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### Table A1 Rules used to determine refugee-sending countries

|  |  |  |
| --- | --- | --- |
|  | Restricted to those arriving | |
| Country | after | before |
| Iraq | - | - |
| Iran | 1980 | - |
| Vietnam | - | - |
| Sri Lanka | 1984 | - |
| Lebanon | - | - |
| Ethiopia |  | 1991 |
| Afghanistan | - | - |
| Somalia | 1989 | - |

### Table A2 Codes used for categories of psychiatric disorder

|  |  |  |
| --- | --- | --- |
| Diagnosis | ICD-10 Codes | Equivalent ICD-8 Codes |
| Any psychiatric disorder | F00-F99 | 290-315 |
| Any substance use disorder | F10-F19 | 291.x9, 294.39,  303.x9, 303.20,  303.28, 303.90,  304.x9 |
| Non-affective psychosis | F20-F29 | 295.x9, 296.89,  297.x9, 298.29-298.99,  299.04, 299.05,  299.09, 301.83 |
| Mood disorders | F30-F39 | 296.x9 (excluding  296.89), 298.09,  298.19, 300.49,  301.19 |
| Neurotic, stress-related, and  somatoform disorders | F40-F48 | 300.x9 (excluding  300.49), 305.x9,  305.68, 307.99 |
| Post-traumatic stress disorder | F43.1 | No equivalent category |

### Table A3 Sample selection table

|  |  |  |
| --- | --- | --- |
| Main sample | Reduction | Remaining sample size |
| All first-generation migrants (to 2017) | - | 1321930 |
| Restrict to refugees as defined by country of origin and year of arrival | 1162104 | 159826 |
| Restrict to arrivals between 1986 and 1998 | 83047 | 76779 |
| Restrict to only those with demographic data (age / gender / marital status) | 1245 | 75678 |
| Remove if first-arriving spouse is a non-migrant | 1741 | 73937 |
| Remove if first-arriving spouse from non-refugee sending country | 898 | 73039 |
| Remove if either index or spouse immigration date is missing | 147 | 72892 |
| Remove if arrived over a year later than spouse | 6878 | 66014 |
| Remove if child and either parent non-migrant | 1684 | 64162 |
| Remove if child arrived more than a year after either parent or parent dates missing | 1695 | 62467 |
| Remove if child arrived before the first-arrived parent | 4182 | 58285 |
| Supplementary sample |  |  |
|  |  |  |
| Refugees arriving 1986-1998 not already in dataset | - | 38906 |
| Remove if family reunification to refugee (spouse or parent) | 4147 | 34759 |
| Remove if family reunification to immigrant (spouse or parent) | 5009 | 29750 |
| Remove if family reunification to Danish/Nordic citizen (spouse or parent) | 16464 | 13286 |
| Remove if missing demographic data | 132 | 13154 |
| Restrict to main refugee sending countries only | 2926 | 10228 |
| Combined main and supplementary sample |  |  |
|  | - | 68513 |
| Drop refugees with only demographic data later than a year after arrival | 1097 | 67416 |
| Drop if housing data missing | 1130 | 66286 |
| Remove refugees from former Yugoslavia | 21207 | 45079 |
| Remove any remaining children not recorded with refugee adult family members | 1046 | **44033** |

### Table A4. Balance test – association between prior education and social composition of first assigned neighbourhood1.

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
|  | Difference in percentage of | | | | | |
| Education level | co-nationals | P-value | refugees | P-value | migrants (1st gen) | P-value |
| Primary only | - |  | - |  | - |  |
| High School | -0.027 | 0.637 | -0.027 | 0.902 | -0.026 | 0.852 |
| Beyond High School | -0.063 | 0.169 | -0.24 | 0.17 | -0.18 | 0.112 |

1 Linear regression analysis adjusting for information known to housing officials.

### Table A5. Relation between neighbourhood density of co-nationals and rates of mental disorder – all models

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Co-nationals density | Model 1 | | Model 2 (deprivation adjusted) | | | Model 3 (deprivation and population density adjusted) | |
| (quartiles) | IRR (95% CI) | P value | IRR (95% CI) | P value | IRR (95% CI) | | P value | |
| Any mental disorder |  |  |  |  |  | |  | |
| 1 (lowest) | 1.08 (1.00 - 1.16) | 0.05 | 1.08 (1.00 - 1.17) | 0.06 | 1.07 (0.98 - 1.16) | | 0.12 | |
| 2 | 1.04 (0.97 - 1.12) | 0.26 | 1.04 (0.97 - 1.13) | 0.26 | 1.03 (0.96 - 1.12) | | 0.4 | |
| 3 | 0.99 (0.92 - 1.06) | 0.79 | 0.99 (0.92 - 1.07) | 0.79 | 0.98 (0.91 - 1.06) | | 0.65 | |
| 4 (highest) | 1 |  | 1 |  | 1 | |  | |
| Non-affective psychosis |  |  |  |  |  | |  | |
| 1 (lowest) | 1.22 (1.04 - 1.43) | 0.01 | 1.25 (1.06 - 1.47) | 0.01 | 1.25 (1.06 - 1.48) | | 0.01 | |
| 2 | 1.27 (1.09 - 1.48) | 0 | 1.30 (1.11 - 1.52) | 0 | 1.31 (1.12 - 1.54) | | 0 | |
| 3 | 1.12 (0.96 - 1.30) | 0.16 | 1.13 (0.97 - 1.32) | 0.11 | 1.14 (0.98 - 1.34) | | 0.09 | |
| 4 (highest) | 1 |  | 1 |  | 1 | |  | |
| Mood disorder – any |  |  |  |  |  | |  | |
| 1 (lowest) | 1.18 (1.03 - 1.36) | 0.02 | 1.18 (1.02 - 1.36) | 0.03 | 1.14 (0.98 - 1.33) | | 0.08 | |
| 2 | 1.19 (1.04 - 1.36) | 0.01 | 1.19 (1.04 - 1.37) | 0.01 | 1.15 (1.00 - 1.33) | | 0.05 | |
| 3 | 1.01 (0.89 - 1.16) | 0.84 | 1.01 (0.88 - 1.16) | 0.9 | 0.99 (0.86 - 1.13) | | 0.84 | |
| 4 (highest) | 1 |  | 1 |  | 1 | |  | |
| Stress disorder – any |  |  |  |  |  | |  | |
| 1 (lowest) | 1.07 (0.97 - 1.18) | 0.16 | 1.07 (0.97 - 1.18) | 0.18 | 1.06 (0.96 - 1.17) | | 0.27 | |
| 2 | 1.04 (0.95 - 1.14) | 0.38 | 1.04 (0.95 - 1.15) | 0.39 | 1.03 (0.94 - 1.14) | | 0.54 | |
| 3 | 1.01 (0.92 - 1.10) | 0.9 | 1.00 (0.92 - 1.10) | 0.92 | 1.00 (0.91 - 1.09) | | 0.93 | |
| 4 (highest) | 1 |  | 1 |  | 1 | |  | |
| PTSD |  |  |  |  |  | |  | |
| 1 (lowest) | 1.17 (1.03 - 1.34) | 0.02 | 1.20 (1.05 - 1.38) | 0.01 | 1.21 (1.05 - 1.39) | | 0.01 | |
| 2 | 1.11 (0.98 - 1.26) | 0.09 | 1.14 (1.00 - 1.30) | 0.04 | 1.14 (1.00 - 1.30) | | 0.06 | |
| 3 | 1.11 (0.98 - 1.25) | 0.1 | 1.13 (0.99 - 1.28) | 0.06 | 1.12 (0.98 - 1.27) | | 0.09 | |
| 4 (highest) | 1 |  | 1 |  | 1 | |  | |

### Table A6. Relation between neighbourhood density of refugees and rates of mental disorder – all models

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Co-nationals density | Model 1 | | Model 2 (deprivation adjusted) | | | Model 3 (deprivation and population density adjusted) | |
| (quartiles) | IRR (95% CI) | P value | IRR (95% CI) | P value | IRR (95% CI) | | P value |
| Any mental disorder |  |  |  |  |  | |  |
| 1 (lowest) | 1.09 (1.00 - 1.18) | 0.04 | 1.10 (1.01 - 1.19) | 0.03 | 1.08 (0.98 - 1.19) | | 0.11 |
| 2 | 1.07 (0.99 - 1.15) | 0.1 | 1.07 (0.99 - 1.16) | 0.1 | 1.06 (0.97 - 1.15) | | 0.18 |
| 3 | 1.06 (0.98 - 1.14) | 0.16 | 1.06 (0.98 - 1.14) | 0.14 | 1.05 (0.97 - 1.14) | | 0.21 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |
| Non-affective psychosis |  |  |  |  |  | |  |
| 1 (lowest) | 1.19 (1.01 - 1.40) | 0.04 | 1.22 (1.03 - 1.45) | 0.02 | 1.24 (1.03 - 1.50) | | 0.02 |
| 2 | 1.07 (0.91 - 1.25) | 0.4 | 1.10 (0.93 - 1.30) | 0.26 | 1.12 (0.94 - 1.33) | | 0.2 |
| 3 | 1.04 (0.89 - 1.21) | 0.62 | 1.06 (0.90 - 1.24) | 0.5 | 1.07 (0.92 - 1.26) | | 0.38 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |
| Mood disorder – any |  |  |  |  |  | |  |
| 1 (lowest) | 1.16 (1.00 - 1.33) | 0.04 | 1.15 (0.99 - 1.33) | 0.07 | 1.09 (0.92 - 1.29) | | 0.32 |
| 2 | 1.09 (0.95 - 1.24) | 0.24 | 1.07 (0.93 - 1.24) | 0.33 | 1.03 (0.88 - 1.20) | | 0.72 |
| 3 | 1.01 (0.89 - 1.16) | 0.83 | 1.00 (0.87 - 1.16) | 0.95 | 0.97 (0.84 - 1.12) | | 0.69 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |
| Stress disorder – any |  |  |  |  |  | |  |
| 1 (lowest) | 1.10 (0.99 - 1.22) | 0.08 | 1.11 (0.99 - 1.23) | 0.07 | 1.09 (0.97 - 1.23) | | 0.16 |
| 2 | 1.11 (1.00 - 1.22) | 0.04 | 1.11 (1.00 - 1.23) | 0.04 | 1.10 (0.98 - 1.22) | | 0.09 |
| 3 | 1.13 (1.02 - 1.24) | 0.01 | 1.13 (1.03 - 1.25) | 0.01 | 1.12 (1.01 - 1.23) | | 0.03 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |
| PTSD |  |  |  |  |  | |  |
| 1 (lowest) | 1.08 (0.94 - 1.24) | 0.27 | 1.12 (0.97 - 1.29) | 0.13 | 1.11 (0.94 - 1.30) | | 0.22 |
| 2 | 1.07 (0.94 - 1.21) | 0.33 | 1.10 (0.96 - 1.26) | 0.17 | 1.08 (0.94 - 1.25) | | 0.27 |
| 3 | 1.14 (1.01 - 1.29) | 0.03 | 1.16 (1.03 - 1.32) | 0.02 | 1.15 (1.01 - 1.30) | | 0.04 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |

### Table A7. Relation between neighbourhood density of migrants and rates of mental disorder – all models

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Co-nationals density | Model 1 | | Model 2 (deprivation adjusted) | | | Model 3 (deprivation and population density adjusted) | |
| (quartiles) | IRR (95% CI) | P value | IRR (95% CI) | P value | IRR (95% CI) | | P value |
| Any mental disorder |  |  |  |  |  | |  |
| 1 (lowest) | 1.06 (0.97 - 1.16) | 0.17 | 1.07 (0.97 - 1.18) | 0.17 | 1.05 (0.93 - 1.18) | | 0.43 |
| 2 | 1.05 (0.97 - 1.14) | 0.26 | 1.06 (0.97 - 1.15) | 0.23 | 1.04 (0.94 - 1.14) | | 0.45 |
| 3 | 1.00 (0.93 - 1.08) | 0.93 | 1.00 (0.93 - 1.09) | 0.94 | 0.99 (0.91 - 1.08) | | 0.81 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |
| Non-affective psychosis |  |  |  |  |  | |  |
| 1 (lowest) | 1.03 (0.86 - 1.23) | 0.77 | 1.03 (0.85 - 1.26) | 0.75 | 1.02 (0.80 - 1.29) | | 0.89 |
| 2 | 0.92 (0.78 - 1.09) | 0.33 | 0.92 (0.77 - 1.11) | 0.4 | 0.93 (0.77 - 1.13) | | 0.46 |
| 3 | 0.89 (0.76 - 1.04) | 0.14 | 0.89 (0.76 - 1.05) | 0.16 | 0.91 (0.77 - 1.08) | | 0.26 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |
| Mood disorder – any |  |  |  |  |  | |  |
| 1 (lowest) | 1.23 (1.05 - 1.43) | 0.01 | 1.21 (1.02 - 1.43) | 0.03 | 1.14 (0.93 - 1.40) | | 0.2 |
| 2 | 1.00 (0.86 - 1.15) | 0.98 | 0.99 (0.84 - 1.16) | 0.86 | 0.93 (0.78 - 1.11) | | 0.43 |
| 3 | 1.05 (0.91 - 1.20) | 0.51 | 1.03 (0.89 - 1.19) | 0.71 | 0.98 (0.85 - 1.15) | | 0.85 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |
| Stress disorder – any |  |  |  |  |  | |  |
| 1 (lowest) | 1.04 (0.92 - 1.16) | 0.56 | 1.04 (0.92 - 1.18) | 0.5 | 1.01 (0.87 - 1.17) | | 0.93 |
| 2 | 1.11 (1.00 - 1.23) | 0.05 | 1.12 (1.00 - 1.25) | 0.05 | 1.09 (0.96 - 1.23) | | 0.18 |
| 3 | 1.03 (0.94 - 1.14) | 0.51 | 1.03 (0.93 - 1.15) | 0.52 | 1.01 (0.91 - 1.12) | | 0.87 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |
| PTSD |  |  |  |  |  | |  |
| 1 (lowest) | 1.02 (0.88 - 1.19) | 0.78 | 1.07 (0.91 - 1.26) | 0.43 | 1.06 (0.87 - 1.29) | | 0.56 |
| 2 | 1.10 (0.96 - 1.26) | 0.16 | 1.15 (0.99 - 1.33) | 0.06 | 1.12 (0.96 - 1.31) | | 0.15 |
| 3 | 1.00 (0.89 - 1.14) | 0.94 | 1.03 (0.90 - 1.17) | 0.71 | 1.00 (0.87 - 1.15) | | 0.96 |
| 4 (highest) | 1 |  | 1 |  | 1 | |  |

### Table A8. Relation between different aspects of social composition of first assigned neighbourhood and subsequent rates of mental disorder for refugees – fully adjusted models with 2-year delay before follow-up

|  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- |
| Mental disorder | Density of co-nationals | | Density of refugees | | Density of migrants | |
| Density (quartiles) | IRR (95% CI) | P value | IRR (95% CI) | P value | IRR (95% CI) | P value |
| Any mental disorder |  |  |  |  |  |  |
| 1 (lowest) | 1.07 (0.99 - 1.16) | 0.08 | 1.05 (0.96 - 1.15) | 0.27 | 1.02 (0.91 - 1.14) | 0.69 |
| 2 | 1.04 (0.97 - 1.13) | 0.27 | 1.03 (0.95 - 1.12) | 0.46 | 1.01 (0.92 - 1.10) | 0.91 |
| 3 | 1.00 (0.93 - 1.08) | 0.91 | 1.05 (0.97 - 1.13) | 0.26 | 0.96 (0.89 - 1.05) | 0.37 |
| 4 (highest) | 1 |  | 1 |  | 1 |  |
| Non-affective psychosis |  |  |  |  |  |  |
| 1 (lowest) | 1.27 (1.06 - 1.51) | 0.01 | 1.24 (1.02 - 1.51) | 0.03 | 1.04 (0.81 - 1.33) | 0.75 |
| 2 | 1.32 (1.12 - 1.56) | 0 | 1.13 (0.94 - 1.36) | 0.18 | 0.92 (0.75 - 1.13) | 0.43 |
| 3 | 1.14 (0.96 - 1.34) | 0.12 | 1.07 (0.91 - 1.27) | 0.41 | 0.91 (0.76 - 1.09) | 0.29 |
| 4 (highest) | 1 |  | 1 |  | 1 |  |
| Mood disorder – any |  |  |  |  |  |  |
| 1 (lowest) | 1.14 (0.99 - 1.32) | 0.07 | 1.10 (0.94 - 1.29) | 0.25 | 1.12 (0.92 - 1.35) | 0.26 |
| 2 | 1.21 (1.05 - 1.38) | 0.01 | 1.04 (0.90 - 1.20) | 0.58 | 0.96 (0.82 - 1.13) | 0.64 |
| 3 | 1.01 (0.89 - 1.16) | 0.85 | 0.97 (0.85 - 1.11) | 0.65 | 0.95 (0.82 - 1.10) | 0.5 |
| 4 (highest) | 1 |  | 1 |  | 1 |  |
| Stress disorder – any |  |  |  |  |  |  |
| 1 (lowest) | 1.05 (0.95 - 1.16) | 0.31 | 1.05 (0.94 - 1.18) | 0.38 | 0.98 (0.85 - 1.13) | 0.78 |
| 2 | 1.01 (0.92 - 1.11) | 0.8 | 1.07 (0.96 - 1.18) | 0.22 | 1.05 (0.94 - 1.18) | 0.39 |
| 3 | 1.01 (0.92 - 1.10) | 0.82 | 1.12 (1.02 - 1.23) | 0.02 | 0.99 (0.89 - 1.09) | 0.8 |
| 4 (highest) | 1 |  | 1 |  | 1 |  |
| PTSD |  |  |  |  |  |  |
| 1 (lowest) | 1.18 (1.03 - 1.35) | 0.02 | 1.05 (0.90 - 1.23) | 0.51 | 0.98 (0.81 - 1.18) | 0.81 |
| 2 | 1.10 (0.96 - 1.25) | 0.16 | 1.05 (0.91 - 1.20) | 0.52 | 1.07 (0.91 - 1.24) | 0.42 |
| 3 | 1.13 (1.00 - 1.27) | 0.05 | 1.14 (1.01 - 1.29) | 0.04 | 0.98 (0.85 - 1.12) | 0.75 |
| 4 (highest) | 1 |  | 1 |  | 1 |  |