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# A Reassessment of the Immigrant Wage Gap

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# When Immigrants Meet Exporters: A Reassessment of the Immigrant Wage Gap*

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**Abstract**

This article shows that wage inequalities between native and immigrant workers depends on the export activity of the employing firm. We build a model with heterogeneous firms and workers showing that white-collar immigrants capture an informational rent in exporting firms that help them close the wage gap with natives. We use French employer-employee data for the manufacturing sector from 2005 to 2015 to support this mechanism. We show that wages react to changes in export intensity when the export destination coincides with the region of origin of immigrant workers.

**Keywords**: Export; Firm; Immigrants; Wage inequality.

**JEL Codes**: F14, F22, F16.

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# 1 Introduction

This article provides a reassessment of the immigrant wage gap and shows that wage inequalities between native and immigrant workers depends on the export activity of the employing firm. Immigrant workers may earn a wage premium when the employing firm increases its export activity, due to the complementarity between their export-specific knowledge and the export activity of the firm.[1]

Two strands of literature provide direct foundations to this work. On the one hand, labour economists have long shown that immigrant workers face wage inequality with respect to natives (Anderson and Huang, 2019). This wage gap is striking at arrival and reduces with time, although some immigrant groups never reach wage equality with natives. Using OECD data for 2005, Dustmann and Glitz (2011) estimate the median wage gap to be 21% in the United States and 10% in France. Our estimations for the French manufacturing sector place the mean wage gap equal to 4.3% in 2005. On the other hand, trade economists have found that exporting manufacturing firms pay higher wages than domestic firms (Bernard et al., 1995; Schank et al., 2007), although trade generates wage inequality within firms (Klein et al., 2013; Friedrich, 2015; Georgiev and Juul Henriksen, 2020). The present article positions itself at the intersection between the two aforementioned strands of literature by studying whether the immigrant wage gap varies along the distribution of the export activity of the firm. We find that the immigrant wage gap is smaller and can turn in favour of immigrants for white-collar workers employed in exporting manufacturing firms.

It is now well established that immigrant workers foster firm-level exports. A number of papers show that skilled and educated immigrants foster exports by reducing transaction costs, intended as cultural and institutional differences, and by easing integration into business networks. Using data on service firms in the U.K., Ottaviano et al. (2018) find that an increase in the supply of immigrant workers fosters bilateral exports for language-intensive and culture-specific services. Andrews et al. (2016) for Germany and Hiller (2013) for Denmark show that immigrants help firms reduce their trade costs and foster export sales thanks to their destination-specific knowledge. A related strand of literature shows that immigrant workers foster trade by improving firm integration in the global value chain through their networks and through their knowledge on input quality (Bastos and Silva, 2012; Hatzigeorgiou and Lodefalk, 2016; Egger et al., 2019; Ariu et al., 2019).

We argue that the wage gap between native and immigrant workers depends on firms' export intensity and the skills of the workers. In addition, we argue that firms' export intensity, workers' skills and nativity status interact as to generate an informational rent

[1]Such complementarity has been documented before. Among others, see Mion and Opromolla (2014) and Mion et al. (2022).

specific to skilled immigrant workers, rent that (over) compensates for the wage discount commonly faced by immigrant workers. For this reason, wage inequality faced by skilled immigrants may be lower in exporting firms. Using French employer-employee data from 2005 to 2015, we confirm the existence of the three effects: (i) immigrant workers earn less than native workers (immigrant discount), (ii) exporting firms pay higher wages than non-exporting firms (export premium), and (iii) white-collar workers earn more than blue-collar workers (skill premium). In a new contribution to this literature, we find that the immigrant wage gap varies with the export intensity of the firm and the occupation group of the worker.

We develop a theoretical model to rationalise these findings. Firms are heterogeneous in productivity and face costs to exporting as in Melitz (2003), which allows the export activity to be concentrated in a subset of firms. Directed search in the labour market, in the tradition of Moen (1997), allows different firms to pay different wages to a given type of labour. Our model yields an immigrant discount when natives face better labour market conditions than immigrants, and a skill premium when a higher skill level translates into a higher marginal product for a certain type of labour. The employment of high-skilled immigrants reduces the cost of exporting which creates a premium for that particular factor. This premium can be associated to an informational rent. In equilibrium, high-skilled immigrants can obtain higher wages than natives in the same occupation group, when the premium for this particular group overcompensates for the immigrant discount.[2]

The theory that is closest to ours has been proposed by Felbermayr et al. (2018). This model features a directed search setting with one single labour type. We generalise the setting to multiple labour markets and allow for trade costs to be firm-specific and dependent on the amount used of one of the labour types. Other important works introducing Melitz-type trade with heterogeneous firms into models with labour market frictions are Helpman et al. (2010), Felbermayr et al. (2011) or Amiti and Davis (2012). However, labour is a homogeneous factor in most of this literature. A notable exception is Sampson (2014), who introduces labour heterogeneity in one dimension (skill) to analyse the effect that trade can have on inequality. Our model differs substantially from that contribution since the aim is different. This translates into our model featuring heterogeneity in two dimensions (skill and nativity). More importantly, we focus on the case in which the use of one factor of production reduces trade costs, and explore its consequences on wages.

We then evaluate the predictions of the model. Our empirical results are obtained from a standard Mincerian equation where wage is explained by the status of workers (native or immigrant, blue- or white-collar) and the export activity of firms. To address endogeneity concerns regarding the export activity of the firm, we instrument the firm export share – our baseline measure of export activity – with the world import demand

[2]We obtain this result with perfectly competitive labour markets, which differentiates our approach to those with monopsony power by firms as in Amior and Manning (2020).

for varieties that the firm produces (Hummels et al., 2014). We find that, on average, immigrant workers earn less than natives. This wage gap does not vary with the export intensity of firms for blue-collar immigrant workers. However, we obtain very different results for the sample of white-collar workers. When employed by firms with a low export intensity, white-collar immigrants earn less than their native counterparts. Yet, the gap reduces, or even reverses, for immigrants employed in high export-intensive firms. Our baseline specification allows us to quantify the exporting threshold: immigrant workers close their wage gap when working in firms that export more than 19%-40% of their total revenue, depending on the specification. Our findings are compatible with the hypothesis that white-collar immigrant workers capture an informational rent because they provide exporters with valuable information for accessing foreign markets.[3] Several papers have shown how workers' knowledge is important for firms to understand changing business practices and tailor marketing costs. Analogously, it has been shown the importance of building trust in repeated buyer-seller interactions as well as the importance of learning about foreign demand and needs (Mion and Opromolla, 2014; Arkolakis, 2010; Artopoulos et al., 2013; Araujo et al., 2016). The results being driven by the sample of white-collar immigrant workers is consistent with the idea that these workers are those that are both more likely to possess more valuable information for the firms and to perform more sophisticated activities related to exporting (Caliendo and Rossi-Hansberg, 2012). We then provide evidence for this mechanism. We show that the average wage of workers from different regions of origin (EU and non-EU countries) in a firm is differently affected by the firm-level share of exports sold in EU and non-EU countries. Assuming that immigrants of a particular group (e.g., EU citizens) possess knowledge specific to their origin market (the European Union), they should be better positioned than members of the other groups (non-EU immigrants and natives) to capture an informational rent when their firm exports more to that market than to the rest of the world.

Our article contributes to the literature studying the effects of trade on the labour market outcomes of immigrants (see, for example, recent efforts by Lodefalk et al., 2022, Brinatti and Morales, 2021 or Morales, forthcoming).[4] Our article is more closely related to the literature showing how trade affects wage inequality. The standard approach

[3]It is important to mention that immigrant workers may also affect firm-level performance through higher productivity (Peri and Sparber, 2009; Mitaritonna et al., 2017; Ottaviano et al., 2018). Yet, productivity gains are a collective outcome resulting from the presence of both natives and immigrants within a firm, so they could hardly translate into a wage premium specific to immigrant workers only. We therefore disregard productivity effects and focus on the informational rent only.

[4]Lodefalk et al. (2022) finds that international trade affects labour market integration of immigrants in Sweden. While the authors find that exporting firms hire significantly more immigrant workers (which is in line with the finding of Brinatti and Morales 2021 for Germany), they find no effect of increased trade on the wages of immigrants. Morales (forthcoming) finds that foreign MNEs in the US hire more immigrants from their origin country but they pay them less than immigrants from other countries. This is because MNEs make it easier for lower ability workers from the same origin to migrate, due to lower screening costs.

highlights how the reward to different factors of production is differently affected by trade shocks, depending on the country's comparative advantage and how relative prices change (see for example Acemoglu, 2003). More recent literature shows how trade together with workers' characteristics affect wage inequality. For example, Verhoogen (2008) links trade and wage inequality through quality upgrading where higher-quality goods require higher-quality workers, and higher-quality workers are paid higher wages. Bøler et al. (2018) find that exporting is associated to a larger gender wage gap. Bonfiglioli and De Pace (2021) provide further evidence on the relationship between exporting and the gender wage gap, finding that an increase in the export activity widens the gender wage gap for blue-collar workers, while it reduces it for white-collar workers. Our results are complementary to these efforts as our paper focuses on how trade affects wages for workers that differ in terms of occupation and foreign status. Finally, our paper relates to the recent work by Dostie et al. (2021), providing a decomposition of both the level and the change of the immigrant-native wage gap in Canada. The authors find that native workers earn an higher average firm-specific pay premium, driven by the under-representation of immigrants at high-premium firms. However, in terms of wage assimilation, the authors show that university-educated immigrants from disadvantaged countries are those experiencing the largest gains thanks to moves up the job ladder.

Our results point to a new dimension through which trade can decrease wage inequality between high-skill native and immigrant workers. By showing and quantifying how the export intensity of the firm and the skills of the worker interact as to generate an informational rent specific to skilled immigrants employed in exporting firms, our results point to a new dimension through which trade can decrease wage inequality. Our study suggests that policies aimed at helping immigrant minorities get higher qualifications is relevant to reduce wage inequality, especially when exporting firms are potential employers. This policy implication is particularly relevant for economies where exporting is a major activity for many firms, as is the case of France.

# 2 Data and Descriptive Evidence

## 2.1 Data Sources

We use three sources of confidential administrative data for French manufacturing firms from 2005 to 2015. We combine them using the *SIREN* code *(système d'identification du répertoire des entreprises)* which is a unique firm identifier used by the French administration.[5]

[5]Our analysis is aggregated at the firm level rather than the establishment level because the information relative to the trade activity of the firms and their balance-sheet is only available at the firm level. The data contains about 20% of multi-establishment firms. For this set of firms, we kept the larger establishment of the firm only.

**Administrative data on employees.** The first data source consists of annual employee declarations compiled by all wage-paying establishments located on the French mainland territory (*Déclarations Annuelles des Données Sociales*, DADS). All wage-paying legal entities established in France are required to fill payroll declarations.[6] The panel version of the DADS allows us to follow contract-establishment spells of all employees born in October. The sample thus contains 1/12th of the working population and all firms that employ at least one worker born in October. The DADS contain information on the characteristics of the workers such as their administrative district of residence, gender, and immigration status (one can distinguish between French and foreign-born workers). Note that the dataset does not contain information on the country of birth of the immigrant worker. In this article, we refer to immigrant workers as foreign-born individuals. In an extension of the empirical analysis, we also use the citizenship of the workers (one can distinguish between French, other European, and non-European citizens). Additionally, the dataset contains information on the characteristics of the job spell such as the type of contract (full-time and part-time), the gross and net annualised wage in constant euros and the occupation.[7] The French classification of occupations *(Nomenclatures des professions et catégories socio-professionnelles)* allows us to identify blue- and white-collar workers. We define blue-collar workers as clerks and labourers, and white-collar workers as executives, higher intellectual professions and intermediate occupations (including, for instance, sales and business executives). Additional information about the occupational codes is provided in Appendix A. From now on, we use low-skill (high-skilled) and blue-collar (white-collar) workers interchangeably. Note that we do not observe the level of education of the workers in this dataset. However, the French population census of 2005 (*Recensement de la Population*) shows a clear positive correlation between the level of education and the occupation held by the individuals, for both groups of natives and immigrants (see Figure A.1 in Appendix C).

**Tax records.** We then use balance-sheet data featuring tax reports filled in by firms located in France. This dataset combines two administrative sources: the FICUS data from 2005 to 2007 *(Fichier de comptabilité unifié dans SUSE)* and the FARE data from 2008 to 2015 *(Fichier approché des résultats d'Esane)*. This dataset covers the manufacturing and the service sectors but excludes the agricultural and financial sectors. It is exhaustive since there is no firm cutoff set on the number of employees, and all firms

[6] Only establishments employing civil servants are excluded from filling such declarations.

[7] Our sample starts in 2005 as information on part- and full-time contracts is available from 2005 onward.

must report to the French tax administration. It contains information on firms' sales, main industry, debt, and other variables related to their accounting books.[8]

**Trade data.** Information on the export activity of firms comes from the French customs data reporting shipments in value (euros) and in volume (tons) by NC8 product and origin/destination country.[9] The custom data provide information on the value of exports, as well as the number of products and destinations served by firms. Finally, to build the instrument approximating the world import demand faced by French firms, we use the Comtrade dataset that contains bilateral trade flows at the HS6 product level by origin and destination countries in U.S. dollars.[10]

## 2.2 Descriptive Statistics

Once all the data sources are combined, we obtain a sample of 1,821,525 worker-firm-year observations. We only keep workers with a full-time contract in order to avoid differences in wages due to differences in the number of hours worked in a year (full-time workers account for 86.66% of the initial sample). This choice could bias the estimations if, for example, immigrant workers were more likely to hold part-time positions than native workers. Yet, we find little difference between natives and immigrants. In that respect, 11.23% of natives and 12.43% of immigrants hold part-time positions.[11] The baseline sample contains 45,037 manufacturing firms, 60.14% of which export at least once over the studied period. More precisely, out of 211,051 firm-year combinations, 125,360 display a positive export value.

The sample confirms an important fact: exporters are large employers. Each year, approximately 83% of the workers are employed by an exporting firm. Table 1 presents an overview of the firm characteristics by export status. Not surprisingly, exporters also have significantly larger revenues and total assets. The average skill intensity of workers is also higher for exporting firms. Interestingly, exporters do not hire a different share of immigrant workers than non-exporters. Switching perspective, one can see how firms' export activity varies with the employment of immigrant workers (Table A.2, Appendix C).

[8] This dataset does not contain information on the share of foreign capital. We are therefore unable to identify multinational firms. It does not contain information on firm linkages such as their foreign affiliates.

[9] Some thresholds apply for reporting to the customs office. Firms are required to report their shipments of goods to/from the EU only if larger than 150,000 euros and shipments to/from other countries only if larger than 1,000 euros or one ton. These thresholds eliminate only a small share of the total shipments (Berman et al., 2015).

[10] For more details, see: https://comtrade.un.org. To convert the Comtrade data in euros, we use the exchange rates from FRED that are available at https://fred.stlouisfed.org/tags/series?t=exchange+rate.

[11] Instead of relying on the yearly wage, one could use the hourly wage in order to keep part-time workers in the analysis. However, the information on the number of hours worked is often missing or misreported in the data.

The data show that exporters employing immigrants display larger export values and larger export shares. They serve a larger number of export destinations and product varieties, as well as a significantly larger number of products-destination markets than their counterparts employing no immigrant workers.

Table 1: Summary Statistics by Firm Export Status.

| | Non-Exporters | | | Exporters | | | |
|---|---|---|---|---|---|---|---|
| | **Obs.** | **Mean** | **Std. Dev.** | **Obs.** | **Mean** | **Std. Dev.** | Signif. |
| Total revenue | 85,691 | 5.37e+06 | 1.61e+07 | 125,360 | 5.10e+07 | 4.04e+08 | *** |
| Assets | 85,663 | 2.70e+06 | 2.74e+07 | 125,342 | 3.50e+07 | 2.83e+08 | *** |
| Average nr. of employees | 85,691 | 30.72 | 55.67 | 125,360 | 150.90 | 478.48 | *** |
| Share of employees in high-skilled occupations | 80,683 | 0.169 | 0.226 | 118,558 | 0.292 | 0.241 | *** |
| Share of foreign-born | 85,691 | 0.098 | 0.212 | 125,360 | 0.098 | 0.173 | |

*Notes:* This table reports descriptive statistics for two groups of firm-year observations. In each year, we identify firms displaying a null export value and firms displaying a positive export value.

The sample includes 400,221 workers among whom 10.27% are immigrants. Immigrant workers represent 8.85% of the total employment of white-collar workers and 10.60% of blue-collar workers. The largest district is *Île-de-France* (Paris agglomeration) with 6,004 manufacturing firms and 12.42% of total employment. However, this number hides a significant degree of heterogeneity between native and immigrant workers: while 11.29% of the natives work in *Île-de-France*, this number rises to 24.36% for immigrants. Finally, we report a number of statistics on individuals by immigration status (Appendix C, Table A.3).

## 2.3 Stylised Facts

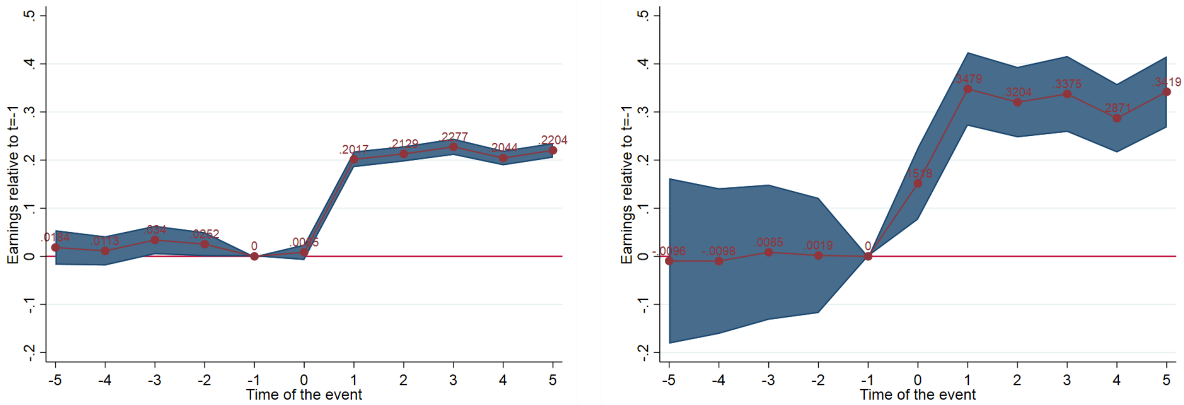
We provide some descriptive statistics on the wage distribution for the workers in our sample. First, wage differences are correlated with a number of characteristics of the firm, in particular the export status of the employing firm: individuals employed by non-exporting firms earn about 6,503 euros less than individuals employed by exporting firms (which is equivalent to 0.33 log percentage points). Second, wage differences are correlated with individual characteristics such as the gender, age, and occupation of the individual. On average, an individual in a white-collar position earns about 15,838 euros more than a blue-collar worker (about 0.66 log percentage points). Third, natives earn about 1,374 euros more than immigrants (about 0.06 log percentage points) which suggests the presence of an immigrant discount. Figure A.2 (Appendix C) shows a large heterogeneity in the immigrant wage gap across occupations for the group of white-collar workers, while it shows that immigrant workers earn less than natives in all the occupations for the group of blue-collar workers.

We argue that the wage gap faced by immigrant workers in white-collar positions is lower, if not reversed, when they are employed by exporting firms. In the spirit of

Kleven et al. (2019), Figure 1 plots the effect of exporting in a given year on wages, as a percentage of the counterfactual scenario of not exporting, controlling non-parametrically for life- and business-cycle trends. We focus on individuals who do not change employer, which account for 75% of the baseline sample, and on firms that export at least once, which account for 90% of the remaining sample. We denote $s = 0$ the year when the firm becomes an exporter and we omit the event time dummy at $s = -1$, so that the event time coefficients measure the impact of exporting relative to the year before the firm starts exporting. The figure shows that the wage of both immigrant and native workers increases after the employing firm starts exporting, which is consistent with a more general export premium, but the effect is larger for the sample of immigrant workers in each of the 5 years following the event. In each year after the firm starts exporting, immigrant workers earn 35% more than the scenario where the firm had not started exporting, while native earn 22% more.

Figure 1: Dynamics of the Export Premium.

(a) Native Workers (b) Immigrant Workers

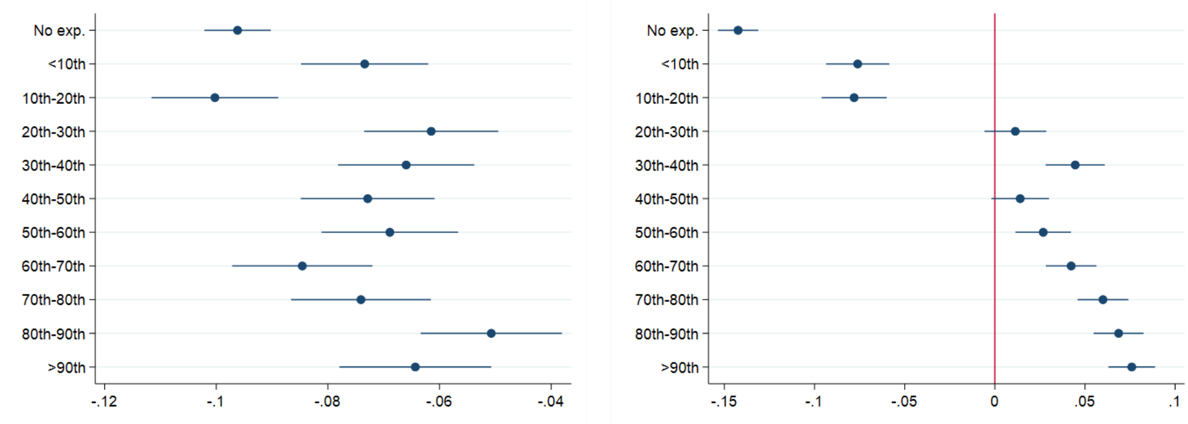



*Notes:* Each figure plots the event time coefficients as percentage of the counterfactual outcomes when the firm does not export. The counterfactual outcome is computed as the predicted wage, without the contribution of the event dummies. The event time coefficients are estimated from the equation below: $\ln w^g_{its} = \sum_{j \neq -1} \beta^g_j \times \mathbb{1}\,[j = s] + \sum_y \gamma^g_y \times \mathbb{1}\,[year = t] + \sum_k \alpha^g_k \times \mathbb{1}\,[k = age_{it}] + \varepsilon^g_{its}$. $w^g_{its}$ is the wage of individual $i$ in group $g$ in year $t$ at the event time $s$. Coefficients are reported together with their 10 percent confidence interval, based on standard errors clustered at the firm-year level.

Figure 2 plots the average wage differential between native and immigrant workers in each percentile of the distribution of export share. We distinguish between blue- and white-collar workers on the left- and right-hand side of the figure, respectively. For the sample of blue-collar workers, we find that compared with native workers, immigrant workers earn consistently less along the entire distribution of firm export share. For the sample of white-collar workers, immigrant individuals earn a lower wage than natives at the beginning of the distribution, however, they earn higher wages than natives in firms whose export share belongs to the 30th percentile, and above. Therefore, the wage differential between white-collar natives and white-collar immigrants seems to be lower or even reversed (to the benefit of immigrants) when firms' export share increases.

Figure 2: Immigrant Wage Gap and Exports by Occupation Groups.

(a) Blue-Collar Workers (b) White-Collar Workers




*Notes:* Each figure plots the average wage differential between native and foreign workers in each percentile of the distribution of export share (in total sales). The distribution is computed within each industry-year. Wage differentials $\beta_g$ are obtained from a wage equation, where we introduce a set of interaction terms between a dummy for immigrant workers ($\mathbb{D}_i$) and another dummy indicating the percentile $g$ of the distribution of export shares to which the employing firm belongs to: $\ln w_{i(j)t} = \mathbb{D}_i \times \sum_{g=1}^{G} \beta_g \mathbb{1}\left[Export_{jt} \in g\right] + X'_{it}\Gamma + X'_{jt}\Theta + \varphi_{dt} + \varphi_{st} + \varepsilon_{it}$. The regression includes individual characteristics denoted $X'_{it}$ (gender, age, experience and experience squared), firm controls denoted $X'_{jt}$ (firm total employment and age of the firm) as well as district-time and industry-time fixed effects. Coefficients are reported together with their 10 percent confidence interval.

# 3 Theoretical Framework

In this section, we present a model showing the determinants of the wage differential between native and immigrant workers that we observe in the data. Our model embeds directed search as in Kaas and Kircher (2015) into a trade model with monopolistic competition and heterogeneous firms as in Melitz (2003). By merging these frameworks our proposed model is closest to Felbermayr et al. (2018). We build on their efforts by generalising the production side to one with multiple factors of production and by introducing the possibility that trade costs can be reduced by the use of one of the labour inputs.

The model features a standard *skill premium* when higher skills translate into higher marginal product of skilled workers. The existence of frictions in the labour market allows an *immigrant discount* to exist when natives have better outside options in the labour market than immigrants. The particular setting with directed search allows wages to be firm-specific. Introducing heterogeneous firms enables the model to reproduce the fact that the most efficient and larger firms are the ones exporting. Because of their larger size, exporters need to pay higher wages to all types of labour to attract larger quantities of all types, leading to an *export premium*. When one of the factors of production (in our case high-skill immigrants) contributes relatively more to increasing exporting profits, that creates an additional premium (what we call an *informational rent*) that is exclusive of that factor and of exporting firms. Our model shows that it is possible for high-skilled immigrants to offset the *immigrant discount*.

The model comprises one economy open to international trade and closed to financial capital movements and migration. The trading partner of our main economy is not explicitly modelled and is assumed to be symmetric in every way. Heterogeneous firms produce output $y(\omega)$ of variety $\omega$, using labour of type $ij$ with $i = L, H$ (low-skill and high-skill respectively) and $j = I, N$ (immigrant and native respectively). Workers of different types differ in their productivity and the labour market conditions they face. On top of this, one particular group of workers, i.e., the $HI$ type, can contribute to reduce exporting costs. Output varieties are consumed by either domestic or foreign consumers as there is free trade in final goods. Firms producing final goods operate under monopolistic competition and are heterogeneous in their productivity level $\phi$. There is free entry into production.

## 3.1 Consumers

Consumers' preferences are homogeneous across consumers in both economies and are CES across differentiated varieties $\omega$ of an aggregate good:

$$C = M^{-\frac{1}{\sigma-1}} \left[ \int_{\omega \in \Omega} y(\omega)^{\frac{\sigma-1}{\sigma}} d\omega \right]^{\frac{\sigma}{\sigma-1}} \tag{1}$$

with $\sigma > 1$ and $\Omega$ being the set of all varieties $\omega$, with mass $M$. In this expression, the term $M^{-1/(\sigma-1)}$ eliminates scale effects stemming from love of variety. The following aggregate price can be derived:

$$P = \left[ \frac{1}{M} \int_{\omega \in \Omega} p(\omega)^{1-\sigma} d\omega \right]^{\frac{1}{1-\sigma}} \tag{2}$$

where $p(\omega)$ is the price of variety $\omega$. We use $P$ as *numeraire* and we obtain the usual inverse demand function:

$$y(\omega) = \frac{Y}{M} p(\omega)^{-\sigma},\ r(\omega) = \frac{Y}{M} p(\omega)^{1-\sigma}, \text{ and } R = Y = \int r(\omega) d\omega \tag{3}$$

The only income consumers have comes from inelastically selling their work force in the labour market. Workers of type $ij$ work for a wage $w_{ij}$. We consider the mass of each type of worker to be exogenous, and these are assumed identical.

## 3.2 Firms

Firms pay a fixed cost ($f_E > 0$) to discover their productivity level $\phi$ in producing one single variety $\omega$. Since each firm has a unique $\phi$ and a unique $\omega$ we can identify firms with either parameter. The ex-ante distribution $g(\phi)$ of firms is exogenous and known to all producers. The cumulative distribution is $G(\phi)$. Once their productivity is revealed, firms may chose to produce for the domestic market paying an additional fixed cost ($f_D > 0$).

A firm with productivity level $\phi$ operates the following Cobb-Douglas production function:

$$y(\phi) = \phi \prod_{ij} \ell_{ij}(\phi)^{\beta_{ij}} \tag{4}$$

with $0 < \beta_{ij} < 1, \forall ij$, and $\sum \beta_{ij} = 1$. $\beta_{ij}$ equals the marginal product of factor $ij$. To match the empirical literature documenting the skill premium, we shall assume that this is higher for high-skilled workers than for low-skilled workers. For simplicity of exposition, we assume no differences due to the nativity status of the worker. We formalize these ideas as follows:

**Assumption 1** *Assume that* $\beta_{HI} = \beta_{HN} > \beta_{LI} = \beta_{LN}$.

## 3.3 Directed Search

Each labour type $ij$ is recruited in a separate labour market through directed search in the spirit of Moen (1997). This means that there are four different labour markets, and each is segmented over a continuum of submarkets. In each submarket there is a number of unemployed workers $U(\theta_{ij})$ and a number of unfilled vacancies $V(\theta_{ij})$, and each submarket is defined by its unique ratio $\theta_{ij} = V(\theta_{ij})/U(\theta_{ij})$, a measure of (inverse) market tightness. Unemployed workers and vacancies are matched through a stochastic matching technology $M(U_{ij}, V_{ij})$, and we define the flow rate of a match for a vacancy as $M(U_{ij}, V_{ij})/V_{ij} = q(\theta_{ij})$. We follow Felbermayr et al. (2018) in setting this rate as a Cobb-Douglas function:

$$q(\theta_{ij}) = A\theta_{ij}^{-\eta} \tag{5}$$

with $0 < \eta < 1$ and $A > 0$.[12] Notice that $\eta = -q'(\theta_{ij})\theta_{ij}/q(\theta_{ij})$, so it denotes the constant elasticity of the filling rate with respect to $\theta_{ij}$. In each labour market $ij$ each firm $\phi$ posts a number of vacancies $v_{ij}(\phi)$ for their requirements of each factor $ij$ at the beginning of the period with a respective wage $w_{ij}(\phi)$. A share $q(\theta_{ij})$ is filled, so their employment level of factor $ij$ at the end of the period is $\ell_{ij}(\phi, \theta_{ij}) = q(\theta_{ij})v_{ij}(\phi)$.

[12] This assumption is compatible with the standard assumptions of $M(.)$ being at least twice continuously differentiable, increasing in its arguments, satisfying the Inada conditions and being homogeneous of degree 1.

Finally, firms face convex costs in posting vacancies. We follow Felbermayr et al. (2018) in specifying the following form for search costs:

$$C(v_{ij}) = v_{ij}^{\alpha} \tag{6}$$

with $\alpha > 1$ driving the degree of convexity in search costs. Then, the recruitment process for the firm boils down to choosing the segment $\theta_{ij}$ and the amount of vacancies $v_{ij}(\phi)$ that allows the firm to maximise its profits.

The matching process is done in one single period, with no time discounting within that period. The product $q(\theta_{ij})\theta_{ij}$ constitutes the share of employed workers in a certain submarket. Then, $q(\theta_{ij})\theta_{ij}w(\theta_{ij})$ equals the expected wage for any worker of the $ij$ type in any submarket. The indifference condition for all workers of that type is:

$$\chi_{ij}W_{ij} = q(\theta_{ij})\theta_{ij}w(\theta_{ij}) \tag{7}$$

In this equation we have assumed that the outside option for all type of workers is the same, and is normalised to zero for simplicity. $W_{ij}$ represents the expected wage of $ij$ workers, in the absence of job-destroying conditions. To introduce exogenous and heterogeneous labour market conditions across labour types, we allow for potential differences in the labour market outcomes due to, for example, different probabilities of the worker being fired. In a one period context, we rationalise this with parameter $0 < \chi_{ij} < 1$, which can be interpreted as the part of potential income that is not lost due to the position being vacated for any reason, before the period expires. To represent the fact that workers, conditional on skill level, face better prospects in a given labour market when they are natives as opposed to immigrants, we assume this parameter is higher for them. For simplicity, we assume no differences within worker nativity status and across skill level. We can formalise our assumption as follows:

**Assumption 2** *Assume that* $\chi_{HN} = \chi_{LN} > \chi_{HI} = \chi_{LI}$.

## 3.4 Exporting

Shipping goods internationally entails costs. First, selling abroad entails a constant fixed cost $f_X > f_D > 0$. Additionally, the activity also involves variable costs. We model variable costs in the form of an iceberg cost $\tau > 1$, which means that $\tau$ units are shipped for one unit to arrive at destination. Following the empirical literature, we let iceberg exporting costs to be firm-specific as they can be reduced by means of hiring high-skilled immigrants. We set the reduction of iceberg costs as proportional to the semi-elasticity of output to the use of factor $HI$. This allows the effect to be continuous and decreasing with the amount of the factor employed by the firm. We impose this notion by the following assumption:

**Assumption 3** *Assume that*

$$\frac{\partial \tau(\phi)}{\partial \ell_{HI}(\phi)} = \frac{-\kappa \beta_{HI}}{\ell_{HI}(\phi)},$$

*with* $\kappa > 0$ *being a constant.*

Profits of firm $\phi$ are given by:

$$\pi(\phi) = R(\phi) - \sum_{ij} [\ell_{ij}(\phi) w_{ij}(\phi) + C(v_{ij})] - f_D - \mathbb{I}_X f_X \tag{8}$$

where $\mathbb{I}_X = 1$ if the firm is an exporter and $\mathbb{I}_X = 0$ if it is not. As is common in Melitz-based models of international trade, the exporting status of a firm is given by weather the firm's productivity is above the exporting threshold that we define later on. Dixit-Stiglitz competition in final goods market implies that revenues can be written as:

$$R(\phi) = \left[ \frac{Y}{M} (1 + \mathbb{I}_X \tau(\phi)^{1-\sigma}) \right]^{\frac{1}{\sigma}} y(\phi)^{\frac{\sigma-1}{\sigma}} \tag{9}$$

Consider the optimisation problem of the firm concerning factor $ij$. The first-order conditions of the problem are:

$$\begin{aligned} \frac{\partial R}{\partial \ell_{ij}} \frac{A}{\theta_{ij}^{\eta}} &= \frac{W_{ij}}{\chi_{ij} \theta_{ij}} + \alpha v_{ij}^{\alpha-1} \\ \frac{\partial R}{\partial \ell_{ij}} \frac{A\eta}{\theta_{ij}^{1+\eta}} &= \frac{W_{ij}}{\chi_{ij} \theta_{ij}^2} \end{aligned} \tag{10}$$

Operating with these equations we obtain an expression for optimal vacancies of firm $\phi$ recruiting factor $ij$:

$$v_{ij}(\phi) = \left[ \frac{1-\eta}{\eta} \frac{W_{ij}}{\chi_{ij} \alpha} \frac{1}{\theta_{ij}} \right]^{\frac{1}{\alpha-1}} \tag{11}$$

Given our production function (4), we have that:

$$\frac{\partial R(\phi)}{\partial \ell_{ij}} = \frac{\sigma - 1}{\sigma} R(\phi) \frac{\beta_{ij}}{\ell_{ij}} [1 + \mathbb{I}_{HI} \lambda(\phi)] \quad \text{, where} \quad \lambda(\phi) = \frac{\kappa \mathbb{I}_X \tau^{-\sigma}}{1 + \mathbb{I}_X \tau^{1-\sigma}} > 0 \tag{12}$$

In the previous equation, $\mathbb{I}_{HI}$ is an indicator that takes value one when $ij = HI$. As can be seen here, the value of the marginal product of factor $ij \neq HI$ equals the contribution that one more unit of that factor has on the production of final good quantities. For $ij = HI$, its marginal product may be enhanced above that level due to its power to reducing iceberg trade costs, when the firm exports. This is captured by term $\lambda(\phi)$. It is important to stress that the term is only positive for exporting firms: for non exporting firms $\mathbb{I}_X = 0$ and $\lambda(\phi) = 0$, so the marginal product of factor $HI$ is restricted to its contribution to the production of final good quantities, as all other factors.

The model is closed with standard zero-profit cutoff conditions, which pin down the productivity thresholds for producing domestically and exporting ($\phi_D$ and $\phi_X$, respectively), and a free-entry condition. We leave those to the Appendix as they are secondary for our purposes.

## 3.5 Equilibrium Wages

Let us denote with a tilde variable levels that pertain to the average firm, i.e. that with productivity $\tilde{\phi}$. By construction $p(\tilde{\phi}) = 1$, so we can write:

$$\tilde{\theta}_{ij} = \left[ \frac{\sigma}{\sigma - 1} \frac{W_{ij}}{A\eta\beta_{ij}\chi_{ij}} \frac{\ell_{ij}(\tilde{\phi})}{\tilde{y}(\phi)} \frac{1}{[1 + \mathbb{I}_{HI}\lambda(\phi)]} \right]^{\frac{1}{1-\eta}} \tag{13}$$

Comparing the first order conditions (equation 10) for two different firms, i.e., one that exports, and the average firm that does not export, we reach:

$$[1 + \mathbb{I}_X\tau(\phi)^{1-\sigma}]^{\frac{1}{\sigma}} \left[ \frac{y(\phi)}{y(\tilde{\phi})} \right]^{\frac{\sigma-1}{\sigma}} \frac{\ell_{ij}(\tilde{\phi})}{\ell_{ij}(\phi)} [1 + \mathbb{I}_{HI}\lambda(\phi)] = \left[ \frac{\tilde{\theta}_{ij}}{\theta_{ij}} \right]^{1-\eta} \tag{14}$$

We can then re-write (14) as:

$$[1 + \mathbb{I}_X\tau(\phi)^{1-\sigma}]^{\frac{1}{\sigma}} [1 + \mathbb{I}_{HI}\lambda(\phi)] \left[ \frac{\phi}{\tilde{\phi}} \right]^{\frac{\sigma-1}{\sigma}} \prod_{k/ij} \left[ \frac{\tilde{\theta}_k}{\theta_k} \right]^{\Psi\beta_k} = \left[ \frac{\tilde{\theta}_{ij}}{\theta_{ij}} \right]^{\frac{\alpha}{\alpha-1} - \beta_{ij}\Psi}$$

where $\Psi = \left(\frac{1}{\alpha-1} + \eta\right) \frac{\sigma-1}{\sigma} > 0$. It defines a system of equations where the number of equations equals the number of labour types in the economy, and from which we can obtain expressions of $\tilde{\theta}_{ij}$ and $\theta_{ij}$ depending only on parameters $\tilde{\phi}$ and $\phi$ respectively. To simplify exposition, we present the solution grouping all $ij \neq HI$ into one single group that we call $B$, so we effectively work with a system of two equations. We find expressions for $\tilde{\theta}_{HI}$, $\tilde{\theta}_B$, $\theta_{HI}$ and $\theta_B$, which we present in the Appendix.

Taking these expressions back to (7), we finally obtain an expression for the wage paid by firm $\phi$ to each factor. The wage paid to factor $HI$ is:

$$\begin{aligned} w_{HI}(\phi) &= \underbrace{\left[ \frac{\phi}{\tilde{\phi}} \right]^{(\sigma-1)\zeta\delta}}_{\text{firm productivity}} \underbrace{[1 + \mathbb{I}_X\tau(\phi)^{1-\sigma}]^{\zeta\delta}[1 + \lambda(\phi)]^{\delta + \frac{1}{1+\rho}}}_{\text{export premium}} \underbrace{\beta_{HI}^{\frac{1}{1+\rho}} \beta_B^{\frac{\rho}{1+\rho}}}_{\text{skill premium}} \times \\ &\times \underbrace{[W_{HI}\chi_{HI}]^{\frac{\mu}{1+\rho}+1} [W_B\chi_B]^{-\frac{\epsilon}{1+\rho}}}_{\text{conditions specific to } ij} \underbrace{\tilde{\phi}\eta \frac{(\sigma-1)}{\sigma}}_{\text{macro conditions}} \end{aligned} \tag{15}$$

where $\zeta$, $\epsilon$, $\delta$, $\rho$ and $\mu$ are bundles of parameters defined in the Appendix. There, we show that all these bundles have positive values. A comparable expression is obtained for the other factors.

Expression (15) shows the determinants of wages in our model and highlights the way in which the export premium, the skill premium and the immigrant discount coexist in a very straightforward way. First, since $(\sigma - 1)\zeta\delta > 0$, high-productivity firms pay higher wages. Additionally, if the firm is an exporter ($\mathbb{I}_X = 1$), the wage it pays is even higher (since $\zeta\delta > 0$). This represents the *export premium* that has been documented in the literature. According to this second term, the export premium is a negative function of iceberg costs ($\tau$): the harder it is to export, the lower the revenues from exporting for a given firm and therefore the lower the premium paid by exporters. This exporter premium is not exclusive of factor $HI$, but affects all other factors (see Appendix). In addition, since $\delta + 1/(1 + \rho) > 0$, we see a positive effect of $\lambda$ on the wage of factor $HI$ which is also exclusive of exporters. We call this effect the *informational rent*. Because of complementarity across factors in the production function, we find a positive effect of $\lambda$ on the wage of the other factors too. Yet, this effect is higher for factor $HI$ under reasonable parametrizations (see Appendix).

Then, a *skill premium* is at play since the wage is positively affected by the marginal product of labour. The higher the marginal product of factor $HI$ ($\beta_{HI}$), the higher the wage of that factor. Notice that a higher marginal product in the other factors also contributes to a higher $w_{HI}$, due to complementarity of factors in the production function. This *indirect* effect is smaller than the direct effect stemming from higher productivity of the factor in question when $\rho < 1$. This inequality does not hold for all possible parameter values but it does for most reasonable parametrizations (see discussion in Appendix). In a setting where higher skills translate into a higher marginal product, then high-skilled workers obtain a wage premium due to their higher productivity with respect to low-skilled workers, other things being equal.

Conditions specific to an $ij$-market also play a role. These conditions include for example the probability of the job being destroyed which we assumed to be different for native and immigrant workers. An improvement of these conditions for factor $HI$ would increase the wage rate for that factor since $\mu/(1 + \rho) + 1 > 0$. When these conditions are better for native workers, our model reflects a *nativity bias* (that we also call *immigrant discount*). Notice that better conditions for other factors unambiguously reduce the wage of factor $HI$, since $-\epsilon/(1 + \rho) < 0$. This is because, when conditions for other types of workers improve, their wages raise, reducing the surplus left to be allocated as wages for workers of type $HI$.

Finally, economy-wide conditions also affect wages. These reflect competitiveness levels in the economy as a whole. In our model, such conditions are represented by the average productivity of firms ($\tilde{\phi}$), firm's market power (driven by $\sigma$) and the technology of the matching function ($\eta$). As the expression puts forward, when firms are on average more productive, wages paid by a certain firm (with a given productivity gap $\phi/\tilde{\phi}$), are higher. When firms have stronger power in the final product market, reflected in higher mark-ups $\sigma/(\sigma-1)$, then wages paid are lower. A better matching technology also rises wages for a given firm.

# 4 Empirical Strategy

## 4.1 Empirical Specification

Following the insights provided by the theoretical model, we now study whether the immigrant wage gap varies with the export activity of the firms and the occupation of the worker. Our empirical strategy relies on a standard wage equation, where we relate the wage of workers employed in French manufacturing firms to the observed characteristics of both workers and firms as follows:

$$\begin{aligned}\ln \mathrm{w}_{i(j)t} =& \beta_0 + \beta_1 \mathrm{Foreign}_i + \beta_2 \mathrm{Export}_{jt} + \beta_3 \mathrm{White}_{it} \\ &+ \beta_4 (\mathrm{Foreign}_i \times \mathrm{Export}_{jt}) + \beta_5 (\mathrm{Foreign}_i \times \mathrm{White}_{it}) \\ &+ \beta_6 (\mathrm{Export}_{jt} \times \mathrm{White}_{it}) + \beta_7 (\mathrm{Foreign}_i \times \mathrm{Export}_{jt} \times \mathrm{White}_{it}) \\ &+ \Gamma X'_{it} + \Theta X'_{jt} + \mathrm{FE} + \varepsilon_{it} \end{aligned} \tag{16}$$

The dependent variable is the (log) annualised real wage of an individual $i$ working in firm $j$ at time $t$. $\mathrm{Foreign}_i$ equals one if worker $i$ is foreign-born and zero otherwise. $\mathrm{Export}_{jt}$ denotes the export share of firm $j$ at time $t$. $\mathrm{White}_{it}$ is a dummy variable indicating whether the worker holds a white-collar position and zero if she holds a blue-collar position at time $t$. This specification includes the triple interaction between the immigrant dummy, the export share and the white-collar dummy. It also includes the corresponding double interaction terms.

Following our hypothesis, the wage gap should be lower in exporting firms because white-collar immigrant workers are able to capture an informational rent due to their superior knowledge of foreign destinations, which should, in turn, compensate the wage discount they face on the labour market. Therefore, we expect a positive sign of $\beta_7$ in Equation (16), indicating that the immigrant wage gap is lower in export-intensive firms for white-collar occupations, while $\beta_4$ provides information on whether the wage gap is on average lower in exporting firms independently from the occupation group of the worker. We include a number of time-invariant and time-varying individual characteristics ($X'_{it}$), namely the gender of individual $i$, their experience in the firm at time $t$ and its squared term, as well as their age at time $t$. As for time-varying firm characteristics ($X'_{jt}$), we include the (log) average number of employees in firm $j$ at time $t$ in order to control for the size of the firm, as well as the age of the firm. Then, we include different fixed effects (FE) depending on the specification. District-year and district fixed effects control for unobserved factors at the district level, such as search costs, typically higher in less dense districts. They also control for the fact that some districts pay systematically higher wages. Depending on the specification, we include industry-year fixed effects that account for systematic variations in wages across industries. Exploiting the within-industry variation allows one to control for the fact that exporters may be concentrated in native- or immigrant-intensive industries. We include firm-year (or firm) fixed effects to control for time-varying (or time invariant) unobserved characteristics of firms. This last set of fixed effects should therefore attenuate concerns related to omitted variable bias, where more productive firms are hiring more immigrant workers, set higher wages and export more. Finally, we use occupation-year fixed effects to compare the wage differential between individual in the same 2-digit occupation. Errors are clustered at the firm-level to account for correlations across workers employed in the same firm.

## 4.2 Endogeneity Concerns

The coefficients in Equation (16) may be biased due to unobserved firm-level demand shocks as well as technological shocks that could simultaneously affect trade and wage decisions (Hummels et al., 2014; Georgiev and Juul Henriksen, 2020) – even though we include firm-year fixed effects which already control for such unobserved shocks in some specifications. Reverse causality could be an issue if firms select higher ability workers as they intensify their export activity. For example, firms might hire from an international labour market as they intensify their export activity, because the high-productivity workers they need are hard to find in the domestic market. In this case, our estimation would reflect differences in the workforce composition of exporting firms and would not capture an informational rent specific to skilled immigrant workers employed by exporters.

**Instrumental Variable Strategy.** We tackle these identification concerns by means of an instrumental strategy. We follow the literature to instrument the firm export share with the world import demand faced by the firm (Georgiev and Juul Henriksen, 2020; Hummels et al., 2014; Berman et al., 2015). We build the world import demand faced by a firm $j$ at time $t$ as follows:

$$\text{WID}_{jt} = \sum_{pc} \bar{\omega}_{jpc} \times M_{pct} \forall c \neq \text{France} \tag{17}$$

where $M_{pct}$ denotes the total imports of product $p$ by country $c$ at time $t$ observed in the Comtrade database, excluding imports from France. Following Berman et al. (2015), $\bar{\omega}_{jpc}$

is a time-invariant weight computed using the average share that the product-destination pair $pc$ represents in firm $j$'s total exports over the studied period. As Hummels et al. (2014) point out, a rise in the world import demand may result from demand shocks on product $p$ in country $c$, or from a loss of comparative advantage by country $c$ in serving product $p$. Therefore, the instrument is correlated with the firm's export activity but not with its productivity or wage-setting decisions. The effect of the firm's export activity on wages (as well as the effect of its interaction with the immigrant and the occupation dummies), is then identified by an increase in import demand, and a consequent increase in the export activity of the firm.

**Endogenous mobility patterns.** We perform a diagnostic test to show that our sample is not subject to endogenous mobility patterns, following the studies by Card et al. (2013) and Bombardini et al. (2019). The purpose of this test is to attenuate concerns related to the selection of more productive workers into export-oriented firms. For instance, exporters may be better at screening and may, therefore, hire workers that prove to be valuable for exporting after they gain more experience and reveal their productivity. In that case, they may benefit from higher wages (reflecting their higher productivity) and eventually move to more export-intensive firms. The self-selection of better (and thus better paid) workers into exporting firms would confound the effect of exporting on wages that is due to information, instead. Therefore, this test assesses whether any mobility pattern can be associated with the variation in wages incurred by individuals around the time they change employer.

We analyse the wage dynamic of individuals before and after they switch firm.[13] We split firms into four bins based on the distribution of the export share. We are interested in analysing wage changes for workers switching from firms in a lower bin to firms in a higher bin of the export distribution, to understand whether workers joining firms with a higher export share are those that are already paid more (before joining). Results are presented in Appendix D, Figure A.3. We do not observe that individuals joining higher export-intensive firms experience a systematic wage gain prior the job switch. We can therefore conclude that our sample does not seem to be subject to endogenous mobility, thus alleviating concerns related to the ability of the worker being the main driver of her wage premium when joining an exporting firm.

To further tackle concerns related to self-selection of (better) workers into exporting firms, we use a difference-in-differences model and an event-study plot to analyse the wage dynamic of workers before and after a firm starts exporting for the first time. We focus on a sample of workers that do not change employers. Workers employed in firms that never export act as controls, providing the counterfactual on which the estimation of the effect of exporting is based. The coefficients represent changes in wages relative to the year

[13]We focus on individuals switching firm only once

when the firm starts exporting for the first time. Results are presented in Appendix D, Figure A.4. We find that both native and immigrant workers experience a wage increase after a firm starts exporting. However, while native workers experience such an increase already before the firm starts exporting, immigrant workers experience such an increase only *after* the firm starts exporting, with the wage increasing slightly more. Additional tests show that while both blue- and white-collar native workers experience an increase in wage after the employing firm starts exporting, the increase in wage is solely driven by white-collar workers for the sample of immigrants.[14]

All in all, these results suggest that the effect of exporting on wages is not driven by self-selection of better workers in exporting firms. Additionally, the relative magnitude of the wage premium after the firm starts exporting reflects different complementarities between workers and export activity.

# 5 A Reassessment of the Immigrant Wage Gap

Before diving into the main results, we present a set of preliminary results in Appendix E aimed at corroborating that (i) immigrants earn, on average, less than natives if they are blue-collar workers, while the opposite is true for white-collar workers, that (ii) exporters pay higher wages, especially to white-collar workers, and that iii) white-collar workers are paid on average more. We then build upon these results to investigate how the immigrant wage gap varies with firms' export intensity by broad occupation groups. Results are presented hereafter.

## 5.1 Baseline Results

In Table 2, we present the results of the baseline specification (Equation 16) analysing the determinants of the immigrant wage gap. In columns (1) to (4), the triple interaction term ($\beta_7$) is positive and significant. Therefore, the magnitude of the immigrant wage gap depends on both the occupation group of the worker and the export intensity of the employing firm. The wage gap can be expressed by means of the partial derivative of Equation (16) with respect to the immigrant dummy ($\text{Foreign}_i$) for blue- and white-collar workers separately. Using these wage elasticities, we can determine, for each occupation group, an export threshold below which immigrant workers earn less than native workers, and above which immigrant workers earn more than native workers.[15]

We start by analysing the results for blue-collar workers. In columns (1) to (4), we find that the immigrant discount persists along the entire distribution of export activity, as the export threshold to reach wage parity for blue-collar workers is above unity (or

[14] Results are available upon request.

[15] The threshold for blue-collar workers is given by $-\beta_1/\beta_4$. The threshold for white-collar workers is given by $-(\beta_1+\beta_5)/(\beta_4+\beta_7)$.

not significant). Regarding white-collar workers, we find that immigrants employed by firms that export less than 27.4% of their total revenue earn less than natives, while immigrants employed in firms that export more than 27.4% earn a wage premium (column 1). In columns (2) and (3), we introduce firm-year and firm fixed effects and find a threshold equal to 19.4% and 22.3% respectively. Finally, in column (4), we include 2-digit occupation-year fixed effects and find a threshold for the export share equal to 40.1%. In columns (1) to (4), the Kleibergen-Paap F statistic is high enough to infer that the instrumental variables are not weak. First-stage results show that the world import demand and its interactions positively and significantly predict firm export intensity and its interactions.

Overall, we find that blue-collar immigrant workers face a wage discount with respect to their native counterparts, irrespective of the export intensity of their employing firm. For this occupation group, exporting has no beneficial impact on the wage inequality across immigrants and natives. On the contrary, the wage differential between immigrant and native white-collar workers depends on the export intensity of the employing firm. Immigrants earn less than natives at the lower end of the export distribution, while they earn more than natives at the upper end of it. The export share at which the wage differential changes sign ranges from 19.4% to 40.1%, depending on the specification. Hence, exporting does play a role in the determination of wage inequality between immigrant and native white-collar workers. Our results are consistent with the idea that immigrant workers, and in particular workers in charge of more sophisticated tasks, possess valuable knowledge on the export market that affects the marginal revenues (or costs) of the employing firm that is already serving a market, thus improving its export performance (Mion and Opromolla, 2014).

Finally, we present the results obtained with a specification analogous to the baseline one but that does not distinguish between blue- and white-collar workers, in Appendix F, Table A.7. This specification provides information on the *average* wage differential along the distribution of firm export intensity. In column (1), we find that foreign-born workers employed in firms that do not export earn on average 16.9% less than native workers. However, this wage gap is reduced when firms increase their export intensity, and is reversed to a wage premium when the export share is above 67.4%. This threshold is similar (65.2%) when we focus on the within-occupation dimension in column (4). Columns (2) and (3), where we exploit the within-firm dimension show thresholds of 79% and 81.3%, respectively.

Table 2: A Reassessment of the Nativity Wage Gap.

| | $\ln w_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| ($\beta_1$) $\text{Foreign}_i$ | -0.107*** | -0.057*** | -0.059*** | -0.076*** |
| | (0.007) | (0.007) | (0.007) | (0.007) |
| ($\beta_2$) $\text{Export}_{jt}$ | 0.204*** | | 0.091 | 0.133*** |
| | (0.028) | | (0.060) | (0.025) |
| ($\beta_3$) $\text{White}_{it}$ | 0.493*** | 0.481*** | 0.462*** | |
| | (0.006) | (0.006) | (0.005) | |
| ($\beta_4$) $\text{Foreign}_i \times \text{Export}_{jt}$ | 0.064** | -0.023 | -0.022 | 0.062** |
| | (0.027) | (0.026) | (0.026) | (0.026) |
| ($\beta_5$) $\text{Foreign}_i \times \text{White}_{it}$ | 0.019 | 0.014 | 0.006 | 0.005 |
| | (0.015) | (0.015) | (0.015) | (0.013) |
| ($\beta_6$) $\text{Export}_{jt} \times \text{White}_{it}$ | 0.050** | 0.016 | 0.060*** | 0.022 |
| | (0.024) | (0.024) | (0.023) | (0.019) |
| ($\beta_7$) $\text{Foreign}_i \times \text{Export}_{jt} \times \text{White}_{it}$ | 0.258*** | 0.247*** | 0.259*** | 0.115*** |
| | (0.045) | (0.045) | (0.044) | (0.038) |
| *First-stage coefficients* | | | | |
| $\text{WID}_{jt}$ | 0.010*** | | 0.003*** | 0.010*** |
| | (0.000) | | (0.000) | (0.000) |
| $\text{WID}_{jt} \times \text{Foreign}_i$ | 0.018*** | 0.019*** | 0.018*** | 0.018*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| $\text{WID}_{jt} \times \text{White}_{it}$ | 0.021*** | 0.021*** | 0.020*** | 0.021*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| $\text{WID}_{jt} \times \text{White}_{it} \times \text{Foreign}_i$ | 0.024*** | 0.024*** | 0.024*** | 0.024*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Bootstrapped export thresholds* | | | | |
| Threshold for blue-collar workers | 1.682*** | -2.537 | -2.745 | 1.232*** |
| | (0.546) | (8.559) | (15.143) | (0.377) |
| Threshold for white-collar workers | 0.274*** | 0.194*** | 0.223*** | 0.401*** |
| | (0.011) | (0.031) | (0.021) | (0.013) |
| Observations | 1,822,463 | 1,822,462 | 1,822,463 | 1,822,461 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 325.36 | 426.32 | 147.95 | 337.76 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

**Workforce composition of firms.** We cannot exclude that exporters, which tend to be the most productive firms, may demand relatively more foreign workers because those workers possess characteristics (other than their place of birth) that firms find valuable for their export activity. In that case, the estimates would reflect differences in the workforce composition across exporters and non-exporters, instead of wage differences across natives and immigrants. To tackle this issue, we modify the baseline estimation by replacing the export activity variable with a dummy variable taking value one if the firm is an exporter at time $t$. We instrument this dummy variable with the world import demand faced by the firm, as in the baseline specification. In addition, we use firm fixed effects which enable us to focus on firms that change their export status over time. In doing so, we study the change in immigrants' wages compared to the change in natives' wages as a firm becomes an exporter.[16]

Results are reported in Table A.8. We first reproduce column (1) of Table 2 using an export dummy. The results are in line with the baseline findings in which we use the export share of the firm. We then focus on the within-firm specification which allows us to better tackle the threat to identification described above (column 2). We find that blue-collar immigrant workers face a wage discount that does not vary with the export status of the firm (as the coefficient associated with $Foreign_i \times Export_{jt}$ is not significant). As for white-collar workers, the results suggest that immigrant workers benefit from a wage premium with respect to their native counterpart when their firm starts exporting. This last set of results lends support to the idea that the baseline results are not driven by differences in workforce composition between exporters and non-exporters.

## 5.2 Robustness Tests

In this section, we investigate the robustness of the estimation of Equation (16). We use an alternative dependent variable, an alternative instrumental variable for the export intensity of the firm, an alternative classification of occupations, and alternative samples. All results are presented in Appendix F and confirm that baseline findings are robust.

**Alternative dependent variable.** We start by using an alternative dependent variable, i.e., the (log) *daily* wage of the individual. This test accounts for the fact that some individuals do not work for the entire year. Using the daily wage allows us to control for differences in wage arising from differences in the number of days worked by an individual.

Results obtained with this alternative dependent variable are reported in Table A.9. The magnitude, sign and significance of the coefficients are in line with the baseline findings. Slightly different from the baseline specification, we find that export thresholds for blue-collar workers is significant and feasible in column (4). However, this threshold is equal to 96.3% which is very high and higher than the threshold for white-collar workers obtained with this specification (14.1%). As for white-collar workers, we find significant export thresholds in all columns but column (2), ranging from 7.1% to 14.1%, depending on the specification.

**Alternative instrumental variable.** We pursue the analysis by using an alternative variable to instrument the export intensity of the firm. We build the world import demand

[16] Bøler et al. (2018) offers a similar discussion on identification of the gender wage gap in relation to firms' export activity.

faced by a firm $j$ at time $t$ as follows:

$$\text{WID}_{jt} = \sum_{pc} \omega_{jpct_0} \times M_{pct} \forall c \neq \text{France} \tag{18}$$

where $\omega_{jpct_0}$ denotes the share that the product-destination pair $pc$ represents in firm $j$'s total exports in 2004. Using the pre-sample year instead of an average over the studied period allows us to further ensure the exogeneity of the instrumental variable, yet it reduces the number of observations.

Results obtained with this alternative IV are reported in Table A.10 and are in line with the baseline findings and the previous robustness test. In columns (1) to (4), we find that blue-collar immigrants earn less than their native counterparts along the entire distribution of export intensity. Then, we find that white-collar immigrants employed by firms that export less than 26.1% of their total revenue earn less than their native counterparts (column 1). Other specifications are also in line with the baseline findings as we find an export threshold between 17.3% and 39.4% of the firm revenue.

Finally, we also replicate the baseline specification excluding from the sample firms that never export and that therefore do not have any variation in the instrumental variable. Results are reported in Table A.11. For blue-collar workers, we find an export threshold which is either non feasible or not significant. For white-collar workers, depending on the specification, we find that immigrants employed by firms that export less than 18.9%-45.1% of their total revenue earn less than natives, while immigrants employed in firms that export more, earn a wage premium.

**Alternative definition of occupation groups.** We now use an alternative classification of occupations to identify blue- and white-collar workers. We follow the International Standard Classification of Occupations (ISCO) proposed by the International Labour Organization (ILO).[17] We aim at checking the validity of the baseline results obtained with the French classification of occupations *(Nomenclatures des professions et catégories socio-professionnelles)* with respect to an international and broadly used classification of occupations in the field of labour economics. After matching French occupation codes (PCS-ESE codes are first converted to PCS 2003) to ISCO 08 codes, we are able to use the four ISCO skill levels defined by the ILO to define blue-collar workers (levels 1 and 2) and white-collar workers (levels 3 and 4). We report the results obtained with the IV-2SLS strategy in Table A.12. Columns (1) to (4) confirm the baseline results.[18] For blue-collar workers, we find an export threshold which is feasible and significant in column (4). This threshold is equal to 88% which is higher than the threshold for

[17] ILO ISCO–08 Volume I *International Standard Classification of Occupations.*

[18] The triple interaction term is not significant in column (4). However, there still is a positive and significant export threshold above which white-collar immigrant workers earn a wage premium.

white-collar workers obtained with this specification (41.8%). For white-collar workers, depending on the specification, we find that immigrants employed by firms that export less than 23.8%-41.8% of their total revenue earn less than natives, while immigrants employed in firms that export more, earn a wage premium.

The last part of the robustness analysis uses an alternative breakdown of workers into broad occupation groups. We identify groups for which individuals are likely (or unlikely) to take decisions affecting trade activities, rather than the baseline white- *vs.* blue-collar distinction. More precisely, trade-related occupations include company directors (occupation 23), occupations related to commercial activities (white-collar occupations 37 and 46), occupations related to the sale and transport of merchandise (blue-collar occupations 54, 55 and 62), and occupations in the craft industry (blue-collar occupation 63). We therefore group workers into trade-related and non-trade-related occupation groups (see column 2 in Table A.1). We report the results obtained with the IV-2SLS strategy in Table A.13. Columns (1) to (4) show that immigrant workers employed in non-trade-related occupations earn less than their native counterparts along the entire distribution of export activity. On the contrary, immigrant workers employed in trade-related occupations see their wage gap reversed into a wage premium as soon as the firm exports at least 37.1% of its total revenues (column 1). Other columns provide similar results. This set of results provides direct evidence that the mechanism driving the relationship between the immigrant wage gap and the export intensity of the firm is the trade-content of foreign workers' occupations.

**Alternative samples.** Finally, we test the robustness of the results to alternative samples. We start by excluding the region of Paris that exhibits a very high concentration of immigrant workers. We report the results in Table A.14. We find that blue-collar immigrant workers earn less than their native counterparts along the whole distribution of export shares. The results confirm that white-collar immigrant workers see their wage gap reversed into a wage premium as soon as their firm exports at least 26.3% of its total revenue (column 1). Other columns provide similar thresholds.

We then reproduce the baseline specifications using the sample of male workers. Excluding female workers allows us to test the robustness of the results on a set of workers who are less likely to hold part-time contracts. The results are reported in Table A.15 and are fully in line with the baseline findings.

# 6 Underpinning Mechanisms

In this section, we explore the mechanisms behind the relationship of interest. Our working hypothesis is that white-collar immigrant workers experience a lower wage discount, if not a wage premium, in exporting firms because they provide valuable information on the foreign market served by the firm. For this reason, they capture an *informational rent* that translates into higher wages.

Our exercise studies how the average wage of immigrant workers from different origin groups varies with the export activity of the employing firm in those same origin regions.

We analyse how the average wage of EU and non-EU citizen workers changes with the export share of the employing firm toward EU and non-EU countries (excluding French citizens from the group of EU workers). If immigrant workers are able to capture an informational rent thanks to a better knowledge of specific foreign markets such as their countries of origin, we should observe that the average wage of immigrant workers from EU (non-EU) countries increases, or increases more, with the export share to EU (non-EU) countries.

To test this hypothesis, we cannot rely on the French administrative panel data at the individual level (the DADS *Panel*) because it does not contain information on the region of origin of the immigrant workers. We therefore use the DADS *Postes*, which consists of pooled cross-sectional administrative data that allow following firms over time (but not workers). This dataset contains individual-level information on wages, type of contract, occupations, birthplace (France or abroad) and citizenship (French, EU or non-EU). We are therefore able to count, for each firm, the number of foreign-born workers who have an EU citizenship and those who have a non-EU citizenship. We impose the same restrictions as for the baseline analysis performed with the individual panel data, by keeping only full-time workers in manufacturing firms, who work for the entire year. We then compute the average firm-level wage by foreign citizenship (EU, non-EU) and by occupation groups (blue-collar, white-collar).

We estimate the following specification for each occupation group:

$$\ln \text{aw}^o_{jt} = \beta_0 + \beta_1 \text{Export}^{\text{EU}}_{jt} + \beta_2 \text{Export}^{\text{non-EU}}_{jt} + \Gamma X'_{jt} + \zeta_{dt} + \zeta_{st} + \varepsilon_{jot} \quad (19)$$

where $\text{aw}^o_{jt}$ is the average wage of type-$o$ workers (with $o$ = EU white-collars, non-EU white-collars, EU blue-collars, non-EU blue-collars) in firm $j$ at time $t$, and $\text{Export}^{\text{EU}}_{jt}$ and $\text{Export}^{\text{non-EU}}_{jt}$ denote the firm $j$'s share of exports to EU and non-EU countries respectively. As with the baseline specification, we instrument the export intensity of the firm following Equation (17), modified to consider the export share toward a subset of destinations (EU or non-EU countries).[19] Vector $X'_{jt}$ includes the (log) number of employees in the firm, and the age of the firm. This specification includes district-year and industry-year fixed effects, and errors are clustered at the firm level.

[19]The weights have been computed to reflect the average importance of the destination-product pair $pc$ in firm $j$'s total export toward EU or non-EU countries separately.

Table 3: Average Wage by Origin Group.

| | White-collar workers | | Blue-collar workers | |
|---|---|---|---|---|
| | $\ln \text{aw}_{jt}^{\text{EU}}$ (1) | $\ln \text{aw}_{jt}^{\text{non-EU}}$ (2) | $\ln \text{aw}_{jt}^{\text{EU}}$ (3) | $\ln \text{aw}_{jt}^{\text{non-EU}}$ (4) |
| *Estimation results* | | | | |
| $\text{Export}_{jt}^{\text{EU}}$ | 0.350*** | 0.243*** | 0.029 | 0.035* |
| | (0.049) | (0.049) | (0.025) | (0.018) |
| $\text{Export}_{jt}^{\text{non-EU}}$ | 0.175** | 0.402*** | 0.096** | 0.073** |
| | (0.085) | (0.072) | (0.047) | (0.033) |
| *First-stage coefficients* | | | | |
| $\text{WID}_{jt}^{\text{EU}}$ | 0.012*** | 0.012*** | 0.011*** | 0.011*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| $\text{WID}_{jt}^{\text{non-EU}}$ | 0.007*** | 0.009*** | 0.006*** | 0.006*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| Observations | 38,809 | 34,864 | 76,531 | 110,033 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 305.419 | 332.895 | 493.912 | 759.042 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | st-dt | st-dt | st-dt |

*Notes:* This table reports IV-2SLS estimations. The dependent variable in columns (1) and (3) and in columns (2) and (4) is the average wage of EU and non-EU immigrant workers, respectively, working in a firm $j$ at time $t$. Note that we distinguish between white-collar (columns 1, and 2) and blue-collar workers (columns 2, and 4). ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. Controls include the (log) number of employees in the firm and the age of the firm. st and dt indicate industry-time and district-time fixed effects respectively.

IV-2SLS results are reported in Table 3, columns (1) to (4). We find that an increase in the share of exports toward EU countries is positively associated with the average wage of white-collar workers from both origin regions, yet the effect is higher for the group of immigrant workers from EU countries (column 1) than for immigrant workers from non-EU countries (column 2). One standard deviation increase in the share of exports to EU countries increases the average wage of white-collar immigrant workers from the same origin group by 0.077% and the average wage of white-collar immigrant workers from the opposite origin group by 0.055%. When focusing on the share of exports toward non-EU countries, we obtain a very similar picture: there is a positive relationship between the share of exports sold in these countries and the average wage of non-EU immigrants, and this is larger than for the other group of immigrant workers (0.033% *vs* 0.083% increase for one standard deviation increase in the share of exports towards non-EU countries). In other words, within columns, we see that one standard deviation increase in the share of exports towards EU countries increases the wage of white collar immigrants from EU countries by 0.077% and of white-collar immigrants from non-EU countries by 0.033%. Additionally, we see that one standard deviation increase in the share of exports towards non-EU countries increases the wage of white collar immigrants from EU countries by 0.051% and of white-collar immigrants from non-EU countries by 0.083%. Finally, column (3) and column (4) show that only the share of exports toward non-EU countries has a small impact on the average wage of immigrant blue-collar workers, independently of their origin group. In particular, even though column (3) shows that the wage of blue-collar workers from EU countries react more to an increase in the export share towards non-EU countries, this coefficient is smaller than in column (1), where the sample focuses on white-collar workers. This result lends support to our working hypothesis, since blue-collar immigrants are less likely to provide valuable information regarding export markets than white-collars and are therefore unable to capture any informational rent.

# 7 Conclusions

We argue that the export intensity of the firm, the nativity status and the skills of the worker interact as to generate an informational rent specific to skilled immigrant workers, rent that (over) compensates for the wage discount commonly faced by immigrant workers. As a result, wage inequality faced by skilled immigrants may be lower in exporting firms. We use a model embedding a typical search and matching setting into a trade model with monopolistic competition and heterogeneous firms, extended to allow for multiple input factors. The model highlights how the wage of workers of different occupation groups and different origins varies with the export activity of the employing firms.

Using employer-employee data on the French manufacturing sector from 2005 to 2015, we show that the magnitude and sign of the immigrant wage gap depends on firms' and workers' characteristics. We find that the wage differential of white-collar workers varies with the export activity of the employing firm: White-collar immigrants employed by high (low)-exporting firms earn more (less) than their native counterparts. The same is not true for blue-collar workers, with immigrant workers earning less than native workers along the entire distribution of export intensity. Our results also show that the average wage of white-collar workers from a certain origin responds positively to the export activity of the firm in those specific markets. These results support the hypothesis that immigrant workers capture an informational rent when they are closer to the export-decision positions in exporting firms.

From a policy perspective, our findings show that both the occupation of individuals and the export intensity of their employers are important in assessing the magnitude and scope of the immigrant wage gap in the French manufacturing sector. Linking the micro evidence provided in this article to aggregate outcomes should be welcome for future research avenues. Our results also imply that, to some extent, trade reduces wage inequality across workers. This last result is important given that trade is often decried as a vector of inequality.

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# Appendix

# A Additional Information on the Data

Table A.1: French Classification of Occupations.

| CS code | Occupation (French) | Occupation (English) | (1) | (2) |
|---|---|---|---|---|
| **1** | **Agriculteurs exploitants** | **Farmers** | | |
| 11 | Agriculteurs sur petite exploitation | Farmers on small farms | - | - |
| 12 | Agriculteurs sur moyenne exploitation | Farmers on medium-sized farms | - | - |
| 13 | Agriculteurs sur grande exploitation | Farmers on large farms | - | - |
| **2** | **Artisans, commerçants et chefs d'entreprise** | **Craftsmen, traders and business leaders** | | |
| 21 | Artisans | Craftsmen | - | - |
| 22 | Commerçants et assimilés | Traders and similar persons | - | - |
| 23 | Chefs d'entreprise de 10 salariés ou plus | Entrepreneurs with 10 or more employees | - | T |
| **3** | **Cadres et professions intellectuelles supérieures** | **Executives and Higher Intellectual Professions** | | |
| 31 | Professions libérales | Liberal professions | W | - |
| 33 | Cadres de la fonction publique | Public Service executives | W | - |
| 34 | Professeurs, professions scientifiques | Professors, scientific professions | W | - |
| 35 | Professions de l'information, des arts et des spectacles | Information, arts and entertainment occupations | W | - |
| 37 | Cadres administratifs et commerciaux d'entreprise | Corporate administrative and commercial executives | W | T |
| 38 | Ingénieurs et cadres techniques d'entreprise | Engineers and business technical executives | W | - |
| **4** | **Professions Intermédiaires** | **Intermediate Occupations** | | |
| 42 | Professeurs des écoles, instituteurs et assimilés | School Teachers, other teachers and assimilated | W | - |
| 43 | Professions intermédiaires de la santé et du travail social | Intermediate health and social work occupations | W | - |
| 44 | Clergé, religieux | Clergy, religious | W | - |
| 45 | Professions intermédiaires administratives de la fonction publique | Intermediate administrative professions in the public service | W | - |
| 46 | Professions intermédiaires administratives et commerciales des entreprises | Intermediate administrative and commercial professions in companies | W | T |
| 47 | Techniciens | Technicians | W | - |
| 48 | Contremaîtres, agents de maîtrise | Foremen, supervisors | W | - |
| **5** | **Employés** | **Clerical occupationss** | | |
| 52 | Employés civils et agents de service de la fonction publique | Civilian employees and public service employees | B | - |
| 53 | Policiers et militaires | Police and military | B | - |
| 54 | Employés administratifs d'entreprise | Corporate Administrative Employees | B | T |
| 55 | Employés de commerce | Commercial employees | B | T |
| 56 | Personnels des services directs aux particuliers | Direct service personnel to individuals | B | - |
| **6** | **Ouvriers** | **Labourers** | | |
| 62 | Ouvriers qualifiés de type industriel | Industrial Skilled Workers | B | T |
| 63 | Ouvriers qualifiés de type artisanal | Skilled craft workers | B | T |
| 64 | Chauffeurs | Drivers | B | - |
| 65 | Ouvriers qualifiés de la manutention, du magasinage et du transport | Skilled workers in handling, storage and transport | B | - |
| 67 | Ouvriers non qualifiés de type industriel | Unskilled industrial workers | B | - |
| 68 | Ouvriers non qualifiés de type artisanal | Unskilled craft workers | B | - |
| 69 | Ouvriers agricoles | Agricultural workers | B | - |

Column (1) classifies occupations into blue- and white-collar occupations (respectively denoted B and W). Column (2) denotes occupations that are possibly related to trade activities (T).

# B Theory Proofs

## B.1 Firm Optimisation and Finding of Key Equations

A firm $\phi$ chooses $\ell_{ij}$ and $\theta_{ij}$ to maximize (8) which we can re-write as:

$$\pi(\phi) = R(\phi) - \sum_{ij}\left[\frac{v_{ij}(\phi)\hat{W}_{ij}}{\theta_{ij}} + v_{ij}^{\alpha}\right] - f_D - \mathbb{I}_x f_X$$

where $\hat{W}_{ij} = W_{ij}\chi_{ij}$ The first order conditions (FOC) to this concave problem are:

$$\frac{\partial \pi(\phi)}{\partial v_{ij}} = \frac{\partial R}{\partial \ell_{ij}}\frac{\partial \ell_{ij}}{\partial v_{ij}} - \frac{\hat{W}_{ij}}{\theta_{ij}} - \alpha v_{ij}(\phi)^{\alpha-1} = 0 \Rightarrow \frac{\partial R}{\partial \ell_{ij}}\frac{A}{\theta_{ij}^{\eta}} = \frac{\hat{W}_{ij}}{\theta_{ij}} + \alpha v_{ij}^{\alpha-1}$$

and

$$\frac{\partial \pi(\phi)}{\partial \theta_{ij}} = \frac{\partial R}{\partial \ell_{ij}}\frac{\partial \ell_{ij}}{\partial q(\theta_{ij})}\frac{\partial q(\theta_{ij})}{\partial \theta_{ij}} + \frac{v_{ij}\hat{W}_{ij}}{\theta_{ij}^2} = 0 \Rightarrow \frac{\partial R}{\partial \ell_{ij}}\frac{A\eta}{\theta_{ij}^{1+\eta}} = \frac{\hat{W}_{ij}}{\theta_{ij}^2}$$

which constitute (10). Combining the two FOC we obtain (11).

Consider first all factors $ij \neq HI$. By (4) and (9):

$$\frac{\partial R(\phi)}{\partial \ell_{ij}} = \left[\frac{Y}{M}(1+\mathbb{I}\tau^{1-\sigma})\right]^{\frac{1}{\sigma}}\frac{\sigma-1}{\sigma}y^{1-\frac{1}{\sigma}}\frac{\beta_{ij}}{\ell_{ij}} \overset{(3)}{=} \frac{\sigma-1}{\sigma}\beta_{ij}\ell_{ij}(\phi)^{-1}p(\phi)y(\phi) \quad \forall ij \neq HI$$

Now consider $ij = HI$, for which we have

$$\begin{aligned}\frac{\partial R(\phi)}{\partial \ell_{HI}} &= \frac{\sigma-1}{\sigma}R(\phi)\frac{Y}{M}\kappa\frac{\beta_{HI}}{\ell_{HI}}\mathbb{I}_X\left[\frac{Y}{M}(1+\mathbb{I}_X\tau^{1-\sigma})\right]^{-1}\tau^{-\sigma} + \frac{\sigma-1}{\sigma}R(\phi)\frac{\beta_{HI}}{\ell_{HI}} \\ &= \frac{\sigma-1}{\sigma}p(\phi)y(\phi)[1+\lambda(\phi)]\frac{\beta_{HI}}{\ell_{HI}(\phi)}\end{aligned}$$

We combine both previous results in (12).

For the average firm $\tilde{\phi}$, we have that $p(\tilde{\phi}) = 1$, then:

$$\frac{\partial R(\tilde{\phi})}{\partial \ell_{ij}} = \frac{\sigma-1}{\sigma}\beta_{ij}\frac{y(\tilde{\phi})}{\ell_{ij}(\tilde{\phi})}[1+\mathbb{I}_{HI}\lambda(\phi)] \overset{(10)}{\Rightarrow} \frac{\sigma-1}{\sigma}\beta_{ij}\frac{y(\tilde{\phi})}{\ell_{ij}(\tilde{\phi})}\frac{A\eta}{\hat{W}_{ij}}[1+\mathbb{I}_{HI}\lambda(\phi)] = \tilde{\theta}_{ij}^{\eta-1}$$

And solving for $\tilde{\theta_{ij}}$ gives (13).

Consider now two types of firms: one that exports with productivity $\phi$ and one that does not export with productivity $\tilde{\phi}$. For the former we have that

$$\frac{\partial R(\ell_{ij}, \mathbb{I}_X, \phi)}{\partial \ell_{ij}} = \left[\frac{Y}{M}(1+\mathbb{I}_X\tau^{1-\sigma})\right]^{\frac{1}{\sigma}}\frac{\sigma-1}{\sigma}y(\phi)^{1-\frac{1}{\sigma}}\frac{\beta_{ij}}{\ell_{ij}}[1+\mathbb{I}_{HI}\lambda(\phi)]$$

While for the latter:

$$\frac{\partial R(\tilde{\ell}_{ij},0,\tilde{\phi})}{\partial \ell_{ij}} = \left[\frac{Y}{M}\right]^{\frac{1}{\sigma}} \frac{\sigma-1}{\sigma} y(\tilde{\phi})^{1-\frac{1}{\sigma}} \frac{\beta_{ij}}{\ell_{ij}}$$

Dividing (10) for these two firms gives (14).

## B.2 Solving the Main System of Equations

We can find the relationship between employment levels and tightness by:

$$\ell_{ij}(\phi,\theta_{ij}) \overset{(6)}{=} q(\theta_{ij})v_{ij} \overset{(11)}{=} A\theta_{ij}^{-\eta}\left[\frac{1-\eta}{\eta}\frac{\hat{W}_{ij}}{\alpha}\frac{1}{\theta_{ij}}\right]^{\frac{1}{\alpha-1}} = A\left[\frac{\hat{W}_{ij}(1-\eta)}{\alpha\eta}\right]^{\frac{1}{\alpha-1}}\frac{1}{\theta_{ij}^{\frac{1}{\alpha-1}+\eta}} \quad \text{(A.1)}$$

For exposition purposes let us now group all $ij \neq HI$ into one single labor type that we call $B$. Then, plugging (4) and (A.1) into (14), we obtain:

$$(1+\mathbb{I}_X\tau^{1-\sigma})^{\frac{1}{\sigma}}\left[\frac{\phi}{\tilde{\phi}}\right]^{\frac{\sigma-1}{\sigma}}\left[\frac{\tilde{\theta}_{HI}}{\theta_{HI}}\right]^{\Psi\beta_{HI}} = \left[\frac{\tilde{\theta}_B}{\theta_B}\right]^{J_B} \quad \text{(A.2)}$$

and

$$(1+\mathbb{I}_X\tau^{1-\sigma})^{\frac{1}{\sigma}}\left[\frac{\phi}{\tilde{\phi}}\right]^{\frac{\sigma-1}{\sigma}}\left[\frac{\tilde{\theta}_B}{\theta_B}\right]^{\Psi\beta_B}(1+\lambda) = \left[\frac{\tilde{\theta}_{HI}}{\theta_{HI}}\right]^{J_{HI}} \quad \text{(A.3)}$$

where $\Psi = \left(\frac{1}{\alpha-1}+\eta\right)\frac{\sigma-1}{\sigma} > 0$ and $J_{ij} = \frac{\alpha}{\alpha-1} - \beta_{ij}\Psi > 0$. Proof that parameter bundles are positive can be found in the next section of this Appendix.

Merging (A.2) with (A.3) delivers:

$$(1+\mathbb{I}_X\tau^{1-\sigma})^{\frac{1}{\sigma}(1+D)}\left[\frac{\phi}{\tilde{\phi}}\right]^{\frac{\sigma-1}{\sigma}(1+D)}(1+\lambda) = \left[\frac{\tilde{\theta}_{HI}}{\theta_{HI}}\right]^{J_{HI}-\Psi\beta_{HI}D} \quad \text{(A.4)}$$

where $D = \frac{\Psi\beta_B}{J_B} > 0$. Taking this back to (A.2):

$$(1+\mathbb{I}_X\tau^{1-\sigma})^{\frac{1}{\sigma}(1+(1+D)H)}\left[\frac{\phi}{\tilde{\phi}}\right]^{\frac{\sigma-1}{\sigma}(1+(1+D)H)}(1+\lambda)^H = \left[\frac{\tilde{\theta}_B}{\theta_B}\right]^{J_B} \quad \text{(A.5)}$$

where $H = \frac{\Psi\beta_{HI}}{J_{HI}-\Psi\beta_{HI}D} > 0$.

We now proceed to obtain parametric expressions for $\tilde{\theta}_{HI}$ and $\tilde{\theta}_B$ that we will use to replace in the expressions above. For this purpose we use (A.1) for the particular case of firm $\tilde{\phi}$, and merge that with (13) to obtain:

$$\tilde{\theta}_{HI} = \left[ \frac{\sigma}{\sigma - 1} \frac{\hat{W}_{HI}^{\frac{\alpha - \beta_{HI}}{\alpha - 1}}}{\hat{W}_{B}^{\frac{\beta_B}{\alpha - 1}}} \frac{\tilde{\theta}_B^{\beta_B\left(\frac{1}{\alpha-1}+\eta\right)}}{A\eta\beta_{HI}\tilde{\phi}} \frac{1}{1+\lambda} \right]^{N_{HI}}, \text{ and } \tilde{\theta}_B = \left[ \frac{\sigma}{\sigma - 1} \frac{\hat{W}_{B}^{\frac{\alpha - \beta_{B}}{\alpha - 1}}}{\hat{W}_{HI}^{\frac{\beta_{HI}}{\alpha - 1}}} \frac{\tilde{\theta}_{HI}^{\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right)}}{A\eta\beta_{B}\tilde{\phi}} \right]^{N_B} \tag{A.6}$$

with $N_{ij} = \left[1 - \eta + (1 - \beta_{ij})\left(\frac{1}{\alpha-1} + \eta\right)\right]^{-1} > 0$.

Using both expressions in (A.6) we obtain the desired parametric expressions:

$$\tilde{\theta}_{HI} = \left[ \left(\frac{\sigma}{\sigma - 1}\right)^{1+\rho} \frac{\hat{W}_{HI}^{\frac{\alpha - \beta_{HI}(1+\rho)}{\alpha - 1}} \hat{W}_{B}^{\frac{\alpha\rho - \beta_{B}(1+\rho)}{\alpha - 1}}}{(1+\lambda)(A\eta\tilde{\phi})^{1+\rho}\beta_{HI}\beta_B^{\rho}} \right]^{\Omega} \tag{A.7}$$

and

$$\tilde{\theta}_B = \left[ \left(\frac{\sigma}{\sigma - 1}\right)^{1+\Phi(1+\rho)} \frac{\hat{W}_B^{\gamma_1}\hat{W}_{HI}^{-\gamma_2}}{(\tilde{\phi}A\eta)^{1+\Phi(1+\rho)}(1+\lambda)^{\Phi}\beta_{HI}^{\Phi}\beta_B^{1+\Phi\rho}} \right]^{N_B} \tag{A.8}$$

where $\rho = \beta_B N_B \left(\frac{1}{\alpha-1} + \eta\right)$, $\Phi = \frac{\beta_{HI}N_{HI}\left(\frac{1}{\alpha-1}+\eta\right)}{1 - N_{HI}\rho\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right)}$, $\gamma_1 = \frac{\alpha - \beta_B}{\alpha - 1} - \Phi\left[\frac{\beta_B(1+\rho) - \alpha\rho}{\alpha - 1}\right]$, $\gamma_2 = \frac{\beta_{HI}}{\alpha-1} - \Phi\left[\frac{\alpha - \beta_{HI}(1+\rho)}{\alpha - 1}\right]$, and $\Omega = \frac{N_{HI}}{1 - N_{HI}\rho\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right)}$.

Inserting (A.7) and (A.8) into (A.4) and (A.5) respectively, gives:

$$\begin{aligned} \theta_{HI} = {} & (1 + \mathbb{I}_X\tau^{1-\sigma})^{-\frac{1}{\sigma}\frac{1+D}{Z}} \phi^{-\frac{\sigma-1}{\sigma}\frac{1+D}{Z}} \tilde{\phi}^{\frac{\sigma-1}{\sigma}\frac{1+D}{Z} - \Omega(1+\rho)} (1+\lambda)^{-\frac{1}{Z} - \Omega} \\ & \cdot \left[ \left(\frac{\sigma}{\sigma - 1}\right)^{1+\rho} \frac{\hat{W}_{HI}^{\frac{\alpha - \beta_{HI}(1+\rho)}{\alpha - 1}} \hat{W}_{B}^{\frac{\alpha\rho - \beta_{B}(1+\rho)}{\alpha - 1}}}{(A\eta)^{1+\rho}\beta_{HI}\beta_B^{\rho}} \right]^{\Omega} \end{aligned} \tag{A.9}$$

and

$$\begin{aligned} \theta_B = {} & (1 + \mathbb{I}_X\tau^{1-\sigma})^{-\frac{1}{\sigma}\frac{1}{J_B}[1+(1+D)H]} \phi^{-\frac{\sigma-1}{\sigma J_B}[1+(1+D)H]} \tilde{\phi}^{\frac{\sigma-1}{\sigma J_B}[1+(1+D)H] - V} \\ & \cdot (1+\lambda)^{-\left[\frac{H}{J_B} + \Phi N_B\right]} \left(\frac{\sigma}{\sigma - 1}\right)^{V} (A\eta)^{-V} \left[ \frac{\hat{W}_B^{\gamma_1}\hat{W}_{HI}^{-\gamma_2}}{\beta_{HI}^{\Phi}\beta_B^{1+\Phi\rho}} \right]^{N_B} \end{aligned} \tag{A.10}$$

with $Z = \frac{H}{\Psi\beta_{HI}}$, and $V = N_B(1 + \Phi(1+\rho))$.

Then inserting these back into (7) gives:

$$w_{HI}(\phi) = \left[\frac{\phi}{\tilde{\phi}}\right]^{\frac{\sigma-1}{\sigma}\frac{1+D}{Z}(1-\eta)} [1+\mathbb{I}_X\tau(\phi)^{1-\sigma}]^{\frac{1-\eta}{\sigma}\frac{1+D}{Z}}[1+\lambda(\phi)]^{\left(\frac{1}{Z}+\Omega\right)(1-\eta)}\beta_{HI}^{\Omega(1-\eta)}\beta_B^{\Omega(1-\eta)\rho}$$
$$\times \hat{W}_{HI}^{\mu\Omega(1-\eta)+1}\hat{W}_B^{-\epsilon\Omega(1-\eta)}\left[\frac{(\sigma-1)\eta\tilde{\phi}}{\sigma}\right]^{\Omega(1-\eta)(\rho+1)} A^{\Omega(1-\eta)(\rho+1)-1} \quad (A.11)$$

and

$$w_B(\phi) = \left[\frac{\phi}{\tilde{\phi}}\right]^{(\sigma-1)T} [1+\mathbb{I}_X\tau(\phi)^{1-\sigma}]^T[1+\lambda(\phi)]^{\left[\frac{H}{J_B}+\Phi N_B\right](1-\eta)}\beta_{HI}^{\Phi N_B(1-\eta)}\beta_B^{V(1-\eta)}$$
$$\times \hat{W}_{HI}^{\gamma_2 N_B(1-\eta)}\hat{W}_B^{1-\gamma_1 N_B(1-\eta)}\left[\frac{(\sigma-1)\eta\tilde{\phi}}{\sigma}\right]^{V(1-\eta)} A^{V(1-\eta)-1} \quad (A.12)$$

with $T = \frac{1-\eta}{\sigma J_B}[1+(1+D)H]$.

To re-write (A.11) as (15), it suffices to show that $[\Omega(1-\eta)]^{-1} = 1+\rho$. For this, we can re-write:

$$\begin{aligned}[\Omega(1-\eta)]^{-1} &= \frac{1}{1-\eta}\frac{1-N_{HI}\rho\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right)}{N_{HI}} = \frac{1}{1-\eta}\left[\frac{1}{N_{HI}} - \rho\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right)\right] \\ &= \frac{1}{1-\eta}\left[1-\eta+\left(\frac{1}{\alpha-1}+\eta\right)(1-\beta_{HI}-\rho\beta_{HI})\right] \\ &= \frac{1}{1-\eta}\left[1-\eta+\left(\frac{1}{\alpha-1}+\eta\right)\rho\left(\frac{\beta_B}{\rho}-\beta_{HI}\right)\right]\end{aligned}$$

Notice that we can write $\rho = \left[\frac{1-\eta}{\beta_B\left(\frac{1}{\alpha-1}+\eta\right)} + \frac{1}{\beta_B} - 1\right]^{-1}$. Then $\frac{\beta_B}{\rho} = \frac{1-\eta}{\left(\frac{1}{\alpha-1}+\eta\right)} + 1 - \beta_B$. Taking this to our previous equation we see that:

$$[\Omega(1-\eta)]^{-1} = \frac{1}{1-\eta}\left[1-\eta+\left(\frac{1}{\alpha-1}+\eta\right)\rho\left(\frac{1-\eta}{\left(\frac{1}{\alpha-1}+\eta\right)}+\underbrace{1-\beta_B-\beta_{HI}}_{=0}\right)\right] = 1+\rho$$

## B.3 Sign of Parameter Bundles

This section provides proofs that the parameter bundles used in the previous section are defined to be strictly positive. For this task, it is useful to keep in mind the range of our baseline parameters in the model: $0<\eta<1$, $\alpha>1$, $0<\beta_{ij}<1$, and $\sum_{ij}\beta_{ij}=1$, $\sigma>1$.

Given this, it is clear that $\Psi = \frac{\sigma-1}{\sigma}\left(\frac{1}{\alpha-1}+\eta\right) > 0$. Also, $\Psi < 1 \Leftrightarrow \frac{1}{\alpha-1}+\eta < \frac{\sigma}{\sigma-1}$.

We can write $J_{ij} = \underbrace{1-\eta}_{0< \quad <1} + \underbrace{\left(\frac{1}{\alpha-1}+\eta\right)}_{0<}\left(1-\beta_A\underbrace{\frac{\sigma-1}{\sigma}}_{0< \quad <1}\right) = \frac{\alpha}{\alpha-1} - \beta_A\Psi > 0.$

Then, it is clear that $D = \Psi\frac{\beta_B}{J_B} > 0$ since all its components are positive.

Let us now show that $H > 0$. Notice that $H = \frac{\beta_{HI}\Psi}{J_{HI}-\beta_{HI}\Psi D}$ so

$$
\begin{aligned}
H \quad > \quad 0 &\iff J_{HI} > \beta_{HI}\Psi D \Leftrightarrow J_{HI} > \beta_{HI}\Psi^2\beta_B J_B^{-1} \Leftrightarrow \frac{J_{HI}}{\beta_{HI}}\frac{J_B}{\beta_B} > \Psi^2 \\
&\iff \left(\frac{\alpha}{\alpha-1}\frac{1}{\beta_{HI}} - \Psi\right)\left(\frac{\alpha}{\alpha-1}\frac{1}{\beta_B} - \Psi\right) > \Psi^2 \\
&\iff \underbrace{\frac{\alpha}{\alpha-1}\frac{1}{\beta_{HI}}}_{>0}\left[\frac{\alpha}{\alpha-1}\frac{1}{\beta_B} - \Psi\left(1+\frac{\beta_{HI}}{\beta_B}\right)\right] + \Psi^2 > \Psi^2 \\
&\iff \frac{\alpha}{\alpha-1}\frac{1}{\beta_B} > \Psi\left(1+\frac{\beta_{HI}}{\beta_B}\right) \iff \frac{\alpha}{\alpha-1} > \Psi\left(\underbrace{\beta_B+\beta_{HI}}_{=1}\right) \\
&\iff 1 > \underbrace{\frac{\sigma-1}{\sigma}}_{0< \quad <1}\left[\frac{1}{\alpha}+\eta\frac{(\alpha-1)}{\alpha}\right]
\end{aligned}
$$

This proof is completed by reckoning that the term in brackets belongs to the range $(\eta, 1)$ for any value of $\alpha$, and therefore the right-hand side of the inequality is always lower than unity. So $H > 0$ always holds.

It is straightforward to see that $N_{ij} = [1-\eta+(1-\beta_{ij})\left(\frac{1}{\alpha-1}+\eta\right)]^{-1} > 0$, since $0 < 1-\eta < 1$, and $\frac{1}{\alpha-1}+\eta > 0$. Similarly, it is straightforward that $T = \frac{1-\eta}{\sigma J_B}[1+(1+D)H] > 0$.

Note also that $\Phi > 0$ since all its components are positive. Also, $\Phi < 1 \Leftrightarrow 1+\beta_B N_B > \beta_{HI}N_{HI} \Leftrightarrow (\beta_B - \beta_{HI})\left(\frac{1}{\alpha-1}+\eta\right) < 1$.

We can also show that $\Omega > 0$. For this notice that, since $N_{HI} > 0$, then

$$
\begin{aligned}
\Omega > 0 \quad &\iff \quad 1 > N_{HI}\rho\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right) \\
&\iff \quad 1 > \frac{\beta_B\left(\frac{1}{\alpha-1}+\eta\right)}{1-\eta+(1-\beta_B)\left(\frac{1}{\alpha-1}+\eta\right)} \times \frac{\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right)}{1-\eta+(1-\beta_{HI})\left(\frac{1}{\alpha-1}+\eta\right)} \\
&\iff \quad 1 > \frac{\beta_B(1+\eta(\alpha-1))}{\alpha-\beta_B(1+\eta(\alpha-1))} \times \frac{\beta_{HI}(1+\eta(\alpha-1))}{\alpha-\beta_{HI}(1+\eta(\alpha-1))} \\
&\iff \quad 1 > \frac{\beta_B}{\frac{\alpha}{1+\eta(\alpha-1)}-\beta_B} \times \frac{1-\beta_B}{\frac{\alpha}{1+\eta(\alpha-1)}-(1-\beta_B)} \\
&\iff \quad 1 > \frac{\beta_B(1-\beta_B)}{\left[\frac{\alpha}{1+\eta(\alpha-1)}\right]^2 - \frac{\alpha}{1+\eta(\alpha-1)} + \beta_B(1-\beta_B)} = \left[\frac{\left[\frac{\alpha}{1+\eta(\alpha-1)}\right]^2 - \frac{\alpha}{1+\eta(\alpha-1)}}{\beta_B(1-\beta_B)} + 1\right]^{-1}
\end{aligned}
$$

The inequality above holds because the term in brackets in the right-hand side is larger than one. To see this notice that

$$\left[\tfrac{\alpha}{1+\eta(\alpha-1)}\right]^2 - \tfrac{\alpha}{1+\eta(\alpha-1)} = \tfrac{\alpha}{1+\eta(\alpha-1)}\left[\tfrac{\alpha}{1+\eta(\alpha-1)} - 1\right] > 0 \iff$$
$$\tfrac{\alpha}{1+\eta(\alpha-1)} > 1 \iff \alpha > 1+\eta(\alpha-1) \iff \alpha - 1 > \eta(\alpha-1)$$

where the last inequality always holds since $0 < \eta < 1$.

Given the above results, it is easy to see that all of the parameter bundles used in (15) have a clear sign. Indeed:

$$\begin{aligned} \zeta &= \frac{1+D}{\sigma} > 0 \\ \delta &= \frac{1-\eta}{Z} > 0 \\ \rho &= \beta_B N_B\left(\frac{1}{\alpha-1}+\eta\right) > 0 \end{aligned}$$

Let us now explore the signs of $\mu = \frac{\alpha-\beta_{HI}(1+\rho)}{\alpha-1}$ and $\epsilon = \frac{\alpha\rho-\beta_B(1+\rho)}{\alpha-1}$. First, we can show that $\mu > 0$:

$$\begin{aligned} \mu > 0 \quad &\iff \quad \alpha > \beta_{HI}(1+\rho) \iff \alpha > \beta_{HI}\left(1 + \frac{\left(\frac{1}{\alpha-1}+\eta\right)\beta_B}{1-\eta+(1-\beta_B)\left(\frac{1}{\alpha-1}+\eta\right)}\right) \\ &\iff \quad \alpha > \beta_{HI}\left(1+\frac{\left(\frac{1}{\alpha-1}+\eta\right)\beta_B(\alpha-1)}{\alpha-\left(\frac{1}{\alpha-1}+\eta\right)\beta_B(\alpha-1)}\right) \\ &\iff \quad \alpha > \frac{\beta_{HI}\alpha}{\alpha-\beta_B\left(1+\eta(\alpha-1)\right)} \iff 1 > \frac{1-\beta_B}{\alpha-\beta_B\left(1+\eta(\alpha-1)\right)} \end{aligned}$$

Where in the last step we used $\beta_{HI} = 1-\beta_B$. Now we proceed by showing that $\alpha - \beta_B\left(1+\eta(\alpha-1)\right) > 0$. This is the case whenever $\frac{\alpha}{1+\eta(\alpha-1)} > \beta_B$. It is easy to see that this condition holds when $0 < \eta < 1$ and $0 < \beta_B < 1$ since then $\frac{\alpha}{1+\eta(\alpha-1)} > \frac{\alpha}{1+(\alpha-1)} = 1 > \beta_B$. Then we can write that:

$$\mu > 0 \quad \iff \quad \alpha - \beta_B\left(1+\eta(\alpha-1)\right) > 1-\beta_B \iff \alpha - 1 > \beta_B\eta(\alpha-1) \iff 1 > \beta_B\eta$$

As can be seen, this condition always holds when $0 < \eta < 1$ and $0 < \beta_B < 1$.

Finally we can show that:

$$\begin{aligned} \epsilon > 0 \quad &\iff \quad \beta_B(1+\rho) < \alpha\rho \iff \frac{1}{\rho} \iff \frac{1-\eta+(1-\beta_B)\left(\frac{1}{\alpha-1}+\eta\right)}{\left(\frac{1}{\alpha-1}+\eta\right)\beta_B} < \frac{\alpha}{\beta_B} - 1 \\ &\iff \quad \frac{\alpha}{(\alpha-1)\left(\frac{1}{\alpha-1}+\eta\right)\beta_B} - 1 < \frac{\alpha}{\beta_B} - 1 \iff (1-\alpha)\left(\frac{1}{\alpha-1}+\eta\right) > 1 \\ &\iff \quad 1+\eta(\alpha-1) > 1 \iff \eta(\alpha-1) > 0 \end{aligned}$$

We know the last inequality always holds, which means that $\epsilon > 0$.

## B.4 Discussion of the Effects in Equation (15)

Equation (15) shows that the wage of factor $HI$ increases when the employer is an exporter by factor $[1+\mathbb{I}_X \tau(\phi)^{1-\sigma}]^{\zeta\delta}[1+\lambda(\phi)]^{\delta+\Omega(1-\eta)}$. The first term in brackets signals the pure export premium that firms pay workers when they serve a foreign market. The second term in brackets appears because of the reduction in trade costs that hiring $HI$ workers has, increasing the appeal of hiring this type of labour for exporting firms. The first effect is present also in the wage of other factors (see equation A.12) because the export premium is not exclusive to any production factor. The second effect, also appears in other wages because of the complementarity of different labour types in the production function. Inspection of (A.12) shows that this second effect will be higher in $HI$ than in other factors whenever $\delta+\Omega(1-\eta) > \left[\frac{H}{J_B}+\Phi N_B\right](1-\eta)$. While this condition does not need to hold for all values of parameters, it does hold for a wide range of parametrizations including the set of parameter values considered most reasonable.[20]

Equation (15) features a direct productivity effect, stemming from the fact that higher productivity of factor $HI$ yields a higher wage rate for that factor, other things equal. The same equation also features an indirect productivity effect: when other types of labour are more productive, other things equal, factor $HI$ has a higher wage rate. While the second effect is unequivocally positive, its relative intensity with respect to the direct effect depends on the magnitude of $\rho$: if $\rho < 1$ the indirect effect is smaller than the direct effect and when $\rho > 1$ the opposite is true. Notice that:

$$\begin{aligned}
\rho < 1 \quad &\iff \quad \left(\frac{1}{\alpha-1}+\eta\right)\beta_B < 1-\eta+(1-\beta_B)\left(\frac{1}{\alpha-1}+\eta\right)\\
&\iff \quad \left(\frac{1}{\alpha-1}+\eta\right)\beta_B < \frac{\alpha}{\alpha-1}-\beta_B\left(\frac{1}{\alpha-1}+\eta\right)\\
&\iff \quad 2\left(\frac{1}{\alpha-1}+\eta\right)\beta_B < \frac{\alpha}{\alpha-1} \iff (1+\eta(\alpha-1))\frac{\beta_B}{\alpha} < \frac{1}{2}
\end{aligned}$$

The last inequality holds for high values of $\alpha$ and for low values of $\eta$ and $\beta_B$. Moreover, we find that under most reasonable values for these parameters, the condition holds. For example, for $\alpha = 3$ and $\eta = 0.4$ the condition only does not hold for values of $\beta_B > 5/6$, which we deem extremely high in a two factor setting.

## B.5 Conditions Closing the Model

In our model, firms will produce and sell in the domestic market if their productivity level is above a cutoff value $\phi_D$. Firms decide to export if their productivity level is above

[20] Numerical exercises show that the condition can be violated when $\sigma \to +\infty$ and $\alpha \to 1$.

threshold $\phi_X$. A sufficient condition for the existence and uniqueness of each of these thresholds is the profit function being monotonically increasing in $\phi$.

We can obtain a function of profits depending on $\phi$ and parameters following a sequence of steps. First, we go back to the FOC in (12) of the firm to find an expression for the price charged in the domestic market:

$$\frac{\partial R(\phi)}{\partial \ell_{ij}} = \frac{\sigma - 1}{\sigma} \frac{\beta_{ij} p_D(\phi) y_D(\phi)}{\ell_{ij}}$$

We derive this expression for two firms $\phi$ and $\tilde{\phi}$ to obtain:

$$p_D(\phi) \frac{y_D}{\ell_{ij}} \frac{\tilde{\ell_{ij}}}{\tilde{y_D}} = \left[\frac{\tilde{\theta}_{ij}}{\theta_{ij}}\right]^{1-\eta} \Rightarrow p_D(\phi) = \frac{\ell_{ij}}{\tilde{\ell_{ij}}} \frac{\tilde{y_D}}{y_D} \left[\frac{\tilde{\theta}_{ij}}{\theta_{ij}}\right]^{1-\eta}$$

where the first equality uses (14).

Notice that (4) establishes that :

$$\frac{\ell_{ij}}{\tilde{\ell_{ij}}} \frac{\tilde{y_D}}{y_D} = \frac{\tilde{\phi}}{\phi} \left[\prod_{h \neq ij} \left(\frac{\tilde{\ell}_h}{\ell_h}\right)^{\beta_h}\right] \left(\frac{\tilde{\ell_{ij}}}{\ell_{ij}}\right)^{\beta_{ij}-1}$$

By (A.1) we have that $\frac{\ell_{ij}}{\tilde{\ell_{ij}}} = \left[\frac{\tilde{\theta}_{ij}}{\theta_{ij}}\right]^{\frac{1}{\alpha-1}+\eta}$, so we can now write:

$$p_D(\phi) = \frac{\tilde{\phi}}{\phi} \left[\frac{\tilde{\theta}_{ij}}{\theta_{ij}}\right]^{N_{ij}^{-1}} \left[\prod_{h \neq ij} \left(\frac{\theta_{ij}}{\tilde{\theta}_{ij}}\right)^{\beta_h\left(\frac{1}{\alpha-1}+\eta\right)}\right]$$

In the case of two factors of production, we can write:

$$p_D(\phi) = \frac{\tilde{\phi}}{\phi} \left[\frac{\tilde{\theta}_{HI}}{\theta_{HI}}\right]^{N_{HI}^{-1}} \left[\frac{\theta_B}{\tilde{\theta}_B}\right]^{\beta_B\left(\frac{1}{\alpha-1}+\eta\right)}, \text{ and } p_D(\phi) = \frac{\tilde{\phi}}{\phi} \left[\frac{\tilde{\theta}_B}{\theta_B}\right]^{N_B^{-1}} \left[\frac{\theta_{HI}}{\tilde{\theta}_{HI}}\right]^{\beta_B\left(\frac{1}{\alpha-1}+\eta\right)}$$

which constitute a system of two equations we can solve to obtain:

$$p_D(\phi) = \left[\frac{\tilde{\phi}}{\phi}\right]^{1+\beta_B\left(\frac{1}{\alpha-1}+\eta\right)N_B^{-1}} \left[\frac{\tilde{\theta}_{HI}}{\theta_{HI}}\right]^{\Gamma}$$

with $\Gamma = N_H^{-1} + N_B^{-1}\beta_B\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right)^2 > 0$

Using (A.4) we can re-write the previous expression as:

$$p_D(\phi) = \left[\frac{\tilde{\phi}}{\phi}\right]^{\Delta} (1 + \mathbb{I}_X \tau^{1-\sigma})^{\Gamma Z \frac{(1+D)}{\sigma}} (1+\lambda)^{\Gamma Z} \tag{A.13}$$

with $\Delta = 1 + \beta_B \left(\frac{1}{\alpha-1} + \eta\right) N_B^{-1} - \Gamma Z(1+D)\frac{\sigma-1}{\sigma}$. Then, we use (2) to write:

$$1 = P = \left[\frac{1}{M}\int_{\omega\in\Omega} p(\omega)^{1-\sigma} d\omega\right]^{\frac{1}{1-\sigma}} = \left[\frac{M_D}{M}\int_{\phi_D}^{\infty} p_D(\omega)^{1-\sigma}[1+\mathbb{I}_X\tau^{1-\sigma}]\mu(\phi)d\phi\right]^{\frac{1}{1-\sigma}}$$

Where, for the second equality, we re-scale the integral so it includes only producing firms (i.e., firms for which $\phi > \phi_D$), $M_D$ is defined as the mass of firms that produce for the domestic market, and we define $\mu(\phi) = g(\phi)/[1 - G(\phi_D)]$. We can call $\varrho$ the share of domestic firms that export. By symmetry, this is also the share of foreign firms that import. Then, we have that $M = M_D + \varrho M_D$, and can re-write the above equation as:

$$1 + \varrho = \int_{\phi_D}^{\infty} p_D(\omega)^{1-\sigma}[1+\mathbb{I}_X\tau^{1-\sigma}]\mu(\phi)d\phi$$

Merging this with (A.13) yields:

$$\tilde{\phi}(\phi_D) = \left[\frac{1}{1+\varrho}\int_{\phi_D}^{\infty} \phi^{\Delta(\sigma-1)}[1+\mathbb{I}_X\tau^{1-\sigma}]^{1-\Gamma Z(1+D)\frac{\sigma-1}{\sigma}}(1+\lambda)^{\Gamma Z(1-\sigma)}\mu(\phi)d\phi\right]^{\frac{1}{(\sigma-1)\Delta}}$$

A further step requires that we find an expression for $R_D(\phi)$, i.e., the revenues obtained by firm $\phi$ from selling in the domestic market. For this notice that we can write: $R(\phi) = [1+\mathbb{I}_X\tau^{1-\sigma}]R_D(\phi)$. Then using (9) we obtain: $R_D(\phi) = [\frac{Y}{M}(1+\mathbb{I}_X\tau^{1-\sigma})]^{\frac{1-\sigma}{\sigma}} y^{\frac{\sigma-1}{\sigma}}$. Dividing two versions of the previous equality (one for $\phi$ and another for $\tilde{\phi}$), we get:

$$\frac{R_D(\phi)}{R_D(\tilde{\phi})} = \left[\frac{y}{\tilde{y}}\right]^{\frac{\sigma-1}{\sigma}} \Rightarrow R_D(\phi) = \left[\frac{\phi}{\tilde{\phi}}\prod_{ij}\left(\frac{\tilde{\theta_{ij}}}{\theta_{ij}}\right)^{\beta_{ij}\left(\frac{1}{\alpha-1}+\eta\right)}\right]^{\frac{\sigma-1}{\sigma}} \tilde{y}$$

where the last equality uses (4) and $p(\tilde{\phi}) = 1$.

The final step is going back to (8) to write an expression for profits that depend on parameters and the productivity level $\phi$:

$$\pi(\phi) = [1+\mathbb{I}_X\tau^{1-\sigma}]\left[\frac{\phi}{\tilde{\phi}}\prod_{ij}\left(\frac{\tilde{\theta_{ij}}}{\theta_{ij}}\right)^{\beta_{ij}\left(\frac{1}{\alpha-1}+\eta\right)}\right]^{\frac{\sigma-1}{\sigma}} \tilde{y} - \sum_{ij}\left[\frac{\hat{W}_{ij}v_{ij}}{\theta_{ij}} + C(v_{ij})\right] - f_D - \mathbb{I}_X f_X$$

We can split the expression above in different components to ease exposition. Using (A.4) and (A.5) we can see that:

$$\begin{aligned}\prod\nolimits_{ij} \quad & \left(\frac{\tilde{\theta_{ij}}}{\theta_{ij}}\right)^{\beta_{ij}\left(\frac{1}{\alpha-1}+\eta\right)} = \\ = \quad & [1+\mathbb{I}_X\tau^{1-\sigma}]^{\Psi\left[\beta_{HI}Z\frac{1+D}{\sigma}+\beta_B\frac{T}{1-\eta}\right]}\left[\frac{\phi}{\tilde{\phi}}\right]^{\Psi\left[\beta_{HI}\frac{1+D}{Z}\frac{\sigma-1}{\sigma}+\beta_B T\frac{\sigma-1}{1-\eta}\right]}(1+\lambda)^{\Psi\left[\beta_{HI}Z+\beta_B\frac{H}{J_B}\right]}\end{aligned}$$

Using (4) and (A.1) we can write:

$$\begin{aligned}\tilde{y} &= A\left[\frac{1-\eta}{\alpha\eta}\right]^{\frac{1}{1-\alpha}}\tilde{\phi}\prod_{ij}\left(\frac{\hat{W}_{ij}}{\theta_{ij}^{\frac{1}{\alpha-1}+\eta}}\right)^{\beta_{ij}} \\ &= K\hat{W}_{HI}^{\beta_{HI}-\iota\alpha_1+\varsigma\gamma_2}\hat{W}_{B}^{\iota\alpha_2+\beta_B-\varsigma\gamma_1}\tilde{\phi}^{\iota(1+\rho)+\varsigma(1+\Phi(1+\rho))}(1+\lambda)^{\iota+\varsigma\Phi}\end{aligned}$$

where the second equality uses (A.9) and (A.10), and where $\iota = \Omega\beta_{HI}\left(\frac{1}{\alpha-1}+\eta\right)$, $\varsigma = N_B\beta_B\left(\frac{1}{\alpha-1}+\eta\right)$, $\alpha_1 = \frac{\beta_B(1+\rho)-\alpha\rho}{\alpha-1}$, $\alpha_2 = \frac{\alpha-\beta_{HI}(1+\rho)}{\alpha-1}$ and

$$\begin{aligned}K &= A^{\iota(1+\rho)+\varsigma(1+\Phi(1+\rho))}\left[\frac{1-\eta}{\alpha}\right]^{\frac{1}{\alpha-1}}\eta^{\frac{-1}{\alpha-1}+\iota(1+\rho)+\varsigma(1+\Phi(1+\rho))}\times \\ &\times\left[\frac{\sigma-1}{\sigma}\right]^{\iota(1+\rho)+\varsigma(1+\Phi(1+\rho))}\beta_{HI}^{\iota+\varsigma\Phi}\beta_B^{\iota\rho+\varsigma(1+\Phi\rho)}.\end{aligned}$$

This allows us to reach a final expression for revenues as a function of productivity levels:

$$\begin{aligned}R(\phi) &= K\hat{W}_{HI}^{\beta_{HI}-\iota\alpha_1+\varsigma\gamma_2}\hat{W}_{B}^{\iota\alpha_2+\beta_B-\varsigma\gamma_1}[1+\mathbb{I}_X\tau^{1-\sigma}]^{1+\Psi\left[\beta_{HI}Z\frac{1+D}{\sigma}+\beta_B\frac{T}{1-\eta}\right]}\times \\ &\times\ \phi^{\Psi\left[\beta_{HI}\frac{1+D}{Z}\frac{\sigma-1}{\sigma}+\beta_B T\frac{\sigma-1}{1-\eta}\right]}\tilde{\phi}^{\frac{1}{\sigma}-\Psi\left[\beta_{HI}\frac{1+D}{Z}\frac{\sigma-1}{\sigma}+\beta_B T\frac{\sigma-1}{1-\eta}\right]+\iota(1+\rho)-\varsigma(1+\Phi(1+\rho))}\times \\ &\times\ (1+\lambda)^{\Psi(\beta_{HI}Z+\beta_B\frac{H}{J_B})\iota+\varsigma\Phi}\end{aligned}$$

Revenues are a monotonically increasing function of productivity levels since, following our previous proofs: $\Psi\left[\beta_{HI}\frac{1+D}{Z}\frac{\sigma-1}{\sigma}+\beta_B T\frac{\sigma-1}{1-\eta}\right] > 0$.

Now we turn to the cost side of the profit function. Using (6) and (11) we can write:

$$\sum_{ij}\left[\frac{\hat{W}_{ij}v_{ij}}{\theta_{ij}}+C(v_{ij})\right] = \sum_{ij}\left[X_{ij}^{\frac{1}{\alpha-1}}\theta_{ij}^{\frac{-\alpha}{\alpha-1}}\hat{W}_{ij}+X_{ij}^{\frac{\alpha}{\alpha-1}}\theta_{ij}^{\frac{-\alpha}{\alpha-1}}\right] = \sum_{ij}\theta_{ij}^{\frac{-\alpha}{\alpha-1}}[X_{ij}^{\frac{1}{\alpha-1}}(1+X_{ij}^{\alpha})]$$

with $X_{ij} = \left[\frac{1-\eta}{\eta}\frac{\hat{W}_{ij}}{\alpha}\right]$. Notice that costs are a negative function of $\theta_{ij}$. Then, inspection of (A.9) and (A.10) suffices to see that the cost function is a positive function of $\phi$. Clearly, the shape of the profit function for different productivity levels depends on the parametrization chosen. We find that it is a monotonically increasing function of productivity levels $\phi$, for a broad range of parametrizations that include the set of values found reasonable elsewhere in this Appendix.

When the profit function is monotonically increasing in $\phi$, then a threshold $\phi_D$ for producing for the domestic market exists, is unique, and is determined by setting $\pi(\phi_D) = 0$, which constitutes the zero-profit condition. The threshold for exporting $\phi_X$, also exists and is unique. This is obtained by setting the following equality: $\pi(\phi_X, \mathbb{I}_X = 0) = \pi(\phi_X, \mathbb{I}_X = 1)$.

Finally, the free-entry condition establishes that expected profits need to equal entry costs, so it can be written as:

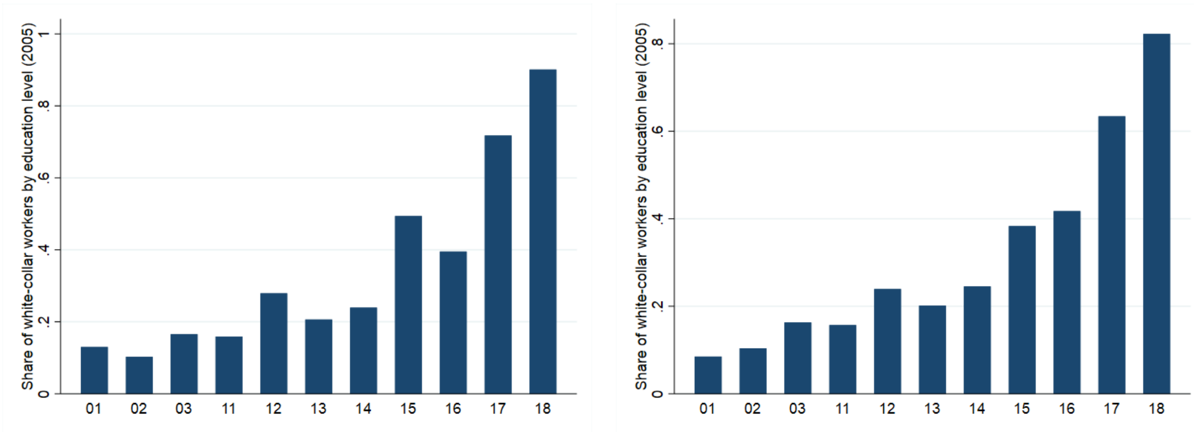
$$\int_{\phi_D}^{\infty} \pi(\phi) dG(\phi) = f_E$$

Again, when profits are a monotonically increasing function of $\phi$, there is one single solution for this equation.

# C Additional Descriptive Statistics

Figure A.1: Share of White-Collar Workers by Education Level.

(a) Native Workers (b) Immigrant Workers




*Notes:* This figure displays the share of white-collar workers for each education level, for natives (left-side graph) and immigrants (right-side graph) respectively. The level of education refers to the highest degree declared by the individual. The classes of degree used are as follows: 01 - No qualifications - did not attend school or no tuition or schooling completed before the end of primary school; 02 - No qualifications - attended school until primary or secondary school; 03 - No qualifications - full schooling; 11 - Certificate of primary education; 12 - Junior secondary education certificate, lower school certificate; 13 - Certificate of professional competence (CAP); 14 - Diploma of occupational studies (BEP); 15 - General baccalaureate, higher certificate; 16 - Technological or vocational baccalaureate, vocational, technical or educational certificate, or equivalent diploma; 17 - University Technology Diploma, Health or social diploma bac+2 equivalent, License, professional license, equivalent to bac+3 or bac+4; 18 - Master, high school diploma level bac+5, Health PhD; Research Doctorate.

Table A.2: Firm Export Activity by Employment of Immigrant Workers.

| | **No immigrant worker** | | | **At least 1 immigrant worker** | | | |
|---|---|---|---|---|---|---|---|
| | **Obs.** | **Mean** | **Std. Dev.** | **Obs.** | **Mean** | **Std. Dev.** | Signif. |
| Export value in euros | 75,570 | 4.34e+06 | 1.95e+07 | 49,790 | 3.47e+07 | 2.24e+08 | *** |
| Export sh. | 75,570 | 0.223 | 0.270 | 49,790 | 0.305 | 0.302 | *** |
| Nr. of destinations | 75,570 | 11.54 | 13.92 | 49,790 | 20.40 | 22.61 | *** |
| Nr. of products | 75,570 | 9.96 | 15.56 | 49,790 | 21.20 | 36.94 | *** |
| Nr. of markets | 75,570 | 33.79 | 83.04 | 49,790 | 97.67 | 293.52 | *** |

*Notes:* This table reports descriptive statistics for the full sample of firm-year observations as well as for two subsamples. In each year, we identify firms employing no immigrant worker and firms employing at least one immigrant worker.

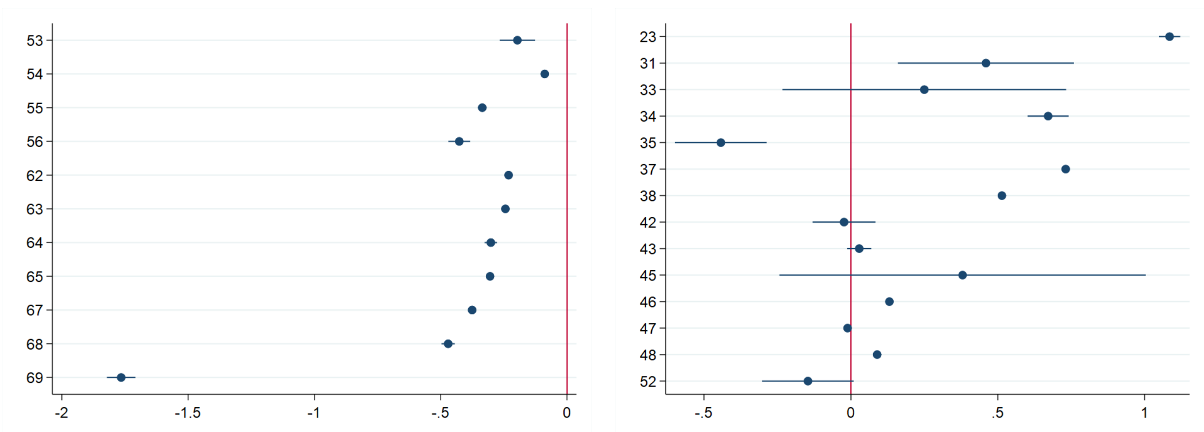
Table A.3: Worker Characteristics by Nativity Status.

| | **Native workers** | | | **Foreign-born workers** | | | |
|---|---|---|---|---|---|---|---|
| | **Obs.** | **Mean** | **Std. Dev.** | **Obs.** | **Mean** | **Std. Dev.** | Signif. |
| (log) Annualised wage | 1,663,506 | 9.99 | 0.740 | 158,019 | 9.93 | 0.842 | *** |
| Age | 1,663,506 | 41.27 | 10.72 | 158,019 | 44.36 | 10.31 | *** |
| Sh. of male workers | 1,663,506 | 0.731 | 0.443 | 158,019 | 0.729 | 0.444 | *** |
| Sh. of white-collar workers | 1,663,506 | 0.378 | 0.485 | 158,019 | 0.316 | 0.465 | *** |
| Job spell | 1,663,506 | 6.50 | 6.51 | 158,019 | 5.65 | 6.18 | *** |
| Job spell of white-collar workers | 628,801 | 6.70 | 6.48 | 49,955 | 5.90 | 6.30 | *** |
| Job spell of blue-collar workers | 1,142,769 | 6.38 | 6.53 | 108,064 | 5.54 | 5.50 | *** |

*Notes:* This table reports descriptive statistics for the full sample of worker-year observations as well as for native-year and immigrant-year observations.

Figure A.2: Immigrant Wage Gap by Occupation Groups.

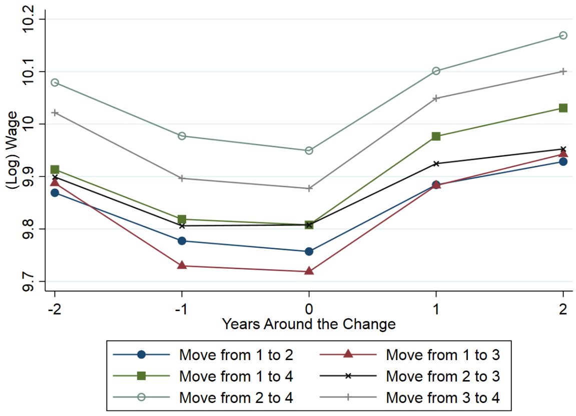
(a) Blue-Collar Workers (b) White-Collar Workers




*Notes:* Each figure plots the average wage gap by two-digit occupation, measured by the coefficient $\beta_{cs}$ obtained from the following wage equation: $\ln w_{i(j)t} = \mathbb{D}_i \times \sum_{cs \in CS} \beta_{cs} \mathbb{1}\left[cs_{it} \in CS\right] + X'_{it}\Gamma + X'_{jt}\Theta + \varphi_{dt} + \varphi_{st} + \varepsilon_{it}$ where $CS$ denotes the set of 2-digit occupations listed in Table A.1. The regression includes individual characteristics denoted $X'_{it}$ (gender, age, experience and experience squared), firm controls denoted $X'_{jt}$ (firm size and age of the firm) as well as district-time and industry-time fixed effects. Coefficients are reported together with their 10 percent confidence interval.

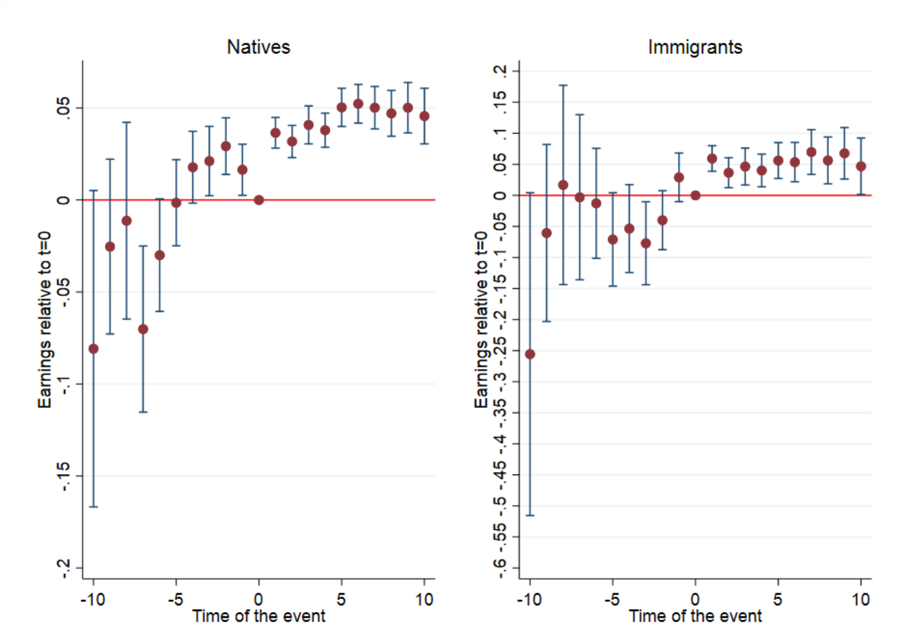
# D Endogeneity Concerns

Figure A.3: Wage Changes for Firm Switchers Along the Distribution of Export Intensity.




*Notes:* This figure shows the wage dynamic of individuals (immigrants and natives) before and after they switch firm. We split firms into four bins based on their export share (in total sales). The figure reports changes for workers switching from firms in a lower bin to firms in a higher bin of the export distribution.

Figure A.4: Wage Dynamics in Firms Starting to Export.




*Notes:* This figure shows the result of a panel event study of the wage dynamics of native (left-side graph) and immigrant workers (right-side graph) around the year when the employing firms starts exporting for the first time. Workers employed in firms that never export acts as controls, providing the counterfactual on which the estimation of the effect of the event (exporting) is based. Controls include the experience and experience squared of the individual, and the (log) number of employees. Two-way fixed effects estimation includes firm and year fixed-effects. Errors are clustered at the firm-year level.

# E Preliminary Results

We start by studying the relationship between wages and the characteristics of individuals as well as the export status of firms. We present the results of Equation (16) without any interaction term in Table A.4. We find that foreign-born workers earn 4.9% less than their native counterparts (column 1). When introducing firm-year or firm fixed effects into the specification, the wage differential remains significant. We find that foreign-born workers earn 2.5% less than natives using firm-year fixed effects (column 2), and 2.7% using firm fixed effects (column 3). The wage gap amounts to 4.2% when we exploit the within-occupation dimension (column 4). Overall, the wage gap is negative and significant. In addition, exporters pay higher wages, white-collar workers earn higher wages, male workers earn more than female workers, experience shows a bell-shaped relationship with wages and bigger firms pay higher wages. OLS results are reported in Table A.5.

We then introduce the double interaction terms. We start by analysing the immigrant wage gap for blue- and white-collar workers in the French manufacturing sector. Results are reported in Table A.6, columns (1) to (4). In all columns, we find that foreign-born individuals exhibit a wage discount when they hold blue-collar positions. Within-industry, blue-collar immigrant workers earn on average 9.1% less than their native counterparts. White-collar immigrants, however, earn on average 3.8% more than their native counterparts (column 1). In the within-firm specification, we estimate that blue-collar workers earn between 6.3% and 6.4% less than the native counterpart, while there is a wage premium of 4.6%-4.2% for white-collar immigrants (columns 2 and 3). Finally, when we exploit the occupation-year dimension (column 4), the wage discount of blue-collar immigrants amounts to 6.1% and the wage discount reduces to 0.2% for white-collar immigrant workers. Overall, this set of results points toward the presence of a wage discount for blue-collar immigrants, and a wage premium for white-collar immigrants within the industry, within the firm and within occupations.

We pursue the analysis by studying the magnitude of the wage export premium, and how it differs across blue- and white-collar workers. Results are reported in Table A.6, columns (5) to (8). In column (5), we find that, within an industry, the higher the export intensity of the employing firm, the higher the individual wage. In addition, the magnitude of the export premium is larger for white-collar workers. Blue-collar workers earn on average 21.3% more when employed by an exporting firm, and white-collar workers earn on average 28.1% more when employed by an exporting firm. The introduction of firm fixed effects in column (7) corroborates the presence of a wage export premium for white-collar workers. For each IV-2SLS regression, the Kleibergen-Paap F statistic is large enough to infer that the instruments are not weak. First-stage results show that the world import demand positively and significantly predicts firm export intensity. Once interacted with the white-collar dummy or the export intensity, the instrumental variable correctly predicts the interaction term of interest.

Table A.5: Wages and the Characteristics of Individuals and Firms - OLS Estimations.

| | $\ln w_{i(j)t}$ | | |
|---|---|---|---|
| | (1) | (2) | (3) |
| *Estimation results* | | | |
| $\text{Foreign}_i$ | -0.048*** | -0.027*** | -0.041*** |
| | (0.004) | (0.004) | (0.003) |
| $\text{Export}_{jt}$ | 0.095*** | 0.043*** | 0.087*** |
| | (0.010) | (0.008) | (0.008) |
| $\text{White}_{it}$ | 0.520*** | 0.489*** | |
| | (0.004) | (0.004) | |
| $\text{Gender}_i$ (male) | 0.200*** | 0.170*** | 0.201*** |
| | (0.003) | (0.002) | (0.003) |
| $\text{Age}_i$ | 0.012*** | 0.011*** | 0.010*** |
| | (0.000) | (0.000) | (0.000) |
| $\text{Seniority}_i$ | 0.059*** | 0.058*** | 0.059*** |
| | (0.001) | (0.001) | (0.001) |
| $\text{Seniority}_i^2$ | -0.186*** | -0.180*** | -0.182*** |
| | (0.003) | (0.003) | (0.003) |
| (log) $\text{Size}_{jt}$ | 0.047*** | 0.140*** | 0.044*** |
| | (0.002) | (0.009) | (0.002) |
| $\text{Age}_{jt}$ | -0.000*** | -0.000 | -0.001*** |
| | (0.000) | (0.001) | (0.000) |
| Observations | 1,822,463 | 1,822,463 | 1,822,461 |
| Method | OLS | OLS | OLS |
| R-squared | 0.342 | 0.431 | 0.408 |
| FE | st-dt | f-dt-st | st-dt-ot |

*Notes:* This table reports OLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses.s t, dt, f, and ot indicate industry-time, district-time, firm and occupation-time fixed effects respectively.

Table A.4: Wages and the Characteristics of Individuals and Firms.

| | $\ln \text{w}_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| $\text{Foreign}_i$ | -0.049*** | -0.025*** | -0.027*** | -0.042*** |
| | (0.004) | (0.004) | (0.004) | (0.003) |
| $\text{Export}_{jt}$ | 0.228*** | | 0.113* | 0.148*** |
| | (0.026) | | (0.059) | (0.023) |
| $\text{White}_{it}$ | 0.518*** | 0.495*** | 0.489*** | |
| | (0.004) | (0.005) | (0.004) | |
| $\text{Gender}_i$ (male) | 0.201*** | 0.169*** | 0.170*** | 0.201*** |
| | (0.003) | (0.002) | (0.002) | (0.003) |
| $\text{Age}_i$ | 0.012*** | 0.011*** | 0.011*** | 0.010*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| $\text{Seniority}_i$ | 0.059*** | 0.059*** | 0.058*** | 0.059*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| $\text{Seniority}_i^2$ | -0.185*** | -0.182*** | -0.180*** | -0.182*** |
| | (0.003) | (0.004) | (0.003) | (0.003) |
| (log) $\text{Size}_{jt}$ | 0.040*** | | 0.141*** | 0.041*** |
| | (0.003) | | (0.009) | (0.002) |
| $\text{Age}_{jt}$ | -0.001*** | | -0.000 | -0.001*** |
| | (0.000) | | (0.001) | (0.000) |
| *First-stage coefficient* | | | | |
| $\text{WID}_{jt}$ | 0.011*** | | 0.003*** | 0.011*** |
| | (0.000) | | (0.000) | (0.000) |
| Observations | 1,822,463 | 1,822,462 | 1,822,463 | 1,822,461 |
| Method | IV-2SLS | OLS | IV-2SLS | IV-2SLS |
| R-squared | | 0.486 | | |
| K-Paap Stat. | 1,206.17 | | 592.89 | 1,272.96 |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS and OLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

Table A.6: Nativity Gap and Export Premium.

| | $\ln w_{i(j)t}$ | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | The nativity wage gap | | | | The wage export premium | | | |
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) | (8) |
| *Estimation results* | | | | | | | | |
| $\text{Foreign}_i$ | -0.091*** | -0.063*** | -0.064*** | -0.061*** | -0.050*** | -0.025*** | -0.028*** | -0.042*** |
| | (0.005) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.004) | (0.003) |
| $\text{Export}_{jt}$ | 0.228*** | | 0.113* | 0.148*** | 0.213*** | | 0.088 | 0.141*** |
| | (0.026) | | (0.059) | (0.023) | (0.028) | | (0.060) | (0.024) |
| $\text{White}_{it}$ | 0.508*** | 0.486*** | 0.481*** | | 0.497*** | 0.483*** | 0.464*** | |
| | (0.004) | (0.004) | (0.004) | | (0.006) | (0.006) | (0.005) | |
| $\text{Foreign}_i \times \text{White}_{it}$ | 0.129*** | 0.109*** | 0.106*** | 0.059*** | | | | |
| | (0.008) | (0.008) | (0.008) | (0.006) | | | | |
| $\text{Export}_{jt} \times \text{White}_{it}$ | | | | | 0.068*** | 0.034 | 0.079*** | 0.029 |
| | | | | | (0.025) | (0.024) | (0.023) | (0.019) |
| *First-stage coefficients* | | | | | | | | |
| $\text{WID}_{jt}$ | 0.011*** | | 0.003*** | 0.011*** | 0.010*** | | 0.003*** | 0.010*** |
| | (0.000) | | (0.000) | (0.000) | (0.000) | | (0.000) | (0.003) |
| $\text{WID}_{jt} \times \text{White}_{it}$ | | | | | 0.021*** | 0.021*** | 0.020*** | 0.020*** |
| | | | | | (0.005) | (0.005) | (0.005) | (0.005) |
| Observations | 1,822,463 | 1,822,462 | 1,822,463 | 1,822,461 | 1,822,463 | 1,822,462 | 1,822,463 | 1,822,461 |
| Method | IV-2SLS | OLS | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| R-squared | | 0.486 | | | | | | |
| K-Paap Stat. | 1,206.68 | | 592.87 | 1,273.53 | 649.77 | 1401.14 | 295.91 | 674.55 |
| Controls | yes | yes | yes | yes | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS and OLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

# F Additional Results

Table A.7: A Reassessment of the Nativity Wage Gap - Reduced Model.

| | $\ln \text{w}_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| $\text{Foreign}_i$ | -0.169*** | -0.099*** | -0.101*** | -0.075*** |
| | (0.007) | (0.007) | (0.007) | (0.006) |
| $\text{Export}_{jt}$ | 0.304*** | | 0.134** | 0.135*** |
| | (0.030) | | (0.060) | (0.023) |
| $\text{Foreign}_i \times \text{Export}_{jt}$ | 0.249*** | 0.125*** | 0.123*** | 0.115*** |
| | (0.026) | (0.025) | (0.025) | (0.020) |
| *First-stage coefficients* | | | | |
| $\text{WID}_{jt}$ | 0.011*** | | 0.003*** | 0.011*** |
| | (0.000) | | (0.000) | (0.000) |
| $\text{WID}_{jt} \times \text{Foreign}_i$ | 0.020*** | 0.021*** | 0.020*** | 0.020*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| *Bootstrapped export thresholds* | | | | |
| | 0.674*** | 0.790*** | 0.813*** | 0.652*** |
| | (0.022) | (0.055) | (0.061) | (0.042) |
| Observations | 1,822,463 | 1,822,462 | 1,822,463 | 1,822,461 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 608.83 | 1,714.31 | 296.46 | 636.96 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

Table A.8: A Reassessment of the Nativity Wage Gap - Export Dummy.

| | $\ln w_{i(j)t}$ | |
|---|---|---|
| | (1) | (2) |
| *Estimation results* | | |
| $\text{Foreign}_i$ | -0.111*** | -0.059*** |
| | (0.008) | (0.008) |
| $\text{ExportD}_{jt}$ | 0.034*** | -0.001 |
| | (0.006) | (0.004) |
| $\text{White}_{it}$ | 0.481*** | 0.462*** |
| | (0.007) | (0.006) |
| $\text{Foreign}_i \times \text{ExportD}_{jt}$ | 0.026*** | -0.007 |
| | (0.009) | (0.009) |
| $\text{Foreign}_i \times \text{White}_{it}$ | -0.003 | -0.011 |
| | (0.017) | (0.017) |
| $\text{ExportD}_{jt} \times \text{White}_{it}$ | 0.033*** | 0.022*** |
| | (0.010) | (0.009) |
| $\text{Foreign}_i \times \text{ExportD}_{jt} * \text{White}_{it}$ | 0.151*** | 0.129*** |
| | (0.020) | (0.020) |
| *First-stage coefficients* | | |
| $\text{WID}_{jt}$ | 0.053*** | 0.054*** |
| | (0.000) | (0.000) |
| $\text{WID}_{jt} \times \text{Foreign}_i$ | 0.051*** | 0.051*** |
| | (0.000) | (0.000) |
| $\text{WID}_{jt} \times \text{White}_{it}$ | 0.049*** | 0.049*** |
| | (0.000) | (0.000) |
| $\text{WID}_{jt} \times \text{White}_{it} \times \text{Foreign}_i$ | 0.048*** | 0.048*** |
| | (0.000) | (0.000) |
| Observations | 1,821,525 | 1,821,525 |
| Method | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 6,059.55 | 4,779.73 |
| Controls | yes | yes |
| FE | dt-st | f-dt-st |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. $\text{ExportD}_{jt}$ denotes a dummy equal to one if firm $j$ exports at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, dt and f indicate industry-time, district-time and firm fixed effects respectively.

Table A.9: A Reassessment of the Nativity Wage Gap - Alternative Dependent Variable.

| | $\ln \text{dw}_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| ($\beta_1$) Foreign$_i$ | -0.065*** | -0.043*** | -0.044*** | -0.043*** |
| | (0.004) | (0.003) | (0.003) | (0.004) |
| ($\beta_2$) Export$_{jt}$ | 0.083*** | | -0.008 | 0.042*** |
| | (0.018) | | (0.025) | (0.015) |
| ($\beta_3$) White$_{it}$ | 0.399*** | 0.408*** | 0.389*** | |
| | (0.005) | (0.004) | (0.004) | |
| ($\beta_4$) Foreign$_i$ × Export$_{jt}$ | 0.057*** | 0.014 | 0.016 | 0.044*** |
| | (0.013) | (0.011) | (0.011) | (0.012) |
| ($\beta_5$) Foreign$_i$ × White$_{it}$ | 0.029** | 0.032*** | 0.028*** | 0.023*** |
| | (0.011) | (0.011) | (0.010) | (0.008) |
| ($\beta_6$) Export$_{jt}$ × White$_{it}$ | 0.136*** | 0.056*** | 0.095*** | 0.081*** |
| | (0.019) | (0.018) | (0.017) | (0.013) |
| ($\beta_7$) Foreign$_i$ × Export$_{jt}$ × White$_{it}$ | 0.226*** | 0.202*** | 0.207*** | 0.096*** |
| | (0.032) | (0.031) | (0.030) | (0.023) |
| *First-stage coefficients* | | | | |
| WID$_{jt}$ | 0.010*** | | 0.003*** | 0.010*** |
| | (0.000) | | (0.000) | (0.000) |
| WID$_{jt}$ × Foreign$_i$ | 0.018*** | 0.019*** | 0.018*** | 0.018*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| WID$_{jt}$ × White$_{it}$ | 0.021*** | 0.021*** | 0.020*** | 0.021*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| WID$_{jt}$ × White$_{it}$ × Foreign$_i$ | 0.024*** | 0.025*** | 0.024*** | 0.024*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Bootstrapped export thresholds* | | | | |
| Threshold for blue-collar workers | 1.150*** | 3.168 | 2.462*** | 0.963*** |
| | (0.082) | (67.484) | (0.902) | (0.110) |
| Threshold for white-collar workers | 0.128*** | 0.038 | 0.071*** | 0.141*** |
| | (0.013) | (0.029) | (0.021) | (0.023) |
| Observations | 1,821,525 | 1,821,525 | 1,821,525 | 1,821,523 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 325.37 | 426.53 | 147.91 | 337.58 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) real daily wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

Table A.10: A Reassessment of the Nativity Wage Gap - Alternative Instrumental Variable.

| | $\ln w_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| ($\beta_1$) Foreign$_i$ | -0.108*** | -0.059*** | -0.060*** | -0.076*** |
| | (0.007) | (0.007) | (0.008) | (0.007) |
| ($\beta_2$) Export$_{jt}$ | 0.175*** | | 0.149** | 0.119*** |
| | (0.025) | | (0.066) | (0.022) |
| ($\beta_3$) White$_{it}$ | 0.495*** | 0.482*** | 0.465*** | |
| | (0.006) | (0.006) | (0.006) | |
| ($\beta_4$) Foreign$_i$ × Export$_{jt}$ | 0.055** | -0.023 | -0.023 | 0.053** |
| | (0.026) | (0.025) | (0.026) | (0.025) |
| ($\beta_5$) Foreign$_i$ × White$_{it}$ | 0.027* | 0.023 | 0.013 | 0.010 |
| | (0.016) | (0.016) | (0.016) | (0.013) |
| ($\beta_6$) Export$_{jt}$ × White$_{it}$ | 0.051** | 0.020 | 0.058** | 0.020 |
| | (0.025) | (0.025) | (0.024) | (0.019) |
| ($\beta_7$) Foreign$_i$ × Export$_{jt}$ × White$_{it}$ | 0.253*** | 0.232*** | 0.250*** | 0.114*** |
| | (0.046) | (0.046) | (0.045) | (0.038) |
| *First-stage coefficients* | | | | |
| WID$_{jt}$ | 0.013*** | | 0.004*** | 0.013*** |
| | (0.000) | | (0.000) | (0.000) |
| WID$_{jt}$ × Foreign$_i$ | 0.020*** | 0.021*** | 0.020*** | 0.020*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| WID$_{jt}$ × White$_{it}$ | 0.023*** | 0.022*** | 0.022*** | 0.022*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| WID$_{jt}$ × White$_{it}$ × Foreign$_i$ | 0.025*** | 0.025*** | 0.025*** | 0.025*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Bootstrapped export thresholds* | | | | |
| Threshold for blue-collar workers | 1.968 | -2.578 | -2.569 | 1.441*** |
| | (2.290) | (54.755) | (5.016) | (0.386) |
| Threshold for white-collar workers | 0.261*** | 0.173*** | 0.207*** | 0.394*** |
| | (0.015) | (0.039) | (0.028) | (0.015) |
| Observations | 1,663,736 | 1,663,736 | 1,663,736 | 1,663,734 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 402.81 | 241.10 | 84.50 | 416.70 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

Table A.11: A Reassessment of the Nativity Wage Gap - Excluding non-Exporting Firms.

| | $\ln w_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| ($\beta_1$) Foreign$_i$ | -0.092*** | -0.058*** | -0.061*** | -0.057*** |
| | (0.010) | (0.009) | (0.010) | (0.010) |
| ($\beta_2$) Export$_{jt}$ | 0.139*** | | 0.118* | 0.103*** |
| | (0.028) | | (0.061) | (0.025) |
| ($\beta_3$) White$_{it}$ | 0.503*** | 0.502*** | 0.486*** | |
| | (0.009) | (0.008) | (0.008) | |
| ($\beta_4$) Foreign$_i$ × Export$_{jt}$ | 0.010 | -0.023 | -0.018 | -0.000 |
| | (0.034) | (0.031) | (0.032) | (0.034) |
| ($\beta_5$) Foreign$_i$ × White$_{it}$ | 0.016 | 0.017 | 0.019 | -0.014 |
| | (0.021) | (0.021) | (0.020) | (0.017) |
| ($\beta_6$) Export$_{jt}$ × White$_{it}$ | 0.027 | -0.039 | -0.004 | 0.004 |
| | (0.031) | (0.029) | (0.027) | (0.023) |
| ($\beta_7$) Foreign$_i$ × Export$_{jt}$ × White$_{it}$ | 0.286*** | 0.243*** | 0.232*** | 0.176*** |
| | (0.058) | (0.056) | (0.055) | (0.047) |
| *First-stage coefficients* | | | | |
| WID$_{jt}$ | 0.011*** | | 0.003*** | 0.011*** |
| | (0.000) | | (0.000) | (0.000) |
| WID$_{jt}$ × Foreign$_i$ | 0.019*** | 0.021*** | 0.019*** | 0.019*** |
| | (0.000) | (0.001) | (0.001) | (0.000) |
| WID$_{jt}$ × White$_{it}$ | 0.023*** | 0.023*** | 0.021*** | 0.022*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| WID$_{jt}$ × White$_{it}$ × Foreign$_i$ | 0.026*** | 0.027*** | 0.026*** | 0.026*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Bootstrapped export thresholds* | | | | |
| Threshold for blue-collar workers | 8.959 | -2.510 | -3.449 | -287.297*** |
| | (15.686) | (23.929) | (428.609) | (9.053) |
| Threshold for white-collar workers | 0.258*** | 0.189*** | 0.198*** | 0.451*** |
| | (0.019) | (0.038) | (0.035) | (0.008) |
| Observations | 1,648,100 | 1,648,100 | 1,648,100 | 1,648,098 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 315.74 | 278.83 | 145.35 | 314.46 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

Table A.12: A Reassessment of the Nativity Wage Gap - ISCO Classification.

| | $\ln w_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| ($\beta_1$) Foreign$_i$ | -0.104*** | -0.058*** | -0.059*** | -0.092*** |
| | (0.008) | (0.008) | (0.008) | (0.008) |
| ($\beta_2$) Export$_{jt}$ | 0.127*** | | 0.004 | 0.082*** |
| | (0.030) | | (0.061) | (0.025) |
| ($\beta_3$) White$_{it}$ | 0.348*** | 0.364*** | 0.350*** | |
| | (0.006) | (0.005) | (0.005) | |
| ($\beta_4$) Foreign$_i$ × Export$_{jt}$ | 0.067** | -0.014 | -0.013 | 0.104*** |
| | (0.029) | (0.027) | (0.027) | (0.028) |
| ($\beta_5$) Foreign$_i$ × White$_{it}$ | -0.003 | 0.008 | 0.001 | 0.051*** |
| | (0.014) | (0.015) | (0.014) | (0.013) |
| ($\beta_6$) Export$_{jt}$ × White$_{it}$ | 0.310*** | 0.191*** | 0.226*** | 0.102*** |
| | (0.024) | (0.023) | (0.022) | (0.016) |
| ($\beta_7$) Foreign$_i$ × Export$_{jt}$ ∗ White$_{it}$ | 0.255*** | 0.221*** | 0.234*** | -0.007 |
| | (0.044) | (0.044) | (0.043) | (0.038) |
| *First-stage coefficients* | | | | |
| WID$_{jt}$ | 0.010*** | | 0.003*** | 0.010*** |
| | (0.000) | | (0.000) | (0.000) |
| WID$_{jt}$ × Foreign$_i$ | 0.018*** | 0.019*** | 0.018*** | 0.018*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| WID$_{jt}$ × White$_{it}$ | 0.021*** | 0.021*** | 0.020*** | 0.019*** |
| | (0.000) | (0.001) | (0.000) | (0.000) |
| WID$_{jt}$ × White$_{it}$ × Foreign$_i$ | 0.024*** | 0.024*** | 0.024*** | 0.024*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Bootstrapped export thresholds* | | | | |
| Threshold for blue-collar workers | 1.557** | -4.144 | -4.653 | 0.880*** |
| | (0.622) | (7.618) | (12.594) | (0.098) |
| Threshold for white-collar workers | 0.332*** | 0.238*** | 0.264*** | 0.418*** |
| | (0.010) | (0.028) | (0.015) | (0.030) |
| Observations | 1,767,927 | 1,764,587 | 1,767,504 | 1,767,926 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 305.74 | 493.18 | 138.92 | 321.69 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. Blue- and white-collar workers are defined using the ISCO classification. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

Table A.13: A Reassessment of the Nativity Wage Gap - Trade-related Occupations.

| | $\ln w_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| ($\beta_1$) Foreign$_i$ | -0.111*** | -0.066*** | -0.068*** | -0.077*** |
| | (0.007) | (0.007) | (0.007) | (0.007) |
| ($\beta_2$) Export$_{jt}$ | 0.158*** | | 0.040 | 0.116*** |
| | (0.028) | | (0.059) | (0.054) |
| ($\beta_3$) Info$_{it}$ | 0.380*** | 0.404*** | 0.387*** | |
| | (0.006) | (0.006) | (0.006) | |
| ($\beta_4$) Foreign$_i$ $\times$ Export$_{jt}$ | 0.044* | -0.027 | -0.028 | 0.067*** |
| | (0.026) | (0.024) | (0.025) | (0.024) |
| ($\beta_5$) Foreign$_i$ $\times$ Info$_{it}$ | 0.001 | 0.007 | -0.002 | 0.003 |
| | (0.018) | (0.019) | (0.019) | (0.016) |
| ($\beta_6$) Export$_{jt}$ $\times$ Info$_{it}$ | 0.429*** | 0.303*** | 0.342*** | 0.108*** |
| | (0.025) | (0.024) | (0.023) | (0.021) |
| ($\beta_7$) Foreign$_i$ $\times$ Export$_{jt}$ $*$ Info$_{it}$ | 0.252*** | 0.242*** | 0.259*** | 0.139*** |
| | (0.050) | (0.051) | (0.051) | (0.044) |
| *First-stage coefficients* | | | | |
| WID$_{jt}$ | 0.011*** | | 0.003*** | 0.011*** |
| | (0.000) | | (0.000) | (0.000) |
| WID$_{jt}$ $\times$ Foreign$_i$ | 0.019*** | 0.020*** | 0.019*** | 0.019*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| WID$_{jt}$ $\times$ Info$_{it}$ | 0.020*** | 0.021*** | 0.020*** | 0.020*** |
| | (0.000) | (0.001) | (0.001) | (0.000) |
| WID$_{jt}$ $\times$ Info$_{it}$ $\times$ Foreign$_i$ | 0.024*** | 0.025*** | 0.024*** | 0.024*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Bootstrapped export thresholds* | | | | |
| Threshold for blue-collar workers | 2.551 | -2.501 | -2.375 | 1.160*** |
| | (2.685) | (31.383) | (6.817) | (0.272) |
| Threshold for white-collar workers | 0.371*** | 0.277*** | 0.304*** | 0.363*** |
| | (0.013) | (0.037) | (0.022) | (0.014) |
| Observations | 1,821,525 | 1,821,525 | 1,821,525 | 1,821,523 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 301.49 | 262.52 | 148.18 | 320.34 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. Info$_{it}$ is a dummy equal to one if the individual holds a trade-related job. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

Table A.14: A Reassessment of the Nativity Wage Gap - Excluding the Region of Paris.

| | $\ln w_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| ($\beta_1$) Foreign$_i$ | -0.115*** | -0.066*** | -0.069*** | -0.089*** |
| | (0.008) | (0.008) | (0.008) | (0.008) |
| ($\beta_2$) Export$_{jt}$ | 0.192*** | | 0.097 | 0.123*** |
| | (0.029) | | (0.063) | (0.026) |
| ($\beta_3$) White$_{it}$ | 0.491*** | 0.478*** | 0.460*** | |
| | (0.006) | (0.006) | (0.006) | |
| ($\beta_4$) Foreign$_i$ $\times$ Export$_{jt}$ | 0.080*** | -0.001 | 0.003 | 0.086*** |
| | (0.031) | (0.028) | (0.028) | (0.029) |
| ($\beta_5$) Foreign$_i$ $\times$ White$_{it}$ | 0.044*** | 0.032* | 0.026 | 0.028* |
| | (0.017) | (0.017) | (0.017) | (0.015) |
| ($\beta_6$) Export$_{jt}$ $\times$ White$_{it}$ | 0.040* | 0.015 | 0.054** | 0.034* |
| | (0.022) | (0.023) | (0.022) | (0.018) |
| ($\beta_7$) Foreign$_i$ $\times$ Export$_{jt}$ $*$ White$_{it}$ | 0.191*** | 0.201*** | 0.206*** | 0.056 |
| | (0.047) | (0.047) | (0.046) | (0.041) |
| *First-stage coefficients* | | | | |
| WID$_{jt}$ | 0.010*** | | 0.003*** | 0.010*** |
| | (0.000) | | (0.000) | (0.000) |
| WID$_{jt}$ $\times$ Foreign$_i$ | 0.018*** | 0.019*** | 0.018*** | 0.018*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| WID$_{jt}$ $\times$ White$_{it}$ | 0.021*** | 0.021*** | 0.020*** | 0.021*** |
| | (0.000) | (0.001) | (0.000) | (0.000) |
| WID$_{jt}$ $\times$ White$_{it}$ $\times$ Foreign$_i$ | 0.025*** | 0.025*** | 0.026*** | 0.025*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Bootstrapped export thresholds* | | | | |
| Threshold for blue-collar workers | 1.452*** | -128.067 | 20.627 | 1.038*** |
| | (0.225) | (297.014) | (19.292) | (0.264) |
| Threshold for white-collar workers | 0.263*** | 0.171*** | 0.204*** | 0.430*** |
| | (0.017) | (0.033) | (0.029) | (0.023) |
| Observations | 1,581,661 | 1,581,661 | 1,581,661 | 1,581,659 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 275.69 | 521.15 | 148.84 | 287.55 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.

Table A.15: A Reassessment of the Nativity Wage Gap - Males Only.

| | $\ln w_{i(j)t}$ | | | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| *Estimation results* | | | | |
| ($\beta_1$) Foreign$_i$ | -0.101*** | -0.043*** | -0.047*** | -0.072*** |
| | (0.008) | (0.008) | (0.009) | (0.008) |
| ($\beta_2$) Export$_{jt}$ | 0.213*** | | 0.084 | 0.150*** |
| | (0.029) | | (0.064) | (0.025) |
| ($\beta_3$) White$_{it}$ | 0.484*** | 0.485*** | 0.463*** | |
| | (0.006) | (0.007) | (0.006) | |
| ($\beta_4$) Foreign$_i$ × Export$_{jt}$ | 0.063** | -0.054* | -0.043 | 0.057** |
| | (0.029) | (0.030) | (0.030) | (0.029) |
| ($\beta_5$) Foreign$_i$ × White$_{it}$ | 0.010 | -0.007 | -0.012 | 0.005 |
| | (0.016) | (0.017) | (0.016) | (0.014) |
| ($\beta_6$) Export$_{jt}$ × White$_{it}$ | 0.046* | -0.011 | 0.041 | 0.008 |
| | (0.026) | (0.028) | (0.027) | (0.020) |
| ($\beta_7$) Foreign$_i$ × Export$_{jt}$ ∗ White$_{it}$ | 0.283*** | 0.312*** | 0.313*** | 0.132*** |
| | (0.048) | (0.050) | (0.049) | (0.042) |
| *First-stage coefficients* | | | | |
| WID$_{jt}$ | 0.010*** | | 0.003*** | 0.011*** |
| | (0.000) | | (0.000) | (0.000) |
| WID$_{jt}$ × Foreign$_i$ | 0.018*** | 0.019*** | 0.018*** | 0.018*** |
| | (0.000) | (0.001) | (0.000) | (0.000) |
| WID$_{jt}$ × White$_{it}$ | 0.021*** | 0.021*** | 0.020*** | 0.020*** |
| | (0.001) | (0.001) | (0.001) | (0.000) |
| WID$_{jt}$ × White$_{it}$ × Foreign$_i$ | 0.024*** | 0.025*** | 0.024*** | 0.024*** |
| | (0.001) | (0.001) | (0.001) | (0.001) |
| *Bootstrapped export thresholds* | | | | |
| Threshold for blue-collar workers | 1.608** | -0.795* | -1.095 | 1.268 |
| | (0.716) | (0.445) | (25.829) | (0.832) |
| Threshold for white-collar workers | 0.265*** | 0.194*** | 0.218*** | 0.354*** |
| | (0.013) | (0.027) | (0.021) | (0.016) |
| Observations | 1,331,460 | 1,298,363 | 1,327,892 | 1,331,454 |
| Method | IV-2SLS | IV-2SLS | IV-2SLS | IV-2SLS |
| K-Paap F Stat. | 288.24 | 363.12 | 132.44 | 294.06 |
| Controls | yes | yes | yes | yes |
| FE | st-dt | ft-d | f-st-dt | st-dt-ot |

*Notes:* This table reports IV-2SLS estimations. The dependent variable is the (log) annualised real wage of an individual $i$ working in a firm $j$ at time $t$. ***, ** and * respectively denote significance at the 1%, 5% and 10% level. Robust standard errors clustered at the firm level are reported in parentheses. When compatible with our set of fixed effects, controls include the gender, age, experience and experience squared of the individual, and the (log) number of employees and age of the firm. st, d, dt, f, ft, and ot indicate industry-time, district, district-time, firm, firm-time and occupation-time fixed effects respectively.