Central European
Labour Studies
Institute

www.celsi.sk

CELSI Discussion Paper No. 26

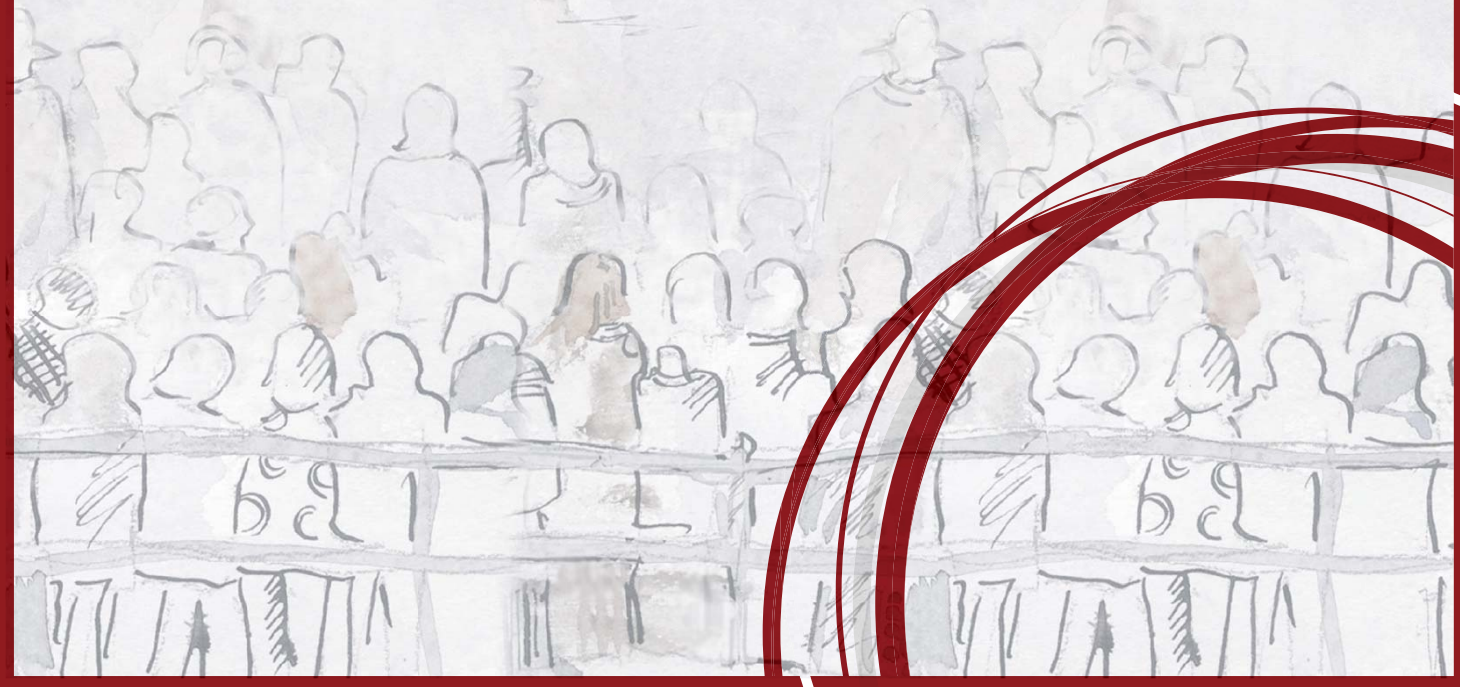
FOREIGN MARKET EXPERIENCE, LEARNING BY HIRING AND FIRM EXPORT PERFORMANCE

September 2014

JAAN MASSO

KÄRT RÕIGAS

PRIIT VAHTER



Foreign Market Experience, Learning by Hiring and Firm Export Performance

CELSI Discussion Paper No. 26
September 2014

Jaan Masso
University of Tartu

Kärt Rõigas
University of Tartu

Priit Vahter
University of Tartu

Central European Labour Studies Institute (CELSI)

Zvolenská 29
821 09 Bratislava
Slovak Republic

Tel/Fax: +421-2-207 357 67
E-mail: info@celsi.sk
Web: www.celsi.sk

CELSI Discussion Paper No. 26
September 2014

ABSTRACT

Foreign Market Experience, Learning by Hiring and Firm Export Performance

Export experience of managers and other top specialists is among the key drivers of export decisions in firms. We show evidence of this regularity based on employer-employee level data from the manufacturing industry in Estonia. We find that hiring managers and other high-wage employees with prior experience in exporting to a specific geographical region is associated with a higher probability of export entry to that region. However, there is little evidence of significant effects on export intensity. Notably, the relationship between export experience and a firm's export decisions is usually stronger if the prior export experience is from an exporter that is located nearby in the product space. Our findings suggest that the contribution of prior trade experience of employees and the firm's productivity as drivers of export market entry are of comparable magnitude.

Keywords: export experience, export entry, labour mobility, learning-to-export

JEL Classification: F10, F14, J31

Corresponding Author:
Priit Vahter
Faculty of Economics and Business Administration, University of Tartu
Narva Rd. 4 - A115, Tartu, 51009, Estonia.
T: +372-7-376 367
E-mail: priit.vahter@ut.ee, priit.vahter@gmail.com

* We are grateful to Statistics Estonia for granting access to the data used in the paper. The datasets have been processed in accordance with the confidentiality requirements of Statistics Estonia. The authors acknowledge financial support from the Estonian Science Foundation project No. 8311, the Ministry of Education and Research of the Republic of Estonia target financed project No. SF0180037s08 and Estonian Research Agency project No. IUT20-49 "Structural Change as the Factor of Productivity Growth in the Case of Catching up Economies". We thank the participants of the MEIDE 2013 conference, Estonian Economic Association 2014 conference and seminar at the University of Sheffield for useful comments.

Introduction

The movement of employees between firms is an important channel of inter-firm knowledge transfer. Various papers estimate FDI spillovers through labour mobility (Görg and Strobl 2005, Balsvik 2011) and the effects of the mobility of R&D workers (Jaffe et al. 1993) or foreign specialists (Markusen and Trofimenko 2009, Hiller 2013). Labour mobility can also transfer export related knowledge between firms, and in this way affect various market and product level decisions about exporting (Mion and Opromolla 2014, Hiller 2013, Aitken et al. 1997).

The study of the relationship between labour mobility or export experience on the one hand, and export market level decisions on the other, is difficult due to the substantial data requirements and the likely endogeneity of the mobility of export-experienced employees. Many empirical studies have concentrated on the central role of productivity as a means of covering the sunk costs involved in exporting (e.g. a literature review can be found in Bernard and Jensen 1999, and Wagner 2007). However, analysis of the role of prior export experience of managers deserves more attention than it has so far in empirical literature on international trade. Only a limited number of studies have used representative firm-level datasets to estimate its contribution in determining export decisions (e.g. Sala and Yalcin 2014, Mion and Opromolla 2014).

We investigate how hiring high-wage employees with different types of export experience is associated with market-specific export decisions by their new employer and whether this relationship also depends on the proximity of the product level between firms. While recent studies show the relevance of hiring employees with specific market related experience for successful export market entry (Mion and Opromolla 2014), the effects of this type of learning by hiring can potentially also depend on product level proximity between the firm the experience was acquired in and the new employer. Hiring employees with export experience

in product groups similar to yours could be expected to result in stronger effects. The reasons for that are the higher relevance of external knowledge and higher absorptive capacity of the recipient firm due to the similarity of the contexts of the firms (Cohen and Levinthal 1990). However, too much similarity in terms of the context of the donor and recipient could also constrain potential learning from prior experience (e.g. Sapienza et al. 2004).

We concentrate on the hiring of employees and managers that belong to the upper levels of wage distribution within narrowly defined industries. The analysis is based on Estonian employer-employee level data combined from three different sources. We use employee-level labour mobility data from the Tax and Customs Office dataset, merged with firm-level variables from the Commercial Registry and detailed firm-product-destination market-level export and import data from Statistics Estonia. The advantage of our dataset is that it covers the full population of Estonian exporters, firms and employees. The analysis concentrates on the manufacturing industry. The merged yearly data cover the period 2006–2011; detailed product (at CN 8-digit level) and market level export information is available for each firm for a significantly longer period – from 1995.

We test the robustness of standard probit and fixed effects regression analysis based on the application of instrumental variables (IV) to allow for the endogeneity of prior export experience. Our results show that prior region-specific export experience (acquired at a prior workplace) among managers and other high-wage employees is associated with a higher propensity for export entry to this region. We find that the role of export experience is significantly enhanced if the experience originates from firms that are similar to the new employer in terms of their product mix.

The remainder of the paper is structured as follows. Section 2 provides an overview of the related literature, Section 3 describes the data, Section 4 outlines our empirical approach, Section 5 presents the results of the econometric analysis and Section 6 concludes.

Literature Review

Knowledge transfer through labour mobility can affect firm performance. For example, a study by Stoyanov and Zubanov (2012) shows, using data from the Danish manufacturing sector, that firms that employ workers with experience from establishments with high productivity, themselves gain in terms of productivity after hiring the new employee. The positive effects of learning by hiring for productivity through hiring technicians and highly educated workers are also shown, again based on Danish data, in Parrotta and Pozzoli (2012). Important channels of learning by hiring include hiring employees with experience of working at multinationals and exporting firms. In the case of FDI, the knowledge transfer and productivity related spillovers through labour mobility are investigated by Aitken et al. (1997), Görg and Strobl (2005), Balsvik (2011), Martins (2005) and Poole (2013). These papers tend to find evidence in support of FDI productivity spillovers taking place through labour mobility from multinationals to local firms.

A smaller number of studies investigate knowledge spillovers through the presence of exporters. The presence of exporters in a sector or a region can affect the trade activities of local firms in several ways (Aitken et al. 1997). Firstly, knowledge of export prospects, experience with foreign markets, knowledge of foreign distribution networks can be transferred through labour mobility between exporters and other firms, when current employees (esp. the managers) of exporters move to other firms and take the export related know-how with them. In addition, such outcomes can also take place due to interaction between the current employees of exporters and individuals from other firms. Positive outcomes can materialize because of imitation, when local firms copy the trade practices of successful exporters. As with FDI spillovers (see e.g. Javorcik 2004, Görg and Greenaway

2004), such positive outcomes can be due to a tougher competition environment, as a larger share of successful exporters in a sector or region may induce other local firms to invest more in international trade activities in order to survive the superior competition.

Most of the studies that investigate how the presence of exporters affects other firms—export spillovers—have used variables of the presence of exporters at the sector and regional level as indirect proxies for knowledge transfer. These papers find rather mixed evidence of spillovers; both no effects and significant positive effects have been found. For example, no effects are found in Aitken et al. (1997) and Barrios et al. (2003), but significant effects in Koenig et al. (2010) and Silvente and Giménez (2007).

Several recent papers that use firm-level proxies for labour mobility and firm-level export data do provide evidence suggesting a significant positive relationship between various forms of labour mobility and export decisions by firms. For example, Hiller (2013) shows, using the IV approach, that international labour mobility is positively related to foreign trade decisions in firms in Denmark. Previous export experience among workers and managers has been found to be among the key determinants of export entry decisions, export status and trade intensity for Portuguese firms (Mion and Opromolla 2014). Similarly, Sala and Yalcin (2014) and Minondo (2011) show that hiring managers with previous export experience is positively associated with a firm's likelihood of foreign market entry, based on micro data from Denmark and Spain and probit or linear probability models.

Arguably, export related knowledge is to a large extent tacit, created by experience and is to a significant extent embodied in the employees. Therefore, one can expect substantial transfer of export related knowledge when managers or other employees with export experience move between firms (Mion and Opromolla 2014, Aitken et al. 1997). Mion and Opromolla (2014) provide further evidence that what matters for export decisions is the movement of managers, not the movement of employees in general.

It is well known both from the theory (Melitz 2003) and empirical literature on trade (see Wagner 2007 for literature review) that exporting entails large sunk costs. Therefore, only the more productive firms are able to successfully enter foreign markets (e.g. Bernard and Jensen 1999, 2004b) and preparing to export entails investments to increase productivity (López 2009, Molina and Muendler 2013). A less studied means for overcoming these sunk costs is hiring employees that have previously worked at exporters, who have either general exporting experience or trade experience with a specific market or product group (Molina and Muendler 2013). It is of interest to study the relative magnitudes of the effects of prior productivity and hiring employees with export experience on the subsequent export decisions of firms.

Notably, export entry costs are clearly market specific, as shown by Eaton et al. (2011) and Moxnes (2010), and therefore, specific foreign market level experience can be expected to be highly relevant. Mion and Opromolla (2014) have shown the importance of previous market/region-specific export experience in determining the export entry decisions of firms.[2] In general, a common assumption in almost any kind of spillover study is that spillovers may be greater between firms that are located close in the technology space or close to the productivity frontier (e.g. Glass and Saggi 1998). To the best of our knowledge, the small but growing empirical literature using employer-employee level datasets to study the relationship between mobility of employees with export experience and firm's export decisions has not yet investigated the potentially important role of specific product-group experience. Hiring managers with prior experience in exporting products that are relatively similar to those of the new employer can possibly result in stronger effects on export markets entry decisions by the new employer. This is due to the greater relevance of external knowledge and the higher absorptive capacity of the recipient firm because the firms have similar contexts (Cohen and

[2] However, we note that the evidence is not fully conclusive about the role of prior experience and presence of employees with export experience. For example, a small cross-section survey that provides descriptive evidence of rapidly internationalizing Chinese firms by Vissak et al. (2012) suggests no significant role of prior experience with foreign markets in the rapid expansion of Chinese international new ventures.

Levinthal 1990, Lane and Lubatkin 1998). The assimilation of external experience may work faster in a similar context, where it may be easier for the firm to "recognize the value of new, external knowledge, assimilate it and apply it to commercial ends" (Cohen and Levinthal, 1990, p.128). At the same time, too much similarity in terms of the context of the donor and recipient may also constrain the potential learning from prior external experience (e.g. Sapienza et al. 2004).

Data Description

To analyse the linkages between labour mobility and firm-level outcomes, matched employer-employee data is usually necessary. We have constructed such data for the purposes of our analysis by merging two firm-level datasets, namely Statistics Estonia's firm-product-destination market-level export and import data and the Estonian Commercial Registry data on firms annual reports, with employee-level data from the Tax and Customs Office on the employees' payroll taxes. The datasets were merged using the firms' unique registry codes. The merged dataset covers the years 2006–2011.

The trade dataset includes export data disaggregated by destination market and detailed product level (as described by the combined nomenclature (CN) 8-digit code) for each firm in Estonia from 1995 to 2011. Using registry numbers, the detailed trade data from Estonia have been merged with Estonian Commercial Registry information on firm financial statistics from annual reports (balance sheets, profit and loss statement). The data are at firm level (legal entities) and available for the full population of firms. This detailed trade dataset has previously been used in Masso and Vahter (2014a, 2014b). However, the merged trade and employer-employee dataset for Estonia is a by-product of this paper.

During the period 1995–2011 there were altogether 29,880 unique firms with exporting activities in at least one year. Owing to the small size of the country, the share of exporters in the manufacturing industry is rather high, 49 per cent in 2003 (albeit varying significantly

over time). It is quite typical that firms start exporting in the first year of their activity, while in larger countries it is more common to start exporting after a period of activity at the home market.

Estonia joined the European Union (EU) in 2004, which also marks some changes in export data collection. Until 2004 all trade flows were recorded in the customs statistics, since then transactions by firms with intra-EU trade are collected based on the Intrastat system. This means that firms with exports value of more than about (depending on a year) 90,000-100,000 EUR per year were fully collected by the statistics authority during our studied period.

The average number of markets (destination countries) per exporting firms in our dataset is 4.6 in 2009. The most common export markets are neighbouring countries: Sweden, Finland, Latvia and Russia. There are substantial dynamics in the dataset at the firm, market and product level. Lots of entry into exporting takes place every year; new exporters typically have a smaller number of products and markets (in 2003, 3.6 markets for continuing exporters and 1.6. for new exporters). Among different types of exporters, multi-market and multi-product exporters who have superior performance characteristics, as shown in Masso and Vahter (2014b).

The key explanatory variable in our empirical analysis is (market specific) export knowledge and experience. This is defined as the export experience that employees have attained in previous locations (firms) of employment; in other words, whether the employees had worked in the past in another firm that exported (to a specific destination). For that purpose, it is necessary to track individual employment over the time. We have used the Estonian Tax and Customs Office dataset on all employee (the total number varies annually around 600 thousand) social contributions (payroll taxes) paid for the years 2006–2012 for that purpose. Social security tax is applied to all employees at the rate of 33 per cent of the gross wage and its payments enable us to identify an individual's employment status at a particular firm.

We introduced the following adjustments to the data. Firstly, similarly to Mion and Opromolla (2014), we allowed each employee only one job in a given period (year) – for those with multiple jobs in the same period we kept only the main job, proxied as the one with the largest wage in that period. Secondly, we focused on year-to-year mobility: changes in employment from January of a particular year to January of the next year. Third, we interpolated away short (1-3 months) breaks in the payment of wages; that is, employees with wage payments in January and March but not February of a given year were assumed to have a stable (without breaks) employment relationship with the firm in that period.

Apart from payroll taxes, the tax dataset includes only the age and gender of the employee. One potentially significant concern is that we do not observe the occupation of the employee. Previous studies have shown especially the mobility and experience of managers to be important (Mion and Opromolla 2014). We have proxied the group of managers and top specialists using employees whose wages belong to the top 20 per cent or top 10 per cent (the first one is used in the reported estimations) of the wage distribution in a given year and 3-digit NACE industry. If there are no such employees in a firm, then we define the employee with the highest wage as the manager. Naturally, income differs considerably from occupation to occupation and managers are typically at the top of the ranking of broad occupational groups (e.g. as defined by 1-digit ISCO codes) in terms of wages. Still such a classification will result in some errors as some non-managers are expected to earn more than some managers.

However, in the Estonian data such an approximation should result in a relatively low error rate given the relatively high wage inequality and high relative returns to managerial occupations (as compared to countries like Sweden with much more compressed wage distribution). For example, in 2010 according to the structure of earnings survey in Estonia, the ratio of the 90th to the 10th wage percentile was 4.1 versus 3.7 in the old EU members

(EU15). Concerning occupations, while in Estonia managers (ISCO category 1) earned 3.1 times more than the lowest paid occupational group, in the UK (which does not have a low level of wage inequality) just 2.4 times more and in Ireland 1.9 times more (based on Eurostat data). Therefore, in the case of Estonia, wages differ relatively more across occupations, and that should provide some support to our wage-based proxy for occupation.

The calculations of the previous export experience were conducted as follows. In order to have export market experience, people need to have worked previously in an exporting firm. Therefore, the variables on experience start with 2007, as we have individual-level employment data since 2006. For general export experience, it is sufficient to have been working in any exporting enterprise in the past. However, for specific export experience (knowledge), experience related to a specific market or region, the employee must have worked in the past in an enterprise exporting to the particular destination country or region. In the analysis of market-specific experience, we have chosen to aggregate the export destination markets into the major groups based on geographical proximity. In particular, we have defined the following main country groups:

a) Group 1 - neighbouring EU countries: Scandinavian countries (Finland, Sweden, Denmark) and Baltic States (Latvia, Lithuania). These are the most important export destination countries, sharing cultural similarities and close economic ties.
b) Group 2 - former Soviet countries, excluding the Baltic States: Russia, Belarus, Ukraine, Moldova, Georgia, Armenia, Azerbaijan, Kazakhstan, Turkmenistan, Uzbekistan, Kyrgyzstan and Tajikistan. In the tables below, we denote these countries by the abbreviation ‘CIS’, Commonwealth of Independent States, although Georgia has not been a member of CIS since 2009.
c) Group 3 - the rest of the European Union (EU 27, excluding Group 1 countries).
d) Group 4 - the rest of the world.

In addition, we divide the very heterogeneous Group 4 into more specific regions. We show these additional results separately for two groups:

e) USA, Australia, Canada, New Zealand (English language based countries outside Europe);

f) Asian countries (incl. China and India among others).

In the following Table (Table 1) we show descriptive statistics of Estonian manufacturing firms for 2007–2011, grouped according to export experience of high-wage employees. It can be seen that the average labour productivity is higher in groups with previous export experience of high-wage employees, compared to firms where managers and other high-wage employees do not have prior export experience (see Column 1 in Table 1). Groups with experience do not, however, differ significantly from each other based on these performance characteristics. Lagged wage per employee and export intensity are the lowest in the 'without experience' group. For the experience groups, there is some indication suggesting sequential export expansion. The sequential pattern of export expansion is also brought out in previous studies (see Rauch and Watson 2003, Albornoz et al. 2012, Eaton et al. 2008). For example, export intensity to neighbouring countries is the lowest in the group with experience of neighbouring countries, which means that firms with export experience to other countries are, obviously, also exporting to neighbouring countries as well.

We can see the same pattern in the case of dummies indicating exporting to a specific region. Based on these, exporting to neighbouring EU countries is the most frequent in all of the experience groups: respectively 12.6 per cent of firms in the 'without experience' group are exporting to neighbouring countries, in the group with experience the corresponding figure is above 50 per cent. The average number of export markets is again the lowest among firms that do not have high-wage employees with any export experience, and the highest in firms having employees with CIS export experience.

Table 1. Firm-level averages of key variables, manufacturing industry

	Without experience	Experience with neighb. countries	Experience with the CIS	Experience with other EU	Experience with the rest of world
Log labour productivity(t-1)	11.992	12.408	12.448	12.426	12.423
Log wage per employee(t-1)	10.745	11.702	11.739	11.722	11.727
Log export intensity to neighb. countries	1.537	6.485	6.945	6.765	6.699
Log export intensity to CIS	0.403	1.749	2.168	1.874	1.844
Log export intensity to other EU	0.740	4.013	4.598	4.405	4.246
Log export intensity to the rest of world	0.795	3.631	3.993	3.871	4.005
Export to neighb. countries (dummy)	0.126	0.529	0.568	0.554	0.547
Export to CIS (dummy)	0.038	0.174	0.216	0.185	0.184
Export to other EU (dummy)	0.067	0.363	0.413	0.397	0.383
Export to the rest of world (dummy)	0.076	0.351	0.387	0.377	0.385
Number of export markets	0.495	3.049	3.524	3.289	3.261

Notes: firm-level panel data, manufacturing industry. Period: 2007–2011.

Further descriptive statistics for the variables used in our regression models are provided in Table A1 in Annex 1. The average age of the firms in our estimation sample is 2 years, and 9.4 per cent of firms have foreign ownership. The share of firms having high-wage employees with export experience amounts to 35 per cent. The share of firms with employees with neighbouring EU experience is the highest (18.6 per cent) compared to the other groups. There are on average approximately 12 per cent of firms with high-wage employees with export experience to the CIS. The shares of firms with employees with experience to other EU and the rest of the world are respectively 15.6 per cent and 15.2 per cent.

Empirical Strategy

Wage Analysis

As the first step in the analysis of the importance of export experience, we determine whether there is a wage premium for managers with prior export experience. Evidence of a wage premium would suggest that firms value this type of prior experience and that their experience can potentially also affect (export) decisions in firms. To that end, we estimate the wage regressions augmented with indicator variables showing the presence of export experience. Formally, the wage equation is as follows:

$$\ln W_{ikt} = \beta X_{ikt} + \phi_i + \lambda_k + u_{ikt}, \quad (1)$$

where the dependent variable $\ln W_{ikt}$ denotes the log real wage for employee *k* in firm *i* at time *t*, β is the vector of regression parameters, X_{ikt} is the vector of explanatory variables, the terms ϕ_i, λ_k and u_{ikt} denote respectively firm fixed effects, employee fixed effects and a random error term. As in the analysis by Balsvik (2011) on wage premiums related to MNE experience, we include employee fixed effects. We estimate the model using two-way fixed effects in order to control for the unobserved employee-level (e.g. education) and firm-level (e.g. the presence of trade union or collective agreements) factors. The model with 2-way fixed effects was estimated using the Stata package *felsdvreg* (Cornelissen 2008). We acknowledge that we lack several important variables for determining wages, primarily education data. The list of explanatory variables in wage regressions includes employee age and its square (to capture the length of the potential work experience), firm size and its square, a dummy for foreign-owned firms (that typically have higher wages), a dummy variable indicating whether the employee has changed job in the last year (expected to be negative) and a dummy variable for the prior export experience of the employee from his previous work places. In the regressions estimated with only firm-level fixed effects, we also included the dummy for gender as an additional explanatory variable (to account for the rather

high gender wage gap in Estonia). Table A2 in Annex 1 presents the descriptive statistics for the variables included in the wage regressions.

Export Performance

The core empirical relationship of interest is the effect of prior export experience among high-waged employees (gained from their previous employer) on export performance. As measures of exports, we use both a dummy indicating exporting to a specific region and the intensity of exporting to a specific region. We endeavour to address the endogeneity of export experience via instrumental variables.

For estimating the probability of exporting to a specific region, we use an IV probit model:

$$\exp\_regionj_{it}^{*} = \beta_1 sh\_\exp erience\_regionj_{it} + \beta_2 X_{it} + \lambda_t + \gamma_{indt} + \varepsilon_{1it} \qquad (2)$$

In Equation 2, subscript i denotes firm, t year and ind industry. The dependent variable $\exp\_regionj_{it}^{*}$ is a firm's latent (unobserved) propensity to export to specific region j (to neighbouring countries, to CIS, to other EU or to the rest of the world). The observed variable $\exp\_regionj_{it}$ equals 1 when firm i is exporting to a specific region and 0 otherwise. A firm is going to export to a market ($\exp\_regionj_{it} = 1$) if the latent variable is above c ($\exp\_regionj_{it}^{*} > c$), while c is a constant threshold level. So, the latent variable reflects the decision criterion, whether to engage in export activities, considering the related costs and expected returns.

The main variable of interest is $sh\_\exp erience\_regionj_{it}$, which shows the share of high-wage employees with region j specific export experience. This is calculated as the ratio between the number of high-wage employees with experience in region j in firm i and the total number of employees in firm i. X_{it} is a vector of explanatory variables; the choice of explanatory variables is based on previous papers about various drivers of firm-level exporting that emphasize the role of sunk costs and prior productivity of exporting in export

decisions, as in Bernard and Jensen (2004a) or Hiller (2013), among many. The vector of explanatory variables consists of firm size (log of employment) l_{it}, firm age (years) a_{it}, a dummy indicating foreign ownership for_{it}, cash to assets ratio cta_{it}, log of labour productivity (value added per employee) lagged by one year $\log(lprod)_{i(t-1)}$, log of capital intensity $\log(K/L)_{i(t-1)}$ lagged by one period, log of wage per employee lagged by one period $\log(w)_{i(t-1)}$, and the share of high-wage employees in the total number of employees in firm i sh_hw_{it}. Dummies for different years λ_t and sectors γ_{indt} are also included in the model. The last term, ε_{1it}, is an error term, which is assumed to be normally distributed with a zero mean and variance σ_1^2. We expect firm size, foreign ownership, liquidity, capital intensity, share of high-wage employees (a proxy of skill intensity) and average wage rate to be positively associated with exporting. An especially clear and strong relationship is expected in the case of prior productivity, as implied by heterogeneous producer models from trade theory.

To analyse the intensity of exporting to a specific region, we use the following model, estimated using the instrumental variable method (two stage least squares, 2SLS) with firm-level fixed effects:

$$\log(\text{expint}\_regionj)_{it} = \beta_3 sh\_\text{experience}\_regionj_{it} + \beta_4 X_{it} + \lambda_t + \kappa_i + \varepsilon_{2it} \quad (3)$$

In Equation 3, the dependent variable $\log(\text{expint}\_regionj)_{it}$ stands for the log of export intensity to specific region j. Export intensity is calculated as follows: the value of exports to a specific region is divided by the total number of employees in firm i. The explanatory variables are the same as those used in the Equation 2. Again, year dummies are included in the model and the error term ε_{2i} is assumed to be normally distributed with a zero mean and variance σ_2^2.

We use standard probit and IV probit models to estimate Equation 2 and OLS with firm fixed effects or two stage least squares (2SLS) for Equation 3. To endeavour to identify the effects of region-specific prior export experience we use three different instruments. These instrumental variables are as follows:

i) the share of region-specific export experience in other firms in the same 3-digit sector, sh_others_{it};

ii) firm exit rate in 3-digit NACE sector, $exit_{it}$;

iii) share of employees that have moved to the firm because of the closure of their previous employer (i.e. an exogenous reason for labour mobility), $source\_exit_{it}$.

Altogether we have 3 instrumental variables in each of our IV models. The share of region-specific export experience in other firms is slightly similar to the instrument used by Hiller (2013).[3] This instrument reflects the use of high-wage employees with export experience to a specific region in a given 3-digit manufacturing sector. This can be seen as a proxy of the supply of a high-wage workforce in the sector. Usage of this variable as an instrument is based on a restrictive assumption that the share of employees with export experience in other firms in the same sector is not related to the export performance of a particular firm through other channels than the mobility of experienced employees.

The second instrument (firm exit rate) is also calculated at the 3-digit sector level and is used in the early 2011 version of the work by Mion and Opromolla (2014) as an instrument for managers with export experience. This variable should capture the availability of workforce with export experience in the labour market. The third instrument is also related to the exit rate of firms. However, this variable is calculated at firm level, and it shows the share of employees that have moved because of the closure of their previous employer. The rationale

[3] She studied the effects of hiring immigrants on exporting in Denmark and used region-specific usage of immigrant workforce as an instrument for firm's own hiring of immigrants. This assumes that regional immigrant stock is exogenous to the firm.

behind using firm closure for identifying returns to experience stems from Dustmann and Meghir (2005). They argue that firm closure can be seen as exogenous because the following mobility of workers is not directly due to their performance in a previous work place. Therefore, an increase in the supply of high-wage employees with export experience due to firm closure could be considered an exogenous labour supply for a given firm (Mion and Opromolla, 2014).

The Role of Product Proximity

The relevance of export related knowledge obtained at previous places of employment for the new employer is likely to depend on the specificity of products or technology. The benefits of prior export experience are likely to be greater if the person used to work in a firm active in a similar field (producing similar products) to the new employer.

We account for this by investigating how the effects of export experience vary depending on the product level proximity between the previous and new employer of the person who has moved to a new workplace. There are various approaches to the empirical measurement of the positions and differences of firms in terms of technology or product space. We focus on a product level distance measure. In calculating the distance between firms in the export product space, we have focused for simplicity and clarity on the exporters' core (i.e. best performing) product group (the product group with the highest share in the firm's exports), proxied by the 4-digit CN product group that has the largest share of the firm's total export sales over the last three years. To measure the product level distance between any two core competencies (i.e. two 4-digit CN product groups), we use the product proximity matrix developed by Hidalgo et al. (2007). They developed this based on an international trade dataset for 1962–2000 (by Feenstra et al. 2005). Hidalgo et al. (2007) provide a distance measure (varying between 0 and 1) for the pairs of 4-digit SITC Rev. 4 product codes.

The measure has its origins in the analysis of country-level data, relying on the assumption that technologically similar and proximate products are probably exported in tandem. Therefore, for example, any country able to produce and export apples has probably most of the capabilities and resources needed to produce and export pears (The Product Space…2005; Hausmann and Klinger 2006). As the Estonian export data use CN (Combined Nomenclature) product codes, we have used the CN-SITC correspondence tables (Eurostat 2014) to establish the link between the two.

Naturally, the particular employee (let us denote that with index k) may have worked in different exporting companies in the past with different core products. Therefore, the product level distance (denoted as $DIST_{ikt}$ for employee k at firm i at time t) between the new employer's core competence and the previous employer's core competence will take different values for each previous employer. In the case where there is more than one value of the product level distance for the particular worker (i.e. more than one prior employer), we take the arithmetic average of the different technological distances, i.e. $\overline{DIST_{ikt}} = \left(DIST_{ikt}^{1} + \ldots + DIST_{ikt}^{N}\right) / N_{ikt}$. Here N_{kt} shows the number of the employee's previous employers.

In order to estimate the relevance of export experience for export decisions with firm-level regressions we have aggregated the employee-specific export experience to the level of the firm and calculate the total number (and share) of high-wage employees with export experience from previous places of employment. As the next step, we account for product level proximity in export experience. For that, we do the same aggregation as before, but now by weighting each employee with the proximity of his export experience to the current employer's core competence. Employees with closer (less distant) experience are attributed higher weight in the firm-level distance-adjusted experience indicator. The employee-level proximity between current and prior employers is therefore defined as 1 minus the average

product level distance between the core competencies of current and prior employers, or $PROX_{ikt} = 1 - \overline{DIST}_{ikt}$. More formally, the share of employees with export experience (weighted with the proximity of that experience to the firm's core competence) is derived as follows:

$$\text{W\_}sh\_\text{exp}erience\_region_{it}^{j} = \frac{\sum_{k} D_k^j \cdot PROX_{ikt}}{N_{it}} \quad (4),$$

where dummy variable D_k^j is 1 if and only if employee k has region j specific export experience (has worked in the past in companies exporting to region j). By definition, such a measure is smaller or equal to the previous unweighted aggregate, or the share of employees with some export experience in the firm's total number of employees. If the product distance or proximity affects the role of export experience (e.g. if it is not only the general market-specific knowledge that matters), then we would expect the new measure to have a stronger relationship with the dependent export variables in the regression analysis.

Results

Wage Analysis

The key results of estimating the wage equation (1) based on employee-level data are shown in Table 2 below, both with firm fixed effects and two-way (firm and employee) fixed effects. This way we account to some extent for firm and employee-level heterogeneity, and we take into account other time-invariant determinants of an employee's wages.[4] The results presented here are cleaned of outliers, we remove the upper and lower percentiles of the wage distribution. We have also experimented with a more strict removal of potential outliers.

[4] This is particularly important as we do not have many employee-level control variables available in the dataset, we are forced to assume in our estimation of wage regressions that other key individual-level determinants of his or her wages, including skill level, ability and motivation are fixed over the studied period 2007–2011.

Our wage regressions show the conditional wage premium of experienced employees, and not necessarily the causal effects of experience on wages. Table 2 shows the estimated wage premium of general export experience for all employees, managers-top specialists (top 20 per cent of the wage distribution), managers-top specialists in non-exporters and separately for managers-top specialists in exporting firms.

It is evident that having prior export experience is, *ceteris paribus*, associated with the higher wages of the person at his or her new place of work. This experience-related wage premium is larger for managers than for all employees, correspondingly about 10 per cent and 6 per cent higher wages than other employees on average (based on the model with firm fixed effects). This is an expected result, as managers are the central drivers of export decisions. We also find that non-exporters value export experience less than exporters (see Table 2 below). Some key results are also confirmed once we take into account the individual-level fixed effects, except that the wage premium for all employees is 6 per cent and for managers 4 per cent. The presence of experience exporting to a specific country group is associated with a statistically significant wage premium in the case of experience with neighbouring EU countries (5.5%), CIS countries (9.5%) and the rest of the world (group 4, 6.9%). We note that the results of a significant experience-related wage premium are driven by the upper part of the wage distribution of managers and top specialists. If we exclude the top 3 per cent of (all) wage earners from the analysis, then the export experience premium is not statistically significant any more.

In general, the estimation of wage equations has shown that firms value prior export experience. There is therefore good reason to expect some knowledge transfer through the mobility of export-experienced employees and potential effects on a firm's export decisions or more general benefits on firm performance.

Table 2. Wage equations augmented with export experience variables (dependent variable: log real monthly wages)

Variable	All employees	Managers, all firms	Managers, non-exporters	Managers, exporters	All employees	Managers, all firms	Managers, non-exporters	Managers, exporters
	Firm and employee FE	Firm and employee FE	Firm and employee FE	Firm and employee FE	Firm FE	Firm FE	Firm FE	Firm FE
Male					0.305***	0.088***	0.084***	0.089***
					(0.002)	(0.003)	(0.007)	(0.003)
Age in years	0.108***	0.095***	0.074***	0.095***	0.054***	0.021***	0.015***	0.022***
	(0.003)	(0.004)	(0.011)	(0.004)	(0.001)	(0.001)	(0.002)	(0.001)
Age in years squared	-0.001***	0.000***	0.000	0.000***	-0.001***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Firm size	0.111***	0.130***	0.180***	0.114***	0.039***	0.095***	0.133***	0.018
	(0.008)	(0.010)	(0.016)	(0.015)	(0.009)	(0.010)	(0.014)	(0.017)
Firm size squared	-0.006***	-0.010***	-0.023***	-0.008***	-0.011***	-0.021***	-0.026***	-0.014***
	(0.001)	(0.001)	(0.003)	(0.001)	(0.001)	(0.001)	(0.003)	(0.002)
Foreign-owned firm	-0.032***	-0.029**	0.153***	-0.018*	-0.031***	-0.026**	0.204***	-0.060***
	(0.009)	(0.011)	(0.037)	(0.010)	(0.012)	(0.012)	(0.035)	(0.013)
Changed job during the last year	-0.059***	-0.038***	-0.034***	-0.029***	-0.244***	-0.084***	-0.067***	-0.091***
	(0.003)	(0.004)	(0.009)	(0.004)	(0.003)	(0.003)	(0.006)	(0.004)
Export experience dummy	0.061***	0.041**	-0.133	0.024	0.060***	0.105***	0.064***	0.112***
	(0.008)	(0.016)	(0.182)	(0.017)	(0.003)	(0.004)	(0.010)	(0.005)
Number of obs.	320187	99803	24449	75354	320187	99803	24449	75354
R-squared					0.115	0.042	0.027	0.049

Notes: * significant at 10%; ** significant at 5%; *** significant at 1%. Standard errors in parentheses. FE- fixed effects.

Export Equations

For comparison purposes we start by presenting the marginal effects of a simple probit model of Equation (2) in Table 3, followed by the second and first stage of the corresponding IV probit in Tables 4 and 5. Tables 6 and 7 show the estimates of the effects of export experience on export intensity, as specified in Equation (2). Finally, Table 8 provides evidence about the role of product proximity in this relationship. A simple robustness test of our results is shown in Annex 2.

The results in Column 1–4 of Table 3 provide clear evidence of the significant association between the prior region-specific trade experience of high-wage employees in the firm and the firm's propensity to export to that specific region. The share of high-wage employees who have gained region-specific export experience from their previous workplace is statistically significant in the case of exporting to neighbouring countries in the EU (Column 1), other EU (Column 3) or CIS countries (Column 2) and also in the case of trade with the rest of the world (Column 4). Note that in the case of export propensity we do not find evidence that importance of region-specific knowledge increases monotonically with the distance to the destination countries. The strongest correlation can be found between prior experience and export decision in the case of exports to nearby countries, followed by markets in more distant 'rest of the world' regions or 'other EU' (other than neighbouring) countries. The role of experience appears to play a somewhat smaller role (albeit significant in the standard probit model) in the case of exports to former Soviet markets. One explanation could be the discouragement effects (negative experience related to exporting in some locations due to failure, excessive bureaucratic burdens etc.) reducing the positive effect on export propensity; for example, due to a negative experience in the Russian market, the firm may decide not to experiment with exporting to that destination.

We show the role of experience in the case of exporting to the US, Australia and Canada in Column 5 and to Asia in Column 6 of Table 3. Market-specific experience also matters in the case of these region groups. However, the role of experience is, perhaps surprisingly, smaller than in the case of broader country groups. Other controls in the estimated export propensity equations include the standard firm-level drivers of export decisions, as well as industry dummies to account for sector-level time-invariant determinants. The control variables mostly have the expected signs. For example, size and foreign ownership tend to be significantly positively correlated with export decisions to different markets.

The prior productivity of a firm is positively associated with export decisions in the next period, as could be expected based on monopolistic competition models of trade (Melitz 2003, Melitz and Ottaviano 2008), and the vast related empirical literature on learning-by-exporting that documents a strong selection of only relatively productive firms into exporting (e.g. Wagner et al 2007, 2011). In addition, we find that a higher capital intensity or wage rate is associated with a higher probability of entry to export markets in the subsequent year. The pseudo R-squared of the probit model is the highest in the case of nearby EU countries, and the lowest in the case of markets in the CIS.

As one important control variable, we include the firm's general share of high-wage employees (i.e. employees that belong to the top 20 per cent of the wage distribution of the corresponding 3-digit industry). In this way we endeavour to account for higher skill intensity in the firm. It is important not to confuse the general effects of the share of high-wage (and highly skilled) employees in the firm with the effects of their export experience.

An obvious question is whether export experience needs to be region specific, as implicitly assumed in Table 3. As a robustness test, in Table A3 in Annex 2, we include all four main types of prior export experience proxies in our probit models with different export target

market dummies as dependent variables. It is obvious from Table A3 that it is the region-specific prior experience of employees that matters for export decisions.

The share of employees with experience from other main regions outside the destination area is never significant in Table A3. This result confirms those by Mion and Opromolla (2014), who find that it is the market-specific prior experience which is strongly associated with Portuguese firms' propensity to start exporting to that market.

Another issue is whether export experience should perhaps be defined simply as a binary variable, indicating whether there are export-experienced managers or not. We have performed estimations using a dummy variable for export experience (available upon request). These confirm the main broad findings in this section. However, our findings indicate that there are (additional) gains of having a higher share of employees with market-specific knowledge beyond simply having one employee with such experience. We also note that whereas the indicator shows market or more precisely region-specific experience, individual-level experience can be from different regions within the market/region or with different firms; therefore, complementing the knowledge of other employees from the same market. We therefore believe that there is an advantage in presenting the results of using the employment share of experienced employees instead of a dummy variable. Further, we use instrumental variables in some of our analysis – in IV probit and 2SLS. In these estimation frameworks, the endogenous explanatory variable of experience needs be continuous, not binary.

Table 3. Region-specific export experience and propensity to export, standard probit model

Dependent variable (dummies)	(1) Group 1 Export to neighbouring EU countries	(2) Group 2 Export to the CIS	(3) Group 3 Export to other EU	(4) Group 4 Export to the rest of world	(5) Group 5 Export to the US, Canada, Australia	(6) Group 6 Export to Asian countries
Share of high-wage employees with region-specific export experience	0.233*** (0.028)	0.130*** (0.028)	0.189*** (0.027)	0.215*** (0.029)	0.088*** (0.022)	0.105*** (0.025)
Size	0.104*** (0.007)	0.012*** (0.004)	0.069*** (0.006)	0.068*** (0.005)	0.019*** (0.002)	0.018*** (0.003)
Age	0.034*** (0.006)	0.007 (0.006)	0.009* (0.006)	0.002 (0.006)	-0.001 (0.033)	0.006 (0.004)
Foreign-owned	0.118*** (0.009)	0.002 (0.006)	0.063*** (0.007)	0.053*** (0.007)	0.020*** (0.004)	0.031*** (0.004)
Cash/assets	-0.050*** (0.016)	-0.034*** (0.013)	-0.054*** (0.016)	-0.047*** (0.016)	-0.007 (0.009)	-0.006 (0.009)
Log labour productivity(t-1)	0.083*** (0.007)	0.030*** (0.005)	0.053*** (0.006)	0.038*** (0.006)	0.011*** (0.004)	0.017*** (0.004)
Log capital intensity(t-1)	0.018*** (0.003)	0.008*** (0.002)	0.012*** (0.002)	0.008*** (0.002)	0.004** (0.002)	0.004** (0.002)
Log wage per employee(t-1)	-0.009 (0.008)	-0.022*** (0.004)	-0.019*** (0.006)	-0.015** (0.006)	-0.002 (0.003)	-0.007** (0.003)
Share of 'high-wage employees'	-0.050*** (0.013)	0.004 (0.009)	-0.036*** (0.012)	0.002 (0.012)	-0.002 (0.007)	0.0004 (0.007)
Sector and year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,323	12,323	12,309	2,330	12,239	12,154
Pseudo R2	0.406	0.192	0.381	0.283	0.265	0.314
Wald chi2	2662.3	886.4	2044.9	1988.8	859.5	957.9

Notes: marginal effects from probit model. *significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Panel data of firms from the manufacturing industry. Period: 2007–2011. Sector dummies are defined at NACE 2-digit level.

Next, we present the results of the IV probit model, which tries to address the likely endogeneity of the share of employees with export experience. The endogeneity problem arises both due to potential reverse causality between export decision and decisions about hiring people with export experience and omitted variables that can affect both export decisions and hiring. For example, managers' skills and demand shocks could be such omitted variables. Therefore, one could expect that standard probit or OLS estimates of effects are biased.

Table 4 provides the final stage and Table 5 the first stage of the IV probit model. We present here the models that use all three previously outlined instruments in the first stage regression. The statistically significant instrumental variable in the first stage is in most cases (see Table 5) the share of current employees that moved to the firm because of the closure of their previous employer. Sector-level firm exit rate is never significant, once the exogenous firm-level exit indicator has been included. The average prior export experience of other firms in the same sector proved to be significant in some of the specifications.

It is evident from the IV model in Table 4 that the instrumented results are somewhat different (as expected) from the standard probit model in terms of their magnitude, but close in terms of the qualitative findings. They confirm that there is a positive relationship between the share of employees with prior market-specific export experience and firm's export decisions, except in the case of the CIS. Obviously, the interpretation of these coefficients as effects depends fully on the validity of our instruments. The central assumption in Table 4 is that the instrumental variables affect firm export decisions only through the effects on the export experience of the firm (arguably, a rather strong assumption).

Table 4. Region-specific export experience and propensity to export, IV probit model

Dependent variable (dummies)	(1) Group 1 Export to neighbouring EU countries	(2) Group 2 Export to the CIS	(3) Group 3 Export to other EU	(4) Group 4 Export to the rest of world	(5) Group 5 Export to the US, Canada, Australia	(6) Group 6 Export to Asian countries
Share of high-wage employees with region-specific export experience	0.307*** (0.081)	0.248 (0.209)	0.208** (0.093)	0.307*** (0.102)	0.270* (0.146)	0.255* (0.152)
Size	0.103*** (0.007)	0.011*** (0.004)	0.068*** (0.006)	0.066*** (0.006)	0.018*** (0.003)	0.018*** (0.003)
Age	0.037*** (0.007)	0.008 (0.006)	0.010* (0.006)	0.004 (0.006)	0.001 (0.004)	0.007* (0.004)
Foreign-owned	0.118*** (0.009)	0.002 (0.006)	0.062*** (0.007)	0.052*** (0.007)	0.020*** (0.003)	0.031*** (0.004)
Cash/assets	-0.049*** (0.016)	-0.032*** (0.013)	-0.054*** (0.016)	-0.046*** (0.015)	-0.006 (0.009)	-0.005 (0.010)
Log labour productivity(t-1)	0.082*** (0.007)	0.029*** (0.005)	0.053*** (0.006)	0.038*** (0.006)	0.011*** (0.004)	0.017*** (0.004)
Log capital intensity(t-1)	0.018*** (0.003)	0.009*** (0.002)	0.013*** (0.002)	0.008*** (0.002)	0.004** (0.002)	0.004** (0.002)
Log wage per employee(t-1)	0.010 (0.008)	-0.023*** (0.005)	-0.019*** (0.006)	-0.016** (0.006)	-0.002 (0.003)	-0.008** (0.003)
Share of 'high-wage employees'	-0.051*** (0.013)	0.002 (0.009)	-0.036*** (0.012)	0.001 (0.011)	-0.003 (0.007)	-0.001 (0.007)
Sector and year dummies	Yes	Yes	Yes	Yes	Yes	Yes
Observations	12,317	12,318	12,303	12,325	12,237	12,151
Wald chi2	2669.9	887.2	2039.4	1993.7	885.2	974.2

Notes: marginal effects from IV probit model. * significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Panel data of firms from the manufacturing industry. Period: 2007–2011. Sector dummies are defined at NACE 2-digit level

One needs to point out that, apart from the existence of the positive effect, the magnitude of these estimated effects may not appear large at first glance. A 10 percentage point increase in the share of high-wage employees with region-specific export experience (in total employment of the firm) is associated with a 3 per cent higher export probability in the case of exporting to nearby countries (Column 1 in Table 4). The corresponding numbers in the case of a similar increase in the share of workforce with other region-specific experience are as follows: 3 per cent higher export probability in the case of the 'rest of the world' region (Group 4 in Table 4), and correspondingly 0 and 2 per cent higher export probability in the case of exporting to CIS and 'other EU' markets. A 10 per cent increase in the share of employees with experience with US and other English-speaking non-European markets is associated with a bit less than a 3 per cent increase in the probability of export entry to these markets. A similar result is found for export entry to Asian countries.

Table 5. First stage of the IV probit model, coefficients of instrumental variables

Dependent variable:	(1) Group 1 Share of high-wage employees with export experience to neighbouring EU countries	(2) Group 2 Share of high-wage employees with export experience to the CIS	(3) Group 3 Share of high-wage employees with export experience to other EU	(4) Group 4 Share of high-wage employees with export experience to the rest of world
Share of region X-specific export experience in other firms in the same 3-digit level sector	0.072	0.208***	0.105**	0.049
	(0.045)	(0.073)	(0.046)	(0.042)
Firm exit rate, at 3-digit sector level	0.008	-0.011	-0.018	-0.013
	(0.022)	(0.012)	(0.016)	(0.015)
Share of current employees that moved because of closure of their prior employer	0.751***	0.203***	0.546***	0.523***
	(0.073)	(0.040)	(0.071)	(0.073)
Sector and year dummies	Yes	Yes	Yes	Yes

Notes: coefficients of instruments from the 1st stage equation of the IV probit model. *significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Panel data of firms from the manufacturing industry. Period: 2007–2011. Sector dummies are defined at NACE 2-digit level.

However, it pays to compare the relative sizes of the effects of prior productivity and the share of export-experienced employees. One standard deviation increase in the share of

export-experienced high-wage employees is associated with an even somewhat stronger increase in export propensity than the corresponding one standard deviation sized increase in log of productivity. Hence, the role of hiring export-experienced employees appears to be important.

Table 6. Effects of export experience on export intensity to different regions: 2SLS approach

Dependent variable:	(1) Group 1 Log export intensity to neighbouring EU countries	(2) Group 2 Log export intensity to CIS	(3) Group 3 Log export intensity to other EU	(4) Group 4 Log export intensity to the rest of world
Share of high-wage employees with region-specific export experience	2.381* (1.087)	0.366 (1.391)	0.788 (1.131)	3.502** (1.356)
Size	0.426*** (0.052)	0.149*** (0.036)	0.361*** (0.044)	0.236*** (0.046)
Age	0.717*** (0.226)	-0.088 (0.159)	0.082 (0.190)	-0.442** (0.194)
Foreign-owned	-0.600** (0.280)	0.3003 (0.197)	-0.777*** (0.236)	-0.347 (0.240)
Cash/assets	-0.039 (0.147)	-0.002 (0.104)	-0.136 (0.124)	0.144 (0.127)
Log labour productivity(t-1)	0.258*** (0.042)	0.042 (0.030)	0.146*** (0.035)	0.073** (0.036)
Log capital intensity(t-1)	-0.005 (0.028)	0.008 (0.020)	0.042* (0.023)	0.003 (0.023)
Log wage per employee(t-1)	-0.240*** (0.044)	-0.139*** (0.031)	-0.187*** (0.037)	-0.117*** (0.038)
Share of 'high-wage employees'	0.139 (0.099)	0.070 (0.070)	0.090 (0.84)	0.241*** (0.086)
Firm fixed effects and year dummies	Yes	Yes	Yes	Yes
Observations	11,481	11,481	11,481	11,481
Number of instrumental variables	3	3	3	3

Notes: coefficients from the 2nd stage of 2SLS. *significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Instrumented variable: share of high-wage employees with region-specific export experience. Panel data of firms from the manufacturing industry. Period: 2007–2011.

If we concentrate on the effects of the prior export experience of the firm's current managers and skilled employees on its export intensity (see Table 6 and 7), then there is much less evidence of a significant and strong relationship. We estimate fixed effects IV regressions

(2SLS) in Table 6 and, for comparison, also standard fixed effects regressions in Table 7. We use log exports per employee as a dependent variable, as specified in Equation (2). The set of control variables is the same as in the export propensity analysis.

Stock et al. (2002) suggest that the F-statistic of instrumental variables in the first stage regression should be above 10 to avoid the problem of weak instruments. The F-statistic is above 10 in our analysis. However, we acknowledge that the parameter estimates in the fixed effects and IV model differ quantitatively (this may reflect potential problems with the instruments). Still, the key conclusion is similar. The robust finding is that prior export experience seems to be positively associated with export intensity in the case of the more distant destination countries (Group 4 in Table 6 and 7). The parameter estimate is also significant (at 5 per cent level) for the USA, Canada, Australia sub-group, taking the value 2.76 (not reported in the table). The coefficient of the experience variable is also statistically significant in the case of exports to neighbouring countries. However, we note that in standard OLS specification this estimated effect was not significant. Therefore we should be cautious about making strong conclusions based on this particular result because of the rather strong assumptions about the validity of the instruments.

Table 7. Export experience and export intensity to different regions: OLS with firm-level fixed effects

Dependent variable:	(1) Group 1 Log export intensity to neighbouring EU countries	(2) Group 2 Log export intensity to the CIS	(3) Group 3 Log export intensity to other EU	(4) Group 4 Log export intensity to the rest of world	(3) Group 5 Log export intensity to US, etc.	(4) Group 6 Log export intensity to Asia
Share of high-wage employees with region-specific export experience	0.203 (0.365)	-0.092 (0.372)	-0.113 (0.364)	0.699* (0.383)	0.645* (0.348)	0.234 (0.380)
Firm fixed effects, firm level other controls from Equation (3) and year dummies	Yes	Yes	Yes	Yes	Yes	Yes

Notes: OLS with firm fixed effects. *significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Panel data of firms from the manufacturing industry. Period: 2007–2011.

An important question is whether the effects of export experience are stronger if the experience originates from exporters of similar product groups. Here below we report the estimated effects of export experience weighted with product proximity. To save space we report only the estimates of the product proximity weighted export experience variables. Other controls are as before (see Table 8). These additional robustness tests based on a standard probit model show that the effects of specific product-group experience are stronger than general experience in the case of exports to the CIS and 'other EU' or 'rest of the world'. In the case of neighbouring countries, the effect of product-specific experience is of similar magnitude compared to general experience (see Table 4).

Table 8. The role of product proximity in the effects of prior export experience

Dependent variable (dummies)	(1) Group 1 Export to neighbouring EU countries	(2) Group 2 Export to the CIS	(3) Group 3 Export to other EU	(4) Group 4 Export to the rest of world
Region-specific export experience	0.23***	0.13***	0.19***	0.22***
Region-specific export experience weighted with product proximity	0.23***	0.21***	0.29***	0.25***

Notes: marginal effects from probit model. * significant at 10%; ** significant at 5%; *** significant at 1%. Panel data of firms from the manufacturing industry. Period: 2007–2011. Other control variables similar to Table 3.

Finally, an interesting issue that deserves more detailed study is related to the welfare effects of labour mobility. The positive effects of labour mobility in the recipients of experienced employees might be balanced out due to negative consequences on exporting and firm performance in the donor firms of experienced employees[5]. We have shown that hiring a higher share of export-experienced managers and top specialists is associated with a higher

[5] We thank Martti Randveer and Tiia Vissak for pointing out this issue.

propensity of export entry to a specific region. In addition, we have conducted some simple robustness tests using OLS and probit models that also include in the export decision regressions a dummy variable indicating the firms where the share of export-experienced employees fell over the studied period. This variable proved to be not significant, suggesting that there is no clear evidence[6] of a strong negative effect on donors.

Conclusions

In summary, we find significant evidence suggesting that the region-specific export experience that high-wage employees have obtained at their previous workplaces matters for the export market entry decisions of their current employer. The export experience of managers and top specialists in Estonia's manufacturing firms is reflected in a wage premium and is strongly associated with the probability of exporting to different regions. However, only in the case of more distant destinations (outside the EU and the CIS) is the prior experience also associated with higher export intensity. Our results confirm that hiring specialists with export experience helps firms to overcome the sunk costs of exports and to enter export markets successfully. In terms of the size of the effects, the effect of an increase in the share of high-wage employees with export experience by one standard deviation is of comparable magnitude to the similar increase by one standard deviation in the firm's prior productivity.

We stress that we find the effects of prior export experience in high-wage employees in the case of region-specific experience. For example, exports to distant regions are not, on average, promoted by export experience from nearby markets, but they are related to prior experience from distant regions. This result is policy relevant, suggesting that for successful

[6] However, we note that for a more detailed study of this issue one has to look also into the relationship between the loss of human capital in terms of export experienced employees leaving the firm and firm's propensity of exit.

expansion of firms abroad, learning from existing foreign markets may not be enough; specific experience with the particular region is valued and often needed for successful entry to more distant markets.

An important issue is the role of technological proximity between the donor of employees and the recipient firm in terms of the effects of labour mobility and export experience. We find that in a significant share of the studied regions, the benefits of hiring employees with prior export experience seem to be stronger for the firm if the donor firm of the employee(s) is not too different from the new employer in terms of its structure of product portfolio.

In general, our results imply that mobility of employees is an important channel of knowledge transfer. Further, the years of economic crisis provide a useful period for study, as there is more exogenously determined mobility of employees than usual (i.e. labour mobility determined by the closure of the previous employer).

However, there are many different directions that deserve further study. One is to collect additional survey data on the types of knowledge transferred through hiring export-experienced managers, and to investigate the extent to which the effects materialize specifically in terms of acquiring new clients or reducing the market related uncertainty and sunk costs in general. In addition, the effects of labour mobility are likely to be rather heterogeneous depending on which manager or top specialist is moving. This calls for more detailed data on occupations and education. Further, the identification of a causal effect from labour mobility on exporting deserves a more detailed study. It is important to investigate the welfare effects of these movements, including whether the gains of firms that receive new experienced employees are not balanced out by the losses due to the movement for the donor firms. Finally, the effects of labour mobility are just one key channel of export spillovers; there is a need for econometric studies providing credible evidence about the relative importance of various channels of export spillovers.

References

Aitken, B., Hanson, G. H. and Harrison, A. E. (1997). Spillovers, foreign investment, and export behavior, *Journal of International Economics*, 43(1–2), 103-132.

Albornoz, F., Calvo Pardo, H., Corcos, G. and Ornelas, E. (2012). Sequential exporting, *Journal of International Economics*, 88(1), 17–31.

Balsvik, R. (2011). Is labor mobility a channel for spillovers from multinationals? Evidence from Norwegian manufacturing, *Review of Economics and Statistics*, 93(1), 285–297.

Barrios, S., Görg, H. and Strobl, E. (2003). Explaining firms' export behaviour: R&D, spillovers and the destination market, *Oxford Bulletin of Economics and Statistics* 65(4), 475–496.

Bernard, A. B. and Jensen, J. B. (1999). Exceptional Exporter Performance: Cause, Effect, or Both? *Journal of International Economics*, 47, 1–25

Bernard, A. and Jensen, J. B. (2004a). Why do firms export, *The Review of Economics and Statistics*, 86(2), 561–569.

Bernard, A. B. and Jensen, J. B. (2004b). Exporting and Productivity in the USA, *Oxford Review of Economic Policy*, 20, 343–357.

Cohen, W. M. and Levinthal, D. A. (1990). Absorptive capacity: a new perspective on learning and innovation, *Administrative Science Quarterly*, 35(1), 128–152.

Cornelissen, T. (2008). The Stata command felsdvreg to fit a linear model with two high-dimensional fixed effects. *The Stata Journal*, 8(2), 170–189.

Dustmann, C. and Meghir, C. (2005). Wages, experience and seniority, *Review of Economic Studies*, 72(1), 77–108.

Eaton, J., Eslava, M., Kugler, M. and Tybout J. (2008). The Margins of Entry into Export Markets: Evidence from Colombia, in E. Helpman, D. Marin and T. Verdier (eds), The Organization of Firms in a Global Economy, Harvard University Press, Cambridge, MA.

Eaton, J., Kortum, S. and Kramarz, F. (2011). An anatomy of international trade: Evidence from French firms, *Econometrica*, 79(5), 1453–1498.

Eurostat (2014). Index of correspondence tables. http://ec.europa.eu/eurostat/ramon/relations/index.cfm?TargetUrl=LST_REL Last accessed: 30th of May 2014

Feenstra, R. C., Lipsey, R. E., Deng, H., Ma, A. C. and Mo, H. (2005). World Trade Flows: 1996-2000. NBER Working Paper No. 11040.

Glass, A. and Saggi, K. (1998). International Technology Transfer and the Technology Gap, *Journal of Development Economics*, 55, 369–398.

Görg, H. and Strobl, E. (2005). Spillovers from Foreign Firms through Workers Mobility: An Empirical Investigation, *Scandinavian Journal of Economics*, 107, 693–709.

Hausmann, R. and Klinger, B. (2006), Structural Transformation and Patterns of Comparative Advantage in the Product Space. CID Working Paper No. 128.

Hidalgo, C. A., Klinger, B., Barabási, A.-L. and Hausmann, R. (2007). The Product Space Conditions the Development of Nations, *Science*, 317(5837), 482–487.

Hiller, S. (2013). Does Immigrant Employment Matter for Exports? Evidence from Denmark, *Review of World Economics*, 149(2), 369–394.

Jaffe, A.B., Trajtenberg, M. and Henderson, R. (1993). Geographic localization of knowledge spillovers as evidenced by patent citations, *Quarterly Journal of Economics*, 108, 577–598.

Javorcik, B. (2004). Does Foreign Direct Investment Increase the Productivity of Domestic

Firms? In Search of Spillovers through Backward Linkages, *American Economic Review*, 94(3), 605–627.

Koenig, P., Mayneris, F. and Poncet, S. (2010). Local export spillovers in France, *European Economic Review*, 54(4), 622-641.

Lane, P. J. and Lubatkin, M. (1998). Relative absorptive capacity and interorganizational learning, *Strategic Management Journal*, 19(5), 461-477.

López, R. (2009). Do Firms Increase Productivity in Order to Become Exporters? *Oxford Bulletin of Economics and Statistics*, 71(5), 621–642.

Markusen, J. R. and Trofimenko, N. (2009). Teaching locals new tricks: Foreign experts as a channel of knowledge transfers, *Journal of Development Economics*, 88(1), 120–131.

Martins, P.S. (2005). Inter-Firm Employee Mobility, Displacement, and Foreign Direct Investment Spillovers, Queen Mary: University of London (mimeo), 52 p.

Masso, J. and Vahter, P. (2014a). The Role of Product Level Dynamics in Export Growth and Productivity: Evidence from Estonia, *Emerging Markets Finance and Trade*, forthcoming.

Masso, J. and Vahter, P. (2014b). Exporting and Productivity: The Effects of Multi-market and Multi-product Export Entry, *Scottish Journal of Political Economy*, forthcoming

Melitz, M. J. (2003). The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity, *Econometrica*, 71, 1695–1725.

Melitz, M. and Ottaviano, G. (2008). Market Size, Trade, and Productivity, *Review of Economic Studies*, 75(1), 295–316.

Minondo, A. (2011). Learning to Export with New Managers, *Empirical Economics Letters*, 10(1), 7–11.

Mion, G. and Opromolla, L. D. (2014). Managers' Mobility, Trade Status, and Wages, *Journal of International Economics*, DOI: 10.1016/j.jinteco.2014.06.00, forthcoming.

Molina, D. and Muendler, M. (2013). Preparing to Export, NBER Working Papers 18962, National Bureau of Economic Research, Inc.

Moxnes, A. (2010). Are sunk costs in exporting country specific? *Canadian Journal of Economics*, 43(2), 467–493.

Parrotta, P. and Pozzoli, D. (2012). The effect of learning by hiring on productivity, *RAND Journal of Economics*, 43(1), 167–185.

Poole, J. P. (2013). Knowledge Transfers from Multinational to Domestic Firms: Evidence from Worker Mobility, *Review of Economics and Statistics*, 95(2), 393–406.

Rauch, J. and Watson J. (2003). Starting Small in an Unfamiliar Environment, *International Journal of Industrial Organization*, 21, 1021–1042.

Sala, D. and Yalcin, E. (2014). Export Experience of Managers and the Internationalization of Firms, *The World Economy*, forthcoming.

Sapienza, H. J., Parhankangas, A. and Autio, E. (2004). Knowledge relatedness and post-spin-off growth, *Journal of Business Venturing*, 19(6), 809–829.

Silvente, F. and Giménez, J. (2007). Information Spillovers and the Choice of Export Destination: A Multinomial Logit Analysis of Spanish Young SMEs, *Small Business Economics*, 28(1), 69–86.

Stock, J., J. Wright and Yogo, M. (2002). A Survey of Weak Instruments and Weak Identification in Generalized Method of Moments, *Journal of Business and Economic Statistics*, 20(4), 518–529.

Stoyanov, A. and Zubanov, N. (2012). Productivity Spillovers across Firms through Worker Mobility, *American Economic Journal: Applied Economics*, 4(2), 168–198.

The Product Space (2005). http://www.chidalgo.com/productspace/index.htm Last accessed: 28th of May 2014

Vissak, T., Zhang, X. and Ukrainski, K. (2012). Successful born globals without experiential market knowledge: survey evidence from China. In: **Gabrielsson, M. and Kirpalani, V.H.M**. (eds), Handbook of Research on Born Globals. Edward Elgar Publishing.

Wagner, J. (2007). Exports and Productivity: A Survey of Evidence from Firm-level Data, *The World Economy*, 30(1), 60–82.

Annex 1. Descriptive statistics

Table A1. Descriptive statistics of the estimation sample in export performance analysis

Variable	Obs	Mean	Std. dev.
Size	22,177	1.768	1.477
Age	37,489	2.001	0.779
Foreign-owned	34,670	0.094	0.291
Cash/assets	33,789	0.284	0.340
Log labour productivity(t-1)	16,996	12.001	1.056
Log capital intensity(t-1)	19,644	11.322	1.657
Log wage per employee(t-1)	17,871	11.157	1.435
Export to neighbouring EU countries (dummy)	22,821	0.205	0.404
Export to CIS (dummy)	22,821	0.065	0.247
Export to other EU (dummy)	22,821	0.125	0.331
Export to the rest of world (dummy)	22,821	0.130	0.337
High-wage employees with export experience (dummy)	22,821	0.345	0.475
High-wage employees with export experience to neighbouring EU countries (dummy)	22,821	0.186	0.389
High-wage employees with export experience to CIS (dummy)	22,821	0.118	0.323
High-wage employees with export experience to other EU (dummy)	22,821	0.156	0.363
High-wage employees with export experience to the rest of world (dummy)	22,821	0.152	0.360
Log export intensity to neighbouring EU countries	22,821	2.509	5.002
Log export intensity to CIS	22,821	0.676	2.628
Log export intensity to other EU	22,821	1.386	3.762
Log export intensity to the rest of world	22,821	1.356	3.595
Number of export markets	23,045	1.004	3.096
Share of 'high-wage employees'	22,610	0.481	0.341
Share of high-wage employees with export experience to neighbouring EU countries	22,821	0.041	0.128
Share of high-wage employees with export experience to CIS	22,821	0.020	0.088
Share of high-wage employees with export experience to other EU	22,821	0.029	0.105
Share of high-wage employees with export experience to the rest of world	22,821	0.030	0.107

Notes: panel data of firms from the manufacturing industry. Period: 2007–2011.

Table A2. Descriptive statistics of the variables used in the wage equations

Variable	**Mean**	**St. Dev.**	**Min.**	**Max.**
Log real wage	8.297	0.522	5.059	9.634
Male	0.696	0.46	0	1
Age in years	41.701	11.422	14	88
Age in years squared	1869.413	992.046	196	7744
North Estonia	0.365	0.481	0	1
Central Estonia	0.092	0.289	0	1
North East Estonia	0.069	0.253	0	1
Western Estonia	0.091	0.288	0	1
Firm size	4.31	1.668	0	11.158
Firm size squared	21.359	13.528	0	124.504
Foreign-owned firm	0.379	0.485	0	1

Variable	Mean	St. Dev.	Min.	Max.
Changed job during the last year	0.319	0.466	0	1
Manager or top specialist	1	0	1	1
Export experience, managers	0.122	0.327	0	1
Export experience from the same 2-digit industry, managers	0.049	0.216	0	1
Export experience, managers, group 1 countries	0.102	0.302	0	1
Export experience from the same 2-digit industry, group 1 countries	0.044	0.204	0	1
Export experience, managers, group 2 countries	0.051	0.221	0	1
Export experience from the same 2-digit industry, group 2 countries	0.02	0.139	0	1
Export experience, managers, group 3 countries	0.081	0.273	0	1
Export experience from the same 2-digit industry, group 3 countries	0.036	0.186	0	1
Export experience, managers, group 4 countries	0.028	0.166	0	1
Export experience from the same 2-digit industry, group 4 countries	0.011	0.102	0	1
Export experience, managers, group 5 countries	0.01	0.102	0	1
Export experience from the same 2-digit industry, group 5 countries	0.003	0.054	0	1
Export experience, managers, group 6 countries	0.032	0.176	0	1
Export experience from the same 2-digit industry, group 6 countries	0.013	0.112	0	1
Export experience, managers, group 7 countries	0.009	0.094	0	1
Export experience from the same 2-digit industry, group 7 countries	0.003	0.058	0	1
Export experience, managers, group 8 countries	0.057	0.232	0	1
Export experience from the same 2-digit industry, group 8 countries	0.023	0.151	0	1
Export experience, managers, group 40 countries	0.07	0.256	0	1
Export experience from the same 2-digit industry, group 40 countries	0.027	0.161	0	1
Export experience, all employees	0.19	0.393	0	1
Export experience from the same 2-digit industry, all employees	0.068	0.251	0	1
Export experience, managers	0.122	0.327	0	1
Export experience from the same 2-digit industry, managers	0.049	0.216	0	1
Experience from foreign-owned firm, manager	0.06	0.237	0	1
Experience from foreign-owned firm in the same 2-digit industry, manager	0.018	0.133	0	1
Experience from high-productivity firm, manager	0.028	0.166	0	1
Experience from high-productivity firm in the same 2-digit industry, manager	0.008	0.089	0	1

Notes: employee-level panel data, manufacturing industry. Period: 2007–2011.

Annex 2. Different types of export experience and firm's export decisions

Table A3. The role of region-specific and outside-region export experience as drivers of propensity to export, standard probit model

	(1)	(2)	(3)	(4)
Dependent variable (dummies)	Group 1 Export to neighbouring EU countries	Group 2 Export to CIS	Group 3 Export to other EU	Group 4 Export to the rest of world
Export experience of the firm in Group 1 region	0.235***	0.020	0.001	0.021
	(0.039)	(0.029)	(0.048)	(0.046)
Export experience of the firm in Group 2 region	0.095*	0.126***	0.002	-0.054
	(0.052)	(0.032)	(0.047)	(0.048)
Export experience of the firm in Group 3 region	-0.026	0.005	0.190***	-0.049
	(0.056)	(0.035)	(0.055)	(0.057)
Export experience of the firm in Group 4 region	0.032	-0.024	-0.005	0.252***
	(0.052)	(0.034)	(0.046)	(0.046)
Sector and year dummies, other controls similarly to the specification of Equation (1) in Table 1	Yes	Yes	Yes	Yes
Observations	12,323	12,323	12,309	12,330
Pseudo R2	0.407	0.192	0.381	0.283
Wald chi2	2670.8	888.1	2048.8	1988.9

Notes: marginal effects from probit model. *significant at 10%; ** significant at 5%; *** significant at 1%. Robust standard errors in parentheses. Panel data of firms from the manufacturing industry. Period: 2007–2011. Sector dummies are defined at NACE 2-digit level.


CELSI