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Immigrant Earnings Assimilation, 1981-2021

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Abstract

We characterize trends in the earnings assimilation of immigrant workers from 1981 to 2021. We use administrative longitudinal data that contains the earnings of immigrant workers beginning in their first year of residence in the United States and in each year thereafter, allowing us to identify immigrants who eventually leave the United States (referred to in this paper as 'return migrants'). We use these data to provide the first examination of earnings assimilation trends over a 41-year period and to estimate earnings assimilation separately for return migrants versus those who remain in the United States. Obtaining a better understanding of the assimilation of immigrants will improve CBO's ability to model the earnings of immigrants, and in turn, the impact of immigration on Social Security finances. We document several new facts. First, roughly one-fifth to one-third of immigrants return migrate from the US within 10 years after arrival. Second, return migrants have approximately similar entry earnings as permanent migrants but experience slower rates of earnings growth. Third, earnings assimilation occurs relatively quickly for cohorts arriving since the mid-1990s: the earnings of permanent immigrants converge, or come close to converging, with the earnings of native-born people within 10 years after arrival. Migrants from earlier arrival cohorts experience significant earnings growth but do not converge to that of the native born. We discuss how changes in the labor market quality of immigrant cohorts and selective return migration play an important role in determining whether repeated cross-section data over or underestimate earnings assimilation.

Keywords: Immigration, Earnings Assimilation, Return Migration, Administrative Data

JEL Classification: F22, J15, J31, J61

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1. Introduction

Immigration has important implications for the federal budget and the Social Security program. Considering the direct effects of immigrants on the program, many immigrants work and pay payroll taxes, thus contributing to the Social Security program. They may also receive Social Security benefits that will be based on their earnings histories (as native-born workers do). Thus, the labor market integration of immigrants has important implications for the extent to which immigrants affect the federal budget, including that of the Social Security program, through tax payments and benefits receipt (Blau and Mackie, 2017; Storesletten, 2000).

In this paper, we estimate how the earnings of immigrants to the United States evolve with duration of residence in the United States and whether they eventually emigrate from the country. The data that we use for this analysis contains earnings information for workers with a Social Security number. Thus, the earnings assimilation estimates for immigrants in this paper are not representative of the subpopulation of immigrants without legal status who do not work in the formal labor market or do not have earnings recorded under a Social Security number.[1] Obtaining a better understanding of the earnings of immigrants relative to native-born workers will improve our understanding of their contributions to Social Security through payroll taxes as well as their earnings histories which will factor into the benefits that they will eventually receive. The results of this analysis will improve CBO's capacity to model the earnings of immigrants and the resulting impact on Social Security finances.

We organize our analysis into two parts. In the first part, we study patterns in return migration. Across arrival cohorts and by gender, we describe trends in return migration by inferring emigration using prolonged absences from the labor market. We find that approximately 20-30% of immigrants across all arrival cohorts return migrate within the first 10 years after arrival in the US.[2] Leveraging the longitudinal nature of our data, we also find that emigration occurs at a fairly constant rate over time spent in the US (with somewhat faster rates of emigration in the first few years after arrival).

In the second part of the paper, we describe the labor market assimilation of immigrants by estimating the earnings trajectories of permanent and return migrants. Upon arrival, immigrants earn less than native-born people, with the earnings of return migrants slightly lower than those of permanent migrants. Earnings of return migrants (prior to out-migration) tend to

[1] Some immigrants without legal status may have earnings recorded in the data if they have work authorization (e.g., under Temporary Protected Status), work in the United States using a fraudulent SSN, or accrue unauthorized earnings after overstaying their visa.

[2] In this paper, we use the terms return migrate, emigrate, and out-migrate interchangeably, even though migrants do not necessarily return to their country of origin, and we do not observe destination countries for individuals who leave.

remain flat or decline with time spent in the US, while permanent migrants realize sustained earnings growth. We show that panel estimates only slightly exceed estimates obtained from treating our data as repeated cross-sections; this is potentially due to the relatively small proportion (15-20% of the total arrival cohort) of return migrants compared with the number of permanent migrants from the same arrival cohort. We also find that rates of assimilation and return migration vary by country of origin, as well as across cohorts within sending countries.

In describing the labor market assimilation of immigrants, we also investigate heterogeneity by arrival cohort, gender, and country of origin. Understanding how the composition of immigration flows along those dimensions affects earnings assimilation could inform CBO's future analyses of the effect of immigration policy changes on Social Security finances. Disaggregating by arrival cohort and gender, we find that the earnings of permanent migrants from all cohorts grow at a faster rate than the earnings of native-born people, illustrating a "catch-up" process. Male permanent migrants from more recent arrival cohorts are more likely to reach earnings convergence with native-born people than earlier arrival cohorts. This trend is driven by an increase in the initial earnings of successive arrival cohorts (offsetting a slight decline in the rate of earnings assimilation over time). In contrast, while the earnings of immigrant women do converge towards the earnings of native-born women, they remain below the earnings of native-born women for most arrival cohorts within the first ten years.

Our work builds on a large literature studying the labor market integration of immigrants. In economics, much of this literature is concerned with the methodological issues that arise in the estimation of immigrant earnings profiles. We follow recent work using complete longitudinal data to track immigrants and their labor market outcomes with time spent in the US, beginning at the time of arrival (Akee and Jones, 2024; Rho and Sanders, 2021). This approach avoids the estimation issues that arise in stock-sampled data (Lubotsky, 2007; Duleep and Dowhan, 2008, 2002; Hu, 2000; Duleep and Regets, 1997) and single and repeated cross-section data (Chiswick, 1978; Borjas, 1985, 1995, 2015). Duleep (2015) summarizes this large body of work; Dustmann and Görlach (2015) overview the estimation issues that arise when estimating immigrant earnings profiles using these different types of data. Generally, prior work finds that the negative selection of return migrants drives an upward bias in cross-sectional estimation of assimilation rates (Rho and Sanders (2021) and Akee and Jones (2024) are notable exceptions). In our paper, we use complete longitudinal data that provides estimates that are not subject to those biases.

The remainder of the paper is organized as follows. Section 2 describes our data. Sections 3 and 4 discuss our empirical findings on return migration and earnings assimilation. Section 5 discusses estimation issues that arise in studying immigrant earnings profiles and situates our findings in the context of prior research. Section 6 concludes.

2. Dataset Description

We characterize immigrant earnings and migration histories using longitudinal records obtained from the Social Security Administration (SSA) for 1981-2021. This period covers much of the "modern" Age of Mass Migration that began with the Immigration and Nationality Act of 1965. This legislation ushered in a new period of mass migration by repealing immigration quotas that had been in place since the 1920s. Today, the share of foreign-born people as a percentage of the population in the US is comparable to what it was in the first Age of Mass Migration from 1850-1920 (Abramitzky and Boustan, 2017).

One advantage of our data relative to that of previous analyses is that it contains information about individual immigrants beginning at their estimated time of arrival and in subsequent years while they are in the United States. This means our longitudinal data is "complete" in the sense of Dustmann and Görlach (2015); that is, we can construct representative earnings histories for immigrants by arrival cohort. These data avoid estimation issues involved with repeated cross-sectional data, as well as "stock-sampled" panel data that retrospectively constructs histories for immigrants observed at a single point in time. It also allows us to study the earnings dynamics for permanent and return migrants, separately. Another advantage is that it is a relatively long panel, which allows us to examine how immigrant assimilation has changed over time. Previous research utilizing longitudinal data relied on relatively short panels; other studies cover a longer period but employ unrepresentative cross-sectional or stock-sampled data. Finally, our data avoids selective matching issues that arise in survey and administrative data linkages, a commonly used approach in prior work.

Our analysis uses the Continuous Work History Sample (CWHS), a research extract consisting of several datasets maintained by the SSA, collectively comprising a one percent representative sample of all individuals who have an SSN.[3] Key variables include longitudinal earnings drawn from W-2 tax records from the IRS, as well as basic demographic information such as date of birth, sex, and country of birth. We use a 44-year panel from 1978-2021 to study return migration and a 41-year panel from 1981-2021 to study earnings assimilation.[4]

Our data are arranged in the following manner. We study immigrants who are between ages 25-45 upon arrival for arrival cohorts from 1981 to 2010. Immigrants are defined as those who are foreign-born, excluding individuals born in US territories. We construct immigrant earnings histories for up to 20 years post-arrival, where we track earnings until individuals return

[3] For more discussion of SSA administrative files, please see Panis et al. (2000).

[4] Earnings data from 1978 to 1980 are less accurate due to inconsistent compliance in the first years following the change from quarterly to annual wage reporting, as mandated by the SSA (Leonesio and Del Bene, 2011).

migrate or die.[5] This leaves approximately 500,000 immigrants in our sample. Because the age restriction is only based on initial arrival, our sample includes people who are older than 45 years old. We apply a similar set of restrictions for native-born workers with respect to age and source of earnings. In total, our sample contains approximately four million native-born individuals.

Our measure of annual earnings is drawn from Box 1 of the Internal Revenue Service (IRS) form W-2. Earnings include wages, tips, bonuses, exercised stock options, and other sources of remuneration deemed labor compensation by the IRS. These earnings are uncapped and capture all industries, regardless of Social Security coverage. We exclude self-employment income from our analysis, but do use the presence of self-employment income in our definition of emigration. We sum annual earnings across jobs at the person-year level and express income in 2021 dollars using the Consumer Price Index for All Urban Consumers (CPI-U). Our data do not cover informal labor earnings that are not reported to the SSA.

Although the CWHS captures a small amount of earnings belonging to immigrants without legal status, throughout our study, we will interpret and refer to our results as those from documented immigrants. Immigrants without legal status may have earnings recorded in the CWHS if they have work authorization (e.g., under Temporary Protected Status), work in the United States using a fraudulent SSN, or accrue unauthorized earnings after overstaying their visa. SSA estimates that the number of these immigrants present in its administrative files is small (Goss et al., 2013).[6]

We follow prior work in inferring return migration using prolonged absence from the labor market, as our data do not record emigration directly (Schwabish, 2011). A validation exercise in Akee and Jones (2024) suggests that this approach accurately identifies most return

[5] We restrict our analysis to working-age years to minimize the chance that individuals exit the labor force by retiring.

[6] Immigrants without legal status may use an Individual Taxpayer Identification Number (ITIN) to file an individual income tax return. ITINs are granted to those who do not have and are not eligible for a SSN. The CWHS does not cover these individuals.

migrants.[7] We proxy for year of arrival with the year in which immigrants obtain their SSN.[8] While some immigrants are not required to obtain an SSN upon arrival, they have an incentive to do so for employment purposes. That includes immigrants with employment authorization under a temporary visa and those who have permanent residency. This definition of the year in which an individual obtains an SSN thus has a clear interpretation as the year in which immigrants enter the formal labor market. This definition also has the virtue of avoiding ambiguities present in Census year of arrival measures (Redstone and Massey, 2004).[9]

Table 1 reports descriptive statistics for workers in selected years of our sample. Panel A provides characteristics for the immigrant population sample and Panel B provides characteristics for the sample of native-born workers. Both groups are restricted to be between the ages of 25 and 65. Across selected years in our sample, the average age of immigrants ranges from 40 to 43 years old and women comprise 45 to 50% of the immigrant sample. Average annual earnings range from $23,000 to $40,000 (in 2021 dollars). Native-born people are slightly older and have a higher share of women. They also earn slightly more than immigrants: $8,000 more than immigrants in 1981 and $5,000 in 2021.

Panel A also reports shares of the total number of immigrants for the top five sending countries in our sample by year. We depict the overall proportion of immigrants by their birth country in all of the CWHS data – not only new arrivals in a particular year. Mexican immigrants comprise the largest share of the total number of foreign-born people, with the share staying relatively constant throughout the sample period with the exception of the aftermath of the great recession. For other top sending countries, there have been large changes in the shares over time. Both India and China have an immigrant share that increases significantly over time. The share of immigrants from El Salvador increases modestly over our period, while shares from the Philippines have remained roughly constant.

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[7] In their analysis, Akee and Jones (2024) link return migrants from the 2005 arrival cohort as identified in their data to the 2010 US Census data and find less than 5% remain in the US if they have no reported earnings. They conclude that the vast majority of return migrants have indeed left the US and that prolonged absence from the formal labor market administrative data is a useful proxy for residence in the US for this population.

[8] Using CPS ASEC data linked to the Numident, we examined the relationship between year of SSN issuance from the Numident and the reported year of arrival in the CPS ASEC. The two measures were generally consistent. For arrival cohorts between 1980 and 1986, the average number of years between arrival and SSN issuance was about 2 to 3 years. This likely reflects the effects of the Immigration Reform and Control Act of 1986, which allowed individuals who were already in the country as of 1982, or those who had performed at least 90 days of qualifying agricultural work from May 1985 to May 1986 to obtain an SSN. Those who arrived in 1990 or later years, obtained an SSN in under a year, on average. All results were approved for release by the U.S. Census Bureau, authorization number CBDRB-FY21-301.

[9] In results available upon request, we define cohorts by entry into the labor market using their first year of earnings and find that this makes little difference. We acknowledge that the SSN classification is less accurate at proxying for immigrants' true year of arrival for those who obtained legal status through the Immigration Reform and Control Act (IRCA), as they immigrated prior to obtaining their SSN.

We report trends in immigrant flows in Figure 1. Panel A shows rising immigration flows from all countries with a large spike in SSN issuances beginning in 1987, following the Immigration Reform and Control Act of 1986 (IRCA). Panel B suggests that the IRCA-driven surge in SSN issuances was largely driven by Mexican immigrants. We show in Panel C that there are no corresponding surges in immigration for other immigrant groups post-IRCA, with the exception of a smaller increase in immigrants from El Salvador. Indian and Chinese inflows have steadily increased over time, while the number of Filipino immigrants remains relatively constant.

3. Return Migration

We begin our analysis by studying trends in return migration by year of arrival and gender. Identifying return migrants is challenging since we cannot directly observe individuals leaving the US. Instead, we infer return migration if an individual has consecutive years of missing income through the last year of our sample (2021). For the purposes of defining emigrants, income includes W-2 earnings as well as self-employment income from Schedule SE.[10] This classification method implies an absorbing state, where migrants who leave the US never return.[11] The year of emigration is the first year in which an individual begins to have missing earnings. Our sample selection focuses on individuals between the ages of 25-45 for immigrants at the time of arrival (as well as native born individuals ages 25 to 65); since we examine earnings for ten years after arrival in our main analyses this reduces the chances that anyone is missing future earnings data due to retirement. We further exclude individuals whose place of death is recorded in the US.[12]

Akee and Jones (2024) employed a similar method to identify return migrants in their analysis for a 2005 immigrant arrival cohort to the US. Additionally, the authors linked return migrants to the 2010 US Decennial Census and found that less than 5% remained in the US; this is evidence that using consecutive years of missing earnings is a useful proxy for return migration for immigrants in our age range and who had previously had non-zero earnings in our data. Other researchers (Rho and Sanders, 2021) using a related measure of return migrants linked Longitudinal Employer Household Dynamics (LEHD) data to the 2010 U.S. Census and found a similarly small amount (about 5% remained in the US.

[10] We focus solely on W-2 earnings in our assimilation analysis.

[11] It is possible that these individuals do not return to the formal labor market in the U.S., but this seems unlikely given the age profile and the relatively large number of individuals. Additionally, the missing individuals are probably not attributable to death given the ages of individuals studied in this analysis.

[12] This information is included in CWHS data (in the Numident file).

Panels A and B of Figure 2 depict rates of return migration, defined as above, by arrival cohort and gender for up to ten years after arrival.[13] Each series begins at one on the vertical axis (meaning that 100% of the cohort is remaining in the arrival year). In subsequent years we report the share of immigrants in each cohort that remains in the country. We find that a large share of immigrants out-migrate by ten years post-arrival for all arrival cohorts. This pattern is similar to the high rates of return migration found in other developed economies (OECD, 2008). Rates of return migration appear somewhat higher for men than for women. We find that return rates are about 15% for women and about 20% for men on average in our data.

While these panels exhibit a striking trend in the rates of return migration across cohorts, we note that the trend may be a mechanical result arising from how we classify return migrants. Specifically, it appears that there are higher rates of return (25-30%) for the more recent arrival cohorts in the figures. However, immigrants from earlier arrival cohorts are less likely to be defined as emigrants since their earnings need to be missing for a longer period of time than immigrants from later cohorts.[14] This suggests our absorbing state method is more likely to misclassify immigrants as return migrants for more recent cohorts (either from back-and-forth migration or temporary spells of unemployment or nonemployment). To address this concern, panels C and D of Figure 2 present trends that alternatively define return migrants as immigrants who have ten consecutive years of missing income. The open circles in these plots indicate the years in which we cannot identify return migrants owing to truncation of the sample at 2021.[15] This method ensures consistency across cohorts allowing for a clearer interpretation of trends (though it misclassifies immigrants who return to the labor market after a ten-year absence as return migrants). In these panels, the trends in return migration are more constant. However, the level of return migration remains broadly consistent with our primary definition. Even though the trend in return migration is hard to identify, our takeaway from Figure 2 is that that a significant share of immigrants return migrate within ten years.

In our analysis to follow, we rely on missing earnings that persist until the end of the sample period to define return migrants (as used in panels A and B) unless otherwise indicated.

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[13] We report rates for every third arrival cohort for ease of presentation.

[14] Consider this example. An immigrant we tag as having emigrated in 1990 must have 31 years of missing data; for those emigrating after 1990, we cannot require 31 years of missing data because our sample period is truncated at 2021. This implies that the stringency of the return migrant definition necessarily changes across cohorts.

[15] For example, we are unable to identify those who out-migrate after 2010 because we cannot record ten consecutive years of missing income.

Results using an alternative definition of return migration are available in appendix figures A1, A2, and A3.[16]

4. Earnings Assimilation

4.1 Estimating Equation

Next, we turn to our primary analysis of characterizing immigrant earnings assimilation. Our analysis compares the earnings of native-born people and immigrants over the course of immigrants' time spent in the US. Estimating this relationship will provide insight that CBO will use to improve the agency's modeling of earnings of immigrants separately from native-born workers. Increasing the accuracy of modeled earnings will directly improve the modeling of payroll taxes paid and Social Security benefits received; both of which will lead to more accurate modeling of Social Security finances. These modeling improvements will improve the capacity for the agency to perform long-run analysis of immigration reform proposals on Social Security finances.

Our regression specification is

$$y_{ict} = \sum_{t-c} \gamma_{t-c} + \lambda_c + \theta_{it} + \tau_t + \epsilon_{ict} \qquad (1)$$

where i indexes individuals, c denotes the single year arrival cohort, and t denotes calendar year. The outcome y_{ict} is the natural log of earnings, γ_{t-c} are indicators for years since migration, λ_c are arrival cohort indicators, θ_{it} are age fixed effects, τ_t are year fixed effects, and ϵ_{ict} is a regression error term. Native-born workers form the omitted group for the years since migration variable, so our parameter of interest, γ_{t-c}, is interpreted as the immigrant-native earnings gap in each year post-arrival, conditional on the fixed-effects. Cohort dummies allow for initial earnings to vary but restrict the rate of earnings growth to be the same across cohorts. We begin by estimating this model with pooled arrival cohorts. This restriction is relaxed in Section 4.3 by dropping the cohort dummies and estimating equation (1) separately by cohort to let earnings dynamics vary flexibly. Standard errors are clustered at the individual level.

We estimate this model separately for three samples: permanent migrants, return migrants, and a sample that treats our panel as repeated cross-sections. Permanent and return migrants are mutually exclusive. This implies that estimates from the repeated cross-section sample, which pools all immigrants, are a weighted average of the estimates for the permanent and return migrant samples.

[16] Consistent with the results found using our preferred definition of return migration, we find that male immigrants achieve parity with native-born workers sooner after arrival than female immigrants and that assimilation has generally occurred faster with more recent arrival cohorts.

4.2 Pooled Results Across Arrival Cohorts

Figure 3 depicts the earnings assimilation estimates from this model over a 20-year horizon, pooling arrival cohorts from 1981-2010. We limit our sample to immigrants aged 25-45 upon arrival, along with comparably aged native-born people, so that we reduce the probability that immigrants exit the labor force due to retirement. Closed circles in the plot correspond to estimates $\{\hat{\gamma}_{t-c}\},\ t-c \in \{1, 20\}$. The open circle corresponds to $\hat{\gamma}_0$, the year in which immigrants arrive and are likely to have a partial year of earnings that would not be comparable to the full year earnings of the native born. The dotted line indicates that the large increase in earnings given by $\hat{\gamma}_1 - \hat{\gamma}_0$, is mechanical due to the potential for only a partial year of earnings reported for new migrants and a full year of earnings for the native-born.

Immigrant earnings converge with the earnings of native-born people when their relative earnings cross the zero-horizontal line in this figure. On average, across all entry cohorts, we find that permanent migrants reach earnings parity with native-born people about 8 years after arrival for men and 19 years after arrival for women. Return migrants have lower initial earnings that persist over their time in the US. Individuals who will out-migrate, as a group, tend to have little to no earnings growth relative to native-born people while they are in the US. This pattern could be driven by either downward earnings mobility for eventual return migrants or a pattern of positive selection from *within the return migrant population*. In particular, this would mean that, from the pool of return migrants, the higher earning individuals from that group would tend to migrate sooner than those with lower earnings. Overall, however, return migrants in total are negatively selected relative to their original arrival cohort as shown in Figure 3 where the return migrant lines are consistently lower than the other lines. The former explanation is consistent with models of "behavioral selection" in which migrants intending to stay longer have a greater incentive to invest in human capital in order to reap the returns to investment over a longer horizon (Adda, Dustmann and Gorlach, 2022).[17]

In practical terms there is little difference between the estimates using panel and repeated cross-section data (comparing the red and blue series in Figure 3). This differs from prior work, notably Lubotsky (2007). We believe the difference could partly be explained by improved measurement. In particular, we make panel and cross-sectional comparisons consistently within the same data. Lubotsky compares panel and cross-sectional estimates in separate datasets, which may confound sample differences with estimation biases. We also note that estimation bias in Lubotsky's sample appears to be concentrated in the 1970-1979 arrival cohorts (see his Figure 6), which are not covered in our data. Lubotsky's analysis of 1980-1984 cohorts reveals much less evidence of a divergence between panel and repeated cross-section estimates. This suggests

[17] We investigate these potential explanations below in Figure 6.

that changes in emigrant selection for more recent cohorts are also a plausible explanation for the divergence between our findings and the findings from prior work.[18]

4.3 Trends by Arrival Cohort

Next, we study earnings assimilation by arrival cohort and gender. We estimate equation (1) separately by arrival cohort and gender, which allows for earnings growth rates to vary flexibly by cohort.[19] Tables 2 and 3 report the estimates for men and women, with panels reporting estimates for relative entry earnings, relative earnings in the tenth-year post-arrival, and the difference between the two (ten-year relative earnings growth). Figures 4 and 5 plot the corresponding estimates. As in Figure 3, we estimate our model separately for permanent and return migrants and for a sample that treats our panel as repeated cross-sections.

Disaggregation yields several insights that are masked in our pooled analysis. First, for men, there is an upward trend in initial earnings across cohorts. For permanent migrants in earlier cohorts, the immigrant-native earnings gap is around than 0.7 log points; for the 1998 cohort and thereafter, the gap is only around 0.3 log points.[20] Female immigrants exhibit a less pronounced increase in relative entry earnings. For both men and women, the upward trend in entry earnings holds for both permanent and return migrants.

The earnings of male immigrants are more likely to converge with the earnings of native-born people in more recent arrival cohorts. Panel B of Table 2 shows that after ten years in the US, 1983 permanent migrant arrivals still exhibit a 0.3 log point earnings gap with native-born people. The earnings gap shrinks to 0.2 log points for the 1995 arrival cohort, with immigrants from the 1998, 2001, 2007, and 2010 cohorts achieving earnings parity with native-born people by the tenth year. The trend is driven by the increase in entry earnings rather than an increase in the rate of relative earnings growth, indicating that increasing immigrant labor market quality accounts for observed earnings convergence to the native-born. Trends in assimilation are more muted for women. Panel B of Table 3 shows that, across cohorts, permanent migrants still exhibit about a 0.1 log point earnings gap with native-born people by their tenth year in the US (with the exception of arrivals from 1987-1989–the IRCA cohort–which exhibits a larger earnings gap). This trend arises from relatively stable entry earnings and only modest increases in the rate of earnings growth.

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[18] Abramitzky, Boustan and Eriksson (2014) also find divergence between panel and cross-sectional estimates (making comparisons using the same data) for immigrants arriving during the first Age of Mass Migration. The difference between our study and theirs might also be driven by differences in the arrival cohorts studied.

[19] Cohorts are pooled into three-year buckets for precision. The 1983 cohort includes arrivals from 1981-1983, the 1986 cohort includes arrivals from 1984-1986, and so on.

[20] Villarreal and Tamborini (2018) find similar results for immigrants using the Survey of Income and Program Participation linked to IRS data.

The findings, for men, contrast with Borjas (2015), who finds a slowdown in the rates of wage growth across arrival cohorts using repeated Census cross-sections. In his analysis, substantial wage gaps remain after ten years in the country. While we find some slowdown in earnings growth across cohorts (with a non-monotonic trend), the decline is compensated for by an increase in entry earnings such that later cohorts come much closer to closing the earnings gap. We see two potential reasons why we differ from Borjas: differences in cross-sectional and panel data estimation and differences in the study population and earnings coverage (our data only covers earnings from the formal labor market, which are largely from documented immigrants). We find little evidence of the former in our data, suggesting that bias from repeated cross-section estimates plays a minimal role for the population of documented immigrants. We believe this leaves differences in the study population and earnings coverage as the leading factor for why we differ from Borjas.[21] Additionally, Duleep, Liu and Regets (2022) explain that when following cohorts over time one must follow individuals from their time of arrival but that one must be cautious about excluding individuals without earnings in one year and then including them in subsequent years. This differential composition of immigrant growth can overestimate or underestimate immigrant earnings growth. Our analysis, because we have panel data, does not suffer from those same issues as with repeated cross-section analysis.

Using the CWHS, we estimate that more recent arrival cohorts have both smaller earnings differentials upon entry and faster earnings assimilation than past cohorts. Both of those results indicate that more recent arrival cohorts would likely have higher lifetime earnings, and thus higher payroll tax contributions and benefits received than past arrival cohorts. By more accurately estimating the earnings trajectories of immigrants versus natives, and incorporating heterogeneous results based on the composition of past immigration flows, these results will help improve CBO's modeling of Social Security finances.

Return Migrants. For out-migrants, we find, for all arrival cohorts, constant or negative earnings growth in their first ten years after arrival. For arrival cohorts from 1981 to 1995, we observe that the earnings of return migrants are lower than those of permanent immigrants by a roughly constant magnitude over the first ten years after arrival. However, beginning in 1998, there is a slight downward trend in the relative earnings of return migrants that increases in magnitude in later years of the sample.[22]

This pattern for later cohorts could be driven by downward earnings mobility among return migrants or due to the fact that there is positive earnings selection from within the pool of return migrants. To investigate, we plot the earnings of return migrants for the 1983 and 2010

[21] Appendix Figure A4 confirms that earnings assimilation estimates in repeated cross-sections using the CWHS are similar to those obtained in the American Community Survey.

[22] This trend is robust to using our alternative classification for return migrants that is consistent across cohorts.

arrival cohorts by length of stay in the US in Figure 6. Panel A depicts male return migrant earnings for the 1983 cohort. Trajectories are mostly flat, suggesting that negative earnings shocks play a limited role for out-migration.[23] Panel B depicts the earnings trajectories for female return migrants who arrived in 1983, though the estimates are much less precise. These plots show, for the 1983 cohort, that return migrants had earnings trajectories that were roughly flat regardless of when they return migrated. Panels C and D plot the same trajectories for male and female return migrants from the 2010 arrival cohort. Here, there is some evidence of a downward trend in earnings prior to emigration, especially for women. This suggests that negative earnings shocks might play a role in return migration for immigrants in this period during the Great Recession.

4.4 Country-Level Heterogeneity

Understanding how earnings assimilation estimates differ by country of origin will yield important insight for CBO's modeling of Social Security finances. In general, there is a significant correlation between country of origin and category of admission to the United States. For example, in 2019, 13% of admissions under employment-based preference categories were people from India. Immigrants from India, in contrast, made up only 7% of all admissions under family-based preference categories. Similarly, immigrants from Mexico made up 15% of all family-based preference categories in 2019, but only 5% of employment-based preference categories in that year.[24] By estimating earnings assimilation separately for the top countries of origin, we hope to improve CBO's modeling capacity to estimate the long-run effects of future immigration flows on Social Security finances.

We first examine heterogeneity for return migration (defined as the absence of consecutive earnings through 2021), then turn to assimilation. Figure 7 depicts return migration rates for five source countries. We show return migration by arrival cohort and country of origin for the years 1983-1998 for both men and women. In Panel A, we show that male return migration rates vary by source country, and that there appears to be an increase in return migration over time, especially for immigrants from China. Panel B depicts similar heterogeneity for women. Women generally have lower rates of return migration than men and have less of an increase in the return migration over time compared to our findings for men.

Next, we examine heterogeneity in earnings upon entry and earnings growth. Figure 8 shows variation in relative entry earnings (first full year of earnings after arrival) for permanent migrants both across countries and within countries over time. For men there is evidence that entry earnings generally increase over time for arrivals from Mexico and India. The entry

[23] The exception is the drop in earnings in the final year prior to emigration. This reflects partial year earnings.

[24] See Department of Homeland Security, *Yearbook of Immigration Statistics 2019*, 2019, Table 10, https://www.dhs.gov/immigration-statistics/yearbook/2019.

earnings for men from the Philippines, China, and El Salvador have remained fairly constant over those arrival cohort years. For women immigrants, the entry earnings do not change as dramatically over time as they did for men, except for some instances where it appears that entry earnings declined over time; however, the confidence intervals are quite large in all cases.

Turning towards earnings growth, Figure 9 plots the ten-year relative earnings growth rate for the same sending countries and arrival cohorts. There are few strong trends for either men or women over time or across countries. However, our results do indicate that earnings growth is lower for immigrants (both men and women) from Mexico, compared with immigrants from other countries.

5. Implications for Earnings Assimilation Estimates in Panel and Cross Section Data

Our findings show that there is an increase in average initial earnings for successive immigrant arrival cohorts over time from 1981-2010. That trend has been steadily increasing over time for men and slightly less so for women. A smaller earnings differential upon arrival would be consistent with more recent arrival cohorts containing a greater share of people with characteristics that readily translate into the domestic labor market. For example, a greater share of people with higher levels of educational attainment or those who are otherwise qualified to work in high-paying occupations. Those people would generally contribute more to Social Security through payroll taxes and be eligible for higher benefits upon retirement (assuming they meet other eligibility requirements to claim benefits, such as their age at claiming, covered earnings history, etc.). Consistent with the literature, in the following sections we interpret changes in the earnings differential upon arrival as changes in the 'labor market quality' of that cohort.

We also find that return migration is negatively selected for both men and women across all of the arrival cohorts in the sample; the population that return migrates has consistently lower earnings in all years after arrival relative to permanent migrants from the same arrival cohort. One additional finding is that, in recent years, return migrants' earnings decrease with years in the U.S. after disaggregating their earnings by duration of stay. This represents a relatively new finding that return migration may be related, for more recent immigrant cohorts, to poor earnings outcomes which contrasts with earlier arrival cohorts in our study.

5.1 Contribution of Return Migration and Changing Immigrant Arrival Cohort Labor Market Quality on Estimates of Earnings Assimilation

There is a well-developed literature in economics investigating the earnings assimilation of newly arrived immigrant cohorts to the U.S. and other developed countries. However, past research has been limited by a lack of complete longitudinal data. In particular, early research relied on repeated cross-sectional data that did not allow researchers to control for selective return migration and/or differences in the labor market quality of arrival cohorts over time. As a

result, that research was criticized as biased towards finding higher immigrant earnings assimilation than would be found with a complete panel data. In particular, those studies, which do not account for selective return migration, indicated that immigrants required a fewer number of years to reach parity with the native born than panel data would suggest.

Theoretically, there are several factors that can affect estimates of average immigrant earnings growth over time that are unrelated to actual labor market assimilation. When there is only cross-sectional data available, changes in the average immigrant cohort quality (with respect to labor market characteristics) may affect estimates of earnings assimilation. For example, immigrants in one arrival cohort may possess skills that are more positively valued in the labor market than another arrival cohort. In this situation, cross-sectional data may provide incorrect inferences on earnings assimilation. This case was made most clearly by Borjas (1985) who showed that declining immigrant arrival cohort labor market quality over multiple decades can result in overly optimistic earnings assimilation rates for immigrants when using cross-sectional data as compared to panel data. The opposite may occur when the labor market quality of immigrant arrival cohorts is increasing over time, indicating an overly pessimistic earnings assimilation.

The second factor that may affect average immigrant earnings assimilation over time is the self-section of return migrants. If there is a non-random emigration out of the US, then this selection may affect the estimate of immigrant earnings assimilation over time when cross-sectional data is used. For instance, if the return migrants are negatively selected (as shown in the U.S. in the early 20th century by Abramitzky, Boustan and Eriksson (2014)) then the remaining immigrant cohort contains proportionately more economically successful immigrants and thus any cross-sectional estimates will also tend to overestimate average immigrant earnings relative to those estimated with panel data. If, instead, return migration is positively selected, this would mean that remaining immigrant cohort contains proportionately less economically successful immigrants and cross-sectional estimates of average immigrant earnings assimilation would be lower than that estimated with panel data.

These two factors are shown in Table 4 and the effect that they have on the earnings assimilation – specifically, the number of years it takes to reach parity with the native-born population – when using either panel or cross-sectional data. Existing research has found differing estimates of earnings assimilation of immigrants at different time periods depending upon whether cross-section or panel data was used. For example, Abramitzky, Boustan and Eriksson (2014) found negative selection of return immigrants and declining immigrant arrival cohort labor market quality. They conclude that cross-sectional data estimates provide quicker earnings assimilation estimates relative to panel data in historical U.S. Census data. As discussed previously, negative selection of return migrants and declining immigrant arrival cohort labor market quality indicate an unambiguous result that cross-section data will overestimate the

immigrant earnings growth rate relative to panel data. This outcome is shown in the top right quadrant of Table 4.

Alternatively, Rho and Sanders (2021) found that return migrants in their sample are positively selected and that the average labor market quality of immigrant cohorts is increasing over time. They conclude that cross-section data estimates provide lower earnings assimilation relative to panel data in their data. In this situation, the two factors indicate unambiguously that cross-section estimates of immigrant earnings assimilation are slower than panel data estimates would indicate. That outcome is shown in the bottom left quadrant in Table 4.

There are two other cases, however, that are possible when estimating immigrant earnings assimilation. It is possible that there is decreasing immigrant cohort labor market quality over time while there is positive selection of return migrants. This is depicted in the top left quadrant of Table 4. In this situation, the difference in immigrant earnings assimilation estimates between panel and cross-sectional data will be dependent upon the relative magnitude of the effect of decreasing immigrant arrival cohort quality (which tends to lead to overestimates of earnings growth in cross-section data) and the effect of positively selected return migrants (which tends to lead to underestimates of earnings growth in cross-sectional data). The reverse case is shown in the bottom right quadrant in Table 4; in fact, this is the situation that we identify for the majority of the years in our analysis. We find that there is a negative selection of return migrants and increasing immigrant arrival cohort quality over time.

5.2 Earnings Growth by Years Since Migration in Cross-Section and Panel Data

We also find that estimates of earnings growth using cross-section data are slower than that of the panel data. In Table 5 we regress the pooled earnings for all arrival cohorts by the years since migration in five-year categories; our omitted category is recent arrivals (0-5 years). Additionally, we control for age fixed effects, year fixed effects and three-year arrival cohort fixed effects. We estimate all regressions separately by gender. Additionally, for each gender, we estimate separate regressions for two samples of the data. In the first sample, we treat the data as cross-sectional and include both permanent migrants and those who we observe will eventually return migrate. This allows for the fact that some portion of future return migrants exist in the U.S. labor force each year. In the second sample, we restrict it to include only permanent migrants. The earnings growth for immigrants in the permanent immigrant sample is consistently larger than the cross-section data for men and women at all lengths of stay in the U.S.

Our findings related to changing immigrant arrival cohort quality and return migration actually tend to push cross-section estimates of earnings growth in two different directions compared with estimates from panel data. As discussed in Section 5, increasing immigrant cohort quality will tend to produce results where cross-section data underestimates earnings growth as compared to panel data. Alternatively, negatively selected return migration tends to

produce results where cross-sectional data overestimates earnings growth compared to estimates derived from panel data (as shown in Table 4). Therefore, it is ambiguous as to whether the cross-section estimates of immigrants' earnings growth will be larger or smaller than estimates from panel data; consistent with the lower right-hand cell in Table 4. We find, empirically, that the immigrant earnings growth estimates using panel data are larger than those from the cross-section data and conclude that the effect of changing immigrant cohort quality appears to be driving the difference in earnings growth rates between the two potential forces described.

6. Conclusions

This paper studies the economic assimilation of immigrants to the US in the late 20th and early 21st century. Our sample period covers much of the "modern" Age of Mass Migration that began with the Immigration and Nationality Act of 1965. Prior work studying this period relies on cross-sectional or stock-sampled panel data. By observing and tracking immigrants from their year of arrival, we construct for this period the first estimates that are representative and longitudinal (in the complete sense). We complement recent work in this vein (Abramitzky, Boustan and Eriksson, 2014; Akee and Jones, 2024; Rho and Sanders, 2021).

We paint a new picture of trends in assimilation during this period. Male immigrants, across arrival cohorts, increasingly have higher relative earnings upon entry. Trends in assimilation declined slightly but were non-monotonic. Taken together, we find that immigrants, across cohorts, are increasingly likely to close the earnings gap with native-born people within ten years of arrival. Our work contrasts with Borjas (2015), which we argue is driven by differences in the population studied. Our findings provide credible estimates of the immigrant assimilation process for documented immigrants participating in the formal labor market only; informal earnings and immigrants without legal status might be driving different results in Census data.

We present several other findings on the assimilation process. First, we find that panel estimates of assimilation are remarkably similar to estimates obtained from repeated cross-sections (only slightly larger). These results are most likely driven by the relatively small size of the return migrant population – ranging between 15-20% of the total arrival cohort size. Additionally, the large number of observations in our data allow, for the first time, an exploration of heterogeneity by gender and sending country. Trends in entry earnings and assimilation fluctuate for women, though permanent migrants from most cohorts close the earnings gap with native-born people. We also show that there is significant heterogeneity by country, as well as within country across cohorts. Our data also allow us to track earnings for eventual return migrants. While in the US, return migrants always have lower earnings than permanent migrants, and there is suggestive evidence that recent out-migrants experience downward earnings mobility prior to emigration.

Lastly, our work provides new insight into the earnings assimilation process that will inform CBO's modeling of earnings. By incorporating differences in the earnings of immigrant workers relative to native born workers, the agency will improve the accuracy of its modeled individual-level earnings. As Social Security benefit payments and payroll taxes depend on those earnings, incorporating the results of this paper will improve the agency's modeling of Social Security finances. This paper has also examined how earnings assimilation varies depending on the composition of previous immigration flows. That analysis will help improve CBO's capacity to perform long-run analysis of immigration reform proposals on Social Security finances.

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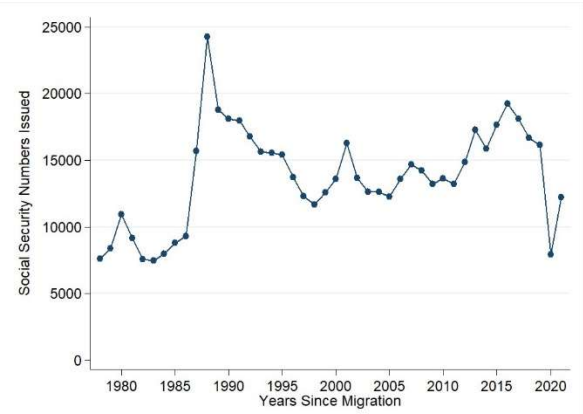
Figures

Figure 1. [Return to Text]

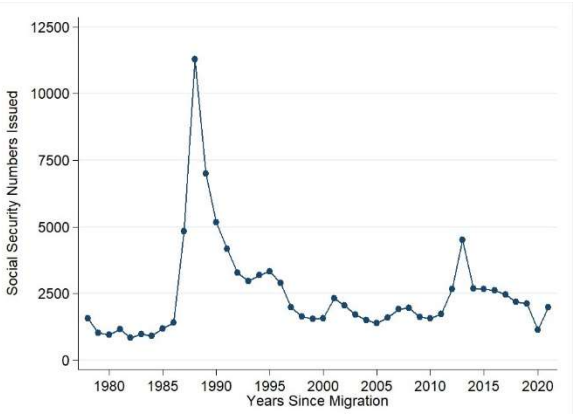
Immigrant Flows Based on Issuance of Social Security Numbers by Country of Birth and Year, 1978-2021

Social Security Numbers Issued

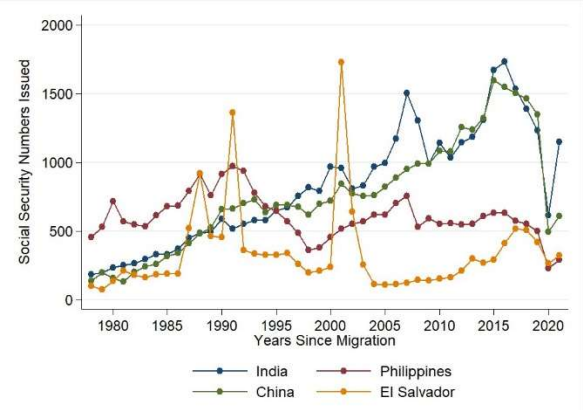
(a) Total



(b) Mexico



(c) Top Senders Excluding Mexico



Data source: Social Security Administration Continuous Work History Sample.

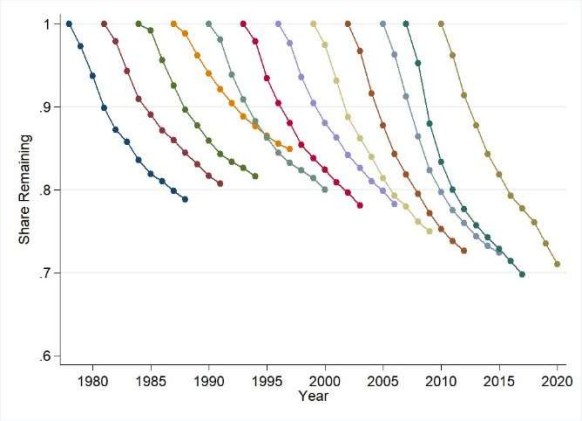
This figure depicts immigrant inflows from 1978-2021. We proxy for year of arrival with the year in which immigrants obtain their Social Security Number. Panel A reports total inflows, Panel B reports inflows for immigrants born in Mexico, and Panel C reports inflows for immigrants born in India, China, the Philippines, and El Salvador.

Figure 2. [Return to Text]

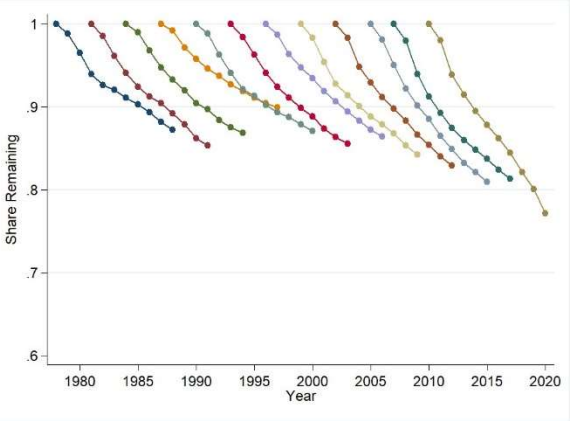
Return Migration by Arrival Cohort

Share of arrival cohort remaining

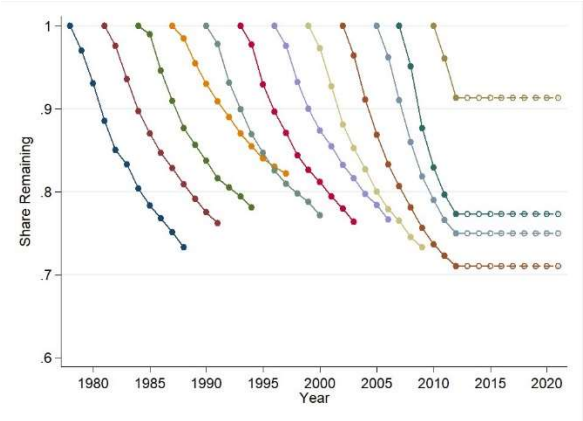
(a) Missing Earnings (Men)



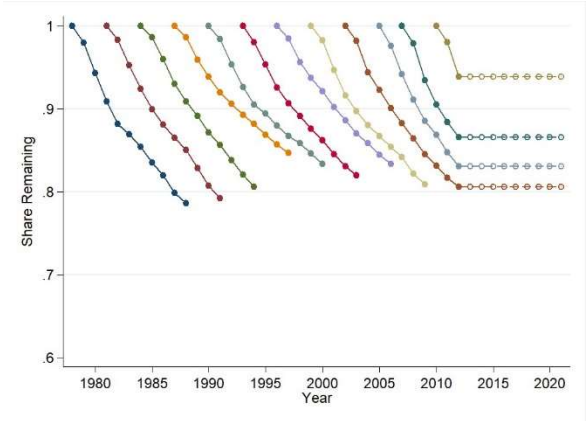
(b) Missing Earnings (Women)



(c) Ten Consecutive Years of Missing Earnings (Men)



d) Ten consecutive Years of Missing Earnings (Women)



Data source: Social Security Administration Continuous Work History Sample.

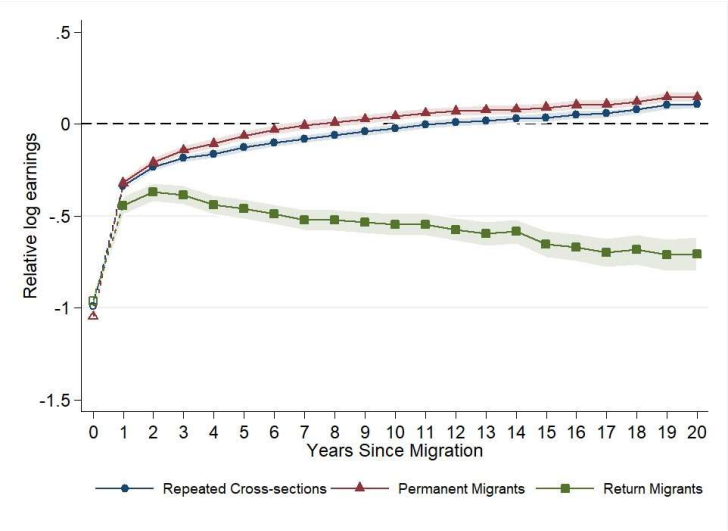
This figure depicts the shares of immigrants remaining from the same arrival cohorts over a 10 year period after arrival. Arrival cohorts are shown for 1978, 1981, 1984, 1987, 1990, 1993, 1996, 1999, 2002, 2005, 2007, and 2010. Outmigrants in Panels A and B are defined as individuals who have missing earnings in at least one year and for all subsequent years thereafter. Out-migrants in Panels C and D are defined as those who have ten years of consecutive missing earnings.

Figure 3. [Return to Text]

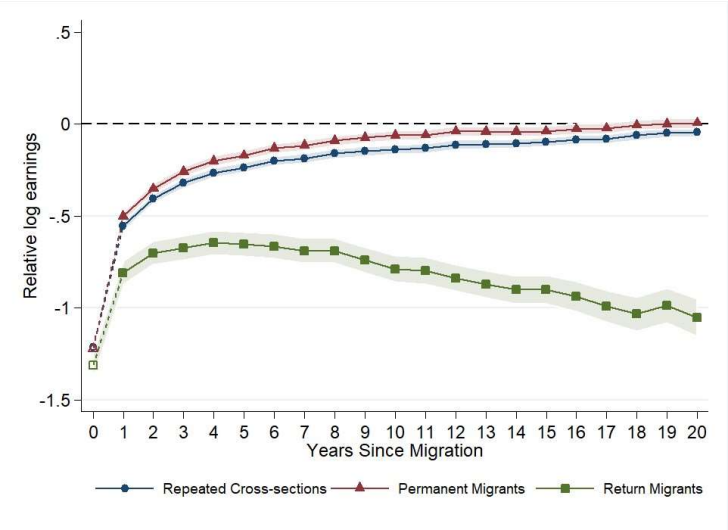
Long-run Earnings Assimilation

Relative log earnings

(a) Men



(b) Women



Data source: Social Security Administration Continuous Work History Sample.

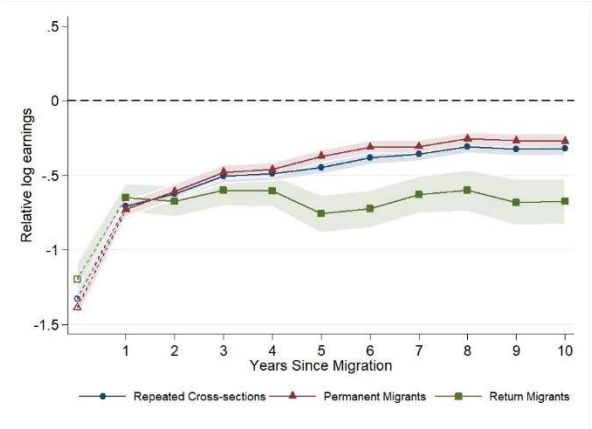
The top line in each figure is the Permanent Migrants. The middle line is the Repeated Cross-Section. The bottom line is the Return Migrants. This figure depicts the earnings assimilation of immigrants over a 20 year horizon. Assimilation estimates are obtained from a regression of log earnings on years since arrival indicators for years 1-20, with native workers as the omitted group, cohort, year, and age fixed effects, pooling all arrival cohorts 1981-2010. Return migrants are defined as individuals who have at least one year of missing earnings and in all subsequent years in the data. Permanent migrants are those who have arrived in the US and do not have missing earnings permanently in the data. Shaded regions indicate 95% confidence intervals.

Figure 4. [Return to Text]

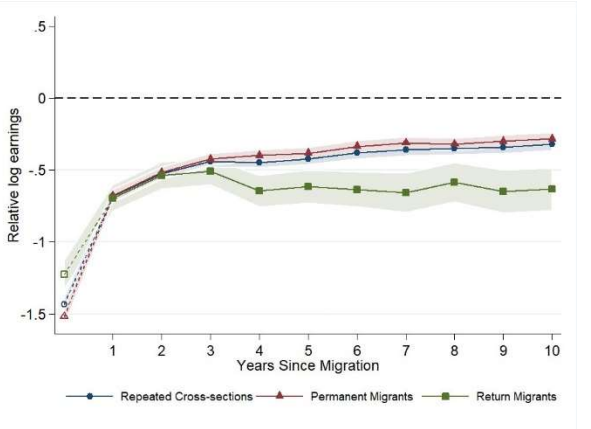
Earnings Assimilation by Cohort (Men)

Relative log earnings

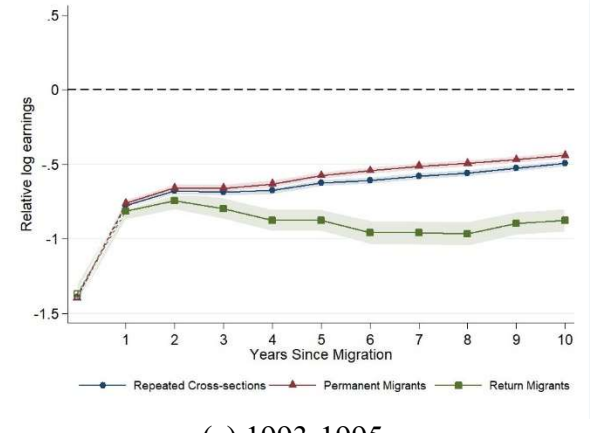
(a) 1981-1983



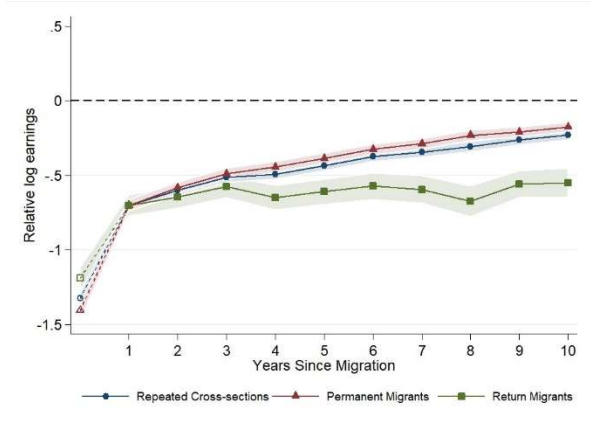
(b) 1984-1986



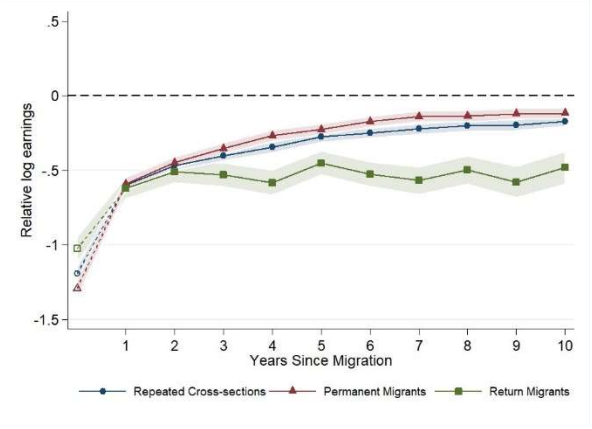
(c) 1987-1989



(d) 1990-1992



(e) 1993-1995



(f) 1996-1998

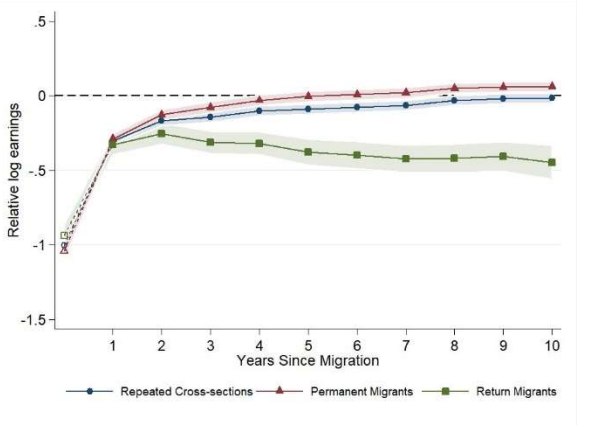
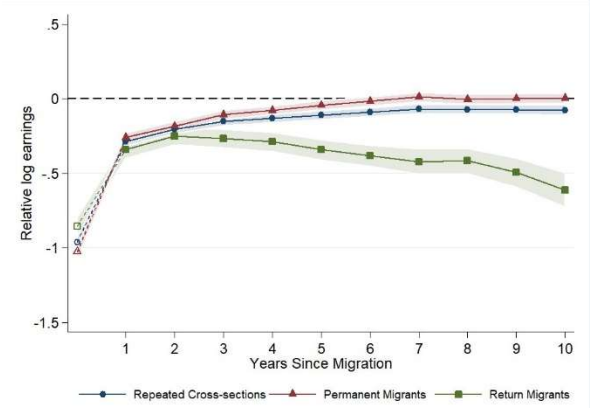


Figure 4. Continued [Return to Text]

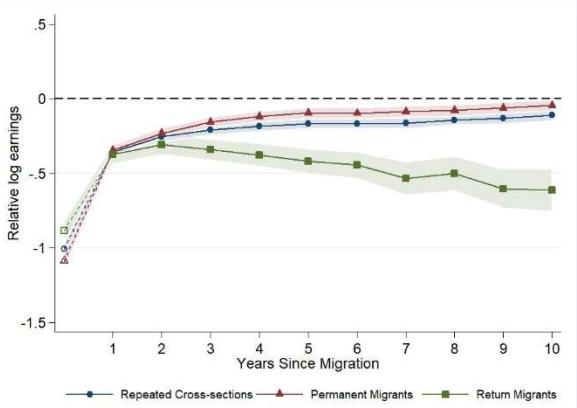
Earnings Assimilation by Cohort (Men)

Relative log earnings

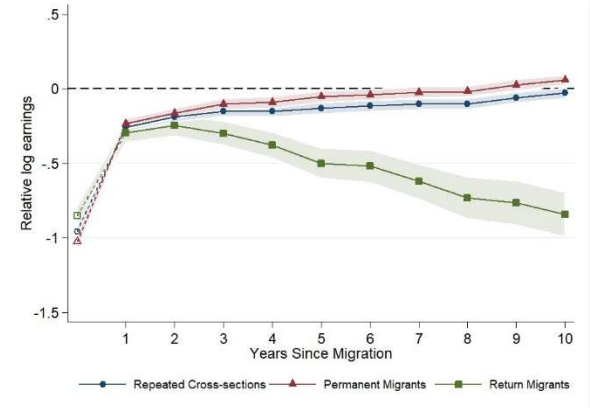
(g) 1999-2001



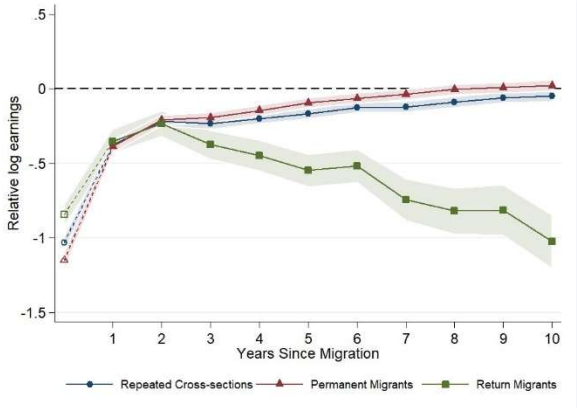
(h) 2002-2004



(i) 2005-2007



(j) 2008-2010



Data source: Social Security Administration Continuous Work History Sample.

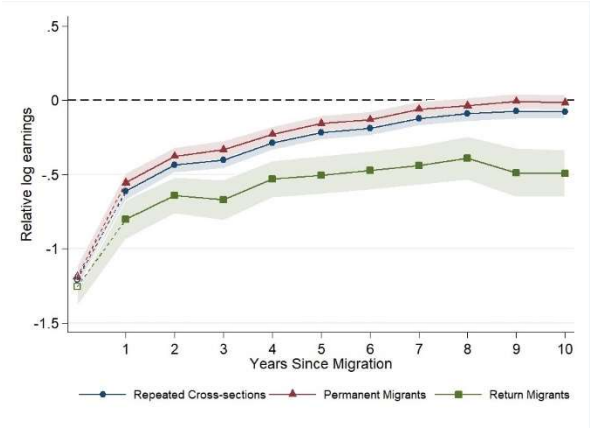
The top line in each figure is the Permanent Migrants. The middle line is the Repeated Cross-Section. The bottom line is the Return Migrants. This figure depicts earnings assimilation by arrival cohort. Return migrants are defined as individuals who have at least one year of missing earnings and in all subsequent years in the data set. Permanent migrants are those who have arrived in the US and do not have missing earnings permanently in the data. The cross-section estimates treat the panel as if it were a sample of repeated cross-sections. Each arrival cohort has pooled three years of data; for the 1983 arrival cohort this includes years 1981, 1982 and 1983 and so forth for all subsequent three year pooled cohorts. Shaded areas indicate 95% confidence intervals.

Figure 5. [Return to Text]

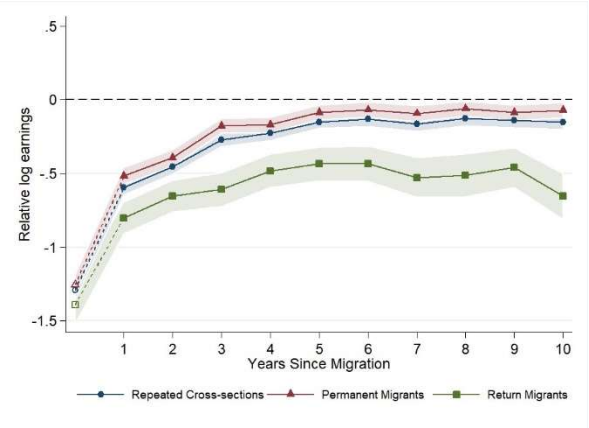
Earnings Assimilation by Cohort (Women)

Relative log earnings

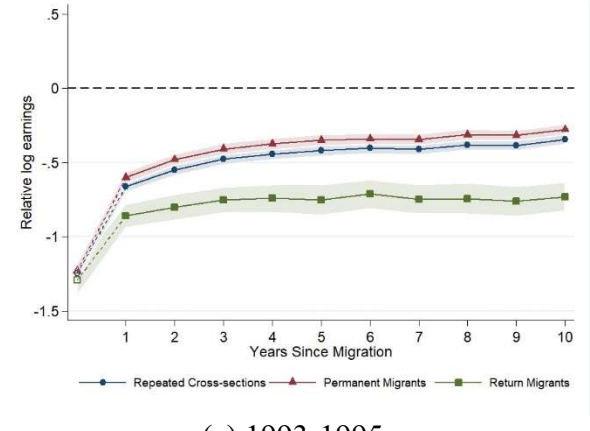
(a) 1981-1983



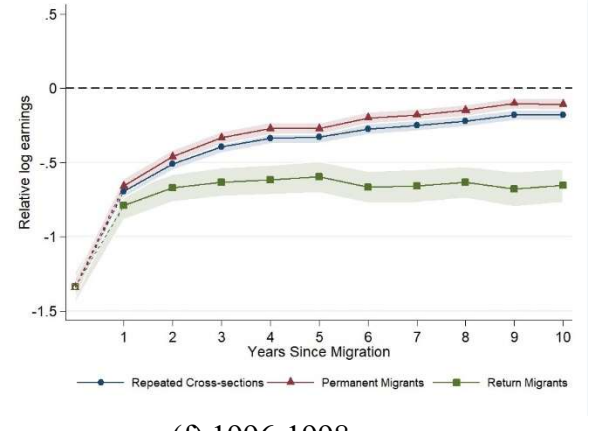
(b) 1984-1986



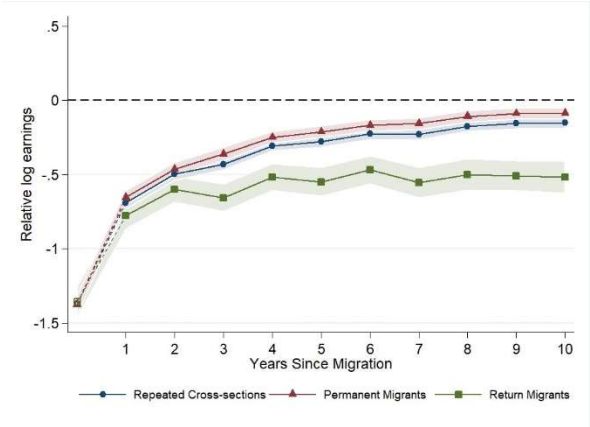
(c) 1987-1989



(d) 1990-1992



(e) 1993-1995



(f) 1996-1998

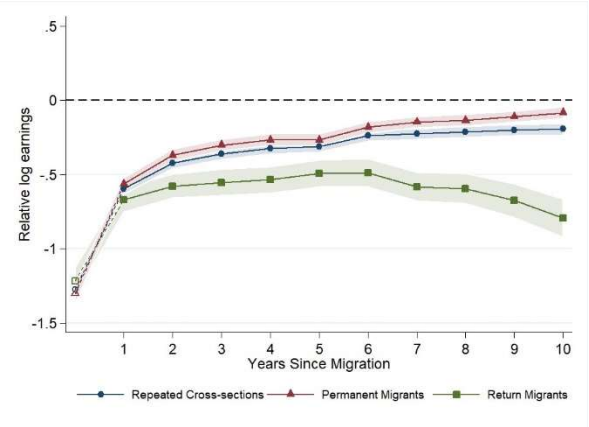
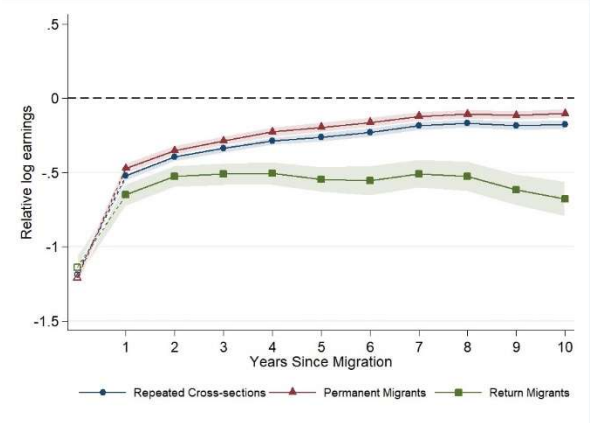


Figure 5. Continued [Return to Text]

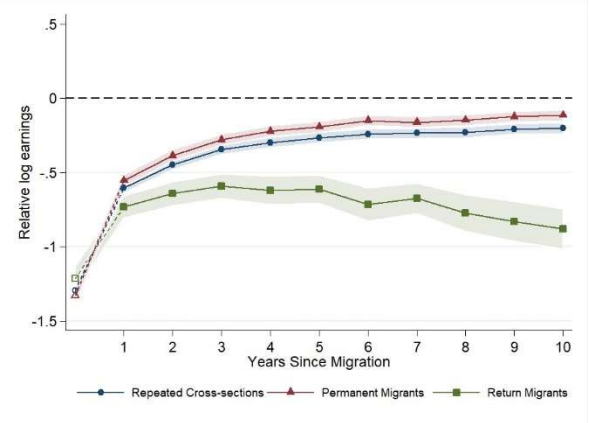
Earnings Assimilation by Cohort (Women)

Relative log earnings

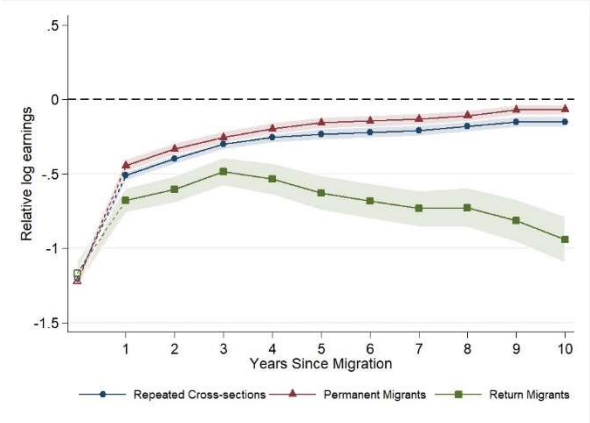
(g) 1999-2001



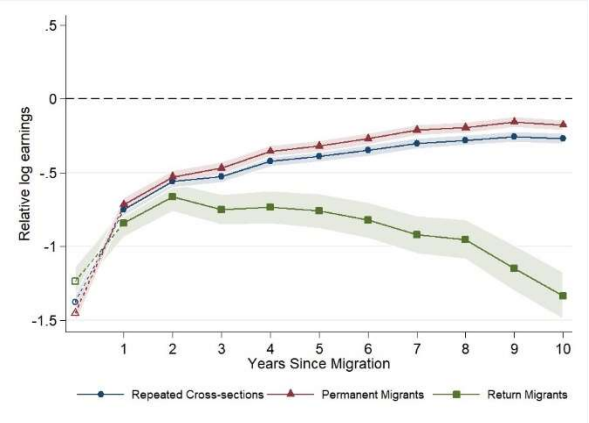
(h) 2002-2004



(j) 2005-2007



(j) 2008-2010



Data source: Social Security Administration Continuous Work History Sample.

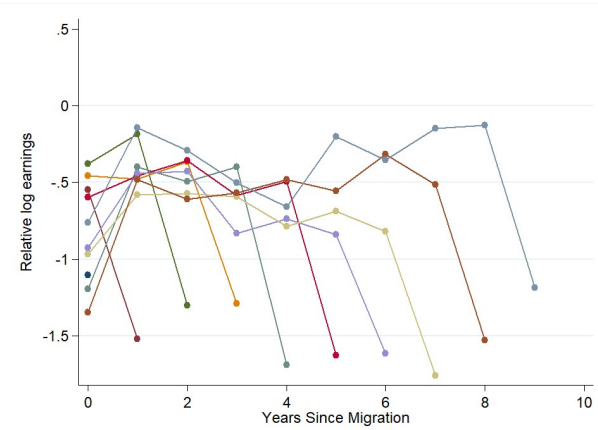
The top line in each figure is the Permanent Migrants. The middle line is the Repeated Cross-Section. The bottom line is the Return Migrants. This figure depicts earnings assimilation by arrival cohort. Return migrants are defined as individuals who have at least one year of missing earnings and in all subsequent years in the data set. Permanent migrants are those who have arrived in the US and do not have missing earnings permanently in the data. The cross-section estimates treat the panel as if it were a sample of repeated cross-sections. Each arrival cohort has pooled three years of data; for the 1983 arrival cohort this includes years 1981, 1982 and 1983 and so forth for all subsequent three year pooled cohorts. Shaded areas indicate 95% confidence intervals.

Figure 6. [Return to Text]

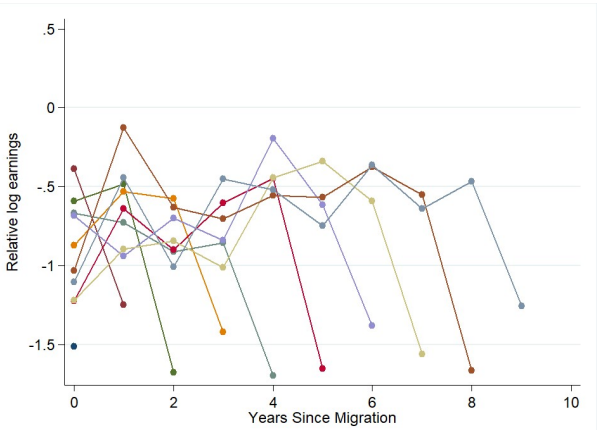
Return Migrants Earnings Assimilation by Duration of Stay

Relative log earnings

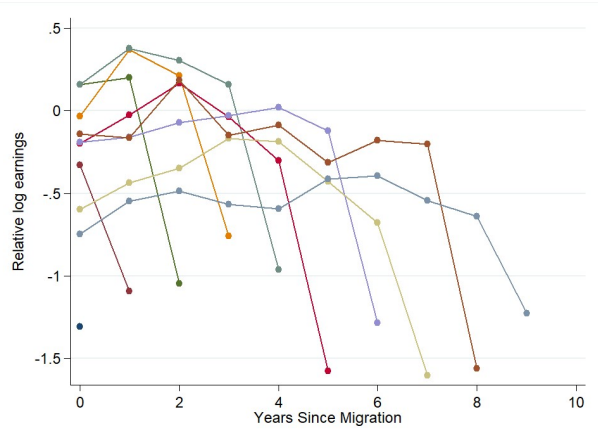
(a) 1981-1983 Arrivals (Men)



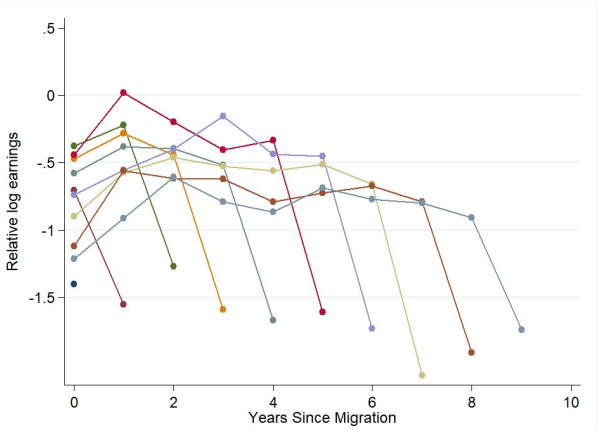
(b) 1981-1983 Arrivals (Women)



(c) 2008-2010 Arrivals (Men)



(d) 2008-2010 Arrivals (Women)



Data source: Social Security Administration Continuous Work History Sample.

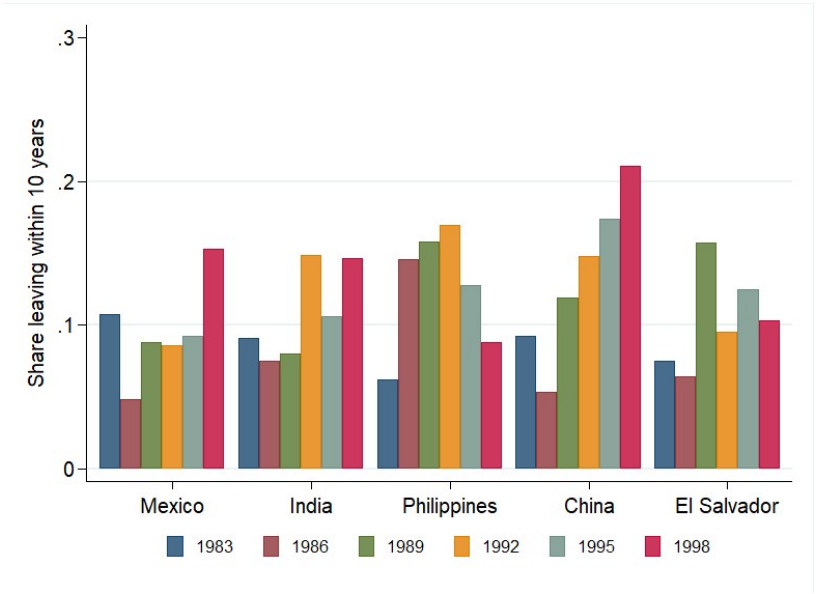
This figure depicts earnings assimilation for return migrants by duration of stay. For example, the lines that end at 1 year since migration represents the earnings assimilation for return migrants who leave after 1 year. Return migrants are defined as individuals who have at least one year of missing earnings and in all subsequent years in the data set. Duration of stay is defined as the number of years an immigrant is in the country before their spell of missing earnings. Panels A and B depict earnings trajectories for male and female return migrants arriving in 1981-1983. Panels C and D depict earnings trajectories for male and female return migrants arriving in 2008-2010.

Figure 7. [Return to Text]

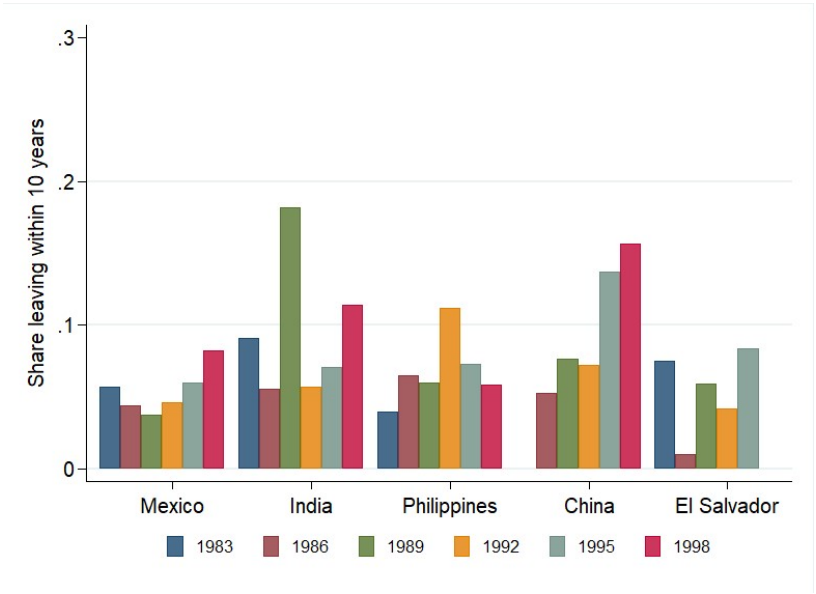
Return Migration by Country of Origin

Share leaving within 10 years

(a) Men



(b) Women



Data source: Social Security Administration Continuous Work History Sample.

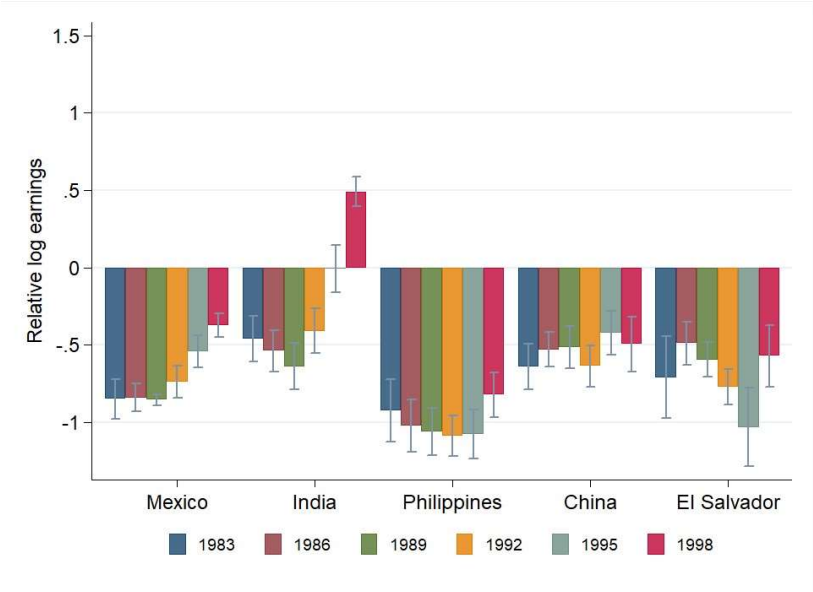
This figure depicts rates of return migration for immigrants by country of origin, arrival cohort, and gender. Share leaving indicates the fraction of immigrants who we estimate to have left the country within 10 years after arrival. Return migrants are defined as individuals who have at least one year of missing earnings and in all subsequent years in the data set. Panel A depicts results for men; Panel B depicts results for women.

Figure 8. [Return to Text]

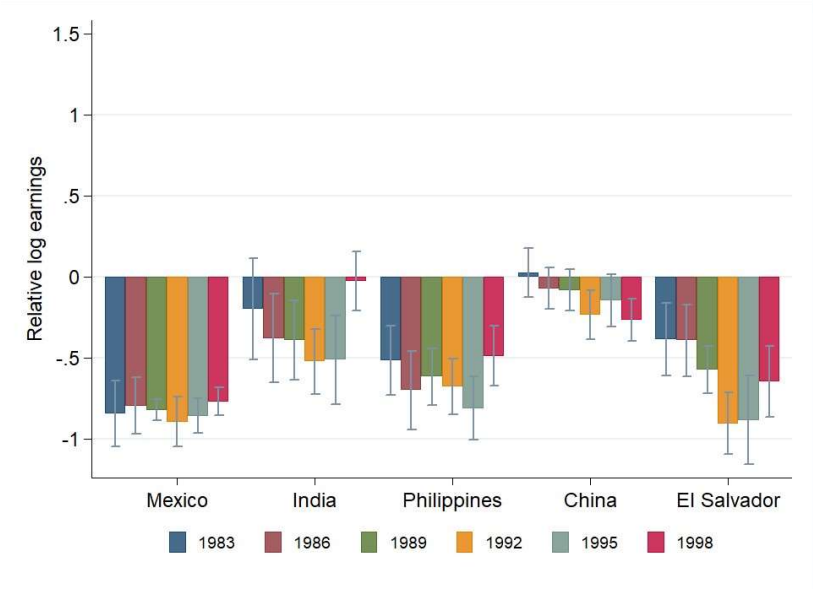
Permanent Migrant Entry Earnings Differential by Country of Origin

Relative log earnings

(a) Men



(b) Women



Data source: Social Security Administration Continuous Work History Sample.

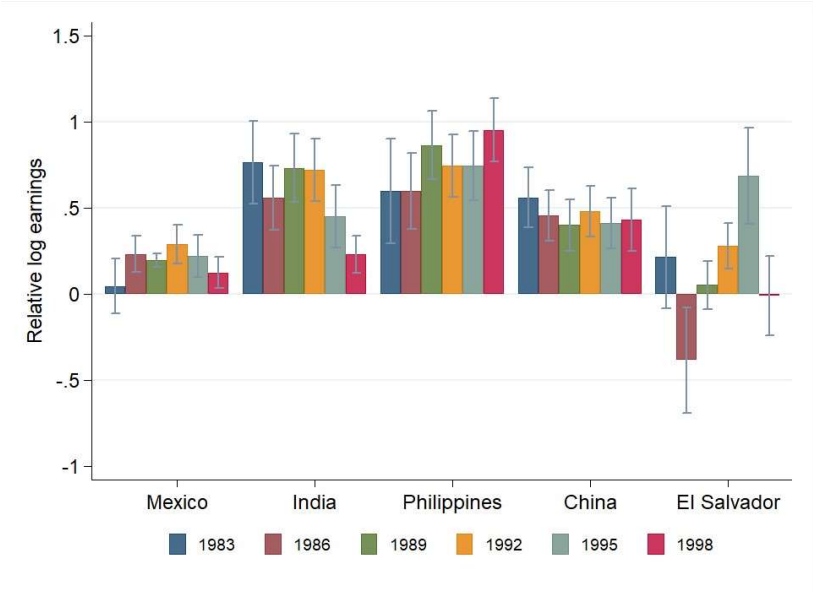
This figure depicts immigrant relative entry earnings by country of origin, arrival cohort, and gender. Panel A depicts results for men; Panel B depicts results for women. Entry earnings are measured in the first year after arrival to avoid partial year earnings. Whiskers depict 95% confidence intervals.

Figure 9. [Return to Text]

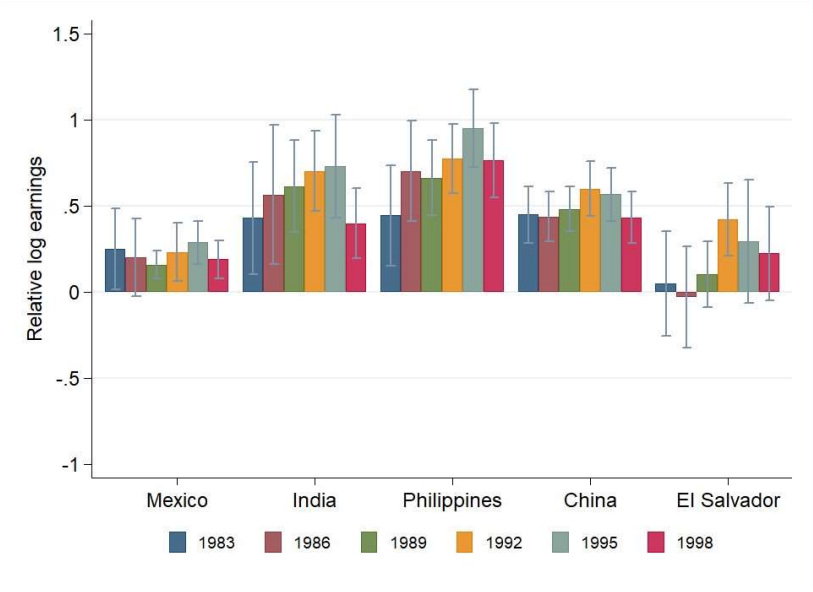
Permanent Migrant Earnings Growth by Country of Origin

Relative log earnings

(a) Men



(b) Women



Data source: Social Security Administration Continuous Work History Sample.

This figure depicts the relative earnings growth of immigrants over 10 years by country of origin, arrival cohort, and gender. Panel A depicts results for men; Panel B depicts results for women. Whiskers depict 95% confidence intervals. Permanent migrant earnings growth is the relative log earnings growth over 10 years for immigrants who do not return migrate.

Tables

Table 1. [Return to Text]

Descriptive Statistics

	1981	1990	2000	2010	2021
			Panel A: Immigrants		
Age	41.1	40.0	41.3	42.7	42.6
Average Annual Earnings	22,500	23,000	29,800	29,200	40,100
Fraction Female	46.20%	44.70%	45.74%	48.76%	49.58%
Country Shares:					
Mexico	17.19%	21.87%	17.64%	13.62%	15.24%
India	2.92%	3.51%	4.58%	7.80%	11.27%
China	1.77%	2.96%	4.74%	6.18%	7.17%
Philippines	5.16%	5.79%	4.97%	4.41%	3.57%
El Salvador	1.01%	2.58%	3.06%	2.88%	2.36%
N	45,100	67,400	91,900	101,100	107,300
			Panel B: Native-Born People		
Age	43.3	42.5	43.8	45.3	45.1
Average Annual Earnings	30,600	34,600	41,400	37,800	44,800
Fraction Female	48.93%	48.93%	48.87%	48.89%	48.95%
N	1,153,900	1,286,100	1,382,500	1,480,600	1,507,600

Data source: Social Security Administration Continuous Work History Sample.

This table reports a one percent sample of the cross-sectional summary statistics for the CWHS. Country shares show the percentage of immigrants who are born in each of the top five sending countries in our sample. Annual earnings are individual Box 1 W-2 earnings reported in 2021 dollars, deflated using the CPI-U

Annual earnings and observations are rounded to the nearest hundred.

Table 2. [Return to Text]

Earnings Assimilation Estimates by Arrival Cohort (Men)

Relative log earnings

	1981-1983	1984-1986	1987-1989	1990-1992	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010
Panel A: Relative log entry earnings										
Repeated cross-sections	-0.706	-0.683	-0.774	-0.701	-0.600	-0.302	-0.288	-0.355	-0.256	-0.375
	(0.0223)	(0.0203)	(0.0128)	(0.0176)	(0.0191)	(0.0170)	(0.0144)	(0.0163)	(0.0163)	(0.0188)
Permanent migrants	-0.727	-0.679	-0.760	-0.700	-0.590	-0.289	-0.259	-0.345	-0.235	-0.385
	(0.0246)	(0.0216)	(0.0137)	(0.0193)	(0.0216)	(0.0189)	(0.0158)	(0.0182)	(0.0184)	(0.0200)
Return migrants	-0.649	-0.694	-0.811	-0.703	-0.619	-0.328	-0.340	-0.372	-0.296	-0.351
	(0.0488)	(0.0466)	(0.0299)	(0.0353)	(0.0370)	(0.0338)	(0.0288)	(0.0318)	(0.0317)	(0.0408)
Panel B: Relative 10th year earnings										
Repeated cross-sections	-0.319	-0.320	-0.494	-0.230	-0.170	-0.0153	-0.0769	-0.111	-0.0288	-0.0482
	(0.0241)	(0.0208)	(0.0120)	(0.0165)	(0.0181)	(0.0175)	(0.0171)	(0.0187)	(0.0178)	(0.0188)
Permanent migrants	-0.272	-0.283	-0.439	-0.174	-0.116	0.0608	0.00468	-0.0443	0.0595	0.0216
	(0.0251)	(0.0213)	(0.0122)	(0.0172)	(0.0188)	(0.0176)	(0.0172)	(0.0185)	(0.0173)	(0.0185)
Return migrants	-0.673	-0.633	-0.875	-0.550	-0.481	-0.446	-0.610	-0.611	-0.841	-1.023
	(0.0771)	(0.0747)	(0.0402)	(0.0501)	(0.0552)	(0.0574)	(0.0583)	(0.0738)	(0.0759)	(0.0916)
Panel C: Relative log earnings growth over 10 years										
Repeated cross-sections	0.387	0.363	0.279	0.471	0.43	0.287	0.211	0.244	0.228	0.327
	(0.0297)	(0.0264)	(0.0155)	(0.0216)	(0.0233)	(0.0209)	(0.0193)	(0.0217)	(0.0204)	(0.0228)
Permanent migrants	0.455	0.396	0.322	0.525	0.473	0.35	0.264	0.301	0.295	0.407
	(0.0311)	(0.0271)	(0.0159)	(0.0223)	(0.0244)	(0.0207)	(0.0189)	(0.0213)	(0.0196)	(0.0219)
Return migrants	-0.024	0.061	-0.064	0.153	0.138	-0.118	-0.27	-0.24	-0.544	-0.672
	(0.0863)	(0.0839)	(0.0463)	(0.0582)	(0.0633)	(0.0634)	(0.0618)	(0.0772)	(0.0799)	(0.0976)
Observations:										
Repeated Cross-sections	21,439,300	21,447,500	21,544,400	21,476,400	21,468,000	21,473,200	21,499,800	21,464,800	21,455,000	21,440,600
Permanent migrants	21,431,100	21,438,800	21,521,800	21,460,300	21,452,700	21,457,400	21,479,900	21,450,400	21,442,900	21,431,100
Return migrants	21,392,000	21,392,500	21,406,500	21,399,900	21,399,100	21,399,600	21,403,700	21,398,200	21,395,900	21,393,400

Data source: Social Security Administration Continuous Work History Sample.

This table reports earnings assimilation estimates for men by arrival cohort. Panel A reports immigrant earnings relative to native-born people upon arrival; Panel B reports earnings relative to native-born people in their 10th year after arrival; Panel C relative earnings growth between arrival and the 10th year (difference between Panels A and B). Entry earnings are measured in the first year after arrival to avoid partial year earnings. Return migrants are defined as individuals who have at least one year of missing earnings and in all subsequent years in the data set. Permanent migrants are those who have arrived in the US and do not have missing earnings permanently in the data. The cross-section estimates treat the panel as if it were a sample of repeated cross-sections. Standard errors are in parentheses. Observations are rounded to the nearest hundred.

Table 3. [Return to Text]

Earnings Assimilation Estimates by Arrival Cohort (Women)

Relative log earnings

	1981-1983	1984-1986	1987-1989	1990-1992	1993-1995	1996-1998	1999-2001	2002-2004	2005-2007	2008-2010
Panel A: Relative log entry earnings										
Repeated cross-sections	-0.613	-0.594	-0.662	-0.692	-0.688	-0.594	-0.522	-0.602	-0.508	-0.750
	(0.0298)	(0.0265)	(0.0180)	(0.0227)	(0.0220)	(0.0197)	(0.0174)	(0.0181)	(0.0192)	(0.0225)
Permanent migrants	-0.554	-0.518	-0.601	-0.658	-0.654	-0.563	-0.471	-0.553	-0.444	-0.715
	(0.0326)	(0.0298)	(0.0200)	(0.0255)	(0.0246)	(0.0219)	(0.0188)	(0.0206)	(0.0210)	(0.0245)
Return migrants	-0.802	-0.801	-0.857	-0.788	-0.776	-0.671	-0.650	-0.731	-0.676	-0.839
	(0.0685)	(0.0552)	(0.0400)	(0.0478)	(0.0462)	(0.0415)	(0.0387)	(0.0370)	(0.0419)	(0.0496)
Panel B: Relative 10th year earnings										
Repeated cross-sections	-0.0754	-0.153	-0.344	-0.179	-0.150	-0.193	-0.175	-0.200	-0.151	-0.267
	(0.0258)	(0.0253)	(0.0167)	(0.0186)	(0.0187)	(0.0196)	(0.0172)	(0.0184)	(0.0184)	(0.0192)
Permanent migrants	-0.0151	-0.0708	-0.277	-0.108	-0.0851	-0.0833	-0.102	-0.113	-0.0668	-0.176
	(0.0267)	(0.0259)	(0.0174)	(0.0192)	(0.0195)	(0.0192)	(0.0173)	(0.0183)	(0.0180)	(0.0189)
Return migrants	-0.492	-0.653	-0.729	-0.654	-0.518	-0.793	-0.676	-0.880	-0.940	-1.333
	(0.0820)	(0.0793)	(0.0498)	(0.0574)	(0.0547)	(0.0656)	(0.0611)	(0.0694)	(0.0792)	(0.0823)
Panel C: Relative log earnings growth over 10 years										
Repeated cross-sections	0.538	0.441	0.318	0.512	0.539	0.401	0.346	0.402	0.356	0.482
	(0.0362)	(0.0336)	(0.0224)	(0.0269)	(0.0264)	(0.0251)	(0.0219)	(0.0229)	(0.0232)	(0.0269)
Permanent migrants	0.539	0.447	0.323	0.55	0.569	0.48	0.369	0.44	0.377	0.539
	(0.0388)	(0.0362)	(0.0239)	(0.029)	(0.0284)	(0.0258)	(0.0222)	(0.0238)	(0.0233)	(0.0274)
Return migrants	0.31	0.147	0.128	0.133	0.258	-0.122	-0.026	-0.149	-0.263	-0.494
	(0.0973)	(0.09)	(0.0608)	(0.0721)	(0.0682)	(0.0738)	(0.0693)	(0.0765)	(0.0858)	(0.0945)
Observations:										
Repeated Cross-sections	19,608,600	19,614,200	19,668,100	19,645,400	19,646,700	19,647,200	19,667,000	19,653,200	19,634,500	19,617,600
Permanent migrants	19,602,700	19,607,200	19,653,300	19,634,500	19,634,200	19,634,500	19,652,800	19,641,600	19,625,300	19,610,000
Return migrants	19,572,400	19,573,400	19,581,300	19,577,400	19,579,000	19,579,200	19,580,600	19,578,000	19,575,800	19,574,100

Data source: Social Security Administration Continuous Work History Sample.

This table reports earnings assimilation for women by arrival cohort. Panel A reports immigrant earnings relative to native-born people upon arrival; Panel B reports earnings relative to native-born people in the 10th year after arrival; Panel C reports relative earnings growth between arrival and the 10th year (difference between Panels A and B). Entry earnings are measured in the first year after arrival to avoid partial year earnings. We treat our panel as repeated cross-sections to obtain the repeated cross-section estimates. Return migrants are defined as individuals who have at least one year of missing earnings and in all subsequent years in the data set. Permanent migrants are those who have arrived in the US and do not have missing earnings permanently in the data. Standard errors are in parentheses. Observations are rounded to the nearest hundred.

Table 4. [Return to Text]

Differences in Immigrant Earnings Assimilation Estimates for Panel or Cross-Section Data due to Changes in Immigrant Arrival Cohorts and Selected Return Migration

	Positive Selection of Return Migrants	**Negative Selection of Return Migrants**
Decreasing Immigrant Arrival Cohort Quality	Ambiguous	Cross > Panel (Abramitzky et al, 2014)
Increasing Immigrant Arrival Cohort Quality	Cross < Panel (Rho and Sanders, 2021)	Ambiguous (Our Study)

This table shows how changing immigrant arrival cohort "quality" and selection of return migrants drive differences between the number of years until immigrants assimilate to native-born people's earnings using cross-section versus panel data.

Table 5. [Return to Text]

Earnings Growth Rate by Years Since Migration for Cross-Section and Panel Data by Gender

	Men		Women	
	(1)	(2)	(3)	(4)
	Cross-Section	Permanent Migrant	Cross-Section	Permanent Migrant
Years in the U.S.:				
6-10	0.0402	0.150	0.0582	0.121
	(0.00374)	(0.00393)	(0.00414)	(0.00450)
11-15	0.110	0.257	0.149	0.242
	(0.00435)	(0.00440)	(0.00457)	(0.00493)
16-20	0.147	0.290	0.168	0.270
	(0.00479)	(0.00498)	(0.00492)	(0.00532)
Constant	10.59	10.59	10.09	10.09
	(0.000850)	(0.000853)	(0.000874)	(0.000875)
Observations	22,568,900	22,311,900	20,562,600	20,354,400
R-Squared	0.043	0.043	0.026	0.025

Data source: Social Security Administration Continuous Work History Sample.

Robust standard errors in parentheses. Omitted category is less than 6 years in the U.S. Observations rounded to the nearest hundred.

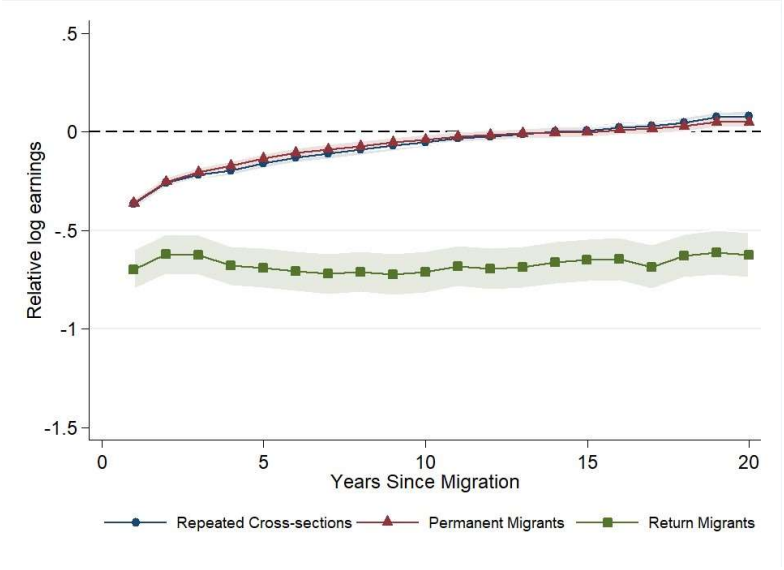
Appendix

Figure A1. [Return to Text]

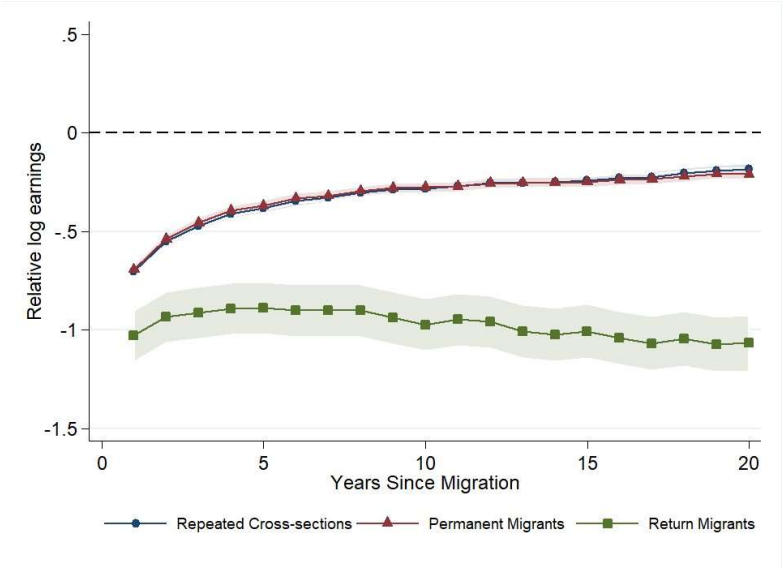
Long-run Earnings Assimilation (Return Migrants Defined as Those Having Ten Consecutive Years of Missing Earnings)

Relative log earnings

(a) Men



(c) Women



Data source: Social Security Administration Continuous Work History Sample.

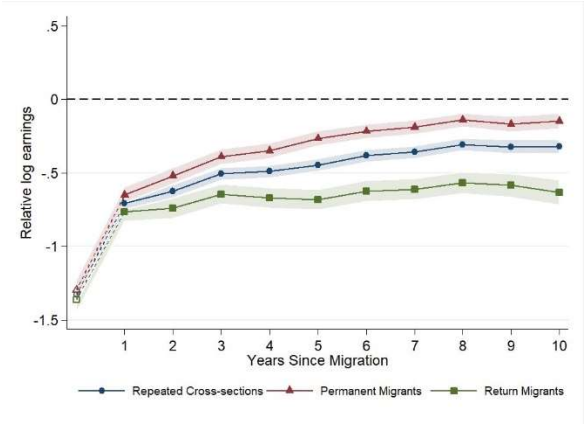
This figure depicts the earnings assimilation of immigrants over a 20 year horizon. Assimilation estimates are obtained from a regression of log earnings on years since arrival indicators for years 1 through 20, with native-born workers as the omitted group, and age fixed effects, pooling all arrival cohorts. Shaded regions indicate 95% confidence intervals.

Figure A2. [Return to Text]

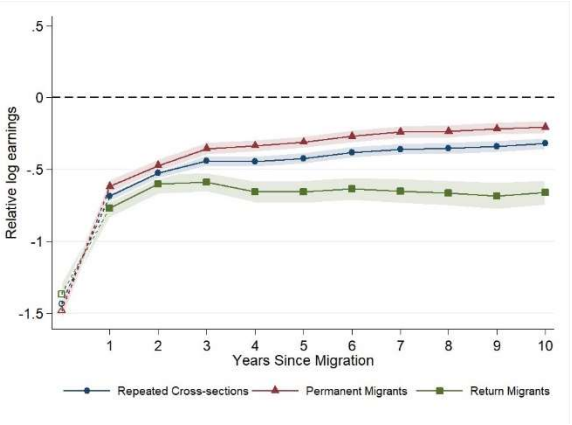
Earnings Assimilation (Return Migrants Defined as Those Having Ten Consecutive Years of Missing Earnings) by Arrival Cohort (Men)

Relative log earnings

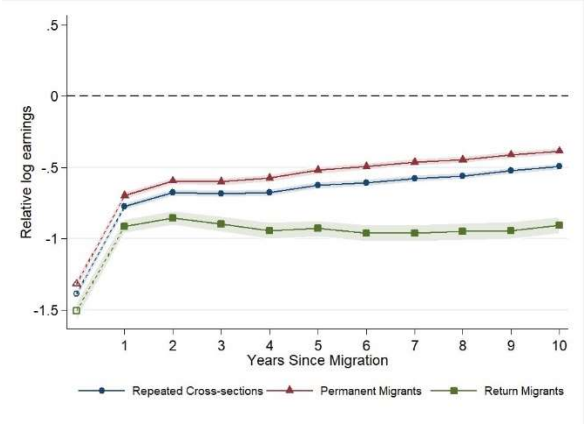
(a) 1981-1983



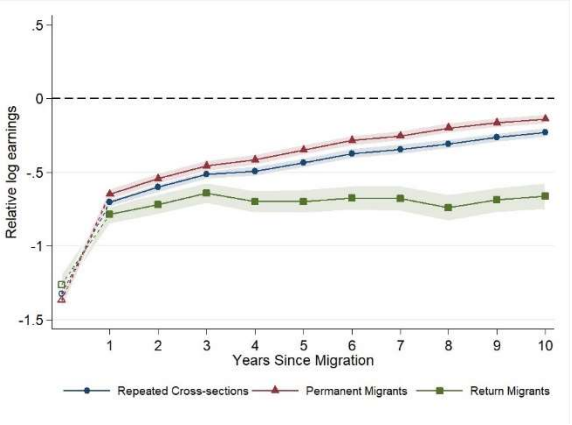
(b) 1984-1986



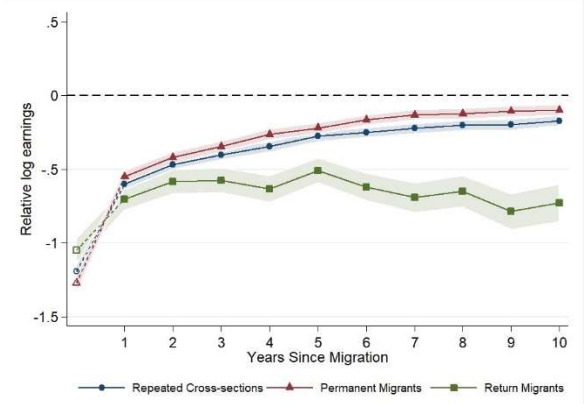
(c) 1987-1989



(d) 1990-1992



(e) 1993-1995



(f) 1996-1998

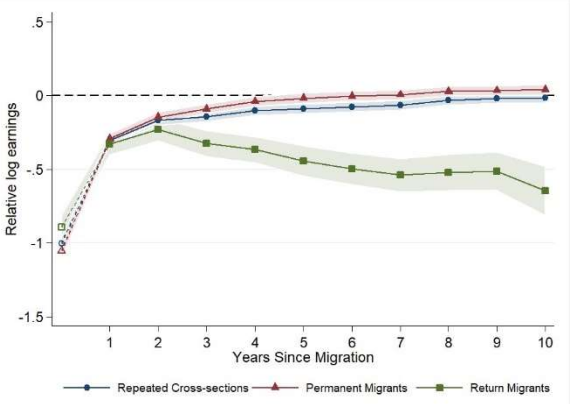
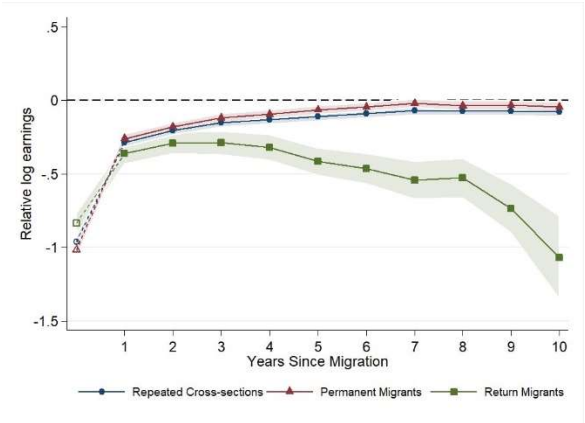


Figure A2. Continued [Return to Text]

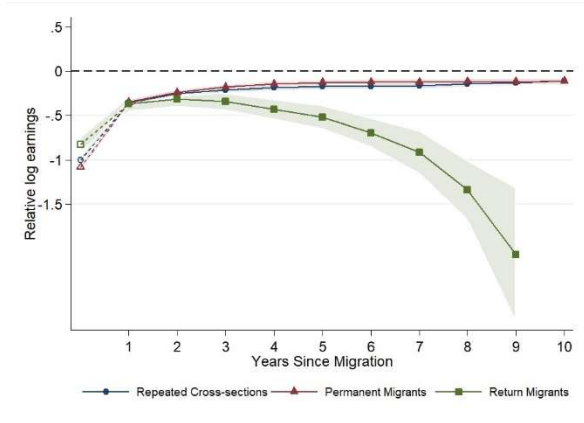
Earnings Assimilation (Return Migrants Defined as Those Having Ten Consecutive Years of Missing Earnings) by Arrival Cohort (Men)

Relative log earnings

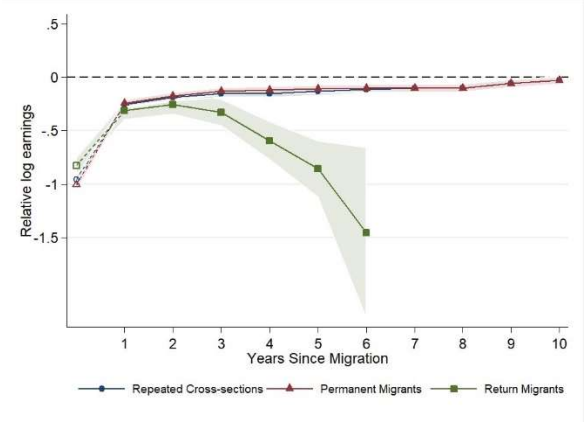
(g) 1999-2001



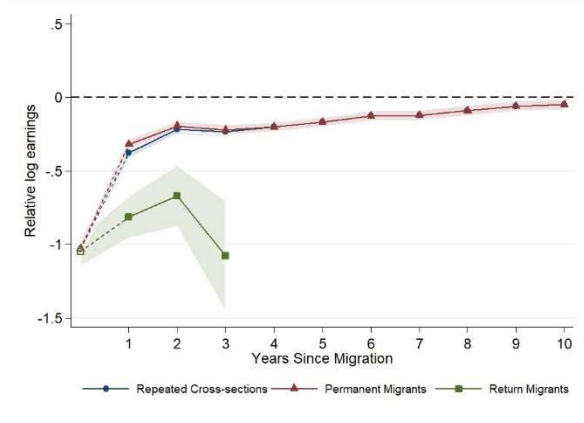
(h) 2002-2004



(i) 2005-2007



(j) 2008-2010



Data source: Social Security Administration Continuous Work History Sample.

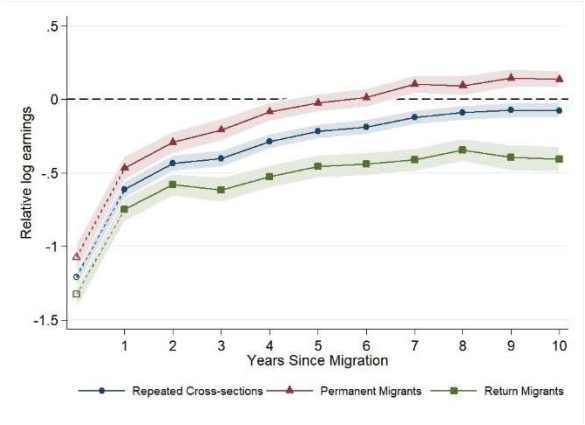
This figure depicts earnings assimilation by arrival cohort and immigrant sample. Return migrants are defined as foreign-born individuals who have missing income that persists for 10 consecutive years (omitting individuals whose place of birth is recorded in the US). Permanent migrants are the complement of return migrants in the set of immigrants. The cross-section estimates treat the panel as if it were a sample of repeated cross-sections, pooling permanent and return migrant samples. The immigrant sample is restricted to those who are age 25-45 upon arrival. Estimates come from a regressions of log earnings on years since migration indicators and age dummies, estimated separately by cohort and immigrant sample. Native-born people form the omitted group for the vector of years since migration indicators; the figure plots the estimated years since migration effects. Shaded areas indicate 95% confidence intervals.

Figure A3. [Return to Text]

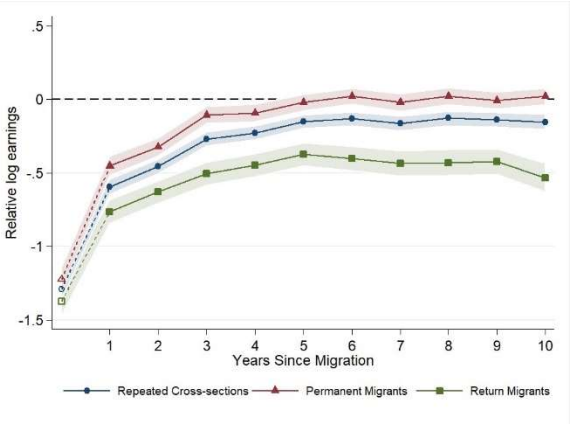
Earnings Assimilation (Return Migrants Defined as Those Having Ten Consecutive Years of Missing Earnings) by Arrival Cohort (Women)

Relative log earnings

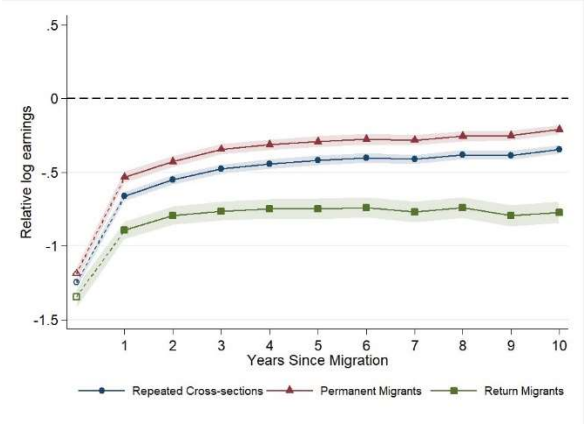
(a) 1981-1983



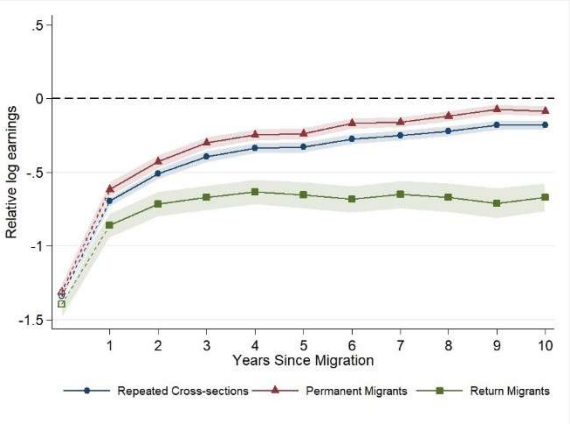
(b) 1984-1986



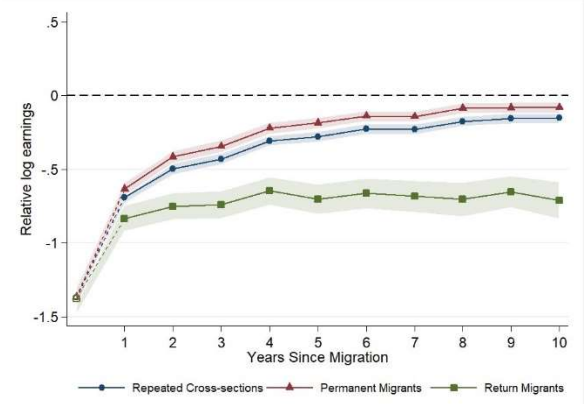
(c) 1987-1989



(d) 1990-1992



(e) 1993-1995



(f) 1996-1998

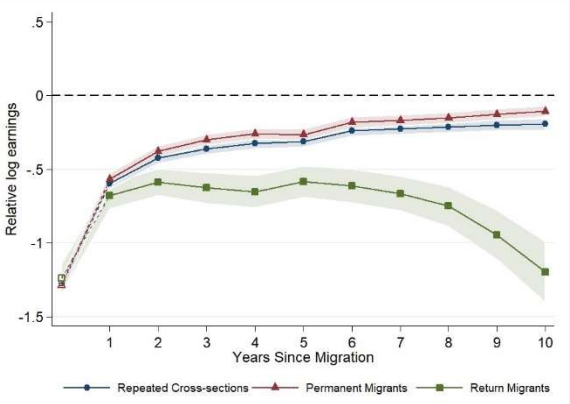
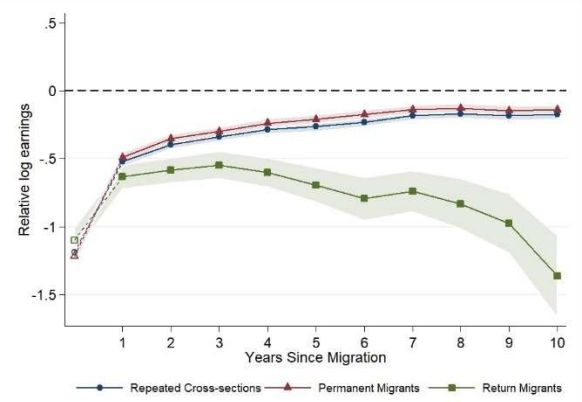


Figure A3. Continued [Return to Text]

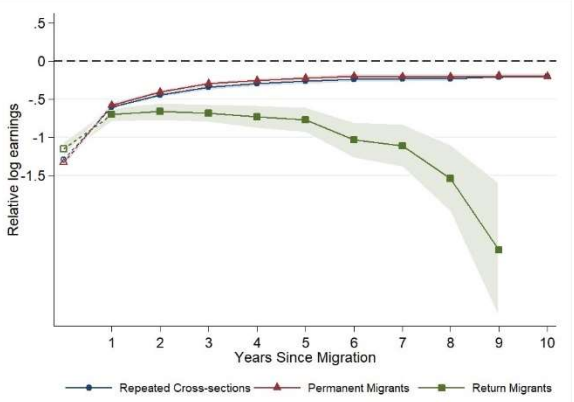
Earnings Assimilation (Return Migrants Defined as Those Having Ten Consecutive Years of Missing Earnings) by Arrival Cohort (Women)

Relative log earnings

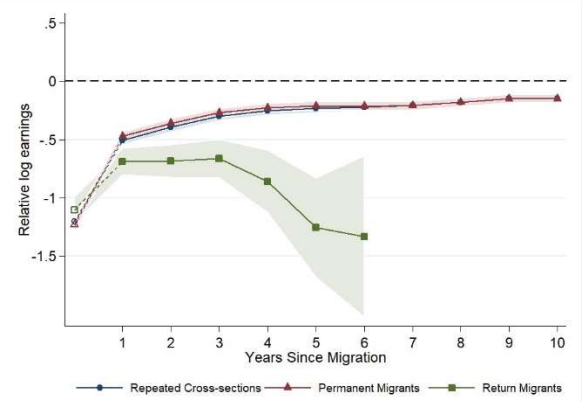
(g) 1999-2001



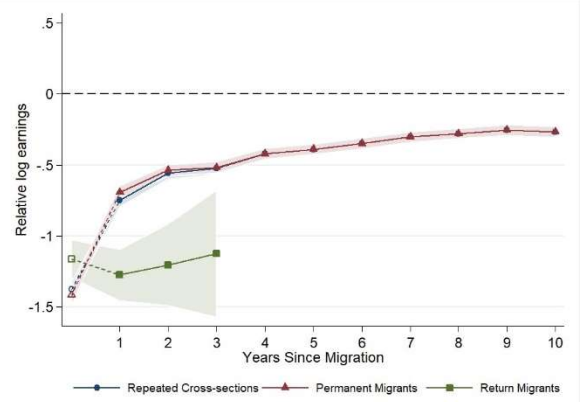
(h) 2002-2004



(j) 2005-2007



(j) 2008-2010



Data source: Social Security Administration Continuous Work History Sample.

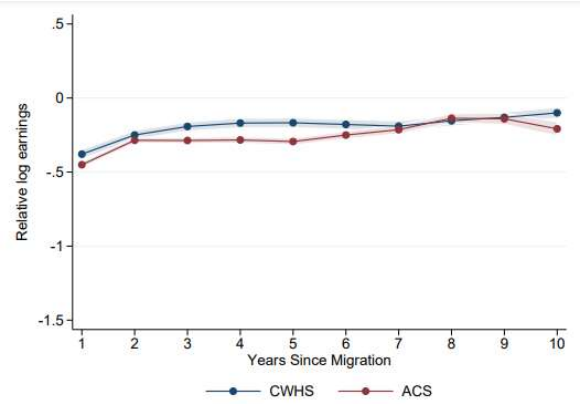
This figure depicts earnings assimilation by arrival cohort and immigrant sample. Return migrants are defined as foreign-born individuals who have missing income that persists for 10 consecutive years (omitting individuals whose place of birth is recorded in the US). Permanent migrants are the complement of return migrants in the set of immigrants. The cross-section estimates treat the panel as if it were a sample of repeated cross-sections, pooling permanent and return migrant samples. The immigrant sample is restricted to those who are age 25-45 upon arrival. Estimates come from a regressions of log earnings on years since migration indicators and age dummies, estimated separately by cohort and immigrant sample. Native-born people form the omitted group for the vector of years since migration indicators; the figure plots the estimated years since migration effects. Shaded areas indicate 95% confidence intervals.

Figure A4 [Return to Text]

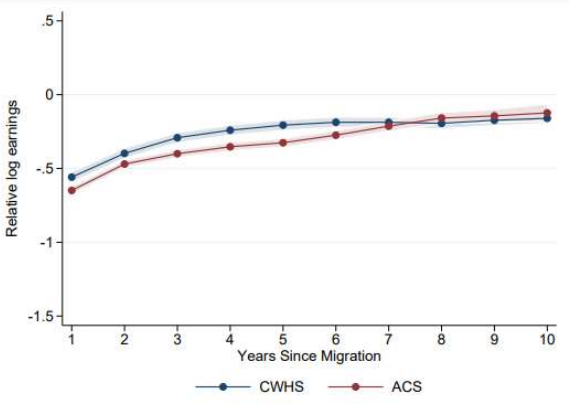
Earnings Assimilation in Repeated Cross-Sections: CWHS and ACS

Relative log earnings

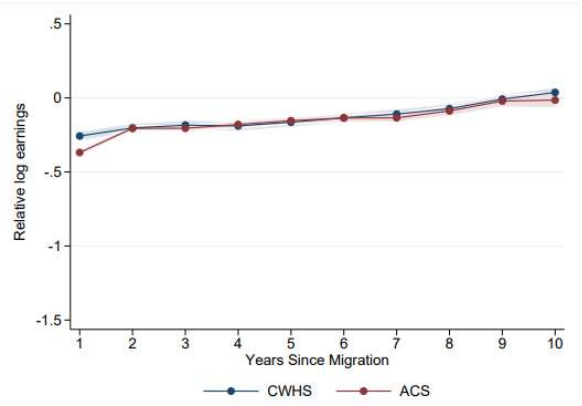
(b) 2002-2004 Arrivals (Men)



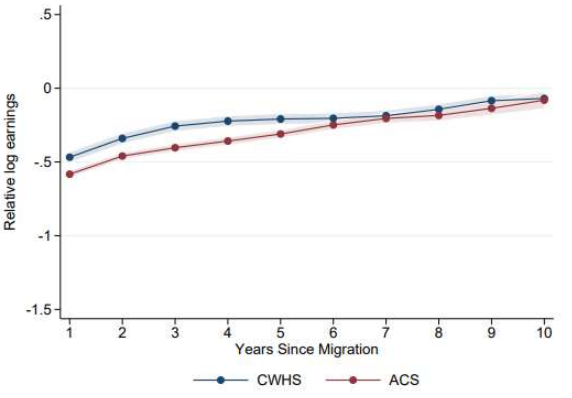
(b) 2002-2004 Arrivals (Women)



(c) 2005-2007 Arrivals (Men)



(d) 2005-2007 Arrivals (Women)



Data source: Social Security Administration Continuous Work History Sample, American Community Survey (ACS).

These figures depict the earnings assimilation of immigrants over a 10 year horizon using the American Community Survey (ACS) annual data (Ruggles et al., 2021) and the Continuous Work History Survey data treated as repeated cross-section data. Assimilation estimates are obtained from a regression of log earnings on years since arrival indicators for years 1 through 10, with native workers as the omitted group, and age fixed effects. Panels A and B report estimates for men and women for the immigrant cohort arriving from 2002-2004. Panels C and D report corresponding estimates for the cohort arriving from 2005-2007. Shaded regions indicate 95\% confidence intervals.