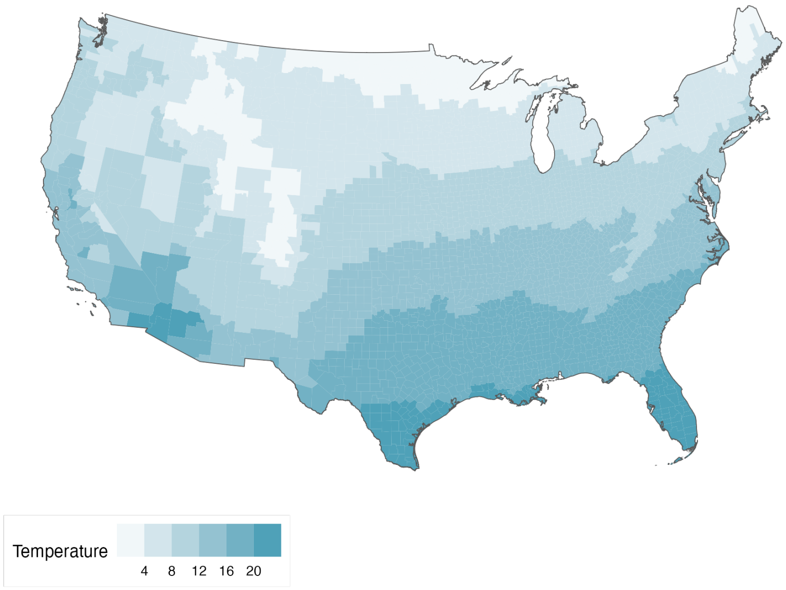
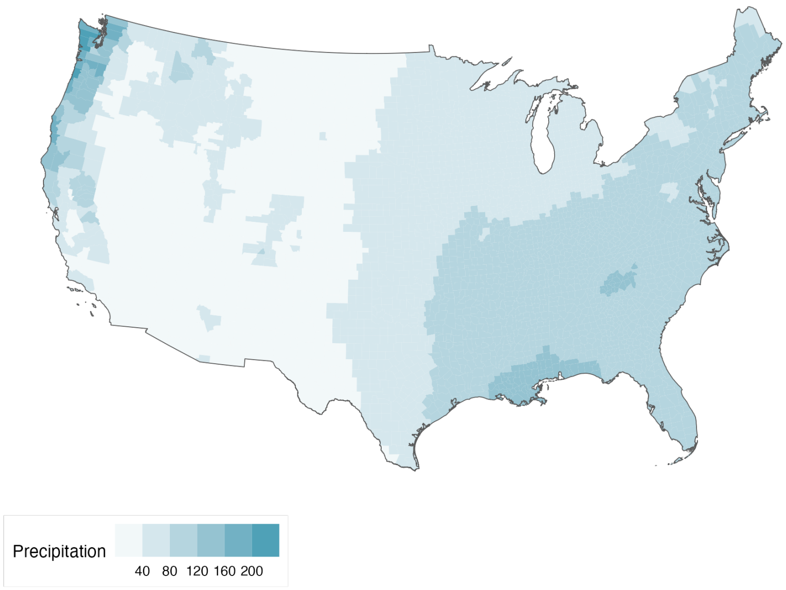
A Additional Figures and Tables

Figure A1. US County Historical Climate (1895-1920)

(a) Temperature

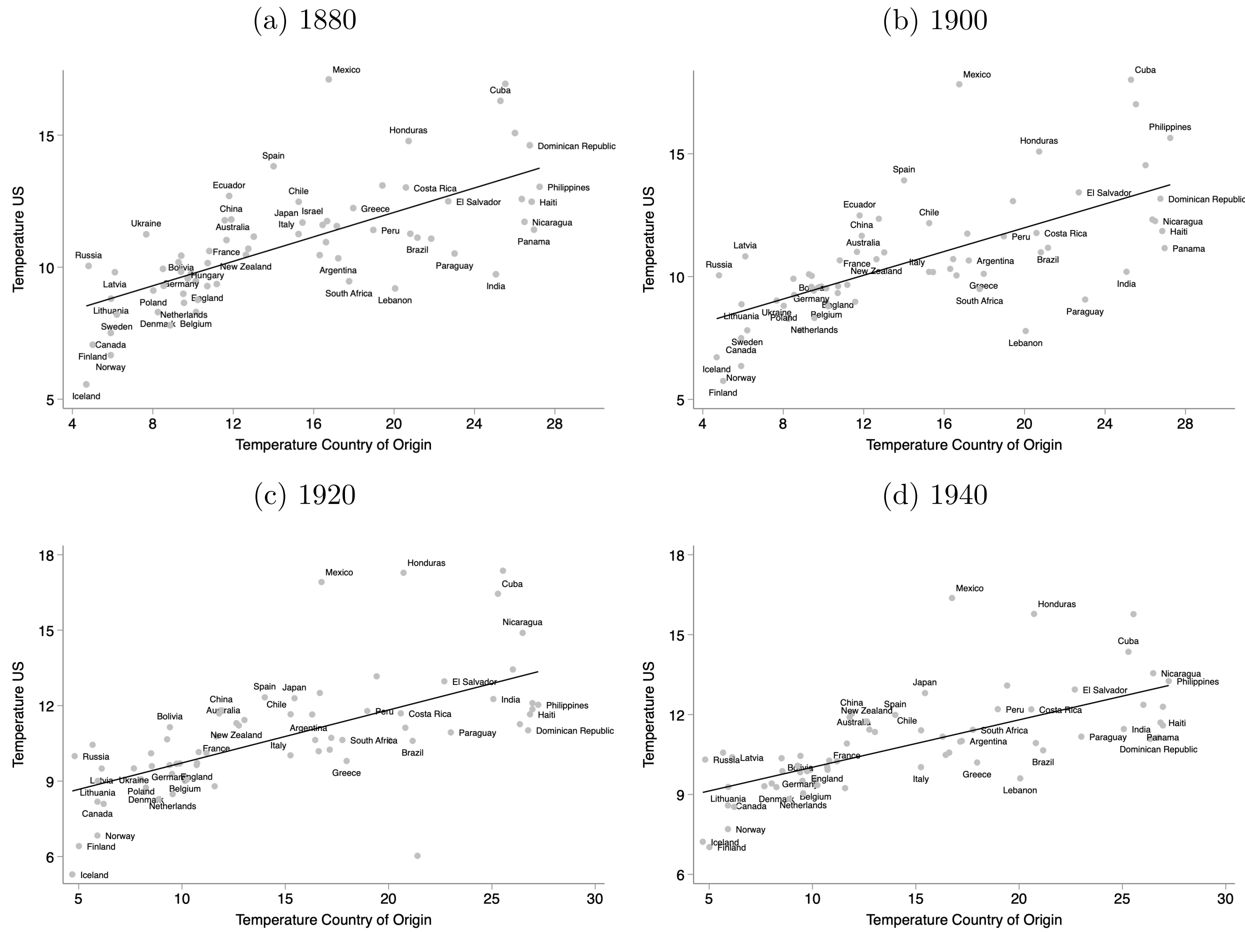


(b) Precipitation



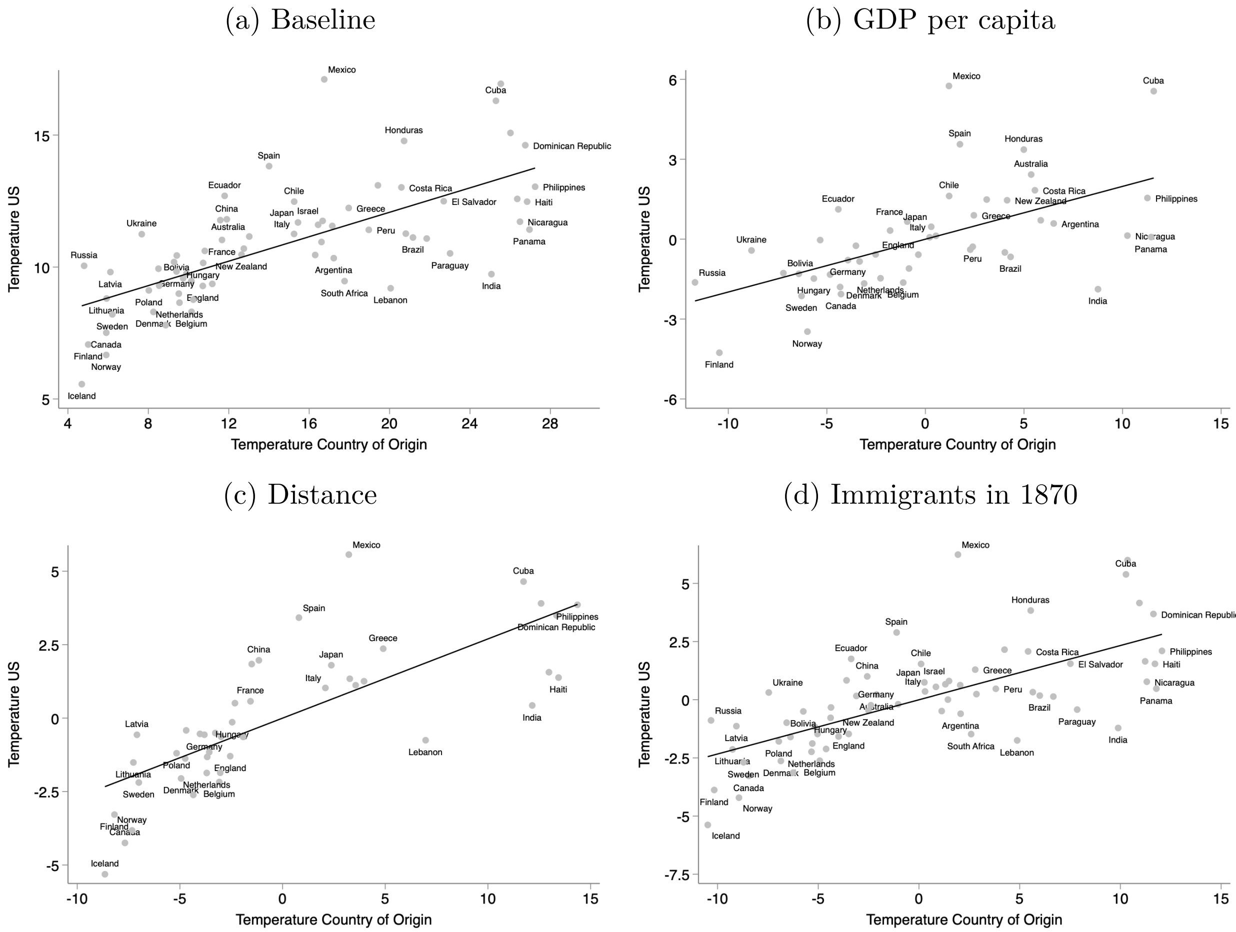
Notes: The figure displays the average temperature and precipitation in each US county. All year averages at the US county level for the period 1895-1920 based on NOAA monthly gridded historical data (Vose et al., 2014). Temperature and precipitation are expressed in Celsius degrees and mm/month respectively.

Figure A2. Temperature Matching of Immigrants in the US, by Decade



Notes: The figure displays the relationship between average temperature in degrees Celsius across US counties where immigrants from each origin lived in a given decade (y-axis) and the average temperature in the capital city of their country of origin (x-axis). Panel A reports results for 1880, replicating Figure 1. Panels B, C, and D consider, respectively: 1900, 1920, and 1940. The regression coefficients (robust standard errors) are: .231 (.033) in Panel A, .242 (.038) in Panel B, .210 (.034) in Panel C, and .178 (.024) in Panel D.

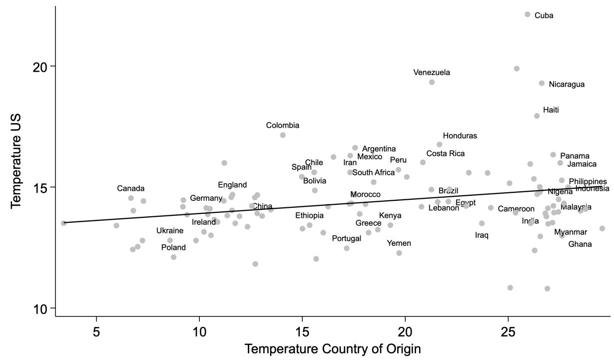
Figure A3. Temperature Matching of Immigrants in the US (1880): Robustness



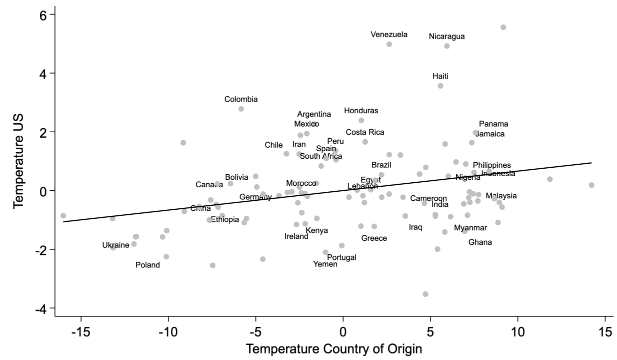
Notes: The figure displays the relationship between average temperature in degrees Celsius across US counties where immigrants from each origin were living in 1880 (y-axis) and the average temperature in the capital city of their country of origin (x-axis), after controlling for additional factors. Panel A replicates Figure 1. Panels B, C, and D control for: country of origin GDP per capita in 1920; the distance between the US county of residence and the foreign capital city; the number of immigrants from each country of origin who were living in each US county in 1870. The regression coefficients (robust standard errors) are: .231 (.033) in Panel A, .198 (.047) in Panel B, .270 (.038) in Panel C, and .233 (.034) in Panel D.

Figure A4. Temperature Matching of Immigrants in the US: 2015

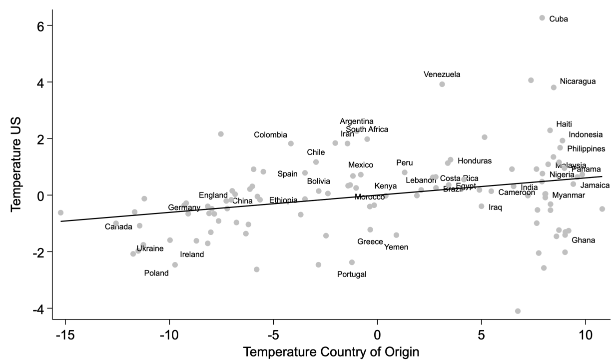
(a) Baseline



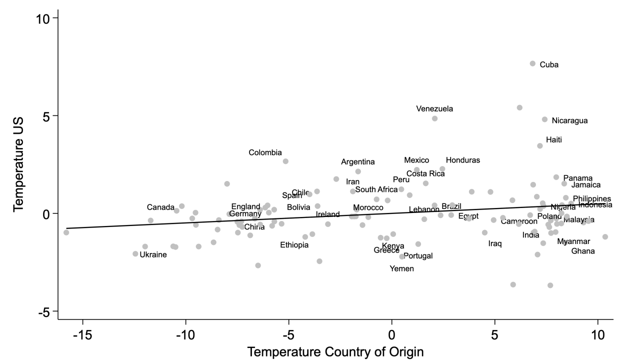
(b) GDP per capita



(c) Distance



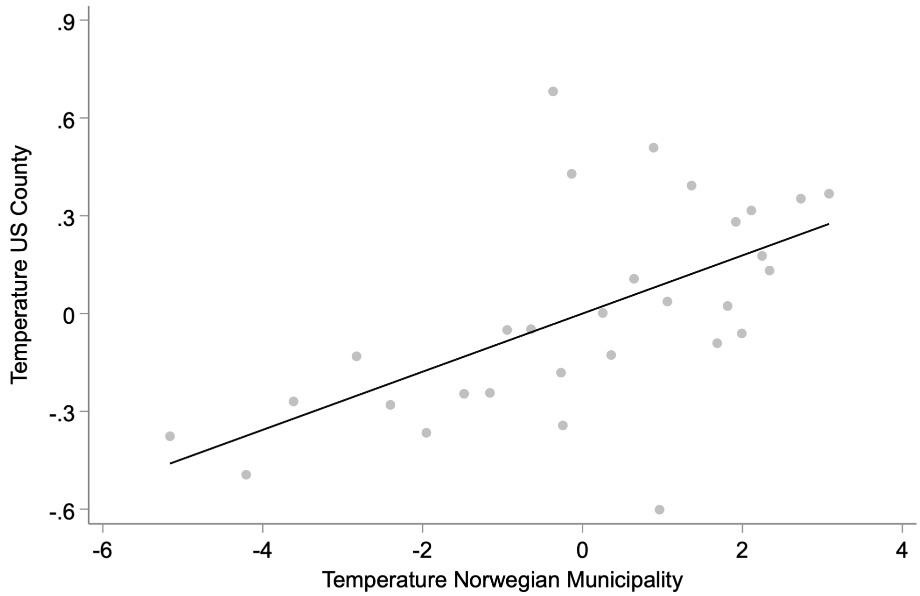
(d) Immigrants in 1920



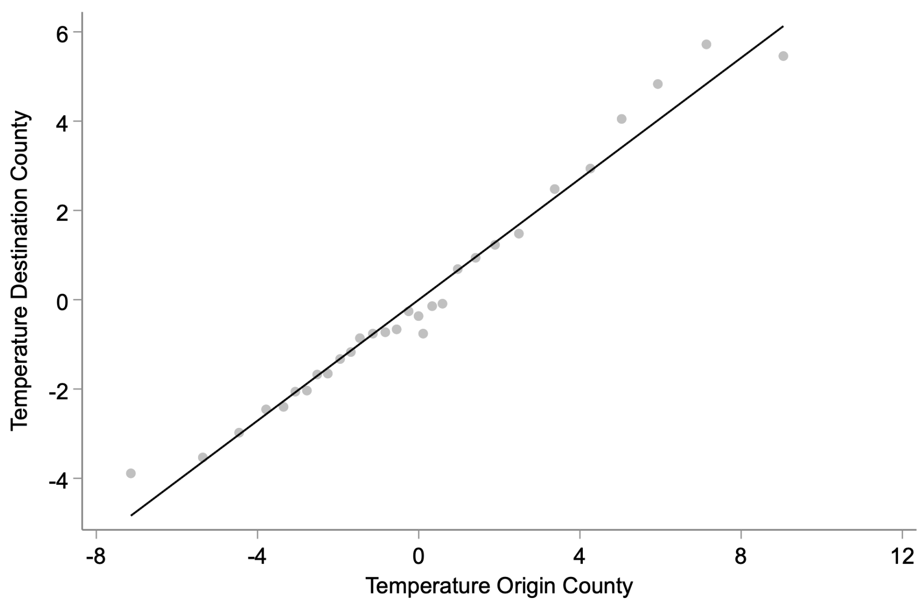
Notes: The figure displays the relationship between average temperature in degrees Celsius across US counties where immigrants from each origin were living in 2011-2015 (y-axis) and the average temperature in the capital city of their country of origin (x-axis), after controlling for additional factors. Panel A displays the raw correlation. Panels B, C, and D control for: country of origin GDP per capita in 2010; the distance between the US county of residence and the foreign capital city; the number of immigrants from each country of origin who were living in each US county in 1920. The regression coefficients (robust standard errors) are: .057 (.020) in Panel A, .077 (.022) in Panel B, .061 (.019) in Panel C, and .049 (.021) in Panel D.

Figure A5. Temperature Matching and Migration, Controlling for Geography

(a) Norwegian Immigrants



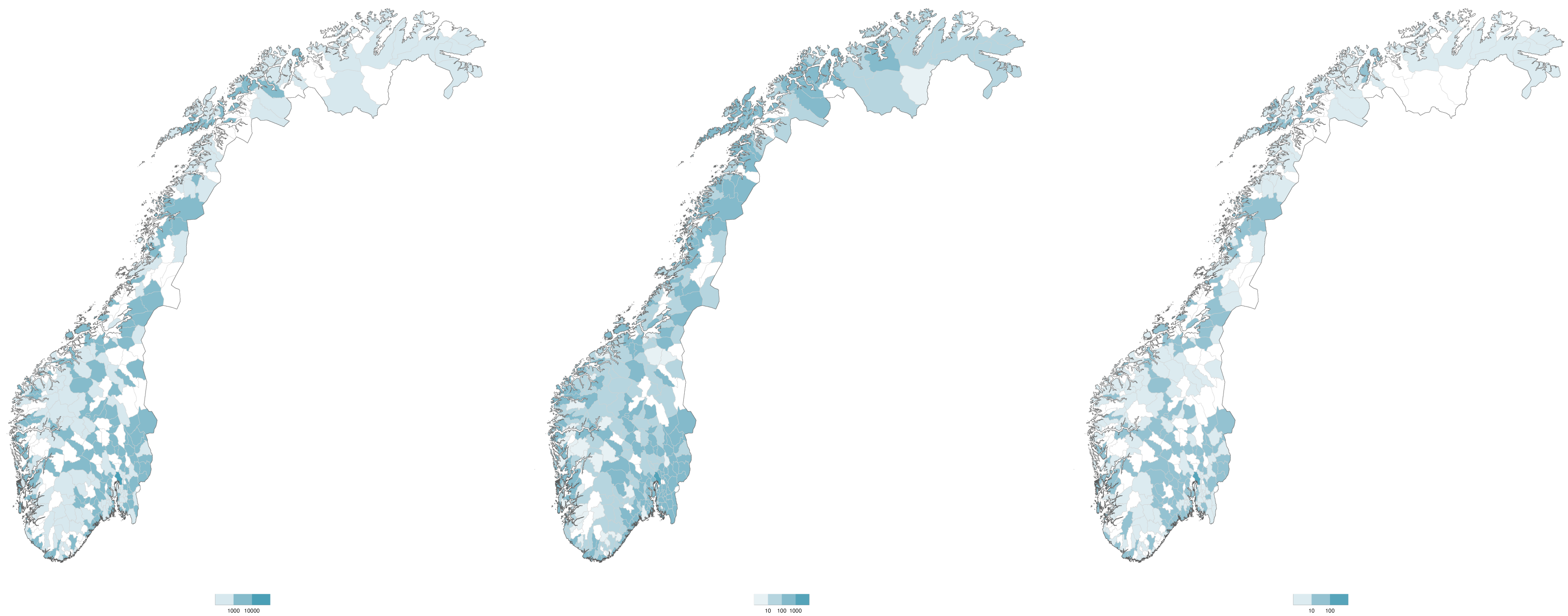
(b) US Internal Migrants



Notes: The figure displays binned scatterplots obtained from individual-level regressions of average temperature at destination against average temperature at origin when other controls are included. Panel A considers the sample of Norwegian immigrants linked between the 1865 Norwegian and the 1880 US full count Censuses. Origins and destinations are, respectively, Norwegian municipalities and counties in the contiguous US. In this panel, we control for the distance of the destination county from New York and for the distance of the origin municipality from the closest Atlantic port (either Oslo or Kristiansand). Panel B considers the sample of individual migrants (within the contiguous US) linked across US full count Censuses over the period 1850-1860 to 1930-1940. Origins and destinations are counties in the contiguous US. In this panel, we control for the distance between the origin county and the destination county (expressed in 100 km). In Panel A, the regression coefficient and the corresponding standard errors, clustered at the Norwegian province by US state level, are .089 and .039. In Panel B, the regression coefficient and the corresponding standard errors, clustered at the US state of origin by US state of destination by decade level, are .677 and .016.

Figure A6. Distribution of Population in Norway (1865)

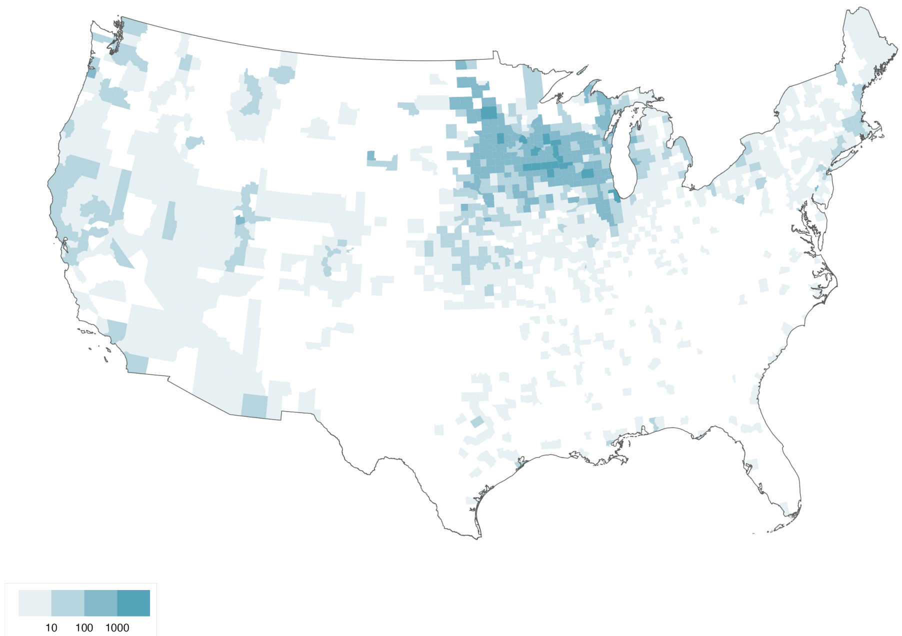
(a) Norwegians in 1865... (b) ...Matched to 1900 Norwegian Census (c) ...Matched to 1880 US Census



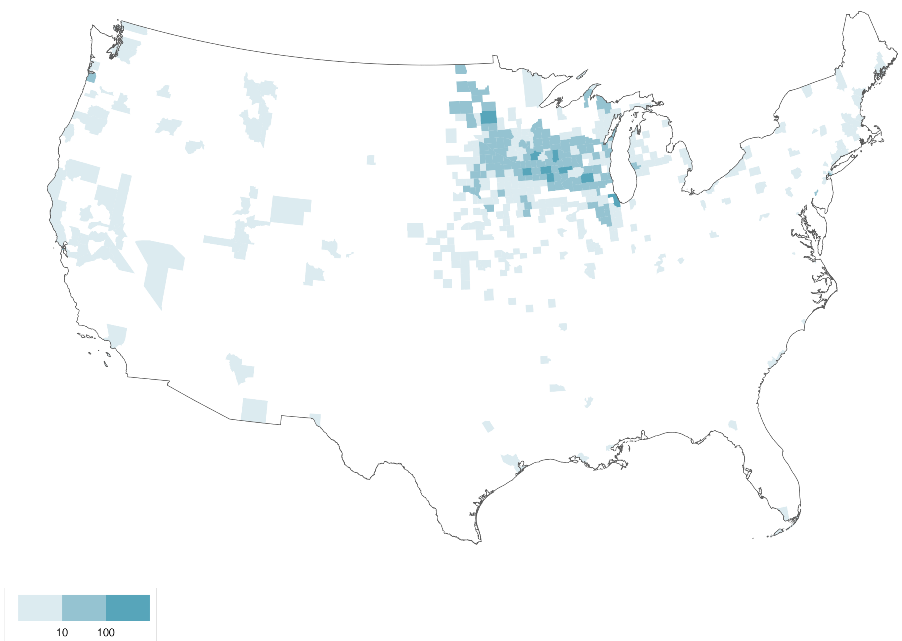
Notes: Panel A plots the distribution of men 15+ in the full count 1865 Norwegian Census. Panels B and C plot the distribution of men 15+ in the full count 1865 Norwegian Census who are matched, respectively to the 1900 Norwegian Census and the 1880 US Census.

Figure A7. Distribution of Norwegian Immigrants in the US (1880)

(a) Norwegian Immigrants in 1880 Full Count US Census



(b) Norwegian Immigrants Matched to 1865 Norwegian Census

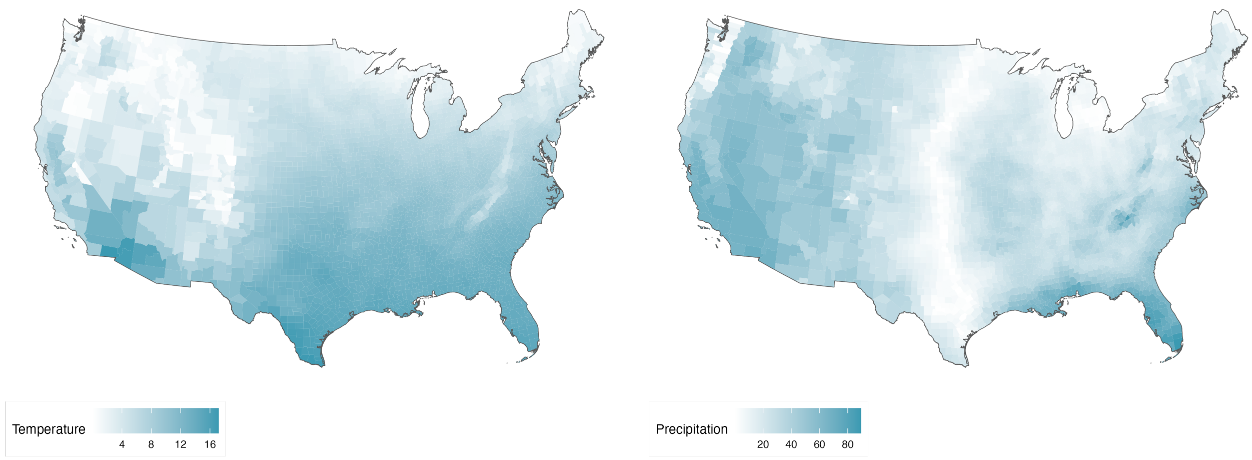


Notes: Panel A (resp., Panel B) plots the distribution of Norwegian male immigrants of age 15+ in the full count 1880 US Census (resp., who are linked between the 1865 Norwegian and the 1880 US full count Censuses).

Figure A8. Climate Distances Between Oslo and US Counties

(a) Temp. Distance, Oslo

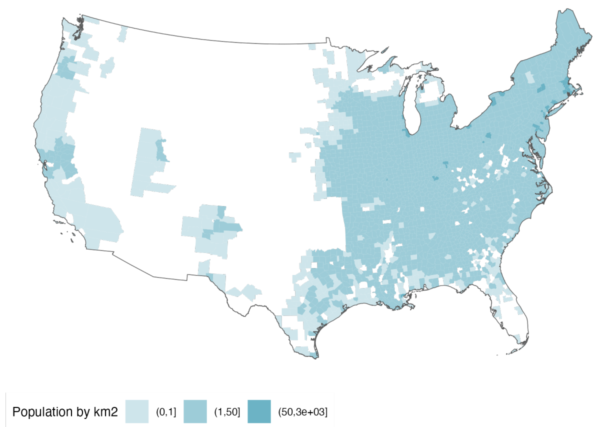
(b) Precip. Distance, Oslo



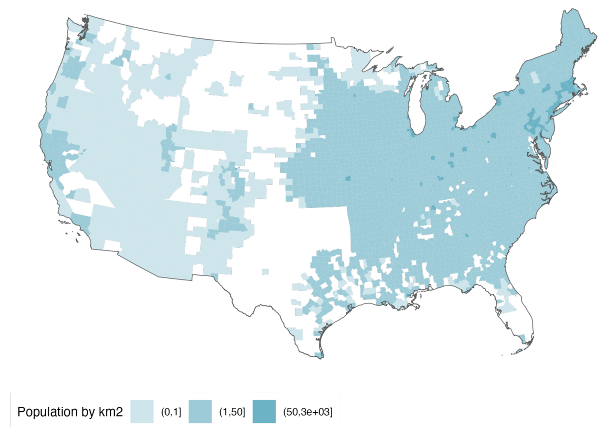
Notes: The figure plots the climate distances between each US county and Oslo. Temperature and precipitation are averages of all-year climate in degrees C and mm/month, respectively. For the US, these averages are taken over the period 1895-1920 using NOAA data (Vose et al., 2014). For Norway, TerraClimate data are averaged over the period 1958-1980 (Abatzoglou et al., 2018). Temperature and precipitation distances are defined as the absolute value of the difference in average temperature and precipitation between each US county and Oslo.

Figure A9. Distribution of US Population, by Decade

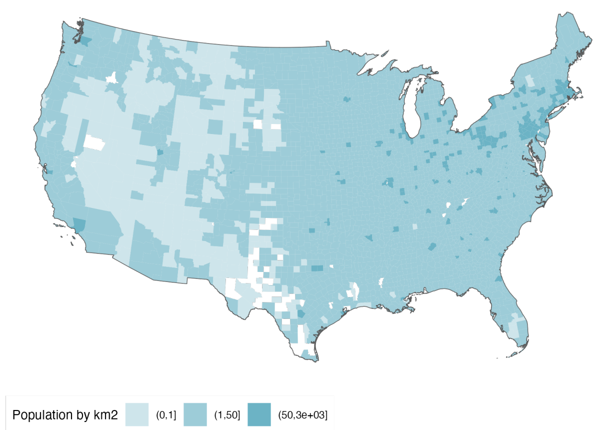
(a) 1860



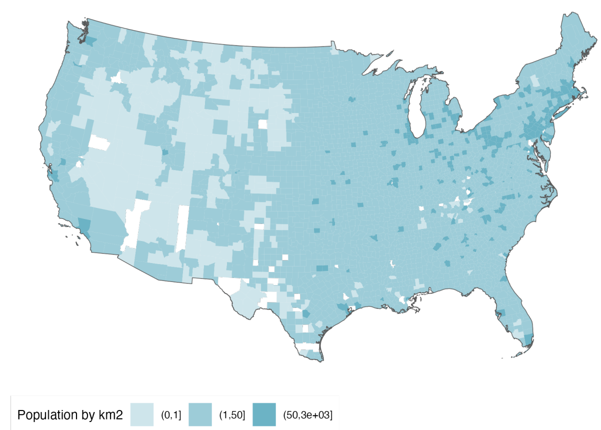
(b) 1880



(c) 1920



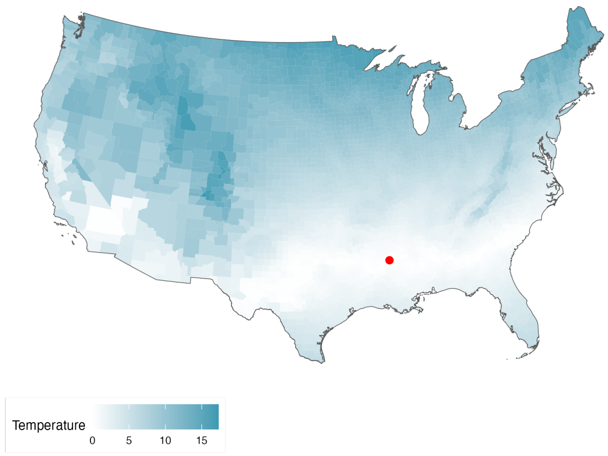
(d) 1940



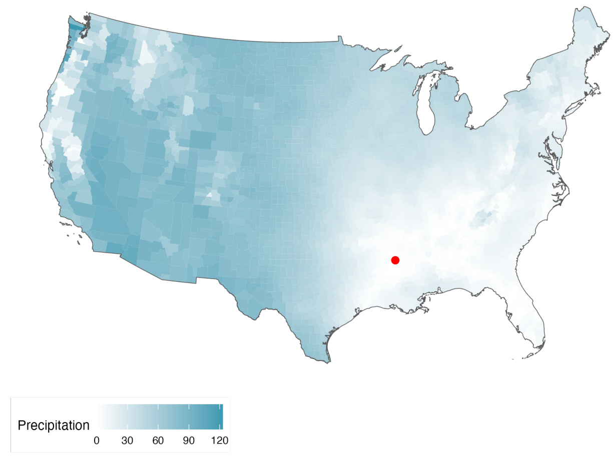
Notes: Each map plots county population density (per square km) in a given decade.

Figure A10. Climate Distances Between US Counties

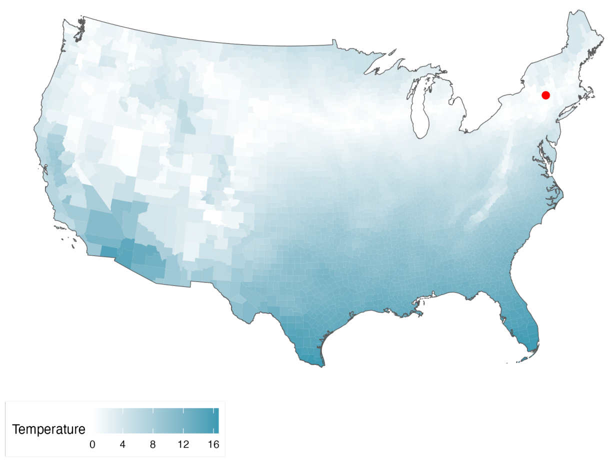
(a) Temp. Distance, Delta Region



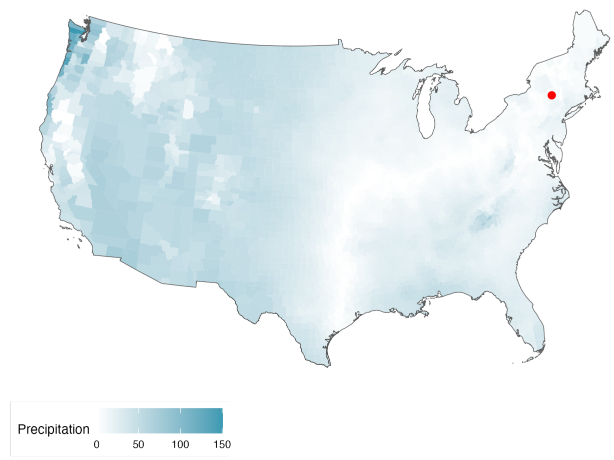
(b) Precip. Distance, Delta Region



(c) Temp. Distance, US Northeast



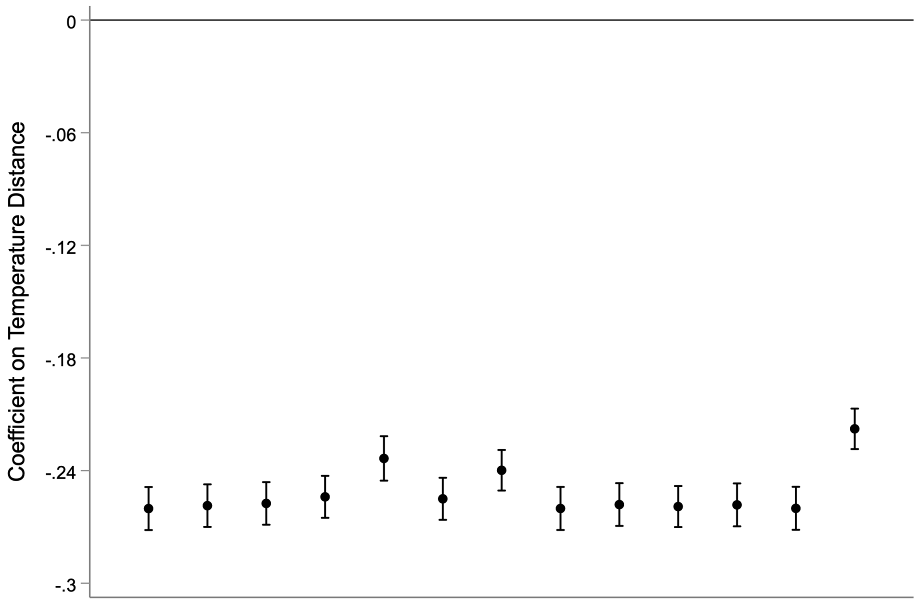
(d) Precip. Distance, US Northeast



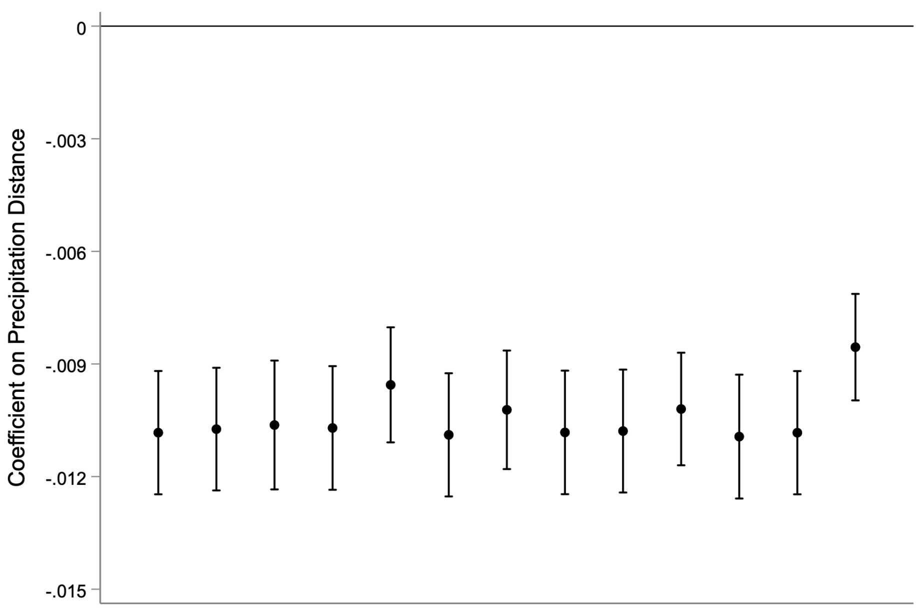
Notes: The figure plots the climate distances between each US county and the centroid of the considered region. Red dot is the centroid of the considered region. Temperature and precipitation are averages of all-year climate in degrees C and mm/month, respectively. These averages are taken over the period 1895-1920 using NOAA data (Vose et al., 2014). Temperature and precipitation distances are defined as the absolute value of the difference in average temperature and precipitation between each US county and the centroid of the considered region. To interpret the figure, note that the distance in temperature between the Delta region and New York City is +12° C, even though New York City is 12° C colder than the Delta region.

Figure A11. Climate Distance and Migration: Including County-Pair Controls

(a) Temperature



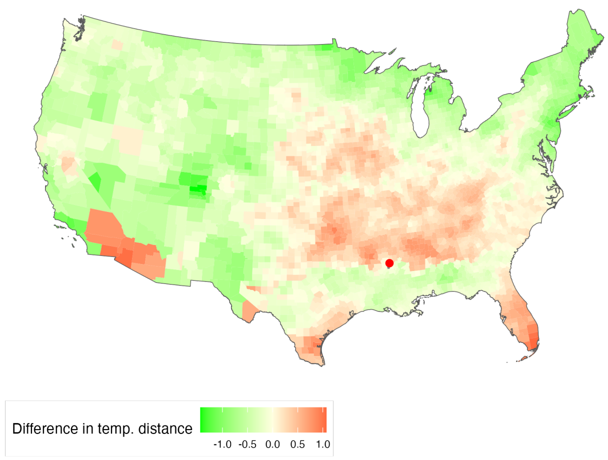
(b) Precipitation



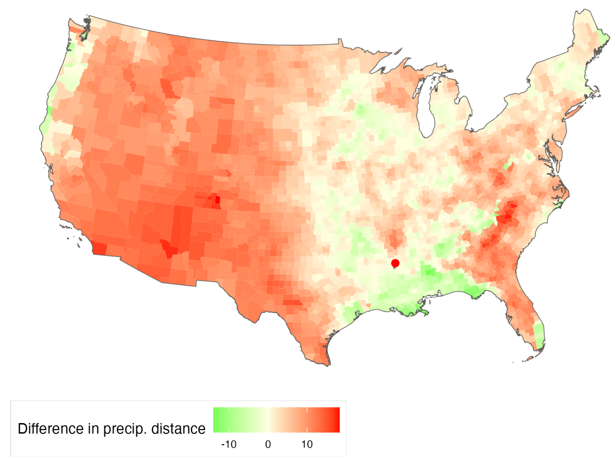
Notes: The figure plots the coefficient, with corresponding 95% confidence intervals, on the absolute value of the difference in temperature (Panel A) and precipitation (Panel B) between origin and destination counties. The first dot replicates the baseline specification (Table 3, column 5). Each subsequent dot reports results obtained when also including, one at the time, the absolute value of the difference in the following county-pair variables (measured in the baseline decade): employment share; manufacturing employment share; agriculture employment share; Black population share; urban population share; immigrant population share; sex ratios; population density; frontier exposure from Bazzi et al. (2020); market access from Donaldson and Hornbeck (2016); and a dummy equal to one for being connected to railroads. The last dot reports results obtained including all variables simultaneously. Frontier exposure is time invariant, and so the (absolute value of the) county-pair difference of this variable is interacted with decade dummies. Standard errors are clustered at the state of origin by state of destination by decade level.

Figure A12. Historical Change in Climate Distances Between US Counties

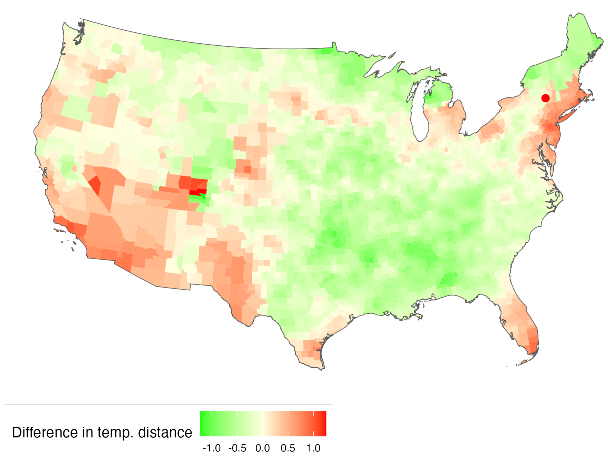
(a) Change in Temp. Distance, Delta Region



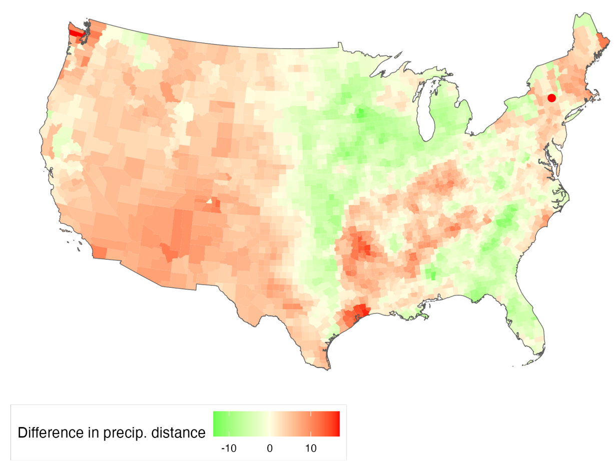
(b) Change in Precip. Distance, Delta Region



(c) Change in Temp. Distance, US Northeast

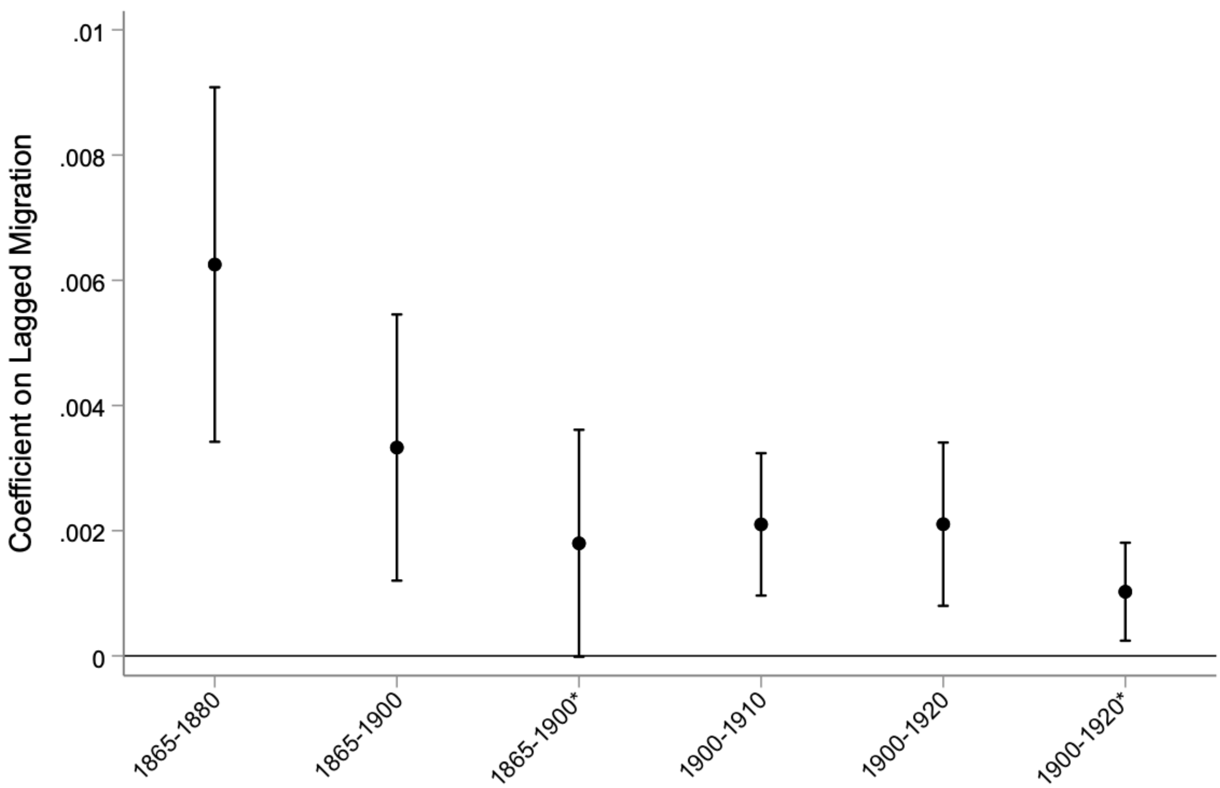


(d) Change in Precip. Distance, US Northeast



Notes: The figure plots the change in climate distances between each US county and the centroid of the considered region. Red dot is the centroid of the considered region. Temperature and precipitation are averages of all-year climate in degrees C and mm/month, respectively. These averages are taken over the period 1895-1920 and 1990-2020 using NOAA data (Vose et al., 2014). To interpret the figure, note that the *distance* in temperature between the Delta region and New York City decreased by 1.5° C: it went from 12° C to 10.5° C ; New York City today is colder on average than the Delta region but less so on average than 100 years ago.

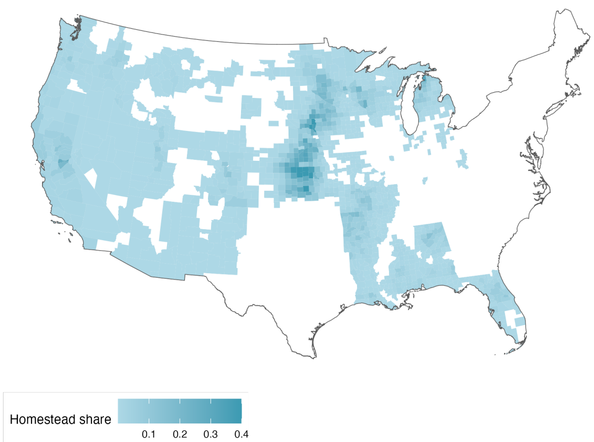
Figure A13. Lagged Number of Immigrants and Subsequent Norwegian Immigration



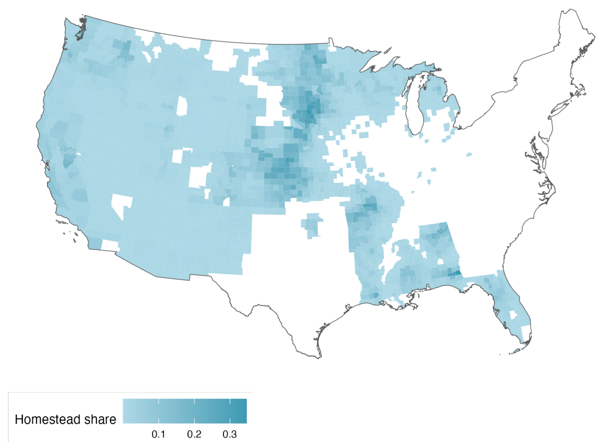
Notes: The figure plots the coefficient, with corresponding 95% confidence intervals, on the lagged number of migrants in regressions, where the dependent variable is the number of Norwegian immigrants linked between the Norwegian and the US Censuses of the year reported on the x-axis. All regressions also include the set of controls and fixed effects from the baseline specification (see notes to Table 1). The third (resp., sixth) dot from the left refers to individuals linked between the 1865 Norwegian and the 1900 US (resp., the 1900 Norwegian and the 1920 US) Censuses and who migrated after 1880 (resp., after 1910). Lagged migration refers to number of immigrants: from 1865 to 1870 in the first to third dots; from 1865 to 1900 in the fourth and fifth dots; and, from 1900 to 1910 in the last dot. The lagged number of immigrants is standardized within the relevant sample to have zero mean and standard deviation equal to one. Standard errors clustered at the US state by Norwegian province level.

Figure A14. Homestead Shares, by County and Decade

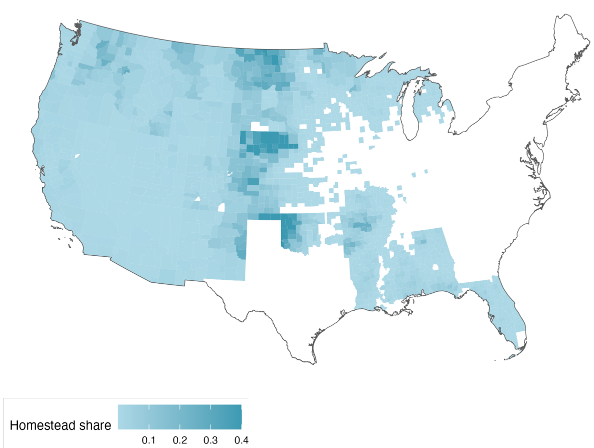
(a) 1870



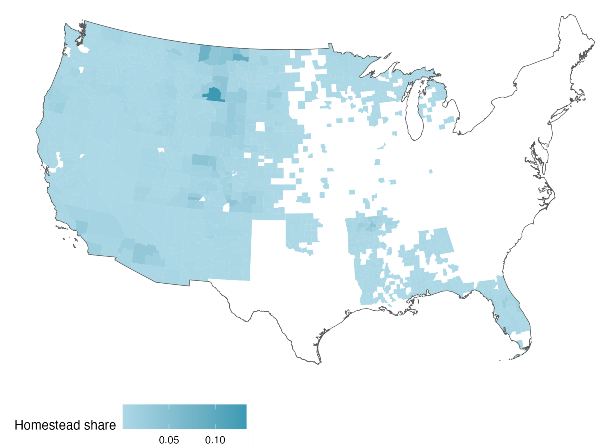
(b) 1880



(c) 1900

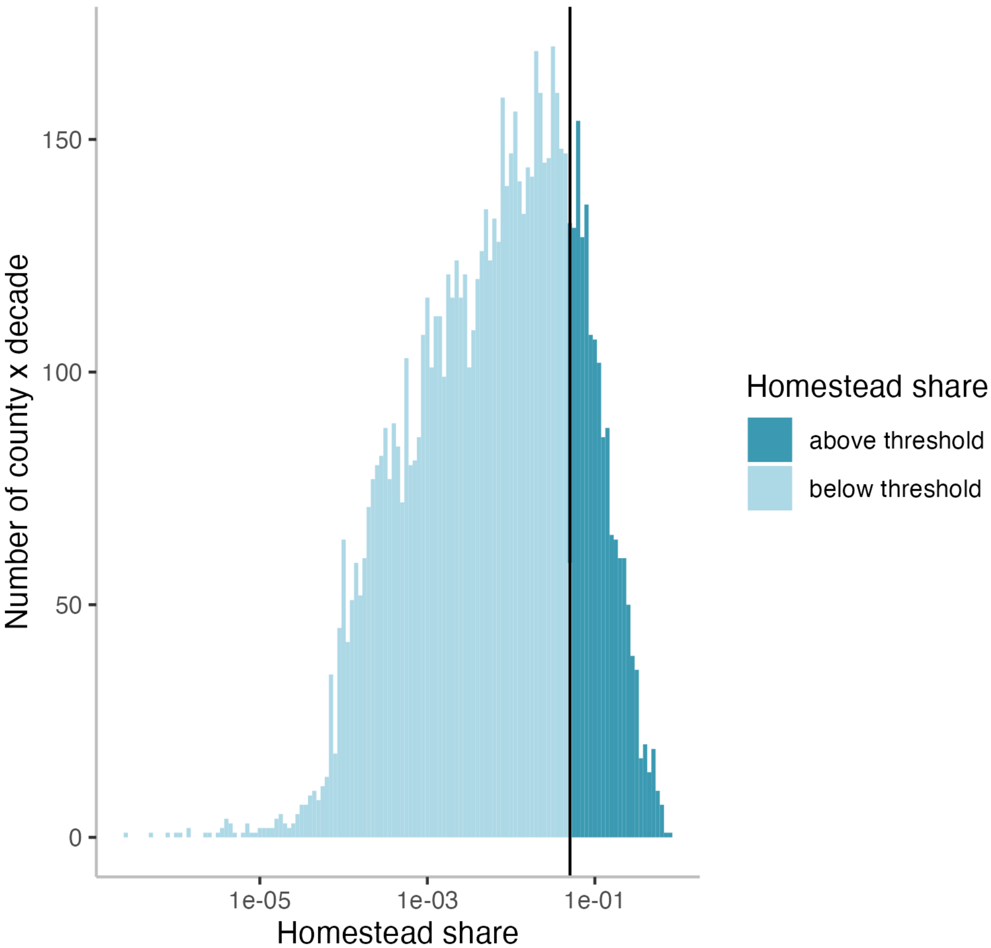


(d) 1920



Notes: Each map plots the share of county area that is distributed through Homestead in each county and decade. Because a Homestead patent is signed five years after the arrival of the homesteader on the land, we attribute patents signed between, e.g., 1915 and 1924 to the 1910 decade.

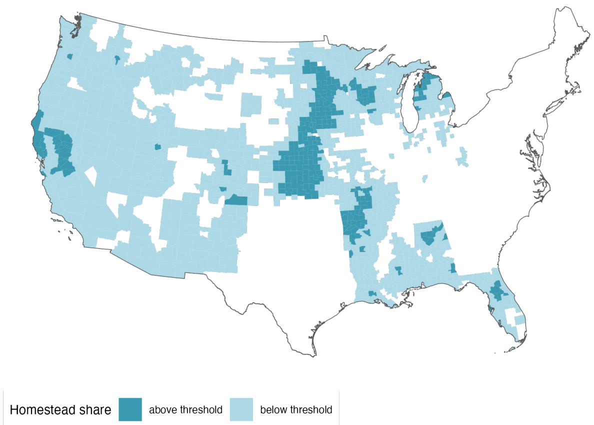
Figure A15. Distribution of Homestead Shares (1860-1920)



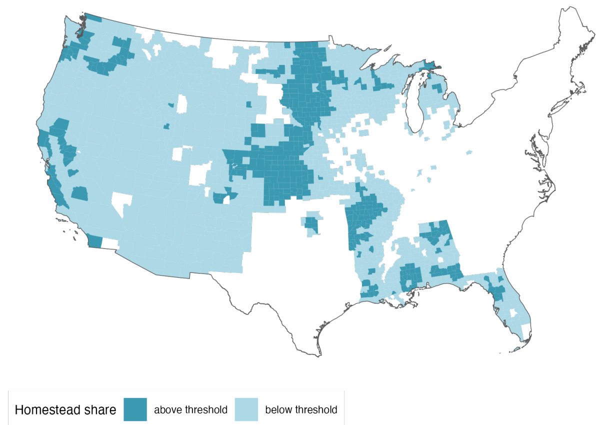
Notes: The figure plots the distribution of county level Homestead shares for all years from 1860 to 1920. Because a Homestead patent was signed five years after the arrival of the homesteader on the land, we attribute patents signed over a given decade to the previous five years. For instance, patents signed between 1915 and 1924 are assigned to migrants moving to a county between 1910 and 1919 (i.e., the 1910-1920 decade). The vertical bar corresponds to the 80^{th} percentile of the distribution, and is the threshold chosen to define the Homestead county dummy used in the analysis.

Figure A16. Homestead Counties, by Decade

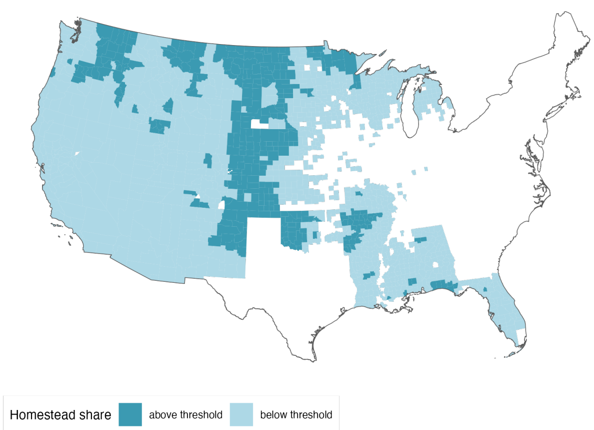
(a) 1870



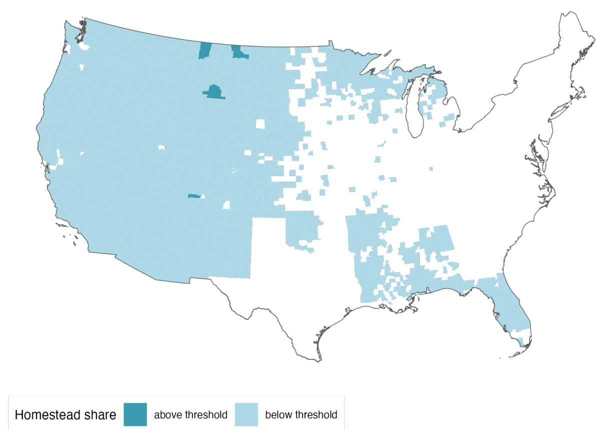
(b) 1880



(c) 1900

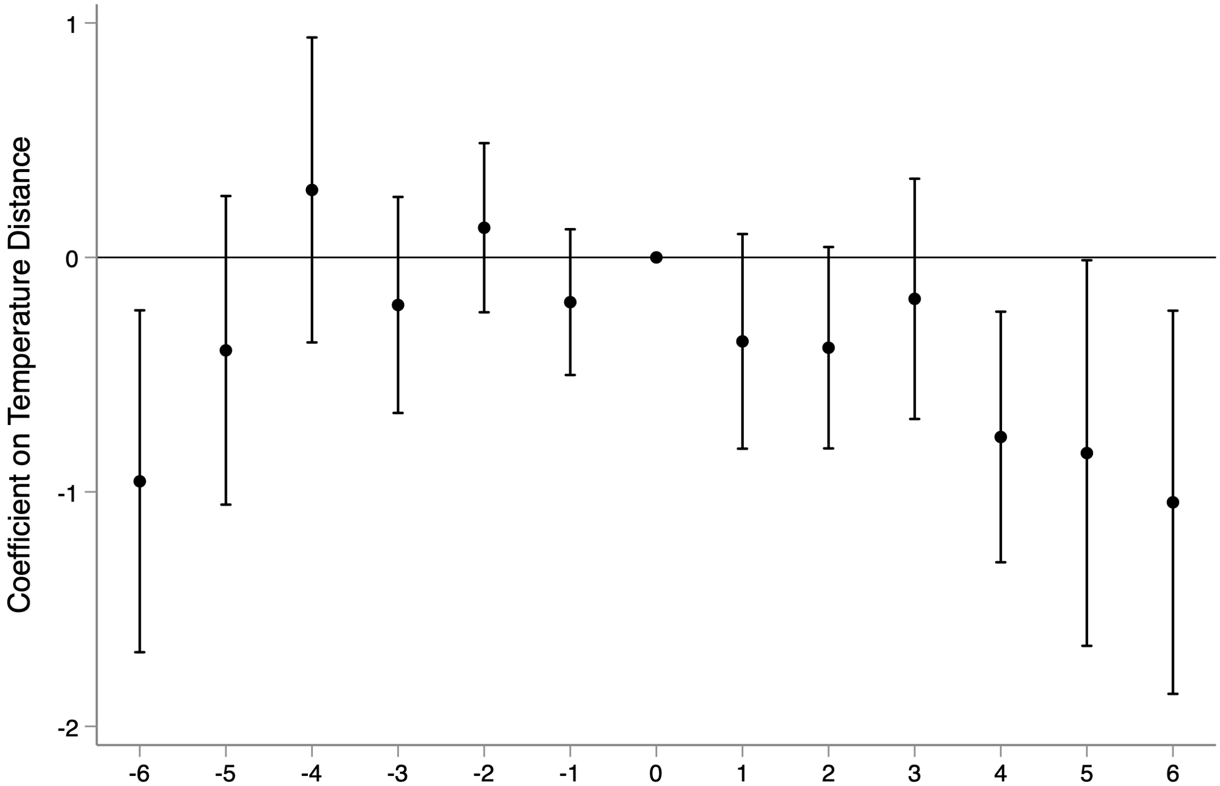


(d) 1920



Notes: The figure plots the counties that are classified as "Homestead counties" in each decade. Homestead counties are those where the share of land that is homesteaded in a given decade is above the 80$^{\text{th}}$ percentile of the distribution of Homestead shares for the entire US over the 1860-1920 period. Because a Homestead patent is signed five years after the arrival of the homesteader on the land, we attribute patents signed between, e.g., 1915 and 1924 to the 1910 decade.

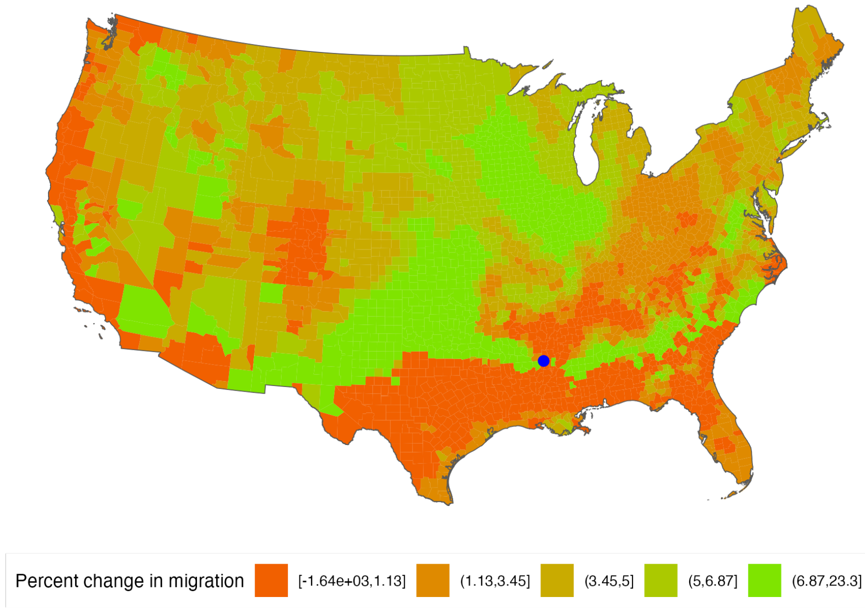
Figure A17. Temperature Distance and Age at Death of Immigrants in the US (1959-1961)



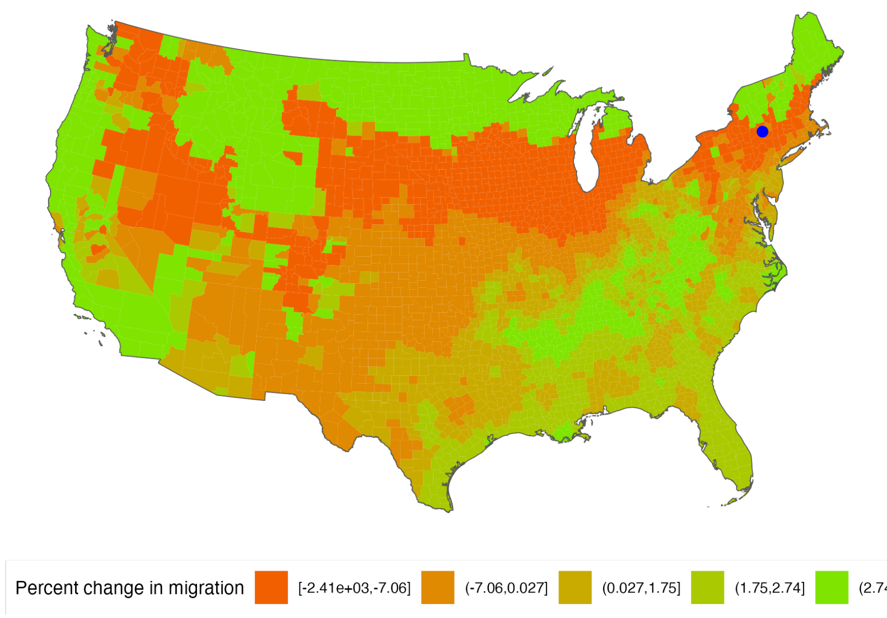
Notes: The figure plots the coefficients, with corresponding 95% confidence intervals, of the regression of age of death on 1°C temperature distance bins for the difference in temperature between the US county of death and birth country capital. The 0°C bin is omitted, whereas the -6°C and 6°C bins include observations with differences beyond these thresholds. The sample includes all foreign-born individuals died between 1959 and 1961 in the continental US. All models include fixed effects for US county of death, year of death, and country of birth; and, individual controls (gender and marital status). Standard errors clustered at the US state by country of birth level.

Figure A18. Change in Climate Distances and Migration Between US Counties

(a) Change in Temp. Distance Induced Migration, Delta Region



(b) Change in Temp. Distance Induced Migration, US Northeast



Notes: The figure plots the change in migration induced by the temperature distance change between each US county and the centroid of the considered region. The blue dot is the centroid of the considered region. Changes in temperature-induced migration are computed using averages of all-year temperature from 1990-2020 to 2080-2100. To interpret the figure, note that the distance in temperature between the Delta region and New York City is projected to decline, increasing migration flows by 1.13-3.45%.

Table A1. 1865 Norwegian Census: Full Count and Linked Sample

	Full Count			Linked		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Individual-level Characteristics						
Age	33.822	18.103	608,157	25.470	11.164	82,274
Married	0.532	0.499	512,548	0.446	0.497	64,690
Urban	0.153	0.360	519,934	0.160	0.367	65,807
In Labor Force	0.866	0.340	471,522	0.842	0.365	65,725
Farmer	0.497	0.500	408,431	0.451	0.498	55,315
In Manufacturing	0.133	0.340	408,431	0.138	0.345	55,315
Municipality-level Characteristics						
Population Density	13.591	36.068	610,271	14.190	36.984	82,274
Distance from Closest Port (in 100km)	2330.311	2706.986	588,891	2473.883	2926.971	80,269
Average Temperature	4.093	2.254	588,891	4.292	2.150	80,269
Average Precipitation	99.142	44.702	588,891	98.357	44.262	80,269

Notes: The sample is restricted to men who were at least 10 years old as of 1865. *Linked* refers to individuals linked between the Norwegian 1865 Census and the US 1880 Census (migrants), and to individuals linked between the Norwegian 1865 Census and the Norwegian 1900 Census (stayers). The dummies for being married and for living in an urban area (resp., for labor force participation) are defined only for men 15+ (resp., for men in the age range 15-64). The dummies for being a farmer and for working in manufacturing are defined for men in the age range 15-64 who were in the labor force. Population density is scaled by 100,000. Distance from closest international port is defined as the shortest between the municipality and the Port of Kristiansand and the Port of Oslo.

Table A2. 1865 Norwegian Census (Linked Sample): Stayers and Movers

	Linked Stayers			Linked Movers		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Individual-level Characteristics						
Age	25.254	10.917	76,308	28.232	13.652	5,966
Married	0.444	0.497	59,893	0.474	0.499	4,797
Urban	0.153	0.360	60,878	0.252	0.434	4,929
In Labor Force	0.840	0.367	60,876	0.862	0.345	4,849
Farmer	0.455	0.498	51,134	0.399	0.490	4,181
In Manufacturing	0.134	0.341	51,134	0.185	0.389	4,181
Municipality-level Characteristics						
Population Density	13.609	36.349	76,308	21.625	43.633	5,966
Distance from Closest Port (in 100km)	2490.500	2943.744	74,521	2258.451	2691.065	5,748
Average Temperature	4.300	2.147	74,521	4.200	2.192	5,748
Average Precipitation	98.480	44.414	74,521	96.757	42.206	5,748

Notes: The sample is restricted to men who were at least 10 years old as of 1865. The dummies for being married and for living in an urban area (resp., for labor force participation) are defined only for men 15+ (resp., for men in the age range 15-64). The dummies for being a farmer and for working in manufacturing are defined for men in the age range 15-64 who were in the labor force. Population density is scaled by 100,000. Distance from closest international port is defined as the shortest between the between the municipality and the Port of Kristiansand and the Port of Oslo.

Table A3. Norwegian Immigrants in the US, 1880: Full Count and Linked Sample

	Full Count			Linked		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Individual-level Characteristics						
Age	41.693	12.981	69,440	43.187	13.695	5,747
Married	0.728	0.445	69,440	0.733	0.442	5,747
Urban	0.177	0.381	69,440	0.175	0.380	5,747
Literate	0.865	0.342	69,440	0.848	0.359	5,747
In Labor Force	0.964	0.185	65,224	0.963	0.190	5,280
Farmer	0.631	0.482	62,906	0.640	0.480	5,082
In Manufacturing	0.079	0.270	62,906	0.077	0.266	5,082
Occupational Score	17.536	7.176	62,906	17.463	7.102	5,082
County-level Characteristics						
Population Density	0.000	0.001	69,440	0.000	0.001	5,747
Norwegian Population Share	0.103	0.089	69,440	0.106	0.089	5,747
Immigrant Population Share	0.328	0.095	69,440	0.332	0.093	5,747
Distance from NYC (in 100km)	1593.613	548.586	69,440	1575.773	510.642	5,747
Connected to Railroad	0.957	0.202	69,440	0.954	0.209	5,747
Average Temperature	6.753	2.053	69,440	6.698	1.977	5,747
Average Precipitation	64.834	13.556	69,440	64.423	12.316	5,747

Notes: The full count (resp., linked sample) is restricted to men who were at least 25 as of 1880 (resp., who were at least 10 as of 1865). The dummy for labor force participation is defined for men younger than 64. Occupational scores as well as the dummies for being a farmer and for working in manufacturing are defined for men younger than 64 who were in the labor force. Population density is scaled by 100,000. Norwegian and immigrant population shares are computed as a share of total county population.

Table A4. Climate Distance and Norwegian Immigration: Additional Controls

Dep. var.:	Number of Migrants						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Temperature Distance	-0.107***	-0.116***	-0.106***	-0.136***	-0.064***	-0.076***	-0.060***
	(0.016)	(0.015)	(0.016)	(0.018)	(0.018)	(0.019)	(0.019)
	[-4.257]	[-4.600]	[-4.195]	[-5.335]	[-0.945]	[-1.112]	[-0.880]
Precipitation Distance	-0.006***	-0.007***	-0.006***	-0.012***	-0.003***	-0.001	-0.002
	(0.001)	(0.001)	(0.001)	(0.003)	(0.001)	(0.002)	(0.002)
	[-1.967]	[-2.225]	[-1.836]	[-3.737]	[-0.545]	[-0.215]	[-0.271]
Observations	847,894	847,894	847,894	839,838	180,188	178,476	178,476
Pseudo R-squared	0.401	0.398	0.406	0.430	0.293	0.330	0.334
Mean Temp. Dist.	7.429	7.429	7.429	7.387	4.606	4.566	4.566
SD Temp. Dist.	4.609	4.609	4.609	4.591	3.689	3.667	3.667
Mean Precip. Dist.	40.17	40.17	40.17	40.22	42.06	42.19	42.19
SD Precip. Dist.	36.16	36.16	36.16	36.27	40.21	40.33	40.33
US Controls	Yes	Yes	Yes	Yes			
Norwegian Controls	Yes		Yes		Yes		
US State FE	Yes	Yes	Yes	Yes			
Norwegian Province FE	Yes	Yes	Yes		Yes		
Bilateral Controls		Yes	Yes				Yes
Norwegian Municipality FE				Yes		Yes	Yes
US County FE					Yes	Yes	Yes

Notes: The sample includes pairs formed by all Norwegian municipalities (origins) and all US counties (destinations) with at least one European immigrant in 1880. *Number of Migrants* is the number of Norwegian male immigrants who were at least 10 years old in 1865 linked between the 1865 Norwegian and the 1880 US Censuses. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the Norwegian municipality and the US county. The table replicates column 4 of Table 1, reported in column 1 (see notes to Table 1 for the list of baseline controls). Column 2 replaces the vectors of US county and Norwegian controls with a vector that includes their difference (X_{od}). Column 3 includes both the separate controls and their difference. Column 4 (resp., column 5) replaces Norwegian (resp., US) controls with municipality (resp., US county) fixed effects. Column 6 includes simultaneously Norwegian municipality and US county fixed effects. Column 7 augments column 6 with the vector of bilateral controls, X_{od}. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the US state by Norwegian province level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Table A5. Climate Distance and Norwegian Immigration: Controlling for Geography

Dep. var.:	Number of Migrants				
	(1)	(2)	(3)	(4)	(5)
Temperature Distance	-0.107***	-0.105***	-0.119***	-0.111***	-0.125***
	(0.016)	(0.016)	(0.015)	(0.017)	(0.016)
	[-4.257]	[-4.167]	[-4.739]	[-4.417]	[-4.942]
Precipitation Distance	-0.006***	-0.006***	-0.007***	-0.006***	-0.007***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-1.967]	[-1.990]	[-2.026]	[-1.997]	[-2.103]
Observations	847,894	847,894	847,894	847,894	847,894
Pseudo R-squared	0.401	0.401	0.401	0.401	0.402
Mean Temp. Dist.	7.429	7.429	7.429	7.429	7.429
SD Temp. Dist.	4.609	4.609	4.609	4.609	4.609
Mean Precip. Dist.	40.17	40.17	40.17	40.17	40.17
SD Precip. Dist.	36.16	36.16	36.16	36.16	36.16
US State FE	Yes	Yes	Yes	Yes	Yes
Norwegian Province FE	Yes	Yes	Yes	Yes	Yes
US Controls	Yes	Yes	Yes	Yes	Yes
Norwegian Controls	Yes	Yes	Yes	Yes	Yes
Geographic Control	None	Elevation	Ruggedness	Coastal	All

Notes: The sample includes pairs formed by all Norwegian municipalities and all US counties with at least one European immigrant in 1880. *Number of Migrants* is the number of Norwegian male immigrants who were at least 10 years old in 1865 linked between the 1865 Norwegian and the 1880 US Censuses. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the Norwegian municipality and the US county. Column 1 replicates the baseline specification (see notes to Table 1 for the list of baseline controls). Columns 2 and 3 also add the absolute value of the difference in, respectively, elevation and ruggedness, between the Norwegian municipality and the US county. Column 4 includes a dummy if the US county has coastal access. Column 5 includes all variables in columns 2 to 4 simultaneously. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the US state by Norwegian province level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A6. Climate Distance and Norwegian Immigration: Alternative Samples

Dep. var.:	Number of Migrants							
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Temperature Dist.	-0.107***	-0.110***	-0.101***	-0.075***	-0.105***	-0.093***	-0.104***	-0.106***
	(0.016)	(0.016)	(0.016)	(0.016)	(0.017)	(0.016)	(0.015)	(0.015)
	[-4.257]	[-5.413]	[-2.746]	[-1.101]	[-5.635]	[-4.872]	[-5.505]	[-4.834]
Precipitation Dist.	-0.006***	-0.007***	-0.006***	-0.005***	-0.006***	-0.004***	-0.005***	-0.004***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-1.967]	[-2.438]	[-1.516]	[-0.782]	[-2.539]	[-1.786]	[-2.244]	[-1.342]
Observations	847,894	1,095,442	467,731	181,451	845,789	809,536	847,828	817,161
Pseudo R-squared	0.401	0.423	0.344	0.244	0.359	0.358	0.368	0.402
Mean Temp. Dist.	7.429	7.675	5.834	4.601	7.439	7.234	7.429	7.620
SD Temp. Dist.	4.609	5.007	4.256	3.684	4.609	4.521	4.609	4.572
Mean Precip. Dist.	40.17	43.09	42.29	42.15	40.17	40.21	40.17	40.02
SD Precip. Dist.	36.16	37.94	39.48	40.25	36.15	36.46	36.16	35.90
US State FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Norwegian Prov. FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
US Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Norwegian Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The table replicates column 4 of Table 1, reported in column 1 (see notes to Table 1 for the list of baseline controls), using different samples. *Number of Migrants* is the number of Norwegian male immigrants who were at least 10 years old in 1865 linked between the 1865 Norwegian and the 1880 US Censuses. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the Norwegian municipality and the US county. The sample includes: all US counties in column 2; counties with at least one Norwegian immigrant in the 1880 full count US Census (resp., in the linked sample) in column 3 (resp., in column 4). Column 5 (resp., column 6) drops US counties (resp., Norwegian municipalities) at the top 1% of the distribution of the population in the linked sample. Column 7 drops municipality-county-pairs at the top 1% of the distribution of bilateral migration flows. Column 8 excludes Minnesota. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the US state by Norwegian province level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Table A7. Climate Distance and Norwegian Immigration: Alternative Linking Methods

Dep. var.:	Number of Migrants					
	(1)	(2)	(3)	(4)	(5)	(6)
Temperature Distance	-0.107***	-0.097***	-0.108***	-0.115***	-0.099***	-0.087***
	(0.016)	(0.017)	(0.017)	(0.016)	(0.016)	(0.022)
	[-4.257]	[-5.009]	[-4.431]	[-3.871]	[-4.208]	[-5.552]
Precipitation Distance	-0.006***	-0.006***	-0.006***	-0.006***	-0.006***	-0.008***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-1.967]	[-2.533]	[-2.054]	[-1.661]	[-1.998]	[-4.030]
Observations	847,894	847,894	847,894	847,894	822,213	759,484
Pseudo R-squared	0.401	0.382	0.399	0.416	0.401	0.367
Mean Temp. Dist.	7.429	7.429	7.429	7.429	7.267	7.416
SD Temp. Dist.	4.609	4.609	4.609	4.609	4.553	4.754
Mean Precip. Dist.	40.17	40.17	40.17	40.17	40.02	40.66
SD Precip. Dist.	36.16	36.16	36.16	36.16	36.17	36.60
US State FE	Yes	Yes	Yes	Yes	Yes	Yes
Norwegian Province FE	Yes	Yes	Yes	Yes	Yes	Yes
US Controls	Yes	Yes	Yes	Yes	Yes	Yes
Norwegian Controls	Yes	Yes	Yes	Yes	Yes	Yes
Restriction	Older than 10 in 1865	15-40 in 1865 (Nor)	18-65 in 1880 (US)	None	ABE-JW	Conservative ABE-NYSIIS

Notes: The sample includes pairs formed by all Norwegian municipalities (origins) and all US counties (destinations) with at least one European immigrant in 1880. *Number of Migrants* is the number of Norwegian male immigrants linked between the 1865 Norwegian and the 1880 US Censuses. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the Norwegian municipality and the US county. Column 1 replicates the baseline specification in column 4 of Table 1, where the linked sample used to derive the number of immigrants is restricted to men 10+ in 1865. In columns 2, 3, and 4, the sample is restricted to men: 15-40 in 1865, 18-65 in 1880, and without age restrictions. Columns 5 and 6 derive the linked sample using, respectively, the Jaro-Winkler and the conservative version of the NYSIIS algorithm (i.e., individuals who are unique within a 5-year window around their birth date in terms of the matching variables) from Abramitzky et al. (2012). Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the US state by Norwegian province level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1

Table A8. US Population: Full Count vs Linked Samples, by Decade

	Full Count			Linked		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Panel A: 1860						
Age	33.31	14.73	6,077,761	33.34	13.85	985,763
Foreign Born	0.178	0.382	6,077,761	0.128	0.334	985,763
White	0.980	0.141	6,077,761	0.989	0.105	985,763
Urban	0.167	0.373	6,077,761	0.151	0.358	985,763
Literate	0.757	0.429	6,077,761	0.787	0.410	985,763
In Labor Force	0.865	0.342	5,819,994	0.884	0.320	959,596
Occupational Score	20.24	9.937	5,032,160	20.21	9.989	848,616
Farmer	0.525	0.499	5,032,160	0.551	0.497	848,616
In Manufacturing	0.126	0.332	5,032,160	0.140	0.347	848,616
Panel B: 1900						
Age	35.15	15.32	15,183,543	30.66	11.55	2,217,092
Foreign Born	0.218	0.413	15,183,543	0.158	0.365	2,217,092
White	0.882	0.323	15,183,543	0.942	0.234	2,217,092
Urban	0.279	0.449	15,183,543	0.262	0.440	2,217,092
Literate	0.847	0.360	15,183,543	0.912	0.284	2,217,092
In Labor Force	0.925	0.264	14,394,375	0.912	0.284	2,209,530
Occupational Score	19.86	10.26	13,311,350	19.93	10.39	2,014,568
Farmer	0.486	0.500	13,311,350	0.510	0.500	2,014,568
In Manufacturing	0.125	0.330	13,311,350	0.133	0.340	2,014,568
Panel C: 1940						
Age	38.64	14.70	38,246,367	35.08	12.10	8,467,821
Foreign Born	0.180	0.384	38,246,367	0.124	0.330	8,467,821
White	0.901	0.299	38,246,367	0.950	0.218	8,467,821
Urban	0.577	0.494	38,246,367	0.595	0.491	8,467,821
Literate	0.951	0.216	38,246,367	0.979	0.143	8,467,821
In Labor Force	0.982	0.132	36,076,601	0.987	0.112	8,375,759
Occupational Score	23.76	10.77	34,149,990	24.76	10.99	7,966,512
Farmer	0.251	0.433	35,436,485	0.233	0.423	8,270,197
In Manufacturing	0.233	0.423	35,436,485	0.247	0.431	8,270,197

Notes: The table reports summary statistics for men in the full count US Censuses and linked samples by decade. All characteristics are measured in the year of origin. The dummy for labor force participation is defined for men in the age range 15-64. The dummies for employment-related variables are defined for men in the age range 15-64 who were in the labor force. All remaining dummies are defined for men 15+.

Table A9. US Population: Full Count vs Linked Samples, by Period

	Full Count			Linked		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Panel A: 1860-1940						
Age	36.59	14.95	166,172,765	34.15	12.82	32,943,677
Foreign Born	0.209	0.407	166,172,765	0.139	0.346	32,943,677
White	0.902	0.297	166,172,765	0.949	0.220	32,943,677
Urban	0.447	0.497	166,172,765	0.461	0.498	32,943,677
Literate	0.897	0.304	166,172,765	0.944	0.231	32,943,677
In Labor Force	0.936	0.245	157,632,799	0.943	0.232	32,442,995
Occupational Score	22.02	10.62	144,194,339	22.85	11.06	29,851,951
Farmer	0.359	0.480	147,492,877	0.353	0.478	30,586,862
In Manufacturing	0.188	0.391	147,492,877	0.198	0.399	30,586,862
Panel B: 1860-1900						
Age	34.47	15.13	41,581,297	32.80	13.45	6,762,309
Foreign Born	0.219	0.414	41,581,297	0.155	0.362	6,762,309
White	0.916	0.277	41,581,297	0.958	0.201	6,762,309
Urban	0.254	0.435	41,581,297	0.236	0.425	6,762,309
Literate	0.808	0.394	41,581,297	0.855	0.352	6,762,309
In Labor Force	0.849	0.358	39,596,861	0.849	0.358	6,627,222
Occupational Score	19.80	10.27	33,612,787	19.82	10.41	5,629,415
Farmer	0.510	0.500	33,612,787	0.543	0.498	5,629,415
In Manufacturing	0.120	0.325	33,612,787	0.127	0.333	5,629,415
Panel C: 1910-1940						
Age	37.29	14.82	124,591,468	34.50	12.63	26,181,368
Foreign Born	0.206	0.405	124,591,468	0.134	0.341	26,181,368
White	0.898	0.303	124,591,468	0.947	0.224	26,181,368
Urban	0.511	0.500	124,591,468	0.519	0.500	26,181,368
Literate	0.926	0.261	124,591,468	0.967	0.180	26,181,368
In Labor Force	0.965	0.184	118,035,938	0.967	0.179	25,815,773
Occupational Score	22.70	10.64	110,581,552	23.56	11.08	24,222,536
Farmer	0.315	0.464	113,880,090	0.310	0.463	24,957,447
In Manufacturing	0.208	0.406	113,880,090	0.214	0.410	24,957,447

Notes: The table reports summary statistics for men in the full count US Censuses and linked samples by period. All characteristics are measured in the year of origin. The dummy for labor force participation is defined for men in the age range 15-64. The dummies for employment-related variables are defined for men in the age range 15-64 and who were in the labor force. All remaining dummies are defined for men 15+.

Table A10. Linked Sample: Stayers vs Domestic Migrants, by Period

	Stayers			Migrants		
	Mean	Std. Dev.	Obs.	Mean	Std. Dev.	Obs.
Panel A: 1860-1940						
Age	35.38	13.11	20,073,837	32.24	12.11	12,869,840
Foreign Born	0.125	0.330	20,073,837	0.161	0.367	12,869,840
White	0.965	0.184	20,073,837	0.925	0.264	12,869,840
Urban	0.473	0.499	20,073,837	0.442	0.497	12,869,840
Literate	0.957	0.203	20,073,837	0.923	0.267	12,869,840
In Labor Force	0.952	0.214	19,699,172	0.929	0.257	12,743,823
Occupational Score	23.14	11.21	18,289,799	22.40	10.79	11,562,152
Farmer	0.358	0.479	18,750,778	0.346	0.476	11,836,084
In Manufacturing	0.204	0.403	18,750,778	0.189	0.391	11,836,084
Panel B: 1860-1900						
Age	34.76	14.15	3,597,638	30.56	12.23	3,164,671
Foreign Born	0.111	0.314	3,597,638	0.206	0.404	3,164,671
White	0.971	0.169	3,597,638	0.943	0.232	3,164,671
Urban	0.221	0.415	3,597,638	0.253	0.435	3,164,671
Literate	0.879	0.326	3,597,638	0.827	0.378	3,164,671
In Labor Force	0.861	0.346	3,498,306	0.837	0.370	3,128,916
Occupational Score	19.65	10.50	3,011,825	20.01	10.32	2,617,590
Farmer	0.584	0.493	3,011,825	0.496	0.500	2,617,590
In Manufacturing	0.122	0.328	3,011,825	0.132	0.338	2,617,590
Panel C: 1910-1940						
Age	35.51	12.87	16,476,199	32.78	12.02	9,705,169
Foreign Born	0.128	0.334	16,476,199	0.146	0.353	9,705,169
White	0.964	0.187	16,476,199	0.919	0.273	9,705,169
Urban	0.528	0.499	16,476,199	0.504	0.500	9,705,169
Literate	0.974	0.159	16,476,199	0.954	0.210	9,705,169
In Labor Force	0.971	0.166	16,200,866	0.959	0.199	9,614,907
Occupational Score	23.83	11.22	15,277,974	23.10	10.83	8,944,562
Farmer	0.314	0.464	15,738,953	0.304	0.460	9,218,494
In Manufacturing	0.219	0.414	15,738,953	0.205	0.404	9,218,494

Notes: The table reports summary statistics for stayers and migrants in the linked samples by period. All characteristics are measured in the year of origin. The dummy for labor force participation is defined for men in the age range 15-64. The dummies for employment-related variables are defined for men in the age range 15-64 who were in the labor force. All remaining dummies are defined for men 15+.

Table A11. Climate Distance and Migration: Controlling Non-Linearly for Geography

Dep. var.:	Number of Migrants			
	(1)	(2)	(3)	(4)
Temperature Distance	-0.260***	-0.325***	-0.342***	-0.347***
	(0.006)	(0.007)	(0.007)	(0.007)
	[-0.070]	[-0.088]	[-0.092]	[-0.094]
Precipitation Distance	-0.011***	-0.027***	-0.034***	-0.037***
	(0.001)	(0.001)	(0.002)	(0.002)
	[-0.018]	[-0.044]	[-0.056]	[-0.061]
Distance (in 100km)	-0.149***	-0.002***	-0.000***	-0.000***
	(0.005)	(0.000)	(0.000)	(0.000)
	[-0.085]	[-0.051]	[-0.027]	[-0.015]
Observations	30,479,809	30,479,809	30,479,809	30,479,809
Pseudo R-squared	0.705	0.672	0.662	0.659
Mean Temp. Dist.	5.321	5.321	5.321	5.321
SD Temp. Dist.	3.829	3.829	3.829	3.829
Mean Precip. Dist.	29.61	29.61	29.61	29.61
SD Precip. Dist.	23.21	23.21	23.21	23.21
County o × Decade FE	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes
Distance	Linear	Quadratic	Cubic	Quartic

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). Column 1 controls for physical distance linearly. Columns 2, 3, and 4 control, respectively, for the second, third, and fourth order polynomials of physical distance, always including lower order terms. The coefficient on physical distance refers to the sum of all distance terms. All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A12. Climate Distance and Migration, by Direction of Move

Dep. var.:	Number of Migrants						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Temperature Distance	-0.260***	-0.216***	-0.210***	-0.223***	-0.139***	-0.152***	-0.122***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.009)	(0.009)	(0.011)
	[-0.070]	[-0.053]	[-0.111]	[-0.082]	[-0.036]	[-0.085]	[-0.050]
Precipitation Distance	-0.011***	-0.010***	-0.009***	-0.012***	-0.008***	-0.006***	-0.009***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)	(0.002)	(0.002)
	[-0.018]	[-0.019]	[-0.036]	[-0.032]	[-0.010]	[-0.017]	[-0.019]
Distance (in 100km)	-0.149***	-0.142***	-0.131***	-0.157***	-0.425***	-0.437***	-0.420***
	(0.005)	(0.004)	(0.004)	(0.005)	(0.013)	(0.014)	(0.014)
	[-0.085]	[-0.089]	[-0.179]	[-0.149]	[-0.146]	[-0.325]	[-0.230]
Observations	30,479,809	20,085,470	19,826,771	19,114,830	10,136,584	9,676,434	9,640,674
Pseudo R-squared	0.705	0.687	0.628	0.674	0.789	0.755	0.754
Mean Temp. Dist.	5.321	4.278	4.269	4.254	7.320	7.270	7.237
SD Temp. Dist.	3.829	3.388	3.380	3.378	3.818	3.809	3.783
Mean Precip. Dist.	29.61	31.23	31.16	30.76	26.29	26.33	25.90
SD Precip. Dist.	23.21	24.93	24.85	24.75	18.90	18.88	18.61
County o × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Direction	All	Horizontal	East-West	West-East	Vertical	South-North	North-South

Notes: The sample in column 1 includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. Subsequent columns consider county-pairs within the direction of move reported at the bottom of the table. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). All regressions control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A13. Climate Distance and Migration: Controlling for Latitude and Longitude

Dep. var.:	Number of Migrants				
	(1)	(2)	(3)	(4)	(5)
Temperature Distance	-0.260***	-0.130***	-0.157***	-0.127***	-0.133***
	(0.006)	(0.006)	(0.007)	(0.006)	(0.006)
	[-0.070]	[-0.035]	[-0.043]	[-0.034]	[-0.036]
Precipitation Distance	-0.011***	-0.010***	-0.009***	-0.009***	-0.013***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-0.018]	[-0.017]	[-0.014]	[-0.015]	[-0.021]
Distance (in 100km)	-0.149***	-0.142***	-0.369***	-0.288***	
	(0.005)	(0.004)	(0.013)	(0.018)	
	[-0.085]	[-0.081]	[-0.211]	[-0.165]	
Observations	30,479,809	30,479,809	30,479,809	30,479,809	30,479,809
Pseudo R-squared	0.705	0.708	0.709	0.709	0.706
Mean Temp. Dist.	5.321	5.321	5.321	5.321	5.321
SD Temp. Dist.	3.829	3.829	3.829	3.829	3.829
Mean Precip. Dist.	29.61	29.61	29.61	29.61	29.61
SD Precip. Dist.	23.21	23.21	23.21	23.21	23.21
County o × Decade FE	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes
Latitude Distance		Yes		Yes	Yes
Longitude Distance			Yes	Yes	Yes

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). Columns 2 and 3 replicate the baseline specification of Table 3, column 5 (also reported in column 1), by controlling for latitude and longitude distance, respectively. Column 4 includes both measures simultaneously. Column 5 replicates column 4 without controlling for physical distance. All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A14. Climate Distance and Migration: Dropping Selected Counties

Dep. var.:	Number of Migrants						
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Temperature Distance	-0.260***	-0.207***	-0.189***	-0.189***	-0.180***	-0.257***	-0.254***
	(0.006)	(0.004)	(0.004)	(0.004)	(0.004)	(0.007)	(0.006)
	[-0.070]	[-0.113]	[-0.128]	[-0.128]	[-0.126]	[-0.068]	[-0.070]
Precipitation Distance	-0.011***	-0.007***	-0.007***	-0.006***	-0.007***	-0.010***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-0.018]	[-0.024]	[-0.027]	[-0.026]	[-0.028]	[-0.016]	[-0.016]
Distance (in 100km)	-0.149***	-0.122***	-0.109***	-0.109***	-0.090***	-0.153***	-0.190***
	(0.005)	(0.004)	(0.003)	(0.003)	(0.003)	(0.005)	(0.005)
	[-0.085]	[-0.141]	[-0.157]	[-0.157]	[-0.132]	[-0.083]	[-0.102]
Observations	30,479,809	30,391,967	30,244,609	30,255,171	29,356,823	26,596,850	29,274,530
Pseudo R-squared	0.705	0.683	0.664	0.664	0.649	0.725	0.711
Mean Temp. Dist.	5.321	5.330	5.348	5.350	5.428	5.723	5.349
SD Temp. Dist.	3.829	3.826	3.822	3.822	3.817	3.865	3.847
Mean Precip. Dist.	29.61	29.65	29.75	29.77	30.16	31.63	29.22
SD Precip. Dist.	23.21	23.19	23.18	23.18	23.17	23.45	22.94
County o × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Sample	Full	Drop Adjacent Counties	Drop Adjacent and Next to Adjacent Counties	Drop Moves $<$ 100km	Between States Only	Drop Adjacent States	Drop California

Notes: The sample in column 1 includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. Subsequent columns exclude counties (or county-pairs) as specified at the bottom of the table. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** $p<0.01$, ** $p<0.05$, * $p<0.1$.

Table A15. Climate Distance and Migration: Controlling for Time-Varying Travel Distance

Dep. var.:	Number of Migrants					
	(1)	(2)	(3)	(4)	(5)	(6)
Temperature Distance	-0.260***	-0.260***	-0.252***	-0.271***	-0.253***	-0.296***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.008)
	[-0.070]	[-0.070]	[-0.074]	[-0.079]	[-0.074]	[-0.086]
Precipitation Distance	-0.011***	-0.011***	-0.010***	-0.011***	-0.014***	-0.020***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.002)
	[-0.018]	[-0.017]	[-0.017]	[-0.019]	-[0.025]	[-0.034]
Distance (in 100km)	-0.149***		-0.068***	-0.136***		
	(0.005)		(0.006)	(0.005)		
	[-0.085]		[-0.042]	[-0.084]		
Transportation Cost			-0.018***	-0.005***	-0.028***	-0.061***
			(0.001)	(0.002)	(0.001)	(0.003)
			[-0.110]	[-0.009]	[-0.176]	[-0.118]
Observations	30,479,809	30,479,809	23,119,668	23,119,668	23,119,668	23,119,668
Pseudo R-squared	0.705	0.706	0.700	0.693	0.696	0.679
Mean Temp. Dist.	5.321	5.321	5.348	5.348	5.348	5.348
SD Temp. Dist.	3.829	3.829	3.845	3.845	3.845	3.845
Mean Precip. Dist.	29.61	29.61	29.28	29.28	29.28	29.28
SD Precip. Dist.	23.21	23.21	22.98	22.98	22.98	22.98
County o × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). Column 2 replicates column 1, which estimates the baseline specification (Table 3, column 5), by interacting physical distance with decade dummies. Columns 3 and 5 (resp., columns 4 and 6) control for time-varying county-pair level travel costs measured in hours (resp., dollars). See Appendix B.6 for more details on the construction of these variables. Columns 5 and 6 do not include (time invariant) physical distance. All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A16. Climate Distance and Migration: Controlling for Geography

Dep. var.:	Number of Migrants				
	(1)	(2)	(3)	(4)	(5)
Temperature Distance	-0.260***	-0.255***	-0.259***	-0.258***	-0.251***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)
	[-0.070]	[-0.069]	[-0.070]	[-0.070]	[-0.068]
Precipitation Distance	-0.011***	-0.010***	-0.011***	-0.011***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-0.018]	[-0.016]	[-0.018]	[-0.017]	[-0.016]
Distance (in 100km)	-0.149***	-0.145***	-0.152***	-0.145***	-0.146***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
	[-0.085]	[-0.083]	[-0.087]	[-0.083]	[-0.084]
Observations	30,479,809	30,479,809	30,479,809	30,479,809	30,479,809
Pseudo R-squared	0.705	0.706	0.706	0.706	0.707
Mean Temp. Dist.	5.321	5.321	5.321	5.321	5.321
SD Temp. Dist.	3.829	3.829	3.829	3.829	3.829
Mean Precip. Dist.	29.61	29.61	29.61	29.61	29.61
SD Precip. Dist.	23.21	23.21	23.21	23.21	23.21
County o × Decade FE	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes
Elevation		Yes			Yes
Ruggedness			Yes		Yes
Coastal				Yes	Yes

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). All regressions control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. In column 2, we control for the distance in elevation between county o and county d. In column 3, we control for the distance in the standard deviation in elevation between county o and county d. In column 4, we control for a dummy equal to one if both counties are coastal. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A17. Climate Distance and Migration: Controlling for Soil Types

Dep. var.:	Number of Migrants					
	(1)	(2)	(3)	(4)	(5)	(6)
Temperature Distance	-0.260***	-0.251***	-0.248***	-0.260***	-0.256***	-0.244***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.006)	(0.005)
	[-0.070]	[-0.068]	[-0.067]	[-0.070]	[-0.069]	[-0.066]
Precipitation Distance	-0.011***	-0.010***	-0.010***	-0.007***	-0.009***	-0.005***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-0.018]	[-0.016]	[-0.016]	[-0.011]	[-0.015]	[-0.008]
Distance (in 100km)	-0.149***	-0.139***	-0.146***	-0.146***	-0.147***	-0.137***
	(0.005)	(0.005)	(0.004)	(0.004)	(0.005)	(0.005)
	[-0.085]	[-0.080]	[-0.084]	[-0.084]	[-0.084]	[-0.078]
Bulk Distance		-0.030***				-0.019***
		(0.002)				(0.003)
		[-0.020]				[-0.013]
Concentration Distance			-0.168***			-0.115***
			(0.017)			(0.018)
			[-0.025]			[-0.017]
pH Distance				-0.024***		-0.021***
				(0.002)		(0.002)
				[-0.012]		[-0.010]
Water Distance					-0.078***	-0.052***
					(0.005)	(0.005)
					[-0.017]	[-0.011]
Observations	30,479,809	30,479,809	30,479,809	30,479,809	30,479,809	30,479,809
Pseudo R-squared	0.705	0.707	0.707	0.706	0.707	0.709
Mean Temp. Dist.	5.321	5.321	5.321	5.321	5.321	5.321
SD Temp. Dist.	3.829	3.829	3.829	3.829	3.829	3.829
Mean Precip. Dist.	29.61	29.61	29.61	29.61	29.61	29.61
SD Precip. Dist.	23.21	23.21	23.21	23.21	23.21	23.21
County o × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). All regressions control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A18. Climate Distance and Migration: Average vs Variability

Dep. var.:	Number of Migrants		
	(1)	(2)	(3)
Temperature Distance	-0.260***	-0.256***	-0.247***
	(0.006)	(0.006)	(0.006)
	[-0.070]	[-0.069]	[-0.067]
Precipitation Distance	-0.011***	-0.010***	-0.009***
	(0.001)	(0.001)	(0.001)
	[-0.018]	[-0.017]	[-0.015]
Distance (in 100km)	-0.149***	-0.146***	-0.141***
	(0.005)	(0.005)	(0.005)
	[-0.085]	[-0.084]	[-0.080]
Temp. SD Distance		-0.034**	
		(0.015)	
		[-0.004]	
Precip. SD Distance		-0.002	
		(0.001)	
		[-0.002]	
Temp. Range Distance			-0.040***
			(0.005)
			[-0.013]
Precip. Range Distance			-0.001
			(0.000)
			[-0.002]
Observations	30,479,809	30,479,809	30,479,809
Pseudo R-squared	0.705	0.705	0.706
Mean Temp. Dist.	5.321	5.321	5.321
SD Temp. Dist.	3.829	3.829	3.829
Mean Precip. Dist.	29.61	29.61	29.61
SD Precip. Dist.	23.21	23.21	23.21
County o × Decade FE	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). *Temp. SD Distance* (resp., *Precip. SD Distance*) is the absolute value of the difference in the standard deviation of temperature (resp., precipitation) between the origin and the destination county. For each county, the standard deviation of both temperature and precipitation is first computed at the yearly level between 1895 and 1920, and then averaged over the entire period. *Temp. Range Distance* (resp., *Precip. Range Distance*) is the absolute value of the difference in the range of temperature (resp., precipitation) between the origin and the destination county. For each county, the range of temperature (resp., precipitation) is first computed as the difference between the highest and lowest daily temperature (resp., monthly precipitation) at the yearly level between 1895 and 1920, and then averaged over the entire period. All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standard errors are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A19. Climate Distance and Migration: Alternative Climate Definitions

Dep. var.:	Number of Migrants				
	(1)	(2)	(3)	(4)	(5)
Temperature Distance	-0.260***	-0.253***	-0.277***	-0.197***	-0.245***
	(0.006)	(0.006)	(0.007)	(0.005)	(0.007)
	[-0.070]	[-0.070]	[-0.062]	[-0.066]	[-0.054]
Precipitation Distance	-0.011***	-0.012***	-0.003**	-0.008***	-0.010***
	(0.001)	-0.001	(0.001)	(0.001)	(0.001)
	[-0.018]	[-0.02]	[-0.005]	[-0.020]	[-0.014]
Distance (in 100km)	-0.149***	-0.146***	-0.161***	-0.149***	-0.155***
	(0.005)	(0.004)	(0.005)	(0.005)	(0.006)
	[-0.085]	[-0.083]	[-0.092]	[-0.085]	[-0.070]
Observations	30,479,809	30,479,809	30,479,809	30,498,928	18,594,032
Pseudo R-squared	0.705	0.706	0.698	0.703	0.730
Mean Temp. Dist.	5.321	5.455	4.375	6.506	31.65
SD Temp. Dist.	3.829	3.899	3.197	4.725	23.88
Mean Precip. Dist.	29.61	29.61	27.90	38.85	5.435
SD Precip. Dist.	23.21	23.21	24.85	34.46	3.899
County o $\times$ Decade FE	Yes	Yes	Yes	Yes	Yes
County d $\times$ Decade FE	Yes	Yes	Yes	Yes	Yes
Temperature Measurement	Yearly Avg.	Yearly Max	Summer	Winter	Rolling Avg.
Precipitation Measurement	Yearly Avg.	Yearly Avg.	Summer	Winter	Rolling Avg.

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). *Yearly Avg.* is the baseline measure of climate, obtained by taking the 1895-1920 mean of yearly average climate. *Yearly Max* refers to the 1895-1920 mean of yearly maximum temperature. *Summer* (resp., *Winter*) corresponds to the 1895-1920 mean of summer (resp., winter) average climate. In the *Rolling Avg.* specification, we use average yearly climate, but we attribute to each decade: *i*) before 1910, the climate computed over the 1895-1910 period; *ii*) after 1910, the climate measured as a rolling average of the 15 previous years (e.g., we assign average climate over the period 1905-1920 to 1910-1920 migration flows). All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by decade level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A20. Climate Distance and Migration: Alternative Samples

Dep. var.:	Number of Migrants					
	(1)	(2)	(3)	(4)	(5)	(6)
Temperature Distance	-0.260***	-0.190***	-0.160***	-0.284***	-0.285***	-0.175***
	(0.006)	(0.003)	(0.002)	(0.007)	(0.007)	(0.006)
	[-0.070]	[-1.334]	[-2.500]	[-0.047]	[-0.046]	[-0.011]
Precipitation Distance	-0.011***	-0.008***	-0.007***	-0.017***	-0.017***	-0.009***
	(0.001)	(0.000)	(0.000)	(0.002)	(0.002)	(0.001)
	[-0.018]	[-0.355]	[-0.627]	[-0.015]	[-0.014]	[-0.004]
Distance (in 100km)	-0.149***	-0.090***	-0.063***	-0.159***	-0.159***	-0.106***
	(0.005)	(0.002)	(0.001)	(0.006)	(0.006)	(0.003)
	[-0.085]	[-1.334]	[-2.047]	[-0.059]	[-0.058]	[-0.020]
Observations	30,479,809	30,161,185	29,229,535	14,005,934	13,389,801	3,093,539
Pseudo R-squared	0.705	0.346	0.195	0.748	0.748	0.607
Mean Temp. Dist.	5.321	5.357	5.443	4.763	4.711	3.002
SD Temp. Dist.	3.829	3.827	3.828	3.425	3.391	2.787
Mean Precip. Dist.	29.61	29.78	30.13	21.67	21.43	20.05
SD Precip. Dist.	23.21	23.19	23.19	17.82	17.68	20.57
County o × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes

Notes: The sample in column 1 includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. Column 2 (resp., column 3) drops observations in the top 1% (resp., 5%) of the distribution of the number of migrants. Column 4 includes only counties already existing in 1860. Column 5 (resp., column 6) includes county-pairs that existed in all decades (resp., observations with a strictly positive number of migrants). *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by decade level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A21. Climate Distance and Migration: Alternative Standard Errors

Dep. var.:	Number of Migrants									
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Temperature Distance	-0.260***	-0.260***	-0.260***	-0.260***	-0.260***	-0.260***	-0.260***	-0.260***	-0.260***	-0.260***
	(0.006)	(0.013)	(0.008)	(0.011)	(0.017)	(0.024)	(0.009)	(0.012)	(0.019)	(0.027)
	[-0.077]	[-0.077]	[-0.077]	[-0.077]	[-0.077]	[-0.077]	[-0.077]	[-0.077]	[-0.077]	[-0.077]
Precipitation Distance	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***	-0.011***
	(0.001)	(0.002)	(0.001)	(0.002)	(0.001)	(0.003)	(0.001)	(0.002)	(0.001)	(0.003)
	[-0.019]	[-0.019]	[-0.019]	[-0.019]	[-0.019]	[-0.019]	[-0.019]	[-0.019]	[-0.019]	[-0.019]
Distance (in 100km)	-0.149***	-0.149***	-0.149***	-0.149***	-0.149***	-0.149***	-0.149***	-0.149***	-0.149***	-0.149***
	(0.005)	(0.010)	(0.008)	(0.011)	(0.019)	(0.025)	(0.008)	(0.010)	(0.005)	(0.018)
	[-0.091]	[-0.091]	[-0.091]	[-0.091]	[-0.091]	[-0.091]	[-0.091]	[-0.091]	[-0.091]	[-0.091]
Observations	30,485,232	30,485,232	30,485,232	30,485,232	30,485,232	30,485,232	30,485,232	30,485,232	30,485,232	30,485,232
Pseudo R-squared	0.70528	0.70528	0.70528	0.70528	0.70528	0.70528	0.70528	0.70528	0.70528	0.70528
Mean Temp. Dist.	5.426	5.426	5.426	5.426	5.426	5.426	5.426	5.426	5.426	5.426
SD Temp. Dist.	3.884	3.884	3.884	3.884	3.884	3.884	3.884	3.884	3.884	3.884
Mean Precip. Dist.	31.16	31.16	31.16	31.16	31.16	31.16	31.16	31.16	31.16	31.16
SD Precip. Dist.	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62	23.62
County o × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Conley Cutoff (in km)			50	100	250	500	50	100	250	500
Latitude & Longitude			Origin	Origin	Origin	Origin	Destination	Destination	Destination	Destination

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors are reported in parentheses, and are clustered at the state of origin by state of destination by decade level in column 1, and at the state of origin by state of destination level in column 2. Columns 3 to 10 estimate standard errors using the procedure in Conley (1999) with the spatial cutoffs reported at the bottom of the table. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A22. Climate Distance and Migration: Long Differences

Dep. var.:	Change in Log Migrants					
	(1)	(2)	(3)	(4)	(5)	(6)
Change Log Temp. Distance	-0.073***	-0.047***	-0.048**	-0.035**	-0.045***	-0.043***
	(0.020)	(0.016)	(0.023)	(0.016)	(0.016)	(0.012)
	[-0.017]	[-0.011]	[-0.011]	[-0.007]	[-0.012]	[-0.017]
Change Log Precip. Distance	-0.041**	-0.038**	-0.058**	-0.039***	-0.040***	-0.028***
	(0.020)	(0.015)	(0.024)	(0.015)	(0.015)	(0.009)
	[-0.012]	[-0.011]	[-0.015]	[-0.010]	[-0.013]	[-0.014]
Observations	26,331	26,331	17,866	49,973	19,377	53,456
R-squared	0.572	0.618	0.641	0.583	0.628	0.640
County o FE	Yes	Yes	Yes	Yes	Yes	Yes
County d FE	Yes	Yes	Yes	Yes	Yes	Yes
Log Distance		Yes	Yes	Yes	Yes	Yes
Log Bilateral Controls			Yes			
Modern Period	2018-2019	2018-2019	2018-2019	2011-2012	2014-2015	Avg. 2011-2019
Historical Period	1935-1940	1935-1940	1935-1940	1935-1940	1935-1940	Avg. 1910-1940

Notes: The sample includes all county-pairs in the contiguous US with strictly positive migration flows in both the historical and the modern period. *Change in Log Migrants* is the difference between the log number of modern and historical migrants. *Change Log Temp. Distance* (resp., *Change Log Precip. Distance*) is the difference between the log temperature (resp., precipitation) of modern and historical period. Log Distance refers to the the log of physical distance between counties (expressed in 100 km). *Bilateral Controls* include the absolute value of the difference in the following variables: labor force participation, the manufacturing employment share, the agriculture employment share, the Black population share, the urban population share, the immigrant population share, sex ratios, population density, exposure to the frontier (Bazzi et al., 2020), market access (Donaldson and Hornbeck, 2016), and a dummy equal to one if the two counties were both connected to the railroad. All variables are measured in 1930, except for market access, which is measured in 1920. County o (resp., county d) refers to county of origin (resp., of destination). Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A23. Climate Distance and Norwegian Immigration: Past Migrants

Dep. var.:	Number of Migrants					
	(1)	(2)	(3)	(4)	(5)	(6)
Temperature Distance	-0.098***	-0.100***	-0.109***	-0.055***	-0.048***	-0.062***
	(0.016)	(0.013)	(0.015)	(0.010)	(0.009)	(0.015)
	[-3.884]	[-5.695]	[-11.033]	[-1.456]	[-1.403]	[-6.637]
Precipitation Distance	-0.006***	-0.003***	-0.002*	-0.002***	-0.002***	-0.002**
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-1.727]	[-1.473]	[-1.517]	[-0.465]	[-0.509]	[-1.803]
Lagged Migration	0.320***	0.263***	0.261***	0.133***	0.145***	0.008**
	(0.063)	(0.054)	(0.049)	(0.041)	(0.039)	(0.004)
	[0.251]	[0.253]	[0.582]	[0.051]	[0.057]	[0.033]
Temperature Distance × Lagged Migration	-0.054***	-0.049***	-0.052***	-0.022**	-0.025***	-0.001
	(0.013)	(0.011)	(0.010)	(0.009)	(0.008)	(0.001)
	[-0.160]	[-0.179]	[-0.442]	[-0.031]	[-0.036]	[-0.017]
Precipitation Distance × Lagged Migration	-0.001**	-0.001***	-0.001***	-0.000	-0.000*	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
	[-0.024]	[-0.030]	[-0.085]	[-0.007]	[-0.008]	[0.044]
Observations	847,894	1,001,559	911,886	1,437,294	1,670,015	1,300,165
Pseudo R-squared	0.406	0.372	0.333	0.466	0.474	0.386
Mean Temp. Dist.	7.429	7.511	7.354	7.496	7.914	7.480
SD Temp. Dist.	4.609	4.974	5.099	5.043	4.961	5.173
Mean Precip. Dist.	40.17	42.60	42.90	44.88	43.98	44.85
SD Precip. Dist.	36.16	37.72	38.14	39.24	38.01	39.09
US State FE	Yes	Yes	Yes	Yes	Yes	Yes
Norwegian Province FE	Yes	Yes	Yes	Yes	Yes	Yes
US Controls	Yes	Yes	Yes	Yes	Yes	Yes
Norwegian Controls	Yes	Yes	Yes	Yes	Yes	Yes
Migration Period	1865-1880	1865-1900	1880-1900	1900-1910	1900-1920	1910-1920
Lagged Year	1870	1870	1880	1900	1900	1910

Notes: The sample includes pairs formed by all Norwegian municipalities and all US counties with at least one European immigrant at the time of the US Census. *Number of Migrants* is the number of Norwegian male immigrants who were at least 10 years old in 1865 linked between the Norwegian and the US Censuses. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the Norwegian municipality and the US county. In columns 1 to 5 (resp., column 6), *Lagged Migration* is the number of 10+ Norwegian male immigrants linked between the Norwegian Census of 1865 (resp., 1900) and the US Census of the year reported in the last row of the table. See the notes to Table 1 for the detailed list of controls. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the US state by Norwegian province level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A24. Climate Distance and Migration: Controlling for Lagged Migration

Dep. var.:	Number of Migrants					
	(1)	(2)	(3)	(4)	(5)	(6)
Temperature Distance	-0.260***	-0.255***	-0.255***	-0.255***	-0.241***	-0.241***
	(0.006)	(0.006)	(0.006)	(0.006)	(0.007)	(0.007)
	[-0.070]	[-0.067]	[-0.069]	[-0.069]	[-0.053]	[-0.053]
Precipitation Distance	-0.011***	-0.011***	-0.011***	-0.011***	-0.010***	-0.010***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
	[-0.018]	[-0.017]	[-0.018]	[-0.018]	[-0.013]	[-0.013]
Distance (in 100km)	-0.149***	-0.146***	-0.146***	-0.146***	-0.153***	-0.153***
	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)	(0.006)
	[-0.085]	[-0.082]	[-0.084]	[-0.083]	[-0.069]	[-0.069]
Lagged Migration		1.362***	0.549***	3.706***	1.389***	5.596***
		(0.274)	(0.106)	(0.643)	(0.343)	(1.378)
		[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
Observations	30,479,809	29,328,452	30,479,809	30,479,809	18,594,032	18,594,032
Pseudo R-squared	0.705	0.708	0.707	0.707	0.731	0.731
Mean Temp. Dist.	5.321	5.306	5.321	5.321	5.454	5.454
SD Temp. Dist.	3.829	3.813	3.829	3.829	3.912	3.912
Mean Precip. Dist.	29.61	29.53	29.61	29.61	31.07	31.07
SD Precip. Dist.	23.21	23.08	23.21	23.21	23.77	23.77
County o × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
Definition Lagged Mig.		Previous Decade	Lagged Stock	Avg. Lagged Flows	1900 Stock	Pre-1900 Avg. Flows
Sample Period	Full	Full	Full	Full	1910-1940	1910-1940

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1930-1940 in columns 1 to 4, and from 1900-1910 to 1930-1940 in columns 5 and 6. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period. The migration matrix is described in detail in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). *Lagged Migration* is the: total number of migrants in the last decade (resp., in all previous decades) in column 2 (resp., column 3); average number of migrants from 1850-1860 to the previous decade in column 4; total (resp., the average) number of migrants from 1850-1860 to 1880-1900 in column 5 (resp., column 6). Lagged migration is expressed in 10,000. All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A25. Climate Distance and Migration: Evidence from the US Frontier

Dep. var.:	Number of Migrants					
	(1)	(2)	(3)	(4)	(5)	(6)
Temperature Distance	-0.323***	-0.206***	-0.251***	-0.151***	-0.188***	-0.206***
	(0.008)	(0.010)	(0.019)	(0.018)	(0.019)	(0.018)
	[-0.434]	[-1.683]	[-1.815]	[-1.581]	[-1.278]	[-2.034]
Precipitation Distance	-0.018***	-0.024***	-0.025***	-0.008	-0.048***	0.005
	(0.001)	(0.004)	(0.005)	(0.007)	(0.008)	(0.006)
	[-0.145]	[-0.993]	[-0.746]	[-0.380]	[-1.568]	[0.257]
Distance (in 100km)	-0.129***	-0.229***	-0.267***	-0.303***	-0.199***	-0.201***
	(0.008)	(0.017)	(0.029)	(0.038)	(0.032)	(0.028)
	[-0.389]	[-2.778]	[-2.937]	[-4.754]	[-1.948]	[-2.749]
Observations	19,994,393	1,227,965	309,380	305,085	307,040	306,460
Pseudo R-squared	0.527	0.366	0.378	0.321	0.386	0.349
Mean Temp. Dist.	5.001	5.534	5.558	5.372	5.461	5.746
SD Temp. Dist.	3.615	3.715	3.720	3.618	3.660	3.846
Mean Precip. Dist.	26.28	30.50	21.11	29.17	32.68	39.10
SD Precip. Dist.	21.50	18.65	15.07	16.98	17.36	20.14
County o × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes	Yes
Origins	Any	Never Frontier	Never Frontier	Never Frontier	Never Frontier	Never Frontier
Destinations	Any	Frontier	Frontier	Frontier	Frontier	Frontier
Endline Decade	1900	1900	1860	1870	1880	1900

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1850-1860 to 1880-1900. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by year of destination level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A26. Climate, Migration, and the Homestead Act: Robustness to Sample

Dep. var.:	Number of Migrants				
	(1)	(2)	(3)	(4)	(5)
Temperature Distance	-0.299***	-0.279***	-0.299***	-0.225***	-0.186***
	(0.007)	(0.008)	(0.007)	(0.007)	(0.007)
	[-0.181]	[-0.137]	[-0.206]	[-0.344]	[-0.363]
Temperature Distance	0.147***	0.165***	0.124***	0.072***	0.035***
× Homestead	(0.011)	(0.013)	(0.011)	(0.011)	(0.010)
	[0.042]	[0.039]	[0.038]	[0.068]	[0.057]
Precipitation Distance	-0.014***	-0.017***	-0.012***	-0.013***	-0.009***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)
	[-0.050]	[-0.048]	[-0.049]	[-0.121]	[-0.108]
Precipitation Distance	0.002	-0.005*	0.002	0.004*	0.001
× Homestead	(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
	[0.005]	[-0.007]	[0.005]	[0.025]	[0.009]
Distance (in 100km)	-0.185***	-0.267***	-0.153***	-0.142***	-0.140***
	(0.009)	(0.013)	(0.008)	(0.009)	(0.008)
	[-0.245]	[-0.297]	[-0.229]	[-0.471]	[-0.563]
Distance × Homestead	0.065***	0.135***	0.049***	0.020***	0.010*
	(0.007)	(0.011)	(0.007)	(0.005)	(0.006)
	[0.049]	[0.093]	[0.040]	[0.051]	[0.044]
Observations	27,678,550	19,546,989	35,164,852	13,337,957	6,345,932
Pseudo R-squared	0.600	0.639	0.581	0.536	0.501
Mean Temp. Dist.	5.113	4.863	5.229	5.634	5.730
SD Temp. Dist.	3.699	3.514	3.773	3.951	3.971
Mean Precip. Dist.	27.22	25.10	28.92	34.07	37.52
SD Precip. Dist.	22.06	20.31	22.92	24.05	23.33
County o × Decade FE	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes
Origins	Never Htd	Never Htd States	No Htd t-10, t	Never Htd	Never Htd
Destinations	Any	Any	Any	Some Htd 1862-1920	Some Htd t-10, t

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1860-1870 to 1910-1920 such that: *i*) origin counties never offered any Homestead land (column 1); *ii*) origin counties belong to US states that never offered any Homestead land (column 2); *iii*) origin counties did not offer any Homestead land in the previous decade (column 3); *iv*) origin counties never offered any Homestead land and destination counties offered at least some Homestead land, respectively, between 1862 and 1920 and during the previous decade (columns 4 and 5). *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). *Homestead* is a dummy equal to one if the homesteaded share of the area in the county of destination in a given decade is above the 80$^{\text{th}}$ percentile of the distribution of the homesteaded share of county area calculated over the entire US for the 1860-1920. All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by decade level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table A27. Climate, Migration, and the Homestead Act: Robustness to Area Threshold

Dep. var.:	Number of Migrants				
	(1)	(2)	(3)	(4)	(5)
Temperature Distance	-0.293***	-0.300***	-0.298***	-0.299***	-0.297***
	(0.007)	(0.007)	(0.007)	(0.007)	(0.007)
	[-0.158]	[-0.166]	[-0.171]	[-0.181]	[-0.191]
Temperature Distance × Homestead	0.171***	0.177***	0.173***	0.147***	0.103***
	(0.010)	(0.010)	(0.010)	(0.011)	(0.011)
	[0.070]	[0.065]	[0.057]	[0.042]	[0.022]
Precipitation Distance	-0.019***	-0.020***	-0.017***	-0.014***	-0.012***
	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
	[-0.058]	[-0.062]	[-0.057]	[-0.050]	[-0.047]
Precipitation Distance × Homestead	-0.001	-0.001	0.001	0.002	0.006***
	(0.002)	(0.002)	(0.002)	(0.002)	(0.002)
	[-0.004]	[-0.002]	[0.003]	[0.005]	[0.009]
Distance (in 100km)	-0.259***	-0.223***	-0.208***	-0.185***	-0.155***
	(0.011)	(0.011)	(0.010)	(0.009)	(0.008)
	[-0.303]	[-0.267]	[-0.260]	[-0.245]	[-0.219]
Distance × Homestead	0.141***	0.112***	0.090***	0.065***	0.016**
	(0.010)	(0.008)	(0.008)	(0.007)	(0.007)
	[0.162]	[0.116]	[0.081]	[0.049]	[0.009]
Observations	23,031,689	24,027,360	25,577,474	27,678,550	30,637,624
Pseudo R-squared	0.626	0.617	0.609	0.600	0.589
Mean Temp. Dist.	4.921	4.968	5.033	5.113	5.187
SD Temp. Dist.	3.561	3.597	3.646	3.699	3.747
Mean Precip. Dist.	25.46	25.82	26.48	27.22	27.98
SD Precip. Dist.	20.39	20.69	21.48	22.06	22.60
County o × Decade FE	Yes	Yes	Yes	Yes	Yes
County d × Decade FE	Yes	Yes	Yes	Yes	Yes
Threshold (percentile)	50	60	70	80	90

Notes: The sample includes all county-pairs in the contiguous US for each decade from 1860-1870 to 1910-1920 such that origin counties never offered any Homestead land. *Number of Migrants* is the number of men 15+ in the baseline year who moved from the origin to the destination county in each period, and is derived from the linked sample described in Appendix B. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). *Homestead* is a dummy equal to one if the homesteaded share of the area in the county of destination in a given decade is above the percentile of the distribution of the homesteaded share of county area calculated over the entire US for the 1860-1920, and reported at the bottom of the table. All regressions also control for county of origin (county o) by decade and county of destination (county d) by decade fixed effects. Standardized beta coefficients are reported in square brackets. Standard errors, reported in parentheses, are clustered at the state of origin by state of destination by decade level. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

B Data Appendix

B.1 Climate Spatial Correlation

As discussed in the main paper (Section 3), a potential concern with our analysis is that climate is spatially correlated. For this reason, it is possible that our estimates pick up the effects of geographic—rather than climate—distance. Such concern is especially relevant for domestic migration, where, unlike for Norwegian immigrants, the "Atlantic reset" does not create a clear break between the origins and the destinations. Temperature and precipitation are determined by continuous physical phenomena, and discontinuity can only be introduced by topography: mountain ranges or large bodies of water (such as the Atlantic Ocean) can interrupt climate correlation.

The higher the correlation between physical and climate distance, the more concrete the possibility that our results might capture migrants' distaste for travelling long distances. To explore this possibility, we measure the extent of spatial correlation of climate within the US. In Table B1, we flexibly regress temperature and precipitation distance on non-linear functions of physical distance. We regress temperature and precipitation distance between the universe of US counties on distance polynomials of increasing degrees, from 1 to 6. Interestingly, we find that physical distance can explain at most 22% (31%) of the variation in bilateral temperature (precipitation) distance between US counties. The low predictive power of these models suggests that spatial correlation does not absorb all the variation in our regressors of interest.

In Table B2, we explore the possibility that climate distance might be highly correlated within short physical distances. This might pose a threat to our analysis, since migrants in the domestic linked sample tend to travel relatively short distances.[81] Column 1 replicates column 2 of Table B1. In subsequent columns, we regress temperature and precipitation distances on polynomials of degree 2 of geographic distance, restricting the sample to county-pairs that are apart no more than the number of km reported at the bottom of each panel. Column 3 of Table B2 shows that, even for short-range migration (e.g., 0 to 500km), a quadratic function of physical distance can only explain 19% (resp., 7%) of the temperature (resp., precipitation) variation between counties.

Taken together, these results indicate that, while climate and physical exhibit some degree of correlation, there remains large variation in climate distance even after controlling for physical distance. In the main text, we leverage such variation to identify the relationship between climate distance and migration.

[81] The median distance traveled by migrants in our sample is 580km.

Table B1. Spatial Correlation of Climate: Flexibly Predicting Climate Distances

Dep. var.:	Temperature Distance					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (in 100km)	4,202***	4,202***	4,202***	4,202***	4,202***	4,202***
	(3.690)	(3.485)	(3.482)	(3.477)	(3.477)	(3.477)
Distance (in 100km)^2		-3,768***	-3,768***	-3,768***	-3,768***	-3,768***
		(3.485)	(3.482)	(3.477)	(3.477)	(3.477)
Distance (in 100km)^3			429.1***	429.1***	429.1***	429.1***
			(3.482)	(3.477)	(3.477)	(3.477)
Distance (in 100km)^4				582.4***	582.4***	582.4***
				(3.477)	(3.477)	(3.477)
Distance (in 100km)^5					128.3***	128.3***
					(3.477)	(3.477)
Distance (in 100km)^6						122.8***
						(3.477)
Observations	9,644,130	9,644,130	9,644,130	9,644,130	9,644,130	9,644,130
R-squared	0.11852	0.21385	0.21509	0.21736	0.21747	0.21758
Dep. var.:	Precipitation Distance					
	(1)	(2)	(3)	(4)	(5)	(6)
Distance (in 100km)	39,624***	39,624***	39,624***	39,624***	39,624***	39,624***
	(20.13)	(19.82)	(19.77)	(19.77)	(19.77)	(19.77)
Distance (in 100km)^2		-10,950***	-10,950***	-10,950***	-10,950***	-10,950***
		(19.82)	(19.77)	(19.77)	(19.77)	(19.77)
Distance (in 100km)^3			-4,033***	-4,033***	-4,033***	-4,033***
			(19.77)	(19.77)	(19.77)	(19.77)
Distance (in 100km)^4				-184.4***	-184.4***	-184.4***
				(19.77)	(19.77)	(19.77)
Distance (in 100km)^5					1,637***	1,637***
					(19.77)	(19.77)
Distance (in 100km)^6						339.9***
						(19.77)
Observations	9,644,130	9,644,130	9,644,130	9,644,130	9,644,130	9,644,130
R-squared	0.28664	0.30853	0.31150	0.31151	0.31200	0.31202

Notes: The sample includes all county-pairs in the contiguous US. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Table B2. Spatial Correlation of Climate: Flexibly Predicting Temperature Distances within Distance Bins

Dep. var.:	Temperature Distance							
Distance Bins	All	(0,2]	(0,5]	(0,10]	(0,15]	(0,20]	(0,30]	(0,40]
Distance (in 100km)	4,202***	1,288***	685.1***	2,285***	4,006***	5,016***	5,103***	4,235***
	(3.485)	(0.7930)	(1.267)	(2.053)	(2.730)	(3.178)	(3.444)	(3.479)
Distance (in 100km)^2	-3,769***	-6.466***	-24.23***	-65.52***	-343.8***	-973.3***	-2,494***	-3,771***
	(3.485)	(0.7930)	(1.267)	(2.053)	(2.730)	(3.178)	(3.444)	(3.479)
Observations	9,644,130	214,464	1,171,944	3,651,476	6,084,924	7,776,054	9,182,151	9,624,016
R-squared	0.21385	0.10813	0.19986	0.25342	0.26283	0.24949	0.22847	0.21637
Dep. var.:	Precipitation Distance							
Distance Bins	All	(0,2]	(0,5]	(0,10]	(0,15]	(0,20]	(0,30]	(0,40]
Distance (in 100km)	39,624***	708.2***	3,068***	10,234***	19,072***	27,498***	38,492***	39,774***
	(19.82)	(7.369)	(10.07)	(13.62)	(16.20)	(17.97)	(19.31)	(19.79)
Distance (in 100km)^2	-10,950***	-100.4***	-296.9***	-113.2***	-695.5***	-1,024***	-3,228***	-10,207***
	(19.82)	(7.369)	(10.07)	(13.62)	(16.20)	(17.97)	(19.31)	(19.79)
Observations	9,644,130	214,464	1,171,944	3,651,476	6,084,924	7,776,054	9,182,151	9,624,016
R-squared	0.30853	0.04208	0.07405	0.13390	0.18571	0.23161	0.30355	0.30911

Notes: The sample includes all county-pairs in the contiguous US. *Temperature Distance* (resp., *Precipitation Distance*) is the absolute value of the difference in temperature (resp., precipitation) between the origin and the destination county. *Distance* refers to the physical distance between counties (expressed in 100 km). Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

B.2 Norwegian Immigration to the US

B.2.1 Linked Sample over 1865-1880

In the paper, we rely on a dataset that measures the number of immigrants who were living in a given Norwegian municipality in 1865 and who moved to a given US county in 1880. To derive this dataset, we proceed as follows. We adapt the matching algorithm described in Abramitzky et al. (2021) to match the Norwegian Census of 1865 to the population of Norwegian immigrants enumerated in the US Census of 1880. As is standard in the literature and in order to circumvent changes from maiden to married name, common for women at the time, we restrict attention to men in both Censuses (Abramitzky et al., 2021). More specifically, we consider men who were at least 10 years old in the Norwegian Census, and at least 25 in the 1880 US Census. This ensures that we perform the Census linking on samples of men with plausible birth dates, and who were old enough (i.e., at least 15 years old) in the 10 years prior to the 1880 US Census (when we observe them in the new location). We clean first and last names by removing special characters, accents, middle names, and name extensions, such as "Jr." or numbers. Then, we standardize nicknames using a crosswalk provided by the Minnesota Population Center and made available by Abramitzky et al. (2012). Finally, both first and last names are standardized using the NYSIIS algorithm implemented through the code in Sayers (2014). This procedure translates all names to their English phonetic form, ensuring that they are transcribed in the closest possible way to what a Census enumerator would have done in 1880.

Next, we search for *unique exact* matches of observations between the two Censuses. Matches are performed on first name, last name, and age in 1880. As in Abramitzky et al. (2012), we augment the matched dataset by relaxing the exact matching constraint on the age of the individual by accepting a unique match if the first and last names agree and if $\text{age}^{NOR,1865} + 15 = \text{age}^{US,1880} \pm 2$. We discard all ambiguous matches. That is, we drop from the dataset all individuals who can be matched to two or more Norwegian immigrants in the US based on their name and date of birth. The resulting dataset is a panel dataset with two observations for each individual—one in 1865 and one in 1880. As shown in Table B3, we are able to match 5,966 individuals, corresponding to a match rate of 8.24% (very close to the 8.52% match rate obtained for the same period by Eriksson, 2020).[82]

We locate Norwegian immigrants in the US using data from the Census Place Project (Berkes et al., 2023). Information on Norwegians municipality of residence in Norway is obtained from the Norwegian Census.[83] Additional individual characteristics, such as labor force participation,

[82] The slight discrepancy between our match rate and that in Eriksson (2020) is likely due to the different sets of individuals included in the linking procedure: Eriksson (2020) focuses on men aged 18-65 in 1880 and 1910, and aged 21-65 in 1920.

[83] Few municipalities change boundaries over time. In the event of a split, we assign population to the largest of the two resulting

occupation, and urban status, are retrieved from the two Censuses. Table A3 in Appendix A presents the characteristics (reported in the US Census of 1880) of individuals linked between the 1865 Norwegian Census and the 1880 US Census, and compares them to those of Norwegian immigrant men (of comparable age) in the 1880 US full count Census.[84]

Finally, we collapse the data to obtain the number of individuals who migrated from Norwegian municipality o to US county d. The resulting dataset consists of all possible pairs of Norwegian municipalities in 1865 and US counties in 1880, provided that at least one European immigrant—irrespective of age and gender—was recorded in the US county in the US full count Census of 1880.[85]

B.2.2 Linked Samples over Alternative Periods

In the paper, we also present results considering Norwegian immigrants linked over alternative time periods. Besides the 1865-1880 sample, we also consider: 1865-1870, 1865-1900, 1900-1910, and 1900-1920. To this end, we adopt a procedure very similar to the one described in Appendix B.2.1 for 1865-1880. Specifically, we: *i*) select only Norwegian men older than a given age threshold—10 years at the time in Norway; *ii*) clean and standardize their first and last names via the procedure described earlier; and, *iii*) link them based on their standardized names and reported age in the US, always allowing for some misreporting in age. The sample of individuals in the US (our target population) is constructed by selecting individuals who are: *i*) older than 10 in the Norwegian Census; *ii*) old enough to appear in the Norwegian Census (either of 1865 or of 1900).[86]

Concretely, take Peter—a Norwegian immigrant living in the US who was 45 in 1900. According to his reported age in 1900, Peter: *i*) is older than 10 in 1865; and, *ii*) is old enough to appear in the 1865 Norwegian Census. Thus, he is part of our sample. On the other hand, Eric—a Norwegian immigrant living in the US in 1900 who reports an age of 37—is not part of our sample. This is because, even if Eric is old enough to appear in the 1865 Norwegian Census, he was younger than 10 at the time of that Census.

Similarly to Eriksson (2020), since from 1900 onward the US Census reports also the year of

geographies.

[84] Using a procedure very similar to the one described above, we also create a sample of Norwegian men linked between the 1865 and the 1900 Norwegian Censuses. We compare their characteristics with those of linked migrants in Table A2. Table A1 compares the 1865 characteristics of Norwegian men in either linked sample (migrants and stayers) to those of men 10+ in the full count Norwegian Census. Appendix A also presents the geographic distribution of Norwegian men, both in Norway and in the US (Figures A6 and A7).

[85] As discussed in the main text, results are robust to using alternative sample definitions.

[86] The actual constraint on age that we impose is slightly less stringent, so as to allow for potential mis-reporting in the Census. For example, if the age restriction requires men to be older than 45, the constraint we impose is that men have to be 40 or older. Results are robust to using exact age.

immigration (while this piece of information is not available in 1880), we augment the linking procedure with this variable too, whenever possible. That is, for the linked samples of 1865-1900, 1900-1910, and 1900-1920, in addition to the parameters mentioned above, we further exploit the year of immigration reported in the US Census, discarding individuals whose immigration year predates the year of the Norwegian Census of origin.[87]

Table B3 reports the number of Norwegian men linked in each time window, together with the corresponding match rate, expressed relative to the number of eligible Norwegian-born men in the US. Overall, the resulting match rates are in line with those in the literature (Abramitzky et al., 2021), including specifically those in Eriksson (2020) for Norwegian immigrants.

Table B3. Linked Individuals and Match Rates, by Period

Sample Period	Number of Individuals	Match Rate (%)
1865-1870	3,874	6.86
1865-1880	5,966	8.24
1865-1900	4,486	8.30
1900-1910	8,262	11.22
1900-1920	8,292	11.57

Notes: Number of individuals is the number of matched individuals in that sample period. *Match Rate* is computed as the ratio between the number of matched individuals and the number of individuals in the US who meet our eligibility criteria, namely Norwegian-born men older than a given threshold.

B.3 Historical US Internal Migration

Linked samples. To construct the county-to-county migration dataset used in the paper, we proceed as follows. We use the Census Linking Project to create longitudinal datasets from historical US Census records that span each decade from 1850-1860 to 1930-1940 (Abramitzky et al., 2020).[88] The Census Linking Project relies on automated algorithms to link individuals across Census pairs using first and last name, year of birth and state or country of birth. Matches must be unique. Following Abramitzky et al. (2021) and the approach described in Appendix B.2.1, we focus only on men. We also exclude any individual who was younger than 15 in the baseline year.[89] We then rely on the Census Place Project (Berkes et al., 2023)

[87] Results are virtually unchanged when dropping this additional restriction.

[88] Since the 1890 Census was destroyed in a fire, this year cannot be used in the analysis; we thus consider the 1880-1900 period.

[89] As in the Norwegian case, this restriction is imposed to increase confidence that we focus on individuals who are old enough to make the decision as to whether and where to move. All results are unchanged when imposing alternative age thresholds

to assign individuals in the linked sample to the county of residence in a given decade. We exclude individuals reporting to live in either Hawaii or Alaska. This process yields a dataset with 32,943,677 observations. Tables A8 and A9 in Appendix A present the characteristics of the individuals included in the linked sample (separately by decade) and compare them to those of individuals in the full count Censuses.[90]

Similar to what we did for Norwegian immigration, we collapse the data at the county-pair by decade level to obtain a dataset with the number of county-to-county migrants in each decade. Whenever the full count US Census of the baseline year reported no men 15+ in the origin county, we set the number of migrants to missing (since there could be no individual within the age range considered in our analysis migrating from that origin).

Full count 1940 US Census. As discussed in Section 3.2 of the paper, we complement the linked sample with a dataset obtained from the 1940 full count US Census. We take advantage of the fact that in 1940, for the first time, the US Census asked individuals their place of residence five years before. We use this piece of information to construct a migration matrix that tracks moves of individuals between 1935 and 1940. As for the linked sample, we adjust county boundaries at destination using the Census Place Project in 1940 (Berkes et al., 2023). Instead, since the Census Place Project cannot be used for the (1935) county of origin, we rely on the cross-walk made available by Eckert et al. (2020). For consistency with the linked sample, we further restrict attention to individuals who, in 1940, were 20 years or older (who, thus, were at least 15 years old in 1935, i.e., in their location of origin), and who in either 1935 or 1940 did not live in Alaska or Hawaii. Finally, as before, we collapse the data at the county of origin by county of destination level to measure the county-to-county moves between 1935 and 1940.

B.4 Modern US Internal Migration: IRS Data

In Sections 3 and 4, we leverage county-to-county migration data from 2011 to 2019. To construct this dataset, we build on the County-to-County Migration files produced by the Internal Revenue Service (IRS) Statistics of Income (SOI) Division.[91] These data are based on year-to-year address changes reported on individual income tax returns filed with the IRS, and present migration patterns by state or by county. In particular, they record both the number of new residents who moved to a state or county (from each origin) and the number of residents leaving a state or county (to each destination). Data are available for tax filing

(including capping age in the endline year, as in Zimran, 2023) or when leaving the sample completely unrestricted in terms of age.

[90] Table A10 also compares the characteristics of individuals in the linked sample who did not move to those of domestic migrants.

[91] See SOI Tax Stats—Migration Data, `https://www.irs.gov/statistics/soi-tax-stats-migration-data`.

years from 1991 to 2021. However, because data collection methods changed in 2011, we focus on migration flows between 2011 and 2019, further excluding 2020 and 2021 to avoid potential COVID-related migration anomalies.[92] For robustness, we verify that results are unchanged when including 2020 and 2021.

B.5 Surname-Level Climate Distance from German Data

In Section 2 of the paper, we explore the relationship between the temperature in Germany and the temperature in the US counties where German immigrants lived in 1880. Since full count Census data for late 19th century Germany are not available, we cannot proceed as we did for the Norwegians, by matching individuals between the US and Germany. Instead, we match spatially clustered surnames in Germany to surnames of German immigrants in the US. For each surname, we compute its associated (weighed) average German temperature, based on the geographic distribution of that surname in Germany. Likewise, leveraging the distribution of German immigrants across US counties, we compute the (weighed) average temperature associated with that surname in the US. In what follows, we explain in detail our procedure.

We build on the lists of German WWI casualties compiled by the Association for Computer Genealogy (Verein für Computergenealogie e.V., 2014). The lists, published between 1914 and 1919 by the Prussian State Gazette, encompass the governmental notifications on the military losses sustained by the entire army of the German Empire (Zedlitz, 2016), and include wounded, missing, captured, and dead soldiers. We acquire information on approximately 3.3 million entries through data scraping.[93] Each entry contains information about the soldier's first and last name, and town of birth. The lists allow us to infer the geographic distribution of German surnames around the time of WWI. We acknowledge that the lists are only partially representative of the German population, most notably because the draft was not uniform across the Empire (De Juan et al., 2021). However, the lists represent a rare source of information on the geographic distribution of the population in a country that experienced mass migration to the US at the turn of the 20th century.

In a first step, we derive a measure of average temperature at the surname-level in Germany. We geolocate the soldiers' birthplaces using ArcGIS. To ensure consistency with the definition of Germany used by US Census enumerators, we restrict attention to individuals born within the 1880 borders of the German Empire. Then, we standardize last names by removing special characters, accents, and *umlauts*. These steps leave us with a list of $132,910$ surnames. Next,

[92] As for the historical analysis, we exclude records from Alaska and Hawaii. Results are unchanged when including also years prior to 2011.

[93] This represents 38.8% of the total 8.5 million entries in the official lists.

we select geographically clustered surnames, in order to ensure that the associated climate is measured with precision. We compute the centroid of birthplaces of each soldier bearing a given surname. We consider a surname as clustered if 85% of the soldiers were born within 30km of the centroid.[94] Finally, we discard surnames with less than three associated casualties. This is done for two reasons. First, very rare surnames are more likely to be the result of misspelling. Second, surnames associated with only one individual would automatically get selected based on our definition of geographically clustered surnames. Given that our goal is to select surnames that are both informative of their region of origin and common enough to be matched to German immigrants in the US, we exclude them.[95] This leaves us with $9,633$ surnames.

The average German temperature associated to each surname is given by:

$$\text{Temp}^{GER}\left(s^{GER}\right) = \sum_{o} \mathbf{P}(k \in o \mid s(k) = s^{GER}) \times \text{Temp}_o^{GER}$$

where $\mathbf{P}(k \in o \mid s(k) = s^{GER}) := \frac{\sum_k 1(k \in (o,s))}{\sum_o 1(k \in s)}$ is the probability that individual k was born in county o, conditional on having surname s. Intuitively, $\text{Temp}^{GER}(s)$ can be interpreted as the average temperature experienced in Germany by an individual with surname s.

To derive a similar surname-level average temperature for German immigrants living in the US, we turn to the 1880 full count US Census, restricting attention to German-born men 15+. We clean last names by removing special characters, accents, and numbers. This leaves us with $275,856$ surnames. Next, we compute the Jaro-Winkler (JW) spelling distance between each selected German surname and the surnames of German immigrants in the US. We keep a matched surname pair if the associated JW distance is below .1.[96] Out of the $275,856$ surnames of eligible German immigrants in the US, we match $95,721$ (34.7%) to at least one of the $9,633$ selected German surnames. Finally, we assign German climate to German immigrants in the US as follows:

$$\text{Temp}^{GER}\left(s^{US}\right) = \sum_{s^{GER} \text{ s.t. } d(s^{GER}, s^{US}) \leq 0.1} w\left(s^{GER}, s^{US}\right) \times \text{Temp}\left(s^{GER}\right)$$

94 The threshold was selected as follows. First, for each surname, we computed the distribution of distances from the centroid of each individual with that surname. Then, for each surname we considered the 85^{th} percentile (the 85^{th} percentile of the distance for the average surname is 338km). Next, within the distribution of the 85^{th} percentiles, we picked the 10% of surnames with the lowest 85^{th} percentile. Such 10% defines an implicit threshold of 30km (in terms of 85^{th} percentile).

95 Results, not reported for brevity, are robust to using alternative percentile thresholds and considering different radii. They are also unchanged when changing the minimum number of casualties for each surname to values higher than three.

96 This is the same threshold used in the literature (e.g., Abramitzky et al., 2021) and in our own analysis with Norwegian immigrants (see also Appendix B.2).

where $d(s,z)$ is the JW distance between s and z and:

$$w\left(s^{GER}, s^{US}\right) = \frac{1/d\left(s^{GER}, s^{US}\right)}{\sum_{s^{GER} \text{ s.t. } d(s^{GER}, s^{US}) \leq 0.1} 1/d\left(s^{GER}, s^{US}\right)}$$

$\text{Temp}^{GER}\left(s^{US}\right)$ can thus be interpreted as the expected temperature experienced *in Germany* by a German-born US immigrant with surname s.[97] To see this, note that $\text{Temp}^{GER}\left(s^{US}\right)$ is the average of the temperature associated to each matched surname weighed by the spelling similarity between the immigrant's surname and the matched German surname. Finally, we collapse the dataset of matched German immigrants in the US Census at the surname-level. The resulting dataset consists of $95,721$ surnames of German-born men aged 15+ living in a US county in 1880 who are matched to at least one of the geographically concentrated German surname.

In the last step, we define the US temperature associated to each German immigrant's surname, $\text{Temp}^{US}(s^{US})$ as:

$$\text{Temp}^{US}\left(s^{US}\right) = \sum_{d} \mathbf{P}(k \in d \mid s(k) = s^{US}) \times \text{Temp}_d^{US}$$

where $\mathbf{P}(k \in d \mid s(k) = s^{US}) := \frac{\sum_k 1(k \in (d,s))}{\sum_d 1(k \in s)}$ is the probability that individual k lives in US county d, conditional on having surname s. Intuitively, $\text{Temp}^{US}(s)$ can be interpreted as the average temperature experienced in the US by a German immigrant with surname s.

Figure 3 in the main text plots the raw correlation between the two temperature measures, reporting German and US climate on the x-axis and on the y-axis, respectively.

[97] Note that when two surnames are identical, $d\left(s^{GER}, s^{US}\right) = 0$, and $w\left(s^{GER}, s^{US}\right)$ is not defined. To allow for perfect matches, whenever $d\left(s^{GER}, s^{US}\right) = 0$ we set $d\left(s^{GER}, s^{US}\right) = 10^{-8}$.

B.6 Railroads and Transportation Costs

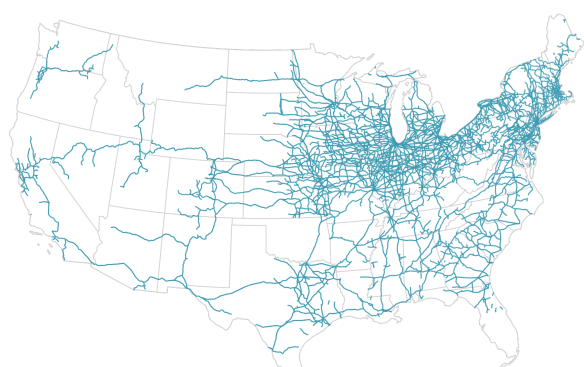
Data on the US railroad network expansion are taken from Donaldson and Hornbeck (2016). Figure B1 plots the evolution of the rail lines between 1860 and 1900. Most of the rail construction was finished by 1920. We use these data to compute bilateral time-varying transportation costs for each US county-pair. To this end, we augment the railroad network with straight connections within and between county centroids, which are meant to proxy stage coach connections (Figure B2). Then, we assign a weight to each edge of the resulting network. Transportation costs can be expressed either in hours or in dollars. In the former case, we use as weights 25 miles per hour for a railroad edge and 8 miles per hour for all other edges. In the latter case, we use \$1.5 per mile for a train ride and \$.03 for all other edges.[98] Then, with this weighed network at hand, we compute the least-cost paths between each county pair, for each decade between 1860 and 1920. As the railroad network grew, we observe substantial over time as well as cross-sectional variation in both measures of transportation costs.

[98] These numbers were gathered from various sources, including the Poor's Railroad Manuals available at http://www.pacificng.com/template.php?page=/ref/rrmanuals/index.htm and the Annual report on the railroads of New York.

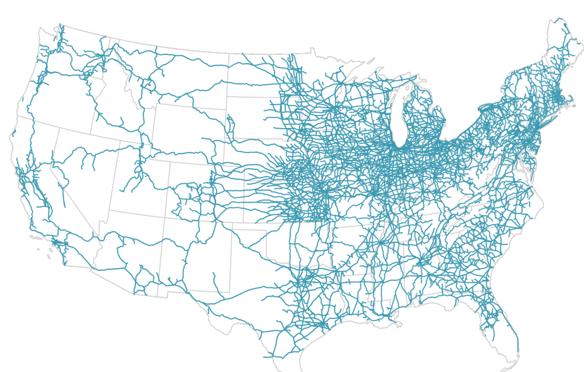
Figure B1. Railroads Expansion over Time

(a) 1860

(b) 1880

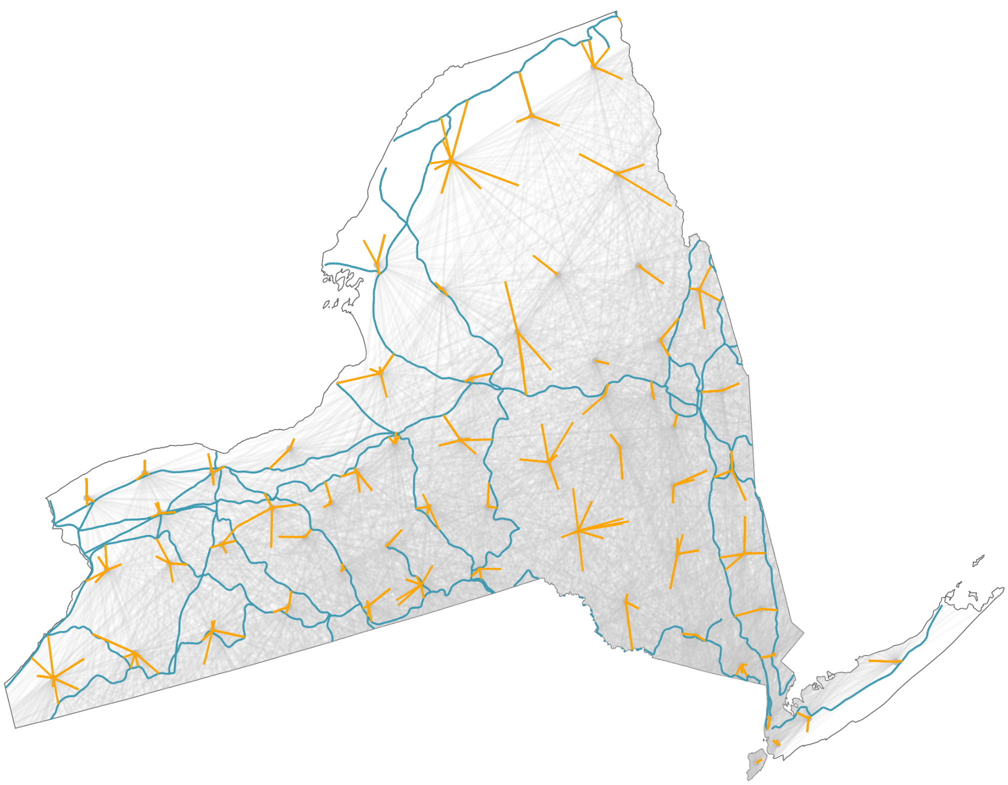


(c) 1900



Notes: The maps display the railroad network across US counties in 1860 (Panel A), 1880 (Panel B), and 1900 (Panel C).

Figure B2. Network Used to Compute Transportation Costs (1860)



Notes: The figure displays the map of New York state county centroids (grey dots), showing: (in blue) the railroad network as of 1860, (in orange) within county connection, (in grey) out of county connections.