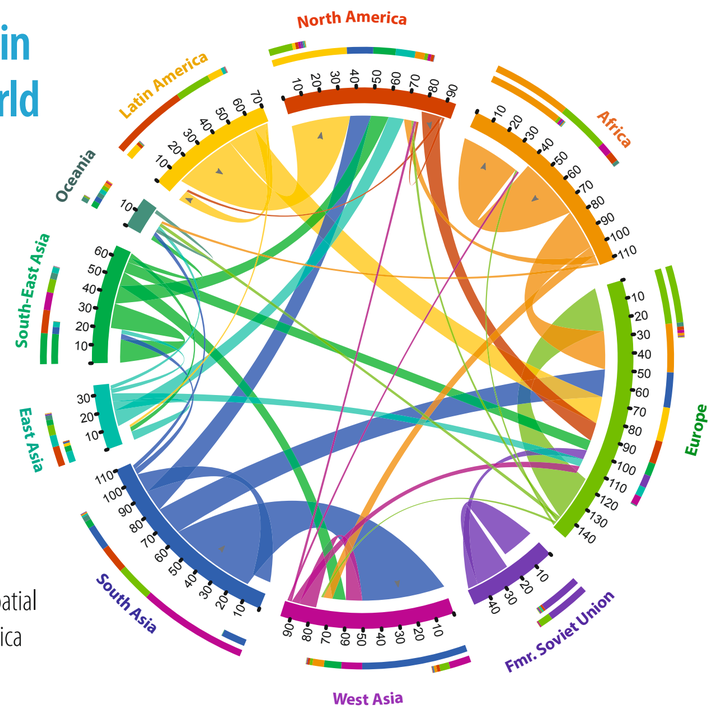
Wittgenstein Centre
FOR DEMOGRAPHY AND GLOBAL HUMAN CAPITAL
A COLLABORATION OF IIASA, VID/ÖAW, WU

Vienna Institute of Demography
ÖAW Austrian Academy of Sciences

Global Migration **Data Sheet** 2005–10

Migration flows within and between ten world regions, in 100,000's



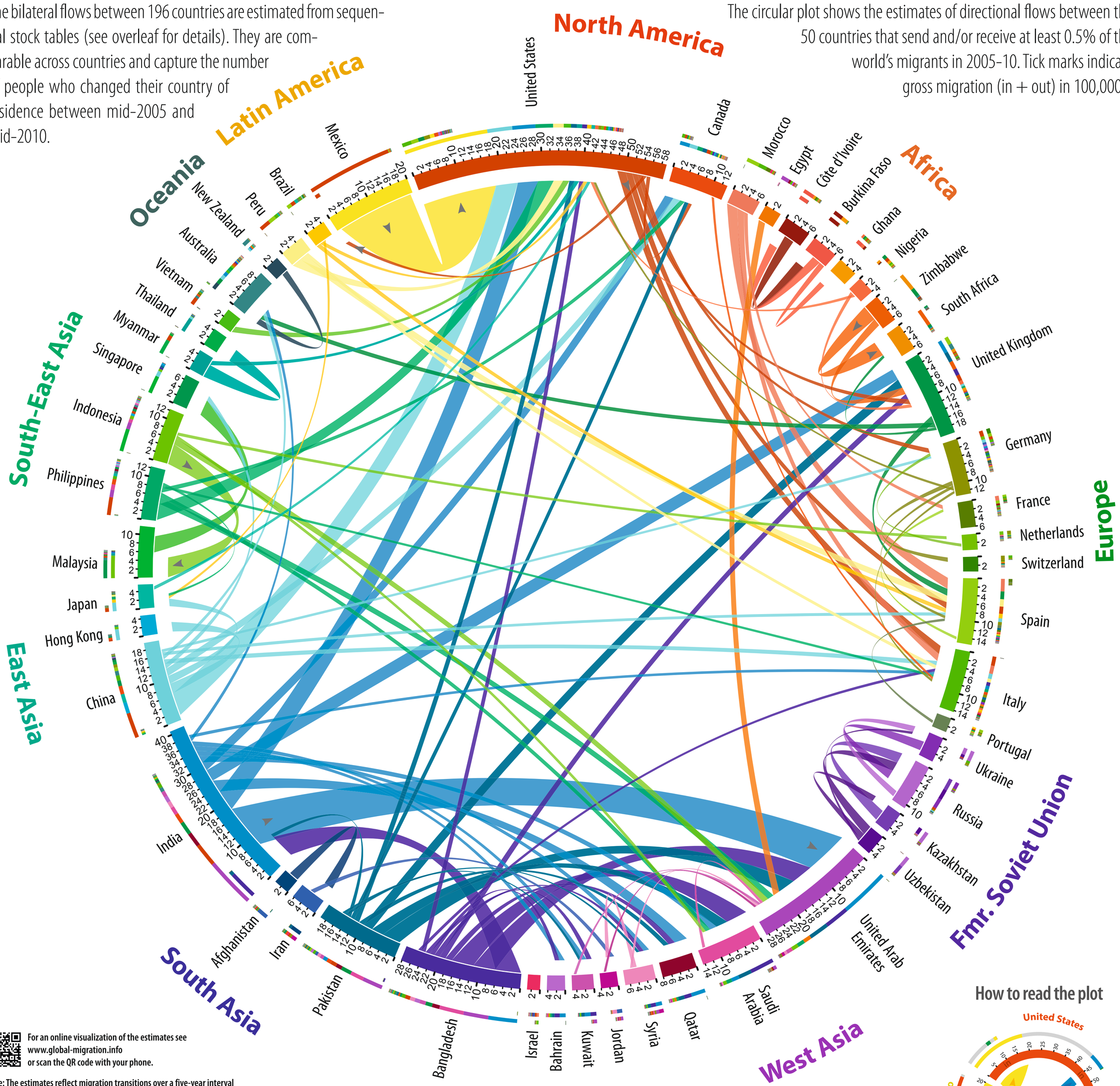
This circular plot shows all global bilateral migration flows for the five-year period mid-2005 to mid-2010, classified into a manageable set of ten world regions.

Key features of the global migration system include the high concentration of African migration within the continent (with the exception of Northern Africa), the 'closed' migration system of the former Soviet Union, and the high spatial focus of Asian emigration to North America and the Gulf states.

Unique estimates of migration flows between the top 50 sending and receiving countries

The bilateral flows between 196 countries are estimated from sequential stock tables (see overleaf for details). They are comparable across countries and capture the number of people who changed their country of residence between mid-2005 and mid-2010.

The circular plot shows the estimates of directional flows between the 50 countries that send and/or receive at least 0.5% of the world's migrants in 2005–10. Tick marks indicate gross migration (in + out) in 100,000's.



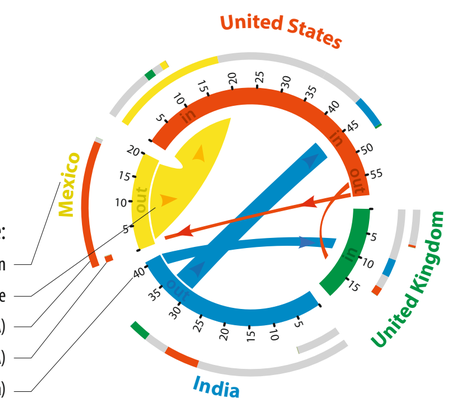
For an online visualization of the estimates see
www.global-migration.info
or scan the QR code with your phone.

Note: The estimates reflect migration transitions over a five-year interval and thus cannot be compared to annual movements flow data published by United Nations and Eurostat.

The large circular plot only shows the top 75% of all flows.

Credits: circular plots created with Circos (Krzywinski, M. et al. Circos: an Information Aesthetic for Comparative Genomics. Genome Res, 2009, 19:1639–1645)

How to read the plot



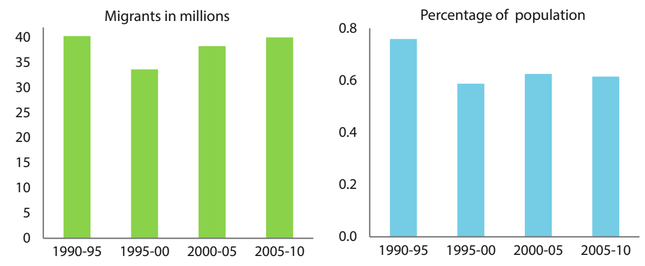
Origin and destination countries are represented by segments around the circle:

- Each country is assigned a colour (Mexico: yellow); flows have the same colour as the origin
- Flow from Mexico to USA: no gap at origin, large gap at destination; the width indicates its size
- Total emigration from Mexico, coloured by destination country (here USA)
- Total immigration to Mexico, coloured by origin country (here small [return] flow from USA)
- Tick marks indicate a country's gross migration in 100,000's (here 4.1 mio in India)

Team at the Wittgenstein Centre for Demography and Global Human Capital (IIASA,VID/ÖAW,WU): Nikola Sander, Guy J. Abel and Ramon Bauer. Contact: Nikola Sander, Vienna Institute of Demography (VID/ÖAW), nikola.sander@oeaw.ac.at

The global intensity of migration

Our flow estimates suggest a stable intensity of global migration, with just over 0.6 per cent of the world population moving over five year periods, 1990-95 to 2005-10.



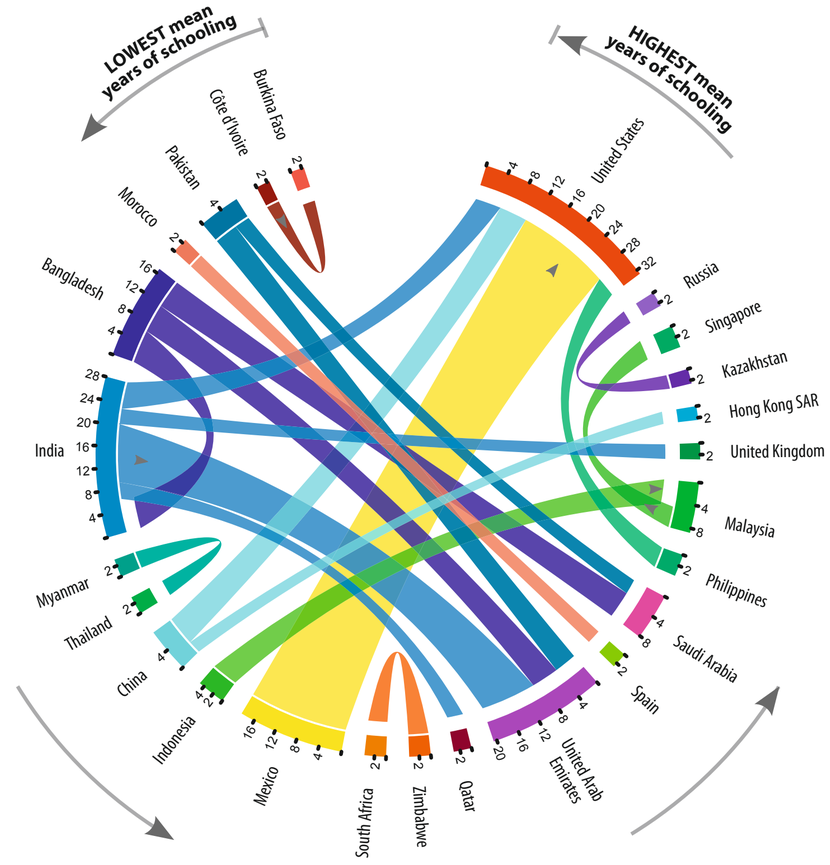
Migration to, from and within ten world regions in 2005–10

The table shows the intensities of migration to, from and within ten major world regions in millions. In absolute terms, Europe was the biggest receiver of migrants (8.9 million over five years), while South Asia was the biggest sender, with 8.7 million emigrants. In Africa and the former Soviet Union, emigration intensities were lower than within-region flows.

Region	Moving into the region	Moving out of the region	Net migration by region	Moving within the region
North America	7.64	1.58	6.06	0.14
Africa	0.41	3.49	-3.09	3.63
Europe	8.92	0.70	8.21	2.64
Frm. Soviet Union	0.33	0.67	-0.34	1.98
West Asia	6.73	0.83	5.90	0.99
South Asia	0.02	8.72	-8.70	1.15
East Asia	0.52	1.97	-1.45	0.53
South-East Asia	0.60	3.11	-2.51	1.42
Oceania	1.22	0.09	1.13	0.21
Latin America	0.23	5.46	-5.23	0.64

The 20 largest country-to-country flows in 2005–10

Visualizing the 20 largest flows in the world in a circular layout and arranging origins and destinations by each country's mean years of schooling* reveals a remarkably consistent pattern of migration to countries with higher education levels. The size of the flow is not proportional to the difference in education level.



The circular plot depicts the 20 largest country-to-country flows (in absolute terms) in 2005-10. The origins and destinations of these flows are arranged by level of education, with Burkina Faso having the lowest mean years of schooling and the United States the highest. Tick marks indicate the size of the migration flow in 100,000 increments. Flows have the same colour as the origin country.

It appears that most of the largest flows originated in Asia and went to the oil-rich Gulf countries and the United States. Exceptions to this trend are the flow from Mexico to the United States and flows within Africa (Côte d'Ivoire to Burkina Faso and Zimbabwe to South Africa). Malaysia and India were the only countries to be both receivers and senders of very large flows, highlighting the strong effect that migration and differentials in education levels have on the redistribution of population.

* Estimates of adult mean years of schooling provided by Wittgenstein Centre Data Lab.

Rank	Origin → Destination	Flow, in 1000
1	Mexico → United States	1845
2	India → United Arab Emirates	1083
3	Bangladesh → India	618
4	China → United States	546
5	Bangladesh → United Arab Emir.	536
6	Bangladesh → Saudi Arabia	527
7	India → United States	502
8	Indonesia → Malaysia	489
9	Pakistan → United Arab Emirates	437
10	Malaysia → Singapore	389

Rank	Origin → Destination	Flow, in 1000
11	Philippines → United States	384
12	Zimbabwe → South Africa	373
13	Myanmar → Thailand	314
14	India → Qatar	311
15	Pakistan → Saudi Arabia	289
16	India → United Kingdom	283
17	Morocco → Spain	273
18	Kazakhstan → Russia	258
19	Côte d'Ivoire → Burkina Faso	241
20	China → Hong Kong SAR	238

Estimating a unique set of global bilateral migration flows

International moves are typically enumerated using either a measurement of migrant stocks or migration flows. A migrant stock is defined as the total number of international migrants present in a given country at a particular point in time. A migration flow is defined as the number of people arriving or leaving a given country during a specific period of time. Flow measures reflect the dynamics of the migration process.

As migration flow data is often incomplete and not comparable across nations, we estimate the number of movements by linking changes in migrant stock data over time. Using statistical missing data methods, estimates of the five-year migrant flows that are required to meet differences in migrant stock totals are produced. For example, if the number of foreign-born in the United States increases between two time periods, the minimum migrant flows between the US and all other countries in the world that are required to meet this increase are estimated.

In the hypothetical example shown in Figure 1, the location of people born in Country A is given in 2005 and 2010. As we assume no births and deaths in this example, the stock of migrants across all (of the possible 3) locations in both years are equal (270 + 30 + 50 = 210 + 80 + 60 = 350).

The number of people born in Country A and living in Country A (blue field) decreases from 270 in 2005 to 210 in 2010. The number of people born in A and living in Country B (green field) increases from 30 to 80 and the number of people living in Country C (orange field) also increases from 50 to 60.

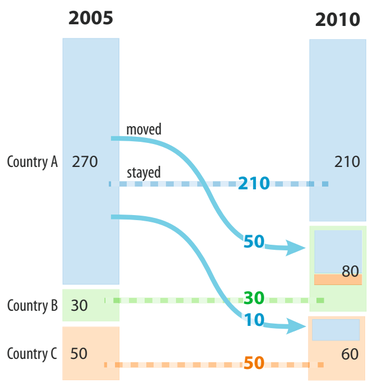


Fig. 1: Hypothetical location of people born in Country A

We estimate the minimum number of migrant flows required to match the differences in the stocks of people born in Country A. In doing so, we set the number of "stayers", those who remain in their country of residence between 2005 and 2010 as the maximum possible number. In this simplified example, 210 people born in A stay in A, 30 stay in B and 50 stay in C. This assumption generates 50 moves from Country A to Country B and 10 moves from Country A to Country C, whilst maintaining the observed stocks in 2005 and 2010. This estimation procedure is replicated simultaneously for all 196 countries to estimate birthplace-specific flow tables, resulting in a comparable set of global migration flow estimates.

Alterations are made to the original migrant stock counts to control for births and deaths during the period, using standard demographic procedures. These alterations allow our country-specific net migration flows to closely match the net migration flows published by the United Nations.

Further reading:
Abel, Guy J. 2013. Estimating global migration flow tables using place of birth data. Demographic Research 28 (18): 505-546.

Why estimates and UN flow data are incomparable

Official international migration data collected by national statistics institutes, and collated by Eurostat and the United Nations, are not directly comparable due to differences in definitions, measurements and data collection procedures. In contrast, our estimates of migration flows between two sequential migrant stock tables capture the number of people who permanently change their country of residence over five year periods.

It is tempting to evaluate our estimates against official data by dividing our five-year flows by a factor of five to derive an annual number similar to that of official data. However, this is not a suitable comparison as the two measures capture different types of moves.

Annual flow data sourced from administrative records or national surveys capture every move during the reference period, providing the duration of stay exceeds 12 months (the time criterion differs across countries). Our five-year flow estimates capture migrants who changed their country of residence between mid-2005 and mid-2010. Figure 2 depicts the types of movements between three hypothetical countries that can be distinguished for people born in Country A. First, initial moves (a) involve people moving out of their country of birth; second, return moves (b) toward their country of birth; and third, onward moves (c) to a third country.

Our estimates do not distinghish return moves (d) from those who stayed in Country C. They also cannot identify multiple moves (e) during the interval, where only one transition over the length of the period is captured. Since the ratio between one-year and five-year migration numbers differs across countries, depending on how much circular and return movement occurs, there is no simple algebraic solution to comparing annual register data and our five-year transitions flows

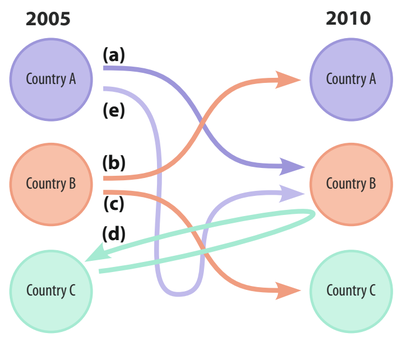


Fig. 2: Types of flows distinguished in our estimates using a hypothetical example for people born in Country A

Immigration (in), emigration (out) and net migration flows for 196 countries in 2005–10 (in 1,000s)

The estimates capture the number of people who permanently changed their country of residence over the five-year period 2005 to 2010 and thus reflect movements over a longer time period than currently published statistics.

Country	In	Out	Net
EUROPE			
Albania	31	79	-48
Austria	214	54	160
Belarus	60	110	-51
Belgium	215	15	200
Bosnia & Herzegovina	20	30	-10
Bulgaria	34	84	-50
Croatia	37	27	10
Cyprus	45	1	44
Czech Republic	241	0	240
Denmark	109	19	90
Estonia	4	4	0
Finland	73	0	72
France	752	251	500
Germany	1330	780	550
Greece	212	58	154
Hungary	84	9	75
Iceland	13	2	10
Ireland	167	67	100
Italy	2007	8	1999
Latvia	0	10	-10
Lithuania	0	36	-36
Luxembourg	43	0	42
Macedonia	18	16	2
Malta	5	0	5
Moldova	7	179	-172
Montenegro	18	20	-3
Netherlands	297	247	50
Norway	171	0	171
Poland	93	38	55
Portugal	316	166	150
Romania	42	142	-100
Russia	1409	273	1135
Serbia	175	175	0
Slovakia	37	0	36
Slovenia	24	2	22
Spain	2412	162	2250
Sweden	318	53	265
Switzerland	306	123	182
Turkey	112	161	-49
Ukraine	386	426	-41
United Kingdom	1722	700	1021
AMERICA			
Argentina	74	273	-200
Aruba	4	0	4
Bahamas	6	0	6
Barbados	2	2	-1
Belize	6	7	-1
Bolivia	28	193	-165
Brazil	5	506	-502
Canada	1392	293	1098
Chile	101	71	30
Colombia	20	139	-120
Costa Rica	119	43	75
Cuba	0	190	-191
Dominican Republic	65	205	-140
Ecuador	139	259	-120
El Salvador	3	295	-292
French Guiana	9	3	6
Grenada	0	5	-5
Guadeloupe	2	5	-4
Guatemala	5	205	-200
Guyana	3	43	-40
Haiti	1	241	-240
Honduras	1	101	-100
Jamaica	2	102	-100
Martinique	2	4	-2
Mexico	123	1926	-1803
Netherlands Antilles	11	3	8
Nicaragua	0	200	-200
Panama	28	17	11
Paraguay	6	46	-40
Peru	0	724	-725
Puerto Rico	1	146	-146
Saint Lucia	1	2	-1
Saint Vincent & Grenadines	0	5	-5
Suriname	1	6	-5
Trinidad and Tobago	1	20	-20
United States	6391	1431	4959
Uruguay	3	53	-50
Venezuela	111	71	40
Virgin Islands	0	3	-4
AFRICA			
Algeria	55	195	-140
Angola	83	0	82
Benin	79	28	50
Botswana	38	19	18
Burkina Faso	263	387	-124
Burundi	370	0	370
Cameroon	35	53	-18
Cape Verde	3	20	-18
Central African Republic	39	34	5
Chad	74	149	-75
Comoros	0	10	-10
Côte d'Ivoire	206	565	-359
Congo DR	72	94	-22
Djibouti	2	2	0
Egypt	50	393	-343
Equatorial Guinea	20	0	20
Eritrea	56	0	55
Ethiopia	0	296	-297
Gabon	35	30	5
Gambia	25	38	-14
Ghana	263	312	-50
Guinea	3	302	-300
Guinea-Bissau	8	18	-10
Kenya	80	268	-188
Lesotho	1	21	-20
Liberia	322	21	300
Libya	32	52	-21
Madagascar	2	8	-6
Malawi	19	38	-20
Mali	16	116	-100
Mauritania	21	10	10
Mauritius	10	10	0
Mayotte	3	3	-1
Morocco	2	676	-675
Mozambique	119	138	-20
Namibia	19	21	-2
Niger	31	58	-27
Nigeria	150	435	-286
Republic of Congo	50	0	50
Réunion	3	3	0
Rwanda	62	47	15
Sao Tome & Principe	0	7	-7
Senegal	19	151	-133
Sierra Leone	75	14	60
Somalia	0	299	-300
South Africa	799	98	701
Sudan	199	62	137
Swaziland	11	17	-6
Tanzania	67	366	-299
Togo	12	17	-5
Tunisia	9	28	-20
Uganda	12	146	-134
Western Sahara	47	0	47
Zambia	42	126	-85
Zimbabwe	0	899	-900
ASIA			
Afghanistan	13	392	-379
Armenia	19	94	-75
Azerbaijan	67	13	53
Bahrain	447	0	447
Bangladesh	18	2918	-2900
Bhutan	19	2	16
Brunei	49	46	3
Cambodia	0	254	-255
China	127	2021	-1895
East Timor	0	49	-50
Georgia	1	151	-150
Hong Kong SAR	332	156	176
India	709	3632	-2924
Indonesia	0	1276	-1277
Iran	291	474	-184
Iraq	0	149	-149
Israel	364	90	273
Japan	440	170	269
Jordan	380	177	203
Kazakhstan	343	335	7
Kuwait	400	123	277
Kyrgyzstan	0	132	-132
Laos	0	75	-75
Lebanon	87	99	-13
Macao SAR	55	4	50
Malaysia	696	610	85
Maldives	0	0	-1
Mongolia	0	15	-15
Myanmar	0	498	-499
Nepal	81	179	-99
North Korea	19	22	-3
Oman	184	31	153
Pakistan	33	2022	-1990
Palestine	0	89	-90
Philippines	30	1260	-1230
Qatar	862	5	857
Saudi Arabia	1287	230	1056
Singapore	721	0	721
South Korea	80	110	-30
Sri Lanka	1	250	-250
Syria	397	452	-55
Tajikistan	0	296	-296
Thailand	508	15	493
Turkmenistan	2	56	-55
United Arab Emirates	3077	0	3076
Uzbekistan	7	525	-519
Vietnam	19	448	-430
Yemen	77	211	-134
OCEANIA			
Australia	1164	39	1125
Fiji	2	31	-29
French Polynesia	0	1	-1
Guam	6	6	0
Micronesia	0	8	-9
New Caledonia	6	0	6
New Zealand	247	182	65
Papua New Guinea	6	5	0
Samoa	1	16	-16
Solomon Islands	0	0	0
Tonga	0	8	-9
Vanuatu	0	0	0

Team at the Wittgenstein Centre for Demography and Global Human Capital (IIASA,VID/ÖAW,WU): Nikola Sander, Guy J. Abel and Ramon Bauer. Contact: Nikola Sander, Vienna Institute of Demography (VID/ÖAW), nikola.sander@oeaw.ac.at