Appendix.

Data Sources

- Original bilateral migrant stock data produced by the World Bank can be downloaded from [here](#)
- Original data on total population per country produced by the UN Population Division can be downloaded from [here](#)
- Original data on number of deaths per country produced by the UN Population Division can be downloaded from [here](#)
- Original data on number of births per country produced by the UN Population Division can be downloaded from [here](#)
- Taiwan's total population, number of births, and number of deaths data can be downloaded from [here](#)
- Original *Adjusted Income per Capita Index* is developed by Padros de la Escosura (2015). The raw data can be downloaded from [here.](#) Since the original data ranges from 0 to 1 with a three-decimal point format, each original value was multiplied by 100.
- Original *Major Episodes of Political Violence (MEPV) 1946-2015 data set* developed by the Center for Systematic Piece codebook and data can be accessed [here](#). This data set lists annual time-series data on political violence. I manually added Bahamas, Barbados, Belize, Jamaica, Puerto Rico, St Vincent and the Grenadines, and St. Lucia which were not in the original data set but did not have any major political conflicts between 1946-2015. I also completed the entries for Jamaica (1946 to 1961 were absent), Guyana (1946 to 1965 were absent), Suriname (1946 to 1974 were absent) and Trinidad (1946 to 1961 were absent). None of these four countries had major episodes of political violence during those years. Importantly, the MEPV does not include in the count of major episodes of political violence any conflict related to independence (see codebook).
- Geographic distance between countries in the world can be downloaded from [here](#)
  - The original data file can be downloaded after clicking on the hyperlink "dist_cepii.dta" on page 2. The original file is a STATA data file (dist_cepii.dta). Therefore, the data set was opened in STATA 13 and save as a .csv file.

The UN data (i.e. population, births, deaths) originally are in thousands, so before saving these three data sheets in .csv format, all cell containing data were multiplied by 1000. This is important because if the data sheets are directly saved in .csv format, the decimal points are lost.

Code

All the relevant code to estimate migration flows and fit TERG models, as well as the raw input data files used in the article, can be downloaded as R objects from [here.](#)

Table A.1. Circos Plots Specifications

| LABELS						
	Parallel		**Font**	**Size**	**Color**	
Segment	Yes		Normal	Med	Black	
Tick	No		Light	Small	Black	
Segment labels inside segments	Unchecked					
DATA FILTERS						
Cell percentile cutoff		0		**Intra-segment cells**		Show
VALUE REMAPPING						
Attenuate small values		Unchecked				
ROW AND COLUMN SEGMENTS						
Thickness		thin	**Spacing**	very loose	**radius**	Large
Order	name		**Progression**	Desc	**Normalize segment size**	No
CELL RIBBONS						
Ribbon placement on segments	Row ribbon first		**Ribbon order**	Destination segment position	**Ribbon layer order**	Large on top of small
Reverse row and column ribbon position	Unchecked		**Default Transparency**	2		
QUARTILE RIBBONS						
Q1	Unchecked	**Color**	(blank)	**Transparency**	(blank)	**Stroke**	Yes
Q2	Unchecked	**Color**	(blank)	**Transparency**	(blank)	**Stroke**	Yes
Q3	Unchecked	**Color**	(blank)	**Transparency**	(blank)	**Stroke**	Yes
Q4	Unchecked	**Color**	(blank)	**Transparency**	(blank)	**Stroke**	Yes
CONTRIBUTION TRACKS						
Hide	checked	**Expand size to segment size**	Unchecked	**No stroke**	Unchecked
RIBBON CAPS						
hide ribbon caps colored by row	Unchecked		**no stroke**	Unchecked	**hide ribbon caps colored by column**	Unchecked
RATIO LAYOUT						
Use ratio layout	Unchecked					
Start segments at 3 o'clock	checked	**Hide first tick label**	checked	**No stroke on any segment**	Unchecked
Draw last tick (seg. size)	Unchecked	**Hide segment labels**	Unchecked	**Hide absolute tick marks**	checked
Hide all tick labels	Unchecked	**Hide relevant tick marks**	checked		
COLORS						
Colors ribbon by	row	**Colors ribbons by value**	no	**Segment color order**	Segment label	**Seg color interpolation**	By count

Input data files can be obtained by running the relevant code (see data and code section in this document).

Once data files are obtained, make sure you delete all the quotation marks "" around the column and row names of the flow matrices, and writing "DAT" in cell [1,1] of all flow matrices, the circos plots used in the paper can be reproduced using the this web application with settings detailed in the table above.

Table A.2. Sociograms of the Migration Flows in the Americas by Thresholding Rule

Thresholding = top 10 destinations

Mean percent flows present out
of all flows observed = 40.08%

Mean Graph Density 0.298

Thresholding = top 15 destinations

Mean percent flows present out
of all flows = 60.23%

Mean Graph Density 0.449

Thresholding = top 20 destinations

Mean percent flows present out
of all flows observed = 79.95%

Mean Graph Density = 0.595

Table A.3. In-degree Distributions with Thresholding = 15, Migration Flows in the Americas 1960 – 2000.
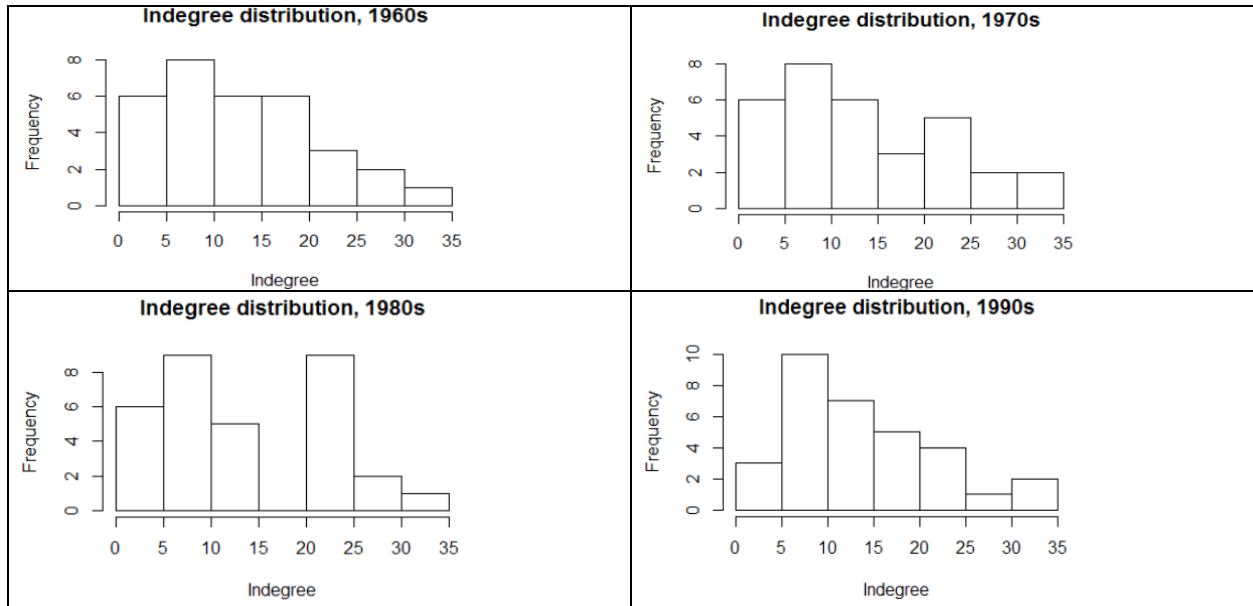
Table A.4. Temporal Exponential Random Graph Model to Investigate International Migration Flows in the Americas (1960-2000), Thresholding = 10

	Estimates		CI Lower Bound	CI Upper Bound
Intercept/edges	-77.353	***	-111.082	-74.899
Endogenous dependencies				
Cyclic triples	-0.240	***	-0.562	-0.159
Transitive triples	0.127	***	0.069	0.234
Endogenous controls				
Reciprocity	0.538	***	0.169	0.998
Delayed reciprocity	0.316	***	0.076	0.968
Dyadic stability	0.564	***	0.437	0.886
In-degree popularity	-0.065		-0.309	0.245
Out-degree popularity	36.556	***	36.353	49.338
GWesp (1.5)	0.317		-0.034	0.984
GWdesp (1.5)	-0.016		-0.042	0.050
Out-2-star	-10.543	***	-14.422	-10.543
In-4-star	0.001		0.000	0.001
Out-degree absolute diff	-3.553	***	-6.768	-2.690
Exogenous controls				
Same region	0.422		-0.065	0.891
same language	1.022	***	0.653	1.976
Income absolute diff	0.001	***	0.001	0.002
Conflict absolute diff	0.004		-0.022	0.015

P-value thresholds: * < 0.1, ** < 0.05, *** < 0.005

Table A.5. Temporal Exponential Random Graph Model to Investigate International Migration Flows in the Americas (1960-2000), Thresholding = 20

	Estimates		CI Lower Bound	CI Upper Bound
Intercept/edges	-4.449		-8.859	62.468
Endogenous dependencies				
Cyclic triples	-0.155	***	-0.208	-0.078
Transitive triples	0.101	***	0.065	0.134
Endogenous controls				
Reciprocity	0.539	***	0.379	0.730
Delayed reciprocity	0.242	***	0.178	0.476
Dyadic stability	0.397	***	0.297	0.618
In-degree popularity	0.016		-0.083	0.399
Out-degree popularity	0.356		-18.898	1.268
GWesp (1.5)	0.362	***	0.046	0.544
GWdesp (1.5)	0.029	***	0.016	0.066
Out-2-star	-0.133		-0.313	3.061
In-4-star	0.000	***	0.000	0.000
Out-degree absolute diff	-0.379	***	-1.049	-0.100
Exogenous controls				
Same region	0.797	***	0.465	1.087
same language	0.612	***	0.364	0.759
Income absolute diff	0.000		-0.001	0.000
Conflict absolute diff	-0.002		-0.009	0.001

P-value thresholds: * < 0.1, ** < 0.05, *** < 0.005

Table A.6. Degeneracy Check for TERG Model in Table 4 (large P-values are desirable)

Degeneracy check for network 1:

	obs	sim	est	se	zval	pval
ctriple	1014.0	1017	2.70	1533.86	0.00	1.00
ttriple	4014.0	4414	399.64	2077.92	0.19	0.85
mutual	126.0	123	-2.66	254.84	-0.01	0.99
edgecov.delrecip[[1]]	246.0	243	-2.51	95.73	-0.03	0.98
edgecov.mem.stability[[1]]	243.0	207	-36.18	234.35	-0.15	0.88
idegreepopularity	1898.2	2021	122.80	609.65	0.20	0.84
odegreepopularity	1640.2	1707	66.52	705.18	0.09	0.92
gwesp.fixed.1.5	1642.4	1726	84.02	582.26	0.14	0.89
gwdsp.fixed.1.5	2796.7	2743	-53.40	4346.00	-0.01	0.99
ostar2	2860.0	3014	154.32	1733.26	0.09	0.93
istar4	165356.0	193445	28089.22	207890.39	0.14	0.89
absdiff.odegsqrt	87.1	93	5.89	21.79	0.27	0.79
nodematch.region	132.0	126	-6.42	163.28	-0.04	0.97
nodematch.language	247.0	263	16.37	67.64	0.24	0.81
absdiff.aici	64361.7	65844	1482.14	8258.40	0.18	0.86
absdiff.conflict	902.0	3053	2151.25	2633.76	0.82	0.41
edges	439.0	451	12.41	124.25	0.10	0.92

Degeneracy check for network 2:

	obs	sim	est	se	zval	pval
ctriple	926.0	1017	9.07e+01	1.53e+03	0.06	0.95
ttriple	3994.0	4414	4.20e+02	2.08e+03	0.20	0.84
mutual	118.0	123	5.34e+00	2.55e+02	0.02	0.98
edgecov.delrecip[[2]]	252.0	243	-8.51e+00	9.57e+01	-0.09	0.93
edgecov.mem.stability[[2]]	184.0	207	2.28e+01	2.34e+02	0.10	0.92
idegreepopularity	1916.2	2021	1.05e+02	6.10e+02	0.17	0.86
odegreepopularity	1653.6	1707	5.31e+01	7.05e+02	0.08	0.94
gwesp.fixed.1.5	1658.9	1726	6.75e+01	5.82e+02	0.12	0.91
gwdsp.fixed.1.5	2748.2	2743	-4.92e+00	4.35e+03	0.00	1.00
ostar2	2885.0	3014	1.29e+02	1.73e+03	0.07	0.94
istar4	150840.0	193445	4.26e+04	2.08e+05	0.20	0.84
absdiff.odegsqrt	95.1	93	-2.17e+00	2.18e+01	-0.10	0.92
nodematch.region	131.0	126	-5.42e+00	1.63e+02	-0.03	0.97
nodematch.language	264.0	263	-6.25e-01	6.76e+01	-0.01	0.99
absdiff.aici	65698.0	65844	1.46e+02	8.26e+03	0.02	0.99
absdiff.conflict	2832.0	3053	2.21e+02	2.63e+03	0.08	0.93
edges	442.0	451	9.41e+00	1.24e+02	0.08	0.94

Degeneracy check for network 3:

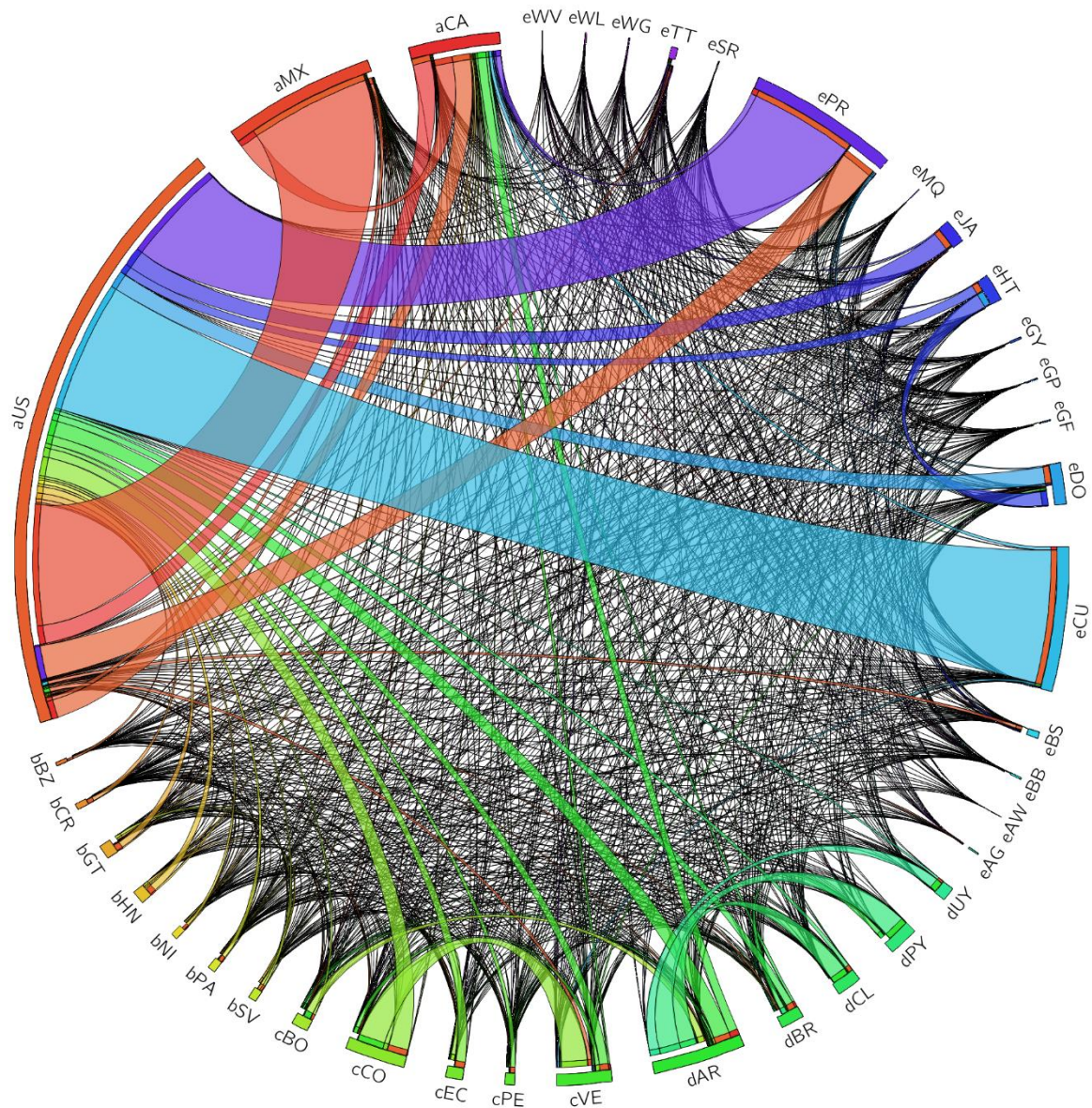|	obs	sim	est	se	zval	pval
ctriple	1014.0	1017	2.70	1533.86	0.00	1.00
ttriple	4000.0	4414	413.64	2077.92	0.20	0.84
mutual	133.0	123	-9.66	254.84	-0.04	0.97
edgecov.delrecip[[3]]	247.0	243	-3.51	95.73	-0.04	0.97
edgecov.mem.stability[[3]]	184.0	207	22.82	234.35	0.10	0.92
idegreepopularity	1906.5	2021	114.46	609.65	0.19	0.85
odegreepopularity	1721.4	1707	-14.70	705.18	-0.02	0.98
gwesp.fixed.1.5	1696.8	1726	29.55	582.26	0.05	0.96
gwdsp.fixed.1.5	3001.8	2743	-258.50	4346.00	-0.06	0.95
ostar2	3050.0	3014	-35.68	1733.26	-0.02	0.98
istar4	141194.0	193445	52251.22	207890.39	0.25	0.80
absdiff.odegsqrt	96.1	93	-3.13	21.79	-0.14	0.89
nodematch.region	145.0	126	-19.42	163.28	-0.12	0.91
nodematch.language	262.0	263	1.37	67.64	0.02	0.98
absdiff.aici	67728.0	65844	-1884.19	8258.40	-0.23	0.82
absdiff.conflict	4533.0	3053	-1479.75	2633.76	-0.56	0.57
edges	454.0	451	-2.59	124.25	-0.02	0.98

Figure A.7 TERG Model: Goodness-of-fit Assessment based on 500 simulated Networks per Decade.
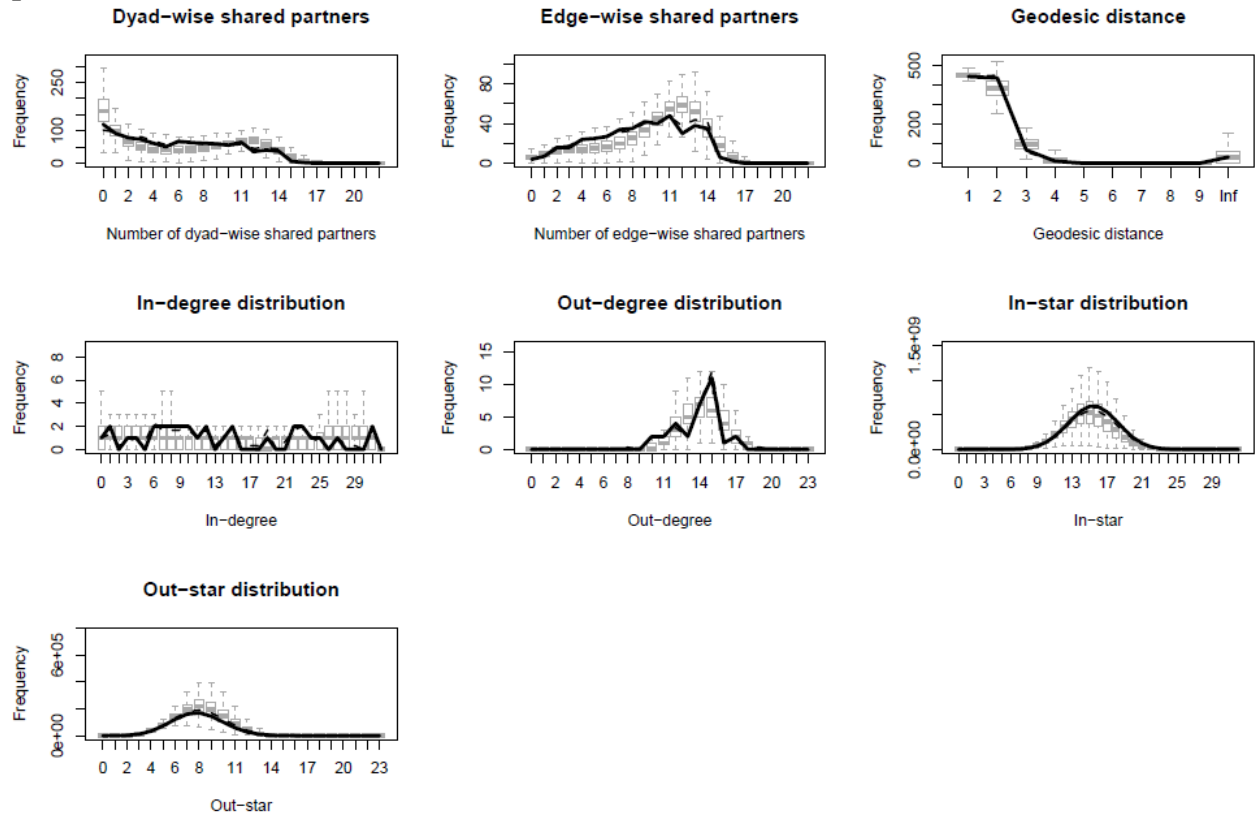
Solid lines represents median of the observed networks. Box plots represents 95% confidence intervals around the mean simulated networks.
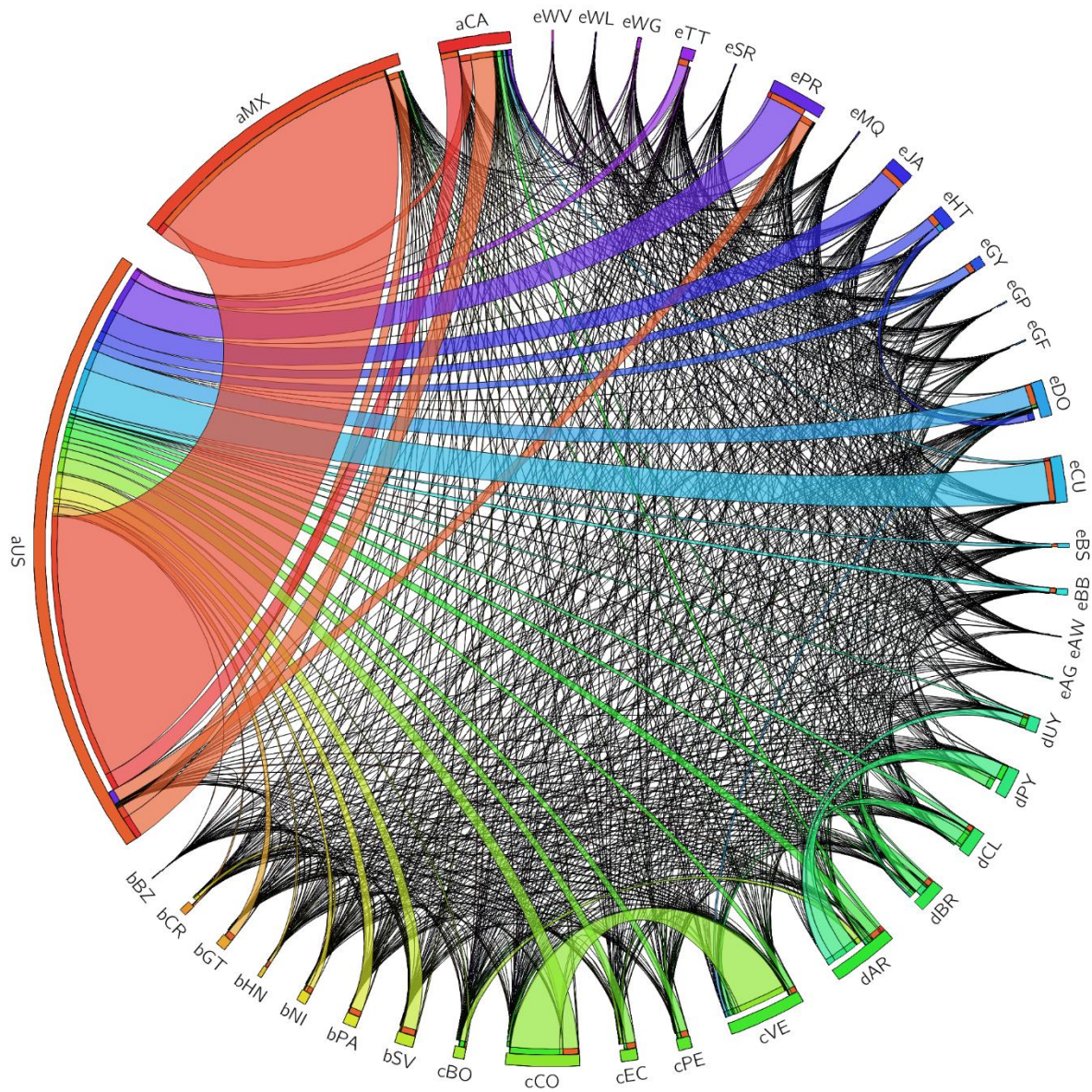
Figure A.8 Migration in the Americas Including the US, 1960s

Note. Countries can be identified as follows: Canada (aCA); Mexico (aMX); United States (aUS); Belize (bBZ); Costa Rica (bCR); El Salvador (bSV); Guatemala (bGT); Honduras (bHN); Nicaragua (bNI); Panama (bPA); Bolivia (cBO); Colombia (cCO); Ecuador (cEC); Peru (cPE); Venezuela (cVE); Argentina (dAR); Brazil (dBR); Chile (dCL); Paraguay (dPY); Uruguay (dUY); Antigua and Barbuda (eAG); Aruba (eAW); the Bahamas (eBS); Barbados (eBB); Cuba (eCU); Dominican Republic (eDO); French Guiana (eGF); Grenada (eWG); Guadalupe (eGP); Guyana (eGY); Haiti (eHT); Jamaica (eJA); Martinique (eMQ); Puerto Rico (ePR); St. Lucia (eWL); St. Vincent and the Grenadines (eWV); Suriname (eSR); Trinidad and Tobago (eTT).
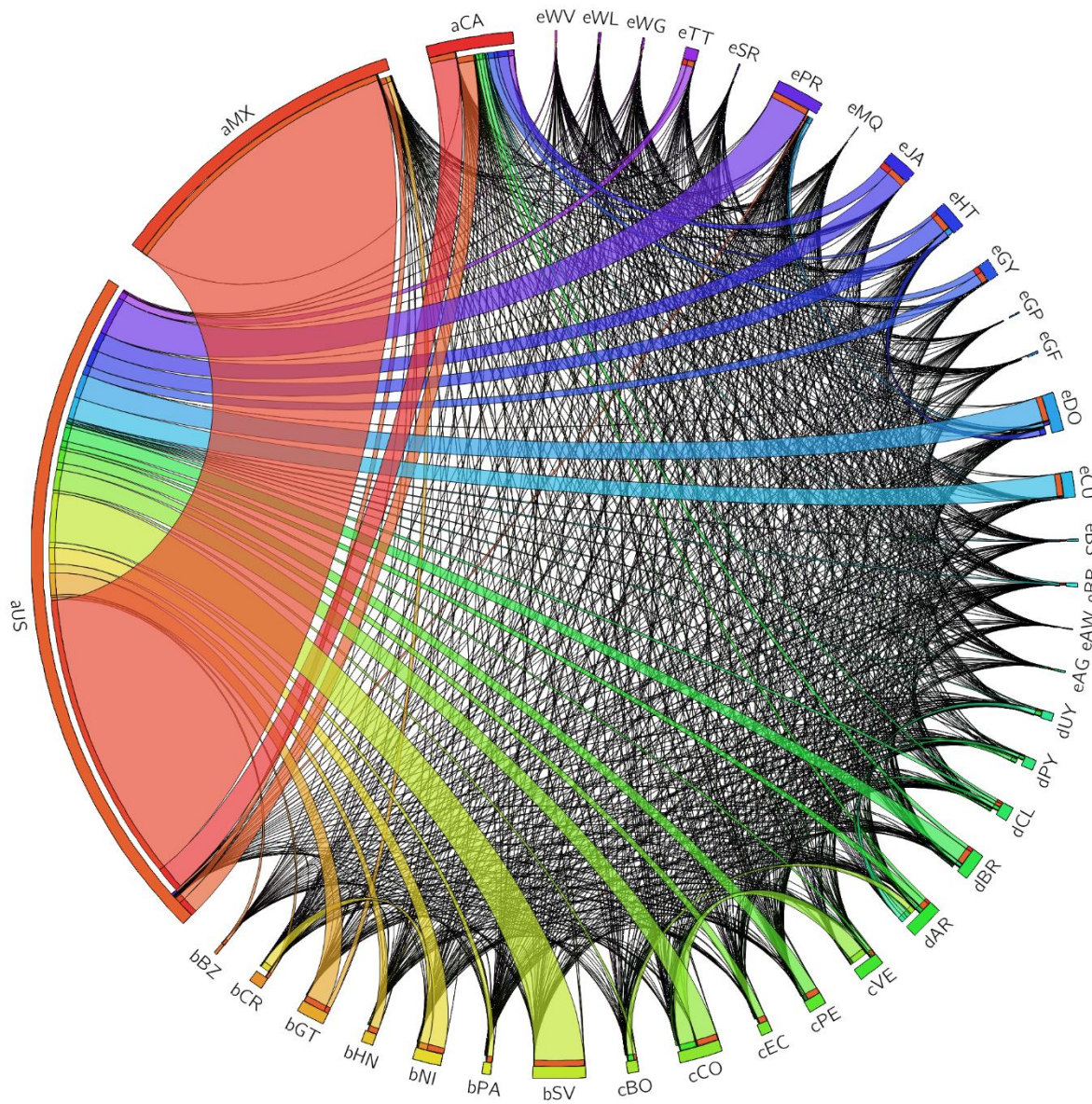
Figure A.9 Migration in the Americas Including the US, 1970s

Note. Countries can be identified as follows: Canada (aCA); Mexico (aMX); United States (aUS); Belize (bBZ); Costa Rica (bCR); El Salvador (bSV); Guatemala (bGT); Honduras (bHN); Nicaragua (bNI); Panama (bPA); Bolivia (cBO); Colombia (cCO); Ecuador (cEC); Peru (cPE); Venezuela (cVE); Argentina (dAR); Brazil (dBR); Chile (dCL); Paraguay (dPY); Uruguay (dUY); Antigua and Barbuda (eAG); Aruba (eAW); the Bahamas (eBS); Barbados (eBB); Cuba (eCU); Dominican Republic (eDO); French Guiana (eGF); Grenada (eWG); Guadalupe (eGP); Guyana (eGY); Haiti (eHT); Jamaica (eJA); Martinique (eMQ); Puerto Rico (ePR); St. Lucia (eWL); St. Vincent and the Grenadines (eWV); Suriname (eSR); Trinidad and Tobago (eTT).
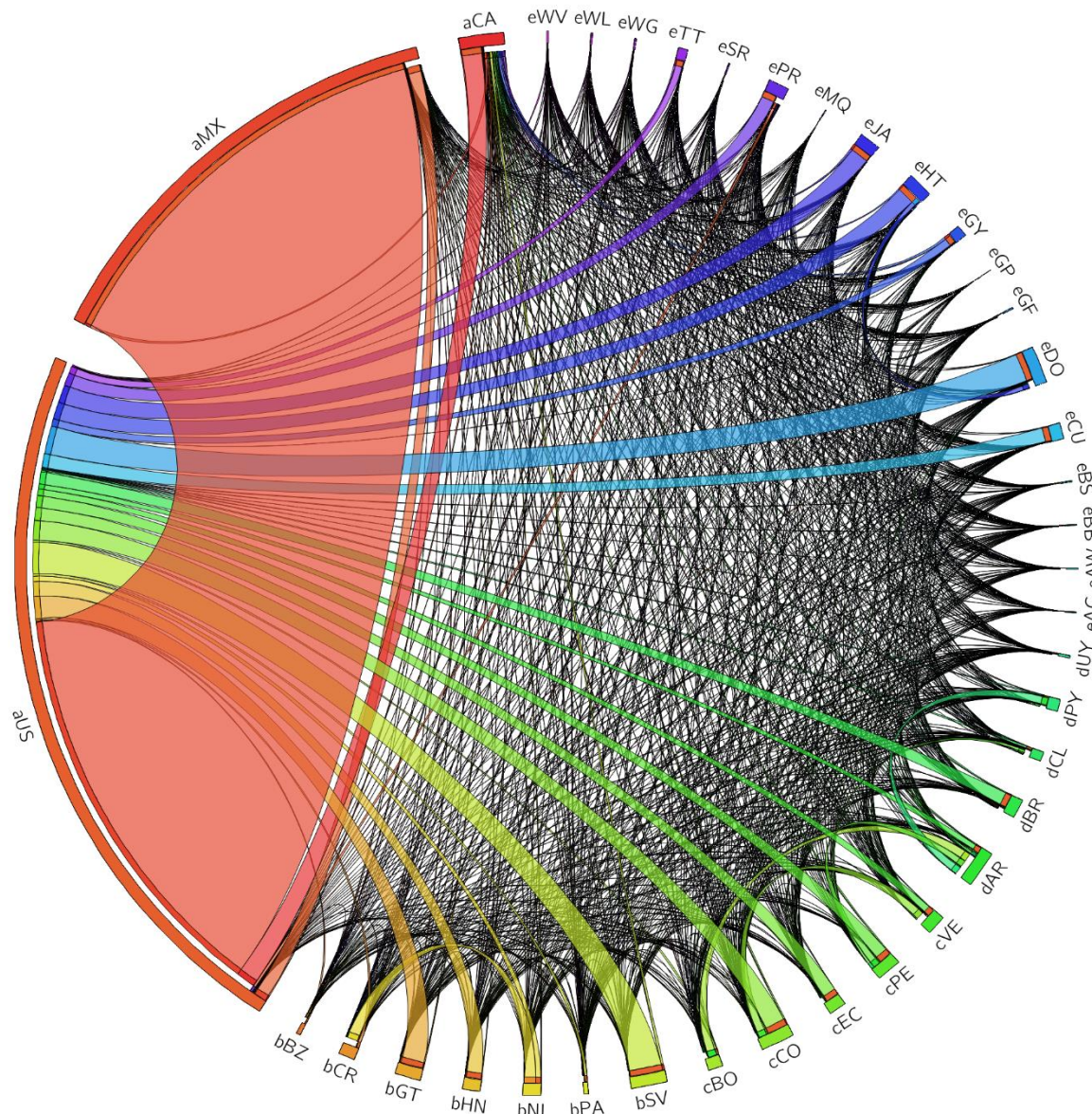
Figure A.10 Migration in the Americas Including the US, 1980s

Note. Countries can be identified as follows: Canada (aCA); Mexico (aMX); United States (aUS); Belize (bBZ); Costa Rica (bCR); El Salvador (bSV); Guatemala (bGT); Honduras (bHN); Nicaragua (bNI); Panama (bPA); Bolivia (cBO); Colombia (cCO); Ecuador (cEC); Peru (cPE); Venezuela (cVE); Argentina (dAR); Brazil (dBR); Chile (dCL); Paraguay (dPY); Uruguay (dUY); Antigua and Barbuda (eAG); Aruba (eAW); the Bahamas (eBS); Barbados (eBB); Cuba (eCU); Dominican Republic (eDO); French Guiana (eGF); Grenada (eWG); Guadalupe (eGP); Guyana (eGY); Haiti (eHT); Jamaica (eJA); Martinique (eMQ); Puerto Rico (ePR); St. Lucia (eWL); St. Vincent and the Grenadines (eWV); Suriname (eSR); Trinidad and Tobago (eTT).

Figure A.11 Migration in the Americas Including the US, 1990s

Note. Countries can be identified as follows: Canada (aCA); Mexico (aMX); United States (aUS); Belize (bBZ); Costa Rica (bCR); El Salvador (bSV); Guatemala (bGT); Honduras (bHN); Nicaragua (bNI); Panama (bPA); Bolivia (cBO); Colombia (cCO); Ecuador (cEC); Peru (cPE); Venezuela (cVE); Argentina (dAR); Brazil (dBR); Chile (dCL); Paraguay (dPY); Uruguay (dUY); Antigua and Barbuda (eAG); Aruba (eAW); the Bahamas (eBS); Barbados (eBB); Cuba (eCU); Dominican Republic (eDO); French Guiana (eGF); Grenada (eWG); Guadalupe (eGP); Guyana (eGY); Haiti (eHT); Jamaica (eJA); Martinique (eMQ); Puerto Rico (ePR); St. Lucia (eWL); St. Vincent and the Grenadines (eWV); Suriname (eSR); Trinidad and Tobago (eTT).