Online Appendix: Intergenerational Mobility of Immigrants in the US over Two Centuries

Ran Abramitzky, Leah Boustan, Elisa Jácome, and Santiago Pérez

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1 Name Changes

As described above, to assemble the linked historical data we link individuals using information on names, state of birth and year of birth. One concern with this approach is that by relying on names, we might miss individuals who changed their names in the intercensal period. This omission could be problematic if individuals who change their names are systematically different from those who do not. Specifically, for our finding of higher upward mobility of children of immigrants to be driven by differential selection of individuals with stable names, it would need to be the case that children of immigrants who changed their names in the intercensal period had lower rates of upward mobility than those who did not.

There are a number of reasons why this concern is unlikely to be driving our findings. First, the cross-sectional results do not rely upon linking and show that, on average, second-generation immigrants narrow the gap with the children of the US-born. Second, previous evidence (Biavaschi, Giulietti and Siddique 2017) show that immigrants who Americanized their names had better outcomes than those who did not, which will bias our results towards finding less upward mobility of immigrants. Third, we show below that name changes were actually very infrequent in the second generation.

To show that name changes were infrequent, we use cross-sectional data from the Censuses of 1880, 1910 and 1940 that includes information on individual's names. We focus on the cohorts of second-generation immigrants who were aged 0 to 16 in 1880 or 1910 and were born in the US. Panel (a) of Figure 1 shows a scatter plot of first name frequency in 1880 against first name frequency in 1910. Panel (b) shows the corresponding figure for name frequency in 1910 and 1940. Each observation corresponds to a first name held by a second-generation immigrant. As it is clear from the figure, the vast majority of points are close to the 45 degrees line, which is consistent with name changes being infrequent.

While name changes are infrequent on average, one concern is that they might have been relatively more frequent among immigrants from more (or less) assimilated households. To test this possibility, we split children of immigrants into two groups based on how "foreign-sounding" their name was. Specifically, we compute a "foreignness" index, which measures the relative odds that a name will be held by a foreign-born relative to a US-born individual.

Panels (a) and (b) of Figure 2 show a scatter plot of first-name frequencies in 1880 against first name frequencies in 1910, separately for individuals based with above and below median foreign-sounding names (based on the distribution of names in 1880). Panels (c) and (d) show the analogous figures for 1910-1940. In all cases, we find that first name frequencies are stable over time and similarly so for above and below-median foreign-sounding names.

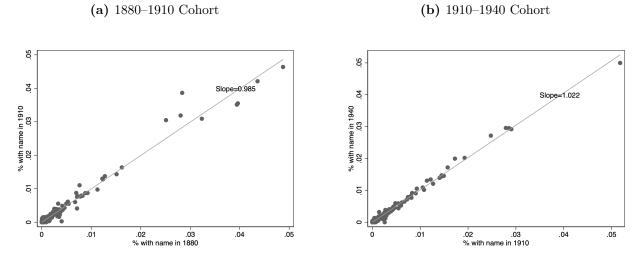
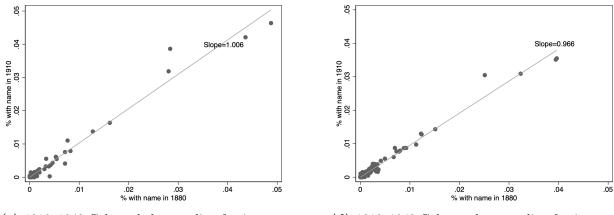


Figure 1: First-name frequencies among second-generation immigrants

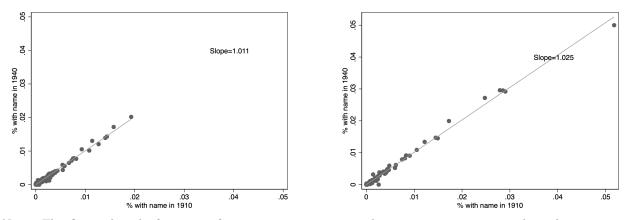
NOTE: This figure plots the frequency of a given name among second-generation immigrants in the earlier census year against its frequency in the later census year. Each observation corresponds to a given first name.

Figure 2: First-name frequencies among second-generation immigrants, by first-name foreignness(a) 1880–1910 Cohort, below median foreignness(b) 1880–1910 Cohort, above median foreignness



(c) 1910–1940 Cohort, below median foreignness

(d) 1910–1940 Cohort, above median foreignness



NOTE: This figure plots the frequency of a given name among second-generation immigrants in the earlier census year against its frequency in the later census year. Each observation corresponds to a given first name. Panels (a) and (c) focus on names with below-median foreignness (where the foreignness is index is computed using the distribution of names in the earlier census year), whereas Panels (b) and (d) focus on names with above-median foreignness.

2 Details on Linking Algorithm

Our baseline linking algorithm has the following steps:

- 1. Clean names in each of the censuses so as to remove any non-alphabetic characters and account for common mis-spellings and nicknames (e.g. so that Ben and Benjamin would be considered the same name).
- 2. Restrict the sample to people who are unique by first and last name, implied birth year calculated from calendar year and age, and place of birth (either state or country) in the earlier census.
- 3. For each record in the earlier census look for records in the later census that match on a standardized (using NYSIIS, New York State Identification and Intelligence System) version of first name and last name, place of birth, and exact birth year. At this point there are three possibilities:
 - If there is a unique match, this pair of observations is considered a match.
 - If there are multiple potential matches with the same year of birth, the observation is discarded (it is impossible to tell which potential match is correct).
 - If there are no matches by exact year of birth, the algorithm searches for matches within 1 year of reported birth year, and if this is unsuccessful, it looks for matches within 2 years. In each of these steps, only unique matches are accepted. If none of these attempts produces a unique match, the observation is discarded.

We also implement more conservative versions of this algorithm in which we: (1) use actual rather than standardized names, and (2) restrict the sample to people whose names are unique within a five-years age band.

3 Details on Income Calculations and Sample Weights

3.1 Census of Agriculture Income Calculation

In Section 5 of the paper, we use an alternative version of farmer income based on the 1900 Census of Agriculture. Specifically, we use the 1900 Census of Agriculture to calculate net earnings for farmers at the county level (and then adjust these earnings to 1940 dollars).

For each county, we calculate farmer's net earnings as the difference between farm income and expenses. Income is calculated as the sum of the value of farm output not fed to livestock and the value of house rent and food/fuel produced on farm and consumed by family. Expenses are calculated as the sum of expenditures for farm labor; fertilizer; feed, seed, and threshings; taxes; depreciation of value of buildings; and depreciation of machinery. For more details on this calculation, we refer the reader to Goldenweiser (1916) and Abramitzky et al. (2012).

Finally, we note that for farmers living in counties for which we could not calculate farmer net earnings, we assigned them the state estimate for farmer net earnings. For farmers livingn in counties for which this approach yielded negative net earnings, we assigned them the minimum positive value of county-level farmer earnings in their state. Finally, for farmers living in counties for which this approach yielded very large net earnings (i.e., obvious outliers above the 99th percentile of the farmer earnings distribution), we assigned them the median value of farmer earnings in that state.

3.2 Historical Sample Weights

To account for selection into the linked sample, we at times re-estimate our main specifications after re-weighting each observation using observable characteristics. Since we observe the same individual at two points during their life, we can compare the linked individuals to their childhood or adult cohorts using observable characteristics. We therefore have two possible weights for each individual:

- 1. Weight using earlier Census (i.e., childhood) characteristics: To construct this weight, we use the cross-sectional version of the earlier Census and identify the individuals (i.e., the sons) we are able to link forward. We then regress the indicator for being a "matched" individual on fixed effects for the state of residence, the son's age, the birthplace, as well as the father's birthplace and broad occupational category. Using this specification, we generate a probability for being matched.
- 2. Weight using later Census (i.e., adulthood) characteristics: To construct this weight, we use the cross-sectional version of the later Census and identify the individuals (i.e., the sons) we are able to link backward. We then regress the indicator for being a "matched" individual on fixed effects for the son's state of residence, age, birthplace, and broad occupational category. Using this specification, we generate a probability for being matched.

In both cases, the weights we use to re-weight observations are the inverse probability that an individual can be linked across Censuses.

4 Transition Matrices

Table 1: Occupational Mobility

(a) 1880–1910: US-born fathers

		Son's occupation						
Father's occupation	Share	White Collar	Farmer	Skilled	Unskilled			
White Collar	0.14	0.52	0.12	0.24	0.12			
Farmer	0.57	0.19	0.46	0.18	0.17			
Skilled	0.19	0.29	0.13	0.40	0.17			
Unskilled	0.11	0.19	0.23	0.32	0.26			
Column total		0.26	0.33	0.25	0.17			

(c) 1910–1940: US-born fathers

		Son's occupation						
Father's occupation	Share	White Collar	Farmer	Skilled	Unskilled			
White Collar	0.18	0.58	0.04	0.27	0.11			
Farmer	0.45	0.23	0.26	0.29	0.21			
Skilled	0.23	0.37	0.04	0.43	0.16			
Unskilled	0.14	0.29	0.08	0.39	0.24			
Column total		0.34	0.14	0.34	0.18			

(e) GSS: US-born fathers

(b) 1880–1910: Immigrant fathers

		Son's occupation					
Father's occupation	Share	White Collar	Farmer	Skilled	Unskilled		
White Collar	0.14	0.51	0.08	0.28	0.13		
Farmer	0.33	0.17	0.47	0.18	0.17		
Skilled	0.37	0.30	0.08	0.44	0.18		
Unskilled	0.16	0.25	0.11	0.40	0.24		
Column total		0.28	0.21	0.33	0.18		

(d) 1910–1940: Immigrant fathers

		Son's occupation						
Father's occupation	Share	White Collar	Farmer	Skilled	Unskilled			
White Collar	0.19	0.59	0.02	0.28	0.11			
Farmer	0.22	0.21	0.34	0.25	0.21			
Skilled	0.40	0.40	0.02	0.43	0.15			
Unskilled	0.20	0.33	0.03	0.43	0.21			
Column total		0.38	0.09	0.36	0.17			

(f) GSS: Immigrant fathers

Son's occupation			Son's occupation								
Father's occupation	Share	White Collar	Sales	Blue-Collar	Service	Father's occupation	Share	White Collar	Sales	Blue-Collar	Service
Professional	0.35	0.53	0.13	0.24	0.10	Professional	0.27	0.49	0.17	0.23	0.10
Sales/Office	0.12	0.45	0.21	0.25	0.09	Sales/Office	0.10	0.44	0.15	0.37	0.04
Blue-Collar	0.45	0.25	0.12	0.50	0.12	Blue-Collar	0.48	0.34	0.13	0.44	0.09
Service	0.08	0.28	0.15	0.40	0.17	Service	0.15	0.31	0.17	0.38	0.14
Column total		0.38	0.14	0.37	0.11	Column total		0.39	0.15	0.37	0.10

NOTE: For the historical cohorts, we use 1950 occupational codes to categorize fathers and sons into the four broad occupational categories. For the GSS cohort, we use 2010 occupational codes to categorize fathers and sons into the four broad categories. In the last cohort, "white collar" refers to professional and management occupations; "sales" refers to sales and office occupations; "blue collar" refers to natural resources, construction, maintenance, production, transportation, and material moving occupations; and "service" refers to service occupations.

4.1 Mobility Patterns Using Occupational Transition Matrices

Occupational transition matrices provide further insight, descriptively, into how the children of immigrants were able to move up from the bottom of the income distribution more rapidly than the children of the US-born. We follow previous papers in the intergenerational mobility literature (e.g., Feigenbaum 2018; Long and Ferrie 2013; Prez 2019) and construct matrices with rows representing fathers' occupations and columns representing sons' occupations using the historical data. For brevity, we classify each individual into one of four broad occupational categories: white-collar worker, farmer, skilled worker, or unskilled worker.¹

In the past, US-born men were around twice as likely as immigrant men to be in the farm sector; immigrant men were more likely to hold skilled and unskilled blue-collar positions. Table 2 contains occupational transition matrices for the 1880–1910 and 1910–1940 cohort, respectively. Focusing on occupations at the bottom of the income distribution, we note that the persistence rate within the unskilled category in the 1880–1910 is roughly the same for sons of immigrants and USborn individuals (around 25 percent of sons with unskilled fathers remain unskilled). Yet, the sons of immigrant fathers were substantially more likely to become white-collar workers (6 percentage points) or skilled blue-collar workers (8 percentage points), whereas the sons of the US-born were far more likely to become farmers. Sons in the 1910–1940 cohort show a similar pattern, even though overall employment in the farm sector had begun to decline. Descriptively, the differences in upward mobility at the bottom of the income distribution are driven in part by the propensity for the sons of the US-born to become farmers (who were on average in the 36th percentile of the distribution in 1910), in contrast to the propensity of the sons of immigrants to become white-collar or skilled blue-collar workers (who were on average in the 84th and 60th percentiles, respectively, of the income distribution in 1910). We also note that, unlike in the previous cohort, the sons of immigrant farmers in 1940 were more likely to remain farmers, which likely dampened the upward mobility of immigrants in this period.

The higher upward mobility of the children of immigrants does not seem to be driven by a higher propensity to work in a different occupational category than their fathers. Whereas children of immigrants in the 1880–1910 cohort were slightly more likely than the children of the US born to move to a different occupational category than their father (60 versus 57 percent, respectively), this was not the case in the 1910–1940 cohort (61 versus 64 percent, respectively).

Finally, for the modern cohort in the GSS, we see that children of immigrants whose fathers were employed as blue-collar or service workers were more likely to become professionals than the children of the US-born.

¹We use the 1950 occupational codes to classify individuals into the four categories. An individual is classified as a farmer if he is a farm owner, farm tenant, or farm manager. White-collared workers are professional workers; managers, officials, and proprietors; clerical and kindred workers; and sales workers. Skilled workers are craftsmen and operatives. Unskilled workers are service workers, farm laborers, and laborers. The shares and column totals do not add up to 100 due to rounding.

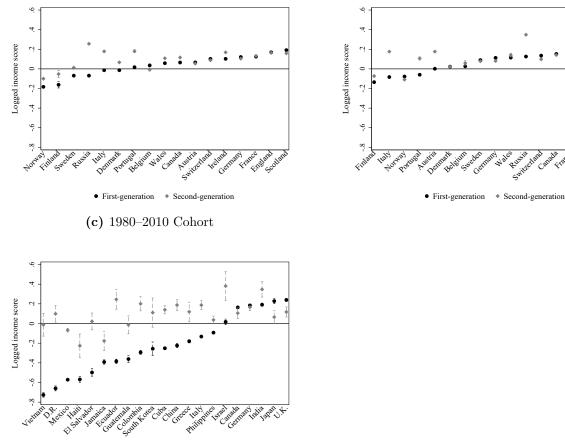
5 Linked Historical Samples Classifying Immigrants Using Mother's Birthplace

In this appendix, we reproduce the main figures and tables of the paper, but using a sample that classifies men as sons of immigrants based on their mother's birthplace.

Figure 1: Cross-Sectional Earning Gaps for First- and Second-Generation Immigrants relative to US-Born, by Country of Origin

(a) 1880–1910 Cohort

(b) 1910–1940 Cohort



First-generation
 Second-generation

NOTE: The historical samples use the 1880, 1910, and 1940 Censuses. The historical samples of first-generation immigrants and the US born are restricted to white men in the earlier Census who are aged 30–50, who have a child in the household, and who were either born in the US or in one of the 17 source countries. The second-generation samples are restricted to white men in the later Census who are aged 30–50 and whose mothers were either born in the US or in one of the 17 source countries. For the most recent cohort, we use the 1980 Census and the 2006–2015 Current Population Survey (CPS)'s Annual Social and Economic Supplement. We restrict the CPS sample of second-generation immigrants and their counterparts to men aged 30–50 whose mothers were either born in the US or in one of the top sending countries. We restrict the 1980 sample of first-generation immigrants and their counterparts to men aged 30–50 whose were born in the US or in one of the top sending countries identified in the CPS sample. For all of these cohorts, we use predicted income as the measure of income.

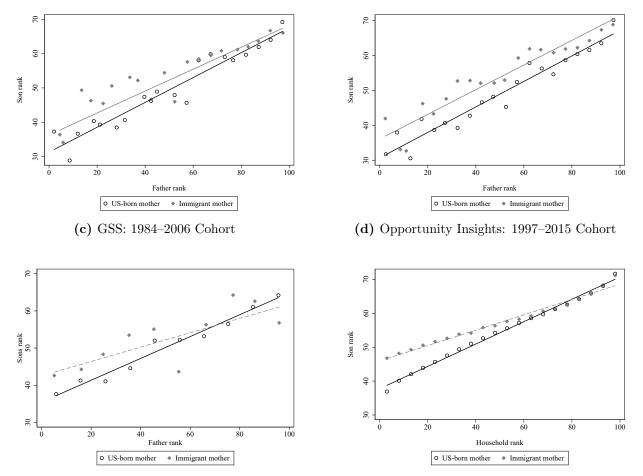


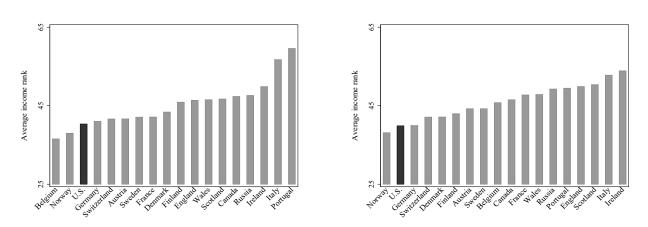
Figure 2: Intergenerational Mobility of Immigrants and the US born, Rank-Rank Correlations

(a) 1880–1910 Cohort

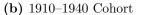
(b) 1910-to 1940 Cohort

NOTE: Sons are assigned percentile ranks relative to all other respondents born in the same birth year. Fathers are ranked relative to all fathers with children in the same birth year. The figures plot the mean income rank of children by father's income rank, for sons with and without foreign-born mothers, as well as the corresponding regression lines. Data for the Opportunity Insights cohort come from Chetty et al. (2018b).

Figure 3: Average Income Rank for Children Born to 25th Percentile, by Cohort and Mother's Birthplace

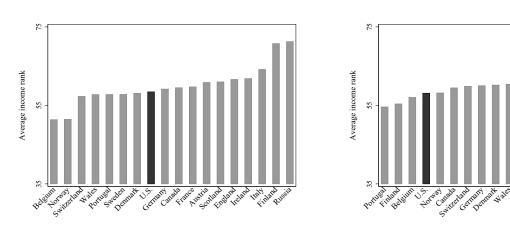


(a) 1880–1910 Cohort



NOTE: This figure plots the average income rank for children born to the 25th percentile of the parent income distribution.

Figure 4: Average Income Rank for Children Born to 75th Percentile, by Cohort and Mother's Birthplace



(a) 1880–1910 Cohort

(b) 1910–1940 Cohort

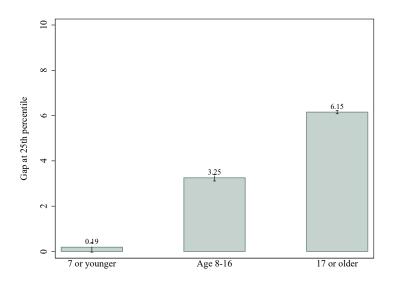
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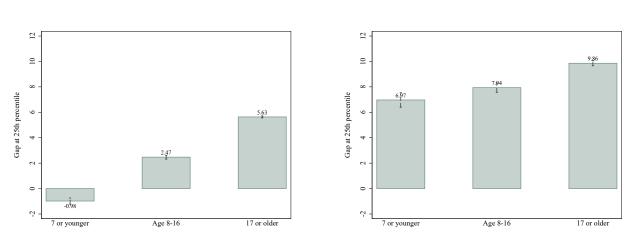
NOTE: This figure plots the average income rank for children born to the 75th percentile of the parent income distribution.

Figure 5: Intergenerational Gap for 1910–1940 Cohort, by Father's Age of Arrival



NOTE: This graph plots the intergenerational gap between children of immigrants and children of US-born women, for children born to the 25th percentile of the income distribution. Sons of immigrants are divided into groups based on their father's age of arrival to the United States.

Figure 6: Intergenerational Gap for 1910–1940 Cohort, by Father's Age of Arrival and Language in Sending Country



(a) Non-English-speaking Countries

(b) English-speaking Countries

NOTE: This graph plots the intergenerational gap between children of immigrants and children of US-born women, for children born to the 25th percentile of the income distribution. Then, sons of immigrants are divided into groups based on their father's age of arrival to the United States as well as the language spoken in the father's sending country (where English-speaking countries are Canada, England, Ireland, Scotland, and Wales).

Figure 7: Educational Attainment, 1910–1940 cohort

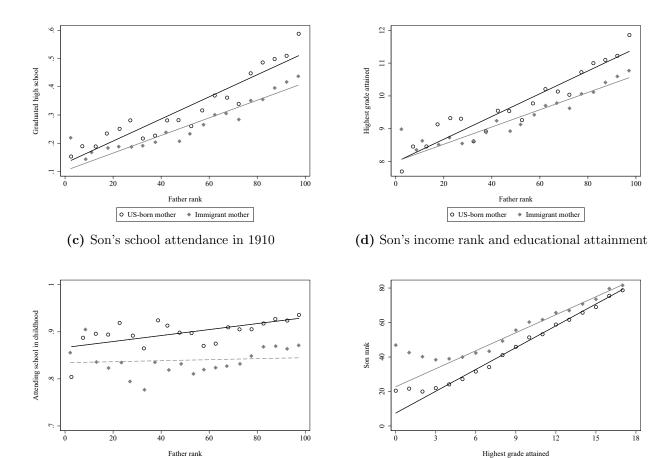


• US-born mother

Immigrant mother

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(b) Highest grade in school
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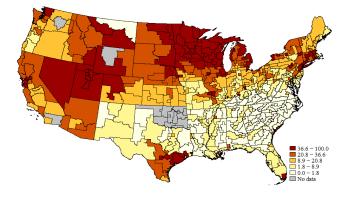
• US-born mother • Immigrant mother



NOTE: Fathers are ranked relative to all fathers with children in the same birth year. Panels (a) and (b) plot the mean educational attainment of children by their father's income rank, for sons with and without foreign-born mothers, as well as the corresponding regression lines. Panel (c) considers sons aged 12–16 in the 1910 Census and plots school attendance as a function of his father's income rank (after controlling for age fixed effects). Panel (d) plots a son's mean income rank as a function of completed years of schooling.

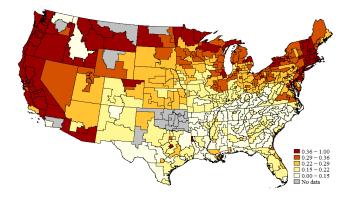
Figure 8: Share of Immigrants and Upward Mobility, by State Economic Area

(a) Share of sons that are second-generation (1880–1910)

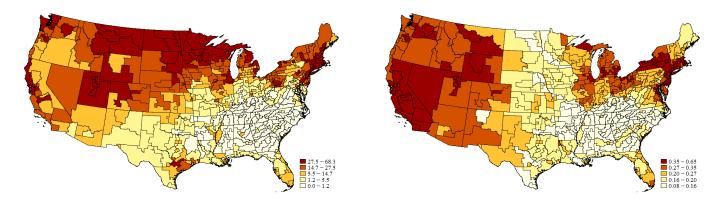


(c) Share of sons that are second-generation (1910–1940)

(b) Upward mobility of sons of US-born mothers (1880–1910)



(d) Upward mobility of sons of US-born mothers (1910–1940)



NOTE: Panels (a) and (c) show the share of the individuals in our linked sample that are second-generation immigrants in each 1880 or 1910 state economic area, respectively. In panels (b) and (d), upward mobility is measured as the share of sons in each state economic area that reached the top third of the national income distribution, conditional on having had a father in the bottom third of the corresponding national income distribution.

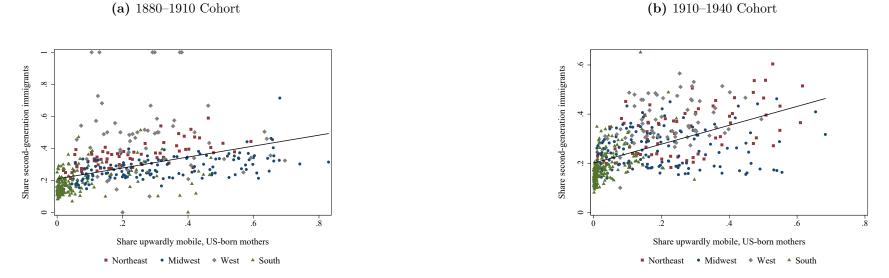


Figure 9: Share of Immigrants and Upward Mobility, by State Economic Area

NOTE: The first two panels use the linked samples to plot the share of a childhood SEA population that is a second-generation immigrant against the corresponding share of children with US-born mothers who were upwardly mobile. Upward mobility is measured as the share of sons in each SEA that reached the top third of the national income distribution, conditional on having had a father in the bottom third of the corresponding national income distribution.

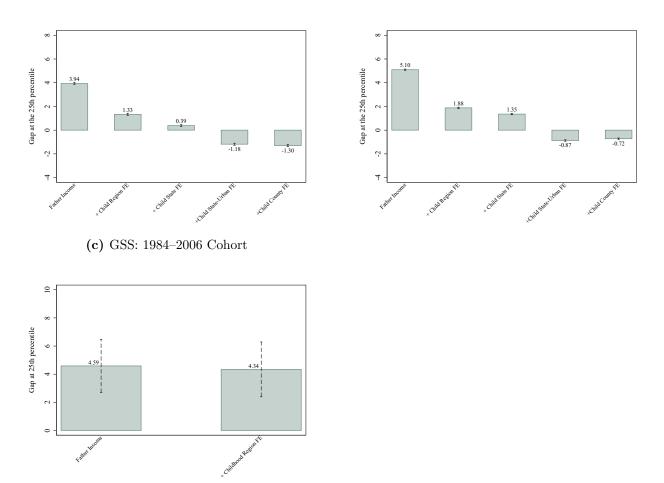


Figure 10: Intergenerational Gap for Historical Cohorts, with Childhood Location Fixed Effects(a) 1880–1910 Cohort(b) 1910–1940 Cohort

NOTE: This graph plots the intergenerational gap between children of immigrants and children of US-born women, for children born to the 25th percentile of the income distribution. The first bar for each cohort is estimated by regressing son's income ranks on their fathers' ranks, an indicator for having a foreign-born mother, and the interaction of these two variables. The second bar for each cohort plots the gap after including childhood region fixed effects. In the historical cohorts, the third bar plots the gap after including childhood state fixed effects and the fourth bar plots the gap after including state \times urban fixed effects. Finally, the fifth bar plots the gap after including childhood county fixed effects.

		Intercept α		Slope β			
	US-born mother	Immigrant mother	T-statistic	US-born mother	Immigrant mother	T-statistic	
1880–1910 Cohort	31.29	36.31	39.91	0.36	0.32	20.92	
1910–1940 Cohort	30.75	36.17	61.00	0.36	0.35	8.28	
GSS Cohort	35.46	42.56	2.58	0.29	0.19	1.99	
Opp. Insights Cohort	37.75	45.95	28.81	0.33	0.23	21.03	

Table 1: Intergenerational Mobility Estimates, by Cohort

NOTE: This table reports the slope and intercept from regressions of son's rank regressed on father rank for each cohort. The third and sixth columns correspond to the test of the hypothesis that both estimates are equal to each other. Data for the Opportunity Insights cohort comes from Chetty et al. (2018b).

6 Linked Historical Sample with Opportunity Insights Characteristics

In this appendix, we reproduce the main figures and tables of the paper that consider the linked historical cohorts using a sample matches the characteristics of the Opportunity Insights sample. First, we shorten the window of observation between the fathers and the sons from 30 years to 20 years; we therefore link individuals from the 1880 and 1920 Censuses to the 1900 and 1940 Censuses, respectively. Second, we restrict the analysis to sons aged 31–37. Third, we loosen the restriction on father's age, and instead ensure that the mother (or the father if no mother was present) was between the ages of 15 and 50 when she (he) had the child. Next, we use a measure of family income—as opposed to father's income—that sums the father's income with the predicted income for working mothers; for farmer parents, we continue to assign the family the farmer income from the CW adjustments. Finally, we continue classifying men as sons of immigrants using the father's birthplace.

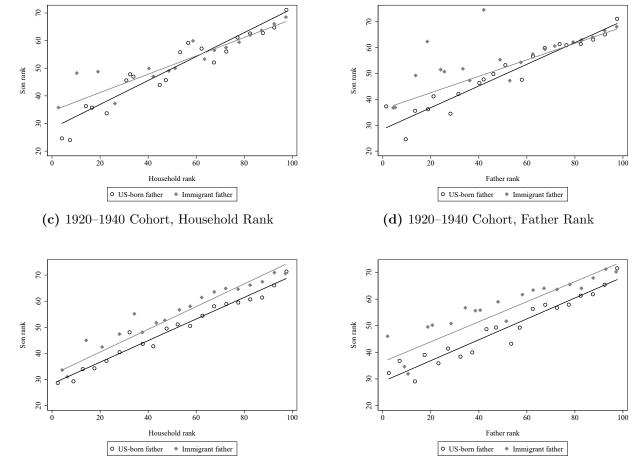
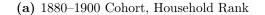


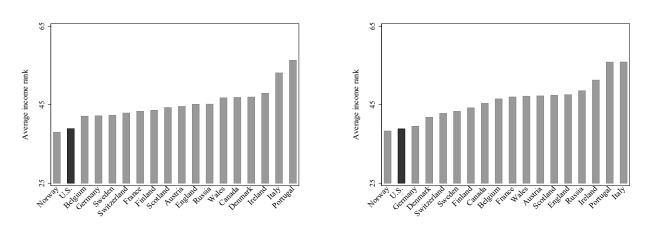
Figure 1: Rank-rank Correlations, by Cohort



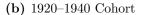
(b) 1880–1900 Cohort, Father Rank

NOTE: Sons are assigned percentile ranks relative to all other respondents born in the same birth year. Households (fathers) are also ranked relative to all households (fathers) with children in the same birth year. The figures plot the mean income rank of children by household's (father's) income rank, for sons with and without foreign-born fathers, as well as the corresponding regression lines.

Figure 2: Average Income Rank for Children Born to 25th Percentile, by Cohort and Father's Birthplace

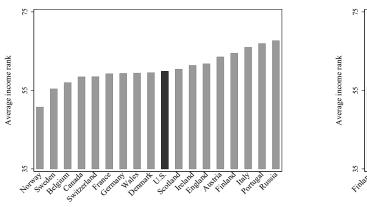


(a) 1880–1900 Cohort



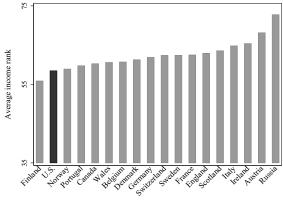
NOTE: This figure plots the average income rank for children born to the 25th percentile of the parent income distribution.

Figure 3: Average Income Rank for Children Born to 75th Percentile, by Cohort and Father's Birthplace



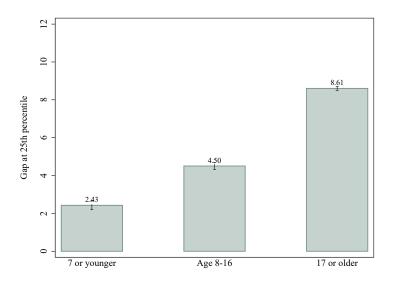


(b) 1920–1940 Cohort



NOTE: This figure plots the average income rank for children born to the 75th percentile of the parent income distribution.

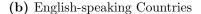
Figure 4: Intergenerational Gap for 1920–1940 Cohort, by Father's Age of Arrival

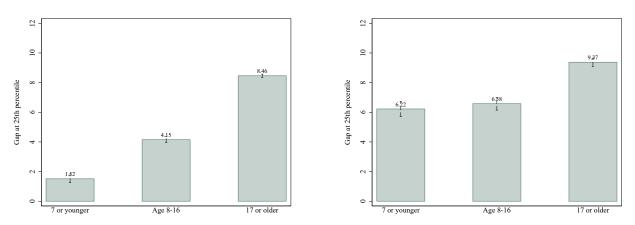


NOTE: This graph plots the intergenerational gap between children of immigrants and children of US-born men, for children born to the 25th percentile of the income distribution. Sons of immigrants are divided into groups based on their father's age of arrival to the United States.

Figure 5: Intergenerational Gap for 1920–1940 Cohort, by Father's Age of Arrival and Language in Sending Country

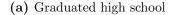
(a) Non-English-speaking Countries





NOTE: This graph plots the intergenerational gap between children of immigrants and children of US-born men, for children born to the 25th percentile of the income distribution. The figures first separate sons based on language spoken in the father's sending country (where English-speaking countries are Canada, England, Ireland, Scotland, and Wales). Then, sons of immigrants are divided into groups based on their father's age of arrival to the United States.

Figure 6: Educational Attainment, 1920–1940 cohort



20

40

• US-born father

Father rank

60

Immigrant father

80

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(b) Highest grade in school
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9

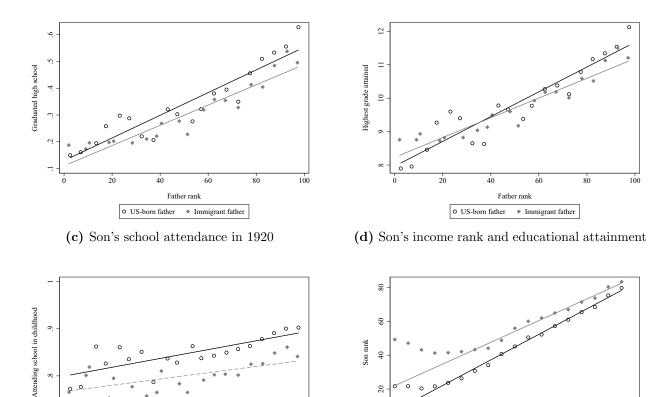
Highest grade attained • US-born father • Immigrant father

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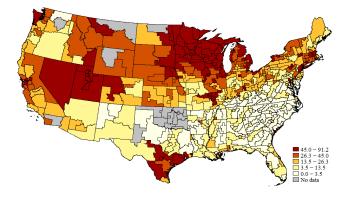
NOTE: Fathers are ranked relative to all fathers with children in the same birth year. Panels (a) and (b) plot the mean educational attainment of children by their father's income rank, for sons with and without foreign-born fathers, as well as the corresponding regression lines. Panel (c) considers sons aged 12–16 in the 1920 Census and plots school attendance as a function of his father's income rank (after controlling for age fixed effects). Panel (d) plots a son's mean income rank as a function of completed years of schooling.

100

20

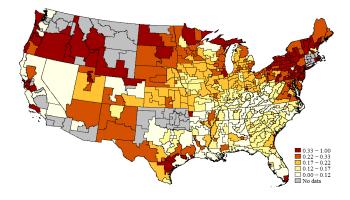
Figure 7: Share of Immigrants and Upward Mobility, by State Economic Area

(a) Share of sons that are second-generation (1880–1900)

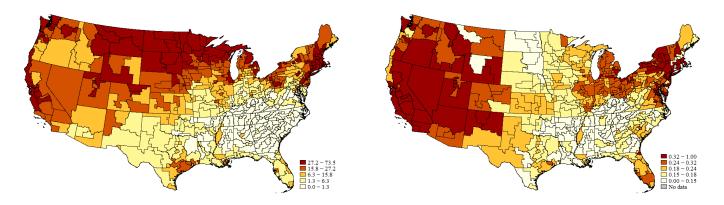


(c) Share of sons that are second-generation (1920–1940)

(b) Upward mobility of sons of US-born fathers (1880–1900)



(d) Upward mobility of sons of US-born fathers (1920–1940)



NOTE: Panels (a) and (c) show the share of the individuals in our linked sample that are second-generation immigrants in each 1880 or 1920 state economic area, respectively. In panels (b) and (d), upward mobility is measured as the share of sons in each state economic area that reached the top third of the national income distribution, conditional on having had a father in the bottom third of the corresponding national income distribution.

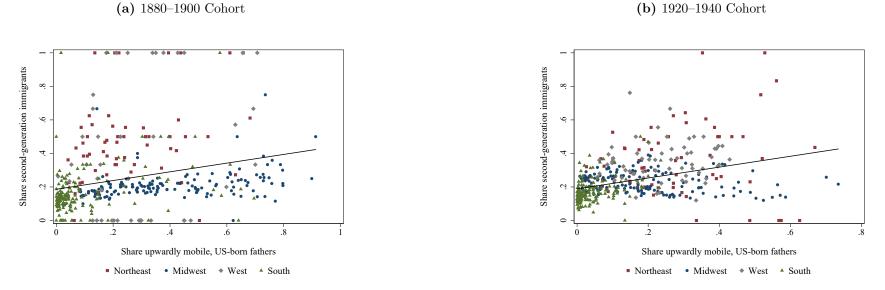


Figure 8: Share of Immigrants and Upward Mobility, by State Economic Area

NOTE: The two panels use the linked samples to plot the share of a childhood SEA population that is a second-generation immigrant against the corresponding share of children with US-born fathers who were upwardly mobile. Upward mobility is measured as the share of sons in each SEA that reached the top third of the national income distribution, conditional on having had a father in the bottom third of the corresponding national income distribution. Each graph includes a line of best fit.

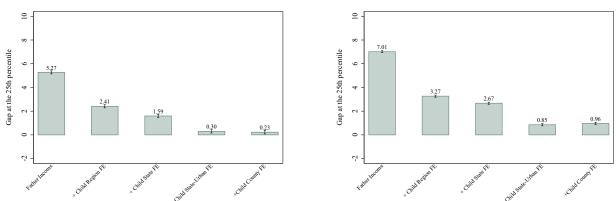
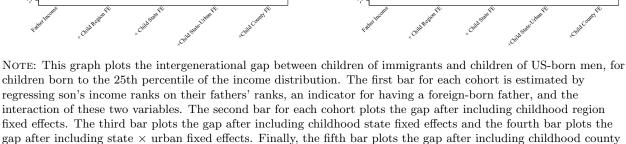


Figure 9: Intergenerational Gap for Historical Cohorts, with Childhood Location Fixed Effects



(a) 1880–1900 Cohort

fixed effects.

⁽b) 1920–1940 Cohort

		Intercept α		Slope β			
	US-born father	Immigrant father	T-statistic	US-born father	Immigrant father	T-statistic	
1880–1900 Cohort	28.42	36.23	40.30	0.42	0.32	31.91	
1920–1940 Cohort	29.04	36.44	56.49	0.39	0.38	7.27	
GSS Cohort	35.42	42.18	2.52	0.29	0.21	1.58	
Opp. Insights Cohort	36.64	44.05	12.46	0.33	0.25	8.13	

Table 1: Intergenerational Mobility Estimates, by Cohort

NOTE: This table reports the slope and intercept from regressions of son's rank regressed on family rank for each cohort. The third and sixth columns correspond to the test of the hypothesis that both estimates are equal to each other. Data for the Opportunity Insights cohort comes from Chetty et al. (2018a).