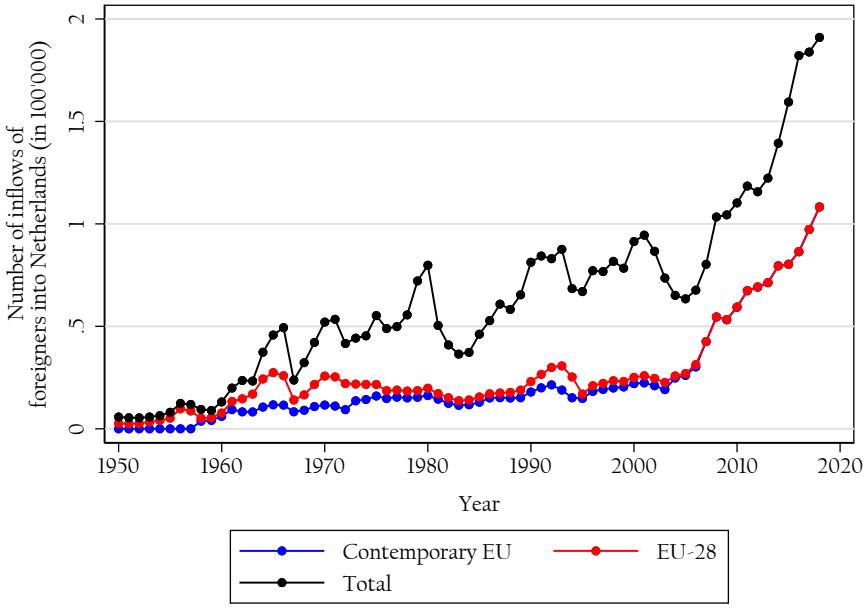
Online Appendix to

"Migration and Labor Market Integration in Europe"

by David Dorn and Josef Zweimüller

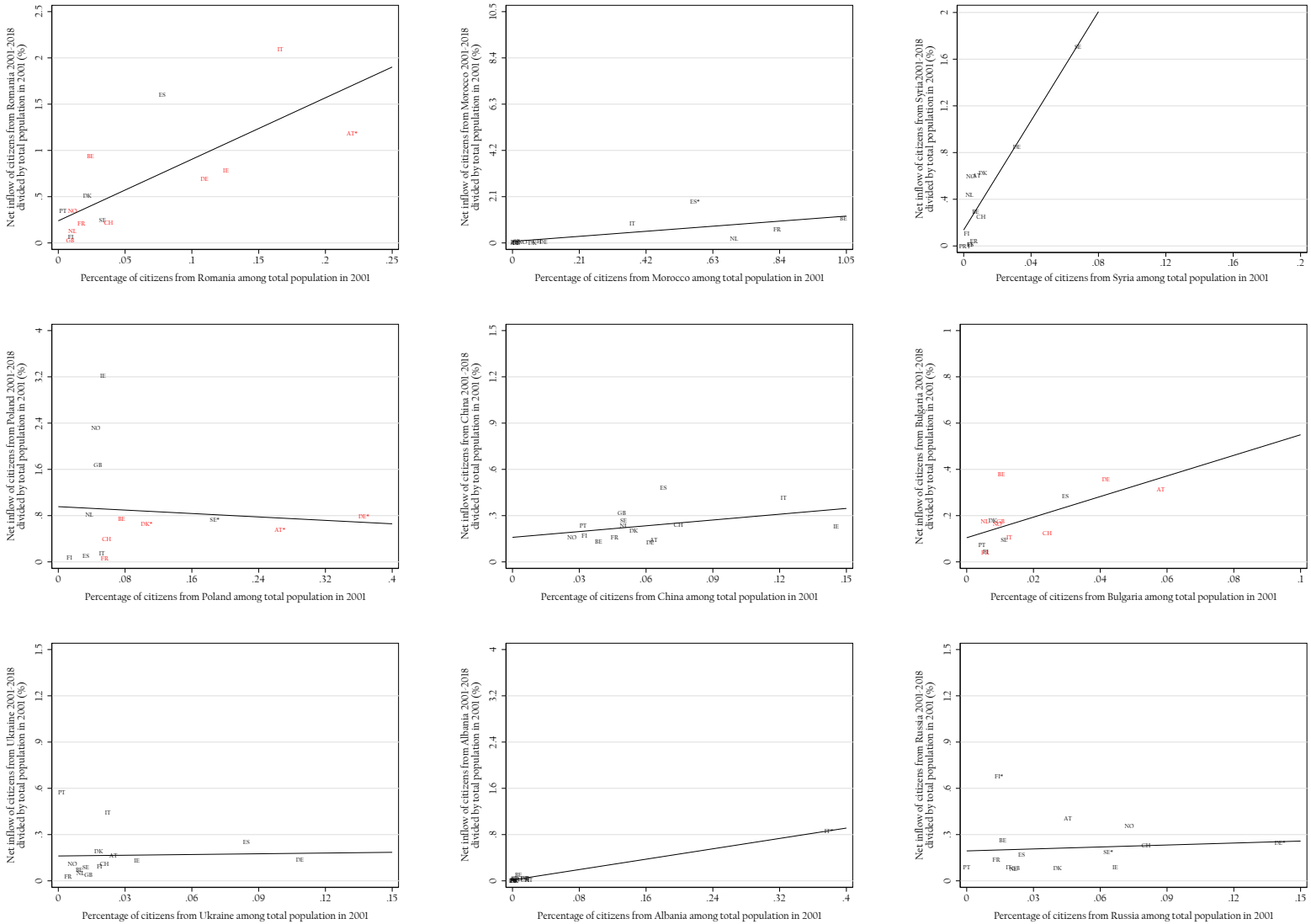
Appendix A: Appendix Figures

Figure A1: Annual inflows of foreign citizens into the Netherlands



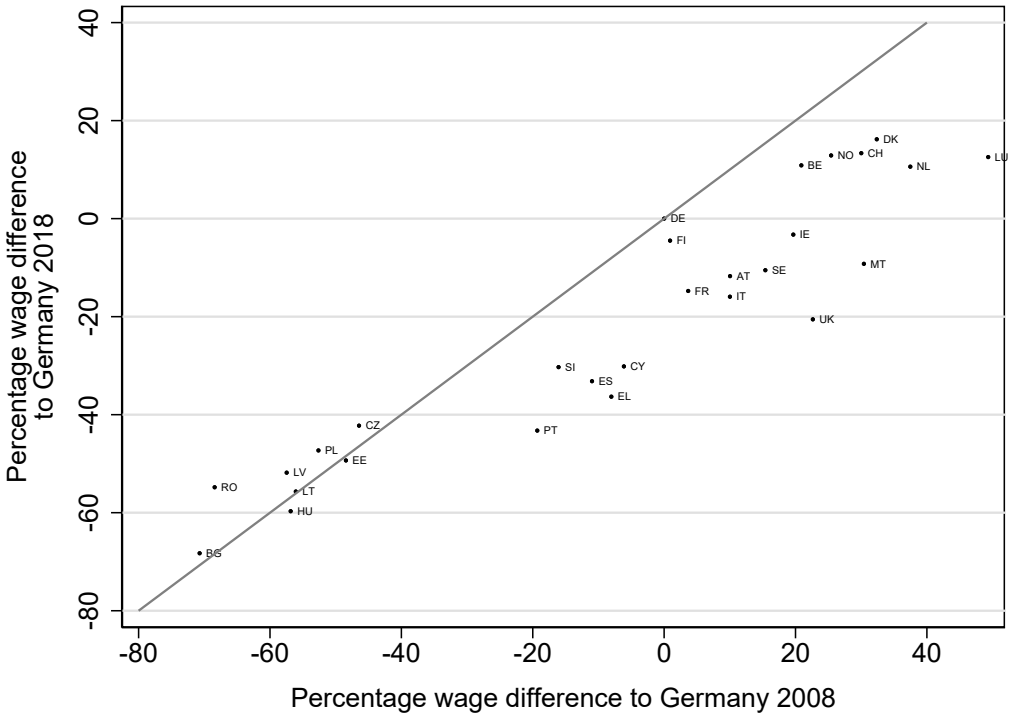
Note: "Contemporary EU" indicates inflows of foreign nationals who were citizens of a country that was a member of the EEC/EU in the indicated year. "EU-28" indicates inflows of foreigners who were citizens of one of the 28 countries that eventually joined the EU.
Data sources: International Migration Institute (2015), Statistics Netherlands (2020a, 2020b).

Figure A2: Net inflow of foreign citizens to western Europe from 2001 to 2018



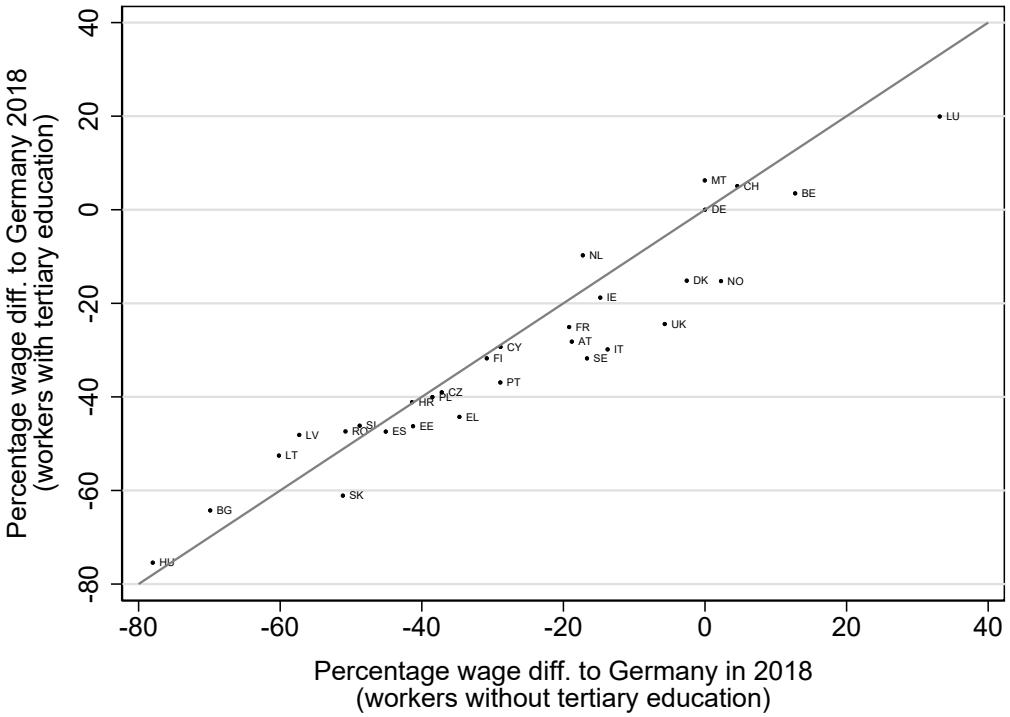
Notes: The figure provides information on immigration in 15 western European countries (EU-15 without Greece and Luxembourg, plus Norway and Switzerland) for the period of 2001 to 2018. Each panel refers to one of the nine immigrant nationalities whose numbers increased the most in the destination countries during the outcome period: Romania, Morocco, Syria, Poland, China, Bulgaria, Ukraine, Albania and Russia. The panels plot the share of foreign citizens from the indicated source country in 2001 (or earliest available year) as a percentage of the destination country's population in 2001 against the growth in the number of citizens from the source country plus naturalizations for that nationality over the period 2001 to 2018, again expressed as a fraction of population in 2001. Each panel indicates a linear regression fit, where a regression slope of 45 degrees would indicate that the immigrant inflow from 2001 to 2018 equals ten times the stock of foreign nationals in 2001. Destination countries that are located within 500km of an origin country are indicated with an asterisk. The panels for immigration from the eastern European countries Romania, Poland and Bulgaria indicate in red the countries that opened their labor markets to these countries only 4 to 7 years after these countries joined the EU, and in black the countries that opened their labor markets either immediately or up to 3 years after the eastern countries' EU accession.
Data sources: Central Statistics Office (Ireland) (2017a, 2017b), Eurostat (2020a), Federal Statistical Office (Switzerland) (2020), Federal Statistical Office of Germany (2020), Instituto Nacional de Estadística (Spain) (2020), Institut national de la statistique et des études économiques (France) (2011, 2020), Italian National Institute of Statistics (2020), Office for National Statistics (UK) (2001, 2018), PORDATA (2020), Statistics Austria (2020), Statistics Belgium (2020), Statistics Denmark (2021), Statistics Finland (2020), Statistics Netherlands (2020a), Statistics Norway (2021), Statistics Sweden (2020).

Figure A3: Convergence in real wages across countries, controlling for job characteristics



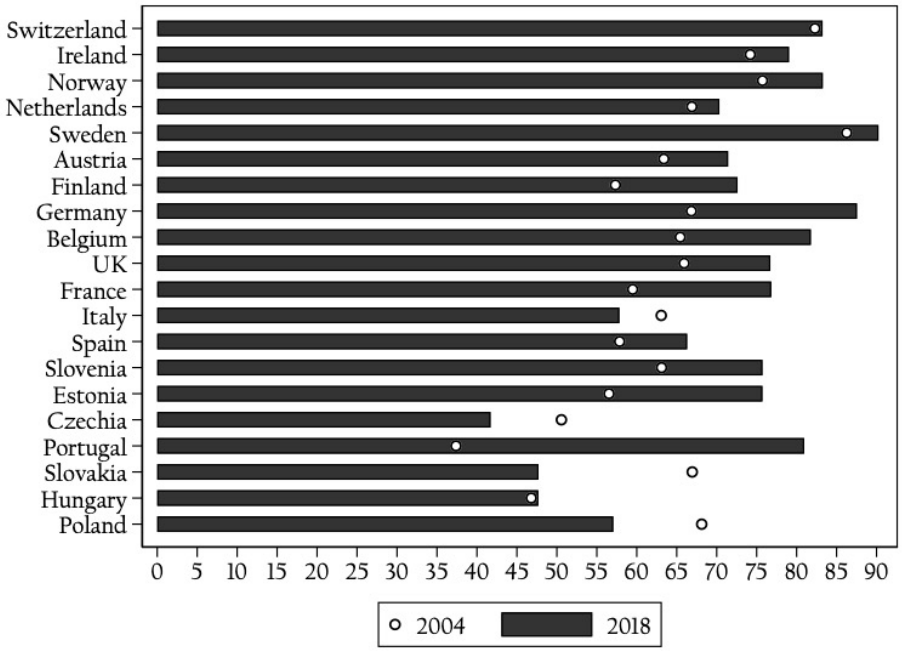
Notes: The figure indicates coefficient estimates for country fixed effects from year-specific regressions that relate individuals' log annual real wage to country fixed effects and controls for a quartic in age, sex, marital status, highest education degree obtained, weekly work hours, occupation, and industry of employment. Country fixed effect estimates have been converted from log points to percentage points. Germany is the reference country for the country fixed effects. All wages are converted to Euros and adjusted for price level differences across countries.
Data sources: SILC microdata and price level data from Eurostat (2020b, 2020c).

Figure A4: Real wage differences across countries by education group in 2018



Notes: The figure indicates coefficient estimates for country fixed effects from education group-specific regressions that relate individuals' log annual real wage to country fixed effects and controls for a quartic in age, sex, marital status, highest education degree obtained. Highly educated workers are those with tertiary education while low-educated workers are those without tertiary education. Country fixed effect estimates have been converted from log points to percentage points. Germany is the reference country for the country fixed effects. All wages are converted to Euros and adjusted for price level differences across countries. Data sources: SILC microdata and price level data from Eurostat (2020b, 2020c).

Figure A5: Change in Support for Same-Ethnicity Immigration, 2004-2018



Notes: The figure indicates the percentage of a country X's population who in 2004 or in 2018 answer the question *"To what extent should country X allow people of the same race or ethnic group as most of country X's people to come and live there?"* with either *"allow many"* or *"allow some"*, as opposed to *"allow few"* or *"allow none"*. Countries are listed by decreasing nominal GDP per capita in 2015.
Data sources: European Social Survey data from NSD – Norwegian Centre for Research Data (2004, 2018), Eurostat (2020d).

Appendix B: Computation of Country-Specific Wage Levels and Gains from Migration

Our calculations of country-specific wage levels and static gains from migration draw on EU-SILC (European Union Statistics on Income and Living Conditions), which is a comprehensive microdata base administered by Eurostat. The underlying data is collected separately by the national statistical authorities in each of the participating countries, which some countries fielding surveys to obtain data for EU-SILC, and others drawing on pre-existing register and survey data. We use data for the two years 2008 and 2018, which cover all EU countries except Croatia, plus Switzerland, Norway and Iceland.

Our regression analysis includes all individuals present in EU-SILC who have positive gross earnings and for whom information on control variables is available. The sample size for our baseline regression (specification (1) below) is 253,894 observations in 2008 and 262,255 observations in 2018. The country-specific observation counts range from 8,644 (Malta) to 52,433 (Italy) in 2008, and from 9,815 (Malta) to 56,600 (Greece) in 2018. In regressions with additional control variables (specification (2) below), the sample sizes are 196'176 observations in 2008 and 197'470 observations in 2018, as especially information on industry of employment is not available for some workers. We use the regression weights provided in the EU-SILC data, which give each country a total weight proportional to its population. To account for variation in price levels across countries and over time, we adjust gross wages using Eurostat's price series for actual individual consumption to the EU-28 average price level.

We use the following regression specifications for our analysis of country-specific wage levels:

Specification (1) provides our baseline regression which underlies the estimates shown in Figure 5. We regresses, separately for each year 2008 and 2018, individuals' log gross annual wage on a constant, a set of indicators for individuals' country of residence (omitting the indicator for Germany, so that the coefficients on the country dummies measure wage premia relative to Germany), as well as a quadratic in age, sex, marital status, and a vector of indicators for highest educational degree obtained (6 categories in 2008, 19 categories in 2018):

$$\ln(\mathrm{w}_i) = \alpha + \gamma_c + \beta_1 \mathrm{age}_i + \beta_2 {\mathrm{age}_i}^2 + \beta_3 \mathrm{sex}_i + \beta_4 \mathrm{maritalstatus}_i + \mathrm{education}_i \phi + \varepsilon_{c,i} \quad (1)$$

Specification (2), which is used for Appendix Figure A3, additionally controls for weekly hours worked, and two vectors with indicators for occupations (36 categories in 2008, 51 categories in 2018) and industries (12 categories in 2008, 13 categories in 2018):

$$\ln(\mathrm{w}_i) = \alpha + \gamma_c + \beta_1 \mathrm{age}_i + \beta_2 {\mathrm{age}_i}^2 + \beta_3 \mathrm{sex}_i + \beta_4 \mathrm{maritalstatus}_i + \beta_5 \mathrm{workhours}_i + \mathrm{education}_i \phi_1 + \mathrm{occupation}_i \phi_2 + \mathrm{industry}_i \phi_3 + \varepsilon_{c,i} \quad (2)$$

We use the following formula to calculate static gains from migration:

$$G = G_l + G_h = \sum_{i=1}^{N} \sum_{j=1}^{N} \left[L_l(i,j) \cdot (w_{lj} - w_{li}) + L_h(i,j) \cdot (w_{hj} - w_{hi}) \right] \qquad (3)$$

The total gain G is the sum of migration gains for low-skilled workers without tertiary education, G_l, and for high-skilled workers who have completed at least short-cycle tertiary education, G_h. For each of the two education groups e, we obtain the static migration gain as the product of the stock of citizens from origin country i who work in destination country j, $L_e(i,j)$, multiplied with the difference in country-specific earnings levels, $(w_{ej} - w_{ei})$, and summed up over all origin-destination pairs (i,j).

To obtain $L_e(i,j)$, we use data from Eurostat on the number of citizens aged 15-64 for each country origin-destination pairs (i,j) in the year 2018 (Eurostat 2020e). This data is available for every country pair in the EU, except for some immigrant nationalities in Spain, for which we used data from Spain's national statistical agency (INE 2020), and for Cyprus and Malta, which we exclude as both origin or destination countries in our analysis. Since the migrant stocks in Eurostat include not only workers but also individuals who are not employed, we multiply the migrant stocks with the destination country-specific employment rates of 15-64 year old immigrants from other EU countries (Eurostat 2021). This employment rate data is available from Eurostat for the year 2018 for all countries except Bulgaria and Romania, and our calculation of gains from migration thus considers these two countries only as migration origins but not as destinations. In order to roughly separate the stocks of migrant workers into those with (or without) tertiary education, we multiply with the share of high-skill (low-skill) migrants for the origin-destination pair (i,j) among the migrants observed in the EU-SILC microdata.

To obtain $(w_{ej} - w_{ei})$, we estimate equation (1) separately for workers who have or do not have a tertiary education, using the EU-SILC data for 2018. We then use the estimated education group-specific log wage premium of a migrants' source country relative to Germany, $\hat{\gamma}_{ei}$, and the corresponding wage premium of the destination country, $\hat{\gamma}_{ej}$, to calculate the migrant worker's static earnings gain as $\left(w_{ej} - w_{ei}\right) = \overline{w}_{ei} \cdot \left(\frac{\exp(\hat{\gamma}_{ej})}{\exp(\hat{\gamma}_{ei})} - 1\right)$ where $\overline{w}_{ei}$ is the average wage for workers of education group e in country i in the EU-SILC data.

We also consider an alternative version of this computation of static gains from trade, in which country-specific wage premia are allowed to vary between natives and foreigners. To this end, we estimate equation (1) separately for workers who have or do not have a tertiary education, and augment that equation with an interaction term between the country dummies and an indicator for whether or not an individual is a domestic or foreign citizen. In this case, earnings gains are computed as $\left(w_{ej}^{f} - w_{ei}^{d}\right) = \overline{w}_{ei}^{d} \cdot \left(\frac{\exp\left(\hat{\gamma}_{ej}^{f}\right)}{\exp\left(\hat{\gamma}_{ei}^{d}\right)} - 1\right)$, which is the difference between the earnings of a domestic citizen in origin country i and the earnings of a foreign citizen in destination country j.

References

Central Statistics Office. 2017a. "E7002: Population Usually Resident and Present in the State 2011 to 2016 by Nationality, Sex, County of Usual Residence and Census Year." PxStat. https://data.cso.ie/# (accessed November 15, 2020).

Central Statistics Office. 2017b. "B0439 - 2002 Population Usually Resident and Present in their Usual Residence." PxStat. https://data.cso.ie/# (accessed February 18, 2021).

Eurostat. 2020a. "Acquisition of citizenship by sex, age group and former citizenship." Eurostat database. https://ec.europa.eu/eurostat/web/products-datasets/product?code=migr_acq (accessed February 18, 2021).

Eurostat. 2020b. "Purchasing power parities (PPPs), price level indices and real expenditures for ESA 2010 aggregates." Eurostat database. https://ec.europa.eu/eurostat/web/products-datasets/-/PRC_PPP_IND (accessed November 15, 2020).

Eurostat. 2020c. "EU-SILC." European Union Statistics on Income and Living Conditions database. Restricted access with data contract (accessed November 15, 2020).

Eurostat. 2020d. "GDP and main components (output, expenditure and income)." Eurostat database. https://ec.europa.eu/eurostat/web/products-datasets/-/NAMQ_10_GDP (accessed February 18, 2021).

Eurostat. 2020e. "Population on 1 January by age group, sex and citizenship." Eurostat database. https://ec.europa.eu/eurostat/web/products-datasets/-/MIGR_POP1CTZ (accessed November 15, 2020).

Eurostat. 2021. "Employment rates by sex, age and citizenship (%)." Eurostat database. https://ec.europa.eu/eurostat/web/products-datasets/-/LFSA_URGAN (accessed February 18, 2021).

Federal Statistical Office. 2020. "Population résidante permanente étrangère selon la nationalité, de 1980 à 2019." Statistique de la population résidante de nationalité étrangère (1991-2019). https://www.bfs.admin.ch/bfs/fr/home/statistiques/population/migration-integration/nationalite-etrangere.assetdetail.13707205.html (accessed February 18, 2021).

Federal Statistical Office of Germany. 2020. "Foreigners: Germany, reference date, sex/age years/ marital status, country groups/citizenship." Genesis database. https://www-genesis.destatis.de/genesis//online?operation=table&code=12521-0002&bypass=true&levelindex=1&levelid=1616407800617#abreadcrumb (accessed February 18, 2021).

Instituto Nacional de Estadística. 2020. "Población extranjera por Nacionalidad, provincias, Sexo y Año." INEbase.

https://www.ine.es/jaxi/Tabla.htm?path=/t20/e245/p08/l0/&file=03005.px (accessed February 18, 2021).

Institut national de la statistique et des études économiques. 2011. “Population immigrée et population étrangère en 1999.” Recensement de la population. https://www.insee.fr/fr/statistiques/2118522 (accessed February 18, 2021).

Institut national de la statistique et des études économiques. 2020. “Etrangers - Immigrés en 2017.” Recensement de la population. https://www.insee.fr/fr/statistiques/zones/4515432 (accessed November 15, 2020).

International Migration Institute. 2015. “DEMIG C2C.” Demig data. https://www.migrationinstitute.org/data/demig-data/demig-c2c-data (accessed September 6, 2020).

Italian National Institute of Statistics. 2020. “Resident foreigners on 1st January - Citizenship: Italy, regions, provinces - Country of citizenship.” Statbase. http://dati.istat.it/viewhtml.aspx?il=blank&vh=0000&vf=0&vcq=1100&graph=0&view-metadata=1&lang=it&QueryId=19675&metadata=DCIS_POPSTRCIT1 (accessed February 18, 2021).

NSD - Norwegian Centre for Research Data. 2004. “European Social Survey Round 2 Data.” European Social Survey Database. http://www.europeansocialsurvey.org/data/ (accessed November 15, 2020).

NSD - Norwegian Centre for Research Data. 2018. “European Social Survey Round 9 Data.” European Social Survey Database. http://www.europeansocialsurvey.org/data/ (accessed November 15, 2020).

Office for National Statistics. 2001. “Table 2.3: Non-British population in the UK, excluding some residents in communal establishments, by sex, by nationality.” National Statistics. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/datasets/populationoftheunitedkingdombycountryofbirthandnationalityunderlyingdatasheets (accessed February 18, 2021).

Office for National Statistics. 2018. “Table 2.3: Non-British population in the UK, excluding some residents in communal establishments, by sex, by nationality.” National Statistics. https://www.ons.gov.uk/peoplepopulationandcommunity/populationandmigration/internationalmigration/datasets/populationoftheunitedkingdombycountryofbirthandnationalityunderlyingdatasheets (accessed February 18, 2021).

PORDATA. 2020. “Foreign population with legal resident status by nationalities.” Base de Dados Portugal Contemporâneo. https://www.pordata.pt/en/Portugal/Foreign+population+with+legal+resident+status+total+and+by+certain+nationalities-24 (accessed February 18, 2021).

Statistics Austria. 2020. “Population at the beginning of the year since 2002 (regional status of 2020).” STATcube.

https://statcube.at/statistik.at/ext/statcube/jsf/tableView/tableView.xhtml (accessed February 18, 2021).

Statistics Belgium. 2020. “Population par commune selon la nationalité et le sexe depuis 1992.” Statbel. https://statbel.fgov.be/fr/themes/population/structure-de-la-population#figures (accessed November 15, 2020).

Statistics Denmark. 2021. “Population 1. January by sex, age, ancestry, country of origin and citizenship.” StatBank Denmark. https://www.statbank.dk/FOLK2 (accessed February 18, 2021).

Statistics Finland. 2020. “Citizenship according to age and sex by region, 1990-2019.” Statistics Finland's PxWeb databases. https://pxnet2.stat.fi/PXWeb/pxweb/en/StatFin/StatFin__vrm__vaerak/statfin_vaerak_pxt_11rg.px/ (accessed November 15, 2020).

Statistics Netherlands. 2020a. “Immi- en emigratie; nationaliteit, leeftijd en geslacht.” StatLine. https://opendata.cbs.nl/#/CBS/nl/dataset/84484NED/table (accessed November 15, 2020).

Statistics Netherlands. 2020b. Immigration statistics, provided by e-mail to authors (accessed September 6, 2020).

Statistics Norway. 2021. “Population, by sex, age and citizenship 1977–2021.” Statbank. https://www.ssb.no/en/statbank/table/05196 (accessed February 18, 2021).

Statistics Sweden. 2020. “Foreign citizens by country of citizenship, age and sex. Year 1973–2019.” Statistikdatabasen. http://www.statistikdatabasen.scb.se/pxweb/en/ssd/START__BE__BE0101__BE0101F/UtlmedbR/?rxid=b83e5bbd-958a-4655-aa40-486ba2ca09a3 (accessed February 18, 2021).