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ABSTRACT

Revisiting the Family Investment Model with Longitudinal Data: The Earnings Growth of Immigrant and U.S.-Born Women[*]

Historical, longitudinal data are used to track the earnings of cohorts of immigrant and U.S.-born women over time. The longitudinal data circumvent potential cohort biases that afflict cross-sectional analyses of immigrant earnings growth and biases due to immigrant emigration and other issues that affect synthetic cohort analyses. Their historical nature permits the analysis of numerous cohorts. The central result to emerge from the multi-cohort study inspires revisiting the Family Investment Model.

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Less attention has been paid to the earnings of immigrant women than immigrant men despite the prominent role women's earnings play in family income differences across ethnic groups (Reimers, 1984). There are also compelling reasons why the earnings profiles of immigrant women may differ from those of immigrant men. Thus to understand immigrant economic assimilation we must also understand immigrant women's earnings. Using longitudinal data on individuals to describe the earnings profiles of multiple foreign- and U.S.-born cohorts, we discover a profound historical shift in the earnings patterns of foreign-born women. This central result, bolstered by several sensitivity tests, prompts revisiting a key model in the nascent literature on immigrant women's labor force behavior.

I. Previous Research on the Earnings Profiles of Immigrant Women

Analysis of longitudinal individual data and cross-sectional data reveals that immigrant men experience higher earnings growth than U.S.-born men.[1] This result fits theoretical expectations based on source-country to host-country skill transferability: immigrants, whose skills do not transfer perfectly to the U.S., have a higher incentive to invest in U.S.-specific skills than U.S. natives because of lower opportunity costs of investment, the role of untransferred human capital as a factor of production for host-country skills, and a higher return to investment stemming from the complementarity of foreign and U.S. human capital (Chiswick 1978, 1979; Duleep and Regets, 1996, 1999).

Intergroup variations in the propensity to work of immigrant women, however, are unexplained by and even contradict expectations based on skill transferability (Duleep and Sanders, 1993; Duleep, Regets, and Sanders, 1999). One way that empirical results for immigrant women have been understood is within a family investment model. This model

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[1]Refer to Duleep and Regets (1997), Demonbynes (1999), Duleep and Dowhan (1999a, 1999b, 2002), and Chiswick (1978, 1979).

suggests that financing their husband's investment in host-country skills[2] affects the labor

force decisions and human capital investment of immigrant married women.[3] As an evolving

product of several scholars' work, this hypothesis is associated with three specific

predictions:

(1) In positive relationship to their husbands' investment in host-country specific skills, immigrant women will be more likely to work, and to work longer hours and more weeks, than would otherwise be the case.
(2) With time in the U.S., their greater propensity to work will decrease as immigrant husbands lacking host-country skills acquire them and the return to further such investment decreases.
(3) Immigrant women will be less likely to undertake human capital investment in the initial years following immigration in order to take jobs that pay more during the period in which the husband's investment in host-country skills is most intense: their initial wages will be higher, than would otherwise be the case, and the wage profile, by foregoing investment, flatter.

Given this paper's emphasis on immigrant women's earnings, it is important to note that the

second and third predictions associated with the Family Investment Model both work to

flatten the earnings profiles of foreign-born women (relative to native-born women)

compared with the foreign-born/native-born relationship for men.

The empirical studies that have led to the development of the Family Investment

Model include an analysis of 1970 census data from which Long (1980, p. 628) observed that

the earnings of married immigrant women—initially greater than those of U.S.-born

women—decreased with time in the United States. The estimated earnings decrease prompted

Long to speculate that "...wives in immigrant families that have recently entered the United

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[2]The cost of husband's investment in host-country-specific human capital includes both direct, and more importantly, indirect costs in the form of foregone earnings.

[3]This review is housed in terms of the Family Investment Model and, as such, is a partial synopsis of work on immigrant women s labor force behavior and earnings. Other key studies include Chiswick (1980), Reimers (1985), MacPherson and Stewart (1989), and Schoeni (1998).

States may have to work to help finance their husbands' initial investments in schooling or job skills required in U.S. labor markets. Later, as earnings of their spouses rise with time in the United States, foreign-born wives reallocate their time from market to nonmarket activities and their earnings are reduced."

Directly linking individual wives' and husbands' U.S. experiences, Duleep and Sanders (1993) found an inverse relationship between the husband's years since migration and the wife's labor force participation, controlling for her own years since migration and other relevant variables. Across immigrant groups, they found the "unexplained" propensity to work of married immigrant women rose with the expected return to investment in U.S. human capital by immigrant married men.

Using Canadian data, Beach and Worswick (1993) found initially higher hours worked of recently arrived immigrant women (versus Canadian-born women) decreased with years since migration. In contrast to the higher earnings growth of immigrant men relative to native-born men, Beach and Worswick found flatter wage profiles for immigrant married women than for native-born married women. They suggested that underlying the flatter wage profiles was a family investment strategy in which immigrant women forego investment by pursuing work options that are initially higher paying, but offer less opportunity for career investment so as to finance their husbands' investment in host-country skills.[4]

Comparing the hours worked and wage profiles of Canadian immigrant women married to Canadian-born men, versus Canadian immigrant women married to foreign-born men, Baker and Benjamin (1997) provided further evidence in support of the family investment model. They found that immigrant women married to foreign-born men work more upon arrival and have flatter wage profiles and a lower propensity to invest in schooling relative to immigrant women married to native-born men.

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[4]Also refer to Worswick's (1999) theoretical and empirical analysis.

Yet, in recent empirical work the expected hours and wage profiles associated with the family investment model have not held up to empirical scrutiny. Worswick (1996) using Canadian data to examine cohorts of foreign-born and Canadian-born men and women finds that the wage profile of immigrant women versus native-born women is steeper than the wage profile of immigrant versus Canadian-born men, contradicting a key finding of his earlier cross-sectional study with Beach. Using 1980 and 1990 U.S. census data, Duleep, Regets, and Sanders (1999) and Duleep (1998) find that intergroup differences in hours worked by immigrant women persist as cohorts are followed over time, contradicting an earlier Duleep-Sanders result, and the wage profiles of immigrant women married to men facing a relatively high return to investment in host-country human capital are steeper, not flatter, than the wage profiles of women married to men who face a relatively low return to investment in host-country human capital.

The studies to date have been either cross-sectional or synthetic cohort analyses. As first identified and explored in Chiswick (1980), cross-sectional analyses rest upon the potentially troubling assumption that immigrant earnings profiles are stationary across cohorts once observable characteristics are controlled. Immigrant emigration affects the earnings profiles estimated in both cross-sectional and synthetic cohort analyses. And, there is the more general question of whether defined cohorts followed across censuses (or other data sources) really represent the same people.[5] Perhaps these biases, interacting with the various methods researchers use, account for the diversity of findings on the earnings profiles of

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[5]Regression models that pool cohorts from multiple censuses typically limit the sample to employed individuals. Yet, individuals who are not earning during the first census, perhaps because of low employability or time spent in school, might be fully employed during the second. This issue is particularly important for a study of immigrants as immigrants have high occupational mobility (Green, 1999) and high in-school rates (Duleep, Regets, and Sanders, 1999; Duleep and Regets, 1999). Many synthetic cohort studies also precisely control for educational achievement in the earnings regressions; given their high relative educational investment, this will understate the relative earnings growth of immigrants. Changes in census coverage of various immigrant groups may also bias immigrant earnings growth estimates based on following synthetic cohorts (Passel and Luther, 1990).

immigrant women. These problems point to the importance of following the same foreign- and native-born individuals over time.

II. Measuring Immigrant Earnings Growth with Longitudinal Data

The Data

Social Security maintains a longitudinal annual record of each person's earnings to determine the eligibility and amount of benefits an individual worker or dependent is entitled to. We use these data matched to the 1994 March Current Population Survey (CPS) to shed light on the above controversy. By tracking the annual earnings of the same working-age foreign- and U.S.-born women over time, we circumvent potential cohort biases that afflict cross-sectional analyses, and biases due to cohort identification (are we following the same people?) that afflict cohort and cross-sectional analyses of immigrant earnings growth.[6]

 The Social Security data are replete with advantages, such as their accuracy and historical nature. The data used in this analysis do, however, present certain challenges. Zero earnings are recorded for both employment not covered by Social Security and for not working (unemployment or out of the labor force), making it impossible to distinguish between these states. Though Social Security covers most employment, it is nevertheless important in examining the same individuals over time to identify those whose principle source of earnings is Social Security covered employment. To do this, we limited the study sample to individuals who had positive reported earnings in whatever years we chose to analyze, generally the beginning and final year of each earnings profile. Another challenge is that the Social Security earnings data in the matched data set are truncated at each year's Social Security taxable maximum. To sidestep this handicap while avoiding assumptions

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[6]For a fuller discussion of the matched Social Security earnings data, how they can be used to address these and other issues, analyses of Social Security versus CPS defined populations, and detailed analyses of foreign-born men, refer to Duleep and Dowhan (1999a, 1999b, 2002).

about the unknown earnings distribution above the maximum, we measured each cohort's earnings at the median, 40th, and 30th percentiles.[7] In addition to circumventing the top-coding handicap, the median is a much less volatile measure of central tendency than the mean in small samples, an important advantage since we separately analyze each foreign-born cohort, rather than pooling and assuming a relationship between each cohort's earnings growth and the earnings growth of other cohorts.[8] While the procedures used in this paper (e.g. using the median instead of tobit or censored quantile analysis) do not make full use of the individual data, we can be certain that our results are not the product of assumptions.

The Results

To examine the earnings growth of immigrant women in the 1960's through 1980's, we followed the earnings of foreign- and U.S.-born women for 10-year periods. Immigrants were identified through the 1994 CPS information as persons born abroad of non-U.S. parents. Sample selection for each of the 10-year periods requires that women be at least 25 years old in the initial year of analysis and no more than 60 in the tenth year of analysis and that they have positive Social Security earnings in the first and last year of each ten-year period. Each cohort of foreign-born women is further defined by the year-of-U.S. immigration information on the 1994 CPS (1960-1964, 1965-1969, 1970-1974, 1975-1979, 1980-1981, 1982-1983).[9] These sample selection rules create 6 cohorts in which the earnings of the same individual immigrants and natives are measured the year following the last year of each CPS multi-year immigration category, and ten years later. Starting with the 1984-85

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[7]For women, the median earnings of natives and immigrants fall below the Social Security taxable maximum in each year of our analyses.

[8]Duleep and Regets (1996) show that pooling immigrant cohorts and controlling for cohort effects with dummy variables can lead to misleading conclusions.

[9]Following recently arrived immigrants avoids the confounding effects of age and assimilation highlighted in Kossoudji (1989) and Friedberg (1993).

cohort, we follow the earnings through 1993, the last year of earnings on the CPS-SSA data set. Sample selection for these cohorts requires that women are at least 25 in the initial year of analysis and no more than 60 in 1993, and that they have positive Social Security earnings in the first year of analysis and in 1993.

Table 1 shows foreign-born earnings at the beginning and end of each earnings profile, measured at the 50th, 40th, and 30th percentiles, and divided by the corresponding percentile for U.S.-born women.[10] Looking at the unadjusted results, we see that foreign-born women in the pre-1980 cohorts generally start at earnings that exceed natives' earnings: their initial earnings are 98% to 130% of the U.S. born; ten years later, the relative earnings of the foreign born have generally increased a little or dropped. The opposite pattern occurs for the post-1979 cohorts: foreign-born women initially earn 22% to 44% less than the native born; ten or fewer years later, the earnings of foreign-born women generally approach, and sometimes exceed, those of the U.S. born.[11]

To control for age and education differences between immigrants and natives, we imposed the age-education distribution of immigrants on natives. This was done by first describing the age-education distribution of each immigrant and native cohort sample, labeling the percent in each age-education cell $f(i,j)$ for the foreign born and $n(i,j)$ for the native born. Each native-born observation in cell i,j is then weighted by $f(i,j)/n(i,j)$. An advantage of this approach, especially given the small foreign-born sample sizes accompanying our cohort-specific analyses, is that it estimates the median earnings of immigrants at their own age-education distributions, while exploiting the plenitude of native-born observations to reliably estimate the native median earnings at alternative detailed age-

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[10]Note that it is only for these years that the earnings data are meaningful since it is only for these years that we have imposed the Social Security covered employment restriction.

[11]The 1986-87 cohort stands as an outlier, possibly due to the Immigration and Reform Control Act.

education distributions.[12] Of more general import, this procedure controls for foreign-born/native-born age and education differences without imposing any assumptions about the relationship of age and education to earnings.

Adjusting for age and education (right-hand side of Table 1), the relative earnings of the foreign born, whether measured at the beginning or end of the earnings profile, generally increase, reflecting natives' higher educational achievement.[13] Yet, the same story persists. For pre-1980 cohorts, immigrant women tend to initially earn more and to experience slower earnings growth than their U.S.-born counterparts. Starting with the 1980 cohort, foreign-born women, who initially earn 61 to 89% of natives' earnings, approach or exceed natives' earnings after ten years or less in the United States.

The first set of results in Table 2 presents the ratios of foreign-born to native-born earnings growth rates[14] which simply retell the story related by the earnings outcomes in Table 1: prior to the 1980-81 cohort, the earnings growth rates of foreign-born women resembled or were less than those of U.S.-born women; starting with the 1980-81 cohort, the growth rates of foreign-born women substantially exceed those of U.S. natives.[15]

These two patterns, revealed by the historical longitudinal data, echo the two patterns found in the literature: earlier results, primarily based on cross-sectional data, show high initial earnings and low earnings growth of foreign-born women versus U.S.-born women;

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[12]Prediction error is increased the smaller the sample size and the farther away the forecast is from the sampling experience. Since the sample size for the native born is so much larger than that for the foreign born, it makes sense to predict the U.S. native values at the foreign-born's schooling and age distribution, than vice versa. A program to iteratively accomplish the weighting for multiple cohorts is available from the authors. Also see Duleep and Regets (1997a).

[13]The age and education means, as well as the foreign-born cohort sample sizes are given in Appendix A.

[14]The earnings growth rates are defined as $[(Y_{END} - Y_1)/Y_1]_F / [(Y_{END} - Y_1)/Y_1]_N$ where Y_1 and Y_{END} denote the beginning- and end-year earnings, and F and N denote foreign and native born.

[15]The post-1979 foreign-born/native-born differences in earnings growth rates are statistically significant at a .05 level of statistical significance. We assessed statistical significance using bootstrap estimates of the standard errors, given that our focus is the difference in medians and other deciles.

two recent studies following foreign-born cohorts show low initial relative earnings and high relative earnings growth. The cross-sectional data based on the 1970 and 1980 censuses trace out earnings profiles by using information from earlier and earlier cohorts. The more recent synthetic cohort analyses go forward in time and follow cohorts that did not immigrate prior to the late 70's. Thus the cohorts that inform the earlier, cross-sectional, studies versus the cohorts that inform the more recent synthetic cohort analyses roughly correspond to the early versus more recent cohorts that we follow longitudinally.[16] The correspondence suggests that the divergence of results in the literature reflects a true change that has occurred over time in the earnings profiles of foreign-born versus native-born women.

III. Statistical Chimera or Real Change?

Several caveats must be considered before concluding that there has been an over time change in the relative earnings profiles of foreign-born women.

The implicit assumption when using CPS data is that the reported year of U.S. immigration represents an immigrant's initial U.S. immigration. Yet, the matched Social Security earnings records reveal that many immigrants are in the United States before their

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(No parametric procedure exists for estimating the standard error of the difference of two medians).

[16]This explanation for the dichotomy of results in the family investment model literature does not cover a recent synthetic cohort analysis – the Baker-Benjamin results. They find (in accordance with the second and third predictions of the family investment model) that immigrant women married to foreign-born men are less likely to invest in human capital and have flatter earnings profiles than immigrant women married to Canadian-born men. There is, however, a potential sample selection issue that contaminates their natural experiment and could explain the higher propensity to invest in human capital among foreign-born women married to Canadian-born men: colleges and other places of training are meccas for the formation of foreign-born/native-born marriages.

CPS reported year of immigration (Duleep and Dowhan 1999a, 1999b, 2002). This is not inconsistent with the meaning of the CPS question, "what year did you come to the U.S. *to stay*?" Nevertheless, intercohort changes in the extent and type of immigrant with previous U.S. work experience could affect intercohort comparisons of immigrant earnings growth. To determine whether the over time change in the earnings profile of immigrant women relative to U.S. natives reflects inter-cohort changes in year-of-first-U.S. work experience, we delete from each immigrant cohort, women with earnings prior to their reported CPS intended-to-stay year of immigration. Doing so leaves intact our central conclusion that the relative earnings growth of foreign-born women in the pre-1980 cohorts tends to be low, and that of the post-1979 cohorts, high (Table 2, second set of results).

Measuring the earnings of foreign-born women relative to those of native-born women helps control for over time changes in the economy while yielding policy-relevant information on how immigrants fare relative to their U.S.-born counterparts. Yet, the change we measure in the earnings profiles of immigrant women could entirely stem from over time changes in the work and investment behavior of U.S.-born women. To control for over time changes in the economy, without invoking the over time behavioral changes of U.S.-born women, we measure the earnings growth of foreign-born women relative to U.S.-born men (Table 2, third set of results). Once again, the earnings growth of the post-1979 cohorts of foreign-born women exceeds that of the pre-1980 cohorts.[17] This suggests that the change we measure is not the product of underlying changes in the earnings patterns of U.S.-born women.

The CPS year-of-immigration categories include more years for the earlier cohorts than for the later cohorts. For the earlier cohorts of foreign-born women (showing high initial earnings and low earnings growth relative to the native born), year of immigration is recorded

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[17]To economize on space in Table 2, we do not show all the percentile results.

in 5-year categories; for the more recent cohorts (showing low initial earnings and high

earnings growth), the CPS year of immigration is recorded in two-year categories. The over

time change we measure could simply be the product of measuring immigrant earnings

growth at different points in the U.S. life cycle of immigrant women. Indeed, our result of low

earnings growth among the early cohorts and high earnings growth among the more recent

cohorts could occur with a *cohort-invariant* relative earnings profile of immigrant women

that initially increased, during their first five years in the U.S., and then stayed constant (or

decreased).

To test this explanation we examined, for women with positive earnings each year,

whether the relative earnings of the post-1979 foreign-born cohorts increased beyond the first

four years of each earnings profile. Figures 1, 2, and 3 show the annual relative earnings of

foreign-born women in the early and later cohorts.[18] In addition to reconfirming our central

result, there is no consistent evidence for the recent cohorts of constant or declining relative

earnings immediately following the first four years of the earnings profiles. Though each

cohort is characterized by ups and downs, the overall trend in all of the recent cohort series is

positive. More precisely, if we first measure the relative earnings of foreign-born women in

the post-1979 cohorts at year 4 of the continuous earnings series, instead of year 1 (the year

immediately following the CPS year-of-immigration category), and continue till the end of

the series (five or fewer years later), their relative earnings grow 9 percentage points for the

1980-81 cohort, 7 percentage points for the 1982-83 cohort, 30 percentage points for the

1984-85 cohort, and 5 percentage points for the 1986-87 cohort. If we follow the pre-1980

cohorts from their year 1 of earnings measurement to five years later, the relative earnings of

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[18]In these graphs, the U.S.-born are adjusted to have the same age and education distribution as their cohort-specific foreign-born counterparts; the unadjusted results are very similar. We do not include the last year of each earnings profile for the continuous earnings series since the end of any such series includes persons who are leaving Social Security covered employment; our results would be potentially biased to the extent that the propensity to leave Social Security covered employment varies between the foreign and U.S. born. The final earnings decline for the 1980-81 and 1982-83 cohorts likely reflects

foreign-born women either fall (as is true for the two earliest cohorts) or gain but a couple

points (as is true for the 1970-74 and 1975-79 cohorts).[19]   These results suggest that the

earnings profile change of foreign-born women is not the spurious consequence of year-of-

immigration measurement changes.

Theory and empirical evidence suggest that, holding level of human capital constant,

immigrants' source-country to host-country skill transferability is inversely associated with

immigrants' propensity to invest in host-country-specific investment (e.g., Duleep and

Regets, 1996, 1999). This raises the possibility that Family Investment Model effects

influence the earnings profiles of recent cohorts of immigrant women (women invest less than

they would otherwise; their hours of work decrease with U.S. time more than they would

otherwise), but these effects are not apparent because the lower skill transferability of recent

cohorts works, in the opposite direction, to increase their earnings growth. To control for

intercohort changes in the skill transferability of immigrant women, we divide the foreign-

born/native-born earnings growth ratios of women by the corresponding ratios for men.

Measuring immigrant women's earnings growth in this fashion, we see, once again, that their

relative earnings growth is low for the pre-1984 cohorts and high for the post-1983 cohorts

(Table 2, fourth set of results).

A huge advantage of the longitudinal earnings data is that emigration is not a source

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the 1991-1992 recession.

[19]The greater growth of the post-1979 cohorts occurs even though the 1984-85 and 1986-87
cohorts are measured over less than 5 years. Furthermore, this comparison understates the over
time earnings growth change that has occurred since at the new year 1 of the post-1979 cohorts,
immigrants have been in the U.S. an average of 4.5 years, versus an average of 3 years for the pre-1980
cohorts.

of earnings-growth measurement bias for a given sample in our analysis. Emigration does affect, however, who is in each cohort sample: to be in our analysis, an immigrant must be in the United States when the 1994 CPS was conducted; immigrants who emigrated before 1994 would not be included. For many policy purposes, it is the immigrants who stay who are of primary interest. Nevertheless, intercohort changes in the extent to which immigrants are permanent could affect measured changes in the earnings profiles of immigrant women. The propensity to emigrate falls with time in the U.S., with most of it occurring in the first 10 years; our more recent cohorts would contain a larger fraction of immigrants who intend to emigrate than our earlier cohorts. Theoretically, the propensity to invest in U.S. human capital should be positively associated with permanence—why invest if the rewards cannot be reaped? This suggests that were we able to hold expected permanence constant across cohorts, our result of higher earnings growth among recent immigrant women might be even stronger.

To learn what effect immigrants' intention to stay has on earnings growth, we compare the earnings growth (measured over the same years) of two sets of cohorts of immigrant women who both started to earn in the U.S. in the same year. The second set of cohorts, labeled *B* in Table 3, includes only those women who reported that they intended to stay in the U.S. starting with the year they first earned in the U.S. The first set of cohorts, labeled *A*, is defined solely by the year immigrant women first earned in the U.S.; it includes persons who had not as yet decided to stay and who may indeed have emigrated following the 1994 CPS.[20] Table 3 shows the results of this comparison: the *B* cohorts, who expressed an intent to stay in the U.S. in the time period that includes their first earnings, generally start at

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[20]For the first group we use the Social Security historical earnings data to identify women who first earned in each of the year-of-immigration categories (e.g. 1984-85, 1986-87). For the second group we use the CPS responses to identify women who report that a given time period was when they first decided to stay in the U.S. and then we use the Social Security data to identify those whose first earnings were also in the CPS-defined year-of-immigration period.

about the same earnings level as their group-*A* counterparts, but experience much higher earnings growth.

A final caveat is that our samples include all women, regardless of marital status, whereas the Family Investment Model pertains to married women. Higher earnings growth among recent cohorts of foreign-born versus U.S.-born women could occur if recent foreign-born women were less likely to marry, and more likely to divorce than U.S. natives. (The higher the propensity to divorce, the lower the return to investment in the husband's human capital versus the wife's own human capital.) This explanation for our results seems unlikely as marriage rates are higher and divorce rates lower for the foreign born than U.S. born. Furthermore, when we limit the analysis to married women, our central conclusion that the relative earnings profiles of foreign-born women have profoundly changed remains unaltered.

IV. Putting the Pieces Together

While studies have consistently found a positive correlation across groups between the unexplained propensity of immigrant women to work and the expected return to human capital investment by immigrant men,[21] a diversity of results has appeared concerning the earnings profiles of foreign-born versus native-born women.

Other work using longitudinal and cohort-based data (Duleep and Dowhan, 1999a, 1999b, 2002; Duleep and Regets, 1996, 1997) has found that the earnings growth of foreign-born men in the U.S. generally exceeds that of U.S.-born men, and that this has intensified in recent years as the initial earnings of immigrant men have fallen. A likely explanation for the increase in the relative earnings growth of U.S. immigrant men is that their skills transferability has fallen in recent years. Theoretically, the incentive to invest in U.S.-specific human capital will increase the lower the initial skill transferability of immigrants.

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[21]See Duleep and Sanders (1993), Baker and Benjamin (1997), and Duleep, Regets, and Sanders, (1999). Also see note 22 on this point.

Our historical analysis of longitudinal data reveals two distinctly different earnings profiles of U.S. immigrant women relative to U.S.-born women. The pattern that characterizes the earlier cohorts fits a Family Investment Model framework: foreign-born women have higher initial earnings than their U.S.-born cohorts, and lower earnings growth because they work more at first and take lower investment careers in order to help finance the host-country specific human capital investment of their husbands. Yet, if the Family Investment Model, as currently conceived, were the propelling force behind the earnings profiles we have measured, then we would expect that as the earnings growth of immigrant men has increased, fueled by higher human capital investment, the entry earnings of immigrant women would increase relative to their native-born statistical twins, and their earnings growth decrease. Our findings, which complement the U.S. census cohort-based findings of Duleep, Regets, and Sanders and the Canadian cohort-based findings of Worswick, suggest the reverse. Recent immigrant women have earnings profiles closely resembling those of recent immigrant men—low initial earnings relative to natives and high earnings growth.

These findings are surprising if one thinks of the impact of the Family Investment Model on the type of work a woman pursues in isolation, apart from her decision to work and ignoring her own level of host-country specific skills and the effect of investment in her own human capital on the present value of lifetime family income. A more realistic approach may be to think of the family investment strategy as a sequence of steps that the wife and husband take to help finance their own career path and the career path of each other so as to maximize the net present value of family lifetime earnings. These steps would be: (a) the decision to work, (b) hours of work, and (c) what type of job to take (to invest or not to invest). From the wife's perspective, lifetime family income optimization dictates that she will take steps to finance her husband's investment in U.S.-specific capital until the marginal cost of pursuing this strategy equals the marginal benefit. We assume that there are decreasing returns to

investment in the husband's U.S.-specific capital. Furthermore, the cost to pursuing a job path that helps finance the husband's investment includes the lower present value of the family income that would result from the wife pursuing a low investment job. *Given* that a wife works and works a certain number of hours, the additional increase in the family's present value income via the husband's investment that could occur by the wife taking a low investment job may be less than the increased present value income that would occur if the wife invests. The higher the return to investment to the wife (as a function of her source-country to host-country skill transferability), the more likely that the husband's investment would be financed by the wife working and working longer hours, *but pursuing a job line with investment.*[22]

Viewing the type of job path taken in conjunction with the propensity to work also highlights two other considerations that would work against a woman pursuing a low-investment path to finance her husband's investment in U.S.-specific skills. (1) A woman who works in part because she is responding to a family investment return, lengthens her working-life horizon. This, in turn, raises the return to investment in her own U.S.-specific human capital. (2) Taking into account the decision to work in the decision about what type of job to pursue alters the cost of not taking a job. The wife must weigh the benefit to finding a high-wage job in terms of financing her husband's investment in U.S.-specific skills with the cost of not working while searching for the "optimal" job. The pressure to take a job right away could mean that the first job of women working in response to a family investment strategy are poor matches; higher wage growth would be expected to ensue as better matches

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[22]In considering this variant of the Family Investment Model, it is important to keep in mind that the results are predicted holding a women's skill transferability constant. Thus it need not be the case that foreign-born women work more than native-born women. Indeed, in the U.S., they do not (e.g. Duleep and Sanders, 1994).

were found.

In sum, the earnings profiles of recent cohorts of immigrant women resemble those of recent cohorts of immigrant men. This result is consistent with a Family Investment Model if we model the wife's wage profile in conjunction with her decision to work and her hours of work, and consider the decreasing return to investment in the husband's U.S.-specific capital along with the cost to lifetime family income of lower investment in the wife's U.S.-specific capital. Taking these factors into account, we would still expect—as has been consistently found—a positive correlation across immigrant groups between the unexplained propensity of immigrant women to work and the expected return to human capital investment by immigrant men. At the same time, this formulation of the Family Investment Model permits a variety of earnings profiles as a function of the source-country to host-country skill transferability of immigrant husbands and wives.

References

Baker, Michael and Dwayne Benjamin, "The Role of the Family in Immigrants' Labor Market Activity: An Evaluation of Alternative Explanations," *American Economic Review*, vol. 87 (4) Sept. 1997, pp.705-727

Beach, Charles M. and Christopher Worswick, "Is There a Double-Negative Effect on the Earnings of Immigrant Women?" *Canadian Public Policy*, vol. 19, no. 1, 1993, pp. 36-53.

Chiswick, Barry, "The Effect of Americanization on the Earnings of Foreign-Born Men," *Journal of Political Economy*, October 1978, pp. 897-922.
____."The Economic Progress of Immigrants," in W. Fellner, ed., *Contemporary Economic Problems*. Washington, D.C.: American Enterprise Institute, 1979, pp. 359-99.
____. *An Analysis of the Economic Progress and Impact of Immigrants*. Department of Labor monograph, N.T.I.S. No. PB80-200454. Washington, D.C.: National Technical Information Service, 1980.

Cobb-Clark, Deborah and Sherrie Kossoudji, "Coming Out of the Shadows: Learning about the Legal Status and Wages from the Legalized Population," unpublished paper, Economics Dept., University of Michigan and Australian National University, 1999.

Duleep, Harriet, "The Family Investment Model: A Formalization and Review of Evidence from Across Immigrant Groups," *Gender Issues*, vol. 16, no. 4, Fall, 1998, pp. 84-104.

Duleep, Harriet and Daniel J. Dowhan, "Analyzing Immigrant Economic Assimilation with Matched Social Security Longitudinal Data on Individuals," paper presented at the annual meeting of the Population Association of America, 1999a.
____. "U.S. Immigrant Earnings Growth 1960-1990: Insights from Longitudinal Data on Individuals," Paper presented at the annual meeting of the Society of Labor Economists, 1999b.
____. "Insights from Longitudinal Data on the Earnings Growth of U.S. Foreign-born Men," *Demography*, August 2002.

Duleep, Harriet and Mark Regets. "Immigrants and Human Capital Investment," *American Economic Review*, May 1999, pp. 186-191.
____."The Elusive Concept of Immigrant Quality: Evidence from 1970-90," PRIP-UI-41, Washington, DC: Urban Institute, 1996.
____."Measuring Immigrant Wage Growth Using Matched CPS Files," *Demography*, 34(2), May 1997, pp. 239-49.

Duleep, Harriet, Mark Regets, and Seth Sanders, *A New Look at Human Capital Investment: Immigrants and Their Family Ties*, Kalamazoo, MI: Upjohn Institute for Employment Research, 1999, forthcoming.

Duleep, Harriet Orcutt and Seth Sanders, "The Decision to Work by Married Immigrant Women: Evidence from Asian Women", *Industrial & Labor Relations Review*, vol. 46, no. 4, July, 1993, pp. 677-690.
___. "Empirical Regularities Across Cultures: The Effect of Children on Women's Work," *Journal of Human Resources*, Spring 1994, pp. 328-347.

Friedberg, Rachel, "The Labor Market Assimilation of Immigrants in the U.S: The Role of

Age at Arrival," Brown University, 1993.

Green, David A., "Immigrant Occupational Attainment: Assimilation and Mobility Over Time," *Journal of Labor Economics*, vol. 17, no. 1, January 1999, pp. 49-79.

Kossoudji, Sherrie A., "Immigrant Worker Assimilation: Is It a Labor Market Phenomenon?,"*Journal of Human Resources*, Vol 24, No.3 Summer 1989, pp. 494-527.

Long, John, "The Effect of Americanization on Earnings: Some Evidence for Women," *Journal of Political Economy*, vol. 88, no.3, 1980, pp. 620-29.

MacPherson, David and James Stewart, "The Labor Force Participation and Earnings Profiles of Married Female Immigrants." *Quarterly Review of Economics and Business*, Vol. 29, Autumn, 1989, pp. 57-72.

Reimers, Cordelia. 1984. "Sources of the Family Income Differentials among Hispanics, Blacks, and White Non-Hispanics," *American Journal of Sociology*, vol. 89, no. 4, pp. 889-903.
____. "Cultural Differences in Labor Force Participation Among Married Women" *American Economic Review*, May 1985, pp. 251-255.

Schoeni, Robert, "Labor Market Assimilation of Immigrant Women," *Industrial & Labor Relations Review* 51 (3) April, 1998, pp. 483-504.

Worswick, Christopher, "Immigrant Families in the Canadian Labour Market," *Canadian Public Policy* 22 (4), 1996, pp. 378-396.
____. "Credit Constraints and the Labour Supply of Immigrant Families in Canada," *Canadian Journal of Economics*, vol. 32, no. 1, February 1999, pp. 152-170.

Table 1: Earnings of foreign-born women relative to native-born women in first year (start) and in last year (end), measured at the median, fortieth percentile, and thirtieth percentile.
Each cohort is followed for ten years. The foreign and native born are 25-60 years old in each year of analysis.

entry year of immigration/ employment restriction	Unadjusted results						Adjusted results in which the native born are weighted to have the foreign-born's age and education distribution.					
Covered employment required in first and tenth year only	Median		40th percentile		30th percentile		Median		40th percentile		30th percentile	
	start	end	start	end	start	end	start	end	start	end	start	end
1960-64	1.04	1.05	1.20	1.15	1.30	1.17	1.08	1.06	1.25	1.17	1.33	1.20
1965-69	1.05	.95	1.16	1.06	1.28	1.04	1.18	1.07	1.40	1.16	1.51	1.18
1970-74	.98	1.07	1.03	1.07	1.19	.78	1.03	1.05	1.11	1.07	1.37	.81
1975-79	1.02	.90	1.03	.87	1.23	.91	1.08	.96	1.13	.97	1.35	1.00
1980-81	.77	87	.71	.88	.76	.96	.81	.94	.77	.96	1.22	1.08
1982-83	.71	.93	.76	.91	.78	.96	.76	.97	.83	.96	.86	1.02
Covered employment in first year and in 1993												
1984-85	.67	.98	.64	.98	.59	.89	.76	1.08	.76	1.12	.77	1.06
1986-87	.60	.75	.72	.71	.57	.72	.69	.82	.84	.80	.69	.86
1988-89	.66	1.00	.61	1.05	.65	.98	.68	.98	.64	1.07	.71	1.02

Table 2: The earnings growth of foreign-born women

Ratio of earnings growth rates:

Cohort	Earnings growth measured over...	I. foreign-born women relative to U.S.-born women						II. foreign-born women relative to U.S.-born women excluding foreign-born women with earnings prior to the first CPS recorded year of immigration						III. foreign-born women relative to U.S.-born men				IV. Women's fb/nb ratio divided by men's fb/nb ratio, at median	
		unadjusted results			*adjusted results*			*unadjusted results*			*adjusted results*			*unadjusted*		*adjusted*		*unadj*	*adj.*
		P50	P40	P30	P50	P40	P30	P50	P40	P30	P50	P40	P30	P50	P30	P50	P30	P50	P50
1960-64	*10 years*	1.03	.91	.84	.96	.89	.84	.80	.89	.84	.76	.87	.84	.91	2.04	.98	1.37	1.03	.89
1965-69		.83	.85	.70	.83	.72	.65	.87	.80	.74	.86	.68	.69	1.02	1.18	.96	1.09	.83	.88
1970-74		1.15	1.07	.43	1.04	.94	.36	1.01	1.10	.47	.90	.97	.39	1.49	.77	1.62	.74	.88	.73
1975-79		.74	.67	.49	.77	.70	.48	.98	.88	.76	1.01	.87	.75	1.10	.85	1.04	.78	.50	.55
1980-81		1.32	1.52	1.53	1.34	1.54	1.54	1.34	1.52	1.74	1.42	1.63	1.83	1.97	2.90	1.95	2.69	.63	.64
1982-83		1.73	1.49	1.52	1.66	1.34	1.40	1.39	1.76	2.41	1.28	1.62	2.26	2.56	2.97	2.30	2.62	.61	.65
1984-85	*8 years*	2.39	2.55	2.37	2.23	2.30	1.88	3.97	4.09	3.19	3.37	3.48	2.83	3.40	4.33	2.72	3.19	1.68	1.97
1986-87	*6 years*	2.05	.93	2.03	1.64	.81	1.92	1.97	1.89	2.70	1.54	1.65	2.59	3.06	4.16	2.12	2.57	1.63	1.88
1988-89	*4 years*	4.75	6.61	4.55	3.77	5.48	3.56	5.86	7.80	3.53	4.68	6.17	2.80	7.38	9.50	5.44	6.36	1.62	1.75

Table 3: Some Insight on the Effect of Permanence on the Earnings Growth of Immigrant Women					
	(A) Cohort defined by first earnings		*(B)* Cohort defined by first earnings and by stated intention to stay in the U.S.		Ratio of earnings growth for definition-*B* cohort to definition-*A* cohort
CPS defined year-of-immigration period	First year following the CPS-defined period	1993	First year following the CPS-defined period	1993	
1984-85: Earnings measured at					
Median	8,477	16,690	6,449	19,226	2.02
P40	6,747	13,246	5,933	18,359	2.17
P30	5,317	8,076	3,659	10,554	3.29
1986-87: Earnings measured at					
Median	8,342	10,567	8,845	14,268	2.30
P40	7,280	8,232	7,296	11,683	4.60
P30	5,366	7,659	4,814	9,525	2.29
1988-89: Earnings measured at					
Median	8,947	10,144	9,353	17,872	6.81
P40	7,564	8,806	7,045	15,252	7.09
P30	5,341	6,614	5,780	9,095	2.41

Appendix A

Mean characteristics as reported in 1994 CPS for each CPS year-of-immigration foreign-born cohort and accompanying native-born cohort. Women are 25-60 in each year of analysis and have positive earnings in the first and tenth year, or in the first year and in 1993 for cohorts followed less than ten years. (The first year follows the last year of each CPS year-of-immigration category.)

Cohort	Mean years of schooling		Mean age at first year of analysis		Foreign-born sample sizes according to various specifications			
	foreign born	*native born*	*foreign born*	*native born*	Earnings required in first and last year of analysis only*	First definition, but excluding persons with earnings prior to CPS year-of-immigration category	Earnings required each year of analysis	Cohort defined by first earnings
1960-64	11.27	12.03	39.12	38.78	50	46	35	
1965-69	10.50	12.55	35.74	38.22	72	66	55	
1970-74	12.17	13.07	33.00	37.21	97	86	72	
1975-79	12.48	13.47	33.98	36.46	90	66	66	
1980-81	11.85	13.61	36.63	36.46	46	36	34	
1982-83	12.56	13.65	33.23	36.50	39	32	29	
1984-85	12.82	13.68	33.32	34.46	44	28	31	62
1986-87	12.11	13.68	30.58	35.33	45	35	41	92
1988-89	13.05	13.68	31.74	36.30	84	62	77	153

*First year refers to the year following the last year of each CPS year-of-immigration category. The last year is 10 years later or 1993.

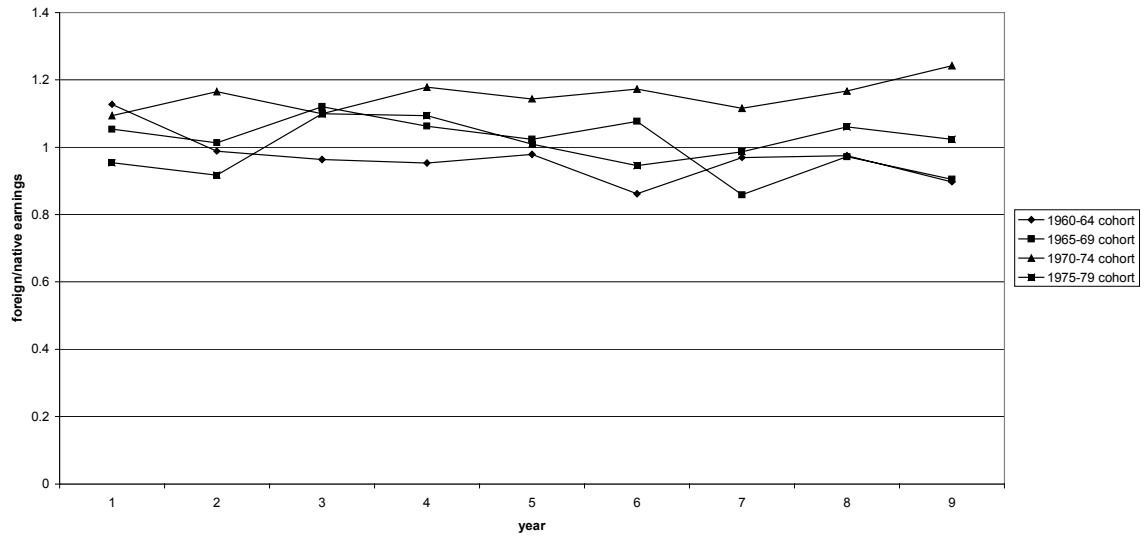Figure 1: Year-to-Year Earnings Patterns--The Early Cohorts

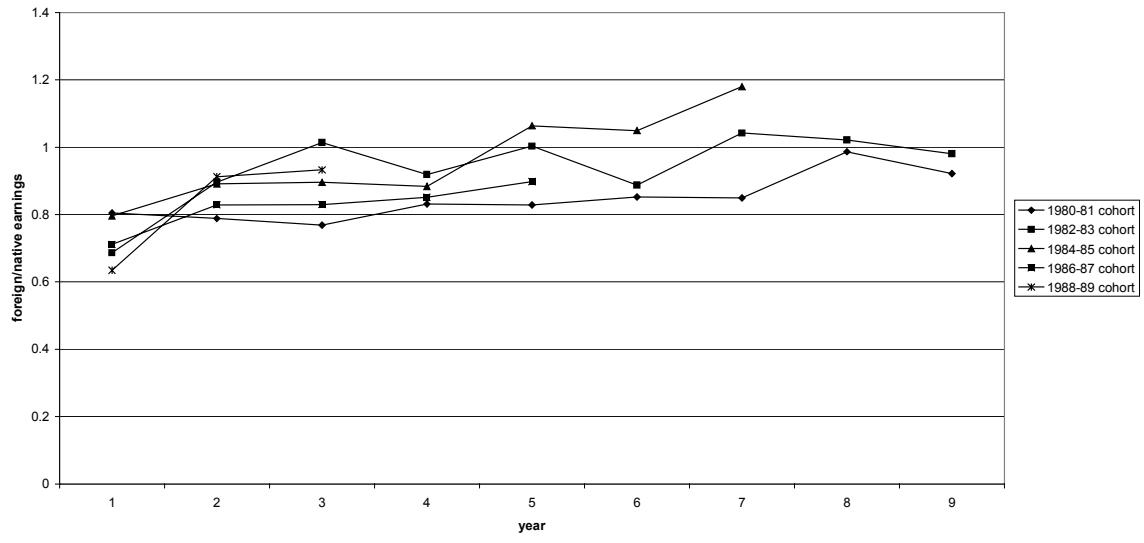**Figure 2: Year-to-Year Earnings Patterns--The Recent Cohorts**

Legend:
- 1980-81 cohort
- 1982-83 cohort
- 1984-85 cohort
- 1986-87 cohort
- 1988-89 cohort

Figure 3: The Annual Earnings of Foreign-Born Women Relative to U.S. Natives

◆	1960-64 cohort
■	1965-69 cohort
▲	1970-74 cohort
✕	1975-79 cohort
✱	1980-81 cohort
●	1982-83 cohort
+	1984-85 cohort
—	1986-87 cohort
—	1988-89 cohort
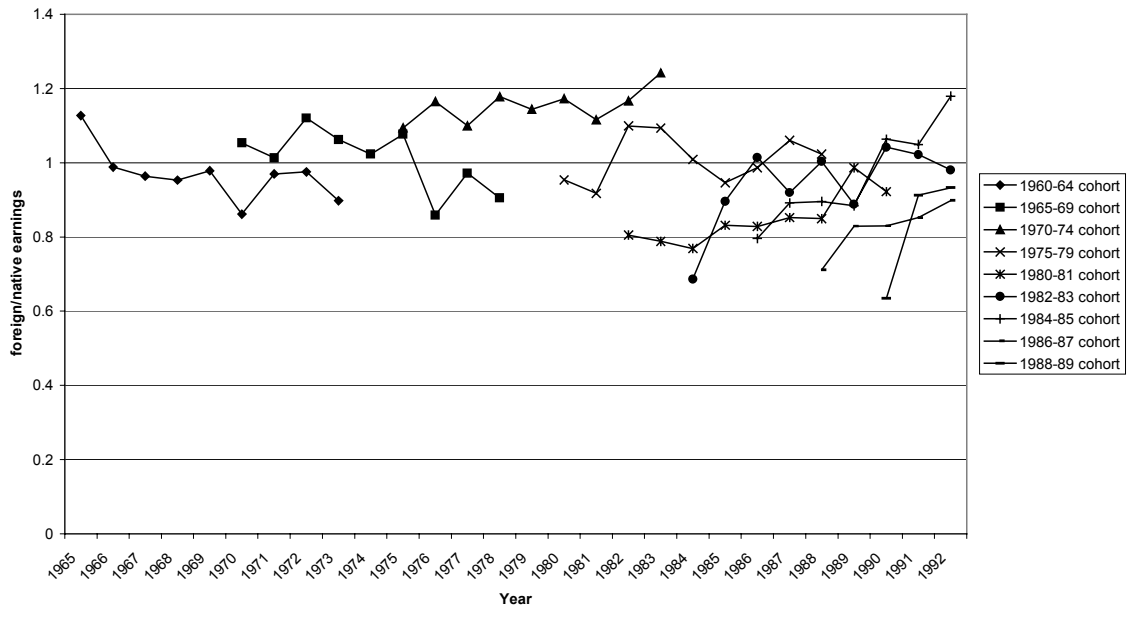
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