

Hiring the First Non-native Worker and Exports



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Abstract

This study examines whether non-native workers contribute to firms' export growth, using matched data spanning nearly three decades and covering the entire workforce and all manufacturing firms. The estimation strategy relies on the timing of a firm's first non-native hire, constructing counterfactuals from otherwise similar firms that hire non-native workers a few years later. The results indicate that nonnative employment is associated with increased total exports, greater trade with workers' home countries, and a higher number of exported products. These findings remain robust when addressing potential endogeneity concerns, such as the simultaneity of hiring decisions and broader export growth strategies.

Tiivistelmä

Ensimmäisen ulkomaisen työntekijän palkkaus ja vaikutukset vientiin

Tässä tutkimuksessa tarkastellaan, edistävätkö ulkomaiset työntekijät yritysten viennin kasvua Suomen teollisuudessa. Tutkimuksessa hyödynnetään rekisteritietoja, jotka kattavat kaikki työlliset ja yritykset lähes kolmen vuosikymmenen ajalta. Aikaisemmasta kirjallisuudesta poiketen tutkimuksessa tarkastellaan yrityksen ensimmäisen ulkomaisen työntekijän palkkauksen vaikutuksia. Verrokkiryhmään kuuluvat muuten samankaltaiset yritykset, jotka palkkaavat ensimmäisen ulkomaisen työntekijän eri ajankohtana. Tulokset osoittavat, että ulkomainen työllisyys on yhteydessä kokonaisviennin kasvuun, suurempaan todennäköisyyteen viedä tuotteita työntekijän kotimaahan ja suurempaan vientituotteiden määrään. Tulokset pysyvät samankaltaisina, kun mallissa otetaan huomioon mahdollinen samanaikaisuus yritysten rekrytointipäätösten ja viennin kasvustrategian välillä.

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1 Introduction

The relationship between immigration and trade has been the focus of active research in recent years (Felbermayr, Grossmann, and Kohler 2015). The trade-creation effect of immigrants suggests that immigration from a particular country should increase trade with that country (Gould 1994). This effect may arise through various mechanisms, such as immigrant employees acting as intermediaries to overcome information barriers by sharing knowledge about their home regions (Rauch 2001). While existing studies have focused solely on the effects of immigration stock or the share of immigrant workers in a firm, this paper addresses the question from a different angle. Specifically, it analyzes the relationship between immigration and exports in the context of a firm hiring its first non-native worker. Finland provides a compelling case study, as the share of the foreign-born population is substantially lower compared to other European countries and its Nordic peers (Eurostat 2024).

I use rich administrative datasets that span nearly three decades, covering the entire workforce and all firms in Finland. This study focuses on manufacturing firms while excluding those that have never employed non-native workers or have systematically employed them every year. According to calculations based on matched employer-employee data, over 70% of manufacturing firms in Finland do not employ any non-native workers, indicating that the Finnish economy is still in the early stages of integrating immigration into its labor market. I first employ a dynamic difference-in-differences approach that leverages the timing of a firm's first non-native hire. Counterfactuals are constructed from otherwise similar firms that hire non-native workers a few years later, which addresses potential endogeneity concerns related to self-selection into immigrant hiring. Using an event-study framework, I analyze both short- and long-term impacts, which have been largely omitted in previous immigration-trade studies. Examining effects over an

extended period of over eight years allows me to capture the full extent of how non-native workers influence firm export performance, and whether the transmission channel of trade, through potential complementarity between non-native workers and other inputs, operates with longer time lags.

A key challenge in evaluating the causal relationship between immigration and trade is simultaneity. To further account for endogeneity arising from the simultaneity between a firm's hiring decision and broader export growth strategies, I adopt an instrumented difference-in-differences approach (hereafter DDIV). Specifically, I construct a shift-share instrumental variable using historical local immigrant flows from specific countries to predict the share of immigrants in a firm's region (Altonji and Card 1991; Card 2001). This instrument passes the validity tests (Borusyak, Hull, and Jaravel 2021; Goldsmith-Pinkham, Sorkin, and Swift 2020), and proves to be a strong predictor of a firm hiring its first non-native worker.

The study reveals four main results. First, firms that hire their first non-native workers tend to employ a higher number of non-native workers over the entire follow-up period. This could be because non-native workers act as a positive signal that encourages others to join, firms have positive experiences when hiring immigrants, or non-native employees actively influence subsequent hiring decisions. Second, firms become more likely to export to an immigrant's country of origin immediately after hiring their first non-native worker. This effect is both economically significant and persistent, with an estimated increase of over 10 percentage-points in export probability. Third, firms expand the number of exported products. The DDIV results suggest that the first non-native hire increases the number of exported products by approximately five. Fourth, firms also experience an increase in total exports, with the positive association lasting a few years after a hire. However, when addressing endogeneity concerns using predicted local immigrant supply as an instrumental variable, the positive relationship

between total exports and non-native employment holds across all manufacturing firms but not within the subsample of exporting firms. These findings suggest that the first non-native hire influences exports at the extensive margin rather than the intensive margin. In contrast, I find no consistent link between non-native employment and the number of market areas. These findings contribute to the broader literature on the economic impacts of immigration at the firm level.

To the best of my knowledge, this paper is one of the first to present causal evidence on the impact of a firm's first non-native hire on export activity. It also contributes to the literature on the determinants and economic outcomes of first hires, such as an entrepreneur's decision to hire their first employee (Coad, Nielsen, and Timmermans 2017; Fairlie and Miranda 2017; Cockx and Desiere 2024), or the first female employee hires in start-ups (Weber and Zulehner 2010). Unlike prior studies that examine start-ups or nonemployers, this paper focuses on the first non-native hire across all manufacturing firms. This is an important contribution to the literature, as the positive impact of immigrations on firm performance – particularly trade – is already well documented (Felbermayr, Grossmann, and Kohler 2015, for a survey).

This analysis extends previous firm-level research in the immigration-trade area.¹ Several earlier studies have used a shift-share instrumental variables based on pre-existing immigrant concentrations to measure the local supply of immigrants. For instance, Ottaviano, Peri, and Wright (2018) found a positive association between the local share of immigrants and both firm productivity and country-specific exports in the UK service sector. Additionally, immigration reduces the extent of country-specific service offshoring, consistent with a reallocation of tasks (Ottaviano, Peri, and

¹Regional level evidence on the positive relationship between immigrants and trade includes Peri and Requena-Silvente (2010), Parsons and Vézina (2018), Steingress (2018), and Ariu (2022), among others.

Wright 2013).² Olney and Pozzoli (2021) demonstrated that an exogenous influx of non-EU immigrants into Danish municipalities reduced offshoring at both the extensive and intensive margins, while bilateral immigration increased imports and exports to immigrants' countries of origin. Mitaritonna, Orefice, and Peri (2017) found that increases in the local immigrant supply were associated with stronger productivity, larger exports, and greater firm survival probabilities in the French manufacturing sector.

Other studies, including Hiller (2013), Hatzigeorgiou and Lodefalk (2017), Andrews, Schank, and Upward (2017), and Cardoso and Ramanarayanan (2022), have similarly addressed endogeneity concerns in their specifications. These studies often use index number approaches, lagged immigrant employment, or instrumental variables constructed at local labor market level which exclude the unit's own workers, to analyze immigration's effect on trade. Collectively, these studies document a positive and statistically significant impact of immigration on exports. However, Hatzigeorgiou and Lodefalk (2017) find that only smaller firms benefit from immigrant employment, with the effects being stronger for skilled immigrants. Bastos and Silva (2012) provide an interesting case where the large stock of Portuguese immigrants in a given destination increases both export participation and export intensity to that country.

Finally, this paper relates to the growing immigration-trade literature that utilizes firm-level data on immigrant workers rather than regional immigrant stocks (Hiller 2013; Hatzigeorgiou and Lodefalk 2017; Andrews, Schank, and Upward 2017; Cardoso and Ramanarayanan 2022). As Hatzigeorgiou and Lodefalk (2017) highlight, aggregate immigrant stock data serve as inadequate proxies for the actual number of immigrants employed in enterprises. Accordingly, regional immigrant stocks may capture indirect spillover

²Glennon (2023) examined the effect of H-1B program restrictions on firms' offshoring responses. The results suggest that these restrictions limit firms' ability to hire skilled workers from abroad, prompting them to increase offshoring, particularly to China, Indian and Canada.

effects rather than direct trade-creating effects that immigrants provide to firms. Hiller (2013) studied the impact of immigration on exports using Danish firm-level data on manufacturing firms, distinguishing between the effects of the local presence of foreigners and immigrant employment within firms. She finds that while firms benefit from hiring non-native workers, there is only weak evidence that the local immigrant stock increases export sales. This suggests that intercultural knowledge, such as business networks that help reduce trade barriers, may be more effectively accessed through actual employment of foreign workers within firms. Similar to these studies, this paper presents one of the few findings on non-native workers within firms and their impact on export activity, focusing specifically on a firm's first non-native hire.

The remainder of the paper is structured as follows. Section 2 discusses the conceptual framework, while Section 3 describes the data. Section 4 presents the methodology and Section 5 presents the results. Section 6 discusses the results by contextualizing the findings within a broader framework and concludes the paper.

2 Conceptual framework

2.1 Simple theoretical model

The theoretical threat-benefit model proposed by Tartakovsky and Walsh (2016) and further extended by Fang et al. (2022) provides an interesting starting point for explaining why firms choose to hire immigrants. Firms make hiring decisions based on a cost-benefit analysis. Hiring immigrants may involve costs (or perceived threats) but can also yield long-term benefits. The costs of hiring may include training, legal compliance, low retention, and integration challenges (e.g., language barriers and unfamiliar workplace norms). In contrast, the potential benefits include wage flexibility, a strong

work ethic, creativity-enhancing multiculturalism, skill complementarities, and market expansion.

Consider a firm that maximizes its long-term profits, Π , by deciding whether to hire immigrants ($I = 1$) or not ($I = 0$). Firms incur costs in two main categories: initial costs (C_0) and ongoing costs (C_t). The initial costs C_0 may include recruitment expenses, legal and visa fees, and adaptation costs (e.g., language training), whereas C_t includes administrative compliance, potential resistance from native workers and wage premiums in cases of skill shortages. The firm first evaluates the trade-off between long-term costs C_t and benefits B_t over time. The firm's objective function is:

$$\max_{I \in \{0,1\}} \Pi = \sum_{t=1}^{\infty} \beta^t (B_t - C_t) \quad (1)$$

where B_t represents the benefits of hiring immigrants in period t , C_t represents the ongoing costs of hiring immigrants in period t , and $\beta \in (0, 1)$ is the firm's discount factor. We can write $B_t = B_t^m + B_t^d$, where B_t^m is the benefit component that allows firms to reach new markets by leveraging worker's networks and cultural knowledge (Rauch 2001), while B_t^d includes the other benefit components discussed above.

A firm will hire immigrants ($I = 1$) if the net present value of benefits outweighs the net present value of costs:

$$\sum_{t=1}^{\infty} \beta^t (B_t^m + B_t^d) \geq \sum_{t=1}^{\infty} \beta^t C_t \quad (2)$$

To simplify, assume that the ongoing benefits and costs are constant over time, so that $B_t = B$ and $C_t = C$ for all t . Incorporating the upfront initial cost (C_0) into the model, we can arrange the equation to obtain:

$$\frac{B^m + B^d - C}{1 - \beta} \geq C_0 \quad (3)$$

In this interpretation, the firm must not only have a non-negative net

benefit over time but must also cover its initial hiring costs C_0 . Therefore, a firm will hire immigrants if the long-term discounted benefits exceed upfront costs. Firms that are more forward-looking (i.e., have a higher discount factor β) are more likely to hire immigrants. Additionally, firms are more likely to employ immigrants if hiring policies, such as government subsidies, reduce initial costs (C_0). Finally, firms with greater long-term benefits, particularly those with stronger export growth strategies that benefit from B^m , stand to gain more from hiring immigrants.

2.2 Immigration in Finland

Since 1990, the number of international migrants in developing nations has nearly doubled. In Europe, the proportion of migrants increased from about 7% in 1990 to 11% in 2015 (Edo 2019). By 2023, foreign-born individuals accounted for 14.5% of Europeans aged 15-74 (Eurostat 2024). However, the distribution of migrants varies significantly across countries, with Luxembourg having the highest percentage of foreign-born residents (56%). In contrast, Finland's foreign-born population aged 15-74 remained relatively small at 10%, notably lower than its Nordic neighbors Sweden (25%) and Norway (21%).

The proportion of all foreign-born residents in Finland's total population from 1990 to 2023 is depicted in Figure 1 (Statistics Finland 2024). In 1990, foreign-born individuals constituted just 0.5% of Finland's population. Over the years, immigration has steadily increased, reaching 6.7% by 2023 (black dotted line). The proportion of foreign-born employees exhibits a comparable pattern to that of the overall population (red dotted line). Historically, the primary immigrant groups in Finland were from Estonia, Sweden, or Russia (Peri 2016). However, in recent years, there has been a notable influx of immigrants from Ukraine and Iraq (Statistics Finland 2024).

Individuals migrate to Finland for various reasons. In 2023, residence

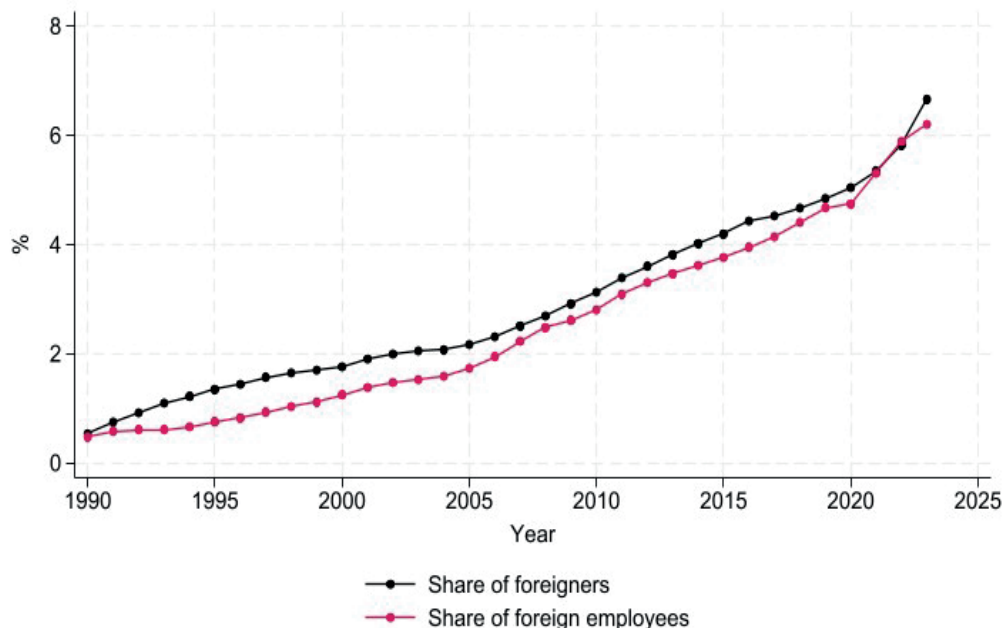


Figure 1: The share of boreign-born in Finland, 1990-2023 (Source: Statistics Finland)

permits were issued as follows: 25% for family-related applications, 25% for international protection, 20% for employment, and 16% for education. The remaining permits covered EU citizen registrations, remigration, refugee quotas, and other categories (Finnish Immigration Service 2024). The distribution of foreign-born residents across Finland's 19 NUTS 3-level regions is uneven. As of 2023, Åland had the highest proportion of foreign-born inhabitants at 12.2%, followed closely by Uusimaa (the capital region) at 11.5%. In contrast, Central Ostrobothnia had the lowest percentage at just 3.1%.

3 Data sources and measures

The analysis utilizes the Financial Statement panel, which provides firm-level data from income statements and balance sheets for the period 1987-2019. All enterprises with at least 20 employees are directly included, while data

for smaller enterprises is drawn from administrative sources such as business taxation registers. The panel includes variables such as the number of personnel, industry and sales. Using firm identification codes, the Financial Statement panel is linked to the Business Register to capture information on firm age and Foreign Affiliates Statistics for data on foreign ownership. Additionally, Finnish Customs provides detailed firm-level data on goods exports and imports from 1999 to 2019. This dataset records the total values of imports and exports with all partner countries and classifies goods at the 8-digit level according to the Combined Nomenclature (CN).

The FOLK modules supplement the analysis with comprehensive background information on the entire population, covering foreign background and other individual characteristics from 1987 to 2018. Detailed nationality is available in FLEED (Finnish Longitudinal Employer-Employee Data) for the 1987-2016 period. Employees are matched to their respective firms using unique identification codes. This matching enables the construction of a comprehensive dataset that combines employee-level data with firm-level characteristics, providing detailed background information for each firm.

Immigration status is determined based on individual's origin, categorized into four groups: (1) Finnish background, born in Finland; (2) Finnish background, born abroad; (3) foreign background, born in Finland; and (4) foreign background, born abroad. Immigrants are defined as individuals born abroad with a foreign background.

As outcome variables, I use the firm's total exports (in euros), adjusted to 2015 prices. The relationship between non-native employment and exports is examined separately for all manufacturing firms in the final sample (both exporters and non-exporters) and exporting firms only. This assesses the export growth sources due to extensive margin and due to intensive margin. Additionally, I include three measures of firm-level exporting at the extensive margin: i) the likelihood of a firm exporting to an immigrant's country

of origin (based on nationality), ii) the number of products exported, and iii) the number of destination market areas. The latter two variables are computed only for exporting firms. Studying products and market areas is crucial, as product churning and firms changing market areas may be key mechanisms driving total export growth (Hu et al. 2017; Egger, Li, and Wu 2023).

4 Model specifications

4.1 Sample construction and empirical specifications

To construct the estimation sample, the analysis focuses on manufacturing firms established after 1986. This criterion ensures accurate matching of firms with historical data on the immigration status of all employees, encompassing 23,320 firms. The identification strategy centers on the event of a firm hiring its first immigrant employee. Therefore, firms that never employed immigrants (16,726 firms) or consistently employed immigrant workers (1,903 firms) are excluded. These restrictions reduce the sample size to 4,691 firms. Notably, 72% of manufacturing firms did not employ any immigrant workers during the study period.

The estimation window spans 2000 to 2018.³ In the main specification, an event study approach is utilized to examine the relationship between hiring the first non-native worker and firm-level outcomes. To inspect parallel pre-trends in the event study design, four lags prior to the event are included, which require firms to be at least five years old. The treatment group con-

³Data on immigrant's nativity is not available after 2016, meaning that the estimation window spans 2000 to 2016 when using exporting to an immigrant's country of origin as an outcome variable. Accordingly, the instrumental variable that is constructed using local immigrant concentration based on nationality covers a smaller sample size, defined in more detail in Section 4.2.

sists of firms that hired their first immigrant employee(s)⁴ in year t (where $t = 2004, \dots, 2018$), tracked for up to eight years ($t + 8$). The panel is unbalanced in event time, as some firms are not observed for the entire estimation period. After sample construction, the final dataset includes 1,772 manufacturing firms and 24,999 firm-year observations. The counterfactual group comprises firms similar in all respects except for the timing of the event, such as in Fadlon and Heien Nielsen (2019).⁵ When treatment and control groups differ only in timing, differences in outcomes are less likely to be driven by unobservable factors that vary across firms, reducing the risk of selection bias. This is particularly relevant in this study design, as firms' perspectives on hiring immigrants depend on a mix of economic rationality, labor market conditions, industry needs, policy constraints, and social attitudes. While some firms view immigrants as an essential workforce, others may refrain from hiring due to regulatory burdens, workplace cohesion concerns, or biases Fang et al. (2022) and Berlina and Cavicchia (2023).

The dynamic difference-in-differences specification is expressed as:

$$y_{it} = \sum_{r \neq -1, r = -4}^8 \gamma_r \times I_r + \sum_{r \neq -1, r = -4}^8 \delta_r \times I_r \times \text{treat}_i + \rho X_{it} + \alpha_i + \tau_t + \varepsilon_{it} \quad (4)$$

where y_{it} denotes an outcome of firm i at time t ; treat_i is an indicator for whether a firm belongs to the treatment group (equaling 1 for each firm); and I_r is an indicator for time relative to the event year (or the placebo event year for control units). Fixed effects are represented by α_i (firm-level) and τ_t (calendar year). X_{it} includes firm-level controls, such as firm age, foreign ownership status, employee turnover rate, and industry indicators. Industry

⁴In the year a firm hires its first non-native employee, the majority of firms (86%) hire only one immigrant, approximately 10% hires two, while the rest hire three or more.

⁵Fadlon and Heien Nielsen (2019) study the effects of health shocks on the health behaviors of family members. Their identification strategy relies on the timing of the health shock, and counterfactuals are constructed using otherwise similar households that experience the same health shock a few years later.

is measured using a 2-digit SIC code. Despite the inclusion of firm fixed effects, industry is explicitly incorporated in the model because firms may switch industries within the same sector, reflecting changes in production strategies or survival tactics (N. Kuosmanen and T. Kuosmanen 2023).

The key parameters of interest are δ_r , which measure treatment effects in period r ($r > 0$) relative to the pre-event reference period ($r = -1$). The parallel trends assumption requires $\delta_r = 0$ for all $r < 0$. Error terms ϵ_{it} are clustered at the firm level.

Accordingly, the basic difference-in-differences (DD) model is estimated as follow:⁶

$$y_{it} = \delta \text{post}_{it} + \rho X_{it} + \alpha_i + \tau_t + \epsilon_{it} \quad (5)$$

In equation (2), post_{it} is an indicator equal to 1 if the firm-year observation belongs to the post-shock period, and parameter δ represents the average treatment effect over the years on firm-level outcomes.

4.2 DDIV specification

Note that the parameter δ should be interpreted as descriptive evidence only. The first concern relates to measurement error, which is likely minimal since all variables are sourced from administrative registers. However, each worker's employment status and respective employer are officially recorded during the last week of each statistical year in Statistics Finland. As a result, some firms may have employed immigrant workers at some point during the year, but these workers may no longer be with the firm by week 52. This could introduce measurement error in the recorded number of immigrant workers per firm. Nevertheless, the data also include information on each

⁶Note that the basic difference-in-differences model would be estimated as: $y_{it} = \beta \text{treat}_i + \gamma \text{post}_{it} + \delta(\text{treat}_i \times \text{post}_{it}) + \rho X_{it} + \alpha_i + \tau_t + \epsilon_{it}$. However, since treat_i equals 1 for all firms in the specification where the counterfactuals are "not yet treated", the model simplifies to the form presented in Equation (5).

worker's longest employment spell for the year. The correlation between these two measures of the number of immigrant employees in a firm is high, at 0.995, suggesting that any potential measurement error is minimal.

A second concern is endogeneity due to self-selection, as firms differ in their decisions to hire non-native workers. However, my specification uses “not yet treated” firms as a control group, suggesting that these firms are likely similar in their perceptions of hiring immigrants. Nevertheless, it should be noted that endogeneity concerns related to the timing of hiring non-native workers remains relevant. A third concern is simultaneity. For instance, the result could be upward biased if a firm anticipates expanding its market to country c and simultaneously hires an immigrant worker from country c to facilitate exporting to that market. Such issues may create a correlation between the residual and the treatment variable. To address potential endogeneity concerns, an instrumented difference-in-differences (DDIV) design is applied ⁷

I follow the original approach of Altonji and Card (1991), which has been used in various immigration-related studies (Mitaritonna, Orefice, and Peri 2017; Ottaviano, Peri, and Wright 2018). The idea is to utilize an exogenous source of variation in the local supply of immigrants as an instrumental variable estimator to identify the effect of immigration. The identification strategy relies on immigrant enclaves, based on the tendency of new immigrants to settle in areas where their compatriots have already established themselves. Previously, Mitaritonna, Orefice, and Peri (2017) found that an increased supply of immigrants in a region was positively related to local firms increasing the number of immigrants from zero to a positive value.

Specifically, I construct an instrument as the expected share of immigrants in a region where the firm is located. First, I calculate $IMMI_{rt}$,

⁷For a classical example, see Duflo (2001); for a discussion on interpreting instrumented difference-in-differences, see Hudson, Hull, and Liebersohn (2017); and for a theory and application of the specification in biometrics, see Ye et al. (2023).

which is the imputed number of immigrants in region r (measured at the NUTS 3-level) in year t :

$$IMMI_{rt} = \sum_c \left(\frac{IMMI_{crt_0}}{IMMI_{ct_0}} \times IMMI_{ct} \right) \quad (6)$$

Here, $IMMI_{ct}$ represents the national stock of immigrants from originating country c in year t . These immigrants are allocated to Finnish regions r based on the initial distribution of immigrants from the same country c across regions in the base year t_0 (1998 in this study). The predicted stocks of immigrants from each country are then aggregated at the regional level to calculate the total predicted stock of immigrants in region r for year t . Finally, the predicted share of immigrants in each region r is calculated as:

$$IMMIshare_{rt} = \frac{IMMI_{rt}}{IMMI_{rt} + Native_{rt_0}} \quad (7)$$

In the denominator, the predicted stock of immigrants is combined with the regional native population, which is fixed at the base year 1998 level to avoid spurious effects that could arise from subsequent endogenous changes in native population growth within a region.

This type of shift-share approach has faced criticism (Borusyak, Hull, and Jaravel 2021; Goldsmith-Pinkham, Sorkin, and Swift 2020). The validity of the instrument depends on the exogeneity of the "shares" (i.e., initial immigrant shares in a region). However, unobserved regional economic conditions or firm-level factors may have influenced initial immigrant inflows to certain regions, subsequently affecting firm-level exporting activity. If this is the case, the exclusion restriction would be violated, and the instrumental variable could be spuriously correlated with firm-level outcomes during our study period. To address this concern, I examine whether pre-existing firm-level

characteristics are correlated with the instrumental variable.⁸ The initial year of immigrant stock is measured in 1998; therefore, the pre-“instrument” firm-level characteristics are drawn from data before 1998. While Finnish Customs data are only available from 1999 onwards, other dataset from Statistics Finland (Business Register Database) provides indicator variables for firm’s exporting and importing activity in 1996. In addition to these variables, I use a firm-level data on sales, foreign ownership status, wage sum, and number of employees, all measured in 1996.

Table 1 presents the correlation coefficients from separate regressions, which include time and regional indicators. The results indicate no significant correlation between a firm’s initial trade activity or other characteristics and the instrumental variable in the region where the firm is located.⁹ However, these findings do not entirely rule out the possibility of other omitted variables still violating the exclusion restriction.

5 Results

5.1 Description of the sample

Table 2 summarizes the main characteristics of the sample. One-third of manufacturing firms in the sample are exporters, and 5% are foreign-owned firms. The average firm age is nearly 14 years, with an average size of 22 employees. Total exports for all the firms average approximately 2.1 million euros, while the average total export value among exporters is 6.4 million euros. The average number of products exported is approximately eight, and Finnish manufacturing firms export to an average of three countries.

⁸The number of initial immigrant shares consists of 1,542 cells, making it impractical to examine the exogeneity of each share separately. Instead, I analyze whether pre-existing firm-level characteristics are associated with the overall calculated instrumental variable.

⁹Note that the number of firm-year observations is reduced, as not all firms in my estimation sample existed in 1996.

Table 1: Correlations between the imputed local share of immigrants (instrumental variable) and firm-level characteristics measured in 1996

	Local share of immigrants (1)	imputed of immigrants (2)	Firm-year observations
Exporting firm	0.0017 (0.0030)		12,101
Importing firm	-0.0023 (0.0041)		12,101
Foreign owned firm	0.0100 (0.0130)		12,101
ln(Number of employees)	-0.0006 (0.0010)		12,101
ln(Sales)	0.0005 (0.0008)		12,101
ln(Wage sum)	-0.0004 (0.0006)		12,101

Notes: Each row reports the OLS coefficient from a separate regression, where the outcome variable is the imputed local share of immigrants (instrumental variable) and the explanatory variable is firm-level trade activity or other characteristics obtained from 1996. Sales and wages are deflated to 2015 prices. Each model includes time and region fixed effects, and the standard errors are clustered at the firm level.

Table 2: Means of characteristics

Variable	Mean	Std	Firm-year observations
<i>All firms</i>			
Foreign owned	0.047	0.211	24,999
Total exports (M€)	2.137	22.97	24,999
Exporting firm	0.335	0.472	24,999
Firm age	13.61	6.858	24,999
Number of employees	21.75	45.21	24,999
<i>Exporters</i>			
Total exports (M€)	6.438	39.65	8,065
Number of exported products	8.25	15.40	8,065
Number export destinations	3.46	6.468	8,065

Notes: Means and standard deviations of main characteristics for all firms and exporters

5.2 Estimation results

Figure 2 presents the event-study regression estimates from Equation (4), examining the relationship between hiring a first non-native worker and firm-level outcomes. I begin by looking at the overall impact on immigrant employment. Specifically, the number of immigrant employees within a firm increases steadily after hiring the first one (Panel A).

There is also a positive relationship between immigrant employment and trade at the extensive margin. Firms that hire immigrants from a particular country are more likely to start exporting to that country, and this effect remains stable over the entire 8-year follow-up period (Panel B). Notably, hiring a first non-native worker is associated with an approximately 10-percentage-point increase in the probability of exporting to the worker's home country. Furthermore, the results suggest a positive total export growth response to non-native employment. For a sample of all firms, total exports increase by approximately 3% within one to four years after hiring the first immigrant worker (Panel C). This effect is even greater for exporting

firms, with an average increase of 5-7% a few years after hiring (Panel D).

Finally, there is a positive trend in both the number of exported products and the total number of market areas for exporting firms after a firm hires its first non-native worker. However, the annual point estimates for the number of market areas (Panel E) are mostly statistically insignificant at the conventional level, whereas the estimates for the number of exported products (Panel F) show statistically significant associations for nearly the entire 8-year follow-up period. Specifically, event-study regression estimates indicate that the number of exported products increases steadily, from one additional product a year after the first hire to three products eight years later. These findings collectively suggest a positive association between non-native employment and exports. Moreover, the absence of discernible pre-trends supports the assumption that the control and treated groups would have evolved in parallel without treatment.

Table 3 presents the average treatment effects for the outcomes from Equation (5) (Panel A). These results align with the event-study regression approach, with one exception: the average treatment effect for the number of exported products does not reach statistical significance. Table 3 further reports the DDIV regression results, where the firm's non-native employment is instrumented using a predicted share of immigrants in a region, derived from immigrant enclaves (Panel B). The estimation models incorporate a comprehensive set of explanatory variables and fixed effects, with standard errors clustered at the regional level - the level of variation of the instrument. The results are mostly in line with the baseline estimates. Specifically, hiring the first non-native worker corresponds to an approximately 11 percentage-point increase in the probability of exporting to a worker's country of origin. Similarly, non-native employment within all firms increases total exports by 3%, but the effect is statistically insignificant when we focus on exporting firms only. Finally, hiring a first non-native worker increases the number of

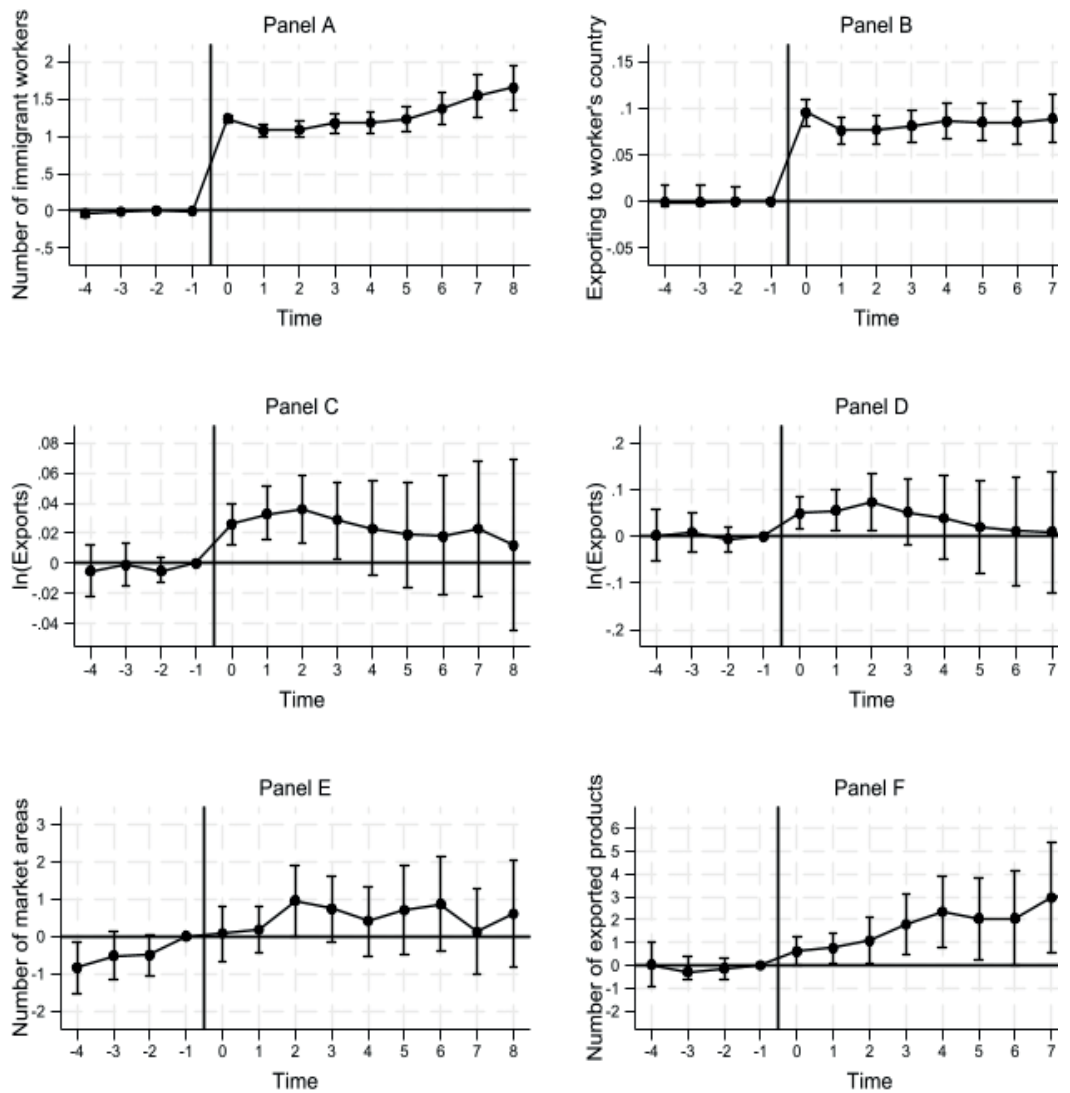


Figure 2: Event-study estimates: First non-native worker and firm-level outcomes

Notes: Coefficient estimates with 95% significance intervals. Other controls include firm fixed effects, year indicators, firm age, industry indicators (21 categories), employee turnover, and foreign ownership. Total exports for a sample of all firms (Panel C) and for exporting firms only (Panel D). Standard errors are clustered at firm-level.

exported products by nearly five. The final row reports the Kleibergen-Paap F -statistics, which assess the power of the instrument. The F -statistics consistently exceed 20, indicating that the instrument is robust and not weak. Therefore, the imputed local share of immigrants appears to be a strong predictor of immigrant employment within firms.

6 Conclusion

This study examined the relationship between hiring non-native workers and firms' export performance of manufacturing sector in Finland. Unlike previous studies, the analysis focused on the event of firms hiring their first non-native worker and constructed counterfactuals from otherwise similar firms that hired non-native workers a few years later. The results reveal several key findings, which remain robust when accounting for endogeneity concerns such as simultaneity.

First, hiring the first non-native worker is associated with an immediate increase in total export sales, with effects persisting a few years of post-treatment. However, this positive relationship is observed only for the full sample of firms, suggesting impacts on the extensive rather than intensive margins. Second, firms experience an increased probability of exporting to the immigrant employee's country of origin after hiring, with over 10-percentage-point higher likelihood that remains stable over the 8-year follow-up period. Third, there is evidence of positive trends in the number of exported products by exporting firms after hiring their first non-native worker.

These findings align with and extend previous literature on the trade-creation effects of immigration. While earlier studies have documented positive associations between local immigrant populations and export performance (Ottaviano, Peri, and Wright 2018; Mitaritonna, Orefice, and Peri

Table 3: DD and DDIIV regression results: Non-native employment and exports activity

	Number of non-native workers	Exporting worker's country	to home	ln(Exports)	ln(Exports)	Number of exported products	Number of market areas
Panel A: DD	(1)	(2)	(3)	(4)	(5)	(6)	(6)
First non-native worker	1.081*** (0.0416)	0.085*** (0.0066)	0.034*** (0.0097)	0.065*** (0.0235)	0.639 (0.4878)	0.974*** (0.2537)	
Number of obs.	24,999	22,552	24,999	8,065	8,065	8,065	
Number of firms	1,777	1,777	1,777	977	977	977	
Panel B: DDIIV							
First non-native worker	1.343*** (0.0696)	0.114*** (0.0165)	0.030** (0.0134)	-0.028 (0.0593)	4.907*** (1.885)	-1.671 (1.4604)	
Number of obs.	22,552	22,552	22,552	7,007	7,007	7,007	
Number of firms	1,777	1,777	1,777	795	795	795	
Kleibergen-Paap Wald test	20.011	20.011	20.011	21.381	21.381	21.381	

Notes: Other controls include firm fixed effects, year indicators, firm age, industry indicators (21 categories), employee turnover, and foreign ownership. Total exports for a sample of all firms (Column 3) and for exporting firms only (Column 4). Standard errors are clustered at firm-level (Panel A) or at the regional level (Panel B). Predicted local immigrant share is used as an instrument variable in DDIIV approach. *** p < 0.001, ** p < 0.050.

2017), this analysis provides novel firm-level evidence on the impacts of hiring the first non-native workers. The results support theoretical mechanisms whereby immigrant employees may facilitate exports by acting as intermediaries, sharing knowledge about their home markets, and helping firms overcome information barriers (Rauch 2001). The results also suggest that the relationships observed are not solely driven by firms strategically hiring immigrants as part of predetermined export expansion plans.

From a policy perspective, these results highlight potential economic benefits of immigration for host country firms and trade. The findings suggest that policies facilitating the employment of immigrants, particularly in export-oriented sectors, may yield positive spillovers for firm performance and international trade. However, it is important to note that the analysis focuses on the first non-native hire, and effects may differ for subsequent immigrant employees.

Several limitations and areas for future research should be noted. First, while the instrumental variable approach addresses some endogeneity concerns, causal interpretation requires strong assumptions about the exclusion restriction that cannot be fully tested. Second, the analysis does not distinguish between different types of non-native workers (e.g., by skill level or origin country), which may have heterogeneous effects. Future work could explore these dimensions to provide more nuanced insights. Third, the study focuses on manufacturing firms in Finland, and results may not generalize to other sectors or countries with different immigration patterns and economic structures.

In conclusion, this study provides novel evidence on the positive relationship between hiring non-native workers and firm-level export performance. The findings suggest that immigrant employees may play an important role in facilitating international trade connections, particularly with their countries of origin. However, two significant caveats must be considered. First,

ethnicity-based recruitment discrimination remains prevalent in Finnish labor markets (Ahmad 2020). And second, the number of immigrant workers in Finland is still modest compared to other western countries. For the Finnish economy to fully benefit from immigrant labor, more work is needed to address ethnicity-based recruitment discrimination and encourage firms to hire immigrants.

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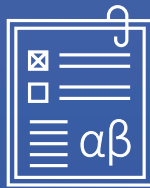
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