ESPON

Co-funded by the European Union
Interreg

Instytut Geografii i Przestrzennego Zagospodarowania
Polska Akademia Nauk

Tomasz Komornicki, Wojciech Pomianowski, Rafał Wiśniewski, Barbara Szejgiec-Kolenda, Marcin Mazur, Eugenia Maruniak, Patryk Duma, Julia Wójcik

# Interregional migration flows in Europe


## ESPON IRiE - Interregional Relations in Europe

24th - 25th November 2022 // Baluarte Palacio de Congresos, Pamplona (NAVARRA)

# Agenda

1. Source data and methodology
2. Results
3. Explanatory factors: drivers and barriers
4. Ukrainian Case
5. Conclusions

1

# Source data and methodology

# Source data

## External migration

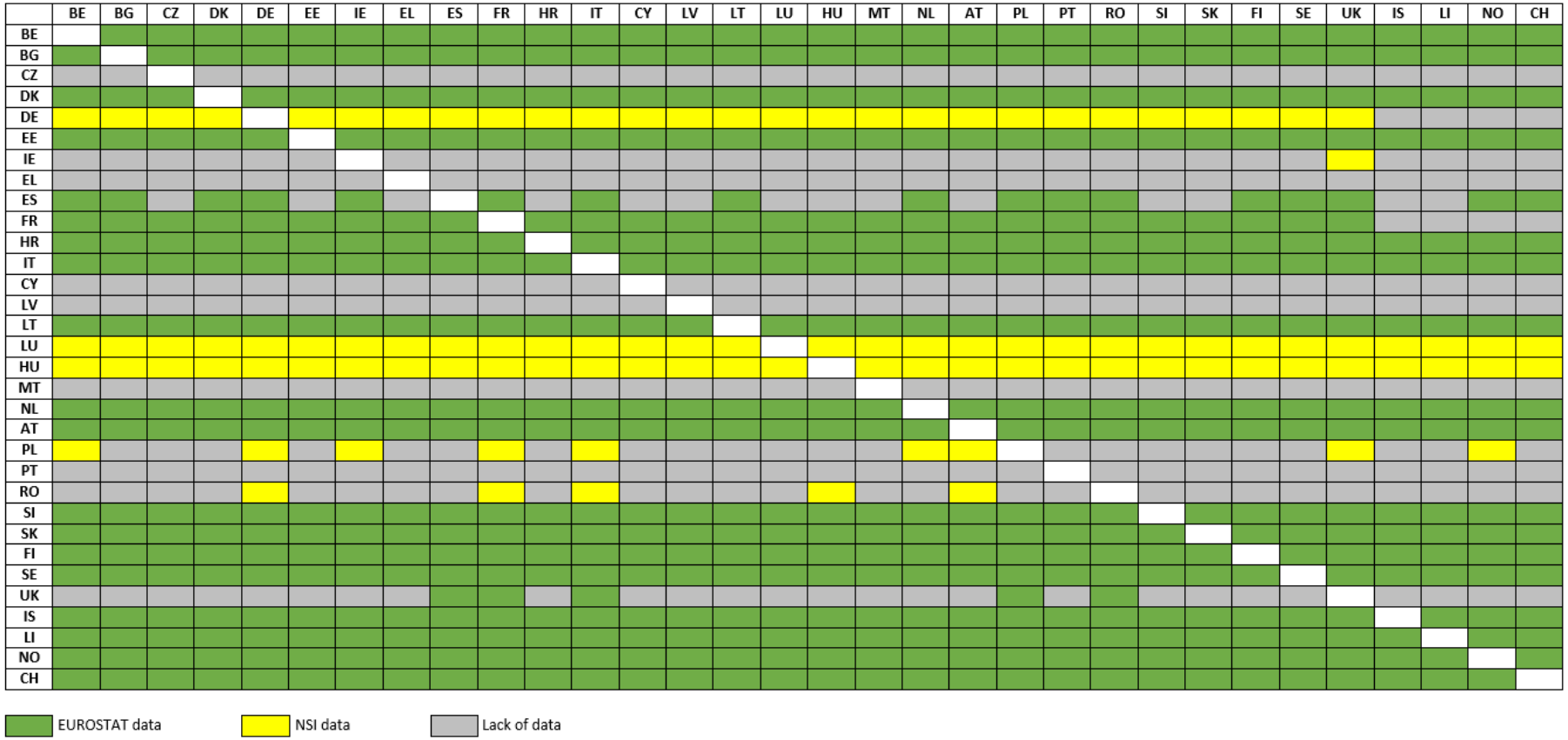
- EUROSTAT - primary source for country-to-country migration matrix (full data for 18 countries of ESPON space, flows in both directions; incomplete data for 2 countries)
- National statistical institutions (NSI) – secondary source for country-to-country migration matrix:
  - NSI, stage 1 - statistical data was collected from publicly available NSI websites;
  - NSI, stage 2 - enquiries about the missing data (in the majority of cases, the NSIs' responses confirmed the prior information obtained from the preliminary research that there was a shortage of data).

## Internal migration

National statistical institutions (NSI) – primary source for internal migration matrix

- Whole country = NUTS 2 – 7 countries
- Full data sets available – 6 countries (Bulgaria, Spain, Italy, Austria, Poland, Norway)

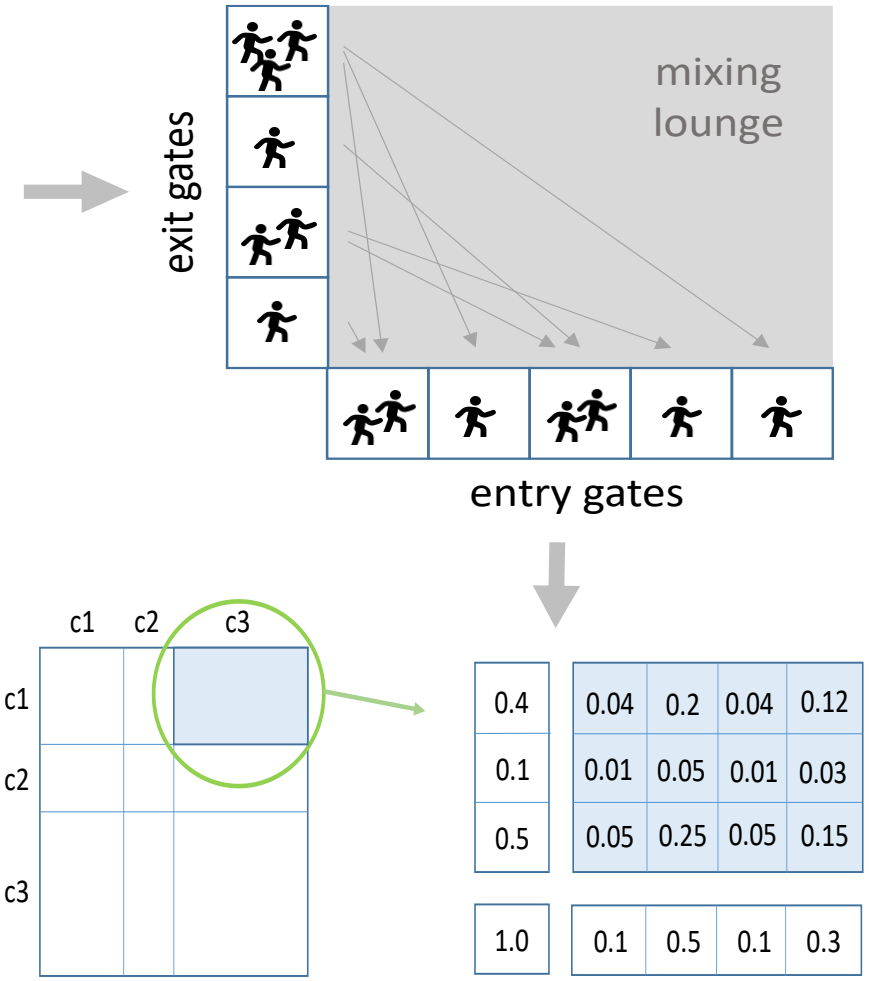
# Data availability – country-to-country matrix, 2018 (example)



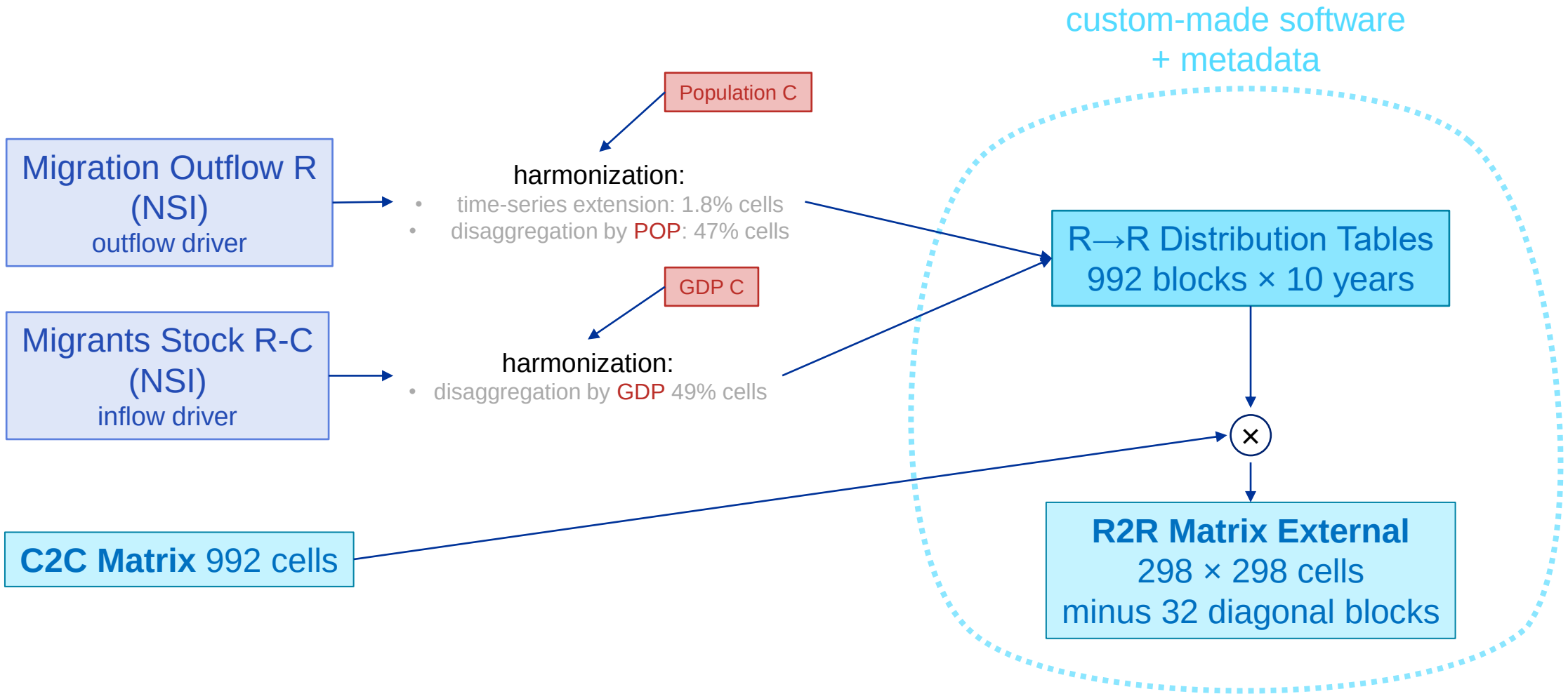
# Methodology

## Rules of Engagement

1. Minimize loses
   - preserve raw data, don't over-model
2. Different internal / external methodology
3. Aggresive counting
   - global origin vs. destination statistics dilemma unsolvable
   - local (C-C pair) dilemma unsolvable
   - migrations underestimated
4. Accept heterogeneity
   - linear models work on heterogeneous data
5. No-backtracking workflow
   - once estimated, cells are not "repaired" later
6. Accept flat cases occasionally
   - year-to-year structure may be flat
7. Track data provenances (metadata)



# Methodology - R2R External Migration Flows



# Matrices

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 | 22 | 23 | 24 | 25 | 26 | 27 | 28 | 29 | 30 | 31 | 32 | 33 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Order | | BE | BG | CZ | DK | DE | EE | IE | EL | ES | FR | HR | IT | CY | LV | LT | LU | HU | MT | NL | AT | PL | PT | RO | SI | SK | FI | SE | UK | IS | LI | NO | CH | ROW |
| 1 | BE | 0 | 1406 | 390 | 462 | 5582 | 126 | 508 | 690 | 5538 | 17256 | 209 | 2652 | 48 | 105 | 148 | 2138 | 603 | 70 | 9032 | 538 | 3926 | 2280 | 4013 | 124 | 322 | 273 | 604 | 4600 | 41 | 2 | 378 | 1582 | |
| 2 | BG | 3800 | 0 | 570 | 1131 | 81793 | 61 | 209 | 453 | 5173 | 2075 | 36 | 2500 | 289 | 1 | 22 | 210 | 86 | 11 | 4835 | 3525 | 162 | 269 | 197 | 575 | 72 | 265 | 555 | 5908 | 95 | 0 | 447 | 587 | |
| 3 | CZ | 406 | 90 | 0 | 384 | 11580 | 82 | 377.438 | 508.5401 | 4380.44 | 1191 | 81 | 333 | 0 | 268.3599 | 25 | 82 | 171 | 102.0898 | 788 | 1266 | 85 | 246.9032 | 279.382 | 54 | 1733 | 93 | 403 | 1158.186 | 258 | 5 | 152 | 886 | |
| 4 | DK | 517 | 633 | 443 | 0 | 3665 | 112 | 359 | 234 | 1808 | 1278 | 130 | 1343 | 58 | 399 | 1334 | 119 | 540 | 81 | 1123 | 345 | 2788 | 411 | 2208 | 57 | 451 | 502 | 3333 | 2655 | 882 | 2 | 2709 | 597 | |
| 5 | DE | 5075 | 56703 | 8699 | 4145 | 0 | 792 | 2602 | 19047 | 23255 | 18264 | 26324 | 41318 | 705 | 5347 | 7844 | 2763 | 37396 | 428 | 14062 | 21702 | 127001 | 8457 | 176451 | 2839 | 9947 | 2188 | 4573 | 17182 | 304 | 46 | 1280 | 21692 | |
| 6 | EE | 112 | 51 | 100 | 125 | 924 | 0 | 71 | 20 | 267 | 229 | 5 | 222 | 16 | 253 | 135 | 51 | 42 | 12 | 226 | 57 | 110 | 45 | 47 | 13 | 52 | 4611 | 405 | 477 | 19 | 0 | 206 | 117 | |
| 7 | IE | 435 | 39 | 561.6552 | 448 | 3247 | 236 | 0 | 0 | 2597 | 3311 | 209 | 614 | 48.34167 | 570.4329 | 1244 | 178 | 536 | 56.84426 | 1466 | 220 | 675 | 905.6214 | 638.6296 | 24 | 163 | 127 | 343 | 11400 | 26 | 0 | 105 | 593 | |
| 8 | EL | 1583 | 1251 | 187.7554 | 568 | 30498 | 50 | 123.5374 | 0 | 4428.488 | 1784 | 14 | 778 | 0 | 61.46364 | 37 | 416 | 124 | 103.1161 | 3568 | 858 | 61 | 333.2471 | 883.3197 | 21 | 31 | 289 | 2386 | 8667.026 | 81 | 3 | 674 | 1395 | |
| 9 | ES | 5773 | 7527 | 3113.389 | 2355 | 28029 | 326 | 2019 | 4783.299 | 0 | 20929 | 52 | 7695 | 204.6669 | 2966.545 | 777 | 701 | 476 | 384.2909 | 6597 | 996 | 2795 | 7480 | 45759 | 92 | 91 | 916 | 2230 | 40597 | 247 | 4 | 1809 | 5275 | |
| 10 | FR | 15836 | 531 | 637 | 1381 | 21302 | 323 | 1009 | 2708 | 30086 | 0 | 145 | 35932 | 43 | 248 | 232 | 3994 | 870 | 41 | 5018 | 937 | 855 | 5014 | 898 | 156 | 190 | 514 | 1574 | 23393 | 193 | 4 | 717 | 16453 | |
| 11 | HR | 453 | 32 | 124 | 372 | 51450 | 7 | 2051 | 17 | 106 | 282 | 0 | 749 | 3 | 2 | 5 | 165 | 191 | 20 | 469 | 3724 | 49 | 23 | 52 | 1187 | 67 | 44 | 1243 | 596 | 197 | 2 | 429 | 873 | |
| 12 | IT | 6490 | 1008 | 634 | 1510 | 64852 | 371 | 2346 | 280 | 22002 | 18568 | 523 | 0 | 68 | 62 | 214 | 1893 | 888 | 1387 | 6127 | 3391 | 2051 | 1926 | 12033 | 711 | 420 | 540 | 2677 | 30814 | 115 | 13 | 750 | 14416 | |
| 13 | CY | 81 | 202 | 34.92888 | 79 | 767 | 21 | 56.05926 | 0 | 808.8843 | 102 | 5 | 57 | 0 | 24.51463 | 86 | 12 | 138 | 25.79561 | 343 | 40 | 15 | 612.9321 | 215.4427 | 15 | 17 | 41 | 104 | 9335.011 | 1 | 0 | 32 | 87 | |
| 14 | LV | 219 | 14 | 109.6418 | 530 | 7317 | 877 | 1802.749 | 252.6476 | 1201.06 | 183 | 5 | 135 | 0 | 0 | 204 | 58 | 13 | 34.17312 | 992 | 172 | 24 | 301.7726 | 80.40063 | 16 | 6 | 383 | 608 | 7222.173 | 536 | 0 | 796 | 211 | |
| 15 | LT | 314 | 27 | 56 | 1803 | 11854 | 184 | 2014 | 48 | 1247 | 351 | 11 | 262 | 165 | 112 | 0 | 102 | 43 | 73 | 1380 | 158 | 138 | 62 | 12 | 9 | 8 | 182 | 1475 | 12157 | 1025 | 0 | 3000 | 283 | |
| 16 | LU | 1935 | 65 | 43 | 123 | 3894 | 28 | 93 | 133 | 338 | 3117 | 53 | 783 | 7 | 41 | 41 | 0 | 136 | 19 | 470 | 146 | 197 | 2492 | 269 | 33 | 33 | 62 | 118 | 318 | 39 | 1 | 28 | 331 | |
| 17 | HU | 715 | 124 | 207 | 653 | 41925 | 56 | 426 | 125 | 538 | 1114 | 88 | 824 | 162 | 28 | 26 | 193 | 0 | 142 | 2329 | 8791 | 464 | 100 | 5409 | 132 | 2226 | 210 | 609 | 4160 | 98 | 1 | 362 | 1975 | |
| 18 | MT | 143 | 34 | 50.03538 | 86 | 366 | 35 | 108.8299 | 0 | 666.4977 | 334 | 0 | 332 | 32.06676 | 48.74925 | 38 | 15 | 113 | 0 | 220 | 28 | 0 | 584.2595 | 61.05935 | 7 | 6 | 83 | 201 | 5544.933 | 10 | 1 | 22 | 68 | |
| 19 | NL | 10305 | 1550 | 699 | 1145 | 13293 | 146 | 975 | 1245 | 5506 | 3937 | 170 | 2642 | 155 | 422 | 581 | 306 | 1343 | 118 | 0 | 851 | 9177 | 1762 | 1963 | 122 | 429 | 458 | 1431 | 7703 | 82 | 3 | 695 | 1591 | |
| 20 | AT | 379 | 1484 | 808 | 290 | 19317 | 91 | 115 | 435 | 574 | 1027 | 1326 | 1780 | 19 | 79 | 94 | 69 | 7320 | 4 | 909 | 0 | 2688 | 270 | 5029 | 853 | 2090 | 131 | 344 | 669 | 25 | 112 | 126 | 3312 | |
| 21 | PL | 4086 | 108 | 47 | 3343 | 146209 | 108 | 480 | 27 | 3211 | 2779 | 86 | 2014 | 20 | 0 | 116 | 498 | 376 | 316.3267 | 18056 | 3535 | 0 | 30 | 8 | 49 | 196 | 421 | 3851 | 21402 | 3300 | 4 | 4740 | 3451 | |
| 22 | PT | 2730 | 128 | 851.5709 | 597 | 8806 | 83 | 876.676 | 871.4797 | 6369 | 7326 | 12 | 625 | 430.6138 | 845.8102 | 63 | 3501 | 114 | 99.59228 | 2452 | 407 | 57 | 0 | 873.2834 | 16 | 16 | 131 | 438 | 2754.833 | 308 | 0 | 412 | 5668 | |
| 23 | RO | 12496 | 100 | 2211.858 | 3905 | 238824 | 113 | 2598.288 | 184 | 28030 | 7389 | 49 | 36553 | 0 | 1857.868 | 44 | 799 | 2927 | 171.9459 | 5936 | 13403 | 92 | 72.05055 | 0 | 77 | 366 | 470 | 2096 | 29180 | 554 | 2 | 982 | 1257 | |
| 24 | SI | 249 | 412 | 61 | 58 | 4212 | 13 | 53 | 12 | 135 | 111 | 1189 | 528 | 3 | 5 | 5 | 61 | 87 | 7 | 226 | 1938 | 67 | 22 | 49 | 0 | 55 | 24 | 114 | 456 | 12 | 3 | 39 | 723 | |
| 25 | SK | 449 | 20 | 1170 | 459 | 11555 | 45 | 65 | 2 | 26 | 273 | 56 | 385 | 5 | 0 | 8 | 96 | 2088 | 5 | 1008 | 3513 | 56 | 3 | 1 | 65 | 0 | 63 | 151 | 296 | 106 | 2 | 220 | 1531 | |
| 26 | FI | 353 | 179 | 82 | 603 | 2301 | 5547 | 137 | 262 | 1115 | 1121 | 15 | 276 | 22 | 59 | 79 | 115 | 138 | 91 | 745 | 193 | 303 | 116 | 117 | 24 | 46 | 0 | 3089 | 1622 | 59 | 1 | 499 | 444 | |
| 27 | SE | 448 | 195 | 189 | 3856 | 4354 | 394 | 288 | 403 | 2985 | 1823 | 183 | 507 | 80 | 210 | 521 | 123 | 340 | 237 | 1286 | 272 | 1689 | 786 | 362 | 79 | 67 | 2896 | 0 | 3239 | 596 | 1 | 3581 | 969 | |
| 28 | UK | 3308 | 1894 | 2097.708 | 3805 | 21627 | 831 | 20100 | 4708.529 | 31276 | 25492 | 216 | 6955 | 3056.167 | 1870.012 | 7670 | 584 | 5828 | 537.846 | 10443 | 1551 | 27206 | 4945.704 | 4252.348 | 366 | 998 | 1263 | 4327 | 0 | 365 | 4 | 1885 | 5747 | |
| 29 | IS | 46 | 18 | 49 | 820 | 211 | 11 | 12 | 6 | 174 | 45 | 5 | 33 | 6 | 46 | 206 | 11 | 51 | 5 | 117 | 26 | 837 | 73 | 51 | 2 | 35 | 49 | 594 | 211 | 0 | 0 | 336 | 84 | |
| 30 | LI | 1 | 0 | 1 | 2 | 59 | 0 | 0 | 1 | 21 | 3 | 1 | 13 | 0 | 0 | 0 | 1 | 0 | 0 | 1 | 50 | 2 | 9 | 1 | 2 | 3 | 0 | 13 | 5 | 0 | 0 | 0 | 291 | |
| 31 | NO | 223 | 267 | 210 | 2651 | 1170 | 315 | 104 | 96 | 1648 | 474 | 50 | 282 | 21 | 413 | 1886 | 37 | 251 | 22 | 686 | 122 | 4157 | 168 | 553 | 27 | 317 | 444 | 4392 | 2233 | 566 | 0 | 0 | 363 | |
| 32 | CH | 1046 | 370 | 793 | 590 | 16313 | 105 | 497 | 677 | 5649 | 13554 | 463 | 9322 | 96 | 112 | 135 | 298 | 1678 | 104 | 1539 | 2436 | 2465 | 10432 | 1030 | 267 | 1222 | 463 | 960 | 5373 | 70 | 383 | 379 | 0 | |
| 33 | ROW | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |

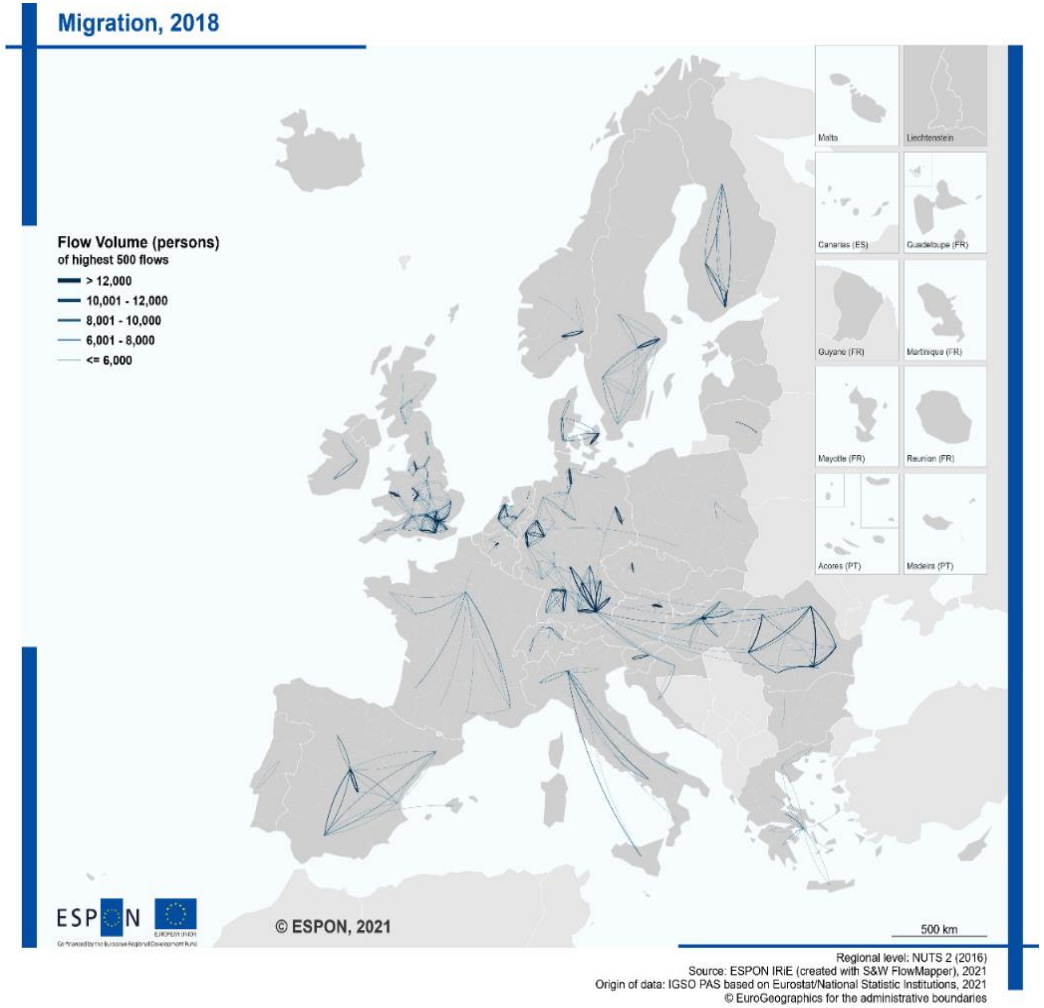
| | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| r | r | r | r | r1 | r infinity | r4 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | r | Pop SubZ (0.483) | t | t | t | t | Pop (0.322) | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | Stock (0.772) | r | Pop (0.728) | t | t | t | GDP SubZ (0.587) | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | r | Pop (0.483) | r | t1 | t | r2 | Pop (0.322) | | | | | | | | | | | | | | | | | | | | | | | | | |
| t8 | r | r | r2 | r | t2 | r9 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t2 | r | r | r | t1 | r | r1 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t7 | r | r | t3 | t1 | t1 | r | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | Stock (0.585) | Pop SubZ (0.483) | Pop (0.728) | t | t | t | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | Stock (0.591) | GDP (0.534) | Pop (0.728) | t | t | t | GDP SubZ (0.534) | | | | | | | | | | | | | | | | | | | | | | | | | |
| t4 | r | r | t2 | t1 | r1 | r1 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| r1 | r | r | r | t1 | r5 | r3 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t4 | r | r | r | t1 | t4 | r1 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | Stock (0.6) | Pop SubZ (0.483) | Pop (0.728) | t | r | t | Pop (0.322) | | | | | | | | | | | | | | | | | | | | | | | | | |
| r1 | r | r | t1 | r1 | r2 | r2 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t2 | r | r | r | t2 | r3 | r2 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t18 | r | r | t19 | t13 | t | t7 | r | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | Stock (0.651) | GDP (0.532) | t | t | t | t | GDP (0.532) | | | | | | | | | | | | | | | | | | | | | | | | | |
| t | Stock (0.846) | r | t4 | t7 | t | t8 | GDP SubZ (0.555) | | | | | | | | | | | | | | | | | | | | | | | | | |
| t4 | r | r | r | r2 | r2 | r2 | r | | | | | | | | | | | | | | | | | | | | | | | | | |

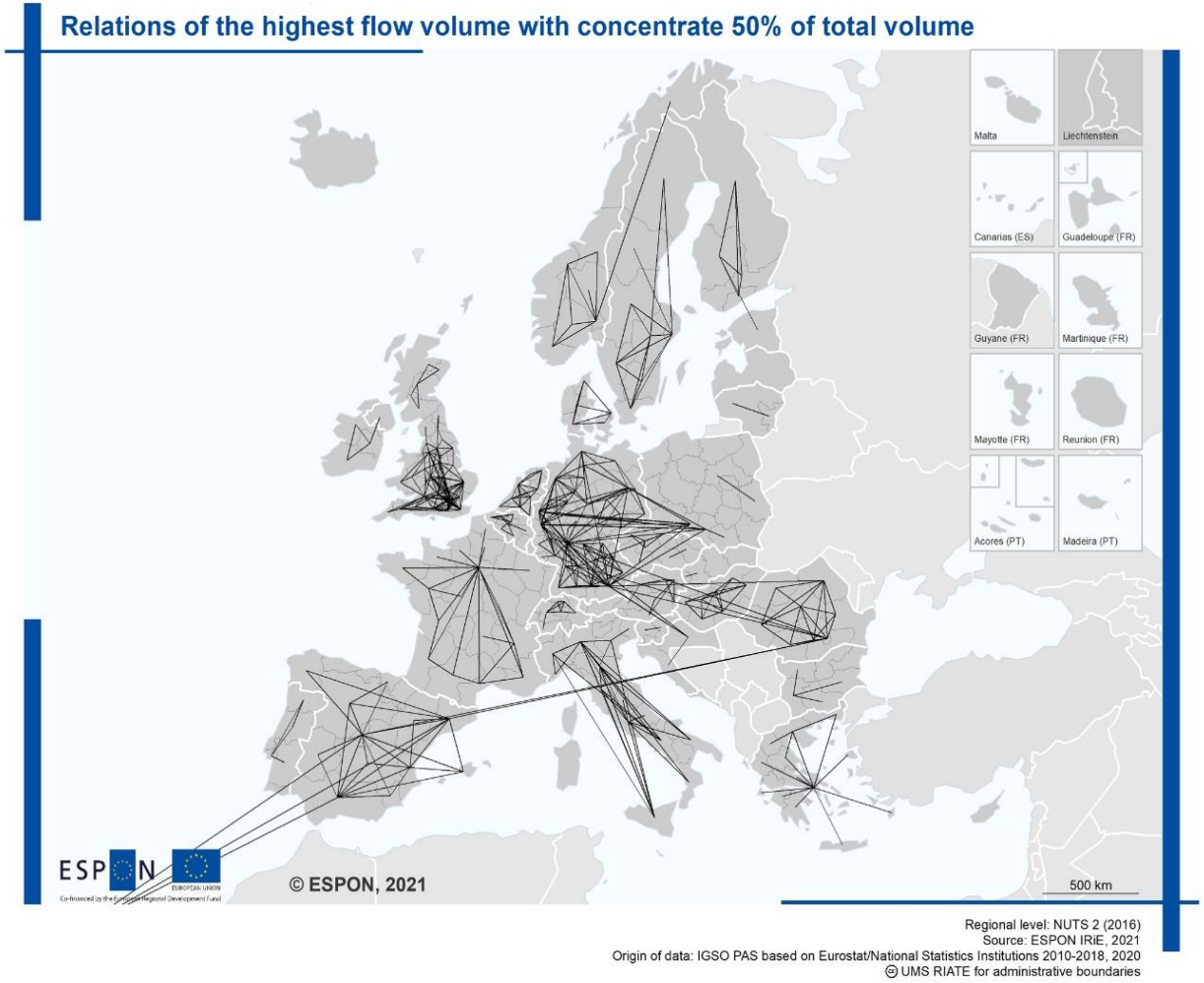
| | | | Order | 156 | 157 | 158 | 159 | 160 | 161 | 162 | 163 | 164 | 165 | 166 | 167 | 168 | 169 | 170 | 171 | 172 | 173 | 174 | 175 | 176 | 177 | 178 | 179 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | LV | LT | LT | LU | HU | HU | HU | HU | HU | HU | HU | HU | MT | NL | NL | NL | NL | NL | NL | NL | NL | NL | NL | NL |
| | Order | | O/D | LV00 | LT01 | LT02 | LU00 | HU11 | HU12 | HU21 | HU22 | HU23 | HU31 | HU32 | HU33 | MT00 | NL11 | NL12 | NL13 | NL21 | NL22 | NL23 | NL31 | NL32 | NL33 | NL34 | NL41 |
| BE10 | 1 | BE | BE10 | 11.13907 | 5.973522 | 9.727255 | 226.8126 | 24.14693 | 6.727619 | 6.189307 | 6.522273 | 4.01731 | 4.549647 | 6.176597 | 5.640373 | 7.426043 | 38.60692 | 27.00524 | 20.46016 | 54.46659 | 98.35568 | 17.19504 | 88.32812 | 194.2596 | 208.0084 | 17.51447 | 139.5889 |
| BE21 | 2 | BE | BE21 | 17.05275 | 9.144839 | 14.89141 | 347.2264 | 36.96643 | 10.29928 | 9.475183 | 9.984919 | 6.150083 | 6.965034 | 9.455725 | 8.634822 | 11.3685 | 59.10317 | 41.34221 | 31.32237 | 83.38266 | 150.5723 | 26.32381 | 135.2211 | 297.3912 | 318.4392 | 26.81282 | 213.696 |
| BE22 | 3 | BE | BE22 | 8.028155 | 4.305241 | 7.010634 | 163.4685 | 17.40319 | 4.848734 | 4.460762 | 4.700737 | 2.895359 | 3.279025 | 4.451601 | 4.065134 | 5.352103 | 27.82481 | 19.46324 | 14.74606 | 39.2552 | 70.88697 | 12.39282 | 63.65991 | 140.0069 | 149.916 | 12.62304 | 100.6046 |
| BE23 | 4 | BE | BE23 | 13.89815 | 7.453133 | 12.13665 | 282.9929 | 30.128 | 8.394015 | 7.722366 | 8.137805 | 5.012377 | 5.67657 | 7.706508 | 7.037464 | 9.265435 | 48.16966 | 33.6943 | 25.52804 | 67.95768 | 122.7179 | 21.45416 | 110.2065 | 242.3767 | 259.531 | 21.85271 | 174.1643 |
| BE24 | 5 | BE | BE24 | 10.5098 | 5.636067 | 9.177745 | 213.9995 | 22.78283 | 6.347564 | 5.839662 | 6.153818 | 3.790365 | 4.292629 | 5.82767 | 5.321738 | 7.006533 | 36.42595 | 25.47967 | 19.30433 | 51.38967 | 92.79939 | 16.22366 | 83.33831 | 183.2856 | 196.2576 | 16.52504 | 131.7032 |
| BE25 | 6 | BE | BE25 | 10.97142 | 5.883619 | 9.580856 | 223.399 | 23.78351 | 6.626366 | 6.096156 | 6.42411 | 3.956848 | 4.481173 | 6.083637 | 5.555483 | 7.314279 | 38.02588 | 26.59881 | 20.15223 | 53.64685 | 96.87539 | 16.93625 | 86.99875 | 191.336 | 204.8778 | 17.25087 | 137.488 |
| BE31 | 7 | BE | BE31 | 3.705938 | 1.987375 | 3.236232 | 75.45996 | 8.033622 | 2.238261 | 2.059166 | 2.169943 | 1.336549 | 1.513656 | 2.054938 | 1.876537 | 2.470625 | 12.84442 | 8.984574 | 6.807042 | 18.12089 | 32.72268 | 5.720744 | 29.38654 | 64.62967 | 69.20386 | 5.827017 | 46.44085 |
| BE32 | 8 | BE | BE32 | 12.33739 | 6.616143 | 10.7737 | 251.2127 | 26.74462 | 7.451364 | 6.855141 | 7.223927 | 4.449485 | 5.039089 | 6.841064 | 6.247154 | 8.224923 | 42.76019 | 29.91042 | 22.66123 | 60.326 | 108.9366 | 19.04485 | 97.8303 | 215.1577 | 230.3856 | 19.39864 | 154.6056 |
| BE33 | 9 | BE | BE33 | 10.17451 | 5.45626 | 8.884948 | 207.1723 | 22.05599 | 6.145058 | 5.65336 | 5.957493 | 3.669441 | 4.155682 | 5.64175 | 5.151959 | 6.783004 | 35.26385 | 24.66679 | 18.68847 | 49.75019 | 89.83881 | 15.70608 | 80.67957 | 177.4382 | 189.9964 | 15.99784 | 127.5015 |
| BE34 | 10 | BE | BE34 | 2.62804 | 1.409333 | 2.294952 | 53.5119 | 5.696987 | 1.587248 | 1.460244 | 1.5388 | 0.947804 | 1.073398 | 1.457245 | 1.330733 | 1.752027 | 9.108533 | 6.371348 | 4.827167 | 12.85031 | 23.20506 | 4.056826 | 20.83926 | 45.83168 | 49.07543 | 4.132189 | 32.93321 |
| BE35 | 11 | BE | BE35 | 4.554797 | 2.442591 | 3.977504 | 92.74435 | 9.873754 | 2.750944 | 2.530826 | 2.666977 | 1.64269 | 1.860364 | 2.525629 | 2.306366 | 3.036532 | 15.78649 | 11.04253 | 8.366222 | 22.27155 | 40.21793 | 7.031103 | 36.11764 | 79.43335 | 85.05527 | 7.161718 | 57.07831 |
| BG31 | 12 | BG | BG31 | 0.128126 | 1.072434 | 1.746347 | 26.90655 | 4.15932 | 1.158835 | 1.066111 | 1.123464 | 0.691984 | 0.783679 | 1.063922 | 0.971557 | 1.409391 | 24.96071 | 17.45982 | 13.2282 | 35.21454 | 63.59035 | 11.11719 | 57.10719 | 125.5956 | 134.4846 | 11.32371 | 90.24903 |
| BG32 | 13 | BG | BG32 | 0.125207 | 1.047998 | 1.706555 | 26.29345 | 4.064546 | 1.13243 | 1.041819 | 1.097865 | 0.676216 | 0.765822 | 1.039679 | 0.949419 | 1.377276 | 24.39196 | 17.06199 | 12.92678 | 34.41214 | 62.14138 | 10.86387 | 55.80594 | 122.7338 | 131.4203 | 11.06569 | 88.19262 |
| BG33 | 14 | BG | BG33 | 0.125297 | 1.048754 | 1.707785 | 26.31242 | 4.067477 | 1.133247 | 1.04257 | 1.098657 | 0.676704 | 0.766374 | 1.040429 | 0.950104 | 1.378269 | 24.40955 | 17.07429 | 12.93611 | 34.43695 | 62.18619 | 10.87171 | 55.84619 | 122.8223 | 131.515 | 11.07367 | 88.25622 |
| BG34 | 15 | BG | BG34 | 0.161565 | 1.35232 | 2.202112 | 33.92867 | 5.244827 | 1.461271 | 1.344347 | 1.416668 | 0.872579 | 0.988205 | 1.341586 | 1.225116 | 1.777216 | 31.47501 | 22.01652 | 16.68052 | 44.40489 | 80.18628 | 14.01857 | 72.01113 | 158.3738 | 169.5827 | 14.27899 | 113.8024 |
| BG41 | 16 | BG | BG41 | 0.257547 | 2.155701 | 3.510333 | 54.08488 | 8.360653 | 2.329376 | 2.142991 | 2.258277 | 1.390957 | 1.575273 | 2.13859 | 1.952927 | 2.833017 | 50.17355 | 35.09601 | 26.59002 | 70.78477 | 127.823 | 22.34667 | 114.7912 | 252.4598 | 270.3277 | 22.7618 | 181.4097 |
| BG42 | 17 | BG | BG42 | 0.202257 | 1.69292 | 2.756742 | 42.47404 | 6.565805 | 1.82931 | 1.682938 | 1.773475 | 1.092349 | 1.237097 | 1.679482 | 1.533677 | 2.224831 | 39.40239 | 27.56167 | 20.88173 | 55.58884 | 100.3822 | 17.54933 | 90.14806 | 198.2622 | 212.2943 | 17.87534 | 142.465 |
| CZ01 | 18 | CZ | CZ01 | 99.54403 | 3.532887 | 5.752937 | 30.4575 | 23.97517 | 6.679765 | 6.145282 | 6.47588 | 3.988735 | 4.517285 | 6.132663 | 5.600253 | 37.88616 | 11.79311 | 8.249192 | 6.24989 | 16.63771 | 30.04434 | 5.252505 | 26.98126 | 59.33977 | 63.53956 | 5.350079 | 42.6397 |
| CZ02 | 19 | CZ | CZ02 | 23.98668 | 0.851304 | 1.386259 | 7.339208 | 5.77719 | 1.609593 | 1.480801 | 1.560464 | 0.961148 | 1.08851 | 1.47776 | 1.349468 | 9.129259 | 2.841734 | 1.987771 | 1.506008 | 4.009114 | 7.239651 | 1.265673 | 6.501554 | 14.29884 | 15.31084 | 1.289185 | 10.2747 |
| CZ03 | 20 | CZ | CZ03 | 21.30929 | 0.756282 | 1.231525 | 6.520006 | 5.132341 | 1.42993 | 1.315514 | 1.386285 | 0.853864 | 0.967011 | 1.312813 | 1.19884 | 8.110252 | 2.52454 | 1.765896 | 1.337907 | 3.561617 | 6.431562 | 1.124398 | 5.775851 | 12.7028 | 13.60185 | 1.145286 | 9.127835 |
| CZ04 | 21 | CZ | CZ04 | 26.32082 | 0.934144 | 1.521156 | 8.053384 | 6.339367 | 1.766222 | 1.624897 | 1.712312 | 1.054677 | 1.194433 | 1.621561 | 1.480784 | 10.01762 | 3.118262 | 2.1812 | 1.652557 | 4.399239 | 7.944139 | 1.388835 | 7.134219 | 15.69025 | 16.80074 | 1.414635 | 11.27452 |
| CZ05 | 22 | CZ | CZ05 | 23.27271 | 0.825965 | 1.344997 | 7.120754 | 5.60523 | 1.561683 | 1.436725 | 1.514016 | 0.932539 | 1.05611 | 1.433774 | 1.309301 | 8.857523 | 2.757149 | 1.928604 | 1.461181 | 3.889781 | 7.02416 | 1.227999 | 6.308034 | 13.87323 | 14.85511 | 1.250812 | 9.968867 |
| CZ06 | 23 | CZ | CZ06 | 42.57739 | 1.511101 | 2.46067 | 13.02741 | 10.25476 | 2.857097 | 2.628486 | 2.76989 | 1.706078 | 1.932152 | 2.623088 | 2.395363 | 16.20483 | 5.044199 | 3.528378 | 2.673229 | 7.116349 | 12.85069 | 2.246623 | 11.54054 | 25.38105 | 27.1774 | 2.288358 | 18.23803 |
| CZ07 | 24 | CZ | CZ07 | 14.05974 | 0.49899 | 0.812553 | 4.30186 | 3.386287 | 0.943459 | 0.867968 | 0.914662 | 0.563374 | 0.638028 | 0.866186 | 0.790987 | 5.351094 | 1.665676 | 1.165127 | 0.882743 | 2.349933 | 4.243505 | 0.741871 | 3.810871 | 8.381231 | 8.974415 | 0.755652 | 6.022489 |

2

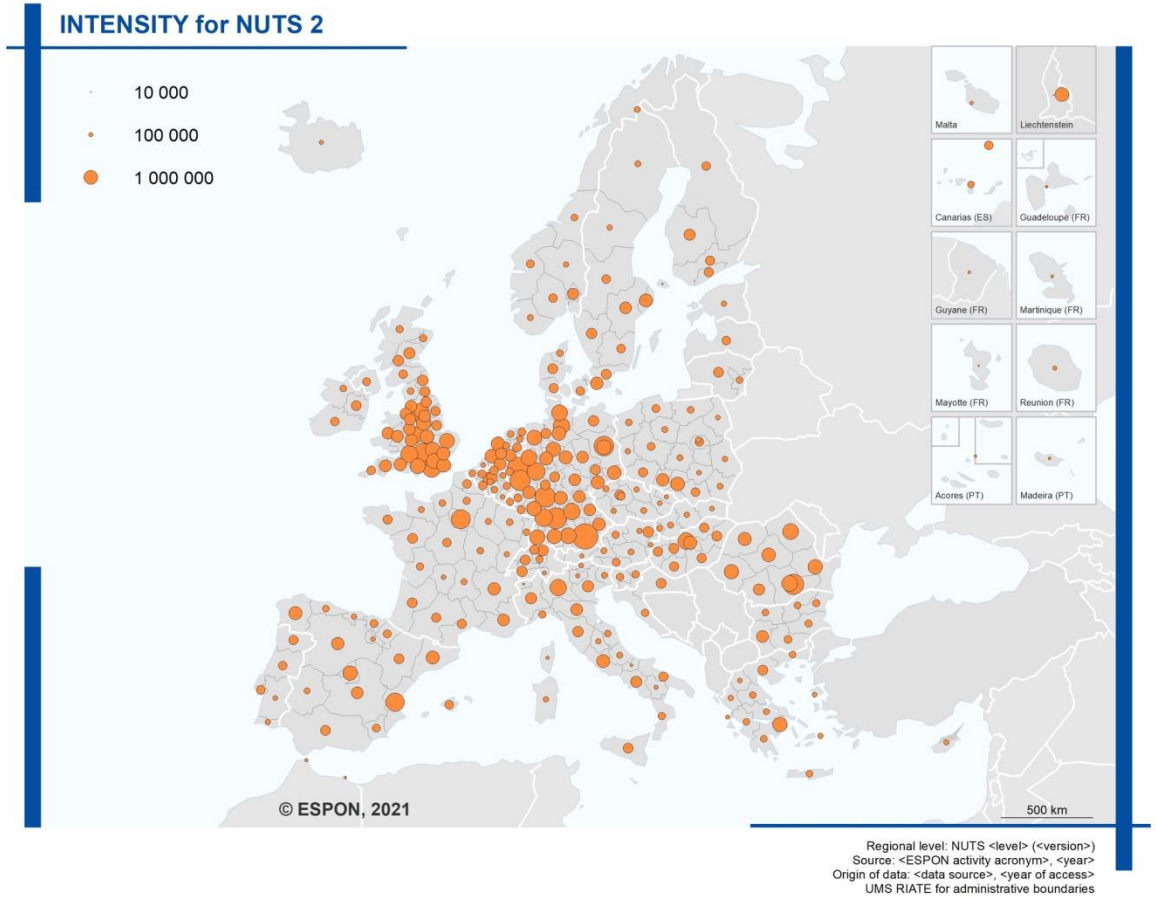
# Results

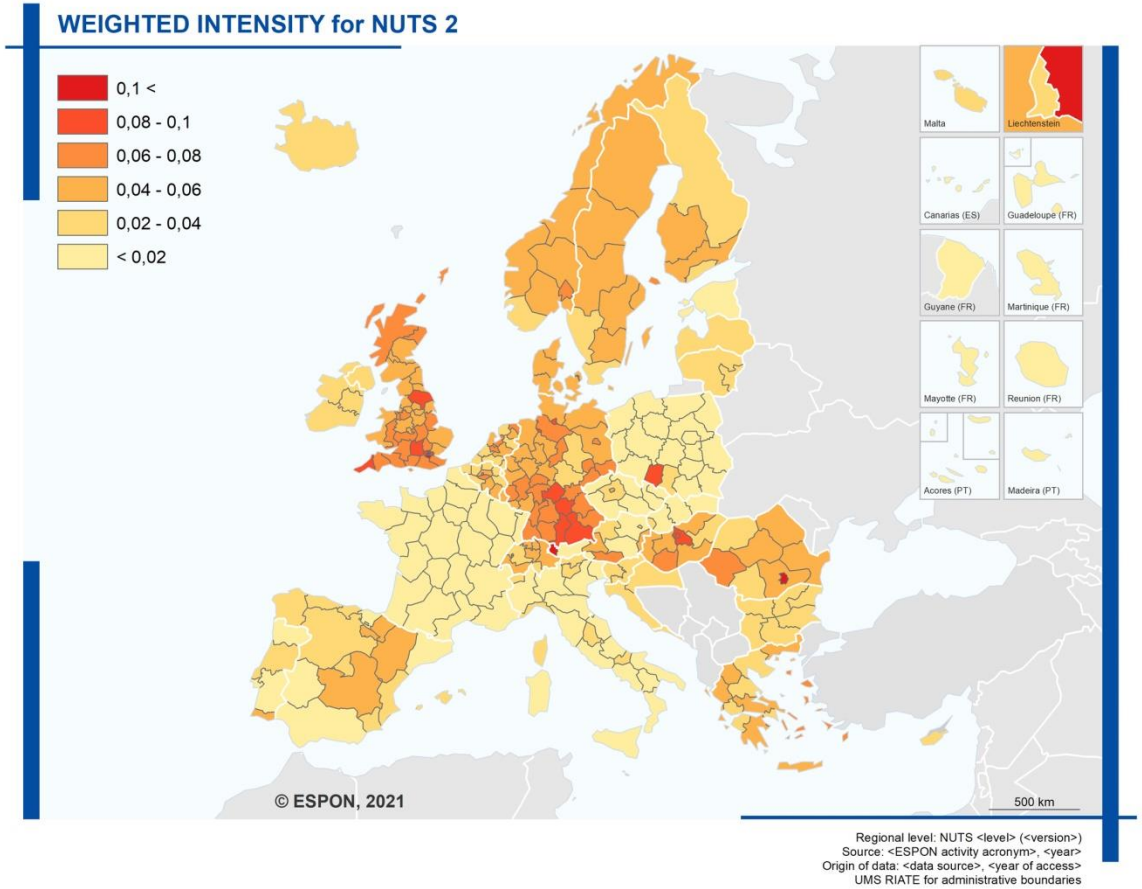
# Strongest relations



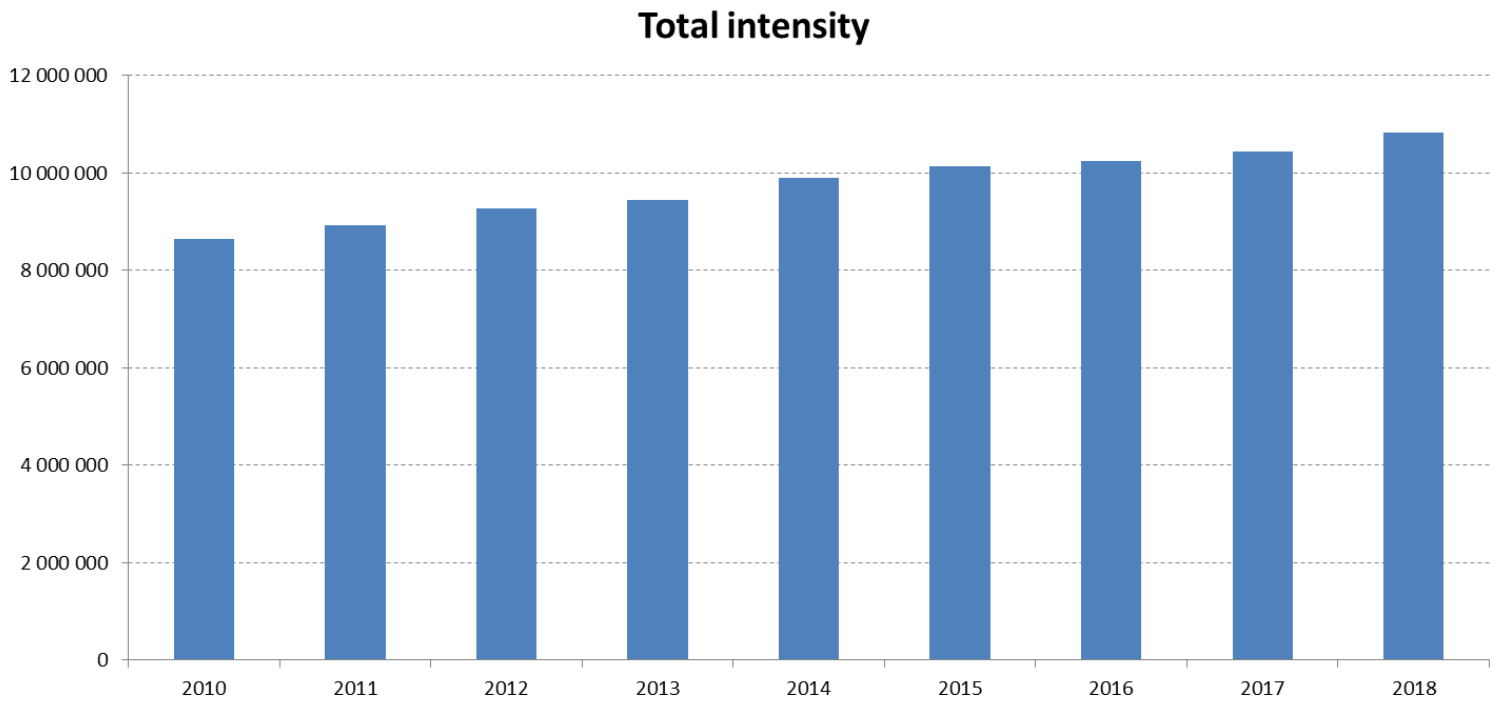



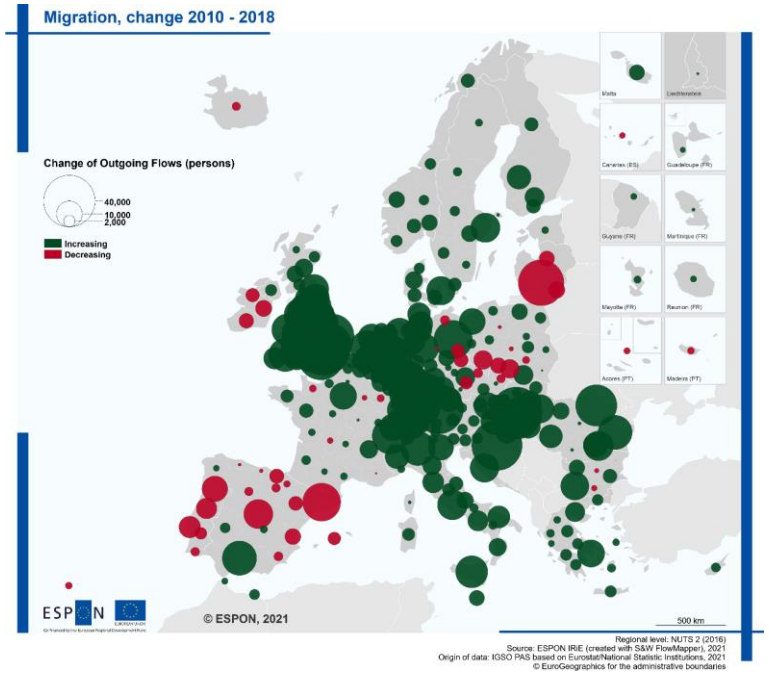
# Intensity

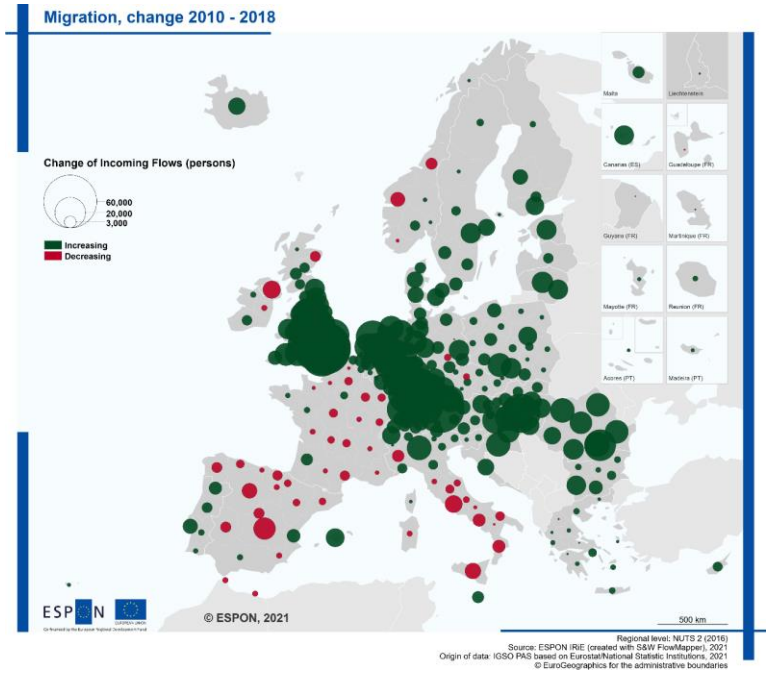

INTENSITY for NUTS 2
10 000
100 000
1 000 000
Malta
Liechtenstein
Canarias (ES)
Guadeloupe (FR)
Guyane (FR)
Martinique (FR)
Mayotte (FR)
Reunion (FR)
Acores (PT)
Madeira (PT)
© ESPON, 2021
500 km
Regional level: NUTS <level> (<version>)
Source: <ESPON activity acronym>, <year>
Origin of data: <data source>, <year of access>
UMS RIATE for administrative boundaries


WEIGHTED INTENSITY for NUTS 2
0,1 <
0,08 - 0,1
0,06 - 0,08
0,04 - 0,06
0,02 - 0,04
< 0,02
Malta
Liechtenstein
Canarias (ES)
Guadeloupe (FR)
Guyane (FR)
Martinique (FR)
Mayotte (FR)
Reunion (FR)
Acores (PT)
Madeira (PT)
© ESPON, 2021
500 km
Regional level: NUTS <level> (<version>)
Source: <ESPON activity acronym>, <year>
Origin of data: <data source>, <year of access>
UMS RIATE for administrative boundaries

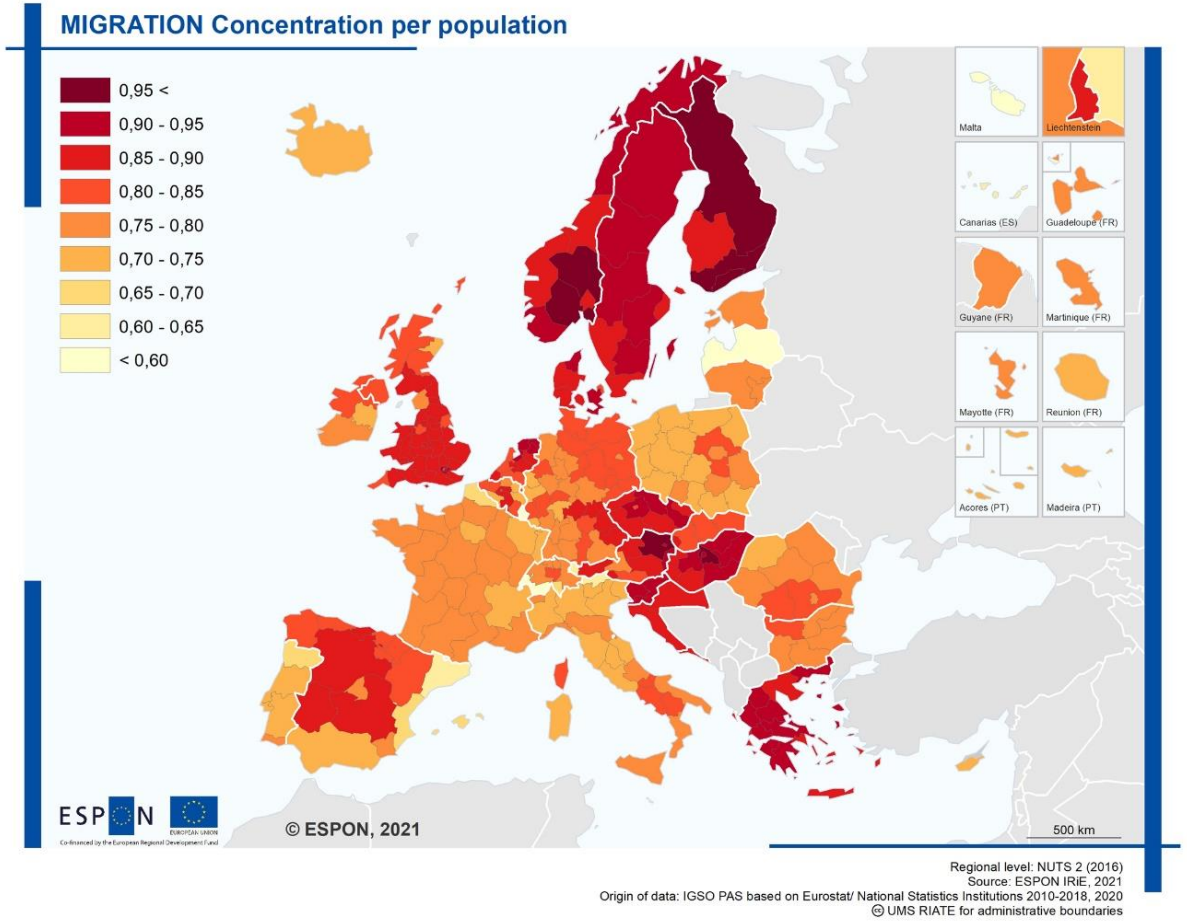
# 2010-2018 dynamics

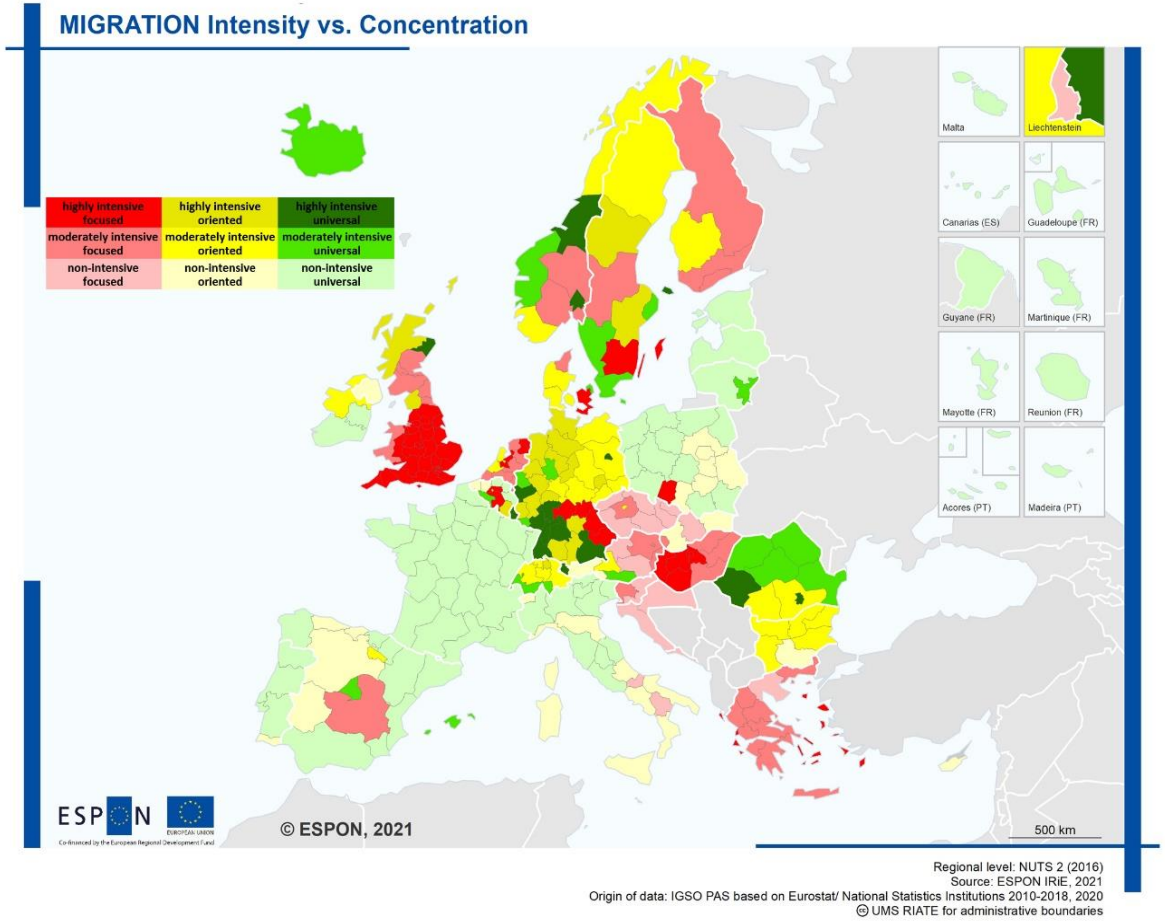


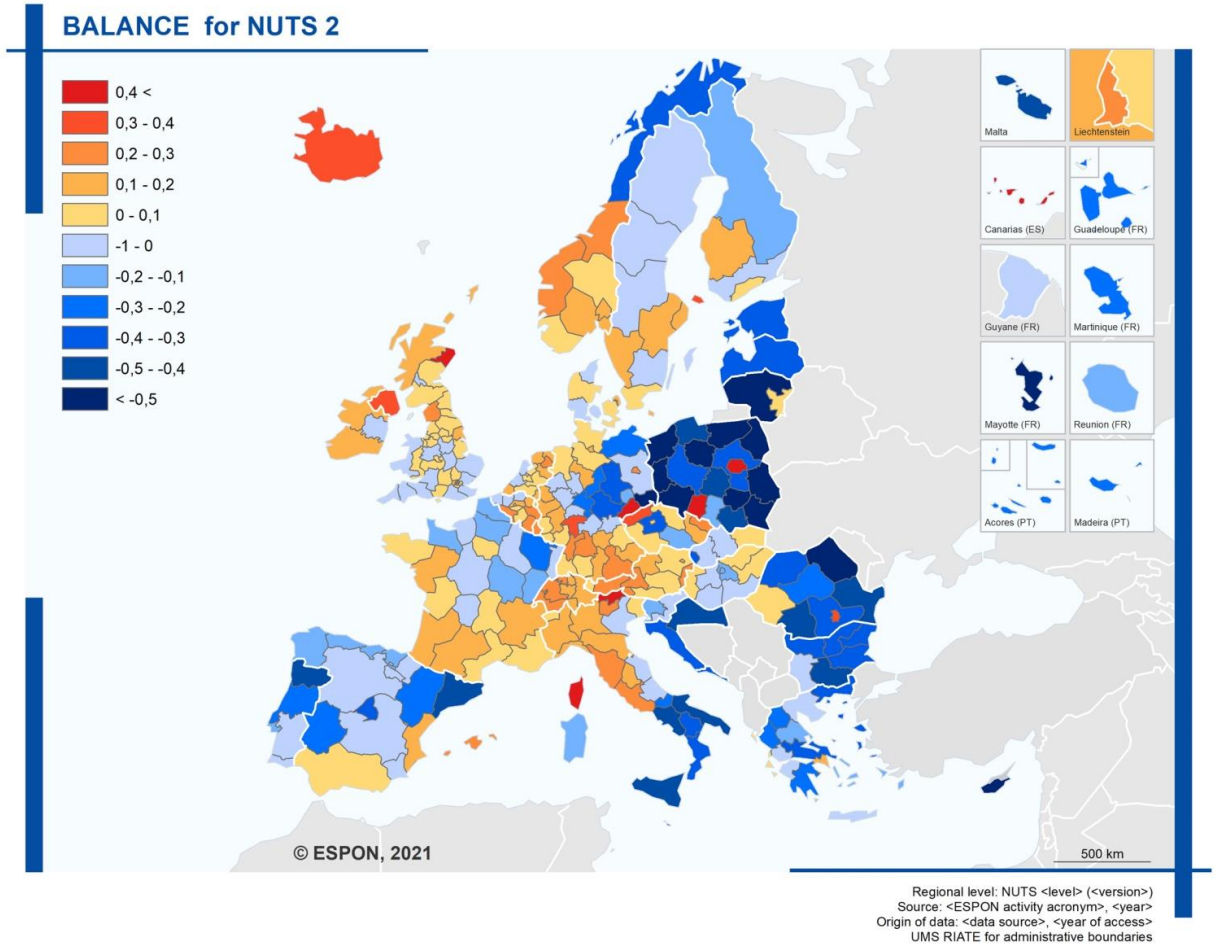



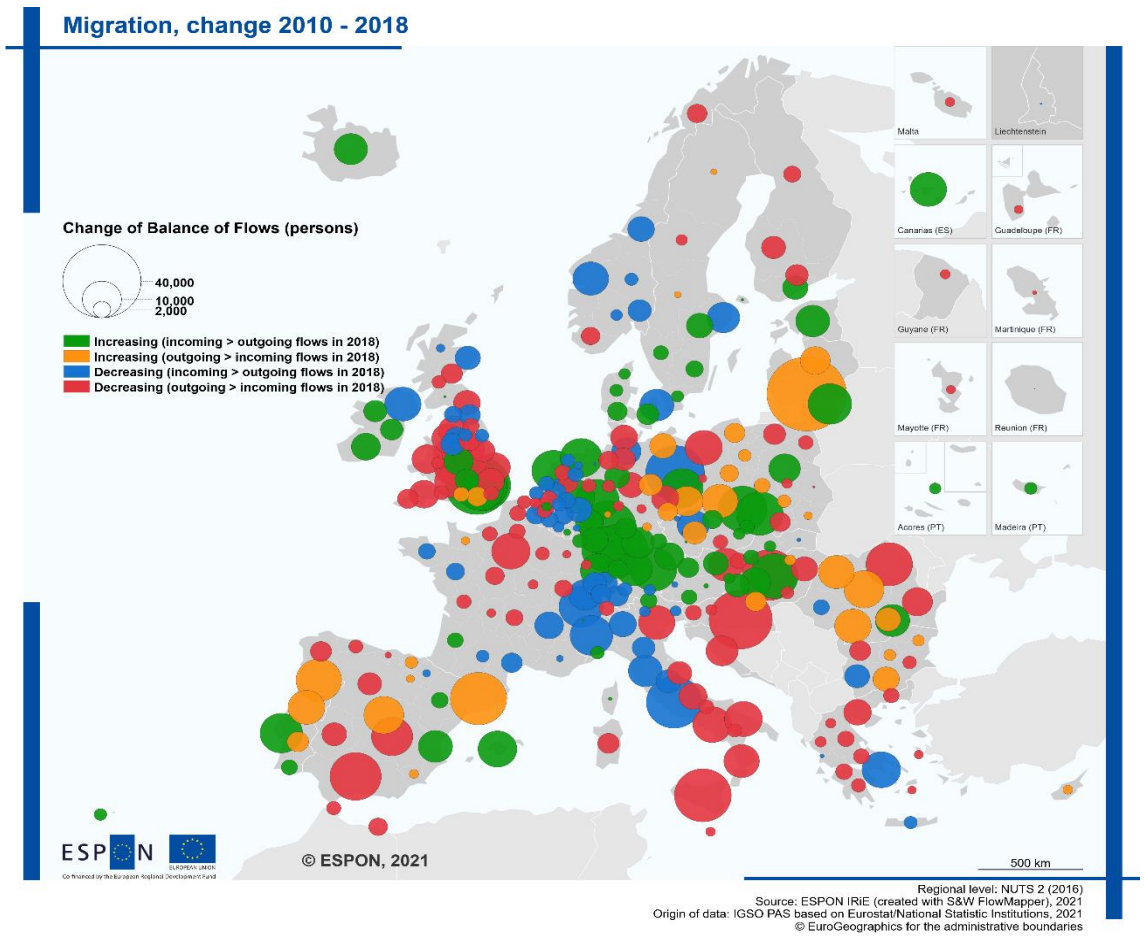
# Concentration



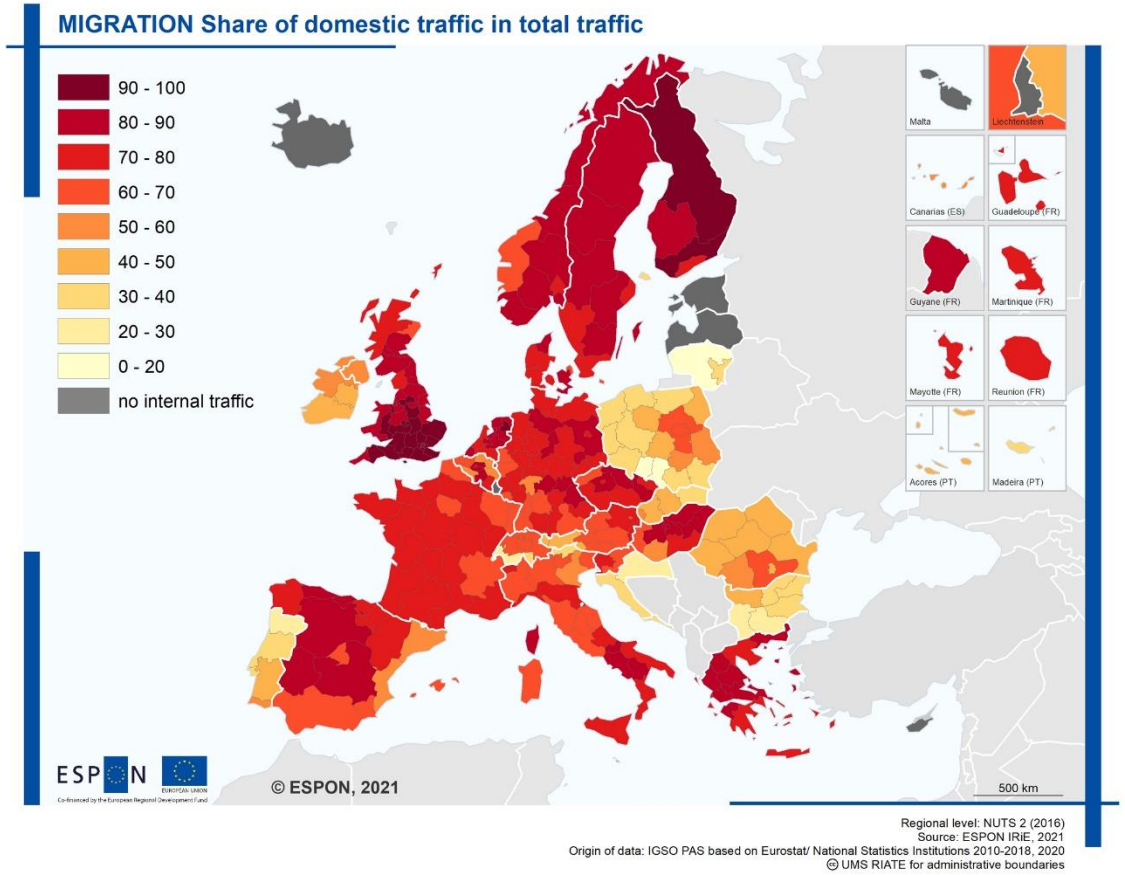



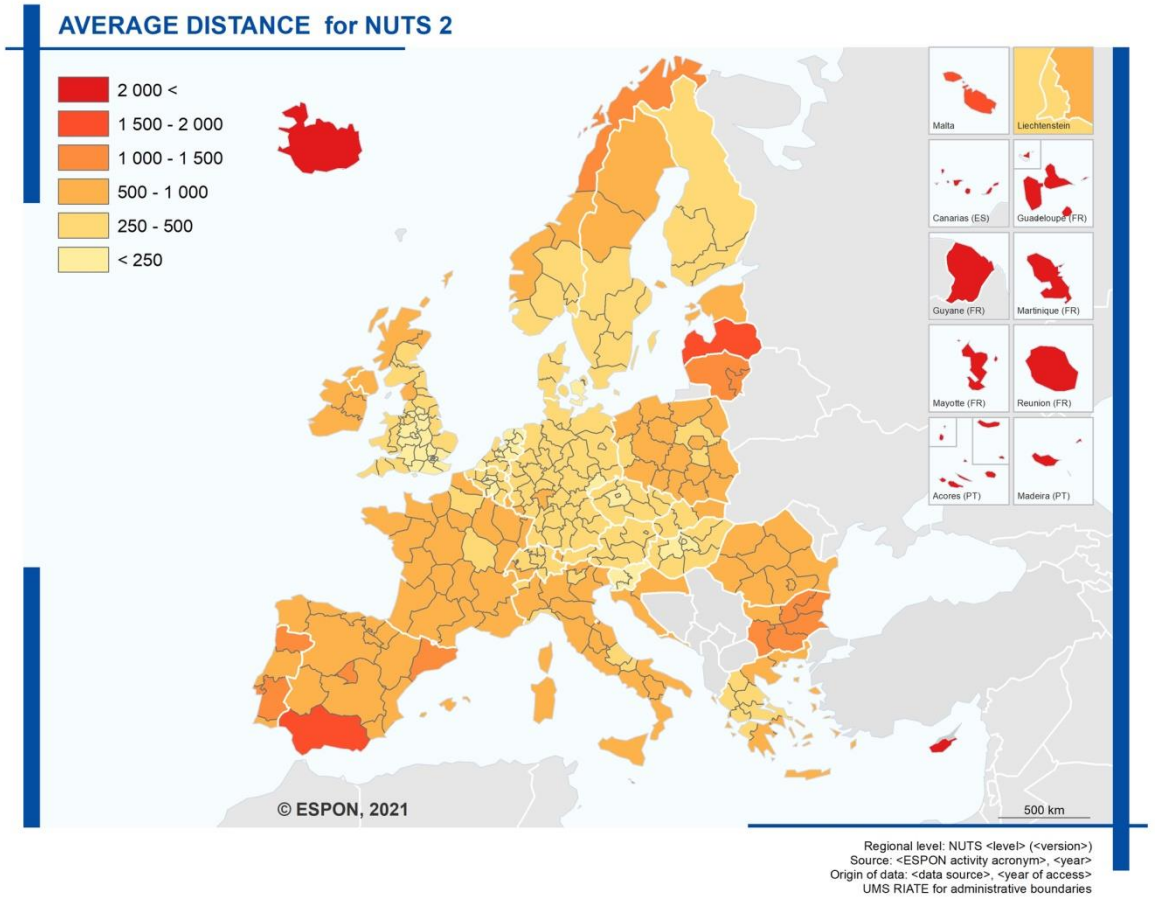
# Balance


BALANCE for NUTS 2
0,4 <
0,3 - 0,4
0,2 - 0,3
0,1 - 0,2
0 - 0,1
-1 - 0
-0,2 - -0,1
-0,3 - -0,2
-0,4 - -0,3
-0,5 - -0,4
< -0,5
Malta
Liechtenstein
Canarias (ES)
Guadeloupe (FR)
Guyane (FR)
Martinique (FR)
Mayotte (FR)
Reunion (FR)
Acores (PT)
Madeira (PT)
© ESPON, 2021
500 km
Regional level: NUTS <level> (<version>)
Source: <ESPON activity acronym>, <year>
Origin of data: <data source>, <year of access>
UMS RIATE for administrative boundaries


Migration, change 2010 - 2018
Change of Balance of Flows (persons)
40,000
10,000
2,000
Increasing (incoming > outgoing flows in 2018)
Increasing (outgoing > incoming flows in 2018)
Decreasing (incoming > outgoing flows in 2018)
Decreasing (outgoing > incoming flows in 2018)
Malta
Liechtenstein
Canarias (ES)
Guadeloupe (FR)
Guyane (FR)
Martinique (FR)
Mayotte (FR)
Reunion (FR)
Acores (PT)
Madeira (PT)
ESPON
© ESPON, 2021
500 km
Regional level: NUTS 2 (2016)
Source: ESPON IRiE (created with S&W FlowMapper), 2021
Origin of data: IGSO PAS based on Eurostat/National Statistic Institutions, 2021
© EuroGeographics for the administrative boundaries

# Share of internal migration, distance



3

# Explanatory factors: drivers and barriers

# Explanatory factors: drivers and barriers

## Drivers:

- income levels as well as the wealth of the receiving regions (with the positive sign) and of the source regions (with the negative sign – gravity model);
- the affinity of languages (the very same language or the same group of languages);
- a high percentage of highly educated population in regions of origin;
- membership in the Schengen zone;
- opening of the labour markets of particular regions - the more recently a labour market had opened up, the greater its influence on migrations (novelty effect);
- for internal migration within new (since 2004) member countries of the EU an important spur to the flow of migrants was internal movements, frequently undertaken for non-economic reasons;
- GDP was important for international movement, not important for internal migration.

## Major barriers:

- bad labour market in the region of (potential) destination;
- lack of metropolies in the region – in the regions of both origin and destination, the inter-metropolitan migrations of the staff, students, etc. are important.

| | dependent variable: Migration flow... | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| VARIABLES | (1) | (3) | (4) | (5) | (6) | (7) | (8) | (9) | (10) | (11) |
| popul_o | 0.816*** | 0.829*** | 0.731*** | 0.851*** | 0.824*** | 0.993*** | 0.687*** | 0.974*** | 0.850*** | 0.075 |
| popul_d | 0.787*** | 0.779*** | 0.667*** | 0.725*** | 0.652*** | 0.677*** | 0.631*** | 0.828*** | 0.728*** | 0.693*** |
| dist | -1.511*** | -1.605*** | -1.034*** | -0.959*** | -0.932*** | -0.954*** | -0.960*** | -0.996*** | -0.943*** | -0.989*** |
| lag_gdp_pc_o | -0.313*** | | -0.298*** | -0.433*** | | -0.301*** | -0.434*** | -0.566*** | -0.272*** | -0.345*** |
| lag_gdp_pc_d | 0.164*** | | 0.276*** | 0.382*** | | 0.530*** | 0.358*** | 0.233*** | 0.410*** | 0.361*** |
| pop_den_rel | | | 0.019 | 0.037** | 0.127*** | 0.055** | 0.042*** | 0.013 | 0.041** | 0.052*** |
| domestic | | | 2.593*** | 2.456*** | 2.138*** | 2.346*** | 2.497*** | 2.417*** | 2.314*** | 2.466*** |
| language | | | -0.195*** | -0.118*** | -0.027 | 0.060* | -0.114*** | -0.191*** | 0.111*** | -0.118*** |
| outer_o | | | 0.724*** | 0.754*** | 0.723*** | 0.649*** | 0.775*** | 1.031*** | 0.819*** | 0.537*** |
| outer_d | | | 1.516*** | 1.507*** | 1.190*** | 1.373*** | 1.599*** | 1.588*** | 1.511*** | 1.426*** |
| island_o | | | 0.278*** | 0.244*** | 0.177* | 0.172* | 0.307*** | 0.288*** | 0.255*** | 0.376*** |
| island_d | | | 0.318*** | 0.146* | 0.319*** | 0.148* | 0.149** | 0.168* | 0.177** | 0.198*** |
| euro_rel | | | 0.273*** | 0.071* | | 0.138*** | 0.029 | 0.128*** | -0.526*** | 0.108*** |
| precip_rel | | | 0.131*** | 0.047 | 0.061* | 0.046 | 0.069** | -0.067* | 0.043 | 0.042 |
| temp_rel | | | 0.007 | -0.000 | -0.042*** | -0.000 | 0.001 | -0.021*** | -0.005 | 0.005 |
| unempl_o | | | 0.045 | 0.066* | | 0.018 | 0.047 | 0.074** | 0.083** | 0.218*** |
| unempl_d | | | -0.140*** | -0.209*** | | -0.176*** | -0.237*** | -0.237*** | -0.218*** | -0.235*** |
| schen_rel | | | 0.421*** | 0.477*** | | 0.699*** | 0.561*** | 0.264*** | 0.595*** | 0.403*** |
| lag_disp_inc_o | | -0.734*** | | | | | | | | |
| lag_disp_inc_d | | 0.487*** | | | | | | | | |
| h_edu_o | | | | 0.381*** | 0.396*** | 0.675*** | 0.281*** | 0.780*** | 0.441*** | 0.356*** |
| rd_exp_o | | | | -0.049* | -0.036* | -0.207*** | -0.041 | -0.048 | -0.058* | -0.078*** |
| new_eu_o | | | | | 0.454*** | | | | | |
| agr_sh_o | | | | | | -0.102*** | | | | |
| metro_o | | | | | | | 0.383*** | | | |
| metro_d | | | | | | | 0.232*** | | | |
| urban_o | | | | | | | | -0.276*** | | |
| urban_d | | | | | | | | -0.033 | | |
| lab_mar_long | | | | | | | | | -0.192*** | |
| lab_mark_med | | | | | | | | | 0.880*** | |
| lab_mark_short | | | | | | | | | 1.305*** | |
| emp_y_o | | | | | | | | | | -0.323*** |
| emp_sen_o | | | | | | | | | | 0.109** |
| emp_w_o | | | | | | | | | | 1.061*** |
| emp_mobil_o | | | | | | | | | | 0.805*** |
| Constant | -9.18*** | -5.78*** | -9.75*** | -13.62*** | -12.51*** | -13.96*** | -9.88*** | -18.67*** | -13.32*** | -10.37*** |
| Observations | 665,428 | 535,178 | 598,870 | 440,163 | 509,320 | 361,116 | 440,163 | 283,290 | 440,163 | 414,496 |
| pseudo R- | 0.387 | 0.402 | 0.518 | 0.492 | 0.480 | 0.471 | 0.483 | 0.592 | 0.487 | 0.499 |

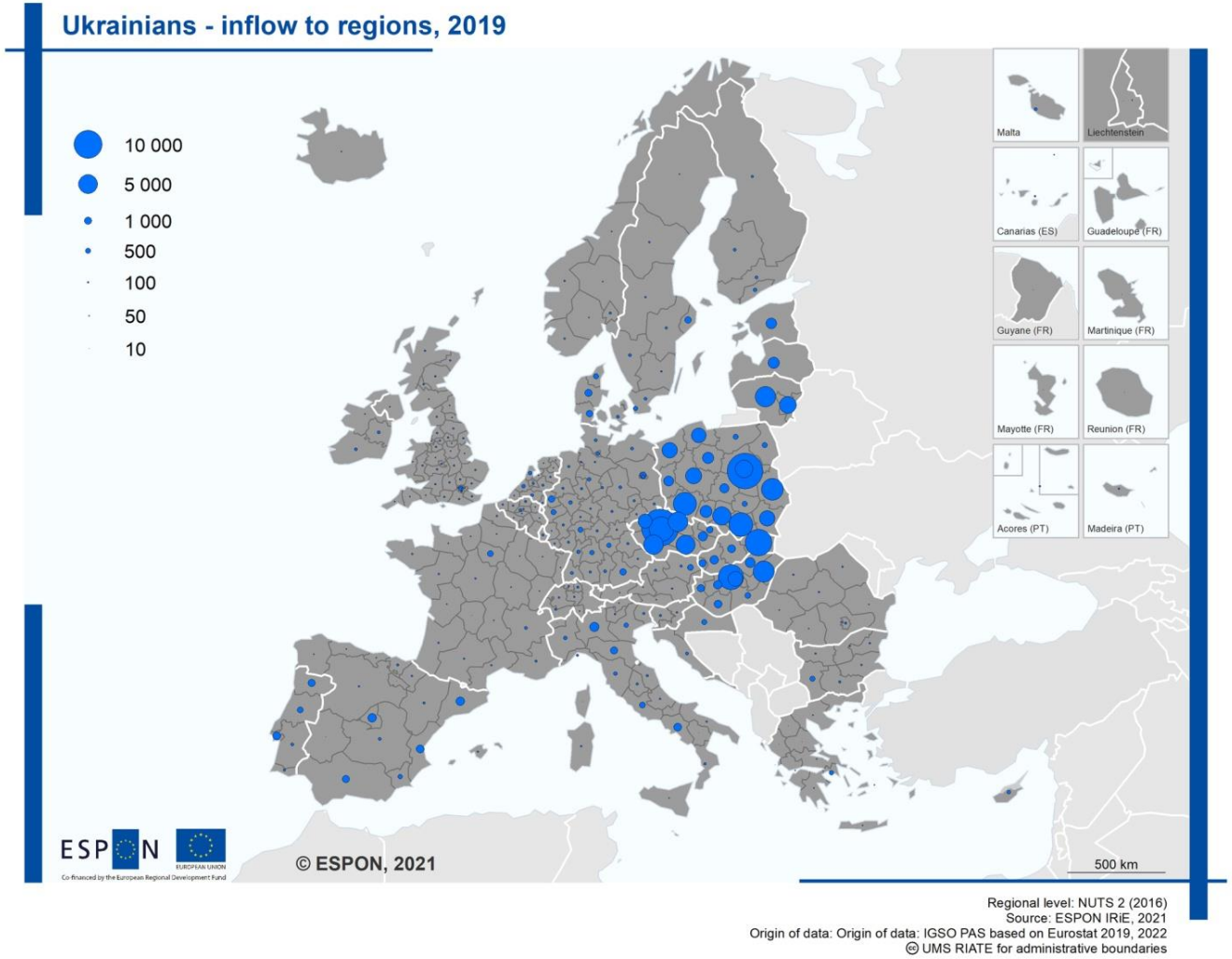
Robust standard errors for significance tests; *** p<0.01, ** p<0.05, * p<0.1; the PPML estimation results.

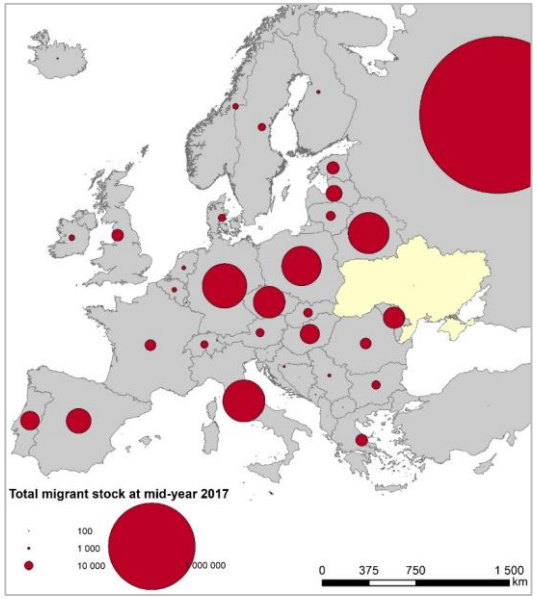
Source: Own elaboration.

4

# Ukrainian Case

# Pre-war situation

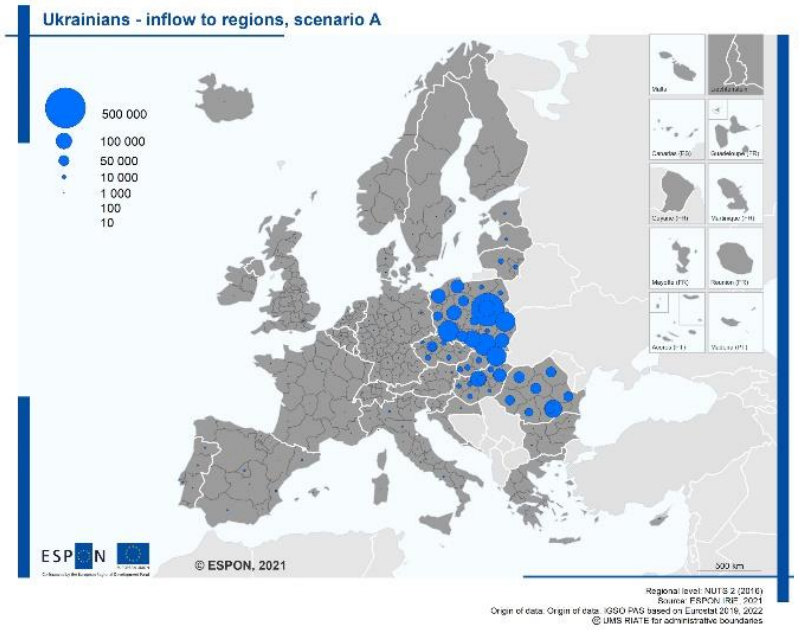


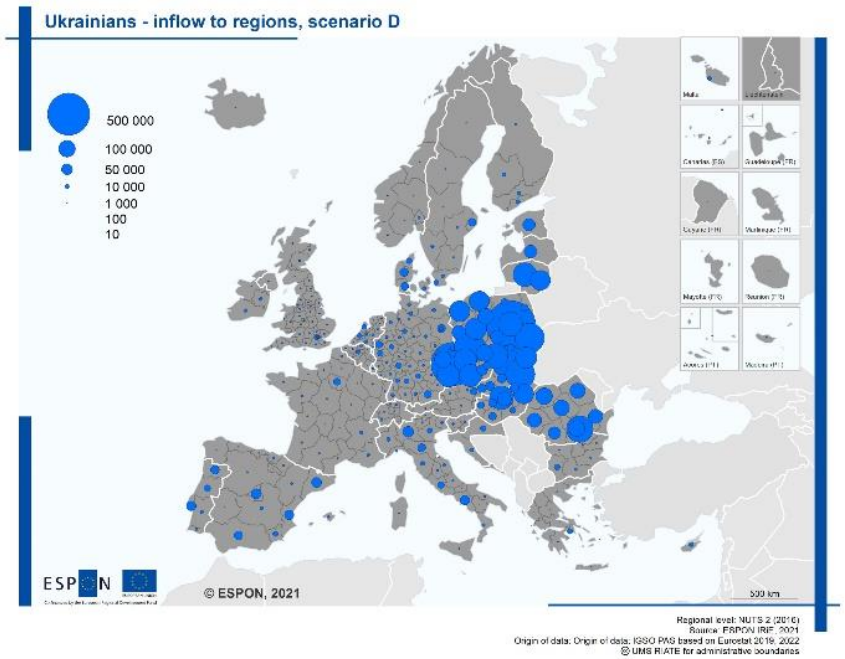



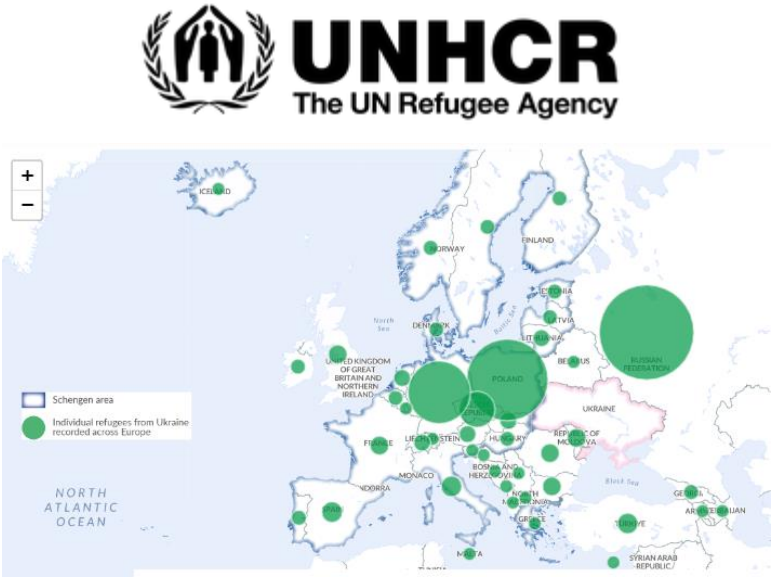

# Cases

| Ukrainians | War damage | Length of war | Number of refugees | % in First-Contact country | % migrating outside ESPON Space | Number for regional estimations in ESPON Space minus PL, HU, SK, RO | Comments |
|---|---|---|---|---|---|---|---|
| **Case A** | limited | short | 3 500 000 | 88 | 10 | 378 000 | Total number similar to present outmigration, taking into account returns to Ukraine (27%-30%) |
| **Case B** | limited | long | 4 500 000 | 70 | 20 | 900 000 | Case A + 1 000 000 newcomers (internally displaced who now decide to move abroad or escape from occupied territories) |
| **Case C** | severe | short | 7 000 000 | 75 | 10 | 1 260 000 | A second wave, first of all from new source regions |
| **Case D** | severe | long | 10 500 000 | 55 | 20 | 3 360 000 | Two assumptions. Syrian scenario (30% of population became refugees) and extrapolation from the highly affected Ukrainian regions (now the number of refugees is about 20-30% of the population in those regions). |

# Inflow of refugees from Ukraine by region, scenarios A&D (absolute)



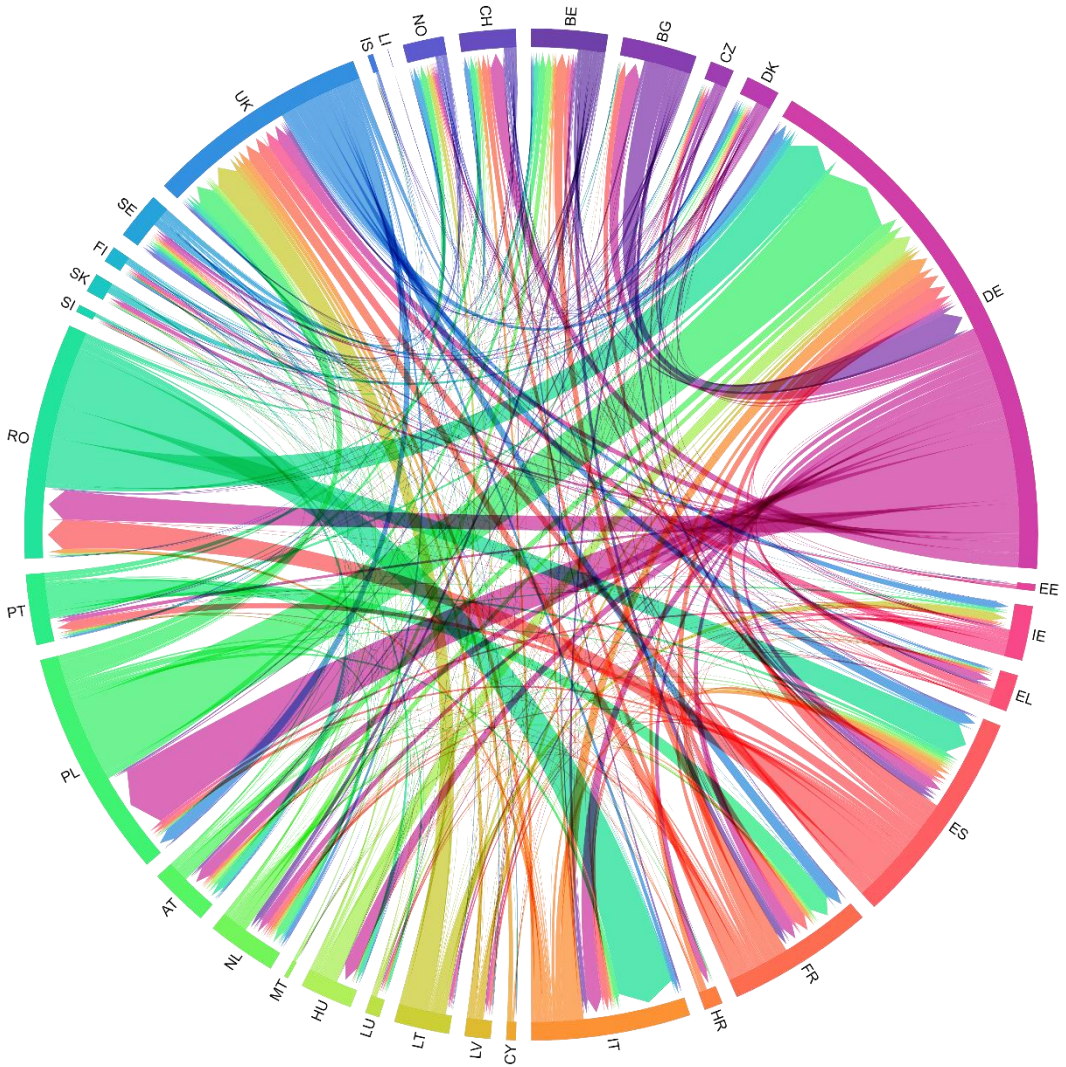



5

# Conclusions

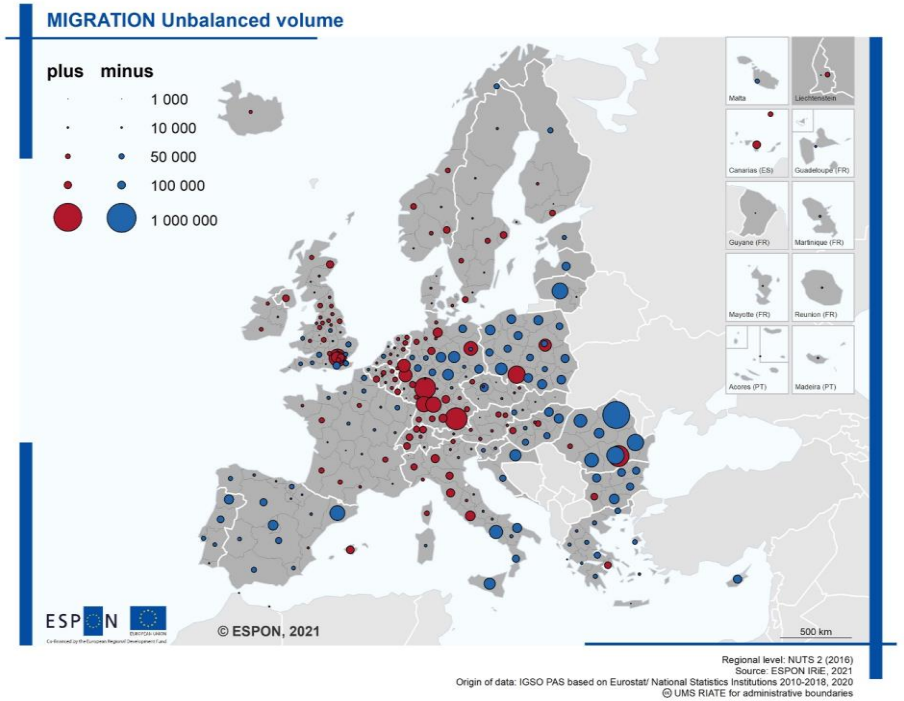
# Conclusions (1)

- Europe is dominated by internal migration, usually focused on the largest metropolitan areas.
- International migration is still dominated by the east-west flows.
- The intensity of migration in Europe is increasing linearly.
- International migration is dominated by Germany and the UK as receiving countries and by Poland and Romania as sending countries.
- The importance of the UK in migration was already declining before Brexit (with the exception of London).
- Poland's share of migration outflows decreases, while Romania's share increases (2010-2018).



# Conclusions (2)

- MEGAs have the highest positive net migration balance, even in the countries with a negative total balance: e.g., Warsaw,  Berlin, Budapest, Bucharest, Sofia and Athens.
- In the years 2010-2018 the migration balance became clearly higher in only a few of European MEGAs, namely Munich, Frankfurt, London, Berlin, and Warsaw.
- There is competition for migrants from peripheral regions between Western Europe and some metropolitan areas in Central and Eastern Europe.
- In many regions of CEEC, the migration balance is negative but improving. At the same time in a number of western regions the situation is deteriorating (Italy, France). In others (England, Spain) the balance is already negative.
- Lower values of the concentration indicator were observed in bigger countries, in both Western and Central-Eastern Europe. The reasons may be polycentric settlement systems.
- In peripheral countries the higher values of this indicator appeared usually around capital units and other metropolises (draining migrants from the direct hinterland).



# Conclusions (3)

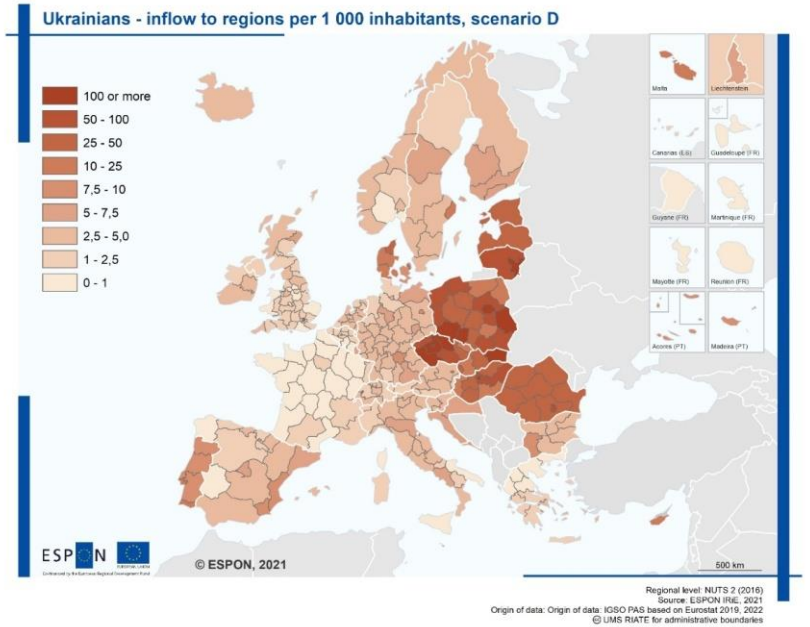
- Eastern part of the ESPON space was dominated by relative significance of distance in inflow as compared to outflow.
- Most of the countries of Western Europe presented the inverse situation. Distance affects mainly migration outflow.
- Model confirmed the significance of the associations between migration flows and income levels and the wealth of the receiving and origin regions. The distance, affinity of languages and the opening up of labour markets are the other important factors.

***

- Further development of the war in Ukraine will affect the scale of territorial differences.
- Reality has already verified some models negatively.

***

- Europe has no comparable migration statistics. Member States lack basic data, not only on region-to-region, but sometimes even on country-to-country level.



ESPON

Co-funded by the European Union
Interreg

Instytut Geografii i Przestrzennego Zagospodarowania
Polska Akademia Nauk

espon.eu

# Thank you!
# ¡Muchas gracias por su atención!

https://irie.espon.eu