Do Immigrants Improve the Health of Natives?

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Abstract

This paper studies the effects of immigration on health. Specifically, we merge information on individual characteristics from the German Socio-Economic Panel (1984-2009) with detailed local labour market characteristics, and we then exploit the longitudinal component of the data to determine how immigration affects the health of both immigrants and natives over time. We find that immigrants to Germany are healthier than natives upon their arrival (the healthy immigrant effect) but that immigrants' health deteriorates over time. We show that the convergence in health is heterogeneous across immigrants and occurs more rapidly among those working in more physically demanding jobs. Because immigrants are significantly more likely to work in strenuous occupations, we investigate whether changes in the spatial concentration of immigrants affect the health of the native population. Our results suggest that immigration reduces the likelihood that residents will report negative health outcomes. We show that these effects are concentrated in blue-collar occupations and are stronger among low-educated natives. Improvements in natives' average working conditions and workloads help explain the positive effects of immigration on the health of the native population.

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1 Introduction

In the public discourse, immigration is frequently blamed for higher health care costs and increased burdens on taxpayers. However, empirical evidence shows that immigrants are typically young, relatively healthy and thus less likely to utilise health care than natives of host countries (Goldman et al., 2006); indeed, a voluminous set of studies provides evidence of a "healthy immigrant effect". Upon their arrival, immigrants are healthier than both their populations of origin and than natives of host countries, but immigrants' health deteriorates over time. These paradoxical facts are observed across several countries and across various metrics of health (Kennedy et al., 2006; Antecol and Bedard, 2006; Chiswick et al., 2008). Shedding light on these health patterns is crucial to evaluate the costs and benefits of migration, and, in particular, its impact on health care costs. Yet, the mechanisms underlying immigrant health trajectories are not fully understood.

Previous research analysing the "healthy immigrant effect" has focused on selection, behaviours and return migration as possible factors underlying the convergence observed in immigrants' health (Giuntella, 2013; Antecol and Bedard, 2006; Chiswick et al., 2008; Jasso et al., 2004). Surprisingly, previous studies have largely ignored the relationship between working conditions and the health trajectories of immigrants. However, there is evidence that immigrants are more likely both to work in riskier occupations and to have more difficult work schedules than natives (Orrenius and Zavodny, 2012, 2009; Giuntella, 2012). In addition, several studies show that both the physical requirements and the environmental conditions of the workplace have negative effects on health (Case and Deaton, 2005; Fletcher and Sindelar, 2009; Fletcher et al., 2011; Ravesteijn et al., 2013). In this paper, we hypothesise that sorting into more strenuous occupations contributes to immigrants' health deterioration. Furthermore, we examine whether immigration improves the health of natives and previous cohorts of immigrants by increasing the supply of healthy low-skilled workers, which leads natives and previous cohorts of immigrants to shift into better working conditions.

Although there is a voluminous literature on immigration's effects on wages, employment and prices (Card, 1990; Hunt, 1992; Friedberg and Hunt, 1995; Borjas, 1995; Carrington and Lima, 1996; Dustmann et al., 2005; Borjas et al., 2011, 2008; Ottaviano and Peri, 2012; Glitz, 2012), little is known about the possible effects that immigration might have on other working conditions that are known to affect health. This paper studies how sorting immigrants across jobs affects their health trajectories and, in turn, the health of the incumbent resident population. Our contribution is twofold. First, we focus on one of the mechanisms affecting immigrants' health convergence by examining the role of occupations. Second, to the best of our knowledge, this is the first paper to study the effects of immigration on the health of the native population. We argue that differences in the initial endowments and the composition of capital (health capital, human capital, and financial endowments) between immigrants and natives can explain the reallocation of tasks in the host country population and the positive effects of immigration on health outcomes. Indeed, both the absence of detrimental effects on employment and wages and the reallocation of working conditions can be explained by the complementarity of tasks in the production function (Peri and Sparber, 2009; D'Amuri and Peri, 2010; Foged and Peri, 2013).

Similar to Akay et al. (2014), who examine the effects of immigration on individual well-being, we focus on Germany, a country characterised by a large and diverse immigrant population. We exploit the richness of the German Socio-Economic Panel (SOEP) which allows us to analyse the health trajectories of a representative sample of both natives and immigrants in Germany. The SOEP contains information on self-reported and doctor-assessed health conditions and a large set of socio-demographic characteristics. In addition, it includes occupational titles that can be used to classify occupations based on the physical intensity that is associated with relative working conditions.

We demonstrate that immigrants (regardless of their arrival cohort) are healthier upon their arrival than their German-born counterparts, but the health of these immigrants rapidly converges to that of the native population. Moreover, the convergence is heterogeneous across immigrants and occurs more rapidly among male immigrants working in more physically demanding jobs. We show that immigrants are more likely both to be employed in blue-collar jobs and to be exposed to work-related health risks for longer periods of time than their native counterparts. These facts are consistent with the implications of a standard Grossman (1972) health capital model. Ceteris paribus, low-skilled individuals are more willing to accept risky occupations, trading off health for higher lifetime earnings (Case and Deaton, 2005). Because immigrants appear to be positively selected on health with respect to their population of origin but typically are characterised by lower education and less wealth than natives, they have greater incentive to trade their health capital for money. Therefore, immigrants may be more willing than natives to accept poorer working conditions in exchange for higher wages.

Having determined that immigrants are more likely to work in riskier occupations than natives and that health deterioration occurs significantly more quickly among immigrants working in more strenuous jobs, we next investigate how immigration affects the health trajectories of both natives and immigrants in Germany. We merge the SOEP with local labour market characteristics and investigate how changes in the spatial concentration of immigrants over time affect the health of the incumbent resident population. One of the major challenges of the spatial correlation approach is that the location of immigrants across different areas may be endogenous. Natives may respond to the wage impact of immigration on a local area by moving to other areas, and immigrants may cluster in areas with better economic conditions.

Exploiting the longitudinal nature of the data, we are able to follow individuals over time wherever they move. Using a transition approach, we internalise the spillover effects that may be induced by native mobility (Foged and Peri, 2013) and that would typically bias area studies (Borjas, 2003). Including individual fixed effects allows us to examine how changes in an individual's exposure to immigrants affect that individual's working conditions and health over time. Moreover, we can determine whether respondents change their location in response to changes in the proportion of immigrants in the local population and whether movers are in better health conditions than stayers. Furthermore, we find similar results when using a higher level of aggregation.

Finally, we argue that pull factors that attract more immigration, such as economic growth, should lead to a downward bias in the effect of interest because of the well-known negative (short-run) correlation between the economic cycle and health (Ruhm, 2000). In particular, Ruhm (2000, 2013); Haaland and Telle (2014) show that work-related injuries and cardiovascular diseases follow the economic cycle while Borjas (1994) shows the pro-cyclicality of migration. Therefore, although we expect a positive correlation between immigration and wages, we may expect a negative (if any) correlation between economic conditions and health outcomes. In other words, the effects of immigration on health would be downward biased if we do not properly control for the economic cycle. For this reason, we also control for local labour market fixed effects and a large set of time-varying local labour market characteristics (GDP, unemployment, etc.) that should account for the omitted variable bias associated with permanent and time-varying local area characteristics.

To further address the issue of endogeneity, we exploit the fact that historical concentrations of immigrants are a good predictor of current immigrant inflows and use a traditional shift-share instrument in our analysis (Card, 2001). By including individual, local area, and year fixed effects and controlling for the time-varying characteristics of the local labour market and ROR specific time trends, we can reasonably assume that past immigrant concentrations are uncorrelated with current unobserved labour demand shocks that may be correlated with health. Moreover, we conduct several falsification tests using forward values of the immigration rate, analysing the relationship between changes in the immigration share and regional trends in the health outcomes in the periods preceding our analysis, and focusing on groups who are less likely to be exposed to immigrants in the labor market. Our results are robust to alternative model specifications and estimation methods.

We find that a higher immigration share in the local labour market increases the likelihood of the native population reporting better health outcomes. Consistent with our hypothesis, the 2SLS estimates are larger than the OLS estimates, and the positive effects are concentrated among low-skilled males in blue-collar jobs. We find no evidence that immigration has significant effects on the allocation of blue- and white-collar jobs in the population. However, we do observe that immigration reduces the number of hours worked and the degree of physical intensity among blue-collar workers. At the same time, consistent with several studies analysing the effects of immigration in Germany (D'Amuri et al., 2010; Bonin, 2005; Pischke and Velling, 1997), we find no evidence of any detrimental effects of immigration on wages and employment.[1] The effects of immigration on these observable working conditions can explain approximately 20% of the reduced form effect of immigration on health. We argue that these estimates represent only a lower bound of the total effect of immigration on workers' physical burden, since we do not observe task changes within the same job over time but only changes in the physical burden associated with occupational changes.

This paper is organised as follows. Section 2 presents the data, discusses the healthy immigrant effect and illustrates the role of occupation in affecting the health convergence over time. In Section 3, we analyse the effects of immigration on the health of the native population and explore the possible mechanisms behind it. Concluding remarks are reported in Section 4.

2 Data and Stylised Facts

2.1 Data

Our main data are drawn from the SOEP, which is a longitudinal panel dataset that contains information on a rich set of individual socio-economic characteristics. This annual household-based study was initiated in 1984 and includes annual information on approximately 12,000 households and more than 20,000 individuals. Each household member above the age of 16 is asked questions annually on a broad range of socio-economic indicators. The panel is unbalanced because some respondents entered the sample after 1984 and/or have left the sample before 2009. Because the SOEP over-samples immigrants and contains several questions regarding both health outcomes and job characteristics, it is an ideal source for investigating the relationship between immigration, work conditions and the health statuses

[1] Although most studies of Germany have found no evidence of detrimental effects on wages, it is notable that recent evidence using establishment-level analysis (Campos-Vazquez, 2008) or a quasi-experimental approach (Glitz, 2012) finds negative short-run effects on employment. Consistent with these studies, we find evidence of negative short-run effects on employment among individuals previously employed in blue-collar occupations.

of both natives and immigrants. For a detailed description of the survey, see Haisken-DeNew and Frick (2005).

The SOEP provides information on several health metrics (including self-assessed health status, satisfaction with health, and number of hospital visits, among others). In this paper, we focus on one main health outcome: a dummy variable equal to one for a doctor-assessed disability (*disability*). Respondents were asked about their current disability status from 1984 onwards. Furthermore, respondents are also asked about the degree of any disability they have with the following question: "What is the extent of the capability reduction or handicap (as a percentage) according to the most recent diagnosis?" We use an indicator for whether individuals reported a disability greater than 30%.[2] Although this variable is self-reported, it relies on a doctor's assessment and is thus less subject to heterogeneity in health perception, which is particularly relevant for us because self-assessment may vary systematically across ethnicities in comparing the health of immigrants and natives. Moreover, because we hypothesise that immigration might improve the average working conditions of natives, it is natural to focus on a health metric that is directly affected by work-related injuries. In the Appendix, we evaluate the robustness of our results using subjective health measures, such as self-rated health, which we dichotomise as poor health. In addition, the SOEP includes occupational titles that are coded into the International Standard Classification of Occupations (OECD, ISCO-88) at the 4-digit level.

Using the ISCO classification and the General Index for Job Demands in Occupations (Kroll, 2011), we constructed a 1 to 10 metric of the physical intensity (*physical burden*) associated with a given occupational title. Furthermore, we can classify workers according to major occupations (1-digit) and identify blue- and white-collar workers using standard OECD classifications.

Using the information on the geographical residence of the individual we merged individual-level information with data on local labour market characteristics drawn from the INKAR administrative records.[3] There are 96 regional policy regions, and these are defined by the Federal Office for Building and Regional Planning based on their economic inter-linkages. Our main variable of interest is the proportion of immigrants in a ROR. We also use the INKAR dataset to draw information on employment rates, GDP per capita, and gross value added per worker. Because this dataset is only available for the 1996-2009 period, we restrict our analysis of the effects of immigration (Section 4) to this time period.

[2]As a robustness check, we consider the sensitivity of our results to different definitions of disability status.

[3]The INKAR (Indikatoren und Karten zur Raumentwicklung) dataset is provided by the German Federal Office for Building and Regional Planning and contains a wide range of regional economic and demographic figures.

In particular, we use the share of immigrants between time $t-3$ and $t-1$ in our baseline model; therefore, we limit our analysis to the 1999-2009 period.[4]

We report summary statistics for the main variables used in Table 1. Columns 1-4 report means and standard deviations by immigrant status and sex. We restrict the analysis to individuals between 25 and 59 years old to avoid changes in perceived or actual health after retirement (Mazzonna and Peracchi, 2012). Furthermore, this restriction allows us to ignore changes in the legal retirement age over the years considered in the sample. We divide immigrants into three main cohorts based on arrival: 60% of the immigrants arrived before the 1980s, 18% arrived in the 1980s and the remaining 22% arrived after the fall of the Berlin wall in 1989.[5]

When considering unconditional mean differences, there appears to be no evidence of a healthy immigrant effect for men. In fact, there are only slight and non-significant differences in the health statuses of Germans compared with immigrants. In the next section, we show that the underlying cause of this finding is that we are not controlling for years spent in Germany. Indeed, the average number of years spent in Germany in the sample is 20 years.

Moreover, there are substantial socio-economic differences between the two populations. Immigrants are less educated and have lower wages. Furthermore, immigrants in our sample are almost twice as likely as Germans to work in blue-collar occupations and on average work 2.1 years more in these occupations. Notably, the incidence of doctor-assessed disability is significantly lower among immigrant women than among their native counterparts, although the average number of years spent in Germany by immigrant women is similar to that of immigrant men. As shown in Table 1, immigrant men are much more likely than immigrant women to be employed in blue-collars jobs (61% vs. 25%) and in occupations characterised by substantial physical burdens (6.35 for men vs. 3.56 for women).

In the next section, we demonstrate that immigrant men have an even greater health advantage than immigrant women upon arrival, but an analysis of the health trajectories of immigrants over time demonstrates that immigrant men's health converges to that of their

[4] In a previous version of this paper, we used the share of immigrants at time $t-1$ and analysed the 1996-2009 period, which yielded similar results.

[5] A preliminary analysis conducted to identify the most important waves of immigration in Germany indicates that that these waves are also strongly connected with the most important nationality groups in the data (see Table A.2 in the Appendix). In particular, the first wave of immigrants arriving before the 1980s consists mainly of immigrants from Turkey, Yugoslavia and other Mediterranean countries (Italy, Greece and Spain). These first-wave immigrants are primarily low-skilled workers employed in blue-collar occupations. However, the second and third waves are more heterogeneous, and the largest share of these immigrants came from Eastern Europe and Russia. On average, the more recent immigrants show higher educational attainment. However, despite the higher levels of human capital, recent immigrants are not significantly different from previous cohorts with respect to the likelihood that they will work in physically demanding jobs, which is significantly higher than that of their native counterparts.

native counterparts at a faster pace than that of immigrant women. Finally, the descriptive statistics are substantially unchanged when restricting the sample to the years used in Section 4 (1999-2009).

2.2 Stylised Facts: Immigrant Health and Working Conditions

As discussed above, the literature on the healthy immigrant effect has largely focused on selectivity, behavioural assimilation, return migration, and access to care (Antecol and Bedard, 2006). However, the differences observed in the health trajectories of immigrant men and immigrant women suggest that mechanisms other than differences in access to care may explain the health convergence observed among immigrant men. While we acknowledge that assimilation in behaviours (dietary and substance use) are important mechanisms underlying the health trajectories of immigrants over time, we focus in this paper on the role of working conditions in the host country. Although recent studies have shown that working in physically demanding occupations has negative effects on health (Case and Deaton, 2005; Fletcher et al., 2011; Ravesteijn et al., 2013)[6], the role of working conditions has largely been neglected in the literature on the healthy immigrant effect.

Table 2 analyses health differences between immigrant and native men using standard linear panel data models. In particular, consistent with Antecol and Bedard (2006), we estimate equations of the following form:

$$h_{it} = \alpha_i + \beta X'_{it} + \gamma C'_i + \lambda YSM_{it} + \theta_t + \epsilon_{it}, \tag{1}$$

where h_{it} denotes the health of individual i at time t; α_i, is an individual fixed effect; X'_{it} is a set of individual time-varying characteristics (a set of age dummies, an indicator for marital status, number of children, and dummies for three educational groups); C'_i denotes a vector of dummy variables identifying immigrants arrival cohorts (Germans are taken as the baseline); and YSM_{it} is a quadratic control in years since migration (YSM) that we include to analyse the health trajectories of immigrants together with time spent in Germany. Moreover, we include survey years fixed effects, θ_t, and a full set of regional fixed effects at the NUTS2 level.[7] Column 1 reports the results from the quasi-fixed effect model (QFE). This model

[6] We find similar evidence in our sample. In particular, we find that one additional year spent in a physically demanding occupation is associated with an increase of 3% in the incidence of disability. Results are available upon request.

[7] The Nomenclature of Territorial Units for Statistics (NUTS) is a geocode standard developed and regulated by the European Union. NUTS2 is the lowest level of geographical detail available for the entire period of the SOEP data (1984-2009). While we have information on RORs, these regions were redefined in 1996 and can thus be used only for pre/post-1996 analysis, which avoids having to readjust for the redefined RORs (Knies and Spiess, 2007).

imposes a restricted correlation between the individual fixed effect α_i and our time-varying regressors, X'_{it} (Mundlak, 1978), which allows us to evaluate the effect of the time-invariant individual characteristics (e.g., the immigrant cohort). In column 2, we use individual fixed effects (FE). Standard errors are clustered at the ROR level. Results remain significant when clustering at the household or individual level. Given the discrete nature of our dependent variable, we evaluate the robustness of our results using non-linear panel data methods, including a random effect probit model (results available upon request). Regardless of the timing of their arrival cohort, immigrants are found to be healthier upon their arrival than their German-born counterparts. In particular, immigrant men have a much lower incidence of doctor-assessed disability upon their arrival than natives (-0.06, see column 1), but their health quite rapidly converges to natives' health, i.e., within approximately 15 years (see the coefficient on YSM).

Having already shown in Table 1 that immigrant men are more likely than native men to work in occupations that involve higher physical intensity (see also Section 3.5), we investigate whether the rapid convergence in male immigrants' health is heterogeneous across occupational groups. Columns 3 and 4 show that the yearly rate of health depreciation associated with YSM is significantly lower among men who were employed in less strenuous occupations in the previous year (jobs with physical intensity lower than the median). The sample considered in columns 3 and 4 is restricted to those individuals for whom information is available regarding occupational type information. These results are robust to the inclusion of controls for German language skills and to the restriction of the analysis to the sample of immigrants.

In Table A.1, we report the same analysis for women: when conditioned on standard sociodemographic controls, there is relatively less of a health advantage upon arrival for immigrant women than native women (see column 1). Health selectivity at the time of migration appears to be less important among female immigrants than among male immigrants.[8] Notably, the coefficient on the interaction between the level of physical burden and time spent in Germany has no significant effects among women. Employed women are a highly selected sample and are likely to work in less physically demanding occupations than their male counterparts even when employed in blue-collar jobs (see Table 1).

Overall, the analysis of the role of occupation suggests that immigrants are more likely than natives to work in physically demanding jobs and that the health convergence occurs more rapidly among immigrants working in blue-collar jobs. These facts motivate us to

[8] To assess this hypothesis, we examined single and married women separately and found significant differences between the two groups. In particular, there was no evidence of a health advantage for married women who were likely to have migrated for family rather than economic reasons and who were thus less selected.

investigate whether immigration affects natives' health by changing the allocation of working conditions in the population.

3 Effects of Immigration on Health

3.1 Empirical Specification

To identify the effect of immigration on the health of the incumbent resident population, we exploit variation over time in the share of immigrants living in a ROR between 1999 and 2009. In our baseline specification, we model health according to the following static linear model:

$$h^*_{irt} = \alpha_i + \beta S_{rt-k} + X'_{irt}\gamma + Z'_{rt}\lambda + \delta_r + \theta_t + \epsilon_{irt}, \tag{2}$$

where h^*_{irt} is the latent health status of individual i at time t in ROR r; α_i is a time-invariant individual fixed effect; S_{rt-k} is the share of immigrants in ROR r at time $t-k$; X is a vector of time-varying individual characteristics (such as age, education, marital status and number of children); Z'_{rt} is a vector of time-varying labour market and economic conditions; δ_r and θ_t are ROR and years fixed effects, respectively; and ϵ_{irt} captures the residual variation in health status. As discussed above, there is no reason to conclude that immigration should have direct and immediate effects on incumbent residents' health, particularly if we believe that immigration affects health through its impact on the labour market. In light of the foregoing, we used lagged values $(t-k)$ of the immigration share to predict its effects on health. However, defining the lag structure is not straightforward.

The annual variation in the immigration share might not be sufficient to analyse its effect on health outcomes and the underlying mechanisms. However, a very long lag structure would affect the power of our estimation strategy and reduce the number of time periods available for the estimation. To account for this trade-off, we use the average immigration share from the previous three years in our preferred specification (from $t-1$ to $t-3$). As discussed in Section 3.5, our results are robust to alternative lag structures (up to 5 years lag). Moreover, we implement placebo tests on the forward value of the immigration share (from t to $t+2$, see Table A.7 in the Appendix). The baseline estimation method for this model is the FE estimator because it allows the unobserved time-invariant individual heterogeneity α_i and our regressors to be correlated. Unfortunately, h^*_{irt} is not directly observed. Instead, we observe certain health binary indicators (h_{irt}), such as disability status or self-reported poor health, with an observation mechanism that can be expressed as:

$$H_{irt} = \mathbb{1}\{h^*_{irt} > 0\}. \tag{3}$$

For this reason, a straightforward choice would be to use non-linear models, such as a probit or logit model. However, with these models we cannot rule out the individual effect, α_i, when using within transformation, and we cannot directly estimate it because of the well-known incidental parameters problem. Because we are interested in estimating the average effect of immigration on the population, a linear probability model might represent a good approximation of this effect (Angrist and Pischke, 2008). However, for robustness, we estimate equation (2) using a correlated random effect probit estimator (see Table A.9, allowing a restricted dependence between α_i and the regressors in X'_{irt} (Wooldridge, 2002). In practice, we use a random effects model augmented by the means of time-variant individual characteristics. We are less concerned that disability status may be an absorbing state that would call into question the validity of the fixed effect estimator. Having chosen a relatively low threshold to define disability (30%), we note that approximately one-third of the changes in disability status occur among people who reported disability in the previous year and are no longer assessed with a disability greater than 30%.

The use of geographical variation in the share of immigrants (often called an "area approach") has been criticised by many scholars (e.g., Borjas et al., 1996; Borjas, 2003) for two main reasons. First, natives may respond to the wage impact of immigration on a local area by moving to other areas, and healthier natives may be more likely to migrate. Our identification strategy should not be affected by this potential source of bias because we follow the respondents wherever they move (Foged and Peri, 2013). Yet to further address the concern that immigration may affect internal mobility and that health may be correlated with the likelihood of leaving a ROR, we test whether respondents in our sample changed their location in response to new immigrant inflows in the ROR and whether movers were healthier than stayers. Furthermore, following Borjas et al. (1996), we test the robustness of our results to the change of the geographical unit using a higher level of aggregation (namely the NUTS2).

The second critique to the area approach is that immigrants might endogenously cluster in areas with better economic conditions. In this setting, we posit that pull factors that attract more immigration, such as economic growth, should lead to a downward bias in the effect of interest based on the well-known negative (short-run) correlation between the economic cycle and health (Ruhm, 2000).[9] Moreover, recent evidence by Haaland and Telle

[9]Recent papers (Ruhm, 2013; Tekin et al., 2013) show that healthy recession effects are not present when using more recent cuts of the data and, in particular, that the association between economic deterioration and these outcomes has weakened considerably during the Great Recession. The weakening of the relationship between macroeconomic conditions and health appears to be explained by the strong countercyclical patterns of cancer and accidental poisoning fatalities that have emerged over time. However, Ruhm (2013) confirms that deaths due to cardiovascular disease, transport accidents and deaths resulting from falls, drowning or fires continue to be pro-cyclical. Excluding the Great Recession (2007-2009) from the analysis, we find

(2014) shows that the pro-cyclical health deterioration is even more pronounced in the case of disability.

To this end, we show in the next section that, after controlling for important time-varying market and economic conditions at the ROR level (GDP per capita, unemployment rate and population size), the estimated effect of the immigration share on health remains unaffected or marginally increases in absolute value. All our estimates control both for the time-invariant differences between local regions and for regional changes in demand. Even assuming that the large number of controls for market and economic conditions at the ROR level may not be sufficient to account for all the time-varying unobservables, it is not particularly likely that they might confound the relationship of interest in the opposite direction with respect to the large number of observable ROR characteristics. Moreover, fixed effects estimates are notoriously susceptible to attenuation bias due to measurement error (Wooldridge, 2002; Aydemir and Borjas, 2011). Nonetheless, to further address the concern of a local unobserved shock affecting both native and immigrant labour demand, we include ROR-specific time trends and use an instrumental variables approach. Following Altonji and Card (1991) and Card (2001), we use an instrumental variable based on a "shift-share" of national levels of immigration into RORs to impute the supply-driven increase in immigrants in each ROR.

In practice, we exploit the fact that immigrants tend to locate in areas that have higher densities of immigrants from their own country of origin, and we distribute the annual national inflow of immigrants from a given source country across the RORs using the 1996 distribution of immigrants from a given country of origin. Note that the classification of RORs changed in 1996, and we cannot, therefore, use earlier years as a base to construct our shift-share instrument.

Specifically, let us define F_{ct} as the total population of immigrants from country c residing in Germany in year t and $s_{cr,1996}$ as the share of that population residing in ROR r as of year 1996. We then construct $\hat{F}_{crt}$, the imputed population from country c in ROR r in year t, as follows:

$$\hat{F}_{crt} = s_{cr,1996} F_{ct} \tag{4}$$

and the imputed total share of immigrants as:

$$\hat{S}_{rt} = \sum_{c} \hat{F}_{crt} / P_{r,1996} \tag{5}$$

where $P_{r,1996}$ is the total population in ROR r as of 1996. The variation of $\hat{S}_{rt}$ is only driven

substantially identical results.

by the changes in the imputed foreign population (the denominator is held fixed at its 1996 value) and is used as an instrument for the actual share of immigrants in ROR r at time t (S_{rt}). Using the distribution of immigrants in 1996, we reduce the risk of endogeneity because annual immigration inflows across RORs might be driven by time-varying characteristics of the ROR that are associated with health outcomes.

One potential threat to the validity of this instrument is that the instrument cannot credibly address the resulting endogeneity problem if the local economic shocks that attracted immigrants persist over time. However, we believe that this problem is substantially mitigated by including individual, ROR, and year fixed effects and by controlling for the time-varying characteristics of the local labour market; thus, we believe that we can reasonably assume that past immigrant concentrations are not correlated with current unobserved ROR-specific shocks that might be correlated with health. Under the assumption that the imputed inflow of immigrants is orthogonal to the ROR-specific shocks and trends in labour market conditions after controlling for fixed effects and observed variables, the exclusion restriction holds.

Although it is not possible to test the exogeneity of our instrument with respect to the unobservable determinants of local labour market conditions, we find that the 1999-2009 change in our instrument -the imputed share of immigrants across RORs- is not correlated with the change of any of the outcome variables in those RORs between 1996 and 1999, which suggests that there is no significant correlation with trends that predate the period analysed (results are available upon request). Finally, we analyse the heterogeneity in the effect of interest by estimating equation (2) by nationality, education (college vs. no-college) and occupation (blue vs. white collar) and show that these results are consistent with the mechanism suggested throughout this study.

3.2 Results

Table 3 illustrates the effect of immigration on doctor-assessed disability for men, and Table A.4 does the same for women. As discussed in the previous section, to approximate the potential lag structure of the effect of interest, we measure the effect of immigration using the average immigration share over the previous three years. For simplicity, we will refer to this effect as the effect of immigration share in the discussion that follows.

In each panel, we report the effect of the total immigration share and that of the gender-specific immigration shares. Gender-specific immigration shares may better proxy for actual exposure to immigrants in the labour market. As presented in Section 3.1, we estimate model (2) using individual fixed effects (FE) and two-stage least squares (2SLS) using the Card

(2001) instrument. Beginning with FE estimates, Column 1 controls for a set of individual socio-demographic controls (a quadratic in age, gender, a dummy for East Germany, education, marital status, and the logarithm of household size), ROR fixed effects and survey year fixed effects.

As emphasised in the previous section, time-varying economic conditions might endogenously affect the sorting of both immigrants and natives across areas. For this reason, Column 2 adds a set of time-varying characteristics at the ROR level (GDP per capita, employment rate, and population size). Additionally, in column 3, we include ROR-specific time trends. Finally, comparable 2SLS estimates are reported in columns 4, 5 and 6. Standard errors are clustered at the ROR level. Table 3 shows that immigration is negatively associated with the likelihood that men will report a doctor-assessed disability. As expected, the coefficient is larger when using the gender-specific immigration share. Our FE estimates show that a one percentage point increase in immigration share reduces the probability that a man will report a doctor-assessed disability by roughly 10% with respect to the mean. Our estimates are not affected by the inclusion of time-varying economic and demographic conditions or by ROR specific time trends.

Consistent with the pro-cyclicality of work injuries (Ruhm, 2000, 2013), when we include time-varying controls (see Columns 1 and 2), we observe, if anything, a slight increase in the effect of interest. As expected, 2SLS estimates are even larger and confirm that immigration reduces the likelihood of reporting a doctor-assessed disability. In this case, a one percentage point increase in the immigration share reduces the risk of a doctor-assessed disability by approximately 2 percentage points (-25%). As discussed in Section 3.1, this larger effect is not surprising. The residual unobservable ROR characteristics may downward bias FE estimates because of the negative relationship between health and the business cycle.

Furthermore, our instrument is constructed using only annual immigration inflows at the national level and excluding internal flows of earlier cohorts of immigrant across RORs. The fact that recent immigrants are more likely to work in strenuous jobs than previous cohorts, because of differences in health capital and in language skills, may help explain why the 2SLS estimate is larger than the OLS estimate. Notably, we do not find significant effects among women (see Table A.4), which is likely the result of women being less likely to be hold blue-collar jobs and because those women who are employed in blue-collar occupations work in less physically intensive jobs than men (see Table 1). If we believe that the mechanism behind immigration's effect on health is the change in average working conditions, it is not surprising to find no effects among women because they are significantly less likely than men to work in strenuous occupations.

Having determined that immigration share has a significant negative effect on the likelihood of men reporting a disability, we explore the heterogeneity of the effect of men's immigration share by foreign born status in Table 4, (Panel A), education (Panel B), and occupational type (Panel C). We report results from both FE and 2SLS as in Column 2 and 4 of Table 3. The effects are significantly greater among individuals who are more likely to work in physically demanding jobs, i.e., previous cohorts of immigrants and low-skilled individuals. However, among immigrants, the coefficients are less precisely estimated. The effects on native residents are not substantially different from the overall sample of incumbent residents. Notably, Panel B shows that the effect is concentrated among people without a college education, whereas the estimated effect is small and not statically different from zero for college graduates. Similarly, Panel C shows that the effect of immigration on health is largely driven by blue-collar workers. This result is consistent with our hypothesis that immigration may induce a reallocation of tasks and working conditions and that individuals who are in jobs associated with a higher risk of negative health effects benefit the most from an increase in the supply of low-skilled and relatively healthy immigrants.

3.3 Possible Mechanisms

To shed further light on the potential mechanism underlying our reduced-form results regarding the effects of immigration on health, we examine the effects of immigration on the labour market. In Table 5, we examine whether immigration affects the likelihood of individuals being employed in occupations involving different levels of physical burden. Panel A reports FE estimates, whereas Panel B presents 2SLS estimates. Column 1 shows that immigration has no effect on the likelihood of individuals working in blue-collar occupations. In column 2, we consider a more precise measure of the physical intensity associated with a given occupation. We again do not find evidence of significant effects on physical burden, although the coefficients have a negative sign. However, column 3 shows that immigration significantly reduces the average physical burden of people previously employed in blue-collar occupations (the interaction term). A one standard deviation increase in immigration share (2.38%) decreases the average physical burden by roughly 7%.[10] Because the estimated effect is small, it only partially accounts for the positive effects of immigration on health. This finding suggests that the reallocation of tasks and jobs may occur within similar occupations, rather than across macro categories. In other words, we do not observe dramatic shifts from white- to blue-collar jobs. Nevertheless, we do have some evidence that an increase in the immigration share among blue-collar workers in the ROR is associated with a reduction in the average physical burden.

[10]Consistent with our previous results, we find no evidence of similar significant effects for women. Results available upon request.

Unfortunately, we do not observe task changes within the same job over time but only changes in the physical burden associated with job changes. If most of the effect of immigration on workers' physical burden occurs across similar occupations (as suggested by column 3), it is reasonable to expect larger effects on the reallocation of tasks within a given occupational category. Therefore, our estimate is likely to capture a lower bound of the total effect of immigration on workers' physical burden.

We test this conjecture using information regarding the perceived strenuousness of the occupation. Information on perceived physical intensity is acquired only in the 2001 survey. Columns 4 and 5 replicate the results presented in columns 2 and 3 with respect to perceived physical burden. Because we have information for only one year, we must exploit cross-sectional variation across RORs to identify the effects of immigration. Therefore, we use a simple OLS regression including area fixed effects at the level of NUTS-1. The results thus suggest that immigration is associated with a reduction in the perceived physical burden. A one standard deviation increase in the immigration share is associated with a 25% reduction in perceived physical burden. Furthermore, and consistent with our prior findings, column 6 indicates that the coefficient is robust to the inclusion of a full set of dummies for each value of the occupation's physical burden derived from the dependent variable analysed in columns 2 and 3. These results again suggest that our objective measure of physical burden captures only a small part of the total effect of immigration on workers' physical burden. In particular, controlling for the average physical burden associated with a given job captures only 18% of the reduced-form effect of immigration on perceived physical burden. This evidence is consistent previous findings obtained using firm-level data from Germany in the 70's showing that new immigrants are primarily employed in risky activities and that as more immigrants are available to take riskier jobs in the firm, native workers have the opportunity to be promoted to safer tasks (Bauer et al., 1998).

3.4 Effects on Other labour Market Conditions

In Table 6, we analyse the effects of immigration on labour market outcomes. Panel A illustrates the results for the overall sample. Although we do not find any evidence of a negative effect of the immigration share on employment, there are substantial differences across educational groups (see Panels B and C) in the effects of immigration on wages and working hours. Among individuals with less than a college degree (Panel B), an increase in immigration share significantly reduces the number of working hours (.6 hours in FE estimates and 1.3 hours in 2SLS) without affecting wages. On the other hand, our estimates suggest that immigration increases the wages of college graduates (Panel C), which suggests that there are large complementarity effects between low-skilled immigrants and high-skilled natives (Peri and Sparber, 2009; D'Amuri and Peri, 2010; Foged and Peri, 2013).

Overall, these results suggest that part of the positive effect of immigration on health may be explained by the improvement of average working conditions with no detrimental effect on wages and employment. When our baseline specification includes controls for income, employment status, working hours, indicators for whether individuals work overtime hours or engage in nightly shifts, and indicators for the average physical burden associated with the occupation (Table 3, columns 2 and 5), the effect of immigration on doctor-assessed disability is reduced by approximately 20%, and the coefficient becomes non-significant (coef. -.0057; std.err. 0.003). Again, this estimate ignores changes in the physical intensity of tasks. Therefore, we interpret this as a lower bound for the contribution of the improvement in job physical burden to the observed improvement in the health of native workers. Indeed, the evidence presented in Table 5 suggests that occupational changes capture only a small part (about 18%) of the effects of immigration on perceived physical burden. When new immigrants are employed, native workers may not change their job, but as suggested by (Bauer et al., 1998), they may have the opportunity to be promoted to safer tasks.

3.5 Robustness Checks

Table 1 presents evidence of large unconditional differences between immigrants and natives regarding the probability of working in physically demanding jobs. In Table A.3, we use a probit model to analyse such differences more thoroughly. In particular, immigrant status is associated with an increase in the index of the physical intensity of the job, which ranges between 10% and 20% (with respect to the mean), depending on the cohort considered. Although these differences are observed among both men and women, the reference group among their native counterparts differs significantly (see the constant terms). Furthermore, these regressions are conditional on being employed, and both the employment rate and the average number of hours worked are significantly lower among immigrant women (only 55% are employed), which leads to a highly selected sample.

As discussed above, the spatial approach has been criticised by several scholars because of the endogenous residential sorting of both natives and immigrants. In Section 3.1, we discussed why our identification strategy is shielded from this criticism. To further test the validity of our identification strategy, the results in Table A.5 demonstrate that the probability of moving to a different area (ROR) is affected by neither the immigration share nor by actual or previous health status. Moreover, in Table A.6, we implement a simple test suggested by Borjas et al. (1996). If local labour markets adjust to immigration inflows and our identification strategy could not fully control for this source of endogeneity, we should expect our results to be sensitive to the geographical unit of analysis used in the spatial approach. When we change the unit of analysis to the higher level of aggregation - in our case passing from ROR to NUTS2 (from 96 regions to 47) - our results are substantially unchanged.

We then replicate the estimates reported in Table 3 using a forward value of the immigration share as a placebo test. In practice, we consider the average share of immigrants between time t and $t + 2$. Table A.7 shows the results of this analysis. As expected, the forward value of the immigration share does not affect respondents' health.[11]

The direction of the effect of immigration on health is confirmed when using more subjective health outcomes, such as self-assessed health status (see Table A.8). Although the fixed effect estimate is not precise, the 2SLS estimates are larger and marginally significant. In addition, we confirm the robustness of our main results to different definitions of disability status. As discussed above in Section 2, individuals are asked to report whether they are registered as having a reduced capacity for work or as being severely disabled; if so, they are asked to report the degree of their disability. Following previous studies (see, for instance, Oswald and Powdthavee, 2008), we adopted the threshold of 30% to define disability status. However, our results are robust to changes of the threshold between 10% and 50%. Notably, while the benefits associated with different levels of disability differ significantly (Burkhauser and Schroeder, 2007; Boersch-Supan and Juerges, 2011), the impact of immigration on the likelihood of doctor-assessed disability among the native population is always negative, and the magnitude of the effect does not change substantially. This finding is reassuring because it may be of some concern that the differences in the likelihood of reporting a given percentage of disability are driven by the benefits associated with specific thresholds (results available upon request).

Given the binary nature of our main outcome variable, doctor-assessed disability, we replicate our main results using a correlated random effect probit model that includes the individual mean over time of certain socio-demographic characteristics. Table A.9 reports the average partial effect (APE, see Wooldridge, 2002). The results are similar to those estimated using linear FE (and smaller than found in the 2SLS). Again, we find larger effects among low-skilled workers.

[11] In a previous version of this paper, we considered different lagged values of the immigration share (up to $t - 3$) and confirmed the main finding of a positive effect of immigration on individual health.

4 Conclusion

This paper contributes to the literature on the effects of immigration by analysing the impact of immigration on the health of both immigrants and native workers. First, we document the importance of occupations and physical burden when explaining the health trajectories of immigrants. We show that the convergence in health is heterogeneous across immigrants and, in particular, that it occurs more quickly among those working in more physically demanding jobs. Immigrants are significantly more likely to work in these types of jobs and to be exposed to job-related health risks for longer periods.

Second, we investigate whether the shock to labour supply induced by immigration affects health outcomes by changing the allocation of tasks and working conditions in the resident population. In particular, we find that immigration reduces the likelihood of doctor-assessed disability. The effects are mostly concentrated on low-skilled individuals and are larger for previous cohorts of immigrants. Our results suggest that immigration improves working conditions for native workers by reducing the average number of hours worked and the physical intensity of blue-collar jobs. In addition, we find no evidence of negative effects on employment and wages. Overall, the improvement observed in these working conditions helps explain the reduced form effect on health, and we argue that these results are consistent with the Grossman (1972) health capital model. Furthermore, the differences in the initial endowments and in the composition of capital (health capital, human capital, and financial endowments) between immigrants and their native counterparts can explain the reallocation of tasks in the population. The complementarity of tasks in the production function accounts for both the absence of detrimental effects on employment and wages and the reallocation of natives and previous immigrants into jobs involving better working conditions. To some degree, these labour market effects explain the positive effects of immigration on health outcomes.

This study thus suggests that policy makers should not neglect immigration's positive effects on native working conditions and health. Similarly, as newly arrived and healthy immigrants might not be aware of the health risks associated with particular working conditions, providing those immigrants at higher risk with information and access to care might contain the process of unhealthy assimilation and the associated costs for the health care system.

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Table 1: Descriptive Statistics

	(1)	(2)	(3)	(4)
	Men		Women	
	Natives	Immigrants	Natives	Immigrants
Disable	0.0741	0.0725	0.0664	0.0463
	(0.262)	(0.259)	(0.249)	(0.210)
Severe health limitations	0.0835	0.0789	0.0703	0.0484
	(0.277)	(0.270)	(0.256)	(0.215)
Age	41.7539	42.0465	41.5945	41.5434
	(9.729)	(9.809)	(9.682)	(9.637)
Married	0.6613	0.8273	0.6898	0.8310
	(0.473)	(0.378)	(0.463)	(0.375)
High school degree	0.7477	0.7255	0.7860	0.6501
	(0.434)	(0.446)	(0.410)	(0.477)
College degree	0.2291	0.1003	0.1905	0.1038
	(0.420)	(0.300)	(0.393)	(0.305)
Employed	0.8789	0.8297	0.6948	0.5536
	(0.326)	(0.376)	(0.461)	(0.497)
Blue collar	0.3519	0.6186	0.0941	0.2510
	(0.478)	(0.486)	(0.292)	(0.434)
Years blue	3.1230	5.3043	0.8335	2.1948
	(4.685)	(5.247)	(2.385)	(3.844)
Physical burden	4.8123	6.3562	3.1623	3.5695
	(3.389)	(3.664)	(2.940)	(3.747)
log (annual wage)	8.2663	8.1578	6.3781	5.1788
	(3.993)	(3.851)	(4.535)	(4.665)
Working hours (weekly)	44.5956	41.8528	33.0792	31.8851
	(10.018)	(8.720)	(13.149)	(12.438)
Years since migration (YSM)		20.0084		19.1015
		(9.346)		(9.538)
Arrived before 1980		0.6066		0.5437
		(0.4885)		(0.498)
Arrived 1980-1990		0.1754		0.2067
		(0.380)		(0.405)
Arrived after 1990		0.2181		0.2496
		(0.413)		(0.433)
Observations	92,067	19,706	96,881	20,064
ROR Share of Immigrants (1996-2009)				
Share of Immigrants	8.5480			
	(4.669)			
Share of Male Immigrants	4.4896			
	(2.386)			
Share of Female Immigrants	4.0584			
	(2.295)			

Notes - Data are drawn from the GSOEP (1984-2009).

Table 2: Healthy Immigrant Effects by Occupation (*assessed disability*), Men

	(1)	(2)	(3)	(4)
	QFE	FE	QFE	FE
Arrived before 1980	-0.0663***		-0.0895***	
	(0.022)		(0.027)	
Arrived before 1980	-0.0695***		-0.0909***	
	(0.016)		(0.018)	
Arrived after 1980	-0.0693***		-0.0856***	
	(0.013)		(0.015)	
YSM	0.0036***	0.0041**	0.0055***	0.0062***
	(0.002)	(0.002)	(0.002)	(0.002)
Low physical burden*YSM			-0.0027***	-0.0031***
			(0.001)	(0.001)
YSM^2	-0.0001*	-0.0001*	-0.0001**	-0.0001**
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.5216***		0.3949***	
Mean of Dep. Var.	0.0741	0.0741	0.0550	0.0550
Std. Dev. of Dep. Var.	0.2621	0.2621	0.2280	0.2280
Observations	110,835	110,835	81,619	81,619
Number of individuals	15,971	15,971	12,249	12,249

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, NUTS-2 fixed effects, and year fixed effects. Quasi fixed effects estimates (QFE) are random effects estimates augmented with the individual mean over time of the socio-demographic controls. Columns 3 and 4 include a dummy for people employed in low physical demanding jobs in the previous year and the interaction between this indicator and YSM. Significance levels: $***p < 0.01$, $**p < 0.05$, $*p < 0.1$. Standard errors are robust and clustered at the ROR level.

Table 3: Effect of Immigration on Doctor-Assessed Disability, Men

	Fixed-Effects			2SLS-Fixed-Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
% immigrants	-0.003**	-0.003**	-0.003**	-0.008**	-0.008**	-0.009***
	(0.002)	(0.002)	(0.001)	(0.003)	(0.003)	(0.003)
$F^{\dagger}$				39.60	39.31	84.80
% male immigrants	-0.006**	-0.007**	-0.006**	-0.015**	-0.015**	-0.018***
	(0.003)	(0.003)	(0.003)	(0.006)	(0.006)	(0.005)
$F^{\dagger}$				40.62	40.03	83.02
Mean of Dep. Var.	0.0749	0.0749	0.0749	0.0749	0.0749	0.0749
Std. Dev. of Dep.	0.2632	0.2632	0.2632	0.2632	0.2632	0.2632
Observations	48,849	48,849	48,849	48,849	48,849	48,849
Number of individuals	8,787	8,787	8,787	8,787	8,787	8,787
INDIVIDUAL F.E	YES	YES	YES	YES	YES	YES
YEAR F.E.	YES	YES	YES	YES	YES	YES
ROR-F.E.	YES	YES	YES	YES	YES	YES
ROR-trends	NO	NO	YES	NO	NO	YES
ROR Economic Characteristics	NO	YES	YES	NO	YES	YES

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, ROR fixed effects, year fixed effects. Columns 2-6 include local economic conditions at the ROR level. Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors are robust and clustered at ROR level.

FE=Fixed Effects model; 2SLS=Two stage least squares.

†F-test on the excluded instrument.

Table 4: Effect of Immigration on Doctor-Assessed Disability by Foreign-Born Status, Education and Occupational Type

Panel A	Nationality					
	(1)	(2)	(3)	(4)	(5)	(6)
	All		Natives		Immigrants	
	FE	2SLS-FE	FE	2SLS-FE	FE	2SLS-FE
% male immigrants	-0.007**	-0.015**	-0.004	-0.013**	-0.021	-0.044
	(0.003)	(0.006)	(0.003)	(0.006)	(0.013)	(0.043)
$F^{\dagger}$		40.03		40.86		16.16
Mean of Dep. Var.	0.0749	0.0749	0.0733	0.0733	0.0756	0.0756
Std. Dev. of Dep. Var	0.2632	0.2632	0.2606	0.2606	0.2644	0.2644
Observations	48,849	48,849	42,045	42,045	6,745	6,745
Number of individuals	8,787	8,787	7,585	7,585	1,191	1,191

Panel B	Education					
	All		No College		College	
	FE	2SLS-FE	FE	2SLS-FE	FE	2SLS-FE
% male immigrants	-0.007**	-0.015**	-0.008**	-0.023**	-0.001	0.000
	(0.003)	(0.006)	(0.004)	(0.010)	(0.001)	(0.002)
$F^{\dagger}$		40.03		28.37		44.31
Mean of Dep. Var.	0.0749	0.0749	0.0853	0.0853	0.0409	0.0409
Std. Dev. of Dep. Var	0.2632	0.2632	0.2771	0.2771	0.1980	0.1980
Observations	48,849	48,849	37,263	37,263	10,918	10,918
Number of individuals	8,787	8,787	6,793	6,793	2,158	2,158

Panel C	Occupational Type: White vs Blue Collars					
	All		Blue Collars		White Collars	
	FE	2SLS	FE	2SLS	FE	2SLS
% male immigrants	-0.007**	-0.015**	-0.007*	-0.018**	-0.003	-0.002
	(0.003)	(0.006)	(0.004)	(0.010)	(0.003)	(0.007)
$F^{\dagger}$		40.03		17.85		47.16
Mean of Dep. Var.	0.0749	0.0749	0.0593	0.0593	0.0756	0.0756
Std. Dev. of Dep. Var	0.2632	0.2632	0.2361	0.2361	0.2644	0.2644
Observations	48,849	48,849	18,926	18,926	23,011	23,011
Number of individuals	8,787	8,787	4,078	4,078	4,864	4,864

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate) marital status, number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level. Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors are robust and clustered at ROR level.

†F-test on the excluded instrument.

Table 5: Effect of Immigration on Physical Burden, Men

	(1)	(2)	(3)	(4)	(5)	(6)
	1999-2009			2001		
	Blue collar	Physical burden		Perceived physical burden		
			Panel A: Fixed Effects			
% male immigrants	0.001	-0.017	0.009	-0.001	0.008	0.008
	(0.004)	(0.027)	(0.022)	(0.008)	(0.008)	(0.008)
% male immigrants*blue			-0.083**		-0.017***	-0.014***
			(0.038)		(0.005)	(0.005)
Blue collar			4.031***		0.292***	0.143***
			(0.176)		(0.028)	(0.031)
Observations	49,937	49,270	49,270	3,305	3,258	3,258
Number of individuals	8,984	8,889	8,889			
			Panel B: 2SLS-Fixed Effects			
% male immigrants	-0.013	-0.068	-0.013	0.053	0.027	0.027
	(0.017)	(0.100)	(0.079)	(0.043)	(0.034)	(0.034)
% male immigrants*blue			-0.080*		-0.017**	-0.014**
			(0.043)		(0.007)	(0.007)
Blue collar			4.021***		0.292***	0.140***
			(0.201)		(0.037)	(0.042)
Observations	49,937	49,270	49,270	3,305	3,258	3,258
Number of individuals	8,984	8,889	8,889			
ROR FE	YES	YES	YES	NO	NO	NO
NUTS1 FE	NO	NO	NO	YES	YES	YES
Physical burden FE	NO	NO	NO	NO	NO	YES
INDIVIDUAL FE	YES	YES	YES	NO	NO	NO
Mean of Dep. Var.	5.6926	5.6926	5.6926	0.1954	0.1900	0.1900
Std. Dev. of Dep. Var	3.0772	3.0772	3.0772	0.3966	0.3924	0.3924

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level. Columns 1-3 report the estimates obtained using the within estimator (FE) including ROR and survey year fixed effects. The dependent variable in column 1 is an indicator for whether the worker reported being employed in a blue-collar occupation; in columns 2 and 3 the dependent variable is the physical burden index associated with a given occupation; in columns 4, 5, and 6 the dependent variable is the perceived physical burden. In column 3, the effect of immigration rate is interacted with the blue collar dummy. Columns 4, 5 and 6 control for NUTS-1 fixed effects. Column 6 includes a full set of dummies for the value of physical burden index. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Standard errors are robust and clustered at ROR level.

Table 6: Effect of Immigration on Labor Market Outcomes, by Education

	(1) FE	(2) 2SLS-FE	(3) FE	(4) 2SLS-FE	(5) FE	(6) 2SLS-FE
	Employed	Employed	log(Annual Wage)	log(Annual Wage)	Weekly Hours	Weekly Hours
Panel A: Overall Sample						
% male immigrants	0.007	-0.012	0.018	0.043	-0.403**	-0.349
	(0.005)	(0.016)	(0.014)	(0.031)	(0.180)	(0.504)
Mean of Dep. Var.	0.8717	0.8717	10.2246	10.2246	44.5152	44.5152
Std. Err. of Dep. Var.	0.3412	0.3412	0.7045	0.7045	10.2442	10.2442
Observations	58,049	58,049	46,808	46,808	49,335	49,335
Number of individuals	9,776	9,776	8,427	8,427	8,968	8,968
Panel B: No college						
% male immigrants	0.009	-0.013	-0.003	-0.014	-0.555**	-1.429*
	(0.007)	(0.022)	(0.014)	(0.039)	(0.212)	(0.758)
Mean of Dep. Var.	0.8509	0.8509	10.1108	10.1108	43.9335	43.9335
Std. Err. of Dep. Var.	0.3511	0.3511	0.6675	0.6675	10.2442	10.2442
Observations	44,183	44,183	35,618	35,618	36,683	36,683
Number of individuals	7,556	7,556	6,468	6,468	6,765	6,765
Panel C: College						
% male immigrants	0.009	0.003	0.070***	0.138***	0.055	0.851
	(0.007)	(0.019)	(0.022)	(0.044)	(0.219)	(0.587)
Mean of Dep. Var.	0.9456	0.9456	10.1108	10.1108	46.3353	46.3353
Std. Err. of Dep. Var.	0.2266	0.2266	0.6675	0.6675	10.1816	10.1816
Observations	13,057	13,057	10,586	10,586	12,043	12,043
Number of individuals	2,404	2,404	2,048	2,048	2,309	2,309

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level. All models include individual fixed-effects. Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors are robust and clustered at ROR level.

Appendix A

Table A.1: Healthy Immigrant Effects by occupation (*assessed disability*), Women

	(1)	(2)	(3)	(4)
	QFE	FE	QFE	FE
Arrived before 1980	-0.0397***		-0.0390**	
	(0.013)		(0.018)	
Arrived 1980-1990	-0.0423***		-0.0421***	
	(0.008)		(0.012)	
Arrived after 1990	-0.0384***		-0.0390***	
	(0.008)		(0.011)	
YSM	0.0005	0.0005	0.0017	0.0017
	(0.001)	(0.001)	(0.001)	(0.002)
Low physical burden*YSM			-0.000	0.0004
			(0.001)	(0.001)
YSM^2	-0.0000	-0.0000	-0.0000	-0.0000
	(0.000)	(0.000)	(0.000)	(0.000)
Constant	0.3784***		0.2902***	
Mean of Dep. Var.	0.0632	0.0632	0.0480	0.0480
Std. Dev. of Dep. Var.	0.2432	0.2432	0.2139	0.2139
Observations	115,883	115,883	65,755	65,755
Number of individuals	16,152	16,152	10,886	10,886

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, NUTS-2 fixed effects, and year fixed effects. Quasi fixed effects estimates (QFE) are random effects estimates augmented with the individual mean over time of the socio-demographic controls. Column 3 and 4 interact YSM with a dummy for people employed in low physical demanding jobs in the previous year. Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors are robust and clustered at the ROR level.

Table A.2: Immigrants by Arrival Cohort, Country of Origin and Education

	(1)	(2)	(3)	(4)	(5)	(6)
	Arrived before 1980		Arrived 1980-1990		Arrived after 1990	
Origin	Education	%	Education	%	Education	%
Turkish	9.217	30.346	9.410	27.230	9.596	13.867
Mediterranean	9.243	34.805	9.588	10.139	10.052	8.264
Balkan	9.745	18.237	9.666	6.701	10.808	9.347
East and Russia	11.291	7.356	11.507	40.846	11.020	48.802
Other	12.162	9.256	12.342	15.084	11.797	19.720
Germans*	10.989		11.310		12.124	

Notes - For immigrants who arrived before 1980, we consider Germans who were over 40 in the waves 1985-1989 as a reference group; for immigrants arrived between 1980 and 1989, we consider all Germans aged 25-59 in the waves 1985-1989; for immigrants arrived after 1989, we consider all Germans (aged 25-59) in the waves 1990-2009.

Table A.3: Immigrant Occupational Sorting

	(1)	(2)	(3)	(4)
	Men		Women	
	Physical burden	Blue collar	Physical burden	Blue collar
Arrived before 1980	1.4974***	0.2498***	1.2533***	0.2055***
	(0.112)	(0.022)	(0.178)	(0.037)
Arrived 1980-1990	1.5290***	0.1982***	1.3855***	0.0793***
	(0.108)	(0.018)	(0.122)	(0.013)
Arrived after 1990	1.0048***	0.1511***	1.1210***	0.1563***
	(0.126)	(0.018)	(0.101)	(0.018)
Constant	8.1986***	0.2079***	5.1168***	0.1533***
Mean of Dep. Var.	5.9383	0.4830	4.9240	0.1952
Std. Dev.	3.0612	0.4997	2.5319	0.3963
Observations	105,964	107,381	83,827	84,479
Number of individuals	15,343	15,487	13,514	13,578

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, NUTS-2 fixed effects, and year fixed effects. Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors are robust and clustered at the ROR level. The model is estimated using the random effects estimator.

Table A.4: Effect of Immigration on Doctor-Assessed Disability, Women

	Fixed-Effects			2SLS-Fixed-Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
% immigrants	0.001	0.000	0.000	-0.001	-0.001	0.000
	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
$F^{\dagger}$				39.60	40.34	75.51
% female immigrants	0.001	0.001	0.000	-0.002	-0.003	-0.001
	(0.002)	(0.002)	(0.002)	(0.005)	(0.005)	(0.003)
$F^{\dagger}$				39.60	40.34	69.16
Mean of Dep. Var.	0.0670	0.0670	0.0670	0.0670	0.0674	0.0670
Std. Dev. of Dep.	0.2500	0.2500	0.2500	0.2500	0.2500	0.2500
Observations	53,305	53,305	53,305	53,305	53,305	53,305
Number of individuals	9,322	9,322	9,322	9,322	9,322	9,322
INDIVIDUAL F.E	YES	YES	YES	YES	YES	YES
YEAR F.E.	YES	YES	YES	YES	YES	YES
ROR-F.E.	YES	YES	YES	YES	YES	YES
ROR-trends	NO	NO	YES	NO	NO	YES
ROR Economic Characteristics	NO	YES	YES	NO	YES	YES

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, ROR fixed effects, year fixed effects. Column 2,3,5 and 6 include local economic conditions at the ROR level.

Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors are robust and clustered at the ROR level.

†F-test on the excluded instrument.

Table A.5: Internal Mobility, Immigration, and Health

	(1)	(2)	(3)
Dependent variable	Moving to a different ROR		
% male immigrants	-0.005		
	(0.023)		
Assessed disability (t)		0.004	
		(0.003)	
Assessed disability ($t-1$)			0.003
			(0.004)
Observations	49,066	48,849	48,653
Number of individuals	8,797	8,787	8,758

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, ROR fixed effects, year fixed effects. Significance levels: $***p < 0.01$, $**p < 0.05$, $*p < 0.1$. Standard errors are robust and clustered at ROR level.

Table A.6: Effects of Immigration on Assessed Disability, NUTS2 FE

Model	(1) FE-ROR	(2) FE-NUTS2	(3) 2SLS-FE-ROR	(4) 2SLS-FE-NUTS2
% male immigrants	-0.007**	-0.007*	-0.013**	-0.009
	(0.003)	(0.004)	(0.006)	(0.006)
Observations	48,849	48,849	48,849	48,849
Number of individuals	8,787	8,787	8,787	8,787

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high dropouts, high-school and college graduate), marital status, number of children, ROR -or NUTS2 in columns 2 and 4- fixed effects, year fixed effects and time-varying local economic conditions at the ROR level. Significance levels: $***p < 0.01$, $**p < 0.05$, $*p < 0.1$.

Table A.7: Robustness checks: Timing of the Effect of Immigration

Time:	Lagged [t-1;t-3]		Forward[t; t+2]	
	FE	2SLS-FE	FE	2SLS-FE
% male immigrants	-0.007**	-0.015**	-0.000	0.001
	(0.003)	(0.007)	(0.004)	(0.012)
$F^{\dagger}$		40.03		33.70
INDIVIDUAL F.E	YES	YES	YES	YES
YEAR F.E.	YES	YES	YES	YES
ROR F.E.	YES	YES	YES	YES
Observations	48,849	48,849	54,820	54,820
Number of individuals	8,787	8,787	9,518	9,518

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school drop-outs, high-school and college graduate), marital status, number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level. Significance levels: $^{***}p < 0.01$, $^{**}p < 0.05$, $^{*}p < 0.1$. Standard errors are robust and clustered and ROR level.

Table A.8: Effects of Immigration on Poor Health, Men

	Fixed-Effects			2SLS-Fixed-Effects		
	(1)	(2)	(3)	(4)	(5)	(6)
% male immigrants	-0.005	-0.005	-0.007*	-0.013	-0.012	-0.008
	(0.004)	(0.004)	(0.004)	(0.008)	(0.008)	(0.006)
$F^{\dagger}$				40.51	39.92	82.84
Observations	48,987	48,987	48,987	48,987	48,987	48,987
Number of individuals	8,794	8,794	8,794	8,794	8,794	8,794
Mean of Dep. Var.	0.168	0.168	0.168	0.168	0.168	0.168
Std. Dev. of Dep.	0.378	0.378	0.378	0.378	0.378	0.378
INDIVIDUAL F.E	YES	YES	YES	YES	YES	YES
YEAR F.E.	YES	YES	YES	YES	YES	YES
ROR-F.E.	YES	YES	YES	YES	YES	YES
ROR-trends	NO	NO	YES	NO	NO	YES
ROR Economic Characteristics	NO	YES	YES	NO	YES	YES

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, ROR fixed effects, year fixed effects. Column 2,3,5 and 6 include local economic conditions at the ROR level.

Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors are robust and clustered at ROR level

†F-test on the excluded instrument.

Table A.9: Robustness Checks: Correlated Random Effect Probit Model

	(1)	(2)	(3)
Panel A		Nationality	
	All	Natives	Immigrants
% male immigrants	-0.005***	-0.005**	-0.007
	(0.002)	(0.002)	(0.006)
Observations	48,849	42,045	6,745
Panel B		Education	
	All	No College	College
% male immigrants	-0.005***	-0.030***	0.013
	(0.002)	(0.013)	(0.015)
Observations	48,849	37,263	10,918

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high-school dropouts, high-school and college graduate), marital status, number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level. We used a correlated random effect probit model including individual averages for age, education, and household size.

The reported coefficients are average partial effects (APE). Significance levels: ***$p < 0.01$, **$p < 0.05$, *$p < 0.1$. Standard errors are robust and clustered at ROR level.