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THE IMPACT OF ASSIMILATION ON THE  
EARNINGS OF IMMIGRANTS:  
A REEXAMINATION OF THE EVIDENCE

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ABSTRACT

This paper reexamines the empirical basis for two "facts" which seem to be found in most cross-section studies of immigrant earnings: (1) the earnings of immigrants grow rapidly as they assimilate into the U.S.; and (2) this rapid growth leads to many immigrants overtaking the earnings of the native-born within 10-15 years after immigration. Using the 1970 and 1980 U.S. Censuses, this paper studies the earnings growth experienced by specific immigrant cohorts during the 1970-1980 period. It is found that within-cohort growth is significantly smaller than the growth predicted by cross-section regressions for most immigrant groups. This differential is consistent with the hypothesis that there has been a secular decline in the "quality" of immigrants admitted to the United States.

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THE IMPACT OF ASSIMILATION ON THE EARNINGS OF IMMIGRANTS:  
A REEXAMINATION OF THE EVIDENCE

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I. Introduction

The question of how immigrants do in the U.S. labor market has again become an important policy issue due mainly to the rapid increase in immigration rates during the postwar period. The work of Chiswick (1978, 1980) has been extremely influential in the development of the current consensus that immigrants adapt quite rapidly and quite well to the U.S. labor market. The two fundamental results in Chiswick's research are that in a cross-section of immigrant men: (1) the earnings of recently arrived immigrants are significantly lower than the earnings of immigrants who have been in this country for longer periods, and (2) the relatively rapid growth of immigrant earnings over time leads to the existence of an overtaking age, at which point the earnings profiles of the native-born and the foreign-born cross. This creates the remarkable finding that, for most immigrant groups at later stages of the life cycle, immigrant earnings exceed the earnings of the native-born. In Chiswick's (1978) study, the overtaking point was estimated to be around 10-15 years after immigration.

These findings appeal to labor economists since the human capital framework can be easily invoked to explain the empirical regularities. In particular, persons immigrating to the United States for "economic" reasons have strong incentives to devote a large fraction of their effort to the process of accumulating U.S.-specific human capital skills.<sup>1</sup> This investment process explains the relatively rapid rates of growth in immigrant earnings observed in cross-

sections, and combined with assumptions about how the immigration decision leads to a relatively select group of immigrants, also explains the existence of the overtaking age.

A large literature developed following the appearance of Chiswick's study. This literature borrows both the theoretical framework and the empirical methodology of Chiswick's original work. The studies in Borjas (1982), Borjas and Tienda (1985), Carliner (1980), De Freitas (1979), Long (1980), and others, essentially expand the literature by analyzing both male and female immigrants, by studying alternative data sets (such as the 1976 Survey of Income and Education), and by focusing on specific immigrant populations (e.g., Hispanics or Asians). These various studies tend to confirm the robustness of the results in cross-section analyses of the problem, and their cumulative impact has led to the current conventional wisdom that after 10-15 years immigrants do extremely well in the U.S. labor market.

The analysis presented in this paper questions the empirical validity of this conclusion. Using the 1970 and 1980 Public Use Samples from the U.S. Census, the analysis shows that the cross-section regressions commonly used in the literature confound the true assimilation impact with possible quality differentials among immigrant cohorts. The empirical analysis below shows that the study of earnings within immigrant cohorts leads to a very different picture of the rate of assimilation of immigrants into the U.S. labor market. Instead of the rapid growth found by the cross-section studies, the cohort analysis predicts relatively slow rates of earnings growth for most immigrant groups. The direct comparison of immigrant cohorts in the 1970 and 1980 Census data shows that the strong assimilation rates measured in the cross-section may be partly due to a precipitous decline that has occurred in the "quality" of immigrants admitted to this country since 1950. Thus the positive

impact of the years-since-migration variable in cross-section earnings equations captures both the higher quality of earlier immigrant cohorts as well as the increase in U.S.-specific capital hypothesized in the literature. Finally, the cohort analysis indicates that, for most immigrant groups, the overtaking point takes place much later in the life cycle (if at all) than the point predicted by the cross-section regression.<sup>2</sup>

Section II of the paper presents the conceptual framework allowing the identification of the assimilation and cohort effects in census data. This methodology is applied in Section III to the study of immigrant earnings, and in Section IV to the study of the earnings of immigrants relative to the native-born. Finally, Section V summarizes the results of the study.

## II. Framework

The economic analysis of how immigrant earnings respond to the assimilation process is commonly based on the results obtained from the following cross-section model:

$$\ln w_i = X_i \lambda + \beta t_i + \varepsilon_i \quad (1)$$

where  $w_i$  is the wage rate of immigrant  $i$ ;  $X_i$  is a vector of his socioeconomic characteristics (e.g., years of completed schooling, years of labor market experience, etc.); and  $t_i$  measures how long immigrant  $i$  has been in the United States.<sup>3</sup>

Since total labor market experience (i.e., Age-Education-6) is usually included as one of the regressors in (1), the coefficient  $\beta$  measures the differential value placed by the U.S. labor market between U.S. experience and foreign experience. As was noted in the introduction, one of the most important findings of the cross-section literature is that  $\hat{\beta}$  is significantly

positive. Thus the U.S. labor market rewards U.S. experience at a higher rate than it rewards foreign experience. The economic interpretation of this finding is usually couched in terms of the human capital framework. When immigrants first arrive in the United States they lack U.S.-specific human capital, and this results in relatively low earnings upon entrance to the labor market. In order for the costs of immigration to be recouped, the immigrant rapidly begins an investment path with high levels of investment costs. These high levels of human capital investments further depress the current earnings of recent immigrants, but guarantee high rates of growth in earnings as the immigrants "assimilate" into the U.S. labor market. Thus the positive and significant  $\hat{\beta}$  obtained in cross-section estimates of equation (1) captures how earnings grow with the assimilation process.

The fallacy with this interpretation lies in its use of a cross-section regression model to explain a dynamic series of events. There are (at least) two obvious factors which can seriously bias cross-section estimates of  $\beta$  and raise serious doubts about the conclusion that the earnings of immigrants rise rapidly as they assimilate. The first of these problems (and one about which little can be done with currently available data) arises from the fact that many immigrants eventually return to their country of origin. Piore (1979), for example, estimates that over 30 percent of the immigrants admitted into the United States in the early 1900's emigrated back to their country of origin. Similarly, Warren and Peck (1980), using the 1960 and 1970 Census, estimate that 18 percent of immigrants admitted to the U.S. between 1960 and 1970 had emigrated by 1970. Since the incidence of emigration is not likely to be a random process in the immigrant population, potentially serious selection biases can affect the cross-section estimate of  $\beta$ . For example, if immigrants who do not do well in the United States are more likely to emigrate, the coefficient  $\hat{\beta}$  will be biased upward since earlier cohorts of immigrants

will have been self-selected to include only the most successful immigrants, while the recent cohorts contain a more representative selection of the immigrant pool. It is unfortunate that, despite the potential importance of this problem, the complete lack of emigration data for the United States implies that any analysis of this issue (even the simple counting of how many emigrants there are) requires the making of many unverifiable statistical and institutional assumptions.<sup>4</sup>

The second problem with the dynamic interpretation of the cross-section coefficient  $\beta$  is its implicit assumption that, abstracting from the emigration problem, the average "quality" of successive cohorts of immigrants is not changing over time. It is this stationarity assumption which permits the inference that since the cross-section regression indicates that a recently arrived immigrant earns  $(10\beta) \cdot 100$  percent less than one who arrived 10 years earlier, it follows that the earnings of recently arrived immigrants will increase by  $(10\beta) \cdot 100$  percent in the next decade (net of aging effects).

Note that the direction of the bias if the stationarity assumption is not empirically valid depends on the secular trend in the quality of the immigrant cohorts admitted to the United States. If, for example, institutional changes in immigration policies and/or political disturbances in sending countries lead to higher quality immigration, the cross-section estimate of  $\beta$  would be downward biased. If, on the other hand, the shift from occupational to family preferences mandated by the 1965 Immigration and Nationality Act and the increase in unscreened illegal immigrants has lowered the average quality of immigrant cohorts, the cross-section estimate of  $\beta$  would be upward biased, and the impact of the assimilation process on the earnings of immigrants would be overestimated.

It is likely that the rapid increase in immigration rates since 1950 has violated the stringent requirements imposed by the stationarity assumption in cross-section studies. Thus the estimates of equation (1) are likely to suffer from serious biases. To derive a general framework for comparing the cross-section results with the findings obtained from within-cohort analyses, consider the group of immigrants aged 18-54 in 1970. Using the 1970 Census, it is convenient to partition this group into four cohorts: arrivals in 1965-1969, arrivals in 1960-1964, arrivals in 1950-1959, and immigrants who arrived prior to 1950. Consider next the group of immigrants aged 28-64 in the 1980 Census. The 1980 Census data allows the partitioning of this group of immigrants into six cohorts: arrivals in 1975-1979, arrivals in 1970-1974, arrivals in 1965-1969, arrivals in 1960-1964, arrivals in 1950-1959, and immigrants who arrived prior to 1950. Note that the last four cohorts defined in the 1980 group exactly match the definitions of the cohorts from the 1970 Census. In addition, the age composition of the two samples ensures that (if the census data contained all observations from the population) the same individuals are included in each of these cohort samples.<sup>5</sup> Given these data, two cross-section regressions can be estimated:

$$\ln w_{70} = Xy_{70} + \alpha_{65}D_{65} + \alpha_{60}D_{60} + \alpha_{50}D_{50} + \alpha_{40}D_{40} + \varepsilon_{70}, \quad (2)$$

$$\begin{aligned} \ln w_{80} = Xy_{80} + \beta_{75}D_{75} + \beta_{70}D_{70} + \beta_{65}D_{65} + \beta_{60}D_{60} + \beta_{50}D_{50} \\ + \beta_{40}D_{40} + \varepsilon_{80}, \end{aligned} \quad (3)$$

where the dummy variables indexing years-since-immigration/cohort are defined by:  $D_{75} = 1$  if immigrated in 1975-1979;  $D_{70} = 1$  if immigrated in 1970-1974;  $D_{65} = 1$  if immigrated in 1965-1969;  $D_{60} = 1$  if immigrated in 1960-1964;  $D_{50} = 1$



if immigrated in 1950-1959; and  $D_{40} = 1$  if immigrated prior to 1950. By definition, the vector  $X$  in (2) and (3) does not contain a constant term.

Consider cohort  $k$ , where  $D_k = 1$  ( $k=40,50,60,65$ ). Let  $\bar{X}_k$  give the mean values of the socioeconomic characteristics for this cohort as of 1980. Define:

$$\hat{y}_{70,k} = \bar{X}_k \hat{y}_{70} + \hat{\alpha}_k, \quad (4)$$

$$\hat{y}_{80,k} = \bar{X}_k \hat{y}_{80} + \hat{\beta}_k, \quad (5)$$

$$\hat{y}_{80,k+10} = \bar{X}_k \hat{y}_{80} + \hat{\beta}_{k+10}. \quad (6)$$

Equations (4) and (5) give the predicted (ln) earnings of the average member of cohort  $k$  in 1970 and 1980, respectively. Equation (6) gives the predicted (ln) earnings in 1980 for the cohort who arrived 10 years after cohort  $k$ .

Note that, by definition, as of 1970 cohort  $k$  has been in the U.S., say,  $j$  years. As of 1980, cohort  $k+10$  has also been in the U.S.  $j$  years. Thus the comparison of these two cohorts across censuses holds constant the number of years since immigration.

Using the definitions in (4)-(6), the 1980 regression predicts that over 10 years, the cross-section growth for cohort  $k$  (net of aging) is given by:<sup>6</sup>

$$\hat{y}_{80,k} - \hat{y}_{80,k+10} = \hat{\beta}_k - \hat{\beta}_{k+10}. \quad (7)$$

The cross-section growth given by (7) can be rewritten as:

$$\hat{y}_{80,k} - \hat{y}_{80,k+10} = (\hat{y}_{80,k} - \hat{y}_{70,k}) + (\hat{y}_{70,k} - \hat{y}_{80,k+10}). \quad (8)$$

Equation (8) decomposes the cross-section growth into two parts. The first term in (8) gives the earnings growth experienced by cohort  $k$  over the decade, and

will be called the "within-cohort" growth. The second term in (8) estimates the difference in earnings which occurred over the decade for individuals with a given number of years since immigration. Thus it compares different cohorts at the same point of their U.S. life cycle and will be called the "across-cohort" earnings growth. If, for example, the quality of cohorts is declining over time, the earnings of immigrants who have been in the U.S.  $j$  years will decline across censuses. Thus the second term in (8) is positive, upwardly biasing the cross-section measure of earnings growth. Equation (8), therefore, illustrates a very useful result: the comparison of immigrant cross-sections over time can be used to infer the extent to which the underlying quality of immigrant cohorts is changing.<sup>7</sup>

It is important to note that, although as equation (8) shows, the cross-section growth is biased by the existence of quality differentials across cohorts, the within-cohort growth can also be biased by the effect of secular changes in aggregate labor market conditions. For example, if economic conditions worsened between 1970 and 1980, the within-cohort growth in (8) will be biased downwards, and the decomposition in (8) will exaggerate the extent of quality differences across cohorts. One possible solution to this problem is simply to analyze the behavior of immigrant earnings relative to a base of native-born workers. Suppose the wage structures for native-born workers are given by:

$$\ln w_{70,n} = X\delta_{70} + \alpha_n, \quad (9)$$

$$\ln w_{80,n} = X\delta_{80} + \beta_n, \quad (10)$$

where the subscript "n" indicates native-born status. Define the earnings a native-born worker statistically similar to the average immigrant from cohort  $k$  would earn by:

$$\hat{y}_{70,n} = \bar{X}_k \hat{\delta}_{70} + \hat{\alpha}_n \quad (11)$$

$$\hat{y}_{80,n} = \bar{X}_k \hat{\delta}_{80} + \hat{\beta}_n \quad (12)$$

Note that the cross-section growth in the relative earnings of immigrant cohort  $k$  is given by:

$$(\hat{y}_{80,k} - \hat{y}_{80,n}) - (\hat{y}_{80,k+10} - \hat{y}_{80,n}) = \hat{\beta}_k - \hat{\beta}_{k+10} \quad (13)$$

Thus the estimate of cross-section growth is unaffected by the introduction of the native-born into the analysis.<sup>8</sup> Equation (13) can be decomposed into:

$$\begin{aligned} \hat{\beta}_k - \hat{\beta}_{k+10} = & [(\hat{y}_{80,k} - \hat{y}_{80,n}) - (\hat{y}_{70,k} - \hat{y}_{70,n})] \\ & + [(\hat{y}_{70,k} - \hat{y}_{70,n}) - (\hat{y}_{80,k+10} - \hat{y}_{80,n})]. \end{aligned} \quad (14)$$

The first bracketed term in (14) gives the difference in the relative earnings of cohort  $k$  between 1980 and 1970. This within-cohort effect measures the rate at which the earnings profiles of the immigrant-born and the native-born are converging (or diverging). The second bracketed term in (14), as before, gives the across-cohort effect. It estimates the difference in the relative earnings of immigrants who are at the same position in their U.S. life cycle between 1970 and 1980. If this difference is positive, the across-cohort growth indicates that, relative to the native-born base, the quality of immigrants is falling over time, upwardly biasing the cross-section growth in immigrant earnings.

Finally, it should be noted that the statistical framework leading to equations (8) and (14) is rather general. By allowing the socioeconomic vector  $X$  to have a different effect between the native-born and the foreign-born, and across different time periods, the biases introduced by invalid restrictions

on the coefficients are avoided. It turns out that in the census data analyzed below, the large sample sizes used led to the rejection of equality constraints on these coefficients for practically all immigrant and native groups.

### III. The Earnings of Immigrants

The data used in the analysis are drawn from the 1970 1/100 Public Use Sample from the U.S. Census (5 percent SMSA and County Group Sample), and the 1980 A Sample from the U.S. Census (a 5 percent random sample of the population). Due to the very large sample sizes in these data sets, random samples were drawn for some of the larger groups (e.g., white natives in both 1970 and 1980, black natives in 1980, etc.).<sup>9</sup>

The analysis is restricted to male persons aged 18-54 in 1970 and 28-64 in 1980. The four sample selection rules used in both Censuses are: (1) the individual is not self-employed or working without pay; (2) the individual is not in the Armed Forces (as of the Census week); (3) the individual does not reside in group quarters; and (4) the individual's record can be used to calculate the 1969 or 1979 wage rate.<sup>10</sup> Since previous research has shown that major differences in economic status exist within the male immigrant (and native) labor force, the study will be conducted separately for each of the six major immigrant groups: Mexican (18.0 percent of the male immigrant population as of 1980), Cuban (5.3 percent), other Hispanic (9.7 percent), Asian (15.9 percent), white (45.4 percent), and black (5.7 percent), where the "white" and "black" immigrant samples contain the observations which are neither Hispanic nor Asian.<sup>11</sup> Table 1 presents the means of basic economic characteristics for the cohorts in each of the immigrant samples, and for their native-born male counterparts. The table presents the mean (ln) wage rate (WAGE), the mean completed years of schooling (EDUC), the average age of the group, as well as the number of observations in the sample (N). Throughout

the paper the 1979 wage rate has been deflated to 1969 levels by using the Consumer Price Index. Table 1 illustrates the well known facts that major differences in these socioeconomic characteristics exist both between native and immigrant groups, as well as within each of these populations across national groups.

The empirical analysis reported throughout the paper is based on the estimates of equations (2), (3), (9), and (10): the two immigrant cross-sections and the two native-born cross-sections. To allow the testing of coefficients across these equations, the four equations were estimated jointly. The Appendix to this paper presents the complete set of regressions used in the analysis: Table A1 provides a description of the variables used in the regression; Table A2 presents the estimated regressions; and Table A3 presents the means of the socioeconomic characteristics used in the decomposition of cross-section effects into its within- and across-cohort components. The vector of socioeconomic characteristics,  $X$ , in the cross-section regressions includes the variables: years of completed schooling; years of labor market experience (defined by Age-Schooling-6); years of labor market experience squared; whether or not health limits work; whether or not married, spouse present; and whether or not the individual resides in an SMSA.<sup>12</sup> The dependent variable is the 1969 or 1979 (ln) wage rate.<sup>13</sup>

In this section the discussion will focus on the estimates of the immigrant cross-sections (2) and (3). To provide comparability between these results and the literature, Table 2 presents the coefficients of the years-since-migration variable obtained from the 1980 cross-section for each of the six national groups. The omitted dummy variable in the table is  $D_{75}$  (arrivals in 1975-79), so that all coefficients in Table 2 measure wage differentials between earlier immigrant cohorts and their most recent counterparts. The results in Table 2

tend to mimic those presented in the literature: with relatively minor exceptions, the earnings of immigrants who have been in the U.S. many years are significantly higher than the earnings of recent arrivals. For example, Asian immigrants who arrived in the early 1970's report about 17 percent higher earnings than the most recent Asian arrivals in the 1980 Census. This differential increases to over 30 percent for the Asian immigrants who arrived in the early 1960's, and to over 40 percent for the Asians who immigrated prior to 1950. Similar qualitative conclusions can be drawn for practically all national groups. Thus the 1980 cross-section regressions in the immigrant samples, if anything, indicate the robustness of the years-since-migration variable in cross-section regressions.

The analysis in the previous section, as summarized by equation (8), shows how the growth implicit in the cross-section estimates of Table 2 can be decomposed into a within-cohort growth and an across-cohort growth. This decomposition is carried out in Table 3 for each of three cohorts which can be matched exactly in the 1970 and 1980 Census files: arrivals in 1965-1969, 1960-1964, and 1950-1959.<sup>14</sup>

Perhaps the best way to understand Table 3 is to illustrate its derivation through an example. Consider the group of white immigrants who arrived in the U.S. during the 1965-1969 period. As Table 2 shows, these individuals earn roughly 7.0 percent more than the most recent arrivals (i.e., white men who immigrated in 1975-1979). Thus the cross-section analysis predicts that over a 10-year period the 1965-69 immigrants will have increased their earnings by 7.0 percent. However, if we compare the earnings of this cohort in 1970 and 1980, as measured by the first term in (8), the cohort actually experienced an insignificant increase in earnings of about .6 percent. The difference between the cross-section growth and the within cohort growth is 6.4 percent.

This differential indicates that recently arrived immigrants in 1970 had 6.4 percent higher earnings than recently arrived immigrants in 1980, and may be indicative of a drop in quality across immigrant cohorts. Thus the decomposition of the cross-section growth predicted for this immigrant cohort indicates that, in fact, the cohort experienced no earnings growth over the decade, and that the entire cross-section growth is explained by earnings differences across immigrant cohorts.

The remaining rows of Table 3 replicate this analysis for all other cohorts in the six immigrant groups. The major finding obtained from these results is that there are significant differences in the within-cohort growth experienced by immigrants both within a national group, and across national groups. The latter fact is illustrated by the result that within-cohort growth is overwhelmingly negative for white and black immigrants, but is overwhelmingly positive for Asian, Mexican, and Cuban immigrants. Thus there are strong racial/ethnic differences in the rate at which the earnings of immigrant cohorts actually increased over the 1970-1980 period. Note also that the across-cohort growth is positive in 16 out of 18 cases, and has a t-ratio exceeding 1.5 in 12 out of 18 cases. These results are consistent with the hypothesis that the quality of immigrants has declined over succeeding immigrant cohorts. It is, in fact, interesting to note that the only important negative (but insignificant) across-cohort effect, indicating that the quality of immigrants increased over time, is obtained in the row for Cuban immigrants who arrived in 1950-1959. The across-cohort effect in this case measures how these arrivals compare with the Cubans who arrived in 1960-1969. The increase in quality suggested by Table 3 is consistent with the hypothesis that the 1959 political upheaval in Cuba led to the outflow of "better" Cuban immigrants in the first few years of the post-revolution period.

#### IV. The Relative Earnings of Immigrants

As was pointed out earlier, the decomposition of the cross-section growth in Table 3 into the within-cohort and across-cohort components is itself not free of bias. If labor market conditions worsened sufficiently between 1969 and 1979, the within-cohort growth of immigrants will be depressed by the fall in the aggregate wage level, and the across-cohort quality change will be exaggerated. It is important to note, however, that the evidence in Table 3 suggests that this cannot be the only reason for the difference between cross-section and within-cohort effects. In particular, if the fall in aggregate wage levels was neutral across immigrant cohorts and national groups, the results in Table 3 indicate that since some immigrant national groups and/or some cohorts within each group did fare quite well during the 1970-1980 period, the relative differences in the results across the 18 cohorts do measure the variance in the within-cohort growth and the secular quality change among immigrant cohorts.

The analysis in Section II suggested that a simple way of netting out the influence of the fall in aggregate demand from the estimates was to decompose the cross-section growth in immigrant earnings relative to the native-born base. One of the most remarkable findings of the cross-section literature on the relative earnings of immigrants is the existence of an overtaking age, at which point immigrants' earnings begin to surpass the earnings of statistically similar native-born workers. This overtaking point has been dated at between 10-15 years after immigration for some immigrant groups.

Before proceeding to the decomposition of the relative change in immigrant earnings over the 1970-1980 period, it is useful to provide a set of results comparable to those found in the literature. Table 4 presents the difference between the 1980 (ln) earnings of statistically similar immigrants and native-born workers, evaluated at the mean level of the socioeconomic characteristics



of the immigrant cohort.<sup>15</sup> It should be noted that the choice of the reference group - the native-born - is somewhat arbitrary since the immigrants can either be compared to the white native-born population or to the immigrants' nationality counterparts in the native-born population (i.e., Mexican immigrants would be compared to Mexican/American native-born men, black immigrants to black native-born men, etc.). Both of these strategies were pursued and since the possibility of overtaking the white native-born population was quite low for most of the immigrant groups, the analysis is presented using the latter alternative.

That is, each immigrant group is compared to its native-born counterpart.<sup>16</sup>

The results in Table 4 are consistent with the findings reported in the literature: the earnings of white immigrants overtake the earnings of statistically comparable white native-born workers within 10-15 years after immigration.<sup>17</sup> All other immigrant groups, however, have slower rates of convergence, even though the other groups are not being compared to the white native-born base.

Equation (14) presents the methodology by which the cross-section rates of convergence can be decomposed into within-cohort and across-cohort changes in relative earnings.<sup>18</sup> This decomposition is given in Table 5. Consider, for example, the results for Mexican immigrants who arrived in 1965-1969. According to the cross-section, relative to the Mexican native-born, the wage of these immigrants increases about 32 percent within the first 10 years after immigration. Note, however, that the cohort actually experienced an increase of only 18.8 percent in their relative earnings during their first decade in the U.S. The difference between these two growth rates, about 13.2 percent, is the across-cohort growth and indicates that recent Mexican immigrants in 1970 did 13.2 percent better (relative to Mexican natives) than recent Mexican immigrants in 1980. Thus relative to the Mexican native-born population, the result in Table 5 indicates that the relative quality of Mexican immigrants may have declined over time.

An additional implication of this result is that the cross-section growth underestimates the number of years that it will take the recent Mexican immigrants to overtake their statistically similar native-born counterparts. Since the earnings profiles of the Mexican native and foreign-born men are converging at relatively slow rates, the overtaking point is delayed considerably.

The remaining rows of Table 5 indicate that practically all the immigrant cohorts being analyzed experienced strong relative earnings growth over a 10-year period according to the cross-section results. The within-cohort analysis, however, shows that improvements in the relative earnings of immigrants is concentrated within specific race/ethnic groups. For example, the groups of white, Asian, and Mexican immigrants generally exhibit strong rates of convergence between immigrant and native-born earnings profiles. On the other hand, the results for blacks and Cubans show either little change in the relative earnings of immigrants or a deterioration in their relative earnings over the 1970-1980 decade.

The results in Table 5 also show that the rate of growth in relative immigrant earnings given by the cross-section analysis often exceeds the actual rate of growth experienced by the immigrant cohort. The across-cohort growth is positive and has a t-statistic exceeding 1.5 in 10 of the 18 cohorts under analysis. These positive across-cohort effects state that, for the same number of years in the U.S., immigrants in earlier cohorts do better (relative to natives) than immigrants in more recent cohorts. Thus the results in Table 5 are again consistent with the hypothesis that the quality of immigrant cohorts has been falling over time for many immigrant groups.

It can, of course, be argued that the across-cohort effects are only capturing the fall in demand for immigrant labor that presumably occurred during the 1970's. This argument, however, is not sufficient to explain the results in Table 5 since the variation in across-cohort effects across and

within immigrant groups is quite large. For example, why are the across-cohort changes larger for black and Cuban immigrants than they are for white and Asian immigrants? Further, why are the across-cohort effects so different within specific groups? In the white sample, for instance, two of the across-cohort effects are negative (and insignificant), while one is significantly positive and numerically large. The demand shift hypothesis cannot explain these variations unless it is also argued that demand varied systematically not only across national groups, but also within national groups according to the years-since-migration. Finally, the demand shift hypothesis must also assume that the demand for immigrant labor declined relative to the demand for native-born labor. The evidence on any of these assumptions is, at present, nonexistent.

The results in Tables 3 and 5, therefore, raise important doubts about the validity of the inference drawn from cross-section studies that immigrants "assimilate" rapidly in the U.S. labor market. It is important to note that these effects, by focusing solely on the years-since-migration variable, are measuring the impact of assimilation net of aging effects. The effect of aging on the relative earnings of immigrants would not be very important if the age coefficients (more precisely, the coefficients of potential labor market experience) were roughly similar in the native-born and foreign-born earnings functions. The regressions in Appendix Table A2, however, suggest that this is not the case. Thus it is worthwhile to conclude the analysis by presenting estimates of the change in the relative wage of immigrants over a 10 year period due solely to the fact that the men are 10 years older in 1980 than in 1970.

Using the 1980 cross-section regression in equation (3), the earnings of immigrants in a particular cohort with  $T$  years of potential labor market experience can be defined by:

$$\hat{y}_{i,T} = \bar{Z}\hat{\theta}_i + \hat{\rho}_i T + \hat{\lambda}_i T^2, \quad (15)$$

where  $\bar{Z}$  is the vector of all the socioeconomic characteristics except for experience and experience squared, and the subscript "i" indicates that the parameters are drawn from the cross-section regression estimated in the immigrant sample. The predicted earnings for an immigrant who is 10 years younger, holding all other factors constant, is given by:

$$\hat{y}_{i,T-10} = \bar{Z}\hat{\theta}_i + \hat{\rho}_i(T-10) + \hat{\lambda}_i(T-10)^2. \quad (16)$$

Thus the change in immigrant earnings due solely to the aging of the immigrant over the decade is:

$$\Delta_i = 10\hat{\rho}_i + \hat{\lambda}_i(20T-100). \quad (17)$$

Using the 1980 cross-section estimated in the sample of the native-born leads, of course, to a similar expression for the aging effect experienced by statistically similar native-born men:

$$\Delta_n = 10\hat{\rho}_n + \hat{\lambda}_n(20T-100). \quad (18)$$

Hence the change in the relative earnings of immigrants due purely to aging is given by:

$$\Delta_i - \Delta_n = 10(\hat{\rho}_i - \hat{\rho}_n) + (\hat{\lambda}_i - \hat{\lambda}_n)(20T-100). \quad (19)$$

Equation (19) illustrates the obvious fact that the relative earnings of immigrants are affected by aging only if the coefficients of the age variables differ between the immigrant and native-born earnings functions.

Table 6 presents the estimated aging effects, as defined by equation (19), for each of the 18 cohorts under analysis. The obvious implication of these results is that for four of the six immigrant groups, pure aging effects lead to a deterioration of the relative earnings of immigrants over time. This deterioration is not only statistically significant but is also numerically important. For example, the fact that the immigrant men are 10 years older in 1980 than in 1970 lowers the relative earnings of Asians by 15-17 percent, lowers the relative earnings of Mexicans by 7.5 percent, lowers the relative earnings of Cubans by 10-12 percent, and lowers the relative earnings of other Hispanics by 10-11 percent. If these quantities are added to the within-cohort assimilation effects presented in Table 5, it quickly becomes apparent that, in fact, the relative earnings of immigrants, as a result of relatively low assimilation rates and detrimental aging effects, simply did not increase very much in the 1970-1980 decade.

The other two immigrant groups - whites and blacks - have aging effects which are positive, but generally insignificant. Only one of the six aging effects estimated for these two groups has a t-ratio exceeding 1.5. Moreover, in the case of whites the impact of aging on the relative earnings of immigrants is numerically trivial. Thus Table 6 reveals that the pure impact of aging seldom works in favor of the immigrants and, in fact, often works to their detriment.

## V. Summary

This paper has conducted a reexamination of the empirical basis for two "facts" concerning immigrant wage growth which seem to be found in most cross-section empirical studies of the problem: (1) the earnings of immigrants grow rapidly as they assimilate into the United States; and (2) this rapid growth also leads to immigrants overtaking the earnings of the native-born within 10-15 years after arrival.

The study in this paper stresses the differences between cross-section and cohort analyses of earnings determination. In particular, cross-section studies of immigrant earnings growth confound the true assimilation impact with across-cohort changes in immigrant quality. The analysis of 18 specific immigrant cohorts in the 1970 and 1980 Public Use Samples of the U.S. Census led to three major results:

1. The earnings of a cohort of immigrants grow at a much slower rate than that predicted by cross-section studies. Over the 1970-1980 decade, the cross-section regression overestimated the true rate of growth experienced by immigrants by as much as 20 percentage points in some immigrant cohorts.

2. The earnings growth of immigrant cohorts relative to the native-born are again greatly overestimated by cross-section analysis. The empirical study of specific immigrant cohorts shows that the relative earnings of many of these cohorts experienced little change, or even a slight decline, over the 1970-1980 period even though the cross-section regression predicts rapid growth in the relative earnings of immigrants.

3. These results imply that the across-cohort change in immigrant earnings is quite significant, with earlier cohorts earning more at every point of their U.S. labor market career than more recent cohorts. Although part of this across-cohort result may be due to a hypothesized fall in demand for immigrant labor, the results are also consistent with the hypothesis that the quality of immigrant cohorts has experienced a secular decline.

The analysis in this paper, therefore, raises serious questions about the economic interpretation of immigrant behavior in the labor market and about the policy question of what is the contribution of immigrants to the United States. The main lesson of this paper, however, is that cross-section studies of immigrant earnings provide few, and misleading, insights into the process of how immigrants assimilate in the labor market. More generally, the results of the cohort analysis

make it clear that an understanding of the immigrant experience in the U.S. cannot be obtained in a vacuum free of an institutional framework. The immigration experience cannot be understood without the introduction into the model of the parameters of admission policies, the recurring political and economic upheavals in sending countries, and the shifts in labor demand for native- and foreign-born labor. The study of immigrant earnings, within this institutional framework, will surely lead to a much deeper understanding of the immigration experience.

Appendix

TABLE A1

DEFINITION OF INDEPENDENT VARIABLES IN REGRESSION

EDUC = years of completed schooling.

EXPER = Age - EDUC - 6.

EXPER2 = EXPER squared.

MAR = 1 if married, spouse present;  
0 otherwise.

HLTH = 1 if health limits work;  
0 otherwise.

SMSA = 1 if resides in SMSA;  
0 otherwise.

D75 = 1 if immigrated in 1975-1979;  
0 otherwise.

D70 = 1 if immigrated in 1970-1974;  
0 otherwise.

D65 = 1 if immigrated in 1965-1969;  
0 otherwise.

D60 = 1 if immigrated in 1960-1964;  
0 otherwise.

D50 = 1 if immigrated in 1950-1959;  
0 otherwise.

D40 = 1 if immigrated prior to 1950;  
0 otherwise.



TABLE A2  
Wage Regressions\*  
Dependent Variable=ln(Wage Rate/10)

| GROUP/<br>VARIABLE | WHITES  |           | BLACKS  |           | ASIANS  |          |
|--------------------|---------|-----------|---------|-----------|---------|----------|
|                    | COEFF.  | t         | COEFF.  | t         | COEFF.  | t        |
| 1980 Native:       |         |           |         |           |         |          |
| EDUC               | .0594   | (29.46)   | .0493   | (16.46)   | .0531   | (19.94)  |
| EXPER              | .0296   | (12.83)   | .0076   | (2.31)    | .0343   | (12.75)  |
| EXPER2             | -.0004  | (-9.48)   | -.0001  | (-.93)    | -.0005  | (-10.08) |
| MAR                | .2179   | (14.44)   | .1988   | (11.22)   | .2020   | (12.27)  |
| HLTH               | -.1828  | (-8.38)   | -.1409  | (-4.62)   | -.1320  | (-3.76)  |
| SMSA               | .1917   | (14.51)   | .3102   | (13.99)   | .1814   | (8.33)   |
| CONSTANT           | -2.4023 | (-56.74)  | -2.2654 | (-38.57)  | -2.3186 | (-42.91) |
| 1980 IMM:          |         |           |         |           |         |          |
| EDUC               | .0551   | (16.56)   | .0426   | (8.88)    | .0581   | (41.75)  |
| EXPER              | .0391   | (8.39)    | .0235   | (3.79)    | .0120   | (7.04)   |
| EXPER2             | -.0006  | (-7.28)   | -.0004  | (-3.33)   | -.0003  | (-7.40)  |
| MAR                | .1541   | (5.16)    | .0602   | (1.78)    | .1579   | (11.69)  |
| HLTH               | -.1537  | (-2.80)   | -.0268  | (-.28)    | -.1201  | (-3.70)  |
| SMSA               | .1348   | (2.87)    | .2187   | (2.42)    | .0175   | (.73)    |
| D75                | -2.4076 | (-26.01)  | -2.4107 | (-18.11)  | -2.2785 | (-59.61) |
| D70                | -2.4265 | (-25.65)  | -2.2166 | (-16.35)  | -2.1047 | (-53.03) |
| D65                | -2.3378 | (-24.42)  | -2.1325 | (-15.13)  | -1.9943 | (-48.47) |
| D60                | -2.2468 | (-22.96)  | -2.2126 | (-14.89)  | -1.9271 | (-43.38) |
| D50                | -2.2349 | (-23.54)  | -2.2526 | (-15.35)  | -1.9387 | (-43.26) |
| D40                | -2.3218 | (-23.15)  | -2.2192 | (-15.90)  | -1.8658 | (-39.65) |
| 1970 Native:       |         |           |         |           |         |          |
| EDUC               | .0690   | (49.60)   | .0579   | (36.64)   | .0589   | (8.41)   |
| EXPER              | .0388   | (29.63)   | .0262   | (18.32)   | .0385   | (6.35)   |
| EXPER2             | -.0006  | (-18.72)  | -.0004  | (-10.75)  | -.0007  | (-4.53)  |
| MAR                | .1822   | (18.18)   | .1647   | (17.09)   | .2347   | (5.50)   |
| HLTH               | -.0925  | (-6.24)   | -.0161  | (-.91)    | -.2205  | (-2.59)  |
| SMSA               | .2175   | (27.85)   | .3108   | (31.58)   | .0252   | (.33)    |
| CONSTANT           | -2.5125 | (-120.90) | -2.6055 | (-117.09) | -2.2652 | (-18.38) |
| 1970 IMM:          |         |           |         |           |         |          |
| EDUC               | .0466   | (24.22)   | .0647   | (5.13)    | .0705   | (10.22)  |
| EXPER              | .0403   | (17.52)   | .0150   | (1.00)    | .0045   | (.61)    |
| EXPER2             | -.0007  | (-13.34)  | .0000   | (.50)     | .0000   | (.10)    |
| MAR                | .1439   | (8.37)    | -.0055  | (-.06)    | .1098   | (2.04)   |
| HLTH               | -.1162  | (-3.92)   | .1267   | (.64)     | -.2165  | (-1.97)  |
| SMSA               | .1273   | (6.66)    | .4137   | (2.43)    | -.0811  | (-1.14)  |
| D65                | -2.1748 | (-57.52)  | -2.5982 | (-9.71)   | -2.2160 | (-15.85) |
| D60                | -2.0602 | (-51.69)  | -2.5375 | (-8.92)   | -2.0667 | (-14.45) |
| D50                | -2.0557 | (-53.85)  | -2.5593 | (-9.12)   | -2.0034 | (-13.59) |
| D40                | -2.0375 | (-48.95)  | -2.7399 | (-8.90)   | -1.9732 | (-12.44) |

R<sup>2</sup>

.174

.128

.169

TABLE A2, continued  
Wage Regressions\*

| GROUP/<br>VARIABLE | MEXICANS |          | CUBANS  |          | OTHER<br>HISPANICS |          |
|--------------------|----------|----------|---------|----------|--------------------|----------|
|                    | COEFF.   | t        | COEFF.  | t        | COEFF.             | t        |
| 1980 Native:       |          |          |         |          |                    |          |
| EDUC               | .0539    | (25.54)  | .0602   | (5.56)   | .0609              | (26.89)  |
| EXPER              | .0181    | (6.90)   | .0296   | (2.21)   | .0260              | (9.46)   |
| EXPER2             | -.0002   | (-4.26)  | -.0004  | (-1.56)  | -.0003             | (-6.06)  |
| MAR                | .1944    | (11.52)  | .1908   | (2.64)   | .1963              | (12.03)  |
| HLTH               | -.1262   | (-4.44)  | -.2018  | (-1.58)  | -.1353             | (-5.22)  |
| SMSA               | .1568    | (8.63)   | .1543   | (1.17)   | .1510              | (8.93)   |
| CONSTANT           | -2.2628  | (-47.32) | -2.4771 | (-9.36)  | -2.4131            | (-49.15) |
| 1980 IMM:          |          |          |         |          |                    |          |
| EDUC               | .0286    | (10.91)  | .0331   | (13.28)  | .0469              | (27.10)  |
| EXPER              | .0106    | (2.67)   | -.0020  | (-.56)   | .0114              | (4.25)   |
| EXPER2             | -.0002   | (-3.43)  | -.0000  | (-.32)   | -.0002             | (-3.43)  |
| MAR                | .1303    | (5.37)   | -.1564  | (6.83)   | .1183              | (7.44)   |
| HLTH               | -.1083   | (-2.46)  | -.1363  | (-2.76)  | -.0690             | (-1.80)  |
| SMSA               | .1689    | (5.60)   | -.0157  | (-.21)   | .0185              | (.44)    |
| D75                | -2.1721  | (-29.04) | -1.9783 | (-19.05) | -2.1771            | (-35.91) |
| D70                | -1.9714  | (-26.21) | -1.6102 | (-16.31) | -2.0172            | (-32.96) |
| D65                | -1.8526  | (-23.90) | -1.6119 | (-16.40) | -1.9440            | (-30.98) |
| D60                | -1.8218  | (-22.51) | -1.4601 | (-15.07) | -1.8619            | (-28.73) |
| D50                | -1.7296  | (-21.17) | -1.4893 | (-15.00) | -1.8192            | (-27.36) |
| D40                | -1.7921  | (-21.06) | -1.3115 | (-11.81) | -1.7738            | (-25.09) |
| 1970 Native:       |          |          |         |          |                    |          |
| EDUC               | .0635    | (18.71)  | .0488   | (1.39)   | .0606              | (13.10)  |
| EXPER              | .0385    | (11.51)  | .1120   | (3.95)   | .0378              | (8.56)   |
| EXPER2             | -.0006   | (-7.20)  | -.0026  | (-3.51)  | -.0006             | (-5.71)  |
| MAR                | .2284    | (8.79)   | -.0752  | (-.32)   | .1902              | (5.62)   |
| HLTH               | -.0750   | (-1.81)  | -.2708  | (-.37)   | -.0396             | (-.85)   |
| SMSA               | .2304    | (10.13)  | -.0128  | (-.03)   | .2032              | (7.49)   |
| CONSTANT           | -2.6573  | (-53.69) | -2.4858 | (-3.44)  | -2.4719            | (-35.86) |
| 1970 IMM:          |          |          |         |          |                    |          |
| EDUC               | .0280    | (4.97)   | .0363   | (5.57)   | .0448              | (7.51)   |
| EXPER              | .0292    | (4.43)   | .0116   | (1.41)   | .0337              | (4.22)   |
| EXPER2             | -.0005   | (-3.76)  | -.0003  | (-1.62)  | -.0007             | (-3.32)  |
| MAR                | .1766    | (4.08)   | .1543   | (2.63)   | .2399              | (5.05)   |
| HLTH               | .1234    | (1.73)   | -.1834  | (-1.99)  | .1476              | (1.60)   |
| SMSA               | .3611    | (7.66)   | .0832   | (.68)    | .0598              | (.70)    |
| D65                | -2.4984  | (-26.28) | -1.9549 | (-11.72) | -2.2848            | (-17.56) |
| D60                | -2.3343  | (-22.82) | -1.8175 | (-11.02) | -2.1701            | (-15.96) |
| D50                | -2.2948  | (-21.97) | -1.8504 | (-10.92) | -2.1142            | (-15.05) |
| D40                | -2.2264  | (-19.17) | -1.7065 | (-8.71)  | -2.0533            | (-12.67) |
| R <sup>2</sup>     | .116     |          | .099    |          | .122               |          |

\*See Table A1 for the definition of the variables.

TABLE A3  
Means of Independent Variables in 1980 Cross-Section\*

| GROUP/<br>VARIABLE     | YEAR OF IMMIGRATION |         |         |         |         |         |
|------------------------|---------------------|---------|---------|---------|---------|---------|
|                        | 1975-79             | 1970-74 | 1965-69 | 1960-64 | 1950-59 | <1950   |
| <u>WHITE:</u>          |                     |         |         |         |         |         |
| EDUC                   | 13.55               | 12.18   | 12.16   | 12.80   | 12.51   | 12.71   |
| EXPER                  | 18.69               | 20.75   | 23.65   | 24.67   | 27.34   | 33.92   |
| EXPER2                 | 473.38              | 549.33  | 668.69  | 728.21  | 885.94  | 1256.24 |
| MAR                    | .77                 | .80     | .84     | .79     | .83     | .81     |
| HLTH                   | .04                 | .03     | .02     | .06     | .04     | .07     |
| SMSA                   | .95                 | .95     | .95     | .95     | .94     | .90     |
| <u>BLACK:</u>          |                     |         |         |         |         |         |
| EDUC                   | 11.39               | 12.22   | 12.58   | 13.34   | 11.94   | 10.70   |
| EXPER                  | 19.27               | 19.77   | 22.13   | 22.80   | 28.39   | 32.29   |
| EXPER2                 | 472.09              | 500.57  | 591.05  | 614.57  | 961.35  | 1181.97 |
| MAR                    | .71                 | .74     | .72     | .78     | .64     | .72     |
| HLTH                   | .01                 | .03     | .02     | .03     | .03     | .06     |
| SMSA                   | .97                 | .99     | .99     | .99     | .95     | .85     |
| <u>ASIAN:</u>          |                     |         |         |         |         |         |
| EDUC                   | 13.88               | 15.29   | 15.56   | 15.82   | 14.75   | 11.59   |
| EXPER                  | 17.88               | 16.60   | 18.33   | 19.65   | 23.65   | 35.50   |
| EXPER2                 | 437.42              | 370.32  | 433.71  | 470.27  | 659.79  | 1368.97 |
| MAR                    | .81                 | .85     | .88     | .88     | .84     | .89     |
| HLTH                   | .03                 | .02     | .01     | .01     | .03     | .05     |
| SMSA                   | .95                 | .97     | .96     | .96     | .97     | .92     |
| <u>MEXICAN:</u>        |                     |         |         |         |         |         |
| EDUC                   | 6.34                | 6.65    | 6.89    | 7.17    | 8.07    | 7.45    |
| EXPER                  | 24.28               | 23.19   | 24.05   | 28.20   | 30.60   | 36.63   |
| EXPER2                 | 693.72              | 623.69  | 666.90  | 913.19  | 1093.47 | 1493.53 |
| MAR                    | .77                 | .86     | .87     | .88     | .89     | .85     |
| HLTH                   | .02                 | .03     | .04     | .04     | .05     | .08     |
| SMSA                   | .89                 | .92     | .93     | .90     | .93     | .87     |
| <u>CUBAN:</u>          |                     |         |         |         |         |         |
| EDUC                   | 11.18               | 9.80    | 10.24   | 13.10   | 11.65   | 11.21   |
| EXPER                  | 24.83               | 31.74   | 32.16   | 25.28   | 29.40   | 36.21   |
| EXPER2                 | 745.92              | 1106.12 | 1134.15 | 781.16  | 984.69  | 1386.45 |
| MAR                    | .72                 | .83     | .85     | .81     | .78     | .82     |
| HLTH                   | .06                 | .04     | .03     | .03     | .03     | .05     |
| SMSA                   | 1.00                | .99     | .99     | .98     | .98     | .96     |
| <u>OTHER HISPANIC:</u> |                     |         |         |         |         |         |
| EDUC                   | 10.93               | 10.83   | 10.97   | 11.76   | 12.30   | 11.54   |
| EXPER                  | 19.85               | 20.73   | 23.30   | 24.63   | 27.00   | 33.76   |
| EXPER2                 | 501.58              | 527.50  | 643.82  | 699.04  | 843.35  | 1256.07 |
| MAR                    | .76                 | .80     | .82     | .80     | .81     | .79     |
| HLTH                   | .02                 | .02     | .03     | .03     | .04     | .06     |
| SMSA                   | .98                 | .98     | .98     | .98     | .96     | .96     |

\*See Table A1 for the definition of the variables.

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Footnotes

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<sup>1</sup>This argument can also be made for the so-called "non-economic" immigrants (e.g., political refugees); see Borjas (1982).

<sup>2</sup>Although the cohort analysis of earnings conducted in this paper is not available in the literature, a few previous studies have addressed issues related to those discussed below. For example, Chiswick (1984) has analyzed the earnings growth of the small sample of immigrants available in the Mature Men National Longitudinal Survey. Similarly, both Chiswick (1980, Chapter 10) and DeFreitas (1981) have used the 1965 and 1970 occupation variables available in the 1970 Census to study the extent of occupational mobility in immigrant samples. The results of these studies, however, do not provide a consensus on whether or not longitudinal data leads to different results than cross-section data. In the studies of occupational mobility, for example, Chiswick finds relatively higher rates of upward mobility as immigrants assimilate in the labor market, while DeFreitas, in his analysis of black men, finds either no difference between the native-born and the foreign-born or slower rates of upward mobility for the foreign-born. In addition, the study of the longitudinal National Chicano Survey by Snipp and Tienda (1984) finds no evidence that Mexican immigrants experience relatively more upward occupational mobility than native-born Mexican/Americans.

<sup>3</sup>In some studies,  $t_i$  is defined as a vector of variables indicating the time period in which the immigrant arrived rather than a continuous variable measuring years since migration. The simpler specification is used in the discussion to focus attention on the substantive problems introduced by cross-section data.

<sup>4</sup>A simple calculation of the magnitude of the bias could, in principle, be based on the fact that some immigrants (e.g., political refugees) have no possibility for return migration, while other immigrants (e.g., Mexicans) face low return costs due to geographic circumstances. This kind of solution, however, would have to take into account the differences in observable (and unobservable) quality indices among the national groups.

<sup>5</sup>Of course, there are many reasons why the cohorts in the 1970 and 1980 Census data may not be perfectly matched. For instance, as noted earlier, the presence of emigration will lead to secular trends in the size (and quality) of a specific immigrant cohort. Similarly, institutional changes in the Census enumeration procedures may lead to different counts of immigrants (and native-born persons) in particular cohorts across Censuses. Finally, there may be age (or cohort) related differences in labor supply, self-employment propensities, and mortality rates which generate additional differences in the cohort samples included in the regressions over time. Note, however, that all these problems will impart biases on both cross-section and cohort analyses. Hence the cohort study presented below simply nets out one of the many sources of bias, that due to violations of the assumption of stationarity in the immigrant human capital stock at the time of entry.

<sup>6</sup>Equation (7) defines the cross-section growth exactly for all but one of the cohorts in the data. In particular, consider the cohort which arrived in 1950-1959. Since the 1960 cohorts are partitioned into 2 groups, the definition for cross-section growth used for this sample is given by:

$$\hat{y}_{80,50} - \hat{y}_{80,60} = \hat{\beta}_{50} - \frac{\hat{\beta}_{60} + \hat{\beta}_{65}}{2},$$

so that a simple average is used to pool the two coefficients from the 1960's.

<sup>7</sup>The decomposition of the cross-section growth into its components can also be made by pooling the 1970 and 1980 observations for a specific cohort, and including a dummy variable in the earnings function indicating the census from which the observation is drawn. It is easy to show that this methodology is identical to that given by equation (8) as long as the  $\gamma$  coefficient vector is allowed to vary across censuses but is fixed for all cohorts within a census.

<sup>8</sup>Of course, this result follows directly from the fact that all the predicted earnings terms are evaluated at a given level of socioeconomic characteristics,  $\bar{X}_k$ , so that the decompositions in this section are net of any pure aging effects. The empirical analysis below will present separate estimates of the earnings differentials created by the aging process.

<sup>9</sup>The sampling fractions for 1970 are: white native-born (.001 of the population), all other groups (.01). The 1980 sampling fractions are: black natives (.00245), black immigrants (.01651), Mexican natives (.01652), Mexican immigrants (.01638), white natives (.00042), white immigrants (.00249), all other groups (.05).



<sup>10</sup>As was noted earlier there are many reasons why in actual Census data the 1970 and 1980 cohorts of immigrant (and native-born) men are not exactly matched. In fact, the ratio of the number of immigrants in the 1980 sample to that of the 1970 sample is 1.12. The value of the same ratio for native-born men is 1.07. Thus the restriction of the sample to salaried men in the labor force - along with the age restrictions imposed on the two samples - leads to an increase in sample size over the decade. The increase in sample size, however, is relatively neutral for immigrants and native-born men since in the 1970 data 4.4 percent of the sample is foreign-born, while the same statistic in the 1980 data is 4.6 percent.

<sup>11</sup>Two points should be made about this ethnic/racial breakdown. First, the Asian sample aggregates over a wide variety of countries and cultures; hence the results for the Asian sample should be interpreted cautiously. Second, the Hispanic samples do not include the group of Puerto Rican men since Puerto Ricans born in Puerto Rico are not asked the year they migrated to the U.S. by the Census.

<sup>12</sup>Since most immigrants reside within an SMSA, the analysis was also conducted on the subsample of metropolitan residents. This estimation led to only minor changes in the results.

<sup>13</sup>The calculation of the 1969 wage rate uses the weekly hours worked reported for the Census week, while the estimated 1979 wage rate uses the usual hours worked per week in 1979.

<sup>14</sup>The cohort arriving prior to 1950 can also be matched in the two census data files. The open-ended lower interval, however, leads to the aggregation of immigrants from many different cohorts, and thus confuses the basic issues.

<sup>15</sup>More precisely, using the notation in Section II, the statistics presented in Table 4 are given by  $(\hat{y}_{80,k} - \hat{y}_{80,n})$ .

<sup>16</sup>It has been suggested that a more relevant base group would be the sample of native-born young men. Since immigrants are new entrants to the labor market, their experiences are likely to resemble those encountered by native-born youths. This comparison, however, ignores the fact that, for example, the 1960-1964 cohort of white immigrants has been in the U.S. for 17 years and is, on the average, 43.5 years old. Thus the comparison of this group with teenage workers would be quite misleading.

<sup>17</sup>An important implication of the hypothesis that there has been a secular decline in the quality of immigrants is that overtaking will occur at a later point in the life cycle in the 1980 Census than in the 1970 Census. The result in Table 4 that white immigrants in 1980 overtake the native-born after 10-15 years seems to contradict this implication since Chiswick (1978) dates overtaking at the same point using the 1970 Census. However, the definitions of "white" men vary significantly across the two studies; in this paper a distinction is made between Hispanic whites and non-Hispanic whites. In fact, given that the samples are defined identically in the two Censuses the results do show that overtaking occurs at a later point in the 1980 Census. For example, a regression estimated in the 1970 Census using a pooled sample of white native and immigrant men yields:

$$\ln w = X\gamma - .0468D65 + .0626D60 + .0603D50 + .0479D40, R^2 = .205,$$

|         |        |        |        |
|---------|--------|--------|--------|
| (-1.18) | (1.38) | (2.11) | (1.49) |
|---------|--------|--------|--------|

where the omitted dummy variable indicates native-born status. This 1970 regression implies that among white men overtaking occurs within 5-10 years

after arrival in the U.S., while the 1980 results in Table 4 reveal that overtaking (in the same racial/ethnic sample) occurs within 10-15 year after immigration. Thus over a 10 year period the overtaking age increased by 5 years, a movement consistent with the hypothesis that the quality of white immigrants has declined over time.

<sup>18</sup>The astute reader will realize that the cross-section rates of convergence implicit in Table 4 are not identical to those given by equation (13). The reason is that in Table 4 the comparison between each immigrant cohort and the native-born population is calculated at the mean level of X for each immigrant cohort, whereas the conceptually correct cross-section growth in equation (13) holds constant the values of the socioeconomic characteristics across cohorts. The reader can verify that the differences between the two experiments are minimal.

TABLE 1  
Summary Statistics

| GROUP/Year<br>of Arrival | 1970     |      |      |       | 1980     |      |      |       |
|--------------------------|----------|------|------|-------|----------|------|------|-------|
|                          | ln(WAGE) | EDUC | AGE  | N     | ln(WAGE) | EDUC | AGE  | N     |
| <b>White:</b>            |          |      |      |       |          |      |      |       |
| 1975-1979                | -        | -    | -    | -     | 1.32     | 13.5 | 38.2 | 352   |
| 1970-1974                | -        | -    | -    | -     | 1.27     | 12.2 | 38.9 | 260   |
| 1965-1969                | 1.25     | 11.7 | 33.1 | 1690  | 1.40     | 12.2 | 41.8 | 372   |
| 1960-1964                | 1.41     | 11.5 | 35.2 | 1288  | 1.52     | 12.8 | 43.5 | 329   |
| 1950-1959                | 1.42     | 11.6 | 37.2 | 3276  | 1.53     | 12.5 | 45.8 | 870   |
| <1950                    | 1.53     | 12.2 | 43.5 | 2595  | 1.47     | 12.7 | 52.6 | 578   |
| Native-Born              | 1.31     | 12.1 | 35.6 | 26045 | 1.39     | 12.8 | 43.0 | 11563 |
| <b>Black:</b>            |          |      |      |       |          |      |      |       |
| 1975-1979                | -        | -    | -    | -     | .90      | 11.4 | 36.7 | 488   |
| 1970-1974                | -        | -    | -    | -     | 1.14     | 12.2 | 38.0 | 675   |
| 1965-1969                | 1.05     | 10.7 | 33.8 | 145   | 1.26     | 12.6 | 40.7 | 524   |
| 1960-1964                | 1.18     | 11.9 | 33.6 | 67    | 1.22     | 13.3 | 42.1 | 224   |
| 1950-1959                | 1.15     | 10.6 | 38.2 | 81    | 1.11     | 11.9 | 46.3 | 175   |
| <1950                    | 1.08     | 10.1 | 45.5 | 49    | 1.08     | 10.7 | 49.0 | 219   |
| Native-Born              | .93      | 10.0 | 35.3 | 27761 | 1.11     | 11.2 | 42.2 | 7675  |
| <b>Asian:</b>            |          |      |      |       |          |      |      |       |
| 1975-1979                | -        | -    | -    | -     | 1.08     | 13.9 | 37.8 | 7315  |
| 1970-1974                | -        | -    | -    | -     | 1.34     | 15.3 | 37.9 | 5206  |
| 1965-1969                | 1.13     | 14.2 | 32.7 | 425   | 1.47     | 15.6 | 39.9 | 3420  |
| 1960-1964                | 1.29     | 14.0 | 33.4 | 195   | 1.57     | 15.8 | 41.5 | 1296  |
| 1950-1959                | 1.34     | 13.4 | 36.8 | 177   | 1.49     | 14.8 | 44.4 | 1338  |
| <1950                    | 1.26     | 11.2 | 43.9 | 152   | 1.34     | 11.6 | 53.1 | 823   |
| Native-Born              | 1.31     | 12.6 | 35.8 | 1441  | 1.44     | 13.6 | 43.0 | 9030  |
| <b>Mexican:</b>          |          |      |      |       |          |      |      |       |
| 1975-1979                | -        | -    | -    | -     | .67      | 6.3  | 36.6 | 1427  |
| 1970-1974                | -        | -    | -    | -     | .90      | 6.7  | 35.8 | 1742  |
| 1965-1969                | .67      | 6.4  | 29.2 | 415   | 1.03     | 6.9  | 36.9 | 1214  |
| 1960-1964                | .92      | 6.6  | 32.2 | 366   | 1.05     | 7.2  | 41.4 | 943   |
| 1950-1959                | .98      | 7.1  | 36.0 | 559   | 1.16     | 8.1  | 44.7 | 1284  |
| <1950                    | 1.05     | 7.4  | 42.4 | 286   | 1.04     | 7.4  | 50.1 | 609   |
| Native-Born              | 1.00     | 9.4  | 33.5 | 5064  | 1.17     | 10.3 | 40.7 | 11937 |
| <b>Cuban:</b>            |          |      |      |       |          |      |      |       |
| 1975-1979                | -        | -    | -    | -     | .72      | 11.2 | 42.0 | 273   |
| 1970-1974                | -        | -    | -    | -     | 1.04     | 9.8  | 47.5 | 1127  |
| 1965-1969                | .95      | 9.6  | 39.0 | 344   | 1.05     | 10.2 | 48.4 | 1791  |
| 1960-1964                | 1.18     | 12.2 | 35.7 | 428   | 1.32     | 13.1 | 44.4 | 2280  |
| 1950-1959                | 1.09     | 10.3 | 37.9 | 155   | 1.22     | 11.6 | 47.0 | 865   |
| <1950                    | 1.25     | 11.0 | 44.7 | 44    | 1.37     | 11.2 | 53.4 | 173   |
| Native-Born              | 1.14     | 11.6 | 34.1 | 61    | 1.27     | 12.8 | 41.2 | 473   |
| <b>Other Hispanic:</b>   |          |      |      |       |          |      |      |       |
| 1975-1979                | -        | -    | -    | -     | .89      | 10.9 | 36.8 | 2489  |
| 1970-1974                | -        | -    | -    | -     | 1.05     | 10.8 | 37.6 | 3053  |
| 1965-1969                | 1.02     | 11.1 | 31.9 | 459   | 1.15     | 11.0 | 40.3 | 2824  |
| 1960-1964                | 1.19     | 11.2 | 33.9 | 332   | 1.27     | 11.8 | 42.4 | 1781  |
| 1950-1959                | 1.31     | 12.1 | 36.7 | 227   | 1.34     | 12.3 | 45.3 | 1145  |
| <1950                    | 1.42     | 13.0 | 41.8 | 82    | 1.35     | 11.5 | 51.3 | 527   |
| Native-Born              | 1.17     | 10.8 | 34.1 | 3024  | 1.29     | 12.1 | 41.7 | 10368 |

TABLE 2  
Coefficients of Years-Since-Migration Variables in 1980 Cross-Section\*

| VARIABLE | GROUP           |                 |                  |                  |                  |                           |
|----------|-----------------|-----------------|------------------|------------------|------------------|---------------------------|
|          | White<br>Imm.   | Black<br>Imm.   | Asian<br>Imm.    | Mexican<br>Imm.  | Cuban<br>Imm.    | Other<br>Hispanic<br>Imm. |
| D70      | -.0189<br>(.39) | .1941<br>(4.51) | .1740<br>(14.32) | .2007<br>(7.75)  | .3681<br>(7.67)  | .1599<br>(8.56)           |
| D65      | .0698<br>(1.53) | .2782<br>(6.00) | .2842<br>(20.32) | .3195<br>(11.25) | .3664<br>(7.91)  | .2331<br>(12.09)          |
| D60      | .1608<br>(3.42) | .1981<br>(3.31) | .3514<br>(17.29) | .3503<br>(11.29) | .5182<br>(11.39) | .3152<br>(14.26)          |
| D50      | .1727<br>(4.37) | .1581<br>(2.40) | .3398<br>(16.79) | .4425<br>(14.90) | .4890<br>(9.93)  | .3579<br>(13.90)          |
| D40      | .0858<br>(1.92) | .1915<br>(3.01) | .4127<br>(15.78) | .3800<br>(9.96)  | .6668<br>(9.60)  | .4035<br>(11.53)          |

\*Source: Table A2. The t-ratios are given in parentheses.

TABLE 3  
Decomposition of Cross-Section Growth in Immigrant Earnings\*

| <u>GROUP/<br/>YEAR OF IMMIGRATION</u> | <u>CROSS-SECTION<br/>GROWTH</u> | <u>WITHIN-COHORT<br/>GROWTH</u> | <u>ACROSS-COHORT<br/>GROWTH</u> |
|---------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| <u>WHITE:</u>                         |                                 |                                 |                                 |
| 1965-69                               | .0698<br>(1.53)                 | .0059<br>(.20)                  | .0639<br>(1.70)                 |
| 1960-64                               | .1797<br>(3.55)                 | -.0084<br>(-.17)                | .1881<br>(4.42)                 |
| 1950-59                               | .0574<br>(1.85)                 | .0133<br>(.62)                  | .0441<br>(1.58)                 |
| <u>BLACK:</u>                         |                                 |                                 |                                 |
| 1965-69                               | .2782<br>(6.00)                 | .0020<br>(.10)                  | .2762<br>(3.52)                 |
| 1960-64                               | .0040<br>(.01)                  | -.1564<br>(-1.52)               | .1604<br>(1.65)                 |
| 1950-59                               | -.0801<br>(-1.28)               | -.2294<br>(-2.18)               | .1493<br>(1.60)                 |
| <u>ASIAN:</u>                         |                                 |                                 |                                 |
| 1965-69                               | .2842<br>(20.33)                | .1925<br>(4.55)                 | .0917<br>(2.34)                 |
| 1960-64                               | .1776<br>(8.56)                 | .1077<br>(1.80)                 | .0699<br>(1.33)                 |
| 1950-59                               | .0220<br>(1.03)                 | .0279<br>(.37)                  | -.0059<br>(-.01)                |
| <u>MEXICAN:</u>                       |                                 |                                 |                                 |
| 1965-69                               | .3195<br>(11.25)                | .1731<br>(3.72)                 | .1464<br>(3.18)                 |
| 1960-64                               | .1496<br>(5.00)                 | .0418<br>(.84)                  | .1078<br>(2.28)                 |
| 1950-59                               | .1076<br>(4.07)                 | .0959<br>(2.17)                 | .0117<br>(.28)                  |
| <u>CUBAN:</u>                         |                                 |                                 |                                 |
| 1965-69                               | .3664<br>(7.91)                 | .1077<br>(1.88)                 | .2587<br>(3.78)                 |
| 1960-64                               | .1501<br>(5.60)                 | .1049<br>(2.35)                 | .0452<br>(1.00)                 |
| 1950-59                               | .0467<br>(1.76)                 | .1163<br>(1.54)                 | -.0696<br>(-.89)                |
| <u>OTHER HISPANIC:</u>                |                                 |                                 |                                 |
| 1965-69                               | .2331<br>(12.0)                 | .0313<br>(.71)                  | .2018<br>(4.89)                 |
| 1960-64                               | .1553<br>(7.37)                 | .0018<br>(.01)                  | .1535<br>(3.34)                 |
| 1950-59                               | .0838<br>(3.61)                 | .0092<br>(.10)                  | .0746<br>(1.38)                 |

\*Source: Tables A2 and A3. The t-ratios are given in parentheses.

TABLE 4  
Wage Differentials Between The Foreign-Born  
and The Native-Born in 1980 Cross-Section\*

| VARIABLE | GROUP             |                   |                    |                    |                   |                           |
|----------|-------------------|-------------------|--------------------|--------------------|-------------------|---------------------------|
|          | White<br>Imm.     | Black<br>Imm.     | Asian<br>Imm.      | Mexican<br>Imm.    | Cuban<br>Imm.     | Other<br>Hispanic<br>Imm. |
| D75      | -.0827<br>(-2.62) | -.2665<br>(-7.48) | -.4058<br>(-31.78) | -.3052<br>(-13.77) | -.4962<br>(-8.82) | -.3243<br>(-19.55)        |
| D70      | -.0935<br>(-2.57) | -.0836<br>(-2.44) | -.2735<br>(-13.65) | -.1082<br>(-5.20)  | -.1756<br>(-3.48) | -.1754<br>(-11.31)        |
| D65      | -.0030<br>(-.28)  | .0056<br>(.59)    | -.1159<br>(-5.83)  | -.0030<br>(-.10)   | -.1904<br>(-3.97) | -.1520<br>(-8.04)         |
| D60      | .0865<br>(2.39)   | -.0845<br>(-1.42) | -.0696<br>(-1.69)  | -.0166<br>(-.59)   | -.0300<br>(-.82)  | -.0933<br>(-3.47)         |
| D50      | .0909<br>(3.93)   | -.1244<br>(-1.84) | -.1375<br>(-4.45)  | .0310<br>(1.52)    | -.0715<br>(-1.62) | -.0758<br>(-1.81)         |
| D40      | -.0040<br>(-.50)  | -.0965<br>(-1.37) | -.0996<br>(-3.74)  | -.0670<br>(-2.08)  | .0563<br>(.74)    | .0331<br>(.64)            |

\*Source: Tables A2 and A3. The t-ratios are given in parentheses.

TABLE 5  
Decomposition of Cross-Section Growth in Immigrant/Native Relative Earnings\*

| <u>GROUP/YEAR OF<br/>IMMIGRATION</u> | <u>CROSS-SECTION<br/>GROWTH</u> | <u>WITHIN-COHORT<br/>GROWTH</u> | <u>ACROSS-COHORT<br/>GROWTH</u> |
|--------------------------------------|---------------------------------|---------------------------------|---------------------------------|
| <u>WHITE:</u>                        |                                 |                                 |                                 |
| 1965-69                              | .0698<br>(1.53)                 | .0861<br>(2.30)                 | -.0163<br>(-.35)                |
| 1960-64                              | .1797<br>(3.55)                 | .0801<br>(1.97)                 | .0996<br>(2.39)                 |
| 1950-59                              | .0574<br>(1.85)                 | .0869<br>(3.17)                 | -.0295<br>(-.89)                |
| <u>BLACK:</u>                        |                                 |                                 |                                 |
| 1965-69                              | .2782<br>(6.00)                 | -.0230<br>(-.41)                | .3012<br>(3.79)                 |
| 1960-64                              | .0040<br>(.01)                  | -.1705<br>(-1.63)               | .1745<br>(1.77)                 |
| 1950-59                              | -.0801<br>(-1.28)               | -.2543<br>(-2.38)               | .1742<br>(1.82)                 |
| <u>ASIAN:</u>                        |                                 |                                 |                                 |
| 1965-69                              | .2842<br>(20.32)                | .2086<br>(4.01)                 | .0756<br>(1.61)                 |
| 1960-64                              | .1776<br>(8.56)                 | .1240<br>(1.81)                 | .0536<br>(.93)                  |
| 1950-59                              | .0220<br>(1.03)                 | .0145<br>(.10)                  | .0075<br>(.24)                  |
| <u>MEXICAN:</u>                      |                                 |                                 |                                 |
| 1965-69                              | .3195<br>(11.25)                | .1875<br>(3.75)                 | .1320<br>(2.69)                 |
| 1960-64                              | .1496<br>(5.00)                 | .0504<br>(.94)                  | .0992<br>(1.98)                 |
| 1950-59                              | .1076<br>(4.07)                 | .0983<br>(1.99)                 | .0093<br>(.22)                  |
| <u>CUBAN:</u>                        |                                 |                                 |                                 |
| 1965-69                              | .3664<br>(7.91)                 | -.2305<br>(-1.06)               | .5969<br>(2.68)                 |
| 1960-64                              | .1501<br>(5.60)                 | -.0515<br>(-.32)                | .2016<br>(1.16)                 |
| 1950-59                              | .0467<br>(1.76)                 | -.1194<br>(-.28)                | .1661<br>(.53)                  |
| <u>OTHER HISPANIC:</u>               |                                 |                                 |                                 |
| 1965-69                              | .2331<br>(12.09)                | .0868<br>(1.86)                 | .1463<br>(3.24)                 |
| 1960-64                              | .1553<br>(7.37)                 | .0552<br>(1.01)                 | .1001<br>(2.01)                 |
| 1950-59                              | .0838<br>(3.61)                 | .0440<br>(.65)                  | .0398<br>(.70)                  |

\*Source: Tables A2 and A3. The t-ratios are given in parentheses.



TABLE 6

Estimates of Aging Effect on Immigrant/Native Relative Earnings\*

| GROUP             | Year of Immigration |                   |                    |
|-------------------|---------------------|-------------------|--------------------|
|                   | <u>1965-69</u>      | <u>1960-64</u>    | <u>1950-59</u>     |
| White             | .0204<br>(.87)      | .0163<br>(.71)    | .0056<br>(.14)     |
| Black             | .0562<br>(1.55)     | .0522<br>(1.47)   | .0187<br>.32)      |
| Asian             | -.1697<br>(-8.95)   | -.1644<br>(-9.26) | -.1484<br>(-10.20) |
| Mexican           | -.0750<br>(-3.97)   | -.0750<br>(-5.16) | -.0750<br>(-5.91)  |
| Cuban             | -.0987<br>(-3.02)   | -.1538<br>(-3.60) | -.1208<br>(-3.64)  |
| Other<br>Hispanic | -.1094<br>(-6.11)   | -.1067<br>(-6.42) | -.1020<br>(-6.92)  |

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\*Source: Tables A2 and A3. The t-ratios are given in parentheses.