the NQTM proposed by Caliendo and Parro (2015) which is a multi-sector version of the multi-country multi-goods stochastic technology Ricardian trade model of Eaton and Kortum (2002). Of particular relevance, the model accounts for the rich network of intra- and international input-output linkages that characterize trade in goods and services in Europe. We estimate the model on data provided in the WIOD project (Timmer et al., 2015) for 50 sectors and 43 countries.

The key advantage of the Ricardian setup is that we need to estimate only one structural parameter – the dispersion of productivity – per sector. On top of this, we successfully estimate four policy parameters per sector. The disadvantage of our framework is that it assumes perfect competition and homogeneous producers. Melitz (2003) type models relax these assumptions. However, they require estimating two parameters per sector; see Felbermayr et al. (2015). This is not feasible given the data we have available; we would require a harmonized set of firm-level data for all sectors and countries.

We proceed as follows: In a first step, we use the gravity representation of the model to

econometrically evaluate how different integration steps – the EU Customs Union, the Single Market, the Common Currency, the Schengen Agreement, and the network of RTAs with third parties – have affected the flow of goods and services. To identify causal treatment effects, we exploit the panel nature of our data. Given the theoretical model, these estimates can be translated into changes in ad valorem tariff equivalents of non-tariff trade costs. In a second step, we use these estimates to inform the counterfactual analysis. More specifically, we simulate the effects of reversing various European integration steps on welfare, value added, production, and trade. Exploiting the estimated variance-covariance structures associated to the treatment effects, we bootstrap confidence intervals for the interesting variables.

In the gravity analysis, we find that membership in the single market has boosted goods trade by about 36%, which corresponds to an average reduction of non-tariff trade costs of about 9%, given the estimated trade elasticity. In services trade, the trade creation effects is as high as 82%, corresponding to a trade cost saving of about 34%. Membership in the Eurozone yields trade cost savings of about 1.7% in goods and of about 9.8% in services trade. The evaluation of the Schengen Agreement is more involved; how bilateral trade costs between two countries i and n are affected depends on whether the transit countries between i and n are Schengen members. Accounting for this complication, we find that abolishing border controls at one border reduces trade costs by 2.6% for goods and by 5.2% for services. Across sectors, we detect a large degree of heterogeneity.

In our counterfactual analysis, we find that a complete elimination of all European integration steps would lower trade within the EU by some 40%. Intra-EU production networks would unravel: The domestic value added content in exports would go up by 5 to 7 percentage points as sourcing of inputs from foreign sources falls by more than overall trade. These effects are significant at least at the 10% level. Due to substitution effects, trade with third parties may go up, but this effect is dampened and – in some cases reversed – by negative income effects. Moreover, third country effects are both statistically and quantitatively insignificant. In scenarios that involve a more partial breakdown of the EU – undoing of the Currency Union, the Schengen Agreement, etc. – trade effects are much smaller.

A complete breakdown of the EU would generate statistically significant real per capita income losses for all EU members. Smaller countries such as Luxembourg, Hungary or Ireland would lose 24%, 21% and 13% respectively; larger countries such as Germany, France or Italy would lose 5%, 4%, and 4%, respectively. The least exposed EU country is Great Britain (-3%). Reintroducing tariffs equal to current EU MFN tariffs could have positive (albeit tiny) effects on real per capita income in several countries, such as Cyprus or Portugal. Overall, Single Market effects dominate strongly. Also, the termination of transfers has a significant effect in several net receiving countries, such as Hungary or Greece, while the effect on net payers is minor, and, due to terms-of-trade adjustments, sometimes close to zero. Overall, per capita income losses are larger in smaller, poorer, more central, and more open EU members.

Our paper is related to several strands of literature. First, a large empirical literature estimates the trade effects of integration policies using gravity models; see Head and Mayer (2014) for a critical overview. The European currency union has received special attention, but the earlier literature has been inconclusive; see Micco et al. (2003), Flam and Nordström

(2006), Baldwin and Taglioni (2007), Bun and Klaassen (2007), Berger and Nitsch (2008), Bergin and Lin (2012) or Camarero et al. (2014). There has been substantially more consensus on the effects of goods market integration; see Baier and Bergstrand (2007a), Egger and Larch (2011), Egger et al. (2012) or Bergstrand et al. (2015).

In contrast, very little literature exists on the trade effects of the Schengen Agreement. It is important to acknowledge a special characteristic of Schengen: unlike bilateral agreements, Schengen has a spatial dimension. Land-borne trade flows within Europe may cross one (e.g., France – Spain) or up to eight internal border (e.g., Portugal – Finland). Hence, Schengen membership treats country pairs heterogeneously, depending on the number of internal Schengen borders to be crossed. This feature is ignored in the small existing literature, which treats Schengen analogously to trade agreements and currency unions, e.g., Davis and Gift (2014) or Chen and Novy (2011).

Our paper is also related to a large literature on trade policy analysis in computational general equilibrium (CGE) models. See Whalley and Shoven (1984) and Francois and Kenneth (1998) for excellent methodological contributions and Checchini et al. (1988) for a famous ex ante analysis related to Europe. Following criticism by Kehoe (2005), quantitative trade modeling has made substantial progress; Costinot and Rodriguez-Clare (2014) and Ottaviano (2014) provide a survey of NQTM, and Kehoe et al. (2017) a critical discussion. This new incarnation of an old literature builds on a tight integration of estimation and calibration. Many papers have employed such techniques; one particularly noteworthy is the one by Corcos et al. (2012). Methods very similar to ours have been employed by Caliendo and Parro (2015) on NAFTA and by Dhingra et al. (2017) on Brexit.

Mayer et al. (2017) is the paper most closely related to ours. However, we go beyond their work by offering three main contributions: (i) we obtain the key model parameters – policy estimates of the different EU integration agreements – for our simulation exercises from a structural gravity model that relies on exactly the same base data (same set of countries, sectoral decomposition and time period) as the simulation exercise; (ii) the scenario definitions of collapsing the various EU integration agreements are based on the economic analysis of those data, as we calculate trade cost changes in tariff and non-tariff barriers from our structural gravity estimates; (iii) we make use of bootstrapping methods to quantify parameter uncertainty of our simulation exercise and thus provide confidence intervals for our estimates.

2 Model

The model builds on Caliendo and Parro (2015), who provide a multi-sector version of the Eaton and Kortum (2002) gravity model with input-output linkages. We extend their setup by allowing for non-tariff trade barriers and services trade.

2.1 Consumption and production

There are N countries indexed by i, n and J sectors indexed by j, k. The representative consumer utility over final goods consumption C_n^j follows Cobb-Douglas preferences, with

α_n^j denoting sectoral expenditure shares

$$u(C_n) = \prod_{j=1}^{J} {C_n^j}^{\alpha_n^j}, \tag{1}$$

with $\sum_j \alpha_n^j = 1$. The labor force L_n of a country is mobile across sectors, i.e. $L_n = \sum_{j=1}^{J} L_n^j$, but not between countries.

In each sector j, a continuum of goods ω^j is produced with labor $l_n^j(\omega^j)$ and a composite intermediate input $m_n^{k,j}(\omega^j)$ of each source sector k according to the following production function:

$$q_n^j(\omega^j) = x_n^j(\omega^j)^{-\theta^j} \left[l_n^j(\omega^j)\right]^{\beta_n^j} \left[\prod_{k=1}^{J} m_n^{k,j}(\omega^j)^{\gamma_n^{k,j}}\right]^{(1-\beta_n^j)}, \tag{2}$$

where $\beta_n^j \geq 0$ is the value added share in sector j in country n and $\gamma_n^{k,j}$ denotes the cost share of source sector k in sector j's intermediate costs, with $\sum_{k=1}^{J} \gamma_n^{k,j} = 1$. It implies sectors are interrelated because sector j uses sector k's output as intermediate input, and vice versa. $x_n^j(\omega^j)$ is the inverse efficiency of good ω^j in sector j and country n. θ^j describes the dispersion of efficiencies in a sector j. A higher θ^j implies higher dispersion of productivity across goods ω^j. The dual cost c_n^j of an input bundle depends on a country's wage rate w_n and the price of the composite intermediate goods k country n has to pay

$$c_n^j = \Upsilon_n^j \; {w_n}^{\beta_n^j} \left[\prod_{k=1}^{J} {p_n^k}^{\gamma_n^{k,j}}\right]^{(1-\beta_n^j)}, \tag{3}$$

where Υ_n^j is a constant. Note that sectoral goods ω^j only differ in their efficiency $x_n^j(\omega^j)$. Consequently, we re-label goods with x_n^j.

Let κ_{in}^j denote trade costs of delivering sector j goods from country i to country n. They consist of iceberg trade costs $d_{in}^j \geq 1$ and ad-valorem tariffs $\tau_{in}^j \geq 0$ such that $\kappa_{in}^j = (1 + \tau_{in}^j) d_{in}^j$. Following other gravity applications, we model iceberg trade costs as a function of bilateral distance, RTAs and other observable trade cost proxies as $d_{in}^j = {D_{in}}^{\rho^j} e^{\delta^j \mathbf{Z}_{in}}$, where D_{in} is bilateral distance, and $\mathbf{Z}_{in}$ is a vector collecting trade cost shifters (such as RTAs or other trade policies). Perfect competition and constant returns to scale imply that firms charge unit costs

$$p_{in}^j(x_i^j) = \kappa_{in}^j \left[x_i^j\right]^{\theta^j} c_i^j. \tag{4}$$

We label a particular intermediate good with the vector of efficiencies $x^j = (x_1^j, \ldots, x_N^j)$. Country n searches across all countries for the supplier with the lowest costs. Consequently, the price n pays for good x^j is

$$p_n^j(x^j) = \min_i \left\{p_{in}^j(x_i^j); i = 1, \ldots, N\right\}. \tag{5}$$

Comparative advantage is introduced by assuming that countries differ in their productivity across sectors. The set of goods a country produces follows an exponential cumulative distribution function. The productivity distribution is assumed to be independent across

countries, sectors, and goods. The joint density of x^j is

$$\phi^j(x^j) = \left(\prod_{n=1}^{N} \lambda_n^j\right) \exp\left\{-\sum_{n=1}^{N} \lambda_n^j x_n^j\right\}, \tag{6}$$

where λ_n^j shifts the location of the distribution, and thus, measures absolute advantage. In contrast, $\theta^j > 0$ indexes productivity dispersion, hence, comparative advantage.

The composite intermediate good q_n^j in each sector j is produced with a Dixit-Stiglitz CES technology. Let η^j denote the elasticity of substitution and $r_n^j(x^j)$ the demand for intermediate good x^j. The sum of costs for all intermediate goods x^j are minimized subject to

$$\left[\int r_n^j(x^j)^{\frac{\eta^j-1}{\eta^j}} \phi^j(x^j) dx^j\right]^{\frac{\eta^j}{\eta^j-1}} \geq q_n^j. \tag{7}$$

As usual, demand for x^j depends on a variety's price relative to the sectoral price index $p_n^j = \left[\int p_n^j(x^j)^{(1-\eta^j)} \phi^j(x^j) dx^j\right]^{\frac{1}{1-\eta^j}}$:

$$r_n^j(x^j) = \left(\frac{p_n^j(x^j)}{p_n^j}\right)^{-\eta^j} q_n^j. \tag{8}$$

Note that $r_n^j(x^j)$ is the demand for intermediates of n from the respective lowest cost supplier of x^j. The composite intermediate good q_n^j is either used to produce intermediate input of each sector k or to produce the final consumption good.

2.2 Exports

Solving for the price distribution and integrating over the sets of goods where each country i is the lowest cost supplier to country n, we get the composite intermediate goods price

$$p_n^j = A^j \left(\sum_{i=1}^{N} \lambda_i^j \left(c_i^j \kappa_{in}^j\right)^{\frac{-1}{\theta^j}}\right)^{-\theta^j}, \tag{9}$$

where $A^j = \Gamma\left[1 + \theta(1-\eta^j)\right]^{\frac{1}{1-\eta^j}}$ is a constant. Prices are correlated across all sectors (via c_i^j). The correlation strength depends on the input-output table coefficients $\gamma_n^{k,j}$.

Similarly, a country n's expenditure share π_{in}^j for source country i's goods in sector j is

$$\pi_{in}^j = \frac{\lambda_i^j \left[c_i^j \kappa_{in}^j\right]^{\frac{-1}{\theta^j}}}{\sum_{i=1}^{N} \lambda_i^j \left[c_i^j \kappa_{in}^j\right]^{\frac{-1}{\theta^j}}}. \tag{10}$$

These shares apply to gross exports, which follow the usual gravity equation.

2.3 General equilibrium

Let Y_n^j denote the value of gross production of varieties in sector j. For each county n and sector j, Y_n^j has to equal the value of demand for sectoral varieties from all countries $i = 1, \ldots, N$.[5] The goods market clearing condition is given by

$$Y_n^j = \sum_{i=1}^{N} \frac{\pi_{ni}^j}{(1+\tau_{ni}^j)} X_i^j \qquad \text{with} \qquad X_i^j = \sum_{k=1}^{J} \gamma_i^{j,k}(1-\beta_i^k) Y_i^k + \alpha_i^j I_i, \tag{11}$$

where national income consists of labor income, tariff rebates R_i and the (exogenous) trade surplus S_i, i.e. $I_i = w_i L_i + R_i - S_i$ and X_i^j is country i's expenditure on sector j goods. The first term on the right hand side gives demand of sectors k in all countries i for intermediate usage of sector j varieties produced in n, the second term denotes final demand. Tariff rebates are $R_i = \sum_{j=1}^{J} X_i^j \left(1 - \sum_{n=1}^{N} \frac{\pi_{ni}^j}{(1+\tau_{ni}^j)}\right)$.[6]

We close the model with an income-equals-expenditure condition that takes into account trade imbalances for each country n. The value of total imports, domestic demand and the trade surplus has to equal the value of total exports including domestic sales, which is equivalent to total output Y_n:

$$\sum_{j=1}^{J}\sum_{i=1}^{N} \frac{\pi_{in}^j}{(1+\tau_{in}^j)} X_n^j + S_n = \sum_{j=1}^{J}\sum_{i=1}^{N} \frac{\pi_{ni}^j}{(1+\tau_{ni}^j)} X_i^j = \sum_{j=1}^{J} Y_n^j \equiv Y_n \tag{12}$$

2.4 Comparative Statics in General Equilibrium

Two conditions are needed to close the model, a goods market clearing condition for all countries' composite goods from all sectors and an income-equals-expenditure condition for every country. Comparative statics with respect to trade policy changes affecting trade cost κ_{in}^j reveals the adjustment in trade flows, wages, sectoral value added, production, and tariff income, in due consideration of general equilibrium effects running through changes in all countries relative competitiveness and demand spillovers. Trade along the value chain as featured in our model implies that a change in one country pairs' bilateral trade costs affect every producer's effective production cost, albeit to a varying extent. Moreover, trade along the value chain implies that trade creation effects spill over to third countries not only through changes in consumer demand, but also through changes in demand for intermediate goods.

In accordance with Dekle et al. (2008), we denote the relative (global) change in a variable from its initial level z to counterfactual z' by $\hat{z} \equiv z'/z$. Moreover, let $\hat{\kappa}_{in}^j = \frac{1+\tau_{in}^{j'}}{1+\tau_{in}^j} e^{\delta^j (Z'_{in} - Z_{in})}$

[5] Our exposition differs from Caliendo and Parro (2015) in that they use total expenditure on composite goods instead of total production of varieties as endogenous variable. So in Caliendo and Parro (2015) the value of gross production comprises all foreign varieties that are bundled into the composite good without generation of value added.

[6] Instead of the goods market clearing condition, one can also use the expenditure equation $X_i^j = \left(\sum_{k=1}^{J} \gamma_i^{j,k}(1-\beta_i^k)(F_i^k X_i^k + S_i^k) + \alpha_i^j I_i\right)$ as in Caliendo and Parro (2015).

denote the change in trade cost due to the dismantling of trade integration agreements. We can solve for counterfactual changes in all variables of interest using the following system of equations:[7]

$$\hat{c}_n^j = \hat{w}_n^{\beta_n^j} \left(\prod_{i=1}^{N} [\hat{p}_n^j]^{\gamma_n^{k,j}} \right)^{1-\beta_n^j}, \tag{13}$$

$$\hat{p}_n^j = \left(\sum_{i=1}^{N} \pi_{in}^j [\hat{\kappa}_{in}^j \hat{c}_i^j]^{-1/\theta^j} \right)^{-\theta^j}, \tag{14}$$

$$\hat{\pi}_{in}^j = \left(\frac{\hat{c}_i^j}{\hat{p}_n^j} \hat{\kappa}_{in}^j \right)^{-1/\theta^j}, \tag{15}$$

$$X_n^{j'} = \sum_{j=1}^{J} \gamma_n^{j,k} (1 - \beta_n^k) \left(\sum_{i=1}^{N} \frac{\pi_{ni}^{k'}}{1 + \tau_{ni}^{k'}} X_i^{k'} \right) + \alpha_n^j I_n', \tag{16}$$

$$\frac{1}{B} \sum_{j=1}^{J} F_n^{j'} X_n^{j'} + s_n = \frac{1}{B} \sum_{j=1}^{J} \sum_{i=1}^{N} \frac{\pi_{ni}^{j'}}{1 + \tau_{ni}^{j'}} X_i^{j'}, \tag{17}$$

where $\hat{w}_n$ are wage changes, X_n^j are sectoral expenditure levels, $F_n^j \equiv \sum_{i=1}^{N} \frac{\pi_j^{in}}{(1+\tau_{in}^j)}$, $I_n' = \hat{w}_n w_n L_n + \sum_{j=1}^{J} X_n^{j'}(1 - F_n^{j'}) - S_n$, L_n denotes country n's labor force, and S_n is the (exogenously given) trade surplus. We fix $s_n \equiv S_n/B$, where $B \equiv \sum_n w_n L_n$ is global labor income, to make sure that the system is homogenous of degree zero in prices.

The shift in unit costs due to changes in input prices (i.e., wage and intermediate price changes) is laid out in equation (13). Trade cost changes directly affect the sectoral price index p_n^j, while changes in unit costs have an indirect effect (see equation (14)). Trade shares change as a reaction to changes in trade costs, unit costs and prices. The productivity dispersion θ^j indicates the intensity of the reaction. Higher θ^j's imply bigger trade changes. Equation (16) ensures goods market clearing in the new equilibrium and the counterfactual income-equals-expenditure or balanced trade condition is given by equation (17). We calculate welfare (real income) changes as[8]

$$\hat{W}_n = \frac{\hat{I}_n}{\prod_{j=1}^{J} (\hat{p}_n^j)^{\alpha_n^j}}. \tag{18}$$

To solve the system of equations for multiple sectors, we again relate to Caliendo and Parro (2015), who extend the single-sector solution algorithm proposed by Alvarez and Lucas

[7]See also Caliendo and Parro (2015). Solving for counterfactual changes rather than levels strongly reduces the set of parameters and moments that have to be estimated or calibrated. In particular, no information on price levels, iceberg trade costs, or productivity levels is needed.

[8]If $S_n \neq 0$, real income is different from real consumption. Therefore, one could use real consumption (i.e., real expenditure) as an alternative measure of welfare. In a static model, there is no fundamental rationale for $S_n \neq 0$, and one can defend both possibilities.

(2007). We start with an initial guess about a vector of wage changes. Using (13) and (14), it computes changes in prices, trade shares, expenditure levels, evaluates the trade balance condition (17), and updates the change in wages based on deviations in the trade balance.

The model provides static level effects on real income and trade. As dynamic effects of trade disintegration are not taken into account, it provides a lower bound for the potential effects of a dismantling of the European integration process. Contrary to trade agreements, where effects occur after a phase-in[9], disintegration effects would potentially occur immediately.

3 Estimation

3.1 Empirical Strategy, Data and Identification

The empirical strategy is built around the gravity equation (10). Inserting the functional forms for κ_{in}^{j} and adding a time index, we obtain

$$X_{in,t}^{j} = \exp\left[-\frac{1}{\theta^{j}}\ln(1+\tau_{in,t}^{j}) + \frac{\delta_{EU}^{j}}{\theta^{j}}EU_{in,t}^{j} + \frac{\delta_{Euro}^{j}}{\theta^{j}}Euro_{in,t}^{j} + \frac{\delta_{Schengen}^{j}}{\theta^{j}}Schengen_{in,t}^{j} + \frac{\delta_{RTA}^{j}}{\theta^{j}}RTA_{in,t}^{j} + \nu_{in}^{j} + \nu_{i,t}^{j} + \nu_{n,t}^{j}\right] + \varepsilon_{in,t}^{j}, \tag{19}$$

where $X_{in,t}^{j}$ is the value of imports of country i to country n in sector j at time t, $1+\tau_{in,t}^{j}$ is an ad valorem tariff factor, and $1/\theta^{j} > 0$ is the sectoral trade elasticity. The terms $\nu_{i,t}^{j}$ and $\nu_{n,t}^{j}$ are year specific exporter and importer fixed effects which control for average prices in the importing country (the denominator in equation (10)) as well as for unit costs and absolute productivity in the exporting country. $\varepsilon_{in,t}^{j}$ is a random disturbance.

Following common practice (Baier and Bergstrand, 2007a), we exploit variation within country-pairs and sectors over time to identify the effects of policy changes. Hence, the presence of appropriate fixed effects ν_{in}^{j}. We estimate the model by Poisson Pseudo Maximum Likelihood (PPML) methods as recommended by Santos Silva and Tenreyro (2006) and Head and Mayer (2014). Standard errors allow for clustering at the country-pair level. The setup allows inference about the Frechet parameter θ^{j} and, given that parameter, about trade cost effects of various integration steps δ_{k}^{j} for each sector.

We estimate equation (19) using yearly data covering the years 2000-2014 from the World Input-Output Database (WIOD) described by Timmer et al. (2015), which also contains the key data for the model calibration. We aggregate sectoral trade flows for 50 industries and 43 countries.[10] Applied tariffs (preferential and MFN) are taken from the World Integrated

[9]This is particularly relevant for non-tariff trade costs. Evidence from existing FTAs shows that this phasing-in process usually takes between 10 and 12 years (see, e.g., Jung, 2012).

[10]The original data has 56 sectors. Aggregation deals with zero output values which are theoretically inadmissible. For a list of sectors see Table A1 in the Appendix.

Trade Solutions (WITS-TRAINS) and the WTO's Integrated Database (IDB).[11] We use binary variables to capture membership in RTAs, the EU, or the Eurozone and obtain the relevant information from the WTO and the EU Commission.

Contrary to the other integration measures, we do *not* define $\text{Schengen}^j_{in,t}$ as a binary variable equal to one if both countries in a pair have ratified Schengen. Such a definition mismeasures the treatment and misses systematic treatment heterogeneity: A land-borne trade flow in Europe from i to n may cross one, two, or up to eight internal Schengen borders. Moreover, the pair in may benefit from lower transit costs, even if both are outsiders to Schengen. We therefore use a count variable $\text{Schengen}^j_{in,t} = \{1, \ldots, 8\}$ registering the number of Schengen border crossings that land-borne trade between i and n involves; see Felbermayr et al. (2017) for further details.

Identifying variation arises from changes in applied tariff rates and in the architecture of Europe over time. Between 2000 and 2014, there were 13 EU accessions (10 Eastern European countries in 2007, Romania and Bulgaria in 2007, and Croatia in 2013). Six countries adopted the Euro (Greece in 2001, Slovenia in 2007, Cyprus in 2008, the Slovak Republic in 2009, Estonia in 2011 and Latvia in 2014). 15 countries became members of the Schengenzone (the Nordic countries in 2001, several new EU members in 2007, and Switzerland in 2008).[12] Figure 1 illustrate what is sometimes called the variable geometry of Europe. Importantly, there is little overlap in the timing of individual countries' accessions to different agreements. This facilitates identification. In total, 33 RTAs entered into force; two of them involve the EU of which the most important one is EU-Korea in 2011. And there has been substantial variation in applied tariff rates resulting from regional integration, unilateral liberalization in countries such as India or Brazil, and – in the early years of our sample – tariff phase-in from the Uruguay round.

For proper identification we assume that the conditions

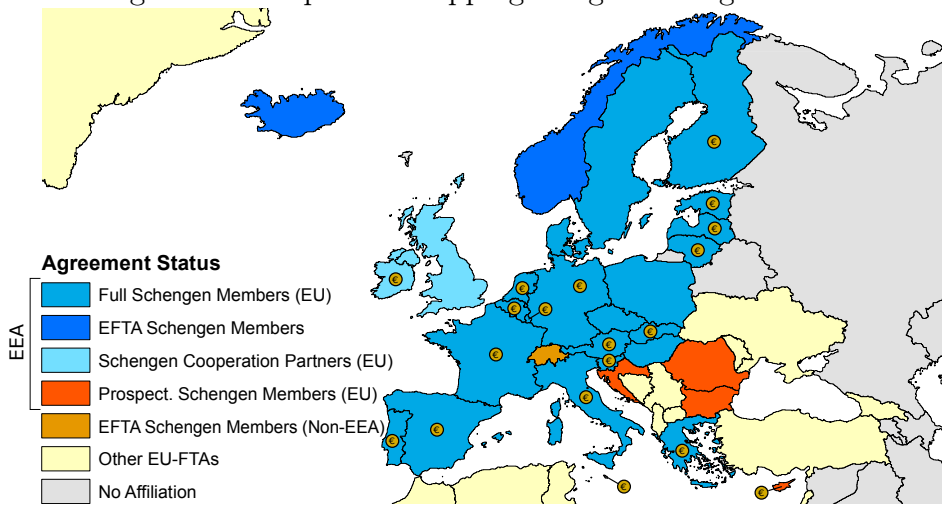
$$\begin{aligned} \text{cov}\left(\mathbf{POL}^j_{in,t}, \varepsilon^j_{in,t} \middle| \nu^j_{it}, \nu^j_{nt}, \nu^j_{in}\right) &= 0 \\ \text{cov}\left(\tau^j_{in,t}, \varepsilon^j_{in,t} \middle| \nu^j_{it}, \nu^j_{nt}, \nu^j_{in}\right) &= 0 \end{aligned}$$

hold, where $\mathbf{POL}^j_{in,t} = \left\{EU^j_{in,t}, Euro^j_{in,t}, Schengen^j_{in,t}, RTA^j_{int}\right\}$. Essentially, we require that trade policies do not correlate with sectoral shocks. The presence of bilateral fixed effects helps against omitted variable bias as time-invariant bilateral or time-dependent country-level factors that affect trade are accounted for (see, e.g., Baier and Bergstrand, 2007b). Moreover, even though the selection of country pairs into integration agreements may not be random, joining a plurilateral agreement such as the EU or Schengen is not a pure bilateral decision. Reverse causality may thus not be a major issue. The main concern is that taste shocks might correlate with policy, so that we wrongly attribute variance in the trade flows to trade costs while it stems from preferences. However, the fact that we work with sectoral data but policy variables have no sector variance provides some protection.

[11] As tariffs are not available for every year and every pair within our time frame, we interpolate tariff levels forward and backward.

[12] Table A5 in the Appendix provides an overview of accessions to the EU, the Euro, and Schengen; A6 shows the change in the number of continental borders affected by Schengen accessions over time by country.

Figure 1: Europe: Overlapping Integration Agreements



Note: The Euro icons mark whether a country is a member of the Eurozone. Data as of December 2017.

3.2 Econometric Results

Here, we show results of aggregate goods and services trade. The results reveal a number of important facts. First, a general EU dummy is associated with substantial trade increases of about 53% ($100 \times (\exp(0.427) - 1)$). Controlling for tariffs reduces that effect to 39%. The tariff elasticity is -3.68, a reasonable number that compares well with the literature. The results imply that the average tariff reduction due to EU membership must have been about 4%; a number very close to the average MFN tariff applied by the EU. This is also a lower bound to the effects of being part of the EU Customs Union only, such as is the case of Turkey. Regression (3) adds our Schengen variable as well as binary variables for Eurozone membership and RTAs. Interestingly, we find a very substantial Schengen effect (which is, however, still lower than those found in previous studies). This changes the general EU effect and the tariff elasticity only slightly. The estimates imply that the effect of EU membership on non-tariff barriers (NTBs) amounts to about 9%-points, which is also comparable to what bottom-up estimates of NTBs tend to find. The other coefficients can be similarly transformed into trade cost effects. For instance, Eurozone membership reduces trade costs by about 2%-points.

For services trade the regression reveals sensible results of the various integration steps, too. The trade effect of EU membership is equal to 83%; which is much higher than what we find for goods. EU membership seems to make a much larger difference here. This tends to be also true for other forms of integration. Of course, in services trade there are no tariffs, so that we cannot identify a trade elasticity in our gravity model.

The aggregate results are informative, however, for the simulations, we need parameters for 22 goods and 28 services sectors. Table 2 reports the results of applying equation (19) at the sector level. By and large, the estimates are sensible. The largest effects of EU membership are found in Construction, Business Services, and Pharmaceuticals; of the Eurozone on Mining & Quarrying and Financial Services; Schengen on Trade & Repair of Motor Vehicles and Human Health & Social Work; and the EU-Korea RTA on Mining & Quarrying and Human

Table 1: The Impact of EU Integration Steps on Bilateral Imports (2000 - 2014)

Dep. var.:	Bilateral Imports				
	Goods			Services	
	(1)	(2)	(3)	(4)	(5)
Both EU	0.427***	0.326***	0.288***	0.603***	0.532***
	(0.04)	(0.04)	(0.07)	(0.03)	(0.07)
Both Euro			0.060*		0.145**
			(0.04)		(0.06)
Schengen			0.089***		0.075***
			(0.01)		(0.02)
EU-KOR RTA			0.102		0.330***
			(0.07)		(0.06)
EU PTAs			0.235***		0.884***
			(0.07)		(0.09)
Other RTAs			0.024		−0.032
			(0.05)		(0.07)
Tariffs		−3.679***	−3.467***		
		(0.90)	(0.92)		

Note: ***, **, * denote significance at the 1%, 5%, 10% levels, respectively. All models estimated using Poisson Pseudo Maximum Likelihood (PPML) methods. Robust standard errors (in parentheses) allow for clustering at the country-pair level. Pair as well as year specific importer and exporter fixed effects included but not reported. Number of observations: 27,735.

Health & Social Services. The largest trade elasticities can be sustained in Pharmaceuticals and Machinery & Equipment. These results compare well to the literature (see, e.g., the estimates in Broda and Weinstein (2006) or Caliendo and Parro (2015)). However, in eight sectors (Crops & Animals, Forestry & Logging, Fishing & Aquaculture, Mining & Quarrying, Food, Beverages & Tobacco, Textiles, Apparel & Leather, Wood & Cork, and Paper) we find theoretically inadmissible estimates. To proceed, we replace them by aggregate elasticities from Table 1 column (3). In robustness checks, we calculate trade elasticities for goods on disaggregated 6-digit trade data.[13]

3.3 Calibration

Since there are no tariffs on services trade flows, we cannot estimate the Frechet parameter θ^j for services sectors with (19). The literature has not yet found convincing ways to estimate those. Egger et al. (2012) are one exception, and we rely on their estimates. However, they do not allow for any variation within the services sector.[14]

[13]More specifically, we run a gravity estimation on HS6 products obtained from CEPII's international trade database (BACI) that we relate to the 22 WIOD goods sectors (Table A9 in the Appendix). We replace sectoral elasticities with import-weighted mean elasticities over HS6 products within a WIOD sector – using only those HS6 products that satisfy our restriction on the tariff estimate.

[14]Egger et al. (2012) exploit properties of a structural gravity model akin to ours to econometrically estimate the difference between the trade elasticity of goods and services, $\beta = \theta_G - \theta_S$. They find $\hat{\beta} = 2.026$. Applying our own estimate $\hat{\theta}_G$, we find $\hat{\theta}_S = 1.449$. We use the t-value from Egger et al. (2012) (equal to 6.4035) to proxy the standard error of θ_S as 0.226.

Table 2: EU Integration Steps and Bilateral Imports (2000 - 2014)

Dep. var.:		Bilateral Imports						
Sector Description	Sector	EU	Euro	Schengen	EU-KOR RTA	EU PTAs	Other RTAs	Tariff
Crops & Animals	1	0.880***	0.237**	0.164***	0.219	0.546***	0.077	−3.467***
Forestry & Logging	2	−0.08	0.410***	0.166***	−0.131	0.432**	−0.269*	−3.467***
Fishing & Aquaculture	3	0.802***	0.104	0.018	−0.245	0.482**	−0.216	−3.467***
Mining & Quarrying	4	0.069	0.950***	−0.001	2.353***	−0.167	−0.485***	−3.467***
Food, Beverages & Tobacco	5	0.700***	0.066	0.213***	0.034	0.649***	0.069	−3.467***
Textiles, Apparel & Leather	6	0.167	−0.059	0.055	0.077	0.085	0.028	−3.467***
Wood & Cork	7	0.199	0.132**	0.01	0.326**	0.212**	0.012	−3.467***
Paper	8	0.283***	0.032	0.038***	0.192	0.296**	−0.095	−3.467***
Recorded Media Reproduction	9	−0.031	−0.179	0.05	0.706**	0.163	−0.22	−1.202
Coke & Refined Petroleum	10	−0.073	0.197*	0.217***	0.493**	0.004	−0.11	−6.028***
Chemicals	11	0.452***	0.131**	0.106***	0.304***	0.389***	0.023	−3.544***
Pharmaceuticals	12	0.953***	0.015	0.178***	−0.068	0.374**	0.309**	−11.480 ***
Rubber & Plastics	13	0.596***	0.071*	0.154***	0.284***	0.305***	0.282***	−2.270**
Other non-Metallic Mineral	14	0.374***	0.180***	0.069***	0.029	0.242***	0.183**	−1.375*
Basic Metals	15	0.568***	0.154	0.130***	0.280***	0.058	0.277***	−3.206***
Fabricated Metal	16	0.447***	0.122***	0.065***	0.266***	0.170**	0.214***	−1.558***
Electronics & Optical Products	17	0.134	−0.184	−0.028	−0.228*	0.241**	−0.045	−7.772***
Electrical Equipment	18	0.535***	0.058	0.091***	0.326***	0.340***	0.199***	−6.012***
Machinery & Equipment	19	0.270***	0.038	0.064***	0.124*	0.325***	0.047	−7.865***
Motor Vehicles	20	0.529***	−0.089	0.118**	0.293***	0.501***	0.249***	−4.610***
Other Transport Equipment	21	−0.034	0.268**	−0.046	0.291	0.665***	0.014	−2.916
Furniture & Other Manuf.	22	0.009	0.079	0.129***	−0.619***	−0.034	−0.16	−3.713***
Electricity & Gas	23	0.728**	−0.177	0.063	0.004	1.333***	0.394	−1.441***
Water Supply	24	−0.086	0.104	0.113**	0.626***	0.185	−0.543***	−1.441***
Sewerage & Waste	25	0.821***	0.084	0.015	−0.007	1.028***	0.351**	−1.441***
Construction	26	1.139***	−0.002	0.102	0.129	1.468***	0.622***	−1.441***
Trade & Repair of Motor Vehicles	27	0.756***	−0.043	0.519***	0.787***	0.423	−0.074	−1.441***
Wholesale Trade	28	0.783***	0.091	0.215***	0.562***	0.915***	0.175**	−1.441***
Retail Trade	29	0.753***	−0.074	0.198***	0.477**	0.157	0.099	−1.441***
Land Transport	30	0.628***	0.283**	−0.041	0.325*	1.050***	−0.251***	−1.441***
Water Transport	31	0.793***	0.047	−0.017	0.221	1.604***	0.117	−1.441***
Air Transport	32	0.358**	−0.099	0.053	0.054	0.785***	−0.294**	−1.441***
Aux. Transportation Services	33	0.233*	−0.203**	0.077***	0.032	0.716***	−0.351***	−1.441***
Postal and Courier	34	0.629***	−0.357**	0.444***	0.3	1.644***	0.600***	−1.441***
Accommodation and Food	35	−0.252	0.353***	−0.305***	−0.702***	0.125	−0.454***	−1.441***
Publishing	36	0.205	−0.504***	−0.015	−0.199	0.441***	−0.352***	−1.441***
Media Services	37	0.370**	0.238*	−0.086	0.071	0.242	−0.147	−1.441***
Telecommunications	38	0.169	0.266***	0.100**	0.414**	0.621***	−0.142	−1.441***
Computer & Information Services	39	0.845***	0.209**	0.151***	0.692**	1.418***	−0.108	−1.441***
Financial Services	40	0.719***	0.514***	−0.064	0.177	0.557	−0.091	−1.441***
Insurance	41	−0.214	0.500***	−0.144	−0.065	0.436*	−0.252	−1.441***
Real Estate	42	0.415	0.183	−0.01	0.19	0.916**	−0.099	−1.441***
Legal and Accounting	43	0.460***	−0.018	0.142***	0.141	0.801***	0.231*	−1.441***
Business Services	44	1.086***	−0.024	0.06	0.649***	1.530***	0.602***	−1.441***
Research and Development	45	0.148**	0.104	0.034	−0.305**	0.474***	−0.023	−1.441***
Admin. & Support Services	46	0.370***	0.201	0.129***	−0.198	0.815***	−0.142	−1.441***
Public & Social Services	47	0.546***	0.024	0.084**	0.381	0.784**	0.271*	−1.441***
Education	48	0.585***	0.256*	0.290***	0.624*	0.702**	0.017	−1.441***
Human Health and Social Work	49	0.397*	0.307*	0.453***	0.981***	0.606	0.023	−1.441***
Other Services, Households	50	0.888*	−0.226**	−0.094	0.458*	0.982	0.063	−1.441***

Note: ***, **, * denote significance at the 1%, 5%, 10% levels, respectively. All models estimated using Poisson Pseudo Maximum Likelihood (PPML) methods. Robust standard errors (not reported) allow for clustering at the country-pair level. Pair as well as year specific importer and exporter fixed effects included but not reported. Number of observations vary between 23,085 and 27,735. Estimates for services sector trade elasticities are triangulated using results in Egger et al. (2012). In eight sectors, sector level trade elasticities did not satisfy theoretical restrictions and were replaced by aggregate ones.

As our results in Table 2 show, parameter estimates come with substantial standard errors which vary in relative size across sectors. Some are not statistically significant.[15] We deal with this issue by using the variance-covariance matrix of the sectoral regressions. Assuming joint normality, we draw 1,000 times for each sector and obtain 1,000 sets of parameters which we use to simulate the model 1,000 times.[16] This provides us with a distribution of

[15] Alternatively, one could simply set insignificant parameters to zero; but this requires an arbitrary choice of a minimum significance level. Or one could use the parameter estimates at face value, ignoring their distribution and the fact that uncertainty varies across sectors. Our strategy avoids these problems.

[16] If a draw results in a value that violates the model-imposed parameter constraints, especially the constraint that $\theta > 0$, we drop that draw and draw again. This comes at the cost of a small upward bias of the mean parameter estimate and a downward bias of the standard errors.

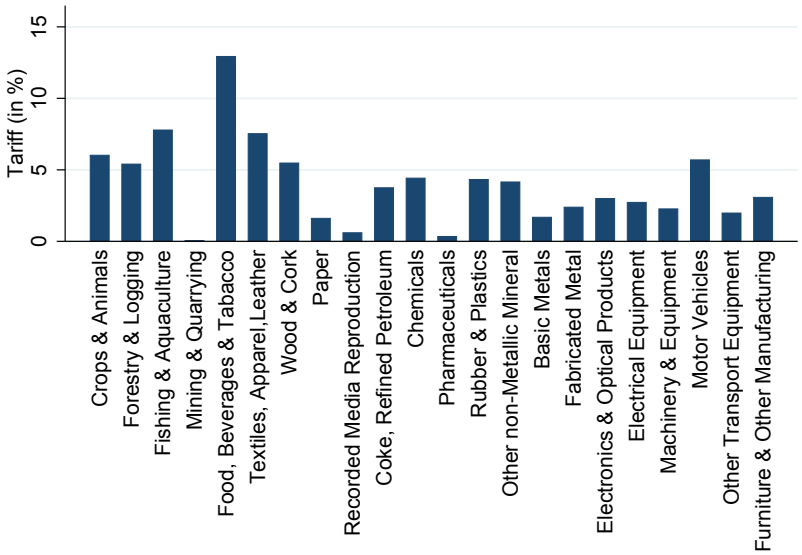
simulated endogenous variables and gives us the possibility to report confidence intervals.[17] Besides values for θ^j, we need information on expenditure shares (the matrices $\boldsymbol{\alpha}, \boldsymbol{\beta}, \boldsymbol{\gamma}$), baseline trade shares $\boldsymbol{\pi}$, trade surpluses $\mathbf{S}$, and sectoral $\mathbf{VA}$. All these data can be directly observed in the WIOD dataset which we also use for estimation purposes. Information on net fiscal transfers of EU member states to the EU comes from the European Commission (Table A8 in the Appendix). All these data are from the year 2014.[18] Hence, the baseline of our simulation is the year 2014.

4 Counterfactual Analysis

4.1 Scenarios

We look at seven different counterfactual scenarios: (1) collapse of the European Customs Union (tariff-free trade replaced by MFN tariffs), (2) dismantling the European Single Market, (3) dissolution of the Eurozone, (4) breakup of the Schengen Agreement, (5) undoing all RTAs with third countries, (6) complete collapse of all European integration steps, (7) complete EU collapse including the termination of fiscal transfers.

Figure 2: Average EU Tariffs



Note: Trade-weighted averages of sectoral bilateral tariffs of the product-level MFN tariffs imposed by the EU in 2014.

In **Scenario S1**, EU members lose existing tariff preferences (currently zero tariffs) with each

[17] For the trade elasticity in the service sectors we draw 1,000 values from a normal distribution with $\mu = 1.449$ and $\sigma = 0.226$ corresponding to Egger et al. (2012)'s structural gravity estimates as explained above.

[18] The exception is net transfers which we average over 2010-2014 to smooth year-to-year variation.

other. We assume that they apply most-favored nation tariffs to each other, as currently granted by the EU to third countries under the rules of the WTO.[19] Figure 2 shows the sectoral trade-weighted MFN tariffs granted at the product-level by the EU to third-countries in 2014, which we use for the simulation exercise. While in this scenario, trade policy changes can be directly observed, in other scenarios trade cost shocks have to be estimated.

Scenario S2 undoes the EU Single market by introducing non-tariff barriers for intra-EU trade flows. The depth of integration provided by the Single Market goes well beyond the tariff reductions of regular trade agreements as it addresses behind-the-border non-tariff trade impediments, e.g., through mutual recognition of market admissions of products, common frameworks for competition policy, regulation, and so on. The top panel in Figure 3 shows the changes in iceberg trade costs that, according to our estimates in Table 2, would result from undoing the EU Single Market.

Scenario S3 dissolves the European Monetary Union. This affects only countries of the Eurozone and re-establishes transaction costs related to currency exchange between them. The expected additional NTBs are calculated from estimated Euro effects in the sectoral gravity equations are presented in Figure 3. Effects on and through monetary policy are not included in our model.

Scenario S4 re-establishes border controls at all border posts internal to the current Schengen zone. This not only affects the NTBs of Schengen members, but also those of geographically European countries' trade flows that pass through the Schengen area. For the respective trade costs calculated from the sectoral gravity estimations; see Figure 3.

Scenario S5 takes back all RTAs between EU members and third countries and covered by our data that were in force in 2014 (These are the RTAs with Korea, Mexico, Norway, Switzerland, and Turkey). MFN Tariffs and NTBs are re-introduced between the EU members and these countries. We assume that the ex post evaluation of the EU-Korea agreement is informative also for the other agreements. Figure 3 shows the NTB changes and Figure 2 the tariff increases.

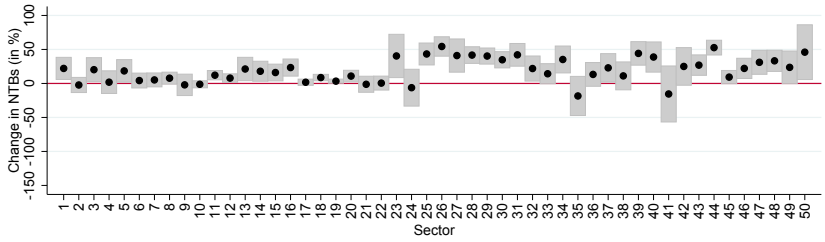
Scenario S6 simulates a world where the EU with all its trade-related integration agreements and other RTAs no longer exists. Related sectoral trade-costs changes (net of tariffs) of a complete collapse of the EU as calculated from the various integration steps in the gravity equation are depicted in the bottom panel of Figure 3.

Scenario S7 is equivalent to **S6** but additionally assumes an end to net payments from any EU country to another. These additional effects come on top of trade effects. We account for this by subtracting fiscal transfers of EU member states (total expenditures – total own resources) from our model-consistent tariff incomes. We are thus in a situation where countries withhold their tariff income and subtract the corresponding amount from fiscal transfers (Table A8 in the Appendix).

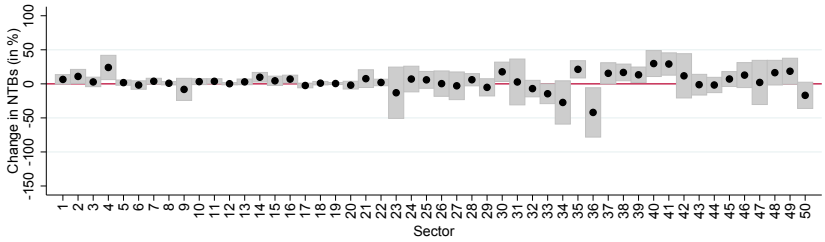
[19]Note that in this case, EU countries would be able to set their own tariffs unrelated to each other, but they would also need to negotiate these individually with the WTO. Hence, we assume MFN tariffs of the EU at the current state in 2014.

Figure 3: Effects of Disintegration on Trade Costs

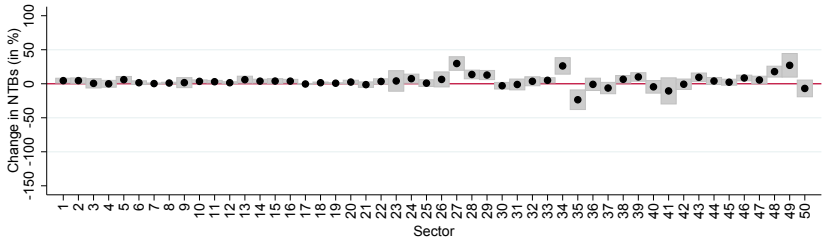
S2: Dissolution of the European Single Market



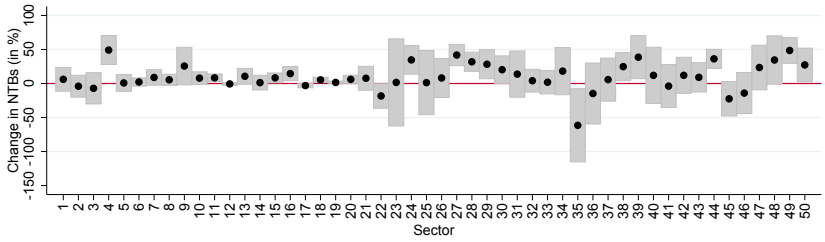
S3: Dissolution of the Euro Zone



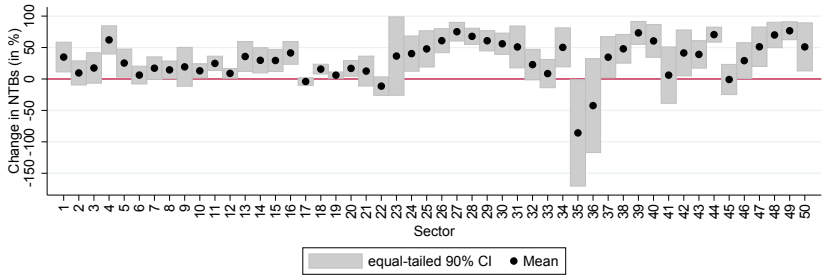
S4: Dissolution of the Schengen Zone



S5: Dissolution of the EU's RTAs



S6: Complete dismantling of EU



Note: Figures show the average increase in trade costs (as valorem tariff equivalents) by sector that would result from undoing the different integration steps. The estimates are based on the gravity estimates of policy measures and trade elasticities reported in Table 2. Bootstrapped 90% confidence intervals.

4.2 Simulated Changes in Output and Gross Trade Flows

We now put the shocks described in the preceding section into our general equilibrium model laid out in Section 2.4. We start by reporting changes in trade flows occurring in the seven disintegration scenarios. In 2014, old EU countries exported 6.3 trillion USD corresponding to 20% of their total production value. About half of these exports were directed to fellow old (45%) and new EU countries (6%). Both shares are slightly larger (51% and 8%, respectively) on the importing side, implying that about 60% of imports (which in turn make up 18% of total expenditure in these countries) come from (old and new) EU countries and are thus directly susceptible to cost increases caused by dismantling the integration agreements. Exports to fellow EU countries are relatively more important for new EU members, accounting for 19% (80%) of their total production (exports). A very similar pattern emerges on the expenditure (import) side.

In terms of value added (VA), old EU members exported 4.3 trillion USD in 2014, corresponding to 27% of the VA generated in these countries. VA exports to other EU countries make up 12% of old EU countries' total VA. For new EU members, exported VA constitutes a larger share of total VA (38%) and, likewise, a greater share goes to fellow EU countries (22%). Larger gross trade shares with fellow EU countries suggest that new EU members are more susceptible to increasing costs on intra-European trade flows and suffer relatively more from a decline in production activity in other EU countries. Moreover, as a larger share of their VA is consumed in other EU countries, they are also more susceptible to negative spillover effects of declining income and consumption in the EU.[20]

Table 3 shows how production, value added, as well as gross and value added trade patterns would change in the various scenarios. Given the prevalence of global value chains and the use of (foreign) intermediate goods in production, changes in gross trade values are only partly informative about the VA effects of trade cost changes for participating countries. Therefore, we additionally discuss changes in VA exports, focusing on the now well established concept of the "VAX-ratio", the ratio of VA exports relative to gross exports.[21] VAX-ratios can be seen as indicators for the relative importance of trade along the value chain.[22]

The first column reports the output change in our seven scenarios. Five patterns become evident, which hold more broadly in our analysis. First, output losses are substantially more important for new EU members (those who have entered the EU after 2000) than for old ones. Second, the dissolution of the Single Market is quantitatively more important than all the other disintegration steps taken together, even accounting for net transfers. For old EU members, a full disintegration of the EU would result in output losses of 5.2%, the end of the Single Market accounting for 3.4%-points thereof. For new members, the total loss would be 10.7%, the Single Market making up 7.5%-points. Third, summing the effects of the separate steps (S1 to S5) yields larger losses (in absolute value) than what would follow from the full dissolution scenario S6. This reflects complementarity of the separate

[20] Tables A2 in the Appendix provides details about gross and value added trade between regions.

[21] This concept was introduced by Johnson and Noguera (2012). Aichele and Heiland (2016) show how the measure can be structurally derived within the present model framework.

[22] Table in the Appendix informs about the baseline VAX-ratios in different broad sectors and between different regions.

integration steps. For example, the losses due to imposing tariffs are smaller when the single market is also dissolved because of tax base effects. Fourth, the simulated effects are statistically significant at the 10% level. For example, the 90%-confidence interval for S6 is $[-5.77, -4.62]$, which is relatively narrow. Hence, parameter uncertainty does not seem to play an overly important role. Fifth, third countries tend to benefit from a collapse of the EU. In S6, non-EU countries would register an output gain of about 1.6%.

Table 3: Changes in Aggregate Output, Gross Trade Flows (in %) and VAX-ratios (in %pts.)

	Output		**Exports to** old EU		new EU		non-EU	
	gross (in %)	VA/Output (in %pts.)	gross (in %)	VAX (in %pts.)	gross (in %)	VAX (in %pts.)	gross (in %)	VAX (in %pts.)
S1 Customs Union (MFN tariffs)								
old EU	**-0.84**	**0.29**	**-8.81**	**1.71**	**-9.70**	**2.01**	**0.50**	**-0.65**
new EU	**-1.81**	**0.53**	**-8.85**	**1.51**	**-9.70**	**2.83**	**0.66**	**-1.39**
non-EU	**0.21**	**-0.03**	**0.69**	**-0.17**	**0.37**	**0.09**	**0.20**	**-0.04**
S2 Single Market								
old EU	**-3.40**	**0.33**	**-27.71**	**3.46**	**-30.64**	**3.95**	**1.75**	**-0.96**
new EU	**-7.54**	**0.66**	**-28.48**	**3.67**	**-29.05**	**5.42**	**2.74**	**-2.81**
non-EU	**1.11**	**-0.09**	**2.54**	**-1.32**	0.89	**-1.55**	**1.10**	**0.05**
S3 Euro								
old EU	**-0.45**	**0.06**	**-2.82**	**0.88**	**-0.80**	0.10	0.05	**-0.14**
new EU	**-0.06**	0.01	**-0.57**	0.00	-0.07	**0.14**	0.05	**0.12**
non-EU	**0.11**	0.00	0.04	**-0.16**	**0.32**	-0.01	**0.11**	**0.05**
S4 Schengen								
old EU	**-0.72**	**0.10**	**-7.93**	**0.82**	**-10.62**	**1.75**	**-0.70**	**-3.24**
new EU	**-1.78**	**0.25**	**-9.96**	**1.62**	**-5.79**	**2.99**	-0.17	**-3.78**
non-EU	**0.26**	**-0.05**	**-0.83**	**0.19**	**-1.01**	0.17	**0.35**	**-3.06**
S5 RTAs								
old EU	**-0.18**	-0.01	**0.35**	**-0.10**	**0.64**	-0.03	**-1.57**	**0.53**
new EU	**-0.24**	**0.03**	0.00	**0.15**	**0.28**	**0.24**	**-2.03**	**0.71**
non-EU	**0.05**	**0.01**	**-1.96**	**0.51**	**-3.11**	**1.04**	**0.09**	**0.04**
S6 All								
old EU	**-5.20**	**0.60**	**-40.78**	**4.85**	**-43.99**	**5.38**	-0.10	**-0.71**
new EU	**-10.74**	**1.15**	**-41.49**	**4.97**	**-39.54**	**7.99**	0.90	**-3.09**
non-EU	**1.63**	**-0.12**	0.30	**-0.82**	**-2.94**	-0.29	**1.74**	0.05
S7 All w Transfers								
old EU	**-5.34**	**0.60**	**-40.85**	**4.85**	**-45.17**	**5.07**	-0.16	**-0.69**
new EU	**-13.53**	**1.10**	**-42.60**	**4.76**	**-41.94**	**7.32**	**-1.08**	**-3.17**
non-EU	**1.60**	**-0.12**	0.22	**-0.82**	**-5.11**	**-0.57**	**1.73**	0.06

Note: Bold numbers indicate significance on the 10%-level based on 1,000 bootstrap replications and an approximate normal distribution. Full results can be found in Tables A12 and A13 in the Appendix. VAX means domestic value added content of exports. New EU members are those 13 mostly Eastern European countries who joined after 2000.

The second column reports the change in the percentage of domestically sourced value added (VA) embedded in the gross value of overall output. This is important, as VA changes are crucial for welfare. Across all scenarios, we find that value added losses (gains) are smaller

than output reductions (increases). That is, value added contracts less than output in EU countries. We show below, that this strong pattern evolves due to a shift in the sectoral composition of output towards more value-added-intensive sectors.

All other columns refer to trade flows, exporters are in rows. In case of ending the Single Market (S2), intra-European trade collapses by about 30%. This exceeds by far the trade creation effects predicted for imports from and exports to the non-EU countries, ranging between 1.1 and 2.7%, as well as for trade among the latter (0.05%). Among European countries, new EU members' exports decline by more. We find a similar pattern for the Customs Union (S1) and the Euro (S3) scenarios, but trade effects are much smaller or not significant.

In the Schengen scenario (S4), we do not find trade creation effects with non-EU countries as higher trade costs between former Schengen members also drive up trade costs with third parties (such as Russia or Turkey, say). Dissolving the EU's RTAs (S5) also hurts trade with outsiders. In contrast to Schengen, however, it entails small positive trade creation effect within Europe.

In the complete EU collapse scenario (S6), the effects from the EU Single Market breakdown dominate. Yet, trade creation effects are mitigated by negative effects due to a dissolution of the Schengen Agreement and the EU's RTAs. In scenario S7, were the termination of fiscal transfers is included, we find very similar effects to the baseline EU breakdown scenario. New EU member states lose the most with respect to exports from other European countries (between 42% and 45%). Exports to old EU countries drop by 41% to 43%. Related to this, output falls between 5% in old EU members and 14% in new EU countries. The latter lose out an additional 3% if fiscal transfers are terminated in addition to all the EU integration steps they were involved in, as they are mostly net beneficiaries from the budget reallocation within Europe.

Interestingly, value added exports appear to be much less affected than gross trade flows. In the Single Market scenario (S2), for example, the intra-European value added exports increased by 3.5 to 5.5%-points less than gross trade. Trade creation effects with non-EU countries are also much smaller in terms of value added, or even negative for new EU countries. Intuitively, bilateral VA exports are less dependent on the direct bilateral trade costs between a country pair, as those do not inhibit the VA that travels through different countries. In other words, while the reintroduction of trade barriers within Europe inhibits direct VA flows, it does not affect VA that is exported first to a non-EU country as an intermediate, processed there and then exported to a (different) EU country. Likewise, VA that is processed first in another EU country and then exported to a non-EU country faces the re-established barriers on intra-European trade, while direct exports to non-EU countries do not (except in S4 and S5). Hence, the EU's integration into the global value chain would mitigate part of the losses caused by the dissolution of EU agreements.

4.3 Simulated Changes in Sectoral Variables

Clearly, VAX ratios of aggregate bilateral trade depend also on the sectoral composition of trade flows. The dependence on (imported) intermediate inputs varies greatly across sectors, being more important for complex manufacturing goods than for raw materials or services;

Table 4: Changes in Sectoral Trade Flows and VAX-ratios

Exports to:		EU		non-EU		World	
Scenario		gross	VAX	gross	VAX	gross	VAX
Region	Sector	(in%)	(in %pts.)	(in%)	(in %pts.)	(in%)	(in %pts.)
S1 Customs Union (MFN tariffs)							
old EU	Agric.	**-8.79**	-1.25	**0.60**	**-1.28**	**-5.77**	-0.06
	Manuf.	**-12.64**	**2.27**	**0.42**	**-0.97**	**-6.76**	**1.79**
	Serv.	**-0.69**	**-4.06**	**0.60**	**-0.50**	0.03	**-1.92**
new EU	Agric.	**-9.88**	-0.69	**1.07**	**-1.81**	**-6.37**	-0.42
	Manuf.	**-12.23**	**1.85**	**0.42**	**-2.38**	**-8.83**	**1.74**
	Serv.	**-0.51**	**-3.78**	**0.98**	**-0.93**	0.09	**-2.41**
S2 Single Market							
old EU	Agric.	**-19.46**	2.86	**4.00**	-2.17	**-11.90**	3.60
	Manuf.	**-28.37**	**3.52**	**0.94**	**-1.23**	**-15.19**	**3.82**
	Serv.	**-28.55**	3.55	**2.80**	**-1.42**	**-10.92**	1.51
new EU	Agric.	**-19.21**	2.10	**5.46**	**-1.73**	**-11.30**	2.21
	Manuf.	**-28.10**	**3.98**	**1.24**	**-4.10**	**-20.21**	**4.40**
	Serv.	**-31.32**	**5.43**	**4.68**	**-3.35**	**-17.01**	**3.41**
S3 Euro							
old EU	Agric.	**-14.40**	**5.47**	**0.56**	**-3.20**	**-9.58**	**3.49**
	Manuf.	-1.52	**1.18**	-0.17	**0.07**	**-0.91**	**0.70**
	Serv.	**-3.31**	**1.14**	**0.33**	**-0.29**	**-1.26**	0.40
new EU	Agric.	0.02	0.21	**0.20**	**0.27**	0.08	**0.24**
	Manuf.	-0.10	**-0.16**	0.07	**0.15**	-0.05	**-0.02**
	Serv.	**-1.44**	**0.77**	0.01	0.10	**-0.86**	**0.55**
S4 Schengen							
old EU	Agric.	**-7.38**	0.43	-0.85	**-4.97**	**-5.27**	-1.17
	Manuf.	**-8.09**	**1.37**	**-1.89**	**-2.60**	**-5.30**	**-0.19**
	Serv.	**-8.77**	1.00	**0.98**	**-4.52**	**-3.29**	**-1.98**
new EU	Agric.	**-7.24**	1.46	0.13	**-4.78**	**-4.88**	-0.47
	Manuf.	**-9.03**	**2.04**	**-1.94**	**-3.63**	**-7.13**	**0.69**
	Serv.	**-9.02**	1.36	**2.41**	**-5.28**	**-4.47**	-1.02
S5 RTAs							
old EU	Agric.	**-1.45**	**0.30**	2.14	**-2.51**	**-0.29**	**-0.51**
	Manuf.	**0.72**	**-0.04**	**-2.53**	**0.90**	**-0.74**	**0.16**
	Serv.	**-0.11**	**0.27**	**-0.40**	**-0.33**	**-0.27**	-0.10
new EU	Agric.	**-0.79**	**0.45**	0.49	**-1.47**	**-0.38**	**-0.21**
	Manuf.	**0.21**	**0.26**	**-3.27**	**1.24**	**-0.73**	**0.22**
	Serv.	**-0.18**	**0.28**	**-0.45**	**-0.45**	**-0.29**	-0.07
S6 All							
old EU	Agric.	**-43.18**	5.54	**6.55**	**-8.69**	**-27.16**	5.51
	Manuf.	**-43.68**	**5.63**	**-2.60**	**-0.42**	**-25.19**	**6.39**
	Serv.	**-35.37**	0.46	**3.10**	**-2.56**	**-13.74**	-0.23
new EU	Agric.	**-32.21**	1.86	**7.51**	**-4.87**	**-19.47**	1.82
	Manuf.	**-42.86**	**5.61**	**-2.42**	**-4.48**	**-31.99**	**6.60**
	Serv.	**-37.39**	2.57	**5.14**	**-4.83**	**-20.48**	1.53

Note: Bold characters indicate significance on the 10%-level based on 1,000 bootstrap replications and an approximate normal distribution. Full results (including Scenario 7 (full collapse and end of transfers) can be found in Tables A14a, A14b, A14c and A14d in the Appendix.

see Table A3 in the Appendix.

Table 4 reports trade effects for EU exports by sector. In the Single Market breakdown scenario (S2), manufacturing exports are hit harder than services and agriculture exports. Despite the fact that the estimated trade cost changes are smaller. This owes, in part, to an uneven impact of the general equilibrium changes in relative competitiveness: As labor costs are depressed in the EU, its competitiveness in third markets disproportionately benefits sectors with large cost shares for labor; services and agriculture. Manufacturing does not benefit from the decline in wages to a similar extent. Since manufacturing relies more on intermediate goods, which are largely sourced from fellow EU countries, it is subjected more to the positive trade cost shock. The growth in exports to non-EU markets is primarily driven by services and agriculture. With respect to intra-EU trade, these differences in the production technology across sectors do not take effect (on average), since all important competitors (namely, EU countries) are hit by structurally similar shocks and experience similar general adjustments in labor cost.

For non-EU countries, we observe the opposite pattern; export growth to EU countries and in total is driven by manufacturing, while exports to other non-EU countries, which exhibit similar labor cost adjustments, grow equally in all sectors. Hence, EU (non-EU) countries' exports become less (more) manufacturing intensive, reinforcing the decline (increase) in the VAX-ratio of aggregate exports. Table 5 shows similar changes to the sectoral structure of production. The Single Market breakdown (S2) brings about a shift in production away from manufacturing in the EU towards more manufacturing in non-EU countries. Consequently, the VA to output ratio increases (decreases) in EU (non-EU) countries.

Table 5: Changes in Sectoral Output and Sectoral Shares in Total Production

Scenario: Region	Sector	Baseline	Single Market	Customs Union	Euro	Schengen	Other RTAs	All	All w Transfers
		Output (in bn. USD)	Output change (in %)						
old EU	Agric.	684	**-2.85**	**-2.14**	**-1.92**	**-0.78**	**-0.60**	**-7.06**	**-7.30**
	Manuf.	7786	**-5.02**	**-2.47**	**-0.52**	**-1.48**	**-0.19**	**-8.28**	**-8.42**
	Serv.	22793	**-2.86**	**-0.25**	**-0.38**	**-0.46**	**-0.17**	**-4.09**	**-4.23**
new EU	Agric.	148	**-3.70**	**-2.09**	**0.27**	**-0.78**	**-0.37**	**-6.34**	**-9.36**
	Manuf.	1027	**-9.41**	**-4.05**	0.04	**-3.15**	**-0.33**	**-14.54**	**-17.43**
	Serv.	1923	**-6.84**	**-0.59**	**-0.14**	**-1.13**	**-0.18**	**-9.04**	**-11.77**
		Output share (in %)	Change in output share (in %pts.)						
old EU	Agric.	2.2	0.01	**-0.03**	**-0.03**	-0.00	-0.01	**-0.04**	**-0.05**
	Manuf.	24.9	**-0.42**	**-0.41**	-0.02	**-0.19**	-0.00	**-0.81**	**-0.81**
	Serv.	72.9	**0.40**	**0.44**	**0.05**	**0.19**	0.01	**0.85**	**0.85**
new EU	Agric.	4.8	**0.20**	-0.01	**0.02**	**0.05**	-0.01	**0.24**	**0.23**
	Manuf.	33.1	**-0.67**	**-0.76**	**0.03**	**-0.46**	**-0.03**	**-1.41**	**-1.50**
	Serv.	62.1	**0.47**	**0.77**	**-0.05**	**0.41**	**0.04**	**1.18**	**1.27**

Note: Bold characters indicate significance on the 10%-level based on 1,000 bootstrap replications and an approximate normal distribution. The full results can be found in Table A15 in the Appendix.

In the Customs Union scenario (S1), we find – not surprisingly given the focus on tariffs –

that the relative effect on manufacturing is even stronger (see Table 4). Total manufacturing exports decline by 7-9%, compared to an insignificant change in services exports. However, services VA exports from EU countries also take at hit, as shown by the changes in sector level VAX-ratios of exports. This is due to fact that a large fraction of services VA is indirectly exported through manufacturing.

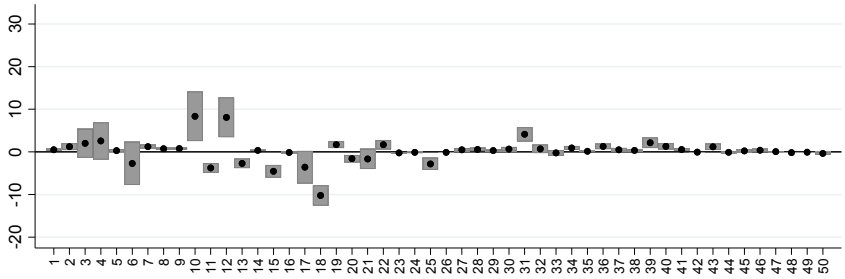
Putting an end to the Euro (S3) primarily affects the agricultural sector and to a lesser extent also services, where total exports decline by 9% and 1%, respectively. Manufacturing is barely affected. This is in line with the disproportionally stronger trade cost effects of the common currency for these sectors (see Figure 3) and, in contrast to the Single Market breakdown, small general equilibrium adjustments as agriculture makes up a very small share of the economy. Terminating the Schengen Agreement (S4) has similar effects on the sectoral pattern of total exports as the Single Market scenario; all sectors' exports take a sizable hit, especially manufacturing. VA trade effects differ vastly. While direct manufacturing exports from the EU to the rest of the world decline as a result of trade cost increases that partly also affect trade with outsiders, VA traveling through Schengen space as intermediates before being exported to the rest of the world embodied in a final good is subjected fully to trade cost increases within the Schengen area. VA exports from EU countries' service and agricultural sectors to the rest of the world also decline, despite the increase in direct exports from these sectors. This can be attributed in part to the mechanism explained above and partly to the decline in manufacturing exports that embody large amounts of VA from these sectors.

In the scenario were the EU dissolves all of its trade agreements (S5) with outsiders, we also find that exports to non-EU countries decline, particularly for manufacturing (Table 4). However, in contrast to a dissolution of the Schengen Agreement, EU-internal trade cost are unchanged and hence, value added exports that reach the rest of the world through other EU countries are not disproportionately affected. Moreover, value added traveling through non-EU countries that did not have a trade agreement with the EU to begin with are also not affected. Hence, total value added exports decline by less than their gross value counterparts. The aggregate change, however, is entirely driven by the manufacturing sector. Services and agricultural value added exports decline by more than gross export flows.

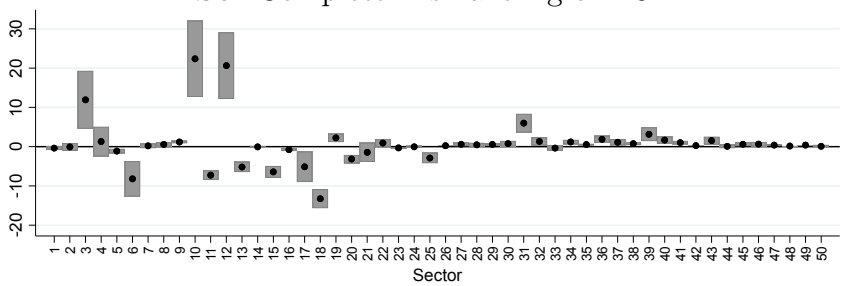
In the complete EU breakdown scenario (S6), we find that the sometimes countervailing forces exerted by the individual steps of European disintegration render some of the VAX-ratio changes small and insignificant. Given that most integration steps seem to have particularly favored manufacturing, a complete EU breakdown would unsurprisingly also affect this sector the most. Manufacturing exports within Europe would decline by up to 44%. Manufacturing output in the old (new) EU countries is predicted to decline by 8% (15%), losing 0.9%-points (1.4%-points) of its share in total production (Table 5). This depresses VA exports from services and agriculture, which decline by more or little less than gross exports from these sectors. Despite the fact that part of this VA travels through countries that are unaffected by trade cost changes. For manufacturing VA flows, in contrast, we find that the ameliorating force of VA flows' lesser dependence on direct bilateral trade cost plays out for intra-EU trade – where VA export changes are about 6%-points smaller. For manufacturing exports to non-EU countries, this same force leads to a decline in the VAX-ratio since VA exports, in contrast to direct exports, also depend on the cost of intra-EU trade.

Figure 4 shows how sectoral employment changes in two selected scenarios. While value

Figure 4: Effects on Sectoral Employment (in %)
S2: Dissolution of the European Single Market



S6: Complete Dismantling of EU



Note: Figures show the EU-wide change in employment (%) in two selected scenarios. Sector labels are explained in Table A1 in the Appendix. Bootstrapped 90% confidence intervals.

added and output tends to fall in most EU sectors in scenarios S2 and S6, due to full employment, absolute changes of sectoral employment add up to zero. The figure shows how the distribution of employment changes. Generally speaking, workers shift from manufacturing sectors (5 to 22) to agriculture and services. Yet, a lot of heterogeneity exists within these broad areas, reflecting the relative size of trade cost shocks, the embeddedness of sectors in EU value added networks, or the availability of third-country input suppliers. The sector with the largest relative losses is Electrical Equipment (18), it sheds 13% of its workforce in S6; in contrast, the Pharmaceuticals (12) adds almost 21%. The disintegration damages productivity of both sectors. However, Europe has a strong comparative advantage in pharmaceuticals but not in electrical appliances. Hence, the change in relative costs leads to an expansion of employment in one sector and to a contraction in the other.

4.4 Change in Real Income per Capita

Next, we turn to changes in real per capita income. We can rank European integration steps according to their effects on real income per capita in the baseline year 2014. The collapse of the EU integration steps hold heterogeneous effects across the 44 countries and regions. A regional breakdown of real income effects from a collapse of EU integration steps relative to the status quo are shown in Table 6; results are summarized in Figure 6.

If we dissolve the European Single Market (S2), we find significant and sizable negative income effects for EU member states. The largest effects on income per capita relative to the status quo in the base year 2014 occur in the smallest economies: Luxembourg (-

19.73%) and Malta (-14.33%). Besides, most new EU members experience large reductions in income per capita if the EU Single Market is resolved. Our simulations predict large effects for Hungary (-10.6%), Czech Republic (-9.5%), Slovak Republic (-8.9%), Slovenia (-7.7%), Estonia (-7.8%), or Poland (5.9%). But long established small EU members, such as Austria, Belgium, or Ireland, also experience similar negative effects, with -6.2%, -8.2%, and -9.4%, respectively. The welfare effects on large EU economies, such as Germany (-3.9%), France (-2.9%), Italy (-2.5%), or the UK (-2.3%), are in comparison much smaller. Some third countries would see significant but small negative effects, like the United States (-0.02%), but several others could reap significant benefits from a collapse of the EU Single Market: Switzerland would see its income per capita increase by 0.5%, Taiwan by 0.3%, Korea by 0.2%, Turkey by 0.2%, and China by 0.1%. Note that these numbers reflect the effect of a change in a stock variable (trade cost) on a flow variable (income). Hence, the predicted losses (or gains) occur repeatedly in the sense that every year (our period for measuring flow variables) following the breakdown of an integration agreement, annual real income is smaller by a given percentage than if the agreement were still in place.

Resolving the EU Customs Union and replacing tariffs on intra-EU trade flows by MFN tariffs (S1) leads to much smaller effects on income per capita compared to the previous scenario.[23] The biggest losses are experienced in Ireland (-0.7%), the Czech Republic (-0.4%) and the Netherlands (0.4%), while most other EU countries experience negligibly small negative effects relative to the status quo. Non-EU countries tend to slightly gain. Interestingly, a few EU countries (Cyprus, Malta, Portugal, Greece and the UK) also significantly gain. Such positive real income effects are not implausible, given that the re-introduction of tariffs, in contrast to the other steps of dismantling EU integration, has a positive first-order effects on income.

In a scenario where we break up the Eurozone (S3), we find clear negative effects on Eurozone members. Significant losses per annum range between -3.9% in Luxembourg and -0.3% in Italy. All Eurozone countries are predicted to lose. Effects are statistically different from zero, with the exception of Greece. Outsiders to the monetary union, in particular non-Euro EU countries, tend to lose as well. Most other outsiders to the agreement remain largely unaffected relative to the status quo; we find trade creating effects for Norway (0.2%), Russia (0.1%) and Mexico (0.01%).

Dismantling the Schengen Agreement affects members to the agreement but also all other geographically European countries negatively – except Romania, Malta and Luxembourg, who do not show an effect that is statistically different from zero. Effects range between -2.9% in Hungary to -0.4% in Russia. But, we also see small trade creation effects for countries far away from Europe, who would win if the Schengen Agreement is abolished. These are India and Mexico (both 0.01%), Indonesia (0.02%), China (0.03%), Taiwan and Korea (both 0.1%). We find substantial heterogeneity among geographically European countries. Peripheral and poorer countries to the agreement, such as Hungary, Estonia, Slovakia, Latvia, Lithuania, or

[23] A reason might be that EU MFN rates are already very low and thus play a minor role compared to low-behind the border barriers. Note also that the EU's current MFN rates might not be optimal for each and every of its members. In the case of a collapse of the Customs Union, each country could set their own "optimal" tariffs, which would have to be negotiated with the WTO. In this scenario, we set EU MFN tariffs as prevalent in the year 2014.

Table 6: Changes in Income per Capita in %, Baseline Year 2014

Scenario:	Single Market	Customs Union	Euro	Schengen	Other RTAs	All	All w Transfers
AUS	0.01	-0.00	0.01	0.00	**0.00**	**0.02**	**0.02**
AUT**	**-6.17**	**-0.09**	**-0.67**	**-1.15**	**-0.14**	**-7.97**	**-7.91**
BEL**	**-8.20**	**-0.24**	**-0.77**	**-1.76**	-0.16	**-11.10**	**-11.47**
BGR*	**-5.67**	**-0.08**	-0.01	**-1.31**	**-0.25**	**-7.12**	**-11.57**
BRA	0.00	0.00	**-0.00**	-0.00	0.00	0.00	0.00
CAN	**0.03**	-0.00	0.01	0.00	-0.00	**0.06**	**0.06**
CHE	**0.49**	**0.05**	**-0.09**	**-0.85**	**-1.15**	**-2.00**	**-2.02**
CHN	**0.14**	**0.03**	0.01	**0.03**	**0.02**	**0.22**	**0.22**
CYP*	**-5.06**	**0.19**	**-0.75**	**-0.91**	0.03	**-6.05**	**-7.29**
CZE*	**-9.47**	**-0.42**	-0.02	**-2.00**	**-0.11**	**-11.97**	**-14.71**
DEU**	**-3.91**	**-0.13**	**-0.41**	**-0.80**	**-0.11**	**-5.22**	**-5.10**
DNK**	**-4.89**	-0.02	-0.01	**-1.23**	**-0.14**	**-6.35**	**-6.37**
ESP**	**-2.55**	**-0.05**	**-0.28**	**-0.78**	-0.01	**-3.56**	**-4.20**
EST*	**-7.75**	**-0.14**	**-0.57**	**-2.81**	**-0.11**	**-11.15**	**-14.01**
FIN**	**-3.78**	-0.01	**-0.28**	**-1.59**	-0.02	**-5.63**	**-5.60**
FRA**	**-2.91**	**-0.04**	**-0.29**	**-0.56**	-0.04	**-3.72**	**-3.72**
GBR**	**-2.33**	**0.07**	-0.02	**-0.46**	-0.01	**-2.71**	**-2.88**
GRC**	**-2.16**	**0.12**	-0.16	**-0.63**	**-0.13**	**-2.84**	**-5.83**
HRV*	**-4.94**	**-0.12**	-0.03	**-0.98**	**-0.05**	**-5.92**	**-6.85**
HUN*	**-10.64**	**-0.30**	-0.06	**-2.94**	**-0.14**	**-14.16**	**-20.82**
IDN	**0.06**	**0.02**	0.00	**0.02**	0.00	**0.10**	**0.10**
IND	**0.06**	**0.02**	0.01	**0.01**	0.01	**0.11**	**0.11**
IRL**	**-9.35**	**-0.68**	**-0.89**	**-0.96**	**-0.34**	**-12.31**	**-12.68**
ITA**	**-2.52**	**-0.07**	**-0.25**	**-0.75**	**-0.09**	**-3.56**	**-3.76**
JPN	**0.02**	**0.01**	**-0.01**	0.01	**0.01**	**0.04**	**0.04**
KOR	**0.24**	**0.06**	0.01	**0.06**	**-0.27**	0.06	0.05
LTU*	**-5.55**	**-0.22**	0.02	**-2.23**	-0.03	**-7.80**	**-12.72**
LUX**	**-19.73**	0.03	**-3.86**	-0.98	-0.24	**-23.26**	**-23.74**
LVA*	**-5.79**	**-0.07**	**-0.46**	**-2.31**	-0.04	**-8.33**	**-12.02**
MEX	**0.03**	**0.01**	**0.01**	**0.01**	-0.06	-0.02	-0.02
MLT*	**-14.33**	**0.10**	**-2.55**	-1.53	-0.05	**-17.81**	**-20.11**
NLD**	**-7.25**	**-0.37**	**-1.30**	**-1.84**	**-0.19**	**-10.90**	**-10.98**
NOR	0.08	**-0.02**	**0.22**	**-1.29**	0.49	-1.11	-1.13
POL*	**-5.93**	**-0.26**	-0.00	**-1.82**	**-0.11**	**-7.77**	**-11.83**
PRT**	**-3.90**	**0.06**	**-0.38**	**-1.31**	**-0.03**	**-5.26**	**-7.30**
ROU*	**-4.53**	-0.01	**-0.04**	-0.00	**-0.15**	**-4.65**	**-8.21**
ROW	**0.06**	**0.03**	0.01	0.03	0.00	**0.15**	**0.13**
RUS	0.04	**-0.01**	**0.08**	**-0.44**	-0.03	**-0.47**	**-0.50**
SVK*	**-8.91**	-0.09	**-0.77**	**-2.28**	**-0.11**	**-11.87**	**-14.34**
SVN*	**-7.68**	**-0.31**	**-0.78**	**-1.77**	**-0.15**	**-10.35**	**-13.25**
SWE**	**-4.22**	-0.01	-0.00	**-1.60**	**-0.12**	**-6.01**	**-5.75**
TUR	**0.19**	**0.08**	-0.01	**-0.63**	**-0.28**	**-0.83**	**-0.85**
TWN	**0.30**	**0.06**	0.00	**0.06**	**0.04**	**0.46**	**0.45**
USA	**-0.02**	**-0.00**	-0.00	**-0.02**	0.00	**-0.03**	**-0.03**

Note: ** Old EU member states, * New EU member states. Bold values are statistically different from zero at $\alpha = 10\%$ based on 1,000 bootstrap replications and an approximate normal distribution.

the Czech Republic lose most from a breakdown of the Schengen Agreement. Small but richer economies (Austria, Netherlands, Portugal, Poland, Belgium, Slovenia, Switzerland and the Nordic countries) lose a significant share of their income due to their trade structure with other European countries; between -0.9% and -1.8%. At the lower end are large European economies, like Germany, France or Spain. Due to its geography, Greece has the smallest loss among Schengen members with -0.6%. Geographically European countries that are outsiders to the agreement like Russia (-0.4%), Turkey (-0.6%), UK (-0.5%), Cyprus (-0.9%), Ireland (-1%) and Croatia (-1%) also lose income per capita, as they trade a lot with European countries and thus benefit from open borders.

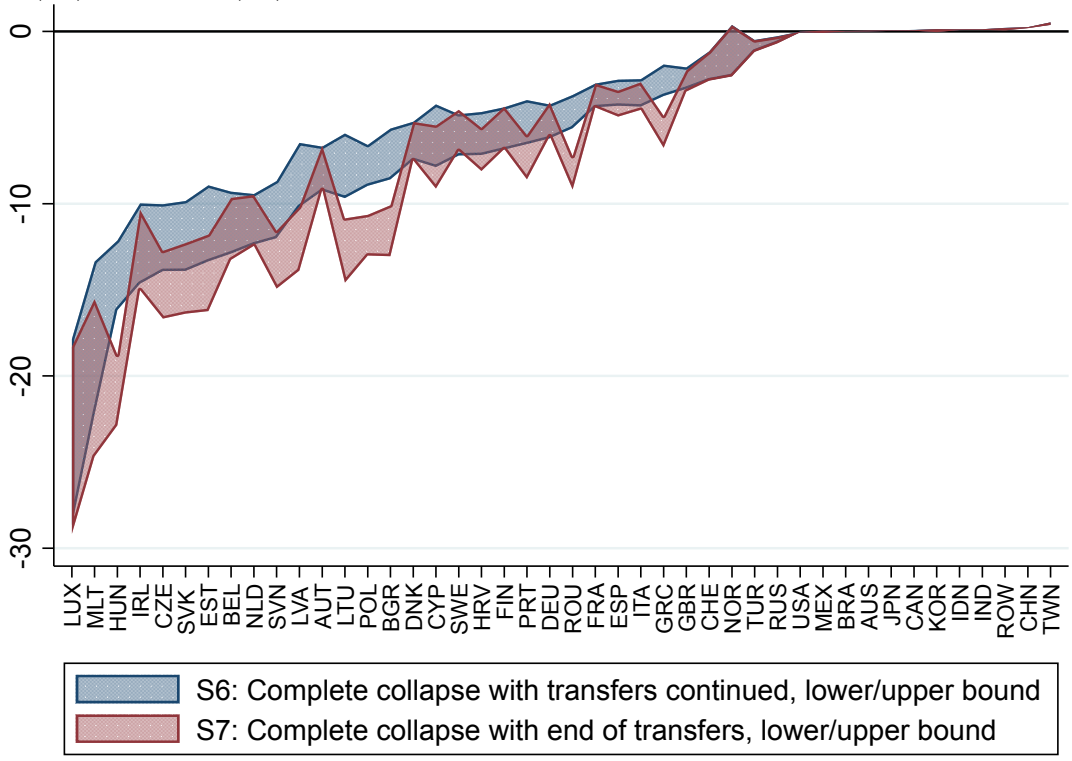
Next, we look at a collapse of all RTAs which EU members have jointly signed with third countries and a reintroduction of NTBs and MFN tariffs (S5). While Switzerland, Turkey and Korea (all partner countries to agreements with the EU) experience large losses in income per capita (-1.15%, -0.28%, and -0.27%, respectively), most EU countries experience small welfare losses of about -0.1 to -0.2%. Ireland has the highest loss with -0.3%. Cyprus and Norway show small positive effects that are not statistically different from zero, while some Asian countries currently not in any RTAs with the EU would gain from a dissolution of existing EU RTAs with third countries. This includes Taiwan (0.04%), China (0.02%), or Japan (0.01%).

In S6 (complete collapse of all EU integration steps), we find that all members to the EU experience significant losses in income per capita, but heterogeneity exists across countries depending on their degree of integration and economic structure. Small economies like Luxembourg (-23.26%) and Malta (-17.81%), as well as new EU members (Hungary -14.16%, Czech Republic -11.97%, Slovakia -11.87%, Estonia -11.15%, Slovenia -10.35%, Lithuania -7.80%, or Latvia -8.33%) lose most, while established EU economies show a wider spread: Ireland -12.31% with the largest and the UK -2.71% with the smallest losses in income per capita relative to the status quo in 2014. Among outsiders to the agreements, countries close to the EU such as Switzerland (-2.00%), Turkey (-0.83%), or Russia (-0.47%), who have a high degree of trade integration with EU countries, lose as well. The U.S. are also negatively affected (-0.03%). Nearly all Asian countries would experience positive changes in their income per capita from a collapse of all the European integration agreements, namely Taiwan (0.46%), China (0.22%), India (0.11%), Indonesia (0.10%) and Japan (0.04%). This is also true for Australia (0.02%) and Canada (0.06%).

Finally, we explicitly include fiscal transfers into the complete EU collapse scenario in S7 in the last column of Table 6. Figure 5 shows the 90% confidence bands for S6 and S7. Countries are sorted according to their losses in S6. This produces very similar effects in magnitude and significance to the complete EU collapse, but countries with net payments lose less, while net receiving economies show larger losses if transfers are terminated. While Sweden, Germany, Austria and Finland would have lower losses by 0.26 to 0.03 percentage points compared to the EU collapse scenario (S6), the income per capita loss of France would be the same. Eastern European economies and EU peripheral countries lose out the most. Hungary shows the largest effect when considering fiscal transfers with -20.82% income per capita losses – which is 6.66 percentage points higher than under the EU complete collapse scenario. This is followed by Lithuania with -12.72% (4.92 percentage points higher losses) and Bulgaria with -11.57% (4.45 percentage points higher losses). Greece would lose -5.83% of per capita GDP due to a collapse of the EU and the termination of fiscal flows – which is

nearly 3 percentage points more than without the explicit inclusion of the budget transfers –, while the income per capita of Portugal would fall by -7.3% (2.04 percentage points more). All other old EU states lose more with the termination of the EU budget transfers, but relatively to the EU collapse scenario (S6), losses are only slightly larger (between 0.02 and 0.64 percentage points). Losses in income per capita range between -23.74% in Luxembourg and -2.88% in the UK, all of them statistically significant for EU countries.

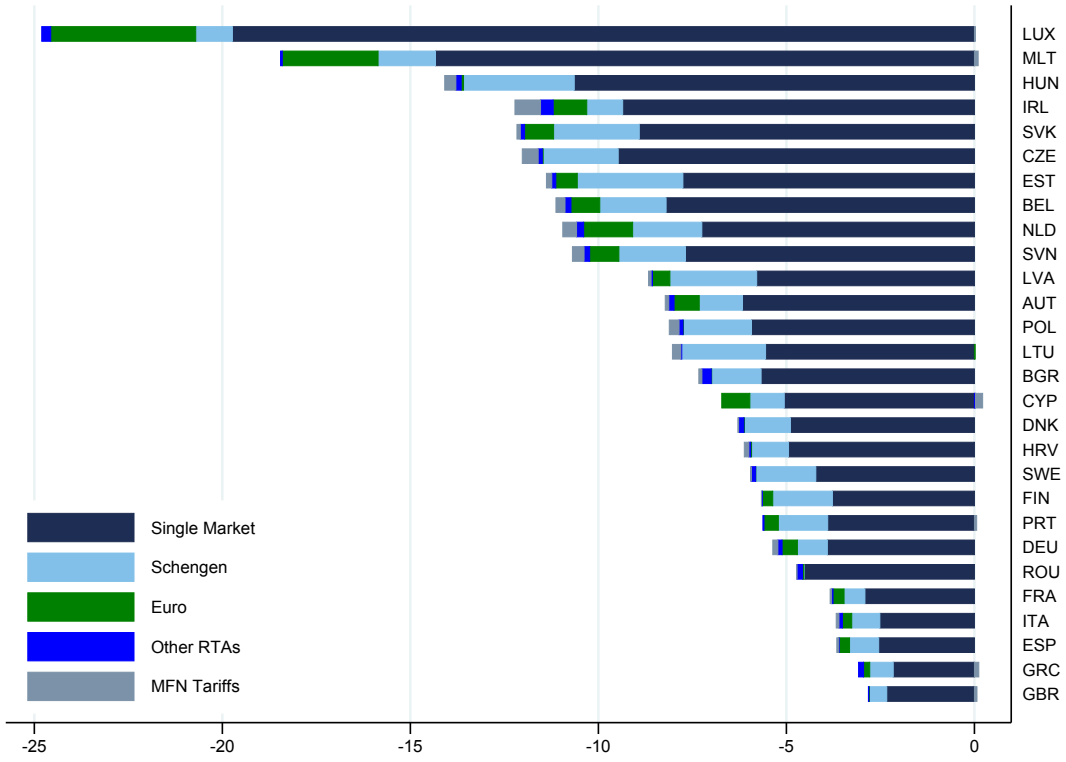
Figure 5: Change in Real Income (90% Confidence Intervals) for Complete EU Collapse without (S6) and with (S7) End of Net Transfers, Baseline Year 2014



Note: The figure plots symmetric 90% confidence bands for percentage changes in income per capita relative to the baseline year 2014.

The share of each component in the total welfare loss or gain due to a EU collapse and its associated trade agreements is depicted in Figure 6. Overall, the breakdown of the EU Single Market has the largest share for member states, followed by the Schengen Agreement and the Eurozone. Generally, it appears to be true that the effect of a complete EU breakdown (Figure 5) is smaller than the sum of the effects of dissolving individual agreements as shown in Figure 6. The reason is that summing over individual effects ignores their dependence on a specific baseline. Since the effect of dissolving an individual agreement is stronger the more integrated affected countries are in the baseline equilibrium, any given individual disintegration step reduces the negative effect of the subsequent steps of disintegration.

Figure 6: Change in Real Income in % for Various Scenarios, Baseline Year 2014

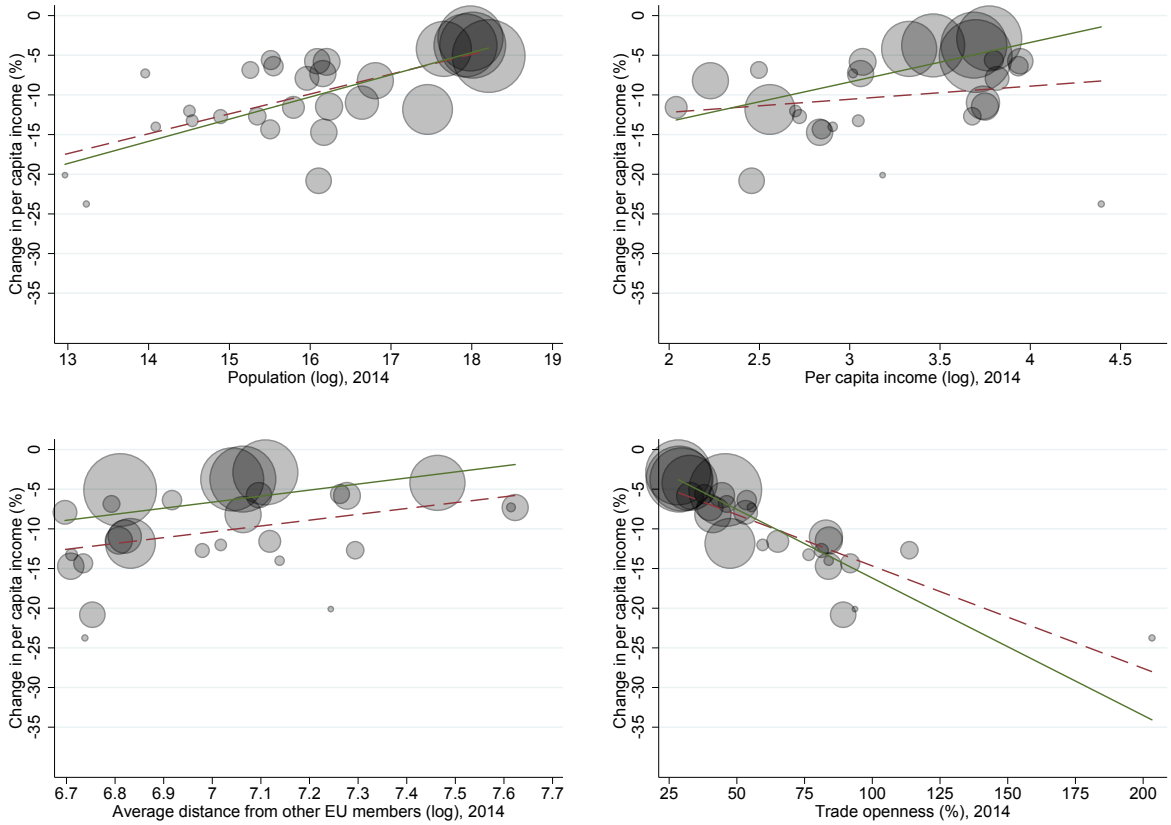


4.5 Patterns of Heterogeneity in the EU28

Figure 7 shows how important country characteristics correlate with the simulated effects of a complete reversal of all EU integration steps including the end of fiscal transfers (S7). The upper-left diagram examines the role of population as of 1995.[24] The graph shows a very clear positive correlation: smaller countries suffer more from a dissolution of Europe, regardless of whether observations are population weighted or not. The weighted regression features a slope of 2.75, indicating that an increase in population by 1% lowers the absolute size of the loss by 0.028 percentage points ($R^2 = 0.45$). The upper-right diagram looks at the role of per capita income. The correlation is very weak and statistically significant only when observations are weighted by population. In that case, the slope is equal to 4.98 and the adjusted R^2 is 0.38. The lower-left diagram looks at the log of the weighted average distance from other EU members and finds a positive correlation. The slope of the fitted curve equals 7.5 regardless of whether observations are weighted or not and is statistically significant at the 5% level. So, more peripheral countries lose less from an end of the EU. Finally, the lower-right figure studies the relation of losses and openness, defined as the ratio of exports over GDP in percent. The plot shows a strong and negative correlation. The regression slope equals -0.13 or -0.17, depending on weighting, and the R^2 is above 0.73. More open countries clearly suffer more from a collapse of Europe.

[24] 1995 is the first year in which data for all EU28 countries is available.

Figure 7: Correlating Losses and Country Characteristics: Size,the Level of Per Capita Income, Remoteness, and Openness



Note: The figure plots correlations between the simulated losses of a complete breakdown of European integration including the end of fiscal transfers (in % of baseline real per capita income) and various characteristics of the 28 EU member states. The size of the population (in logs) as of 1995, income per capita in thousand US dollars (in logs) as of 2014, average distance (in km) to all other EU member states (in logs), and trade openness (exports relative to GDP, in %) in 1995. Size of circles denotes population size. Solid lines represent fitted population-weighted linear regressions; dashed lines represent fits of unweighted regressions. All slopes are statistically different from zero (at least at the 5% level) except the one for the unweighted regression on log per capita income.

A simple population-weighted regression of percentage losses on all four variables featuring in Figure 7 explains almost 92% of the variation resulting from our simulations.[25] Except for population, all variables have a statistically significant partial effect on relative losses, with beta coefficients of 0.43 for log income per capita, 0.11 for log average distance, and -0.66 for openness.[26]

[25]Without weighting, the fit falls to 88%.

[26]Beta coefficients measure the effect of a one standard deviation increase in the independent variable relative to one standard deviation of the dependent variable.

4.6 Robustness

We analyze the robustness of our findings with regard to the choice of the baseline equilibrium and to the estimation specification. Our robustness analysis focuses on real income effects, which are summarized in Table A4.[27]

Brexit. First, we analyze how costly a complete EU collapse would be after the now seemingly unavoidable Brexit. To this end, we first simulate a new equilibrium where pre-EU trade barriers between the EU27 and the UK have been reestablished and the UK also leaves the EU's trade agreements with third countries. In a second step, we then analyze the welfare effects of a complete EU breakdown conditional on Brexit having taken place.[28] The first column of Table A4 in the Appendix shows the effect of Brexit on real income by country. We find a sizable and negative effect for the UK (-2.3%), but also for geographically close and/or small, open, service-oriented nations of Ireland (-4%), Luxembourg (-3.5%) and Malta (-4.5%). The second column shows real income effects of a complete EU breakdown conditional on Brexit. For comparison, column three provides corresponding real income effects of the scenario pre-Brexit, and the fourth column shows the difference between the two. For EU countries, a complete EU breakdown implies significantly smaller losses conditional on Brexit, albeit the relative importance of Brexit is very heterogeneous. For the UK, Brexit makes up 85% of the total losses of the EU collapse; for Ireland this number stands at 30%. Brexit also accounts for substantial shares of the losses from a EU breakdown for old EU members (5 to 12%), but for smaller shares of new EU members' losses (1 to 5%).

Alternative Elasticity Estimates. The last two columns of Table A4 in the Appendix show welfare effects obtained with alternative sets of estimated trade elasticities. The last column uses aggregated elasticities shown in Table 1 for the calibration, applying identical elasticities and trade cost effects to all sectors. In column five, we use sectoral weighted averages of elasticities estimated at the product level (HS6). Elasticities are shown in Table A9 in the Appendix. None of the variations in sectoral elasticities leads to large changes in the magnitude of welfare effects nor in the ranking of countries. These findings suggest that the model's results do not critically hinge on the level of aggregation chosen in the estimation stage, nor do they appear to be very sensitive to the exact magnitude of estimated elasticities and sectoral heterogeneity.

5 Conclusion

In this paper we carry out a quantitative assessment of the trade and welfare effects of European integration. We use a New Quantitative Trade Model (NQTM) (Ottaviano (2014)) to simulate the general equilibrium effects of various milestones such as the introduction of

[27] More detailed results are available upon request.

[28] Our treatment of the UK in the first stage is the same as given to all EU countries in the complete EU breakdown scenario. Arguably, in view of different possible versions of Brexit, our scenario is the hardest possible and should thus be viewed as an upper bound of the possible effects of Brexit on our analysis.

the Euro, the creation of the Schengen Agreement, the Single Market, the Customs Union, and the conclusion of trade agreements with third parties. The integration of parameter calibration and scenario definition based on the estimation of sector-level gravity equations allows to bootstrap confidence intervals for all endogenous variables. This makes one important component of uncertainty surrounding our results visible; however, in most cases, the confidence intervals are actually rather narrow. It is the task of future research to also quantify model uncertainty. To this end, models need to be appropriately nested; NQTMs offer a good platform to do this.

We find that the Single Market dominates the trade and welfare effects, but that the common currency and Schengen have contributed significantly to growth in trade and welfare, too. We also find a very large degree of heterogeneity amongst EU member states: if Europe is undone, smaller, poorer, more central and more open members would lose more than larger, richer, more peripheral and less open ones. For instance, after the complete dissolution of the EU, Hungarian real income exclusive of net transfers would be about 14% lower than under the status quo; inclusive of transfers the loss would be 21%. Occupying a middle ground, Germany would lose 5.2% if transfers are continued and only slightly less (5.1%) if transfers are terminated. This is interesting, as it suggests that Germany's terms-of-trade actually improve due to transfers as the pure fiscal amount is higher than the difference between the welfare damage net and gross of transfers. For some countries, such as Luxembourg, the positive terms-of-trade change triggered by the transfers seems to be even stronger than the negative transfer itself.

Our analysis can be improved on several dimensions. A more comprehensive grasp of the uncertainties involved is necessary to improve the credibility of quantitative trade models. Besides parameter and scenario uncertainty, model uncertainty should be accounted for. For instance, the quantitative role of key assumptions such as the competition mode is still very much unclear. Making progress is not easy: we need nested models and require much richer data than is used in this paper. Related to this, it is also important to move away from models that are 'exactly' identified to models that are 'overidentified' in the sense that the set of empirical moments exceeds the number of parameters to be estimated. Such free moments can be used to assess the validity of the model. A final avenue for further research relates to the estimation step: in this paper, we have estimated average treatment effects. However, for ex-post assessments, it is absolutely possible to allow for heterogeneity between different countries or country groups.

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A Appendix

Table A1: List of Sectors

Sector ID	Sectorname	ISIC Rev. 4
1	Crops & Animals	A01
2	Forestry & Logging	A02
3	Fishing & Aquaculture	A03
4	Mining & Quarrying	B
5	Food, Beverages & Tobacco	C10-C12
6	Textiles, Apparel,Leather	C13-C15
7	Wood & Cork	C16
8	Paper	C17
9	Recorded Media Reproduction	C18
10	Coke, Refined Petroleum	C19
11	Chemicals	C20
12	Pharmaceuticals	C21
13	Rubber & Plastics	C22
14	Other non-Metallic Mineral	C23
15	Basic Metals	C24
16	Fabricated Metal	C25
17	Electronics & Optical Products	C26
18	Electrical Equipment	C27
19	Machinery & Equipment	C28,C33
20	Motor Vehicles	C29
21	Other Transport Equipment	C30
22	Furniture & Other Manufacturing	C31_C32
23	Electricity & Gas	D35
24	Water Supply	E36
25	Sewerage & Waste	E37-E39
26	Construction	F
27	Trade & Repair of Motor Vehicles	G45
28	Wholesale Trade	G46
29	Retail Trade	G47
30	Land Transport	H49
31	Water Transport	H50
32	Air Transport	H51
33	Aux. Transportation Services	H52
34	Postal and Courier	H53
35	Accommodation and Food	I
36	Publishing	J58
37	Media Services	J59_J60
38	Telecommunications	J61
39	Computer & Information Services	J62_J63
40	Financial Services	K64
41	Insurance	K65_K66
42	Real Estate	L68
43	Legal and Accounting	M69_M70
44	Business Services	M71,M73-M75
45	Research and Development	M72
46	Admin. & Support Services	N
47	Public & Social Services	O84
48	Education	P85
49	Human Health and Social Work	Q
50	Other Services, Households	R-U

Table A2: Gross and Value Added Trade in the Baseline Year 2014 (in bn. USD)

Region	Output	Domestic sales	Exports to old EU	Exports to new EU	Exports to non-EU
old EU	31263	24929	2852	403	3071
new EU	3098	2239	452	141	266
non-EU	126637	111769	2322	255	10788

Region	Value added	Domestic absorption	Value added exports to old EU	Value added exports to new EU	Value added exports to non-EU
old EU	15900	11578	1635	222	2464
new EU	1396	871	243	59	222
non-EU	57486	47702	1720	183	7882

Note: Domestic sales (absorption) sums all group members' domestic consumption and does not include sales (VA exports) to other members of the same group. The difference between output (VA) and the sum of domestic sales (absorption) and (VA) exports is due to changes in the inventory stock.

Table A3: Trade Flows and VAX-Ratios in the Baseline Year 2014 (in bn. USD)

Exports to:		EU		non-EU	
Region	Sector	gross (bn. USD)	VAX (in %)	gross (bn. USD)	VAX (in %)
old EU	Agric.	130	68.8	62	118.6
	Manuf.	2154	33.3	1762	49.7
	Serv.	971	108.2	1247	121.6
new EU	Agric.	22	88.9	10	117.8
	Manuf.	414	30.5	152	53.1
	Serv.	156	100.0	103	124.8
non-EU	Agric.	361	110.6	1679	101.4
	Manuf.	1396	42.4	6720	40.1
	Serv.	820	111.1	2389	146.0

Table A4: Changes in Income per Capita in %, Robustness Analysis

Scenario:	Brexit	All post-Brexit	All pre-Brexit	Difference post-pre-Brexit	All HS6	All Aggregate
AUS	**0.01**	0.02	**0.02**	-0.00	**-0.06**	0.04
AUT**	**-0.17**	**-7.81**	**-7.97**	**0.16**	**-7.95**	**-9.06**
BEL**	**-0.87**	**-10.32**	**-11.10**	**0.78**	**-10.26**	**-12.95**
BGR*	**-0.26**	**-6.87**	**-7.12**	**0.24**	**-7.46**	**-7.62**
BRA	**0.00**	0.00	0.00	-0.00	**-0.05**	0.01
CAN	**0.01**	**0.05**	**0.06**	**-0.01**	-0.04	0.06
CHE	0.01	**-2.00**	**-2.00**	-0.00	**-2.23**	**-1.79**
CHN	**0.03**	**0.19**	**0.22**	**-0.03**	**0.12**	**0.25**
CYP*	**-0.88**	**-5.22**	**-6.05**	**0.83**	**-6.08**	**-7.00**
CZE*	**-0.38**	**-11.63**	**-11.97**	**0.34**	**-11.68**	**-12.31**
DEU**	**-0.37**	**-4.86**	**-5.22**	**0.35**	**-5.34**	**-5.84**
DNK**	**-0.54**	**-5.84**	**-6.35**	**0.51**	**-6.20**	**-6.86**
ESP**	**-0.19**	**-3.37**	**-3.56**	**0.19**	**-3.92**	**-3.97**
EST*	**-0.35**	**-10.83**	**-11.15**	**0.31**	**-10.94**	**-12.87**
FIN**	**-0.28**	**-5.37**	**-5.63**	**0.26**	**-5.77**	**-6.43**
FRA**	**-0.34**	**-3.39**	**-3.72**	**0.33**	**-3.96**	**-4.11**
GBR**	**-2.28**	**-0.44**	**-2.71**	**2.27**	**-3.09**	**-3.07**
GRC**	**-0.19**	**-2.65**	**-2.84**	**0.19**	**-3.24**	**-3.19**
HRV*	**-0.20**	**-5.73**	**-5.92**	**0.19**	**-6.27**	**-6.45**
HUN*	**-0.45**	**-13.77**	**-14.16**	**0.39**	**-13.58**	**-14.23**
IDN	**0.01**	**0.09**	**0.10**	**-0.01**	0.01	**0.10**
IND	**0.02**	**0.09**	**0.11**	**-0.02**	0.04	**0.10**
IRL**	**-3.97**	**-8.68**	**-12.31**	**3.62**	**-10.66**	**-14.15**
ITA**	**-0.23**	**-3.34**	**-3.56**	**0.22**	**-3.56**	**-4.02**
JPN	0.01	**0.04**	**0.04**	-0.00	0.03	0.02
KOR	0.00	0.06	0.06	-0.00	0.01	**0.22**
LTU*	**-0.28**	**-7.54**	**-7.80**	**0.26**	**-8.04**	**-7.63**
LUX**	**-3.46**	**-20.51**	**-23.26**	**2.75**	**-21.24**	**-27.15**
LVA*	**-0.35**	**-8.01**	**-8.33**	**0.32**	**-8.63**	**-8.98**
MEX	-0.00	-0.02	-0.02	0.00	**-0.15**	0.01
MLT*	**-4.53**	**-13.90**	**-17.81**	**3.90**	**-15.97**	**-19.59**
NLD**	**-0.89**	**-10.11**	**-10.90**	**0.80**	**-8.11**	**-11.54**
NOR	0.23	-1.33	-1.11	-0.23	**-2.36**	**-2.46**
POL*	**-0.40**	**-7.40**	**-7.77**	**0.37**	**-8.13**	**-7.41**
PRT**	**-0.26**	**-5.01**	**-5.26**	**0.25**	**-5.71**	**-5.69**
ROU*	**-0.17**	**-4.49**	**-4.65**	**0.16**	**-5.29**	**-4.51**
ROW	0.00	**0.14**	**0.15**	-0.00	-0.02	0.06
RUS	0.01	**-0.48**	**-0.47**	-0.01	**-0.86**	-0.37
SVK*	**-0.44**	**-11.48**	**-11.87**	**0.39**	**-10.45**	**-11.35**
SVN*	**-0.18**	**-10.18**	**-10.35**	**0.16**	**-10.19**	**-10.79**
SWE**	**-0.39**	**-5.63**	**-6.01**	**0.37**	**-6.27**	**-6.70**
TUR	-0.00	**-0.82**	**-0.83**	0.00	**-1.22**	-0.68
TWN	**0.07**	**0.39**	**0.46**	**-0.07**	**0.40**	**0.53**
USA	-0.00	**-0.03**	**-0.03**	0.00	**-0.06**	-0.04

Note: ** Old EU member states, * New EU member states. Bold values are statistically different from zero at $\alpha = 10\%$ based on 1,000 bootstrap replications and an approximate normal distribution.

B Online Appendix

Table A5: Membership Accessions EU, Euro, Schengen 2000 - 2014 (within WIOD Country Sample)

EU Country	Accession	Euro Country	Accession	Schengen Country	Accession
CZE	2004	GRC	2001	DNK	2001
CYP	2004	SVN	2007	FIN	2001
EST	2004	CYP	2007	ISL	2001
HUN	2004	MLT	2008	NOR	2001
LTU	2004	SVK	2009	SWE	2001
LVA	2004	EST	2011	CZE	2007
MLT	2004	LVA	2014	EST	2007
POL	2004			HUN	2007
SVK	2004			LTU	2007
SVN	2004			LVA	2007
BGR	2007			MLT	2007
ROU	2007			POL	2007
HRV	2013			SVK	2007
				SVN	2007
				CHE	2008

Source: European Commission.

Table A6: Comparison of Schengen Borders (within WIOD Country Sample, Geographical Europe), 2000 and 2014

Country	Total Number of Borders	# of Schengen Borders 2000	# of Schengen Borders 2014	Share of Schengen to Total Borders 2000	Share of Schengen to to Total Borders 2014
AUT	85	29	67	34.1	78.8
BEL	106	56	88	52.8	83.0
BGR	138	17	68	12.3	49.3
CHE	87	10	69	11.5	79.3
CYP	180	22	56	12.2	31.1
CZE	87	15	69	17.2	79.3
DEU	72	24	54	33.3	75.0
DNK	95	23	77	24.2	81.1
ESP	107	59	89	55.1	83.2
EST	147	18	129	12.2	87.8
FIN	151	18	132	11.9	87.4
FRA	80	32	62	40.0	77.5
GBR	126	49	80	38.9	63.5
GRC	141	23	67	16.3	47.5
HRV	112	18	69	16.1	61.6
HUN	95	19	77	20.0	81.1
IRL	155	51	81	32.9	52.3
ITA	86	36	74	41.9	86.0
LTU	106	16	88	15.1	83.0
LUX	95	47	78	49.5	82.1
LVA	125	16	107	12.8	85.6
MLT	113	36	101	31.9	89.4
NLD	100	51	82	51.0	82.0
NOR	118	23	101	19.5	85.6
POL	88	16	69	18.2	78.4
PRT	136	88	118	64.7	86.8
RUS	118	16	49	13.6	41.5
SVK	92	24	74	26.1	80.4
SVN	98	20	76	20.4	77.6
SWE	114	23	96	20.2	84.2
TUR	155	21	65	13.5	41.9

Note: Schengen borders counted considering the shortest travel and road distance, also considering ferry connections. Total number of borders counts number of potentially treated borders in geographical Europe. Intercontinental borders are considered to be zero.

Table A7: RTAs Entered into Force: 2000 - 2014 (within WIOD Country Sample)

Country codes		year	Treaty
CHE	MEX	2001	EFTA - Mexico
EST	HUN	2001	Pre-EU Accession Treaties
MEX	NOR	2001	EFTA - Mexico
BGR	LTU	2002	Pre-EU Accession Treaties
CHE	HRV	2002	EFTA-Croatia (Pre-EU Accession) until 2012
CHN	IND	2002	Asia Pacific Trade Agreement (APTA) - Accession of China
CHN	KOR	2002	Asia Pacific Trade Agreement (APTA) - Accession of China
EST	BGR	2002	Pre-EU Accession Treaties
HRV	EU	2002	Pre-EU Accession Treaties
HRV	NOR	2002	EFTA-Croatia (Pre-EU Accession) until 2012
BGR	HRV	2003	Pre-EU Accession Treaties
CHN	IDN	2003	ASEAN - China
CZE	HRV	2003	Pre-EU Accession Treaties
HRV	POL	2003	Pre-EU Accession Treaties
HRV	ROU	2003	Pre-EU Accession Treaties
HRV	SVK	2003	Pre-EU Accession Treaties
HRV	TUR	2003	Croatia - Turkey (Pre-EU Accession)
HUN	HRV	2003	Pre-EU Accession Treaties
LVA	BGR	2003	Pre-EU Accession Treaties
AUS	USA	2005	United States - Australia
MEX	JPN	2005	Japan - Mexico
KOR	CHE	2006	EFTA - Korea, Republic of
NOR	KOR	2006	EFTA - Korea, Republic of
IDN	JPN	2008	Japan - Indonesia
CAN	NOR	2009	EFTA - Canada
CHE	CAN	2009	EFTA - Canada
CHE	JPN	2009	Japan - Switzerland
IDN	AUS	2010	ASEAN - Australia
IND	JPN	2011	India - Japan
KOR	EU	2011	EU - Korea, Republic of
KOR	USA	2012	Korea, Republic of - United States
CHE	CHN	2014	Switzerland - China
KOR	AUS	2014	Korea, Republic of - Australia

Table A8: Operating Budgetary Balance, Million Euro, 2010-2014

Country	Transfer
AUT	-1009.5
BEL	-1469.8
BGR	+1260.8
CYP	+29.5
CZE	+2597.0
DEU	-11901.2
DNK	-938.2
ESP	+3048.8
EST	+610.7
FIN	-604.8
FRA	-7169.7
GBR	-6425.8
GRC	+4653.6
HRV	+104.6
HUN	+4216.7
IRL	+435.3
ITA	-4756.4
LTU	+1459.6
LUX	-37.1
LVA	+792.5
MLT	+91.8
NLD	-2759.5
POL	+11477.0
PRT	+3652.3
ROU	+2678.2
SVK	+1281.0
SVN	+542.0
SWE	-1799.1

Source: European Commission.

Table A9: Trade Elasticities Based on HS6 Product Categories

Sector ID	Elasticity	Standard Error
1	-4.24	1.66
2	-5.30	2.02
3	-5.98	3.46
4	-28.44	9.29
5	-3.06	1.14
6	-1.93	0.96
7	-2.36	1.05
8	-2.30	1.02
9	-2.27	0.92
10	-3.64	4.46
11	-3.08	1.81
12	-2.72	0.98
13	-1.68	0.79
14	-2.04	1.08
15	-4.20	2.63
16	-1.85	0.98
17	-2.43	1.20
18	-2.44	1.21
19	-2.49	1.49
20	-1.94	0.97
21	-3.52	2.32
22	-2.38	1.07
Average Goods	-3.72	1.79
Services	-1.69	0.26

Note: Trade elasticities stem from a gravity estimation on HS6 products obtained from CEPII's international trade database (BACI). Sectoral elasticities are import-weighted mean elasticities over HS6 products within a WIOD sector – using only those HS6 products that satisfy our restriction on the tariff estimate. Services trade elasticities and their respective s.e. are calculated based on Egger et al. (2012). We take the import-weighted mean of elasticity estimates and standard errors over all HS6 products.

Table A10: EU Integration Steps and Bilateral Imports, Goods (2000 - 2014)

Dep. var.:	Bilateral Imports														
Sector Description	Sector	EU	s.e.	Euro	s.e.	Schengen	s.e.	EU-KOR	s.e.	EU PTAs	s.e.	RTAs	s.e.	Tariff	s.e.	Obs.
Crops & Animals	1	0.880***	(0.13)	0.237**	(0.09)	0.164***	(0.03)	0.219	(0.28)	0.546***	(0.17)	0.077	(0.11)	-3.467***	(0.92)	27735
Forestry & Logging	2	-0.080	(0.18)	0.410***	(0.16)	0.166***	(0.05)	-0.131	(0.24)	0.432**	(0.18)	-0.269*	(0.15)	-3.467***	(0.92)	26490
Fishing & Aquaculture	3	0.802***	(0.24)	0.104	(0.11)	0.018	(0.10)	-0.245	(0.33)	0.482**	(0.24)	-0.216	(0.16)	-3.467***	(0.92)	25755
Mining & Quarrying	4	0.069	(0.26)	0.950***	(0.29)	-0.001	(0.08)	2.353***	(0.35)	-0.167	(0.22)	-0.485***	(0.17)	-3.467***	(0.92)	27705
Food, Beverages & Tobacco	5	0.700***	(0.17)	0.066	(0.06)	0.213***	(0.03)	0.034	(0.18)	0.649***	(0.17)	0.069	(0.10)	-3.467***	(0.92)	27735
Textiles, Apparel & Leather	6	0.167	(0.16)	-0.059	(0.10)	0.055	(0.04)	0.077	(0.08)	0.085	(0.11)	0.028	(0.14)	-3.467***	(0.92)	27735
Wood & Cork	7	0.199	(0.14)	0.132**	(0.05)	0.010	(0.01)	0.326**	(0.15)	0.212**	(0.10)	0.012	(0.14)	-3.467***	(0.92)	27735
Paper	8	0.283***	(0.09)	0.032	(0.04)	0.038***	(0.01)	0.192	(0.12)	0.296**	(0.12)	-0.095	(0.07)	-3.467***	(0.92)	27735
Recorded Media Reproduction	9	-0.031	(0.15)	-0.179	(0.12)	0.050	(0.06)	0.706**	(0.30)	0.163	(0.14)	-0.220	(0.14)	-1.202	(1.56)	26520
Coke & Refined Petroleum	10	-0.073	(0.13)	0.197*	(0.11)	0.217***	(0.04)	0.493**	(0.25)	0.004	(0.28)	-0.110	(0.11)	-6.028***	(1.25)	26795
Chemicals	11	0.452***	(0.08)	0.131**	(0.06)	0.106***	(0.03)	0.304***	(0.07)	0.389***	(0.14)	0.023	(0.06)	-3.544***	(0.60)	27735
Pharmaceuticals	12	0.953***	(0.15)	0.015	(0.09)	0.178***	(0.05)	-0.068	(0.10)	0.374**	(0.16)	0.309**	(0.13)	-11.480***	(2.78)	26310
Rubber & Plastics	13	0.596***	(0.10)	0.071*	(0.04)	0.154***	(0.02)	0.284***	(0.09)	0.305***	(0.10)	0.282***	(0.08)	-2.270**	(1.02)	27735
Other non-Metallic Mineral	14	0.374***	(0.10)	0.180***	(0.04)	0.069***	(0.01)	0.029	(0.09)	0.242***	(0.09)	0.183**	(0.09)	-1.375*	(0.81)	27735
Basic Metals	15	0.568***	(0.10)	0.154	(0.09)	0.130***	(0.04)	0.280***	(0.07)	0.058	(0.14)	0.277***	(0.08)	-3.206***	(0.86)	27735
Fabricated Metal	16	0.447***	(0.05)	0.122***	(0.04)	0.065***	(0.01)	0.266***	(0.07)	0.170**	(0.07)	0.214***	(0.04)	-1.558***	(0.48)	27090
Electronics & Optical Products	17	0.134	(0.16)	-0.184	(0.12)	-0.028	(0.03)	-0.228*	(0.12)	0.241**	(0.11)	-0.045	(0.10)	-7.772***	(1.63)	27735
Electrical Equipment	18	0.535***	(0.10)	0.058	(0.07)	0.091***	(0.03)	0.326***	(0.09)	0.340***	(0.11)	0.199***	(0.08)	-6.012***	(0.92)	27090
Machinery & Equipment	19	0.270***	(0.09)	0.038	(0.06)	0.064***	(0.02)	0.124*	(0.07)	0.325***	(0.09)	0.047	(0.08)	-7.865***	(1.31)	27735
Motor Vehicles	20	0.529***	(0.12)	-0.089	(0.12)	0.118**	(0.05)	0.293***	(0.11)	0.501***	(0.17)	0.249***	(0.07)	-4.610***	(0.96)	27735
Other Transport Equipment	21	-0.034	(0.15)	0.268**	(0.13)	-0.046	(0.04)	0.291	(0.23)	0.665***	(0.18)	0.014	(0.11)	-2.916	(1.89)	27090
Furniture & Other Manuf.	22	0.009	(0.16)	0.079	(0.07)	0.129***	(0.04)	-0.619***	(0.13)	-0.034	(0.12)	-0.160	(0.16)	-3.713***	(1.20)	27735

Note: ***, **, * denote significance at the 1%, 5%, 10% levels, respectively. All models estimated using Poisson Pseudo Maximum Likelihood (PPML) methods. Robust standard errors (in parentheses) allow for clustering at the country-pair level. Pair as well as year specific importer and exporter fixed effects included but not reported. In eight sectors, sector level trade elasticities did not satisfy theoretical restrictions and were replaced by aggregate ones.

Table A11: EU Integration Steps and Bilateral Imports, Services (2000 - 2014)

Dep. var.:	Bilateral Imports													
Sector Description	Sector	EU	s.e.	Euro	s.e.	Schengen	s.e.	EU-KOR	s.e.	EU PTAs	s.e.	RTAs	s.e.	Obs.
Electricity & Gas	23	0.728**	(0.36)	-0.177	(0.23)	0.063	(0.11)	0.004	(0.43)	1.333***	(0.49)	0.394	(0.37)	27225
Water Supply	24	-0.086	(0.18)	0.104	(0.15)	0.113**	(0.05)	0.626***	(0.22)	0.185	(0.19)	-0.543***	(0.17)	23085
Sewerage & Waste	25	0.821***	(0.17)	0.084	(0.10)	0.015	(0.04)	-0.007	(0.33)	1.028***	(0.27)	0.351**	(0.17)	24435
Construction	26	1.139***	(0.17)	-0.002	(0.14)	0.102	(0.09)	0.129	(0.21)	1.468***	(0.27)	0.622***	(0.16)	27210
Trade & Repair of Motor Vehicles	27	0.756***	(0.28)	-0.043	(0.14)	0.519***	(0.08)	0.787***	(0.16)	0.423	(0.35)	-0.074	(0.25)	25770
Wholesale Trade	28	0.783***	(0.10)	0.091	(0.07)	0.215***	(0.04)	0.562***	(0.13)	0.915***	(0.15)	0.175**	(0.09)	27285
Retail Trade	29	0.753***	(0.10)	-0.074	(0.09)	0.198***	(0.05)	0.477**	(0.20)	0.157	(0.25)	0.099	(0.07)	25740
Land Transport	30	0.628***	(0.10)	0.283**	(0.11)	-0.041	(0.03)	0.325*	(0.18)	1.050***	(0.14)	-0.251***	(0.08)	27630
Water Transport	31	0.793***	(0.17)	0.047	(0.26)	-0.017	(0.06)	0.221	(0.28)	1.604***	(0.24)	0.117	(0.12)	27480
Air Transport	32	0.358**	(0.16)	-0.099	(0.08)	0.053	(0.05)	0.054	(0.12)	0.785***	(0.19)	-0.294**	(0.13)	27735
Aux. Transportation Services	33	0.233*	(0.12)	-0.203**	(0.09)	0.077***	(0.03)	0.032	(0.13)	0.716***	(0.14)	-0.351***	(0.11)	27525
Postal and Courier	34	0.629***	(0.20)	-0.357**	(0.17)	0.444***	(0.11)	0.300	(0.30)	1.644***	(0.40)	0.600***	(0.17)	23475
Accommodation and Food	35	-0.252	(0.17)	0.353***	(0.11)	-0.305***	(0.07)	-0.702***	(0.19)	0.125	(0.18)	-0.454***	(0.14)	25455
Publishing	36	0.205	(0.15)	-0.504***	(0.16)	-0.015	(0.06)	-0.199	(0.27)	0.441***	(0.15)	-0.352***	(0.13)	24270
Media Services	37	0.370**	(0.18)	0.238*	(0.13)	-0.086	(0.06)	0.071	(0.24)	0.242	(0.23)	-0.147	(0.15)	24165
Telecommunications	38	0.169	(0.16)	0.266***	(0.10)	0.100**	(0.04)	0.414**	(0.19)	0.621***	(0.19)	-0.142	(0.16)	27720
Computer & Information Services	39	0.845***	(0.19)	0.209**	(0.09)	0.151***	(0.04)	0.692**	(0.35)	1.418***	(0.31)	-0.108	(0.18)	26955
Financial Services	40	0.719***	(0.25)	0.514***	(0.19)	-0.064	(0.06)	0.177	(0.32)	0.557	(0.59)	-0.091	(0.23)	27015
Insurance	41	-0.214	(0.23)	0.500***	(0.14)	-0.144	(0.12)	-0.065	(0.21)	0.436*	(0.25)	-0.252	(0.19)	26370
Real Estate	42	0.415	(0.25)	0.183	(0.26)	-0.010	(0.05)	0.190	(0.22)	0.916**	(0.36)	-0.099	(0.23)	23565
Legal and Accounting	43	0.460***	(0.14)	-0.018	(0.11)	0.142***	(0.05)	0.141	(0.17)	0.801***	(0.19)	0.231*	(0.13)	24960
Business Services	44	1.086***	(0.07)	-0.024	(0.08)	0.060	(0.04)	0.649***	(0.13)	1.530***	(0.17)	0.602***	(0.06)	25635
Research and Development	45	0.148**	(0.07)	0.104	(0.08)	0.034	(0.03)	-0.305**	(0.14)	0.474***	(0.11)	-0.023	(0.06)	24647
Admin. & Support Services	46	0.370***	(0.13)	0.201	(0.14)	0.129***	(0.03)	-0.198	(0.18)	0.815***	(0.19)	-0.142	(0.12)	26910
Public & Social Services	47	0.546***	(0.16)	0.024	(0.23)	0.084**	(0.04)	0.381	(0.30)	0.784**	(0.32)	0.271*	(0.16)	25785
Education	48	0.585***	(0.15)	0.256*	(0.15)	0.290***	(0.06)	0.624*	(0.36)	0.702**	(0.30)	0.017	(0.10)	25950
Human Health and Social Work	49	0.397*	(0.22)	0.307*	(0.16)	0.453***	(0.16)	0.981***	(0.24)	0.606	(0.39)	0.023	(0.13)	26160
Other Services, Households	50	0.888*	(0.51)	-0.226**	(0.11)	-0.094	(0.08)	0.458*	(0.24)	0.982	(0.60)	0.063	(0.30)	27495

Note: ***, **, * denote significance at the 1%, 5%, 10% levels, respectively. All models estimated using Poisson Pseudo Maximum Likelihood (PPML) methods. Robust standard errors (in parentheses) allow for clustering at the country-pair level. Pair as well as year specific importer and exporter fixed effects included but not reported.

Table A12: Changes in Aggregate Output and Gross Trade Flows (in %)

Scenario		Domestic	Exports to			
Region	Output	sales	old EU	new EU	non-EU	World
S1 Customs Union (MFN tariffs)						
old EU	**-0.84**	0.05	**-8.81**	**-9.70**	**0.50**	**-4.35**
	[-0.90, -0.79]	[-0.04, 0.14]	[-9.88, -7.75]	[-10.70, -8.71]	[0.37, 0.63]	[-4.84, -3.86]
new EU	**-1.81**	-0.19	**-8.85**	**-9.70**	**0.66**	**-6.04**
	[-1.97, -1.65]	[-0.42, 0.05]	[-9.72, -7.97]	[-10.82, -8.58]	[0.49, 0.84]	[-6.64, -5.44]
non-EU	**0.21**	**0.20**	**0.69**	**0.37**	**0.20**	**0.29**
	[0.19, 0.23]	[0.19, 0.22]	[0.53, 0.86]	[0.11, 0.63]	[0.19, 0.21]	[0.25, 0.33]
S2 Single Market						
old EU	**-3.40**	**-0.81**	**-27.71**	**-30.64**	**1.75**	**-13.59**
	[-3.85, -2.95]	[-1.39, -0.24]	[-29.82, -25.60]	[-32.87, -28.41]	[1.30, 2.21]	[-14.54, -12.64]
new EU	**-7.54**	**-3.18**	**-28.48**	**-29.05**	**2.74**	**-18.90**
	[-8.47, -6.61]	[-4.30, -2.07]	[-30.60, -26.37]	[-31.33, -26.77]	[1.95, 3.53]	[-20.24, -17.56]
non-EU	**1.11**	**1.09**	**2.54**	0.89	**1.10**	**1.35**
	[0.96, 1.25]	[0.94, 1.24]	[1.97, 3.10]	[-0.18, 1.96]	[0.92, 1.28]	[1.21, 1.48]
S3 Euro						
old EU	**-0.45**	**-0.23**	**-2.82**	**-0.80**	0.05	**-1.30**
	[-0.62, -0.27]	[-0.36, -0.10]	[-4.11, -1.52]	[-1.04, -0.57]	[-0.12, 0.22]	[-1.85, -0.75]
new EU	**-0.06**	0.03	**-0.57**	-0.07	0.05	**-0.29**
	[-0.12, -0.00]	[-0.04, 0.10]	[-0.75, -0.39]	[-0.25, 0.11]	[-0.05, 0.16]	[-0.40, -0.18]
non-EU	**0.11**	**0.11**	0.04	**0.32**	**0.11**	**0.10**
	[0.06, 0.15]	[0.06, 0.16]	[-0.18, 0.25]	[0.13, 0.50]	[0.06, 0.16]	[0.04, 0.16]
S4 Schengen						
old EU	**-0.72**	**0.26**	**-7.93**	**-10.62**	**-0.70**	**-4.59**
	[-0.94, -0.50]	[0.05, 0.47]	[-9.07, -6.79]	[-12.21, -9.03]	[-0.90, -0.50]	[-5.26, -3.92]
new EU	**-1.78**	-0.07	**-9.96**	**-5.79**	-0.17	**-6.24**
	[-2.23, -1.33]	[-0.47, 0.34]	[-11.41, -8.50]	[-6.78, -4.80]	[-0.47, 0.13]	[-7.18, -5.30]
non-EU	**0.26**	**0.28**	**-0.83**	**-1.01**	**0.35**	**0.12**
	[0.19, 0.33]	[0.20, 0.35]	[-1.12, -0.55]	[-1.44, -0.57]	[0.24, 0.46]	[0.05, 0.19]
S5 Other RTAs						
old EU	**-0.18**	**-0.09**	**0.35**	**0.64**	**-1.57**	**-0.56**
	[-0.25, -0.12]	[-0.15, -0.03]	[0.24, 0.47]	[0.53, 0.75]	[-1.83, -1.30]	[-0.69, -0.43]
new EU	**-0.24**	**-0.11**	0.00	**0.28**	**-2.03**	**-0.58**
	[-0.27, -0.21]	[-0.14, -0.08]	[-0.05, 0.06]	[0.21, 0.34]	[-2.29, -1.76]	[-0.65, -0.51]
non-EU	**0.05**	**0.09**	**-1.96**	**-3.11**	**0.09**	**-0.33**
	[0.02, 0.07]	[0.07, 0.12]	[-2.31, -1.62]	[-3.43, -2.79]	[0.03, 0.15]	[-0.37, -0.29]
S6 All						
old EU	**-5.20**	**-1.13**	**-40.78**	**-43.99**	-0.10	**-21.24**
	[-5.77, -4.62]	[-1.92, -0.33]	[-43.24, -38.32]	[-46.36, -41.62]	[-0.60, 0.41]	[-22.41, -20.06]
new EU	**-10.74**	**-4.10**	**-41.49**	**-39.54**	0.90	**-28.03**
	[-11.82, -9.65]	[-5.53, -2.67]	[-43.73, -39.24]	[-41.98, -37.10]	[-0.01, 1.81]	[-29.49, -26.58]
non-EU	**1.63**	**1.67**	0.30	**-2.94**	**1.74**	**1.40**
	[1.44, 1.81]	[1.48, 1.87]	[-0.36, 0.96]	[-4.14, -1.74]	[1.50, 1.99]	[1.24, 1.56]
S7 All w Transfers						
old EU	**-5.34**	**-1.28**	**-40.85**	**-45.17**	-0.16	**-21.37**
	[-5.92, -4.77]	[-2.07, -0.48]	[-43.31, -38.39]	[-47.51, -42.83]	[-0.67, 0.34]	[-22.54, -20.20]
new EU	**-13.53**	**-7.35**	**-42.60**	**-41.94**	**-1.08**	**-29.63**
	[-14.57, -12.49]	[-8.70, -6.01]	[-44.83, -40.37]	[-44.32, -39.57]	[-1.94, -0.22]	[-31.08, -28.18]
non-EU	**1.60**	**1.65**	0.22	**-5.11**	**1.73**	**1.34**
	[1.41, 1.78]	[1.46, 1.84]	[-0.44, 0.88]	[-6.26, -3.96]	[1.49, 1.97]	[1.18, 1.50]

Note: 90% confidence bounds in brackets based on 1,000 bootstrap replications and an approximate normal distribution.

Table A13: Changes in VAX-Ratios (in %pts.)

Scenario		Domestic		Exports to		
Region	Output	absorption	old EU	new EU	non-EU	World
S1 Customs Union (MFN tariffs)						
old EU	**0.29**	**0.37**	**1.71**	**2.01**	**-0.65**	**1.18**
	[0.28, 0.30]	[0.36, 0.39]	[1.51, 1.90]	[1.74, 2.27]	[-0.68, -0.62]	[1.02, 1.34]
new EU	**0.53**	**0.84**	**1.51**	**2.83**	**-1.39**	**1.56**
	[0.49, 0.58]	[0.77, 0.91]	[1.25, 1.77]	[2.41, 3.26]	[-1.47, -1.31]	[1.34, 1.78]
non-EU	**-0.03**	**-0.03**	**-0.17**	**0.09**	**-0.04**	**-0.06**
	[-0.03, -0.02]	[-0.03, -0.02]	[-0.22, -0.13]	[0.03, 0.15]	[-0.05, -0.03]	[-0.07, -0.05]
S2 Single Market						
old EU	**0.33**	**0.37**	**3.46**	**3.95**	**-0.96**	**3.50**
	[0.28, 0.38]	[0.28, 0.45]	[2.97, 3.94]	[3.37, 4.54]	[-1.09, -0.82]	[3.20, 3.80]
new EU	**0.66**	**0.71**	**3.67**	**5.42**	**-2.81**	**4.71**
	[0.51, 0.82]	[0.52, 0.90]	[3.04, 4.31]	[4.47, 6.36]	[-3.14, -2.48]	[4.18, 5.24]
non-EU	**-0.09**	**-0.10**	**-1.32**	**-1.55**	**0.05**	**-0.22**
	[-0.11, -0.08]	[-0.11, -0.08]	[-1.48, -1.16]	[-1.83, -1.26]	[0.01, 0.09]	[-0.25, -0.19]
S3 Euro						
old EU	**0.06**	0.01	**0.88**	0.10	**-0.14**	**0.48**
	[0.03, 0.09]	[-0.02, 0.04]	[0.47, 1.30]	[-0.03, 0.23]	[-0.21, -0.07]	[0.26, 0.70]
new EU	0.01	-0.01	0.00	**0.14**	**0.12**	**0.11**
	[-0.02, 0.03]	[-0.03, 0.01]	[-0.09, 0.10]	[0.00, 0.28]	[0.05, 0.19]	[0.04, 0.18]
non-EU	0.00	-0.00	**-0.16**	-0.01	**0.05**	0.01
	[-0.01, 0.01]	[-0.01, 0.00]	[-0.24, -0.07]	[-0.12, 0.10]	[0.03, 0.06]	[-0.01, 0.02]
S4 Schengen						
old EU	**0.10**	**0.09**	**0.82**	**1.75**	**-3.24**	**-0.80**
	[0.06, 0.14]	[0.04, 0.14]	[0.49, 1.14]	[1.19, 2.32]	[-3.33, -3.16]	[-1.03, -0.58]
new EU	**0.25**	**0.19**	**1.62**	**2.99**	**-3.78**	0.38
	[0.14, 0.36]	[0.10, 0.28]	[1.09, 2.14]	[2.36, 3.62]	[-3.91, -3.65]	[-0.04, 0.80]
non-EU	**-0.05**	**-2.41**	**0.19**	0.17	**-3.06**	**-2.43**
	[-0.06, -0.03]	[-2.43, -2.40]	[0.08, 0.30]	[-0.00, 0.34]	[-3.09, -3.02]	[-2.45, -2.40]
S5 Other RTAs						
old EU	-0.01	0.00	**-0.10**	-0.03	**0.53**	**0.10**
	[-0.03, 0.02]	[-0.02, 0.02]	[-0.16, -0.03]	[-0.09, 0.03]	[0.43, 0.63]	[0.04, 0.15]
new EU	**0.03**	**0.03**	**0.15**	**0.24**	**0.71**	**0.15**
	[0.02, 0.04]	[0.02, 0.04]	[0.12, 0.19]	[0.19, 0.29]	[0.60, 0.81]	[0.12, 0.18]
non-EU	**0.01**	**0.02**	**0.51**	**1.04**	**0.04**	**0.14**
	[0.00, 0.02]	[0.01, 0.03]	[0.40, 0.62]	[0.93, 1.14]	[0.00, 0.07]	[0.11, 0.16]
S6 All						
old EU	**0.60**	**0.80**	**4.85**	**5.38**	**-0.71**	**5.20**
	[0.54, 0.66]	[0.69, 0.92]	[4.33, 5.37]	[4.78, 5.97]	[-0.87, -0.54]	[4.85, 5.55]
new EU	**1.15**	**1.64**	**4.97**	**7.99**	**-3.09**	**6.62**
	[0.99, 1.32]	[1.38, 1.90]	[4.30, 5.65]	[6.97, 9.01]	[-3.41, -2.77]	[6.06, 7.19]
non-EU	**-0.12**	**-0.13**	**-0.82**	-0.29	0.05	**-0.11**
	[-0.15, -0.10]	[-0.15, -0.10]	[-1.03, -0.62]	[-0.66, 0.07]	[-0.02, 0.11]	[-0.16, -0.07]
S7 All w Transfers						
old EU	**0.60**	**0.80**	**4.85**	**5.07**	**-0.69**	**5.20**
	[0.54, 0.66]	[0.68, 0.91]	[4.33, 5.37]	[4.48, 5.66]	[-0.85, -0.52]	[4.85, 5.56]
new EU	**1.10**	**1.44**	**4.76**	**7.32**	**-3.17**	**6.39**
	[0.94, 1.27]	[1.20, 1.68]	[4.08, 5.44]	[6.33, 8.31]	[-3.49, -2.85]	[5.83, 6.94]
non-EU	**-0.12**	**-0.12**	**-0.82**	**-0.57**	0.06	**-0.11**
	[-0.14, -0.10]	[-0.15, -0.10]	[-1.02, -0.61]	[-0.92, -0.21]	[-0.00, 0.12]	[-0.15, -0.06]

Note: 90%-confidence bounds in brackets based on 1,000 bootstrap replications and an approximate normal distribution.

Table A14a: Changes in Sectoral Trade Flows and VAX-Ratios

Exports to:		EU		non-EU		World	
Scenario		gross	VAX	gross	VAX	gross	VAX
Region	Sector	(in %)	(in %pts.)	(in %)	(in %pts.)	(in %)	(in %pts.)
S1 Customs Union (MFN tariffs)							
old EU	Agric.	**-8.79**	-1.25	**0.60**	**-1.28**	**-5.77**	-0.06
		[-11.61, -5.97]	[-2.96, 0.46]	[0.31, 0.89]	[-1.46, -1.11]	[-7.71, -3.82]	[-1.44, 1.32]
	Manuf.	**-12.64**	**2.27**	**0.42**	**-0.97**	**-6.76**	**1.79**
		[-14.18, -11.10]	[2.12, 2.43]	[0.23, 0.61]	[-0.99, -0.95]	[-7.57, -5.96]	[1.65, 1.93]
	Serv.	**-0.69**	**-4.06**	**0.60**	**-0.50**	0.03	**-1.92**
		[-0.76, -0.62]	[-4.69, -3.43]	[0.46, 0.74]	[-0.57, -0.42]	[-0.05, 0.12]	[-2.19, -1.64]
new EU	Agric.	**-9.88**	-0.69	**1.07**	**-1.81**	**-6.37**	-0.42
		[-12.90, -6.86]	[-2.83, 1.46]	[0.64, 1.50]	[-2.12, -1.50]	[-8.39, -4.35]	[-1.92, 1.08]
	Manuf.	**-12.23**	**1.85**	**0.42**	**-2.38**	**-8.83**	**1.74**
		[-13.52, -10.95]	[1.72, 1.97]	[0.17, 0.68]	[-2.45, -2.31]	[-9.74, -7.92]	[1.61, 1.87]
	Serv.	**-0.51**	**-3.78**	**0.98**	**-0.93**	0.09	**-2.41**
		[-0.65, -0.36]	[-4.25, -3.32]	[0.73, 1.23]	[-1.05, -0.81]	[-0.08, 0.25]	[-2.69, -2.13]
non-EU	Agric.	**-1.79**	**1.63**	**0.26**	**-0.08**	**-0.10**	**0.22**
		[-2.08, -1.51]	[1.26, 2.00]	[0.24, 0.29]	[-0.09, -0.06]	[-0.14, -0.06]	[0.16, 0.28]
	Manuf.	**2.40**	**-0.47**	**0.21**	**-0.02**	**0.58**	**-0.08**
		[1.98, 2.81]	[-0.53, -0.41]	[0.19, 0.22]	[-0.02, -0.01]	[0.51, 0.66]	[-0.09, -0.07]
	Serv.	**-1.21**	**1.11**	**0.15**	-0.01	**-0.20**	**0.29**
		[-1.40, -1.01]	[0.90, 1.31]	[0.12, 0.18]	[-0.03, 0.01]	[-0.25, -0.15]	[0.23, 0.34]
S2 Single Market							
old EU	Agric.	**-19.46**	2.86	**4.00**	-2.17	**-11.90**	3.60
		[-32.71, -6.21]	[-1.95, 7.67]	[2.42, 5.58]	[-5.72, 1.38]	[-20.88, -2.93]	[-0.30, 7.51]
	Manuf.	**-28.37**	**3.52**	**0.94**	**-1.23**	**-15.19**	**3.82**
		[-30.85, -25.90]	[3.12, 3.91]	[0.28, 1.60]	[-1.33, -1.14]	[-16.50, -13.88]	[3.55, 4.10]
	Serv.	**-28.55**	3.55	**2.80**	**-1.42**	**-10.92**	1.51
		[-33.42, -23.68]	[-0.46, 7.55]	[2.12, 3.48]	[-1.79, -1.04]	[-12.92, -8.93]	[-0.00, 3.02]
new EU	Agric.	**-19.21**	2.10	**5.46**	**-1.73**	**-11.30**	2.21
		[-30.97, -7.46]	[-5.42, 9.62]	[3.34, 7.59]	[-3.45, -0.01]	[-19.20, -3.40]	[-2.81, 7.22]
	Manuf.	**-28.10**	**3.98**	**1.24**	**-4.10**	**-20.21**	**4.40**
		[-30.72, -25.48]	[3.61, 4.35]	[0.07, 2.42]	[-4.34, -3.87]	[-22.10, -18.31]	[4.06, 4.74]
	Serv.	**-31.32**	**5.43**	**4.68**	**-3.35**	**-17.01**	**3.41**
		[-35.64, -26.99]	[1.68, 9.17]	[3.45, 5.90]	[-4.11, -2.60]	[-19.35, -14.66]	[1.36, 5.47]
non-EU	Agric.	**-4.61**	**3.88**	**1.32**	**-0.12**	0.27	**0.56**
		[-7.30, -1.93]	[2.10, 5.67]	[1.13, 1.50]	[-0.22, -0.02]	[-0.21, 0.74]	[0.38, 0.75]
	Manuf.	**8.06**	**-2.20**	**1.15**	**0.12**	**2.34**	**-0.24**
		[7.08, 9.03]	[-2.34, -2.05]	[0.96, 1.34]	[0.11, 0.14]	[2.10, 2.57]	[-0.26, -0.22]
	Serv.	**-4.22**	**2.90**	**0.81**	**0.22**	**-0.48**	**1.02**
		[-5.24, -3.21]	[2.17, 3.62]	[0.62, 1.00]	[0.14, 0.30]	[-0.69, -0.26]	[0.79, 1.25]

Note: 90% confidence bounds in brackets based on 1,000 bootstrap replications and approximate normal distribution.

Table A14b: Changes in Sectoral Trade Flows and VAX-Ratios

Exports to:		EU		non-EU		World	
Scenario		gross	VAX	gross	VAX	gross	VAX
Region	Sector	(in %)	(in %pts.)	(in %)	(in %pts.)	(in %)	(in %pts.)
S3 Euro							
old EU	Agric.	**-14.40**	**5.47**	**0.56**	**-3.20**	**-9.58**	**3.49**
		[-20.51, -8.30]	[2.98, 7.96]	[0.22, 0.90]	[-4.63, -1.76]	[-13.69, -5.47]	[1.47, 5.50]
	Manuf.	-1.52	**1.18**	-0.17	**0.07**	**-0.91**	**0.70**
		[-3.08, 0.04]	[0.97, 1.38]	[-0.37, 0.03]	[0.01, 0.13]	[-1.74, -0.08]	[0.54, 0.86]
	Serv.	**-3.31**	**1.14**	**0.33**	**-0.29**	**-1.26**	0.40
		[-4.72, -1.90]	[0.14, 2.15]	[0.15, 0.51]	[-0.42, -0.16]	[-1.86, -0.66]	[-0.06, 0.86]
new EU	Agric.	0.02	0.21	**0.20**	**0.27**	0.08	**0.24**
		[-0.49, 0.54]	[-0.12, 0.54]	[0.09, 0.31]	[0.07, 0.46]	[-0.26, 0.43]	[0.01, 0.47]
	Manuf.	-0.10	**-0.16**	0.07	**0.15**	-0.05	**-0.02**
		[-0.26, 0.06]	[-0.19, -0.14]	[-0.07, 0.22]	[0.09, 0.21]	[-0.15, 0.04]	[-0.04, -0.00]
	Serv.	**-1.44**	**0.77**	0.01	0.10	**-0.86**	**0.55**
		[-1.98, -0.90]	[0.36, 1.17]	[-0.11, 0.14]	[-0.00, 0.21]	[-1.21, -0.52]	[0.25, 0.84]
non-EU	Agric.	**1.96**	-0.66	**0.15**	0.05	**0.47**	-0.06
		[0.80, 3.12]	[-1.48, 0.16]	[0.06, 0.23]	[-0.01, 0.10]	[0.28, 0.66]	[-0.16, 0.03]
	Manuf.	0.02	**-0.45**	**0.11**	**0.06**	0.09	**-0.03**
		[-0.46, 0.50]	[-0.53, -0.37]	[0.06, 0.16]	[0.05, 0.07]	[-0.02, 0.21]	[-0.04, -0.02]
	Serv.	**-0.70**	0.23	**0.07**	**0.05**	**-0.12**	**0.13**
		[-1.03, -0.36]	[-0.04, 0.51]	[0.03, 0.11]	[0.02, 0.08]	[-0.20, -0.05]	[0.03, 0.22]
S4 Schengen							
old EU	Agric.	**-7.38**	0.43	-0.85	**-4.97**	**-5.27**	-1.17
		[-11.74, -3.02]	[-1.12, 1.98]	[-1.98, 0.29]	[-5.75, -4.20]	[-8.56, -1.98]	[-2.69, 0.36]
	Manuf.	**-8.09**	**1.37**	**-1.89**	**-2.60**	**-5.30**	**-0.19**
		[-9.43, -6.74]	[1.19, 1.56]	[-2.21, -1.56]	[-2.69, -2.51]	[-6.14, -4.46]	[-0.35, -0.04]
	Serv.	**-8.77**	1.00	**0.98**	**-4.52**	**-3.29**	**-1.98**
		[-11.02, -6.53]	[-0.42, 2.42]	[0.53, 1.44]	[-4.87, -4.17]	[-4.44, -2.13]	[-2.77, -1.20]
new EU	Agric.	**-7.24**	1.46	0.13	**-4.78**	**-4.88**	-0.47
		[-11.04, -3.44]	[-1.01, 3.92]	[-0.68, 0.95]	[-5.28, -4.27]	[-7.64, -2.11]	[-2.37, 1.43]
	Manuf.	**-9.03**	**2.04**	**-1.94**	**-3.63**	**-7.13**	**0.69**
		[-10.69, -7.38]	[1.85, 2.24]	[-2.49, -1.40]	[-3.75, -3.50]	[-8.41, -5.84]	[0.50, 0.89]
	Serv.	**-9.02**	1.36	**2.41**	**-5.28**	**-4.47**	-1.02
		[-11.38, -6.66]	[-0.06, 2.78]	[1.93, 2.90]	[-5.69, -4.87]	[-6.00, -2.95]	[-2.08, 0.04]
non-EU	Agric.	**-1.75**	1.39	**0.48**	**-2.96**	0.09	**-2.16**
		[-3.41, -0.08]	[-0.07, 2.84]	[0.26, 0.71]	[-3.14, -2.78]	[-0.05, 0.22]	[-2.26, -2.06]
	Manuf.	**0.64**	-0.10	**0.41**	**-2.78**	**0.45**	**-2.30**
		[0.28, 0.99]	[-0.21, 0.00]	[0.30, 0.51]	[-2.79, -2.77]	[0.32, 0.57]	[-2.31, -2.28]
	Serv.	**-2.99**	**1.41**	**0.11**	**-3.18**	**-0.68**	**-2.08**
		[-3.62, -2.36]	[0.98, 1.84]	[0.03, 0.20]	[-3.24, -3.12]	[-0.82, -0.53]	[-2.21, -1.95]

Note: 90% confidence bounds in brackets based on 1,000 bootstrap replications and approximate normal distribution.

Table A14c: Changes in Sectoral Trade Flows and VAX-Ratios

Exports to:		EU		non-EU		World	
Scenario		gross	VAX	gross	VAX	gross	VAX
Region	Sector	(in %)	(in %pts.)	(in %)	(in %pts.)	(in %)	(in %pts.)
S5 Other RTAs							
old EU	Agric.	**-1.45**	**0.30**	2.14	**-2.51**	**-0.29**	**-0.51**
		[-2.62, -0.27]	[0.23, 0.36]	[-0.24, 4.52]	[-4.74, -0.29]	[-0.53, -0.05]	[-0.89, -0.13]
	Manuf.	**0.72**	**-0.04**	**-2.53**	**0.90**	**-0.74**	**0.16**
		[0.56, 0.89]	[-0.06, -0.01]	[-2.88, -2.17]	[0.82, 0.98]	[-0.91, -0.56]	[0.12, 0.19]
	Serv.	**-0.11**	**0.27**	**-0.40**	**-0.33**	**-0.27**	-0.10
		[-0.19, -0.04]	[0.20, 0.34]	[-0.73, -0.07]	[-0.57, -0.10]	[-0.46, -0.09]	[-0.21, 0.02]
new EU	Agric.	**-0.79**	**0.45**	0.49	**-1.47**	**-0.38**	**-0.21**
		[-1.30, -0.29]	[0.31, 0.58]	[-0.59, 1.57]	[-2.39, -0.55]	[-0.58, -0.18]	[-0.36, -0.06]
	Manuf.	**0.21**	**0.26**	**-3.27**	**1.24**	**-0.73**	**0.22**
		[0.14, 0.28]	[0.24, 0.28]	[-3.64, -2.89]	[1.15, 1.33]	[-0.80, -0.65]	[0.21, 0.23]
	Serv.	**-0.18**	**0.28**	**-0.45**	**-0.45**	**-0.29**	-0.07
		[-0.26, -0.09]	[0.21, 0.35]	[-0.79, -0.12]	[-0.70, -0.20]	[-0.41, -0.16]	[-0.14, 0.01]
non-EU	Agric.	1.66	**-1.37**	-0.09	**0.23**	0.22	-0.05
		[-0.39, 3.72]	[-2.72, -0.02]	[-0.26, 0.08]	[0.06, 0.40]	[-0.01, 0.45]	[-0.15, 0.05]
	Manuf.	**-3.77**	**0.71**	**0.15**	-0.00	**-0.53**	**0.09**
		[-4.22, -3.31]	[0.63, 0.79]	[0.10, 0.20]	[-0.01, 0.00]	[-0.61, -0.44]	[0.08, 0.11]
	Serv.	**-0.84**	**-0.45**	**0.05**	**0.05**	**-0.18**	-0.01
		[-1.36, -0.33]	[-0.75, -0.15]	[0.02, 0.09]	[0.02, 0.08]	[-0.30, -0.05]	[-0.11, 0.09]
S6 All							
old EU	Agric.	**-43.18**	5.54	**6.55**	**-8.69**	**-27.16**	5.51
		[-56.65, -29.70]	[-2.88, 13.97]	[2.36, 10.74]	[-11.61, -5.77]	[-36.74, -17.57]	[-0.68, 11.70]
	Manuf.	**-43.68**	**5.63**	**-2.60**	**-0.42**	**-25.19**	**6.39**
		[-46.59, -40.76]	[5.02, 6.24]	[-3.45, -1.74]	[-0.58, -0.26]	[-26.83, -23.55]	[5.97, 6.81]
	Serv.	**-35.37**	0.46	**3.10**	**-2.56**	**-13.74**	-0.23
		[-40.89, -29.85]	[-4.09, 5.02]	[2.04, 4.16]	[-3.19, -1.92]	[-16.15, -11.33]	[-2.02, 1.57]
new EU	Agric.	**-32.21**	1.86	**7.51**	**-4.87**	**-19.47**	1.82
		[-44.90, -19.51]	[-7.84, 11.57]	[3.91, 11.12]	[-6.51, -3.22]	[-28.29, -10.64]	[-4.40, 8.05]
	Manuf.	**-42.86**	**5.61**	**-2.42**	**-4.48**	**-31.99**	**6.60**
		[-45.65, -40.08]	[5.11, 6.11]	[-3.89, -0.95]	[-4.71, -4.24]	[-34.06, -29.92]	[6.13, 7.08]
	Serv.	**-37.39**	2.57	**5.14**	**-4.83**	**-20.48**	1.53
		[-41.96, -32.82]	[-1.48, 6.62]	[3.49, 6.79]	[-5.82, -3.84]	[-23.00, -17.95]	[-0.72, 3.79]
non-EU	Agric.	**-3.95**	**4.40**	**1.96**	-0.01	**0.91**	**0.75**
		[-7.04, -0.86]	[1.86, 6.94]	[1.62, 2.30]	[-0.24, 0.22]	[0.49, 1.34]	[0.53, 0.97]
	Manuf.	**5.68**	**-2.24**	**1.86**	**0.11**	**2.51**	**-0.28**
		[4.66, 6.71]	[-2.41, -2.07]	[1.61, 2.11]	[0.10, 0.13]	[2.24, 2.79]	[-0.31, -0.25]
	Serv.	**-8.01**	**3.94**	**1.26**	**0.31**	**-1.11**	**1.51**
		[-9.19, -6.84]	[3.02, 4.85]	[1.01, 1.52]	[0.19, 0.42]	[-1.39, -0.82]	[1.24, 1.77]

Note: 90% confidence bounds in brackets based on 1,000 bootstrap replications and approximate normal distribution.

Table A14d: Changes in Sectoral Trade Flows and VAX-Ratios

Exports to:		EU		non-EU		World	
Scenario		gross	VAX	gross	VAX	gross	VAX
Region	Sector	(in %)	(in %pts.)	(in %)	(in %pts.)	(in %)	(in %pts.)
S7 All w Transfers							
old EU	Agric.	**-43.45**	5.54	**6.42**	**-8.69**	**-27.38**	5.53
		[-56.86, -30.05]	[-2.88, 13.96]	[2.25, 10.59]	[-11.60, -5.77]	[-36.93, -17.84]	[-0.66, 11.71]
	Manuf.	**-43.88**	**5.60**	**-2.65**	**-0.39**	**-25.33**	**6.41**
		[-46.78, -40.98]	[5.00, 6.21]	[-3.51, -1.80]	[-0.55, -0.23]	[-26.96, -23.70]	[5.99, 6.83]
	Serv.	**-35.57**	0.42	**3.02**	**-2.54**	**-13.87**	-0.23
		[-41.05, -30.08]	[-4.11, 4.96]	[1.97, 4.07]	[-3.18, -1.91]	[-16.27, -11.47]	[-2.02, 1.56]
new EU	Agric.	**-33.96**	1.63	**5.60**	**-5.36**	**-21.27**	1.48
		[-46.53, -21.40]	[-8.20, 11.46]	[2.68, 8.52]	[-6.98, -3.74]	[-30.07, -12.48]	[-4.88, 7.84]
	Manuf.	**-44.44**	**5.28**	**-4.95**	**-4.59**	**-33.82**	**6.24**
		[-47.22, -41.66]	[4.77, 5.79]	[-6.35, -3.55]	[-4.82, -4.36]	[-35.91, -31.73]	[5.76, 6.72]
	Serv.	**-38.35**	2.10	**3.94**	**-5.30**	**-21.53**	1.05
		[-42.96, -33.74]	[-1.99, 6.18]	[2.58, 5.31]	[-6.21, -4.40]	[-24.15, -18.91]	[-1.26, 3.35]
non-EU	Agric.	**-4.50**	**4.53**	**1.95**	-0.01	**0.80**	**0.77**
		[-7.59, -1.41]	[1.97, 7.10]	[1.61, 2.29]	[-0.23, 0.22]	[0.38, 1.23]	[0.55, 1.00]
	Manuf.	**5.43**	**-2.25**	**1.85**	**0.13**	**2.47**	**-0.27**
		[4.41, 6.45]	[-2.42, -2.08]	[1.60, 2.10]	[0.11, 0.15]	[2.19, 2.74]	[-0.30, -0.24]
	Serv.	**-8.24**	**3.88**	**1.25**	**0.32**	**-1.18**	**1.52**
		[-9.41, -7.07]	[2.97, 4.80]	[0.99, 1.50]	[0.21, 0.43]	[-1.46, -0.90]	[1.25, 1.78]

Note: 90%-confidence bounds in brackets based on 1,000 bootstrap replications and approximate normal distribution.

Table A15: Changes in Sectoral Output and Sectoral Shares in Total Production

Scenario: Region	Sector	Baseline	Single Market	Customs Union	Euro	Schengen	Other RTAs	All	All w Transfers
		Output (in bn. USD)	Output change (in %)						
old EU	Agric.	684	**-2.85** [-4.60, -1.09]	**-2.14** [-2.25, -2.03]	**-1.92** [-2.62, -1.23]	**-0.78** [-1.10, -0.47]	**-0.60** [-1.00, -0.19]	**-7.06** [-8.50, -5.63]	**-7.30** [-8.73, -5.87]
	Manuf.	7786	**-5.02** [-5.60, -4.43]	**-2.47** [-2.56, -2.39]	**-0.52** [-0.80, -0.24]	**-1.48** [-1.81, -1.15]	**-0.19** [-0.33, -0.04]	**-8.28** [-9.01, -7.55]	**-8.42** [-9.15, -7.69]
	Serv.	22793	**-2.86** [-3.28, -2.44]	**-0.25** [-0.30, -0.19]	**-0.38** [-0.52, -0.23]	**-0.46** [-0.66, -0.27]	**-0.17** [-0.22, -0.12]	**-4.09** [-4.64, -3.54]	**-4.23** [-4.78, -3.68]
new EU	Agric.	148	**-3.70** [-5.05, -2.34]	**-2.09** [-2.39, -1.78]	**0.27** [0.03, 0.51]	**-0.78** [-1.16, -0.41]	**-0.37** [-0.53, -0.22]	**-6.34** [-7.95, -4.73]	**-9.36** [-10.76, -7.96]
	Manuf.	1027	**-9.41** [-10.60, -8.21]	**-4.05** [-4.35, -3.75]	0.04 [-0.06, 0.13]	**-3.15** [-3.86, -2.44]	**-0.33** [-0.37, -0.29]	**-14.54** [-15.84, -13.24]	**-17.43** [-18.72, -16.15]
	Serv.	1923	**-6.84** [-7.75, -5.93]	**-0.59** [-0.71, -0.48]	**-0.14** [-0.21, -0.07]	**-1.13** [-1.52, -0.73]	**-0.18** [-0.21, -0.15]	**-9.04** [-10.14, -7.95]	**-11.77** [-12.79, -10.74]
non-EU	Agric.	10839	**0.95** [0.76, 1.15]	**0.16** [0.14, 0.19]	**0.23** [0.16, 0.30]	**0.30** [0.22, 0.38]	**0.07** [0.05, 0.09]	**1.59** [1.38, 1.80]	**1.54** [1.33, 1.76]
	Manuf.	40904	**1.46** [1.28, 1.63]	**0.31** [0.28, 0.34]	**0.10** [0.04, 0.17]	**0.41** [0.32, 0.50]	0.01 [-0.03, 0.05]	**2.07** [1.84, 2.29]	**2.04** [1.81, 2.27]
	Serv.	74893	**0.94** [0.80, 1.07]	**0.16** [0.15, 0.18]	**0.09** [0.05, 0.13]	**0.17** [0.11, 0.22]	**0.06** [0.05, 0.08]	**1.39** [1.22, 1.56]	**1.36** [1.19, 1.53]
		Output share (in %)	Change in output share (in %pts.)						
old EU	Agric.	2.2	0.01 [-0.02, 0.05]	**-0.03** [-0.03, -0.03]	**-0.03** [-0.05, -0.02]	-0.00 [-0.01, 0.01]	-0.01 [-0.02, 0.00]	**-0.04** [-0.07, -0.01]	**-0.05** [-0.08, -0.02]
	Manuf.	24.9	**-0.42** [-0.48, -0.35]	**-0.41** [-0.42, -0.40]	-0.02 [-0.05, 0.01]	**-0.19** [-0.23, -0.15]	-0.00 [-0.02, 0.02]	**-0.81** [-0.90, -0.72]	**-0.81** [-0.90, -0.72]
	Serv.	72.9	**0.40** [0.34, 0.47]	**0.44** [0.43, 0.45]	**0.05** [0.02, 0.08]	**0.19** [0.15, 0.23]	0.01 [-0.01, 0.02]	**0.85** [0.77, 0.94]	**0.85** [0.77, 0.94]
new EU	Agric.	4.8	**0.20** [0.14, 0.26]	-0.01 [-0.03, 0.00]	**0.02** [0.01, 0.03]	**0.05** [0.03, 0.07]	-0.01 [-0.01, 0.00]	**0.24** [0.16, 0.31]	**0.23** [0.16, 0.30]
	Manuf.	33.1	**-0.67** [-0.87, -0.47]	**-0.76** [-0.81, -0.70]	**0.03** [0.01, 0.06]	**-0.46** [-0.59, -0.34]	**-0.03** [-0.04, -0.02]	**-1.41** [-1.63, -1.19]	**-1.50** [-1.71, -1.28]
	Serv.	62.1	**0.47** [0.29, 0.66]	**0.77** [0.72, 0.82]	**-0.05** [-0.07, -0.03]	**0.41** [0.30, 0.53]	**0.04** [0.03, 0.04]	**1.18** [0.97, 1.39]	**1.27** [1.06, 1.47]
non-EU	Agric.	8.6	**-0.01** [-0.02, -0.00]	**-0.00** [-0.01, -0.00]	**0.01** [0.01, 0.01]	**0.00** [0.00, 0.01]	**0.00** [0.00, 0.00]	-0.00 [-0.01, 0.01]	-0.00 [-0.01, 0.01]
	Manuf.	32.3	**0.11** [0.09, 0.13]	**0.03** [0.03, 0.04]	-0.00 [-0.01, 0.01]	**0.05** [0.04, 0.06]	**-0.01** [-0.02, -0.01]	**0.14** [0.12, 0.16]	**0.14** [0.12, 0.16]
	Serv.	59.1	**-0.10** [-0.12, -0.08]	**-0.03** [-0.03, -0.02]	**-0.01** [-0.02, -0.00]	**-0.05** [-0.06, -0.04]	**0.01** [0.00, 0.01]	**-0.14** [-0.16, -0.11]	**-0.14** [-0.16, -0.11]

Note: 90% confidence bounds in brackets based on 1,000 bootstrap replications and approximate normal distribution.

Table A16: Changes in Aggregate Value Added and Value Added Trade Flows (in %)

Scenario Region	Value added	Domestic absorption	Value added exports to old EU	new EU	non-EU	World
S1 Customs Union (MFN tariffs)						
old EU	**-0.56** [-0.61, -0.51]	**0.42** [0.32, 0.52]	**-7.11** [-8.03, -6.18]	**-7.69** [-8.59, -6.79]	**-0.15** [-0.26, -0.05]	**-3.17** [-3.52, -2.82]
new EU	**-1.27** [-1.40, -1.15]	**0.65** [0.36, 0.95]	**-7.33** [-8.08, -6.59]	**-6.87** [-8.03, -5.71]	**-0.72** [-0.83, -0.61]	**-4.48** [-4.93, -4.03]
non-EU	**0.18** [0.17, 0.20]	**0.17** [0.16, 0.19]	**0.52** [0.39, 0.65]	**0.46** [0.24, 0.69]	**0.16** [0.15, 0.18]	**0.23** [0.20, 0.26]
S2 Single Market						
old EU	**-3.07** [-3.50, -2.63]	-0.45 [-1.08, 0.19]	**-24.25** [-26.22, -22.28]	**-26.69** [-28.64, -24.74]	**0.80** [0.46, 1.14]	**-10.09** [-10.83, -9.36]
new EU	**-6.87** [-7.74, -6.01]	**-2.47** [-3.67, -1.28]	**-24.81** [-26.65, -22.97]	**-23.63** [-25.67, -21.59]	-0.07 [-0.67, 0.53]	**-14.19** [-15.17, -13.21]
non-EU	**1.02** [0.88, 1.16]	**0.99** [0.84, 1.14]	**1.22** [0.76, 1.67]	-0.66 [-1.66, 0.35]	**1.15** [0.97, 1.33]	**1.13** [1.00, 1.25]
S3 Euro						
old EU	**-0.39** [-0.54, -0.23]	**-0.22** [-0.37, -0.08]	**-1.93** [-2.93, -0.94]	**-0.70** [-0.91, -0.50]	-0.09 [-0.20, 0.02]	**-0.82** [-1.18, -0.46]
new EU	**-0.06** [-0.11, -0.00]	0.02 [-0.05, 0.09]	**-0.57** [-0.75, -0.38]	0.07 [-0.05, 0.19]	**0.17** [0.07, 0.27]	**-0.18** [-0.25, -0.12]
non-EU	**0.11** [0.06, 0.15]	**0.11** [0.07, 0.15]	-0.12 [-0.28, 0.03]	**0.31** [0.14, 0.48]	**0.15** [0.10, 0.20]	**0.11** [0.06, 0.16]
S4 Schengen						
old EU	**-0.62** [-0.81, -0.43]	**0.35** [0.13, 0.57]	**-7.11** [-8.09, -6.14]	**-8.87** [-10.09, -7.65]	**-3.94** [-4.10, -3.79]	**-5.40** [-5.88, -4.92]
new EU	**-1.53** [-1.91, -1.15]	0.12 [-0.31, 0.55]	**-8.34** [-9.47, -7.22]	**-2.80** [-3.47, -2.13]	**-3.95** [-4.19, -3.71]	**-5.86** [-6.46, -5.26]
non-EU	**0.21** [0.15, 0.27]	**-2.14** [-2.20, -2.07]	**-0.65** [-0.88, -0.42]	**-0.84** [-1.23, -0.45]	**-2.70** [-2.79, -2.61]	**-2.31** [-2.36, -2.25]
S5 Other RTAs						
old EU	**-0.19** [-0.24, -0.14]	**-0.09** [-0.14, -0.03]	**0.25** [0.16, 0.35]	**0.61** [0.51, 0.71]	**-1.04** [-1.21, -0.86]	**-0.46** [-0.55, -0.38]
new EU	**-0.21** [-0.24, -0.18]	**-0.08** [-0.11, -0.04]	**0.16** [0.08, 0.23]	**0.51** [0.41, 0.61]	**-1.32** [-1.49, -1.15]	**-0.43** [-0.48, -0.38]
non-EU	**0.06** [0.04, 0.07]	**0.11** [0.09, 0.13]	**-1.45** [-1.70, -1.20]	**-2.07** [-2.31, -1.84]	**0.12** [0.09, 0.16]	**-0.19** [-0.22, -0.16]
S6 All						
old EU	**-4.59** [-5.15, -4.04]	-0.32 [-1.19, 0.54]	**-35.93** [-38.29, -33.57]	**-38.61** [-40.82, -36.40]	**-0.80** [-1.21, -0.40]	**-16.04** [-16.97, -15.11]
new EU	**-9.58** [-10.61, -8.55]	**-2.46** [-4.04, -0.88]	**-36.51** [-38.57, -34.46]	**-31.55** [-34.09, -29.01]	**-2.19** [-2.93, -1.45]	**-21.41** [-22.54, -20.28]
non-EU	**1.50** [1.33, 1.68]	**1.55** [1.36, 1.74]	-0.53 [-1.07, 0.02]	**-3.24** [-4.36, -2.11]	**1.79** [1.55, 2.02]	**1.29** [1.15, 1.43]
S7 All w Transfers)						
old EU	**-4.74** [-5.30, -4.19]	-0.48 [-1.35, 0.39]	**-36.00** [-38.35, -33.64]	**-40.10** [-42.27, -37.93]	**-0.85** [-1.25, -0.45]	**-16.17** [-17.09, -15.24]
new EU	**-12.42** [-13.40, -11.45]	**-5.91** [-7.38, -4.45]	**-37.84** [-39.89, -35.79]	**-34.62** [-37.09, -32.16]	**-4.25** [-4.93, -3.58]	**-23.24** [-24.37, -22.12]
non-EU	**1.47** [1.30, 1.65]	**1.53** [1.34, 1.71]	**-0.60** [-1.14, -0.06]	**-5.68** [-6.74, -4.61]	**1.79** [1.56, 2.02]	**1.23** [1.09, 1.37]

Note: 90% confidence bounds in brackets based on 1,000 bootstrap replications and an approximate normal distribution.

Table A17: Changes in Value Added for EU28, Goods (in %)

Sector Description	Sector	Single Market	Customs Union	Euro	Schengen	Other RTAs	All	All w Transfers
Crops & Animals	1	-3.84	-2.61	-0.49	-1.18	-0.21	-7.12	-7.83
		[-4.41; -3.27]	[-2.73; -2.50]	[-0.81; -0.17]	[-1.45; -0.91]	[-0.26; -0.17]	[-7.80; -6.44]	[-8.50; -7.16]
Forestry & Logging	2	-2.91	-1.9	-0.39	-0.9	-0.24	-5.92	-6.51
		[-3.87; -1.96]	[-2.14; -1.66]	[-0.52; -0.26]	[-1.28; -0.51]	[-0.41; -0.08]	[-7.22; -4.63]	[-7.76; -5.25]
Fishing & Aquaculture	3	-1.91	-3.25	-0.74	0.01	-1.04	-4.59	-5.37
		[-5.34; 1.53]	[-3.76; -2.74]	[-1.70; 0.21]	[-0.38; 0.40]	[-2.80; 0.73]	[-6.33; -2.85]	[-7.07; -3.67]
Mining & Quarrying	4	0.54	-0.18	-6.04	0.53	-1.72	-6.46	-7.32
		[-6.80; 7.88]	[-0.61; 0.26]	[-8.65; -3.44]	[-0.54; 1.61]	[-3.44; -0.01]	[-12.30; -0.63]	[-13.06; -1.58]
Food, Beverages & Tobacco	5	-3.67	-3.02	-0.22	-1	-0.21	-7.13	-7.65
		[-4.38; -2.96]	[-3.06; -2.98]	[-0.45; 0.01]	[-1.27; -0.73]	[-0.28; -0.15]	[-7.87; -6.38]	[-8.40; -6.90]
Textiles, Apparel & Leather	6	-5.77	-5.83	-0.15	-1.49	-0.76	-12.45	-13.19
		[-9.92; -1.62]	[-7.49; -4.18]	[-1.59; 1.29]	[-3.22; 0.25]	[-0.96; -0.56]	[-16.32; -8.57]	[-17.11; -9.27]
Wood & Cork	7	-2.91	-1.94	-0.43	-0.77	-0.6	-6.06	-6.65
		[-3.55; -2.27]	[-1.98; -1.89]	[-0.57; -0.29]	[-1.03; -0.50]	[-0.84; -0.37]	[-6.86; -5.27]	[-7.41; -5.88]
Paper	8	-3.32	-1.35	-0.34	-0.74	-0.18	-5.49	-5.92
		[-3.84; -2.80]	[-1.39; -1.30]	[-0.49; -0.18]	[-0.95; -0.54]	[-0.28; -0.08]	[-6.10; -4.87]	[-6.53; -5.30]
Recorded Media Reproduction	9	-2.82	-0.47	-0.29	-0.51	-0.12	-4.15	-4.55
		[-3.27; -2.36]	[-0.54; -0.40]	[-0.42; -0.17]	[-0.73; -0.30]	[-0.19; -0.06]	[-4.75; -3.54]	[-5.15; -3.96]
Coke & Refined Petroleum	10	-4.52	-2.05	-1.51	-1.46	0.71	-7.56	-8.49
		[-6.13; -2.91]	[-2.27; -1.83]	[-2.24; -0.78]	[-3.50; 0.58]	[-0.71; 2.13]	[-10.40; -4.73]	[-11.34; -5.64]
Chemicals	11	-8.54	-4.52	-1.71	-2.1	-0.63	-14.68	-15.07
		[-10.03; -7.04]	[-5.00; -4.04]	[-2.73; -0.70]	[-3.41; -0.78]	[-0.80; -0.47]	[-16.42; -12.95]	[-16.81; -13.33]
Pharmaceuticals	12	-6.56	0.73	1.51	-2.39	1.29	-4.71	-5.2
		[-9.59; -3.54]	[0.08; 1.38]	[0.58; 2.44]	[-3.59; -1.18]	[0.85; 1.73]	[-8.87; -0.55]	[-9.23; -1.17]
Rubber & Plastics	13	-5.85	-3.11	-0.49	-1.75	-0.36	-9.83	-10.27
		[-6.83; -4.86]	[-3.38; -2.83]	[-0.75; -0.23]	[-2.12; -1.38]	[-0.42; -0.30]	[-10.97; -8.69]	[-11.43; -9.10]
Other non-Metallic Mineral	14	-3.51	-1.27	-0.4	-0.9	-0.34	-5.91	-6.38
		[-3.99; -3.04]	[-1.33; -1.22]	[-0.54; -0.25]	[-1.12; -0.69]	[-0.43; -0.26]	[-6.51; -5.30]	[-6.97; -5.78]
Basic Metals	15	-8.96	-2.07	-1.32	-2.68	-0.4	-13.15	-13.69
		[-10.61; -7.31]	[-2.17; -1.97]	[-2.23; -0.41]	[-3.64; -1.71]	[-0.67; -0.13]	[-14.88; -11.43]	[-15.41; -11.96]
Fabricated Metal	16	-3.86	-1.45	-0.34	-1.11	-0.35	-6.27	-6.64
		[-4.34; -3.38]	[-1.51; -1.39]	[-0.50; -0.18]	[-1.35; -0.87]	[-0.41; -0.29]	[-6.89; -5.66]	[-7.25; -6.04]
Electronics & Optical Products	17	-5.42	-3.24	2.02	-0.68	-0.03	-6.85	-7.19
		[-8.88; -1.96]	[-3.98; -2.49]	[0.25; 3.79]	[-2.24; 0.87]	[-0.24; 0.18]	[-10.59; -3.10]	[-10.91; -3.48]
Electrical Equipment	18	-8.11	-2.33	-0.71	-2.08	-0.28	-11.37	-11.74
		[-9.92; -6.31]	[-2.52; -2.13]	[-1.39; -0.03]	[-2.79; -1.36]	[-0.50; -0.06]	[-13.32; -9.42]	[-13.68; -9.81]
Machinery & Equipment	19	-2.92	-0.97	-0.09	-1.26	-0.22	-4.35	-4.78
		[-3.91; -1.93]	[-1.08; -0.85]	[-0.34; 0.17]	[-1.66; -0.87]	[-0.40; -0.05]	[-5.71; -2.99]	[-6.12; -3.44]
Motor Vehicles	20	-6.56	-4.1	0.05	-2.35	-0.3	-11.34	-11.63
		[-8.08; -5.04]	[-4.56; -3.65]	[-0.66; 0.75]	[-3.31; -1.39]	[-0.34; -0.26]	[-12.91; -9.78]	[-13.20; -10.07]
Other Transport Equipment	21	-4.82	-1.14	-1.59	0	-0.15	-6.86	-7.19
		[-7.02; -2.62]	[-1.57; -0.71]	[-2.86; -0.33]	[-0.94; 0.93]	[-0.52; 0.22]	[-9.27; -4.44]	[-9.62; -4.76]
Furniture & Other Manufacturing	22	-1.76	-1.33	-0.34	-1.26	-0.09	-4.3	-4.7
		[-3.09; -0.43]	[-1.48; -1.17]	[-0.78; 0.11]	[-1.83; -0.69]	[-0.22; 0.04]	[-5.76; -2.84]	[-6.12; -3.28]

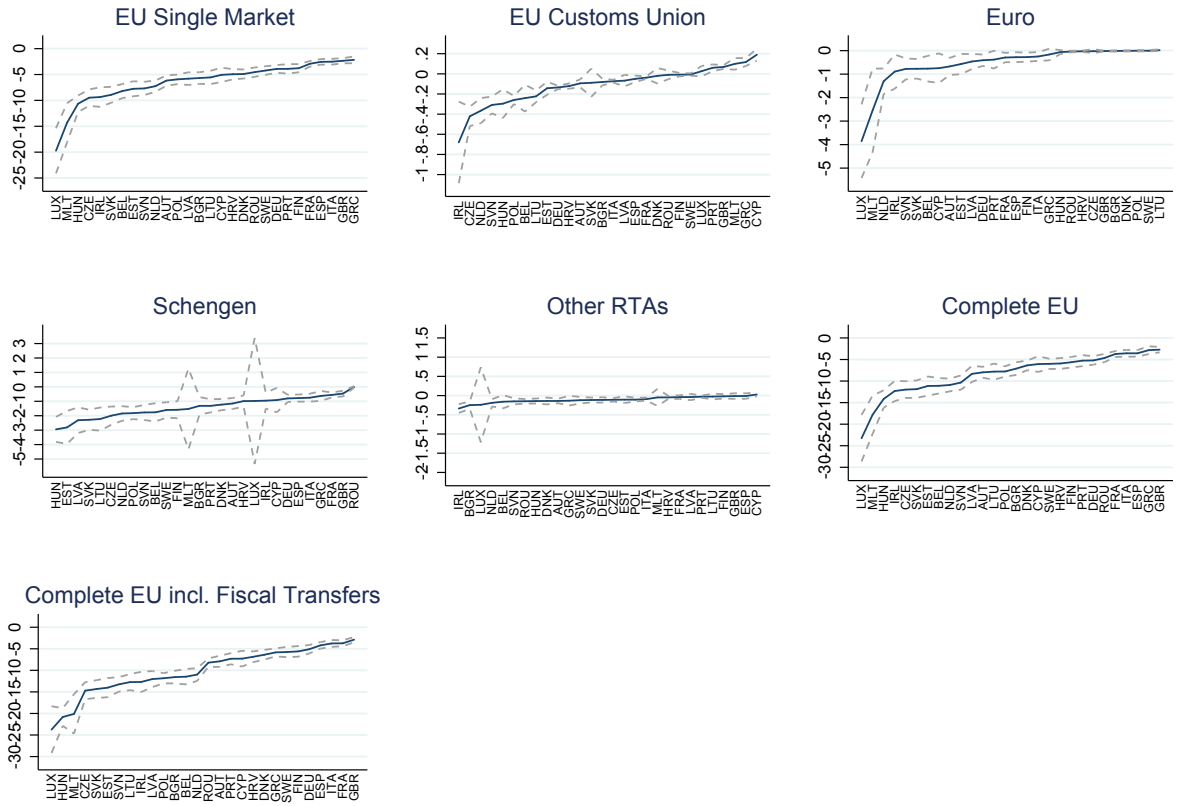
Note: 90%-confidence bounds in brackets based on 1,000 bootstrap replications and an approximate normal distribution. Given changes in value added for EU28 are weighted averages.

Table A18: Changes in Value Added for EU28, Services (in %)

Sector Description	Sector	Single Market	Customs Union	Euro	Schengen	Other RTAs	All	All w Transfers
Electricity & Gas	23	-3.74	-0.71	-0.41	-0.72	-0.13	-5.46	-6
		[-4.26; -3.21]	[-0.78; -0.64]	[-0.58; -0.25]	[-0.97; -0.47]	[-0.23; -0.03]	[-6.13; -4.80]	[-6.66; -5.35]
Water Supply	24	-3.40	-0.4	-0.37	-0.76	-0.11	-4.81	-5.3
		[-3.88; -2.93]	[-0.46; -0.34]	[-0.52; -0.23]	[-0.99; -0.53]	[-0.21; -0.01]	[-5.43; -4.20]	[-5.90; -4.69]
Sewerage & Waste	25	-4.26	-0.71	-0.51	-0.76	-0.15	-5.97	-6.32
		[-4.85; -3.67]	[-0.78; -0.63]	[-0.75; -0.27]	[-1.05; -0.47]	[-0.24; -0.06]	[-6.71; -5.23]	[-7.06; -5.59]
Construction	26	-3.34	-0.11	-0.35	-0.68	-0.18	-4.58	-4.98
		[-3.81; -2.87]	[-0.17; -0.05]	[-0.49; -0.21]	[-0.89; -0.47]	[-0.23; -0.12]	[-5.17; -3.99]	[-5.56; -4.39]
Trade & Repair of Motor Vehicles	27	-3.40	-0.54	-0.28	-1.01	-0.25	-5.15	-5.58
		[-3.86; -2.94]	[-0.61; -0.47]	[-0.41; -0.15]	[-1.22; -0.79]	[-0.33; -0.16]	[-5.72; -4.58]	[-6.14; -5.02]
Wholesale Trade	28	-3.43	-0.75	-0.32	-0.72	-0.32	-5.36	-5.79
		[-4.11; -2.76]	[-0.88; -0.61]	[-0.48; -0.17]	[-0.97; -0.48]	[-0.42; -0.22]	[-6.26; -4.47]	[-6.66; -4.93]
Retail Trade	29	-3.26	-0.22	-0.32	-0.74	-0.18	-4.64	-5.05
		[-3.71; -2.80]	[-0.29; -0.16]	[-0.45; -0.18]	[-0.94; -0.55]	[-0.23; -0.14]	[-5.21; -4.07]	[-5.61; -4.49]
Land Transport	30	-2.96	-0.63	-0.34	-0.54	-0.21	-4.54	-4.98
		[-3.59; -2.33]	[-0.75; -0.51]	[-0.47; -0.21]	[-0.76; -0.32]	[-0.27; -0.14]	[-5.41; -3.67]	[-5.82; -4.15]
Water Transport	31	-0.79	0.05	0.05	0.02	0.14	-0.55	-0.88
		[-1.18; -0.40]	[-0.00; 0.10]	[-0.27; 0.38]	[-0.19; 0.22]	[-0.07; 0.35]	[-1.19; 0.09]	[-1.47; -0.30]
Air Transport	32	-2.05	-0.02	-0.07	-0.3	-0.02	-2.46	-2.68
		[-2.72; -1.38]	[-0.11; 0.07]	[-0.29; 0.15]	[-0.51; -0.08]	[-0.14; 0.10]	[-3.23; -1.68]	[-3.43; -1.92]
Aux. Transportation Services	33	-3.00	-0.62	-0.23	-0.64	-0.1	-4.47	-4.82
		[-3.58; -2.41]	[-0.73; -0.51]	[-0.39; -0.07]	[-0.86; -0.43]	[-0.20; 0.00]	[-5.32; -3.61]	[-5.65; -3.98]
Postal and Courier	34	-2.49	-0.32	-0.27	-0.23	-0.25	-3.69	-4.01
		[-3.04; -1.94]	[-0.41; -0.22]	[-0.38; -0.15]	[-0.46; -0.00]	[-0.33; -0.17]	[-4.39; -3.00]	[-4.69; -3.33]
Accommodation and Food	35	-2.78	-0.07	-0.31	-0.52	-0.16	-3.8	-4.19
		[-3.23; -2.33]	[-0.12; -0.01]	[-0.45; -0.17]	[-0.71; -0.33]	[-0.20; -0.11]	[-4.38; -3.21]	[-4.77; -3.62]
Publishing	36	-2.83	-0.27	-0.01	-0.15	-0.06	-3.55	-3.82
		[-3.38; -2.27]	[-0.40; -0.13]	[-0.26; 0.24]	[-0.41; 0.11]	[-0.15; 0.03]	[-4.50; -2.60]	[-4.75; -2.90]
Media Services	37	-2.66	-0.1	-0.28	-0.07	-0.06	-3.45	-3.75
		[-3.19; -2.13]	[-0.20; 0.00]	[-0.40; -0.17]	[-0.33; 0.20]	[-0.20; 0.07]	[-4.30; -2.60]	[-4.58; -2.91]
Telecommunications	38	-2.95	-0.17	-0.31	-0.5	-0.14	-4.11	-4.55
		[-3.42; -2.48]	[-0.24; -0.09]	[-0.44; -0.19]	[-0.69; -0.31]	[-0.20; -0.08]	[-4.73; -3.48]	[-5.16; -3.94]
Computer & Information Services	39	-1.58	-0.11	-0.1	0.16	-0.11	-2.27	-2.52
		[-2.60; -0.56]	[-0.27; 0.05]	[-0.27; 0.08]	[-0.13; 0.45]	[-0.21; -0.01]	[-3.70; -0.83]	[-3.93; -1.11]
Financial Services	40	-2.19	-0.29	-0.09	-0.54	-0.18	-3.35	-3.7
		[-3.03; -1.35]	[-0.40; -0.17]	[-0.32; 0.14]	[-0.83; -0.26]	[-0.35; -0.01]	[-4.47; -2.22]	[-4.80; -2.59]
Insurance	41	-2.50	-0.13	-0.49	0.75	-0.1	-3.01	-3.25
		[-3.11; -1.88]	[-0.19; -0.06]	[-0.65; -0.32]	[0.07; 1.42]	[-0.19; -0.02]	[-3.96; -2.05]	[-4.20; -2.31]
Real Estate	42	-3.03	-0.11	-0.32	-0.59	-0.18	-4.18	-4.49
		[-3.48; -2.58]	[-0.17; -0.05]	[-0.46; -0.18]	[-0.78; -0.40]	[-0.23; -0.13]	[-4.75; -3.60]	[-5.06; -3.91]
Legal and Accounting	43	-2.62	-0.49	-0.38	-0.33	-0.17	-4.06	-4.34
		[-3.38; -1.85]	[-0.64; -0.35]	[-0.55; -0.20]	[-0.58; -0.07]	[-0.27; -0.07]	[-5.13; -3.00]	[-5.39; -3.28]
Business Services	44	-3.45	-0.54	-0.28	-0.42	-0.21	-4.87	-5.2
		[-3.93; -2.96]	[-0.65; -0.44]	[-0.42; -0.15]	[-0.63; -0.20]	[-0.26; -0.16]	[-5.56; -4.18]	[-5.87; -4.52]
Research and Development	45	-3.04	-0.02	-0.37	-0.58	-0.18	-4.26	-4.49
		[-3.52; -2.56]	[-0.11; 0.08]	[-0.50; -0.23]	[-0.76; -0.39]	[-0.24; -0.12]	[-4.89; -3.62]	[-5.12; -3.86]
Admin. & Support Services	46	-2.94	-0.48	-0.37	-0.49	-0.14	-4.35	-4.58
		[-3.56; -2.32]	[-0.59; -0.38]	[-0.56; -0.18]	[-0.69; -0.28]	[-0.20; -0.08]	[-5.21; -3.48]	[-5.44; -3.72]
Public & Social Services	47	-3.45	-0.09	-0.4	-0.65	-0.18	-4.76	-5.13
		[-3.94; -2.96]	[-0.16; -0.02]	[-0.56; -0.25]	[-0.85; -0.44]	[-0.23; -0.13]	[-5.39; -4.12]	[-5.75; -4.50]
Education	48	-3.41	-0.03	-0.36	-0.69	-0.19	-4.67	-5.03
		[-3.88; -2.94]	[-0.10; 0.04]	[-0.51; -0.22]	[-0.90; -0.49]	[-0.24; -0.13]	[-5.27; -4.07]	[-5.62; -4.44]
Human Health and Social Work	49	-3.50	-0.03	-0.42	-0.71	-0.18	-4.83	-5.07
		[-3.98; -3.02]	[-0.10; 0.04]	[-0.58; -0.26]	[-0.92; -0.50]	[-0.23; -0.13]	[-5.44; -4.21]	[-5.68; -4.45]
Other Services, Households	50	-3.09	-0.09	-0.3	-0.56	-0.16	-4.22	-4.53
		[-3.54; -2.63]	[-0.15; -0.03]	[-0.44; -0.17]	[-0.75; -0.37]	[-0.25; -0.08]	[-4.81; -3.62]	[-5.12; -3.94]

Note: 90%-confidence bounds in brackets based on 1,000 bootstrap replications and an approximate normal distribution. Given changes in value added for EU28 are weighted averages.

Figure A1: Percentage Change in Income per Capita relative to Status Quo, Various Scenarios



Note: The figure depicts percentage changes in income per capita relative to the baseline year 2014. The dashed lines are the 90% confidence bounds based on 1,000 bootstrap replications and approximate normal distribution.

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