ERASMUS UNIVERSITEIT ROTTERDAM
ERASMUS SCHOOL OF ECONOMICS

Master Thesis in Economics & Business Economics: International Economics

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Estimating differential impacts of trade on endogenous specialisation mechanisms

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Abstract

This research focuses on international trade as an endogenous driver of industry specialisation. Data on a subset of European economies, roughly ranging from 1990 until 2020, is empirically evaluated using a step-by-step identification strategy that aims to provide a thorough understanding of the dynamics between trade and specialisation. It is found that the episodes of deep economic integration that Europe underwent over the course of the research period generally resulted in surges in bilateral industry trade flows. Some suggestive evidence is found that countries with higher GDPs per capita see their exports from skilled-labour intensive industries in which they were formerly specialised increase more whereas for countries with lower GDPs per capita surges in exports mainly occur in formerly specialised unskilled-labour intensive industries. Similar patterns are observed when comparing the 15 founding members of the European Union to a subset of Eastern European countries that joined that EU in the early 2000s. Surges in bilateral export seem to enhance a country's relative ability to export goods from a given industry to a given export partner although it remains ambiguous whether this effect is stronger for skilled- or unskilled-labour intensive industries. Trade seems to induce within-country specialisation in high GDP per capita or founding EU countries while low GDP per capita countries rather seem to diversify their export activities. Finally, it is hypothesised and confirmed that exporting enhances industry productivity. It seems that unskilled-labour intensive industries benefit more in terms of productivity although it remains uncertain whether this differential impact is present in high GDP per capita countries.

Supervisor: Prof. dr. EM Bosker
Second assessor: dr. J Emami Namini
Date: 27-10-2021

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1 Introduction

Over the course of the past decades the world economy experienced major transformations which resulted in globalisation of the value chain and enormous surges in international trade. Data from the World Bank shows that merchandise trade as a percentage of GDP has risen from just over 25% to over 60% since the 1970s. Although it remains complicated to pin down the exact causes of global trade growth it is generally believed that liberalising trade policies and technological developments in transportation and communication technologies are important drivers in the rise of global value chains (Hummels, 2007). These developments allowed economies to exploit their comparative advantages and specialise. The consequences of a globalising international value chain can either be marked as positive or negative. On the one hand it brought a large part of the world a seemingly unprecedented increase in prosperity. On the other hand, it arguably induced rising inequality within and between countries (Antràs, De Gortari, & Itskhoki, 2017).

In a Ricardian world economy international specialisation occurs due to exploitation of comparative advantages. If a country becomes more open to international trade this may induce the country to further exploit their comparative advantages and reallocate resources towards the industries in which it already holds a comparative advantage. Assuming that allocating resources towards an industry induces productivity growth in that particular industry, an endogenous mechanism arises in which countries keep on specialising theirselves according to their incumbent comparative advantages. Given that some industries are more profitable or welfare enhancing in the long-term than others, this endogenous mechanism may be an important driver of the aforementioned trade-induced rising inequality.

This research aims to uncover the statistical relations between trade and specialisation that would indicate the existence of this inequality enhancing and/or sustaining endogenous specialisation mechanism. Examining the process that leads from trade to specialisation step-by-step will provide a better understanding of the dynamics in the relation of these subjects. This research starts with examining the causes of surges in international trade after which it will be determined how the benefits from these surges in trade are distributed across countries and industries and which (endogenous) mechanisms are behind this.

Specifically, the focus of this research on trade and specialisation dynamics will be laid on Europe. The economies of Europe have arguably intertwined with each other over the course of, roughly, the past three decades. In theory this enabled countries to take on specific parts in the value chain in which they hold a comparative advantage. Europe is a particularly interesting study object in researching specialisation dynamics due to its efforts to integrate economies with each other. Examining how episodes of integration impact export patterns and cautiously making inferences about it's long-term welfare consequences may give insights in how European economic collaboration can be guided in the right direction and potentially negative consequences of integration averted.

In section 2 the literature concerning trade and specialisation dynamics will be reviewed. From this a methodological approach will arise which will be explained in section 3. Section 4 describes the data (sources) on which the methodology will be applied. In section 5 an overview of the empirical results will be presented after which the findings and conclusions will be summarised in section 6.

2 Literature review

The main theoretical concept this research will build upon is presented by Redding (1999). In his theoretical paper, Redding builds a dynamic Ricardian model where trade may induce countries to specialise in specific directions. Further specialisation according to existing comparative advantage may be long-term welfare reducing, especially for developing economies which are often specialised in low-technology goods that do not exhibit much potential for productivity growth. Redding assumes that productivity growth follows from the learning-by-doing channel which implies that spending more resources on the production of a certain good induces a country's productivity in this certain good to grow at a faster pace. Other than in previous Ricardian models, Redding's model endogenises technology changes and productivity growth. Comparative advantage is proposed to have a dynamic relation with productivity and welfare and trade influences this relation due to the reallocation of resources between high- and low-technology sectors it induces. Redding argues that technological change is a positive externality of current production and therefore is not fully accounted for by private agents.

In the continuation of this section the literature will be reviewed that allows us to set up a theoretical foundation for an empirical evaluation of the mechanisms as proposed by Redding. Since a surge in trade flows should lead to a surge in specialisation, it will be useful to build the identification strategy around events of economic integration that may induce these surges in trade flows. Therefore, in the first part of this literature review we will explore the literature that covers the direct effects of economic integration on trade flows. The literature regarding this subject will be described in subsection *2.1: Direct impact of trade liberalisation*. Subsequently, we will consider the literature concerning the dynamic relationship between trade and specialisation in subsection *2.2: Modelling specialisation dynamics*. Thereafter, we will review the literature that covers the learning-by-doing channel in subsection *2.3: The impact of trade on industry productivity*.

2.1 Direct impact of trade liberalisation

Baier and Bergstrand (2007) state that the standard gravity model, which has been the workhorse model for explaining trade dynamics, needs some adjustment in order to estimate the true impact of free trade agreements (FTAs). Instead of the traditional approach which makes use of mainly cross-sectional data, the proposed method of Baier and Bergstrand exploits panel-data and accounts for potential biases arising from endogeneity by applying either fixed-effects or first-differencing methods. The effects that they find by studying a total of 96 FTAs over the course of 40 years stands out from previously found effects following from traditional gravity models. They find that bilateral trade increases by 100% over the course of 10 years as a result of an FTA. This effect is seven times larger than the effect found by using a regular OLS estimation of the gravity equation.

Building upon their earlier work, Baier, Bergstrand, and Feng (2014) look at the differential impact of all kinds of economic integration agreements (EIAs). Gravity equations are used to describe the differential effects of EIAs on the intensive and extensive margins of trade. In their methodology they refer to Wooldridge (2000) to rationalise the use of 5-year differencing rather than annual differencing. An important argument for this is that dependent and independent variables cannot fully adjust over the course of a year. Evidence is found for larger impacts of deeper integration agreements on aggregated trade flows and the intensive and extensive margins of trade. Intensive margin effects are larger and seem to occur sooner than extensive margin effects. This may suggests that countries react to trade liberalisation by intensifying what they already do rather than move towards new lines of production.

Hummels and Klenow (2005) analyse trade data to examine whether large economies export more in absolute terms through the intensive margin, extensive margin or higher-quality goods. Which channel is dominant has major implications for terms-of-trade effects and subsequently world income distribution. It is found that the extensive margin accounts for around 60% of the greater exports of larger economies and that the higher export value of richer countries is explained by higher quantities at slightly higher prices. These findings have the implication that convergence of world income hardly follows from trade alone and needs other forces like technology diffusion as well.

Egger and Larch (2011) lay down an empirical framework to estimate the GDP and welfare effects of the trade agreements between the 15 incumbent EU countries (EU15) and 10 Central and Eastern European countries (CEEC) Using three alternative sets of estimates, a log-linear estimation, PMLE and one-part versus two-part PMLE, they find that the agreements had a positive effect on bilateral trade, GDP and welfare in the associated countries. The effects are found to be much stronger in the CEEC countries as compared to the EU15.

The literature in this subsection suggests that EIAs and other forms of trade liberalising policies enhance bilateral trade flows significantly. Following this, a proper first step in this research would be to determine if trade liberalising agreements display a similar impact in our sample. It is important to take into account that these effects may not occur immediately which implies that different time intervals and lags should be considered.

2.2 Modelling specialisation dynamics

Redding (2002) can be seen as an empirical follow-up to his previous work in which he develops an empirical framework to evaluate specialisation dynamics. In order to do this Redding looks at the shares in GDP of 20 different industries in seven OECD countries from 1970 till 1990. It is found that there is substantial mobility in patterns of specialisation which means that it is probable for an industry to transit out of it's initial quintile of the distribution of GDP shares. No evidence is found of an increase in the concentration of production in a few industries and thus specialisation. For some countries a decrease in specialisation is even observed.

Breinlich, Soderbery, and Wright (2018) found an impact of trade that may be an indication of the theoretical predictions of Redding (1999). They use UK firm level data to find a link between reductions in manufacturing import tariffs and a shift to greater service provision relative to goods production within firms. In their estimating equation they regress the ratio of revenue from services to revenue from goods on MFN tariff reduction and a set of control variables. Given that in a developed economy like the UK a reduction of import tariffs for manufactures (low-technology) shifts the focus of the economy towards services (high-technology) it could be hypothesised that for less-developed economies the contrary may be true.

One way of determining specialisation is looking at countries' comparative advantages. Essential in the literature concerning comparative advantage is the seminal paper of Balassa (1965) in which he presents the index named after him that is used to describe countries' comparative advantages relative to each other. The Balassa-index, and various modifications of it, is widely used in the international trade literature. Balassa proposes the following formula to express revealed comparative advantage (RCA):

$$RCA_{ij} = \frac{X_{ij}/X_{wj}}{X_{it}/X_{wt}} \tag{1}$$

From this it becomes clear that RCA of country in a good is the fraction of a certain good in total export of the country (X_{ij}/X_{wj}) divided by this same fraction for total world (or subsample) exports (X_{it}/X_{wt}).

In addition to the original Balassa Index, French (2017) presents a modified version that better displays bilateral comparative advantages. The Bilateral Balassa Index (BBI) is defined as follows:

$$BBI_{ij}^{k} = \frac{X_{ji}^{k}/X_{j}^{k}}{X_{ji}/X_{j}} \tag{2}$$

The intuition behind this altered version is similar to the original measure by Balassa but allows for distortions caused by bilateral trade costs and market-specific factors. Also, the interpretation as a measure of specialisation differs. A high BBI value indicates that country i has a high ability to export products from industry k to country j as compared to other countries.

Hidalgo, Klinger, Barabási, and Hausmann (2007) lay the theoretical and empirical link between the production of certain goods and the ability of economies to move to production of more advanced product categories and subsequently higher income levels. They propose and test a model where they categorise product classes within clusters. It is more convenient for economies to shift their production to product classes that are relatively proximate to their incumbent product classes of production. Between the product clusters they define an hierarchical classification following Leamer (1984). The concept of proximity is captured within the model by minimising the pairwise conditional probability that a country has an RCA in a good given that it also has an RCA in the other good. By using trade data from 1998 to 2000 of 775 SITC-4 product classes for 132 different countries a matrix of proximity of product classes is empirically constructed. Thereafter, this matrix is used to analyze patterns of specialisation. The process of diffusion is tested at a broad scale which yields the finding that production tend to shift towards nearby products. The fact that underdeveloped countries lack proximity to profitable product classes may (in part) explain the observed difficulty for those countries to converge to higher income levels. From this research naturally arises the question whether (increased) trade reduces or increases the relative proximity to product classes that are higher on the hierarchical ladder.

Cadot, Carrère, and Strauss-Kahn (2011) show how product diversification patterns of economies evolve and how this interact with their economic development path. The authors discover that their exists a hump-shaped relationship between export diversification and economic development which has a turning point around a GDP per capita of $25.000 at PPP. Below the turning point, diversification at both the intensive and extensive margin is found and product concentration is generally decreasing. Around the turning point diversification is mainly found at the intensive margin after which the extensive margin takes over again and concentration increases. The authors suggest that this is a result of rich countries closing export lines. In order to uncover this relationship, three classes of variables are calculated and derived from COMTRADE data being: export concentration indices, the number of active export lines and a measure of new export products. The findings of Cadot et al. (2011) justify the treatment of export diversification, and thus export specialisation, as endogenous in growth regressions.

One of the main hurdles to overcome in testing Ricardian theories of comparative advantage is that it predicts that some countries fully specialise in a good which makes it impossible to directly observe relative productivity. Costinot and Donaldson (2012) presents a specific solution to this empirical challenge by combining trade flow data and extremely detailed agricultural land productivity data. What makes the agricultural sector uniquely suitable for this kind of research is that even in the absence of production or trade flows in a certain crop, it is possible to predict the potential productivity of a parcel of land. Their empirical framework captures the Ricardian idea that relative, and not absolute, productivity differences determine factor allocation which induces international specialisation. The authors performed 'slope tests' by regressing actual output data on measures of predicted output and found a positive and significant coefficient of .212. Although theory predicts this coefficient to be 1 the estimated coefficient still shows that the Ricardian theory of comparative advantage has substantial explanatory power.

From the literature reviewed in this section follow a number of questions relevant for this research. Does export induce productivity growth especially in the export intensive industry? What is the causal relationship between productivity growth in export intensive industries and specialisation? Having an RCA in a certain industry, which can be interpreted as a measure of specialisation, may be an important predictor of having an RCA in the same (or a similar) industry at a later stage. If increased trade flows and/or EIAs significantly shifts the composition of export baskets to a certain direction this may be an underlying channel through which export and specialisation influence long-term welfare.

2.3 The impact of trade on productivity

McCaig (2011) examines the impact of US tariff cuts, and the subsequent increase in trade flows, on regional poverty in Vietnamese provinces. The main finding of McCaig is that provinces with high exposure to the US tariff cuts experienced faster decrease in poverty. Particularly relevant for this research is the additional finding that in provinces that were most exposed to the US tariff cuts the wages for workers with low education levels grew faster than those of with a higher level of education. McCaig does not draw inferences about the implications of this latter result but in the light of Redding (1999) this effect could be seen as a suggestive indication that increased trade flows between Vietnam and the US induced Vietnam to specialise (further) in low-technology (unskilled-labour abundant) products. Given that wages are generally seen as a good proxy for labour productivity, this result can also be interpreted as suggestive evidence for the learning-by-doing channel and thus endogenous productivity growth following from trade.

Based on research using panel data on 20 OECD countries Abizadeh, Manish, and Tosun (2007) find that relative productivity gains from trade for high-skilled workers exceeds that of low-skilled workers. They categorise industries into skilled- and unskilled-labour intensive based on the average share of workers in production for a particular industry. Given that labour productivity proxies for wage, their findings suggest that trade openness induces an increase in relative wage of skilled-labour to wage for unskilled-labour in developed economies.

Bernard, Redding, and Schott (2007) examine how nations respond to trade liberalisation given specific country, industry and firm characteristics. Their proposed general equilibrium model embeds heterogeneous firms in a model of comparative advantage. It is shown that creative destruction is more highly concentrated in industries holding a comparative advantage and that relative growth of high-productivity firms is strongest in these industries as well. Besides that, the model also predicts that varieties produced in labour-intensive industries in labour-abundant countries have higher productivity and lower prices than varieties produced in labour-intensive industries in skill-abundant countries and vice versa. These forces could induce countries to specialise further according to their existing comparative advantages.

In isolating the effect of international trade on firm productivity researchers often stumble upon endogeneity problems mainly occurring from productive firms self-selecting into international trade. Atkin, Khandelwal, and Osman (2017) offers a unique setting where foreign market access is generated exogenously for Egyptian rug producers. The research provided a random subset of small Egyptian rug-producing firms with an intervention that reduced market frictions between them and foreign buyers. It was found that the firms that where randomly exposed to the foreign market saw overall performance, which was measured by profits, increase with 16%-26%. Interestingly, the output in m^2 of rugs produced dropped for the treatments firms where the quality of rugs became significantly higher. The quality upgrading is found to be consistent with a learning-by-exporting mechanism which can come from learning-by-doing and knowledge transfers from international buyers to the suppliers.

Costinot, Donaldson, and Komunjer (2012) offer a theoretical foundation of Ricardo's trade theory concerning comparative advantage which allows for quantitative validation of such models. Technological differences across countries and industries are drawn from a Frechet distribution and depend on fundamental productivity and intra-industry heterogeneity, estimation of the latter is one of the key focuses of the paper. The authors research how observed differences in industry productivity affect bilateral industry export flows. What follows is a fixed-effects estimation of relative export levels on relative productivity levels. A potential source of bias following from regular OLS regressions is a simultaneous relationship between export and productivity which is why the authors eventually shift towards IV estimation. The coefficients of relative productivity are found to be positive and significant and coherent with the theoretical predictions.

From the literature reviewed in this subsection it follows that in several instances it is found that trade has a positive impact on (firm) productivity. It also becomes clear that on an aggregated level the impact of trade on productivity can be heterogeneous, where this observed heterogeneity may follow from the extent to which an industry or firm is exposed to trade opportunities.

2.3.1 Proposed additions to the existing literature

This research aims to combine the insights and methods of the vast body of literature that covers international trade and specialisation according to comparative advantage. By not just covering a separate part within the dynamic relationship between international trade and specialisation but instead focusing on the dynamics itself it will be attempted to uncover a new angle to look at international trade and its (long-term) consequences. The successive questions that this research will revolve around are: How does economic integration affect bilateral trade? Is this impact differential across industries and countries? Will specialisation lead to more specialisation? And what is the (differential) impact of international trade on industry productivity? In the following section the methodology that will be used to examine these questions will be explained.

3 Methodology

In this research we will gradually build towards empirical identification of our theoretically founded mechanisms of trade and specialisation dynamics. To identify whether bilateral trade relations induce countries to specialise in certain ways, it is necessary to conduct the first step of identifying whether a change in the bilateral trade relation (e.g. economic integration) does affect bilateral export flows at all for our specific sample of countries and industries. Thereafter, we can start looking at possible differential effects for different industries and subsets of countries. Examining the differential effect of extended trade relations on export flows allows us to make the first steps towards identification of specialisation dynamics induced by international trade. If certain countries or industries will see their export patterns change in different ways due to economic integration, this may give an indication of differing specialisation patterns as well. The corresponding empirical identification strategy will be explained in section 3.1.

Moving towards identification strategies revolving around our theoretically obtained bilateral specialisation measure (BBI, French (2017)) as the main dependent variable is a logical next step in estimating the impact of bilateral trade on specialisation dynamics. Statistically confirming a relation between trade and specialisation would confirm that changing trade relations due to economic integration may have secondary impacts on the way countries economically develop themselves. Combined with estimations from the first step, a statistical confirmation of this process may indicate the existence of endogeneity in specialisation induced by trade as described by Redding (1999). The corresponding empirical identification strategy will be explained in section 3.2.

As the final step in determining the endogenous process of trade induced specialisation we will turn to estimating the underlying mechanism that is supposedly behind this which is the learning-by-exporting channel, also described by Redding (1999). If trade enhances industry productivity this may be a source of endogeneity in specialisation dynamics. The corresponding empirical identification strategy will be explained in section 3.3.

3.1 Part I - Effect of European EIAs on bilateral trade flows

First, it will be determined whether bilateral trade flows did increase during the European economic integration episodes of the 1990s and early 2000s. In order to do this the methods of Baier and Bergstrand (2007) and Baier et al. (2014) will be followed closely. The empirical approach will consist mainly of panel-regressions in which endogeneity concerns will be addressed by applying either fixed-effects or first-differencing methods. The use of fixed-effects estimations rather than random effects follows from the concern that there are unobserved time-, country- or industry invariant bilateral variables that could influence both the occurrence of an EIA and bilateral export flows. By applying exporter-importer, exporter-time and importer-time fixed effects Baier et al. (2014) addresses these concerns. Since this paper adds an industry dimension as compared Baier and Bergstrand (2007) & Baier et al. (2014), also industry specific fixed-effects are added to the equation which results in the following empirical specification:

$$\ln(X_{ijkt}) = \beta_0 + \beta_1(EIA_{ijt}) + \omega_{ijk} + \psi_{it} + \phi_{jt} + \tau_{kt} + \epsilon_{ijkt} \tag{5}$$

The dependent variable in this specification, $\ln(X_{i,j,k,t})$ denotes the log of exports from country i to country j for industry k at time t. Variation in unobservable time-invariant factors like geographical distance, language and adjacency are accounted for by using exporter-importer-industry (ijk) fixed-effects and denoted by ω_{ijk}. Further, the industry (k) dimension of this fixed-effect is added in this research to account for variation in industry specific unobservables like incumbent industrial resources and historical industry productivity. Country-time fixed-effects (it, jt) account for variation in country-specific time-varying unobservables like GDPs and multilateral price resistance (Anderson & Van Wincoop, 2003) and are denoted by $\psi_{i,t}$ and $\phi_{j,t}$. Industry-time (kt) fixed-effects capture unobservable developments in industry productivity over time that are not country bound. Inclusion of the latter fixed-effect is up to debate since one has to assume that breakthroughs in industry productivity are a result of international development efforts and occur at the same time in all countries rather than being more country-specific.

Like Baier et al. (2014) we will also distinguish between the different different types of EIAs. This results in the following final specification:

$$\ln(X_{ijkt}) = \beta_0 + \beta_1(CUCMECU_{ijt}) + \beta_2(FTA_{ijt}) + \beta_3(TWPTA_{ijt}) + \beta_4(OWPTA_{ijt}) + \omega_{ijk} + \psi_{it} + \phi_{jt} + \tau_{kt} + \epsilon_{ijkt} \quad (6)$$

Where $CUCMECU_{i,j,t}$ denotes being in either a customs union, common market or economic union. $FTA_{i,j,t}$ denotes a free trade agreement. $TWPTA_{i,j,t}$ denotes a preferential trade agreement and $OWPTA_{i,j,t}$ a non-reciprocal trade agreement.

In Baier et al. (2014) a shift towards first-difference estimations is made. If the number of periods exceeds two, the first-difference estimator may be more efficient if the error term follows a random walk. If it is deemed plausible that there is unobserved heterogeneity in trade flows it can be assumed that the error terms are serially correlated. This results in the following specification:

$$\Delta_5 \ln(X_{ijkt}) = \beta_0 + \beta_1(\Delta_5 CUCMECU_{ijt}) + \beta_2(\Delta_5 FTA_{i,j,t}) + \beta_3(\Delta_5 TWPTA_{ijt}) + \beta_4(\Delta_5 OWPTA_{ijt}) + \Omega_{ijk} + \psi_{5,it} + \phi_{5,jt} + \tau_{5,kt} + \upsilon_{5,ijkt} \quad (7)$$

Exporter-importer-industry fixed effects are denoted by Ω_{ijk}. The inclusion of time-invariant fixed-effects in the first-difference estimation is introduced by Wooldridge (2000) as a random growth first-difference (RGFD) model. Including these fixed-effects in the first-difference specification partially accounts for unobservable exporter-importer-industry specific gradual changes such as falling variable and fixed export costs unrelated to EIAs. The error term $\upsilon_{5,ijkt} = \epsilon_{ijkt} - \epsilon_{ij,t-1}$ is white noise.

Differential effects of EIAs on bilateral industry export flows can be estimated by introducing interaction terms to our specification. In the result section the exact interactions will be discussed more thoroughly. All specification will be based on a main specification that roughly looks as follows:

$$\ln(X_{ijkt}) = \beta_0 + \beta_1(EIA_{ijt}) + \beta_2(TERM_{ijkt}) + \beta_3(EIA_{ijt} \cdot TERM_{ijkt}) + \omega_{ijk} + \psi_{it} + \phi_{jt} + \tau_{kt} + \epsilon_{ijkt} \quad (8)$$

This specification allows us to estimate the effect of the EIA given its interaction with another variable. For example: with a dummy derived from the skilled- and unskilled labour industry distinction of Abizadeh et al. we are able to estimate the differential impact of EIAs on bilateral export for industries that are skilled- and unskilled labour intensive.

3.2 Part II - Effect of trade on specialisation

We proceed with examining the impact of EIAs and increased trade on specialisation by taking revealed comparative advantage as the dependent variable and estimate the effect of trade on (the magnitude of) revealed comparative advantage in a particular industry. Specifically the BBI measure of French (2017) will be used in our specifications. The BBI measure is better suited for this research than the traditional RCA measure by Balassa since it takes into account the bilateral dimension of our data. The basic specification that will be used to estimate the effect of increased export flows on specialisation looks as follows:

$$BBI_{ijkt} = \beta_0 + \beta_1(\ln(X_{ijkt})) + \omega_{ijk} + \psi_{it} + \phi_{jt} + \tau_{kt} + \epsilon_{ijkt} \tag{9}$$

or:

$$BBI_{ijkt} = \beta_0 + \beta_1(\ln(X_{ijt}^{TB})) + \omega_{ijk} + \psi_{it} + \phi_{jt} + \tau_{kt} + \epsilon_{ijkt} \tag{10}$$

Where the dependent variable BBI_{ijkt} denotes the revealed comparative advantage that country i has in exporting goods to country j from industry k at time t as compared to the other countries in the sample. In equation (9) X_{ijkt} denotes the bilateral export flow from i to j in good k at time t. In equation (10) X_{ijt}^{TB} denotes total bilateral export from country i to j at time t and is thus not industry specific. In both equations it will be highly relevant to determine the lagged effect of changes in export flow on BBI given that it can be assumed that specialisation takes time to occur.

To address possible concerns with endogeneity (e.g; causality running from specialisation to bilateral export) and to strengthen our claims regarding causality we will conduct a two-stage least squares approach besides the ordinary least squares. In these regressions an EIA will instrument for bilateral (industry) export. In order to identify unbiased 2SLS estimates the EIA has to meet the following assumptions. First, the effect of the EIA on bilateral (industry) export has to be meaningful and thus significantly different from zero. Obtaining significant coefficients following the specifications in section 3.1 would indicate that this assumption holds. The second assumption implies that the EIA is exogenous relative to unobservables affecting specialisation denoted by BBI_{ijkt}. The EIA should be unrelated to omitted variables that might generate selection bias. Including fixed-effects again presumably accounts for most of the unobservables that make the assignment of the EIA non-random. Besides this, the EIA should only affect specialisation through bilateral (industry) export which is deemed plausible.

3.3 Part III - Effect of trade on productivity

After determining the impact of the European economic integration agreements on bilateral trade flows and specialisation we will turn to productivity. In Redding (1999) it is hypothesised that increased trade induces countries to specialise. The proposed mechanism that causes this relationship is an increase in productivity in export intensive industries. The broad objective is to determine and isolate the effect of changes in export flows on industry productivity. An altered version of the methodology of Costinot et al. (2012) will be used for this. Costinot et al. (2012) estimates the effect of industry productivity on bilateral industry export and control for simultaneity bias (e.g. causality running from from bilateral trade flows to industry productivity) by instrumenting for industry productivity with R&D investment. In contrast to Costinot et al. (2012) we are explicitly interested in the causality that runs from bilateral industry export to industry productivity. Altering the specification of Costinot et al. (2012) to this specific need results in the following empirical strategy:

$$z_{ikt} = \delta_{ijk} + \theta \ln(X_{ijkt}) + \epsilon_{ijkt} \tag{11}$$

Where z_{ikt} is the inverse of average relative producer prices in an industry. δ_{ijk} denotes exporter-importer-industry fixed effects. Time-fixed effects are deemed redundant and are thus not considered in this identification strategy since the amount of observations over time for industry productivity is limited. With θ, which is the coefficient that we are mainly interested in, the impact of variation in the log of bilateral export on industry productivity is captured. ϵ_{ijkt} denotes the error term. It differs from the methodology of Costinot et al. (2012) in that industry productivity is the dependent variable in this specification instead of bilateral industry export. Besides that, it has become feasible to do panel-regressions instead of cross-sectional since more data on industry productivity has become available. Further, it should be noted that the most preferred (e.g. unbiased) estimations of Costinot et al. (2012) use corrected bilateral industry exports whereas it is not feasible to apply this correction in this research due to data limitations. The use of uncorrected bilateral industry export tend to lead to an overestimation of the effect of productivity on export in Costinot et al. (2012) which should be taken into account when interpreting the results.

By altering equation (11) slightly, the dimensions across which a country's industry productivity and industry export differ are equalised. Now using total industry export as the regressor, this results in the following equation.

$$z_{ikt} = \delta_{ik} + \theta \ln(X_{ikt}^{TI}) + \epsilon_{ikt} \tag{12}$$

To address concerns regarding simultaneity bias (causality running from productivity to bilateral export flows) it would be feasible to follow Costinot et al. (2012) once again and apply an instrumental variable approach. As described in section 3.2, the EIA that is used as an instrument should have a significant impact on (bilateral) industry export. In this specification the EIA has to be exogenous relative to unobservables affecting industry productivity, again presumably accounted for by including fixed-effects, and only affecting industry productivity trough (bilateral) industry export which is again deemed plausible.

4 Data

4.1 Bilateral export data by industry

This research revolves around bilateral export flows and how variation in these flows induces countries to specialise in their industrial activities. The main source of bilateral export data is the Structural Analysis (STAN) database from the OECD. Among a wide range of other relevant economic factors, the STAN database provides data on bilateral export flows at 2- or 3-digit ISIC Rev.4 industry level. This relatively detailed data allows to construct RCA measures that indicate the relative extent of specialisation for country i relative to country j in industry k and in year t. The data-set covers a time period ranging from 1990 till 2020.

4.1.1 Countries

The set of European countries that is included in the sample follows mainly from Egger and Larch (2011). In their research they focus on a number of European country groups. The EU15 group consists of the original 15 founding members of the European Union. The CEEC is a subset of 10 central- and eastern European countries. EFTA is a small group of three other Western-European countries and finally the COMECON group wich are a total of 20 former USSR or Yugoslavia countries. Due to limitations in data availability the subset of countries that is used in this research is slightly smaller as compared to the subset of Egger and Larch. The exact list of countries used and their groupings can be found in the Appendix.

4.1.2 Industries

Besides the selection of country and country groups there are choices to be made in the level of aggregation and the selection of exporting industries included in this research. For this Abizadeh et al. (2007) will be roughly followed. Reason for this is that their distinction between skilled- and unskilled-labour intensive industries will be used in our empirical tests in order to estimate potential differential effects. The skilled/unskilled labour intensive distinction is made by Abizadeh et al. (2007) by looking at the fraction of production workers in a particular industry in the US. If this fraction is above 0.75 the industry is marked as unskilled, if it is beneath this fraction the industry is marked as skilled. Abizadeh et al. (2007) retrieved this data from the Bureau of Labor Statistics. As compared to the list of industries that Abizadeh et al. (2007) uses, the amount of industries used in this research is limited by the availability of bilateral export data. The exact list of industries used in this research and their categorisation into skilled or unskilled can be found in the Appendix.

4.2 Data on Economic Integration Agreements

For the data on Economic Integration Agreements (EIAs) we turn to Baier et al. (2014). With their paper comes a highly detailed data-set on, among other things, bilateral trade relations and economic integration agreements between essentially all economies that participated in the world economy from 1950 up until 2012. They provide a categorical EIA variable which can take on values between 0 and 6. In the Appendix an overview is provided of the different forms of EIAs and their corresponding numerical value.

4.3 GGDC productivity level data 1997 & 2005

The Groningen Growth and Development Centre (GGDC) provides databases for relative prices and labor productivity for 42 countries and up to 35 industries. The data is constructed by collecting plant level raw price observations for, in most cases, hundreds of products per industry. Then, these prices are aggregated into a producer price index. There are benchmark databases available for two years: 1997 (Inklaar & Timmer, 2009) and 2005 (Inklaar & Timmer, 2014). In this research, the inverse of relative prices of industry output are used as a proxy for industry productivity which is a methodolgy derived from Costinot et al. (2012). The data-sets do not provide data on all countries and industries that are included in the previously described data-sets. In the Appendix an overview can be found of countries and industries that are included in both the GGDC and previous data-sets.

5 Results

5.1 Effect of EIAs on bilateral industry export

The first section of the results describes the direct impact of EIAs on bilateral trade flows in Europe. Later in this section a gradual move towards specialisation dynamics will be made by looking at differential effects of economic integration and prior specialisation on bilateral industry export in different types of economies and industries.

5.1.1 Direct effects

Table 1 displays the outcomes of the first set of regressions that examine the direct impact of the EIAs on bilateral industry export in Europe. The log of bilateral export is used as the dependent variable so that the impact can be interpreted as percentage change rather than absolute. In column (1) and (2) of Table 1 the results of the regressions run without fixed-effects can be observed. It can be noted that all coefficients are highly significant at the 1% level. Remarkably the coefficient on the non-reciprocal partial trade agreement ($OWPTA_{ijt}$) dummy in column (1) and it's 5 year lag in column (2) are negatively signed implying a trade reducing effect of this EIA on bilateral industry export. The preferential trade agreement ($TWPTA_{ijt}$) dummy is omitted after adding the 5 year lag due to collinearity.

After adding exporter-importer-industry (ijk), exporter-time (it), importer-time (jt) and industry-time (kt) fixed-effects the empirical strategy closely resembles that of Baier et al. (2014) which allows us to directly compare and verify these results. Like Baier et al. (2014) we find that deep economic integration ($CUCMECU_{ijt}$) has the most significant impact, both economically and statistically, in all fixed-effects regressions. Both deep economic integration itself and its 5 year lag are positively signed which confirms the expected positive impact of moving towards the deepest forms of economic integration on bilateral industry export flows between countries. Besides deep economic integration only the direct impact of a free trade agreement (FTA_{ijt}) displays a significant and positive coefficient in the fixed-effects regressions of column (4) and (5). Since the inclusion of the industry-time fixed-effect is debatable, as discussed in section 3.1, the regression of column (4) is repeated now excluding the industry-time fixed-effects which is displayed in column (5). It can be observed that the coefficients remain substantially the same.

The coefficients on deep economic integration and its 5 year lag in column (4) imply that, on average, a move towards deep economic integration increases the exports from country i to country j in industry k by 13.3 percentage points directly and 7.4 percentage points after 5 years. This effect is smaller than the 28.4% and 48.4% increases that Baier et al. (2014) found. This can be explained by either a differing sample in terms of countries and time-span or disaggregation of exports on industry level where Baier et al. (2014) use the log of total bilateral export flow as dependent variable. Table 8 in the Appendix displays the results of regressions using total bilateral export as the dependent variable. Compared to the coefficients in Table 1, the 5 year lag of deep economic integration loses its significance.

Both for statistical and logical reasons, deep economic integration proves to be the most relevant of the EIA dummies for this research. This is in line with prior expectations given that the research period is characterised by extensive economic integration in Europe with the creation of the European (monetary) Union. Besides that, the countries' position on their respective economic development path and relative proximity to each other imply that at least some weak form of economic integration was already in place in most cases. Therefore, in the continuation of this research we will mainly focus on (the lag of) deep economic integration as a driver of bilateral exports.

Table 1

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$CUCMECU_{ijt}$	1.44*** (.000)	.217*** (.000)	.298*** (.000)	.133*** (.000)	.132*** (.000)
$CUCMECU_{ij,t-5}$	-	1.006*** (.000)	-	.074*** (.000)	.078*** (.000)
FTA_{ijt}	.615*** (.000)	.585*** (.000)	.172 (.138)	.221*** (.000)	.228*** (.000)
$FTA_{ij,t-5}$	-	.770*** (.000)	-	.095 (.282)	.078 (.395)
$TWPTA_{ijt}$	1.451*** (.000)	omitted	.179 (.136)	omitted	omitted
$TWPTA_{ij,t-5}$	-	.701*** (.000)	-	-.070 (.454)	-.058 (.550)
$OWPTA_{ijt}$	-.462*** (.000)	.165*** (.000)	.-.023 (.443)	.-.004 (.917)	.001 (.989)
$OWPTA_{ij,t-5}$	-	-.534*** (.000)	-	.028 (.352)	.031 (.307)
FE: $i-j-k$	NO	NO	YES	YES	YES
FE: $i-t$	NO	NO	YES	YES	YES
FE: $j-t$	NO	NO	YES	YES	YES
FE: $k-t$	NO	NO	YES	YES	NO
Observations	385,168	276,264	384,719	275,738	275,738

Notes: OLS panel-regressions estimating the (lagged) impact of the different forms of EIAs on bilateral industry export from country i to country j in industry k at time t. Robust standard errors are in parenthesis. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

5.1.2 5-year first-differencing

In their research Baier et al. (2014) make the shift to and prefer identification strategies using a 5-year first-difference data-set. Although there are clear benefits that motivate the use of a 5-year first-difference data-set, it is less relevant for this research. Baier et al. (2014) make use of a lengthy data-set that covers economic integration agreements over a period of almost 40 years with a lot of variation in degree of economic integration between and within countries. This research covers a shorter and more fragmented time-period which makes differencing the data less relevant. Table 9 in the Appendix displays the results of similar fixed-effects regressions as in Table 1 on 5-year first-difference data. Only in column (1) some significant coefficients are observed, respectively for the free trade and preferential trade agreement dummies where the coefficient on the preferential trade agreement dummy is negative and thus not of the expected sign. In the continuation this research proceeds with the use of regular, non-difference, data.

5.1.3 Indications of specialisation I

There are different approaches by which one can start linking EIA induced growth in bilateral export with specialisation. Simply put, the theory of Redding (1999) prescribes that countries will export more from industries from which they already exported a relatively large amount of. Table 10 in the Appendix displays the results of fixed-effects panel-regressions that directly build upon this intuition. The log of bilateral export from country i to country j in industry k is again the dependent variable. By introducing an interaction and a dummy that denotes whether an industry was above the 50th or 75th percentile of exporting industries 5 years ago ($spec50_{ik,t-5}$, $spec75_{ik,t-5}$), to which will be referred to as *formerly specialised*, one can observe a differential effect of the EIA on industries from which the country already exported a relatively large amount of as compared to the industries for which this is not the case. The coefficients from column (3) of Table 10 can be interpreted as follows: the positive and significant coefficient on the lag of deep economic integration indicates that, as already confirmed, that deep economic integration on average increases bilateral export in a given industry, in this case by 18.5 percentage points. The positive and significant coefficient on the $spec75_{ik,t-5}$ dummy implies that if in an industry was above the 75th percentile of exporting industries 5 years ago, bilateral export in that particular industry is on average 19.1 percentage points higher now as compared to industries for which this was not the case. The significant and negative coefficient on the interaction term indicates that the combined lagged effect of deep economic integration and former specialisation is slightly mitigated which results in 34.1 percentage points higher current bilateral industry exports for formerly specialised industries after deep economic integration. When dropping the industry-time fixed-effects it can be noted that there is a stronger lagged impact of deep economic integration on bilateral industry export in formerly specialised industries. This is displayed by the positive and significant coefficient on the interaction term in column (4) and it implies 40.2 percentage points higher current bilateral industry exports following deep economic integration. The difference in coefficients between the regressions with and without industry-time fixed-effects may be caused by industry-time specific shocks or developments that are not accounted for when excluding the industry-time fixed effects. Another possibility is that in the regressions with industry-time fixed effect some variation in bilateral export is absorbed by the fixed-effect while it is actually caused by former specialisation and economic integration.

Table 2 builds upon Table 10, now adding an interaction with a dummy that indicates whether an industry is skilled-labour intensive or not ($skilled_k$) and running the regressions on different sub-samples based on GDP per capita or country group. By doing this it be can examined whether different country groups tend to specialise more in either skilled- or unskilled-labour intensive industries due to economic integration.

Column (1) displays the results for the fixed-effects panel-regression on the total sample. Explicitly the coefficients imply that deep economic integration 5 years ago induces an increase of 37.4 percentage points in bilateral industry export in skilled-labour intensive industries with a former specialisation. A 26.4 percentage point increase in bilateral industry exports from unskilled-labour intensive formerly specialised industries. A 25.8 percentage point increase in bilateral industry export for skilled-labour intensive industries without a former specialisation and a 14.8 percentage point increase in bilateral industry export for unskilled-labour intensive industries without a former specialisation.

In column (2) and (3) the regressions are repeated for sub-samples of *rich* countries (column (2), above the 75th percentile of GDP per capita), and *poor* countries (column (3), bellow the 75th percentile of GDP per capita). By following the same interpretation as with the coefficients from column (1) it can be noted that *rich* countries export more from skilled-labour intensive industries with a former specialisation after deep economic integration (27.6 percentage point increase) but the impact is less strong as compared to *poor* countries (35.7 percentage point increase). Bilateral industry exports from unskilled-labour intensive industries with a former specialisation see modest growth after deep economic integration in *rich* countries (6.3 percentage point increase) whereas in *poor* countries the impact of deep economic integration on such industries is stronger (29.1 percentage points increase). All industries with a former specialisation benefit from deep economic integration in both country groups although bilateral export growth from unskilled-labour intensive industries is modest in *rich* countries.

In column (4) and (5) the exercise is repeated, now distinguishing between EU15 countries and CEEC countries instead of *rich* and *poor*. It can be observed that EU15 countries see their bilateral industry exports from skilled-labour industries with a former specialisation grow with, on average, 17.8 percentage points after deep economic integration. For CEEC countries these industries experience a 26.7 percentage point increase in bilateral industry exports due to deep economic integration. For unskilled-labour intensive industries with a former specialisation the EU15 countries exhibit a 28.8 percentage point increase in bilateral industry export, for CEEC countries this impact is less strong with an increase of 22 percentage points.

A simplified hypothesis derived from the theory of Redding (1999) could, for example, state that *rich* or EU15 countries will see exports from skilled-labour intensive industries grow more due to specialisation and economic integration. Alternatively, *poor* or CEEC countries should then see exports from unskilled-labour intensive industries grow more due to specialisation and economic integration. The results that are displayed in Table 2 do not convincingly confirm such hypotheses.

In Table 11 in the Appendix the results are displayed of similar regressions without industry-time fixed-effects. Distinguishing again between *rich* and *poor* countries it can be observed these regressions imply that deep economic integration seems to have a slightly stronger positive impact on bilateral export from skilled-labour intensive industries with a former specialisation in *rich* countries (43.8 percentage points increase) as compared to *poor* countries (40.8 percentage points increase). When comparing the effect of deep economic integration on bilateral industry exports from unskilled-labour intensive industries with former specialisation for the same country groups we observe a 35.8 percentage points increase for *rich* countries and a 41.7 percentage point increase for *poor* countries. This would imply that skilled-labour intensive industries with prior specialisation benefit slightly more from deep economic integration in *rich* countries whereas in *poor* countries unskilled-labour intensive industries benefit more.

As a robustness check and alternative for the interaction terms, the impact of deep economic integration on bilateral industry export from industries with or without former specialisation is estimated using several sub-samples distinguished on the basis of GDP per capita of the country and skilled-labour intensiveness of the industry. The results of these regressions are displayed in Table 12 and 13 (without industry-time fixed-effects) in the Appendix. When looking at Table 12 it can be observed that in *rich* countries skilled-labour intensive industries with a prior specialisation benefit more from deep economic integration (33.1 percentage point increase) than unskilled-labour intensive industries (20.9 percentage point increase). In *poor* countries the skilled-labour intensive industries see their bilateral exports increase by, on average, 40.5 percentage points relative to an increase of 29.2 percentage for unskilled-labour intensive industries. Dropping industry-time fixed-effects provides similar coefficients in terms of sign, significance and relative magnitude. These results imply that in both country groups specialised skilled-labour intensive industries benefit more from deep economic integration than other industries. This finding roughly coincides with findings of Abizadeh et al. (2007), McCaig (2011) and Breinlich et al. (2018) that skilled-labour benefits more from trade.

Table 2

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$CUCMECU_{ij,t-5}$	.148***	.124***	.177***	.169***	.218***
	(.000)	(.080)	(.000)	(.000)	(.000)
$spec75_{ik,t-5}$	.204***	-.061*	.249***	.191***	.213***
	(.000)	(.061)	(.000)	(.000)	(.000)
$CUCMECU_{ij,t-5} \times spec75_{ik,t-5}$	-.088***	-.016	-.128***	-.072***	-.211***
	(.000)	(.604)	(.000)	(.000)	(.000)
$CUCMECU_{ij,t-5} \times skilled_k$	.110***	.076**	.109***	-.113***	.252***
	(.000)	(.060)	(.000)	(.000)	(.000)
$spec75_{ik,t-5} \times skilled_k$	.-.025	.238***	-.097*	-.086***	-.113***
	(.252)	(.000)	(.011)	(.000)	(.001)
$CUCMECU_{ij,t-5} \times spec75_{ik,t-5} \times skilled_k$	.004	-.101*	.047**	.089***	-.092*
	(.865)	(.083)	(.036)	(.000	(.052)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES
Sample	Total	GDP75=1	GDP75=0	EU15=1	CEEC=1
Observations	372,661	78,519	267,521	189,659	112,448

Notes: OLS fixed-effect panel-regressions estimating the lagged effect of deep economic integration ($CUCMECU_{ij,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$), given former specialisation ($spec75_{ik,t-5}$) and industry skilled-labour intensity ($skilled_k$). Sub-samples consist of countries that are; above the 75th percentile of GDP per capita (GDP75=1), bellow the 75th percentile of GDP per capita (GDP75=0), in EU15 country group (EU15=1) or the CEEC country group (CEEC=1). Robust standard errors are in parentheses. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

5.1.4 Indications of specialisation II

In this section a gradual move is made from examining the plain effect of EIAs on bilateral export towards indications of specialisation by looking at the differential impact of EIAs on different types of countries and industries. Now, as a final step towards subsection 6.2: *The Effect of Trade on Specialisation*, a slightly altered specification is used in the regressions of Table 2 by letting loose of the EIA variable in our regressions. Table 3 displays the results of a set of fixed-effects panel-regressions on several sub-samples. As compared to Table 2, the $CUCMECU$ dummy is dropped which implies that we are now only looking at the effect of previous specialisation, again denoted by $spec75_{ik,t-5}$, in skilled- and unskilled-labour intensive industries on current bilateral industry export. Dropping the $CUCMECU_{ijt}$ dummy implies that interpretation of the results becomes more straightforward as it substantially reduces the amount of interaction effects to take into account. By separately running the regressions on the same sub-samples as in Table 2 one is able to uncover whether export-specialisation dynamics differ across *rich* and *poor* or economically developed and developing countries.

Column (2) and (3) display that the impact of a former specialisation in skilled- and unskilled-labour intensive industries for *rich* countries is almost the exact opposite of the impact for *poor* countries. The coefficients in column (2) indicate that bilateral industry exports from skilled-labour intensive industries with a former specialisation are 23.5 percentage points higher in *rich* countries relative to 5.6 percentage points for unskilled-labour intensive industries. By looking at the coefficients in column (3) a different pattern can be observed for *poor* countries: unskilled-labour intensive industries in which a country has a prior specialisation export more (20.4 percentage points), the negative and significant at the 5% level coefficient on the interaction term implies that for skilled-labour intensive industries this effect is less strong (11.8 percentage points). The coefficients from column (4) and (5) also display an interesting pattern. Both EU15 countries (15.2 percentage point increase) as CEEC countries (15.8 percentage point increase) export more from unskilled-labour intensive industries with a former specialisation. For skilled-labour intensive industries it can be noted that in EU15 countries the positive impact of a former specialisation on current bilateral industry export does not significantly differ from that of unskilled-labour intensive industries and is thus positive. However, for CEEC countries this is not the case. The negative coefficient on the interaction term implies that in these countries a former specialisation in skilled-labour intensive industries only induces a .02 percentage point increase in current bilateral industry exports.

Table 14 in the Appendix displays the results of similar regressions excluding industry-time fixed-effects. The differences in coefficients for the different sub-samples is even more striking in these regressions. *Rich* countries see a surge in current bilateral industry export in skilled-labour intensive industries with a former specialisation (40.0 percentage points higher) whereas the impact of former specialisation for unskilled-labour intensive industries on current bilateral industry export in these countries is significantly smaller (13.2 percentage points higher). For *poor* countries a substantially differing pattern can be observed. In those countries unskilled-labour intensive industries with a former specialisation export more (25.1 percentage points) as compared to skilled-labour intensive industries with a former specialisation (17.4 percentage points). When comparing EU15 and CEEC countries a somewhat similar pattern can be observed. For EU15 countries a former specialisation implies a 16.7 percentage points more current export from unskilled-labour intensive industries and 33.2 percentage points more from skilled-labour intensive industries. For CEEC a former specialisation implies 31.0 percentage points more current exports for unskilled-labour intensive industries relative to 15.1 percentage points more exports from skilled-labour intensive industries.

Table 3

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$spec75_{ik,t-5}$	.176***	.056**	.204***	.152***	.158***
	(.000)	(.048)	(.000)	(.000)	(.000)
$spec75_{ik,t-5} \times skilled_k$	-.029	.179***	-.086***	-.037	-.156***
	(.136)	(.002)	(.006)	(.200)	(.000)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES
Sample	Total	GDP75=1	GDP75=0	EU15=1	CEEC=1
Observations	372,661	78,519	267,521	189,659	112,448

Notes: OLS fixed-effect panel regressions estimating the lagged impact of former specialisation ($spec75_{ik,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$) given industry skilled-labour intensity ($skilled_k$). Sub-samples consist of countries that are; above the 75th percentile of GDP per capita (GDP75=1), bellow the 75th percentile of GDP per capita (GDP75=0), in the EU15 country group (EU15=1) or the CEEC country group (CEEC=1). Robust standard errors are in parentheses. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

Dropping the EIA variables in the empirical specification implies that the bilateral dimension of industry export becomes less important here. Nonetheless, in Tables 3 and 14 the log of bilateral industry export is used as the dependent variable. Rerunning the regressions of Table 3 with a slightly altered methodology serves as a robustness check. Table 15 in the Appendix displays the results of similar regressions, now taking the log of total export of country i at time t for industry k as the dependent variable. As a consequence of dropping the importer dimension from our regressions we are left with three instead of four fixed effects: exporter-industry, exporter-time and industry-time. To account for the fact that our data is still structured with a bilateral dimension standard errors are clustered at exporter-industry level. By applying this methodology we generally lose some significance in our results. However, the patterns regarding the magnitudes of the coefficients remain substantially the same. This also applies to the regressions without industry-time fixed effects which can be observed in Table 16 in the Appendix.

Again, as a robustness check and alternative for the interaction terms, the impact of former specialisation on bilateral industry export is estimated using several sub-samples that are distinguished on the basis of GDP per capita of the country and skilled-labour intensiveness of the industry. Tables 17 and 18 display the results of these regressions.

In both tables it can be observed that a former specialisation has a stronger positive impact on exports from skilled-labour intensive industry in *rich* countries whereas in *poor* countries the effect is the opposite with a stronger impact on unskilled-labour intensive industries. In Table 19 total industry export is the dependent variable which again results in losing some significance. However, generally the same pattern of *rich* countries exporting more from specialised skilled-labour intensive industries and *poor* countries exporting more from specialised unskilled-labour intensive industries can be observed.

5.1.5 Partial conclusions & limitations

From the findings section 5.1 we can draw some important conclusions. First of all, particularly deep economic integration does seems to have a significant and positive (lagged) effect on bilateral (industry) export in several specifications. Further, the beneficiary effects of deep economic integration or a prior specialisation do not seem to be distributed evenly across industries and countries. Especially the estimations excluding economic integration provide some evidence that *rich* countries tend to export more from skilled-labour intensive industries that already belonged to the top exporting industries whereas in *poor* countries this impact seems to be stronger for unskilled-labour intensive industries. This finding is indicative for a Ricardian dynamic of specialisation according to comparative advantage. Presumed that exporting from and specialising in unskilled-labour intensive industries provide less long-term welfare, the observed trade dynamics could reduce (relative) welfare in the long-run which is in line with the theoretical predictions of Redding (1999). It should be noted that there are several limitations that imply that one should be cautious when interpreting the results. The amount of non-fixed controls is limited and, for example, applying an instrumental variable approach would provide more convincing causal inferences.

5.2 The effect of trade on specialisation

In this part of the result section the effect of EIAs and subsequently increased export flows on the extent to which a country specialises will be examined by applying the methodology of section 3.2.

5.2.1 The effect of trade on the BBI

The main focus of this section will be examining how trade affects specialisation as denoted by BBI. When interpreting the results it is important to adhere to the correct interpretation of BBI as a measure of specialisation. As French (2017) prescribes, BBI should be interpreted as the extent to which country i is able to export goods from industry k to country j as compared to the other countries in the sample. The log of BBI is taken as the dependent variable to counteract outliers and simplify the interpretation of the coefficients. Table 4 displays the results of the first sets of regressions. Fixed-effects alongside the same dimensions as in section 5.1 are added which allows us to isolate the impact of our variables from exporter, importer, industry and time specific factors that could bias the estimates. In the first columns of Table 4 the log of export and its 5 year lag are regressed on the log of BBI using OLS. It can be observed that an increase in exports from country i to country j in industry k significantly increases the bilateral extent of specialisation. The 5 year lagged effect also displays significance albeit with a substantially weaker magnitude.

Endogeneity problems could arise from reversed causality running from specialisation towards bilateral exports. Therefore, we turn to 2SLS regressions of which the results are displayed in column (3) till (6). The 5 year lag of deep economic integration is used as an instrument for the log of bilateral industry export and the 5 year lag of the log of bilateral industry export. The use of deep economic integration is motivated by the fact that it provided the most consistent and significant outcomes in the previous section examining the impact of EIAs on bilateral industry export. A 5 year lag is taken because it presumably takes time for an economy to shift production. The 2SLS regressions all exhibit a strong first stage as the 5 year lag of deep economic integration has a strong, positive and significant impact on (lagged) bilateral industry export which is displayed in Table 20 in the Appendix. All coefficients in the 2SLS regressions display significance at the 1% level. Remarkably, the coefficient on current bilateral industry export drops in magnitude as compared to its OLS counterpart where the coefficient on it's 5-year lagged value substantially increases in magnitude. This indicates that the OLS regressions do suffer from biases deterring the coefficients magnitudes. Explicitly the coefficient in column (4) implies that a 1 percentage point increase in bilateral industry export 5 years ago from and to a given country increases, on average, a countries relative ability to export from a given industry to that same partner country by .371 percentage points.

Columns (5) & (6) display the differential effects for skilled- and unskilled-labour intensive industries. A higher coefficient for the sample of skilled-labour intensive industries implies a stronger effect of exports on specialisation. This coincides with findings of Abizadeh et al. (2007) and McCaig (2011) that skilled-labour benefits more from trade. However, when we test the robustness of this result by applying an extra lag on the instrument it can be observed that now unskilled-labour intensive industries seem to specialise more due to trade surges. This robustness check is displayed in Table 21 in the Appendix.

Subsequently, total bilateral export is used as the regressor. Table 23 in the Appendix displays the results of these regressions. The coefficients are roughly similar in sign, magnitude and significance as compared to those displayed in Table 4 which adds robustness

Table 4

Dependent variable	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(X_{ijkt})$	.914*** (.000)	-	.486*** (.000)	-	-	-
$\ln(X_{ijk,t-5})$	-	.068*** (.000)	-	.274*** (.000)	.371*** (.000)	.193** (.000)
FE: $i-j-k$	YES	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES	YES
Test	OLS	OLS	2SLS	2SLS	2SLS	2SLS
Sample	Total	Total	Total	Total	Skilled	Unskilled
Observations	384,719	372,661	372,661	372,661	131,382	241,275

Notes: OLS and 2SLS fixed-effects panel regressions displaying the impact of bilateral industry export ($\ln(X_{ijkt(-5)})$) on bilateral specialisation ($\ln(BBI_{ijkt})$). In the 2SLS regressions bilateral industry export is instrumented by a lag of deep economic integration ($CUCMECU_{ij,t-5}$). Robust standard errors are in parenthesis. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

to the finding that increased bilateral export induces an increase in bilateral specialisation. Table 25 in the Appendix display the result of the robustness check where again an extra lag in the instrument is applied. It can be observed that from these regressions it again remains unclear whether skilled- or unskilled-labour intensive industries benefit more from export surges.

5.2.2 The effect of trade on the BBI distribution

As previously discussed our BBI measure should be interpreted as the extend to which a country is able to export goods from an industry to another country relative to all other countries in the sample. The construction of the BBI measure implies that, ceteris paribus, if a country's degree of specialisation in an industry increases the degree of specialisation in other industries decreases. This potentially biases previous estimates since increased bilateral exports may induce a country to shift resources from certain industries towards other industries and thus at the same time increase and decrease degree of specialisation in different industries. The negative correlation between export and specialisation in some industries seems to imply that there is no (or lesser) impact of export on specialisation. This while both strong negative and positive correlations may indicate specialisation within a country. Table 5 displays 2SLS regressions results with an altered dependent variable which is the squared value of the difference between the log of BBI and its country-year specific mean. By applying this altered methodology we treat all movements away from a country's mean BBI as within-country specialisation.

The negative and significant coefficient in column (1) implies that in general (for the total sample) it seems that an increase in total bilateral export 5 years ago leads to less within-country specialisation (e.g. diversification). No significant coefficient is found in the sub-sample consisting of countries that are above the 75th percentile in terms of GDP per capita. For countries with GDPs per capita that are bellow this we do see a significant, and negative, lagged impact of bilateral export on specialisation. Interestingly, when distinguishing between EU15 and CEEC countries it can be observed that the EU15 countries display a positive and significant coefficient, implying that these countries tent to specialise more due to increased bilateral export. For the CEEC countries no significant coefficient is found. Table 27 in the Appendix displays the results of the robustness check with an extended lag applied to the instrument. Now, in the sample of *rich* countries we observe a strong, positive and significant coefficient whereas the coefficient for *poor* countries remains negative and significant but strongly increases in magnitude. No significant coefficients are found for the EU15 and CEEC country groups. All in all, these results can be cautiously connected to the findings of Cadot et al. (2011) concerning *rich* countries closing export lines (specialising) and *poor* countries opening new export lines (diversifying).

Table 5

Dependent variable	$\ln(BBI^A_{ijkt})$	$\ln(BBI^A_{ijkt})$	$\ln(BBI^A_{ijkt})$	$\ln(BBI^A_{ijkt})$	$\ln(BBI^A_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$\ln(X^{TB}_{ij,t-5})$	-.720*** (.001)	15.212 (.525)	-.843*** (.000)	1.302** (.046)	-.346 (.557)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES
Test	2SLS	2SLS	2SLS	2SLS	2SLS
Sample	Total	GDP75=1	GDP75=0	EU15=1	CEEC=1
Observations	372,661	78,519	267,521	189,659	112,448

Notes: 2SLS fixed-effects panel regressions displaying the lagged impact of total bilateral export ($\ln(X^{TB}_{ij,t-5})$) on the degree of specialisation ($\ln(BBI^A_{ijkt})$) within a country. The lag of total bilateral export is instrumented by a lag of deep economic integration ($CUCMECU_{ij,t-5}$). Robust standard errors are in parenthesis. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

5.2.3 Partial conclusions & limitations

In section 5.2 it is found that an increase in bilateral (industry) export increases the ability of a country to export goods from a certain industry to their export partner relative to other countries. It remains ambiguous whether skilled- or unskilled-labour intensive industries benefit more in terms of bilateral specialisation. In addition, and perhaps more interestingly, in the second part of this section within-country specialisation is examined using an altered specification. The results of these regressions indicate that in *poor* countries surges in bilateral export induce diversification rather than specialisation. Depending on the methodology, either EU15 or *rich* countries do exhibit significant increases in the degree of specialisation in their exports as a result increased bilateral export flows.

5.3 Effect of trade on productivity

In this part of the result section the effect of bilateral export on industry productivity will be examined by applying the methodology of section 3.3.

5.3.1 Learning-by-exporting

In this last part of the results section focuses on the mechanism proposed by Redding (1999) that is potentially behind the trade induced urge to specialise: the learning-by-doing channel. Exporting from a certain industry presumably increases productivity in that particular industry which in turn may increases exports again. This mechanism implies endogeneity in specialisation and trade dynamics. Table 6 displays OLS and 2SLS regressions that describe the statistical relationship between the log of GGDC and the log of exports or its 5 year lag. The OLS regressions of column (1) and (2) show a positive and significant relationship between bilateral industry export and industry productivity.

As mentioned earlier, the OLS specification comes with concerns regarding endogeneity arising from simultaneity bias. By applying a 2SLS approach, with the 5 year lag of deep economic integration instrumenting for bilateral industry export (1st stage can be found in Table 28 in the Appendix), we can address these concerns. The coefficients displayed in column (3) and (4) are positively signed and significant at the 1% level. The magnitude of the coefficients is significantly stronger as compared to their OLS counterparts which implies that simultaneity bias dampens the effect. The effect should be interpreted as a local average treatment effect for countries and industries for which the bilateral export is positively impacted by deep economic integration. The coefficient on the 5 year lag of log export in column (4) can be interpreted as follows: a 1 percentage point increase in bilateral industry export from country i to country j in industry k at $t-5$ induces a 2.466 percentage point increase in GGDC productivity in country i's industry k at t.

In Table 7 the results are displayed of regressions similar to that of column (4) of Table 6, now using specific sub-samples. The effect of bilateral industry export on industry productivity is estimated separately for skilled- and unskilled-labour intensive industries in high GDP per capita countries and low GDP per capita countries. Only for the latter sub-sample significant coefficients are found. These coefficients imply that bilateral industry

Table 6

Dependent variable	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$
	(1)	(2)	(3)	(4)
$\ln(X_{ijkt})$	.352*** (.000)	-	1.568*** (.000)	-
$\ln(X_{ijk,t-5})$	-	.185*** (.000)	-	2.466*** (.000)
FE: $i-j-k$	YES	YES	YES	YES
Test	OLS	OLS	2SLS	2SLS
Observations	25,068	15,330	15,330	15,330

Notes: OLS and 2SLS fixed-effects panel-regressions estimating the (lagged) impact of bilateral industry export ($\ln(X_{ijkt(-5)})$) on industry productivity ($\ln(GGDC_{ikt})$). In the 2SLS regressions bilateral industry export is instrumented by the 5 year lag of deep economic integration ($CUCMECU_{ij,t-5}$). Robust standard errors are in parenthesis. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

export generally improves industry productivity in low GDP per capita countries and that the effect is substantially stronger for unskilled-labour intensive industries.

Table 7

Dependent variable	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$
	(1)	(2)	(3)	(4)
$\ln(X_{ijk,t-5})$	.757 (.199)	1.629 (.286)	1.381*** (.000)	2.948*** (.000)
FE: $i-j-k$	YES	YES	YES	YES
Sample	$GDP75 = 1$		$GDP75 = 0$	
	Skilled	Unskilled	Skilled	Unskilled
Observations	458	808	4,234	7,812

Notes: 2SLS fixed-effects panel-regressions estimating the lagged impact of bilateral industry export ($\ln(X_{ijk,t-5})$) on industry productivity ($\ln(GGDC_{ikt})$). Bilateral industry export is instrumented by the lag of deep economic integration ($CUCMECU_{ij,t-5}$). Sub-samples consist of; countries that are above the 75th percentile of GDP per capita ($GDP75 = 1$), countries that are bellow the 75th percentile of GDP per capita ($GDP75 = 0$), skilled- or unskilled-labour intensive industries. Robust standard errors are in parenthesis. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Up until now the impact of bilateral industry export on country-specific industry productivity is examined. Although a change in bilateral industry export may well be able to shift industry productivity it is also interesting to equalise the dimensions across which dependent and explanatory variables vary by dropping the bilateral dimension in the regressor. Table 29 in the Appendix displays the results of similar 2SLS regressions now using the log of total industry export of country i at time $t-5$ as the main regressor, instrumented by the average number of deep economic integration agreements country i had at time $t-5$ ($\overline{CUCMECU}_{i,t-5}$). Fixed-effects are alongside the exporter-industry dimension and due to the characteristics of the data standard errors need to be clustered at exporter-industry level. All coefficients show up to be significant at the 1% level, now also the coefficients following from the regressions on the sub-sample of high GDP per capita countries. It is remarkable that, also in this sub-sample, the learning-by-doing channel seems to be much stronger for unskilled-labour intensive industries which is indicated by a coefficient that is more than five times stronger in magnitude as compared to the coefficient found at the skilled-labour intensive industries.

5.3.2 Partial conclusions & limitations

Attempts have been made in subsection 5.3 to empirically expose the learning-by-doing channel by which exporting improves industry productivity. The almost exclusively positive and significant coefficients obtained in the regressions strongly suggest the existence of this channel. The magnitudes of the coefficients following from the 2SLS regressions, which is in most cases well above 1, is remarkable and asks for further exploration. Although coefficients between researches with differing identification strategies cannot be directly compared, it can be noted that Khandelwal (2010) finds a strong impact of openness to international trade on (firm) productivity. Comparing our results to Costinot and Donaldson (2012) provides some perspective. Their 2SLS estimates imply that a 1% change in productivity is associated with a 11.10% change in uncorrected bilateral industry export whereas their OLS estimates are substantially weaker in magnitude with a 1% change in productivity being associated with a 1.36% change in uncorrected bilateral industry export. This implies that there is substantial simultaneity bias which in turn indicates the existence of the (strong) statistical relation between the bilateral industry export and productivity that is found in this research.

There seem to be some differential effects present for skilled- and unskilled-labour intensive industries in *rich* and *poor* countries. In all cases it seems that unskilled-labour intensive industries benefit more from increased export flows in terms of industry productivity. This could possibly be due to skilled-labour intensive industries already being more export-orientated which would make the marginal returns in terms of export induced productivity gains bigger for unskilled-labour intensive industries. Whether this impact is stronger in *rich* or in *poor* countries remains ambiguous.

The findings in this subsection are subject to some limitations. It is not possible to do the robustness check of applying an extra lag to the instrument in the 2SLS regressions due to insufficient observations. The fact that there are only two time periods to observe industry productivity limits validity of the results in general.

6 Conclusion

This research gradually moved from examining the impact of economic integration on bilateral industry trade to trade-induced specialisation dynamics and finally trade-induced changes in industry productivity. In the first part of this research it is found that the conclusion of an economic integration agreement has a positive and significant impact on bilateral industry export in our sample of European economies and over the course of the research period spanning from 1990 till 2012. Especially the formation of either a customs union, common market or an economic union increases bilateral industry exports, both directly and 5 years after application. Further, several differential effects are found for skilled- and unskilled-labour intensive industries, high- and low GDP per capita countries and industries classified as with or without a former specialisation. Former industry specialisation does not necessarily lead to more current industry export and specialisation. However, by estimating differential effects it is found that for particular sub-samples of countries and industries this mechanism does seem to occur.

Some evidence is found that *rich* countries tend to export more from skilled-labour intensive industries with a prior specialisation and *poor* countries from unskilled-labour intensive industries with a prior specialisation. This indicates that countries indeed specialise their selves according to already existing comparative advantages. Unskilled-labour intensive industries presumably are less welfare enhancing in the long-term. Identification of these specialisation patterns therefore points in the direction of the, in some cases, (long-term) welfare reducing implications of trade as proposed by Redding (1999).

In the second part specialisation is examined directly. Bilateral specialisation seems to be positively affected by increased bilateral export flows. It remains ambiguous whether these benefit are reaped more by skilled- or unskilled-labour intensive industries. Besides this, it is found that increased bilateral export induces *poor* countries to diversify their export lines whereas *rich* or EU15 countries, depending on the methodology, seem to specialise as a result of intensified trade relations.

The last part of this research aimed to expose the learning-by-doing channel which proposes industry productivity growth to be a consequence of increased industry export. Positive and significant relations between export and industry productivity are found. Whether the benefits in industry productivity as a result of exporting systematically induce specific countries to specialise in certain directions remains ambiguous.

Although it would be relevant to empirically evaluate the long-term welfare implications of trade-specialisation dynamics, it has not been feasible to include this due to the scope of this research. Nonetheless, it would be a valuable future addition to this research to examine causal inferences between trade-specialisation dynamics and prosperity.

7 Appendix

7.1 Data

7.1.1 Countries

EU15: Austria, Belgium, Denmark, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, Netherlands, Portugal, Spain, Sweden, United Kingdom. **10 CEEC:** Bulgaria, Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Romania, Slovak Republic, Slovenia. **Other Western European countries (EFTA):** Iceland, Norway, Switzerland. **COMECON:** Albania, Belarus, Moldova, Ukraine, Bosnia & Herzegovina, Croatia, North-Macedonia, Serbia, Montenegro.

7.1.2 Industries

Industry	Skilled/Unskilled
Food products	unskilled
Beverages	unskilled
Tobaco products	skilled
Textiles	unskilled
Wearing apparel	unskilled
Leather and related products	unskilled
Wood and products of wood and cork, except furniture	unskilled
Paper and paper products	unskilled
Publishing	skilled
Printing and reproduction of recorded media	skilled
Coke and refined petroleum products	skilled
Chemicals and chemical products	skilled
Rubber and plastics products	unskilled
Other nonmetallic mineral products	unskilled
Basic metals	unskilled
Fabricated metal products, except machinery and equipment	unskilled
Machinery and equipment	skilled
Electrical equipment	skilled
Motor vehicles, trailers and semitrailers	unskilled
Other transport equipment	skilled
Furniture: manufacturing	unskilled

7.1.3 Economic Integration Agreements

Economic Integration Agreement	Dummy reference	Numerical value
No Agreement	-	0
Non-reciprocal partial trade agreement	$OWPTA$	1
Preferential trade agreement	$TWPTA$	2
Free trade agreement	FTA	3
Customs union	$CUCMECU$	4
Common market	$CUCMECU$	5
Economic Union	$CUCMECU$	6

7.1.4 GGDC countries & industries

Countries: Austria, Belgium, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, the Netherlands, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, United Kingdom.

Industries: Basic metals - beverages - Chemicals and chemical products - Coke, refined petroleum products and nuclear fuel - Electrical and optical equipment - Fabricated metal products except machinery - Food products - Furniture - Leather - Machinery - Motor vehicles - trailers and semi-trailers - Other non-metallic mineral products - other transport equipment - Paper and paper products - Printing and Reproduction of recorded media - Publishing - Rubber and plastics products - textile products - Tobacco products - Wearing apparel - Wood and products of wood and cork except furniture.

7.2 Results

7.2.1 Effect of European EIAs on bilateral export

Table 8

Dependent variable	$\ln(X_{ijt}^{TB})$	$\ln(X_{ijt}^{TB})$
	(1)	(2)
$CUCMECU_{ijt}$	.264*** (.000)	.131*** (.001)
$CUCMECU_{ij,t-5}$	-	.022 (.398)
FTA_{ijt}	-.148 (.260)	.230*** (.003)
$FTA_{ij,t-5}$	-	-.096 (.183)
$TWPTA_{ijt}$	.527*** (.000)	omitted
$TWPTA_{ij,t-5}$	-	.211** (.018)
$OWPTA_{ijt}$	-.116 (.130)	-.072 (.359)
$OWPTA_{ij,t-5}$	-	0.035 (.500)
FE: $i-j$	YES	YES
FE: $i-t$	YES	YES
FE: $j-t$	YES	YES
Observations	385,168	276,259

Notes: OLS panel-regressions examining the (lagged) impact of EIAs on total bilateral export ($\ln(X_{ijt}^{TB})$) from country i to country j. Standard errors are in parenthesis and clustered at exporter-importer level. ***=p <0.01, **=p <0.05, *=p <0.1.

Table 9

Dependent variable	$\Delta_5 \ln(X_{ijkt})$	$\Delta_5 \ln(X_{ijkt})$	$\Delta_5 \ln(X_{ijkt})$
	(1)	(2)	(3)
$\Delta_5 CUCMECU_{ijt}$	-.023 (.287)	.004 (.882)	.007 (.797)
$\Delta_5 CUCMECU_{ij,t-5}$	-	-.015 (.461)	-.014 (.473)
$\Delta_5 FTA_{ijt}$	.647*** (.003)	.024 (.774)	.021 (.802)
$\Delta_5 FTA_{ij,t-5}$	-	-.115 (.270)	-.129 (.226)
$\Delta_5 TWPTA_{ijt}$	-.661*** (.003)	omitted	omitted
$\Delta_5 TWPTA_{ij,t-5}$	-	-.005 (.966)	.015 (.898)
$\Delta_5 OWPTA_{ijt}$	.067 (.252)	-.015 (.861)	-.018 (.832)
$\Delta_5 OWPTA_{ij,t-5}$	-	.080 (.105)	.077 (.120)
FE: $i-j-k$	YES	YES	NO
FE: $i-t$	YES	YES	NO
FE: $j-t$	YES	YES	NO
FE: $k-t$	YES	YES	NO
Observations	263,233	169,720	169,720

Notes: 5-year first-differenced OLS fixed-effects panel regressions displaying the 5-year first-difference impact of EIAs on bilateral industry export. Standard errors in parenthesis are clustered at exporter-importer-industry level. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

Table 10

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)
$CUCMECU_{ij,t-5}$	.168***	.221***	.185***	.154***
	(.000)	(.000)	(.000)	(.000)
$spec50_{ik,t-5}$	-	.243***	-	-
		(.000)		
$spec75_{ik,t-5}$	-	-	.191***	.201***
			(.000)	(.000)
$CUCMECU_{ij,t-5} \times spec50_{ik,t-5}$	-	-.108***	-	-
		(.000)		
$CUCMECU_{ij,t-5} \times spec75_{ik,t-5}$	-	-	-.078***	.047***
			(.000)	(.000)
FE: $i-j-k$	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	NO
Observations	372,661	372,661	372,661	372,661

Notes: OLS fixed-effects panel-regressions estimating the lagged impact of deep economic integration ($CUCMECU_{ij,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$) given former specialisation ($spec50_{ik,t-5}$, $spec75_{ik,t-5}$). Robust standard errors are in parenthesis. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

Table 11

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$CUCMECU_{ij,t-5}$	.175***	.185***	.193***	.208***	.196***
	(.000)	(.000)	(.000)	(.000)	(.000)
$spec75_{ik,t-5}$	.224***	.104***	.267***	.162***	.333***
	(.000)	(.000)	(.000)	(.000)	(.000)
$CUCMECU_{ij,t-5} \times spec75_{ik,t-5}$	.-.008	.069**	-.043***	.015	-.093***
	(.486)	(.016)	(.001)	(.239)	(.000)
$CUCMECU_{ij,t-5} \times skilled_k$	-.064***	-.274***	-.011	-.310***	.188***
	(.000)	(.000)	(.476)	(.000)	(.000)
$spec75_{ik,t-5} \times skilled_k$	.-.061***	.126***	-.129***	.053	-.180***
	(.005)	(.000)	(.000)	(.112)	(.00)
$CUCMECU_{ij,t-5} \times spec75_{ik,t-5} \times skilled_k$	.138***	.228***	.120***	.218***	.031
	(.000)	(.000)	(.000)	(.000)	(.373)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	NO	NO	NO	NO	NO
Sample	Total	GDP75=1	GDP75=0	EU15=1	CEEC=1
Observations	372,661	78,519	267,521	189,659	112,448

Notes: OLS fixed-effect panel-regressions estimating the lagged effect of deep economic integration ($CUCMECU_{ij,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$), given former specialisation ($spec75_{ik,t-5}$) and industry skilled-labour intensity ($skilled_k$). Sub-samples consist of countries that are; above the 75th percentile of GDP per capita (GDP75=1), bellow the 75th percentile of GDP per capita (GDP75=0), in the EU15 country group (EU15=1) or in the CEEC country group (CEEC=1). Robust standard-errors are in parentheses. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

Table 12

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$CUCMECU_{ij,t-5}$	.185***	.166***	.146***	.314***	.166***
	(.000)	(.004)	(.000)	(.000)	(.000)
$spec75_{ik,t-5}$	.191***	.283***	.063*	.171***	.256***
	(.000)	(.000)	(.054)	(.000)	(.000)
$CUCMECU_{ij,t-5} \times spec75_{ik,t-5}$	-.078***	-.118**	-.024	-.080***	-.130***
	(.000)	(.017)	(.428)	(.001)	(.000)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES
Sample	Total	GDP75=1		GDP75=0	
		Skilled	Unskilled	Skilled	Unskilled
Observations	372,661	28,271	50,241	94,474	173,044

Notes: OLS fixed-effect panel-regressions estimating the lagged effect of deep economic integration ($CUCMECU_{ij,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$), given former specialisation ($spec75_{ik,t-5}$). Sub-samples are distinguished on the basis of being above (GDP75=1) or bellow (GDP75=0) the 75th percentile of GDP per capita and skilled-labour intensiveness of the industry. Robust standard-errors are in parentheses. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Table 13

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$CUCMECU_{ij,t-5}$	.154***	.016	.125***	.270***	.144***
	(.000)	(.788)	(.000)	(.000)	(.000)
$spec75_{ik,t-5}$	.201***	.186***	.079*	.170***	.277***
	(.000)	(.001)	(.054)	(.000)	(.000)
$CUCMECU_{ij,t-5} \times spec75_{ik,t-5}$	.047***	.307***	.068**	.088***	-.040***
	(.000)	(.000)	(.017)	(.000)	(.001)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	NO	NO	NO	NO	NO
Sample	Total	GDP75=1		GDP75=0	
		Skilled	Unskilled	Skilled	Unskilled
Observations	372,661	28,271	50,241	94,474	173,044

Notes: OLS fixed-effect panel-regressions estimating the lagged effect of deep economic integration ($CUCMECU_{ij,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$), given former specialisation ($spec75_{ik,t-5}$). Sub-samples are distinguished on the basis of being above (GDP75=1) or bellow (GDP75=0) the 75th percentile of GDP per capita and skilled-labour intensiveness of the industry. Robust standard-errors are in parentheses. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Table 14

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$spec75_{ik,t-5}$	.221***	.132***	.251***	.167***	.310***
	(.000)	(.000)	(.000)	(.000)	(.000)
$spec75_{ik,t-5} \times skilled_k$	-.006	.268***	-.077*	.165***	-.159***
	(.750)	(.000)	(.091)	(.000)	(.000)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	NO	NO	NO	NO	NO
Sample	Total	GDP75=1	GDP75=0	EU15=1	CEEC=1
Observations	372,661	78,519	267,521	189,659	112,448

Notes: OLS fixed-effect panel regressions estimating the lagged impact of former specialisation ($spec75_{ik,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$) given industry skilled-labour intensity ($skilled_k$). Sub-samples consist of countries that are; above the 75th percentile of GDP per capita (GDP75=1), bellow the 75th percentile of GDP per capita (GDP75=0), in the EU15 country group (EU15=1) or in the CEEC country group (CEEC=1). Robust standard errors are in parentheses. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

Table 15

Dependent variable	$\ln(X^{TI}_{ikt})$	$\ln(X^{TI}_{ikt})$	$\ln(X^{TI}_{ikt})$	$\ln(X^{TI}_{ikt})$	$\ln(X^{TI}_{ikt})$
	(1)	(2)	(3)	(4)	(5)
$spec75_{ik,t-5}$	.203***	.085	.185***	.207***	.093**
	(.000)	(.280)	(.000)	(.001)	(.013)
$spec75_{ik,t-5} \times skilled_k$	-.003	.171	-.030	-.011	-.000
	(.963)	(.257)	(.559)	(.917)	(.994)
FE: $i-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES
Sample	Total	$GDP75 = 1$	$GDP75 = 0$	$EU15 = 1$	$CEEC = 1$
Observations	373,080	78,711	267,740	189,724	112,535

Notes: OLS fixed-effect panel regressions estimating the lagged impact of former specialisation ($spec75_{ik,t-5}$) on total industry export ($\ln(X^{TI}_{ikt})$) given industry skilled-labour intensity ($skilled_k$). Sub-samples consist of countries that are; above the 75th percentile of GDP per capita (GDP75=1), bellow the 75th percentile of GDP per capita (GDP75=0), in the EU15 country group (EU15=1) or in the CEEC country group (CEEC=1). Standard errors are in parentheses and clustered at exporter-industry level. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$.

Table 16

Dependent variable	$\ln(X_{ikt}^{TI})$	$\ln(X_{ikt}^{TI})$	$\ln(X_{ikt}^{TI})$	$\ln(X_{ikt}^{TI})$	$\ln(X_{ikt}^{TI})$
	(1)	(2)	(3)	(4)	(5)
$spec75_{ik,t-5}$	.265***	.224**	.275***	.226***	.299***
	(.000)	(.040)	(.000)	(.001)	(.000)
$spec75_{ik,t-5} \times skilled_k$	.004	.116	-.049	.146	-.083
	(.949)	(.590)	(.431)	(.278)	(.313)
FE: $i-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $k-t$	NO	NO	NO	NO	NO
Sample	Total	$GDP75=1$	$GDP75=0$	$EU15=1$	$CEEC=1$
Observations	373,080	78,711	267,740	189,724	112,535

Notes: OLS fixed-effect panel regressions estimating the lagged impact of former specialisation ($spec75_{ik,t-5}$) on total industry export ($\ln(X_{ikt}^{TI})$) given industry skilled-labour intensity ($skilled_k$). Sub-samples consist of countries that are; above the 75th percentile of GDP per capita (GDP75=1), bellow the 75th percentile of GDP per capita (GDP75=0), in the EU15 country group (EU15=1) or in the CEEC country group (CEEC=1). Standard errors are in parentheses and clustered at exporter-industry level. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Table 17

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$spec75_{ik,t-5}$	.164***	.216***	.054*	.138***	.211***
	(.000)	(.000)	(.057)	(.000)	(.000)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES
Sample	Total	GDP75=1		GDP75=0	
		Skilled	Unskilled	Skilled	Unskilled
Observations	372,661	28,271	50,241	94,474	173,044

Notes: OLS fixed-effect panel-regressions estimating the effect of former specialisation ($spec75_{ik,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$). Sub-samples are distinguished on the basis of countries that are above the 75th percentile of GDP per capita (GDP75=1) or bellow the 75th percentile of GDP per capita (GDP75=0) and skilled-labour intensiveness of the industry. Robust standard-errors are in parentheses. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Table 18

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$	$\ln(X_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$spec75_{ik,t-5}$	.218*** (.000)	.372*** (.000)	.106*** (.000)	.209*** (.000)	.262*** (.000)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	NO	NO	NO	NO	NO
Sample	Total	GDP75=1		GDP75=0	
		Skilled	Unskilled	Skilled	Unskilled
Observations	372,661	28,271	50,241	94,474	173,044

Notes: OLS fixed-effect panel-regressions estimating the effect of former specialisation ($spec75_{ik,t-5}$) on bilateral industry export ($\ln(X_{ijkt})$). Sub-samples are distinguished on the basis of countries that are above the 75th percentile of GDP per capita (GDP75=1) or bellow the 75th percentile of GDP per capita (GDP75=0) and skilled-labour intensiveness of the industry. Robust standard-errors are in parentheses. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$

Table 19

Dependent variable	$\ln(X_{ikt}^{TI})$	$\ln(X_{ikt}^{TI})$	$\ln(X_{ikt}^{TI})$	$\ln(X_{ikt}^{TI})$	$\ln(X_{ikt}^{TI})$
	(1)	(2)	(3)	(4)	(5)
$spec75_{ik,t-5}$	.202*** (.000)	.221* (.095)	.066 (.339)	.167*** (.000)	.186*** (.000)
FE: $i-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES
Sample	Total	GDP75=1		GDP75=0	
		Skilled	Unskilled	Skilled	Unskilled
Observations	373,080	28,357	50,351	94,589	173,148

Notes: OLS fixed-effect panel-regressions estimating the effect of former specialisation ($spec75_{ik,t-5}$) on total industry export ($\ln(X_{ikt}^{TI})$). Sub-samples are distinguished on the basis of countries that are above the 75th percentile of GDP per capita (GDP75=1) or bellow the 75th percentile of GDP per capita (GDP75=0) and skilled-labour intensiveness of the industry. Standard-errors are in parentheses and clustered at exporter-industry level. *** = $p < 0.01$, ** = $p < 0.05$, * = $p < 0.1$

7.2.2 Effect of trade on specialisation

Table 20: 1st stage of 2SLS

Dependent variable	$\ln(X_{ijkt})$	$\ln(X_{ijk,t-5})$	$\ln(X_{ijk,t-5})$	$\ln(X_{ijk,t-5})$
	(1)	(2)	(3)	(4)
$CUCMECU_{ij,t-5}$	.168*** (.000)	.298*** (.000)	.409*** (.000)	.241*** (.000)
FE: $i-j-k$	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES
Sample	Total	Total	Skilled	Unskilled
Observations	372,661	372,661	131,382	241,275

Notes: This table displays impact of the lag of deep economic integration ($CUCUMECU_{ij,t-5}$) on (lagged) bilateral industry export ($\ln(X_{ijkt(-5)})$) which is the 1st stage of the 2SLS regressions of Table 4.

Table 21

Dependent variable	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$
	(1)	(2)	(3)
$\ln(X_{ijk,t-5})$	.543*** (.000)	.227*** (.000)	.865*** (.000)
FE: $i-j-k$	YES	YES	YES
FE: $i-t$	YES	YES	YES
FE: $j-t$	YES	YES	YES
FE: $k-t$	YES	YES	YES
Test	2SLS	2SLS	2SLS
Sample	Total	Skilled	Unskilled
Observations	328,228	114,846	213,378

Notes: 2SLS fixed-effects panel-regressions displaying the lagged impact of bilateral industry export ($\ln(X_{ijk,t-5})$) on bilateral specialisation ($\ln(BBI_{ijkt})$). Bilateral industry export is instrumented by a lag of deep economic integration ($CUCMECU_{ij,t-10}$). Robust standard errors are in parenthesis. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Table 22: 1st stage of 2SLS

Dependent variable	$\ln(X_{ijk,t-5})$	$\ln(X_{ijk,t-5})$	$\ln(X_{ijk,t-5})$
	(1)	(2)	(3)
$CUCMECU_{ij,t-10}$	.154*** (.000)	.223*** (.000)	.120*** (.000)
FE: $i-j-k$	YES	YES	YES
FE: $i-t$	YES	YES	YES
FE: $j-t$	YES	YES	YES
FE: $k-t$	YES	YES	YES
Test	2SLS	2SLS	2SLS
Sample	Total	Skilled	Skilled
Observations	328,228	114,846	213,378

Notes: This table displays impact of the lag of deep economic integration ($CUCUMECU_{ij,t-10}$) on lagged bilateral industry export ($\ln(X_{ijk,t-5})$) which is the 1st stage of the 2SLS regressions of Table 21.

Table 23

Dependent variable	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$
	(1)	(2)	(3)	(4)	(5)	(6)
$\ln(X^{TB}_{ijt})$	-.452*** (.000)	-	.903*** (.000)	-	-	-
$\ln(X^{TB}_{ij,t-5})$	-	.018 (.126)	-	.300*** (.000)	.566*** (.002)	.170*** (.000)
FE: $i-j-k$	YES	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES	YES
Test	OLS	OLS	2SLS	2SLS	2SLS	2SLS
Sample	Total	Total	Total	Total	Skilled	Unskilled
Observations	384,719	372,661	372,661	372,661	131,382	241,275

Notes: OLS and 2SLS fixed-effects panel regressions displaying the impact of total bilateral export ($\ln(X^{TB}_{ijt(-5)})$ on bilateral specialisation $\ln(BBI_{ijkt})$). In the 2SLS regressions total bilateral export is instrumented by the 5-year lag of deep economic integration ($CUCMECU_{ij,t-5}$). Standard errors are in parenthesis and clustered at exporter-importer level. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Table 24: 1st stage of 2SLS

Dependent variable	$\ln(X^{TB}_{ijt})$	$\ln(X^{TB}_{ij,t-5})$	$\ln(X^{TB}_{ij,t-5})$	$\ln(X^{TB}_{ij,t-5})$
	(1)	(2)	(3)	(4)
$CUCMECU_{ij,t-5}$	.090*** (.000)	.272*** (.000)	.268*** (.000)	.274*** (.000)
FE: $i-j-k$	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES
Sample	Total	Total	Skilled	Unskilled
Observations	372,661	372,661	131,382	241,275

Notes: This table displays impact of the lag of deep economic integration ($CUCUMECU_{ij,t-5}$) on (lagged) total bilateral export ($\ln(X^{TB}_{ijt(-5)})$) which is the 1st stage of the 2SLS regressions of Table 23.

Table 25

Dependent variable	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$	$\ln(BBI_{ijkt})$
	(1)	(2)	(3)
$\ln(X^{TB}_{ijk,t-5})$	1.023***	.608**	1.285***
	(.000)	(.016)	(.000)
FE: $i-j-k$	YES	YES	YES
FE: $i-t$	YES	YES	YES
FE: $j-t$	YES	YES	YES
FE: $k-t$	YES	YES	YES
Test	2SLS	2SLS	2SLS
Sample	Total	Skilled	Unskilled
Observations	328,228	114,846	213,378

Notes: 2SLS fixed-effects panel-regressions displaying the lagged impact of bilateral export ($\ln(X^{TB}_{ij,t-5})$) on bilateral specialisation ($\ln(BBI_{ijkt})$). Bilateral export is instrumented by a lag of deep economic integration ($CUCMECU_{ij,t-10}$). Robust standard errors are in parenthesis. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Table 26: 1st stage of 2SLS

Dependent variable	$\ln(X^{TB}_{ijk,t-5})$	$\ln(X^{TB}_{ijk,t-5})$	$\ln(X^{TB}_{ijk,t-5})$
	(1)	(2)	(3)
$CUCMECU_{ij,t-10}$	.082***	.083***	.081***
	(.000)	(.000)	(.000)
FE: $i-j-k$	YES	YES	YES
FE: $i-t$	YES	YES	YES
FE: $j-t$	YES	YES	YES
FE: $k-t$	YES	YES	YES
Test	2SLS	2SLS	2SLS
Sample	Total	Skilled	Unskilled
Observations	328,228	114,846	213,378

Notes: This table displays impact of the lag of deep economic integration ($CUCUMECU_{ij,t-10}$) on lagged total bilateral export ($\ln(X^{TB}_{ijk,t-5})$) which is the 1st stage of the 2SLS regressions of Table 25.

Table 27

Dependent variable	$\ln(BBI^A_{ijkt})$	$\ln(BBI^A_{ijkt})$	$\ln(BBI^A_{ijkt})$	$\ln(BBI^A_{ijkt})$	$\ln(BBI^A_{ijkt})$
	(1)	(2)	(3)	(4)	(5)
$\ln(X^{TB}_{ijk,t-5})$	-2.499***	3.047***	-4.264***	.981	-.775
	(.000)	(.000)	(.000)	(.366)	(.560)
FE: $i-j-k$	YES	YES	YES	YES	YES
FE: $i-t$	YES	YES	YES	YES	YES
FE: $j-t$	YES	YES	YES	YES	YES
FE: $k-t$	YES	YES	YES	YES	YES
Test	2SLS	2SLS	2SLS	2SLS	2SLS
Sample	Total	GDP75=1	GDP75=0	EU15=1	CEEC=1
Observations	328,228	68,226	238,214	170,110	98,139

Notes: 2SLS fixed-effects panel regressions displaying the lagged impact of total bilateral export ($\ln(X^{TB}_{ij,t-5})$) on the degree of specialisation ($\ln(BBI^A_{ijkt})$) within a country. The lag of total bilateral export is instrumented by a lag of deep economic integration ($CUCMECU_{ij,t-10}$). Robust standard errors are in parenthesis. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

7.2.3 Effect of trade on productivity

Table 28: 1st stage 2SLS

Dependent variable	$\ln(X_{ijk,t-5})$	$\ln(X_{ijk,t-5})$	$\ln(X_{ijk,t-5})$	$\ln(X_{ijk,t-5})$	$\ln(X_{t-5})$
	(1)	(2)	(3)	(4)	(5)
$CUCMECU_{ij,t-5}$	.307***	.332	.211	.485***	.246***
	(.000)	(.242)	(.308)	(.000)	(.000)
FE: $i-j-k$	YES	YES	YES	YES	YES
Sample	Total	GDP75=1		GDP=0	
		Skilled	Unskilled	Skilled	Unskilled
Observations	15,330	458	808	4,234	7,812

Notes: This table displays impact of the lag of deep economic integration ($CUCUMECU_{ij,t-5}$) on (lagged) bilateral industry export ($\ln(X_{ijkt(-5)})$) which is the 1st stage of the 2SLS regressions of Tables 6 and 7.

Table 29

Dependent variable	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$	$\ln(GGDC_{ikt})$
	(1)	(2)	(3)	(4)	(5)
$\ln(X^{TI}_{ik,t-5})$	2.803*** (.000)	.934*** (.000)	5.056*** (.000)	1.780*** (.000)	2.803*** (.000)
FE: $i-k$	YES	YES	YES	YES	YES
Sample	Total	GDP75=1		GDP75=0	
		Skilled	Unskilled	Skilled	Unskilled
Observations	22,945	1,421	2,498	6,760	12,264

Notes: 2SLS fixed-effects panel-regressions estimating the lagged impact of total industry export ($\ln(X^{TI}_{ik,t-5})$) on industry productivity ($\ln(GGDC_{ikt})$). Total industry export is instrumented by the lag of the average amount deep economic integration agreements ($\overline{CUCMECU}_{i,t-5}$). Sub-samples consist of: countries that are above the 75th percentile of GDP per capita ($GDP75 = 1$), countries that are bellow the 75th percentile of GDP per capita ($GDP75 = 0$), skilled-labour intensive industries (skilled) or unskilled-labour intensive industries (usnkilled). Standard errors are in parenthesis and clustered at exporter-industry level. *** $= p < 0.01$, ** $= p < 0.05$, * $= p < 0.1$.

Table 30: 1st stage 2SLS

Dependent variable	$\ln(X^{TI}_{ik,t-5})$	$\ln(X^{TI}_{ik,t-5})$	$\ln(X^{TI}_{ik,t-5})$	$\ln(X^{TI}_{ik,t-5})$	$\ln(X^{TI}_{ik,t-5})$
	(1)	(2)	(3)	(4)	(5)
$\overline{CUCMECU}_{i,t-5}$	1.027*** (.000)	1.793*** (.054)	.386 (.449)	1.351*** (.000)	.872*** (.000)
FE: $i-k$	YES	YES	YES	YES	YES
Sample	Total	GDP75=1		GDP=0	
		Skilled	Unskilled	Skilled	Unskilled
Observations	22,945	1,421	2,499	6,760	12,268

Notes: This table displays the impact of the lag of average amount of deep economic integration agreements ($\overline{CUCUMECU}_{i,t-5}$) on lagged total industry export ($\ln(X^{TI}_{ik,t-5})$) which is the 1st stage of the 2SLS regressions of Table 29.

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