

Escarce, José J.; Rocco, Lorenzo

Working Paper

Immigration and the Health of Older Natives in Western Europe

GLO Discussion Paper, No. 228

Provided in Cooperation with:
Global Labor Organization (GLO)

Suggested Citation: Escarce, José J.; Rocco, Lorenzo (2018) : Immigration and the Health of Older Natives in Western Europe, GLO Discussion Paper, No. 228, Global Labor Organization (GLO), Maastricht

This Version is available at:
<http://hdl.handle.net/10419/180225>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

Immigration and the Health of Older Natives in Western Europe

José J. Escarce^{a*}

Lorenzo Rocco^b

^aDepartment of Medicine, David Geffen School of Medicine, and Department of Health Policy and Management, Fielding School of Public Health, University of California at Los Angeles, United States

^bDepartment of Economics and Management "Marco Fanno," University of Padua, Italy

*Corresponding author at: Division of General Internal Medicine and Health Services Research, University of California at Los Angeles, 911 Broxton Avenue, Los Angeles, CA 90024, United States

Tel.: +1 310 794 3843

Email: jescarce@mednet.ucla.edu

Declarations of interest: None

This research was supported in part by a Research Fellowship for Visiting Professors (Dr. Escarce) from the Fondazione Cariparo (Cassa di Risparmio di Padova e Rovigo). The sponsor had no role in the study design; collection, analysis, or interpretation of the data; writing of the report; or the decision to submit the article for publication.

JEL Classification: I12, I14, J61.

Key words: Health, immigration, aging, social determinants

Abstract

Previous research has found that immigration benefits the health of working-age natives, an effect mediated through the labor market. We use the Study of Health, Ageing and Retirement in Europe (SHARE) to investigate whether immigration also affects the health of natives 65-80 years old.

Immigration may increase the supply and lower the price of personal and household services, a term that refers to care services and non-care services such as cleaning, meal preparation, and domestic chores. Higher consumption of personal and household services by older natives may help maintain health through a variety of pathways. Using a shift-share IV, we find pervasive beneficial effects of immigration on the physical and mental health of older natives. We also find evidence for the hypothesized pathways, especially for an effect of immigration in increasing social integration (e.g., institutional connections, social participation). However, our ability to test mechanisms is limited in our data.

1. Background and objectives

Concerns about the effects of immigration on the well-being of natives, which have been the subject of discussion and research for decades, have only grown in recent years as a result of rising immigration rates and the increasing diversity of immigrants' countries of origin. In many Western countries, including the United States and various European countries, immigration has become a burning political issue and an important factor in elections.

In this context, comprehensive and objective information on the costs and benefits of immigration becomes increasingly important. In many Western countries, the public discourse regarding immigration is growing increasingly heated, and the belief that the impact of immigration on native citizens is almost universally negative often dominates this discourse. Research evaluating this impact can only be helpful to democratic societies struggling to find just, compassionate, and rational approaches to immigration.

Numerous studies have addressed the effects of immigration on natives' wages and employment (Borjas, 1995; Card, 1990, 2001; Dustmann et al., 2005; Glitz, 2012; Ottaviano & Peri, 2012). A recent review concludes that immigration has a very small effect on the average wages of native workers, including less educated workers Peri (2014). Moreover, there is evidence that firms have absorbed immigrants by adopting appropriate technologies, expanding production, and moving native workers into more communication-intensive jobs. Other studies have assessed the effects of immigration on natives' educational outcomes and found mixed results (Brunello & Rocco, 2013; Hardoy & Schøne, 2013; Ohinata & Van Ours, 2013). Additional research has addressed the fiscal costs and benefits of immigration (Dustmann & Frattini, 2014; Dustmann et al., 2010).

By contrast, research on the effects of immigration on dimensions of natives' lives unrelated to

labor market or educational outcomes is just starting. For example, a recent study by Akay et al., (2014), focusing on persons aged 16-64 in Germany, found that immigration has a positive effect on natives' subjective well-being.

More pertinent to our work, Giuntella & Mazzonna, (2015) have recently published the only study examining the effects of immigration on the health of natives. This study, which focused on natives aged 25-59 in Germany, found that immigration reduced the probability that natives reported a doctor-assessed disability exceeding 30 percent. The effects were concentrated among workers without a college degree and blue-collar workers. The researchers posit that the mechanism underlying these beneficial health effects has to do with the impact of immigrants on improving the working conditions of natives. Specifically, since immigrants self-select into physically demanding jobs that may be strenuous and risky but do not require highly developed communication skills (e.g., Giuntella, 2012; Orrenius & Zavodny, 2009), job-related tasks are reallocated such that native workers, especially low-skilled workers, increasingly specialize in communication-intensive tasks that are less physically strenuous and have fewer harmful effects on health (e.g., Fletcher et al., 2011). Giuntella & Mazzonna (2015) also find that immigration reduces the probability that native blue-collar workers are employed in the occupations with the highest physical burden.

To date, however, no study has examined the effect of immigration on the health of natives aged 65 or older. At first blush it might seem reasonable to assume that immigrants cannot influence the health of natives in this age group, since labor market-related mechanisms are unlikely to be in play. However, immigrants could affect the health of older natives through other mechanisms, including mechanisms related to the market for personal and household services.

This study examines the effects of immigration on the health and quality of life of natives aged 65-80 years in 12 Western European countries: Austria, Belgium, Denmark, France, Germany, Greece,

Italy, Luxembourg, Portugal, Spain, Sweden, and Switzerland. We consider mechanisms for health effects on natives that go beyond the narrative of improved working conditions and analyze a wide variety of health measures, including mortality. We use a rich panel dataset to estimate models where the health of natives as a function of the immigrant share in the natives' region of residence, and we take advantage of the panel nature of the data and use instrumental variable (IV) estimation to identify causal effects of the immigrant share.

The rest of the paper proceeds as follows. Section 2 reviews mechanisms through which immigrants may affect the health of natives aged 65-80. Section 3 describes the data and methods used in the study, including our approach to IV estimation. Sections 4 and 5 present our results. Section 6 assesses potential threats to the validity of our findings, including selective migration of natives based on health and the validity of our IV. Section 7 summarizes the results and concludes.

2. Conceptual considerations

A variety of factors have been shown to affect physical and mental health, including physical functioning, disability, and mortality, as people age. Several of these factors may be influenced by the presence of immigrants in a region.

2.1. Maintaining health in older adults

One of the most important factors affecting health is social integration, that is, the development and maintenance of strong social ties, institutional connections, and community participation.

Prospective studies conducted as long as four decades ago in the United States and Europe found that adults, including persons over age 65, who had more ties with friends and relatives and belonged to more groups had lower all-cause mortality (e.g., Berkman & Syme, 1979; House et al.,

1982; Orth-Gomer & Johnson, 1987; Seeman, 1996). A recent meta-analysis including studies from numerous countries corroborated these results and found that the beneficial effects of social ties on mortality are consistent across age, sex, initial health status, and follow-up period (Holt-Lunstad et al., 2010). Further, the effect size rivals or exceeds that of well-established risk factors such as smoking, excessive drinking, physical inactivity, or obesity. Studies have additionally found that the beneficial effects of social integration extend to cause-specific mortality, physical functioning, incidence and prognosis of cardiovascular disease, and mental health (Barth et al., 2010; Seeman, 1996; Unger et al., 1999).

The pathways through which social integration improves health have not been completely elucidated. One possibility is that the social support inherent in strong social ties facilitates health-promoting behaviors such as exercise, healthy diet, not smoking, and adherence to medical regimens (Uchino, 2006). However, there is also evidence that social integration has beneficial effects on the cardiovascular, neuroendocrine, and immune systems and reduces immune-mediated inflammation (Uchino, 2006).

Interestingly, volunteering may have a particularly beneficial effect on the health of older people (Piliavin & Siegl, 2007). The health benefits of volunteering have been demonstrated in numerous prospective studies and one randomized trial and include better self-rated health, improved physical functioning, enhanced psychological well-being, and lower mortality (Anderson et al., 2014; Fried et al., 2004; Fried et al., 2013; Piliavin & Siegl, 2007; Thoits & Hewitt, 2001). The health benefits of volunteering may be especially pronounced for persons aged 65 or older (Anderson et al., 2014; Piliavin & Siegl, 2007).¹

¹ The health benefits of social integration may be viewed from the perspective of the growing economic literature on the health effects of individual social capital where, often, social capital has been proxied by the density of individual social networks and the intensity of social relations. See Folland and Rocco (2014) for a recent review.

On the flip side, social isolation, defined as the objective lack of social integration and paucity of social contacts, and loneliness, regarded as the subjective experience that results from the absence of desired relationships and social ties, are deleterious to the health of people aged 65 or older. Specifically, studies have shown that social isolation, loneliness, and living alone are associated with worse self-rated health, the onset of functional decline and disability, and increased mortality (Holt-Lunstad et al., 2015; Ong et al., 2016; Steptoe et al., 2013). A recent meta-analysis indicates that the findings for mortality are consistent across gender, length of follow up, and region of the world (Holt-Lunstad et al., 2015). However, one study suggests that the risk of functional limitations and disability from social isolation may be higher among men (Lund et al., 2010; Nilsson et al., 2011).

The need to care for sick or frail family members may also adversely affect the health of older persons. As people live longer, growing numbers of persons in their 60s and 70s have living parents or parents-in-law who require high levels of care. Some persons in this age group may have to care for a sick or disabled spouse or partner.

The health effects of caregiving are controversial. An early study found that persons aged 65 or older who cared for a disabled spouse and reported mental or emotional strain had higher mortality than persons with a disabled spouse who did not provide care or who provided care but did not experience strain (Schulz & Beach, 1999). Several studies suggest that caregivers are more likely to report symptoms of depression and psychological distress, have worse physical health, and have higher mortality than non-caregivers (e.g., Pinquart & Sörensen, 2003; Vitaliano et al., 2003). In a recent review, however, Roth et al. (2015) criticize the methods of many of these studies and present evidence that caregiving does not increase mortality, even among persons who report high caregiving strain (Roth et al., 2013).

It seems likely that the health effects of caregiving are highly contingent. Spouses may be at especially high risk for the deleterious impact of caregiving (Penning & Wu, 2016; Pinguart & Sörensen, 2011). High levels of dependency and task demands on the part of the care recipient are associated with higher emotional and physical stress in the caregiver, as well as with restrictions on valued social activities (Beach & Schulz, 2017; Miller & Montgomery, 1990). Conversely, caregivers who are able to maintain high levels of social integration may be protected against the harmful effects of caregiving (Rozario et al., 2004). Women are caregivers more often than men and may be affected differently by caregiving (Miller & Montgomery, 1990; Penning & Wu, 2016; Schulz et al., 2009).

2.2. Immigrants and the market for personal and household services

Immigration can affect the health of older natives through a variety of pathways. At the most general level, the presence of immigrants in a community could encourage older natives to seek out volunteering opportunities or engage with groups or organizations involved with immigrants or immigration policy, such as religious or political organizations. Additional pathways concern the impact of immigration on the market for personal and household services.

The term personal and household services covers a broad range of activities that contribute to the well-being at home of families and individuals. They include care services such as child care and care for the elderly and for persons with disabilities as well as non-care services such as cleaning, cooking and meal preparation, and gardening and other domestic chores (Farvaque et al., 2013). In recent decades, the role of immigrants in the market for personal and household services has grown rapidly in many European countries. The fraction of foreign-born domestic workers exceeded one-fourth in Belgium in 2011, having doubled in five years (Michielsen et al., 2013); surpassed three-fifths in Spain in 2009, where the number of foreign-born domestic workers grew from 15,000 to

320,000 between 1996 and 2009 while the number of native domestic workers plateaued (Leon, 2010);² and reached nearly four-fifths in Italy in 2008 (Peri et al., 2014), where foreign-born domestic workers grew from about 50,000 to more than 700,000 between 1994 and 2011 while the number of native domestic workers rose slightly (Castagnone et al., 2013). As increasing supply has lowered the prices of these services, more households are consuming them with important economic consequences. A higher local share of immigrants who can provide childcare increases the labor supply of women in their child-bearing years (e.g., Barone & Mocetti, 2011; Cortés & Tessada, 2011). Similarly, a higher local share of immigrants who can provide elder care increases the labor supply of women in late middle-age and delays their retirement (Peri et al., 2015).

Consumption of personal and household services increases after retirement age. For example, more than one-fifth of persons aged 65-74 in France hire workers to help them with domestic chores, and this fraction rises to more than two-fifths for persons aged 75 or older. Perhaps not surprisingly, older persons living alone resort more than average to hiring workers to do domestic chores, shop, and prepare or deliver meals. About one-fifth of persons aged 65 or older in France hire workers to assist with the care of a dependent person (Farvaque et al., 2013). In Germany, about one-fifth of households employ workers for domestic chores (Farvaque et al., 2013). These figures offer clues as to how immigration might influence the health of older natives.

For frail older natives and those who live alone, instrumental assistance with cooking and preparation of regular and balanced meals, regular medication taking, and personal and home hygiene are likely to support healthy aging. Common barriers to social participation faced by older persons include illness and disability, loss of contact with friends and relatives, and social fears (Dickens et al., 2011; Goll et al., 2015). Immigrants who provide both care and non-care services to

² A different source also documents the rapid rise in foreign-born domestic workers in Spain, but pegs the fraction of foreign-born workers at 55 percent in 2012 (Dominguez-Mujica et al., 2013).

older natives could encourage their social integration by identifying opportunities for participation, offering emotional support, and providing transportation and assistance with mobility. Provision of personal and household services often has a strong "relational" quality, whereby the assistance recipient and provider develop strong personal relationships (Cangiano & Shutes, 2010; Farvaque, 2015). This feature, coupled with many immigrants' social skills and care ethos (Cangiano & Shutes, 2010), could facilitate their efforts to promote older persons' social integration.

Although for most older persons lack of time is not a barrier to social participation (Krantz-Kent & Stewart, 2007), it may be for some who spend long hours on domestic chores. For these persons, immigrants who provide personal and household services could enhance social integration by freeing up time. Immigrants could reduce loneliness and social isolation among older natives, especially those who live alone, by providing companionship.

Finally, immigrant care providers could promote improved health among older natives who bear the responsibility of providing high-intensity care to a sick, frail, or disabled parent, parent in law, or spouse by assuming a portion of that responsibility. This would both reduce the stress of caregiving and provide time for social participation to the older native.

3. Data and methods

3.1. Data sources

Our main data sources are the Survey of Health, Ageing and Retirement in Europe (SHARE) and the European Union Labor Force Survey (EU LFS). SHARE is a multi-disciplinary and cross-national panel database of micro-data on the health, socioeconomic status (SES), and social and family networks of individuals aged 50 or older. Data collection began in 2004-2005 with Wave 1

and subsequent waves have been conducted approximately every two years; Wave 6 was collected in 2015. The sample is systematically refreshed to address attrition. Eleven Western European countries participated in Wave 1 and participation has grown over time. SHARE currently covers 27 European countries and Israel.

To enhance homogeneity in labor markets and political and economic institutions, our study focuses on natives residing in Western Europe. Specifically, we focus on 12 Western European countries (Austria, Belgium, Denmark, France, Germany, Greece, Italy, Luxembourg, Portugal, Spain, Sweden, and Switzerland) that met three criteria. First, the country participated in at least two waves of SHARE. Second, the country is included in both SHARE and the EU LFS. Third, the region of the country where each subject resided is reported in the data. Region is reported at the NUTS1 level for Germany and Austria and at the NUTS2 level for all other countries.³ (We exclude the Netherlands because region of residence is reported in SHARE but not in the EU LFS.) In the study, we use data from Waves 1, 2, 4, 5 and 6. Wave 3, also called SHARELIFE, focused on subjects' life histories and did not collect most of the health measures we need (see below). As in previous related research (Akay et al., 2014; Giuntella & Mazzonna, 2015), the definitions of natives and immigrants in this study are based on citizenship.

The EU LFS is a large household sample survey that provides quarterly information, including sociodemographic and economic characteristics, on individuals aged 15 or older living in private households in European Union member countries. The surveys are conducted by the national statistical institutes across Europe and are centrally processed by Eurostat, which harmonizes the data across countries. We use the EU LFS to obtain the annual share of immigrants in each study country and region during the period of the study.

³ Region was reported at the NUTS2 level for most of Spain, but region ES5 (Este) was reported at the NUTS1 level. Additionally, the entire country of Denmark was a single NUTS2 region until 2006, when it split into five NUTS2 regions.

Additional data sources for our study include the 2001 censuses of European countries, which we use to obtain the “baseline” share of immigrants in 2001, by source nation, in each study country and region.⁴ However, Belgium and Germany do not make their 2001 census data publicly available. Therefore, we obtain the “baseline” immigrant share for regions in Belgium, by source nation, by pooling the 1998-2001 data from the EU LFS. Similarly, we obtain the “baseline” immigrant shares for regions in Germany, by source nation, by pooling the 1997-2001 data from the German Socio-Economic Panel (SOEP), a longitudinal survey of private households that includes sociodemographic information. As described later, we use the “baseline” immigrant shares to construct the IV needed to identify the effects of immigrants on the health of natives.

Finally, we use harmonized data from Eurostat on the unemployment rate and on gross domestic product (GDP) in each study country and region (<http://ec.europa.eu/eurostat/data/database>). Since Eurostat does not report GDP for Switzerland by region, we supplement the Eurostat data with economic data and reports from the Swiss Federal Statistical Office.

3.2. Study sample

The study sample consists of SHARE subjects in each study country who are native citizens, report complete data for the variables needed in each analysis (see below), and have at least two usable observations. For each subject we use only those observations in which the age of the subject is 65-80 and in which the subject resides at the same address as the first time he or she was surveyed.⁵

⁴ For Greece we use a 10 percent sample from the 2001 census.

⁵ SHARE provides information on whether each subject changed residential address from one wave to the next, but for subjects who move there is no information on the new location. Therefore, we could not follow subjects wherever they moved.

3.3. Variables

3.3.1. Health status

The outcome variables in our analyses are health status measures reported by SHARE respondents as well as mortality. Self-rated health, categorized as excellent, very good, good, fair, or poor, is considered the best single measure of health status obtainable through surveys. It is a strong predictor of mortality in all populations studied and its predictive validity has increased over time (e.g., Idler & Benyamini, 1997; Schnittker & Bacak, 2014). For analysis, we dichotomize the responses as excellent or very good versus good, fair, or poor.

Subjects are asked whether a doctor has ever told them they had any of 16 chronic conditions including heart disease, high blood pressure, diabetes, chronic bronchitis or emphysema, arthritis, and cancer (excluding minor skin cancers). For analysis, we construct a binary variable indicating at least one chronic condition (versus none) and a variable indicating the number of conditions.

Subjects are also asked whether they have difficulty with any of 13 activities reflecting basic activities of daily living (ADLs) and instrumental activities of daily living (IADLs) because of a physical, mental, emotional, or memory problem. For analysis, we construct a binary variable indicating difficulty on at least one activity (versus none) and a variable indicating the number of activities on which the subject has difficulty⁶ (Buz & Cortes-Rodriguez, 2016; Chan et al., 2012; LaPlante, 2010; Spector & Fleishman, 1998).

⁶ This approach is consistent with recent psychometric research indicating that ADLs and IADLs comprise a single dimension (Spector and Fleishman, 1998; LaPlante, 2010; Buz and Cortes-Rodriguez, 2016). Some studies additionally suggest that adding up the items on which subjects have difficulty provides a good measure of functional disability (Spector and Fleishman, 1998). Combining ADLs and IADLs into a single scale also minimizes the age- and gender-related biases in measuring disability that occur with either alone (LaPlante, 2010; Chan et al., 2012).

Subjects are additionally asked whether they have difficulty performing any of 10 everyday activities related to physical performance because of a health or physical problem (Nagi, 1976). For analysis, we construct a binary variable indicating difficulty on at least one activity (versus none) and a variable indicating the number of activities on which the subject has difficulty.

Finally, SHARE assesses depression symptoms and depression are using the EURO-D scale, a 12-item scale that elicits whether subjects have symptoms related to affective suffering (e.g., depression, tearfulness, and wishing to die) and to motivation (e.g., loss of interest, poor concentration, and lack of enjoyment) (Prince, et al., 1999a; Prince, et al., 1999b). For analysis, we construct a binary variable indicating that the subject reports four or more symptoms (versus three or fewer) and a variable indicating the number of symptoms reported. The cut-point of four or more symptoms is considered to indicate clinically significant depression (Castro-Costa et al., 2007; Prince et al., 1999a).

3.3.2. Other individual variables

We use several individual variables from SHARE in our descriptive and econometric analyses including age, gender, marital status, participation in social integration activities, feeling left out of things, living alone, providing personal care or practical household help to others outside or inside the household, having a spouse with physical limitations, and having a parent or parent in law in poor health. (Additional details on some of these variables are given in Section 5.)

3.3.3 Regional variables

The main explanatory variable in the econometric analyses is the share of immigrants in a subject's

region of residence, defined as the percentage of the population in the region who are not citizens of the country. Other regional variables used in the analyses include the unemployment rate for people aged 20-64 years and GDP per capita, expressed in purchasing power standards (PPSs).⁷

3.4. Descriptives

Table 1 reports summary statistics for the study sample. Most of the variables in the table are used in the analyses of health outcomes and are described in the preceding section of the paper. The "mechanistic" and "other personal circumstances" variables are described in Section 6.

Figure 1 shows a map of the study countries, divided into regions, with shading used to indicate the annual percentage point increase in the immigrant share between 2004 and 2015, the period of the study. Regions with the largest percentage point increases are scattered throughout Western Europe, appearing in Spain, Italy, France, Austria, and Luxembourg, and regions with the next largest percentage point increases are additionally seen in Sweden, Denmark, and Belgium. Regions with the smallest increases are geographically dispersed as well.

Figure 2 shows a map of the study countries, where shading is used to indicate the immigrant share in 2015, the final year of the study period.

3.5. Econometric model and estimation

⁷ The PPS is an artificial currency unit. Theoretically, one PPS can buy the same amount of goods and services in each country. However, price differences across borders mean that different amounts of national currency units are needed for the same goods and services depending on the country. PPS is the technical term used by Eurostat for the common currency in which national accounts aggregates are expressed when adjusted for price level differences using purchasing power parities.

We estimate the effect of the immigrant share on the health of natives residing in a region using the following econometric model:

$$H_{irctw}^* = \beta S_{r(t-k)} + X_{it}'\gamma + Z_{rt}'\rho + \alpha_i + \varphi_t + \theta_{cw} + \varepsilon_{irctw} \quad (\text{eq. 1})$$

where H_{irctw}^* is the health status of subject i residing in region r in country c , measured in calendar year t and wave w (of SHARE). Since health status is a latent variable, we don't observe it directly. Instead, we observe a variety of health indicators, described in the section on health variables.

In this specification, $S_{r(t-k)}$ is the immigrant share in region r in year $t-k$; ⁸ X_{it} is a vector of time-varying individual characteristics including age and marital status; and Z_{rt} is a vector of time-varying regional characteristics including the unemployment rate and GDP per capita. To capture the effects of age on health we use a separate linear time trend for each birth-year cohort (1924 to 1950), which allows for different rates of change in health as a function of starting age.

Additionally, α_i is a time-invariant individual fixed effect, φ_t is a calendar year fixed effect, θ_{cw} are country-specific wave fixed effects, ⁹ and ε_{irctw} is an error term.

We estimate all models as linear models. Thus we estimate linear probability models for binary health outcomes, and we treat health outcomes corresponding to counts of conditions, symptoms, or limitations, as well as the CASP-12 score, as continuous, interval-scaled variables. All analyses are stratified by gender.

There are two main threats to the ability of this model to identify the causal effects of immigration

⁸ Thus the immigrant share is lagged by k years relative to the health measures. As we explain in Section 5, we use $k = 2$ in our main analyses.

⁹ We use country-specific wave fixed effects, rather than country-specific year fixed effects, because many country-year combinations had very few observations.

on the health of natives. First, natives may respond to growing shares of immigrants in the regions of residence by moving to other regions. If the propensity of natives to move differs by health, the resulting estimates from our model could be biased. To check this concern, we conduct analyses to assess whether the probability that a subject moves is correlated with health status or the immigrant share and whether the correlation with the immigrant share varies by health status. As we show in Section 6, we find no evidence that the propensity of natives to move differs by health status.

Second, the rate of growth in the immigrant share across regions may be influenced by changes over time in regional economic or non-economic factors that are also correlated with health. For example, faster economic growth and the resulting favorable labor market conditions may attract more immigrants to a region, but economic conditions are also correlated with health status. We adopt several strategies to assess this concern.

To begin, our model includes country-specific wave fixed effects in addition to calendar year fixed effects. Although country-specific wave fixed effects cannot control for differences in the trajectories of relevant economic and non-economic factors across regions within the same country, they capture differences in these trajectories across countries, which may represent a sizable component of overall cross-region differences.

Additionally, our model also includes the unemployment rate and GDP per capita in each region over time. By controlling for these time-varying regional variables, we attempt to capture the role of unobserved regional factors that can influence the immigrant share and health.

Finally, we use IV estimation to address any remaining correlation between the immigrant share and the error term in our models. Following Card (2001) and Giuntella & Mazzonna (2015), we use an IV that allocates the number of immigrants in a host country in each year from a particular

source nation to regions in the host country based on the regional distribution of immigrants from that source nation in a “baseline” year preceding the study period. This IV, often called a “shift-share” IV, takes advantage of the tendency of new immigrants to locate in enclaves established by immigrants from the same source nation (Card, 2001). At the same time, by allocating new immigrants to regions based on their distribution in a prior year, the IV aims to eliminate any correlation between the actual flows of immigrants to regions in each year and time-varying regional factors that might both influence immigration and be associated with the health of natives.

Specifically, let M_{nct} be the total number of immigrants from source nation n residing in host country c in year t and let $f_{nr(c),baseline}$ be the fraction of that population living in region r (of country c) in the baseline year. Then \hat{M}_{nrt} , the imputed number of immigrants from source nation n in region r in year t is given by:

$$\hat{M}_{nrt} = M_{nct} \times f_{nr(c),baseline}$$

To construct the IV, we impute the immigrant share in region r in year t . This involves summing the imputed numbers of immigrants in region r across source nations to obtain an imputed total number of immigrants in region r and dividing the sum by a suitable population. Following Giuntella & Mazzonna (2015), we construct the IV as follows:

$$\hat{S}_{rt} = \frac{\sum_n \hat{M}_{nrt}}{P_{r,baseline}}$$

where $P_{r,baseline}$ is the total population of region r in the baseline year (2001 in this study). By

fixing the denominator at its value in the baseline year, we ensure that the variation in \hat{S}_{rt} is driven only by changes in the imputed immigrant population.¹⁰

The identifying assumption is that, conditional on the explanatory variables in the model, including the various fixed effects, the IV is uncorrelated with any unobservable time-varying regional economic factors that influence the flow of immigrants to a region and may be associated with the health of natives in the region. In a recent review of the use of shift-share IVs in labor economics, Jaeger et al. (2018) note that this assumption might be violated if, for example, region-specific economic shocks persist over time. Persistent local shocks might induce a correlation between the immigrant shares in the baseline year used to construct the IV and subsequent economic conditions.

One way to eliminate the potential correlation due to persistent local shocks is to allow enough years between the baseline year and the study period. We cannot do this because our baseline year is 2001 and the first SHARE wave was in 2004. (The 1991 European census does not include the variables needed to serve as the baseline year.) Therefore, we rely on country-specific time trends and regional macroeconomic variables to capture economic conditions,¹¹ and we conduct a series of indirect tests to assess whether there is a residual correlation between the immigrant shares used in constructing the IV and region-specific economic shocks during the study period. The results, which are reported in Section 6, support the validity of our IV.

4. Main results: Effects of immigration on the health of natives

¹⁰ The data sources we use to construct the IV, the 2001 census and EU LFS, do not report detailed nation of origin for immigrants. Instead, these data sources aggregate country of origin into macroregions such as European Free Trade Association, other European countries, Middle East, North Africa, East Asia, and so on. To develop the IV, we use 12 macroregions common to the census and EU LFS.

¹¹ A similar approach has been used by other researchers when data availability constrains the lag between the study period and the information on immigrant shares used to construct the shift-share IV (e.g., Bell et al., 2013; Ottaviano et al., 2015; Giuntella & Mazzona, 2015, Del Carpio et al., 2015; Machin & Murphy, 2017).

Table 2 shows the effect of the immigrant share on health outcomes for natives 65-80 years old, using a two-year lag between the immigrant share and the health outcomes. After testing other lags (see below), we settled on a two-year lag because we reasoned this was the minimum time it would take for new immigrants to make their way into the market for personal and household services and for their presence in this market to begin to influence the health of older natives.

We find that a higher immigrant share has a pervasive beneficial effect on the health of older men and women. Specifically, for men a higher immigrant share reduces mortality, increases the probability of reporting very good or better health, reduces the probability of having a chronic condition, reduces the probability of having difficulty with at least one ADL or IADL and the number of ADLs and IADLs on which the subject has difficulty, and reduces the number of depression symptoms and the probability of clinical depression. Results are similar for women except that in their case a higher immigrant share additionally reduces the number of chronic conditions and the number of everyday activities related to physical performance on which the subject has difficulty.

The first-stage partial F statistics for the IV shown in Table 2 exceed the rule-of-thumb value of 10 suggested by Staiger & Stock, (1997) to protect against weak instruments. Stock & Yogo (2005) show that in the case of one endogenous variable and one IV the rule-of-thumb works well.

We conduct two robustness checks. In the first, we limit the sample to observations in which the subject was 65-75 years old. As shown in Table 3, the point estimates again indicate that a higher immigrants share has a beneficial effect on the health of older natives, although fewer of these point estimates reach statistical significance. In the second, we use observations in which the subject is 65-80 years old, but exclude observations for subjects who died during the study. The results, presented in Table 4, are very similar to the main results in Table 2.

The Appendix presents the findings of additional analyses in which we vary the lag between the measurement of the immigrant share and the health outcomes. Table A.1 shows that the immigrant share has almost no significant effects on health outcomes when we measure them contemporaneously (i.e., with zero lag), consistent with the notion that it takes time for new immigrants to affect the health of older natives. Table A.2 shows that the findings using a one-year lag are closer to those using a zero lag than they are to the main results, suggesting that even one year may not be enough time. We would have liked to estimate models with lags longer than two years but could not do so because the baseline year for constructing the IV was 2001 and the first SHARE wave was in 2004.

5. Exploring the mechanisms

5.1. Analytic approach

We use the SHARE data to construct “mechanistic” variables that enable us to test several of the mechanisms posited in Section 2.

SHARE asks subjects to report whether and how often they have done any of the following four activities in the last 12 months: done voluntary or charity work; attended an educational or training course; gone to a sport, social, or other kind of club; and taken part in a political or community-related organization.¹² To assess social integration and volunteering, we construct binary variables indicating whether the subject did voluntary or charity work almost every week or more often, a binary variable indicating whether the subject did at least one of the four activities almost every

¹² Additional activities (e.g., taken part in activities of a religious organization) are asked in different SHARE waves, but these four activities are the only ones elicited in every wave.

week or more often, and a variable indicating the number of activities that the subject did almost every week or more often.

Subjects are also asked how often they feel left out of things. To assess loneliness, we construct a binary variable indicating that the subject reported feeling left out of things often (versus sometimes, rarely, or never)¹³ (Hughes et al., 2004).

Finally, subjects are asked whether and how often they have provided personal care or practical household help to family members, friends, or neighbors outside or inside the household in the last 12 months. To assess high-intensity caregiving, we construct a binary variable indicating that the subject reported providing such assistance daily or almost daily outside the household, a binary variable indicating that the subject reported providing such assistance daily or almost daily inside the household, and a binary variable indicating that the subject reported providing such assistance daily or almost daily in either setting.

To assess the effects of the immigrant share on the hypothesized mechanisms we estimate models similar to equation (1), but with the mechanistic variables as the outcomes:

$$Y_{irctw} = \beta S_{r(t-2)} + X'_{it}\gamma + Z'_{rt}\rho + \alpha_i + \varphi_t + \theta_{cw} + \varepsilon_{irctw}$$

where Y_{irctw} is one of the mechanistic variables for subject i residing in region r in country c , measured in calendar year t and wave w , and the other variables are as in equation (1). (The immigrant share is lagged by two years relative to the mechanistic variables.) Additionally, because

¹³ This question was only asked in Waves 2, 4, 5, in 6. It is one of the items in the 3-item UCLA Loneliness Scale (Hughes et al., 2004). The other two items in the scale – how often do you feel you lack companionship and how often do you feel isolated from others – are not elicited in SHARE.

health status may influence people's ability to participate in activities, feelings of loneliness, and ability to care for others, we also estimate versions of this model where we include an indicator for very good or better self-rated health among the explanatory variables. Also, because people who live alone may be especially susceptible to feeling lonely, the analyses of this mechanism also include an interaction between the immigrant share and an indicator for living alone. Analogously, because people who have a spouse with physical limitations or parents or in-laws in poor health may be more likely to be called upon to provide care or help to others, the analyses of caregiving also include interactions between the immigrant share and indicators for these circumstances.

5.2. Results

Table 5 reports the effects of the immigrant share a natives' social integration and volunteering. Among men, a higher immigrant share results in a higher probability of doing voluntary or charity work almost every week or more often and in doing a greater number of social integration activities almost every week or more often. Men with very good or better self-rated health are more likely to engage in social integration activities, but including self-rated health as a covariate does not appreciably change the effect of the immigrant share. Among women, a higher immigrant share leads to a higher probability of doing at least one of the four social integration activities almost every week or more often. Self-rated health does not affect women's participation in social integration activities. Lastly, owing to the larger sample size, when we pool men and women, we find a highly significant effect of a higher immigrant share in increasing the probability of doing at least one of the four social integration activities as well as the number of activities.

Table 6 shows that, among men, a higher immigrant share reduces the probability of reporting feeling left out of things often, our measure of loneliness, although the point estimate is only marginally significant. The immigrant share has no effect on loneliness among women. Similarly,

there are no significant effects of the immigrant share on loneliness when we pool men and women (data not shown).

Table 7 presents the effects of the immigrant share on high-intensity caregiving, defined as providing personal care or practical household help to others outside or inside the household daily or almost daily. A higher immigrant share reduces the probability that men engage in high-intensity caregiving outside the household, but there are no significant effects of the immigrant share on high-intensity caregiving by women (Table 7) or when we pool men and women (data not shown).

To summarize, the results presented in this section offer some support for the mechanisms posited in Section 2, particularly in the case of men. Thus we find evidence that a higher immigrant share results in greater participation in social integration activities and volunteering. These effects are seen in both genders and are especially prominent when we pool men and women. A higher immigrant share also leads to a lower probability of feeling left out of things and of providing high-intensity caregiving among men.

6. Validity of our identification strategy

Our study relies on regional variation in changes over time in the immigrant share to identify the causal effect of immigration on the health and quality of life of natives. As mentioned earlier, there are two main threats to the validity of our identification strategy. First, natives may respond to immigration by moving to a different region, and natives who move may self-select on health. Second, immigrants choose where to locate in part based on the characteristics of local labor markets. If these characteristics affect – or are correlated with factors that affect – health, and if they are not fully controlled for in the analyses, the resulting regression estimates could be biased. In this section, we describe our efforts to assess these threats to validity.

6.1. Selective migration of natives

We assess the first concern by examining whether the probability that a subject moves is correlated with health status or the immigrant share and whether any correlation with the immigrant share varies by health status. Thus we estimate the following model:

$$M_{i(w+1)} = \beta S_{rt} + \mu GSRH_{irctw} + \psi S_{rt} * GSRH_{irctw} + X'_{it}\gamma + Z'_{rt}\rho + \alpha_i + \varphi_t + \theta_{cw} + \varepsilon_{irctw}$$

where $M_{i(w+1)}$ is an indicator for whether subject i , who resided in region r in country c during wave w (and calendar year t), reported a new address in wave $w+1$.¹⁴ In the model, S_{rt} is the immigrant share in region r in year t (and wave w), $GSRH_{irctw}$ is an indicator for very good or better self-rated health, $S_{rt} * GSRH_{irctw}$ is an interaction term, and the other variables are as in equation (1). We estimate the model using IV estimation as in the previous analyses.

Table A.3 (Appendix) shows that a higher immigrant share lowers the probability that women move to a new address, but there are no other significant effects. In particular, we find no evidence that men and women who move self-select on health. These findings suggest that selective migration of natives does not bias our findings regarding the impact of immigration on natives' health.

6.2. Selection in immigrants' location decisions

¹⁴ Ideally, we would model subjects moving to a different region. As discussed in footnote 5, however, SHARE ascertains whether subjects changed residential address from one wave to the next, but for subjects who move there is no information on the new location. Consequently, we settle for modeling whether subjects reported a new address.

We address the second concern by including individual fixed effects, year fixed effects, country-specific wave fixed effects, and time-varying regional macroeconomic variables in the econometric models and by using IV estimation. Therefore, the question becomes whether our IV satisfies the identification assumption discussed earlier: no correlation with any unobservable time-varying regional factors that influence the flow of immigrants to a region and may be associated with the health of natives in the region. As noted earlier, this assumption might be violated if region-specific economic shocks persist over time.

Although we cannot test the identification assumption directly, we conduct analyses to assess whether our IV is correlated with observable regional variables that could affect the health of the population in a region (or could be associated with other “social determinants” that affect health) after conditioning on region fixed effects and country-specific time trends. The regional variables we assess are GDP per capita, the unemployment rate, the percentage of the population aged 25-64 with post-secondary education, the percentage of employment in manufacturing, and the real growth rate of regional gross value added, all obtained from Eurostat.¹⁵ We estimate the following region-level model for the regions and years corresponding to our study sample:

$$R_{rctw} = \beta \hat{S}_{r(t-2)} + \sigma_r + \varphi_t + \theta_{cw} + \varepsilon_{rctw}$$

where R_{rctw} is a regional variable for region r in country c , measured in calendar year t (and wave w), $\hat{S}_{r(t-2)}$ is the IV for region r in year $t-2$, σ_r is a time-invariant regional fixed effect, φ_t is a calendar year fixed effect, θ_{cw} are country-specific wave fixed effects, and ε_{rctw} is an error term.

¹⁵ Gross value added is an indicator of the economic activity of a region. It reflects the total value of all goods and services produced less the value of goods and services used for intermediate consumption in their production. The regional growth rate of gross value added is only available for six countries that account for 73 regions. Percent of employment in manufacturing is only available starting in 2008.

Table A.4 (Appendix) shows that the IV is conditionally uncorrelated with the regional variables we test, suggesting that any residual correlation (i.e., after conditioning on region fixed effects and country-specific time trends) between the immigrant shares used in constructing the IV and regional economic conditions during the study period largely vanishes. While these types of indirect tests can never be definitive, the findings provide strong circumstantial evidence that our IV is valid.

6.3. Additional considerations: short-run versus long-run

Jaeger et al. (2018) show that a potential problem with the shift-share IV is that it may conflate the short and long-run effects of immigration. In particular, in studies of the impact of immigration on natives' wages, it may conflate an initial negative effect with long-run adjustments in firms' stock of capital that lead to wage growth. They posit that this combination of short and long-run effects may explain why the results of studies of the impact of immigration on natives' labor market outcomes are mixed and generally seem biased towards zero.

While we cannot rule out the possibility that we are capturing in part long-run effects of immigration on health, in our context the mechanism of adjustment suggested by Jaeger et al. (2018) is less compelling, because the production function for domestic and personal care services uses few inputs other than labor. One general equilibrium adjustment we can think of is that native domestic workers exit the market in the long run in response to the inflow of immigrants. Were this the case, in the long run the price of personal and household services could return to its original level after an initial fall, and the increased affordability of these services would be short-lived. However, this story does not square well with the (admittedly limited) available data. As noted earlier, in Italy the number of foreign-born domestic workers rose from just above 50,000 to more than 700,000 between 1994 and 2011 and was not accompanied by an outflow of natives from the

market (Castagnone et al., 2013). Similarly, in Spain the number of foreign-born domestic workers increased from 15,000 to 320,000 between 1996 and 2009 while simultaneously the number of native domestic workers held steady (Leon, 2010).

7. Summary and conclusions

This study is the first to examine the effects of immigration on the health of natives aged 65 or older. We find that immigration improves self-rated health and physical functioning and reduces mortality, chronic conditions, and depression in this age group. The beneficial effects of immigration are roughly similar for native men and women.

Our exploration of the mechanisms underlying these beneficial health effects finds good evidence that immigration leads to greater social integration, including volunteering, among older natives. Social integration, and especially participation in volunteer activities, has been demonstrated to improve physical and mental health and reduce mortality as people get older and is considered an essential element in successful aging.

Our results also suggest that immigration reduces feelings of loneliness and the burden of high-intensity caregiving among older men. Loneliness is known to be detrimental to the health of older persons, so relief from loneliness is likely to benefit health. Additionally, some older persons are called upon to provide daily or almost daily personal care to sick or frail relatives or friends. This type of high-intensity caregiving can be stressful and can have deleterious effects on health both directly and indirectly by curtailing social activities.

Overall, our findings regarding mechanisms are weaker than those regarding health. However, although the SHARE data are ideal for studying health transitions among older Europeans, they are

less ideal for testing the mechanisms we posited. Surprisingly, given the purpose of the survey, there is no information in SHARE about whether subjects purchased services in the market for personal and household services, which would have enabled us to test directly whether immigration results in higher consumption of these services by natives. The list of social integration activities elicited uniformly across all waves of SHARE is rather brief and lacks, for instance, information about socializing with friends and relatives. The use of a single item about being left out of things to assess loneliness is limiting as well. Items addressing dimensions of loneliness such as lacking companionship and feeling isolated from others would have provided more insight into subjects' degree of social integration.

In this paper, we have followed the identification strategy commonly used in the literature on immigration and have conducted tests that support its validity in our application. We encourage other researchers to attempt to replicate our findings using other data sets and other identification strategies. In addition, qualitative studies to assess how the lives and activities of older natives are affected by the presence of immigrants in their communities are likely to be helpful in understanding what is surely a complex set of phenomena.

References

- Akay, A., Constant, A., & Giulietti, C. (2014). The impact of immigration on the well-being of natives. *J Econ Behav Organ*, 103, 72-92. doi:<https://doi.org/10.1016/j.jebo.2014.03.024>
- Anderson, N. D., Damianakis, T., Kroger, E., Wagner, L. M., Dawson, D. R., Binns, M. A., . . . Cook, S. L. (2014). The benefits associated with volunteering among seniors: a critical review and recommendations for future research. *Psychol Bull*, 140(6), 1505-1533. doi:10.1037/a0037610
- Barone, G., & Mocetti, S. (2011). With a little help from abroad: The effect of low-skilled immigration on the female labour supply. *Labour Econ*, 18(5), 664-675. doi:<https://doi.org/10.1016/j.labeco.2011.01.010>
- Barth, J., Schneider, S., & von Kanel, R. (2010). Lack of social support in the etiology and the prognosis of coronary heart disease: a systematic review and meta-analysis. *Psychosom Med*, 72(3), 229-238. doi:10.1097/PSY.0b013e3181d01611
- Beach, S. R., & Schulz, R. (2017). Family Caregiver Factors Associated with Unmet Needs for Care of Older Adults. *J Am Geriatr Soc*, 65(3), 560-566. doi:10.1111/jgs.14547
- Bell, B., Fasani, F., & Machin, S. (2013) Crime and immigration: evidence from large immigrant waves. *The Review of Economics and Statistics*, 95 (4),1278-1290. doi: 10.1162/REST_a_00337
- Berkman, L. F., & Syme, S. L. (1979). Social networks, host resistance, and mortality: a nine-year follow-up study of Alameda County residents. *American journal of Epidemiology*, 109(2), 186-204.
- Borjas, G. J. (1995). The Economic Benefits from Immigration. *The Journal of Economic Perspectives*, 9(2), 3-22.
- Brunello, G., & Rocco, L. (2013). The effect of immigration on the school performance of natives: Cross country evidence using PISA test scores. *Economics of Education Review*, 32, 234-246.
- Buz, J., & Cortes-Rodriguez, M. (2016). Measurement of the severity of disability in community-dwelling adults and older adults: interval-level measures for accurate comparisons in large survey data sets. *BMJ Open*, 6(9), e011842. doi:10.1136/bmjopen-2016-011842
- Cangiano, A., & Shutes, I. (2010). Ageing, Demand for Care and the Role of Migrant Care Workers in the UK *Journal of Population Ageing* (14 December 2010 ed., Vol. 3, pp. 39-57): Springer Netherlands.
- Card, D. (1990). The Impact of the Mariel Boatlift on the Miami Labor Market. *ILR Review*, 43(2), 245-257. doi:doi:10.1177/001979399004300205
- Card, D. (2001). Immigrant Inflows, Native Outflows, and the Local Labor Market Impacts of Higher Immigration. *Journal of Labor Economics*, 19(1), 22-64. doi:10.1086/209979
- Castagnone, E., Salis, E., Premazzi, V. (2013). Promoting integration for migrant domestic workers in Italy / International Labour Office, International Migration Programme, International and European Forum of Research on Immigration (FIERI). Geneva: ILO. International migration paper, No.115, ISSN 1020-2668; 1564-4839 (web pdf).
- Castro-Costa, E., Dewey, M., Stewart, R., Banerjee, S., Huppert, F., Mendonca-Lima, C., . . . Prince, M. (2007). Prevalence of depressive symptoms and syndromes in later life in ten European countries: the SHARE study. *Br J Psychiatry*, 191, 393-401. doi:10.1192/bjp.bp.107.036772
- Chan, K. S., Kasper, J. D., Brandt, J., & Pezzin, L. E. (2012). Measurement equivalence in ADL and IADL difficulty across international surveys of aging: findings from the HRS, SHARE, and ELSA. *J Gerontol B Psychol Sci Soc Sci*, 67(1), 121-132. doi:10.1093/geronb/gbr133
- Cortés, P., & Tessada, J. (2011). Low-Skilled Immigration and the Labor Supply of Highly Skilled Women. *American Economic Journal: Applied Economics*, 3(3), 88-123. doi:doi: 10.1257/app.3.3.88

- Del Carpio, X., Özden, C., Testaverde, M., & Wagner M. (2015). Local Labor Supply Responses to Immigration. *Scandinavian Journal of Economics*, 117(2), 493-521.
- Dickens, A. P., Richards, S. H., Greaves, C. J., & Campbell, J. L. (2011). Interventions targeting social isolation in older people: a systematic review. *BMC Public Health*, 11(1), 647. doi:10.1186/1471-2458-11-647
- Domínguez-Mujica, J., Hernández, R., & Parreño-Castellano, J. (2013). *Gender, migration and household services in Spain*.
- Dustmann, C., Fabbri, F., & Preston, I. (2005). The Impact of Immigration on the British Labour Market. *The Economic Journal*, 115(507), F324-F341. doi:10.1111/j.1468-0297.2005.01038.x
- Dustmann, C., & Frattini, T. (2014). The fiscal effects of immigration to the UK. *The Economic Journal*, 124(580).
- Dustmann, C., Frattini, T., & Halls, C. (2010). Assessing the Fiscal Costs and Benefits of A8 Migration to the UK *FISC STUD*, 31(1), 41.
- Farvaque, N. (2015). *Thematic review on personal and household services*: European Employment Policy Observatory (EEPO).
- Farvaque, N., Broughton, A., Ledermaier, S., Kelemen, M., Voss, E., & Wagner, M. (2013). *Developing personal and household services in the EU: A focus on housework activities*: European Commission.
- Fletcher, J. M., Sindelar, J. L., & Yamaguchi, S. (2011). Cumulative Effects of Job Characteristics on Health. *Health economics*, 20(5), 553-570. doi:10.1002/hec.1616
- Folland, S., & Rocco, L. (2014). *The Economics of Social Capital and Health: A Conceptual and Empirical Roadmap*. Washington, DC; World Scientific.
- Fried, L. P., Carlson, M. C., Freedman, M., Frick, K. D., Glass, T. A., Hill, J., . . . Zeger, S. (2004). A social model for health promotion for an aging population: initial evidence on the Experience Corps model. *J Urban Health*, 81(1), 64-78. doi:10.1093/jurban/jth094
- Fried, L. P., Carlson, M. C., McGill, S., Seeman, T., Xue, Q. L., Frick, K., . . . Rebok, G. W. (2013). Experience Corps: a dual trial to promote the health of older adults and children's academic success. *Contemp Clin Trials*, 36(1), 1-13. doi:10.1016/j.cct.2013.05.003
- Giuntella, O. (2012). Do immigrants squeeze natives out of bad schedules? Evidence from Italy. *IZA Journal of Migration*, 1(1), 7. doi:10.1186/2193-9039-1-7
- Giuntella, O., & Mazzonna, F. (2015). Do immigrants improve the health of natives? *Journal of Health Economics*, 43, 140-153. doi:<http://dx.doi.org/10.1016/j.jhealeco.2015.06.006>
- Glitz, A. (2012). The Labor Market Impact of Immigration: A Quasi-Experiment Exploiting Immigrant Location Rules in Germany. *Journal of Labor Economics*, 30(1), 175-213.
- Goll, J. C., Charlesworth, G., Scior, K., & Stott, J. (2015). Barriers to Social Participation among Lonely Older Adults: The Influence of Social Fears and Identity. *PLoS One*, 10(2), e0116664. doi:10.1371/journal.pone.0116664
- Hardoy, I., & Schøne, P. (2013). Does the Clustering of Immigrant Peers Affect the School Performance of Natives? *Journal of Human Capital*, 7(1), 1-25.
- Holt-Lunstad, J., Smith, T. B., Baker, M., Harris, T., & Stephenson, D. (2015). Loneliness and social isolation as risk factors for mortality: a meta-analytic review. *Perspect Psychol Sci*, 10(2), 227-237. doi:10.1177/1745691614568352
- Holt-Lunstad, J., Smith, T. B., & Layton, J. B. (2010). Social relationships and mortality risk: a meta-analytic review. *PLoS medicine*, 7(7), e1000316.
- House, J. S., Robbins, C., & Metzner, H. L. (1982). The association of social relationships and activities with mortality: prospective evidence from the Tecumseh Community Health Study. *American journal of Epidemiology*, 116(1), 123-140.
- Hughes, M. E., Waite, L. J., Hawkey, L. C., & Cacioppo, J. T. (2004). A Short Scale for Measuring Loneliness in Large Surveys: Results From Two Population-Based Studies. *Res Aging*, 26(6), 655-672. doi:10.1177/0164027504268574

- Idler, E. L., & Benyamini, Y. (1997). Self-rated health and mortality: a review of twenty-seven community studies. *J Health Soc Behav*, 38(1), 21-37.
- Jaeger, D.A., Ruist, J., & Stuhler, J. (2018). Shift-share instruments and the impact of immigration. IZA Institute of Labor Economics, Discussion Paper 11307, January.
- Krantz-Kent, R., & Stewart, J. (2007). How do older Americans spend their time? *Monthly Labor Review*, 130, 8–26.
- LaPlante, M. P. (2010). The classic measure of disability in activities of daily living is biased by age but an expanded IADL/ADL measure is not. *J Gerontol B Psychol Sci Soc Sci*, 65(6), 720-732. doi:10.1093/geronb/gbp129
- Leon, M. (2010). Migration and care work in Spain: the domestic sector revisited. *Social Policy and Society* 9(3), 409-418.
- Lund, R., Nilsson, C. J., & Avlund, K. (2010). Can the higher risk of disability onset among older people who live alone be alleviated by strong social relations? A longitudinal study of non-disabled men and women. *Age Ageing*, 39(3), 319-326. doi:10.1093/ageing/afq020
- Machin, S. & Murphy, R. (2017). Paying out and crowding out? The globalization of higher education. *Journal of Economic Geography*, 17(5), 1075–1110.
- Miller, B., & Montgomery, A. (1990). Family Caregivers and Limitations in Social Activities. *Res Aging*, 12(1), 72-93. doi:10.1177/0164027590121004
- Nagi, S. Z. (1976). An epidemiology of disability among adults in the United States. *Milbank Mem Fund Q Health Soc*, 54(4), 439-467.
- Nilsson, C. J., Avlund, K., & Lund, R. (2011). Onset of mobility limitations in old age: the combined effect of socioeconomic position and social relations. *Age Ageing*, 40(5), 607-614. doi:10.1093/ageing/afr073
- Ohinata, A., & Van Ours, J. C. (2013). How immigrant children affect the academic achievement of native Dutch children. *The Economic Journal*, 123(570).
- Ong, A. D., Uchino, B. N., & Wethington, E. (2016). Loneliness and Health in Older Adults: A Mini-Review and Synthesis. *Gerontology*, 62(4), 443-449.
- Orrenius, P. M., & Zavodny, M. (2009). Do Immigrants Work In Riskier Jobs? *Demography*, 46(3), 535-551.
- Orth-Gomer, K., & Johnson, J. V. (1987). Social network interaction and mortality: a six year follow-up study of a random sample of the Swedish population. *Journal of chronic diseases*, 40(10), 949-957.
- Ottaviano, G. I. P., & Peri, G. (2012). Rethinking the effect of immigration on wages. *Journal of the European Economic Association*, 10(1), 152-197. doi:10.1111/j.1542-4774.2011.01052.x
- Ottaviano, G., Peri, G., & Wright, G.C. (2015). Immigration, trade and productivity in services: evidence from U.K. firms. NBER Working Paper 21200 (May). <http://www.nber.org/papers/w21200>
- Penning, M. J., & Wu, Z. (2016). Caregiver Stress and Mental Health: Impact of Caregiving Relationship and Gender. *Gerontologist*, 56(6), 1102-1113. doi:10.1093/geront/gnv038
- Peri, G. (2014). Do Immigrant workers depress the wages of native workers? *IZA World of Labor*, 42. doi:10.15185
- Peri, G., Romiti, A., & Rossi, M. (2015). Immigrants, domestic labor and women's retirement decisions. *Labour Economics*, 36, 18-34. doi:<https://doi.org/10.1016/j.labeco.2015.07.004>
- Piliavin, J. A., & Siegl, E. (2007). Health benefits of volunteering in the Wisconsin longitudinal study. *J Health Soc Behav*, 48(4), 450-464. doi:10.1177/002214650704800408
- Pinquart, M., & Sörensen, S. (2003). Differences between caregivers and noncaregivers in psychological health and physical health: a meta-analysis. *Psychol Aging*, 18(2), 250-267.
- Pinquart, M., & Sörensen, S. (2011). Spouses, adult children, and children-in-law as caregivers of older adults: a meta-analytic comparison. *Psychol Aging*, 26(1), 1-14. doi:10.1037/a0021863

- Prince, M. J., Beekman, A. T., Deeg, D. J., Fuhrer, R., Kivela, S. L., Lawlor, B. A., . . . Copeland, J. R. (1999). Depression symptoms in late life assessed using the EURO-D scale. Effect of age, gender and marital status in 14 European centres. *Br J Psychiatry*, *174*, 339-345.
- Prince, M. J., Reischies, F., Beekman, A. T., Fuhrer, R., Jonker, C., Kivela, S. L., . . . Copeland, J. R. (1999). Development of the EURO-D scale--a European, Union initiative to compare symptoms of depression in 14 European centres. *Br J Psychiatry*, *174*, 330-338.
- Roth, D. L., Fredman, L., & Haley, W. E. (2015). Informal caregiving and its impact on health: a reappraisal from population-based studies. *Gerontologist*, *55*(2), 309-319. doi:10.1093/geront/gnu177
- Roth, D. L., Haley, W. E., Hovater, M., Perkins, M., Wadley, V. G., & Judd, S. (2013). Family caregiving and all-cause mortality: findings from a population-based propensity-matched analysis. *Am J Epidemiol*, *178*(10), 1571-1578. doi:10.1093/aje/kwt225
- Rozario, P. A., Morrow-Howell, N., & Hinterlong, J. E. (2004). Role Enhancement or Role Strain. *Res Aging*, *26*(4), 413-428. doi:doi:10.1177/0164027504264437
- Schnittker, J., & Bacak, V. (2014). The increasing predictive validity of self-rated health. *PLoS One*, *9*(1), e84933. doi:10.1371/journal.pone.0084933
- Schulz, R., & Beach, S. R. (1999). Caregiving as a risk factor for mortality: the Caregiver Health Effects Study. *Jama*, *282*(23), 2215-2219.
- Schulz, R., Beach, S. R., Hebert, R. S., Martire, L. M., Monin, J. K., Tompkins, C. A., & Albert, S. M. (2009). Spousal suffering and partner's depression and cardiovascular disease: the Cardiovascular Health Study. *Am J Geriatr Psychiatry*, *17*(3), 246-254. doi:10.1097/JGP.0b013e318198775b
- Seeman, T. E. (1996). Social ties and health: The benefits of social integration. *Annals of epidemiology*, *6*(5), 442-451.
- Spector, W. D., & Fleishman, J. A. (1998). Combining activities of daily living with instrumental activities of daily living to measure functional disability. *J Gerontol B Psychol Sci Soc Sci*, *53*(1), S46-57.
- Staiger, D., & Stock, J. H. (1997). Instrumental Variables Regression with Weak Instruments. *Econometrica*, *65*(3), 557-586. doi:10.2307/2171753
- Steptoe, A., Shankar, A., Demakakos, P., & Wardle, J. (2013). Social isolation, loneliness, and all-cause mortality in older men and women. *Proceedings of the National Academy of Sciences*, *110*(15), 5797-5801.
- Stock, J., & Yogo, M. (2005). Testing for Weak Instruments in Linear IV Regression. In W. K. A. Donald (Ed.), *Identification and Inference for Econometric Models* (pp. 80-108). New York: Cambridge University Press.
- Thoits, P. A., & Hewitt, L. N. (2001). Volunteer work and well-being. *J Health Soc Behav*, *42*(2), 115-131.
- Uchino, B. N. (2006). Social support and health: a review of physiological processes potentially underlying links to disease outcomes. *J Behav Med*, *29*(4), 377-387. doi:10.1007/s10865-006-9056-5
- Unger, J. B., McAvay, G., Bruce, M. L., Berkman, L., & Seeman, T. (1999). Variation in the impact of social network characteristics on physical functioning in elderly persons: MacArthur Studies of Successful Aging. *J Gerontol B Psychol Sci Soc Sci*, *54*(5), S245-251.
- Vitaliano, P. P., Zhang, J., & Scanlan, J. M. (2003). Is caregiving hazardous to one's physical health? A meta-analysis. *Psychol Bull*, *129*(6), 946-972. doi:10.1037/0033-2909.129.6.946

Table 1. Characteristics of study sample, stratified by gender.

	Men			Women		
	No. obs.	Mean	Std. Dev.	No. obs.	Mean	Std. Dev.
Health status						
Mortality	14,972	0.02	0.15	17,200	0.02	0.12
Very good or better self-rated health	19,776	0.27	0.44	22,640	0.22	0.42
Any chronic condition	19,766	0.51	0.50	22,635	0.54	0.50
Number of chronic conditions	19,751	1.82	1.49	22,612	2.08	1.59
Any ADL/IADL limitation	19,758	0.17	0.38	22,622	0.25	0.43
Number of ADL/IADL limitations	19,758	0.50	1.69	22,622	0.67	1.82
Any physical limitation	19,758	0.44	0.50	22,622	0.62	0.48
Number of physical limitations	19,758	1.22	1.97	22,622	2.06	2.40
Number of depression symptoms	19,255	1.80	1.91	22,157	2.74	2.33
Clinical depression	19,255	0.16	0.37	22,157	0.32	0.46
Individual characteristics						
Age (yrs)	19,776	71.75	4.21	22,640	71.78	4.26
Has spouse or partner	19,776	0.84	0.37	22,640	0.62	0.49
Regional characteristics						
Unemployment rate (%)	19,776	9.01	6.06	22,640	9.17	6.18
GDP per capita (PPS)	19,776	29,689	8,874	22,640	29,477	8,688
Mechanistic variables						
Volunteer or charity work	19,410	0.12	0.33	22,245	0.11	0.32
Any social integration activity	19,410	0.32	0.47	22,245	0.29	0.45
Number of social integration activities	19,410	0.40	0.66	22,245	0.37	0.64
Often feels left out	17,146	0.04	0.20	19,648	0.06	0.23
Caregiving outside household	19,776	0.03	0.17	22,640	0.05	0.22
Caregiving inside household	19,752	0.06	0.24	22,624	0.07	0.26
Caregiving in either setting	19,776	0.09	0.28	22,640	0.11	0.32
Other personal circumstances						
Lives alone	19,776	0.37	0.48	22,640	0.59	0.49
Spouse's number of limitations	19,758	0.30	1.24	22,622	0.23	1.20
Parents or in-laws in poor health	19,776	0.08	0.27	22,636	0.04	0.21

Notes: Age is in years, the unemployment rate is a percentage, and GDP per capita is in purchasing power standards (see footnote 6 for details).

Table 2. Effects of immigration on health outcomes for natives 65-80 years old (immigrant share lagged by 2 years).

	Mortality	Very good or better self-rated health	Any chronic condition	No. chronic conditions	Any ADL/IADL limitation	No. ADL/IADL limitations	Any physical limitation	No. physical limitations	No. depression symptoms	Clinical depression
Men										
Immigrant share	-1.187** (0.522)	2.654*** (0.957)	-3.650*** (1.305)	-4.728 (4.608)	-2.629* (1.411)	-13.928*** (5.026)	-1.270 (1.653)	-7.294 (5.409)	-10.313** (4.567)	-2.421** (0.962)
No. subjects	5,217	7,719	7,714	7,707	7,710	7,710	7,709	7,709	7,432	7,432
No. observations	12,470	19,776	19,761	19,739	19,749	19,749	19,748	19,748	19,010	19,010
First-stage F	18.39									
Women										
Immigrant share	-0.897** (0.365)	2.186*** (0.748)	-2.470*** (0.917)	-7.778** (3.899)	-3.058* (1.625)	-8.475* (4.922)	-0.477 (1.251)	-10.294** (4.693)	-13.732** (6.957)	-2.131* (1.220)
No. subjects	6,050	8,775	8,774	8,759	8,763	8,763	8,761	8,761	8,509	8,509
No. observations	14,475	22,640	22,634	22,596	22,610	22,610	22,608	22,608	21,917	21,917
First-stage F	17.90									

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 3.

Table 3. Effects of immigration on health outcomes for natives 65-75 years old (immigrant share lagged by 2 years).

	Mortality	Very good or better self-rated health	Any chronic condition	No. chronic conditions	Any ADL/IADL limitation	No. ADL/IADL limitations	Any physical limitation	No. physical limitations	No. depression symptoms	Clinical depression
Men										
Immigrant share	-0.032 (0.420)	2.938** (1.359)	-5.072*** (1.351)	-6.772 (5.056)	-1.922 (1.361)	-11.455** (5.738)	-1.556 (1.735)	-4.192 (5.273)	-13.741*** (4.917)	-2.719*** (1.051)
No. subjects	3,954	5,912	5,909	5,901	5,905	5,905	5,905	5,905	5,714	5,714
No. observations	8,973	14,360	14,350	14,330	14,342	14,342	14,342	14,342	13,874	13,874
First-stage F	22.94									
Women										
Immigrant share	-0.589** (0.258)	2.137** (0.861)	-1.653 (1.281)	-4.747 (3.801)	-2.825* (1.486)	-1.105 (5.277)	-0.429 (1.360)	-5.893 (4.618)	-6.898 (9.169)	-1.359 (1.451)
No. subjects	4,478	6,633	6,632	6,624	6,625	6,625	6,626	6,626	6,473	6,473
No. observations	10,241	16,232	16,227	16,204	16,212	16,212	16,215	16,215	15,820	15,820
First-stage F	22.63									

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 3.

Table 4. Effects of immigration on health outcomes for natives 65-80 years old who survived throughout the study period (immigrant share lagged by 2 years).

	Mortality	Very good or better self-rated health	Any chronic condition	No. chronic conditions	Any ADL/IADL limitation	No. ADL/IADL limitations	Any physical limitation	No. physical limitations	No. depression symptoms	Clinical depression
Men										
Immigrant share	NA	2.829*** (1.058)	-3.620*** (1.367)	-5.604 (4.611)	-1.858 (1.377)	-9.982* (5.277)	-1.185 (1.693)	-5.381 (5.313)	-10.613** (4.776)	-2.638*** (0.921)
No. subjects		7,387	7,382	7,376	7,379	7,379	7,378	7,378	7,137	7,137
No. observations		18,979	18,964	18,945	18,956	18,956	18,954	18,954	18,299	18,299
First-stage F	21.32									
Women										
Immigrant share	NA	2.260*** (0.766)	-2.626*** (0.958)	-8.102** (4.100)	-2.613* (1.576)	-7.846 (5.012)	-0.613 (1.464)	-11.439** (5.370)	-14.494** (7.348)	-2.382* (1.365)
No. subjects		8,513	8,512	8,498	8,501	8,501	8,500	8,500	8,262	8,262
No. observations		22,008	22,002	21,966	21,978	21,978	21,978	21,978	21,336	21,336
First-stage F	20.12									

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 3. NA is not applicable.

Table 5. Effects of immigration on social integration activities for natives 65-80 years old (immigrant share lagged by 2 years).

	Volunteer or charity work	Any social integration activity	No. social integration activities	Volunteer or charity work	Any social integration activity	No. social integration activities
Men						
Immigrant share	0.775* (0.471)	1.396 (0.886)	2.079* (1.148)	0.745 (0.475)	1.327 (0.874)	1.975* (1.139)
Very good or better self-rated health				0.012* (0.006)	0.026*** (0.009)	0.040*** (0.013)
No. subjects	7,518	7,518	7,518	7,518	7,518	7,518
No. observations	19,234	19,234	19,234	19,234	19,234	19,234
Women						
Immigrant share	-0.183 (0.428)	1.014* (0.576)	1.196 (0.835)	-0.189 (0.425)	0.990* (0.579)	1.162 (0.834)
Very good or better self-rated health				0.003 (0.008)	0.011 (0.009)	0.015 (0.014)
No. subjects	8,548	8,548	8,548	8,548	8,548	8,548
No. observations	22,041	22,041	22,041	22,041	22,041	22,041
Men and Women (pooled)						
Immigrant share	0.195 (0.354)	1.201*** (0.430)	1.608*** (0.587)	0.176 (0.353)	1.156*** (0.429)	1.541*** (0.586)
Good or better self-rated health				0.008 (0.005)	0.019*** (0.007)	0.028*** (0.009)
No. subjects	16,066	16,066	16,066	16,066	16,066	16,066
No. observations	41,275	41,275	41,275	41,275	41,275	41,275

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 3.

Table 6. Effects of immigration on feeling left out for natives 65-80 years old (immigrant share lagged by 2 years).

	Often feels left out	Often feels left out
Men		
Immigrant share	-1.228 (0.765)	-1.297* (0.768)
Immigrant share x lives alone		0.123 (0.189)
Very good or better self-rated health		0.006 (0.004)
No. subjects	6,299	6,299
No. observations	15,786	15,786
Women		
Immigrant share	0.416 (0.741)	0.277 (0.820)
Immigrant share x lives alone		0.185 (0.357)
Very good or better self-rated health		-0.001 (0.005)
No. subjects	7,183	7,183
No. observations	18,116	18,116

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 3.

Table 7. Effects of immigration on high-intensity caregiving by natives 65-80 years old (immigrant share lagged by 2 years).

	Caregiving outside household	Caregiving inside household	Caregiving in either setting	Caregiving outside household	Caregiving inside household	Caregiving in either setting	Caregiving outside household	Caregiving inside household	Caregiving in either setting
Men									
Immigrant share	-0.813** (0.352)	-0.059 (0.625)	-0.993 (0.773)	-0.772** (0.365)	-0.019 (0.582)	-0.935 (0.730)	-0.821** (0.353)	-0.038 (0.621)	-0.986 (0.769)
Immigrant share x spouse's number of limitations				-0.034 (0.054)	0.052 (0.083)	0.036 (0.083)			
Immigrant share x parents or in-laws are in poor health							0.086 (0.100)	0.352* (0.210)	0.385* (0.218)
Very good or better self-rated health				0.004 (0.005)	-0.001 (0.005)	0.003 (0.006)	0.004 (0.005)	-0.001 (0.006)	0.003 (0.007)
No. subjects	7,719	7,705	7,719	7,710	7,697	7,710	7,719	7,705	7,719
No. observations	19,776	19,738	19,776	19,749	19,714	19,749	19,776	19,738	19,776
Women									
Immigrant share	-0.579 (0.484)	0.208 (0.943)	-0.582 (1.151)	-0.540 (0.480)	0.451 (0.965)	-0.316 (1.138)	-0.607 (0.477)	0.212 (0.947)	-0.606 (1.147)
Immigrant share x spouse's number of limitations				0.003 (0.040)	-0.022 (0.087)	-0.014 (0.087)			
Immigrant share x parents or in-laws are in poor health							-0.076 (0.265)	-0.076 (0.339)	-0.231 (0.445)
Very good or better self-rated health				0.001 (0.005)	0.001 (0.005)	0.001 (0.007)	0.000 (0.005)	-0.000 (0.006)	-0.000 (0.007)

No. subjects	8,775	8,765	8,775	8,763	8,754	8,763	8,773	8,763	8,773
No. observations	22,640	22,614	22,640	22,610	22,586	22,610	22,636	22,610	22,636

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 3.

Figure 1. Annual percentage point increase in immigrant share between 2004 and 2015 for each study region.

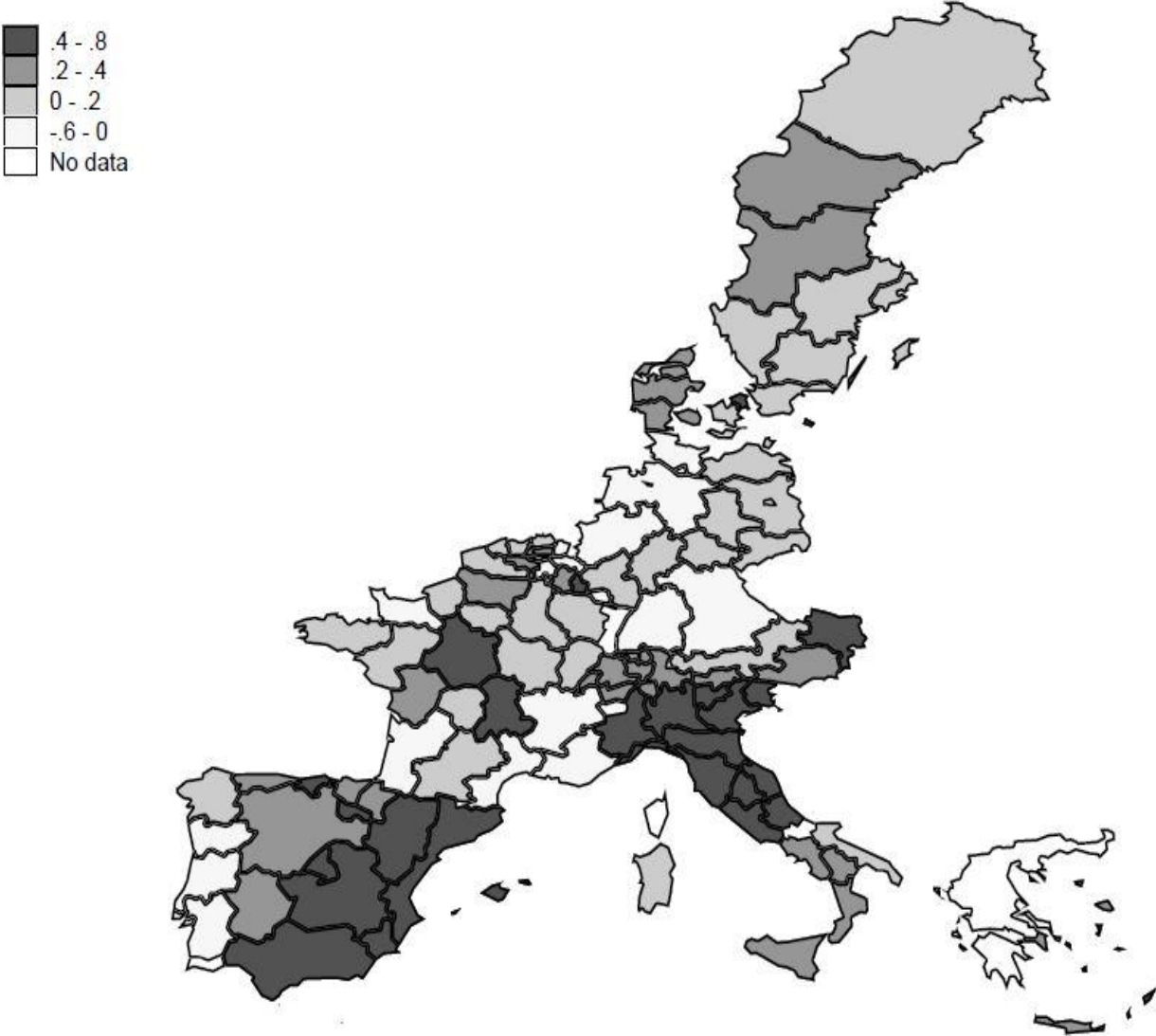
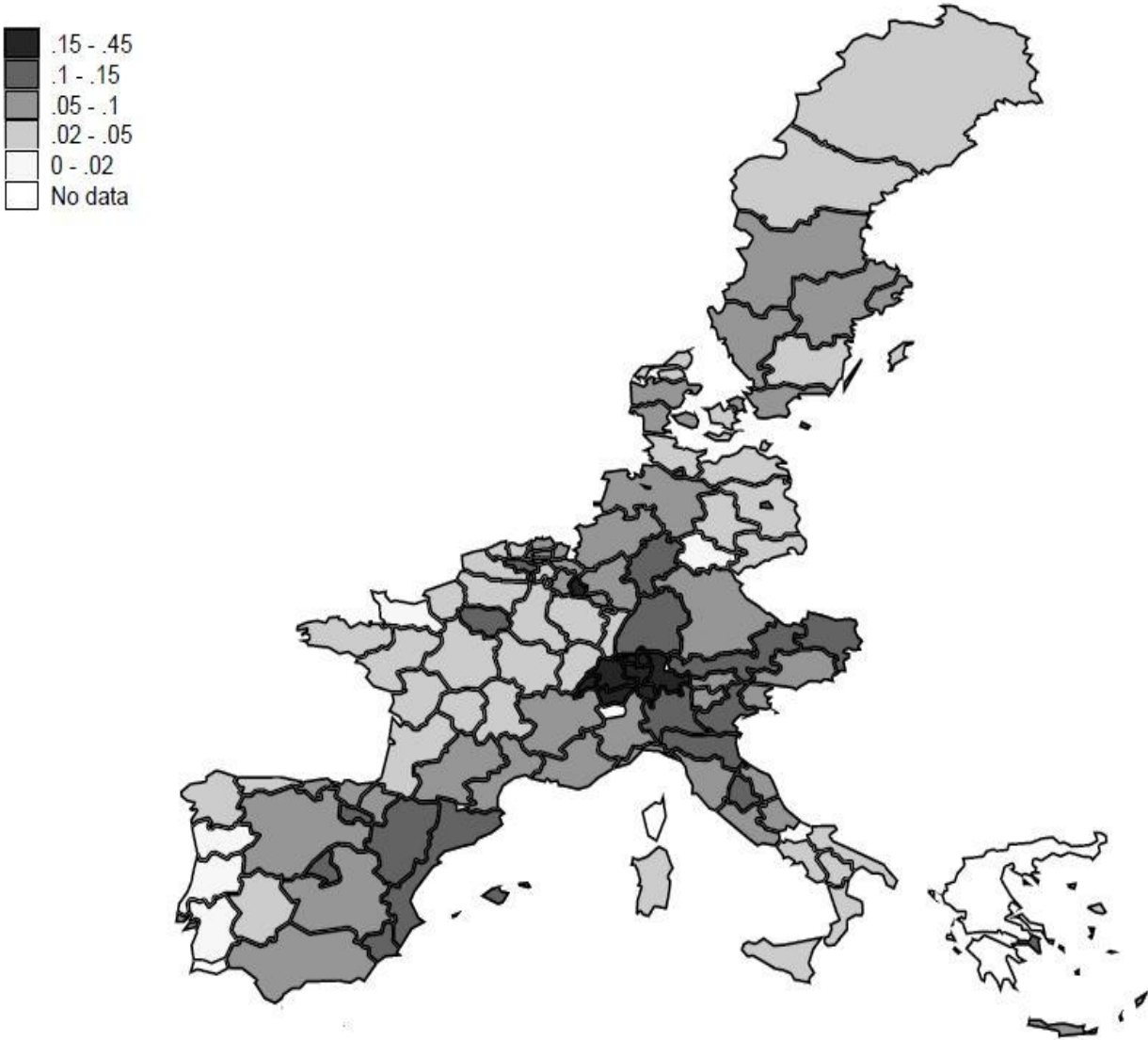


Figure 2. Immigrant share in 2015 in each study region.



Appendix

Table A.1. Effects of immigration on health outcomes for natives 65-80 years old (immigrant share not lagged).

	Mortality	Very good or better self-rated health	Any chronic condition	No. chronic conditions	Any ADL/IADL limitation	No. ADL/IADL limitations	Any physical limitation	No. physical limitations	No. depression symptoms	Clinical depression
Men										
Immigrant share	-0.041 (0.673)	2.813 (1.984)	-0.733 (2.201)	-0.904 (3.852)	-0.368 (1.553)	-5.516 (6.860)	-2.323 (2.145)	-3.119 (5.055)	-4.849 (6.455)	-1.217 (1.617)
No. subjects	5,223	7,724	7,719	7,712	7,715	7,715	7,714	7,714	7,437	7,437
No. observations	12,489	19,794	19,779	19,757	19,767	19,767	19,766	19,766	19,028	19,028
First-stage F	26.47									
Women										
Immigrant share	-1.409** (0.560)	2.806*** (1.033)	-1.216 (1.349)	-4.941 (4.292)	-0.652 (1.756)	-5.436 (5.932)	0.499 (1.666)	2.703 (5.335)	-9.002 (7.378)	-0.357 (1.331)
No. subjects	6,059	8,782	8,781	8,766	8,770	8,770	8,768	8,768	8,516	8,516
No. observations	14,502	22,665	22,659	22,621	22,635	22,635	22,633	22,633	21,942	21,942
First-stage F	33.41									

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 3.

Table A.2. Effects of immigration on health outcomes for natives 65-80 years old (immigrant share lagged by 1 year).

	Mortality	Very good or better self-rated health	Any chronic condition	No. chronic conditions	Any ADL/IADL limitation	No. ADL/IADL limitations	Any physical limitation	No. physical limitations	No. depression symptoms	Clinical depression
Men										
Immigrant share	-0.819 (0.608)	3.121* (1.622)	-1.099 (1.857)	1.069 (4.210)	-1.127 (1.541)	-9.288 (6.494)	-1.651 (1.908)	-0.807 (4.678)	-5.190 (5.407)	-1.370 (1.420)
No. subjects	5,223	7,724	7,719	7,712	7,715	7,715	7,714	7,714	7,437	7,437
No. observations	12,489	19,794	19,779	19,757	19,767	19,767	19,766	19,766	19,028	19,028
First-stage F	26.16									
Women										
Immigrant share	-1.345** (0.613)	2.933*** (1.047)	-1.927 (1.252)	-5.149 (3.780)	-1.500 (1.794)	-6.379 (6.009)	0.691 (1.502)	1.126 (4.949)	-9.896 (6.760)	-1.067 (1.188)
No. subjects	6,059	8,782	8,781	8,766	8,770	8,770	8,768	8,768	8,516	8,516
No. observations	14,502	22,665	22,659	22,621	22,635	22,635	22,633	22,633	21,942	21,942
First-stage F	20.67									

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 3.

Table A.3. Effects of immigration on moving to a new address for natives 65-80 years old (immigrant share lagged by one wave).

	Men	Women	Men and women (pooled)	Men	Women	Men and women (pooled)
Immigrant share	-0.323 (0.777)	-0.972* (0.539)	-0.693 (0.498)	-0.326 (0.797)	-0.870 (0.547)	-0.645 (0.513)
Immigrant share x very good or better self-rated health				0.017 (0.415)	-0.570 (0.525)	-0.257 (0.346)
No. subjects	8,052	9,278	17,330	8,052	9,278	17,330
No. observations	20,719	24,022	44,741	20,719	24,022	44,741

*p<.10 **p<.05 ***p<.01

Notes: All estimates are IV (see text). Standard errors are in parentheses. Models control for time-varying individual and regional characteristics, individual fixed effects, calendar year fixed effects, and country-specific wave fixed effects. Details are provided in Section 6.

Table A.4. Correlation of immigrant share IV with regional macroeconomic variables (immigrant share IV lagged by 2 years).

	GDP per capita	Unemployment rate	Population with post-secondary education	Growth rate regional gross value added	Employment in manufacturing
Immigrant share IV	-0.310 (0.220)	16.877 (10.619)	-11.521 (10.043)	-4.673 (4.937)	7.988 (6.123)
No. observations	598	598	598	373	339
R-squared	0.995	0.954	0.984	0.777	0.991

*p<.10 **p<.05 ***p<.01

Notes: Region-level models for the regions and years corresponding to the study sample. Standard errors are in parentheses. Models control for regional fixed effects, calendar year fixed effects, and country-specific wave fixed effects. The unemployment rate, population with post-secondary education, growth rate of regional gross value added, and employment in manufacturing are percentages. Details are provided in Section 6.