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ABSTRACT

We examine evidence on trends in interstate migration over the past 150 years, using data from the Integrated Public Use Microdata Series of the U.S. Census (IPUMS). Two measures of migration are calculated. The first considers an individual to have moved if she is residing in a state different from her state of birth. The second considers a family to have moved if it is residing in a state different from the state of birth of one of its young children. The latter measure allows us estimate the timing of moves more accurately. Our results suggest that overall migration propensities have followed a U-shaped trend since 1850, falling until around 1900 and then rising until around 1970. We examine variation in the propensity to make an interstate move by age, sex, race, nativity, region of origin, family structure, and education. Counterfactuals based on probit estimates of the propensity to migrate suggest that the rise in migration of families since 1900 is largely attributable to increased educational attainment. The decline of interstate migration in the late nineteenth century remains to be explained.

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1. Introduction

The mobility of the American population has played an important role in the country's economic development. The settlement of the frontier and urbanization are two of the great themes of American economic history. Efforts to study the history of internal migration in the United States have been hampered by a variety of data limitations, however. Since 1940 researchers have been able to make use of data on recent migration experience collected in the Census, the Current Population Survey, and panel data sets.[1] For evidence that extends prior to that date, however, researchers have often been obliged to rely on indirect measures calculated using either census survival methods or aggregate data on the native population's state of residence and state of birth.[2] For the study of internal migration, such data have major limitations: the census survival method only measures net migration (rather than gross flows in and out of a location), and both measures are aggregate and thus are of limited use in examining the factors affecting individual migration decisions.[3]

In this paper we explore two ways of utilizing individual-level data from population censuses assembled in the Integrated Public Use Microdata Series, or IPUMS (Ruggles 1997), to derive new measures of long-run trends in the migration of the native born within the United States. By using information on age in combination with state of birth and state of residence, we can follow interstate migration patterns for successive synthetic birth cohorts of individuals from 1850 through 1990. This allows us to describe changes in migration rates over time and how the propensity to leave one's state of birth varied with individual characteristics. Unfortunately, this measure of migration has some serious deficiencies: it fails to indicate the timing of an individual's move between birth and the census and fails

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[1] See Shryock (1965, ch. 1).

[2] The Census survival approach calculates net migration for a state or region as the difference between the actual change in population between successive censuses, and the predicted change, based on national survival rates for each age group within the population. The state-of-birth/state-of-residence approach looks at changes in the numbers living outside the state in which they were born between censuses.

[3] Some specialized studies use linked census samples to follow individuals over a decade or two (see Schaefer 1989; Ferrie 1997, undated; Stewart 2003).

to count moves subsequent to leaving the birth state. For families with children, however, we can obtain a much more precise measure of recent family moves by matching children with their parents and comparing a young child's state of birth with the family's state of residence at the time of the census.

Both measures suggest that overall migration rates followed a U-shaped trajectory between 1850 and 1990, falling from 1850 until roughly the turn of the century and rising thereafter, especially after 1940. The propensity to move varied with individual characteristics, such as gender, race, and region of origin. We estimate migration probits on census cross sections to identify the marginal impact of these characteristics. Until around 1920, adult men were more likely to have left their state of birth than were adult women, but in recent decades this gender difference has essentially disappeared. Only during the Great Migration of African-Americans during the middle of the twentieth century did overall migration propensities of blacks exceed those of whites: both before and since, African-Americans have been less likely to leave the state of their birth than whites. Among families with children, black families continued to have lower migration rates than whites even after World War II, suggesting that the Great Migration consisted disproportionately of single and/or childless individuals.

Examining the role of region of birth, we find that individuals born in the Northeast region had the lowest migration propensities over much of the period, although regional differences had narrowed by 1990. In the postwar period, southerners and westerners have been the most likely to move between states.

Perhaps our most interesting finding is the potential role of rising educational attainment in explaining the upward trend in migration propensity over the past 100 years. Education is strongly correlated with mobility. Using our migration measure based on moves by families with children, we estimate the impact of education in cross section and use the coefficients from a single census year to calculate a counterfactual migration series for changing characteristics, taking advantage of Goldin's (1999) recent estimates of high-school graduation rates for years before 1940. The counterfactual does a good job tracking the rise in migration propensity since the early 1900s, and changing educational

attainment was the principal driving force. This finding cannot be considered an adequate causal account, however, due to omitted variables that were likely to have been correlated with education, such as occupation and income.

In the next section we review the literature on the history of internal migration in the United States, its causes and effects. The third section describes our measure of lifetime migration based on state of birth, discusses its limitations, and summarizes our findings on cohort and life-cycle migration patterns and differences by sex, race, and region of birth. The fourth section employs the family migration measure based on child's state of birth, again examining covariates of migration, and presents the counterfactual exercise that shows the important effect of education. The fifth section offers conclusions and directions for further research.

2. Internal migration in the United States since 1850

The geographical mobility of Americans is a well-known trait of the national character. According to figures cited by Greenwood (1997), as of 1970 the average American would make nearly twice as many residential moves during her or his lifetime as would the average resident of Britain or Japan. Migration– along with regional differences in rates of natural increase– has played a central role in the geographical redistribution of the U.S. population. Eldridge (1964), examining the sources of population "displacement" by region from 1870 to 1950, shows the centrality of westward migration in the population increase of the West, the role of out-migration from the South in offsetting the South's high rate of natural increase, and the net effect of European immigration to the Northeast in offsetting lower rates of natural increase there. Until the 1920s, net migration into the Northeast and North Central regions was dominated by European immigrants, while internal migration played a dominant role in the South and West. These net interregional migration flows obscure much of the underlying population movement. For example, after 1910, the net migration from the South was largely into the Northeast and North Central regions, which in turn contributed the bulk of the migrants to the West.

Since 1950 there have been important changes in internal migration patterns. Most crucially, since about 1970 the flow of migrants out of the South has been reversed, with the South becoming the region with the largest net in-migration (Greenwood 1997). Around the same time, the longstanding historical pattern of net migration from nonmetropolitan to metropolitan areas also reversed. During the postwar period, differences in employment growth across states can be attributed primarily to migration, rather than differences in rates of natural increase (Blanchard and Katz 1992).

Economic accounts of internal migration have often stressed locational differentials in wages or incomes as the driving force of migration patterns (see Greenwood 1997 for an overview of the literature). In this sense migration can be seen as a process of equilibration of the national labor market. Using published census data from 1850, 1880, 1900, 1920, and 1960, Gallaway and Vedder (1971) examine the effect of income differentials on interstate migration flows, as measured by the number of individuals born in one state but residing in another. They find that the migration into a state increases with its per-capita income and decreases with its population density and distance from the state of origin. Over these years, the estimated elasticity of migration with respect to income increased, while that with respect to distance fell. The latter result is consistent with declining costs of moving over the period.

Although Gallaway and Vedder find a significant role for geographical income differentials in determining migrant flows, other studies of this effect have obtained mixed results (Greenwood 1997). Recent research suggests that other economic factors– in addition to local average wages or incomes– should be considered important determinants of migration patterns. Steckel (1983) and more recently Stewart (2003) stress the importance of specific human capital in farming as a factor directing westward migration flows historically. In particular, migrating farmers tended to move roughly along lines of latitude, presumably because of latitude-specific knowledge about crops and livestock. Theoretical models that assume heterogeneous worker skills imply that migration propensities should depend not only on the mean wage but also on the dispersion of wages (skilled workers want to migrate to places

where skills are highly rewarded).[4] This prediction is confirmed empirically by Borjas et al (1992). Locational differences in employment growth or unemployment rates have been found in some studies to have a greater impact than wage differentials.[5] Differences in government transfer programs or spending across location may also affect migration flows, as Fishback et al (2001) find for New Deal spending.

Given Gallaway and Vedder's finding that internal migration redistributed labor from low- to high-wage states, it might be surmised that internal migration played a large role in the convergence of state wages and per-capita incomes over the past 120 years. Rosenbloom (1990, 1996) has argued that regional convergence in wage rates during the late nineteenth and early twentieth centuries, at least outside of the South, coincided with the emergence of cross-regional labor-market institutions and informational flows. However, the direct evidence linking labor-market and income convergence during the twentieth century is not strong. Barro and Sala-i-Martin (1991) find that migration explains only a small part of overall economic convergence across states. And as Kim (1998) notes, the process of convergence involved not only within-sector wage convergence but also convergence in industry composition, which may have been due to causes other than the integration of labor markets.

One enduring puzzle relating to convergence within the United States is the persistent difference in real wages (and per capita incomes) between the South and the rest of the country. The catch-up of the South, particularly after the Great Depression, was a significant source of economic convergence within the United States (see Wright 1986, Barro and Sala-i-Martin 1991, Mitchener and McLean 1999). Yet why did labor migration fail to narrow this gap before the 1940s? Wright (1986) has argued that prior to the New Deal, the southern labor market remained isolated from the rest of the country, in large part because the demand for low-skilled labor in the industrializing North was satisfied by European

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[4] Greater dispersion of opportunities may also attract job seekers who are willing to search long enough to find a high-wage offer (David 1974).

[5] See Treyz, et al (1993) and Blanchard and Katz (1992). The theoretical claim that unemployment rates should affect migration decisions was made by Todaro (1969), and has been explored using historical data by Hatton and Williamson (1992).

immigrants, while flows of information and migrants between North and South were never established. Fishback (1998) has also noted that for a time southerners found high-wage opportunities by moving westward within the South. Better evidence on gross migration flows between the South and the rest of the country will help us better assess the degree and causes of southern isolation.

The path dependence of migrant flows when migrant stocks affect the propensity of migration has been emphasized by Carrington et al (1996) as a significant factor in the delay of African-American migration to the North, in spite of the lower wages and greater social and political oppression of blacks in the South.[6] An alternative explanation of the delayed timing of the Great Migration is that prior to the 1920s black employment opportunities in the North were severely constrained by competition from unskilled European immigrants, given the racial preferences of northern employers (Collins 1997). The special obstacles to black migration do not, of course, provide an explanation for the persistent North-South wage gap for white workers.

Migration decisions are also influenced by the personal characteristics of potential migrants. The migration propensity of adults, at least for long-distance moves, tends to decline with age and to increase with education.[7] Schwartz (1976) argues that these properties are implications of the equilibrium relationship between earnings, education, and experience; additionally, education may be associated with better sources of information, greater ability to process information about opportunities, or lower risk aversion. The age effect is also partly attributable to changes in family status and career that are correlated with age (Sandefur and Scott 1981). Unemployed individuals are more likely to move than the

[6] For reviews of the evidence on the importance of the stock of fellow migrants from the same source location in explaining migration flows (so-called chain migration), see also Greenwood (1975) and Rosenbloom (1994). The presence of fellow migrants may reduce migration costs by providing credit or housing and may increase expected benefits of moving by providing information on work opportunities and actual contacts or referrals with local employers.

[7] See Long (1973), Schwartz (1976). More educated individuals are also be more likely to engage in international migration. Recent work by Chiquiar and Hanson (2002), for example, finds that the typical Mexican immigrant to the United States is better-educated than the average Mexican who stays in Mexico.

employed, other things equal (DaVanzo 1978). Married couples are less likely to move if both individuals are in the labor force (Greenwood 1997). A distinct advantage of using the individual-level samples of the PUMS to examine historical migration behavior is that it becomes possible to control for the impact of demographic characteristics and family labor allocation decisions on migration probabilities.

In this paper we focus on broad trends in the propensity to migrate and the demographic covariates of that propensity. We leave to future work an analysis of the responsiveness of migration to differences in economic opportunities across location.

3. Migration patterns revealed by state of birth, 1850-1990

Using data from the IPUMS, our first measure of migration is based on whether an individual was living in the state in which he or she was born at the time of the census. We employ samples from thirteen census years spanning the period from 1850 through 1990.[8] The IPUMS combines census microdata files produced by the U.S. Census Bureau since 1960 with new historical census files produced at the University of Minnesota and elsewhere.[9] Each census in the IPUMS data included questions on the state of birth and state of residence of the native-born population along with questions about each individual's age at the time of the census and other demographic characteristics, such as gender and race. Because we are concerned with internal migration between states, we restrict our attention to the native born. Our second measure of migration, using the birthplace of a child, allows us to consider interstate

[8] Data from the 1890 and 1930 censuses are not included in the IPUMS data set. The original manuscript schedules of the 1890 census were destroyed by fire, and the 1930 data are still subject to the 72-year census confidentiality rules.

[9] We use the full IPUMS general samples available for each year, with the following special cases: for 1850 and 1860, the samples of the free population; for 1900, the preliminary new sample drawn by researchers at the University of Minnesota; for 1970 the Form 2 State sample, for 1980, subsamples 0-19 of the 5% sample (thus generating a random 1% sample of the population); for 1990, the 1% unweighted state sample. Choice of samples in 1970 and 1980 was based on obtaining the most complete information about state of birth and state of residence.

migration of families with foreign-born parents. Before exploring the historical trends in migration revealed by the data on state of birth, we consider their relationship to more direct measures of migration that are available for 1940 and later.

Reliability and limitations of measuring migration using state of birth

Using information on state of birth and state of residence to measure interstate migration will understate the size of gross migration flows for several reasons. First, we can only ascertain whether a person has ever moved between birth and the census; the number and exact timing of moves cannot be known. Second, some individuals who have moved during their lifetime will be missed by our measure, because they have moved away from their state of birth and later returned to it.[10] Third, we do not capture within-state moves.[11]

The potential size of the first two biases can be examined using census data on five-year migration rates in 1940, 1960, 1970, 1980, and 1990. These censuses asked individuals where they were residing five years prior to the census date.[12] For these years we can examine the correlation of ever moving (since birth) and five-year moving, as well as the frequency of return migration to the state of birth. Toward this end we have drawn a samples of individuals satisfying each of the following selection criteria: (1) known state of birth (state or DC); (2) known state of residence (state or DC) five years prior to the census; (3) known state of residence (state or DC) at the time of the census; (4) ages 10-79.

Table 1 shows the percentages having moved since birth and in the last 5 years, broken down into 10-year age groups. The age pattern revealed by the table suggests that the probability of having moved in the past 5 years is greatest for young adults (20-29) and tends to tail off beyond that age, while

[10] These problems have been recognized for some time. An early exploration is Ross and Truxal (1931).

[11] Ferrie (undated) found that three-fourths of all moves between 1850 and 1860 were between places within the same state.

[12] The 1950 census asked where individuals resided one year before the census, but only the so-called sample line individuals, subset of the full sample. We have not used this variable here.

the probability of ever having changed state since birth appears to be cumulative, as one would expect, but rises at a decreasing rate with age.

By following birth cohorts across successive censuses, we can estimate the proportion of an age cohort who left their state of birth during the 10 years preceding the census. The implied age profiles are shown in Figure 1.[13] This can be compared with the age profile of the proportion reporting an interstate move in the 5 years prior to the census, in Figure 2. Clearly, both measures show that the propensity to move declines dramatically with age. It is also clear that the measure based on state of birth misses a large number of moves. The 10-year propensity based on birth state is lower in nearly every case than the corresponding 5-year propensity based on the migration question. The proportional magnitude of the bias rises with age, presumably reflecting additional moves by individuals who have already left their birth state.

Clearly, migration estimates based on comparing state of birth with state of residence are a better measure of gross migration the greater the proportion of migrants who are leaving their state of birth for the first time. Table 2 classifies individuals who moved within 5 years prior to the census into three categories: (1) those who left their state of birth during those 5 years; (2) those who returned to their state of birth after having lived elsewhere 5 years prior; and (3) those who were not living in their state of birth 5 years prior and moved to another (third) state by the year of the census.[14] Note that the second of these categories consists of people who did migrate but who will not be counted as movers in our state-of-birth based measure, because as of the census they were back in their state of birth.

For younger people (between 10 and 29), more than half of 5-year moves involved leaving the state of birth in 1940, and about half in 1970-1990. Not surprisingly, the percentage of 5-year moves that

[13] For example, the figure of 6.5% for 30-39 year olds in 1960 is equal to the proportion of 30-39 year olds who were living outside their birth state in 1960 minus the percentage of 20-29 year olds who were living outside their birth state in 1950. This number can be negative as it is for some age groups in 1970, either because of sampling variation or potentially net return migration to the state of birth.

[14] We cannot obtain these numbers for 1960 because the data do not report the state of residence in 1955, only whether that state was different from the state of residence in 1960.

involved leaving the birth state falls with age. For individuals in their 40s, less than one-third of moves involved leaving the state of birth in most years. Clearly, age profiles of migration based on leaving the birth state are going to be excessively concave, because an increasing proportion of moves are not picked up by the measure. It is also noteworthy that the proportion of moves that involved returning to the state of birth from elsewhere shows no systematic age pattern.

Individuals who have moved at least once in their lifetime are more likely to move again. This can be seen in Table 3, which gives the percent who moved during the 5 years preceding the census, conditional on whether they had moved between birth and 5 years prior. In each age category, those who had left their birth state by t-5 were much more likely to move to another state between t-5 and t. This is true even when we don't count those who returned to their state of birth between t-5 and t (last column). Thus there appears to be persistent heterogeneity in migration propensities. Whether this is a trait of individuals or perhaps a characteristic of locations that tend to receive migrants (e.g. more volatile economic opportunities, hence receiving but also sending away many migrants) remains to be determined.

These findings suggest that migration rates based on state of birth must be treated with caution. They are likely to be more informative for younger people. In addition to their imprecision in terms of the timing of moves, their inability to capture moves subsequent to leaving the birth state implies that they systematically underestimate the propensity to move, especially for older individuals. Although we report some general trends and demographic variation using this measure here, we think it is crucial to obtain more accurate estimates of migration, which we are able to do for families with children, as reported later in the paper.

Long-run trends in the propensity to leave the birth state

Figure 3 plots migration propensities for the full samples of the native-born as a function of age at each census. For most age groups, lifetime migration propensities exhibit a downward trend between

1860 and sometime around 1900. For 30-39 year olds, for example, the percent having left their birth state fell from 42 percent in 1860 to 31 percent in 1900. The trend is clearly upward after 1940, although measured migration rates appear to have been unusually low in 1940 at the end of the Great Depression.[15] For ages 30-39, the propensity to migrate rose from about 30 percent in 1940 to around 37 percent in 1990.

For individuals under 40, the pattern describes a long U shape, with the lowest point occurring around 1900, especially if we smooth over the unusually depressed migration rates of 1940. The trough occurs later for the older age groups, although as we have seen the measure based on birth state becomes a less reliable measure of migration rates as we examine older individuals. Interestingly, the trough in migration propensities among the younger native born coincides with the period of heaviest foreign migration into the country.

The compression of the migration rates across the older age groups after 1920 suggests that migration has become increasingly concentrated among the young. By 1970, a person in her 70s was no more likely to be living outside the state of her birth than a person in her 30s. This flattening of the age profile of migration for older individuals is evident in cohort age profiles based on these migration rates.[16] The phenomenon of the increased age concentration of migration is of some interest, although given the inability of this measure to capture a large percentage of moves among older individuals one must be wary of drawing strong inferences from the age profiles.

Covariates of migration propensity

Using the IPUMS data we can estimate a simple descriptive model of migration propensity to see how demographic characteristics and location of origin affected the probability of leaving the birth state

[15] Familiar tales of the "Okie" migration notwithstanding, interstate migration rates were low overall during the Depression.

[16] Cohort age profiles are plotted in an appendix available from the authors.

over time, and to determine whether changes in these characteristics might account for the observed historical trends. Here we present the results of estimating a probit model of the interstate move for 30-39-year-olds.[17] The regressors are age, gender, race, region of birth, and physical size of state. We include a control for state size because interstate moves are more likely to be observed from smaller states just because the border is likely to be closer. For this purpose we use the square root of the land area of the state of origin.[18]

Probit coefficients for each census year are provided in the appendix Table A1. Most of the coefficients are significantly different from zero in most years. To summarize trends in the effects of the variables, Figures 4-7 plot the time path of the estimated effect of each regressor on the move probability (dP/dX).[19] For dummy variables, these effects represent the change in predicted probability of switching the variable from 0 to 1, evaluated at the means of the other variables. These marginal effects should be compared against an average move probability for this age group of between 0.3 and 0.4, depending on the year.

Figure 4 shows the gender differential. Before 1940, women were less likely than men to report having left their birth state. After 1940 the coefficient on female is occasionally statistically significant, but is very small: there is today essentially no gender differential. Figure 5 shows the trend in the coefficient on black (the comparison group is all non-blacks, which consists predominantly of whites). The 1850 and 1860 censuses included only free persons, so the sample of African-Americans shifts dramatically after the Civil War. Still, the picture is consistent with black migration rates being

[17] Use of the 30-39 age group here is a compromise. For younger individuals, the rate of leaving the birth state is a more reliable indicator of recent migration, but their migration decision was likely made by someone else (parents). An individual who is 30-39 at the time of the census has been an adult for at least 10 years, and Figures 1 and 3 suggest that most individuals who will ever leave their birth state are likely to have done so by the time they are 39.

[18] If all states had similar shapes, then the average distance to the nearest border would be proportional to the dimensions of the state, or the square root of the area. A more sophisticated measure would need to take account of different shapes and population concentrations within states.

[19] We exclude a plot of the age variable, which only captures the effect of changing age between 30 and 39 and is thus of limited interest.

substantially lower until around 1900. By 1950, blacks were much more likely to have left their birth state, a reflection of the Great Migration out of the South. The racial differential has since then returned to within 5 percentage points of parity.

Figure 6 shows the effect of region of birth, relative to the Northeast. The sample sizes of individuals born in the West for censuses before 1900 are very small, and the coefficients have been excluded here. The migration rates here include interstate moves within the region of birth, so these regional differentials do not necessarily represent the rate of out-migration from the region as a whole. Throughout the period, individuals born in the Northeast were the least likely to have left their state of birth by their 30s. Individuals born in the Midwest were the most peripatetic in the early 1900s, whereas southerners and westerners have generally been the most likely to move since 1940. By 1990, regional differences were quite small.

Finally, Figure 7 shows the effect of state size, as measured by the square root of area. As expected, the effect is usually negative, indicating that a person born in a large state is less likely to have reported leaving that state by her 30s. The effect is fairly large: the difference in move probability between an individual born in New York versus one born in California would have been on the order of 6 percentage points in 1970, just because of the difference in area. Interestingly, this effect has tended to become stronger over time, contrary to what one might expect given declining real transportation costs.

Can changing demographic characteristics account for the long-run trends in mobility?

The probit results reveal systematic variation in the probability of leaving the birth state by gender, race, region of origin, and state size. We can use a simple counterfactual to judge whether changes in these variables over time might account for the pronounced U shape in the migration propensity. Figure 8 shows one such counterfactual for 30-39 year olds. In the diagram, the actual migration rates are indicated by black diamonds. The white triangles show the results of a counterfactual. In each census year, the probability of an interstate move is predicted for each individual,

using her or his actual X values and the probit coefficients from 1920.[20] These predicted probabilities were then averaged over the whole sample to obtain the probabilities displayed in the figure. Clearly, changes in these observable characteristics cannot account for the actual historical experience.

4. Migration of families with children

The largest drawback of migration measures based on an adult individual's place of birth is their inability to narrow down the timing of moves or measure repeat migration. For families with children, we can construct an alternative measure from census data that largely avoids these problems by comparing where the children were born with where the family was residing at the time of the census. For example, suppose a family living in Illinois reports that its five-year old child was born in Mississippi. Then we might conclude that the family moved sometime during the five or so years prior to the census date. In addition to allowing us to track migration over relatively short periods, the child-birthplace measure of migration has the advantage that we can use it to examine the internal migration of foreign-born as well as native-born adults.[21]

To construct the child-based measure from the IPUMS, we matched children ages 0-9 with their parents. Our sample consists only of families with both parents present and residing in an identified state or D.C. at the time of the census. For the years 1850-1870, the census data do not permit direct identification of spouses and own children; for those years, we used the IPUMS imputed family relationships, which are considered fairly reliable.

One child– referred to hereafter as the *reference child*– was selected at random from each such household, a procedure that allows us to avoid the problem of multiple observations for each family, which would give disproportionate weight to families with more children in the 0-9 age range.[22] The unit

[20] 1920 was chosen simply because it stands at the middle of our full span of years.

[21] Steckel (1983) also used children's birth states to examine the timing of moves.

[22] In future research we will attempt to make use of the information on migration provided by multiple children.

of observation can thus be thought of as a two-parent family with at least one young child. Because we are interested in internal migration, an observation is included only if the reference child was born in the United States, in an identified state or D.C.[23] We conclude that the family moved sometime between the birth of the reference child and the census if the child's state of birth and the family's current state of residence are different.

Measuring the internal migration of adults using a child's place of birth suffers from two obvious flaws. The first is that there is not a one-for one correspondence between the child being born in a different state and the family having resided in that state at the time of the birth. Some births may take place while a family is traveling, or perhaps because a mother may live temporarily with a relative during the period of the birth. The second problem is that families with children may not be representative of the migration behavior of the population as a whole. Recent evidence suggests, for example, that migration propensities fall after marriage and with the coming of children (e.g., Sandefur and Scott 1981).

The importance of the first objection appears to be relatively small. Two types of evidence support our claim that when the child's state of birth and the family's state of residence differ, it is likely that the family actually moved during the interim. First, as we show below, the probability that the states of birth and residence are different increases substantially with the age of the child, as it should if migration is at work, because older children have been at risk of moving for a longer period of time.[24]

Second, there is a high degree of correlation between the child-based migration measure and responses to the 5-year migration questions available beginning in 1940. The censuses of 1940 and 1960 through 1990 asked individuals where they lived 5 years prior to the census. Children born during the

[23] The results presented here are unweighted; a check for 1940 suggests that the results are quite similar when we apply census household weights.

[24] If births away from home were the principal cause of discrepancies between state of birth and current residence, the incidence of this discrepancy would not increase significantly with the age of the reference child.

year following that date would have been reported as 4 years old at the time of the census, while children born during the year preceding that date would have been reported as 5. It seems reasonable, then, to compare the census 5-year migration measure with a child-based migration measure for reference children ages 4-5, an age range whose average birth date will be approximately 5 years before the census date.

Table 4 compares our measure based on the reference child's birth state with several alternatives based on the census 5-year migration question: for parents in the family sample, and then for all men 20-49 years old. Although the kid-based measure tends to be a little greater than the census measure in the within-sample comparisons, it is generally quite close. Examining the last column, it is also interesting to note that the kid-based measure is rather close to the 5-year measure for all men ages 20-49. Thus we can have some confidence that our measure is reasonably representative of the migration rate for the prime-age population as a whole, even though it is based only on a sample of two-parent families.[25]

Table 5 is a cross-tabulation of the two measures within the family sample. The measures are correlated, but not perfectly so. There are a number of moves picked up by the kid-based measure that are not reflected in the father's reported migration status, and somewhat fewer discrepancies in the opposite direction. The sources of these discrepancies are a topic for further inquiry, but it cannot be assumed *a priori* that the estimate based on the census's 5-year residence question is superior. For example, it seems plausible to us that parents' memories regarding where they were living when a child was born may be more accurate than their memories about where they were living on a specific date 5 years ago. Given the substantial correlation between the measures, and the positive relationship between the child-based migration rate and the age of the reference child, we are confident that the child-based measure is at least a reasonable approximation of family migration propensities.[26]

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[25] It may be less representative for specific population sub-groups, such as African-Americans (see below).

[26] We can also examine the extent to which the birth state of children 4-5 years old and the state of residence of the father 5 years prior were the same. This percentage was 96.5 in 1940, 92.4 in 1970,

Interstate migration propensities of families with children

Figures 9 and 10 present the basic trends of interstate migration rates using the kid-based measure. Figure 9 presents the rates for each age of the reference child, while Figure 10 is for 4-5 year olds, the measure closest to a 5-year migration rate. The U shape of the series of migration propensities that appeared in the birthplace data for adults is also evident here. Migration rates tended to fall between 1850 and 1880 and began to rise after 1900, particularly after 1940. In Figure 9, the older the child observed, the greater the likelihood of a move (the curves shift up with age), consistent with the older child's longer period at risk of migration.

The strong dip in migration rates in 1940 is noteworthy. In Figure 9, this dip is especially dramatic for nine-year-olds, and hardly evident at all for one-year-olds. A child of nine in 1940 was born in 1930 or 1931 and lived through the worst years of the Great Depression, when migration rates were apparently dramatically reduced. A child of age one in 1940 was born in 1938 or 1939, when the economy was in recovery and migration had presumably picked up again. The evidence of age compression in migration rates in 1940 illustrates the promise of the children's birthplace measure as a means of pinpointing the timing of changes in migration propensity. It also suggests that 1940 was an unusual year for migration rates, and that the overall trend was probably upward after 1900.

Gross interregional migration flows

Using the family-based migration measure we can also track gross interregional flows over time. Figures 11 through 14 show gross in- and out-migration rates for the four U.S. regions over the period 1850-1990. Out-migration from the Northeast and the South exhibit the familiar U-shaped pattern, while in-migration was U-shaped for the Midwest and downward sloping for the West during the late nineteenth century. After 1900, out-migration rates rise in every region. An interpretation of these

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92.0 in 1980, and 93.1 in 1990. It cannot be derived for 1960 given the variables in the census sample.

patterns would be that around the middle of the 19th century, migration rates were high as people left the Northeast and South and populated the Midwest and West. Overall migration propensities declined as the settlement process slowed in the late 1800s. After 1900, the rising propensity to move was associated with increased interregional flows *in all directions*.

Covariates of five-year moves by families with children

We estimated migration probits analogous to those presented in Section 3, using as a dependent variable the migration measure based on families with a reference child 4 or 5 years old. The independent variables included the age of the child (to control for the extra year at risk of moving for a five-year-old), the ages of each parent, the race and nativity of the father[27], the number of siblings in the household and the presence of a very young (under 2) sibling, and two characteristics of the state of birth of the reference child: state size and region. Probit coefficients for each census year are provided in the appendix Table A2. The regressors used here are available for each year in our samples. Below we consider the effects of literacy and education, which are not consistently available across all years.

In most years, the basic controls have the expected signs. The migration propensity tends to be greater if the reference child is a year older (5 instead of 4), which is consistent with the pattern in Figure 9. Older parents tend to be somewhat less likely to move, although the coefficient on the age of the mother is not often statistically significant. Migration is significantly less likely from a larger state after 1940, although the effect is rather small in magnitude. Families with more children are less likely to move, although interestingly this effect is offset by a greater tendency for families with children under 2 to migrate. In most years, families with foreign-born fathers are less likely to move, but these coefficients are not consistently statistically significant.

[27] Nativity and race of the mother tend to be highly collinear with these characteristics of the father, and added little explanatory power to the probit, so they were excluded in the estimates reported here.

The probit results indicate that families with a black father were less likely to move in almost every census year. The difference is both statistically and economically significant. In 1950 and 1960, for example, near the height of the African-American migration, black families in the sample were actually about 5 percentage points less likely to move than whites, relative to an average migration rate on the order of 13 percent. This contrasts with the finding above (Figure 5) that black adults were overall more likely than whites to have left their birth state at mid-century. The discrepancy is explained by the fact that the black migrants during these years were disproportionately single, childless, and/or single parents, as compared with the white migrants. By 1990, the racial gap in migration propensities had closed completely, a change that may reflect convergence in migration behavior or possibly changes in sample composition.[28]

Increased educational attainment and the rise of migration rates

The IPUMS samples allow us to include an additional covariate for the father's literacy for the years 1850 through 1920, and the father's educational attainment for 1940 on.[29] Education has a strong and statistically significant positive effect on migration propensity. Figure 15 shows the effects of literacy and educational dummy variables when they are added to the demographic variables considered above. The effect of literacy is generally rather small, but it is positive and significantly different from zero by 1900. From 1940 on, educational attainment has a large and significant positive effect.

The strength of the education variable suggests that rising educational attainment over the course of the twentieth century might help explain rising rates of internal migration. Unfortunately, the census only began asking about educational attainment in 1940. Still, it is possible to use the estimated effect of

[28] Between 1970 and 1990, the percentage of black families with children headed by a single parent increased substantially. Consequently, our sample of two-parent black families represents a declining proportion of all black families, and cannot be assumed to be representative of the characteristics and migration behavior of all black families.

[29] We have also run the probits including the mother's literacy and education, with qualitatively similar results.

education in one of the census cross-sections to generate a counterfactual estimate of the impact of education using aggregate measures of educational attainment. Specifically, we make use of Goldin's (1999, Table CG.A.11) series on high-school graduation rates to predict the propensity to migrate. We first estimate a model of migration, including as regressors the above demographic variables and a dummy variable for the father having 12 or more years of schooling. We then use the probit coefficients from one of the years and the mean values of the regressors and Goldin's high-school graduation rate in each year to predict the time path of the migration rate. To the extent that this counterfactual tracks the increase in actual migration rates, we can conclude that rising education is a plausible explanation of the trend.

The calculation is necessarily imprecise. First, census responses may overstate actual educational attainment, so the measure of schooling that we use in our estimates is subject to measurement error (Goldin 1998).[30] Second, using the means of the regressors to predict probabilities from the probit is not strictly correct, because of the nonlinearity of the probit function. Third, we have had to estimate the stock of high-school graduates for synthetic cohorts in the prime-age population from Goldin's "flow" series of high-school graduates among 17-year-olds. To do this, we have simply assumed that the percentage of high-school graduates in any given cohort remains constant, and calculated an unweighted average of the percentage of graduates among 27, 37, and 47-year olds each decade.[31] Finally, the use of high-school graduation as the sole measure of educational attainment fails to capture the large impact of additional schooling on migration propensity at all schooling levels, which can be seen in Figure 15. Undoubtedly more sophisticated estimates could be developed, but our purpose

[30] In addition, years of schooling fail to capture the quality of education, which varied by region, race, and census year.

[31] For example, the percentage of 17-year-olds who graduated from high school was 6 in 1900, 9 in 1910, and 16 in 1920. Thus we calculate the percentage of 27, 37, and 47 year olds who were high-school graduates in 1930 as (16+9+6)/3 = 10.3%. These three ages are roughly consistent with the ages of most fathers in our family sample. This procedure simply ignores the diluting effect of immigrants who arrived after age 17 and were presumably less likely to be high-school educated than those who were children in the United States.

here is to see whether the rough magnitude of the education effect is large enough to have made a significant contribution to the rise of migration rates since 1900.

We ran the counterfactual using probit coefficients from 1940, 1960, and 1990. All three tell a similar story. The results using the 1960 coefficients are presented in Figure 16. The heavy series with diamond markers is the actual average 5-year migration rate from our samples. The series labeled "Mean HS (a)" is the counterfactual that uses the 1960 probit coefficients, sample means of the demographic variables each year, and the percent high school graduates based on the Goldin series for each year. The series labeled "Mean HS (b)" coincides with Mean HS (a) before 1940 and then replaces the Goldin high-school series with the reported high-school graduate rates from our samples after 1940. Table 6 reports the values of the two high-school variables used in the counterfactuals.

Although the decade-to-decade changes differ between the actual and counterfactual series, it is clear that the counterfactuals account quite well for the basic upward trend in migration propensity over the past hundred years. And it is education doing the work here. The counterfactual series labeled "1920 HS" holds the high-school graduate rate fixed at its 1920 level, while allowing all the other regressors to vary over time. This counterfactual, which excludes the effect of changing educational attainment, exhibits a slight upward trend, but leaves most of the increase unaccounted for.

The counterfactuals show that the association between education and migration is strong enough to account for essentially the entire increase in migration propensities of families with children over the twentieth century. Identifying the exact mechanisms whereby schooling might have encouraged or facilitated mobility are beyond the scope of this paper, but it is not hard to think of some. Educated workers may be better informed of distant opportunities elsewhere, they may possess general skills that are more readily transferred to new places or labor markets, and they may be less capital-constrained, which would matter if moving involves a large fixed cost.[32] But correlation need not imply causation.

[32] For further discussion see Chiswick (2000).

Educational attainment could also be a proxy for omitted variables, such as occupation or income. Occupation is available in the census sample for every year, but we have not included occupational controls here because occupation is likely to be endogenous to interstate moves. An important area for future research is to investigate the underlying mechanisms whereby education was associated with the increasing geographical mobility of Americans.

5. Conclusions

The IPUMS data show considerable promise for describing and analyzing internal migration over the past century and a half. In this paper we have presented two alternative measures of interstate migration derived from information on current residence and place of birth: one for individuals, based on the individual's state of birth, and the other for families with young children, based on the child's state of birth. Both measures suggest that for the country as a whole, migration propensities followed a broad U-shaped trend after 1850, falling until around the turn of the century and then rising gradually over much of the twentieth century.

The migration measure based on moves by families with young children takes advantage of census information to pinpoint the timing of interstate moves with much greater accuracy than they can be by examining the state of birth of adults. Still, the measure has some disadvantages. Because we have restricted our sample to two-parent families, we do not capture the behavior of single parents or childless adults. The technique could easily be extended to the migration of single parents, but cannot be used for the childless. This appears to pose a particular problem in examining the migration behavior of African-Americans during the Great Migration, for it would appear that these migrants were disproportionately childless. On the other hand, because so much of the Great Migration took place after 1940, the state-of-birth variables employed here can be augmented by direct migration questions from the census for those without children.

Probit analysis of 5-year migration rates derived from the family data suggests that rising educational attainment offers a potential explanation of the upward trend of migration propensity after 1900, although it could also be proxying for other factors. In future work with these data, we plan to explore the role of education in increasing mobility, geographic patterns of gross and net interstate migration, and the role of economic incentives in the migration decision. In particular, we are interested in the elasticity of migration with respect to locational differences in wages or incomes. This question is central to understanding the role of migration in the geographical integration of labor markets.

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Table 1: Comparison of interstate migration rates since birth and in the five years preceding census (percent)

	Age group	Moved since birth	Moved last five years
1940	10-19	12.6	4.5
	20-29	23.3	8.7
	30-39	30.4	7.5
	40-49	33.1	5.1
	50-59	34.5	3.9
	60-69	36.1	3.3
	70-79	38.2	2.6
1960	10-19	19.2	8.6
	20-29	32.3	19.8
	30-39	34.8	11.1
	40-49	35.6	6.5
	50-59	36.1	4.6
	60-69	36.6	4.4
	70-79	37.6	3.9
1970	10-19	19.1	8.5
	20-29	32.9	19.9
	30-39	34.9	12.2
	40-49	35.5	6.6
	50-59	35.4	4.2
	60-69	35.8	4.3
	70-79	35.8	3.7
1980	10-19	22.3	9.3
	20-29	31.9	17.0
	30-39	38.1	12.9
	40-49	39.3	7.4
	50-59	39.4	4.8
	60-69	39.7	5.2
	70-79	40.2	3.8
1990	10-19	21.8	9.3
	20-29	32.7	16.8
	30-39	36.7	12.1
	40-49	40.8	8.0
	50-59	41.0	5.5
	60-69	41.2	5.2
	70-79	41.6	3.7

Source: IPUMS samples of U.S. Census (Ruggles 1997). Samples restricted to individuals with known state of residence at time of birth, 5 years prior to the census, and on the census date.

Table 2: Distribution of 5-year movers (percent)

	Age group	Returned to birth state	Left birth state	Moved between two non-birth states
1940	10-19	18.1	62.9	18.9
	20-29	13.7	62.4	23.9
	30-39	17.3	46.3	36.4
	40-49	18.9	37.5	43.7
	50-59	18.0	35.1	46.9
	60-69	18.8	33.3	47.9
	70-79	17.1	35.8	47.0
1970	10-19	18.9	49.4	31.8
	20-29	19.0	50.1	30.9
	30-39	22.9	31.0	46.2
	40-49	21.8	29.6	48.7
	50-59	21.3	31.1	47.6
	60-69	22.0	36.2	41.8
	70-79	22.2	35.9	41.9
1980	10-19	17.6	48.8	33.6
	20-29	17.8	47.2	34.9
	30-39	19.9	31.7	48.5
	40-49	21.4	27.8	50.7
	50-59	18.5	32.5	49.0
	60-69	17.3	39.1	43.7
	70-79	17.7	35.9	46.4
1990	10-19	18.0	51.1	30.9
	20-29	16.9	48.3	34.7
	30-39	20.4	33.5	46.1
	40-49	18.7	29.6	51.7
	50-59	20.0	31.2	48.8
	60-69	18.5	35.7	45.8
	70-79	19.4	34.4	46.2

Source: See Table 1.

Table 3: Percent moving during 5 years prior to census by previous migration status

	Age group	Lived in same state at birth and 5 years before census	Moved between birth and 5 years before census	
			Include returns to birth state	Exclude returns to birth state
1940	10-19	3.2	15.8	8.1
	20-29	6.7	17.2	10.9
	30-39	4.8	14.2	9.6
	40-49	2.8	10.0	7.0
	50-59	2.1	7.5	5.4
	60-69	1.7	6.1	4.4
	70-79	1.5	4.5	3.3
1970	10-19	5.0	26.0	16.3
	20-29	13.6	37.1	23.0
	30-39	5.7	24.9	16.6
	40-49	3.0	13.3	9.2
	50-59	2.0	8.3	5.7
	60-69	2.4	7.9	5.2
	70-79	2.1	6.7	4.4
1980	10-19	5.6	24.4	16.0
	20-29	11.0	33.4	22.1
	30-39	6.4	24.0	17.0
	40-49	3.4	13.8	9.7
	50-59	2.5	8.4	6.1
	60-69	3.3	8.2	5.9
	70-79	2.3	6.2	4.5
1990	10-19	5.8	24.3	15.3
	20-29	11.2	31.6	21.2
	30-39	6.3	23.0	15.9
	40-49	4.0	14.2	10.4
	50-59	2.9	9.4	6.6
	60-69	3.1	8.3	5.9
	70-79	2.2	6.0	4.2

Source: See Table 1.

Table 4: Comparison of kid-based and census 5-year move probabilities (percent)

Year	Kid-based measure	Census 5-year migration rate			
		Family sample			All Men 20-49
		Mothers	Fathers	Fathers 20-49	
1940	7.0	6.1	6.0	6.2	7.7
1960	13.3	12.5	12.9	13.2	14.9
1970	14.3	13.0	13.3	13.7	14.9
1980	15.2	13.4	13.5	13.6	14.2
1990	14.7	12.2	12.3	12.4	13.2

Notes: Kid-based measure is percentage of children ages 4 or 5 at the time of the census whose birth state differed from the family's state of residence on the census date. Census migration rate is percentage of individuals reporting a state of residence five years before the census date different from their state of residence on the census date.
Source: IPUMS samples.

Table 5: Cross-tabulation of kid-based and census 5-year migration measures (percent)

		Father	
Year	Kid	No move	Move
1940	No move	92.0	1.0
	Move	2.0	5.0
1960	No move	84.2	2.5
	Move	2.9	10.4
1970	No move	83.1	2.6
	Move	3.6	10.7
1980	No move	82.5	2.3
	Move	4.1	11.1
1990	No move	83.8	1.6
	Move	3.9	10.7

Notes and source: See Table 4.

Table 6: High school graduation rates used in counterfactuals (percent)

Year	Mean HS (a)	Mean HS (b)
1850	2.0	2.0
1860	2.0	2.0
1870	2.0	2.0
1880	2.0	2.0
1890	2.3	2.3
1900	2.7	2.7
1910	4.0	4.0
1920	6.0	6.0
1930	10.3	10.3
1940	18.0	21.9
1950	32.0	40.4
1960	46.3	52.7
1970	60.0	65.6
1980	68.7	79.7
1990	72.7	87.8

Source: Goldin 1999, Table CG.A.11, IPUMS samples.

Table A1: Coefficients from migration probits for 30-39 year olds with known state of birth

Dependent variable: Living in state different from birth state
Coefficients expressed as marginal probability (dF/dX) evaluated at sample means

Variable	1850	1860	1870	1880	1900	1910	1920
Age	0.007470	0.001875	0.007765	0.004239	0.005497	0.003291	0.003625
SE	0.001248	0.001084	0.000903	0.000761	0.000781	0.000792	0.000461
Female	-0.054093	-0.064455	-0.047649	-0.044031	-0.037224	-0.036952	-0.023834
SE	0.007230	0.006265	0.005258	0.004416	0.004625	0.004574	0.002652
Black	-0.149191	-0.132490	-0.108162	-0.080941	-0.047748	-0.013515	0.012006
SE	0.020012	0.019083	0.007725	0.006682	0.007685	0.007699	0.004638
Midwest	0.075374	0.078710	0.073618	0.087745	0.146313	0.161674	0.138028
SE	0.013447	0.009787	0.007697	0.006215	0.006369	0.006528	0.003807
South	0.194897	0.099209	0.052590	0.031799	0.065167	0.053735	0.067820
SE	0.007885	0.007102	0.006611	0.005756	0.006803	0.006864	0.004108
West	-0.381215	-0.379314	-0.241073	-0.149853	0.037069	0.040298	0.100672
SE	0.029606	0.018374	0.030601	0.028304	0.019461	0.016267	0.008891
Sqrt(land area)/100	-0.012290	0.002050	-0.007760	-0.012700	-0.024790	-0.013570	-0.012600
SE	0.004360	0.003930	0.003370	0.002650	0.002370	0.002090	0.001140

	1940	1950	1960	1970	1980	1990
Age	0.004918	0.001181	0.003767	0.000607	0.004926	0.003241
SE	0.000376	0.000366	0.000353	0.000370	0.000324	0.000287
Female	-0.002576	-0.006090	-0.002765	-0.012827	0.001693	0.003957
SE	0.002185	0.002091	0.002015	0.002148	0.001849	0.001638
Black	0.065480	0.109616	0.069436	0.030468	0.032519	-0.050828
SE	0.003933	0.004000	0.003599	0.003616	0.003150	0.002575
Midwest	0.113972	0.102522	0.088859	0.063798	0.029447	0.015994
SE	0.003231	0.003088	0.002948	0.003169	0.002709	0.002372
South	0.101487	0.113035	0.146942	0.120286	0.041417	0.018647
SE	0.003300	0.003131	0.002963	0.003149	0.002716	0.002455
West	0.189344	0.177524	0.114901	0.098666	0.068468	0.044175
SE	0.006400	0.005404	0.004790	0.004933	0.003889	0.003327
Sqrt(land area)/100	-0.015320	-0.013420	-0.018020	-0.021550	-0.026650	-0.024810
SE	0.000879	0.000833	0.000767	0.000809	0.000696	0.000610

Source: IPUMS samples.

Table A2: Coefficients from migration probits for families with 4-5 year old reference child

Dependent variable: Reference child living in state different from birth state
Coefficients expressed as marginal probability (dF/dX) evaluated at sample means

Variable	1850	1860	1870	1880	1900	1910	1920
Child age	0.015811	0.022120	0.008661	0.012638	0.004626	0.026588	0.009116
SE	0.010167	0.024312	0.006987	0.005362	0.005887	0.007093	0.004305
Mother's age	0.001941	0.000364	-0.000328	-0.000614	-0.000874	-0.001135	0.000004
SE	0.001075	0.000965	0.000732	0.000572	0.000648	0.000829	0.000481
Father's age	-0.000811	-0.001309	-0.000479	-0.000315	-0.000134	0.000015	-0.001020
SE	0.000916	0.000822	0.000607	0.000456	0.000536	0.000662	0.000399
Father black	-0.064391	-0.074811	-0.055392	-0.052395	-0.028331	-0.055552	-0.015213
SE	0.024310	0.025333	0.008781	0.006429	0.008520	0.009659	0.007730
Father for-born	-0.004864	-0.018418	-0.015813	-0.010585	-0.001064	0.000292	0.002477
SE	0.015485	0.009892	0.007844	0.006229	0.007480	0.009273	0.005660
Number of children	-0.006614	-0.006114	-0.001561	-0.007855	-0.003743	-0.009735	-0.010354
SE	0.003091	0.002865	0.002229	0.001804	0.001951	0.002421	0.001467
Sibling under 2	0.003015	0.005933	0.018111	-0.000219	-0.017414	0.011944	-0.004151
SE	0.011485	0.009947	0.008490	0.006334	0.006763	0.009092	0.005424
Midwest	0.045729	0.016670	0.018212	0.035177	0.036708	0.034663	0.033120
SE	0.015688	0.011355	0.009453	0.007884	0.009277	0.010896	0.006745
South	0.091357	0.053633	0.005855	0.011393	0.021408	0.012922	0.038410
SE	0.015717	0.013183	0.010306	0.008582	0.010488	0.011590	0.007570
West		-0.046753	-0.038146	0.049674	0.038215	0.035400	0.062981
SE		0.034344	0.019842	0.024862	0.022462	0.021301	0.013181
Sqrt(land area)/100	-0.012130	-0.006390	-0.004330	-0.004070	-0.002370	0.000808	0.000559
SE	0.006380	0.004720	0.003710	0.002660	0.002550	0.002950	0.001730

	1940	1950	1960	1970	1980	1990
Child age	0.004707	0.020998	0.020119	0.012992	0.013329	0.006821
SE	0.003393	0.003393	0.003762	0.004087	0.004440	0.004210
Mother's age	-0.000841	-0.000282	-0.001296	0.000090	0.001086	0.000069
SE	0.000388	0.000429	0.000490	0.000522	0.000630	0.000558
Father's age	0.000156	-0.002884	-0.003323	-0.003777	-0.001768	-0.001983
SE	0.000316	0.000358	0.000433	0.000464	0.000530	0.000482
Father black	-0.020668	-0.053283	-0.052902	-0.052467	-0.039071	0.001749
SE	0.005398	0.005136	0.005698	0.006126	0.007185	0.007994
Father for-born	-0.024020	-0.016221	0.009809	-0.007136	-0.010533	-0.021082
SE	0.005110	0.007529	0.010629	0.009249	0.008096	0.006539
Number of children	-0.009445	-0.021938	-0.010165	-0.006385	-0.007800	-0.004297
SE	0.001173	0.001206	0.001461	0.001599	0.002272	0.002249
Sibling under 2	-0.002885	0.034942	0.015122	0.009249	0.020579	0.015766
SE	0.004853	0.004900	0.005015	0.005586	0.006339	0.006035
Midwest	0.041629	0.030561	0.030697	0.016766	0.009096	0.007461
SE	0.006266	0.005550	0.005959	0.006408	0.007114	0.006993
South	0.055146	0.075995	0.090982	0.079369	0.043975	0.060109
SE	0.006286	0.005695	0.006572	0.006834	0.007226	0.007081
West	0.085134	0.135839	0.085233	0.125872	0.095006	0.056912
SE	0.012784	0.010060	0.009499	0.010592	0.010439	0.008985
Sqrt(land area)/100	-0.003120	-0.009620	-0.007330	-0.013370	-0.013780	-0.011710
SE	0.001300	0.001260	0.001320	0.001480	0.001560	0.001360

Source: IPUMS samples.

Figure 1
Percentage of age cohort having left birth state during preceding 10 years, by age at the time of the census

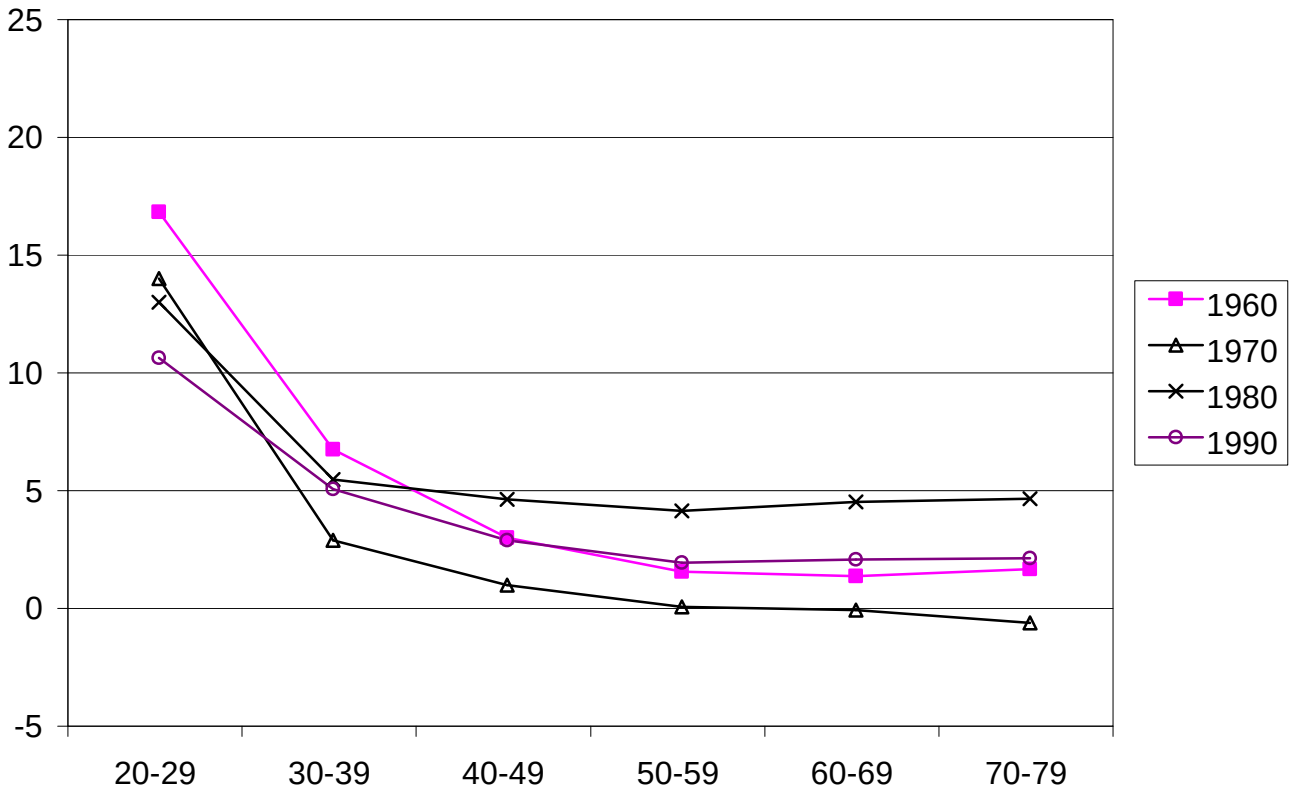


Figure 2
Census 5-year migration rates,
by age at census (percent)

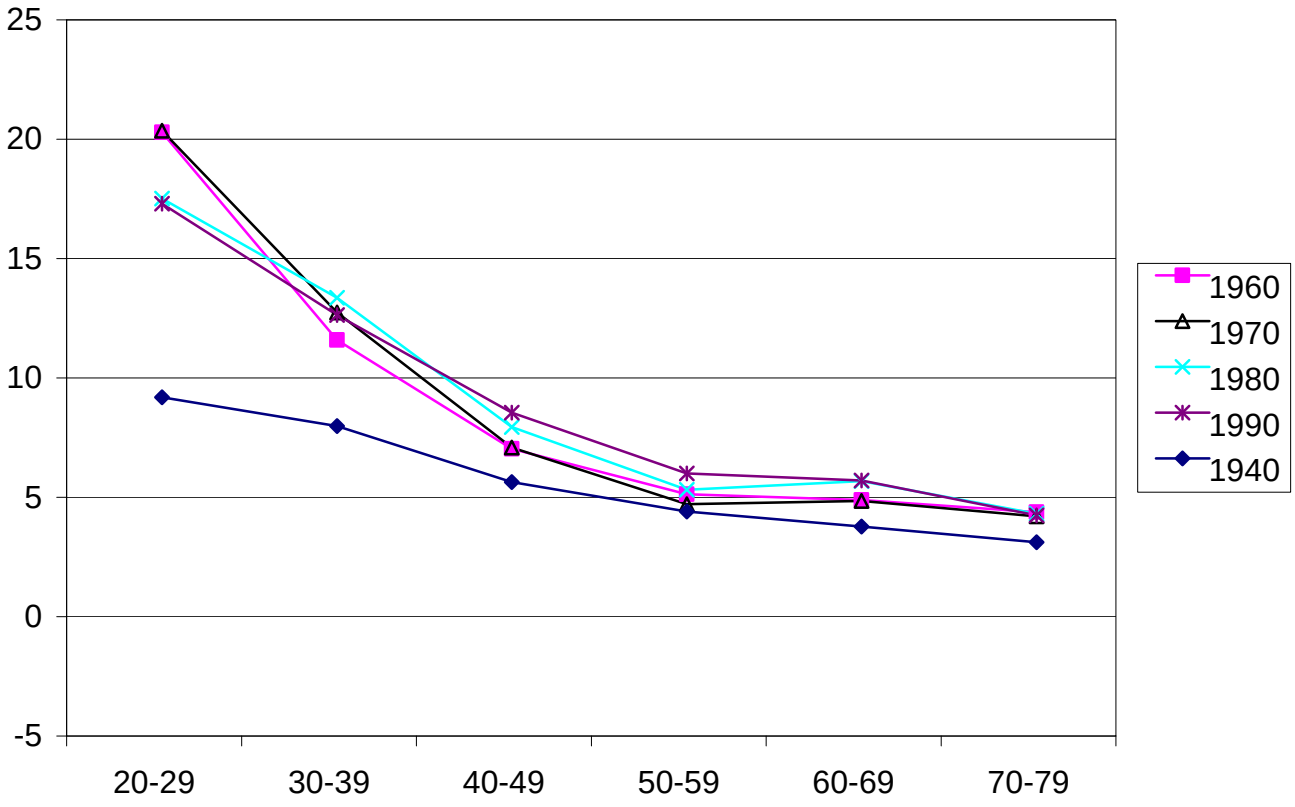


Figure 3
Proportion having left state of origin by age group,
IPUMS samples

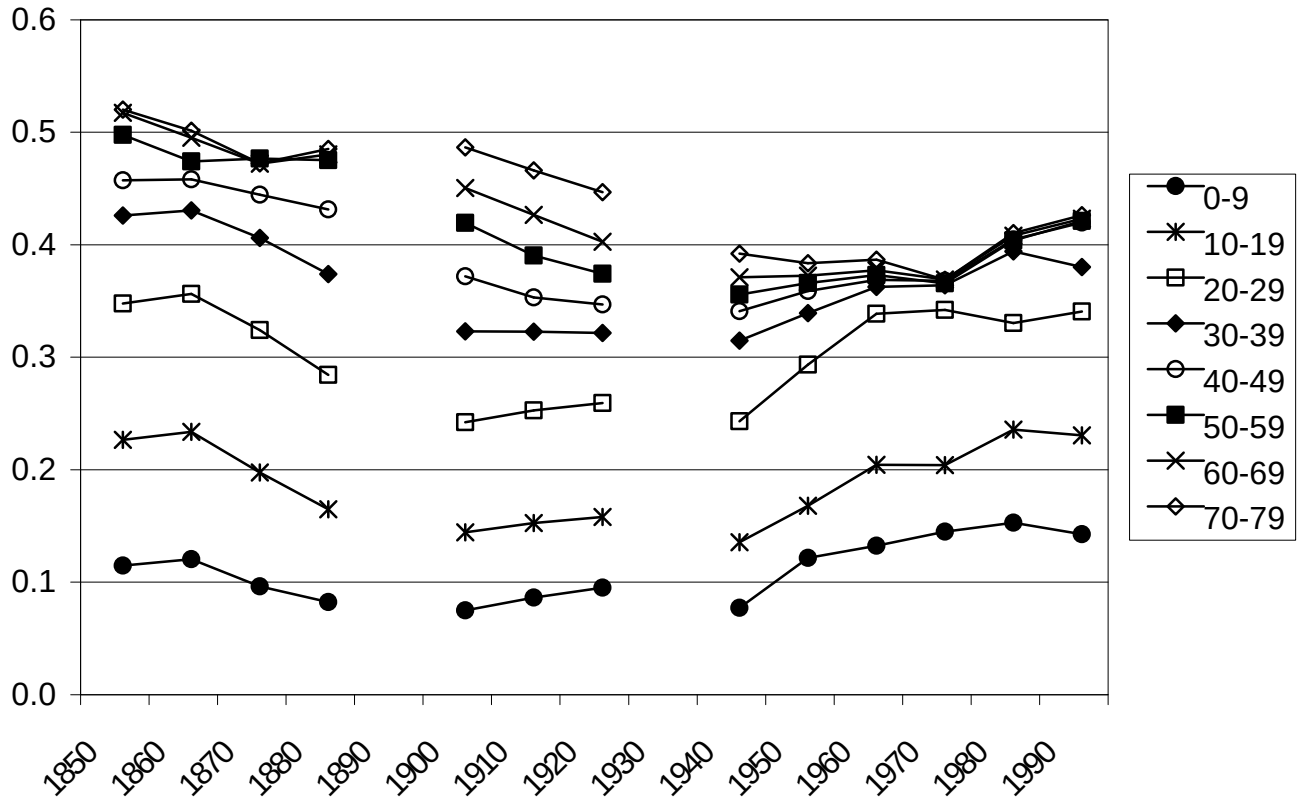
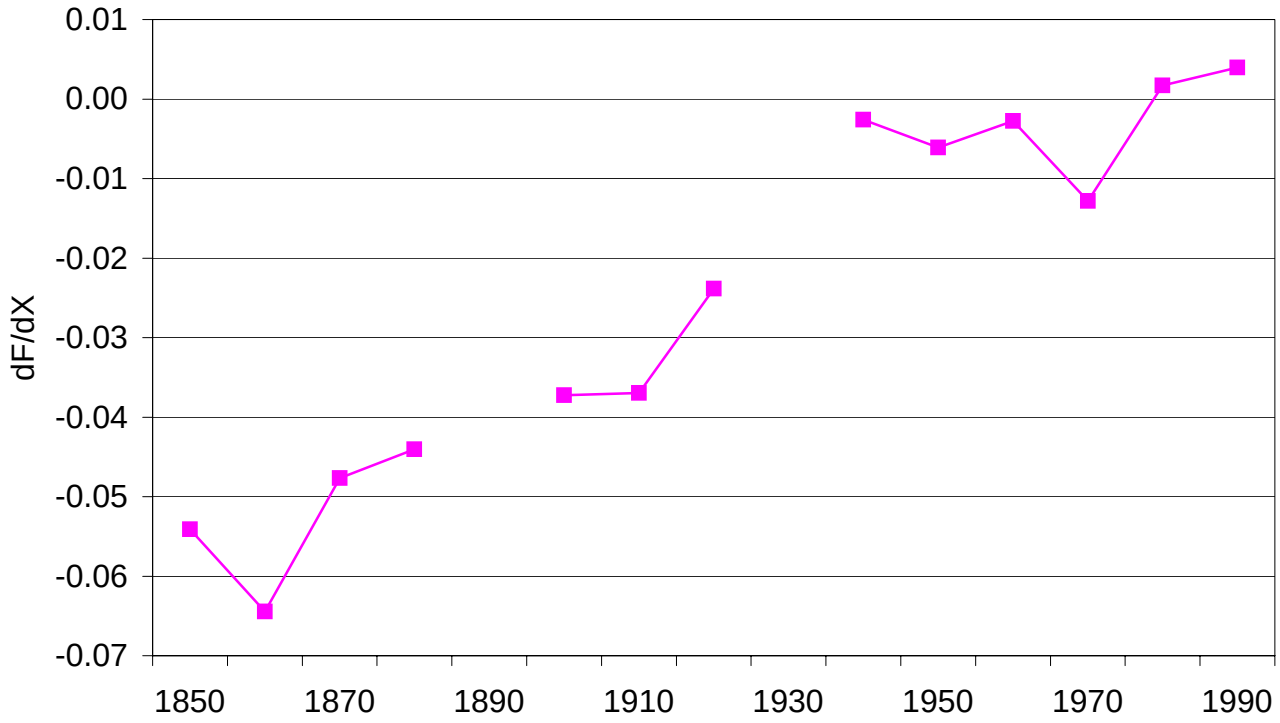
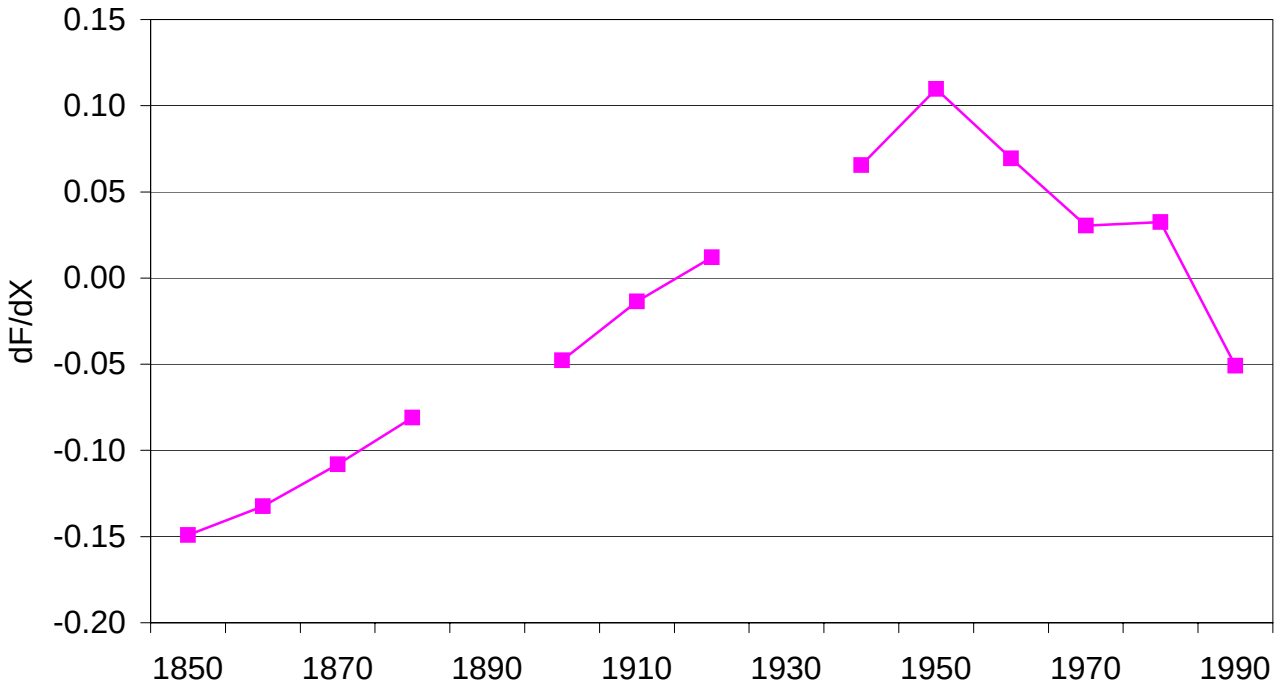


Figure 4
Effect of gender on probability of leaving birth state, 30-39 year olds, differential for female relative to male



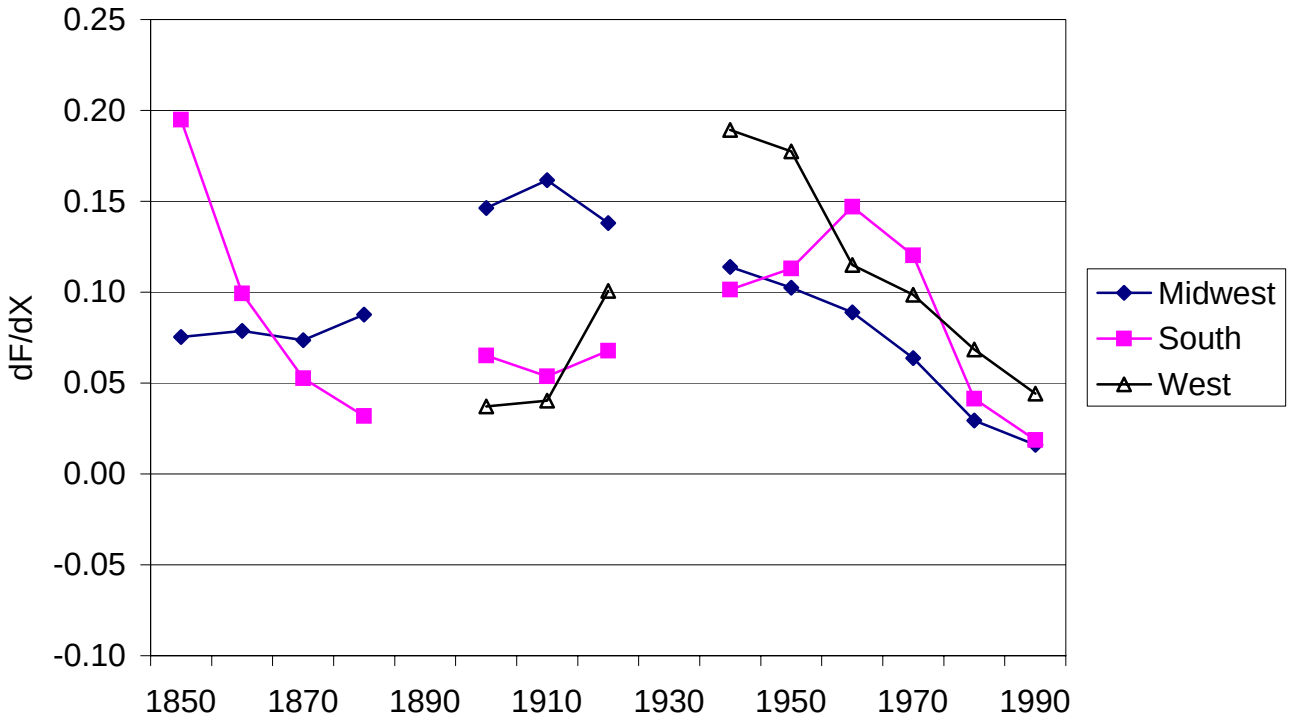
Note: Effect based on probit coefficient, controlling for age, race, region of origin, and size of state of origin.

Figure 5
Effect of race on probability of leaving birth state, 30-39 year olds, differential for black relative to white



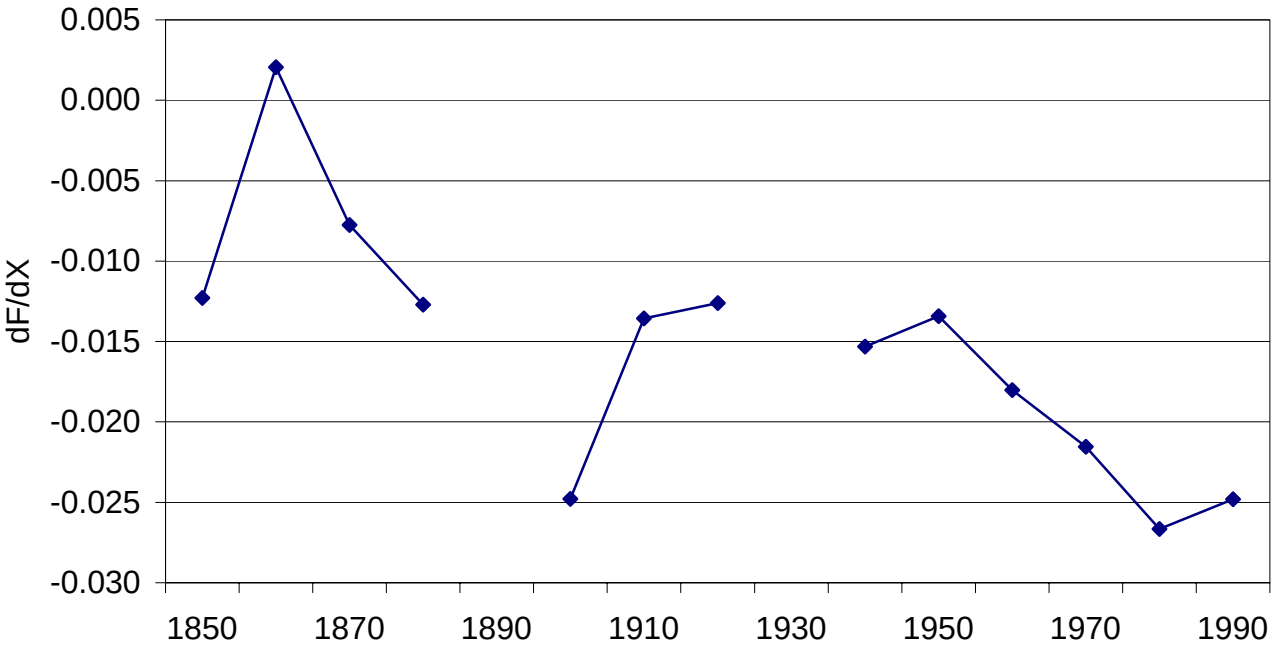
Note: Effect based on probit coefficient, controlling for age, gender, region of origin, and size of state of origin. White includes all non-black races.

Figure 6
Effect of region of origin on probability of leaving birth state, 30-39 year olds, relative to Northeast (=0)



Note: Effect based on probit coefficient, controlling for age, gender, race, and size of state of origin.

Figure 7
Effect on probability of leaving birth state of increasing the size of the state of origin by 100 units (square root of square km), 30-39 year olds



Note: Effect based on probit coefficient, controlling for age, gender, race, and region of origin. For comparison, a move from NY to CA would increase sqrt(area) by 286.

Figure 8
Actual and counterfactual rates of leaving birth state,
30-39 year olds

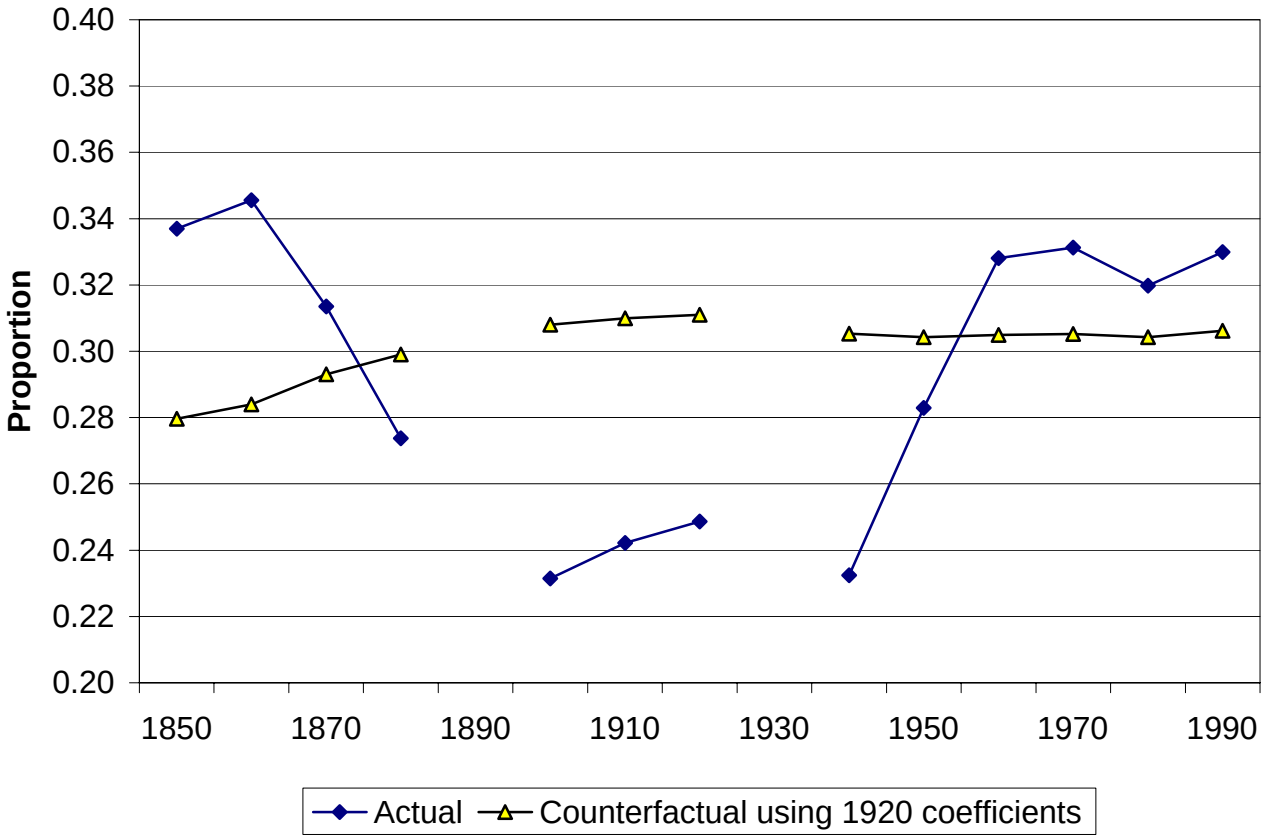


Figure 9
MIgration rates by age of reference child

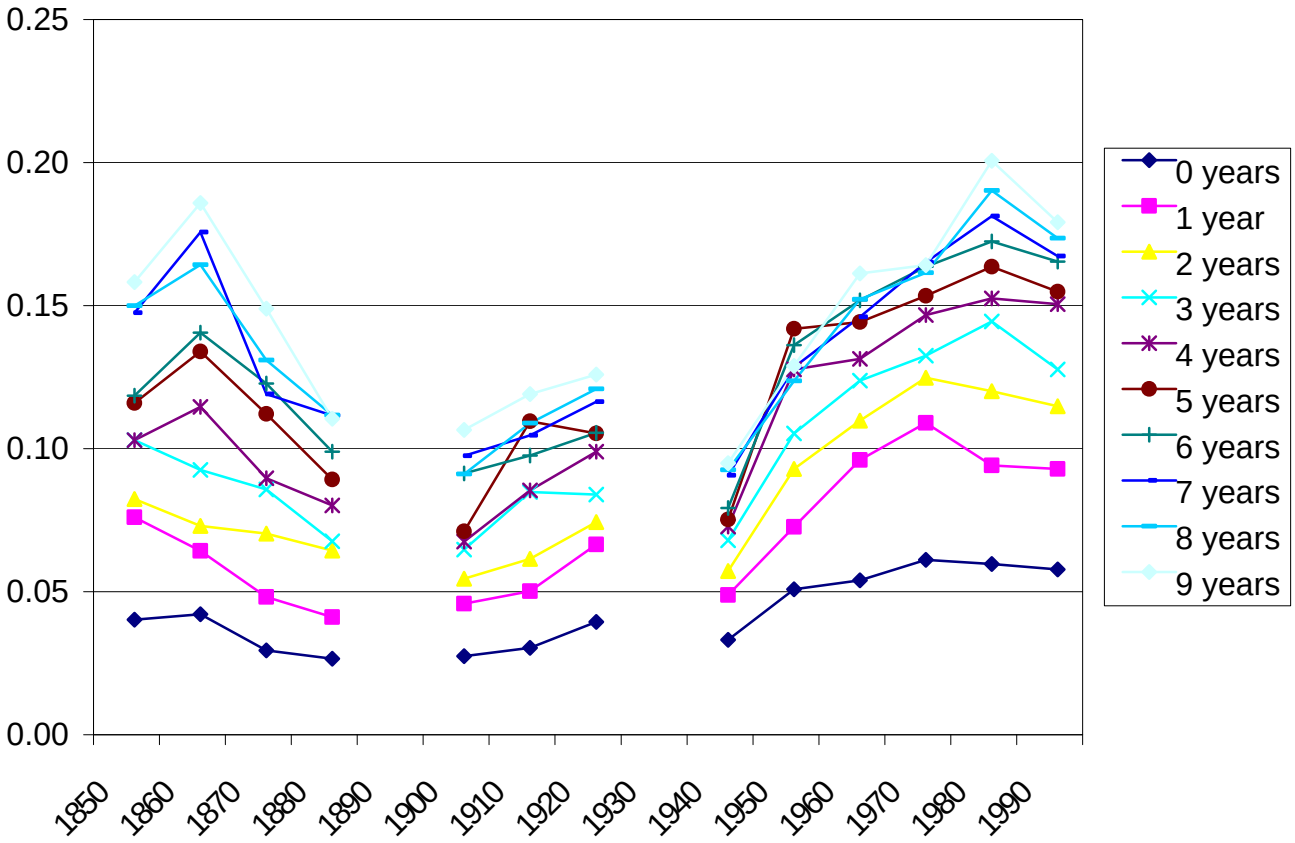


Figure 10
Five-year interstate migration rate based on 4-5 year olds

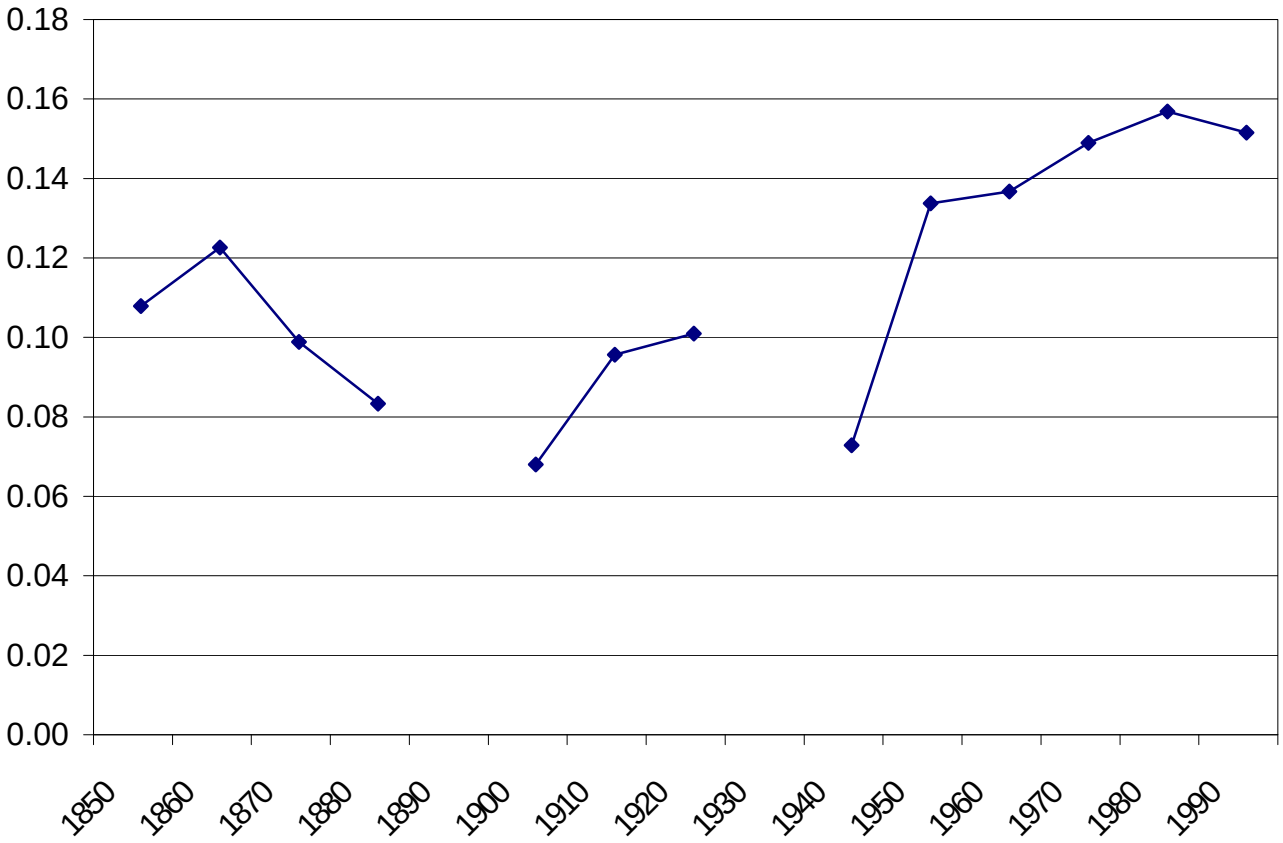


Figure 11
Gross 5-year interregional migration rates of families with children, Northeast (as percent of families in region 5 years prior to census)

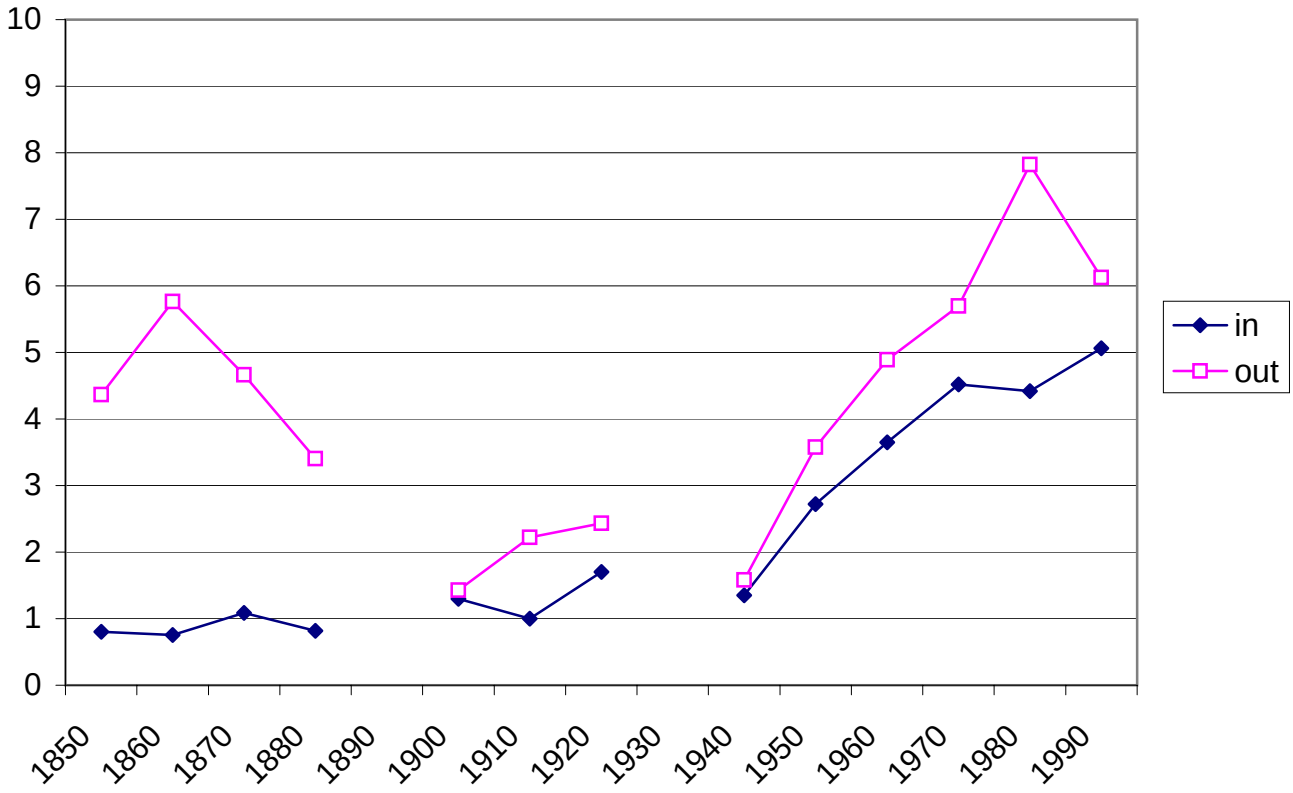


Figure 12
Gross 5-year interregional migration rates of families with children, Midwest (as percent of families in region 5 years prior to census)

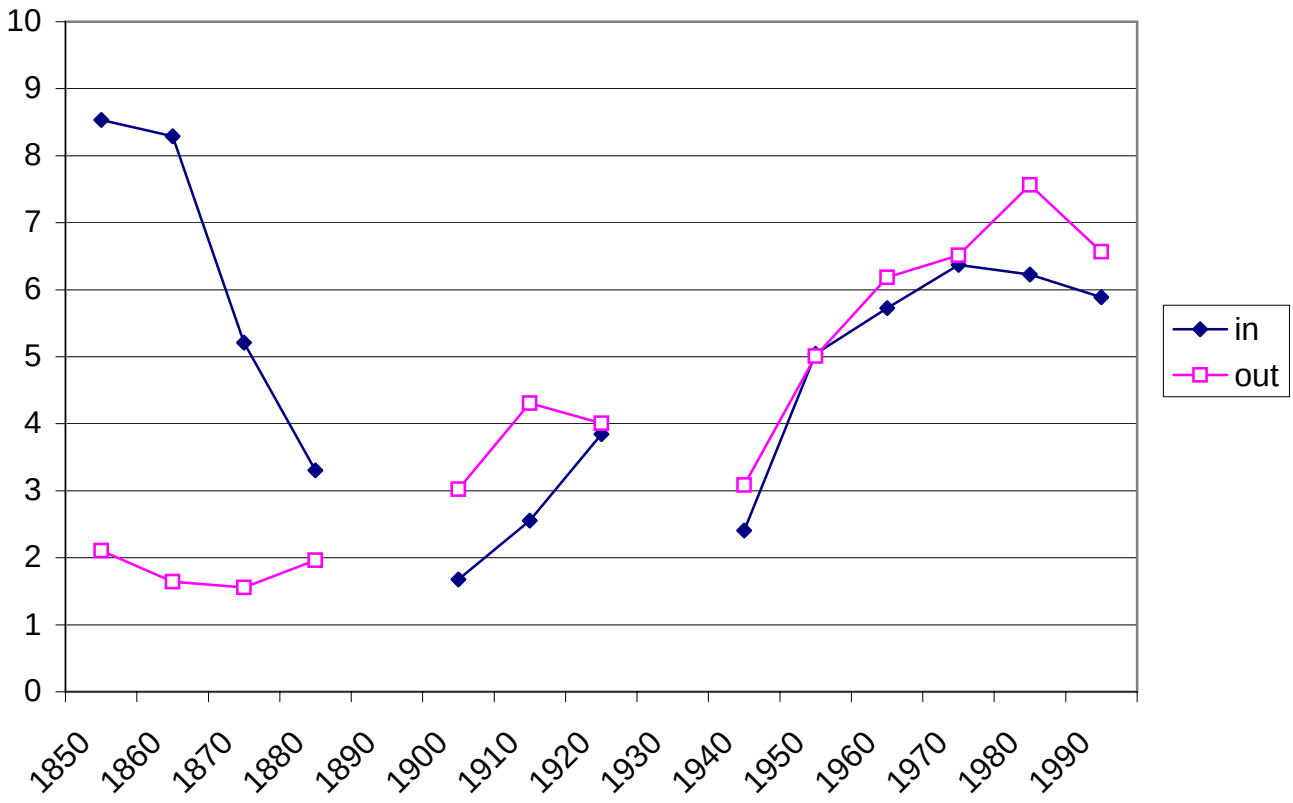


Figure 13
Gross 5-year interregional migration rates of families with children, South (as percent of families in region 5 years prior to census)

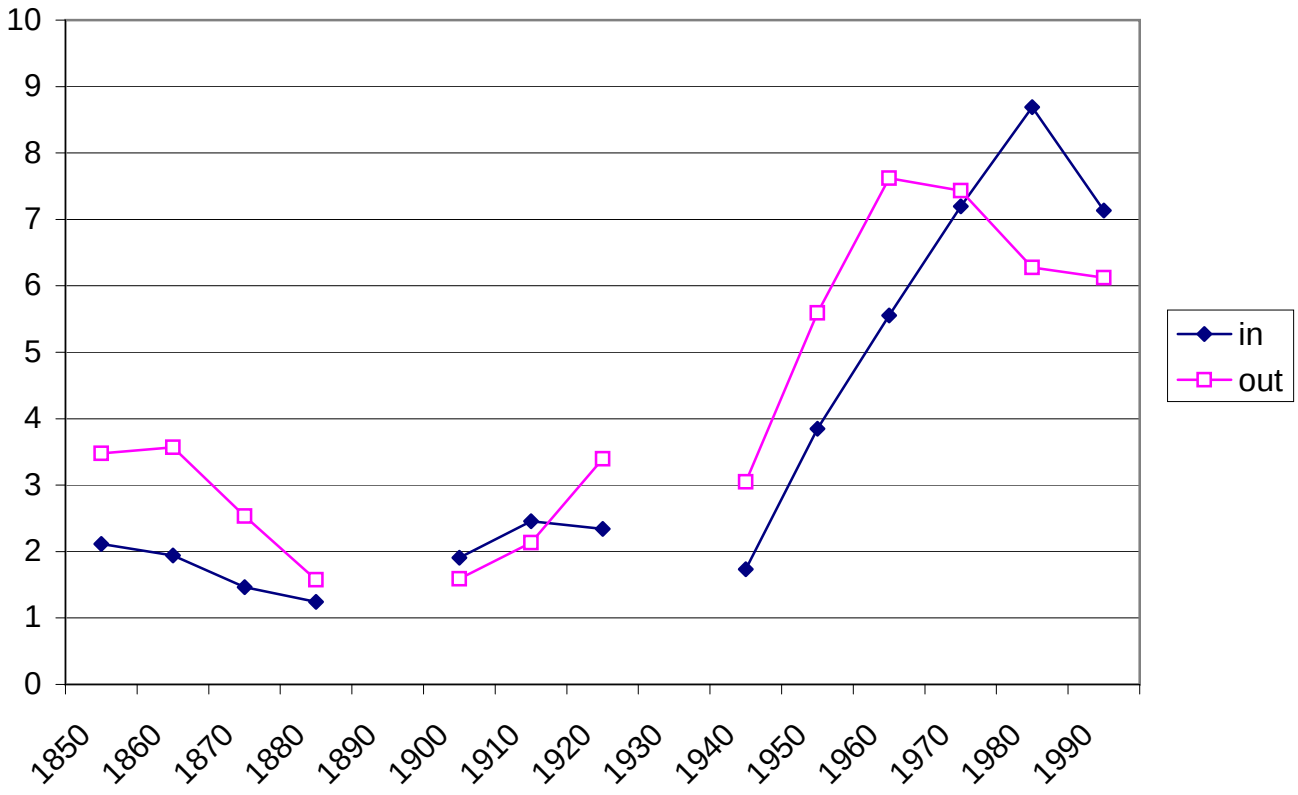


Figure 14
Gross 5-year interregional migration rates of families with children, West (as percent of families in region 5 years prior to census)

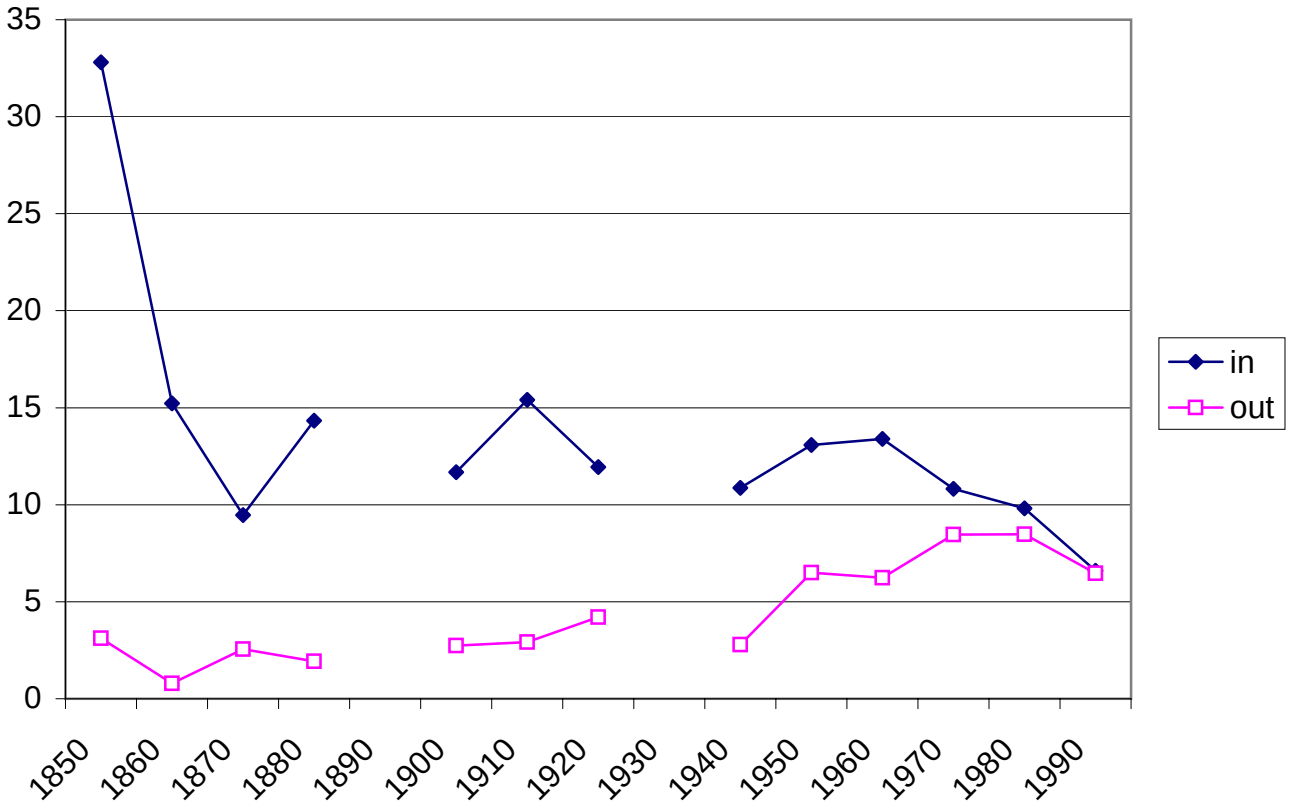


Figure 15
Marginal effect of father's literacy or educational attainment on 5-year migration propensity (relative to illiterate or 0-4 years of schooling)

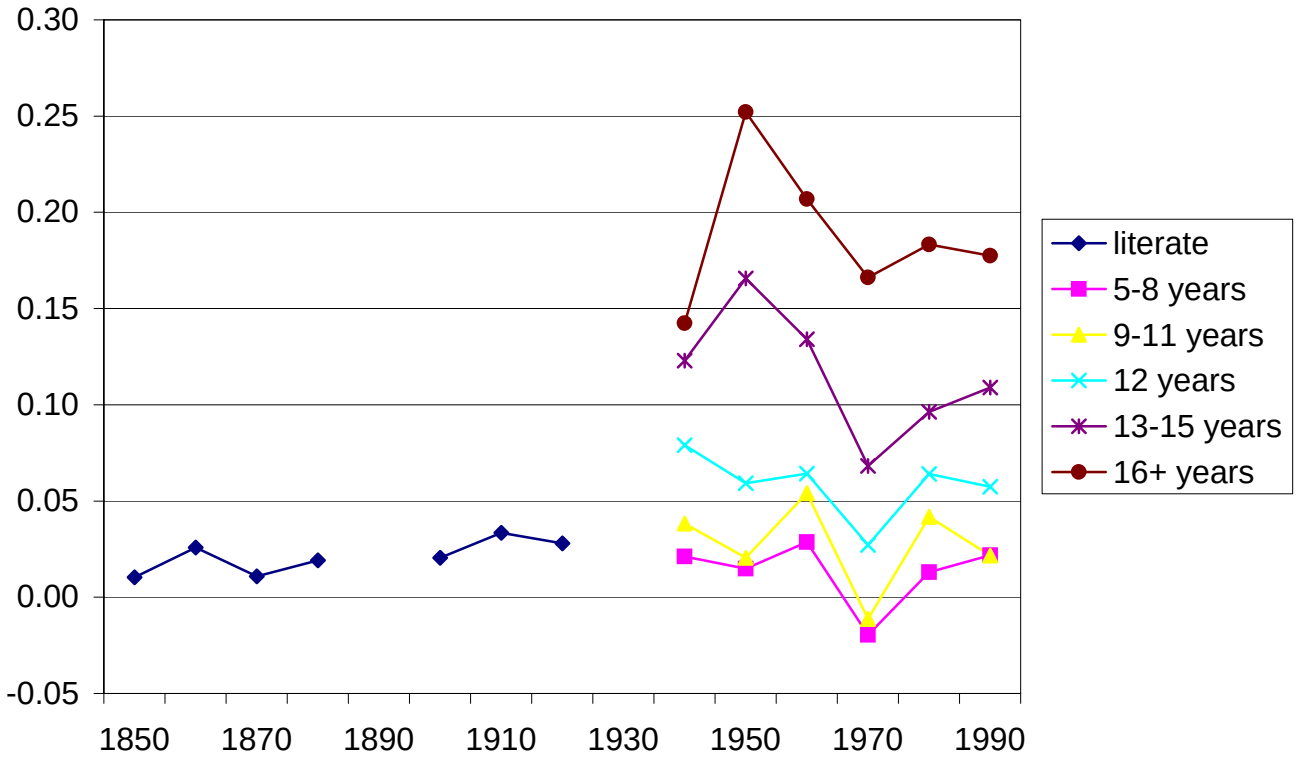


Figure 16
Effect of father's high-school education on predicted 5-year move probabilities, using 1960 probit coeffs. and mean characteristics