George J. Borjas Harvard University

February 2010



R

The employment rate of native men falls at a much faster rate than the employment rate of immigrants as the men near retirement age. The reluctance of immigrants to leave the labor market arises partly because of the eligibility requirements for Social Security benefits. A person needs to have worked in the United States for at least 10 years to qualify for benefits. Newly arrived immigrants have not yet accumulated the requisite employment credits and have greater employment rates than other comparably aged persons. The probability that an older immigrant is employed falls once the 10-year work rule is satisfied.

2

۵

There has been a historic increase in the number of both legal and illegal immigrants in the United States in recent decades. Inevitably, the number of older immigrants also grew rapidly. In 1980, 7.3 percent of persons aged 50-74 were foreign-born. By 2009, the immigrant share in this population had risen to 12.8 percent. Although much of this increase is due to the aging of foreign-born persons who migrated at a younger age, many persons also migrate to the United States when they are in their 50s and 60s. In 2009, for example, 18.9 percent of the foreign-born population aged 50-74 had been in the United States fewer than 10 years.

This paper examines the labor supply behavior of older immigrant men, and documents how immigrant labor supply differs from native labor supply as the two groups near retirement age.<sup>1</sup> There are two crucial differences between the age-employment profiles of older immigrant and native men. First, native employment rates decline at a much faster rate as they near retirement. Second, there is a crossover point in the two age-employment profiles in the late 50s or early 60s. Before that crossover age, natives tend to have larger employment rates. After the crossover age, natives have lower employment rates. The two age-employment profiles then converge around the age of 70.

The analysis argues that the greater reluctance of immigrants to exit the labor market as they near retirement age results partly from the incentives introduced by the eligibility requirements for Social Security benefits. Even after reaching the Social Security retirement age, a person needs to have been employed in the United States for at least 40 quarters to qualify for those benefits. The 10-year work rule will typically have no impact on the labor supply decisions of native men in their 50s or 60s. They typically acquired the requisite employment credits decades earlier. Many older immigrants, however, have only recently arrived in the United States (and even immigrants who arrived at a younger age may not have yet accumulated the 40 quarters of employment). The 10-year work rule can then have a substantial impact on labor supply as immigrants optimize their time allocation to ensure that they eventually qualify for the substantial increase in lifetime wealth provided by the Social Security system.<sup>2</sup>

<sup>\*</sup> Robert W. Scrivner Professor of Economics and Social Policy, Harvard Kennedy School; and Research Associate, National Bureau of Economic Research. This research was supported by the U.S. Social Security Administration through grant #10-P-98363-1-04 to the National Bureau of Economic Research as part of the SSA Retirement Research Consortium. The findings and conclusions expressed are solely those of the author and do not represent the views of SSA, any agency of the Federal Government, or the NBER. I am grateful to Daniel Hamermesh and two referees for helpful comments and suggestions.

<sup>&</sup>lt;sup>1</sup> Although some early studies examined how both earnings and labor supply adjust over the immigrant's life cycle (Carliner, 1980), almost all of the subsequent literature focuses on the evolution of wages. The literature on immigrant labor supply includes Duleep and Sanders (1993), Baker and Benjamin (1997), Borjas (2003), Kaushal (2009) and Lopez and Lozano (2009). The Kaushal study is related to the analysis in this paper since it examines the impact of the Supplemental Security Insurance program (SSI) on the labor supply of elderly immigrants.

<sup>&</sup>lt;sup>2</sup> An additional set of Social Security-related incentives is not explored in this paper. In particular, the payoff per additional year worked will differ between immigrants and natives even after the 10-year work rule is satisfied because older immigrants, on average, have worked fewer years in the United States than older natives.

The paper uses data drawn from the 1960-2000 U.S. Censuses to examine how the eligibility requirements in Social Security differentially influence the labor supply decisions of older immigrants. The evidence reveals that the 10-year work rule has a substantial impact on immigrant labor supply behavior. Immigrants in their 50s who have not yet accumulated the required employment credits have much greater employment rates than otherwise comparable persons. Once the 10-year work rule is satisfied, the probability that an older immigrant receives Social Security retirement benefits rises significantly and his probability of employment drops by 7 to 11 percentage points.

#### ۲

The empirical analysis uses data drawn from the 1960-2000 Integrated Public Use Microdata Series (IPUMS) of the U.S. Census. The 1960 and 1970 data files provide a 1 percent random sample of the population, while the post-1970 files provide a 5 percent sample. Persons who are not citizens or who are naturalized citizens are classified as immigrants; all other persons are classified as natives. The sample consists of "older" men aged 50-74 who do not reside in group quarters.<sup>3</sup>

Figure 1 illustrates the trend in the immigrant share of this older population. The bold lines use the 1960-2000 Census data. The immigrant share among men aged 50-74 fell from 14.9 percent to 7.0 percent between 1960 and 1980, but rose back to 10.8 percent by 2000. The "dashed" lines in the figure use data from the March Current Population Surveys (CPS) to illustrate the post-2000 trend. It is evident that the immigrant share in the older population has continued to rise at a fast pace. By 2009, 12.4 percent of older men were foreign-born.

Part of the increase in the immigrant share cannot be attributed to the aging of immigrants who arrived in the United States at younger ages. To illustrate, I define a "recent" immigrant as someone who migrated in the 10-year period prior to the census cross-section. I then computed the "recent immigrant share" as the ratio of the number of recent immigrants to the total population.<sup>4</sup> Figure 1 also shows that the recent immigrant share in the older population has been rising rapidly, from 0.9 percent in 1980 to 1.8 percent in 2000, and the CPS data show that this rise continued after 2000. In fact, the shares reported in Figure 1 suggest that around 20 percent of the population of older immigrant men is composed of persons who have been in the United States fewer than 10 years.<sup>5</sup>

Gustman and Steinmeier (2000) present a good discussion of how the Social Security benefits formula differentially affects immigrants and natives.

<sup>3</sup> Recent work by Trent, Davern, and Stevenson (2010) shows that the 2000 Census file gives inaccurate counts of the population of persons aged 65 or more. It is unclear how those Census errors influence the results reported in this paper. To assess the sensitivity of the results, however, I estimated the main regression models using the 1980-1990 Censuses (surveys that are unaffected by the inaccurate counts) and the results were qualitatively similar to those reported below.

<sup>4</sup> The recent immigrant share cannot be calculated in the 1960 Census because that survey does not report detailed information on the year of immigration for foreign-born persons.

<sup>5</sup> Moreover, some immigrants will not have accumulated the requisite work credits even after living in the United States for 10 years. In 2000, for example, 22.7 percent of immigrant men (aged 50-61) who arrived between 1985 and 1989 did not work in 1999. Hence the number of immigrants who have been in the country more than 10 years overstates the number that will qualify for Social Security retirement benefits. This issue will be discussed in more detail below.

This fact can generate important differences in labor supply behavior between immigrants and natives as the two groups reach retirement age. After all, a relatively large number of older immigrants will reach the retirement age thresholds of 62 or 65 built into the Social Security system prior to their having worked in the United States for 10 years.<sup>6</sup> Social Security benefits, however, are granted only to persons who have worked at least 40 quarters in the United States.<sup>7</sup> The 10-year work rule implies that a person's Social Security wealth (i.e., the present value of lifetime benefits a person can expect to receive over his lifetime) jumps dramatically (from zero) after the 40<sup>th</sup> quarter of employment. In addition, persons who qualify for Social Security benefits also qualify for Medicare Part A benefits at age 65. The value of the benefits provided by the Medicare program generates an even greater increase in the present value of lifetime wealth after the 40<sup>th</sup> quarter of employment. Many immigrant men in their 50s, therefore, will be keenly aware of the financial value associated with accumulating the 40<sup>th</sup> quarter of employment, while most native men will have accumulated the requisite 40 quarters much earlier in their working lives.

It is also important to emphasize that the definition of "a quarter of employment" is quite generous. In 2010, a quarter "counts" towards the 10-year work rule if a person earns at least \$1,090 in that quarter.<sup>8</sup> Even a worker earning the minimum wage and working only four 40-hour weeks during the quarter meets this threshold. Since the per-quarter earnings threshold is likely to be met by most workers, the 10-year work rule can have a substantial impact on work incentives at the extensive margin of a worker's labor supply decision, i.e., the decision of whether or not to work in a given quarter.<sup>9</sup>

As they attempt to satisfy the 10-year work rule, therefore, some older immigrant men will have much greater incentives to enter the labor market than comparable native men. The additional labor supply provided by immigrants may also affect the slope of the age-employment profile, as fewer immigrants withdraw from the labor market as retirement age nears. In short, the 10-year work rule will likely flatten the age-employment profile of older immigrants relative

<sup>&</sup>lt;sup>6</sup> In 1983, Congress enacted a gradual increase in the age for collecting full Social Security retirement benefits. In particular, the retirement age at which a worker can collect full benefits is now increasing from 65 to 67 over a 22-year period. The first birth cohort affected by this increase is composed of persons born in 1938. Hence the increase in retirement age did not go into effect until after 2000. This change in the Social Security retirement age does not affect the empirical analysis in this paper because most of the empirical evidence is based on the trends in labor supply between 1980 and 2000.

<sup>&</sup>lt;sup>7</sup> The 40 quarters of employment need not be consecutive.

<sup>&</sup>lt;sup>8</sup> In 2010, a worker earned 1 credit (up to a total of 4 per year) for every \$1,090 of covered earnings. This method for "counting" quarters worked, therefore, suggests that if a person works one month during the year and earns \$4,360 in that month, he would get credit for a full year (i.e., 4 quarters) of work.

<sup>&</sup>lt;sup>9</sup> Other aspects of the Social Security benefit formula may affect labor supply at the intensive margin. For instance, monthly social security benefits depend on a person's average earnings in a highly nonlinear (and progressive) way. A worker's Average Indexed Monthly Earnings (AIME) is calculated by indexing the worker's past earnings to changes in average wage levels over the worker's lifetime and then averaging them. In 2010, monthly benefits were calculated as follows: 90 percent of the first \$680 of AIME, plus 32 percent of the next \$3,420, and 15 percent of any earnings above that level (up to a cap). An immigrant's AIME will be very sensitive to the age at migration because the average is carried out over 40 years of lifetime work (regardless of how long the immigrant has been in the United States).

to natives, and may even reverse the direction of the employment gap between immigrants and natives in their late 50s and early 60s.<sup>10</sup>

I document the labor supply differences between older immigrants and natives by focusing on two alternative measures of employment: (1) the probability that a person worked during the Census week; and (2) the fraction of weeks worked in the calendar year prior to the Census (including all persons who work zero weeks). It is instructive to begin the descriptive analysis by comparing the employment propensities of immigrants and natives in the 2000 crosssection. Figure 2 illustrates the age-employment profiles for older immigrants and natives using both of the employment variables.

Regardless of how employment is defined, natives in their early 50s have higher employment rates than comparably aged immigrants. At age 50, for example, the employment rate for native men is 82.3 percent, while the employment rate for immigrant men is 75.7 percent. The figure also reveals, however, a much faster decline in the employment rate of natives as the groups near retirement age. By age 63, in fact, the native employment advantage has been reversed: the employment rate for immigrants is 47.8 percent, while the employment rate for natives is 43.3 percent. In other words, there has been a 10.7 percentage point shift in the employment rate of immigrants relative to natives between the ages of 50 and 63 (from -6.6 percent to +4.1 percent).

Of course, these empirical regularities are difficult to interpret because the cross-section age-employment profiles illustrated in Figure 2 contaminate aging and cohort effects in the immigrant population (Borjas, 1985). The aging effect arises because immigrants acquire relatively more human capital than native workers as they accumulate experience in the U.S. labor market, and their labor supply may adjust accordingly. Cohort effects arise because there may be permanent differences in skills across immigrant waves, and these permanent skill differentials might lead to differences in labor supply.

It turns out, however, that relatively flat age-employment profiles and crossover points are a feature of the data for immigrants who enter the country in their 50s even after adjusting for the existence of aging and cohort effects. Panel A of Figure 3 uses the 1970-2000 Censuses to construct the age-employment profile of a particular cohort of immigrants, where a cohort is defined in terms of both age at arrival and calendar year of arrival. To simplify the exposition, the figure considers immigrants who arrived in the United States between the ages of 50 and 54. In addition, I consider three year-of-arrival cohorts: those arriving in 1965-69, 1975-79, or 1985-89. By judiciously using the data provided by the repeated cross-sections, one can then "track" the specific immigrant cohorts across Censuses and compare their labor supply behavior to that of comparably aged natives.<sup>11</sup>

To more easily understand the figure, it is instructive to track the employment rate of a specific cohort of older immigrants across Censuses. In particular, consider the group of

<sup>&</sup>lt;sup>10</sup> As with the immigrant influx among prime-age workers, there are substantial differences in the skills of older immigrants. The rise in the immigrant share for older men was steepest in the sample of high school dropouts. In 1980, 7.8 percent of older workers with less than a high school education were foreign-born. By 2000, this statistic had risen to 19.3 percent. In contrast, the rise in the immigrant share among older college graduates was modest, from 7.7 percent in 1980 to 11.0 percent in 2000.

<sup>&</sup>lt;sup>11</sup> It is well known that this tracking of immigrant cohorts across Census cross-sections is contaminated by non-random emigration rates in the immigrant population. Remarkably little data is available on the size and composition of return migrants. As a result, it is difficult to cleanse the synthetic cohorts for the effects of selective return migration; see Borjas and Bratsberg (1996).

immigrants who immigrated between 1965 and 1969 and were 50-54 years old at the time of arrival. At the time of entry in 1970, this immigrant group worked 80.4 percent of the year, while a comparably aged group of native persons worked 87.4 percent of the time available (the native profile is given by the corresponding dashed line in the figure).

Fast-forward 10 years. By 1980, the original immigrant cohort and the comparison group of natives are 60-64 years old. Figure 3 shows that a crossover has occurred, and that immigrants now work a larger fraction of the year than natives: 69.3 versus 60.3 percent. Finally, we can move forward to the 2000 Census when both groups are 70-74 years old. By 2000, the fraction of weeks worked by the two groups is roughly similar; both immigrants and natives work roughly 20 percent of the time.

Figure 3 shows that the age-employment profile for this particular cohort of immigrants is flatter than for comparably aged natives, crosses that of natives at some point before retirement age, and that the two profiles tend to converge after retirement age. In fact, the figure shows that this general pattern characterizes the experience of other newly arrived immigrant cohorts as well.

In contrast, Panel B illustrates the age-employment profiles of immigrants who arrived at younger ages. Although these profiles also show a relative increase in employment as immigrants age, the increase is small when compared to the employment increase experienced by immigrants who arrived at older ages. Consider, for example, the immigrants who arrived in 1950-1959 and were 50-54 years old at the time of the 1980 Census. This cohort of immigrants entered the country when they were in the 20s or early 30s. The employment rate of this group in 1980 is essentially equal to that of natives: both groups work about 85 percent of the time. By 1990, when both groups are 60-64 years old, the fraction of time worked is about 10 percentage points larger for immigrants, and the two profiles again converge by 2000. However, the 10 percentage point increase in relative employment is far smaller than the 20 to 30 percentage point shift in relative employment experienced by the immigrant cohorts that arrived at older ages and illustrated in Panel A of the figure.

Figure 3 also documents the presence of sizable cohort effects. The cohort effect can be visualized as the vertical gap in employment rates between immigrants and natives at the time of entry in Panel A. For example, recently arrived immigrants in 1970 worked 80.4 percent of the year, as compared to 87.4 percent for natives, for a gap of -7.0 percentage points. In 1980, recently arrived immigrants worked 67.6 percent of the year, as compared to 84.0 percent for comparably aged natives, for a gap of -16.4 percentage points. Finally, in 1990, recently arrived immigrants worked 64.0 percent of the year, as compared to 83.4 percent for natives, for a gap of -19.6 percentage points. Therefore, there was a systematic decline in the relative employment propensity of immigrants across successive waves. This decline, of course, mirrors the well-documented decline in the relative earnings of successive immigrant waves over the same period.

As noted above, I introduce a simple hypothesis to explain the empirical regularity that older immigrants (particularly those who are recent arrivals to the United States) experience a labor supply "bump" as they near retirement age. In particular, the excess labor supply of newly arrived older immigrants results partly from the incentives introduced by the 10-years-of-work eligibility requirement for Social Security and Medicare benefits. This 10-year work rule will not influence the labor supply behavior of native-born men, as they will likely have accumulated far more than 10 years of employment long before they turn 50. Similarly, the 10-year work rule will not influence the labor supply decision of immigrants who arrived at younger ages. However, the 10-year work rule can have a strong influence on the labor supply decisions of

many older immigrants since a significant number of these immigrants have lived in the United States for a relatively short time.

In fact, the number of immigrants who cannot satisfy the 10-year work rule unless they provide "excess" labor supply as they near retirement age is substantial and growing. To illustrate, I calculated the fraction of immigrant men who cannot satisfy the 10-year work rule at age 62 (i.e., a measure of the ineligibility rate). Put differently, I used the available information on an immigrant's age at migration to determine if a worker aged 62 or less will have lived in the United States for less than 10 years (and hence be ineligible for retirement benefits) at age 62. Similarly, I determined if an immigrant aged 63 or more had lived in the United States for less than 10 years at the time he turned 62.

It is important to note that this exercise uses the number of years that the immigrant has lived in the United States to determine whether the immigrant is eligible to receive Social Security benefits when he reaches the threshold age of 62. As I have documented, however, employment rates of older immigrants in their 50s are far below 100 percent, so that many immigrants who have lived in the United States even more than 10 years will still be ineligible for Social Security benefits because they have not worked the requisite number of quarters. In other words, the variable "years lived in the United States" is a fuzzy proxy for the "quarters of employment" variable that determines Social Security eligibility. Note, however, that the observed ineligibility rates would *understate* the true fraction of ineligible persons in the older immigrant population.

Figure 4 shows the age-profile for the observed ineligibility rate. In 2000, the typical immigrant aged 60 had a 15.2 percent probability of not qualifying for retirement benefits when he reached age 62. Similarly, 31.2 percent of immigrants aged 70 were not eligible for retirement benefits when *they* turned 62. In fact, around 20 to 30 percent of immigrants past the age of 62 were not eligible for retirement benefits at the age of 62. Figure 4 also shows that the ineligibility rate has risen over time. In 1980, only about 15 percent of persons aged 63-67 did not satisfy the 10-year work rule. By 2000, nearly 20 percent did not satisfy the 10-year work rule. The 10-year work rule, therefore, can have a quantitatively important impact on the work incentives of the older immigrant population.<sup>12</sup>

I now use the 1980-2000 Census data to conduct a more formal analysis of the determinants of the labor supply of older immigrants, with a specific focus on the impact of Social Security eligibility.<sup>13</sup> The simplest version of the regression model is:

(1) 
$$p_{ij} = \delta A_j + \alpha y_j + \beta C_j + \gamma_i^0 \pi_j^0 + \gamma_i^1 \pi_j^1 + \lambda_i E_j + \varepsilon_{ij}$$

(2) 
$$p_{nl} = \delta A_l + \gamma_n^0 \pi_l^0 + \gamma_n^1 \pi_l^1 + \lambda_n E_l + \varepsilon_{nl},$$

<sup>12</sup> Although the identification strategy used in this paper focuses on the 10-year work rule, there have been changes in the Social Security benefits formula over time that could, in principle, provide additional variation. For instance, there was a gradual elimination of the earnings test for Social Security benefits. Further, as noted above, the age at which a person can collect full Social Security benefits began to increase after 2000. The regression model in equations (1) and (2) cannot use this time-series variation as an identification strategy since the variation is absorbed by the period effects.

<sup>13</sup> I do not use the data from the 1960 and 1970 Censuses because the number of older immigrants surveyed (particularly within age and year of arrival groups) tends to be relatively small.

where  $p_{ij}$  gives the probability of employment for immigrant *j*;  $p_{n\ell}$  gives the employment probability for native  $\ell$ ; *A* gives the worker's age as of the time of the Census;  $y_j$  gives the number of years since migration; *C* is a vector of dummy variables indicating the calendar year in which the migration occurred;  $\pi^0$  is a dummy variable indicating if the observation was drawn from the 1980 Census;  $\pi^1$  indicates if the observation was drawn from the 1990 Census.; and *E* is a vector of variables (described below) indicating if the immigrant or native is (potentially) eligible for the retirement benefits provided by the Social Security system. The regressions are estimated using the linear probability model.

The coefficient vectors  $\gamma_i$  and  $\gamma_n$  give the period effects for immigrants and natives, respectively. The coefficient  $\delta$  gives the aging effect for natives; the rate at which native employment changes as the person ages. The respective aging effect for immigrants is given by the sum of coefficients ( $\delta + \alpha$ ).<sup>14</sup> The vector *C* contains fixed effects indicating the (calendar year) cohort of arrival. The vector  $\beta$  thus measure the cohort effects, the differences in (time-of-entry) employment probabilities across cohorts.

It is well known that the parameters of the model in equations (1) and (2) are not identified (Borjas, 1985). In order to separately identify the two period effects, the aging effects, and the cohort effects, a restriction must be imposed on the model. The typical restriction used in the literature is that the period effects are the same for immigrants and natives:

(3) 
$$\gamma_n^0 = \gamma_i^0$$
, and  $\gamma_n^1 = \gamma_i^1$ .

Hence changes in macroeconomic conditions have the same impact on the labor supply of immigrants and natives (after conditioning for all the variables included in the regression model).

Table 1 summarizes the regression results. The specification reported in the table is somewhat more general than the generic model in equations (1) and (2). In particular, the regressions include fourth-order polynomials in both age and years-since-migration. Column 1 of the table reports the estimated coefficients *after* imposing the restriction in equation (3).<sup>15</sup> The regressions reported in this column exclude the variables in the eligibility vector *E*.

The estimated cohort effects give the predicted difference in employment rates between a particular immigrant cohort and natives at the time of entry.<sup>16</sup> As implied by the descriptive analysis, there exist cohort differences in labor supply, particularly in the "worked during the Census week" measure of labor supply—with the immigrant disadvantage rising over time. In the first column, the predicted (entry) employment rate for immigrants who arrived in the late 1960s is -2.8 percentage points below that of natives, while the predicted rate for immigrants who arrived in the late 1990s is -15.6 percentage points below that of natives. The cohort effects, however, are much weaker in the regression that uses the fraction of time worked as the

 $<sup>^{14}</sup>$  The vector  $\delta$  was restricted to be equal in the two samples to reduce the amount of collinearity among the variables.

<sup>&</sup>lt;sup>15</sup> The estimates of the period effects are not reported in the table.

<sup>&</sup>lt;sup>16</sup> For expositional convenience, I only report selected coefficients from the vector of cohort effects. The full vector contains indicators for arriving in the following periods: 1995-99, 1990-94, 1985-89, 1980-84, 1975-79, 1970-74, 1965-69, 1960-64, 1950-59, and before 1950.

dependent variable. The cohort effect for immigrants arriving in the late 1960s is -18.5 percent, while the respective statistic for the cohort arriving in the late 1990s is -21.9 percent.

Because both age and years-since-migration are introduced as quartics, it is difficult to "read" the implications of the regression directly from the regression coefficients. Instead, it is easier to summarize the evidence by calculating the aging effect (i.e., the rate of change of employment as a person ages one year) at particular points of the life cycle. I estimate the aging effect for two alternative scenarios. First, I evaluate the aging effect at age 60 for both natives and immigrants, and assume that the immigrants arrived in the United States at age 55 (so they are recent arrivals). Second, I evaluate the aging effect at age 60 for both natives and immigrants, but assume that the immigrants arrived in the United States at age 45.

Table 1 reports that the predicted aging effect for natives and for immigrants who have been in the country for some time is quite similar, but that the aging effect is much smaller for recently arrived immigrants. The rate of change in the fraction of weeks worked for a native at age 60 is -0.043 percent (with a standard error of 0.0001). The comparable rate of change for an immigrant who has been in the United States for 15 years is almost identical (-0.042, with a standard error of 0.001). However, the rate of change is much smaller (-0.021, with a standard error of 0.001) for an immigrant who has been in the United States for only 5 years.

The second column of Table 1 introduces the vector of variables (E) capturing the immigrant's eligibility for Social Security benefits. It is well known that there is a discreet drop in native labor supply at ages 62 and 65, as many natives take advantage of the threshold retirement ages in the Social Security system. The vector E in the native equation, therefore, includes two dummy variables indicating if the native person is aged 62-64 and 65 or above. The coefficients of these dummy variables measure "steps" in the age-employment profile of natives. In the immigrant equation, the specification of E is slightly more complex because eligibility depends not only on age, but also on satisfying the 10-year work rule. In addition to introducing the dummy variables to capture the discreet steps at ages 62 and 65, I also introduce interactions that describe whether immigrants in each of the three relevant age groups (50-62, 62-64, and 65 or above) have *potentially* satisfied the 10-year work rule. It is important to emphasize again that the Census data do not provide information on how many years a person has worked in the United States. My measure of whether the immigrant has satisfied the 10-year work rule is instead obtained from the number of years that the immigrant has lived in the country.

The results reported in the second column of Table 1 support the hypothesis that the 10year work rule influences the labor supply decision of older immigrants. In particular, the ageemployment profile drops by only -0.9 percentage points when an immigrant reaches age 62 (as compared to a drop of -7.1 percentage points for natives), but this drop increases by an additional -6.7 percentage points if the immigrant has also satisfied the 10-year work rule. Similarly, the employment rate of immigrants drops by a further -7.4 percentage points when he reaches age 65 (as compared to a -14.9 percentage point drop for natives), but this drop increases by -13.2 percentage points if the immigrant has satisfied the 10-year work rule. In fact, even the employment rates of immigrants aged 50-61 is affected by the 10-year work rule. The level of the age-employment profile for these immigrants drops by -7.3 percentage points if they have already met the 10-year work rule. In short, the eligibility restrictions implied by the 10-year work rule seem to provide a strong incentive for immigrants who arrived at older ages to accumulate work credits prior to their reaching retirement age, and there is a significant drop in employment once those credits are accumulated. It is instructive to summarize the regression results by tracing out the implications of the coefficients for the age-employment profiles of immigrants and natives. Figure 5 illustrates these predicted profiles assuming that the immigrant arrives at age 57. The predicted profile shows that immigrant labor supply is flatter than that of natives and that the two profiles cross at age 61. At the point where the immigrant satisfies the 10-year work rule (or age 67 in this exercise), there is a significant drop in labor supply, and the two age-employment profiles tend to converge thereafter. It is notable that the age-employment profiles implied by the regression closely mirror the actual age-employment profiles illustrated in the previous section.

The figure also illustrates the age-employment profile resulting from the removal of the 10-year work rule as a prerequisite for retirement benefits. The predicted profile now tends to resemble that of native workers. For instance, the immigrant profile is now about as steep as that of natives before the age of 62. There is still, however, a "bump" in immigrant labor supply in the early 60s. Perhaps immigrants nearing retirement age use their remaining work years to accumulate work credits that increase the Average Indexed Monthly Earnings (AIME) that determines Social Security monthly benefits.

Table 2 shows that the estimated "eligibility effect" is robust to changes in the basic specification of the model. The first column adds a measure of the individual's potential wage as a regressor. The potential wage is defined as the cell mean of the log weekly earnings of a group of workers defined by country of birth, educational attainment, and age (calculated in the sample of persons who report positive weekly earnings).<sup>17</sup> The inclusion of the potential wage does not alter any of the results of the analysis. The coefficient of the predicted wage is positive and significant, and it implies that the labor supply elasticity is around 0.25.

Note that this labor supply elasticity measures the impact of wages on the propensity to work, rather than on hours worked for workers (which is the usual labor supply elasticity estimated in models with interior solutions in the neoclassical model of labor-leisure choice). Because the analysis focuses on the impact of the eligibility requirements on the propensity to work, the labor-leisure model has an interesting additional implication about how the labor supply elasticity differs among workers depending on their eligibility status. Suppose, for instance, that an immigrant has worked the prerequisite number of quarters required for Social Security eligibility. This immigrant's present value of lifetime wealth includes the amount of Social Security benefits that the person can expect to receive during his retirement years. Conversely, a comparable immigrant who has yet to fulfill the 10-year work rule has a substantially lower level of lifetime wealth. At any point in time, a person's decision of whether or not to work is based on a comparison of his reservation wage with the market wage. As long as leisure is a normal good, the greater wealth associated with being eligible for Social Security benefits implies that eligible persons have higher reservation wages. As a result, any given wage change will be more likely to draw a person into the labor market if the person is not yet eligible for Social Security. Put differently, the labor supply elasticity estimated in the first column of Table 2 should be lower for workers who are already eligible for Social Security.

This straightforward implication of the labor-leisure model is tested in Column 2 of the table. In particular, I interact the worker's potential wage with a variable indicating if the immigrant has resided in the United States for at least 10 years. The regression coefficient of this interaction term is -0.102 (with a standard error of 0.002). In other words, the labor supply

<sup>&</sup>lt;sup>17</sup> I use four education groups (high school dropouts, high school graduates, persons with some college, and college graduates) to define the cells, as well as five age groups: ages 50-54, 55-59, 60-64, 65-69, and 70-74.

response associated with a particular wage increase (at the extensive margin) is much greater for persons who have yet to potentially qualify for Social Security benefits.<sup>18</sup>

Finally, the last two columns of Table 2 report the eligibility coefficients from regression models where the dependent variable is a dummy variable indicating if the person receives Social Security benefits. The eligibility effects (as well as the wage effect) are essentially a mirror image of the coefficients in the employment rate regressions presented in the first two columns. For instance, the fraction of immigrants receiving retirement benefits jumps significantly once they satisfy the 10-year work rule.

As noted above, the identification of the employment effects of the 10-year work rule is based on a comparison of immigrants who have been in the United States fewer than 10 years with otherwise equivalent immigrants who have been in country at least 10 years. This identification strategy is imprecise because the number of years that an immigrant has resided in the United States does not correctly measure the number of years the immigrant has worked in the country. Moreover, it is not possible to resort to typical measurement error arguments to conjecture that the eligibility effects estimated in Tables 1 and 2 are understated because the measurement error is non-classical. Even if the immigrant's year of arrival in the United States is measured correctly, those immigrants who have been in the United States fewer than 10 years certainly do not qualify for Social Security benefits, while some of those immigrants who have been in the country for at least 10 years will not qualify.

An alternative identification strategy is to use a regression discontinuity design, one that explicitly compares immigrants who have been in the United States, say, 5-9 years with those who have been in the United States with 15-19 years.<sup>19</sup> The former group of immigrants, of course, does not qualify at all for Social Security benefits, while most immigrant men in the latter group should have had sufficient time to acquire the prerequisite 40 quarters of employment. The cost of this identification strategy is that it "throws away" the labor supply information provided by the vast majority of immigrants, and instead identifies the eligibility effect from changes in labor supply observed in a small subset of the older immigrant population.

Table 3 reports the results of the regression analysis when the regression model in equations (1) and (2) is estimated on the pooled sample of native workers and immigrants who have been in the United States either 5-9 years or 15-19 years. To a large extent, this analysis confirms the results reported above. Those immigrants who have already become eligible for Social Security benefits tend to have lower work propensities than those immigrants who have yet to become eligible. In particular, the age-employment profile drops by 11.8 percentage point when an immigrant reaches age 65 (as compared to a drop of 17.4 percentage points for natives), but this drop increases by an additional 3.5 percentage points if the immigrant has also satisfied the 10-year work rule. Note, however, that the eligibility effect is not significantly different from

<sup>&</sup>lt;sup>18</sup> I also estimated the regression model using a more general specification for the interaction term. In particular, I interacted the log weekly wage variable with variables indicating eligibility for each of the three age groups (50-61, 62-64, and 65+). Each of the 3 interaction terms was negative and significant. In particular, the coefficient for the main effect of the predicted log wage was 0.268 (0.001). The interaction of this variable with the eligibility variable for persons aged 50-61 was -0.086 (0.003); the interaction for persons aged 62-64 was -0.079 (0.006); and the interaction for persons aged 65+ was -0.150 (0.009).

<sup>&</sup>lt;sup>19</sup> The 1980 and 1990 Census report the calendar year of migration in approximately 5-year intervals. For those two Census years, therefore, the immigrants included in the analysis summarized in Table 3 migrated either in 1975-1980 or 1965-1969 (for the 1980 Census), or in 1985-1990 or 1975-1980 for the 1990 Census. The 2000 Census, in contrast, does report the actual calendar year of migration.

zero for the sample of immigrants aged 62-64. The imprecision of the measured coefficient, however, likely arises because the sample size of immigrants in this age group is relatively small (since each Census includes only a relatively small number of immigrants).<sup>20</sup> The second column of Table 3 introduces the worker's potential wage in the regression. The labor supply elasticity is positive and the same magnitude as in the full sample (0.25, with a standard error of 0.001).

### ₿h

The number of older immigrants in the United States is growing rapidly. Using data drawn from the 1960-2000 decennial Censuses, this paper documents two empirical regularities that differentiate the age-employment profiles of older immigrant and native persons. In particular, the employment rate of natives declines much faster as they near retirement. Second, there is a crossover point in the age-employment profiles typically occurring in the late 50s or early 60s. Before that crossover age, natives typically have larger employment rates. After the crossover age, immigrants have larger employment rates.

The paper argues that the greater reluctance of immigrants to exit the labor market as they near retirement age partly results from the incentives introduced by the eligibility requirements for Social Security benefits. In particular, even after reaching retirement age, a worker needs to be employed for at least 10 years in order to be eligible for benefits. Although the 10-year work rule will typically not influence the labor supply behavior of older native persons, it may be a significant constraint for immigrants. After all, a significant number of older immigrants have been in the United States for a relatively short period of time.

The data reveal that the 10-year work rule indeed "encourages" immigrants who arrived in their 50s and 60s to accumulate work credits at a rapid pace. Once the 10-year work rule is satisfied, immigrants quickly begin to receive Social Security benefits and there is a sizable decline in their employment propensities. This finding may have important fiscal implications for the Social Security program, as well as for any assessment of the net benefits from immigration.

 $<sup>^{20}</sup>$  In the 1990 Census cross-section, for example, there are only 1,575 persons who are foreign-born, aged 62-64, and have been in the United States either 5 to 9 years or 15 to 19 years.

#### References

- Alexander, J. Trent, Michael Davern, and Betsey Stevenson. 2010. "Inaccurate Age and Sex Data in the Census PUMS Files: Evidence and Implications." NBER Working Paper 15703.
- Baker, Michael, and Benjamin Dwayne. 1997. "The Role of the Family in Immigrants' Labor-Market Activity: An Evaluation of Alternative Explanations." *American Economic Review*, Vol. 87, No. 4, pp. 705-27.
- Borjas, George J. 1985. "Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants." *Journal of Labor Economics*, Vol. 3, No. 4, pp. 463-489.
- Borjas, George J. 2003. "Welfare Reform, Labor Supply, and Health Insurance in the Immigrant Population." *Journal of Health Economics*, Vol. 22, No. 6, pp. 933-958.
- Borjas, George J., and Brent Bratsberg. 1996. "Who Leaves? The Outmigration of the Foreign-Born." Review of Economics and Statistics, Vol. 78, No. 1, pp. 165-176.
- Carliner, Geoffrey. 1980. "Wages, Earnings and Hours of First, Second and Third Genration American Males." *Economic Inquiry*, Vol. 18, No. 1, pp. 87-102.
- Duleep, Harriet Orcutt, and Seth Sanders. 1993. "The Decision to Work by Married Immigrant Women." *Industrial and Labor Relations Review*, Vol. 46, No. 4, pp. 677-690.
- Gustman, Alan G., and Thomas L. Steinmeier. 2000. "Social Security Benefits of Immigrants and U.S. Born." In George J. Borjas, ed., *Issues in the Economics of Immigration*, pp. 309-350. Chicago, IL: University of Chicago Press.
- Lopez, Mary, and Fernando Antonio Lozano. 2009. "The Labor Supply of Immigrants in the United States: The Role of Changing Source Country Characteristics." *American Economic Review Papers and Proceedings*, Vol. 99, No. 2, pp. 35-40.
- Kaushal, Neeraj. 2009. "Elderly Immigrants' Labor Supply Response to Supplemental Security Income." *Journal of Policy Analysis and Management*, Vol. 29, No. 1, pp. 137-162.



Figure 1. The immigrant share in the population of men aged 50-74



Figure 2. Age-employment profiles in the 2000 Census cross-section

A. Employment rate

B. Fraction of weeks worked







Panel A. Age-employment profiles of immigrants aged 50-54 at time of arrival

Panel B. Age-employment profiles of immigrants who arrived at younger ages





Figure 4. Fraction of immigrants ineligible for Social Security at age 62

Note: A person is ineligible to receive Social Security benefits at age 62 if: (a) he is younger than 62 but will not have been in the United States for 10 years when he turns 62; (b) he is older than 62 and was not in the United States for 10 years at the time he turned 62.



Figure 5. Predicted age-employment profiles (assuming immigrant migrated at age 57 in 1985-89)

A. Employment rate

B. Fraction of weeks worked



Note: The predicted age-employment profiles use the regressions reported in column 2 of Table 1. The "assuming work rule is not binding" counterfactual profile is derived by assuming that immigrants satisfy the 10-year work rule regardless of how long they have resided in the United States.

## Table 1. Basic regression results

	Employment rate		Fraction of time worked	
	(1)	(2)	(1)	(2)
Selected cohort effects:				
1995-99 arrivals	-0.156	-0.214	-0.215	-0.281
	(0.005)	(0.006)	(0.004)	(0.006)
1985-89 arrivals	-0.145	-0.208	-0.236	-0.307
	(0.006)	(0.007)	(0.005)	(0.007)
1975-79 arrivals	-0.093	-0.167	-0.215	-0.298
	(0.006)	(0.008)	(0.006)	(0.008)
1965-69 arrivals	-0.028	-0.107	-0.185	-0.274
	(0.007)	(0.009)	(0.006)	(0.008)
Aging effects:				
Natives at age 60	-0.045	-0.030	-0.043	-0.031
C C	(0.0001)	(0.0002)	(0.0001)	(0.0002)
Imm. at age 60 and 5 years in U.S.	-0.034	-0.009	-0.021	0.002
	(0.001)	(0.001)	(0.001)	(0.001)
Imm. at age 60 and 15 years in U.S.	-0.049	-0.031	-0.042	-0.027
e .	(0.0002)	(0.0004)	(0.0002)	(0.0004)
Eligibility effects:				
Natives aged 62-64		-0.104		-0.071
		(0.001)		(0.001)
Natives aged 65+		-0.174		-0.149
		(0.002)		(0.002)
Imm. aged 62-64		-0.034		-0.009
		(0.006)		(0.006)
Imm. aged 65+		-0.114		-0.074
		(0.005)		(0.004)
Imm. aged 50-61 and satisfy work rule		-0.066		-0.073
		(0.008)		(0.008)
Imm. aged 62-64 and satisfy work rule		-0.066		-0.067
-		(0.010)		(0.009)
Imm. aged 65+ and satisfy work rule		-0.111		-0.132
		(0.009)		(0.008)

Notes: Standard errors are reported in parentheses. The regression specification is given by equations (1) and (2) in the text, but both age and years since migration are introduced as fourth-order polynomials.

	Employment rate		Social Security receipt	
	(1)	(2)	(1)	(2)
Eligibility effects:				
Natives aged 62-64	-0.111	-0.111	0.259	0.258
	(0.001)	(0.001)	(0.001)	(0.001)
Natives aged 65+	-0.095	-0.087	0.426	0.422
	(0.002)	(0.002)	(0.001)	(0.001)
Imm. aged 62-64	-0.046	-0.046	-0.066	-0.066
	(0.006)	(0.006)	(0.005)	(0.005)
Imm. aged 65+	-0.112	-0.110	-0.118	-0.119
	(0.005)	(0.005)	(0.004)	(0.004)
Imm. aged 50-61 and satisfy work rule	-0.071	-0.071	-0.067	-0.067
	(0.008)	(0.008)	(0.006)	(0.006)
Imm. aged 62-64 and satisfy work rule	-0.080	-0.091	0.127	0.134
	(0.010)	(0.010)	(0.008)	(0.008)
Imm. aged 65+ and satisfy work rule	-0.091	-0.141	0.402	0.435
	(0.009)	(0.009)	(0.007)	(0.007)
Log predicted weekly wage	0.253	0.268	-0.112	-0.123
	(0.001)	(0.001)	(0.001)	(0.001)
Log predicted weekly wage $\times$ satisfy		-0.102		0.066
work rule		(0.002)		(0.002)

# Table 2. Estimated eligibility effects in additional regression specifications

Notes: Standard errors are reported in parentheses. The regression specification is given by equations (1) and (2) in the text, but both age and years since migration are introduced as fourth-order polynomials. The log predicted weekly wage for a person equals the mean cell of log weekly earnings in the sample of workers with valid weekly earnings, where the cell is defined by country of birth, education, and age. The "satisfy work rule" variable used to define the interaction term is equal to 1 if the worker is foreign-born and has lived in the United States at least 10 years, and zero otherwise.

	Employment rate		Social Security receipt	
	(1)	(2)	(1)	(2)
Eligibility effects:				
Natives aged 62-64	-0.102	-0.111	0.253	0.257
	(0.001)	(0.001)	(0.001)	(0.001)
Natives aged 65+	-0.174	-0.095	0.460	0.422
	(0.002)	(0.002)	(0.002)	(0.002)
Imm. aged 62-64	-0.009	-0.046	-0.065	-0.058
	(0.009)	(0.006)	(0.007)	(0.007)
Imm. aged 65+	-0.118	-0.112	-0.093	-0.092
	(0.007)	(0.005)	(0.005)	(0.005)
Imm. aged 50-61 and satisfy work rule	-0.041	-0.071	-0.009	-0.004
	(0.005)	(0.008)	(0.004)	(0.004)
Imm. aged 62-64 and satisfy work rule	0.005	-0.080	0.085	0.092
	(0.012)	(0.010)	(0.009)	(0.009)
Imm. aged 65+ and satisfy work rule	-0.035	-0.091	0.320	0.320
	(0.008)	(0.009)	(0.006)	(0.006)
Log predicted weekly wage		0.253		-0.124
		(0.001)		(0.001)

# Table 3. Estimated eligibility effects in sample of immigrantswho have been in the country 5-9 or 15-19 years

Notes: Standard errors are reported in parentheses. The regression specification is given by equations (1) and (2) in the text, but both age and years since migration are introduced as fourth-order polynomials. The log predicted weekly wage for a person equals the mean cell of log weekly earnings in the sample of workers with valid weekly earnings, where the cell is defined by country of birth, education, and age.