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# DHL GLOBAL CONNECTEDNESS INDEX 2014

Analyzing global flows and their  
power to increase prosperity





## II. Visualizing Global Connectedness



Having compiled what is probably the most comprehensive multi-flow dataset on globalization depth, distribution, and directionality—the 3 Ds—we enlisted the help of data visualization experts Dr. Rahul C. Basole and Hyunwoo Park of the Georgia Institute of Technology to depict the data visually. The pages that follow show the results of our collaboration with them on the eight kinds of flows and stocks for which adequate data are valuable.

Two kinds of visualizations were created, circular and cartographic, using open-source Circos and Gephi software respectively, and data for the most recent year for all available countries, combined across outward and inward flows and stocks.<sup>1</sup> The two pages that follow provide a guide to understanding them. The guide is based on the specific example of merchandise trade, but the explanations apply to all eight index components covered since they are treated in parallel fashion.

This two-page guide is followed by four pages of visualizations for each of the eight components. The first page of the four provides a summary of the results for the component being considered that places particular emphasis on comparing it with the other seven. This introduction is deliberately kept brief: the primary purpose of reproducing all the visualizations is to enable and indeed encourage the reader to draw his/her own conclusions.

The introductory page for each index components is followed by a page that presents a circular visualization showing the interactions between countries and regions in terms of the index component being considered. More specifically, this visualization focuses on the 25 countries with the largest international flows or stocks (combined outward and inward) on the component being considered, arrayed by region. The top 25 account for a low of 46% of the global total for tourists to a high of 82% for trade in printed publications. Flows or stocks of countries not in the top 25 are included as well, but are aggregated up to the regional level. Below each circle is a key that explains the country/region labels arrayed around the circle.

These two pages for each component are followed by two that present a cartographic visualization that adds an explicitly geographic element to the analysis, followed by charts and tables that summarize the data used to generate the visualization that show the 10 largest interactions between country pairs, the breakdown of flows or stocks between advanced and emerging economies, the average distance traversed by these flows or stocks, and the share of flows or stocks occurring within the regions. For convenience, summary comparisons on these dimensions across all eight index flows are provided in the table below:

| Flow/Stock                            | 10 Largest Directional Flows (% of Total) | Share from Advanced Economies (%) | Share from Emerging Economies (%) | Share to Advanced Economies (%) | Share to Emerging Economies (%) | Average Distance (kilometers) | Intra-regional Share (%) |
|---------------------------------------|---|-----------------------------------|-----------------------------------|---------------------------------|---------------------------------|-------------------------------|--------------------------|
| Merchandise Trade                     | 14%                                       | 55%                               | 41%                               | 60%                             | 37%                             | 4,824                         | 53%                      |
| FDI Stock                             | 18%                                       | 80%                               | 13%                               | 66%                             | 27%                             | 5,003                         | 50%                      |
| Portfolio Equity Stock (outward only) | 25%                                       | 82%                               | 4%                                | 66%                             | 20%                             | 5,433                         | 38%                      |
| Phone Calls                           | 25%                                       | 65%                               | 24%                               | 32%                             | 56%                             | 4,300                         | 52%                      |
| Printed Publications Trade            | 22%                                       | 75%                               | 25%                               | 72%                             | 28%                             | 3,979                         | 62%                      |
| Tourism (arrivals only)               | 21%                                       | 42%                               | 22%                               | 36%                             | 28%                             | 2,719                         | 73%                      |
| Students (inward only)                | 22%                                       | 25%                               | 75%                               | 77%                             | 23%                             | 5,422                         | 43%                      |
| Migrants                              | 16%                                       | 15%                               | 82%                               | 52%                             | 45%                             | 3,753                         | 50%                      |

Note: In some cases, advanced and emerging shares of total do not sum up to 100% due to different data coverage across components. After summing for these shares, the remaining share of total corresponds to unavailable data, which refers to flows or stocks whose origin and destination countries are not reported. Data coverage across components: Merchandise Trade (97%), FDI Stock (93%), Portfolio Equity Stock (86%), Phone Calls (89%), Printed Publications Trade (100%), Tourism (64%), Students, (100%) and Migrants (97%).

<sup>1</sup> If a given flow or stock was reported in both directions (e.g., merchandise exports to Canada reported by the United States and merchandise imports from the United States reported by Canada), they were averaged; otherwise the single reported was used without further adjustment. Data from both directions were used for all of the visualizations except portfolio equity (outward only), tourists (arrivals only), and international students (inward only). The data coverage thresholds used for the breadth analysis were not applied to the datasets used here, but interpolation and repetition were used to fill gaps according to the method described in Chapter 5.



Circular Visualization

The circle shows the 25 countries with the largest flows or stocks (combined outward and inward) of the index component displayed on the visualization. In the example below, the 25 largest countries based on merchandise trade (exports and imports) are shown. Flows and stocks of countries not in the top 25 are displayed at the regional level.

The 10 largest individual flows or stocks are highlighted with a darker color (or more precisely, a higher opacity level). The color of and order in which regions are presented is kept consistent across all of the visualizations, thus allowing readers to compare patterns across different components. Within regions, the largest country is placed in the center, and the surrounding countries are placed in descending order by flow or stock value. Countries and regions are labeled with three-letter codes, which are explained in clockwise order in the legend at the bottom of the page. Below the circle, there is a scaling factor displayed that corresponds to the scale used for the magnitude of the flows or stocks shown.

At the bottom of this page, we have expanded the section of the circle representing the United States to further explain the details displayed, using the example of the US’s merchandise trade.

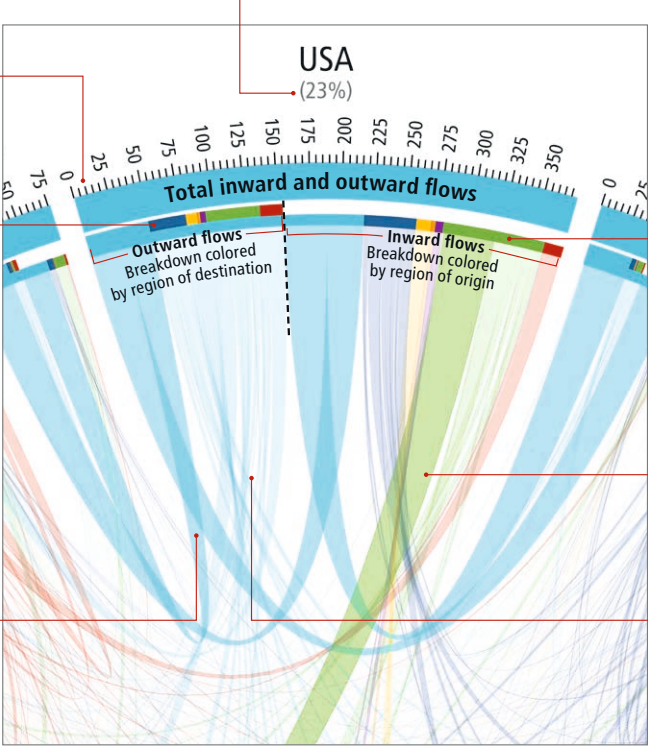
Countries and regions are labeled using three letter codes that are explained in the legend below the circular visualization. “R-” refers to “rest of” a given region, and reflects data for the remaining countries in each region.

The percentage below the country label refers to its depth ratio for a given component, summed across the outward and inward directions. Depth ratios correspond to countries’ total international flows or stocks divided by relevant indicators of the sizes of their domestic economies, as described in Chapter 5. In this example, the US merchandise trade depth ratio of 23% indicates that US merchandise exports and imports add up to 23% of US GDP.

The outer arc and numerical scale represent the total value of outward and inward flows, in this case, the sum of merchandise exports and imports. Multiplying the value shown above the arc times the scaling factor above the legend indicates total US merchandise trade of close to \$4 trillion.

A second parallel arc represents the value of outward flows (merchandise exports), and is colored according to the regions where the flows are directed. The value of these flows can also be read off of the numerical scale and multiplied times the scaling factor, in this example representing roughly \$1.5 trillion of US exports.

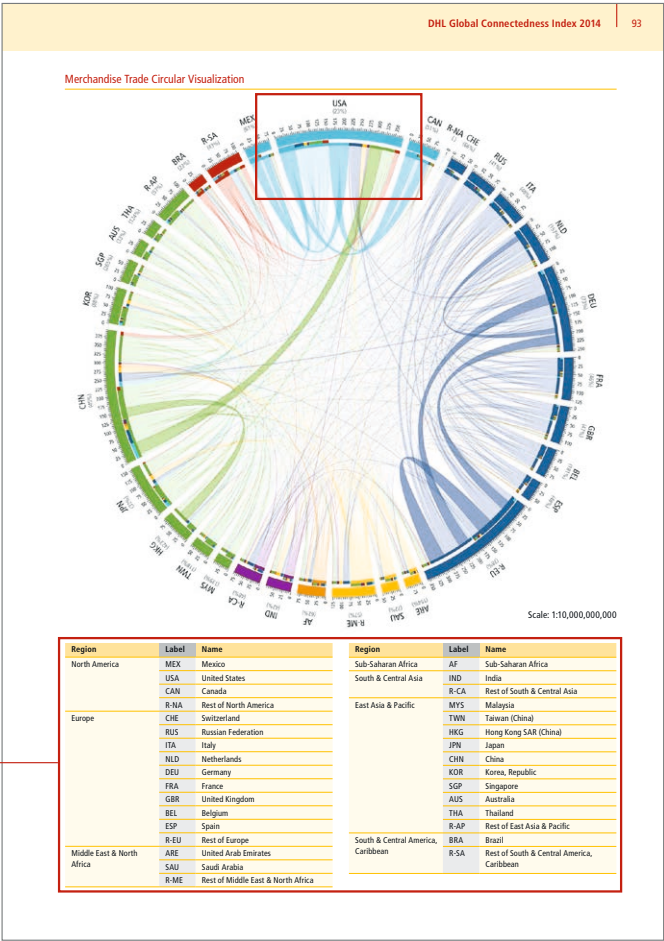
Each line (edge) represents a flow between the United States and one partner country or (rest of) region and its thickness is proportional to the value of the flow.



The part of the inner arc following clockwise after the outward flows represents inward flows (merchandise imports in this example). A dashed line has been added here to illustrate the boundary between outward and inward flows

Several colors make up total US incoming flows (merchandise imports), since the colors reflect the regions of origin of the imports.

The same logic applies to outgoing flows (merchandise exports). In this case they are all blue, since the color is based on the region of origin, North America.



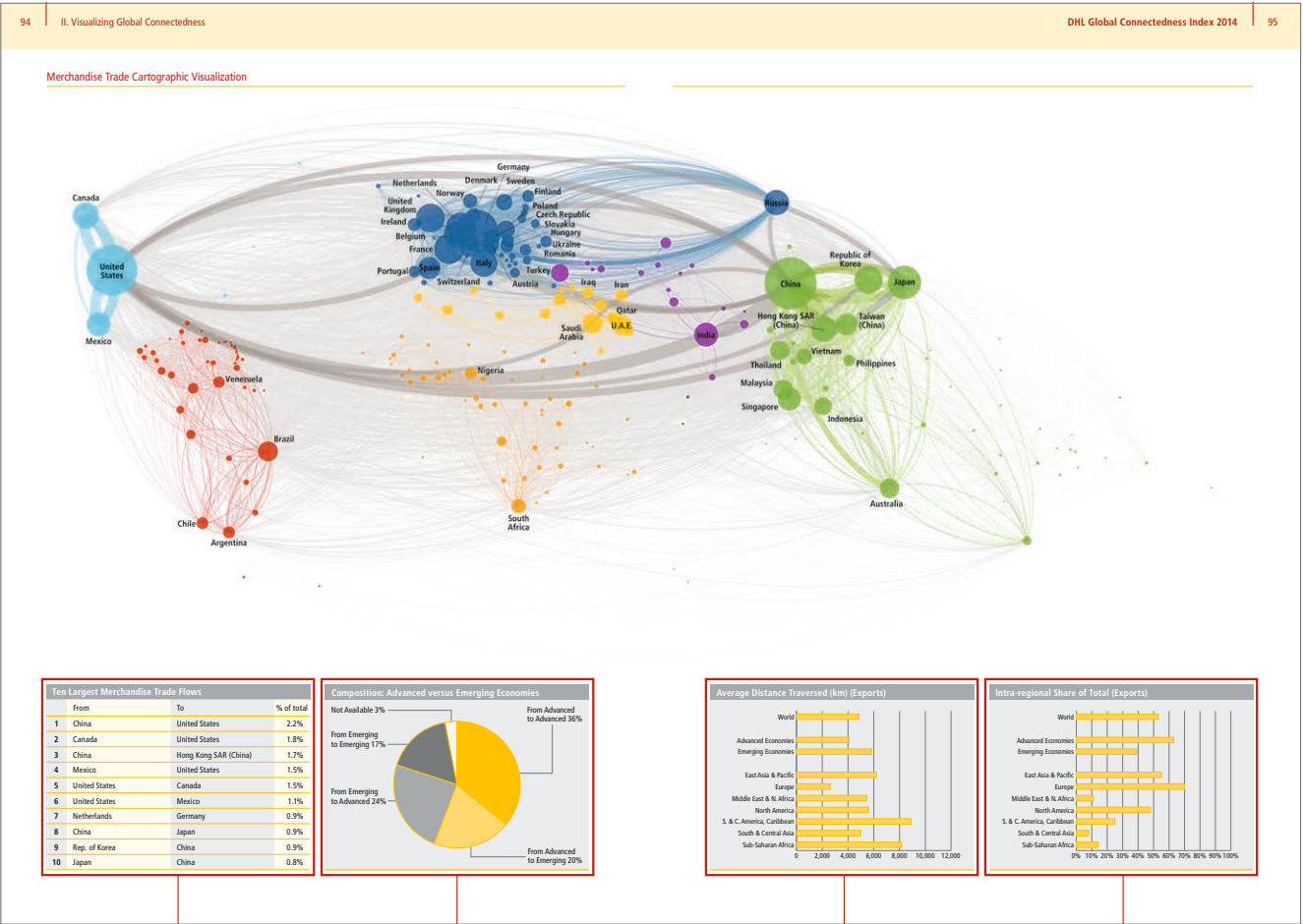
Cartographic Visualization

The cartographic visualization complements the circular visualization by displaying countries in their familiar geographic locations. Each map highlights the 50 largest flows or stocks using a darker color (or more precisely, a higher opacity level).

Consistent with the circular visualization, each region is assigned a color, and interactions within the region are shown with lines (edges) in that color. Interactions between countries in different regions are shown with gray lines. The thickness of the lines (edges) is proportional to the values of the flows or

stocks and the circles are proportional to the combined outward and inward values.

To assist with interpretation of the visualizations, below each cartographic visualization there are charts and tables showing the 10 largest interactions between country pairs, the breakdown of flows or stocks between advanced and emerging economies, the average distance traversed by these flows or stocks, and the share of flows or stocks occurring within the regions. A brief explanation of each is presented below.



Ten Largest Flows or Stocks

This table shows the 10 largest directional flows or stocks and the percentages their values represent of the world total. In the example of merchandise trade, we can see the 10 largest merchandise trade flows and the countries involved in these interactions.

Note that this list differs from the 10 highlighted arcs on the circular visualization because it is at the country-pair level, whereas the highlighting also includes arcs connecting to regions and rest-of-region groupings.

Composition: Advanced / Emerging

The pie chart in this section shows the composition of all directional flows based on the classification of countries into advanced and emerging economies. “Not Available” refers to flows or stocks whose origin and destination countries are not reported.

In the example, more than a third of all flows occurred among advanced economies and around one-quarter came from emerging to advanced economies. In this case, origins and destinations of only 3% of merchandise trade were unavailable.

Average Distance Traversed (km)

This chart provides a comparison of the average distance traversed by each flow or stock globally as well as within countries’ levels of economic development and regions.

In the example, the average distance traversed by merchandise exports across all countries was around 5,000 km. Emerging economies reported longer distances on average and the opposite holds for advanced economies.

Intra-regional Share of Total

This chart parallels the one to the left. This time, however, the value shown corresponds to the percent intra-regional of the given flow or stock. For each country group, the value refers to the share of the flow or stock that goes to countries within the same geographic region, based on the region classifications listed in Appendix B.

The chart in the example shows that more than 50% of all merchandise trade flows are between countries within the same region.



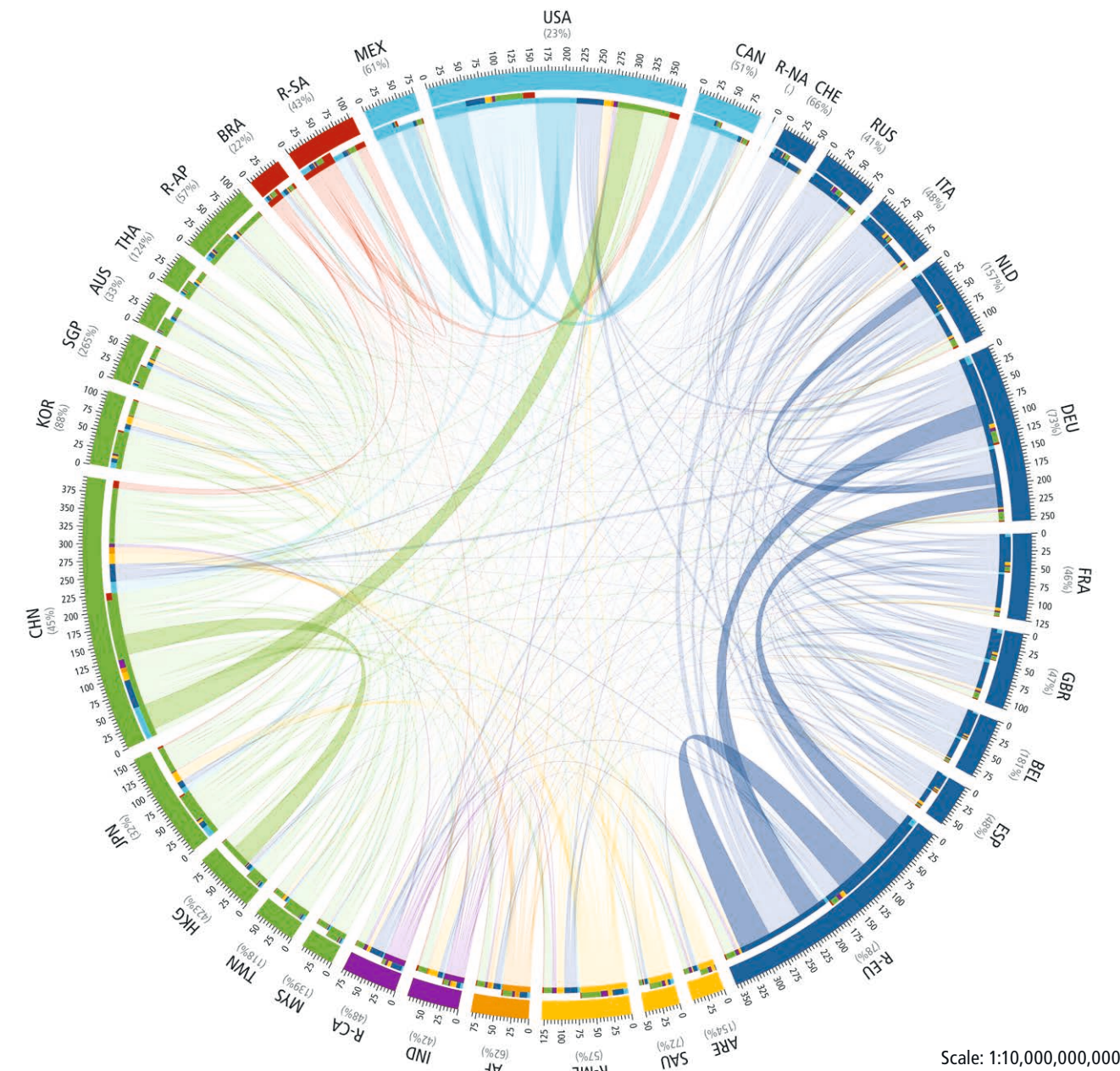
# Merchandise Trade: Something for Everyone

Merchandise trade flows—like migration—date back millennia, and as a source of tax revenue for most countries have also long been tracked and regulated, leading to fairly comprehensive data coverage, and making them a good baseline against which to compare other types of interactions. The trade visualizations displayed here cover 97% of the value of all goods traded during 2013. As the economist David Ricardo observed nearly 200 years ago, every country has opportunities to gain from trade, and so nearly every country shows up on the cartographic visualization. The widespread participation of countries in merchandise trade is also reflected by the top 10 trade flows highlighted on the circular visualization adding up to only 14% of global trade, the lowest among the index components visualized here.

A scan around the outside of the circular visualization highlights the broad participation of both advanced and emerging economies in merchandise trade. Emerging economies are the sources of 41% of merchandise exports and 37% of merchandise imports, roughly in line with their 39% share of world GDP at market exchange rates. Recall that emerging economies are as deeply integrated into trade flows as advanced economies but lag far behind on their integration into capital, people, and especially information flows.

One emerging economy, in particular, stands out in merchandise trade: China. As a participant in 11% of the world’s merchandise trade flows, China is the world’s largest trading nation. (The United States ranks first on the other seven components visualized, with China’s rank ranging from second on international students to 17th on portfolio equity—although the European Union would rank first on all eight if the figures for its members were added up). The green arc running from China to the United States (2.2% of merchandise trade) is the largest single directional flow and helps push down the intra-regional share of merchandise trade while obviously contributing to China being the top-ranked country on this component. Note that all of the other flows among the top 10 highlighted in the circular visualization are intra-regional, as are 53% of trade flows more generally. While the “big shift” of activity to emerging economies has reversed a decades-long trend toward more regionalized trade, the majority of trade still takes place within rather than between regions.

Merchandise Trade Circular Visualization

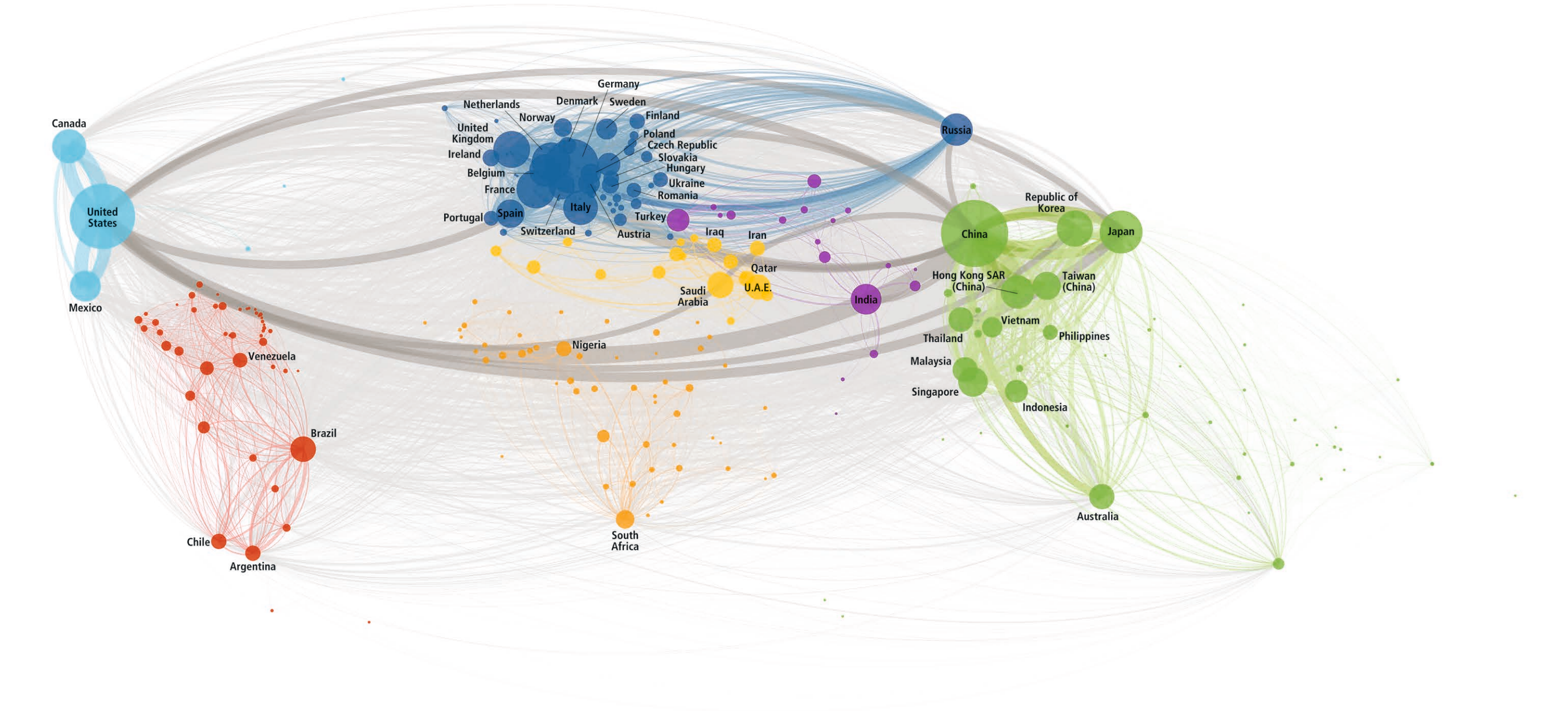


| Region                     | Label | Name                               |
|----------------------------|-------|------------------------------------|
| North America              | MEX   | Mexico                             |
|                            | USA   | United States                      |
|                            | CAN   | Canada                             |
|                            | R-NA  | Rest of North America              |
| Europe                     | CHE   | Switzerland                        |
|                            | RUS   | Russian Federation                 |
|                            | ITA   | Italy                              |
|                            | NLD   | Netherlands                        |
|                            | DEU   | Germany                            |
|                            | FRA   | France                             |
|                            | GBR   | United Kingdom                     |
|                            | BEL   | Belgium                            |
|                            | ESP   | Spain                              |
|                            | R-EU  | Rest of Europe                     |
| Middle East & North Africa | ARE   | United Arab Emirates               |
|                            | SAU   | Saudi Arabia                       |
|                            | R-ME  | Rest of Middle East & North Africa |

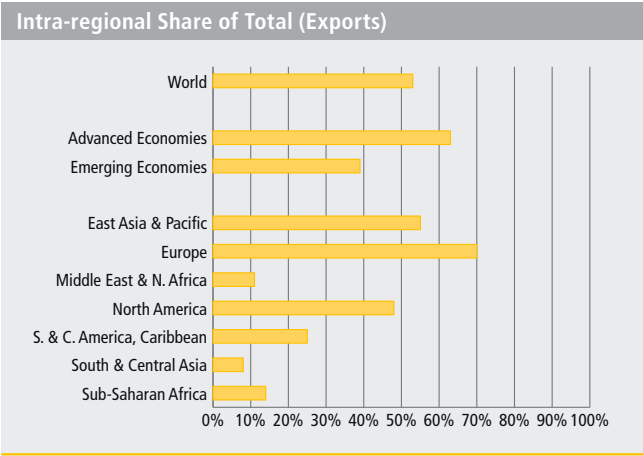
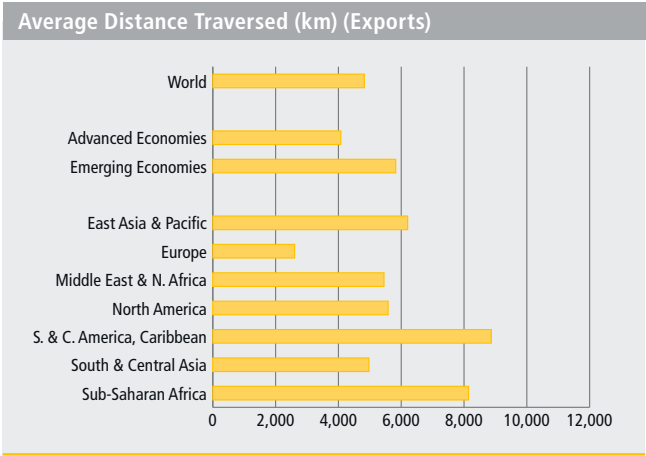
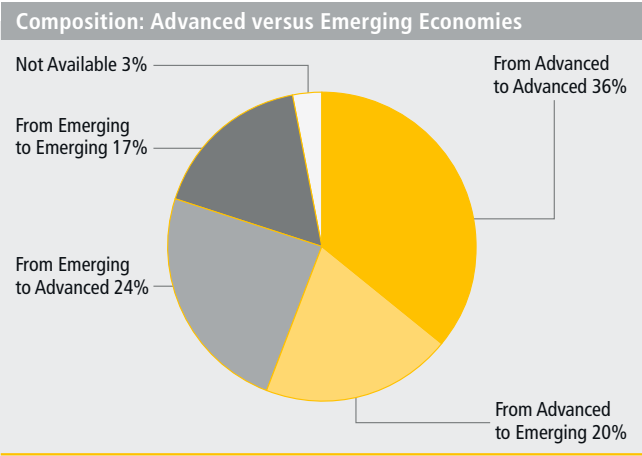
| Region                             | Label | Name                                       |
|------------------------------------|-------|--|
| Sub-Saharan Africa                 | AF    | Sub-Saharan Africa                         |
| South & Central Asia               | IND   | India                                      |
|                                    | R-CA  | Rest of South & Central Asia               |
|                                    | MYS   | Malaysia                                   |
| East Asia & Pacific                | TWN   | Taiwan (China)                             |
|                                    | HKG   | Hong Kong SAR (China)                      |
|                                    | JPN   | Japan                                      |
|                                    | CHN   | China                                      |
|                                    | KOR   | Korea, Republic                            |
|                                    | SGP   | Singapore                                  |
|                                    | AUS   | Australia                                  |
|                                    | THA   | Thailand                                   |
|                                    | R-AP  | Rest of East Asia & Pacific                |
|                                    | BRA   | Brazil                                     |
| South & Central America, Caribbean | R-SA  | Rest of South & Central America, Caribbean |



Merchandise Trade Cartographic Visualization



| Ten Largest Merchandise Trade Flows |               |                       |            |
|-------------------------------------|---------------|-----------------------|------------|
|                                     | From          | To                    | % of total |
| 1                                   | China         | United States         | 2.2%       |
| 2                                   | Canada        | United States         | 1.8%       |
| 3                                   | China         | Hong Kong SAR (China) | 1.7%       |
| 4                                   | Mexico        | United States         | 1.5%       |
| 5                                   | United States | Canada                | 1.5%       |
| 6                                   | United States | Mexico                | 1.1%       |
| 7                                   | Netherlands   | Germany               | 0.9%       |
| 8                                   | China         | Japan                 | 0.9%       |
| 9                                   | Rep. of Korea | China                 | 0.9%       |
| 10                                  | Japan         | China                 | 0.8%       |





# FDI Stocks: Wealth and Wormholes

Foreign Direct Investment (FDI) stocks remain much more the domain of advanced economies than does merchandise trade. Most emerging economies do not even report FDI stocks by partner country. The data on FDI used for these visualizations are based on outward and inward stocks reported by only 47 countries (31 of them advanced economies), but do combine to add up to 93% of worldwide FDI stocks.

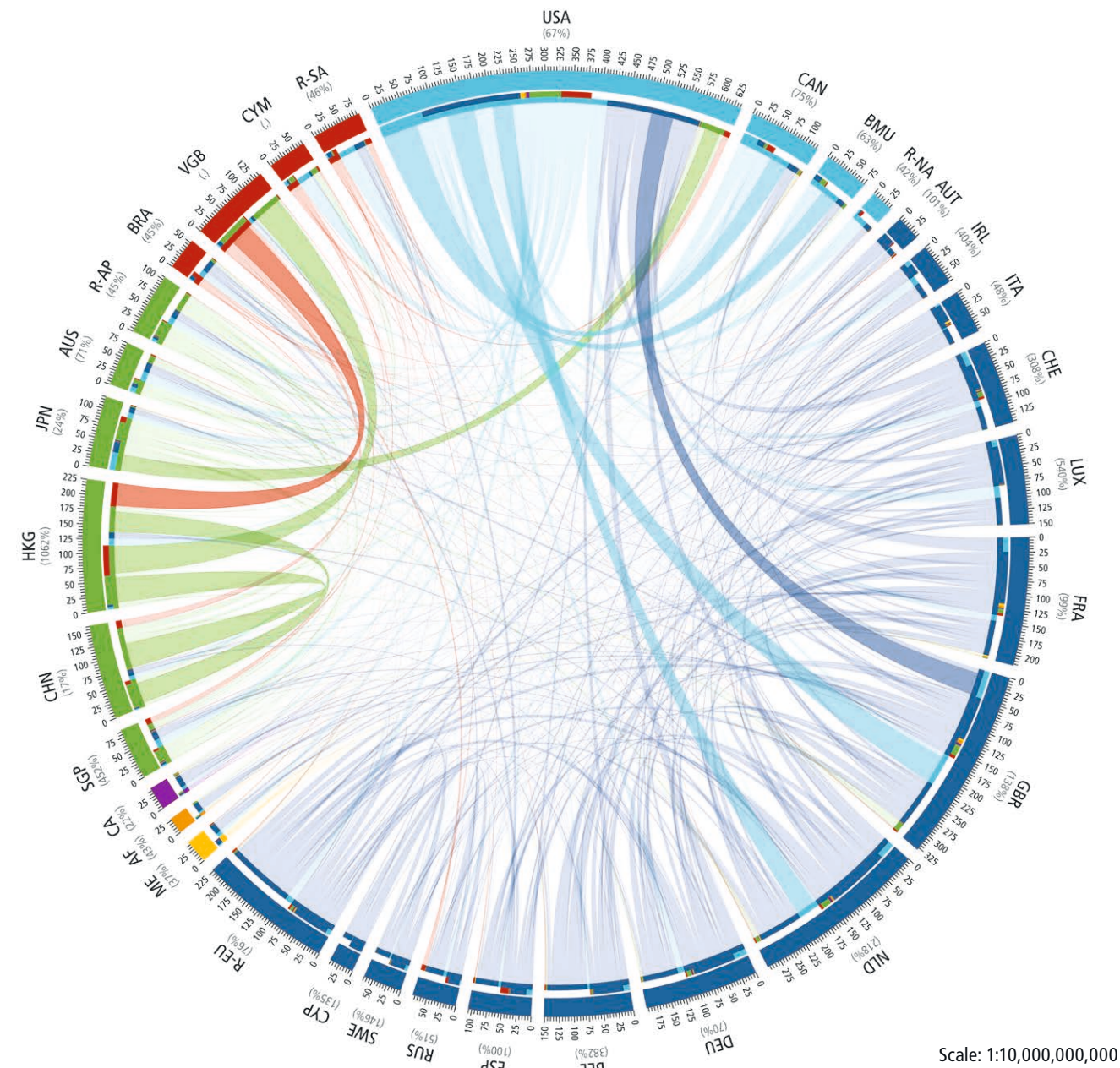
A rough visual indication of advanced economies’ dominance is provided by the share of the circumference of the circular visualization that is light blue (for North America) and dark blue (for Europe), although that does exclude some other advanced economies that are significant investors overseas, most notably Japan, Singapore, and Australia. Despite all the hoopla about “south-south” investments, only 4% of FDI stocks (among those with known origins and destinations) are from one emerging economy to another emerging economy, the second lowest share among the eight index components visualized here. FDI into emerging economies is indeed rising. The UN Conference on Trade and Development (UNCTAD) reported that in 2012, emerging economies attracted more FDI inflows than advanced economies for the first time ever, although it projects emerging economies’ share of FDI inflows to slip back below 50% in 2015.<sup>2</sup>

Another highlight of the FDI visualizations is the jarring juxtaposition of the world’s largest economies and a set of financial centers through which FDI is routed for fiscal reasons. According to one source, half of US FDI was routed via “countries of convenience” in 2012, compared to less than 20% in the 1980s.<sup>3</sup> While the world’s largest directed stock of FDI, from the United States to the United Kingdom, does reflect large real investments in the UK by US firms, the second largest, from Hong Kong to the British Virgin Islands exemplifies the indirect routing of FDI that complicates the use of FDI statistics as meaningful indicators of the real activity of multinational firms. More than 70% of the Netherlands’ inbound and outbound FDI seems to be accounted for by special financial entities, implying that one could treat the Netherlands as a financial center and say that all of the 10 largest FDI stocks involve the US and/or a financial center (most frequently Hong Kong, which shows up in four of the 10).

<sup>2</sup> UNCTAD World Investment Report 2013. Here, “emerging economies” refers to developing and transition economies as classified in UNCTAD statistics rather than our standard classifications based on IMF reporting.

<sup>3</sup> Raymond Mataloni, “The Effects of Multinational Enterprises’ Investments in Countries of Convenience on BEA Direct Investment Statistics,” Presentation at the Annual Meeting of the Academy of International Business,” June 25, 2014.

FDI Stock Circular Visualization

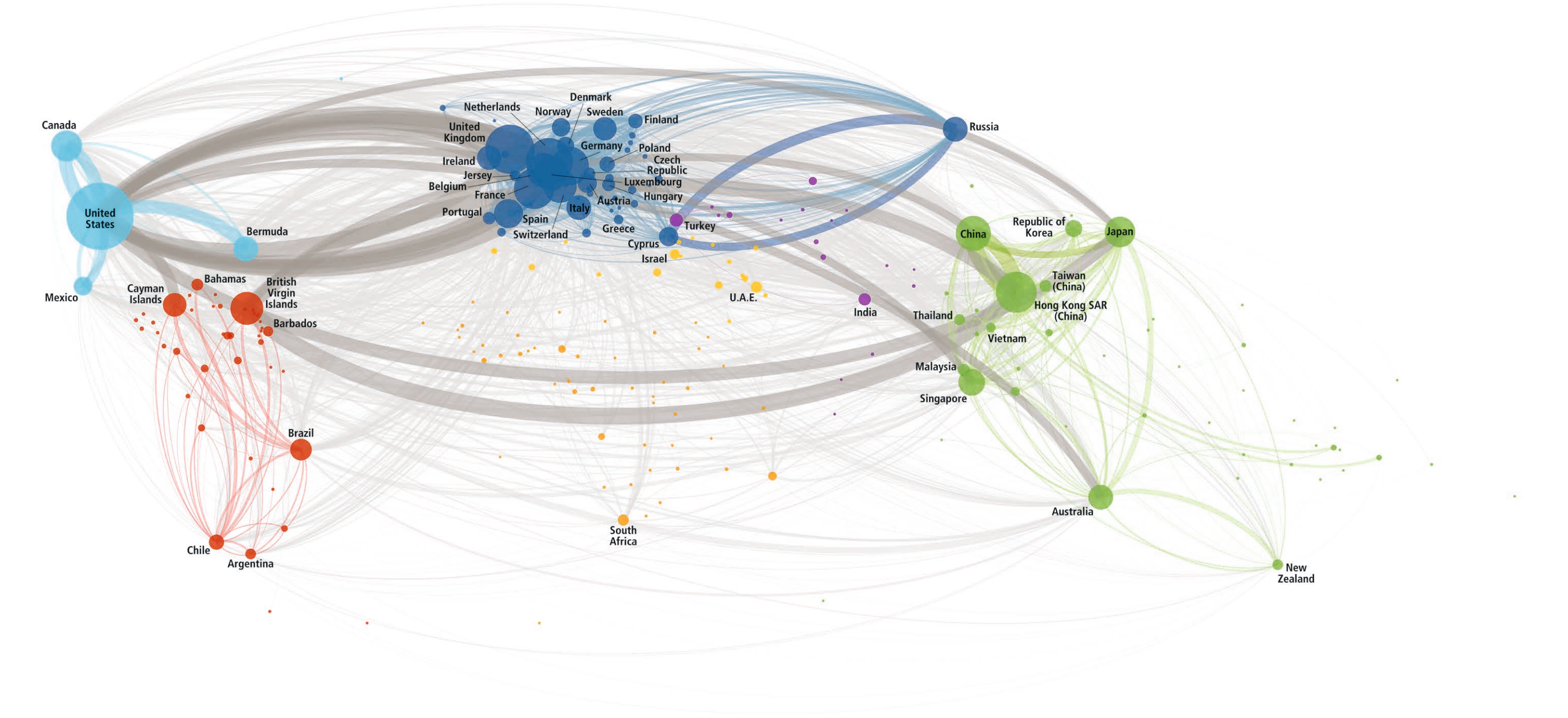


| Region        | Label | Name                  |
|---------------|-------|-----------------------|
| North America | USA   | United States         |
|               | CAN   | Canada                |
|               | BMU   | Bermuda               |
|               | R-NA  | Rest of North America |
| Europe        | AUT   | Austria               |
|               | IRL   | Ireland               |
|               | ITA   | Italy                 |
|               | CHE   | Switzerland           |
|               | LUX   | Luxembourg            |
|               | FRA   | France                |
|               | GBR   | United Kingdom        |
|               | NLD   | Netherlands           |
|               | DEU   | Germany               |
|               | BEL   | Belgium               |
|               | ESP   | Spain                 |
|               | RUS   | Russian Federation    |
|               | SWE   | Sweden                |

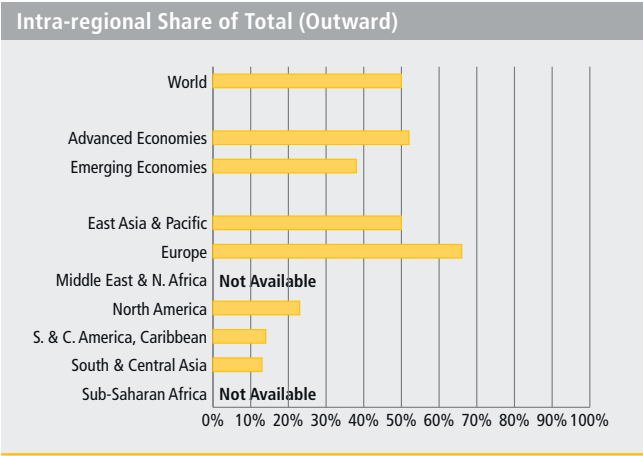
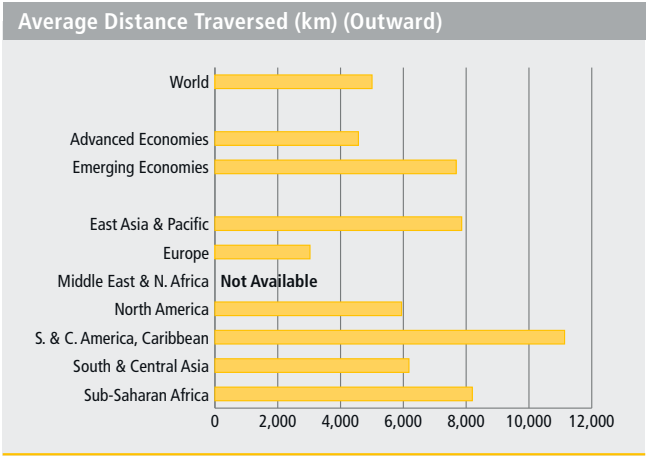
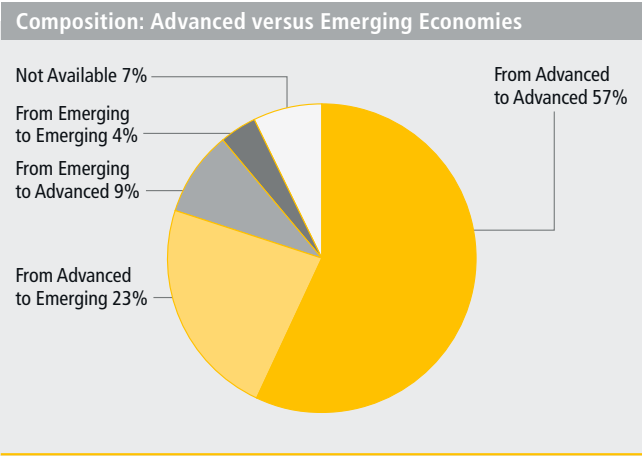
| Region                             | Label | Name                                       |
|------------------------------------|-------|--|
| Europe                             | CYP   | Cyprus                                     |
|                                    | R-EU  | Rest of Europe                             |
| Middle East & North Africa         | ME    | Middle East & North Arica                  |
| Sub-Saharan Africa                 | AF    | Sub-Saharan Africa                         |
| South & Central Asia               | CA    | South & Central Asia                       |
| East Asia & Pacific                | SGP   | Singapore                                  |
|                                    | CHN   | China                                      |
|                                    | HKG   | Hong Kong SAR (China)                      |
|                                    | JPN   | Japan                                      |
|                                    | AUS   | Australia                                  |
|                                    | R-AP  | Rest of East Asia & Pacific                |
| South & Central America, Caribbean | BRA   | Brazil                                     |
|                                    | VGB   | British Virgin Islands                     |
|                                    | CYM   | Cayman Islands                             |
|                                    | R-SA  | Rest of South & Central America, Caribbean |



FDI Stock Cartographic Visualization



| Ten Largest FDI Stocks |                       |                       |            |
|------------------------|-----------------------|-----------------------|------------|
|                        | From                  | To                    | % of total |
| 1                      | United States         | United Kingdom        | 2.2%       |
| 2                      | Hong Kong SAR (China) | Br. Virgin Isds       | 2.1%       |
| 3                      | Hong Kong SAR (China) | China                 | 2.0%       |
| 4                      | Br. Virgin Isds       | Hong Kong SAR (China) | 1.7%       |
| 5                      | United Kingdom        | United States         | 1.7%       |
| 6                      | China                 | Hong Kong SAR (China) | 1.6%       |
| 7                      | United States         | Netherlands           | 1.5%       |
| 8                      | United States         | Canada                | 1.4%       |
| 9                      | United States         | Bermuda               | 1.3%       |
| 10                     | Japan                 | United States         | 1.3%       |





# Portfolio Equity Stocks: Focused Finance

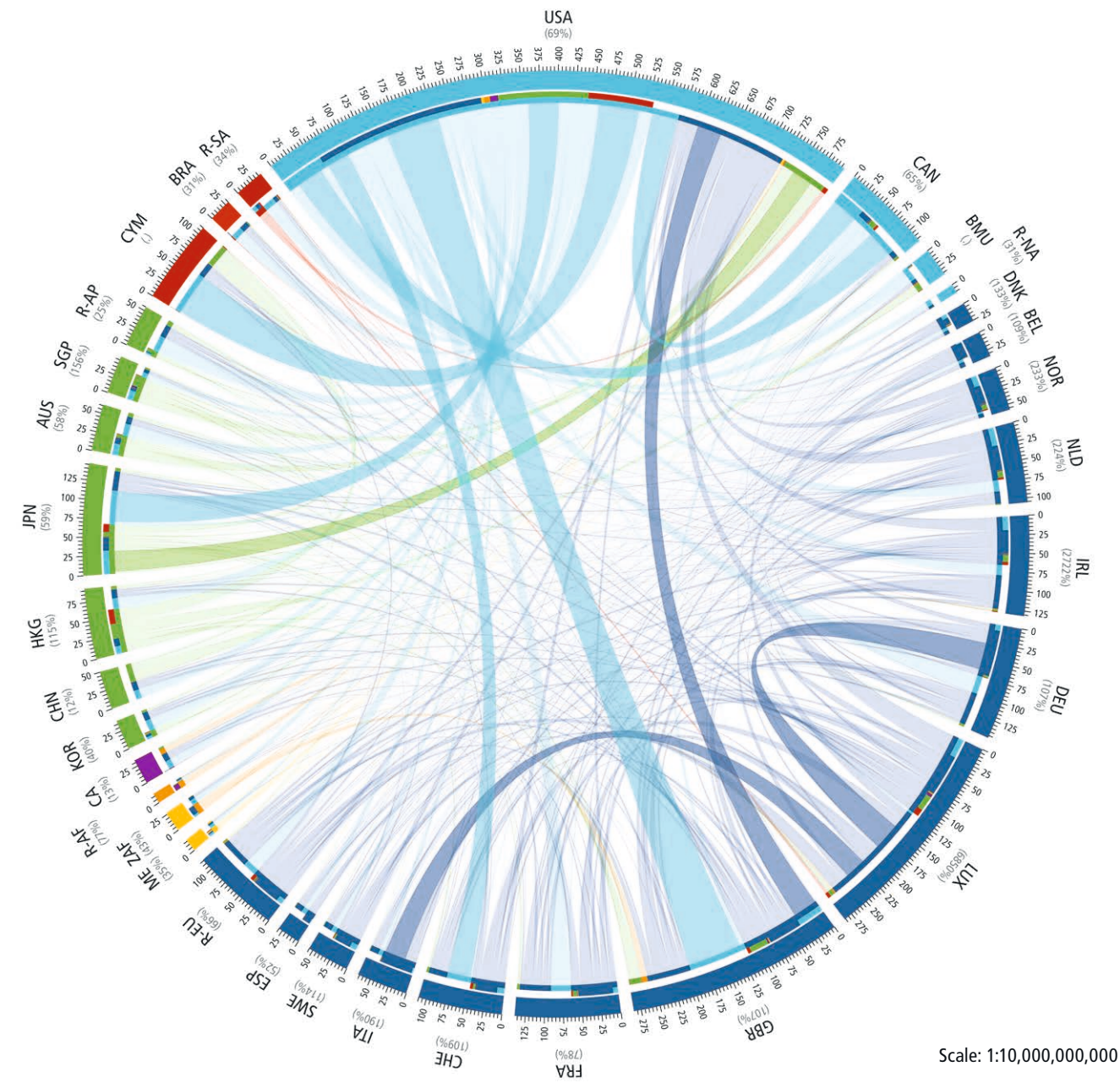
(based on data from outward direction only)

In many respects, the data on portfolio equity stocks are even more extreme than the data on FDI stocks that were just presented. Limitations in data availability are more severe, allowing these visualizations to depict only 86% of world portfolio equity investment. An even higher share of portfolio equity investment (for which origin and destination data are available) is accounted for by advanced economies investing in other advanced economies (63% of the total, just ahead of the 57% figure for FDI)—although investments from advanced economies in emerging economies, at 18%, are a bit lower than the 23% for FDI. And emerging economies’ portfolio equity investments in advanced economies, at 3%, and in other emerging economies, at 1%, are the lowest across all eight visualizations.

Other extremes worth highlighting are that portfolio equity stocks are the least regionalized of the eight components covered on these visualizations, with an intra-regional share of only 38% of the total, and traverse the greatest average distance (5,433 kilometers). In conjunction with the data presented above, the implication seems to be that portfolio equity investments are highly sensitive to economic distance, measured by differences in levels of development, but less so to other kinds of distance that are uncorrelated with development levels.

This characterization of portfolio equity stocks displaying patterns similar to, but more extreme than, FDI stocks also seems to hold up at the country level. Here, among advanced economies the focus narrows even more sharply to those with large stock markets, alongside financial centers. The largest directional stock—investments from the United States to the United Kingdom—has twice as high a share of the world total for portfolio equity as for FDI, presumably in part because of those countries’ large public equity markets as compared to other advanced economies where bank finance is more prominent. Overall, the United States (with more than one-third of the world’s stock market capitalization) is involved in eight of the top 10 bilateral interactions, and the remainder all involve a financial center (in this case, Luxembourg; Hong Kong, which figured in four of the top 10 FDI-related interactions, does not make the cut).

Portfolio Equity Stock Circular Visualization

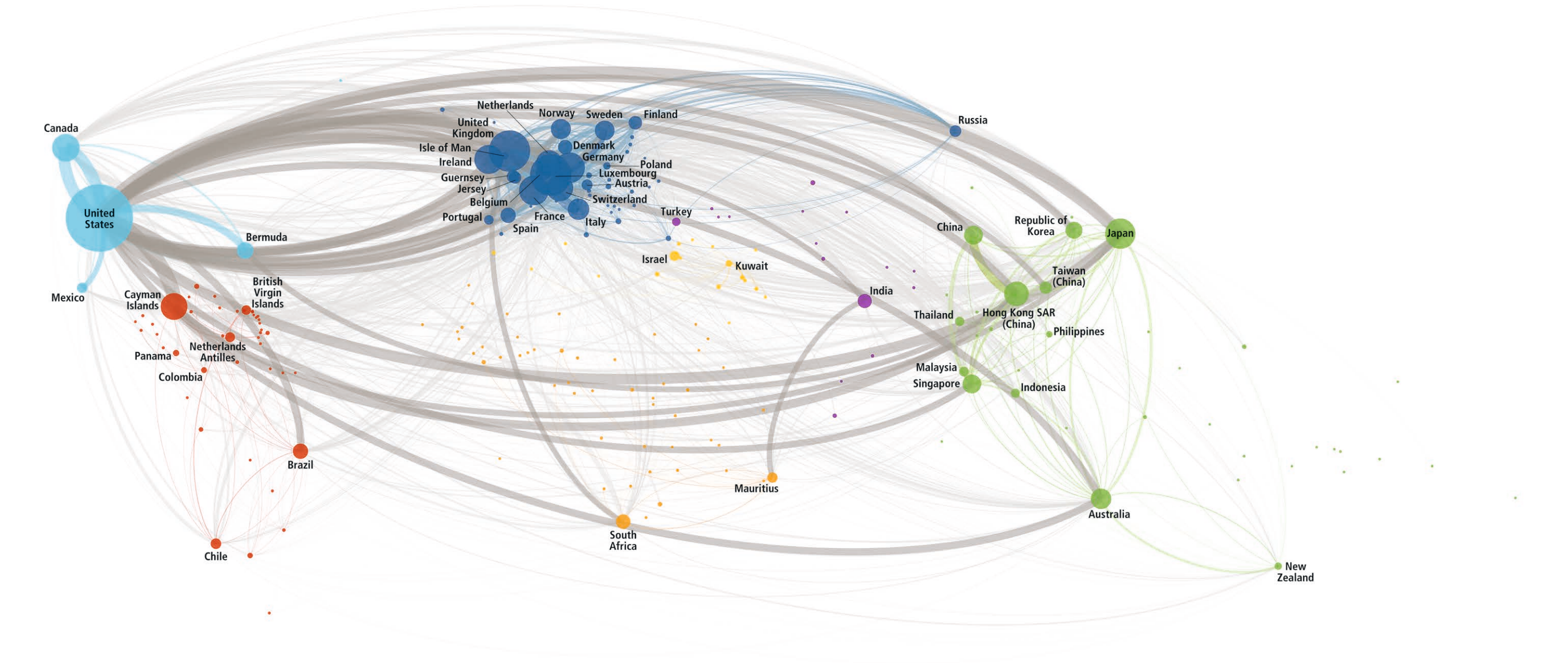


| Region        | Label | Name                  |
|---------------|-------|-----------------------|
| North America | USA   | United States         |
|               | CAN   | Canada                |
|               | BMU   | Bermuda               |
|               | R-NA  | Rest of North America |
| Europe        | DNK   | Denmark               |
|               | BEL   | Belgium               |
|               | NOR   | Norway                |
|               | NLD   | Netherlands           |
|               | IRL   | Ireland               |
|               | DEU   | Germany               |
|               | LUX   | Luxembourg            |
|               | GBR   | United Kingdom        |
|               | FRA   | France                |
|               | CHE   | Switzerland           |
|               | ITA   | Italy                 |
|               | SWE   | Sweden                |
|               | ESP   | Spain                 |
|               | R-EU  | Rest of Europe        |

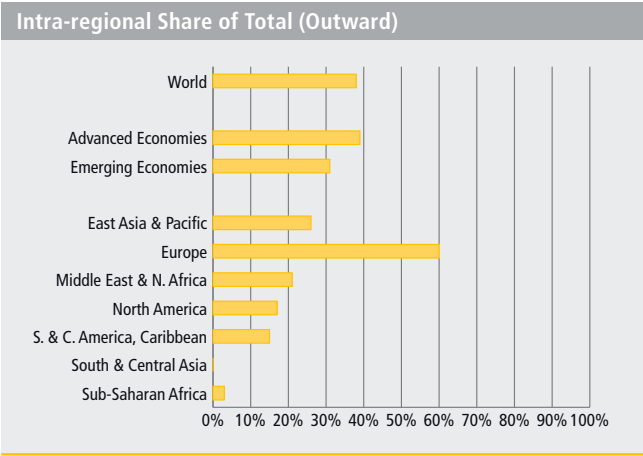
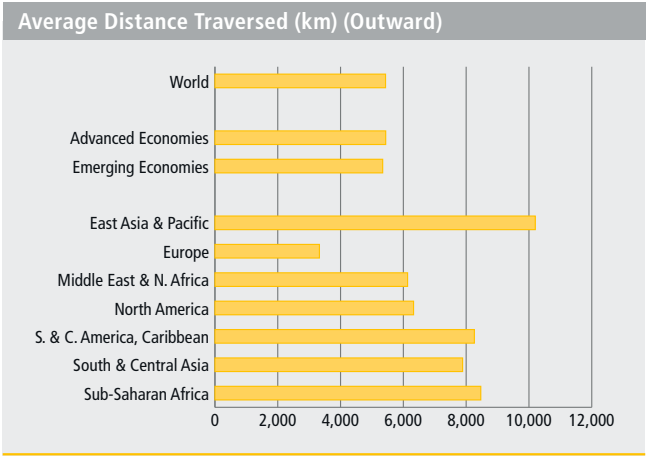
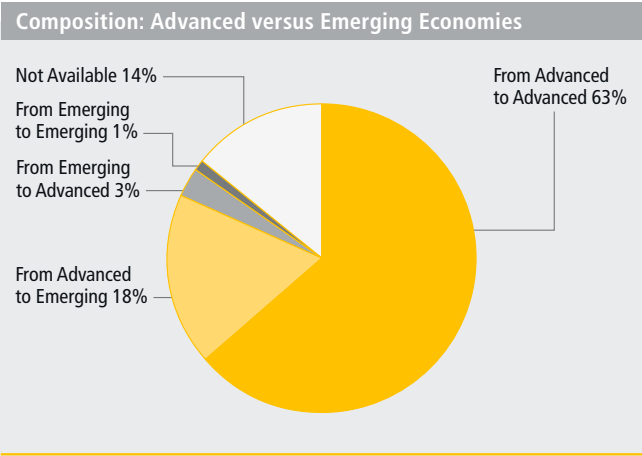
| Region                             | Label | Name                                       |
|------------------------------------|-------|--|
| Middle East & North Africa         | ME    | Middle East & North Arica                  |
| Sub-Saharan Africa                 | ZAF   | South Africa                               |
|                                    | R-AF  | Rest of Sub-Saharan Africa                 |
| South & Central Asia               | CA    | South & Central Asia                       |
| East Asia & Pacific                | KOR   | Korea, Republic                            |
|                                    | CHN   | China                                      |
|                                    | HKG   | Hong Kong SAR (China)                      |
|                                    | JPN   | Japan                                      |
|                                    | AUS   | Australia                                  |
|                                    | SGP   | Singapore                                  |
|                                    | R-AP  | Rest of East Asia & Pacific                |
| South & Central America, Caribbean | CYM   | Cayman Islands                             |
|                                    | BRA   | Brazil                                     |
|                                    | R-SA  | Rest of South & Central America, Caribbean |



Portfolio Equity Stock Cartographic Visualization



| Ten Largest Portfolio Equity Stocks |                |                |            |
|-------------------------------------|----------------|----------------|------------|
|                                     | From           | To             | % of total |
| 1                                   | United States  | United Kingdom | 4.6%       |
| 2                                   | United States  | Cayman Is.     | 3.5%       |
| 3                                   | United States  | Japan          | 2.6%       |
| 4                                   | Germany        | Luxembourg     | 2.3%       |
| 5                                   | United States  | Canada         | 2.3%       |
| 6                                   | Canada         | United States  | 2.2%       |
| 7                                   | United Kingdom | United States  | 2.1%       |
| 8                                   | United States  | Switzerland    | 1.9%       |
| 9                                   | Japan          | United States  | 1.8%       |
| 10                                  | Italy          | Luxembourg     | 1.8%       |





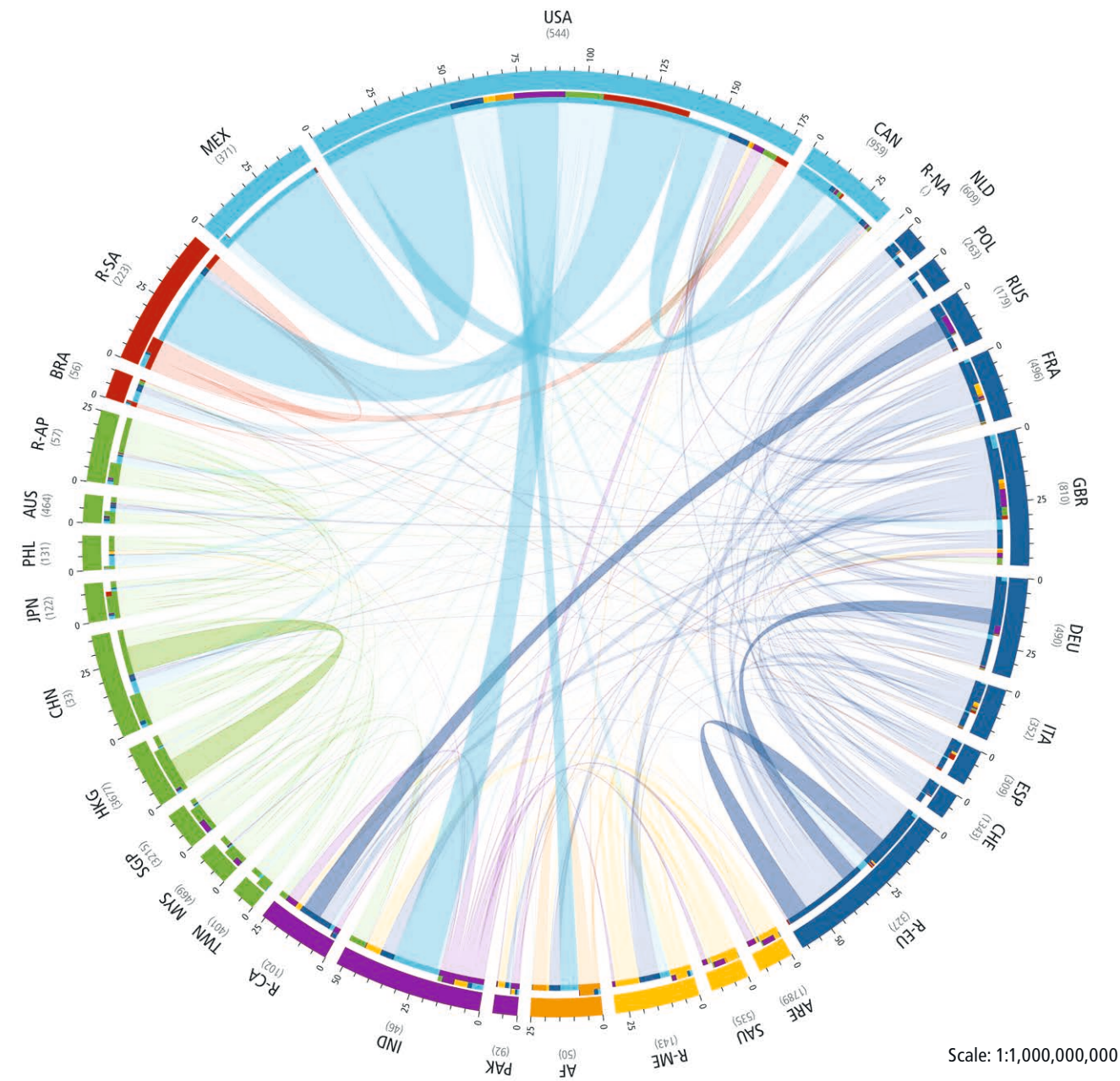
# Phone Calls: Immigrant Connections

The available data on telephone calls cover 89% of the estimated world total calling minutes (including calls routed over the internet and terminated on fixed or mobile phones, but not computer-to-computer calls, e.g., via Skype).<sup>4</sup> Phone calls are one of the components of the index on which directionality is particularly unbalanced. This component has the highest percentage of interactions from advanced to emerging economies (41%), as compared to only 9% from emerging to advanced economies.

This imbalance, reflects, in part, differences in calling charges (particularly from the United States, where international calling rates are relatively low) as well as income levels. The other, more evident driver of calling patterns has to do with interactions due to immigrants (which is also a good example of complementarities across at least some of the index components). Thus, the United States, as a country of immigrants, figures in eight of the top 10 flows of phone calls. The top two destinations of international calls placed from the United States are Mexico (the largest source of first-generation immigrants) and India (the third-largest). All of the United States' country partners in the top 10 figure in the top 15 sources of immigrants to the United States (out of more than 200 countries and territories) with the exception of Brazil, which ranks 26th. The inference of an immigrant effect is backstopped by the observation that the two flows of the largest 10 that don't involve the United States are from Hong Kong to China and from the United Kingdom to India (the largest source of first-generation immigrants to the United Kingdom). Similarly, the other interregional flows that stand out from the circular visualization—the United States to Africa and Russia to the rest of South and Central Asia (minus India and Pakistan, i.e., mostly just to Central Asia) can be given a similar interpretation.

<sup>4</sup> For telephone calls, the main data limitation is that each country only reports data on calls to/from a sample of partners.

Phone Calls Circular Visualization

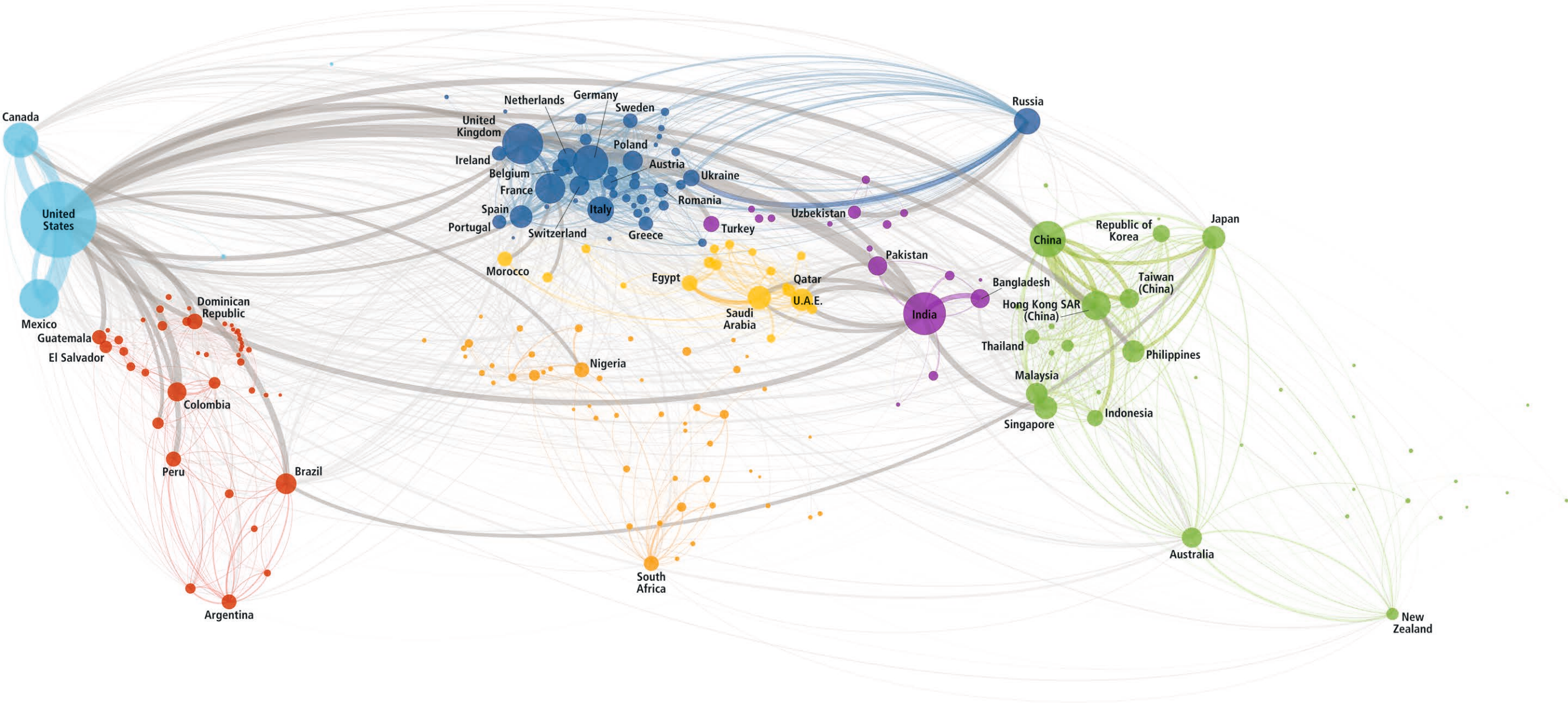


| Region                     | Label | Name                               |
|----------------------------|-------|------------------------------------|
| North America              | MEX   | Mexico                             |
|                            | USA   | United States                      |
|                            | CAN   | Canada                             |
|                            | R-NA  | Rest of North America              |
| Europe                     | NLD   | Netherlands                        |
|                            | POL   | Poland                             |
|                            | RUS   | Russian Federation                 |
|                            | FRA   | France                             |
|                            | GBR   | United Kingdom                     |
|                            | DEU   | Germany                            |
|                            | ITA   | Italy                              |
|                            | ESP   | Spain                              |
|                            | CHE   | Switzerland                        |
|                            | R-EU  | Rest of Europe                     |
| Middle East & North Africa | ARE   | United Arab Emirates               |
|                            | SAU   | Saudi Arabia                       |
|                            | R-ME  | Rest of Middle East & North Africa |

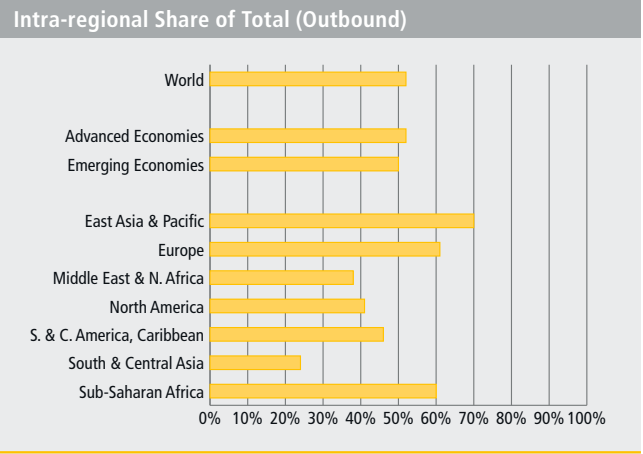
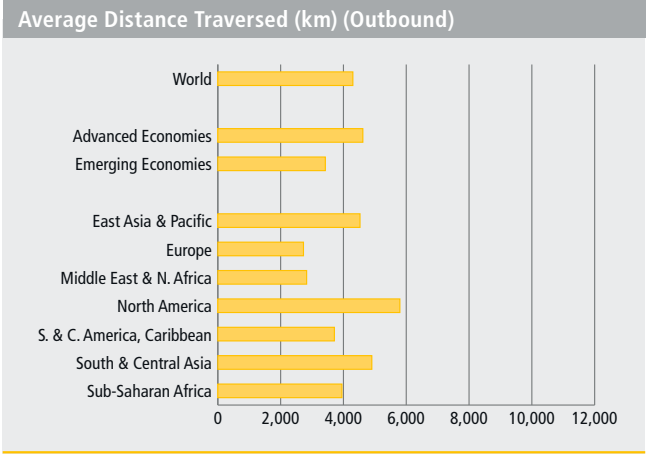
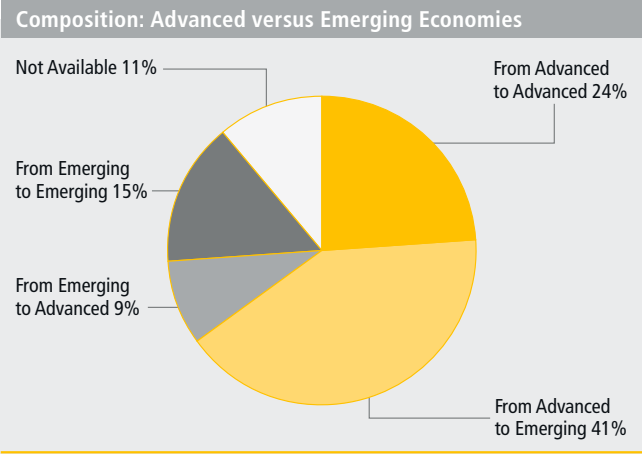
| Region                             | Label | Name                                       |
|------------------------------------|-------|--|
| Sub-Saharan Africa                 | AF    | Sub-Saharan Africa                         |
| South & Central Asia               | PAK   | Pakistan                                   |
|                                    | IND   | India                                      |
|                                    | R-CA  | Rest of South & Central Asia               |
|                                    | TWN   | Taiwan (China)                             |
| East Asia & Pacific                | MYS   | Malaysia                                   |
|                                    | SGP   | Singapore                                  |
|                                    | HKG   | Hong Kong SAR (China)                      |
|                                    | CHN   | China                                      |
|                                    | JPN   | Japan                                      |
|                                    | PHL   | Philippines                                |
|                                    | AUS   | Australia                                  |
|                                    | R-AP  | Rest of East Asia & Pacific                |
| South & Central America, Caribbean | BRA   | Brazil                                     |
|                                    | R-SA  | Rest of South & Central America, Caribbean |



Phone Calls Cartographic Visualization



| Ten Largest Phone Call Routes |                       |                |            |
|-------------------------------|-----------------------|----------------|------------|
|                               | From                  | To             | % of total |
| 1                             | United States         | Mexico         | 7.7%       |
| 2                             | United States         | India          | 3.2%       |
| 3                             | Canada                | United States  | 2.5%       |
| 4                             | United States         | Canada         | 2.1%       |
| 5                             | Hong Kong SAR (China) | China          | 2.0%       |
| 6                             | United States         | Colombia       | 1.2%       |
| 7                             | United States         | Dominican Rep. | 0.9%       |
| 8                             | United States         | Brazil         | 0.8%       |
| 9                             | United States         | China          | 0.8%       |
| 10                            | United Kingdom        | India          | 0.8%       |





# Printed Publications Trade: Linguistic Linkages

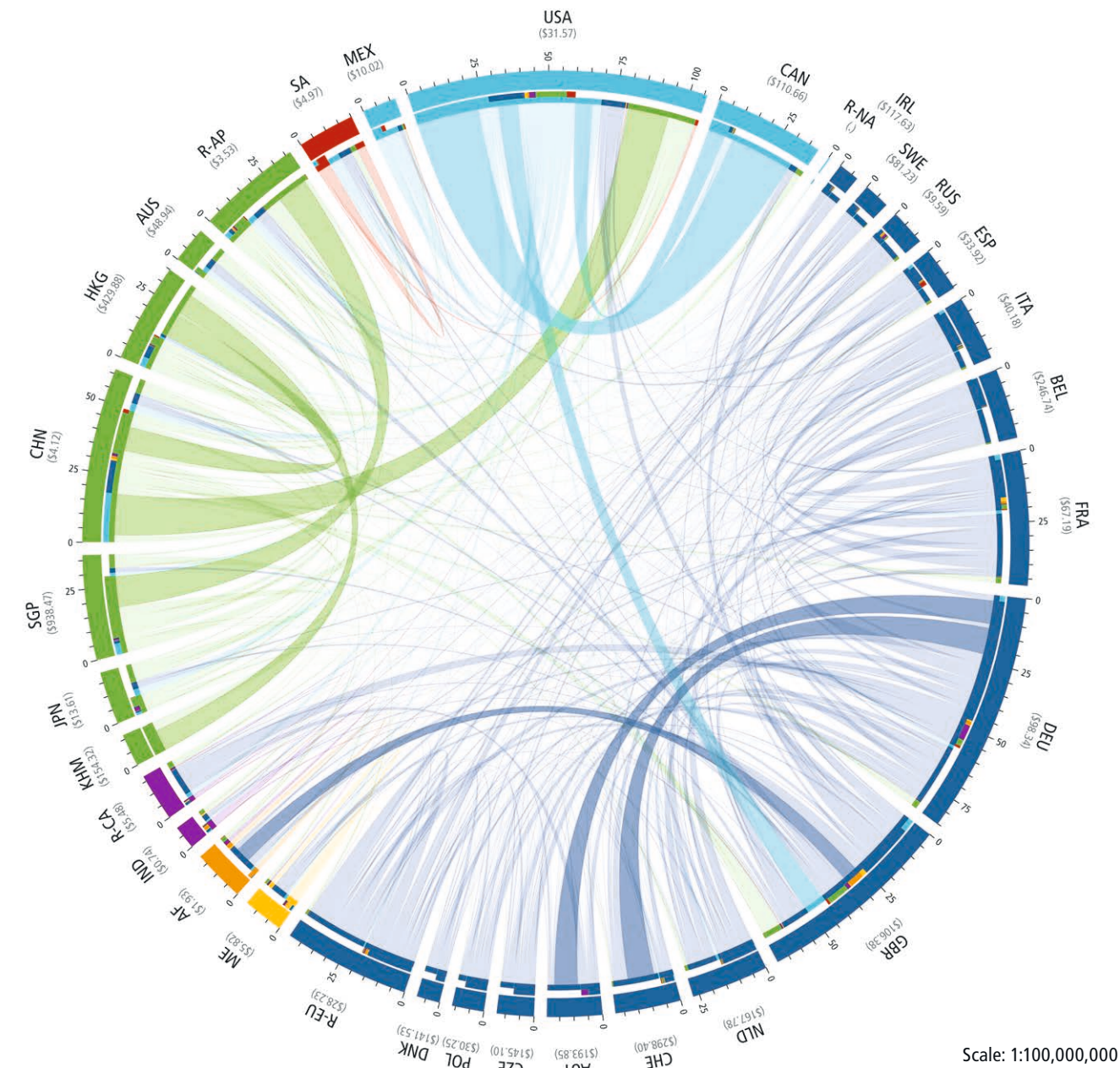
Printed publications trade constitutes the second information pillar component on which we have adequate data to generate visualizations. The data used here encompass trade in printed books, newspapers, pictures and other products of the printing industry, manuscripts, typescripts, and plans.

The comparison with phone calls illustrates the influence of weight versus weightlessness on international interactions. As the circular visualization and the last table on the next two pages indicate, regionalization is much higher for printed publications than for telephone calls: 62%, or the second highest level after tourism. And the average distance traversed is 10% less than that for phone calls.

Looking at the circular visualization and the list of the 10 largest flows also illustrates another factor that has a strong—and intuitive—influence on printed publications trade. Six of the 10 largest flows involve partners that share a common language—versus a 10% likelihood of that happening for two randomly selected countries.

Advanced economies are the leading exporters of printed material, with 75% of world total exports, as compared to only 55% for merchandise trade overall. Recall that across all of the information pillar components, advanced economies are nine times more deeply integrated into international information flows than emerging economies.

Printed Publications Trade Circular Visualization



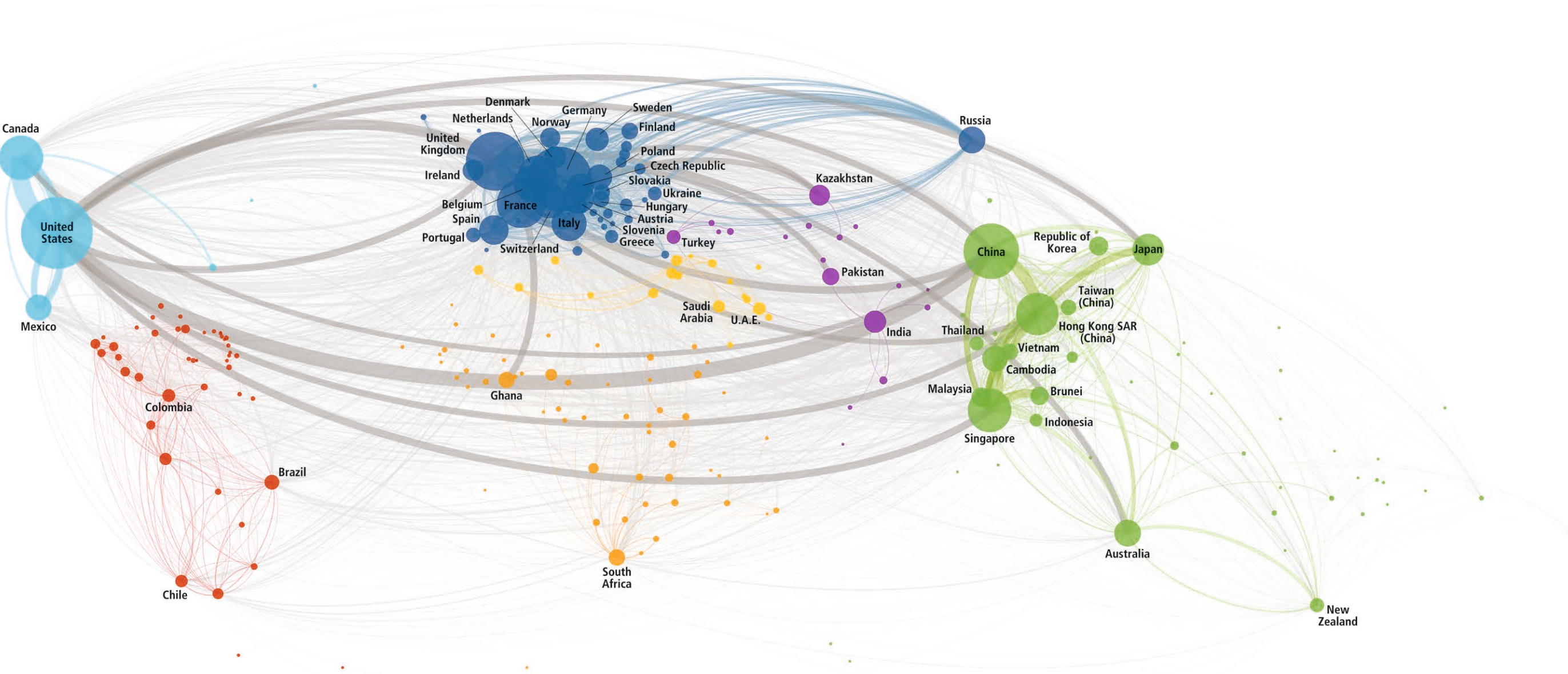
Scale: 1:100,000,000

| Region        | Label | Name                  |
|---------------|-------|-----------------------|
| North America | MEX   | Mexico                |
|               | USA   | United States         |
|               | CAN   | Canada                |
|               | R-NA  | Rest of North America |
| Europe        | IRL   | Ireland               |
|               | SWE   | Switzerland           |
|               | RUS   | Russian Federation    |
|               | ESP   | Spain                 |
|               | ITA   | Italy                 |
|               | BEL   | Belgium               |
|               | FRA   | France                |
|               | DEU   | Germany               |
|               | GBR   | United Kingdom        |
|               | NLD   | Netherlands           |
|               | CHE   | Switzerland           |
|               | AUT   | Austria               |
|               | CZE   | Czech Republic        |

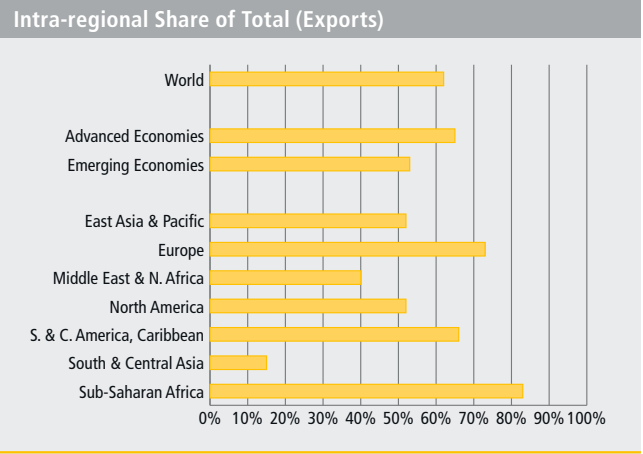
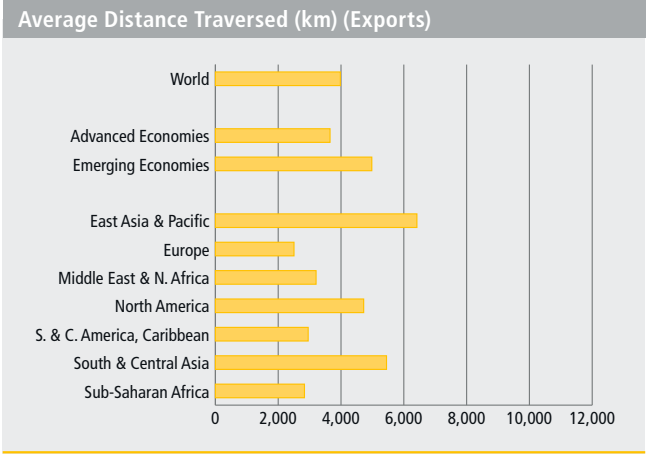
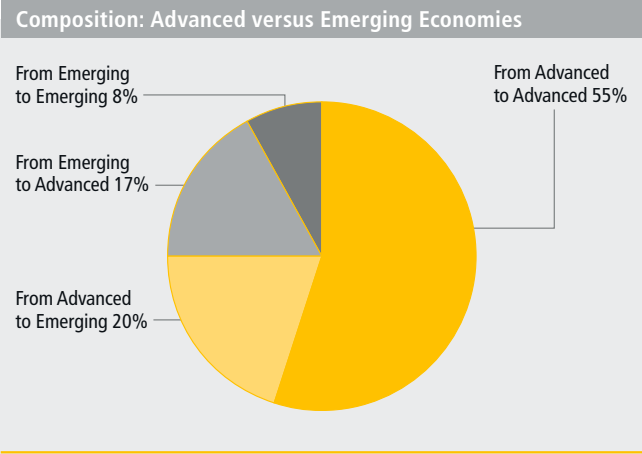
| Region                             | Label | Name                               |
|------------------------------------|-------|------------------------------------|
| Europe                             | POL   | Poland                             |
|                                    | DNK   | Denmark                            |
|                                    | R-EU  | Rest of Europe                     |
| Middle East & North Africa         | ME    | Middle East & North Africa         |
| Sub-Saharan Africa                 | AF    | Sub-Saharan Africa                 |
| South & Central Asia               | IND   | India                              |
|                                    | R-CA  | Rest of South & Central Asia       |
| East Asia & Pacific                | KHM   | Cambodia                           |
|                                    | JPN   | Japan                              |
|                                    | SGP   | Singapore                          |
|                                    | CHN   | China                              |
|                                    | HKG   | Hong Kong SAR (China)              |
|                                    | AUS   | Australia                          |
|                                    | R-AP  | Rest of East Asia & Pacific        |
| South & Central America, Caribbean | SA    | South & Central America, Caribbean |



Printed Publications Trade Cartographic Visualization



| Ten Largest Publications Trade Flows |               |                       |            |
|--------------------------------------|---------------|-----------------------|------------|
|                                      | From          | To                    | % of total |
| 1                                    | United States | Canada                | 5.2%       |
| 2                                    | China         | United States         | 3.5%       |
| 3                                    | Germany       | Switzerland           | 2.2%       |
| 4                                    | China         | Hong Kong SAR (China) | 2.1%       |
| 5                                    | Germany       | Austria               | 2.0%       |
| 6                                    | Cambodia      | Hong Kong SAR (China) | 1.8%       |
| 7                                    | United States | United Kingdom        | 1.7%       |
| 8                                    | Canada        | United States         | 1.5%       |
| 9                                    | Germany       | France                | 1.2%       |
| 10                                   | Singapore     | Brunei                | 1.2%       |





# Tourists: Not too Far from Home

(based on data from arrivals only)

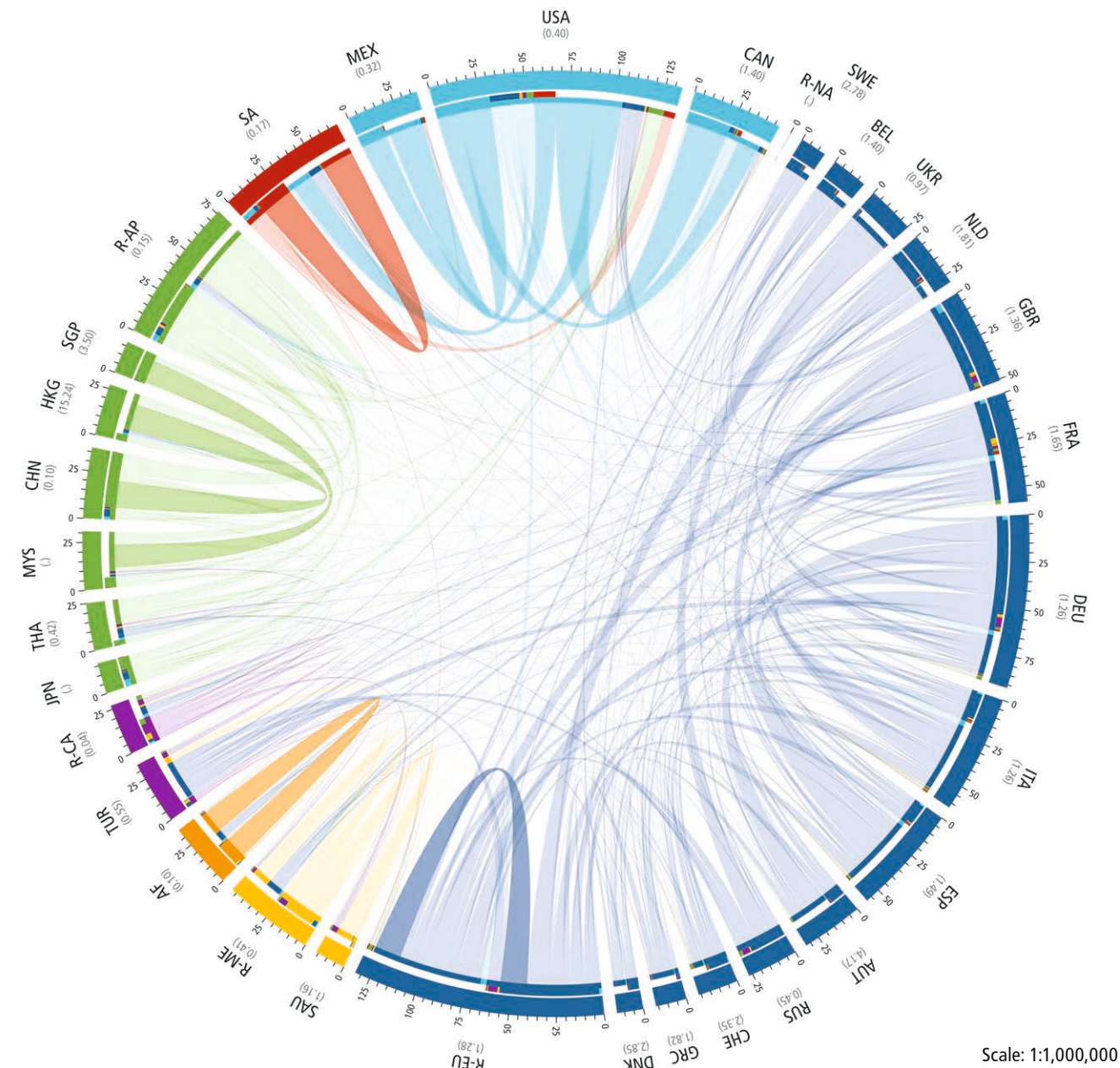
Tourism is the interaction on which our data are least complete: tourist arrivals by origin are unavailable for 36% of total worldwide arrivals. It is also on this component where there is the most inconsistency among the data employed for different countries.<sup>5</sup> With those caveats, the visualizations make intuitive sense. Given the short-run nature of tourism relative to the other people flows that we cover, tourism is more regionalized and tourists traverse shorter distances on average than international students and migrants. The same patterns actually apply even more broadly: tourist flows are by far the most regionalized and occur over the shortest distances of any of the eight flows and stocks visualized here. Eight of the top 10 tourist flows, in fact, occur between neighbors that share a common border. Also note that our data exclude day trippers: if they were included, levels of regionalization would be even higher and distances traversed even lower.

Especially compared to other people flows, tourism is also dominated by advanced economies: based on depth ratios, the average person in an advanced economy travels abroad once every 20 months, versus less than once every 13 years for emerging economies. And flows from emerging economies to advanced economies are relatively small compared to flows between emerging economies. The data therefore cast doubt on the perception in advanced economies that there are already “too many” tourists from emerging economies, especially China—although that country is, in fact, a significant source of growth in outbound tourism. So while tourism is a huge business that is estimated to account for 9% of world GDP and 1 in 11 jobs when its indirect impact is factored in, and while it could be boosted further through relaxation of visa restrictions (an estimated 63% of the world’s population need to obtain a visa before leaving on a leisure trip to a foreign destination), its further growth will require management of such perceptions.<sup>6</sup>

<sup>5</sup> The tourism data, unfortunately, mix together arrivals recorded at borders with arrivals recorded at lodging establishments and origins tracked by nationality and by country of residence, creating some inconsistency. This imperfect combination across data series, however, is a necessary compromise required to achieve the broadest possible data coverage. Its impact, for example is seen in having more incoming tourists in the data going to Spain than to France because we use Spain data recorded at borders (more complete) and France data recorded at lodging establishments (less complete).

<sup>6</sup> Estimates of tourism’s contributions to world GDP and employment are from UNWTO World Tourism Highlights 2014. Analysis of visa requirements from UNWTO/WTTC, “The Impact of Visa Policies on Job Creation in the G20 Economies,” 2012.

Tourists Circular Visualization

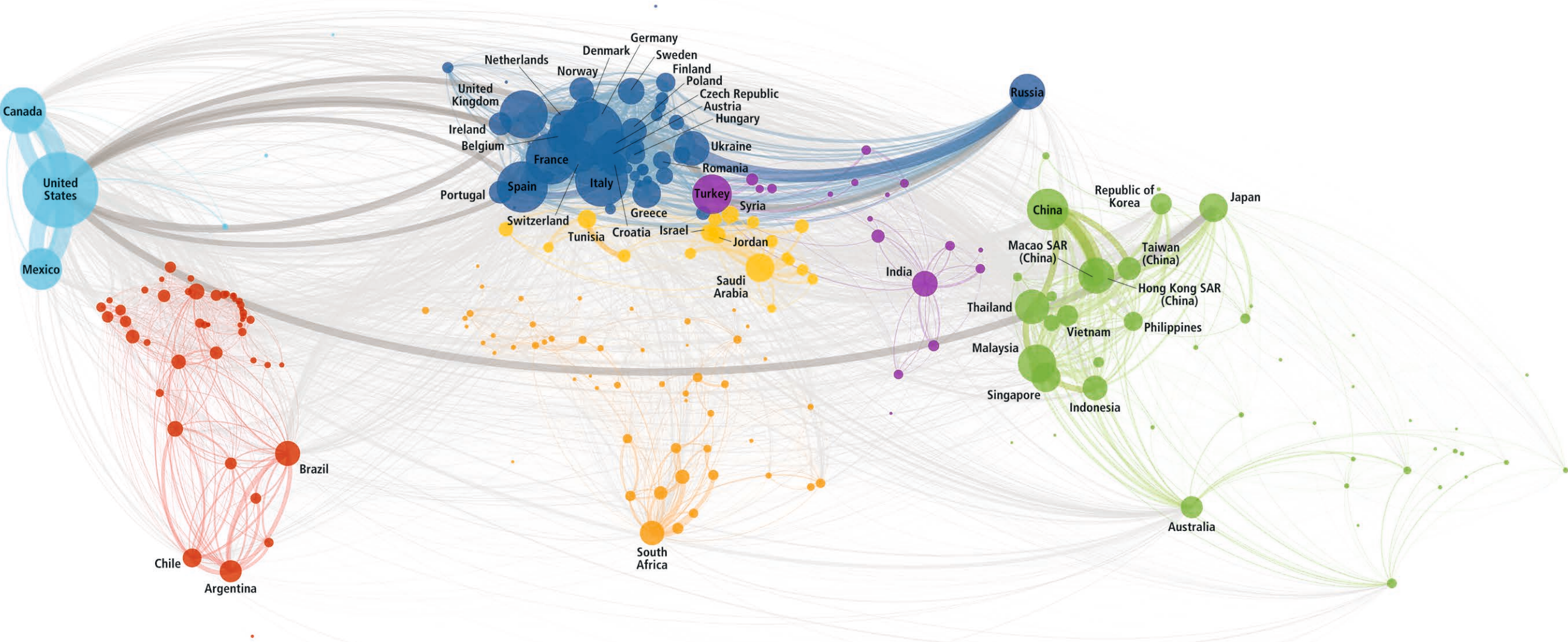


| Region        | Label | Name                  |
|---------------|-------|-----------------------|
| North America | MEX   | Mexico                |
|               | USA   | United States         |
|               | CAN   | Canada                |
|               | R-NA  | Rest of North America |
| Europe        | SWE   | Sweden                |
|               | BEL   | Belgium               |
|               | UKR   | Ukraine               |
|               | NLD   | Netherlands           |
|               | GBR   | United Kingdom        |
|               | FRA   | France                |
|               | DEU   | Germany               |
|               | ITA   | Italy                 |
|               | ESP   | Spain                 |
|               | AUT   | Austria               |
|               | RUS   | Russian Federation    |
|               | CHE   | Switzerland           |
|               | GRC   | Greece                |

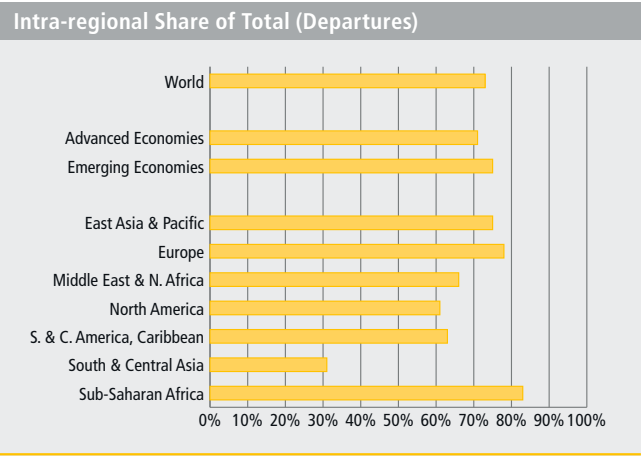
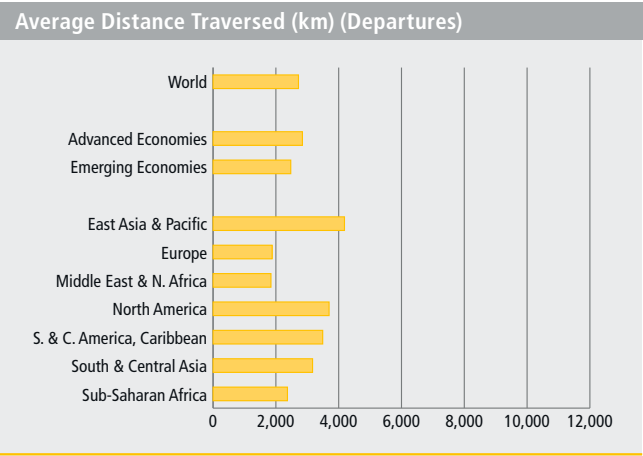
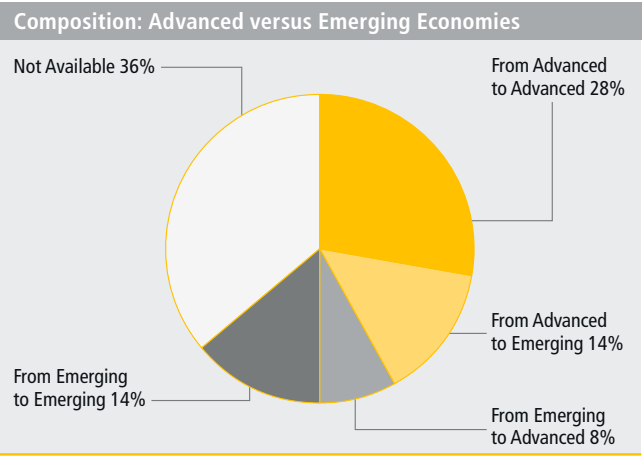
| Region                             | Label | Name                               |
|------------------------------------|-------|------------------------------------|
| Europe                             | DNK   | Denmark                            |
|                                    | R-EU  | Rest of Europe                     |
| Middle East & North Africa         | SAU   | Saudi Arabia                       |
| Sub-Saharan Africa                 | R-ME  | Rest of Middle East & North Africa |
| South & Central Asia               | AF    | Sub-Saharan Africa                 |
|                                    | TUR   | Turkey                             |
| East Asia & Pacific                | R-CA  | Rest of South & Central Asia       |
|                                    | JPN   | Japan                              |
|                                    | THA   | Thailand                           |
|                                    | MYS   | Malaysia                           |
|                                    | CHN   | China                              |
|                                    | HKG   | Hong Kong SAR (China)              |
|                                    | SGP   | Singapore                          |
|                                    | R-AP  | Rest of East Asia & Pacific        |
| South & Central America, Caribbean | SA    | South & Central America, Caribbean |



Tourists Cartographic Visualization



| Ten Largest Tourist Flows |                |                       |            |
|---------------------------|----------------|-----------------------|------------|
|                           | From           | To                    | % of total |
| 1                         | Canada         | United States         | 2.2%       |
| 2                         | United States  | Mexico                | 1.8%       |
| 3                         | China          | Hong Kong SAR (China) | 1.5%       |
| 4                         | Mexico         | United States         | 1.4%       |
| 5                         | Singapore      | Malaysia              | 1.3%       |
| 6                         | United States  | Canada                | 1.1%       |
| 7                         | Germany        | Austria               | 1.1%       |
| 8                         | United Kingdom | Spain                 | 1.0%       |
| 9                         | Germany        | Italy                 | 1.0%       |
| 10                        | Russia         | Ukraine               | 0.9%       |





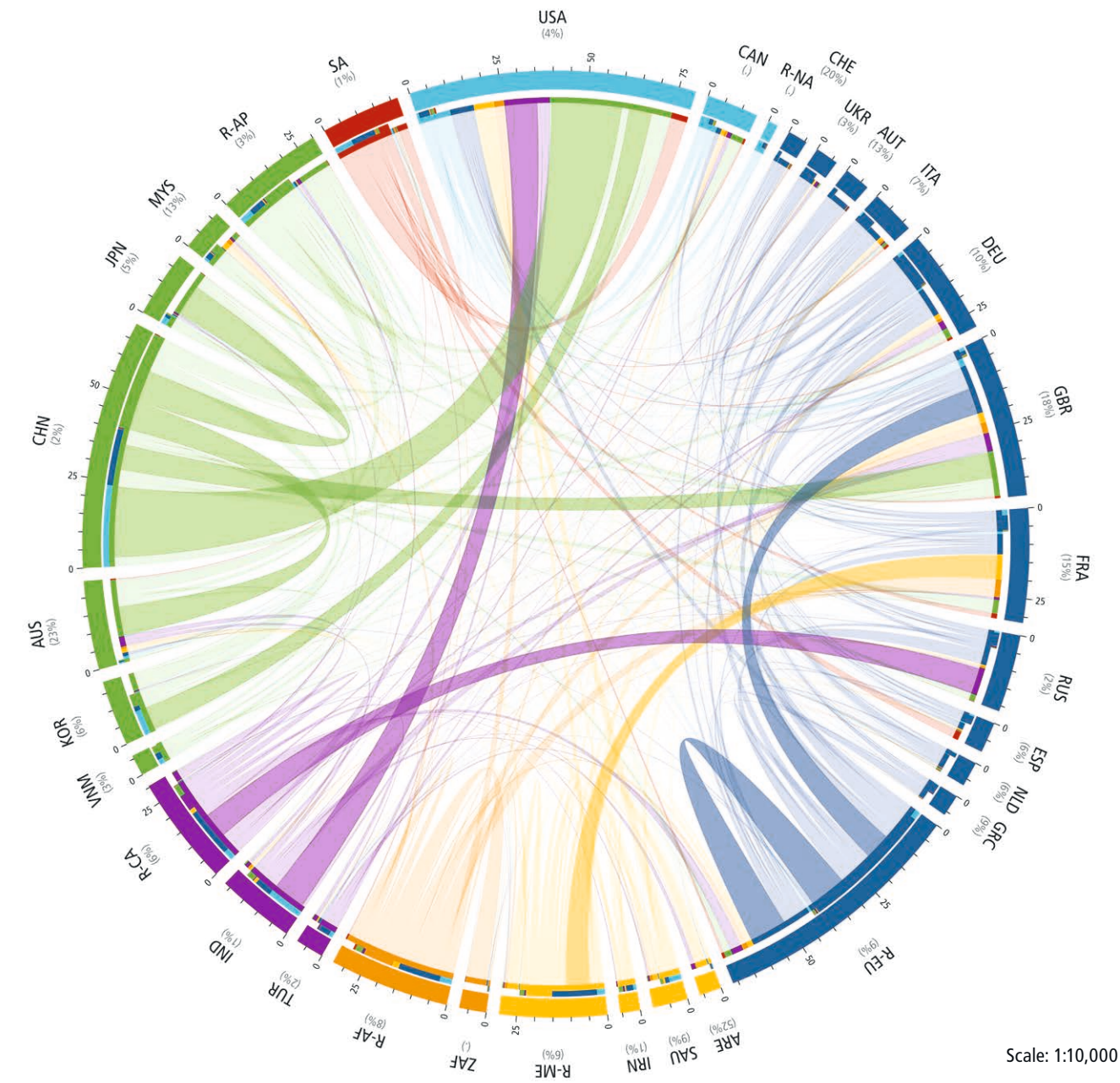
# Students: In Search of Excellence

(based on data from inward direction only)

Compared to tourists, international movement of students is a medium-run phenomenon. An obvious corollary is that it is much less regionalized: in fact the intra-regional component is only 43%, with only portfolio equity ranking lower. Relatedly, the average distance traversed is nearly as high as for portfolio equity (which, again, is top-ranked on this measure).

The stark difference from portfolio equity is that student flows are the second-ranked component in terms of the share of the total accounted for by flows from emerging economies, after migration, and top-ranked in terms of flows from emerging economies to advanced economies in particular. Flows from advanced economies are barely one-third as large, and are also very skewed toward other advanced economies, more so than is the case for any other index component. Students' preference for universities in advanced economies is consistent with the limited shift of top-ranked universities to emerging markets. Based on data from the Academic Ranking of World Universities (ARWU), the share of the world's top 100 universities in emerging economies rose from 0% in 2003 to 1% in 2014. Looking at the top 200 increases these percentages somewhat: emerging economies accounted for 1.5% of the top 200 in 2003 and 7% in 2014 (with the increase driven mainly by the rise of nine universities in China into the top 200). But emerging economies clearly still lag badly on this dimension.

Students Circular Visualization

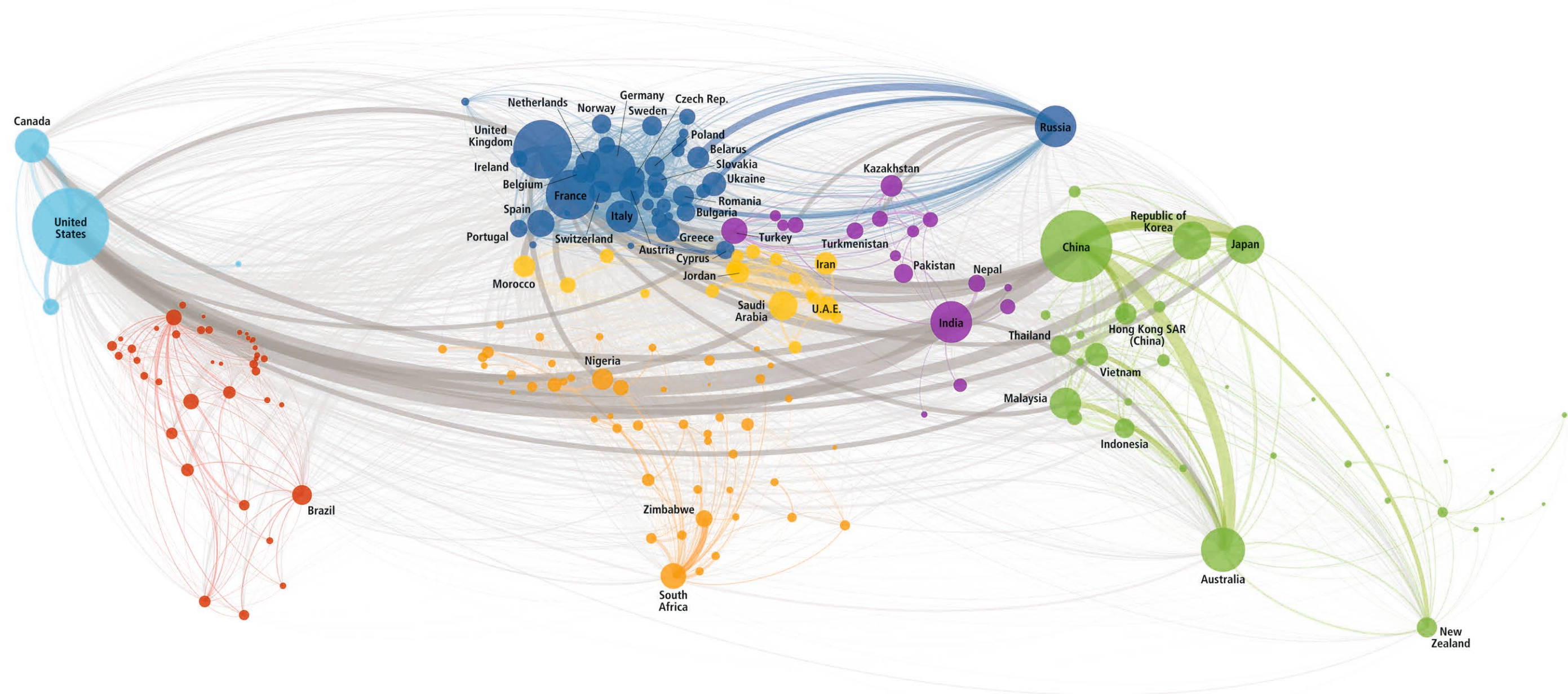


| Region                     | Label | Name                  |
|----------------------------|-------|-----------------------|
| North America              | USA   | United States         |
|                            | CAN   | Canada                |
|                            | R-NA  | Rest of North America |
| Europe                     | CHE   | Switzerland           |
|                            | UKR   | Ukraine               |
|                            | AUT   | Austria               |
|                            | ITA   | Italy                 |
|                            | DEU   | Germany               |
|                            | GBR   | United Kingdom        |
|                            | FRA   | France                |
|                            | RUS   | Russian Federation    |
|                            | ESP   | Spain                 |
|                            | NLD   | Netherlands           |
|                            | GRC   | Greece                |
|                            | R-EU  | Rest of Europe        |
| Middle East & North Africa | ARE   | United Arab Emirates  |
|                            | SAU   | Saudi Arabia          |

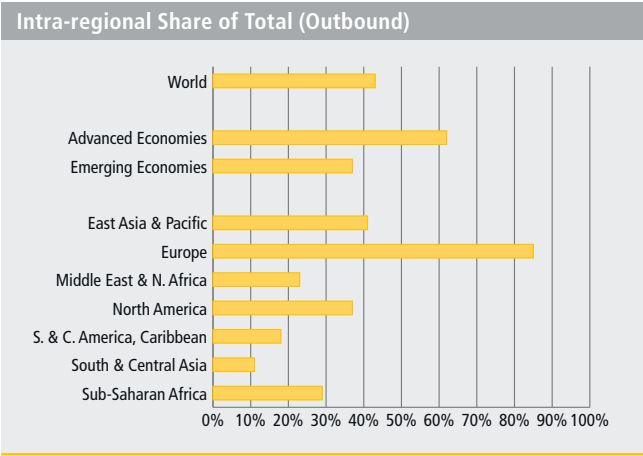
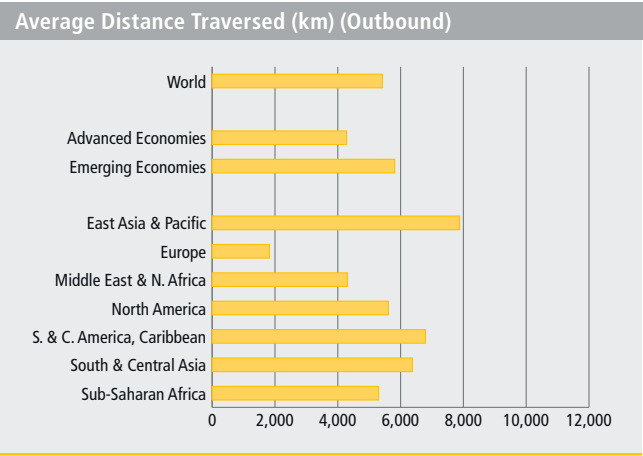
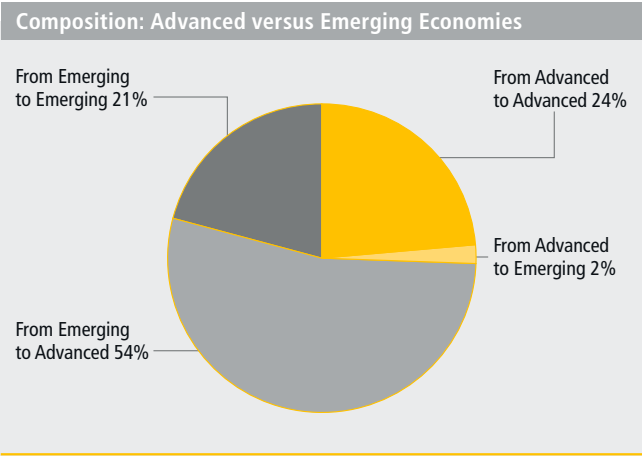
| Region                             | Label | Name                               |
|------------------------------------|-------|------------------------------------|
| Middle East & North Africa         | IRN   | Iran, Islamic Republic             |
| Sub-Saharan Africa                 | R-ME  | Rest of Middle East & North Africa |
|                                    | ZAF   | South Africa                       |
| South & Central Asia               | R-AF  | Rest of Sub-Saharan Africa         |
|                                    | TUR   | Turkey                             |
| East Asia & Pacific                | IND   | India                              |
|                                    | R-CA  | Rest of South & Central Asia       |
|                                    | VNM   | Vietnam                            |
|                                    | KOR   | Korea, Republic                    |
|                                    | AUS   | Australia                          |
|                                    | CHN   | China                              |
| South & Central America, Caribbean | JPN   | Japan                              |
|                                    | MYS   | Malaysia                           |
|                                    | R-AP  | Rest of East Asia & Pacific        |
| South & Central America, Caribbean | SA    | South & Central America, Caribbean |



Students Cartographic Visualization



| Ten Largest Student Stocks |                   |                   |            |
|----------------------------|-------------------|-------------------|------------|
|                            | From              | To                | % of total |
| 1                          | China             | United States     | 6.0%       |
| 2                          | India             | United States     | 2.8%       |
| 3                          | China             | Japan             | 2.8%       |
| 4                          | China             | Australia         | 2.5%       |
| 5                          | China             | United Kingdom    | 2.2%       |
| 6                          | Republic of Korea | United States     | 2.0%       |
| 7                          | China             | Republic of Korea | 1.2%       |
| 8                          | Saudi Arabia      | United States     | 0.9%       |
| 9                          | Belarus           | Russia            | 0.9%       |
| 10                         | Kazakhstan        | Russia            | 0.9%       |





# Migrants: Facts and Fears

Migration is the longest-run people flow and this is where the advanced share of the world total is the smallest: people from rich countries are much less likely to move countries than people from poorer ones. This is, in fact, the one flow for which emerging economies’ share of world totals comes close to matching their share of world population. But unlike university students (which rank second-highest on the emerging share of the total), there is much less of a skew towards advanced economies: more emigrants from emerging economies go to other emerging economies than to advanced economies, despite particularly acute fears in the latter of being swamped by such flows. So the pattern is more mixed than for student flows, where people from emerging and advanced economies alike focus on advanced economy destinations.

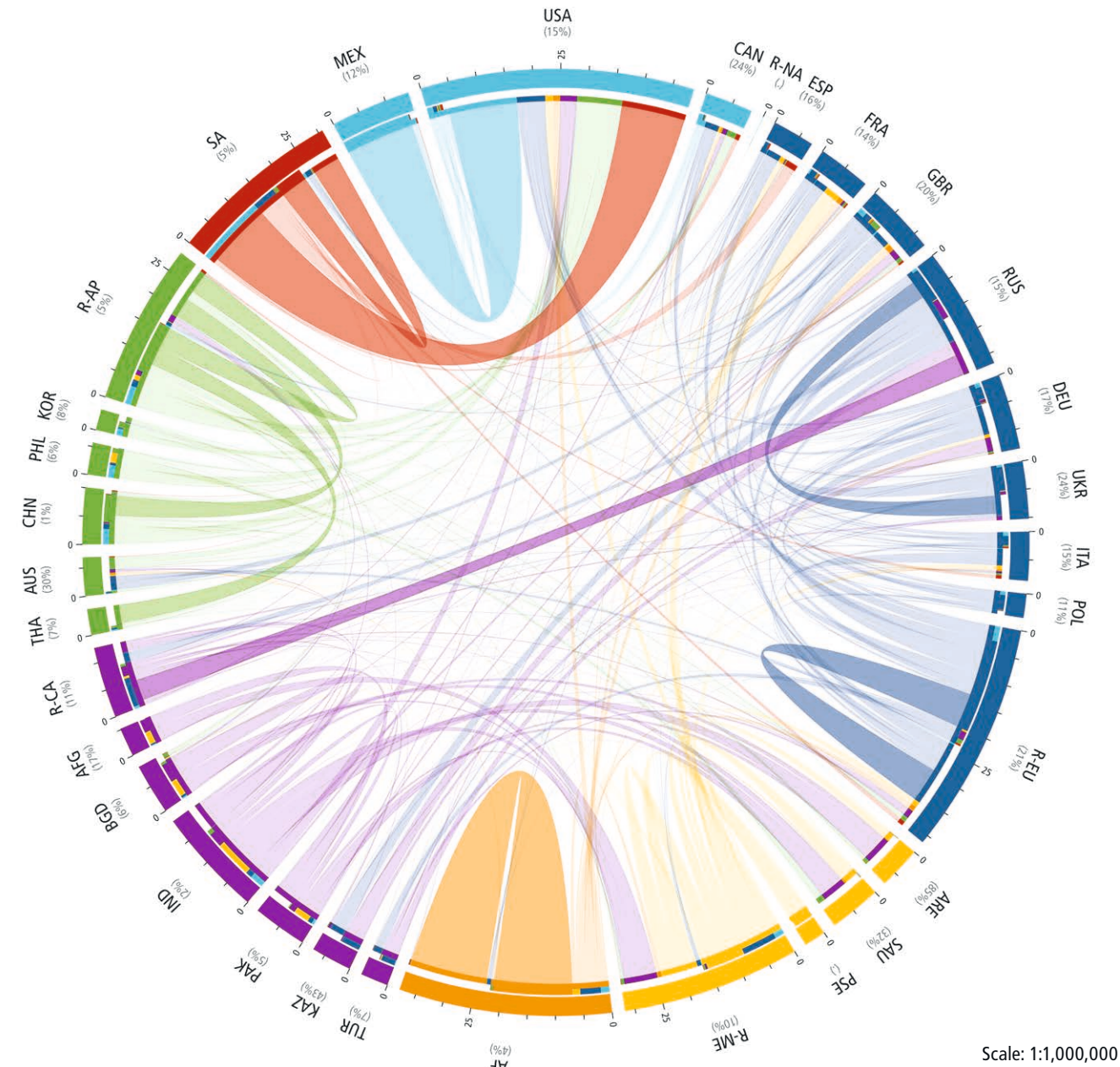
This pattern is indubitably due in large part to visa restrictions. But despite estimates that world GDP could as much as double if such restrictions were removed, that is simply unlikely to happen.<sup>7</sup> Such visa restrictions are doubtless part of the reason why nine of the top 10 flows are between neighbors that share a common border—even more marked than in the case of tourism.

Part of the fear about immigration in some countries seems to be driven by people overestimating the actual depth of immigration in their countries. Survey respondents in the United States and Europe overestimated the share of their countries’ populations born abroad by as much as 2–3 times, and simply telling them the correct values cut the proportion believing their countries had too many immigrants by as much as half. This is another reminder of the problems that globaloney can create—and the potential that can be unlocked by dispelling it.<sup>8</sup>

<sup>7</sup> Bob Hamilton and John Whalley. “Efficiency and distributional implications of global restrictions on labour mobility: Calculations and policy implications.” *Journal of Development Economics* 14.1:61–75 (1984).

<sup>8</sup> The German Marshall Fund of the United States. “Transatlantic Trends: Key Findings 2013.” (2013). <http://trends.gmfus.org/files/2013/09/TTrends-2013-Key-Findings-Report.pdf>; The German Marshall Fund of the United States. “Transatlantic Trends: Mobility, Migration, and Integration.” (2014). [http://trends.gmfus.org/files/2014/09/Trends\\_Immigration\\_2014\\_web.pdf](http://trends.gmfus.org/files/2014/09/Trends_Immigration_2014_web.pdf).

Migrants Circular Visualization

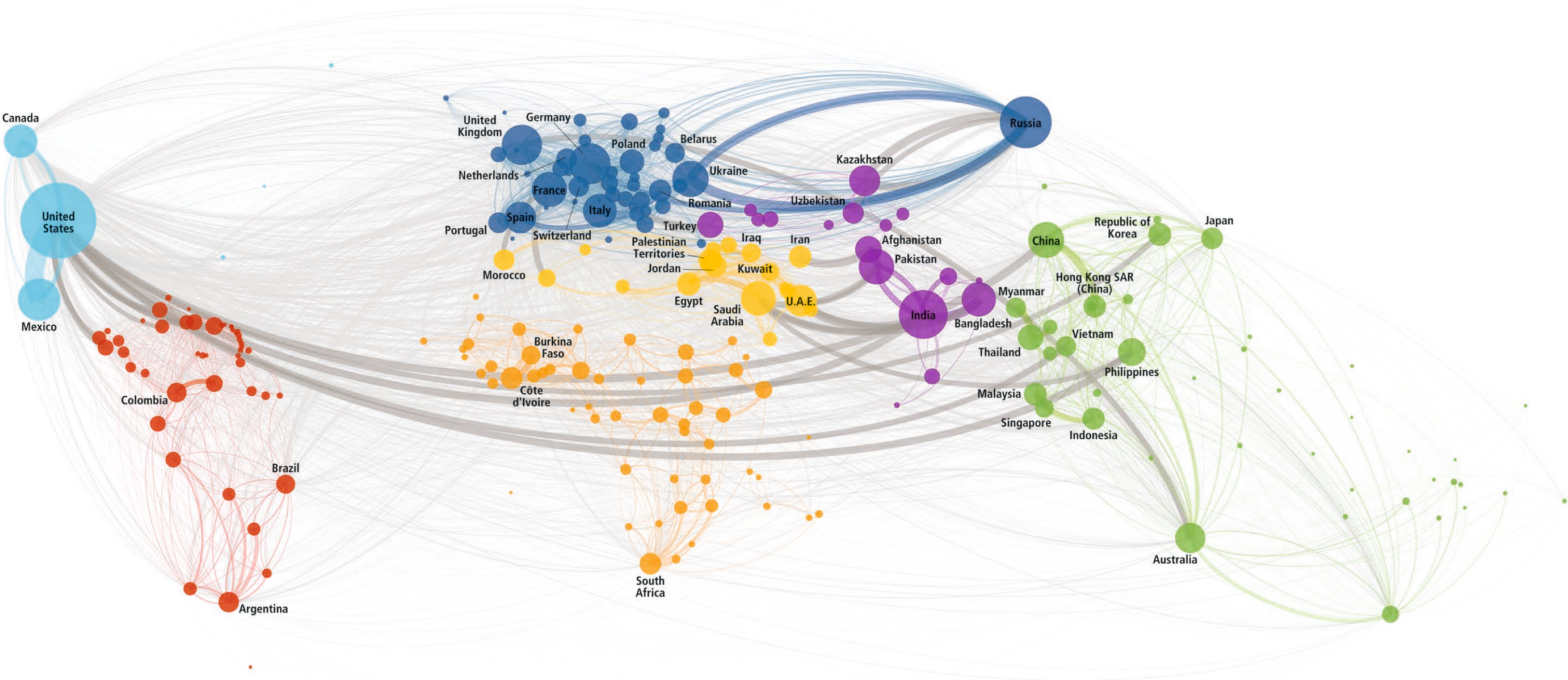


| Region                     | Label | Name                               |
|----------------------------|-------|------------------------------------|
| North America              | MEX   | Mexico                             |
|                            | USA   | United States                      |
|                            | CAN   | Canada                             |
|                            | R-NA  | Rest of North America              |
| Europe                     | ESP   | Spain                              |
|                            | FRA   | France                             |
|                            | GBR   | United Kingdom                     |
|                            | RUS   | Russian Federation                 |
|                            | DEU   | Germany                            |
|                            | UKR   | Ukraine                            |
|                            | ITA   | Italy                              |
|                            | POL   | Poland                             |
|                            | R-EU  | Rest of Europe                     |
| Middle East & North Africa | ARE   | United Arab Emirates               |
|                            | SAU   | Saudi Arabia                       |
|                            | PSE   | Palestinian Territories            |
|                            | R-ME  | Rest of Middle East & North Africa |

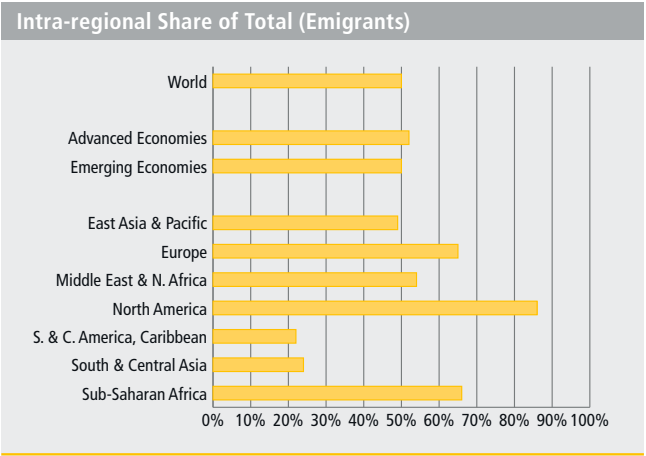
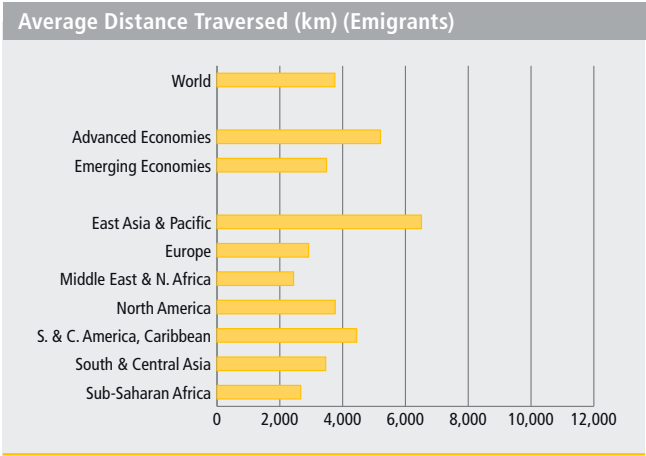
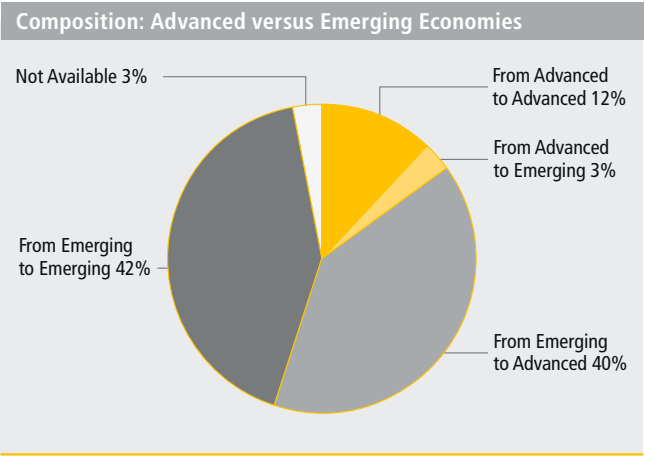
| Region                             | Label | Name                               |
|------------------------------------|-------|------------------------------------|
| Sub-Saharan Africa                 | AF    | Sub-Saharan Africa                 |
| South & Central Asia               | TUR   | Turkey                             |
|                                    | KAZ   | Kazakhstan                         |
|                                    | PAK   | Pakistan                           |
|                                    | IND   | India                              |
|                                    | BGD   | Bangladesh                         |
|                                    | AFG   | Afghanistan                        |
|                                    | R-CA  | Rest of South & Central Asia       |
| East Asia & Pacific                | THA   | Thailand                           |
|                                    | AUS   | Australia                          |
|                                    | CHN   | China                              |
|                                    | PHL   | Philippines                        |
|                                    | KOR   | Korea, Republic                    |
|                                    | R-AP  | Rest of East Asia & Pacific        |
| South & Central America, Caribbean | SA    | South & Central America, Caribbean |



Migrants Cartographic Visualization



| Ten Largest Migrant Stocks |             |                       |            |
|----------------------------|-------------|-----------------------|------------|
|                            | From        | To                    | % of total |
| 1                          | Mexico      | United States         | 5.6%       |
| 2                          | Russia      | Ukraine               | 1.5%       |
| 3                          | Bangladesh  | India                 | 1.4%       |
| 4                          | Ukraine     | Russia                | 1.3%       |
| 5                          | India       | UAE                   | 1.2%       |
| 6                          | Kazakhstan  | Russia                | 1.1%       |
| 7                          | Russia      | Kazakhstan            | 1.0%       |
| 8                          | Afghanistan | Pakistan              | 1.0%       |
| 9                          | Afghanistan | Iran                  | 1.0%       |
| 10                         | China       | Hong Kong SAR (China) | 1.0%       |





Praise for the DHL Global Connectedness Index:

In the current global economic climate where the threat of increased protectionism and isolationist tendencies is of genuine concern, this report offers a compelling argument, based on a methodologically robust analysis, of why increased global and regional inter-connectedness and openness is the more prudent policy path on which to proceed.

Efforts such as the Global Connectedness Index and the WTO's own Made in the World Initiative can assist the trade and development community by providing a more impartial assessment of the status quo and the impacts that policies, geared both at restricting and supporting greater connectivity and deeper integration, can have on global wealth and development.

Pascal Lamy, Former Director-General, World Trade Organization