DISCUSSION PAPER SERIES

IZA DP No. 8073

Do Immigrants Bring Good Health?

Osea Giuntella
Fabrizio Mazzonna

March 2014

Forschungsinstitut
zur Zukunft der Arbeit
Institute for the Study
of Labor

Do Immigrants Bring Good Health?

Osea Giuntella
University of Oxford
and IZA

Fabrizio Mazzonna
University of Lugano
and MEA

Discussion Paper No. 8073
March 2014

IZA

P.O. Box 7240
53072 Bonn
Germany

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

IZA Discussion Paper No. 8073
March 2014

ABSTRACT

Do Immigrants Bring Good Health?*

This paper studies the effects of immigration on health. We merge information on individual characteristics from the German Socio-Economic Panel with detailed local labor market characteristics for the period 1984 to 2009. We exploit the longitudinal component of the data to analyze how immigration affects the health of both immigrants and natives over time. Immigrants are shown to be healthier than natives upon their arrival ("healthy immigrant effect"), but their health deteriorates over time spent in Germany. We show that the convergence in health is heterogeneous across immigrants and faster among those working in more physically demanding jobs. Immigrants are significantly more likely to work in strenuous occupations. In light of these facts, we investigate whether changes in the spatial concentration of immigrants affect natives' health. Our results suggest that immigration reduces residents' likelihood to report negative health outcomes by improving their working conditions and reducing the average workload. We show that these effects are concentrated in blue-collar occupations and are larger among low educated natives and previous cohorts of immigrants.

JEL Classification: F22, I10, J15, J61

Keywords: immigration, health

Corresponding author:

Osea Giuntella
University of Oxford
Nuffield College
Blavatnik School of Government
10 Merton Street
OX1 4JJ, Oxford, Oxfordshire
United Kingdom
E-mail: osea.giuntella@bsg.ox.ac.uk

* Rafael Gruber provided precious research assistance. We are thankful to Catia Nicodemo and Raphael Parchet for their comments and suggestions. We are also grateful to participants at workshops and seminars at University of Lugano, University of Oxford, the 2013 Immigration in OECD Countries Conference, the Max Planck Institute.

IZA Discussion Paper No. 8073
March 2014

NON-TECHNICAL SUMMARY

In the public debate, immigration is often blamed for increased healthcare costs and taxpayer burden. However, empirical evidence shows that immigrants are typically young and relatively healthy and, therefore, less likely to use health care than natives. Indeed, a voluminous set of studies provides evidence of a "healthy immigrant effect". Immigrants are healthier than their population of origin and than natives upon their arrival, but their health deteriorates with time spent in the host country. 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. Despite the evidence that immigrants are more likely to work in occupations that involve higher physical burden and are associated with higher risk of negative health outcomes, the relationship between working conditions and the health trajectories of immigrants has been largely ignored by previous studies.

In this paper, we argue that one of the mechanisms underlying the immigrant health deterioration is the self-selection of immigrants in more strenuous occupations. Furthermore, we test whether immigration, increasing the supply of healthy low skilled workers and leading natives to shift towards better working conditions, improves natives' health. The main idea is that as immigrants are relatively healthy and have lower human capital and less financial endowments than natives, they have incentives to trade off health for higher lifetime earnings, accepting worse working conditions for higher wages. Using German data from 1996 to 2010, this paper shows that the health deterioration of immigrants is larger among immigrants working in more physically demanding jobs. Immigrants arrive healthier, but their health advantage erodes over time. In particular, the health deterioration is significantly larger among immigrants working in blue-collar jobs, with their health converging to the level of natives in less than 10 years. Differences in the initial endowments and composition of capital (health, human capital, and financial endowments) between immigrant and natives can explain the reallocation of tasks in the population and the positive effects of immigration on health outcomes. In light of these facts, we investigate whether changes in the spatial concentration of immigrants affect natives' health.

We find that a higher immigration rate increases natives' likelihood of reporting better health outcomes. Effects are larger, but less precisely estimated for previous cohorts of immigrants. Consistently with our hypothesis, the positive effects are concentrated on among low skilled men in blue-collars jobs. We find that immigration reduces the degree of physical intensity, the number of hours worked, and the likelihood of working at night among blue-collar workers. The effects of immigration on these observable working conditions can explain roughly 25% of the reduced form effect of immigration on health. At the same time, consistently with previous studies, we find no evidence of significant effects on wages and employment.

Our results suggest that policy makers should not neglect the positive effects of immigration on health outcomes. Furthermore, as newly and healthy immigrants might not be fully aware of the health risks associated with particular working conditions, granting information and access to care to those immigrants at higher risk could contain the process of unhealthy assimilation and the associated costs for the health care system.

1 Introduction

In the public debate immigration is often blamed for increased healthcare costs and taxpayer burden. At the same time, empirical evidence shows that immigrants are typically young and relatively healthy and, therefore, less likely to use health care than natives (Goldman et al., 2006). Indeed, a voluminous set of studies provides evidence of a "healthy immigrant effect". Immigrants are healthier than their population of origin and than natives upon their arrival, but their health deteriorates with time spent in the host country. These paradoxical facts are observed across several countries and different 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 work analyzing the "healthy immigrant effect" focused on selection, behaviors 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, the relationship between working conditions and the health trajectories of immigrants has been largely ignored by previous studies. However, there is the evidence that immigrants are more likely to work in riskier occupations, and to have worse schedules (Orrenius and Zavodny, 2012, 2009; Giuntella, 2012). In addition, several studies show that physical requirements and environmental conditions affect the aging profile with negative effects on health (Case and Deaton, 2005; Fletcher and Sindelar, 2009; Fletcher et al., 2011; Ravesteijn et al., 2013). In this paper, we hypothesize that the sorting of immigrants in more strenuous occupations contributes to explain the observed deterioration in the health of immigrants. Furthermore, we test whether immigration, increasing the supply of healthy low skilled workers and leading natives to shift towards better working conditions, improves natives' health.

While there exists a voluminous literature on the effects of immigration on wages, employment and prices (Card, 1990; Hunt, 1992; Friedberg and Hunt, 1995; Borjas, 1995; Carrington and Lima, 1996; Borjas et al., 2011, 2008; Ottaviano and Peri, 2012), little is known about the possible effects on other working conditions that are known to affect health. This paper studies how the sorting of immigrants across jobs affects their health trajectories, and in turn the health of natives and previous immigrant cohorts. Our contribution is twofold. First, we focus on one of the mechanisms affecting immigrants' health convergence by analyzing the role of occupations. Secondly, to the best of our knowledge this is the first paper studying the effects of immigration on natives' health. We argue that differences in the initial endowments

and composition of capital (health, human capital, and financial endowments) between immigrant and natives can explain the reallocation of tasks in the population and the positive effects of immigration on health outcomes. Indeed, both the lack 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).

Similarly to Akay et al. (2012), who analyze the effect of immigration on individual well being, we focus on Germany, a country characterized by a large and diverse immigrant population. We exploit the richness of the German Socio-Economic Panel (GSOEP) which allows to analyze the health trajectories of a representative sample of both natives and immigrants in Germany. The GSOEP contains information on self-reported and doctor-assessed health conditions as well as a large set of socio-demographic characteristics. In addition, it includes occupational titles that can be used to classify occupations based on the total burden or the physical intensity associated with relative working conditions.

We document that regardless of their arrival cohort, immigrants are healthier than German-born upon arrival, but their health rapidly converges to the health of natives. However, the convergence is heterogeneous across immigrants and faster among male immigrants working in more physically demanding jobs. We show that immigrants are more likely to be employed in blue-collar jobs and to be exposed to work-related health risks for longer period than natives.

These facts can be explained by a standard Grossman (1972) health capital model with low-skilled individuals more willing to accept risky occupations, trading off health for higher lifetime earnings (Case and Deaton, 2005; Grossman, 1972). Immigrants may be more willing than natives to trade off higher wages for worse conditions. Furthermore, as immigrants appear to be positively selected on health with respect to their population of origin, their incentives to trade-off money for health capital are even larger.

Having shown important differences in the likelihood of immigrants to work in riskier occupations, we turn to investigate how immigration affects the health trajectories of both natives and immigrants in Germany. Merging the GSOEP with local labor market characteristics allows us to analyze how changes in the spatial concentration of immigrants over time affects health in the resident population. Including individual fixed effects allows us to analyze how changes in the individual exposure to immigrants affected his working conditions and health over time. Controlling for local labor market fixed effects and a set of time varying local labor market characteristics, we are able to account for the omitted variable bias associated with permanent local area characteristics or correlated with important time-varying factors (GDP, unemployment etc.). To further address the concern of endogenous

location of immigrants across Germany, we use the traditional shift-share instrument (Card, 2001). Our results are robust to alternative model specifications and estimation methods.

We find that a higher immigration rate increases natives' likelihood of reporting better health outcomes. Effects are larger, but less precisely estimated for previous cohorts of immigrants. Consistently with our hypothesis, the positive effects are concentrated on among low skilled men in blue-collars 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 degree of physical intensity, the number of hours worked, and the likelihood of working at night among blue-collar workers. At the same time, consistently with previous studies, we find no evidence of significant effects on wages and employment. The effects of immigration on these observable working conditions can explain roughly 25% of the reduced form effect of immigration on health.

The paper is organized as follows. Section 2 presents the data, discusses the healthy immigrant effect and illustrates the role of occupation in affecting the convergence over time. In Section 3, we analyze the effect of immigration on natives' health and explore the possible mechanisms behind it. Concluding remarks are reported in Section 4.

2 Data and Stylized Facts

2.1 Data

Our main data are drawn from the German Socio-Economic Panel dataset (GSOEP). The GSOEP is a longitudinal panel dataset that contains information on a rich set of individual socio-economic characteristics. This annual household based study started in 1984 and includes annual information on about 12,000 households, and more than 20,000 individuals. Annually, each household member above the age of 16 is asked questions on a broad range of socio-economic indicators. In addition, the head of the household completes a household questionnaire that gathers information on household income, housing, and children below the age of 16. The panel is unbalanced as some respondents enter the sample after 1984 and other left the sample before 2010. The GSOEP oversamples immigrants and contains several questions on both health outcomes and job characteristics, making it an ideal source to investigate the relationship between immigration, working conditions and health of both natives and immigrants. For a detailed description of the survey, see Haisken-DeNew and Frick (2005).

In particular, the GSOEP provides information on several health metrics (self-assessed health status, satisfaction with health, number of hospital visits, etc.). 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. The question is: "What is the extent of this capability reduction or handicap (in percentages) according to the most recent diagnosis?" We use an indicator for whether individuals reported a disability higher than 30%.[1] Though, it is still self-reported, this variable relies on doctor-assessment and, therefore, it is less subject to heterogeneity in the perception of health. This is particularly relevant for us, as we compare immigrants and natives' health and self-assessment may vary systematically across ethnicities. Moreover, since as we hypothesize that immigration might improve the average working conditions of natives, and therefore, affect health, it is natural to focus on a health metric that is strongly affected by work related injuries (that might lead to some disability). In the Appendix, we evaluate the robustness of our results using subjective health measures, such as self-rated health (that we dichotomize as poor health) and handicap due to poor health (impediment in carrying out day-to-day activities).

The GSOEP 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 1-10 metric of the physical intensity (*physical burden*) associated with a given occupational title. Furthermore, we can classify workers in major occupations (1-digit) and identify blue and white collars using the standard OECD classifications.

Using the information on the geographical residence of the individual we merged individual-level information with data on local labor market characteristics drawn from the INKAR dataset at the level of German regional policy regions (ROR). Regional policy regions are defined based on their economic inter-linkages by the Federal Office for Building and Regional Planning. There are 97 regional policy areas. Our main variable of interest is the percentage of immigrants in the total resident population in a ROR. From the INKAR dataset we also draw information on employment rate, GDP per capita, and gross value added per worker. As this dataset is available only for the period 1996-2009, we restrict the analysis of the effects of immigration (Section 4) to this time period.

We report summary statistics for the main variables used in Table 1. Columns 1-4 report means and standard deviation by immigrant status. We restrict the analysis to individuals aged between 25 and 59 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. When considering

[1] We consider the robustness of the results moving upward or downward the degree of disability.

the unconditional mean differences, there seems to be no evidence of a healthy immigrant effect for men (Panel A). In fact, there are only slight and not significant differences in health status between Germans and immigrants. However, there are large socio-economic differences between the two populations. Immigrants are less educated and have lower wages. They are also more than twice as likely than Germans to work in blue-collar occupations and on average work 2.6 years more in these occupations in our sample. We divide immigrants in three main cohorts of arrival: 60% of the immigrants arrived before the 80s, with the remaining 40% almost equally divided between the 80s and post-80s cohort.[2] Among immigrants, the average number of years spent in Germany in the sample is 18 years.

Panel B shows that among women the incidence of doctor-assessed disability is significantly smaller among immigrants than among natives. In the next section, analyzing the health trajectories of immigrants over time, we show that among immigrant men have a larger health advantage than immigrant women upon arrival, but their health converges to natives' health at a faster pace. This is particularly true when we focus on doctor-assessed disability and it is consistent with the fact that women are less likely to be employed in strenuous jobs. As evident in Table 1, men are much more likely to be employed in blue collars jobs (80% vs. 40%) and in occupations characterized by a higher physical burden (7.6 for men vs. 6.6 for women). In Column 5-8, we report the same statistics for the sample used in Section 4 and restrict the analysis to 1996 onwards.

2.2 Stylized Facts: Immigrant Health and Working Conditions

Figure 1 illustrates the health trajectories of immigrants over time spent in Germany. We focus on a balanced panel of individuals aged between 25 and 34 years old in the first wave of the survey (1984) to observe individual for a sufficiently long span of time and to avoid selection concerns related to attrition and early retirement. For immigrants, we exclude those who had been in Germany for more than 10 years as of 1984, as we are interested in analyzing the health trajectories following migration. To keep enough observations, we pooled immigrants with less than 10 years in Germany.[3]

[2]Preliminary analysis conducted to identify the most important waves of immigration in Germany had also shown that these waves are also strongly connected with the most important nationality groups present in the data (see Table A.2, in the Appendix). In particular, the first wave of migration considered, immigrant arrived before the '80s, is composed mainly by immigrants from Turkey, ex-Jugoslavia and other Mediterranean countries (Italy, Greece and Spain). First-wave immigrants were mostly low skilled employed in blue-collar occupations. The second and third waves are instead more heterogeneous. As a matter of fact, the largest share of immigrants came from Eastern Europe and Russia. On average more recent immigrants show higher educational attainment.

[3]The patterns are substantially unchanged when considering individuals aged between 25 and 34 drawn from the refreshment sample of 1995.

Immigrants, both men and women, are found to be healthier upon arrival with a lower incidence of doctor-assessed disability than the one observed among natives. While this initial health advantage might be partially explained by the fact that upon arrival immigrants are less likely to visit a German doctor and therefore to report it, we find a similar result when considering perceived health status. However, over time the average incidence of doctor-assessed disability grows significantly faster among immigrant men than among natives. Interestingly, we do not observe convergence among women. As afore mentioned, the literature on the healthy immigrant effect has largely focused on selectivity, behavioral assimilation, return migration, and access to care (Antecol and Bedard, 2006). The differences observed in the health trajectories of immigrant men and women suggest that mechanisms other than differences in access to care, may explain the unhealthy convergence observed among immigrant men. Consistently with our conjecture, using the GSOEP, Sander (2009) finds no evidence that German language skills and years since migration have significant effects on the likelihood of contacting a doctor and on the number of doctor visits.

While we acknowledge that assimilation in behaviors (dietary and substance use) are important mechanisms underlying the health trajectories of immigrants over time, in this paper we focus on the role of working conditions in the hosting country, which has been largely neglected in the literature.[4] As shown in Table 1, immigrant men are more likely than natives to work in occupations that involve higher physical intensity. In Table A.4, we report immigrant native differences in the likelihood of working in physically demanding jobs. In particular, being an immigrant is associated with an increase in the index of physical intensity of the job ranging between 20% and 30% (with respect to the mean) depending on the cohort considered. While these differences are observed among men and women, both the employment rate and the average number of hours worked are significantly lower among immigrant women. Therefore, the share of women working in high physically demanding jobs is considerably lower than the one observed among men.

Recent studies have shown evidence that working in physically demanding occupations has negative effects on health(Ravesteijn et al., 2013; Case and Deaton, 2005; Fletcher et al., 2011).[5] Consistently with these facts, Figure 2 shows that the deterioration of immigrant health is driven by those individuals working in high physically demanding occupations.

Table 2 provides more evidence on these health trajectories analyzing health differences

[4]Sander (2009) documented that while there is evidence of unhealthy assimilation in body mass index, alcohol consumption and smoking behaviors if anything decrease with time spent in Germany. She finds evidence that return migration contributes to explain the health deterioration of immigrants, as healthy immigrants are more likely to return home.

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

between immigrant and native men. Columns 1 reports the results from quasi-fixed effect model (QFE) including controls for the individual average age, education, marital status, employment status and household size, which allow us to include time-invariant characteristics (e.g. immigrant cohort). In columns 2 we use individual fixed effects (FE) and analyze the health trajectories of immigrants including a quadratic in years since migration (YSM). We assign value equal to zero for German-born individuals who are used as a benchmark. We include a quadratic in age, an indicator for marital status, dummies for three educational groups (less than high school degree, high-school degree, college degree), regional fixed effects (NUTS2), and survey year fixed effects. Standard errors are clustered at the individual level.[6] Given the discrete nature of our dependent variable, we evaluate the robustness of our results using nonlinear panel data methods such as a random effect probit model.[7] Regardless of their arrival cohort, immigrants are found to be healthier than German-born upon arrival, once we control for socio-demographic characteristics and YSM. In particular, immigrant men have a much lower incidence of doctor assessed disability than natives upon arrival (-0.06, see column 1) but their health quite rapidly converge to natives' health, in roughly 15 years (see the coefficient on YSM). Consistently with Figure 2, columns 3 and 4 show that, conditional on previous year type of job, the yearly rate of health depreciation associated with time spent in Germany (YSM) is significantly lower among men employed in low physical burden jobs (physical intensity of the job lower than the median). These results are robust to the inclusion of controls for German language skills (as proxy for integration) and to the restriction of the analysis only on the immigrant sub-sample.

In Table A.1 we report the same analysis for women and shows that conditioning on standard socio-demographic controls, the health advantage upon arrival is relatively smaller among women (see column 1). Health selectivity at the time of migration appears to be less important among female immigrants than among men.[8] Interestingly, the coefficient on the interaction between the level of physical burden and time spent in Germany has no significant effects among women. Again, women employed are a highly selected sample and, even when employed in blue collar jobs, they are likely to work in less physically demanding occupations (see Table 1).

[6]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 in the GSOEP data (1984-2010). Note that while we do have information on regional policy regions (ROR), these regions were redefined in 1996 and, therefore, can only be used for pre/post 1996 analysis ignoring the readjustment of ROR (Knies and Spiess, 2007).

[7]Result -available upon request- are very similar to those reported in this Section.

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

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 is faster among immigrants working in blue-collar jobs. In light of these facts, it is natural to ask whether immigration affected the distribution of jobs among natives and their working conditions.

3 Effects of Immigration on Health

Figure 3 depicts a strong negative association between immigration and the average physical burden of the men's job at the ROR level. We use a lagged value of the immigration rate because it is very hard to believe that immigration has an immediate effect on natives' health in particular if we consider a disability status that has to be assessed by a doctor. In Figure 4, we observe only a slightly negative relationship between the share of men reporting a disability in a ROR and men's immigration rate in the previous year (the coefficient on immigration is very small but significant at 5% level). These associations are in line with our conjecture that immigration, by increasing the supply of workers willing to trade-off health for higher life-time earnings, may induce a reallocation of tasks in the resident population and in turn have positive spillovers on their health.

3.1 Empirical Specification

To identify the effect of immigration on the health of the resident population, we exploit over time variation in the share of immigrants living in a ROR between 1996 and 2010. In our baseline specification we model health according to the following static linear model:

$$h^*_{irt} = \alpha_i + \beta IR_{rt-1} + X'_{irt}\gamma + Z'_{rt}\lambda + \delta_r + \theta_t + \epsilon_{irt}, \tag{1}$$

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, IR_{rt-1} is the immigration rate in ROR r in the previous year, 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, and ϵ_{irt} captures the residual variation in health status. The preferred estimation method for this model would be the FE estimators which 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 some health binary indicators (h_{irt}), such as disability status or self reported poor health, with an

observation mechanism that can be expressed as:

$$H_{irt} = \mathbb{1}\{h^*_{irt} > 0\}. \tag{2}$$

For this reason, a straightforward choice would be the use of non linear models, such as probit or logit. However, with these models we cannot rule out the individual effect, α_i, using within transformation nor we can directly estimate it because of the well-know incidental parameters problem. As we are interested in estimating the average effect of immigration in the population, the linear probability model might represent a good approximation of the effect of interest (Angrist and Pischke, 2008). However, as robustness, we estimate equation (1) using a correlated random effect probit estimator and allowing a restricted dependence between α_i and the regressors in X'_{irt} (Wooldridge, 2002). In practice, we use a random-effects model augmented with means of time-variant individual characteristics.

Another relevant concern is that there might be confounding factors that are both correlated with the distribution of immigrants across RORs and individual health. In particular, one could argue that the large number of controls for labor market and economic condition at ROR level may not be sufficient to account for all the time-varying unobservables that could confound the relationship between immigration rate and health. We think that the extensive set of observable individual characteristics, the ROR fixed effects and ROR time-varying controls capture most of the potential omitted variables. If anything, we think that pull factors that attract more immigration, such as the economic conditions of the RORs, should lead to a downward bias of the effect of interest, given the well-known negative (short run) correlation between economic cycle and health (Ruhm, 2000). However, to further address these concerns, we include ROR specific time trends and use an instrumental variables approach. Following Card (2001), we use an instrumental variable based on a "shift-share" of national levels of immigration into RORs. In practice, we exploit the fact that immigrants tend to locate in areas with higher density of immigrants from their own country and distribute the annual national inflow of immigrants from a given source country using the 1996 distribution of immigrants from a given country of origin across RORs.[9] Using the distribution of immigrants as of 1996 we reduce the risk of endogeneity due to the fact that annual immigration inflows across RORs might be driven by time-varying characteristics of the ROR associated with health outcomes.

Finally, we assess the robustness of our findings to different assumptions about the timing of the effect of immigration on health. As mentioned above, there are no reasons to think that immigration should have direct and immediate effects on residents' health, in particular if

[9]Note that the classification of ROR's changed in 1996 and therefore we cannot use earlier years as a base to construct our shift-share instrument.

we think that immigration affects health through its impact on the labor market. Therefore, we used lagged values of immigration rate to predict its effects on health. To not lose too many observations, we show results using only immigration rate at time $t-1$. However, as a robustness check, we consider past values of immigration rate up to $t-3$. Moreover, we implement placebo tests on forward value of the immigration rate (up to $t+1$) (see Table A.2 in the Appendix).

3.2 Results

Table 3 illustrates the effect of immigration on doctor assessed disability on men (Panel A) and women (Panel B). In each panel we report the effect of the total immigration rate and that of the gender-specific immigration rates (separated estimates). In the light of the result reported in Section 3, gender specific immigration rates may better proxy for the actual exposure to immigrants in the labor market. As described in Section 3.1, we estimate this model using individual fixed effects and a two stage least squares model using the Card (2001) instrument. Column 1 controls for a set of individual socio-demographic controls (a quadratic in age, gender, a dummy for East Germany, education, marital status, the logarithm of household size), ROR fixed effects, survey year fixed effects, and a set of time-varying characteristics at the ROR level (gross value added, GDP per capita, employment rate, the logarithm of total population). In column 2, we include ROR-specific time trends. Finally we report the 2SLS estimates in column 3.

Panel A shows that immigration is negatively associated with men's likelihood of reporting a doctor assessed disability. As expected the coefficient is larger when using the gender-specific immigration rate. The 2SLS estimate confirms that immigration reduces the likelihood of reporting doctor-assessed disability. A one standard deviation increase in the immigration rate (2.35 percentage points) reduces the risk of doctor-assessed disability by roughly 16%, with respect to the mean. As expected, see the discussion in Section (3.1), 2SLS point estimates are larger.

On the contrary, we do not find significant effects among women (Panel B). This finding can be explained by the fact that women have lower likelihood of being employed in blue-collar and more generally in physical demanding jobs. If we believe that the mechanism behind the effect of immigration on health is the change in the average working conditions, it is not surprising to find no effects among women who are less likely work in strenuous occupations.

Having assessed the presence of a significant negative effect of immigration rate on men's likelihood of reporting a disability, in Table 4, we explore the heterogeneity in the effect of

men's immigration rate by foreign born status (Panel A), education (Panel B), and occupational type (Panel C). We report results from both FE and 2SLS. The effects are significantly larger among individuals who are more likely to work in physically demanding jobs, namely previous cohorts of immigrants and low skilled. Among immigrants, the 2SLS coefficient is less precisely estimated, but the point estimate is substantially unchanged. Among natives the effects are relatively smaller than those found in the whole resident population. Interestingly, Panel B shows that the effect is concentrated among people without college education, while for college graduate the estimated effect is small and not statically different from zero. 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 were in jobs at higher risk of negative health effects will benefit the most from an increase in the supply of low-skilled and relatively healthy immigrants.

Consistently with previous analysis we do not find evidence of significant effects on women.[10]

3.3 Possible Mechanisms

To shed further light on the potential mechanism underlying our reduced-form results on the effects of immigration on health, we turn to analyze the effects of immigration on the labor market. In Table 5 we analyze whether immigration affected the likelihood of individuals of being employed in occupations involving different level of physical burden.

For reason of space, we report only results form FE estimate but the 2SLS estimates are consistent with those reported in the Table. Column 1 shows no effect of immigration on the likelihood of working in blue-collar occupations. In column 2, we consider a more precise measure of the physical intensity associated with a given occupation. Again, we do not find evidence of significant effects on physical burden. However, column 3 shows that immigration significantly reduces the average physical burden of people previously employed in blue-collar occupations. A one standard deviation increase in immigration decreases by 4% the average physical burden.[11] The estimated effect is rather small and can only partially account for the positive effect of immigration on health. This suggests that the reallocation of tasks and jobs might occur within similar occupations, rather than across macro categories. In other words, we do not observe dramatic shifts from white to blue collar jobs. However, we do have some evidence that among blue-collars an increase in the immigration rate in the

[10] The results are available upon request.

[11] Consistently with our previous results, we find no evidence of significant effects for women. Results are available upon request.

ROR is associated with a reduction in the average physical burden. Unfortunately we do not observe task changes within the same job over time, but only changes in the physical burden associated to job changes. If as suggested by column 3, most of the effect of immigration on workers' physical burden occurs across similar occupations, 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 on perceived strenuousness of the occupation. Information on perceived physical intensity is asked only in the 2001 survey. Columns 4 and 5 replicate the results presented in columns 2 and 3 using for perceived physical burden. As we only have information for one year, we can only exploit cross-sectional variation across RORs to identify the effects of immigration. For this reason, we use a simple OLS regression including area fixed effects at the level of NUTS-1.[12] The results suggest that immigration is associated with a reduction on the the perceived physical burden. One standard deviation increase in the immigration rate is associated with a 25% reduction in perceived physical burden. Furthermore, consistently with our prior, column 6 show that the coefficient is robust to the inclusion of a full set of dummies for each value of the physical burden of the occupation derived from the dependent variable in column 2 and 3. Again, this result suggest that our objective measure of physical burden is able to capture only a small part of the total effect of immigration on workers' physical burden.

In Table 6, we analyze the effects of immigration on a broad set of labor market outcomes and working conditions.[13] Columns 1 and 2 confirm previous studies finding no evidence of negative effects on employment and wages. If anything, and consistently with D'Amuri and Peri (2010), our estimates suggest positive and slightly significant effects on wages. Even more interestingly, an increase in the immigration rate significantly reduces the number of working hours (column 3), the likelihood of working overtime (column 4), and the likelihood of working nightly shifts (column 5). The effect on nightly shifts is not precisely estimated as this information is available only in few waves of the survey. However, the estimate is significant when using quasi-fixed effects (coef. -0.015**; s.e.: 0.006).[14]

Overall, these results suggest that a part of the positive effect of immigration on health should be explained by the reduction of average working load and better schedules, with no

[12]The coefficients are substantially unchanged, but less precisely estimated, when using NUTS-2 fixed effects.

[13]For space considerations, we do not report the 2SLS estimates. However, the results are largely consistent with the estimates presented in 6.

[14]The quasi-fixed effect estimates controls for the individual average age, education, marital status, employment status and household size. Using quasi-fixed effects, we find also find a negative effect of immigration on the likelihood of working evening shifts, working on Sundays, and on the perceived risk of work accidents.

detrimental effect on the wages. Indeed, column 6 shows that immigration is also significantly associated with a reduction in the share of individuals reporting to be concerned about their health status. Including in our baseline specification (Table 5, column 1) controls for income, employment status, working hours, indicators for whether individuals worked overtime hours or nightly shifts, and indicators for the average physical burden associated with the occupation reduces the effect of immigration on the doctor-assessed disability by roughly 25% (coef. -.0034 ; std.err. 0.0015).

3.4 Robustness Checks

As mentioned in Section 4.1, we replicate the estimates reported in Table 5 using the immigration rate at different points in time (both past and forward values). As a placebo test, we also estimate the effect of immigration rate at time $t+1$, which should not affect respondents' health at time t. Table A.3 shows the results of this analysis. As expected forward value of immigration rate does not affect respondents' health, while the contemporaneous effect is not statistically significant. Using lagged values of the immigration rate (up to $t-3$), we confirm the main finding of a positive effect of immigration on individual health, at the same time we find no evidence of significant effects when using the forward value of immigration rate ($t+1$).

The direction of the effect of immigration on health is confirmed when using more subjective health outcomes such as health limitations[15] and self-assessed health status (see Table A.5). Note that though the fixed effect estimate is not precise, the 2SLS estimates are larger and marginally significant.

Given the binary nature of our main outcome variable, doctor assessed disability, we replicate the result in Table 6 using a correlated random effect probit that includes the individual mean over time of some socio-demographic characteristics, among the regressors in the model. For computational reasons, we substitute the ROR fixed effect with a full set of NUTS2 fixed effect (52 regions). Table A.6 reports the average partial effect (APE, see Wooldridge 2005). Results are very similar to those estimated using linear FE (and smaller than the 2SLS). Again, we find larger effect among immigrants and low skilled.[16]

[15] Health limitations is used only as a robustness check as this variable is not available in all survey years.

[16] As an additional robustness check, we run group-level estimates at the ROR-year level. This approach allows us to transform our dependent variable in a continuous variable that measures the incidence of disability in a specific ROR at time t. The results, available upon request, are consistent with those reported so far, with large and significant effects when among low-skilled.

4 Conclusion

This paper contributes to previous studies on the effects of immigration by analyzing the impact of immigration on the health of immigrants and natives. First, we document the importance of occupations and physical burden in explaining the health trajectories of immigrants. We show that the convergence in health is heterogeneous across immigrants and, in particular, it is faster among those working in more physically demanding jobs. Immigrants are significantly more likely to work in these type of jobs and to be exposed to job-related health risks for longer periods. Secondly, we investigate whether the shock to labor 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 larger on previous cohorts of immigrants.

Our results suggest that immigration improves natives working conditions reducing the average number of hours worked, the physical intensity in blue-collar jobs and the likelihood of working nightly shifts. At the same time, consistently with previous studies, we find no evidence of negative effects on employment and wages, and positive effects health expectations. Overall, the improvement observed in these working conditions contributes to explain the reduced form effect on health. We argue that these results are consistent with the Grossman (1972) health capital model. Differences in the initial endowments and composition of capital (health, human, and financial endowments) between immigrant and natives can explain the reallocation of tasks in the population. The complementarity of tasks in the production function can account for both the lack of detrimental effects on employment and wages, and the reallocation of natives and previous immigrants in jobs involving better working conditions. These labor market effects explain the positive effects of immigration on health outcomes.

The evidence presented suggests that policy-makers should not neglect the positive effects of immigration on native working conditions and health. At the same time, as newly and healthy immigrants might not be aware of the health risks associated with particular working conditions, granting information and access to care to those immigrants at higher risk could contain the process of unhealthy assimilation and the associated costs for the health care system.

References

Akay, Alpsaslan, Amelie F. Constant, and Corrado Giulietti (2012) 'The impact of immigration on the well being of natives.' *IZA Discussion paper*

Angrist, Joshua D., and Jorn-Steffen Pischke (2008) *Mostly Harmless Econometrics: An empiricist's companion* (Princeton, NJ: Princeton University Press)

Antecol, Heather, and Kelly Bedard (2006) 'Unhealthy assimilation: Why do immigrants converge to American health status levels?' *Demography* 43(2), 337–360

Borjas, George J. (1995) 'The economic benefits from immigration.' *Journal of Economic Perspectives* 9(2), 3–22

Borjas, George J., Jeffrey Grogger, and Gordon H. Hanson (2008) 'Imperfect substitution between immigrants and natives: A reappraisal.' *NBER Working Paper*

_ (2011) 'Substitution between immigrants, natives, and skill groups.' *NBER Working Paper*

Card, David (1990) 'The impact of the Mariel boatlift on the Miami labor market.' *Industrial and Labor Relations Review* 43(2), 245–257

_ (2001) 'Immigrant inflows, native outflows, and the local labor market impacts of higher immigration.' *Journal of Labor Economics* 19(1), 22–64

Carrington, William J., and Pedro Lima (1996) 'The impact of 1970s repatriates from Africa on the Portuguese labor market.' *Industrial and Labor Relations Review* 42(9), 330–347

Case, Anne, and Angus Deaton (2005) 'Analyses in the economics of aging.' *NBER Chapters* (7588), 185–212

Chiswick, Barry R., Yew Liang Lee, and Paul W. Miller (2008) 'Immigrant selection system and immigrant health.' *Contemporary Economic Policy* 26(4), 1074–3529

D'Amuri, Francesco, and Giovanni Peri (2010) 'Immigration and occupation in Europe.' *Centro Studi Luca d'Agliano Development Studies Working Paper*

Fletcher, J.M., and J.L. Sindelar (2009) 'Estimating causal effects of early occupational choice on later health: Evidence using the psid.' *NBER Working Paper*

Fletcher, J.M., J.L. Sindelar, and Yamaguchi S. (2011) 'Cumulative effects of job characteristics on health.' *Health Economics* 20(5), 553–570

Friedberg, Rachel, and Jennifer Hunt (1995) 'The impact of immigrants on host country wages, employment and growth.' *Journal of Economic Perspectives* 9(2), 23–44

Giuntella, Osea (2012) 'Do immigrants squeeze natives out of bad schedules? Evidence from italy.' *IZA Journal of Migration*

_ (2013) 'Why does the health of immigrants deteriorate? Evidence from birth records.' *IZA Discussion Paper*

Goldman, Dana P., James P. Smith, and Neeraj Sood (2006) 'Immigrants and the cost of medical care.' *Health Affairs* 25(6), 1700–1711

Grossman, Michael (1972) 'On the concept of health capital and demand for health.' *Journal of Political Economy* 80(2), 223–255

Haisken-DeNew, John P., and Joachim R. Frick (2005) *Desktop Companion to the German Socio-Economic Panel (SOEP)* (Berlin, Germany: DIW)

Hunt, Jennifer (1992) 'The impact of the 1962 repatriates from Algeria on the French labor market.' *Industrial and Labor Relations Review* 45(3), 556–572

Jasso, Guillermina, Douglas S. Massey, Mark R. Rosenzweig, and James P. Smith (2004) 'Immigrant health: Selectivity and acculturation.' *The Institute for Fiscal Studies Working Paper* 4(23), 1–46

Kennedy, Steven, James Ted McDonald, and Nicholas Biddle (2006) 'The healthy immigrant effect and immigrant selection: Evidence from four countries.' Social and Economic Dimensions of an Aging Population Research Papers 164, McMaster University, Dec.

Knies, Gundi, and C. Katharina Spiess (2007) 'Regional data in the German Socio-economic Panel Study (soep).' *DIW Data Documentation*

Kroll, Lars Eric (2011) 'Construction and validation of a general index for job demands in occupations based on ISCO-88 and KldB-92.' *Methoden Daten Analysen*

Mazzonna, Fabrizio, and Franco Peracchi (2012) 'Ageing, cognitive abilities and retirement.' *European Economic Review* 56(4), 691–710

Orrenius, Pia M., and Madeline Zavodny (2009) 'Do immigrants work in riskier jobs?' *Demography* 46(3), 531–551

_ (2012) 'Immigrants in risky occupations.' *IZA Discussion Paper*

Ottaviano, Gianmarco I. P., and Giovanni Peri (2012) 'Rethinking the effects of immigration on wages.' *Journal of the European Economic Association* 10(1), 152–197

Peri, Giovanni, and Chad Sparber (2009) 'Task specialization, immigration, and wages.' *American Economic Journal: Applied Economics* 1(3), pp. 135–169

Ravesteijn, Bastian, Hans van Kipperluis, and Eddy van Doorslaer (2013) 'The wear and tear on health: What is the role of occupation?' *Mimeo*

Ruhm, Christopher J (2000) 'Are recessions good for your health?' *The Quarterly Journal of Economics* 115(2), 617–650

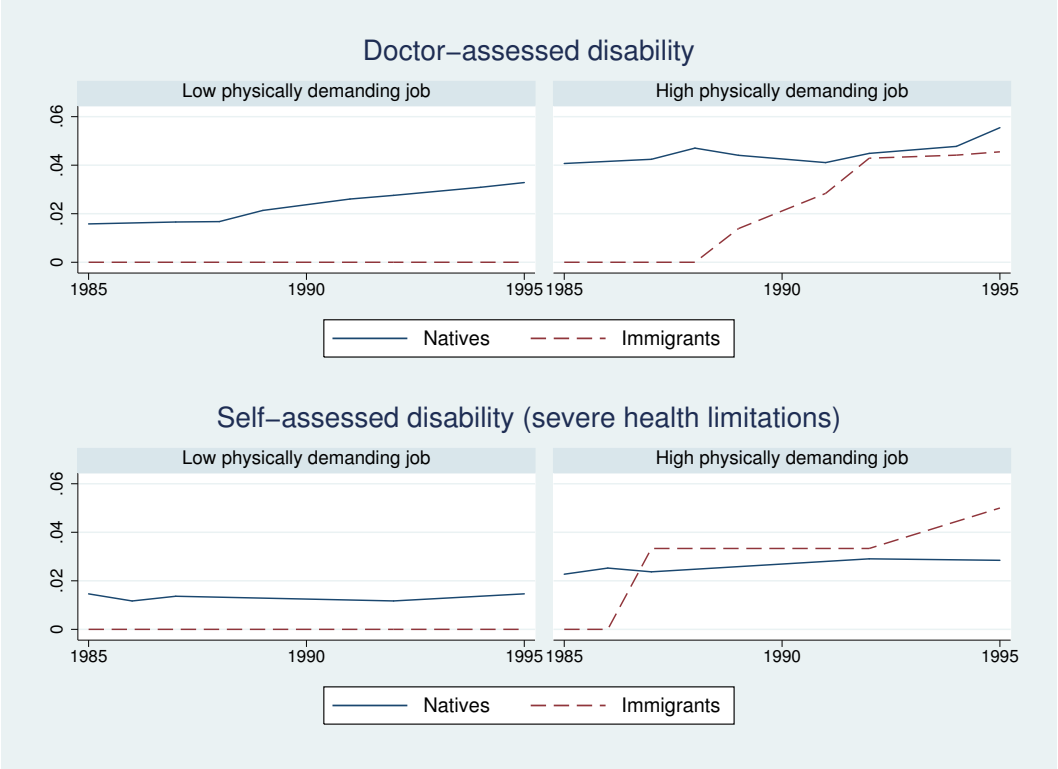
Sander, Monika (2009) 'Migration and health empirical analyses based on the German socio-economic panel study (SOEP).' Mimeo 164, Universitt Bamberg

Wooldridge, Michael (2002) *Econometric Analysis of Cross Section and Panel Data* (Cambridge, MA: The MIT Press)

Figure 1: Health Trajectories by Foreign Status and Gender

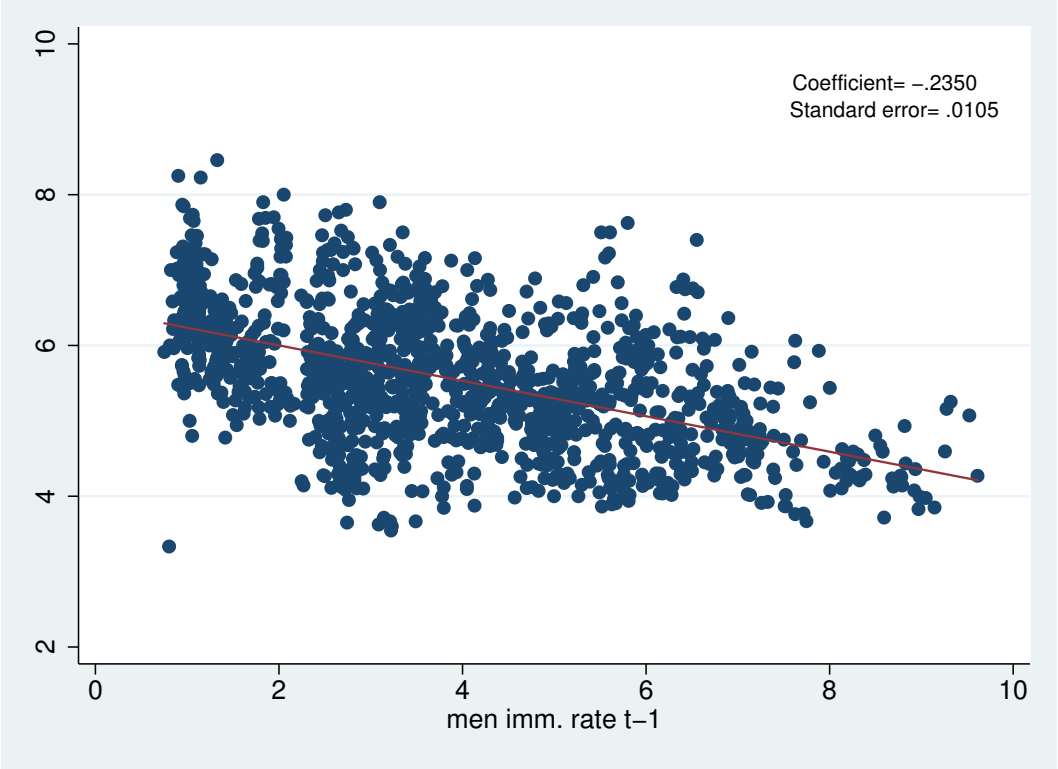
Notes - Data are drawn from the GSOEP (1984-2010). We consider a balanced panel of individuals aged between 25 and 34 years old in the first wave of the survey (1984). We exclude immigrants who had been in Germany for more than 10 years as of 1984.

Figure 2: Health Trajectories by Foreign Status and Physical Burden



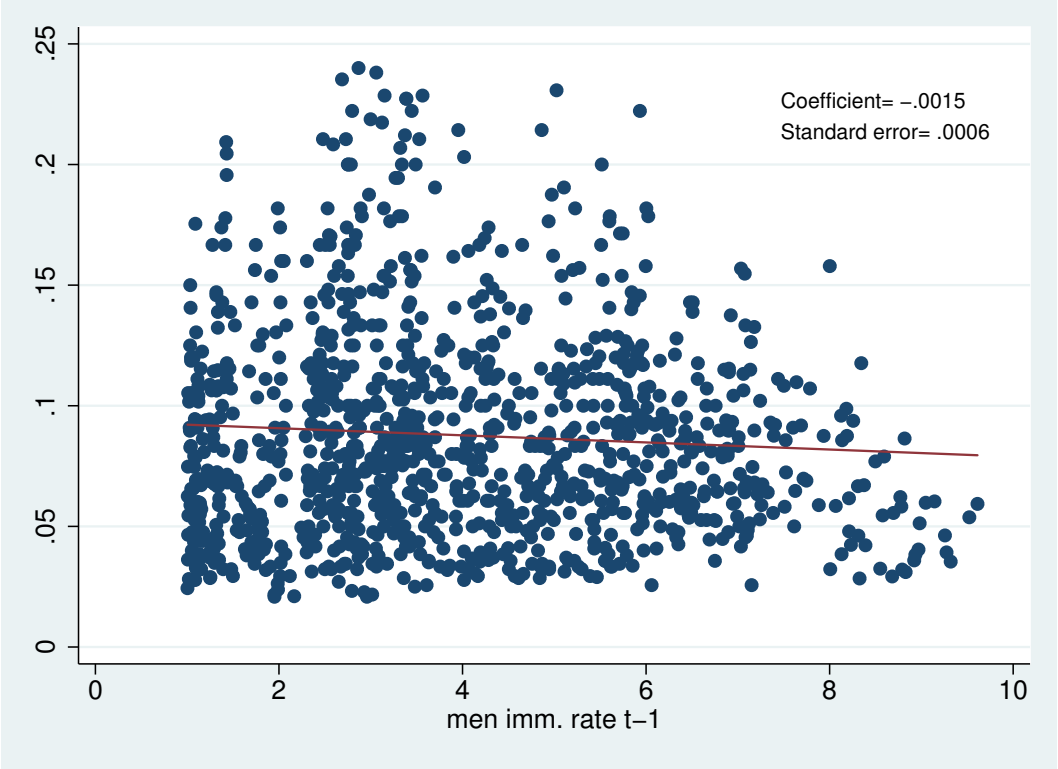
Notes - Data are drawn from the GSOEP (1984-2010). We consider a balanced panel of individuals aged between 25 and 34 years old in the first wave of the survey (1984). We exclude immigrants who had been in Germany for more than 10 years as of 1984. Occupations with an index of physical burden above (below) the median are classified as high (low) physically demanding jobs.

Figure 3: Immigration and Physical Burden Across German RORs



Notes - Data on immigration are drawn from the INKAR dataset (1996-2009). The average physical burden are obtained collapsing the information drawn from the GSOEP (1996-2009) at the ROR level.

Figure 4: Immigration and Disability status Across German RORs



Notes - Data on immigration are drawn from the INKAR dataset (1996-2009). Data on average health status are obtained collapsing information drawn from the GSOEP (1996-2009) at the ROR level.

Table 1: Descriptive Statistics

	(1)	(2)	(3)	(4)
	Men		Women	
	Natives	Immigrants	Natives	Immigrants
Disable	0.0745	0.0731	0.0666	0.0466
	(0.2626)	(0.2603)	(0.2494)	(0.2107)
Severe health limitations	0.0796	0.0841	0.0486	0.0706
	(0.2707)	(0.2775)	(0.2151)	(0.2561)
Age	41.8507	42.0838	41.7019	41.5897
	(9.7317)	(9.7983)	(9.6930)	(9.6417)
Married	0.6584	0.8256	0.6862	0.8280
	(0.4742)	(0.3794)	(0.4640)	(0.3774)
High school degree	0.7453	0.7247	0.7828	0.6509
	(0.4357)	(0.4467)	(0.4123)	(0.4767)
College degree	0.2310	0.1033	0.1934	0.1078
	(0.4215)	(0.3044)	(0.3950)	(0.3101)
Employed	0.8789	0.8293	0.6991	0.5568
	(0.3263)	(0.3762)	(0.4587)	(0.4968)
Blue collar	0.3497	0.6145	0.0936	0.2493
	(0.4769)	(0.4867)	(0.2912)	(0.4326)
Years blue	3.1736	5.3556	0.8466	2.2100
	(4.7803)	(5.3240)	(2.4292)	(3.8869)
Physical burden	4.8009	6.3343	3.1794	3.5772
	(3.3853)	(3.6676)	(2.9362)	(3.7405)
Log wage	8.2641	8.1505	6.4190	5.1946
	(4.0029)	(3.8616)	(4.5277)	(4.6655)
Work. hours	44.5536	41.8615	33.0354	31.7746
	(10.0246)	(8.7575)	(13.1459)	(12.4847)
Years since migration (YSM)		20.1210		19.2187
		(9.4216)		(9.5899)
Arrived before 1980		0.5988		0.5344
		(0.4901)		(0.4988)
Arrived 1980-1990		0.1777		0.2085
		(0.3823)		(0.4063)
Arrived. after 1990		0.2234		0.2570
		(0.4166)		(0.4370)
Imm. rate	8.1346	10.9184	8.1544	10.9326
	(4.7095)	(3.6109)	(4.6994)	(3.6828)
N	96,616	20,203	101,997	20,705

Notes - Data are drawn from the GSOEP (1984-2010).

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

	(1)	(2)	(3)	(4)
	QFE	FE	QFE	FE
Arrived before 1980	-0.0623***		-0.0883***	
	(0.022)		(0.027)	
Arrived between 1980-1990	-0.0570***		-0.0902***	
	(0.016)		(0.019)	
Arrived after 1980	-0.0419***		-0.0749***	
	(0.013)		(0.016)	
YSM	0.0034**	0.0038*	0.0054***	0.0058***
	(0.002)	(0.002)	(0.002)	(0.002)
Low_PDJ *YSM			-0.0027***	-0.0031***
			(0.001)	(0.001)
Constant	0.3408***		0.2680***	
Mean of Dep. Var.	0.0741	0.0741	0.0741	0.0741
Std. Dev. of Dep. Var.	0.2621	0.2621	0.2621	0.2621
N	115,852	115,852	85,739	85,739

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high drop outs, high-school and college graduate), marital status, and number of children, NUTS-2 fixed effects, and year fixed effects. Quasi fixed effects estimates (QFE) are random effect 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 (Low PDJ). Standard errors are robust and clustered at individual level.

Table 3: Effects of Immigration on Doctor-Assessed Disability

	(1)	(2)	(3)
Panel A		Men	
	FE	FE	2SLS
% immigrants	-0.002 **	-0.002 **	-0.005 *
	(0.001)	(0.001)	(0.003)
$F^{\dagger}$			52.15
% male immigrants	-0.005 **	-0.005 **	-0.010 *
	(0.002)	(0.002)	(0.005)
$F^{\dagger}$			52.88
Mean of Dep. Var.	0.0749	0.0749	0.0752
Std. Dev. of Dep.	0.2632	0.2632	0.2637
N	69,654	69,654	63,966
Panel B		Women	
% immigrants	0.000	0.000	-0.000
	(0.001)	(0.001)	(0.002)
$F^{\dagger}$			47.19
% female immigrants	0.001	0.000	-0.001
	(0.002)	(0.001)	(0.004)
$F^{\dagger}$			50.78
Mean of Dep. Var.	0.0670	0.0670	0.0674
Std. Dev. of Dep.	0.2500	0.2500	0.2506
N	74,846	74,846	74,846
INDIVIDUAL F.E	YES	YES	YES
YEAR F.E.	YES	YES	YES
ROR-F.E.	YES	YES	YES
ROR-trends	NO	YES	NO

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

FE=Fixed Effects model; 2SLS= Two stage least squares. Standard errors are robust and clustered at ROR level†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	2SLS	FE	2SLS
% male immigrants	-0.005 **	-0.010 *	-0.003 *	-0.009 *	-0.013 *	-0.013
	(0.002)	(0.005)	(0.002)	(0.005)	(0.007)	(0.033)
$F^{\dagger}$		52.88		55.17		10.42
Mean of Dep. Var.	0.0749	0.0749	0.0749	0.0749	0.0756	0.0756
Std. Dev. of Dep. Var	0.2632	0.2632	0.2632	0.2632	0.2644	0.2644
N	69,654	63,966	59,729	55,194	9,825	8,692
Panel B	Education					
	All		No College		College	
	FE	2SLS	FE	2SLS	FE	2SLS
% male immigrants	-0.005 **	-0.010 *	-0.005 *	-0.015 *	-0.001	-0.001
	(0.002)	(0.005)	(0.003)	(0.008)	(0.001)	(0.003)
$F^{\dagger}$		52.88		38.12		65.44
Mean of Dep. Var.	0.0749	0.0749	0.085	0.085	0.0409	0.0409
Std. Dev. of Dep. Var	0.2632	0.2632	0.08529	0.08529	0.1980	0.1980
N	69,654	63,966	52,741	48,169	15,929	14,731
Panel C	Occupational Type: White vs Blue Collars					
	All		Blue Collars		White Collars	
	FE	2SLS	FE	2SLS	FE	2SLS
% male immigrants	-0.005**	-0.010*	-0.008**	-0.017*	-0.003	-0.003
	(0.002)	(0.005)	(0.003)	(0.010)	(0.002)	(0.006)
$F^{\dagger}$		52.88		56.34		21.84
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
N	69,654	63,966	26,310	23,499	32,169	29,599

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high drop outs, high-school and college graduate) marital status, and number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level. 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)
	1996-2010			2001		
	Blue collar	Physical burden		Perceived physical burden		
% male immigrants	0.002	-0.002	0.003	-0.015**	-0.006	-0.005
	(0.003)	(0.014)	(0.015)	(0.007)	(0.007)	(0.007)
% male immigrants *blue			1.915***		0.314***	0.115***
			(0.110)		(0.023)	(0.026)
Blue collar			-0.050**		-0.019***	-0.018***
			(0.022)		(0.004)	(0.004)
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
N	59,645	58,855	55,169	5,721	5,404	5,404
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

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high drop outs, high-school and college graduate), marital status, and 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 a 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 column 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. Standard errors are robust and clustered at ROR level.

Table 6: Effects of Immigration on Labor Market and Working Conditions

	(1)	(2)	(3)	(4)	(5)	(6)
Dep.Var:	Employment Status	log (Wage)	# Hours Worked	Overtime	Night Shift	Health Concerns
% male immigrants	0.002	0.016*	-0.268**	-0.011*	-0.010	-0.011**
	(0.003)	(0.009)	(0.123)	(0.006)	(0.012)	(0.005)
Mean of Dep. Var.	0.8654	8.1931	44.6063	0.5797	0.3885	0.3646
Std. Err. of Dep. Var.	0.3412	4.1133	10.4184	0.4936	0.4874	0.4813
N	70,009	70,009	59,012	50,864	17,131	61,287

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high drop outs, high-school and college graduate), marital status, and number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level. All models include individual fixed-effects. Standard errors are robust and clustered at ROR level.

Appendix A

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

	(1)	(2)	(3)	(4)
	QFE	FE	QFE	FE
Arrived before 1980	-0.0406**		-0.0337	
	(0.018)		(0.023)	
Arrived 1980-1990	-0.0345***		-0.0372**	
	(0.013)		(0.018)	
Arrived after 1990	-0.0242**		-0.0290**	
	(0.010)		(0.013)	
YSM	0.0004	0.0003	0.0010	0.0009
	(0.001)	(0.002)	(0.002)	(0.002)
Low physical burden*YSM			-0.0001	-0.0001
			(0.001)	(0.001)
Constant	0.3066***		0.2438***	
Mean of Dep. Var.				
Std. Dev. of Dep. Var.				
N obs.	121,603	121603	69,939	69,939

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high drop outs, high-school and college graduate), marital status, and number of children, NUTS-2 fixed effects, and year fixed effects. Quasi fixed effects estimates (QFE) are random effect 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 (Low PDJ). Standard errors are robust and clustered at individual 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 - *We report the average years of education in the sample of the corresponding German reference group: for immigrants pre 80's, we consider as reference group Germans over 40 in the waves 1985-1989; for immigrants 80's we consider all Germans (aged 25-59) in the waves 1985-1989; for immigrants 90's we consider all Germans(aged 25-59) in the waves 1990-2010.

Table A.3: Robustness checks: Timing of the Effect of Immigration

	(1)	(2)	(3)	(4)	(5)
			FE		
Time:	t+1	t	t-1	t-2	t-3
Male imm. rate	0.002	-0.006	-0.005 **	-0.005 **	-0.004 **
	(0.002)	(0.008)	(0.002)	(0.002)	(0.002)
N	70,789	77,776	69,654	60,369	51,679
			2SLS		
Male imm. rate	-0.002	-0.015	-0.011 **	-0.009 ***	-0.006 **
	(0.008)	(0.058)	(0.003)	(0.003)	(0.002)
N	68,936	74,947	63,966	55,134	46,436
INDIVIDUAL F.E	YES	YES	YES	YES	YES
YEAR F.E.	YES	YES	YES	YES	YES
NUTS2-F.E	YES	YES	YES	YES	YES

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

Table A.4: Immigrant Occupational Sorting

	(1)	(2)	(3)	(4)
	Men		Women	
	Physical burden	Blue collar	Physical burden	Blue collar
Arrived before 1980	1.9119***	0.2265***	1.7988***	0.1848***
	(0.070)	(0.012)	(0.082)	(0.012)
Arrived 1980-1990	1.5290***	0.1982***	1.3855***	0.0793***
	(0.108)	(0.018)	(0.122)	(0.013)
Arrived after 1990	0.9980***	0.0903***	1.0954***	0.0740***
	(0.084)	(0.013)	(0.085)	(0.009)
Constant	8.1986***	0.2079***	5.1168***	0.1533***
Mean of Dep. Var.	5.9167	0.4162	4.9122	0.127
Std. Dev. of Dep. Var	3.0612	0.4929	2.5280	0.3330
N	110,101	128,491	87,986	134,157

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high drop outs, high-school and college graduate), marital status, and number of children, NUTS-2 fixed effects, and year fixed effects. Standard errors are robust and clustered at individual level.The model is estimated using the random effect estimator.

Table A.5: Robustness Checks: Effects of Immigration on Poor Health

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A			Nationality			
	All		Natives		Immigrants	
	FE	2SLS	FE	2SLS	FE	2SLS
% male immigrants	-0.004 *	-0.013 *	-0.003	-0.012 *	-0.015	-0.018
	(0.003)	(0.007)	(0.003)	(0.007)	(0.011)	(0.043)
N	69890	64172	59932	55377	9858	8715
Panel B			Education			
	All		No College		College	
% male immigrants	-0.004 *	-0.013 *	-0.004	-0.015	-0.001	-0.011
	(0.003)	(0.007)	(0.004)	(0.011)	(0.003)	(0.007)
N	69890	64172	52953	48358	15944	14744

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high drop outs, high-school and college graduate), marital status, and number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level.Standard errors are robust and clustered at ROR level.

Table A.6: Robustness Checks: Correlated Random Effect Probit Model

	(1)	(2)	(3)
Panel A		Nationality	
	All	Natives	Immigrants
% male immigrants	-0.003 **	-0.002 *	-0.005
	(0.001)	(0.001)	(0.003)
N	69,654	59,650	9,806
Panel B		Education	
	All	No College	College
% male immigrants	-0.003 **	-0.012 *	0.003
	(0.002)	(0.005)	(0.003)
N	69,654	52,741	15,929

Notes - All estimates include controls for age (quadratic), indicators for educational attainment (high drop outs, high-school and college graduate), marital status, and number of children, ROR fixed effects, year fixed effects, and local economic conditions at the ROR level. Estimated using correlated random effect probit model which also include mean value of the demographics. The reported coefficient are average partial effect (APE). Standard errors are robust and clustered at ROR level.