Health Across Borders: A Crossnational Comparison of Immigrant Health in Europe

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Abstract
The immigrant population in Europe is aging. We examine whether immigrants aged 50 and older in Europe are disadvantaged in terms of multiple health domains, what drives the potential immigrant health disadvantage, and whether such differences are contextually dependent or a general feature of the immigrant experience in Europe. To do this, we use the Survey of Health, Aging and Retirement in Europe (SHARE) to estimate physical, mental, and social health of middle age and older adults by nativity in 19 countries including ~176,000 person-years of data. We examine whether nativity-based health disparities can be attributed to demographic composition, socioeconomic factors, family support, and life course timing of migration. Last, we examine regional differences in nativity-based health disparities. We find that immigrants aged 50 and above in Europe are more likely to report fair/poor physical health, score worse on the EURO-D depression scale, and are more likely to be lonely than the native-born. Socioeconomic status and age-at-migration partially explain these health differences, although immigrant health disparities remain after accounting for these and other factors. We document contextual variation within Europe. Immigrants in Eastern, Western and Northern Europe are disadvantaged compared to native-born adults in those regions, while immigrants in Southern Europe are in comparable health to their native-born peers. This article offers new insights into the ways that aging immigrant populations will reshape older adult health profiles throughout Europe. Our empirical evidence informs policy makers, ensuring health systems adapt to support the needs of an increasingly diverse older adult population.

Keywords Migration · Diversity in aging · Health disparities · Comparative demography

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Introduction

In public and scholarly discourse, replacement migration is often considered a means to mitigate societal-scale challenges of population aging (United Nations, 2001) by bringing in young workers to participate in the labor force (Marois et al., 2020). However, immigrants also age. Already 10 percent of the European population 65 and older is foreign-born, with substantial increases projected (Lanzeri, 2011). Examining how and why older immigrant health differs from the health of the native-born is critical to understand if, and to what extent, immigration will alleviate social processes associated with population aging, and inform how health systems can support the needs of an increasingly diverse population of older adults. However, there is limited crossnational research on older adult health that includes nativity beyond a control variable. One exception is Lanari and Bussini (2012), which uses the first wave of SHARE to investigate immigrant health in eight Western and Northern European countries. Our analysis extends this, including countries throughout Western, Northern, Southern, and Eastern Europe and across five waves of data.

It is unclear how the health of immigrants and the native-born might differ in older adulthood. Long-established findings assert there is an “immigrant health paradox” (Markides & Eschbach, 2005): immigrants tend to be in better health than native-born individuals of comparable socioeconomic status in their country of residence. Research on this paradox originally focused on young adult Latino immigrants in the United States, but there is empirical evidence that the immigrant health advantage is also found among a diverse array of immigrants to Canada and Australia, and to some extent, Europe (Markides & Rote, 2019). There is evidence of an erosion of the immigrant advantage as a result of cumulative exposure over the life course to acculturative stress, occupational hazard, and structural racism and discrimination, as well as barriers to healthcare access and the adoption of negative health behaviors (Markides & Rote, 2019). In fact, some studies from the United States (Sheftel & Heiland, 2018) and Europe (Hoogendijk et al., 2022; Solé-Auró & Crimmins, 2008) find the opposite pattern in older adulthood: older immigrants are in worse health than their native-born counterparts on a range of health outcomes. Moreover, because lower socioeconomic status is associated with worse health (Adler & Ostrove, 1999), and immigrants generally have lower socioeconomic status than the native-born, immigrants may be less healthy than the native-born.

Additionally, immigration typically separates families and disrupts traditional systems of support, which are critical social determinants of health as individuals age (Baldassar et al., 2006). Likewise, the processes of immigration and integration expose immigrants to physical, mental, and social stress which have implications for their late-life well-being. These factors likely vary across countries, each with their own migration streams, climates of reception, and heterogeneous native-born populations to which immigrants might be compared.

This paper paints a comprehensive picture of nativity-based health disparities in Europe. Adopting the World Health Organization’s definition of health as
“a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (World Health Organization, 2006), we examine physical, mental, and social well-being. Our crossnational analysis provides comparisons of immigrant health disparities both within and between regions in Europe as well as the sources of heterogeneity in these disparities.

Literature Review

History and Demographics of Migration to/within Europe

The heterogeneous population of immigrants currently aging in Europe arrived during three periods (White, 2006). Migration from after World War II until the oil crisis of 1973–1974 was comprised primarily of guest workers and refugees moving from East to West. Many of the immigrants from this period are 80 and older today. The period between 1974 until the fall of the Soviet Union was a period of restricted migration, particularly in Northern and Western Europe, when the main paths to migration were family reunification and refugee resettlement. During this period of restriction in Northern and Western Europe, Southern Europe, which had previously been primarily a source of out-migration, increased as an immigrant destination. Many of the immigrants from this period are approaching retirement today. Since the 1990s, with the continued expansion of countries included in the European Union, migration within the block has increased (Van Mol & Valk, 2016). Only a portion of immigrants who came since the 1990s are 50 and older today. Since 2010 there has been an expanded migration of refugees from Syria, Afghanistan, and Ukraine but less than 20 percent of these recent refugees are over 35 (European Union Agency for Asylum, 2022).

Today, immigrants in Europe can be divided into four broad categories (Constant et al., 2014): (1) Southern European and Northern African guest workers to Western and Northern Europe; (2) North and West African and South and Southeast Asian citizens of former European colonies; (3) Citizens from the Former Soviet Union and Eastern Europe who migrated since 1989; and (4) Refugees and asylum seekers. Taken together, immigrants are heterogeneous in terms of country-of-origin economic development and educational systems, as well as push/pull factors driving migration. These divergent and interacting micro and macro characteristics have implications for immigrant physical, mental, and social health.

Immigrant Health in Europe

Research on nativity-based health disparities among middle aged and older adults in Europe is mixed, varying by health domain and context. For indicators of physical health, most studies find that older adult immigrants in Europe are in worse health than same-age, native-born individuals in their country of residence. Among a sample of 11 European countries, older immigrants had lower functional ability, higher likelihood of disability, increased disease presence, and more behavioral risk factors.
than older native-born adults (Solé-Auró & Crimmins, 2008). This immigrant health disadvantage has also been found among immigrants to France from Central Europe, Southern Europe, North Africa, Turkey, sub-Saharan Africa and Asia (Dourgnon et al., 2008), among immigrants to Sweden from other Western countries, Yugoslavia, Poland, and Arabic speaking countries (Lindström et al., 2001), and Turkish and Moroccan immigrants to the Netherlands (Denktaş, 2011). On the other hand, more limited evidence of variation in self-reported physical health by nativity has been found in the general adult population in Spain (Sevillano et al., 2014) and among those 50 and older in Italy (Cela & Barbiano di Belgioioso, 2021). This suggests heterogeneity by country of destination and specific immigrant group.

Immigrants may be at risk for poor mental health since the process of migration involves the disruption of traditional family networks, acculturative stress, and potential discrimination (Bhugra & Jones, 2001). In a review of the literature on migration and mental health in Europe, Carta et al (2005) conclude that regardless of age, immigrants have a higher risk of anxiety, depression, psychosomatic disorders, and psychotic disorders than the native-born. There is some geographic variation in these patterns: higher rates of depression among older immigrants than the native-born are found in Western and Northern Europe but not in Southern Europe (Aichberger et al., 2010). Evidence of adverse mental health among immigrants is also found among immigrants between ages 18 and 65 in Belgium (Levecque et al., 2007), older Turkish and Moroccan immigrants in the Netherlands (Van der Wurff et al., 2004), and older immigrants to Sweden (Silveira et al., 2002).

Adverse social health, which is often operationalized as feelings of loneliness (Margolis et al., 2021), is quite common among older adults. Among older Europeans, 59 percent of women and 38 percent of men reported feeling lonely at least some of the time over the past week (Vozikaki et al., 2018). There is evidence that older immigrants are more likely to report loneliness than the native-born in Europe as a whole (De Witte & Van Regenmortel, 2020), a pattern corroborated by country-specific studies of older Turkish immigrants in Germany (Fokkema & Naderi, 2013), older immigrants from the Former Soviet Union in Israel (Dolberg et al., 2016), and older immigrants in Belgium (De Witte & Van Regenmortel, 2020).

Explanations for Nativity-Based Health Differences

The immigrant health disadvantage may be due to socioeconomic factors, social support, and life course timing of migration. Socioeconomic status (SES) is usually lower among immigrants than the native-born (Constant et al., 2014), which explains some of their physical health disadvantage (Nielsen & Krasnik, 2010) in Italy (Cela & Barbiano di Belgioioso, 2021), the Netherlands (Denktaş, 2011), Spain (Malmusi et al., 2010) and Sweden (Lindström et al., 2001). Nativity-based SES disparities also contribute to mental and social health differences (Fokkema & Naderi, 2013; Ladin & Reinhold, 2013). Since those with lower SES have higher levels of loneliness across a variety of European countries (Vozikaki et al., 2018), and immigrants have lower SES than the native-born, SES may play a particularly important role in
explaining nativity-based disparities in loneliness. However, few loneliness studies examine nativity as more than a control variable (Niedzwiedz et al., 2016).

**Family and social support** are key determinants of health and well-being. Because migration often means moving away from one’s family and community, the proximity and availability of kin and other social support may be another explanation for poorer immigrant health. Evidence on the topic is mixed, however; for instance, one study that compares depression rates among immigrant and native-born older adult men in 11 European countries found that although family and social support play a critical role in explaining disparities, it and other factors only account for 20 percent of such differences (Ladin & Reinhold, 2013). There is a large degree of heterogeneity in the role of kin and social support in immigrant health across contexts. In some contexts, access to social networks and social support are protective of health, for example this is true of physical health among immigrants in Sweden (Lindström et al., 2001) and Italy (Cela & Barbiano di Belgioioso, 2021), and loneliness among Polish immigrants in the Netherlands (Djundeva & Ellwardt, 2020). In other contexts family ties and social support do not explain immigrant health and loneliness disadvantages, such as with the loneliness of Turkish immigrants in Germany (Fokkema & Naderi, 2013) or the wellbeing of immigrants in Belgium (Koellet & de Valk, 2016). Similarly, there is conflicting evidence as to whether living in an *ethnic enclave*, a neighborhood with a high concentration of individuals from the same country of origin, is protective or detrimental to immigrant health (Markides & Rote, 2019).

The **life course timing of migration** to the destination society also might explain health differences by nativity. Immigrants arriving as children and adolescents likely benefit from health advantages conferred by educational attainment completed in the destination country, language proficiency, and overall social integration (Denktaş, 2011; Huijts & Kraaykamp, 2012). Conversely, immigrants arriving as older adults may have less opportunity for economic and social integration that benefit health (Garcia & Reyes, 2018). The relationship between exposure to the destination society and health varies by country of origin, destination, and health outcome. In Sweden, older age-at-migration is associated with poor self-rated health (Leão et al., 2009). Aichberger et al., (2010) do not find an association between depression and age-at-migration or time since migration for older immigrants across European countries. Similarly, there is limited evidence that loneliness differs by age-at-migration or length of residence for older immigrants in Europe (De Witte & Van Regemortel, 2020).

**The Current Paper**

A key motivation for this paper is the growing literature calling for immigration as a means to combat the challenges of population aging in low fertility contexts, a literature that generally ignores the question of what happens when immigrants, themselves, age. In response to this, the overall aim of this paper is to examine middle age and older adult immigrant health in Europe to understand if, and to what extent, immigration will alleviate social processes associated with population aging, and
inform how health systems can support the needs of an increasingly diverse population of older adults. To do so we address three questions. First, we examine how the physical, mental, and social health of immigrants 50 and older compares to their native-born counterparts in Europe. Second, we examine the extent to which socioeconomic status, family structure, and life course timing of migration explain nativity-based health differentials. Third, we examine how these patterns and explanatory factors vary within Europe. We are interested in comparing the relative health of the foreign-born to the native-born population. Any gap between them could be shaped by: (1) the population level health of native-born middle-age and older adults, (2) the sending country economic development, educational system, and immigrant selectivity, and (3) the context of reception and level of institutional inclusion in the country of destination.

Data/Methods

Data

We use data from the Survey of Health, Ageing and Retirement in Europe (SHARE), a nationally representative survey of non-institutionalized individuals 50 and older in 28 European countries and Israel. SHARE is uniquely suited to address our research questions because it includes harmonized measures of nativity, health, socioeconomic status, family structure, and migration history across many countries. The first survey was collected in 2004 and subsequent waves are collected approximately every two years with exact timing of collection and wave-to-wave participation varying by country (Börsch-Supan et al., 2013).

Our analytic sample includes countries and waves (1–2, 5–7) that have consistent measurement of our dependent variables (self-rated physical, mental, social health). Supplementary Table 1 provides details on data harmonization across waves and wave selection. We use the SHARE Core files and the Harmonized dataset, Version E.3 as of April 2021, developed by the Gateway to Global Aging Data. We examine respondents ages 50 and older at the time of survey with non-missing data on place of birth and the three dependent variables. The final analytic sample is 58,638 unique respondents with a total of 175,912 person-years. On average, each respondent participated in 2.6 survey waves. The nineteen countries analyzed are: Austria, Belgium, Croatia, Czech Republic, Denmark, Estonia, France, Germany, Greece, Israel, Italy, Luxembourg, Netherlands, Poland, Portugal, Slovenia, Spain, Sweden, and Switzerland. Supplementary Figure 1 documents case selection for the final analytic sample.

Measures

We examine three outcomes. Self-rated physical health is dichotomized as fair/poor (1) vs. excellent/very good/good (0). Self-rated mental health is measured using the discrete ordinal EURO-D depression scale ranging from 0 to 12, which includes
the following component measures: depression, pessimism, suicidality, guilt, sleep, interest, irritability, appetite, fatigue, concentration, enjoyment, and tearfulness. Higher EURO-D scores indicate worse mental health. Social health is measured with a binary indicator for self-reported loneliness. Supplementary Table 1 documents the assessment of loneliness and its harmonization across waves. Each health measure is validated as a reliable measure of physical (Idler & Benyamini, 1997), mental (Prince et al., 1999), and social health (Newmyer et al., 2021), respectively.

The key independent variable in our analysis indicates respondent’s birth outside the country of interview. We adjust for differences in demographic composition (gender and age coded as five-year age groups to capture non-linearities). To explore regional variation, we classify countries following the UN Regional Classification (United Nations, 1999): Northern Europe (Denmark, Estonia, Sweden), Western Europe (Austria, Belgium, France, Germany, Luxembourg, Netherlands and Switzerland), Southern Europe (Croatia, Greece, Italy, Portugal, Slovenia, and Spain) and Eastern Europe (Czech Republic, Poland). We examine three sets of explanatory variables: socioeconomic status, household and family structure, and life course timing of migration.

Socioeconomic status is measured by educational attainment using a cross-nationally harmonized categorical variable (less than high school degree, high school or vocational degree, and some university or more). Education largely captures SES before migration, unlike other measures of SES like income, wealth, or employment, that confound pre- and post-migration socioeconomic status. Additionally, we measure region of birth (Africa, Americas, Asia, Europe, Middle East, Oceania, and Post-Soviet) to account for socioeconomic, migratory patterns, and other unobserved determinants of health from the region of origin.

To account for family support, we measure household and family patterns. We include a dichotomous variable for married/partnered vs. unpartnered and a categorical variable for existence and proximity to children which includes: no living children, co-residence with one or more children, lives within 30 min of one or more children, and has children that do not live within 30 min.

To account for life course timing of migration, we focus on age-at-migration because it emphasizes timing of exposure to correlates of health outcomes. We construct a categorical variable measuring age-at-migration consistent with the literature documenting differential selection mechanisms and incorporation trajectories (Garcia & Reyes, 2018): child/adolescent immigrants (0–18), early adult immigrants (19–44), and mid-life and later adult immigrants (45 and older).

Methods

First, to understand unadjusted health status and explanatory factors by nativity we examine descriptive statistics for the pooled sample (Table 1). Second, using the pooled sample, we estimate a series of nested multivariate regression models. We examine how health differentials by nativity change as each group of covariates is added to the model (Table 2). First, we adjust for demographic factors (age, gender), then socioeconomic factors (education, region of birth), then family structure.
Table 1  Weighted sample characteristics—native-born & foreign-born older adults in Europe

| Sample size<sup>a</sup> | Native born | Foreign born |
|-------------------------|-------------|-------------|
| Health measures         |             |             |
| Physical health         |             |             |
| Fair/poor (%)           | 38.59       | 42.62       |
| Mental health           |             |             |
| Mean EURO-D (SE)        | 2.56 (0.010)| 2.65 (0.035)|
| Social health           |             |             |
| Lonely (%)              | 28.46       | 30.28       |
| Demographic variables   |             |             |
| Mean age (SE)           | 66.21 (0.051)| 65.51 (0.163)|
| Female (%)              | 54.56       | 54.92       |
| Socioeconomic status    |             |             |
| Education (%)           |             |             |
| < HS                    | 45.22       | 35.51       |
| HS or Voc               | 36.30       | 36.94       |
| Some university +       | 18.49       | 27.56       |
| Region of birth (%)     |             |             |
| Europe                  | 99.22       | 56.70       |
| Africa                  | –           | 15.49       |
| Americas                | –           | 6.49        |
| Asia                    | –           | 3.54        |
| Middle East             | 0.60        | 5.15        |
| Oceania                 | –           | 0.21        |
| Post-Soviet             | 0.19        | 12.41       |
| Family structure        |             |             |
| Marital status (%)      |             |             |
| Married/partnered       | 68.11       | 67.55       |
| Children (%)            |             |             |
| No children             | 12.21       | 11.32       |
| 1 + co-residing child   | 25.48       | 24.08       |
| Live w/in 30 min of     |             |             |
| 1 + child               | 43.28       | 42.36       |
| No child w/in 30 min    | 19.02       | 22.24       |
| Migration               |             |             |
| Age at migration (%)    |             |             |
| 0–18                    | –           | 40.88       |
| 19–44                   | –           | 47.31       |
| 45 +                    | –           | 11.80       |

Supplementary Table 2 includes descriptive statistics by country of interview

Adjusted to account for clustering

Data: pooled SHARE Waves 1–2 (2004–2007), 5–7 (2013–2018)

<sup>a</sup>Sample Size is unweighted, person-years
Table 2  Physical, mental, and social health outcomes of Europeans age 50 and older (standard errors)

|                          | Model I          | Model II         | Model III         | Model IV         |
|--------------------------|------------------|------------------|-------------------|------------------|
| (A) Fair/poor self-rated health (logistic coefficients) |                  |                  |                   |                  |
| Foreign born             | 0.33*** (0.04)   | 0.27*** (0.04)   | 0.27*** (0.04)    |                  |
| Age at migration (ref: native born) |                  |                  |                   |                  |
| 0–18                     | 0.28*** (0.06)   |                  |                   |                  |
| 19–44                    | 0.26*** (0.06)   |                  |                   |                  |
| 45+                      | 0.23* (0.11)     |                  |                   |                  |
| % Mediated (KHB)         | − 11.27%         |                  | 0.20%             |                  |
| (B) Self-rated mental health (OLS coefficients) |                  |                  |                   |                  |
| Foreign born             | 0.27*** (0.04)   | 0.22*** (0.04)   | 0.21*** (0.04)    |                  |
| Age at migration (ref: native born) |                  |                  |                   |                  |
| 0–18                     | 0.17** (0.06)    |                  |                   |                  |
| 19–44                    | 0.29*** (0.06)   |                  |                   |                  |
| 45+                      | 0.02 (0.10)      |                  |                   |                  |
| % Mediated               | 18.52%           | 4.55%            |                   |                  |
| (C) Lonely (logistic coefficients) |                  |                  |                   |                  |
| Foreign born             | 0.24*** (0.04)   | 0.17*** (0.05)   | 0.17*** (0.05)    |                  |
| Age at migration (ref: native born) |                  |                  |                   |                  |
| 0–18                     | 0.03 (0.06)      |                  |                   |                  |
| 19–44                    | 0.31*** (0.06)   |                  |                   |                  |
| 45+                      | 0.19 (0.13)      |                  |                   |                  |
| % Mediated (KHB)         | − 29.42%         | − 0.11%          |                   |                  |
| Controls                 |                  |                  |                   |                  |
| Demographic (age, gender) | +                | +                | +                 | +                |
| Socioeconomic (education, region of birth) | −                | +                | +                 | +                |
| Family (marital status, children & proximity) | −                | −                | +                 | +                |
| Migration (age at migration) | −                | −                | −                 | +                |
| Observations             | 175,912          | 175,912          | 175,912           | 175,912          |

Supplementary Table 4 presents full model results
Weighted; Adjusted to account for clustering, country of interview and wave
Data: pooled SHARE Waves 1–2 (2004–2007), 5–7 (2013–2018)
***p < 0.001; **p < 0.01; *p < 0.05

(marital status, children), and last age-at-migration for the foreign-born. All models control for fixed effects of wave and country of interview. The latter adjusts for crossnational differences in unobserved factors that may be associated with immigrant health. For Model 2 (SES) and Model 3 (family structure) we report the percent of the relationship between nativity and health mediated by adding additional covariates to the model.

Third, to compare physical, mental, and social health by nativity within each European region, as well as between regions within nativity groups, we estimate
levels of health by nativity and region. We model physical and social health with logistic regression, and mental health with OLS regression, including an interaction for nativity and region, controlling for demographic characteristics (Fig. 1). Last, to examine geographic heterogeneity in health patterns by nativity and explanatory factors we estimate Model 1 for each country separately (Fig. 2) and subsequent nested models by region (Fig. 3).

**Sensitivity Analyses**

We conducted three sets of supplementary analyses. First, we estimated both ordinal logit and binary logit models for physical health and estimated both OLS and ordinal logit models for mental health. We found no substantive difference in effect size or statistical significance across models. Second, while the analytic sample is restricted to respondents that have non-missing values for all three outcome variables (see

![Graphs showing predicted probabilities and predictions for physical, mental, and social health by nativity and region.](image-url)
Table 1 presents descriptive statistics for the analytic sample. Foreign-born respondents are in worse physical, mental, and social health than native-born respondents. The foreign-born respondents in the sample are also younger on average and have higher levels of education than the native-born subsample. Over half of the immigrants in the sample were born in Europe (57%). Family and household structure does not vary considerably by nativity, where 68 percent is partnered and 43 percent live within thirty minutes of at least one child. The majority of immigrants arrived either as children/adolescents (41%) or during early adult years (47%) with only 12 percent arriving at 45 or older.
Table 2 examines to what extent socioeconomic status, family support, and migration timing explain nativity-based health disparities among the pooled sample. We present logit coefficients for our dichotomous measures of fair/poor self-rated physical health and loneliness, and OLS coefficients for poorer mental health. Across physical, mental, and social dimensions, immigrants are in worse health than native-born individuals, net of compositional differences (Model 1). Immigrants are more likely to report fair/poor physical health than the native-born ($b = 0.33; p < 0.001$). The EURO-D mental health score for immigrants is higher (worse) compared to the native-born ($b = 0.27; p < 0.001$) and the foreign-born are more likely to be lonely than the native-born ($b = 0.24; p < 0.001$).

Adjusting for socioeconomic status in Model 2 reduces the difference in health by nativity across all three outcomes indicating that the different SES distributions of native-born and foreign-born adults partially explain the immigrant health disparity. Adjusting for family structure results in almost no change from Model 2 to Model 3. Model 4 controls for age-at-migration, comparing the native-born to each age-at-migration group. Here results vary by health outcome. For physical health, all three age-at-migration groups are estimated to have worse physical health than the native-born (child/adolescent immigrants $b = 0.28; p < 0.001$, early adult immigrants $b = 0.26; p < 0.001$, later adult immigrants $b = 0.23; p < 0.05$). However, only children/adolescents and early adult immigrants have worse mental health than the native-born. Those migrating at 45 or older have similar mental health outcomes as...
the native-born. In terms of social health, only early adult immigrants are predicted to be lonelier than the native-born.

Next, we examine how the health of immigrants and native-born compare both within and across regions of destination. Figure 1 plots levels of physical, mental, and social health by nativity and region of destination in Europe. In three of the four destination regions (Northern, Western, and Eastern Europe), immigrants have worse physical, mental, and social health than their native-born counterparts (higher levels denote worse health). Immigrants in Southern Europe are no different from their native-born counterparts. Another facet of Fig. 1 is the ability to compare levels of health across respondents of different nativity statuses and regions. Here, we can see that even native-born respondents in Eastern Europe are in worse health than the native or foreign-born respondents in Western and Northern Europe.

Next, we look at results stratified by country of interview to examine whether nativity-based health disparities vary within region, or just across regions. Figure 2 visualizes the results from Model 1 by country. The dark hue indicates that migrants are in worse health than the native-born population in their country of destination and the light hue indicates that migrants are in better health. Results for immigrants compared to the native-born population in Northern and Western European countries are consistent with results from the pooled data. Immigrants are more likely to report worse self-rated physical and mental health and are more likely to be lonely. The only exception to this is that there is no statistically significant difference between immigrants and the native-born in terms of physical health in Austria or loneliness in France. In Israel immigrants also consistently report worse health outcomes, across measures, than the native-born. For the Eastern European countries included here, when there is a difference between the foreign-born and native-born population, immigrants are in worse health. However, this distinction is less pronounced across outcomes. In the Czech Republic immigrants are more likely to report worse physical and mental health than the native-born and in Poland immigrants are more likely to be lonely than the native-born. The difference by nativity on all other health outcomes in these two countries is not statistically significant.

Health outcomes for immigrants in some Southern European countries deviate from the pattern described so far. There is often no statistically significant difference between the native-born and foreign-born population in Southern Europe, and where there is a difference (physical health: Croatia, Portugal, Spain; mental health: Portugal) immigrants report better health than the native-born. The only exception to this pattern is social health in Greece where immigrants are estimated to be more likely to be lonely than middle age and older adults born in Greece.

Last, we examine the importance of the explanatory factors for nativity-based health disparities by region. Figure 3 plots differences in health between foreign- and native-born with positive values indicating that immigrants are in worse health than non-immigrants and negative values indicating that immigrants are in better health than non-immigrants. Overall, across health domains and regions, socioeconomic status (Model 2) has the most explanatory power. In Eastern Europe SES adjustments fully explain worse physical, mental, and social health outcomes for immigrants and in Western Europe including adjustments for SES reduces immigrant
health disparities. The same pattern holds for Northern Europe in terms of mental and social health whereby SES reduces the disparity between immigrants and non-immigrants, whereas for physical health, once adjustments for SES are added the nativity-based disparity grows.

The only region where there is a notable association between household/family structure and health is in Northern Europe and only in terms of loneliness. Here once household and family structure measures are added to the model the higher prevalence of loneliness among immigrants in Northern Europe is further reduced but not totally explained. These figures also show that there are no statistically significant differences in health outcomes by nativity in Southern Europe and accounting for differences in SES and household and family structure do not alter this finding.

Results from Model 4 which include age-at-migration show the same pattern as the pooled results (Table 2). Differences in age-at-migration are only salient for Western and Northern Europe. In those regions, just like in the pooled analysis, immigrants are in worse physical health than the native-born regardless of age-at-migration. Immigrants who migrated at 45 or older are no different in terms of mental health than the native-born and those who migrated during childhood/adolescence and at 45 or older are no lonelier than the native-born. In Southern and Eastern Europe, age-at-migration does not change immigrant-native health patterns.

To deepen our understanding of nativity-based differences in middle-age and older adult health in Europe, we compared the predicted physical, mental, and social health of non-migrants by immigrant region of birth. Results are reported in Supplementary Table 7 where positive values indicate worse health for the focal group in each row compared to the heading row comparison group (labeled "compared to…") and negative values indicate better health for the focal group in each row compared to the heading row comparison group. Results indicate that immigrants from Southern and Eastern Europe and the Former Soviet Union have a relatively consistent health disadvantage compared to non-immigrants and immigrants from Northern and Western Europe, the Americas, and Asia. The same is true, although to a slightly less extent among African and Middle Eastern immigrants. These results highlight heterogeneity within the aging immigrant population in Europe and offer an avenue for future research.

Conclusion—Discussion and Implications

There are substantial debates about the capacity of immigration to offset societal challenges associated with population aging in Europe. Largely absent from this discussion is an understanding of nativity-based health disparities or an assessment of the long-term implications of immigration on population health. Overall, our findings show that across three domains of health—physical, mental, and social—immigrants 50 and older in Europe are generally in worse health than their native-born counterparts. Comparing the effect of nativity on health to that of education on health, an association we know is strong (Von dem Knesebeck et al., 2006), we find nativity has a comparable association with loneliness to that of holding a high school degree, and about half the association that education does with physical
health and mental health. Moreover, our results show no evidence of positive selection on health for immigrants, despite the attention to health selectivity in the U.S.-dominated healthy migrant literature. If indeed immigrants are arriving in Europe healthier than the native-born population, our results suggest a steeper age-health decline for immigrants. Documenting nativity-based health disparities in Europe is crucial to planning for future population health needs. Although the findings from this analysis cannot predict the health of future cohorts of immigrants, it provides a basis upon which to direct research.

What underlies these immigrant health disparities? Socioeconomic status, operationalized by educational attainment and region of birth, is one important explanatory factor. Here, region of origin, rather than differences in educational attainment by nativity, drive immigrant health disparities. This supports previous findings that country of origin characteristics have a lasting influence on immigrant health outcomes, even into older ages (Huijts & Kraaykamp, 2012).

Second, the life course timing of migration explains some of the variation in health outcomes by nativity. Differential exposure to the country of destination society by age-at-migration is particularly salient for loneliness, and to a lesser extent, mental health. We find no differences in loneliness between those who migrated before age 18 and the native born, suggesting that integration in the destination education system and language ability may be protective of social health at middle and older ages. We also find that immigrants arriving at age 45 years or older have the same levels of loneliness and mental health as the native-born. Migration in later adulthood primarily represents family reunification; these immigrants may benefit from family support.

We find limited explanatory power of household and family structure for health by nativity. In fact, we do not find descriptive evidence that migration disrupts traditional family structures as there is minimal variation in household and family structure by nativity. This may be a characteristic specific to immigrants in Europe, many of whom are able to divide their time between country of origin and destination following retirement due to geographic proximity (De Coulon & Wolff, 2006).

Our findings by country and region of destination highlight three things. First, levels of immigrant health are similar across Western, Northern, and Southern Europe, with only immigrants to Eastern European in considerably worse health than immigrants in the rest of Europe (Fig. 1). This may be attributed to higher rates of poverty and unemployment in Eastern Europe irrespective of nativity (Ras et al., 2002). Second, we find limited variation in nativity-based health disparities for countries within regions (Fig. 2), suggesting that similar migration policies, institutional structures, and welfare-state arrangements within European regions drive nativity based health outcomes (Eikemo & Bambra, 2008; Olsen & Dahl, 2007). Third, across regions there is variation in the size of nativity-based health disparities (Fig. 1). Differences in health by nativity are larger across all domains in Northern and Western Europe than in Southern and Eastern Europe. Overall, the fact that disparities are found across most regions and dimensions of health suggests that elements of the immigration experience serve as a fundamental cause of health disparities (Link & Phelan, 1995).
There are several factors that we could not model due to data limitations. First, despite evidence that older immigrants move frequently between country of origin and destination (De Coulon & Wolff, 2006) we could not capture circular migration with SHARE data. Second, adversity, trauma and stress related to migration are important factors to consider, and we partially control for conditions in the country of origin, like poverty and suppressive political regimes, which are associated with adverse health outcomes among immigrants (Huijts & Kraaykamp, 2012) by adjusting for region of origin fixed effects. However, the data do not allow us to consider visa or immigrant type (e.g. refugee status) (Ibragimova & Žužak, 2020), ethnic minority status, or exposure to discrimination in the country of destination (Huijts & Kraaykamp, 2012; Nielsen & Krasnik, 2010; Sevillano et al., 2014), all factors that heighten the probability of poor immigrant health at older ages. Third, in investigating the association between age-at-migration and health, the oldest age-at-migration category (45+) includes a broad range of ages, but we cannot differentiate between substantively meaningful older adult life stages (late working age, retirement age, end of life) due to small sample sizes.

Despite limitations, this paper convincingly shows that immigrant health disparities are evident across physical, mental, and social health with socioeconomic status and life course timing of migration partially explaining nativity-based differences. This points to the importance of addressing the full range of health domains, and not only physical health, in policy and service efforts to close nativity-based health gaps. The growing older adult immigrant population has critical implications for health and welfare systems in Europe, as well as for emerging systems of inequality. This paper provides the basis to inform the direction of policies to meet the needs of this growing portion of the older adult population.

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Author Contributions MGS planned the study, performed data analysis, and wrote the paper. RM planned the study, supervised data analysis, and revised the paper. AMV planned the study, supervised data analysis, and revised the paper.

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Data availability Survey of Health, Aging, and Retirement in Europe (SHARE) data are publicly available via the SHARE website (https://share-eric.eu) following user registration and completion of data user agreements.

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