

Immigrants at new destinations: how they fare and why

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Abstract We explore matched employer–employee data for a new destination of international migrants in Europe—Portugal. We conclude that the difference between the earnings of immigrants and natives with similar personal characteristics is for the most part due to the characteristics of the matches they form, immigrants being penalized on two different counts: absence of match-specific human capital and occupational downgrading. Moreover, we show that non-random sorting across workplaces has a significant detrimental effect on immigrants’ wages. This is the flip side of joining migrant-crowded workplaces.

Keywords Immigrants’ earnings · Workplace concentration of immigrants · Matched employer–employee data

JEL Classification J15 · J61 · J71

1 Introduction

At the very heart of today’s immigration debate lies the question of how well immigrants fare at their destination. The answer to this question crucially

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determines the social and economic consequences of immigration for receiving countries.

Comparison between successive cohorts of immigrants to the USA has unequivocally demonstrated the importance of skills in the process of shaping the economic performance of immigrants both in the immediate post-migration period and over the long run (see Borjas 1999, e.g.). Yet, it is also well-known that human capital accumulated at home, through schooling or labour market experience, instantaneously loses value as individuals cross national borders. The magnitude of this loss is significantly influenced by factors such as the economic and cultural similarity between source and destination countries (Chiswick 1979). The greater those differences are, the more immigrants lack country-specific skills and information, which harms their immediate labour market prospects. Alone, lower returns to foreign human capital were found to fully explain the earnings disadvantage of immigrants as compared with those earned by similar native workers (Friedberg 2000). The difficulty of finding jobs in high-skilled occupations leads high-skilled immigrants to accept job offers in low-skilled occupations, thereby magnifying the depreciation of the human capital acquired at home.

Occupational downgrading may be optimal if combined with on-the-job search which, with time, permits immigrants to find better matches and receive higher wages (Weiss et al. 2003). Mobility up the occupational ladder alongside with rising returns to imported and local human capital are the three major sources of wage growth for immigrants. The national origin of an individual's human capital (Friedberg 2000), language skills (Chiswick and Miller 2002), training and experience acquired locally (Cohen and Eckstein 2002), and clustering into ethnic enclaves (Borjas 2000), have all been found to play a role in the process of economic assimilation of immigrants.

We contribute to the vast literature on the economic assimilation of immigrants at destination by focusing on a new host country and by using matched employer–employee data instead of the more widely used data obtained from household surveys.

Most stylized facts in the economic migration literature are derived from the analysis of countries with a long tradition as hosts of international migrants. However, as international migration flows have gone through major changes in recent years, a number of new destinations have emerged. In Europe, this is notably the case of Southern countries—Italy, Spain, Greece, and Portugal—all of which are traditionally sending nations.

Our analysis focuses on the case of Portugal. We offer evidence that allows us to examine immigrants' economic performance in a new destination country against the background of other countries with a longer history of inward migration.

In this article, we use matched employer–employee data. To the best of our knowledge, only Aydemir and Skuterud (2008) have used the same type of data in the context of migration studies. The data these authors used were obtained from a nationally representative annual survey of Canadian business establishments that, in addition, surveys randomly a small number of employ-

ees within each establishment. We use administrative data covering the entire population of individuals working in the Portuguese private sector. In addition to extensive information on workers' and employers' characteristics, the data also include the nationality of the workers, which is typically absent from most matched employer–employee data sets. Data are available for a reasonably long period (2002–2008) and, more important, workers are traceable even if they switch employers.

Although we do not claim that these data are universally superior to the more widely used employee data, we do show that some important and previously neglected questions can only be addressed with these data.¹ Using such data, we are able to control for employer and match characteristics in the estimation of wage equations and, thereby, to assess how much of the immigrant-native wage gap can be accounted for by personal characteristics, and how much is due to the characteristics of employers and matches.² We are also able to study migrants' wages in relation to one very special characteristic of the workplace—the share of the total number of employees in the same establishment that are also non-natives. In so doing, we link our analysis of immigrants' wages to the fast growing literature on the role of social networks and job referrals as key components of their search strategies (Calvó-Armengol and Jackson 2004; Fontaine 2008; Dustmann et al. 2011).

The paper is outlined as follows. Section 2 briefly describes the evolution of immigration to Portugal in recent years. Section 3 presents the data. In Section 4, an estimate of the wage disadvantage of immigrants is obtained and its variation over the entire distribution of wages is analysed. In Section 5, we look at the effect of the concentration of immigrants in the workplace on their earnings. Section 6 concludes.

2 The immigration record

From an international point of view, Portugal, like most other Southern European countries, is a source country for international migration flows. Portuguese nationals have been leaving the country predominantly for work-related reasons since at least the mid-eighteenth century first, toward the Americas (especially Brazil) and after World War II toward Continental Europe, especially France and Germany. It was only when Europe was hit by

¹Matched employer–employee data are not without problems, the most severe being the absence of information on the workers' family status, and the exact date of arrival to the host country.

²We note from the outset that our analysis focuses on formal employment. There is very limited evidence on the incidence of informal work arrangements amongst immigrants in Portugal. Carvalho (2007) reports survey results indicating that such arrangements are more prevalent in agriculture, construction, and retail and wholesale trade. He also finds that non-regular forms of employment account for 30% of total immigrants' employment, which is above the estimated size of the shadow economy in Portugal (around 23% of the GDP according to Schneider et al. 2010). No data are available on workers' income in the informal sector, immigrants' or natives'.

the first oil crisis, in the early 1970s, that out-migration flows were significantly reduced. Still, as a result of this sustained flow of migration over such a long period of time, it is estimated that as many as 4 million Portuguese citizens (about 40% of the total population residing in the country) currently live abroad.

It was during the post-1974 revolution years and the subsequent independence of the country's former colonies in Africa that Portugal had its first experience as a region of inward migration. It is believed that in 3 years the Portuguese labour force increased by roughly 10% (for a detailed description of the flow of expatriates and its consequences in the Portuguese labour market, see Carrington and Lima 1996).

From the early 1980s on, reduced outward migration and the intensification of return migration flows combined to reduce net migration, which became positive for the first time in 1993. At the same time, the number of foreign nationals living in the country was increasing steadily (Fig. 1). The year 2000 marks the beginning of a new stage, characterized by a sharp increase in the number of foreign citizens admitted every year. In 2008, the stock of foreign citizens with a valid residence card (about 440,000) was twice as large as in the year 2000. It was during this period that Portugal, together with

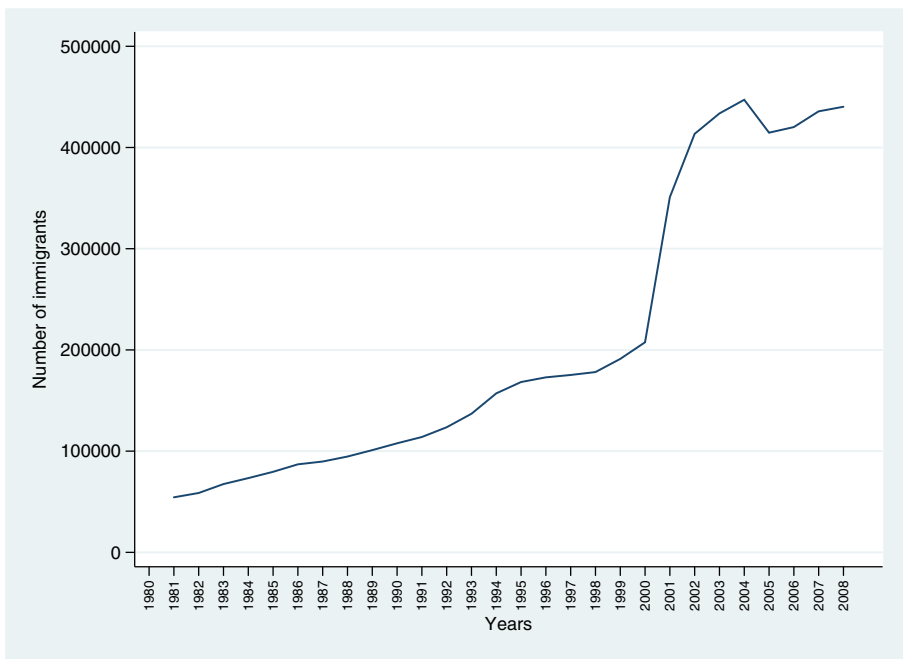


Fig. 1 Stock of immigrants with a valid residence card (1981–2008)

other Southern European countries, truly emerged as a host of international migrants (Venturini 2004).

These changes are part of a larger process of recomposition of migration flows worldwide. As the proportion of European immigrants in worldwide migration flows increased during the 1990s, following the opening of the Eastern European borders, the same occurred in Portugal, where immigrants arriving from Portuguese-speaking nations (in Africa or from Brazil) were outnumbered by those arriving from such countries as the Ukraine and Moldova. Other countries in Asia (China, India, and Pakistan) also contributed with a growing number of immigrants.

The intensification of the inflow of migrants was accompanied by a change in its composition. The regions of origin of newly arrived migrants are more distant from Portugal, both culturally and in linguistic terms, than were the regions where previous migrants originated. Additionally, as we shall see below, immigrants are younger and they have lower levels of education compared even to Portuguese natives, whose education achievement is unusually low. They are also predominantly migrants for employment-related reasons. Asylum seekers and refugees as well as immigrants entering through family reunification programmes are less numerous in Portugal than elsewhere (see SOPEMI 2002, p. 21).

3 The data

The data set used in this study comes from *Quadros de Pessoal (QP)*, an annual mandatory employment survey collected by the Portuguese Ministry of Employment, which covers virtually all establishments with wage earners.³ Each year, every establishment with wage earners is legally obliged to fill in a standardized questionnaire. By law, the questionnaire is made available to every worker in a public space of the establishment. The administrative nature of the data and their public disclosure imply a high degree of coverage and reliability.

QP data cover the establishment (location, economic activity, and employment), the firm (location, economic activity, employment, sales, and legal status), and each and every one of its workers (gender, age, education, skill, occupation, tenure, earnings, and duration of work). The information on earnings is very complete. It includes the base wage (gross pay for normal hours of work), regular and occasional non-wage payments, and overtime pay. Information on normal and overtime hours of work is also available. One of the main advantages of this type of data set is to have information at both the worker and firm levels, and to match workers with their employers.

³Public administration and non-market services are excluded.

Even though the Ministry of Employment has been conducting this survey since 1982, the 2000 wave is the first to have information on the worker's nationality.⁴ For the year 2001, the worker file does not exist. Because of that, in this article we use data for the years 2002 to 2008, which is the last with data available.⁵

Because all information is reported by the employer, we do not know the timing of foreign workers' entry to the country. To overcome this difficulty, we made use of two properties of the data to construct a proxy for the moment of immigrants' entry to Portugal. The first such property implies that all workers enter the data set the first time they obtain (legal) employment. The second property implies that all workers are assigned a unique time-invariant identification number when they first enter the database.

To identify the moment each migrant entered the country, we constructed a panel of employees starting in 1991 and traced each non-national worker present in the data at least once from 2003 on, back to her/his first record. We take the year of that worker-specific first record minus the corresponding tenure (in years) at that moment as a proxy of time of entry to the country and start counting the corresponding length of stay from that moment. This procedure minimizes the impact of the absence of direct information on the time of arrival to the country.

We restrict our sample to non-stateless workers between the ages of 18 and 60. After excluding all observations with missing values on the explanatory variables used in regression analysis, we obtained a data set for the years 2003–2008 that contains a total of 13.8 million observations (years \times individuals), i.e., approximately 2.3 million observations per year.⁶ Immigrants (685,000 observations) represent 5.0% of all workers in the final data set. Male immigrants (62.6% of total immigrants) are 5.5% of the total number of male workers while female immigrants (37.4% of total immigrants) are 4.3% of the total number of female workers.

Consistent with the evolution of the number of foreign citizens residing in the country, the number of immigrants in the data set increases from 84,253 in 2003 (4.5% of total employment) to 137,048 in 2008 (5.4% of total

⁴The nationality of the worker is the only information available that can be used to identify migrant workers. For that reason, in this article we take the word immigrant as synonymous with non-national citizen. Data permitting, our preferred option would have been different, as we must recognize that we are considering as immigrants all non-nationals independently of where they were born. We acknowledge that some of the workers that we are counting as immigrants may have already been born in Portugal. However, given the fact that large inflows of migrants are new to Portugal, we believe that this data limitation is likely to have a minor impact and does not reduce the validity of the results. Besides, the robustness checks we perform indicate that this is not a real problem in this case.

⁵In most model specifications we use one variable—'concentration of immigrants'—lagged one year. For that reason, all results reported refer to the period 2003–2008.

⁶Whenever a worker was present in one wave of the *QP* data set more than once we kept only the record corresponding to the establishment where he or she was working the greater number of hours.

employment). Sample means for the two groups of workers (native borns and immigrants), as well as for selected groups of nationalities are presented separately for men and women in Tables A.1 and A.2, respectively, of Appendix A.⁷

Immigrants from the former Soviet Union are the most numerous group in our data. The same is true for men (34.7% of the total). In this case, workers from the country's former colonies in Africa and from Brazil are, respectively, the second and third largest groups. EU14-nationals (i.e., citizens of the EU15 excluding Portugal) represent a small minority of all foreigners working in Portugal (6.5%). For women, African immigrants are still the largest group (35.4% of the total), the former Soviet Union and Brazil being the second and third most frequent origins. Such region-of-origin composition of the stock of immigrants, although in line with reports from other official sources, is very different from what would have been observed in the late 1990s, when African immigrants were dominant in both groups.⁸

On average, immigrants in the data set are younger and less educated than natives. However, considerable differences across groups of nationalities exist. Considering six nationality groups, we can see that immigrants from Brazil and China are, on average, the youngest, whereas immigrants from the former Soviet Union are the oldest. Western Europeans are the only group with an educational achievement above that of native workers—the share of college graduates in this group is 31.6% for males and 34.0% for females, whereas the corresponding figures for natives are 9.9 and 14.0%, respectively.

Immigrants are not only less educated than natives but they are also more often allocated to positions closer to the bottom end of the skills distribution.⁹ The recent nature of immigration to Portugal is well documented by the sample mean of the variable 'Years since migration', which proxies for time since arrival to the country: 75.8% and 70.9% of all male and female immigrants, respectively, first entered the data set 5 years or less prior to the moment they are observed in employment. The length of stay in the country is especially short for Brazilians, Chinese, and former Soviet Union citizens. Consequently, average tenure on the job is also short (2.2 and 2.4 years, respectively, for men and women), although immigrants from the former Soviet Union seem to have longer employment spells. Despite their more recent arrival, their average tenure is similar (men) or longer (women) than that of African immigrants.

⁷For a description of the composition of each nationality group, see notes to Tables A.1 and A.2 in Appendix A.

⁸See the *Serviços de Estrangeiros e Fronteiras* (SEF) 2009 annual report.

⁹Each worker is administratively assigned to one out of eight possible skill levels: top executives, intermediary executives, supervisors, highly skilled professionals, skilled professionals, semi-skilled professionals, unskilled professionals, and apprentices. Assignment is determined on the basis of the worker's qualification and the nature of the tasks being performed (Decreto-Lei 121/78).

Immigrants' employment clusters around a small number of industries. More than 50% of male immigrants work in two sectors: Construction (35.8%) and Real Estate and Services to Firms (16.4%), where temporary help agencies are included. In the case of women, employment in Real Estate and Services to Firms is also important (29.0% of all female immigrant employment), while Hotels and Restaurants (25.7%) ranks second.

Average wages earned by immigrants are 22% (men) and 17% (women) below the corresponding natives' average. Wages are especially low for the Chinese and immigrants from former Soviet Union nations. Alongside Brazilians, these are also the nationality groups that exhibit the largest shares of minimum wage earners.¹⁰

4 The magnitude of the immigrant wage gap

To measure the wage gap between migrants and natives, we first estimate by pooled OLS standard Mincerian wage equations that include a dummy variable ('Immigrant') denoting immigrant status. Our aim is to understand whether wage differences between observationally similar immigrants and natives can be attributed to the characteristics of their employers and/or of the matches they form. Although alternatives exist, we follow a vast literature that studies immigrants' earnings and other performance measures that also rely on the estimation of linear regression models that include binary controls for immigrant status. This is notably the case of Eckstein and Weiss (2004) who compare the earnings of immigrants from the former Soviet Union to Israel with those of native born Israelis, or Adsera and Chiswick (2007), who compare the earnings in the European Union of foreign borns and natives.¹¹

Thus, we focus our attention on the estimates obtained for the coefficient of the 'Immigrant' variable, starting with a parsimonious specification of the regressor set that controls only for worker characteristics (specification 1), and gradually augmenting it to include employer characteristics (specification 2), and match characteristics (specification 3).¹² Comparison of the estimates obtained for the variables of interest across specifications shows how the conditional wage difference between immigrants and natives changes when we are able to account for factors that typically are not observed from household

¹⁰ A special reference must be made to Chinese workers, as 43.6% of the men in this group and 44.8% of the women are paid at the legal minimum wage.

¹¹ Amongst those using the same approach while focusing on other performance indicators (test scores), see Kahn (2004).

¹² The set of regressors corresponding to specification 1 includes controls for the worker's age (and age squared), immigrant status, a proxy for time since arrival in the country (and the same proxy squared), schooling achievement, and time and region effects. Specification 2 further controls for three employer characteristics: size, industry, and immigrant concentration at the workplace. Finally, specification 3 adds controls for worker tenure (and tenure squared), and skill-categories. For a definition of all variables see Appendix B.

Table 1 Pooled OLS wage regression (selected estimates), 2003–2008 dependent variable: log of the real hourly wage

	OLS		
	Specification 1	Specification 2	Specification 3
Male sample			
Immigrant	−0.2864* (0.0016)	−0.1908* (0.0017)	−0.0825* (0.0015)
Years since migration	0.0142* (0.0005)	0.0109* (0.0005)	0.0053* (0.0005)
Years since migration squared	−0.0001* (0.00002)	−0.00003* (0.00002)	−0.00004*** (0.00002)
Concentration of immigrants		−0.2444* (0.0024)	−0.1888* (0.0022)
<i>N</i>	7,706,548	7,706,548	7,706,548
<i>R</i> -squared	0.438	0.490	0.590
Female sample			
Immigrant	−0.1776* (0.0017)	−0.1062* (0.0017)	−0.0440* (0.0014)
Years since migration	0.0056* (0.0006)	0.0042* (0.0005)	0.0009*** (0.0005)
Years since migration squared	0.0002* (0.00003)	0.0002* (0.00003)	0.0001* (0.00003)
Concentration of immigrants		−0.2297* (0.0028)	−0.1498* (0.0025)
<i>N</i>	6,060,863	6,060,863	6,060,863
<i>R</i> -squared	0.500	0.549	0.637

Notes: Region and time dummies included in all specifications; industry dummies included in specifications 2 and 3. For a full list of covariates and results, see Appendix C (Table 1 for men and Table 2 for women). The definition of all variables is given in Appendix B

Worker-cluster robust standard errors in parentheses

*, **, ***Significant at 1%, 5%, and 10%, respectively

survey data. All equations are estimated separately for men and women using pooled native-foreign data.¹³

Let us first consider specification 1. The estimated coefficient of the Immigrant variable is equal to -0.2864 in the case of males, and -0.1776 in the case of females (see first column of results in Table 1).¹⁴ These estimates indicate that male immigrants' earnings are, at the time of entry to Portugal, 24.9% below the earnings of natives with similar observable characteristics (16.3%

¹³Selectivity into labour force participation is a well-known problem in immigration studies, especially in the case of women. Given the nature of our data, there is nothing we can do to control for this type of selection other than estimating the models by worker fixed effects. Fixed effects estimation is not an option in this case as it would eliminate the parameter of interest because the corresponding variable—immigrant status—does not change over time. Hence, we simply acknowledge the problem and refrain from making causal interpretations of the estimates obtained with the women subsample.

¹⁴In Table 1, we report only the estimates for the coefficients of interest. The full set of results is reported in Tables C.1 and C.2 in Appendix C, for men and women, respectively.

below natives in the case of women). Even though we are not able to control for some characteristics that are included in most available studies (especially, family status), we view this specification as similar to the one more prevalent in migration studies. The estimate we obtain for male workers is between the one reported by Friedberg (2000), who finds that upon arrival, male immigrants aged 25–65 in the Israeli labour market earn approximately 25% less than natives, and the unconditional wage difference between immigrants and natives computed by Borjas (1994) using data from the US Census (32% below natives' wages in the case of immigrants arriving in the USA by 1990). Although less evidently so, our results are also consistent with those reported by Adsera and Chiswick (2007), who use data from the European Community Household Panel that allows them to control for marital status and number of children. They find that in the European Union the earnings of foreign-born men and women are 40 and 36%, respectively, lower than those of natives, which is clearly above our estimated gaps. However, we note that these authors also find that migrants in Portugal are, together with those in Germany, the ones faring the best relative to natives in Europe.

Adding controls for employer characteristics (specification 2) and match-specific characteristics (specification 3) to the set of regressors, the estimated coefficient of the Immigrant variable is reduced to -0.1908 and -0.0825 , respectively, in the case of men, and to -0.1062 and -0.0440 , respectively, in the case of women. These results imply that more than 70% of the conditional wage difference between immigrants and natives implied by specification 1 can be attributed to employer and match characteristics.

We do acknowledge, however, that the simple comparison across specifications of the estimates obtained for the coefficients of interest may be misleading, because the relationship between the Immigrant variable and a given covariate may be sensitive to the order in which other covariates are added. Because of this, to assess the relative contribution of each covariate or subset of covariates included in specification 3 to the variation of the estimate of the coefficient of the Immigrant variable across specifications, we use the Gelbach's conditional decomposition (Gelbach 2009). As compared to a simple comparison of the estimates obtained for the three specifications considered, Gelbach's procedure consistently retrieves the individual contribution of each additional variable, which is obtained conditional on all covariates. The results of implementing this procedure are reported in Table 2.

Match-specific characteristics (tenure and qualifications) account for nearly two thirds of the difference between the estimates of the coefficient of the Immigrant variable in specifications 1 and 3 (-0.2038 in the case of men, -0.1337 in the case of women). The level of qualification male immigrants are assigned to are responsible for a 0.067 log points reduction of the wages they receive, which corresponds to one third of the -0.2038 difference between the specification 1 and specification 3 estimates of the coefficient on the Immigrant status variable. Tenure explains an additional 0.0631 log points reduction of wages, which represents another third of the same difference. The corresponding figures for women migrants are -0.039 log points and 29%

Table 2 Decomposition of the immigrant-native wage gap variation between specifications 1 and 3 (contribution of covariates omitted in specification 1)

	Male sample		Female sample	
	Coefficient	SD	Coefficient	SD
Concentration of immigrants	-0.0436*	(0.0005)	-0.0278*	(0.0005)
Size	-0.0001	(0.0003)	-0.0020*	(0.0003)
Industry	-0.0300*	(0.0003)	-0.0161*	(0.0004)
Tenure	-0.0631*	(0.0005)	-0.0491*	(0.0003)
Qualification levels	-0.0670*	(0.0005)	-0.0388*	(0.0006)
Total	-0.2038*	(0.0009)	-0.1337*	(0.0010)

Notes: The figures reported in the last row ('Total') are estimates of the difference of the wage gap between immigrants and natives obtained with specifications 1 and 3 (and the corresponding robust standard errors); they are equal to the arithmetic difference between the estimated coefficients of the Immigrant variable reported in Table 1. All other figures in the coefficients' columns are interpreted as the absolute contribution of the corresponding covariate for the observed change in the estimated coefficient of the Immigrant variable from specifications 1 to 3. For details, see Gelbach (2009)

*Significant at 1%

of the estimated total wage difference (-0.1337) in the case of qualification levels, and -0.0491 and 37% of the same difference in the case of tenure. The sensitivity of the estimate of the coefficient of the immigrant status variable to the inclusion of the qualification dummies indicates that immigrants work at lower levels of the occupational ladder than similar natives working for similar employers. Considering that large-scale immigration is a recent phenomenon in Portugal, this is consistent with Eckstein and Weiss (2004), who note that upon entry to Israel immigrants from the former Soviet Union experience substantial occupational downgrading—half of the male immigrants with more than 16 years of schooling work in low-skill occupations during the first three years in Israel. Green (1999) also reports substantial occupational mobility (away from nonemployment and less skilled occupations) of immigrants during their first years of stay in Canada.

Results in Table 2 also indicate that the workplace concentration of immigrants accounts for a significant portion of the immigrant conditional wage gap—failure to account for the share of non-native workers at the workplace raises the gap by 0.044 log points which is one fifth of the full difference between the estimates obtained for the coefficient of the Immigrant variable with the base (specification 1) and full (specification 3) specifications of the male wage equation. The corresponding figure for female workers is 0.028 log points.

Specification 3 controls for an extensive set of employer characteristics, and includes region and time effects. However, we also estimated the same equation by (establishment) fixed effects (see Tables C.1 and C.2 in Appendix C). The results we obtained do not change our conclusion qualitatively. Although the conditional wage difference between migrants and natives (both males and females) is cut by approximately half when establishment fixed effects are accounted for, the conclusion remains that employer and match

characteristics are the major reasons why immigrants are paid lower wages than natives in the Portuguese labour market.¹⁵

Similarly to Aydemir and Skuterud (2008), which is the only other study of immigrants' wages that uses linked employer–employee data, we also find that the characteristics of establishments are a major determinant of the wage differential between immigrants and natives. Unlike the Canadian study, however, we also find that within-establishment wage differences also matter because, typically, at the early stages of their admission, immigrants as compared with natives are assigned to lower levels of qualifications than those warranted by their personal characteristics.

As explained above, due to data constraints we identify immigrants on the basis of nationality, not birthplace. Considering that immigration to Portugal is new, we do not expect to have a significant number of foreign nationals born in Portugal in employment by 2003–2008. However, as robustness checks on our results, we re-estimated the wage equation (specification 3) first restricting the sample to immigrants aged 25 or older, and then excluding migrants from the former Portuguese colonies in Africa and East Timor, which is the group with a longer record of migration to Portugal. The results are very much in line with those reported in Table 1. Excluding workers aged less than 25, the estimated coefficients of the Immigrant dummy variable are statistically significant at the conventional levels and equal to -0.1014 for men and -0.0565 for women, slightly above the estimates obtained with the full sample. Excluding immigrants from the Portuguese colonies, the estimated coefficient of the Immigrant dummy decreases slightly in the case of men (-0.075) and remains unchanged in the case of women (-0.047).¹⁶

Especially for males, the penalty on the wages of immigrants is not constant over the wage distribution. The results obtained by estimating quantile wage regressions adopting the same specification as specification 3 in Table 1 indicate that the wage penalty received by male immigrants increases steadily over the entire distribution of wages, from a minimum of 0.05 at the first decile to a maximum of 0.10 at the ninth decile—Fig. 2.¹⁷ For women, although the wage penalty increases slightly from the third to the eighth percentiles, the overall pattern is essentially flat.

The fact that immigrants do relatively better at the lower end of the wage distribution may be attributed to mandatory minimum wage rules that

¹⁵Our results are also consistent with those that would be obtained by computing the Oaxaca–Blinder decomposition of the raw wage differential between migrants and natives. Although the focus of this article is not on measuring wage discrimination against migrants, we note that if we account for all the observable characteristics of workers, employers, and matches included as covariates in specification 3, the Oaxaca–Blinder procedure would attribute 76% of the wage differential between male immigrants and natives (85% in the case of women) to differences in characteristics. Gelbach's procedure, which produced the results in Table 2, actually nests the Oaxaca–Blinder decomposition.

¹⁶The full set of results with the restricted samples are available from the authors upon request.

¹⁷Throughout, we refer to the immigrants' wage penalty as the absolute value of the coefficient of the immigrant status dummy variable in the wage equation.

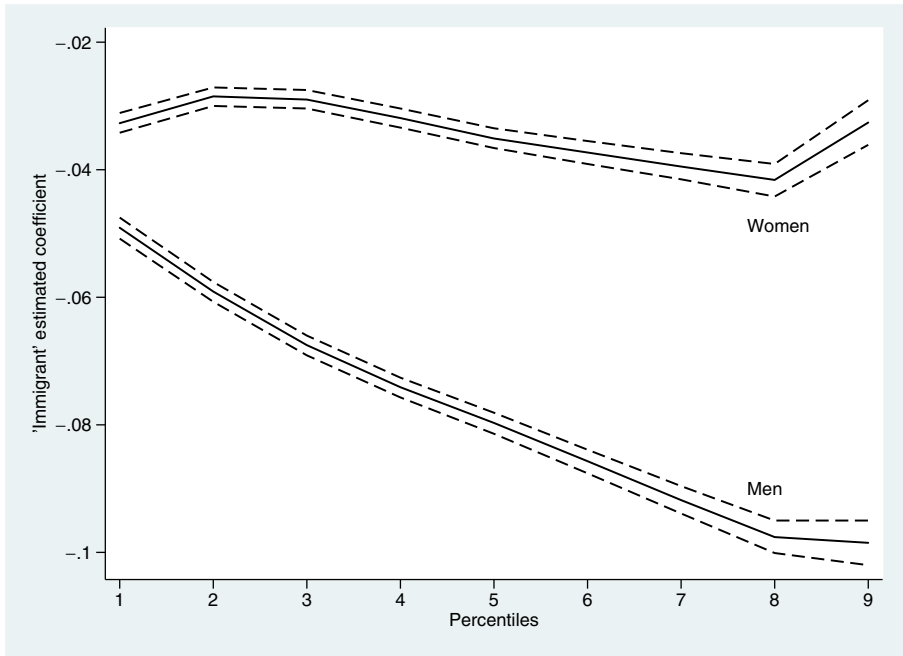


Fig. 2 Estimated immigrants' wage penalty—quantile regression. Note: The *solid lines* depict, at different deciles, the estimates obtained by quantile regression for the coefficient of the variable denoting immigrant status in a wage equation specified as in specification 3 in Table 1 (dependent variable: log of the real hourly wage) and estimated on pooled native-migrant samples. *Dotted lines* represent the width of the confidence interval at 95%

have been in place in Portugal since as early as 1974 and that are actually binding in terms of both wages and employment opportunities (Portugal and Cardoso 2006; Pereira 2003). Immigrants are, in fact, over-represented amongst minimum wage earners in the Portuguese labour market—7.6% of all male migrants (11.7% of females) are paid at the legal minimum (for natives the corresponding figures are 4.4% and 8.6%, respectively)—see Tables A.1 and A.2 in Appendix A.

5 Workplace concentration of immigrants and wages

Results in Table 1 also show that the concentration of immigrants at the establishment has a significant effect on wages.¹⁸ From specification 3 we

¹⁸Immigrant concentration at the level of the establishment is measured as the log of the share of workers in the establishment that are non-national citizens. To minimize potential endogeneity problems we use the first lag of this variable measured at the establishment level, meaning that for worker i in establishment j in year t the immigrant concentration variable measures the proportion of immigrant workers in establishment j in year $t - 1$ even if worker i was working at a different establishment in year $t - 1$ or he or she had not entered the country at that time.

conclude that the estimated effect of a 1% increase in the proportion of the establishment's workforce who are non-nationals reduces wages by 0.19% in the case of male workers (0.15% for female workers). Still, the magnitude of this effect also varies considerably across the wage distribution—it is minimum (in absolute value) at the first decile and increases until the seventh decile for both men and women (Fig. 3). For men, the effect of immigrant concentration at the workplace declines in absolute value from the seventh decile on whereas for women it remains constant.

There are two reasons why a greater presence of immigrants in the workplace may bring about a reduction in wages. The first is a standard compensating wage differential type of argument. Immigrant workers may be willing to pay to work with other immigrants. To the extent that these co-workers have the same national origin or cultural background, several factors can explain why immigrants would be willing to accept lower wages to work in such environments, ranging from (workplace) ethnic goods (common language, working habits, etc.) to search economies or herd behaviour.

However, the same result is also consistent with a discrimination-crowding explanation. According to this explanation immigrants earn lower wages

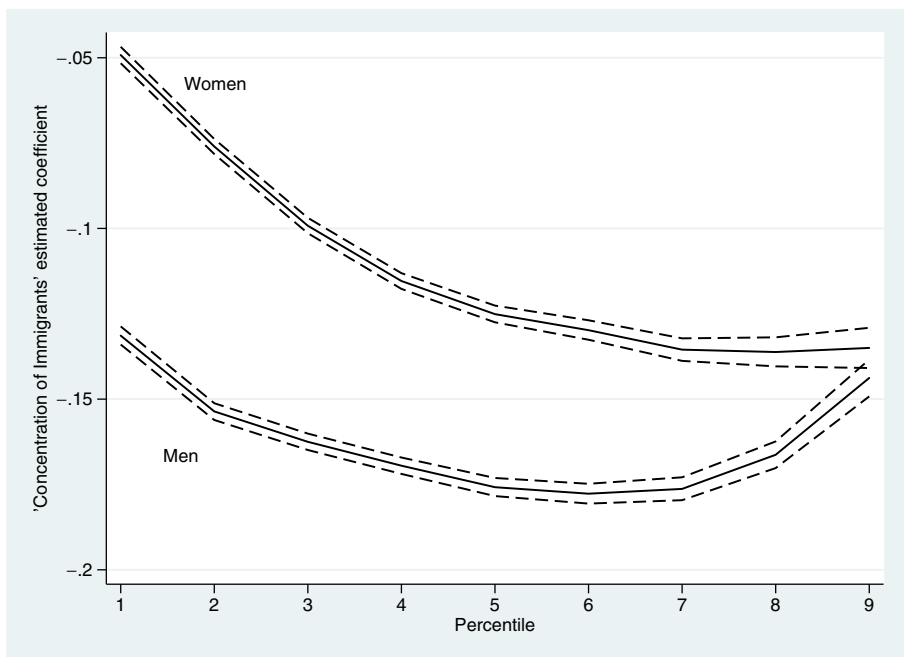


Fig. 3 Estimated coefficient of the variable ‘concentration of immigrants’—quantile regression. Note: The *solid lines* depict, at different deciles, the estimates obtained by quantile regression for the coefficient of the variable ‘concentration of immigrants’ in a wage equation specified as in specification 3 in Table 1 (dependent variable: log of the real hourly wage) and estimated on pooled native-migrant samples. *Dotted lines* represent the width of the confidence interval at 95%

Table 3 Pooled OLS wage regression (selected estimates), 2003–2008 Dependent variable: log of real hourly wage

	Immigrants	Natives
Male sample		
Concentration of immigrants	-0.1832* (0.0031)	-0.2008* (0.0028)
<i>N</i>	425,760	7,280,788
<i>R</i> -squared	0.502	0.592
Female sample		
Concentration of immigrants	-0.0976* (0.0041)	-0.1974* (0.0030)
<i>N</i>	258,743	5,802,120
<i>R</i> -squared	0.548	0.640

Notes: Region, industry, and time dummies included in both regressions. For a full list of covariates and results, see Appendix D. The definition of all variables is given in Appendix B

Worker-cluster robust standard errors in parentheses

*, **, ***Significant at 1%, 5%, and 10%, respectively

because they work in specific occupations and/or for specific employers. Segregation occurs for several reasons. Discriminatory behaviour by employers is one of them. But statistical discrimination or discriminatory behaviour by fellow employees are equally admissible causes of the same result. Statistical discrimination in particular is consistent with a number of stylized facts in the literature on the economic assimilation of immigrants, most notably the fact that immigrants' entry into host labour markets is made more difficult when the cultural distance between home and host countries is greater and the fact that the imperfect portability of human capital across countries reduces wages immediately upon arrival in the country, with some part of the gap being closed after a few years of stay. Note that the statistical discrimination hypothesis crucially depends on the assumption that employers' ability to screen workers varies across groups (cultural distance making screening more difficult) and it implies that the greatest impact of this type of discrimination is on entry-level wages.

Additional insight into the source of the negative causality between workplace concentration of immigrants and immigrants' wages can be obtained from the estimation of the wage equation (specification 3) with all-immigrant and all-native subsamples separately. The estimates we obtained for the coefficient of the 'concentration of immigrants' variable are reported in Table 3.¹⁹

The first thing to notice from Table 3 is that the estimated coefficient of the variable 'Concentration of Immigrants' in the immigrants' equation is indeed negative and significant. The estimated wage of male immigrant workers drops off 0.18% for a 1% increase in the share of non-national

¹⁹Full results are presented in Appendix D.

workers in the establishment. The corresponding estimated effect for female immigrants is 0.10%. This result is insufficient to tell us whether this is due to the compensating wage differential mechanism or if it has a discrimination interpretation.

However, as seen from the second column of Table 3, the estimated coefficient for the same variable in the native workers equation—male or female—is also negative and statistically significant. This result rules out the compensating differential interpretation, as there is no reason to expect native workers to be willing to accept substantial wage reductions to work with non-native fellow workers.²⁰

These results are inconsistent with the compensating wage differential interpretation, as both immigrants' and natives' pay diminish with the share of immigrants at the workplace. Besides, compensating wage differentials are equilibrium outcomes that are less likely in a labour market where large-scale immigration is a recent phenomenon. On the contrary, discrimination-driven wage differentials are a disequilibrium outcome and because of that they are more likely in situations such as that of immigrants in the Portuguese labour market. Results in Table 3 rule out employee discrimination, as this would imply a positive (not negative) sign for the coefficient of the immigrant concentration variable in the native wage equation. Hence, our results indicate that the reason immigrants receive wages lower than those received by otherwise similar native workers is because they are working for different employers, employers that pay lower wages to all their workers, immigrants or natives.²¹ Therefore, we conclude that the wage penalty immigrants receive is the immediate result of their concentration in the low pay sector of the economy, i.e., establishments that pay low wages after controlling for the industry and the region. The concentration of migrants is an empirical implication of referral-based job search networks. In particular, Dustmann et al. (2011), e.g., show that the probability that a minority worker is hired by a certain employer increases with the share of existing minority workers already working for the same employer. Similar to Aydemir and Skuterud (2008), we also find that the detrimental effect of migrants' sorting across workplaces is stronger amongst men than women migrants.

²⁰Nepotism, i.e., a positive preference for co-workers belonging to minority groups, could arguably have produced the same effect, but the estimated coefficients are far too large to believe that this is the case. In any case, nepotistic behaviour is less common among low-wage workers. This type of behaviour is more frequently referred to (although not in the context of wage studies) amongst highly skilled white-collar workers in intellectual or scientific occupations. The results of quantile regression estimation (Fig. 3) indicate otherwise—the magnitude of the effect of workplace concentration for the pooled sample of natives and immigrants increases in absolute value as we move to the right of the wage distribution.

²¹The establishment fixed effects results presented in Appendix C corroborate this idea. Actually, when an establishment fixed effect is added to specification 3, the immigrant wage penalty is reduced by around 0.04 log points for men and 0.02 log points for women.

Two further pieces of evidence can be advanced in support of the same interpretation. The first are the results obtained for the same specification of the wage equation when we control for nationality groups. The compensating wage differential explanation is less likely to hold when the immigrant belongs to a nationality group with a cultural background similar to natives. Native language being the single most important factor determining the proximity between origin and destination, we would expect that workers originating from the former Portuguese colonies in Africa (including East Timorese in this group) and from Brazil to be the least prone to seek proximity to other immigrants, and for that reason to accept lower wages to work with similar immigrants. This is not what we observe.

The distribution of immigrants originating from the former Portuguese colonies in Africa, East Timor, and Brazil across workplaces with varying levels of immigrant concentration does not differ markedly among themselves or from the distribution of the entire population of immigrants working in the Portuguese territory (see Fig. 4 and Tables A.1 and A.2 in Appendix A), even if African immigrants seem to cluster in more immigrant-populated workplaces than do Brazilian immigrants (the average proportion of immigrants in

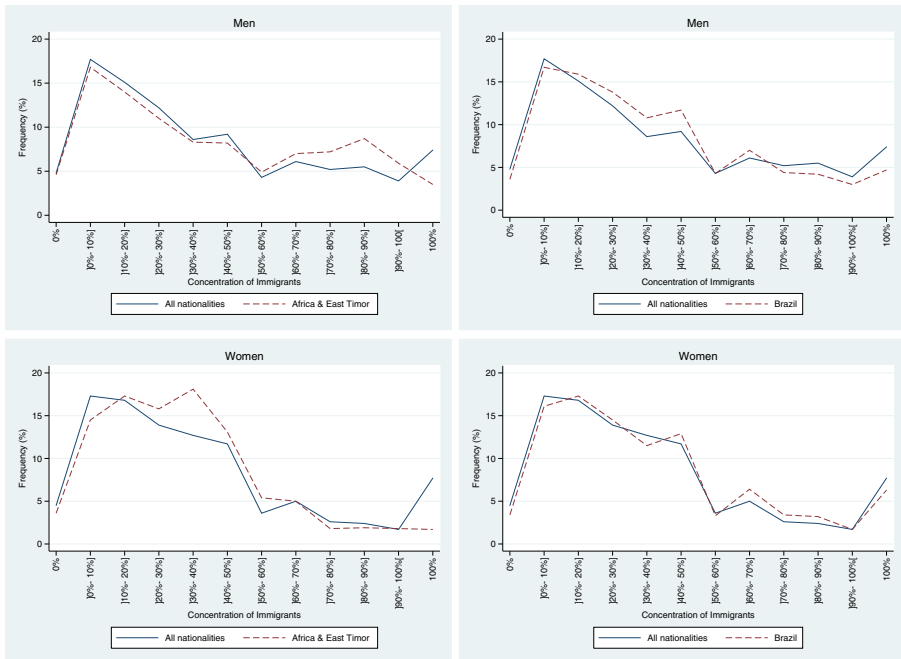


Fig. 4 Distribution of African and E. Timorese, and Brazilian workers across establishments with varying concentration of immigrants. Note: The x-axis measures the percentage of immigrants in the establishment, using intervals of similar (10 percentage points) width plus two mass points (0% and 100%)

Table 4 Pooled OLS wage regression (selected estimates), 2003–2008
Dependent variable: log of real hourly wage

	Men	Women
Concentration of immigrants (CIMIG)	-0.46826*	-0.14833*
Former USSR	(0.02247)	(0.02102)
Africa and East Timor	-0.34288*	-0.22054*
	(0.00822)	(0.00731)
Brazil	-0.32338*	-0.18855*
	(0.00847)	(0.00746)
China	-0.27691*	-0.18737*
	(0.00872)	(0.00753)
Other nationalities	-0.38857	-0.23908*
	(0.01935)	(0.01619)
CIMIG × former USSR	-0.28819*	-0.15706*
	(0.00902)	(0.00854)
CIMIG × Africa and East Timor	0.36875*	0.11306*
	(0.02294)	(0.02192)
CIMIG × Brazil	0.30005*	0.03125*
	(0.02319)	(0.02193)
CIMIG × China	0.30506*	0.06340*
	(0.02358)	(0.02200)
CIMIG × other nationalities	0.35643*	0.09844*
	(0.03471)	(0.03076)
	0.25532*	0.02800*
	(0.02389)	(0.02470)
<i>N</i>	425,760	258,743
<i>R</i> -squared	0.519	0.561

Notes: Region, industry, and time dummies included. Results obtained separately for the samples of all male and all female immigrants. Country and group of countries variables are dummy variables equal to one if the migrant originates in that part of the world. Worker-cluster robust standard errors in parentheses
*, **, ***Significant at 1%, 5%, and 10%, respectively

workplaces where African men are working is 37.4%, for Brazilian males the same average proportion is 30.8%).²²

By looking at the distribution of the share of immigrants at the workplace for these two groups it becomes apparent that the observed differences in the means are due to differences in the upper tail of the two distributions—a smaller share of Brazilians than of other immigrants work in establishments where foreign workers account for more than 70% of the total, whereas the opposite is true for immigrants originating in Africa and East Timor—a greater share of them work in establishments with more than 50% of immigrants. Results in the case of women immigrants are less clear.

Although the distribution of Brazilian and African immigrants across workplaces is not totally coincident (closer to what is warranted by cultural proximity in the case of male Brazilians), we do not find any evidence of either group being willing to pay less to work with other immigrants as would be implied by most existing studies on ethnic segregation and cultural proximity.

Running the same immigrant wage regressions as in Table 3 but including dummy variables for nationality groups and interaction terms between the latter and immigrant concentration (the omitted category is EU14) we find, for both genders, that the two Portuguese-speaking groups are the ones, besides

²²For women, the average share of immigrants in the workplace is 30.1%, 29.0% for the Africa and East Timor group, and 28.8% for the Brazilian group.

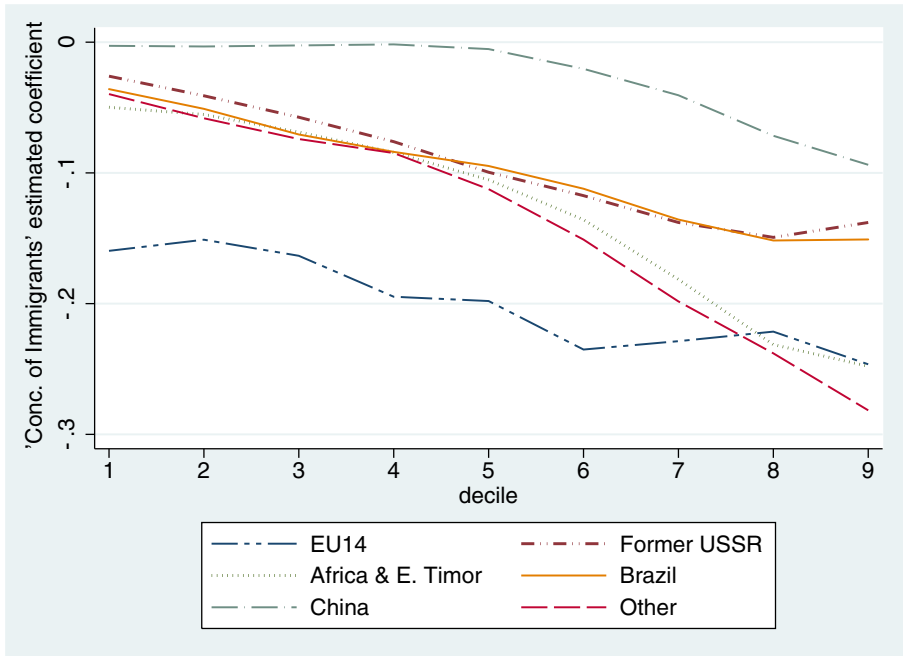


Fig. 5 Estimated coefficient of the ‘concentration of immigrant’ variable, by nationality group—quantile regression (men). Note: Each line depicts, at different deciles, the estimated coefficient of the variable ‘concentration of immigrants’ on a wage equation specified as specification 3 in Table 1 (dependent variable: log of the real hourly wage) obtained by quantile regression on subsamples of male immigrants defined by nationality groups

the residual group, for which we observe a greater reduction in wages when the share of immigrants at the workplace increases (Table 4).

There is also information contained in the pattern of variation over the wage distribution of the estimated coefficient of the ‘concentration of immigrants’ variable if quantile wage regressions are estimated separately for each nationality group. The results concerning the variable of interest are plotted in Fig. 5.²³

With the exception of the Chinese, all nationality groups exhibit a pattern of variation of the estimate for the variable ‘Concentration of immigrants’ consistent with the one corresponding to the entire group of immigrants (see Fig. 3).²⁴ It follows from existing theories of socio-behavioural processes that in a society where members are ranked according to a quantitative characteristic such as income and which has two (or more) subgroups based on nationality or

²³We report only the results for males.

²⁴For Chinese immigrants the estimate is not statistically significant at the 1% level up to the fifth decile, even though this can be due to the fact that this is the group with the smallest usable sample (5,845 observations). The size of each nationality subsample is the same as the total number of observations reported in Table A.1 (Appendix A).

ethnicity for example, the bottom subgroup is less devoted to its own subgroup than the top subgroup (see Jasso 2008). Hence, one might expect that as we approach the top end of the wage distribution individuals would become less willing to pay to work with members of the same subgroup. Figure 5 shows that for all, except for Chinese immigrants, this is not the case. For all those nationality groups (and especially for immigrants originating from former Portuguese colonies) the wage penalty associated with working with other immigrants increases over the wage distribution. This is yet another piece of evidence that works against the compensating differential interpretation of our result.

6 Conclusions

Portugal's history as a destination for international migrants is recent. Still, our results indicate that the magnitude of the migrant-native wage gap in Portugal is similar to what has been reported for other countries with a longer hosting record.

The size of the wage difference between migrants and natives is, however, very sensitive to the content of the regressor set. Immigrants are assigned to lower levels of qualifications than similar natives working for similar employers. Occupational downgrading and the absence of match-specific human capital explain two thirds of the conditional wage difference between migrants and natives estimated from a wage equation that controls only for worker characteristics, as is standard in the migration literature.

As predicted by search models based on social networks and job referrals, immigrants are attracted to workplaces where other migrants are already present, which adds an extra penalty to their wages. This penalty on immigrants' wages is fully explained by non-random sorting across workplaces. The more immigrant crowded the workplace is, the lower is the wage that migrants receive. However, we find that this result also holds for natives, meaning that migrants cluster in the low pay sector of the economy. As a result, we conclude that their lower wages are also due to selection into low pay establishments.

Quantile regression results further indicate that both the migrant-native wage gap and the detrimental effect of the workplace concentration of immigrants on their wages are minimized at the bottom end of the wage distribution. We speculate that this is due to binding minimum wage rules, as immigrants are over-represented within the group of minimum wage earners.

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