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Osea Giuntella
Fabrizio Mazzonna
Catia Nicodemo
Carlos Vargas Silva

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Osea Giuntella
University of Pittsburgh and IZA

Fabrizio Mazzonna
Universita' della Svizzera Italiana and MEA

Catia Nicodemo
University of Oxford, CHSEO and IZA

Carlos Vargas Silva
University of Oxford and COMPAS

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IZA

P.O. Box 7240
53072 Bonn
Germany

Phone: +49-228-3894-0
Fax: +49-228-3894-180
E-mail: iza@iza.org

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ABSTRACT

Immigration and the Reallocation of Work Health Risks

This paper studies the effects of immigration on the allocation of occupational physical burden and work health risks. Using data for England and Wales from the Labour Force Survey, we find that, on average, immigration leads to a reallocation of UK-born workers towards jobs characterized by lower physical intensity and injury risk. The results also show important differences across skill groups. Immigration reduces the average physical burden of UK-born workers with medium levels of education, but has no significant effect on those with low levels.

JEL Classification: J61, I10

Keywords: immigration, labor-market, physical burden, work-related injuries, health

Corresponding author:

Osea Giuntella
University of Oxford
Nuffield College
Blavatnik School of Government
1 New Road
OX11NF, Oxford, Oxfordshire
United Kingdom
E-mail: osea.giuntella@nuffield.ox.ac.uk

1 Introduction

The classical model of labor demand and supply suggests that immigration has a negative effect on the wages and employment of the residents of the host country (Borjas, 2014). However, most studies have found little empirical support for this effect. Previous studies suggest that this lack of evidence could be explained by differences in comparative advantage between immigrant and native workers. Immigrants have a comparative advantage in manual-intensive jobs, while native workers have an advantage in communication-intensive jobs due to better language skills. An expansion in the supply of immigrants increases the relative returns to communication-intensive jobs pushing native workers towards those jobs (Peri and Sparber, 2009; D'Amuri and Peri, 2014; Ottaviano et al., 2013; Peri, 2012).

We extend this literature by exploring if these labor market adjustments lead to a reallocation of natives occupational physical burden and occupational health risks (i.e. injury risk). We also test if the effects of immigration are similar for natives with different levels of education, occupation and gender.

In order to provide this evidence we use 2003 to 2013 data for England and Wales from the Labour Force Survey (LFS). The consequences of immigration on the British population have been at the centre of the political and academic discussion in the country (Dustmann et al., 2013; Giuntella et al., 2016; Dustmann et al., 2010; Dustmann and Frattini, 2014; Sá, 2015; Bell et al., 2013). According to the 2011 Census there were 7.5 million foreign-born persons living in England and Wales corresponding to 13.4% of the population. Close to 40% of these immigrants arrived from 2004 onwards, many of them from the new EU member states. Immigrants represented over 10 percent of the population in a quarter of local authorities in England and Wales (Figure 1).

The increase in immigration in the UK has been accompanied by a decrease in UK-born workers' average physical burden, injury rates (Figure 2) and share of high-physically demanding jobs held by UK-born workers (Figure 3). However, there is no literature on the impact of immigration on working conditions and occupational risk of UK natives.

We exploit spatial and temporal variation in the share of immigrants residing across local authorities. To address the concern that immigration may be endogenous to labor market demand

and correlated with unobserved determinants of working conditions and work health risks, we used an instrumental variable approach exploiting the correlation between immigrant inflows and historical concentration of immigrants across local authorities in England and Wales (Bell et al., 2013; Sá, 2015). Furthermore, using retrospective information on worker's occupational characteristics, we analyse the effects of immigration on occupational changes at the individual level. Examining individual labor market transitions allows controlling for individual time invariant characteristics. This exercise strengthen the causal interpretation of our results mitigating the concern that our identification strategy may be confounded by spillover effects and internal mobility (Borjas et al., 1996; Borjas, 2003).

Our results suggest that immigration pushes UK-born workers towards jobs characterized by lower physical intensity and injury risk. The effects are particularly large for UK-born males with medium levels of education holding physically demanding jobs. These workers have lower search and training costs for new jobs and can take advantage of the increased demand for communication-intensive jobs induced by the inflow of immigrants. Consistent with these findings, immigration also reduces the average occupational risk for natives with medium levels of education.

This paper is organized as follows. Section 2 provides a discussion of the data, the empirical specification, and the identification strategy. Section 3 presents the main results of the paper. Section 4 presents the robustness checks. Concluding remarks are given in Section 5.

2 Data and empirical specification

2.1 Data

The main dataset is the special license version of the LFS from 2003 to 2013. The sample is limited to employed individuals between 20 and 59 years of age. The information on country of birth and location is used to construct an indicator of the immigrant (i.e. foreign-born) share of the population by local authority. The ISCO classification and the General Index for Job Demands in Occupations constructed by Kroll (2011) is used to create variables (1 to 10 metric) for the average physical of a given job. Workers are also classified according to major occupations (1-digit), identify blue- and white-collar workers using standard OECD classifications and created

two indicators for jobs with high physical burden (above median) and very high physical burden (highest quartile).

The special license of the LFS is combined with the standard version to measure work-related risks. The special license does not include information on work-related injuries. This information is available in the standard version, but this version does not contain information on the individual's local authority of residence. In order to analyse the relation between immigration and actual injury rates across local authorities, we constructed an index of occupational risk based on injury rates by occupation, pooling data from 2003 to 2013. Those occupations with an injury rate above the median are categorised as risky.[1] In the Appendix, we consider alternative metrics on injury risk based on the number of days before resuming work after an injury or considering the likelihood of working in occupations in the highest quartile of injury risk.

We also explore differences in the impact of immigration on natives with different levels of education. Natives are divided in three educational groups. The "high education" group refers to those with a university degree or equivalent. The "medium education" group refers to those with a high school degree or equivalent, including GCE, A-level and GCSE grades A*-C. Finally, the "low education" category refers to those natives with no qualifications or qualifications below the ones included in other categories.

Descriptive statistics for the outcomes and covariates are reported in Table 1. Previous studies suggest that as immigrants are positively selected on health they have incentives to self-select into more strenuous jobs (Giuntella and Mazzonna, 2015) and are more likely to hold risky jobs (Orrenius and Zavodny, 2012). Table 2 reports immigrant-native differences in the likelihood of working in physically intensive jobs (1 to 10 measure) by gender. All estimates include standard demographic controls (a quartic in age, marital status, and number of children), year and local authority fixed effects. Immigrants are significantly more likely to hold jobs characterised by higher physical intensity (column 1). With respect to the mean, immigrants are 11% more likely to hold jobs in the upper quartile of the physical burden index distribution (*physical burden* > 7, see column 3). The coefficients are smaller, but the differences remain significant when controlling for education (columns 2 and 4). With respect to the mean, immigrants are 5% more likely to hold high physical intensive jobs than natives with similar levels of education.

[1] Examples of occupations with high/low physical burden and injury rate are reported in Table A.1.

The native-immigrant difference is even more striking when focusing on women. With respect to the mean of the dependent variable, foreign born women are 53% more likely to be employed in high physically intensive occupations. However, this is due to the relative low percentage of native women working in physical demanding jobs (only 12% of native women work in high physical demanding jobs vs. 30% of native men). For this reason, in most of the analysis we focus primarily on men.

Table 3 shows differences in occupational risk and individual likelihood of experiencing an injury between natives and immigrants. In the first two columns, we estimate the native–immigrants difference in occupational risk (continuous variable and above median indicator). Given the higher share of immigrants in physical demanding jobs (see Table 1), it is unsurprising that we find that immigrants are more likely to work in occupations with a higher injury risk. At the same time, using information on self-reported injuries, we show that immigrants are less likely to report an injury (column 3) and that this result holds when we compare immigrants and natives in the same occupational category (column 4).

The fact that immigrants tend to report lower injury rates, despite being more likely to work in high-risk occupations, suggests that a reallocation of risks from natives to healthier immigrants may reduce overall injury rates and related health care costs.

2.2 Empirical Specification

To identify the effect of immigration on job physical burden and occupational risk we exploit variation over time in the share of immigrants living in each local authority between 2003 and 2013. The estimate empirical model is as follows:

$$Y_{ilt} = \alpha + \beta S_{lt} + X'_{ilt}\gamma + Z'_{lt}\lambda + \mu_l + \eta_t + \epsilon_{ilt}, \tag{1}$$

where Y_{ilt} is a metric of job physical burden or occupational risk of individual i, in local authority l at time t; S_{lt} is the share of immigrants in local authority l at time t; X_{ilt} is a vector of individual characteristics; Z_{lt} is a vector of time-varying characteristics at the local authority level (employment rate, log of average wage, share of White, Asian, and Black population, share of individuals with low, medium, and high education, share of female population), and μ_l and

η_t are local authority and year fixed effects, respectively; and ϵ_{ilt} captures the residual variation.

Immigrants might endogenously cluster in areas with better economic conditions and have an impact on natives' internal mobility (e.g., Borjas et al., 1996; Borjas, 2003). We adopt the traditional "shift share" instrumental variable approach (Altonji and Card, 1991; Card, 2001; Bell et al., 2013; Sá, 2015) to address this endogeneity. This approach exploits the fact that immigrants tend to locate in areas with higher densities of individuals from their same country of origin.

The annual national inflow of immigrants from each country across local authorities is distributed according to the concentration of foreign-born individuals in the 1991 UK Census, reducing the bias from endogeneity.

Define F_{ct} as the total population of immigrants from country c residing in England and Wales in year t and s_{cl1991} as the share of that population residing in local authority l in year 1991. We then construct $\hat{F}_{clt}$, the imputed population from country c in local authority l in year t, as follows:

$$\hat{F}_{clt} = s_{cl1991} * \Delta F_{ct} + F_{cl1991} \tag{2}$$

and the imputed total share of immigrants $\hat{S}_{lt}$ in local authority l in year t will be:

$$\hat{S}_{lt} = \sum_{c} \hat{F}_{clt} / P_{l,1991} \tag{3}$$

where $P_{l,1991}$ is the total population in local authority l in 1991. Thus, the predicted number of new immigrants from a given country c in year t in local authority l is obtained by redistributing the national inflow of immigrants from country c based on the distribution of immigrants across local authorities in 1991. Adding data for all countries of origin, it is possible to obtain a measure of the predicted total immigrant inflow in each local authority and use it as an instrument for the actual share of immigrants. We consider nine foreign regions of origin: Africa, Americas and Caribbean, Bangladesh and Pakistan, India, Ireland, EU-15, Poland, and other countries.

One potential threat to the validity of this approach is that the instrument cannot credibly address the resulting endogeneity problem if the local economic shocks that attracted immigrants persist over time. However, this problem is substantially mitigated by including local authority fixed effects and by controlling for time-varying characteristics at the local authority. Thus,

it is reasonable to assume that past immigrant concentrations are not correlated with current unobserved local shocks that might be correlated with job physical burden and occupational risk. In other words, the exclusion restriction holds under the assumption that—after controlling for local authority and year fixed effects, and local authority time-varying characteristics— the imputed inflow of immigrants is orthogonal to the local specific shocks and trends in labor market conditions.

We also present evidence exploiting retrospective information on worker's occupational characteristics. Since 2003 the first quarter of the standard LFS collects information on respondents' occupation in the previous year. This allows us to analyse the effects of immigration on occupational changes at the individual level. By removing any individual time invariant characteristics and following the worker wherever he/she moves we can address the concern about the potential spillovers on other labor markets due to spatial arbitrage (Borjas, 2003).

We test the robustness of our results to a change in the geographical unit using a higher level of aggregation to address the concern that our results may be biased by the effects of immigration on native internal mobility (Borjas et al., 1996). We also show that our results are robust to the inclusion local authorities specific time trends. Finally, a placebo test is conducted to analyse the effects of immigration on past trends in occupational physical burden and injury risk and find no evidence of significant correlations.

3 Main Results

3.1 Physical burden

Table 4 reports on the relationship between immigration and the physical burden associated with a given occupation. In Panel A, we restrict the analysis to UK-born male workers. A 10 percentage point increase in share of immigrants in a local authority (one standard deviation) reduces the average physical burden of native males by 0.25 points (column 1), which corresponds to a 0.09 standard deviation. This is a reduction of 5% with respect to the mean of the dependent variable. These effects are larger when we focus on the likelihood of being employed in a highly physically intensive job. A 10 percentage point increase in share of immigrants reduces the likelihood of male natives to work in a job in the upper quartile of the physical burden distribution

by a 15% effect with respect to the mean (column 2).

The effects are smaller when focusing on women (Panel B). A 10 percentage point increase in share of immigrants in a local authority (one standard deviation) reduces the average physical burden of native females by 0.13 points (column 1), which corresponds to a 0.06 standard deviation. Again, these results are not surprising given the low number of native women working in these jobs. For this reason, henceforth we focus on the results on UK-born men, but we report results for UK-born women in the Appendix.

Table 5, shows that the effects are largely concentrated among men with medium levels of education.[2] For male native workers with a medium level of education, a 10 percentage point increase in share of immigrants (one standard deviation) would lead to a 0.14 standard deviations reduction in physical intensity (column 3).

We also find some evidence of a reduction in physical burden (0.06 standard deviations) for men with high levels of education (column 2). On the other hand, there is no effect for those with low levels of education.

These results indicate that immigration reduces the physical burden of those with medium level of education who may be overqualified for a physically intensive job. Individual with low re-training costs are those who are more likely to be pushed towards less physically intensive jobs as a response to immigration (Orrenius and Zavodny, 2010). This intuition is confirmed by the evidence reported in Table 6, which considers information on previous year occupation (available for the second quarter of each year in the LFS). Panel A examines the effect of immigration on the likelihood that a native man will switch to a less physically intensive job. As expected there is a large and statistically significant effect among individuals with medium levels of education previously working in blue collar jobs (column 5). A 10 percentage point increase in the share of immigrants increases the likelihood of moving to an occupation with lower physical intensity by a 0.1 standard deviation (approximately a 30% effect with respect to the mean). On the contrary, the same change in the immigrant share would reduce the likelihood of moving to a less physically intensive job by a 0.09 standard deviation (a 40% reduction with respect to the

[2]The heterogeneity of results by educational groups is consistent with recent findings on the effects of immigration on wages showing that the impact of immigration can be different along the wage distribution (Dustmann et al., 2013). Consistent with previous literature, we find no evidence of significant effects on wages (Table A.5). While not precisely estimated the coefficient on wages is negative and (larger) in absolute value when focusing on the low-skilled who are more likely to suffer immigrant competition.

mean of the dependent variable) for those with low levels of education. Panel B reports similar effects when we use the absolute change in the physical intensity measure between the previous and current year as the dependent variable.

3.2 Occupational risk

We now turn to investigate whether the reallocation of physical burden induced by immigration affects occupational risk. Table 7 shows that an increase in the share of immigrants living in a local authority is associated with a reduction in the likelihood of being employed in a riskier occupation. A 10 percentage point in the share of immigrants is associated with a 0.08 standard deviation reduction in the likelihood of native men working in an occupation with an injury rate higher than the median (a 7% effect with respect to the sample mean). Again, the effect is only significant for those with medium levels of education.[3]

4 Robustness Checks

To address the concern that results may be biased by the effects of immigration on internal native mobility, we check the robustness of our results to changing the geographical unit of analysis to UK regions.[4] The coefficients on physical burden (column 2, Table 8) remain substantially unchanged compared to the local authority units (columns 1 and 3). Note that all the estimates include socio-demographic controls and year fixed effects.[5]

In Table 9, we conduct a placebo test to check if the results are driven by pre-existing trends affecting immigration and occupational physical burden and injury risk. As in Foged and Peri (2016), we explore whether the 2004–2013 change in the instrument (the predicted change in the share of immigrants) is correlated across local authorities with the pre-treatment trends in physical burden and occupational injury rate. More specifically, using data from the 1991 UK Census,

[3] As shown in the appendix, we obtained similar results for the impact of immigration on the likelihood of working in occupations in the highest quartile of injury risk (Panel A, Table A.3) or considering as an alternative metric the number of days before resuming work after an injury (Table A.4).

[4] The LFS contains information on region of usual residence. England and Wales are divided in 17 regions: Tine and Wear, South West, Rest of Northern Region, West Midlands (Metropolitan), South York Shire, Rest of West Midlands, West Yorkshire, Greater Manchester, Rest of Yorkshire and Humberside, Merseyside, East Midlands, Rest of North West, East Anglia, and Wales.

[5] The regional estimations do not include regional fixed effects as there is not enough variation when using both year and regional fixed effects.

we computed the average job physical intensity by local authority as of 1991. The predicted change in the share of immigrants across local authorities between 2004 and 2013 is regressed on changes in our outcomes of interest between 1991 and 2003. As there is no information on occupational injuries for 1991, the analysis is repeated for occupational injury risk analysing the difference in occupational injury rates between 2003 and 2004. All estimates include controls for average age, and share of individuals with high and medium education.

Column 1 shows no significant relationship between future immigration inflows and pre-existing trends in physical burden. Similarly, columns 2 and 3 report results from regressions of the change in the share of immigrants across local authorities between 2004 and 2013 on changes in physical intensity and occupational injury rate between 2003 and 2004. Again, there is no significant relationship between the change in immigration observed between 2004 and 2013 and pre-trends in our outcomes of interest. Overall, these results provide support to a causal interpretation of our main results.

Finally, since the burden associated with each occupation might be multidimensional, we also consider the psycho-social burden of a given job (Kroll, 2011). However, the results reported in Table A.6 show that there is no evidence of significant effects on psychological burden.

5 Conclusions

This article contributes to previous studies on the labor market effects of immigration by estimating its impact on the physical burden and work-related health risk of UK-born workers in England and Wales from 2003 to 2013. The results suggest that immigration reduces the average physical burden of native workers. However, the mean effects mask important differences along the skill distribution. Immigration significantly reduces the average physical burden of native workers with high or medium levels of education and has no significant impact on those with low levels of education.

Our results are consistent with the existence of imperfect substitution between immigrant and native workers and the observation that immigrants have a comparative advantage in self-selecting into more strenuous jobs. The inflow of workers with a comparative advantage in manual tasks increases the demand for and returns to communication-intensive ones. This in-

crease in returns leads individuals with low re-training costs (medium and high-skilled) towards jobs that are less physically intensive and involve lower injury risks.

These findings together with the evidence that immigrants report lower injury rates than natives in holding jobs with the same injury risk suggest that the reallocation of tasks may result in less injuries and lower health care costs.

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Figure 1: Share of Foreign-born Individuals across England and Wales Local Authorities, UK Census 2011

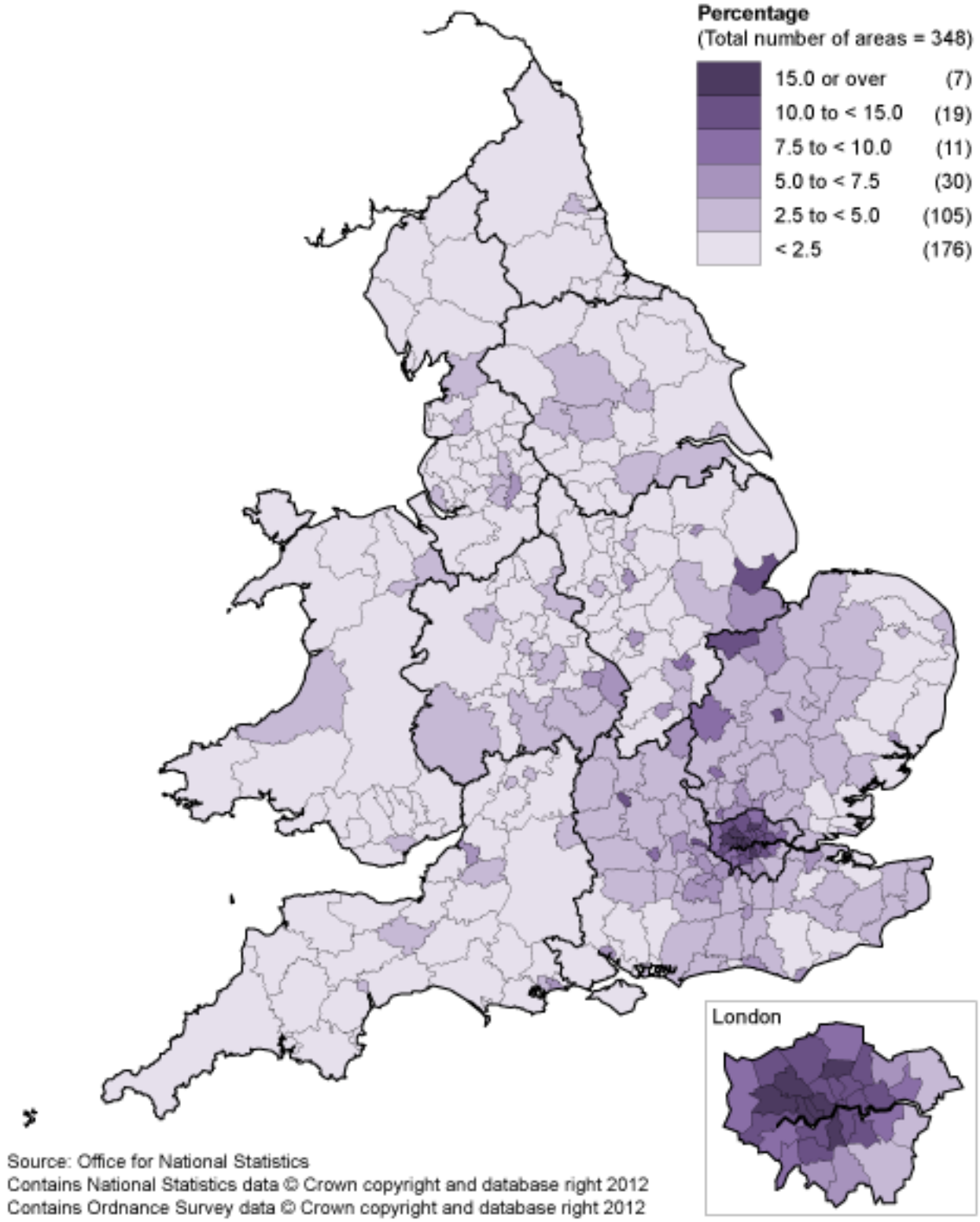
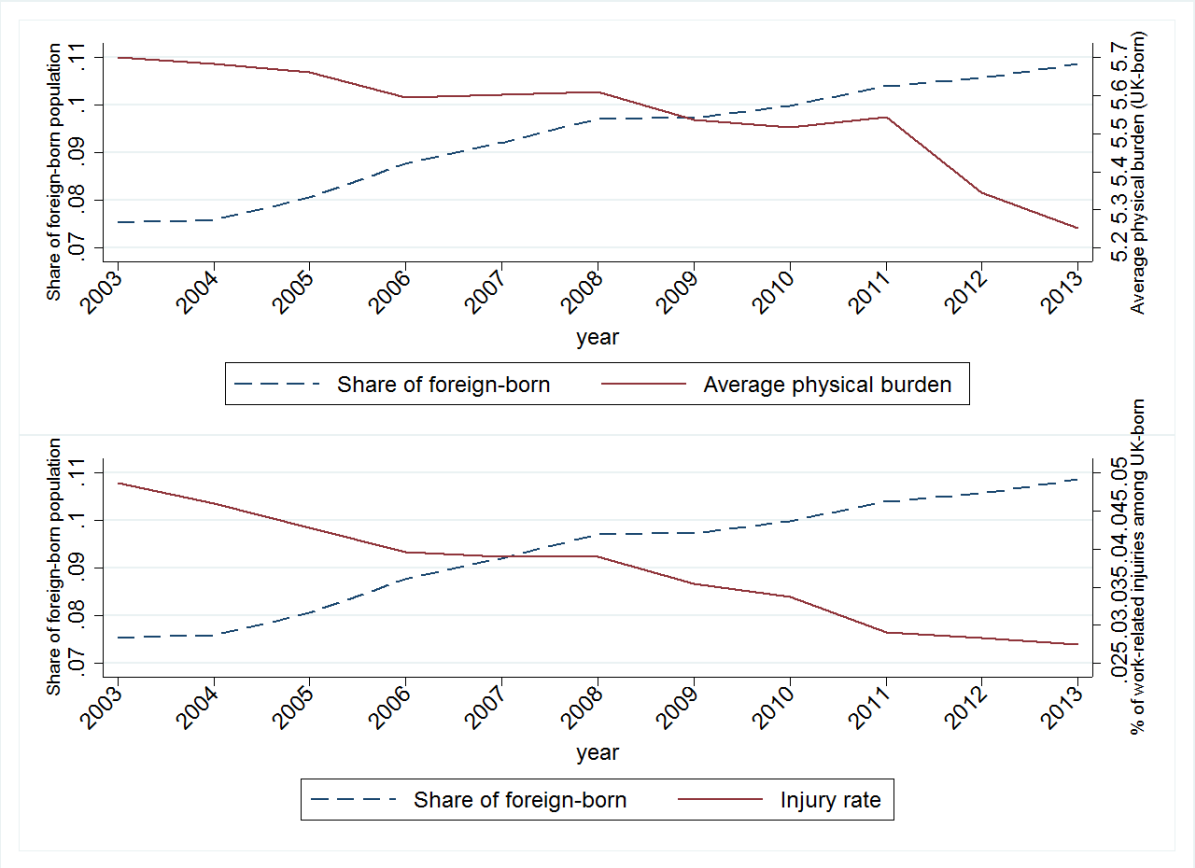
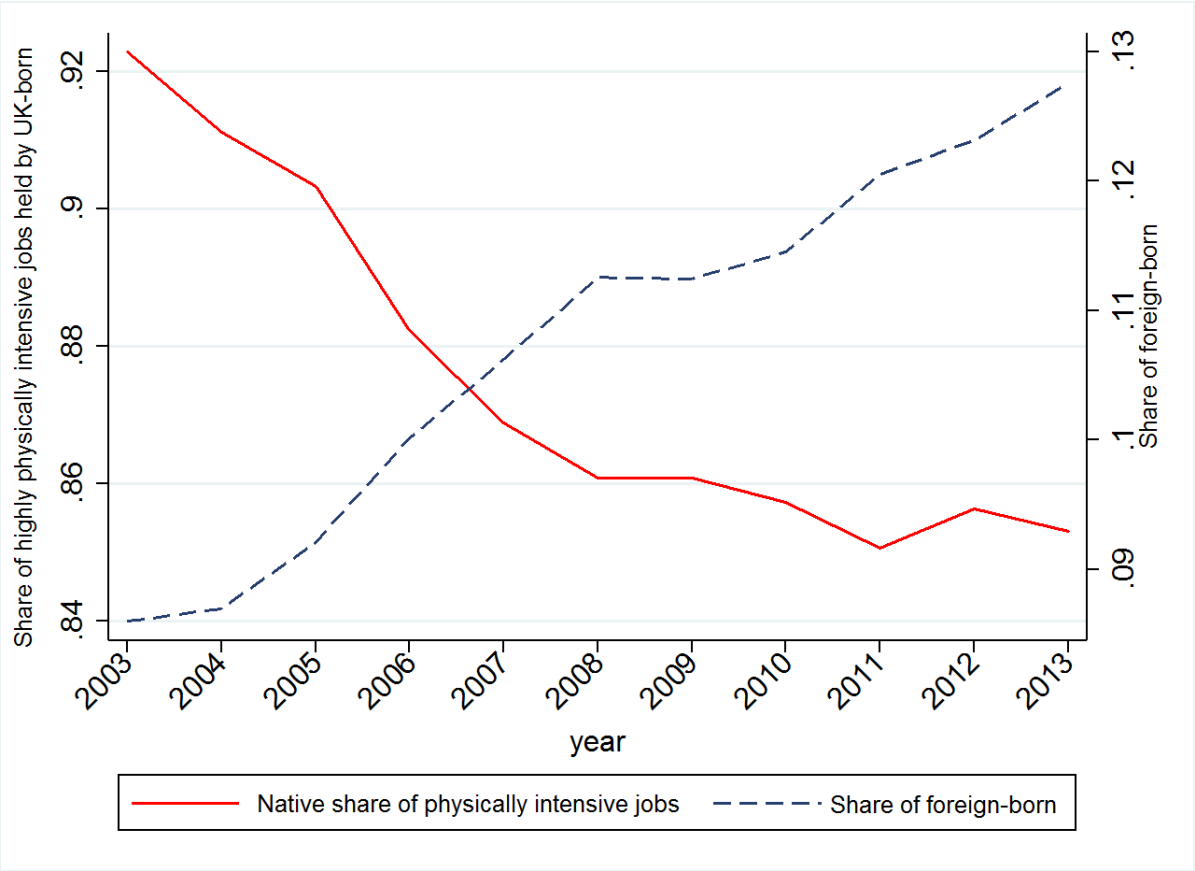


Figure 2: Trends in Immigration, Physical Burden and Injury Rate Among UK-born Men, Aged 20-60)



Notes - Data are drawn from the Labour Force Survey (2003-2013).

Figure 3: Trends in Immigration and the Share of Physically Intensive Jobs held by UK-born workers



Notes - Data are drawn from the Labour Force Survey (2003-2013). The solid line illustrates the trend in the share of physically demanding jobs held by UK-born individuals.

Table 1: Descriptive Statistics

Outcomes	UK-Born		Foreign-Born	
	Mean	S.d.	Mean	S.d.
Physical burden	5.15	2.58	5.29	2.52
High physical burden	0.43	0.50	0.49	0.50
Very high physical burden	0.21	0.41	0.24	0.43
Accident rate (per 100,000)	0.03	0.03	0.03	0.02
Change in physical intensity	-0.03	0.82	-0.02	0.85
Reduction in physical intensity	0.06	0.23	0.06	0.25
High injury rate occupation	0.39	0.49	0.32	0.47
Covariates				
Male	0.48	0.50	0.46	0.50
Age	40.62	11.12	38.35	10.42
High education	0.31	0.46	0.35	0.48
Medium education	0.48	0.50	0.20	0.40
Low education	0.20	0.40	0.44	0.50
Unemployed	0.05	0.22	0.08	0.266
Employed	0.79	0.40	0.69	046
Married	0.46	0.50	0.52	0.50
Number of children	0.80	1.05	1.02	1.22
Num. Obs	1,725,093		314,006	

Notes - Data are England and Wales drawn from the UK Labor Force Survey (2003-2013).

Table 2: Immigrant-Native Differences in Average Physical Burden

Dependent Variable:	(1) Physical Burden	(2) Physical Burden	(3) Physical Burden > 7	(4) Physical Burden > 7
			Panel A: Men	
Foreign born	0.347***	0.137***	0.035***	0.015***
	(0.009)	(0.005)	(0.002)	(0.001)
Observations	827,787	827,787	827,787	827,787
Mean of Dep. Var.	5.55	5.55	0.3	0.3
Std. Dev. of Dep. Var.	2.87	2.87	0.45	0.45
			Panel B: Women	
Foreign born	0.625***	0.419***	0.091***	0.069***
	(0.008)	(0.008)	(0.001)	(0.001)
Observations	790,482	790,482	790,482	790,482
Mean of Dep. Var.	4.75	4.75	0.13	0.13
Std. Dev. of Dep. Var.	2.14	2.14	0.33	0.33
Standard sociodemographic	YES	YES	YES	YES
Education	NO	YES	NO	YES
Local Authority F.E.	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). Robust standard errors are reported in parenthesis.

Table 3: Immigrant-Native Differences in Occupational Risk and Individual Injuries

Dependent variable:	(1) Occupational risk	(2) Occupational risk (above median)	(3) Injury (YES/NO)	(4) Injury (YES/NO)
		Men		
Foreign born	0.001***	0.037***	-0.009***	-0.009***
	(0.000)	(0.002)	(0.001)	(0.002)
Mean of Dep. Var.	0.032	0.497	0.032	0.032
Std. Dev. of Dep. Var.	0.026	0.476	0.176	0.176
Observations	827,787	827,787	208,845	208,845
		Women		
Foreign born	0.003***	0.080***	-0.001	-0.004***
	(0.000)	(0.002)	(0.002)	(0.002)
Mean of Dep. Var.	0.022	0.348	0.020	0.020
Std. Dev. of Dep. Var.	0.026	0.476	0.141	0.141
Observations	790,482	790,482	202,449	202,449
Standard socio-demographic controls	YES	YES	YES	YES
Occupation fixed effects	NO	NO	NO	YES
Local authority fixed effects	YES	YES	YES	YES
Year fixed effects	YES	YES	YES	YES

Notes - Data are drawn from the England and Wales Labor Force Survey. Columns 1 and 2 use the entire sample (2003-2013). Columns 3 and 4 are restricted to the first-quarters of LFS, as these are only quarters containing information on individual work-related accidents (see Section 2). Standard sociodemographic controls include age, marital status, number of children. All estimates include local authority and year fixed effects. Robust standard errors are reported in parenthesis.

Table 4: Immigration and Work-Related Risk, 2SLS Estimates

Dependent variable:	(1) Physical Intensity (1-10)	(2) Physical Intensity > 7
	Panel A: Men	
Share of Foreign Born (t)	-2.492**	-0.450***
(local authority level)	(1.134)	(0.132)
Observations	717,999	717,999
Mean of Dep. Var.	5.549	0.300
Std. Dev. of Dep. Var.	2.896	0.458
First Stage F	15.02	15.02
	Panel B: Women	
Share of Foreign Born (t)	-1.285***	-0.226***
(local authority level)	(0.325)	(0.060)
Observations	692,706	692,706
Mean of Dep. Var.	4.703	0.121
Std. Dev. of Dep. Var.	2.121	0.326
First Stage F	14.79	14.79
Socio-demographic controls	YES	YES
Local Authority F.E.	YES	YES
Local Authority Time-Varying Characteristics	YES	YES
Year F.E.	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children. Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level and are reported in parentheses.

Table 5: Immigration and Physical Burden, 2SLS Estimates, Men

	(1) All	(2) High-Education	(3) Medium Education	(4) Low Education
			Panel A: Physical Intensity	
Share of foreign born	-2.492**	-1.753**	-4.032***	0.497
(local authority level)	(1.134)	(0.875)	(1.002)	(2.666)
Observations	717,999	234,333	345,539	119,453
Mean of Dep. Var.	5.549	5.549	6.185	7.151
Std. Dev. of Dep. Var.	2.896	2.896	2.880	2.309
First Stage F	15.02	15.02	14.45	17.66
			Panel B: Physical Intensity >7	
Share of foreign born	-0.450***	-0.092	-0.846***	-0.075
(local authority level)	(0.132)	(0.095)	(0.124)	(0.436)
Observations	717,999	234,333	345,539	119,453
Mean of Dep. Var.	0.300	0.300	0.383	0.471
Std. Dev. of Dep. Var.	0.458	0.458	0.486	0.499
First Stage F	15.02	15.02	14.45	17.66
Socio-demographic controls	YES	YES	YES	YES
Local Authority F.E.	YES	YES	YES	YES
Local Authority Time-Varying Characteristics.	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children. Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level and are reported in parentheses. Standard errors are clustered at the local authority level and are reported in parentheses.

Table 6: Immigration and Likelihood of Lower Physical Burden, Men

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Occupation:	All	White Collars	Blue Collars	Blue Collars	Blue Collars	Blue Collars	White Collars	White Collars	White Collars
Education:	All	All	All	HS	MS	LS	HS	MS	LS
				Panel A: Likelihood of reduced physical intensity					
Share of Foreign Born (t)	0.082	0.036	0.109	0.150	0.224**	-0.187*	0.057	0.020	0.199
(local authority level)	(0.059)	(0.087)	(0.068)	(0.290)	(0.100)	(0.100)	(0.158)	(0.105)	(0.238)
Observations	127,026	75,226	51,800	3,943	31,103	16,117	37,730	31,197	5,814
Mean of Dep. Var.	0.0616	0.0625	0.0602	0.0976	0.0638	0.0436	0.0600	0.0661	0.0569
Std. Dev. of Dep. Var.	0.240	0.242	0.238	0.297	0.244	0.204	0.237	0.248	0.232
First Stage F	13.75	14.63	14.06	13.73	11.81	17.39	14.34	15.36	11.13
				Panel B:Increase in Physical Intensity					
Share of Foreign Born (t)	-0.391	-0.281	-0.456	0.789	-0.950***	0.229	-0.278	-0.241	-1.313
(local authority level)	(0.266)	(0.340)	(0.304)	(1.993)	(0.321)	(0.243)	(0.548)	(0.469)	(1.035)
Observations	127,026	75,226	51,800	3,943	31,103	16,117	37,730	31,197	5,814
Mean of Dep. Var.	-0.0287	-0.00233	-0.0670	-0.183	-0.0698	-0.0346	-0.0123	0.00830	0.0129
Std. Dev. of Dep. Var.	0.877	0.919	0.811	1.308	0.817	0.619	0.842	0.996	0.954
First Stage F	13.75	14.63	14.06	13.73	11.81	17.39	14.34	15.36	11.13
Controls	YES	YES	YES	YES	YES	YES	YES	YES	YES
Local Authority F.E.	YES	YES	YES	YES	YES	YES	YES	YES	YES
Local Authority Time-Varying Characteristics	YES	YES	YES	YES	YES	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES	YES	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). Information on previous occupation is available only in the first quarter of the LFS. All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children. Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level and are reported in parentheses.

Table 7: Immigration and Occupational Risk, 2SLS Estimates, Men

Dep.Var.:	(1)	(2)	(3)	(4)
High occupational risk (above median injury rate)	All	High-Education	Medium Education	Low Education
Share of Foreign Born	-0.376*	-0.356	-0.576***	0.029
(local authority level)	(0.208)	(0.244)	(0.166)	(0.348)
Observations	573,925	192,844	277,432	91,878
Mean of Dep. Var.	0.532	0.299	0.618	0.752
Std. Dev. of Dep. Var.	0.499	0.458	0.486	0.432
First Stage F	13.12	13.25	12.95	15.48
Socio-demographic controls	YES	YES	YES	YES
Local Authority F.E.	YES	YES	YES	YES
Local Authority Time-Varying Characteristics	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children.Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level and are reported in parentheses.

Table 8: Immigration and Health, 2SLS Estimates, Regional Analysis (Men)

Dependent variable:	(1) Physical Burden (1-10)	(2) Physical Burden (1-10)	(3) High occupational risk (above median injury rate)	(4) High occupational risk (above median injury rate)
Share of Foreign Born (local-authority level)	-2.654*** (0.269)		-0.288*** (0.041)	
Share of Foreign Born (regional-level)		-2.731*** (0.230)		-0.388*** (0.006)
Observations	837,069	837,069	659,754	659,754
Mean of Dep. Var.	5.645	5.645	0.544	0.544
Std. Dev. of Dep. Var.	2.875	2.875	0.498	0.498
F-Test of IV	148	218.2	155.78	255.24
Socio-demographic controls	YES	YES	YES	YES
Local-Authority Time-Varying Characteristics	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children. Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the regional level and are reported in parentheses.

Table 9: Placebo Test, Local Authority Level

Dependent variable:	(1) Average Physical Burden ($\Delta_{1991-2003}$)	(2) Average Physical Burden ($\Delta_{2003-2004}$)	(3) Average Occupational Risk ($\Delta_{2003-2004}$)
Predicted Share of Foreign Born ($\Delta_{2004-2013}$)	0.013	0.145	0.003
	(0.008)	(0.865)	(0.116)
Observations	151	163	163

Notes - Data are drawn from the England Labor Force Survey (2003-2013) and 1991 UK Census. All the estimates are conducted at the local authority level and include controls for average age, and the share of high and low skilled in the local authority. Standard errors are clustered at the local authority level and are reported in parentheses.

Appendix

Table A.1: Occupations, Physical Burden, and Injury Risk

Low Physical Burden	**High Physical Burden**
Advertising and public relations managers	Bricklayers and stonemasons
Supply and distribution managers	Building frame and related trades workers not elsewhere classified
Architects, town and traffic planners	Roofers
Electronics and telecommunications engineers	Floor layers and tile setters
Mechanical engineers	Plasterers
Accountants	Glaziers
Lawyers	Painters and related workers
Legal professionals not elsewhere classified	Metal moulders and coremakers
Legal and related business associate professionals	Welders and flame cutters
Bookkeepers	Structural-metal preparers and erectors
Low Injury Rate	**High Injury Rate**
Managers of small enterprises in agriculture, hunting, forestry and fishing	Mining plant operators
Managers of small enterprises in transport, storage and communications	Veterinarians
Medical doctors	Metal moulders and coremakers
Building and fire inspectors	Silk-screen, block and craft textile printers
Optometrists and opticians	Police officers
Trade brokers	Ships' deck crews and related workers
Government tax and excise officials	Incinerator, water-treatment and related plant operators
Jewellery and precious-metal workers	Protective services workers not elsewhere classified
Tailors, dressmakers and hatters	Structural-metal preparers and erectors
Power-production plant operators	Health associate professionals (except nursing) not elsewhere classified

Notes - The table reports occupation with the highest and lowest physical burden and injury rate. We reported the top and bottom 10 occupations with respect to the index considered.

Table A.2: Immigration and Physical Burden, 2SLS Estimates, Women

	(1) All	(2) High-Education	(3) Medium Education	(4) Low Education
			Panel A: Physical Intensity	
Share of foreign born	-1.285***	-0.713*	-1.496***	-1.393
	(0.325)	(0.394)	(0.511)	(1.025)
Observations	692,706	249,399	325,294	102,385
Mean of Dep. Var.	4.703	4.359	4.652	5.704
Std. Dev. of Dep. Var.	2.121	2.037	2.100	2.080
First Stage F	14.79	16.29	14.07	14.73
			Panel B: Physical Intensity >7	
Share of foreign born	-0.226***	0.024	-0.210***	-0.847***
	(0.060)	(0.057)	(0.054)	(0.162)
Observations	692,706	249,399	325,294	102,385
Mean of Dep. Var.	0.121	0.117	0.100	0.196
Std. Dev. of Dep. Var.	0.326	0.321	0.300	0.397
First Stage F	14.79	16.29	14.07	14.73
Socio-demographic controls	YES	YES	YES	YES
Local Authority F.E.	YES	YES	YES	YES
Local Authority Time-Varying Characteristics	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children.Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level and are reported in parentheses.

Table A.3: Immigration and Highest Quartile Occupational Risk, 2SLS Estimates

	(1) All	(2) High-Education	(3) Medium Education	(4) Low Education
	Panel A: High occupational risk (highest quartile of occupational injury rate, Men)			
Share of Foreign Born	-0.278	-0.328***	-0.400**	0.055
(local authority level)	(0.174)	(0.063)	(0.190)	(0.468)
Observations	573,925	192,844	277,432	91,878
	Panel B: High occupational risk (highest quartile of occupational injury rate, Women)			
Share of Foreign Born	0.020	-0.100**	0.157	-0.125
(local authority level)	(0.085)	(0.051)	(0.169)	(0.145)
Observations	558,396	209,189	264,756	75,004
Socio-demographic controls	YES	YES	YES	YES
Local Authority F.E.	YES	YES	YES	YES
Local Authority Time-Varying Characteristics	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children. Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level and are reported in parentheses.

Table A.4: Immigration and Occupational Risk (days before resuming work), 2SLS Estimates

	(1) All	(2) High-Education	(3) Medium Education	(4) Low Education
	Panel A : High occupational risk (days before resuming work after injury, Men - highest quartile)			
Share of Foreign Born	-0.399***	-0.405***	-0.589***	-0.048
	(0.106)	(0.095)	(0.169)	(0.262)
Observations	573,925	192,844	277,432	91,878
	Panel B : High occupational risk (days before resuming work after injury, Women - highest quartile)			
Share of Foreign Born	-0.008	-0.116	0.082	0.036
	(0.126)	(0.075)	(0.157)	(0.304)
Observations	558,396	209,189	264,756	75,004
Socio-demographic controls	YES	YES	YES	YES
Local Authority F.E.	YES	YES	YES	YES
Local Authority Time-Varying Characteristics	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children. Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level and are reported in parentheses.

Table A.5: Immigration and Weekly Wages, 2SLS Estimate, Men

Dep. Var: log (Weekly Wages)	(1) All	(2) High-Education	(3) Medium Education	(4) Low Education
Share of Foreign Born	0.049	0.240	-0.039	-0.158
	(0.197)	(0.316)	(0.191)	(0.186)
Observations	170,213	59,330	80,627	26,521
Mean of Dep. Var.	5.850	6.089	5.767	5.582
Std. Dev. of Dep. Var.	0.573	0.577	0.530	0.498
First-Stage F	13.40	14.66	13.12	11.99
Socio-demographic controls	YES	YES	YES	YES
Local Authority F.E.	YES	YES	YES	YES
Local Authority Time-Varying Characteristics	YES	YES	YES	YES
Year F.E.	YES	YES	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children. Local authority time-varying characteristics include the share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level.

Table A.6: Immigration and Psycho-social Burden, 2SLS Estimates

Dependent variable:	(1) Psycho-social burden (1-10)	(2) Psycho-social burden > 7
	Panel A: Men	
Share of Foreign Born (t)	-0.027	-0.111
(local authority level)	(0.646)	(0.124)
Observations	717,999	717,999
Mean of Dep. Var.	6.051	0.395
Std. Dev. of Dep. Var.	2.737	0.489
First Stage F	15.02	15.02
	Panel B: Women	
Share of Foreign Born (t)	-0.425	-0.095
(local authority level)	(0.666)	(0.133)
Observations	692,706	692,706
Mean of Dep. Var.	5.408	0.284
Std. Dev. of Dep. Var.	2.984	0.451
First Stage F	14.79	14.79
Socio-demographic controls	YES	YES
Local Authority F.E.	YES	YES
Local Authority Time-Varying Characteristics	YES	YES
Year F.E.	YES	YES

Notes - Data are drawn from the England Labor Force Survey (2003-2013). All the estimates include controls for education (dummies), a quartic in age, marital status, and number of children. Local authority time-varying characteristics include employment rate, log of average wage, share of white, asian, black population, share of individuals with low, medium, and high education, and share of female population. Standard errors are clustered at the local authority level and are reported in parentheses.