**Online Appendix 1: Foreign-born population aged over 65, 2011-2020**

|  |
| --- |
| *Foreign-born population over 65 in EU15, Norway and Switzerland, 2011-2020* |
|  | 2011 | 2020 | Change 2011-2020 (%) | Average 2011-2020 |
| Austria | 181828 | 237506 | 31 | 206241 |
| Belgium | 208461 | 278449 | 34 | 241119 |
| Denmark | 41143 | 64181 | 56 | 51713 |
| Finland | 12092 | 22334 | 85 | 16584 |
| France | 1490313 | 1935409 | 30 | 1706701 |
| Germany  | 1112977 | 3249546 | 192 | 1888879 |
| Greece | 99391 | 150271 | 51 | 123257 |
| Ireland | 30898 | 77451 | 151 | 61536 |
| Italy | 290328 | 477582 | 64 | 360370 |
| Luxembourg | 14825 | 35260 | 138 | 27105 |
| Netherlands | 204212 | 308758 | 51 | 252973 |
| Norway | 32063 | 57172 | 78 | 43786 |
| Portugal | 42944 | 112242 | 161 | 73798 |
| Spain | 368045 | 638209 | 73 | 489424 |
| Sweden | 201273 | 277531 | 38 | 238992 |
| Switzerland | 279731 | 362873 | 30 | 324298 |
| United Kingdom | 836357 | 1044345¹ | 25 | 955976 |
| Total | 5446881 | 8284774 | 76 | 7062750 |
| Source: Eurostat (2021), Population on 1 January by age group, sex and country of birth [migr\_pop3ctb] |
| ¹ Figure for 2019 |

**Online Appendix 2: Pension generosity variable**

In constructing this variable, the aim was to control in regressions for the generosity of host country pension systems, allowing for the particular entitlement issues migrants might confront, for example, shorter periods of accrual in the main public pension system after entry into the host country. For reasons explained in the main paper, this involved the use of replacement rate data from the Comparative Welfare Entitlement Dataset (CWED) (Scruggs *et al.*, 2017a; 2017b) and Social Insurance Entitlement Dataset (SIED) (Korpi and Palme, 2008) datasets. The CWED provides the projected replacement rates for an average waged worker retiring in any given year since 1970. The SIED provides such rates for equivalent individuals retiring every five years from 1950. They also provide information about replacement rates from the minimum pension received by workers who would not have developed an entitlement to the main public pension. For each country, for which there was data,[[1]](#endnote-1) we collected the CWED replacement rates for minimum pensions and standard pensions for the years 1970 to 2015 and the SIED replacement rates for every five years since 1960.

To separate the countries into less and more protective groups, using this data, the mean replacement rate for the period was found for minimum and for standard pensions separately from each dataset for all countries. For each pension type and dataset, countries were ranked. This means there were four rankings, for CWED standard, CWED minimum (Table 1 below) SIED standard and SIED minimum (Table 2). The median position in each ranking was determined. In addition, country pensions of each type from both datasets were compared with the overall mean for that type to determine whether they were above or below it.

*Appendix Table 1: Comparative welfare entitlements, average replacement rates 1970-2011*

|  |  |
| --- | --- |
| Minimum pension (median) | Standard pension (median) |
| Ranking | Countries | Replacement rate for average waged worker | Replacement rate minus country minimum | Ranking | Countries | Replacement rate for average waged worker | Replacement rate minus country minimum |
| 13 | Germany | 0.18 | -0.17 | 13 | Ireland | 0.39 | -0.25 |
| 12 | Italy | 0.25 | -0.11 | 12 | Switzerland | 0.40 | -0.24 |
| 11 | Portugal | 0.27 | -0.09 | 11 | Netherlands | 0.50 | -0.14 |
| 10 | Spain | 0.27 | -0.08 | 10 | Denmark | 0.50 | -0.13 |
| 9 | Switzerland | 0.34 | -0.01 | 9 | France | 0.56 | -0.08 |
| 8 | Ireland | 0.35 | -0.01 | 8 | Finland | 0.60 | -0.03 |
| 7 | Finland | 0.37 | 0.01 | 7 | Sweden | 0.64 | 0.00 |
| 6 | Belgium | 0.39 | 0.03 | 6 | Belgium | 0.66 | 0.02 |
| 5 | Sweden | 0.40 | 0.04 | 5 | Germany | 0.73 | 0.09 |
| 4 | France | 0.42 | 0.06 | 4 | Portugal | 0.75 | 0.12 |
| 3 | Austria | 0.44 | 0.09 | 3 | Austria | 0.80 | 0.16 |
| 2 | Denmark | 0.45 | 0.10 | 2 | Italy | 0.83 | 0.19 |
| 1 | Netherlands | 0.50 | 0.14 | 1 | Spain | 0.92 | 0.28 |
| Overall average | 0.36 |  | Overall average | 0.64 |  |
| Source: Comparative Welfare Entitlement Dataset (CWED) (Scruggs *et al.,* 2017a; 2017b) |

*Appendix Table 2: Social insurance entitlements, average replacement rates 1960-2015*

|  |  |
| --- | --- |
| Minimum pension (median) | Standard pension (median) |
| Ranking | Countries | Replacement rate for average waged worker | Replacement rate minus country minimum | Ranking | Countries | Replacement rate for average waged worker | Replacement rate minus country minimum |
| 11 | Switzerland | 0.31 | -0.09 | 11 | Switzerland | 0.35 | -0.19 |
| 10 | Italy | 0.33 | -0.07 | 10 | Ireland | 0.36 | -0.18 |
| 9 | Ireland | 0.33 | -0.06 | 9 | Denmark | 0.49 | -0.05 |
| 8 | Germany | 0.36 | -0.03 | 8 | Netherlands | 0.50 | -0.04 |
| 7 | Sweden | 0.37 | -0.03 | 7 | Germany | 0.52 | -0.02 |
| 6 | Finland | 0.38 | -0.02 | 6 | France | 0.52 | -0.02 |
| 5 | France | 0.38 | -0.01 | 5 | Sweden | 0.55 | 0.00 |
| 4 | Austria | 0.42 | 0.02 | 4 | Finland | 0.61 | 0.06 |
| 3 | Denmark | 0.46 | 0.06 | 3 | Belgium | 0.67 | 0.13 |
| 2 | Netherlands | 0.50 | 0.11 | 2 | Italy | 0.69 | 0.14 |
| 1 | Belgium | 0.51 | 0.12 | 1 | Austria | 0.71 | 0.17 |
| Overall average | 0.39 |  | Overall average | 0.54 |  |
| Source: Social Insurance Entitlements Dataset (SIED) (Korpi and Palme, 2008) |

The placement of a country in either the less or more protective group was determined by how often their replacement rates were below the median in the four rankings, combined with how often their replacement rates fell below the overall mean for that pension type (Tables 3 and 4 below).

*Appendix Table 3: Averages based on comparative welfare entitlements dataset 1970-2011*

|  |  |
| --- | --- |
| Minimum pension (median) | Standard pension (median) |
| Average or below | Above average | Average or below | Above average |
| Finland1 | Austria | Denmark | Austria |
| Germany | Belgium | Finland | Belgium |
| Ireland | Denmark | France | Germany |
| Italy | France | Ireland | Italy |
| Portugal | Netherlands | Netherlands | Portugal |
| Spain | Sweden | Sweden | Spain |
| Switzerland |  | Switzerland |  |
| Notes: 1 Using mean data Finland would be categorised as above average |

*Appendix Table 4: Averages based on social insurance entitlements dataset 1960-2015*

|  |  |
| --- | --- |
| Minimum pension (median) | Standard pension (median) |
| Average or below | Above average | Average or below | Above average |
| Finland | Austria | Denmark | Austria |
| Germany | Belgium | France | Belgium |
| Ireland | Denmark | Germany | Finland |
| Italy | France1 | Ireland | Italy |
| Sweden | Netherlands | Netherlands | Sweden |
| Switzerland |  | Switzerland |  |
| Notes: 1 Using mean data France would be categorised as below average |

For most countries, this determination was straightforward i.e. the data for both types of pension from each dataset clearly indicated whether their pension system was more or less protective. Where the situation was less clear-cut (Portugal, France, Sweden), a final determination was based a more specific consideration of the country's placement in each of the categories (e.g. how far they were above the median for one type compared to how far they were below it in another). Thus, for example, while the median pension for the Swedish average waged worker was in two out of the four categories at or below the overall country average for the relevant type of pension, it only on one occasion fell below this average. Thus, Sweden was included in the more protective group.

Given the absence of data on Luxembourg and Greece, these were assigned to the more protective group based on OECD data (2005-2019). The final rankings are shown in table 5.

*Appendix Table 5: Overall country rankings of pension generosity*

|  |  |
| --- | --- |
| Less protective | More protective |
| Denmark | Austria |
| France | Belgium |
| Germany | Greece |
| Portugal | Luxembourg  |
| Switzerland | Netherlands |
|   | Spain |
|   | Sweden |

There are limitations to this approach. Both datasets are based on projections of the impact of systems over time on the replacement rate of a hypothetical average wage worker. No actual workers will have experienced this wage trajectory and built up pension entitlements on this basis. The inclusion of minimum pension data compensates for this problem to a limited extent, but no aggregated data is available which can provide a precise indication of the impact of different country pension systems on pensioner incomes over time. Secondly, concerns have been raised about the validity of the CWED and SIED datasets, particularly given differences in projected replacement rates between them (Wenzelburger *et al.,* 2013). However, these differences are less marked for pensions and, with regard to replacement rates, are largely explained by differences in founding assumptions (Scruggs, 2013). Moreover, the use of both datasets in combination to construct our indices compensates for any remaining issues.

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1. Data for Portugal was only available from the CWED dataset [↑](#endnote-ref-1)