Effects of Trade Variety on the Skill Premiums in CEECs: A Comparative Analysis

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Abstract: In this contribution we study the effects of changing varieties of trade for CEECs over the period 1995-2011 and how these impacted on the skill premium. The effects of changes in varieties on the skill premium is recently studied in Kurokawa (2009) and Atolia and Kurokawa (2009). These contributions show that if varieties and skills are complements the effects of intra-industry trade would be partly sizeable increases in the skill premium of both trading partners. In this paper we take an econometric approach studying the link between changes in varieties on the cost shares of high, medium and low skilled workers. Our results based on a panel of countries and industries do not support that hypothesis however. Trade in varieties impact the skill premia in a negative way or lead to a squeezing out of the middle for various subsamples, particularly also for the CEECs. For the latter group of countries however changes in trade volumes do impact the skill premia positively.

Keywords: trade in varieties, skill premium

JEL codes: F14, F16

1. Introduction

Significant evidence has built up over the last 20 years or so indicating that skill premia have risen in both developed and developing countries. The two main explanations for these changes revolve around technological change and international trade. In the former case, declining prices for equipment, which are considered complementary to high-skilled labour, led to an increase in the demand for skilled workers and an increase in the skill premium. To the extent that such equipment substitutes for low skilled workers, the decline in equipment prices would lower the demand for low-skilled labour. Such a process would be consistent with increasing skill premia in both the developed and developing world (Krusell et al, 2000). In the latter case, the Stolper-Samuelson theorem suggests that imports of low-skill intensive goods into developed countries from developing countries would be expected to reduce the demand for low-skilled labour in the developed world, thereby increasing the skill premium.

While intuitively plausible, this latter argument doesn’t explain the rising skill premia in developing countries, with the Stopler-Samuelson theorem predicting an increase in demand for low-skilled labour in developing countries, and a corresponding decline in the skill premia. In response to this, alternative approaches have been suggested that account for rising skill premia in both developed and developing countries. Feenstra (1997), for example, argues that firms in developed countries will outsource activities or tasks that are low-skill intensive to countries with low relative wages of low-skilled labour. Ordering a firm’s activities or tasks by skill intensity therefore, we would expect to see that the least skill-intensive activities would be outsourced first, followed by the next lowest skill-intensity and so on. An increase in outsourcing due to a decline in trade costs for example, will then see the developed country outsource activities that are less skill-intensive than the activities that remain in the developed country. This will have the effect of increasing the relative wage of high-skilled labour in the developed country. The new activities outsourced to the developing country will be more skill-intensive than the activities already outsourced, which will have the effect of increasing demand and the relative wage of skilled labour. Such arguments are consistent with the observation of rising skill premia in developed and developing countries therefore.

A number of empirical studies have considered the relationship between the demand for skilled and unskilled labour and both measures of technological change and outsourcing (or globalisation more generally), usually for developed countries. The results tend to indicate that while outsourcing has been a contributory factor to the change in the skill premia in developed countries, the majority of the change is due to technological progress. Feenstra and Hanson (1996) for example consider the case of the USA, regressing the change in the non-production wage share on the change in the log capital-output ratio, the change in log output and the change in offshoring. They find for the later period in their dataset (i.e. 1979-1990) that offshoring contributed around 31 percent of the increase in the nonproduction wage that occurred in the 1980s. Falk and Koebel (2002) use data for 26 German industries over the period 1978-1990. With their data they estimate a system of seven equations, one for each type of variable cost (different types of labour and materials). Their results provide little support for substitution effects between different types of labour and imported materials, with the increase in imported materials being driven by higher output growth rather than input substitution. Hijzen et al (2005) also estimate a system of regressions for three different types of labour and materials using data on UK manufacturing industries over the period 1982-1986. Their results indicate a large negative effect of outsourcing on the demand for unskilled labour. Similar results to those of Hijzen et al (2005) are presented by Strauss-Kahn (2003) for France. More recent research also suggests that skill-biased technological change is still the main determinant of the rising demand for skilled workers. In particular, Michaels et al. (2014) examine skill demand related to investment in information and communication technologies (ICT) for a cross-section including the US, Japan, and nine European countries. They find that changes in skill demand away from medium-skilled workers towards high-skilled workers are explained by changes in ICT capital inputs. The effects of trade openness are positive but insignificant when proxies for ICT are included in the model.

Despite these results indicating a role for trade the consensus view of empirical economists is that trade was not the major reason for rising wage inequality in the 1980s and early 1990s. This view is based upon a number of factors. Firstly, the share of skilled workers increased within most industries, which contrasts with the predictions of the basic Heckscher-Ohlin theory if one ignores trade in intermediate inputs (Feenstra, 2010). Secondly, the demand for skilled workers was closely related to various measures of technology such as R&D, but not with measures of trade (Autor et al., 2006). Thirdly, calibrated general equilibrium models found only a small quantitative role of trade (Borjas et al., 1997).

In this paper we move away from outsourcing and consider an alternative – albeit related – mechanism through which international trade can impact upon relative labour demand in various country groups focusing on respective changes in Europe and the CEECs in particular. A small number of papers have looked to develop alternative models that can explain rising skill premia by endogenising technology. Dinopoulos and Segerstrom (1999) develop a model in which trade drives R&D investment, which results in skill-biased technological change in all countries, while Acemoglu (2003) argues that skill-biased technological change due to trade in leader countries can spill over to other countries, thus increasing the skill premium in these countries also.

We follow the work of Kurokawa (2011) and Atolia and Kurokawa (2013) by considering whether trade in variety is an explanation for rising skill premia in countries at a different level of development. As emphasised by Kurokawa (2011) standard variety trade models with monopolistic competition (e.g. Krugman, 1979; Dixit and Norman, 1980; Ethier, 1982) argue that the variety of goods which consumers can consume and producers can use in production increases in both countries following trade. Kurokawa (2011) develops a fairly standard model in which a final goods sector uses differentiated intermediate goods and high skilled labour, while the monopolistically competitive intermediate goods sector requires a low skilled task for production. Allowing for trade between two countries increases the number of available varieties in each country, which lowers the price of intermediates. The lower price of intermediates has the effect of increasing output of the final good, which with fixed supply of high skilled labour will increase the real wage of high-skilled labour. If intermediates and high-skilled labour are complements it can also be shown that the skill premia will also rise following trade, a result that applies equally well to both countries. Since the rate of increase in the number of varieties will be lower in the low skill abundant country, the rate of the price decline will be lower in the low skill abundant country, which has the implication that the change in the skill premia will be lower in the low skill abundant country. Atolia and Kurokawa (2013) present an alternative model with two countries and three sectors (primaries, manufactures and services). Primaries and services use constant returns to scale technology and perfect competition, while manufactures are produced under increasing returns and monopolistic competition. Production of each good requires low and high skilled labour, primaries, services and a composite input of manufacturing. The static general equilibrium model is calibrated to the input output table of Mexico for 1987, with the results indicating that the extensive margin growth of Mexican manufactured imports from the US can explain around 10 percent of the actual increase in the skill premium in Mexico over the period 1987-1994.

We test these hypotheses using the World Input Output Database (WIOD) and estimate a model of cost shares for each of three types of labour (low, medium and high educated). Results point towards a more distinct patterns of varieties on skill premia which is particularly pronounced for CEECs.

The remainder of the paper is organised as follows: Section 2 describes the methodology we adopt; Section 3 discusses the data and come descriptive statistics; Section 4 presents the results; and Section 5 concludes.

2. Methodology

The starting point for our econometric analysis follows the now standard approach when analysing the relative demand for labour, which involves the estimation of a translog cost function (see Berman et al., 1994 and more recently Michaels et al., 2014). The basic model model that results from minimising the cost function can be written as:

$$s_i = \alpha_i + \frac{1}{2}\sum_{j=1}^{M}\gamma_{ij}\ln w_j + \frac{1}{2}\sum_{k=1}^{K}\phi_{ik}\ln x_k + \frac{1}{2}\sum_{y=1}^{Y}\delta_{iy}\ln z_y, \qquad i = 1, \ldots, M.$$

where s_i is the cost share of factor i (either a type of labour or intermediate inputs), w_j is the factor price of factor j, x_k denote the fixed inputs and outputs (i.e. the quantities of the (quasi-) fixed input capital and gross output), and z_y denote a set of demand shifters that in the existing literature include indicators of technical change (e.g. R&D spending, measures of investment in ICT) and indicators of international trade (e.g. outsourcing measures).

Taking differences between two periods, the estimating equations for wage shares of different labour skill types and materials in industries $n = 1, \ldots, N$ become:

$$\Delta s_i = \alpha_0 + \sum_{j=1}^{M} \gamma_j \, \Delta \ln w_{ij} + \ \phi_K \, \Delta \ln K_i \ + \phi_Y \Delta \ln Y_i + \ \sum_{y=1}^{Y} \phi_i \Delta z_{yi} + \varepsilon_i \quad (1)$$

In our analysis, we use long (i.e. five-year) differences since these have been shown to be less sensitive to measurement error than either first differences or fixed effects (Griliches and Hausman, 1986). An initial question that we have to answer is what set of variables are included in the demand shifters. As mentioned above, a variable commonly included in the set of demand shifters is a measure of (skill-biased) technological change. Unfortunately, the dataset that we use for our analysis (the World Input-Output Database, WIOD) doesn't report information on variables that could be used to capture SBTC. Moreover, given the broad sample of countries covered in the WIOD we are not aware of an alternative database that reports such variables for the full sample of countries and sectors covered in our analysis. To control for the effects of SBTC therefore we adopt an alternative approach and include a set of country-sector linear time trends (i.e. for each sector within each country we include a separate time trend), which control for unobserved changes in labour demand over time for each sector in each country. The inclusion of such time trends would also be expected to control for other country-sector specific differences, such as differences in the degree of labour market protection across countries[1] The variables that we do include in the set of demand shifters in addition to the country-sector time trends are a measure of variety trade and a measure of the overall level of trade, which are defined in more detail below. The inclusion of the variety trade measure allows for the testing of the main hypothesis of whether trade in variety can explain the skill premium, while including the level of trade controls for the general effects of international trade and openness.

While the model in equation (1) is estimated on the full sample of countries and sectors in our dataset, we further split the sample, estimating the model for the set of EU-27 countries included in WIOD and the subgroup of CEECs. As discussed above, skill premia have been observed to increase in both advanced and emerging countries. The mechanisms through which the skill premia have risen may differ between these country groups however. Skill premia in the advanced countries may have risen due to SBTC, due to standard Stolper-Samuelson type effects or due to variety trade as argued above. In the case of emerging economies however, Stolper-Samuelson effects would tend to work in the opposite direction, suggesting that the causes of rising skill premia in developing countries would be limited to SBTC and variety trade. By splitting our sample we can shed further light on this question, i.e. whether this pattern could be found in the European economies.

3. Data Sources and Construction

The basic data source for our analysis is the recently compiled World-Input-Output-Database (WIOD), which reports data on socio-economic accounts, international input-output tables and bilateral trade data across 35 industries and 40 countries over the period 1995-2009. These data result from an effort to bring together information from national accounts statistics, supply and use tables, data on trade in goods and services and corresponding data on factors of production (capital and labour by educational attainment categories). The starting point for the WIOD data are national supply and use tables (SUTs) which have been collected, harmonized and standardized for 40 countries (the 27 EU countries,

[1] Given the relatively short time-series dimension of the dataset and given that the degree of labour market protection tends to evolve rather slowly, we would also expect that taking the fifth difference of the data – which we do below – would further control for differences in labour market protection across countries and sectors.

Australia, Brazil, Canada, China, India, Indonesia, Japan, Korea, Mexico, Russia, Taiwan, Turkey and the US) over the period 1995-2009. These tables contain information on the supply and use of 59 products in 35 industries together with information on final use (consumption, investment) by product, value added and gross output by industry. These tables have further been benchmarked to time series of national accounts data on value added and gross output to allow for consistency over time and across countries. This approach allows one to provide information on the supply and use of a product by industry for each country. Using detailed trade data the use tables are then split up into domestic and imported sourcing components, with the latter further split by country of origin. Data on goods trade were collected from the UN COMTRADE database at the HS 6-digit level. These detailed bilateral trade data allow one to differentiate imports by use categories (intermediates, consumption and investment goods) by applying a modified categorisation based on broad end-use categories at the product classification. Bilateral trade in services data were collected from various sources. Services trade data are only available from Balance of Payments (BoP) statistics providing information at a detailed level only in BoP categories. Using a correspondence these data were merged to the product level data provided in the supply and use tables. The differentiation into use categories of services imports was based on information from existing import use or import input-output tables. Combining this information from the bilateral trade data by product and use categories with the supply and use tables resulted in a set of 40 international use tables for each year. This set of international supply and use tables was then transformed into an international input-output table using standard procedures (model D in the Eurostat manual (Eurostat, 2008)). A rest-of-the-world was also estimated using available statistics from the UN and included in this table to account for world trade and production. This results in a world input-output database for 41 countries (including the rest-of-the-world) and 35 industries. Additional data allow for the splitting up of value added into capital and labour income and the latter into low, medium and high skilled workers. These data are available both in factor income and physical input terms (for a detailed presentation of the database see Timmer, 2012).

In our analysis we use data on all 40 WIOD countries, but are forced to limit the number of sectors in the analysis. The measures of variety trade and the level of trade are calculated using data from UN COMTRADE, which reports data on manufacturing trade only. As such, we are forced to limit our analysis to a set of 17 sectors (see Table A1 in the appendix for a list of the sectors).

To measure variety trade we use detailed trade data at the six-digit HS level, and follow Feenstra and Kee (2007) to calculate a measure of both import and export variety. The measure of variety is constructed according to the following formula:

$$\lambda_{it}^{a} = \frac{\sum_{i \in I_{it}^{a}} p_{it}^{c} q_{it}^{c}}{\sum_{i \in I} p_{it}^{c} q_{it}^{c}}$$

Where λ_{it}^{a} is the measure of export (import) variety from (to) country a to (from) country i in period t. The numerator of this equation is the value of exports (imports) from (to) reference country c to (from) country i in the set of goods that are exported (imported) from (to) country a to (from) country i in period t. The denominator is the total value of exports (imports) from (to) reference country c to (from) country i. The reference country in our analysis is the world (i.e. the full sample of exporting or importing countries), and is constructed in our analysis such that it is not time-varying[2] This measure

[2] In particular, we use the average of the bilateral trade flows of the world over the sample period. The approach of making the data for the reference country time-invariant has the advantage that all variation across time in the extensive margin is due solely to variations in trade

of variety can be thought of as a weighted count of a's categories relative to c's categories, where the goods are weighted by their importance in world exports (imports) to country i. If all categories are of equal importance then the extensive margin is simply the fraction of categories in which j imports from i.

Data on the labour market is split into three different skill categories (i.e. low-skilled, medium- skilled and high- skilled) according to the ISCED classification. In a similar manner to Gregory et al (2001) and Hijzen et al (2005) low-, medium- and high-skilled workers are defined as those with ISCED levels 1-2, 3-4 and 5-6 respectively. The dependent variables in the econometric analysis are the shares of each labour type in total variable costs, where total variable costs are calculated as the sum of total labour compensation plus the value of intermediate input purchases. For our analysis we further require data on average wages by education-level, which are calculated directly from the WIOD dataset as the ratio of labour compensation for each skill type to the total hours worked of each skill type. We also require a measure of gross output and the capital stock, which are available directly from the WIOD.

Table 1. Summary Statistics

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Cost Shares					
Δs_{hs}	6372	0.005	0.015	-0.109	0.164
Δs_{ms}	6372	-0.003	0.026	-0.253	0.218
Δs_{ls}	6372	-0.012	0.024	-0.303	0.185
Δs_{II}	6372	0.010	0.044	-0.329	0.374
Input Quantities					
ΔH	6361	0.144	0.358	-3.270	3.064
ΔM	6361	0.008	0.306	-2.982	2.597
ΔL	6361	-0.181	0.318	-3.972	2.606
ΔII	6392	0.212	0.539	-5.313	7.427
Flexible Factor Prices					
$\Delta \ln w_{hs}$	6336	0.335	0.502	-1.672	4.071
$\Delta \ln w_{ms}$	6336	0.354	0.493	-1.585	4.071
$\Delta \ln w_{ls}$	6336	0.360	0.500	-1.556	4.071
$\Delta \ln w_{II}$	6399	0.220	0.423	-1.572	4.767
Fixed Input and Output Quantities					
$\Delta \ln K$	6066	0.340	0.751	-4.284	5.716
$\Delta \ln Y$	6373	0.377	0.530	-4.359	4.659
Variety and Level of Trade					
$\Delta \ln V$ $(exports)$	6400	0.113	0.383	-4.495	4.356
$\Delta \ln T$ $(exports)$	6384	0.437	0.528	-3.313	5.926
$\Delta \ln V$ $(imports)$	6400	0.079	0.314	-2.453	9.822
$\Delta \ln T$ $(imports)$	6379	0.472	0.500	-2.682	10.118

Source: WIOD; own calculations.

In Table 1 we report summary statistics on the five-year differenced data of all variables included in the analysis. Considering the trade variables, we observe that both exports and imports have grown rapidly, with the measures of export and import variety also increasing over the sample period. The

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in the exporting country and not to variations in the reference country. The approach does suffer from the drawback that the extensive margin can increase over time solely because of inflation however.

table further reveals that the cost shares of low- and medium-skilled labour have declined over the period of interest, with those of high-skilled labour and materials increasing. Similar results are found when we consider the quantities of these inputs. The growth in the number of hours worked by low-skilled labour was negative, with a small positive growth rate in the case of medium-skilled labour. For high-skilled labour and materials inputs in particular however, growth rates were positive. Considering the average growth rates of returns to the flexible factors however, we find that these have tended to be higher for low- and medium-skilled labour than for high-skilled labour and materials.

Table 2. Initial cost shares and average growth rates by country

Country	Initial Values (i.e. 1995)				Average Five-Year Growth Rates, 1996-2009			
	s_{LS}	s_{MS}	s_{HS}	s_{II}	Δs_{LS}	Δs_{MS}	Δs_{HS}	Δs_{II}
Austria	0.06240	0.22124	0.03748	0.67888	-0.01124	-0.02258	0.00754	0.02628
Belgium	0.10270	0.09472	0.03365	0.76894	-0.02036	0.01040	0.00166	0.00830
Denmark	0.07437	0.15849	0.05060	0.71655	-0.00497	-0.01771	0.00799	0.01469
Finland	0.08381	0.11950	0.07012	0.72657	-0.01541	-0.00385	0.00599	0.01327
France	0.09220	0.11888	0.06357	0.72535	-0.01732	-0.00563	0.00419	0.01876
Germany	0.04577	0.18964	0.08951	0.67507	-0.00721	-0.02037	0.00004	0.02753
Greece	0.17751	0.07229	0.03396	0.71624	-0.01249	0.01707	0.00703	-0.01161
Ireland	0.10327	0.10636	0.03871	0.75166	-0.01294	-0.01081	0.01856	0.00520
Italy	0.16785	0.07295	0.02052	0.73867	-0.02353	0.01164	0.00121	0.01069
Luxembourg	0.15902	0.08916	0.04673	0.70509	-0.03133	0.00088	0.00832	0.02213
Netherlands	0.09835	0.12159	0.03881	0.74125	-0.01158	-0.00684	0.01039	0.00802
Portugal	0.18415	0.02832	0.01617	0.77136	-0.00979	0.00304	0.00280	0.00396
Spain	0.16659	0.03591	0.04864	0.74887	-0.02761	0.00346	0.00758	0.01657
Sweden	0.08050	0.15047	0.03341	0.73563	-0.01440	-0.00490	0.00506	0.01423
United Kingdom	0.09606	0.12042	0.07315	0.71038	-0.01361	0.00558	0.01872	-0.01068
Bulgaria	0.20205	0.03419	0.01962	0.74414	-0.03448	-0.00277	-0.00058	0.03783
Czech Republic	0.01396	0.12901	0.01766	0.83937	-0.00276	-0.00762	0.00182	0.00855
Estonia	0.02344	0.14612	0.06742	0.76301	0.00106	-0.00500	-0.00002	0.00395
Hungary	0.04227	0.15147	0.04423	0.76203	-0.00680	-0.00924	-0.00032	0.01636
Latvia	0.04980	0.18023	0.05752	0.71245	-0.00926	-0.01927	-0.00040	0.02894
Lithuania	0.02068	0.15840	0.05689	0.76403	0.00022	-0.00112	0.00415	-0.00326
Poland	0.03078	0.19550	0.02854	0.74517	-0.00716	-0.02397	0.00446	0.02667
Romania	0.21377	0.03437	0.01948	0.73238	0.00410	0.00609	0.00477	-0.01496
Slovakia	0.01408	0.12229	0.01764	0.84599	-0.00371	-0.00147	0.00158	0.00360
Slovenia	0.07652	0.19464	0.05099	0.67785	-0.01301	-0.01088	0.00426	0.01963
Cyprus	0.13130	0.10166	0.06705	0.70000	-0.01500	0.01315	-0.00553	0.00738
Malta	0.22546	0.03993	0.02222	0.71239	-0.02183	0.00266	0.00301	0.01617
Australia	0.12526	0.10648	0.03088	0.73737	-0.01210	0.00250	0.00496	0.00464
Brazil	0.10054	0.06643	0.05806	0.77497	-0.01291	0.01061	0.00047	0.00183
Canada	0.02200	0.19916	0.03090	0.74794	-0.00388	-0.00226	0.00881	-0.00267
China	0.11757	0.05321	0.00293	0.82629	-0.01578	-0.00769	0.00088	0.02258
India	0.09312	0.06644	0.02480	0.81564	-0.00432	-0.00392	0.00522	0.00302
Indonesia	0.16127	0.06025	0.02080	0.75768	-0.01012	0.00341	0.00286	0.00385
Japan	0.06343	0.15318	0.04992	0.73346	-0.01332	-0.00557	0.00047	0.01842
Korea	0.06559	0.10825	0.06563	0.76053	-0.01660	-0.00481	0.00833	0.01308
Mexico	0.05740	0.08945	0.03425	0.81889	-0.00648	0.00478	-0.00230	0.00400
Russia	0.02312	0.21350	0.03369	0.72969	-0.00368	-0.00815	0.00075	0.01108
Taiwan	0.12583	0.05847	0.03838	0.77732	-0.02010	0.00044	0.00566	0.01400
Turkey	0.13605	0.02884	0.01336	0.82175	-0.01699	0.00371	0.00300	0.01028
USA	0.03200	0.14470	0.06708	0.75229	-0.00319	-0.00628	0.02117	0.00017

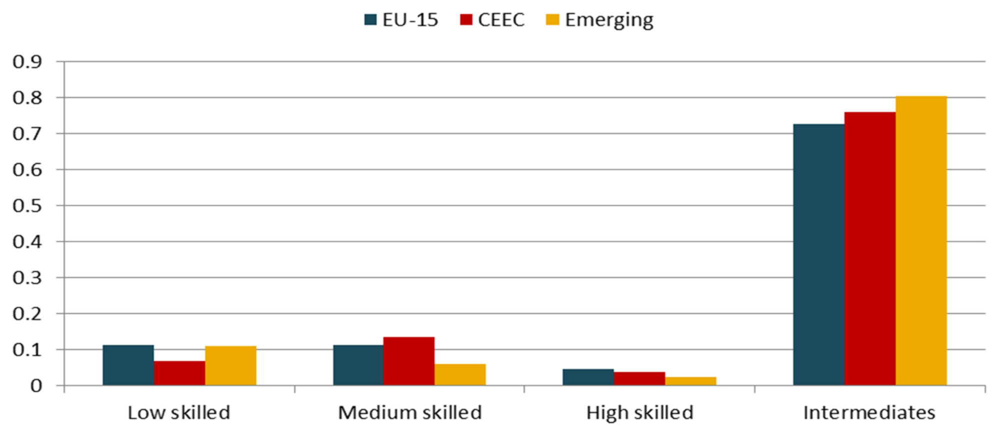
Note: This table presents information on the initial shares of low-, medium- and high-skilled workers and materials purchases in total variable costs, as well as their average growth rates over the period 1996-2009.
Source: WIOD; own calculations.

To look in greater detail at developments in cost shares we report in Table 2 the initial level and growth rates of average cost shares by country.

The table reveals that intermediates make up by far the largest portion of total variable costs, ranging from 67 percent in Germany to 84.6 percent in Slovakia and 83.9 percent in the Czech Republic. These rates are similar to those observed for other emerging countries like China, Mexico, India and Turkey and to a less extent Indonesia. On average, the CEECs tend to have slightly larger shares of intermediates as compared to the EU-15 though this is mostly driven by the two countries mentioned above (see Figure 1).

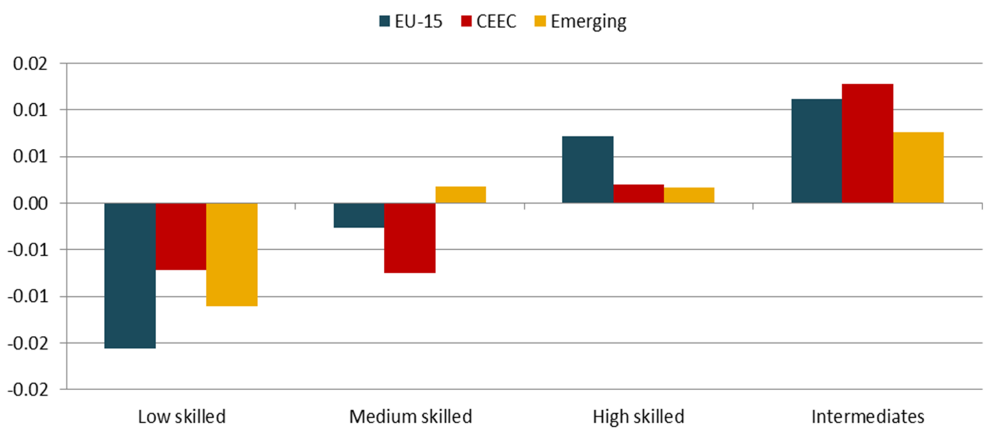
In terms of labour cost shares it is interesting to note that the share of low-skilled workers is lowest on average for the CEECs with the ones for the EU-15 and the emerging countries as listed above being relatively similar on average. However, CEECs show much larger shares of cost shares for medium-educated workers. For this group, the emerging countries show the lowest shares. For the high-educated workers, there is a clear ranking in the sense that the largest cost shares are observed on average for the EU-15, followed by CEECs and the emerging countries (see Figure 1).

Figure 1. Average initial cost shares



Source: WIOD; own calculations.

Figure 2. Average growth rates of cost shares



Source: WIOD; own calculations.

Of more interest however, is the fact that in all but three countries we observe a negative growth rate of the low-skilled cost share, while in 24 countries we observe a negative growth rate on the medium-skilled cost share. Only in three countries do we observe negative growth rates of the high-skilled cost share however. Again comparing the three groups of countries we observe that on average labour cost shares for the EU-15 but less so in the CEECs with the emerging countries being in the middle. On the contrary, cost shares for medium educated have declined strongest for the CEECs. Cost shares for high educated have increased in all three country groups, but mostly so in the EU-15 (see Figure 2).

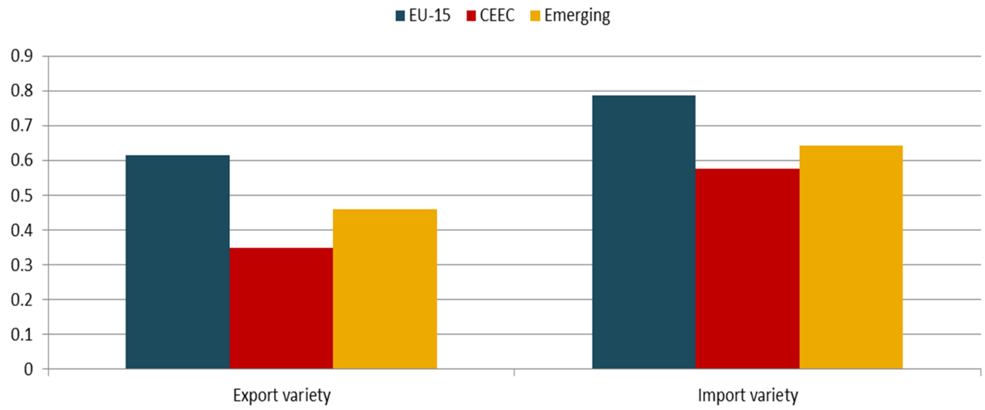
Finally, Table 3 provides some information concerning our variable of interest, the trade varieties in exports and imports. In the initial year, these trade varieties have been largest in the EU-15 and lowest in the CEECs on average for both exports and imports. Trade varieties in imports tend to be larger in all countries as compared to exports (see Figure 3).

Table 3. Initial trade variety and average growth rates by country

Country	Initial Values (i.e. 1995)				Average Five-Year Growth Rates, 1996-2009			
	Xv	Mv	$\ln X$	$\ln M$	ΔXv	ΔMv	$\Delta\ln X$	$\Delta\ln M$
Austria	0.5835	0.7983	21.1105	21.5625	0.1523	0.0599	0.4357	0.3505
Belgium			22.3176	22.3703	-0.0702	-0.0451	0.3741	0.3699
Denmark	0.5545	0.7409	21.2689	21.2853	0.1054	0.1425	0.3353	0.4476
Finland	0.4635	0.7286	20.6289	20.5609	0.1128	0.0581	0.3177	0.4139
France	0.8256	0.8842	22.9779	23.0748	0.0235	0.0267	0.2703	0.3252
Germany	0.8313	0.9049	23.2969	23.5201	0.0404	0.0212	0.3899	0.2694
Greece	0.3077	0.6844	19.7304	20.6731	0.1529	0.0806	0.3636	0.4144
Ireland	0.3553	0.6482	20.5024	20.6099	0.1087	0.0767	0.2126	0.3565
Italy	0.7983	0.8506	22.8373	22.7513	0.0497	0.0411	0.2978	0.3212
Luxembourg			18.9225	19.7239	-0.3250	-0.1855	0.3800	0.3568
Netherlands	0.7501	0.8372	22.4723	22.4819	0.0448	0.0271	0.3546	0.3229
Portugal	0.4335	0.7066	20.6374	20.9558	0.1676	0.0614	0.3661	0.3156
Spain	0.6762	0.8372	21.9466	22.1763	0.0804	0.0407	0.3903	0.4588
Sweden	0.6200	0.7621	21.3865	21.4820	0.0812	0.0486	0.3875	0.3925
United Kingdom	0.7886	0.8391	22.5847	22.8753	0.0138	0.0310	0.1975	0.3282
Bulgaria	0.2666	0.4921	18.8805	18.7687	0.2790	0.2539	0.5940	0.7968
Czech Republic	0.4848	0.7155	20.5597	20.4084	0.1520	0.1761	0.6027	0.6992
Estonia	0.2226	0.4668	18.0629	18.4098	0.2731	0.1913	0.6642	0.6145
Hungary	0.3887	0.6759	19.9976	19.9536	0.0676	0.0637	0.5346	0.5791
Latvia	0.1915	0.4114	17.4022	17.9048	0.3854	0.2193	0.8713	0.8344
Lithuania	0.2204	0.4169	18.3879	18.5274	0.3270	0.2028	0.7745	0.7211
Poland	0.7722	0.8435	20.5937	20.6959	0.1356	0.0885	0.7035	0.6479
Romania	0.2873	0.5361	19.2611	19.3419	0.2429	0.2148	0.7021	0.8690
Slovakia	0.3464	0.5848	19.5289	19.2306	0.1858	0.1315	0.6970	0.7440
Slovenia	0.3069	0.6315	19.2521	19.6686	0.2691	0.0974	0.4666	0.4739
Cyprus	0.1581	0.5354	17.2146	18.7725	0.0000	0.1126	0.1517	0.4322
Malta	0.1414	0.5203	17.1022	18.3821	0.0541	0.0569	0.2512	0.2983
Australia	0.4959	0.7399	21.0122	21.3114	0.0392	0.0289	0.2105	0.4164
Brazil	0.4247	0.6237	21.0898	21.0932	0.1939	0.0395	0.4896	0.2253
Canada	0.6578	0.7992	22.4192	22.2820	0.0984	0.0655	0.2452	0.3414
China	0.6663	0.8439	22.6471	22.8802	0.1084	0.0357	0.7021	0.4630
India	0.4092	0.4962	20.5717	20.2910	0.2543	0.2016	0.7710	0.7394
Indonesia	0.3802	0.5651	21.0974	20.6846	0.1756	0.1106	0.4260	0.3704
Japan	0.6290	0.8442	22.2932	23.2370	0.0557	0.0117	0.2405	0.2002
Korea	0.5633	0.7577	21.8442	22.0641	0.0637	0.0697	0.2406	0.4376
Mexico	0.5225	0.7289	21.4015	21.3373	0.0957	0.0612	0.3418	0.4515
Russia					0.1000	0.0740	0.5144	0.8889
Taiwan	0.5749	0.7728	21.7430	21.8295	-0.0085	0.0000	0.1971	0.2274
Turkey	0.3508	0.5953	20.1272	20.5582	0.2469	0.1471	0.7794	0.6785
USA	0.8563	0.8793	23.5223	23.9409	0.0061	0.0146	0.2405	0.3260

Note: In 1995 for Russia, Belgium and Luxembourg some data problems emerged which are therefore not reported. The initial values concerning the varieties are averages across sectors for each country. Similarly, growth rates are unweighted averages across sectors for each country.
Source: UN COMTRADE; own calculations.

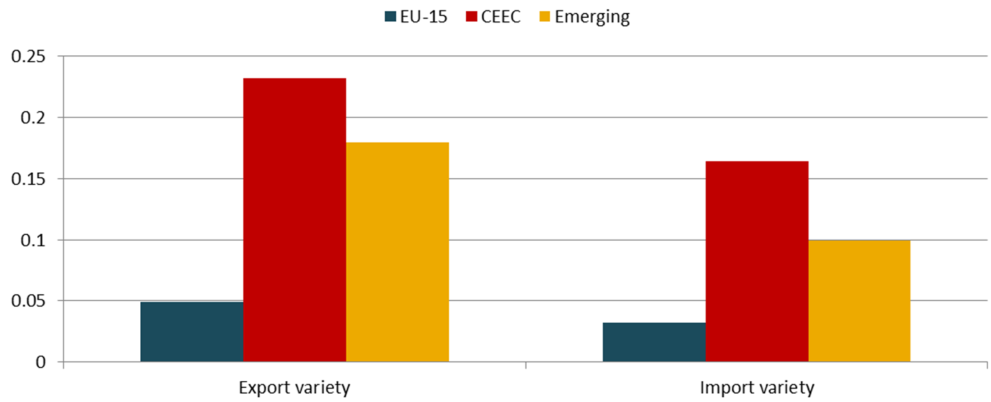
Figure 3. Average initial export and import varieties



Source: UN COMTRADE; own calculations.

A quite different pattern emerges when considering growth rates. For both export and import varieties growth rates in the CEECs are largest whereas those of the EU-15 are rather small; the growth rates for the emerging countries are in between. Interestingly also, growth rates of export varieties tend to be larger as those for import varieties (see Figure 4).

Figure 4. Average growth rates of exports and import varieties



Source: UN COMTRADE; own calculations.

4. Results

This section is no concerned to econometrically test the above mentioned hypothesis, i.e. to which extent the changes in trade in varieties impact upon the relative demand for labour. We present results first when including all countries, then split the sample into developed and developing countries and finally investigate the effects for the subsamples of EU-15 and CEECs. Specifically we estimate equation (2) for each of the labour cost shares using SUR techniques on the full sample of countries and industries above focusing on the effects of the variables capturing varieties in exports and imports.

4.1 Total sample

To investigate the relationship between international outsourcing and the skill structure of labour demand we adopt a fairly standard approach by analysing the relative demand for skilled labour based on the estimation of a translog cost function (introduced by Berman et al, 1994) as described above. The cost functions are estimated as a system of demand equations for all variable factors (i.e. high, medium and low skilled labour and materials) as in Hijzen et al (2005). The complete system of equations is estimated using seemingly unrelated regression (SUR) methods. Given that the sum of shares adds up to one we are forced to drop one of the regressions. In our analysis, we choose to drop the equation for the share of materials in total variable costs.

Below we report results for the full sample (Table 3), the sample of developed countries (Table 4) and the sample of developing countries (Table 5). We report results when including import and export variety separately. The theory of Kurokawa (2011) suggests that variety can impact upon the skill premium by providing a greater range and a cheaper set of varieties for use in final manufacturing. As such, we would expect the effects to work largely through import variety. For completeness we report results using both import and export variety.

Table 4 reports results from estimating equation (2) for each of the labour cost shares using SUR techniques on the full sample of countries and industries. As mentioned above, all regression equations include a set of country-sector time trends, the coefficients of which are not reported. The results in Table 3 indicate that the cost shares of all three types of labour are decreasing in output and the capital stock. While the negative association between output and the labour shares is consistent with Hijzen et al (2005), that between the capital stock and the labour shares is not. The own-wage coefficients are found to be consistently positive and significant, but the coefficients on the cross-price variables are more mixed. The medium-skilled wage impacts negatively upon the cost shares of both low- and high-skilled labour, while the low- and high-skilled wage impact negatively upon the medium-skilled cost share. Finally, the high-skilled (low-skilled) wage impacts positively (negatively) upon the low-skilled (high-skilled) cost shares however. The price of intermediates has a positive impact on all cost shares suggesting that materials are substitutes for all types of labour. Such results are similar when considering both the measures of import and export variety.

Turning now to the coefficients on the trade measures, we find in the case of exports that the level of exports impacts positively upon the cost share of low-skilled labour, and negatively upon the cost shares of medium- and high-skilled labour. In terms of the export variety measure we find that increased export variety has a negative impact upon the cost share of medium-skilled labour, but positive effects for low- and high-skilled labour, with the effects tending to be larger for low-skilled labour. Such an outcome is consistent with the view that trade – and exporting in this case – helps explain the hollowing out of the middle that has been observed elsewhere (see for example Michaels et al, 2012). Considering import variety we find somewhat similar results for the level of imports, with an increase in the level of import increasing the cost share for low-skilled and reducing cost shares for high-skilled (with no significant effect for medium-skilled labour). In terms of the variety measure we find a positive and significant coefficient on import variety in the case of low-skilled labour and negative and significant effects in the case of medium- and high-skilled. Such results go against the main hypothesis of Kurokawa (2011), with increased import variety increasing the share of low-skilled in total variable costs rather than high-skilled[3].

4.2 Subsamples – Developed and developing countries

In the final two tables we consider the sub-samples of developed and developing countries to examine whether similar results hold to those for the full sample. Results on the additional explanatory variables are largely consistent with those reported in Table 4, so we concentrate our discussion on the coefficients on the trade related variables[4]. In Table 5, which considers the subsample of developed countries, we again observe that the level of exports impacts positively upon the low-skill cost share and negatively upon the cost shares of medium- and high-skilled labour. Coefficients on the export variety variable are also consistent with those in Table 3, with positive and significant effects observed

[3] One should note that when looking at cost shares we are combining two effects – the level of employment by type and the wages paid. Disentangling these effects will be an interesting route in future research.

[4] The full set of results is reported in the annex.

for the low- and high-skilled shares and negative effects found for the medium-skilled share. Results when considering imports are largely similar, with the level of imports reducing the medium- and high-skilled cost shares. Results on the import variety measure are also consistent with those for export variety (though not with the results in Table 3), with positive coefficients on the variety measure found for both the low- and high-skilled cost share, and negative effects found for the medium-skilled cost share. In the case of developed countries therefore, we find evidence to suggest that increased import variety increases the cost shares of high-skilled labour, though this is at the expense of medium-skilled labour rather than low-skilled.

Table 4. Results for All Countries

	(1) Δs_{ls}	(2) Δs_{ms}	(3) Δs_{hs}
Export Variety			
$\Delta \ln w_{hs}$	0.00108	-0.0213***	0.0319***
	(0.00199)	(0.00217)	(0.00133)
$\Delta \ln w_{ms}$	-0.0192***	0.0515***	-0.0142***
	(0.00249)	(0.00271)	(0.00167)
$\Delta \ln w_{ls}$	0.0397***	-0.00232	-0.00651***
	(0.00162)	(0.00176)	(0.00108)
$\Delta \ln w_{ii}$	0.00316***	0.00612***	0.00209***
	(0.000950)	(0.00103)	(0.000636)
$\Delta \ln K$	-0.00233***	-0.00345***	-0.00173***
	(0.000480)	(0.000523)	(0.000321)
$\Delta \ln Y$	-0.0190***	-0.0276***	-0.0149***
	(0.00109)	(0.00118)	(0.000727)
$\Delta \ln V$	0.00354***	-0.00386***	0.00174***
	(0.000744)	(0.000810)	(0.000498)
$\Delta \ln T$	0.00389***	-0.00146**	-0.000685*
	(0.000560)	(0.000610)	(0.000375)
Constant	-0.0137***	-0.00127***	0.00723***
	(0.000361)	(0.000393)	(0.000242)
Observations	6,025	6,025	6,025
R-squared	0.189	0.261	0.221
Import Variety			
$\Delta \ln w_{hs}$	0.000667	-0.0207***	0.0313***
	(0.00199)	(0.00217)	(0.00133)
$\Delta \ln w_{ms}$	-0.0190***	0.0506***	-0.0136***
	(0.00250)	(0.00272)	(0.00167)
$\Delta \ln w_{ls}$	0.0390***	-0.00150	-0.00638***
	(0.00162)	(0.00177)	(0.00108)
$\Delta \ln w_{ii}$	0.00227**	0.00690***	0.00220***
	(0.000944)	(0.00103)	(0.000631)
$\Delta \ln K$	-0.00235***	-0.00353***	-0.00167***
	(0.000481)	(0.000524)	(0.000322)
$\Delta \ln Y$	-0.0169***	-0.0291***	-0.0148***
	(0.00104)	(0.00113)	(0.000693)
$\Delta \ln V$	0.00472***	-0.00484***	-0.000979*
	(0.000876)	(0.000954)	(0.000586)
$\Delta \ln T$	0.00260***	0.000423	-0.00111***
	(0.000541)	(0.000589)	(0.000362)
Constant	-0.0135***	-0.00186***	0.00757***
	(0.000374)	(0.000408)	(0.000250)
Observations	6,020	6,020	6,020
R-squared	0.187	0.260	0.222

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

In the case of developing countries (Table 5) we observe that the level of exports has a significant effect on both the low- and high-skilled cost shares, with the coefficients both being positive. The export variety variable has a significant effect in the case of high-skilled labour only, with the coefficient being negative. In the case of import variety we find a positive and significant coefficient on the level of imports for the low-skilled cost share only. Consistent with the results for the full sample, we find in the case of the import variety variable a positive and significant effect on low-skilled cost shares, and negative and significant effects on the medium- and high-skilled cost shares.

Table 5. Sample split by development level

Results for developed countries

	(1) dcostsh_ls	(2) dcostsh_ms	(3) dcostsh_hs
Export Variety			
$\Delta \ln V$	0.00463***	-0.00927***	0.00693***
	(0.000938)	(0.00113)	(0.000865)
$\Delta \ln T$	0.00190**	-0.00599***	-0.00246***
	(0.000764)	(0.000922)	(0.000704)
Import Variety			
$\Delta \ln V$	0.00637***	-0.00521***	0.00437***
	(0.00117)	(0.00143)	(0.00108)
$\Delta \ln T$	0.000498	-0.00265**	-0.00466***
	(0.000855)	(0.00105)	(0.000792)

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Results for developing countries

	(1) dcostsh_ls	(2) dcostsh_ms	(3) dcostsh_hs
Export Variety			
$\Delta \ln V$	0.00152	-0.00177	-0.00131**
	(0.00110)	(0.00114)	(0.000545)
$\Delta \ln T$	0.00321***	-0.000570	0.000957**
	(0.000810)	(0.000834)	(0.000400)
Import Variety			
$\Delta \ln V$	0.00341***	-0.00512***	-0.00271***
	(0.00125)	(0.00128)	(0.000614)
$\Delta \ln T$	0.00172**	0.000760	0.000326
	(0.000733)	(0.000753)	(0.000361)

Standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

4.3 Subsamples – EU member states

Finally we consider the impact of trade in varieties on EU countries only. This section therefore present results for the EU-27 countries and for the subsamples of EU-15 and CEECs. These results are reported in Table 6.

Table 6. Results for EU country samples

Results for EU-27

	(1) Δs_{ls}	(2) Δs_{ms}	(3) Δs_{hs}
Export Variety			
$\Delta \ln V$	0.00317***	-0.00636***	0.00280***
	(0.000862)	(0.000949)	(0.000532)
$\Delta \ln T$	0.00348***	-0.00132*	0.000419
	(0.000676)	(0.000744)	(0.000417)
Import Variety			
$\Delta \ln V$	0.00357***	-0.00617***	-0.000383
	(0.00103)	(0.00113)	(0.000636)
$\Delta \ln T$	-0.000314	4.81e-05	-0.000708
	(0.000710)	(0.000779)	(0.000437)

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Results for EU-15

	(1) Δs_{ls}	(2) Δs_{ms}	(3) Δs_{hs}
Export Variety			
$\Delta \ln V$	0.00614***	-0.0121***	0.00708***
	(0.00119)	(0.00138)	(0.000894)
$\Delta \ln T$	0.00351***	-0.00803***	-0.000866
	(0.000988)	(0.00115)	(0.000742)
Import Variety			
$\Delta \ln V$	0.00576***	-0.00544***	0.00434***
	(0.00144)	(0.00170)	(0.00109)
$\Delta \ln T$	0.000111	-0.00407***	-0.00112
	(0.00102)	(0.00120)	(0.000767)

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Results for CEECs

	(1) Δs_{ls}	(2) Δs_{ms}	(3) Δs_{hs}
Export Variety			
$\Delta \ln V$	-0.00207	-0.00379**	-0.00206***
	(0.00128)	(0.00159)	(0.000696)
$\Delta \ln T$	0.00143	0.00375***	0.00436***
	(0.00104)	(0.00128)	(0.000563)
Import Variety			
$\Delta \ln V$	-4.80e-05	-0.00677***	-0.00288***
	(0.00137)	(0.00170)	(0.000759)
$\Delta \ln T$	-0.00329***	0.00446***	0.00139**
	(0.00102)	(0.00126)	(0.000563)

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Generally, similar patterns as those observed for the other samples emerge. For the EU-27 trade in export varieties has a positive impact on both the cost shares of low and high educated workers whereas the one on the medium educated is negative. This is similar when considering import varieties in which case however the coefficient on the high educated labour share becomes insignificant. This is similar for the sample of EU-15 country only in which case however import varieties positively impact upon the share of high-educated workers.

Finally, the increase in the import and export varieties – which have been largest for the CEECs on average as shown above – impact significantly negatively on the medium and high-educated labour cost shares with insignificant effects found for the shares of low educated shares. Here it is however further interesting to note that the coefficients concerning trade volumes are significantly positive for both medium and high-skilled workers.

5. Conclusion

In this paper we investigated the impact of trade in varieties and its changes over time on the relative cost shares of low, medium and high-educated workers. Theory and previous studies on specific countries (see Kurokawa (2011) and Atolia and Kurokawa (2013)) would suggest that an increase in traded varieties tend to increase the skill premia in advanced and emerging countries though to a different degree.

We do however find a somewhat different pattern: Changes in both export and import varieties tend to impact significantly negative on the cost shares of medium educated workers whereas the cost shares of high educated and low educated are impacted positively. These results grosso modo holds when considering various subsamples with sometimes the coefficient for the high-educated workers becoming insignificant or even negatively significant. Thus, the results in general suggest that trade in varieties either lead to 'squeeze-out-of-the middle' or even shift labour cost shares towards the low educated workers. Results concerning changes in trade volumes point into the same directions.

This pattern with regard to traded varieties is particularly strong for the CEECs where coefficients of export and import varieties on both the medium and high educated workers are significantly negative. However, changes in trade volumes point towards an increase in the skill premium for the medium and high-skilled workers.

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Appendix

Table A1. Industries and Industry Classification

Code	Industry
AtB	Agriculture, Hunting, Forestry and Fishing
C	Mining and Quarrying
15t16	Food, Beverages and Tobacco
17t18	Textiles and Textile Products
19	Leather, Leather and Footwear
20	Wood and Products of Wood and Cork
21t22	Pulp, Paper, Paper , Printing and Publishing
23	Coke, Refined Petroleum and Nuclear Fuel
24	Chemicals and Chemical Products
25	Rubber and Plastics
26	Other Non-Metallic Mineral
27t28	Basic Metals and Fabricated Metal
29	Machinery, Not Elsewhere Classified
30t33	Electrical and Optical Equipment
34t35	Transport Equipment
36t37	Manufacturing, Not Elsewhere Classified; Recycling

Table A.2. Results for Developed Countries

	(1) dcostsh_ls	(2) dcostsh_ms	(3) dcostsh_hs
Export Variety			
$\Delta\ln w_{hs}$	0.00407*	-0.0206***	0.0505***
	(0.00224)	(0.00270)	(0.00206)
$\Delta\ln w_{ms}$	-0.0228***	0.0779***	-0.0178***
	(0.00361)	(0.00436)	(0.00333)
$\Delta\ln w_{ls}$	0.0493***	-0.0143***	-0.0110***
	(0.00278)	(0.00336)	(0.00257)
$\Delta\ln w_{ii}$	0.0125***	0.00661***	0.00196
	(0.00163)	(0.00197)	(0.00151)
$\Delta\ln K$	-0.00132**	-0.00192***	-0.000294
	(0.000606)	(0.000732)	(0.000558)
$\Delta\ln Y$	-0.0184***	-0.0267***	-0.0226***
	(0.00145)	(0.00175)	(0.00134)
$\Delta\ln V$	0.00463***	-0.00927***	0.00693***
	(0.000938)	(0.00113)	(0.000865)
$\Delta\ln T$	0.00190**	-0.00599***	-0.00246***
	(0.000764)	(0.000922)	(0.000704)
Constant	-0.0173***	-0.00438***	0.00749***
	(0.000455)	(0.000549)	(0.000419)
Observations	2,879	2,879	2,879
R-squared	0.204	0.284	0.293
Import Variety			
$\Delta\ln w_{hs}$	0.00396*	-0.0186***	0.0492***
	(0.00224)	(0.00275)	(0.00207)
$\Delta\ln w_{ms}$	-0.0226***	0.0762***	-0.0159***
	(0.00361)	(0.00444)	(0.00335)
$\Delta\ln w_{ls}$	0.0488***	-0.0132***	-0.0110***
	(0.00278)	(0.00341)	(0.00258)
$\Delta\ln w_{ii}$	0.0123***	0.00611***	0.00333**
	(0.00165)	(0.00202)	(0.00153)
$\Delta\ln K$	-0.00122**	-0.00201***	-0.000233
	(0.000607)	(0.000745)	(0.000563)
$\Delta\ln Y$	-0.0176***	-0.0297***	-0.0226***
	(0.00139)	(0.00171)	(0.00129)
$\Delta\ln V$	0.00637***	-0.00521***	0.00437***
	(0.00117)	(0.00143)	(0.00108)
$\Delta\ln T$	0.000498	-0.00265**	-0.00466***
	(0.000855)	(0.00105)	(0.000792)
Constant	-0.0170***	-0.00502***	0.00827***
	(0.000479)	(0.000588)	(0.000444)
Observations	2,876	2,876	2,876
R-squared	0.205	0.261	0.286

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A.3. Results for Developing Countries

	(1) dcostsh_ls	(2) dcostsh_ms	(3) dcostsh_hs
Export Variety			
$\Delta\ln w_{hs}$	0.00268	-0.0187***	0.0128***
	(0.00326)	(0.00335)	(0.00161)
$\Delta\ln w_{ms}$	-0.0181***	0.0451***	0.000317
	(0.00372)	(0.00383)	(0.00184)
$\Delta\ln w_{ls}$	0.0359***	-0.000769	-0.00474***
	(0.00212)	(0.00218)	(0.00105)
$\Delta\ln w_{ii}$	0.00242*	0.00788***	0.00176***
	(0.00127)	(0.00130)	(0.000625)
$\Delta\ln K$	-0.00342***	-0.00459***	-0.00286***
	(0.000703)	(0.000724)	(0.000347)
$\Delta\ln Y$	-0.0197***	-0.0291***	-0.00917***
	(0.00157)	(0.00162)	(0.000775)
$\Delta\ln V$	0.00152	-0.00177	-0.00131**
	(0.00110)	(0.00114)	(0.000545)
$\Delta\ln T$	0.00321***	-0.000570	0.000957**
	(0.000810)	(0.000834)	(0.000400)
Constant	-0.00914***	0.00167**	0.00477***
	(0.000689)	(0.000709)	(0.000340)
Observations	3,146	3,146	3,146
R-squared	0.187	0.281	0.185
Import Variety			
$\Delta\ln w_{hs}$	0.00234	-0.0183***	0.0129***
	(0.00326)	(0.00335)	(0.00161)
$\Delta\ln w_{ms}$	-0.0177***	0.0440***	1.99e-05
	(0.00374)	(0.00384)	(0.00184)
$\Delta\ln w_{ls}$	0.0351***	0.000249	-0.00458***
	(0.00213)	(0.00219)	(0.00105)
$\Delta\ln w_{ii}$	0.00143	0.00867***	0.00160***
	(0.00125)	(0.00128)	(0.000616)
$\Delta\ln K$	-0.00350***	-0.00465***	-0.00287***
	(0.000706)	(0.000725)	(0.000348)
$\Delta\ln Y$	-0.0178***	-0.0300***	-0.00891***
	(0.00151)	(0.00155)	(0.000744)
$\Delta\ln V$	0.00341***	-0.00512***	-0.00271***
	(0.00125)	(0.00128)	(0.000614)
$\Delta\ln T$	0.00172**	0.000760	0.000326
	(0.000733)	(0.000753)	(0.000361)
Constant	-0.00875***	0.00131*	0.00510***
	(0.000691)	(0.000710)	(0.000341)
Observations	3,144	3,144	3,144
R-squared	0.187	0.283	0.188

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table A.4. Results for EU27

	(1) Δs_{ls}	(2) Δs_{ms}	(3) Δs_{hs}
Export Variety			
$\Delta \ln w_{hs}$	0.000838	-0.0321***	0.0326***
	(0.00283)	(0.00312)	(0.00175)
$\Delta \ln w_{ms}$	-0.0204***	0.0669***	-0.0174***
	(0.00335)	(0.00368)	(0.00207)
$\Delta \ln w_{ls}$	0.0434***	-0.00897***	-0.00606***
	(0.00178)	(0.00196)	(0.00110)
$\Delta \ln w_{ii}$	0.00720***	0.00652***	0.00244***
	(0.00118)	(0.00130)	(0.000730)
$\Delta \ln K$	-0.00308***	-0.00375***	-0.00228***
	(0.000521)	(0.000573)	(0.000321)
$\Delta \ln Y$	-0.0180***	-0.0266***	-0.0134***
	(0.00130)	(0.00142)	(0.000799)
$\Delta \ln V$	0.00317***	-0.00636***	0.00280***
	(0.000862)	(0.000949)	(0.000532)
$\Delta \ln T$	0.00348***	-0.00132*	0.000419
	(0.000676)	(0.000744)	(0.000417)
Constant	-0.0155***	-0.00277***	0.00716***
	(0.000453)	(0.000499)	(0.000280)
Observations	3,983	3,983	3,983
R-squared	0.246	0.275	0.226
Import Variety			
$\Delta \ln w_{hs}$	-0.00107	-0.0304***	0.0310***
	(0.00283)	(0.00311)	(0.00175)
$\Delta \ln w_{ms}$	-0.0182***	0.0650***	-0.0161***
	(0.00337)	(0.00369)	(0.00207)
$\Delta \ln w_{ls}$	0.0425***	-0.00840***	-0.00607***
	(0.00180)	(0.00197)	(0.00111)
$\Delta \ln w_{ii}$	0.00569***	0.00735***	0.00232***
	(0.00118)	(0.00129)	(0.000725)
$\Delta \ln K$	-0.00301***	-0.00391***	-0.00222***
	(0.000524)	(0.000575)	(0.000323)
$\Delta \ln Y$	-0.0153***	-0.0279***	-0.0125***
	(0.00125)	(0.00138)	(0.000772)
$\Delta \ln V$	0.00357***	-0.00617***	-0.000383
	(0.00103)	(0.00113)	(0.000636)
$\Delta \ln T$	-0.000314	4.81e-05	-0.000708
	(0.000710)	(0.000779)	(0.000437)
Constant	-0.0143***	-0.00329***	0.00773***
	(0.000479)	(0.000526)	(0.000295)
Observations	3,978	3,978	3,978
R-squared	0.239	0.271	0.221

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table A.5. Results for EU15

	(1) Δs_{ls}	(2) Δs_{ms}	(3) Δs_{hs}
Export Variety			
$\Delta \ln w_{hs}$	-0.0109***	-0.0326***	0.0354***
	(0.00299)	(0.00347)	(0.00224)
$\Delta \ln w_{ms}$	-0.0184***	0.0798***	-0.0136***
	(0.00378)	(0.00439)	(0.00284)
$\Delta \ln w_{ls}$	0.0692***	-0.0111***	-0.00706***
	(0.00287)	(0.00333)	(0.00215)
$\Delta \ln w_{ii}$	0.0166***	0.00979***	-0.00555***
	(0.00215)	(0.00249)	(0.00161)
$\Delta \ln K$	-0.00126**	-0.00194***	-0.00112**
	(0.000612)	(0.000711)	(0.000459)
$\Delta \ln Y$	-0.0225***	-0.0198***	-0.0188***
	(0.00172)	(0.00200)	(0.00129)
$\Delta \ln V$	0.00614***	-0.0121***	0.00708***
	(0.00119)	(0.00138)	(0.000894)
$\Delta \ln T$	0.00351***	-0.00803***	-0.000866
	(0.000988)	(0.00115)	(0.000742)
Constant	-0.0206***	-0.00410***	0.00920***
	(0.000658)	(0.000765)	(0.000494)
Observations	2,238	2,238	2,238
R-squared	0.300	0.256	0.238
Import Variety			
$\Delta \ln w_{hs}$	-0.0136***	-0.0257***	0.0330***
	(0.00295)	(0.00348)	(0.00223)
$\Delta \ln w_{ms}$	-0.0166***	0.0751***	-0.0116***
	(0.00378)	(0.00446)	(0.00286)
$\Delta \ln w_{ls}$	0.0691***	-0.0114***	-0.00633***
	(0.00288)	(0.00339)	(0.00217)
$\Delta \ln w_{ii}$	0.0180***	0.00683***	-0.00502***
	(0.00215)	(0.00253)	(0.00162)
$\Delta \ln K$	-0.00129**	-0.00188***	-0.00111**
	(0.000617)	(0.000728)	(0.000466)
$\Delta \ln Y$	-0.0207***	-0.0233***	-0.0184***
	(0.00169)	(0.00199)	(0.00128)
$\Delta \ln V$	0.00576***	-0.00544***	0.00434***
	(0.00144)	(0.00170)	(0.00109)
$\Delta \ln T$	0.000111	-0.00407***	-0.00112
	(0.00102)	(0.00120)	(0.000767)
Constant	-0.0197***	-0.00494***	0.00928***
	(0.000677)	(0.000799)	(0.000511)
Observations	2,235	2,235	2,235
R-squared	0.294	0.225	0.222

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Table A.6. Results for EU10

	(1) Δs_{ls}	(2) Δs_{ms}	(3) Δs_{hs}
Export Variety			
$\Delta \ln w_{hs}$	0.0171***	-0.0328***	0.0195***
	(0.00593)	(0.00733)	(0.00322)
$\Delta \ln w_{ms}$	-0.0227***	0.0639***	-0.00660*
	(0.00686)	(0.00849)	(0.00372)
$\Delta \ln w_{ls}$	0.0247***	-0.00205	-0.00451***
	(0.00250)	(0.00309)	(0.00136)
$\Delta \ln w_{ii}$	0.00595***	0.0102***	0.00517***
	(0.00153)	(0.00189)	(0.000831)
$\Delta \ln K$	-0.00546***	-0.00584***	-0.00336***
	(0.000787)	(0.000974)	(0.000427)
$\Delta \ln Y$	-0.0132***	-0.0317***	-0.0120***
	(0.00191)	(0.00236)	(0.00104)
$\Delta \ln V$	-0.00207	-0.00379**	-0.00206***
	(0.00128)	(0.00159)	(0.000696)
$\Delta \ln T$	0.00143	0.00375***	0.00436***
	(0.00104)	(0.00128)	(0.000563)
Constant	-0.00707***	-0.00648***	0.00357***
	(0.000987)	(0.00122)	(0.000536)
Observations	1,462	1,462	1,462
R-squared	0.250	0.328	0.282
Import Variety			
$\Delta \ln w_{hs}$	0.0151**	-0.0306***	0.0194***
	(0.00594)	(0.00734)	(0.00328)
$\Delta \ln w_{ms}$	-0.0195***	0.0603***	-0.00658*
	(0.00690)	(0.00853)	(0.00381)
$\Delta \ln w_{ls}$	0.0229***	-0.000290	-0.00471***
	(0.00253)	(0.00313)	(0.00140)
$\Delta \ln w_{ii}$	0.00448***	0.00970***	0.00346***
	(0.00146)	(0.00180)	(0.000806)
$\Delta \ln K$	-0.00537***	-0.00616***	-0.00351***
	(0.000787)	(0.000973)	(0.000435)
$\Delta \ln Y$	-0.0112***	-0.0310***	-0.00973***
	(0.00182)	(0.00225)	(0.00101)
$\Delta \ln V$	-4.80e-05	-0.00677***	-0.00288***
	(0.00137)	(0.00170)	(0.000759)
$\Delta \ln T$	-0.00329***	0.00446***	0.00139**
	(0.00102)	(0.00126)	(0.000563)
Constant	-0.00474***	-0.00715***	0.00491***
	(0.00102)	(0.00126)	(0.000563)
Observations	1,460	1,460	1,460
R-squared	0.255	0.332	0.260

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1