

## Labor market assimilation and the self-employment decision of immigrant entrepreneurs

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**Abstract.** This paper uses data from the 1980 and 1990 U.S. Censuses to study labor market assimilation of self-employed immigrants. Separate earnings functions for the self-employed and wage/salary workers are estimated. To control for endogenous sorting into the sectors, models of the self-employment decision are estimated. Self-employed immigrants are found to do substantially better in the labor market than wage/salary immigrants. Earnings of self-employed immigrants are predicted to converge with natives' wage/salary earnings at about age 30 and natives' self-employed earnings at about age 40. Including the self-employed in the sample reduces the immigrant-native earnings gap by, on average, 14%.

**JEL classification:** J15, J23, J61

**Key words:** Immigration, assimilation, self-employment

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### 1. Introduction

One of the “stylized facts” in the economics of immigration is that immigrants arriving in the U.S. in the last decades are not performing as well in the labor

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market as their counterparts who arrived in the 1940's and 1950's and are not likely to reach earnings parity with natives (e.g., Borjas 1985, 1995). Notably, self-employed immigrants have continuously been excluded from these studies. This paper takes a closer look at the performance and assimilation in the labor market of self-employed immigrants. The paper explores two aspects of self-employment among immigrants. The first is the self-employment decision. More specifically, what are the main factors that cause the self-employment rates to differ between immigrants and natives, and what are the roles of these factors? The other aspect explored in the paper is the relative labor market performance of self-employed immigrants, compared to wage/salary immigrants and natives. I ask whether self-employed immigrants assimilate into the labor market, in terms of earnings, at the same rate as wage/salary workers. Also, at what point, if at all, do immigrants' earnings reach parity with self-employed native born Americans? The consequence of excluding the self-employed on the immigrant-native wage gap is also analyzed.

The lack of attention to the self-employed sector could easily be justified if either it was represented by a relatively small proportion of the labor force or if self-employed individuals possess very similar socioeconomic characteristics to wage and salary workers (i.e. they are simply a random sub-sample of the labor force). Neither of these statements is in fact true. Using the 1980 and 1990 Census of Population, I find that 10.39% of native born American males in the labor force were self-employed in 1980 and this increased to 11.21% in 1990. The proportions for immigrant men in 1980 and 1990 were 11.63% and 12.20% respectively, but vary greatly over ethnic groups and arrival cohorts (see Table 1). This is certainly not a small number of workers given that the total male labor force consists of over 70 million individuals<sup>1</sup>.

As will be shown, self-employed immigrant workers are also, on average, older by about 5 to 6 years, display higher levels of English language fluency and are generally more educated than wage/salary immigrants. For example, in 1990 self-employed immigrants had on average 1.5 years more schooling than immigrants in the wage/salary sector. Self-employed workers also have higher total annual earnings than wage/salary workers do<sup>2</sup>. However, earnings from self-employment may not only reflect returns to human capital, but also returns to physical capital. A better comparison between wage/salary workers and self-employed individuals may be income including total earnings and investment income. This too is higher for self-employed persons. The fact that self-employed individuals are both more educated and older is likely to explain some of these differences.

Overall, both immigrants and natives who chose self-employment increased their earnings advantage over wage/salary workers in the last decade. In 1980 the self-employment to wage/salary earnings ratio was 1.42 for natives and 1.57 for all immigrants. By 1990 it increased slightly to 1.43 for natives and to 1.62 for immigrants.

Self-employment is also commonly believed to be an important tool in immigrants' cultural and economical assimilation process. As such, it may be an important stepping stone towards upward social and economic mobility (Cummings 1980).

In this paper I estimate separate earnings functions for the self-employed and wage/salary workers. To control for endogenous sorting into the sectors, models of the self-employment decision are estimated. Variables for immigrant population proportion and the ratio of average self-employment earn-

Table 1. Self-employment rates by national origin group and arrival cohort

Group:	National origin Group:		Arrival cohort:	
	Sample size		Self-employment rates	
	1980	1990	1980	1990
Natives	472,046	489,821	0.104	0.112
All immigrants	151,010	229,902	0.116	0.122
National origin group:				
Mexico	31,360	66,972	0.041	0.057
Central/South America	11,554	26,184	0.083	0.091
South East Asia	9,070	20,181	0.065	0.079
North East Asia	10,215	19,069	0.172	0.205
India, Pakistan, etc	4,518	9,190	0.114	0.140
Middle East/Egypt	4,402	9,950	0.225	0.245
Europe, CAN, AUS, NZ	61,663	52,897	0.154	0.176
Africa	1,756	3,838	0.126	0.131
Caribbean	7,780	11,342	0.052	0.080
Cuba	8,692	10,279	0.152	0.177
			Cohort:	
			1985-89 Arrivals	0.061
			1980-84 Arrivals	0.100
			1975-79 Arrivals	0.060
			1970-74 Arrivals	0.094
			1965-69 Arrivals	0.115
			1960-64 Arrivals	0.133
			1950-59 Arrivals	0.149
			Pre-1950 Arrivals	0.182
				0.180
				0.171
				0.150
				0.145
				0.127
				0.100
				0.061

ings to average wage/salary earnings ratios, by national origin group and SMSA, are used as instruments to identify the inverse Mills correction terms. The estimated earnings functions are used to generate sector specific measures of labor market assimilation. I find that wage/salary immigrants do not reach earnings parity with natives. However, earnings of self-employed immigrants appear to converge with and surpass earnings of both wage/salary and self-employed natives. Using the consistent estimators from the earnings equations, I develop a new economy wide measure of assimilation that accounts for the distribution across sectors. This shows that the immigrant-native earnings gap is overstated when the self-employed are excluded from the study.

The paper is organized in the following way. Section 2 describes the data used and how national origin groups were created. Section 3 outlines and compares traits of immigrants and natives in the two sectors. Implications of these characteristics on self-employment rates and earnings are discussed. In Sect. 4, the self-employment decision model is described and Sect. 5 shows the empirical results. Earnings equations are presented in Sect. 6. Age-earnings profiles are derived and discussed in this section, as is the implication of excluding the self-employed. Finally, Sect. 7 summarizes the results of the study.

## 2. Data and national origin group definition

The data used in this paper are drawn from the 1980 5% a Sample and the 1990 5% Sample of the U.S. Census of Population. The study includes males between the ages of 18 and 64 who are not residing in group quarters, who are not in military service or enrolled in school, and who reported working in the year prior to the census<sup>3</sup>. Given the extremely large data set this leaves us with, I extracted a 20% randomly selected sub-sample of native born Americans from the 5% Sample, but kept all immigrants.

It is interesting to note that the selection process that determines who migrates or not, and hence the labor market performance of immigrants, is believed to be determined by the relative conditions in host and source country (see for example, Borjas 1987). However, the majority of studies on immigrant performance have been done based on *ethnic* groups, and not on *country of origin*. In this paper I try to create 10 relatively homogenous groups based on countries' geographic location and cultural and economic conditions, while maintaining a large enough sample size for each group.

It should be noted that any attempt to create homogenous groups will be scarred by compromises. As noted above, there *are* substantial differences in characteristics such as self-employment rates and educational attainment between immigrant groups. If the group is defined too widely, the impact of variations in these variables may not be accurately estimated. If the group is too narrowly defined, by country for example, the sample size will be small for some of the countries. This is particularly true when studying self-employed immigrants, a group that represents approximately one percent of the male labor force<sup>4</sup>. However, if different ethnic groups face different labor market constraints, such as discrimination, creating groups based on national origin may not be the best way to compose groups. Table A1 in the Appendix describes the countries represented in each national group used in this paper<sup>5</sup>.

### 3. Characteristics – The self-employed v. wage/salary workers

In this section I outline traits of immigrants and natives in the two sectors. This descriptive portrait suggests that immigrants are highly heterogeneous, that the way they self-select into the self-employment and wage/salary sectors is not random, and that the nature of this self-selection may have changed somewhat during the 1980's.

Self-employment rates vary greatly over both national origin groups and arrival cohort. These are presented in Table 1. It is shown in this table that the Mexican national origin group displays the lowest self-employment rates both in 1980 and 1990 of any group. The group with the highest self-employment rate in both census years is the Middle Eastern national origin group. Table 1 also shows that immigrant self-employment probabilities increase with time spent in the U.S. The most recent arrival cohorts in both census years display the lowest self-employment rates while the most senior cohort exhibits the highest rate. The rate also increases for each cohort between 1980 and 1990. Some of these increases are likely due to the fact that the average age of a cohort increases over time.

As stated above, self-employed individuals have higher earnings than wage/salary workers. Table 2 presents mean earnings and a measure of earnings dispersion, the ratio of the 90<sup>th</sup> earnings percentile to the 10<sup>th</sup> earnings percentile, by arrival cohort; Table 3 shows these statistics by national origin groups. Earnings are shown in 1989 dollars and are adjusted for inflation by the annual Consumer Price Index. From the average earnings shown in Tables 2 and 3, earnings differentials between groups were calculated. Self-employed immigrants earned on average 4.6% more than self-employed natives did in 1980. This advantage had disappeared by 1990 when self-employed natives earned approximately 1.5% more than immigrants. Wage/salary immigrants displayed an earnings disadvantage of 6% and 15.3% respectively in 1980 and 1990. The tables also show that annual earnings vary greatly across national origin groups and increases with time spent in the U.S.

It is quite likely that differences in human capital explain some of the earnings disparity over national origin groups and arrival cohorts. The differences in educational attainment and English ability are seen in Tables 4, 5 and 6. These tables show the average years of schooling<sup>6</sup>, high school drop out rates, college graduation rates and the percentage of immigrants in the group who report that they do not speak English well or not at all.

Self-employed immigrants display lower high school drop out rates and higher college graduation rates than immigrant wage/salary employees. This is shown in Table 4. The educational attainment gap between self-employed and wage/salary immigrants increased in the 1980's while during the same period the gap between self-employed and wage/salary natives decreased. If immigrants' education is valued less by U.S. employer than natives' education, as is found in Betts and Lofstrom (2000), it is plausible that relatively highly educated immigrants are more likely to choose self-employment compared to relatively highly educated natives. This is possibly one of the reasons why the educational gap between the self-employed and wage/salary employees is greater for immigrants than for natives.

The decline in earnings of recently arrived immigrants, relative to natives, is possibly due to a decline in educational attainment. Table 5 displays the human capital variables described above by arrival cohorts. The most recent

**Table 2.** Annual earnings, mean and ratio 90th/10th percentile, by arrival cohort

Group	1980			1990		
	Self-employed		Wage/salary	Self-employed		Wage/salary
	Mean	P90/10	Mean	P90/10	Mean	P90/10
Natives	40,388	11.12	28,459	5.75	41,993	14.29
All immigrants	42,246	11.53	26,841	6.42	41,364	14.09
Ratio: natives ÷ immigrants	0.956	0.965	1.060	0.895	1.015	1.014
Cohort:						
1985–89 Arrivals					25,462	13.75
1980–84 Arrivals					31,464	11.00
1975–79 Arrivals	32,295	13.72	19,800	8.66	40,582	12.50
1970–74 Arrivals	38,534	10.79	22,954	5.21	45,492	15.44
1965–69 Arrivals	42,589	11.23	27,018	5.60	47,272	13.72
1960–64 Arrivals	44,845	9.99	29,357	5.45	48,700	13.72
1950–59 Arrivals	43,900	9.99	32,374	4.56	48,003	12.15
Pre-1950 arrivals	46,516	11.16	35,391	5.14	55,467	16.17
					18,253	9.34
					20,604	6.67
					24,782	6.70
					27,303	6.94
					31,245	6.29
					35,229	6.44
					37,728	5.91
					40,301	7.65

Note: Earnings are shown in 1989 dollars and are adjusted for inflation by the annual Consumer Price Index

Table 3. Annual earnings, mean and ratio 90th/10th percentile, by national origin group

Group	1980			1990		
	Self-employed		Wage/salary	Self-employed		Wage/salary
	Mean	P90/10	Mean	P90/10	Mean	P90/10
Natives	40,388	11.12	28,459	5.75	41,993	14.29
All immigrants	42,246	11.53	26,841	6.42	41,364	14.09
Ratio: natives ÷ immigrants	0.956	0.965	1.060	0.895	1.015	1.014
National origin group:						
Mexico	27,708	8.70	17,702	5.93	21,957	9.93
Central/South America	40,880	11.99	23,253	6.24	34,076	13.00
South East Asia	65,046	15.70	23,919	6.00	45,022	20.59
North East Asia	39,582	11.35	29,714	7.38	42,441	10.75
India, Pakistan, etc	65,000	11.23	35,788	5.98	69,864	19.48
Middle East/Egypt	46,753	13.26	30,016	6.72	48,299	12.35
Europe, CAN, AUS, NZ	42,628	9.16	33,152	5.42	46,487	11.67
Africa	47,517	13.20	29,259	7.10	43,328	15.44
Caribbean	33,882	11.22	19,949	5.90	27,348	9.67
Cuba	37,395	10.19	24,750	5.00	35,912	11.43

Note: Earnings are shown in 1989 dollars and are adjusted for inflation by the annual Consumer Price Index

**Table 4.** Educational attainment and English proficiency – immigrants and natives

Group	Self-employed				Wage/salary			
	Years of schooling	High school drop out	College graduate	Limited English	Years of schooling	High school drop out	College graduate	Limited English
Natives		1980				1980		
All immigrants	13.30	0.204	0.291	N/A	12.55	0.235	0.196	N/A
Ratio: natives ÷ immigrants	12.82	0.294	0.306	0.112	11.55	0.394	0.225	0.226
	1.04	0.69	0.95	N/A	1.09	0.60	0.87	N/A
		1990				1990		
Natives	13.65	0.141	0.319	N/A	13.00	0.162	0.236	N/A
All immigrants	12.64	0.289	0.323	0.167	11.14	0.415	0.23.3	0.267
Ratio: natives ÷ immigrants	1.08	0.49	0.99	N/A	1.17	0.39	1.02	N/A



Table 5. Educational attainment and English proficiency by arrival cohort

Group	Self-Employed				Wage/salary			
	Years of schooling	High school drop out	College graduate	Limited English	Years of schooling	High school drop out	College graduate	Limited English
Cohort:								
1975-79 Arrivals	13.22	0.243	0.370	0.254	11.13	0.446	0.235	0.419
1970-74 Arrivals	13.01	0.292	0.360	0.187	10.91	0.471	0.211	0.310
1965-69 Arrivals	12.87	0.317	0.331	0.151	11.49	0.414	0.225	0.224
1960-64 Arrivals	12.84	0.290	0.293	0.103	11.97	0.338	0.221	0.139
1950-59 Arrivals	12.51	0.302	0.258	0.052	12.14	0.309	0.229	0.077
Pre-1950 Arrivals	12.78	0.298	0.278	0.020	12.14	0.334	0.227	0.046
		1990				1990		
1985-89 Arrivals	12.03	0.319	0.293	0.365	10.71	0.467	0.221	0.459
1980-84 Arrivals	12.24	0.304	0.288	0.276	10.65	0.466	0.202	0.331
1975-79 Arrivals	12.89	0.256	0.366	0.162	10.85	0.441	0.233	0.241
1970-74 Arrivals	12.58	0.318	0.337	0.155	10.90	0.440	0.225	0.210
1965-69 Arrivals	12.64	0.314	0.310	0.121	11.78	0.350	0.253	0.147
1960-64 Arrivals	12.90	0.266	0.320	0.074	12.36	0.284	0.279	0.100
1950-59 Arrivals	12.99	0.269	0.317	0.038	12.44	0.267	0.273	0.059
Pre-1950 arrivals	13.54	0.218	0.387	0.033	12.68	0.256	0.318	0.045

Table 6. Educational attainment and English proficiency by national origin group

National origin group:	Self-employed				Wage/Salary			
	Years of schooling	High school drop out	College graduate	Limited English	Years of schooling	High school drop out	College graduate	Limited English
		1980				1980		
Mexico	9.20	0.621	0.101	0.339	7.73	0.761	0.028	0.521
Central/South America	13.56	0.217	0.317	0.128	11.85	0.346	0.171	0.252
South East Asia	16.84	0.066	0.722	0.059	13.59	0.184	0.371	0.113
North East Asia	14.43	0.151	0.514	0.233	14.41	0.163	0.511	0.244
India, Pakistan, etc	17.39	0.052	0.780	0.012	17.08	0.061	0.779	0.026
Middle East/Egypt	13.61	0.232	0.360	0.056	13.86	0.213	0.421	0.085
Europe, CAN, AUS, NZ	12.44	0.311	0.247	0.046	12.28	0.311	0.237	0.091
Africa	14.55	0.149	0.434	0.014	14.57	0.134	0.463	0.035
Caribbean	12.23	0.335	0.199	0.112	11.18	0.401	0.119	0.153
Cuba	12.08	0.361	0.246	0.312	11.59	0.375	0.186	0.326
		1990				1990		
Mexico	8.11	0.710	0.064	0.385	7.45	0.770	0.026	0.497
Central/South America	12.35	0.311	0.261	0.231	10.75	0.438	0.138	0.325
South East Asia	14.03	0.181	0.446	0.143	12.91	0.204	0.327	0.143
North East Asia	13.96	0.144	0.461	0.288	13.90	0.169	0.497	0.281
India, Pakistan, etc	16.63	0.055	0.751	0.018	15.55	0.092	0.691	0.048
Middle East/Egypt	14.12	0.152	0.464	0.046	14.47	0.129	0.527	0.050
Europe, CAN, AUS, NZ	12.85	0.254	0.288	0.050	12.95	0.230	0.316	0.081
Africa	14.65	0.105	0.512	0.015	14.68	0.099	0.544	0.035
Caribbean	11.87	0.350	0.180	0.152	11.23	0.402	0.126	0.173
Cuba	11.82	0.396	0.217	0.336	11.60	0.384	0.181	0.283

cohort of immigrants who chose self-employment appear to have higher high school drop out rates and a lower percentage of college graduates in 1990 compared to 1980. Table 5 also shows that in 1990 recent wage/salary immigrants displayed lower educational attainment levels than did recent wage/salary immigrants in 1980. The decline relative to natives is quite notable since during the 1980's, educational attainment levels increased quite considerably for both self-employed and wage/salary natives.

The apparent relative decline in schooling levels of immigrants does not hold for all immigrant groups. In fact, there is quite a difference in changes of educational attainment in the 1980's over national origin groups. These statistics are presented in Table 6. In general, the groups who displayed an improvement of relative earnings over the decade also exhibited increases in educational attainment levels.

Educational attainment of immigrants overall appears to have declined relative to natives in the 1980's. The decline seems to be slightly greater among wage/salary immigrants than among self-employed immigrants. Furthermore, the educational attainment gap is generally smaller for self-employed immigrants than it is for wage/salary immigrants and in fact, the percentage of college graduates is greater for immigrant entrepreneurs than for self-employed natives.

The level of English ability of immigrants, measured here as limited English proficiency, appears to have changed in the last decade, as shown in Tables 4 through 6<sup>7</sup>. Overall, there appears to be a shift in the distribution of English proficiency levels of immigrants from higher ability to lower ability. Self-employed immigrants report speaking limited English to a lesser extent than wage/salary immigrants. This is true for all arrival cohorts and national origin groups except for North East Asians and Cubans in 1990.

The increase in the numbers of immigrants coming to the U.S. in the last decade may have made it easier to "get by" with limited English ability. The increase makes it more likely or easier for immigrants to settle in areas with higher proportion of co-nationals, or in so called enclaves. The role of enclaves will be analyzed in the self-employment decision models below.

#### 4. The self-employment decision

Individuals choose whether to participate in the wage/salary sector of the labor market or to become self-employed. The decision will depend on several factors that determine expected utility in each sector. In this paper I assume that the utility function is a function of expected earnings,  $y_i^{s-e}$  for self-employment work and  $y_i^{w/s}$  for work in the wage/salary sector, and that the function also indicates preferences for the characteristics of work in the two sectors, denoted  $z_i$ . Furthermore, earnings in each sector will depend on a vector of observable characteristics,  $X_i$  and unobserved characteristics  $\varepsilon_i$ . Note that the characteristics  $z_i$  are assumed to affect utility but not earnings in each sector. Assuming that individuals maximize expected utility, a person will choose self-employment if the expected utility from self-employment, denoted  $E(u_i^{s-e})$ , is greater than the expected utility in the wage/salary sector, represented here by  $E(u_i^{w/s})$ . Expected utility in the two sectors can be defined as:

$$E(u_i^{w/s}) = z_i^{w/s} \lambda^{w/s} + y_i^{w/s} = z_i^{w/s} \lambda^{w/s} + X_i \beta^{w/s} + \varepsilon_i^{w/s} \quad (1)$$

$$E(u_i^{s-e}) = z_i^{s-e} \lambda^{s-e} + y_i^{s-e} = z_i^{s-e} \lambda^{s-e} + X_i \beta^{s-e} + \varepsilon_i^{s-e} \quad (2)$$

where  $\varepsilon_i^{w/s}$  and  $\varepsilon_i^{s-e}$  are jointly normally distributed with mean zero and variances  $\sigma_{w/s}^2$  and  $\sigma_{s-e}^2$ . An individual chooses self-employment if:

$$I_i^* = E(u_i^{s-e}) - E(u_i^{w/s}) > 0 \quad (3)$$

Clearly the index function  $I_i^*$  is unobservable. However, from Eqs. (1), (2) and (3)  $I_i^*$  can be defined as:

$$\begin{aligned} I_i^* &= E(u_i^{s-e}) - E(u_i^{w/s}) \\ &= X_i \beta^{s-e} - X_i \beta^{w/s} + z_i^{s-e} \lambda^{s-e} - z_i^{w/s} \lambda^{w/s} + \varepsilon_i^{s-e} - \varepsilon_i^{w/s} \\ &= W_i \pi + e_i \end{aligned} \quad (4)$$

If we set  $I = 1$  if  $I_i^* > 0$ , if self-employment is chosen, and  $I = 0$  if  $I_i^* \leq 0$ , if the wage/salary sector is selected, then Eq. (4) can be seen as a probit model of sectoral choice of self-employment.

Estimating the self-employment decision in Eq. (4) has two main benefits. The first is that it will give us insight to the role of the different characteristics in choosing a sector. The question that can be answered through this process is: What are the reasons for the differences in self-employment rates between immigrants and natives and what are the roles of the factors? The second advantage is that from the probit estimates, when the instruments  $z_i$  are included in the model, the inverse Mills ratio can be calculated. This will help to correct for self-selection problems in the earnings functions through use of the Heckman two-step procedure.

## 5. Empirical model and findings: The self-employment decision

The sectoral choice an individual makes will depend on several factors. As explained above, an individual is assumed to compare the expected utility from work in the self-employment sector to the expected utility from employment in the wage/salary sector. If this difference is positive, the individual chooses to be self-employed. The model to be estimated by probit is:

$$I_i^* = W_i \pi + e, \quad \text{where } e \sim N(0, 1)$$

The probability an individual chooses self-employment is:

$$\text{Prob}[I_i = 1] = \Phi(W\pi),$$

where  $\Phi(\cdot)$  is the standard normal cumulative density

function. The probability a person chooses the wage/salary sector is then simply:

$$\text{Prob}[I_i = 0] = 1 - \Phi(W\pi)$$

The choice over self-employment will likely depend on socio-economic characteristics such as age, education, marital status and geographic location. If there are differences in the impact any of these variables have on earnings, we would expect these variables to affect the self-employment decision. For immigrants, it is likely that the number of years in the U.S. will also have an effect on this decision. Furthermore, both age and education may impact earnings and self-employment probabilities differently for immigrants compared to natives. This too needs to be incorporated in the model. All these individual characteristics and a period effect for 1980 are included in the matrix  $W$ . The probit estimation results for the above described model are presented in Table 7 as model 1. As expected, age and education are positively related to the probability of self-employment, as is years since migration for immigrants. It also appears that after controlling for years since migration, there is very little difference in self-employment probabilities between arrival cohorts. Also, immigrants are more likely to choose self-employment than natives even after the above described characteristics are controlled for.

Light (1984) argues that differences in traditions of commerce among immigrants from different countries help explain differences in self-employment rates among immigrants in the U.S. This may be one of the reasons for variations in self-employment rates over countries of origin that is not captured by the observable traits in the model. Also, if immigrants experience discrimination in the labor market and if discrimination varies over source countries, this also needs to be controlled for in the model. To attempt to incorporate these country specific unobservables, Model 2 in Table 7 adds dummy variables for the national origin groups. The African national origin group is the reference group. Adding these variables has a considerable impact on the arrival cohort and immigrant coefficients. Model 1 predicts that an immigrant who arrived between 1965 and 1969 is approximately 0.7% less likely, but statistically insignificantly so, to be self-employed than an immigrant who arrived in the most recent cohort in 1990. The same individual, statistically defined, is according to Model 2 around 3% significantly less likely to choose self-employment than a co-national who arrived between 1985 and 1989. By simply including a dummy variable for immigrants and not controlling for country of origin, differences in self-employment probabilities are greatly understated.

The impact of number years of education on the self-employment decision is also inaccurately estimated if no country of origin variables are included. Using the immigrant characteristics above, Model 1 predicts a positive marginal effect of slightly more than 7% on the probability of self-employment for an additional year of schooling. However, the estimates in Model 2 suggest that the marginal increase is only about 2.5%. The substantial change in probabilities from adding national origin variables may be related to both differences in levels and quality of education across countries. Nonetheless, it is quite clear that it is important to control for country of origin in the sectoral choice models of self-employment. The role of education in the self-employment decision is also very different for immigrants compared to natives. The marginal impact of education for a native with same characteristics as the immigrant described above is close to 7%. Education appears to play a greater role in choosing sector for natives than it does for immigrants.

**Table 7.** Probit models for self-employment for males aged 18–64, based on 1980 and 1990 public use samples of the U.S. census

Variable	Model 1	Model 2	Model 3	Model 4
Constant	-4.9720 (0.0603)	-4.9700 (0.0603)	-4.9703 (0.0603)	-4.9869 (0.0612)
Immigrant	1.1556 (0.2242)	1.7160 (0.2322)	1.7072 (0.2322)	1.6247 (0.2363)
Mexico		-0.3721 (0.0424)	-0.4392 (0.0441)	-0.4526 (0.0451)
South and Central America		-0.1544 (0.0428)	-0.1558 (0.0428)	-0.1678 (0.0438)
South East Asia		-0.3550 (0.0443)	-0.3621 (0.0443)	-0.3716 (0.0453)
North East Asia		0.2305 (0.0422)	0.2280 (0.0422)	0.2239 (0.0431)
India/Pakistan		-0.0571 (0.0467)	-0.0599 (0.0467)	-0.0676 (0.0476)
Middle East		0.3985 (0.0445)	0.3979 (0.0445)	0.3925 (0.0454)
Europe/Canada/Australia/New Zealand		0.0967 (0.0405)	0.0927 (0.0405)	0.0920 (0.0413)
Caribbean		-0.3065 (0.0465)	-0.3115 (0.0466)	-0.3197 (0.0475)
Cuba		0.1202 (0.0451)	0.0144 (0.0489)	0.0122 (0.0498)
Period Effect 1980	-0.0751 (0.0135)	-0.0754 (0.0136)	-0.0751 (0.0136)	-0.0596 (0.0137)
Age	0.2075 (0.0048)	0.2075 (0.0048)	0.2075 (0.0048)	0.2059 (0.0048)
Age2	-0.0042 (0.0001)	-0.0042 (0.0001)	-0.0042 (0.0001)	-0.0042 (0.0001)
Age3/1000	0.2898 (0.0098)	0.2898 (0.0098)	0.2898 (0.0098)	0.2870 (0.0099)
Years of Schooling	0.0390 (0.0007)	0.0390 (0.0007)	0.0390 (0.0007)	0.0388 (0.0008)
Years of Schooling* Immigrant	-0.0139 (0.0016)	-0.0300 (0.0017)	-0.0295 (0.0017)	-0.0295 (0.0018)
Age* immigrant	-0.1002 (0.0177)	-0.1199 (0.0180)	-0.1196 (0.0180)	-0.1143 (0.0183)
Age2* immigrant	0.0028 (0.0004)	0.0032 (0.0005)	0.0031 (0.0005)	0.0030 (0.0005)
Age3/1000* immigrant	-0.2406 (0.0361)	-0.2677 (0.0366)	-0.2670 (0.0366)	-0.2570 (0.0371)
Speaks little or no English	-0.1262 (0.0154)	-0.0881 (0.0162)	-0.0936 (0.0163)	-0.0961 (0.0166)
Years since migration	0.0352 (0.0048)	0.0463 (0.0049)	0.0450 (0.0050)	0.0450 (0.0050)
Years since migration2	-0.0011 (0.0002)	-0.0012 (0.0002)	-0.0012 (0.0002)	-0.0012 (0.0002)
Years since migration3/1000	0.1075 (0.0300)	0.1091 (0.0303)	0.1112 (0.0303)	0.1104 (0.0307)
Arrival cohort pre-1950	0.0588 (0.1510)	-0.4240 (0.1541)	-0.3593 (0.1548)	-0.3661 (0.1559)
Arrival cohort 1950-59	-0.0070 (0.1032)	-0.3631 (0.1056)	-0.3157 (0.1061)	-0.3227 (0.1069)

**Table 7** (continued)

Variable	Model 1	Model 2	Model 3	Model 4
Arrival cohort 1960–64	–0.0135 (0.0805)	–0.2744 (0.0824)	–0.2382 (0.0827)	–0.2438 (0.0834)
Arrival cohort 1965–69	–0.0335 (0.0656)	–0.2237 (0.0671)	–0.1967 (0.0674)	–0.2002 (0.0680)
Arrival cohort 1970–74	0.0193 (0.0515)	–0.0990 (0.0526)	–0.0789 (0.0528)	–0.0819 (0.0534)
Arrival cohort 1975–79	0.0149 (0.0379)	–0.0579 (0.0387)	–0.0444 (0.0389)	–0.0482 (0.0393)
Arrival cohort 1980–84	0.0458 (0.0304)	0.0086 (0.0311)	0.0153 (0.0311)	0.0132 (0.0318)
Proportion of immigrants from same country in SMSA			0.6650 (0.1167)	0.6655 (0.1188)
Ratio of S-E earnings to W/S earnings by SMSA and ethnicity of natives				0.0182 (0.0089)
Ratio of S-E earnings to W/S earnings by SMSA and national origin group				0.0483 (0.0105)
Sample size	1342779	1342779	1342779	1342779
Log likelihood	–454043	–453178	–453161	–441567

*Note:* Standard errors are presented in parentheses. all models include interactions between education and period effect, education interacted with period effect and immigrant status, in addition to dummies for regions, SMSA residency, disability and for being married.

One of the reasons for estimating the probits of the self-employment decision is to calculate the inverse Mills ratio. The objective in doing so is to reduce the possible selection bias that may arise in the estimated wage models. The goal is to include in the probit model variables that will influence the self-employment decision, but that will not affect earnings, i.e. some characteristics  $z_i$  from the self-employment decision model above. It is highly desirable, but not necessary, for the probit model to include instruments that help to predict self-employment but which do not belong directly in the earnings function. I now discuss these additional instruments.

The first instrument added to Model 2 is a variable to test whether immigrants living in areas where relatively many co-nationals reside, so called enclaves, may be the reason we observe higher self-employment rates for some immigrant groups. The sociology literature commonly speaks of ethnic resources as a determinant in an individual's choice of whether or not to choose self-employment (see for example, Light 1984 and Aldrich and Waldinger 1990). Examples of ethnic resources are skills or knowledge to provide services or goods to other co-ethnics or co-nationals, availability of low wage labor, social support networks that assist an individual in obtaining necessary start-up capital or in transferring managerial skills. Aldrich and Waldinger (1990) describe "opportunity structures" as market conditions that may favor goods or services oriented towards co-ethnics or co-nationals. Immigrants who are living in areas with relatively high proportions of co-nationals may have a comparative advantage in providing certain goods or services, food or restaurant services for example, to their co-nationals compared to natives or other immigrants. The result, according to this theory, is higher self-employment rates among immigrants living in enclaves.

Hence, Model 3 extends Model 2 by adding a variable for the proportion of immigrants in the census year of the total population by SMSA and country of origin. This is calculated by adding up the number of male immigrants in the sample from a particular country in the SMSA and then dividing this by the total male population in the sample in the SMSA. For immigrants living in a non-SMSA area, the proportion is calculated based on the state's non-SMSA immigrant population. Given the definition above, it follows that the value of this variable is zero for all natives. The coefficient of this variable is positive and highly significant. This indicates that immigrants living in an area where a greater proportion of co-nationals are living, increases the probability of self-employment. For example, for a Mexican immigrant living in a SMSA where 10% of the population also comes from Mexico, the mean value for Mexican immigrants, an increase in the proportion of Mexicans by 1% in the area increases the probability of self-employment by 0.1%. The proportion of co-nationals in the area appears to greatly influence the self-employment decision of Cuban immigrants. Model 2 predicts that Cubans are approximately 3.5% more likely to be self-employed compared to a statistically similar African immigrant. When the immigrant proportion ratio is added, Cubans are found to be no more likely to be self-employed than African immigrants. That is, the difference in self-employment rates between Cuban and African immigrants possessing similar individual characteristics can be explained completely by the proportion of co-nationals living in the area.

The last model presented in Table 7, Model 4, adds to the previous model two instruments measuring the ratio of self-employment earnings to wage/salary earnings. The first variable is calculated by dividing the average native self-employment earnings in the SMSA in a given census year by the average native wage/salary earnings in the same SMSA and by natives' ethnicity<sup>8</sup>. The second variable measures the same ratio, but for immigrants by SMSA and national origin group. The latter variable is set to zero for all natives and the former is set to zero for all immigrants. It is expected that higher self-employment earnings to wage/salary earnings ratios are associated with higher self-employment rates, given a set of individual characteristics, since it essentially measures the relative success of the self-employed in the area<sup>9</sup>. The signs of both of the estimated coefficients are positive, as expected, and significant. However, the impact of a change in the earnings ratio on the probability of self-employment appears to be stronger for immigrants than natives. An increase in the earnings ratio by 0.1 increases the probability of self-employment for natives by 0.17%. The effect of the same change in the ratio on a Mexican immigrant who arrived between 1975 and 1979 is an increase in the probability of self-employment by 0.46%<sup>10</sup>. The effect is close to 3 times stronger for immigrants as compared to natives. The overall entrepreneurial success of an immigrant's co-nationals in the area seems to be quite important in the self-employment decision process. Natives are less influenced by the relative rewards between self-employment and wage/salary work in the area than immigrants.

The models described above show that it is important to include controls for country of origin when analyzing the self-employment decision. They also show differences in the role of education and earnings ratios in the self-employment choice process between immigrants and natives. The specification in Model 4 is used for the two-step Heckman selection correction models estimated and described below.



## 6. Empirical model and findings: Labor market assimilation

Immigrants' earnings in the wage/salary sector have been found not to converge with natives' earnings (Borjas 1985, 1995) over the work life. Earnings of immigrants start out at a lower point and rise more rapidly over time than natives' earnings. However, parity is not reached. This section will look at whether this also holds for self-employed immigrants when compared to self-employed natives. Comparisons of immigrant labor market performance between the two sectors will also be made. The main goal of this section is to establish whether self-employed immigrants do better or worse in the labor market than wage/salary immigrants, both relative to each other and relative to natives in their own sector.

The earnings models estimated in this paper use as the dependent variable log of weekly earnings<sup>11</sup>. To try to take into account the possibility that self-employed workers earn a return on physical capital, I also estimate models using as the dependent variable the log of weekly income, which includes any earnings from wage/salary work and/or self-employment earnings and in addition any interest, rental or dividend income. If an individual is deciding between a wage/salary job or self-employment, he/she can keep his/her assets in, for example, savings accounts, the stock market, bonds, or real estate and work in the wage/salary sector. Alternatively he/she can use a proportion, or all, of his/her assets to start a business. In the former, returns to physical capital will be observed in terms of interest, rental or dividend income. If self-employment is chosen, returns may show up both in increased earnings and interest, rental or dividend income. Therefore, as an alternative outcome measure, I use log income, where income is sum of total earnings and interest, rental or dividend income. With this measure, both groups are put on "par", and this measure of income can be compared reasonably between the two sectors. It appears that the results are not very sensitive to whether earnings or income is used<sup>12</sup>. In light of this, I use the log of weekly earnings as the dependent variable in all wage regressions presented and discussed in this paper. Furthermore, all earnings are deflated to 1989 dollars using the CPI.

One convenient way of analyzing labor market assimilation is to estimate earnings equations and use the estimated coefficients to trace out age-earnings profiles or alternatively use the predicted earnings to derive the profiles. The wage models are estimated separately for the self-employed and the wage/salary workers. The regressions are specified as:

$$\log y_i^{s-e} = \mathbf{X}_i \beta^{s-e} + \mathbf{A}_i \delta^{s-e} + \mathbf{YSM}_i \gamma^{s-e} + \varepsilon_i^{s-e}, \quad \text{for the self-employed}$$

$$\log y_i^{w/s} = \mathbf{X}_i \beta^{w/s} + \mathbf{A}_i \delta^{w/s} + \mathbf{YSM}_i \gamma^{w/s} + \varepsilon_i^{w/s}, \quad \text{for wage/salary workers}$$

where  $\mathbf{X}$  is a vector of socio-economic and geographic characteristics, including dummy variables for immigrant status, national origin group and arrival cohort,  $\mathbf{A}$  is a vector of age variables, i.e. age, age<sup>2</sup> and age<sup>3</sup>, and  $\mathbf{YSM}$  is a vector of years since migration variables, i.e. YSM, YSM<sup>2</sup> and YSM<sup>3</sup>. The vector  $\mathbf{A}$  also includes the age variables interacted with an immigrant dummy variable. The years since migration variable is equal to zero for all natives.

The models described above were estimated both by ordinary least squares with no correction and also by heteroskedastic robust ordinary least squares using the inverse Mills ratio to correct for selection bias. The estimated coefficients from the earnings models are presented in Table 8 where Model 1 is

**Table 8.** OLS weekly wage models for males aged 18–64, based on 1980 and 1990 public use samples of the U.S. census

Variable	Self-employed		Wage/salary	
	Model 1	Model 2	Model 1	Model 2
Constant	3.0797 (0.0968)	-0.7753 (1.0676)	2.7430 (0.0168)	3.0173 (0.0224)
Immigrant	0.9177 (0.3617)	1.9554 (0.4612)	1.1660 (0.0652)	0.7977 (0.0682)
Mexico	-0.1325 (0.0602)	-0.3713 (0.0893)	-0.0697 (0.0154)	-0.0082 (0.0158)
South and Central America	-0.0965 (0.0606)	-0.1962 (0.0665)	-0.0562 (0.0157)	-0.0252 (0.0158)
South East Asia	-0.0265 (0.0637)	-0.2554 (0.0897)	-0.0799 (0.0159)	-0.0134 (0.0163)
North East Asia	-0.0938 (0.0584)	0.0455 (0.0699)	0.0387 (0.0161)	-0.0160 (0.0164)
India/Pakistan	0.1448 (0.0652)	0.1070 (0.0660)	0.0870 (0.0174)	0.0979 (0.0175)
Middle East	0.0616 (0.0602)	0.3027 (0.0897)	0.0924 (0.0177)	-0.0112 (0.0185)
Europe/Canada/Australia/New Zealand	0.0549 (0.0564)	0.1124 (0.0586)	0.1633 (0.0152)	0.1406 (0.0152)
Caribbean	-0.1593 (0.0677)	-0.3583 (0.0871)	-0.1043 (0.0165)	-0.0483 (0.0168)
Cuba	-0.0963 (0.0624)	-0.0168 (0.0661)	-0.0229 (0.0171)	-0.0490 (0.0172)
Period effect 1980	0.3884 (0.0182)	0.3502 (0.0210)	0.4061 (0.0048)	0.4160 (0.0049)
Age	0.0676 (0.0075)	0.2075 (0.0393)	0.1136 (0.0014)	0.0968 (0.0017)
Age2	-0.0007 (0.0002)	-0.0035 (0.0008)	-0.0017 (0.00004)	-0.0015 (0.00004)
Age3/1000	-0.0072 (0.0147)	0.1894 (0.0562)	0.0758 (0.0031)	0.0606 (0.0032)
Years of schooling	0.0983 (0.0010)	0.1229 (0.0068)	0.0796 (0.0003)	0.0714 (0.0005)
Years of schooling* immigrant	-0.0363 (0.0023)	-0.0553 (0.0057)	-0.0350 (0.0006)	-0.0290 (0.0007)
Age* immigrant	-0.0422 (0.0275)	-0.1138 (0.0338)	-0.0589 (0.0053)	-0.0338 (0.0054)
Age2* immigrant	0.0009 (0.0007)	0.0028 (0.0009)	0.0011 (0.0001)	0.0005 (0.0001)
Age3/1000* immigrant	-0.0625 (0.0537)	-0.2226 (0.0695)	-0.0757 (0.0116)	-0.0187 (0.0120)
Speaks little or no English	-0.1484 (0.0237)	-0.2064 (0.0286)	-0.1488 (0.0052)	-0.1374 (0.0052)
Years since migration	0.0428 (0.0072)	0.0718 (0.0108)	0.0289 (0.0016)	0.0222 (0.0016)
Years since migration2	0.00002 (0.0003)	-0.0008 (0.0004)	0.0003 (0.0001)	0.0004 (0.0001)
Years since migration3/1000	0.0076 (0.0410)	0.0775 (0.0453)	-0.0367 (0.0115)	-0.0481 (0.0115)
Arrival cohort pre-1950	-1.6573 (0.2173)	-1.9049 (0.2278)	-1.3338 (0.0515)	-1.2617 (0.0517)
Arrival cohort 1950-59	-1.0811 (0.1504)	-1.2954 (0.1616)	-0.8453 (0.0345)	-0.7818 (0.0346)

**Table 8** (continued)

Variable	Self-employed		Wage/salary	
	Model 1	Model 2	Model 1	Model 2
Arrival cohort 1960–64	-0.7429 (0.1184)	-0.9044 (0.1265)	-0.5768 (0.0265)	-0.5308 (0.0266)
Arrival cohort 1965–69	-0.5662 (0.0973)	-0.6973 (0.1038)	-0.4374 (0.0212)	-0.3996 (0.0213)
Arrival cohort 1970–74	-0.3888 (0.0770)	-0.4442 (0.0785)	-0.3103 (0.0164)	-0.2956 (0.0164)
Arrival cohort 1975–79	-0.2657 (0.0575)	-0.2977 (0.0582)	-0.1912 (0.0117)	-0.1836 (0.0117)
Arrival cohort 1980–84	-0.1637 (0.0465)	-0.1538 (0.0466)	-0.1107 (0.0096)	-0.1117 (0.0096)
Correction term		-0.7830 (0.2160)		0.6799 (0.0368)
Sample size	152243	152243	1190536	1190536
R-square	0.1841	0.1843	0.3088	0.3090

*Note:* Standard errors are presented in parentheses. Model 2 standard errors are White corrected standard errors since the Heckman two-step procedure introduces heteroskedasticity of the disturbance term. All models include interactions between education and period effect, education interacted with period effect and immigrant status, in addition to dummies for regions, SMSA residency, disability and for being married.

the equation without correction and Model 2 includes the correction term calculated based on estimation of Model 4 in Table 7.

The sign of the coefficient on the inverse Mills ratio variable tells us whether there is an overall positive or negative selection into each sector. Not surprisingly, the correction term indicates that there is positive selection into both wage/salary work and self-employment. That is, individuals who choose self-employment are better suited for self-employment, at least in terms of earnings, than are the persons who choose to work in the wage/salary sector and vice versa. Fairlie and Meyer (1994) also find indication of positive selection into both sectors. However, the coefficient on the correction term for the self-employed is not found to be statistically significant in their study.

Comparing the estimated coefficients from the models with and without correction for selectivity gives further insight to the selection process. The coefficient for limited English proficiency is of similar magnitude in both sectors in the models without correction. When correction is controlled for, the estimated coefficient does not change much for wage/salary workers but becomes substantially greater in absolute terms for the self-employed. The higher penalty for limited English ability in the self-employment sector may be one of the reasons for the observed lower proportion of individuals with this proficiency level of English among the self-employed.

Returns to education appear to be greater for self-employed immigrants and natives, as compared to wage/salary employees, both in models with and without a correction term. Also, the effect of controlling for self-selection is much greater on the schooling coefficient for the self-employed. As was found in Betts and Lofstrom (2000), returns to education for immigrants are lower than for natives. The returns from an additional year of schooling are greater

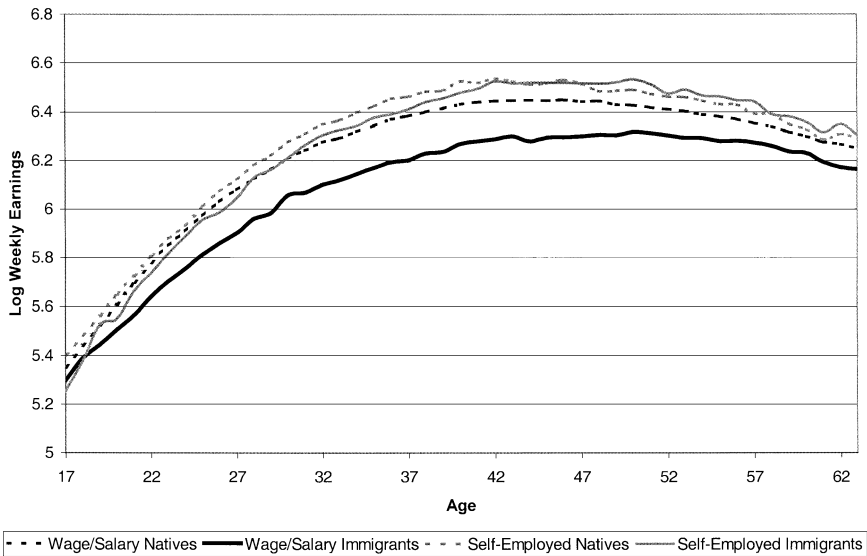


Fig. 1. Predicted age-earnings profiles, no control for self selection

for self-employed immigrants compared to wage/salary immigrants. However, when selection is controlled for it appears that immigrant education is discounted to a greater extent for the self-employed.

The self-employment decision models indicate that age affects self-employment probabilities differently between immigrants and natives. One possible reason for this is that age also impacts earnings differently for immigrants and natives. Model 1 in Table 8 suggest that this is the case and that there are also differences in returns to experience, or age, between the two sectors. For immigrants it also appears that years since migration impacts earnings differently between the self-employed and wage/salary workers. Since the models allow for non-linearities in both age and years since migration, it is difficult to analyze labor market assimilation by a simple comparison of the estimated coefficients. Instead, as stated above, a convenient way to analyze this is to look at age-earnings profiles. Figure 1 shows the predicted age-earnings profiles derived from Model 1. It traces out the average predicted log weekly earnings over age. In other words, the estimated coefficients from Model 1 are used to calculate the predicted earnings for *each* individual by age for the four groups, self-employed immigrants and natives and, wage/salary immigrants and natives.

The age-earnings profiles suggest that both wage/salary and self-employed immigrants start out at lower earnings than natives. They also indicate that wage/salary immigrants never reach earnings parity with natives. The supports the findings by Borjas (1995). A very interesting finding here is that self-employed immigrants' earnings appear to catch up with wage/salary natives' earnings at around age 30 and overtake, but stay close to, self-employed natives' earnings at around age 40. The greater labor market assimilation rate of self-employed immigrants, as compared to wage/salary immigrants, allows these immigrants to overcome their initial earnings disadvantage compared to

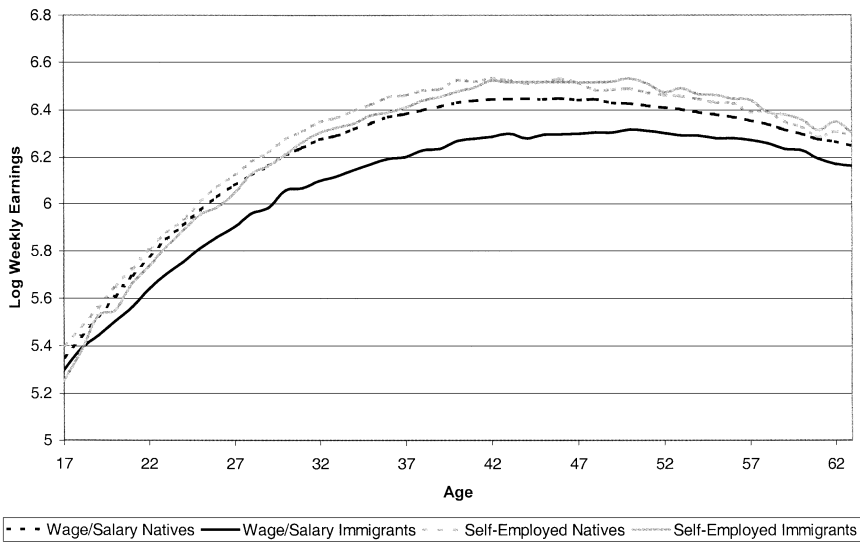


Fig. 2. Predicted age-earnings profiles with self selection correction

wage/salary immigrants and natives and self-employed natives. As can be seen in Fig. 2, this also holds true when correction for self-selection is incorporated into the model. Figure 2 shows the predicted age-earnings profile obtained from Model 2 in Table 8.

The results shown in Fig. 2 do not answer the question if self-employed immigrants do *statistically* significantly better in the labor market than do, say, self-employed natives? One way of answering this question is to look at whether expected lifetime earnings of the different groups are significantly different. From the estimated results in Models 2 in Table 8, the expected lifetime earnings for the four groups were calculated under the assumption of equal hours worked per week. The expected lifetime earnings of self-employed immigrants are about 1.5% less than the predicted earnings over the work life of self-employed natives, but within 2 standard errors of each other. In other words, there appears to be no significant difference in predicted lifetime earnings between self-employed immigrants and natives. In contrast, wage/salary immigrants are predicted to earn close to 15% less over their work life, compared to wage/salary natives. The difference is measured relatively precisely and is statistically significant.

A methodological concern in regards to the method used in this paper to analyze labor market assimilation of immigrants has been raised by Duleep and Regets (e.g., 1999). The concern is that wage convergence of immigrants may be underestimated if there is negative correlation between immigrant wage growth and time of entry human capital. According to Duleep and Regets, the observed decline in immigrant entry earnings is less of a concern since these individuals are likely to experience greater earnings growth than earlier relatively more skilled cohorts. One implication of their work is that the slope of age earnings profiles may differ across arrival cohorts. A solution that addresses this concern is to interact the variables for years since migration

**Table 9.** Change in median weekly earnings 1979–1989, by arrival cohort

Sample:	Wage/salary only	Wage/salary and self-employed*
Natives	-0.056	-0.056
Immigrant cohort:		
1975–79 Arrivals	0.275	0.298
1970–74 Arrivals	0.170	0.177
1965–69 Arrivals	0.154	0.175
1960–64 Arrivals	0.151	0.146
1950–59 Arrivals	0.112	0.121
Pre-1950 arrivals	0.024	0.030

\* Sample includes self-employed individuals who reported negative earnings.

with the indicator variables for arrival cohorts. This method, however, does not allow for identification of cohort effects in levels of earnings.

Duleep and Regets (1999) find evidence of an inverse relationship between immigrant entry earnings and immigrant earnings growth. It should be pointed out that the finding of this relationship is based on holding educational attainment upon arrival constant. Borjas (2000) results corroborate the finding of Duleep and Regets, but he finds no evidence of earnings convergence if entry schooling level is not held constant. One implication of these results is that less skilled immigrant groups, like Mexican immigrants, are unlikely to reach the earnings levels of relatively more skilled groups, like North East Asian immigrants. However, a Mexican immigrant with a high school diploma is likely to reach earnings parity with a statistically similar high school graduate from North East Asian, even if he has lower initial earnings than the North East Asian migrant.

The discussion above points out that studies of labor market assimilation of immigrants is sensitive to whether immigrant entry skill levels are held constant or not. The results presented above are based on estimates in which I control for educational attainment and English proficiency of immigrants. To ensure that these results are not driven by the critique brought up by Duleep and Regets, or the exclusion in the sample of the self-employed who report negative earnings, I derived median weekly earnings for the cohorts included in both census years and calculated the unadjusted earnings growth rate for each cohort between the ages of 18 and 54 in 1980 and between the ages of 28 and 64 in 1990. These calculations were made based on two samples, one including only wage/salary workers and one including both wage/salary workers and the self-employed. The results are shown in Table 9. It appears that the regression results are driven neither by the potential bias in earnings assimilation stemming from a negative correlation between earnings growth and initial earnings, nor the exclusion of negative earners. For most arrival cohort, the increase in median weekly earnings increases somewhat when the self-employed, including negative earners, are included in the sample.

The finding that self-employed immigrants do better in the U.S. labor market and display greater earnings growth than wage/salary immigrants suggests that the wage gap between natives and immigrants is measured somewhat inaccurately unless self-employed immigrants are included in the sample. The

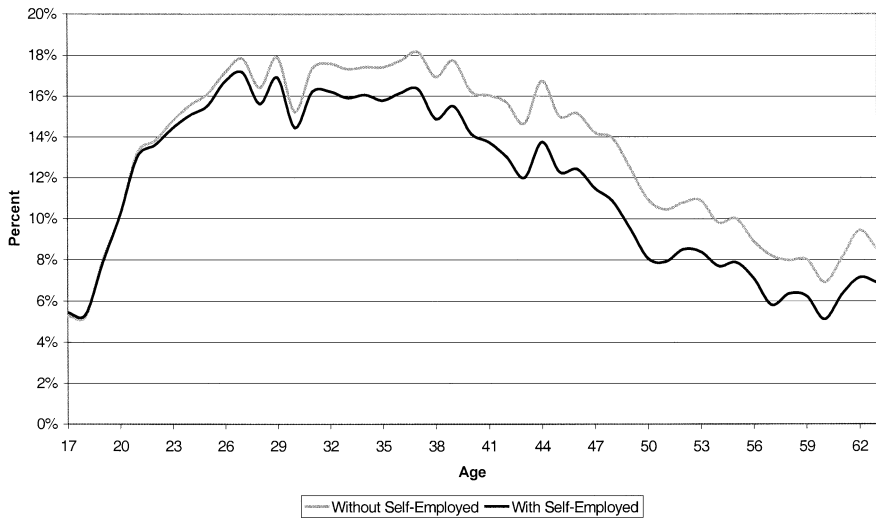


Fig. 3. Predicted log weekly earnings gap, immigrants-natives

important question is then: how does this gap change when the self-employed are included? This can be answered by calculating “weighted” age-earnings profiles separately for immigrants and natives in the following way:

$$\bar{y}_j^k = \frac{n_j^{w/s}}{n_j} \hat{y}_j^{w/s} + \frac{n_j^{s-e}}{n_j} \hat{y}_j^{s-e}$$

where  $n$  is the number of individuals in age group  $j$ ,  $j$  varies between 17 and 63, and where  $k$  indicates the group, i.e. immigrants or natives. I suppress the superscript on the right hand side variables to simplify the notation. By subtracting  $\bar{y}_j^{\text{immigrants}}$  from  $\bar{y}_j^{\text{natives}}$  the wage gap when the self-employed are included can be calculated for each age group. Figure 3 shows the log wage gap calculated in this way, based on Model 2 in Table 8, and also the log wage gap when the self-employed are excluded.

The immigrant native earnings gap changes very little for individuals under the age of 30 when the self-employed are included. However, the gap becomes more exaggerated with age and is most overstated for individuals in their fifties. Excluding the self-employed when studying labor market assimilation overstates the gap between natives and immigrants by up to 30% of the earnings gap. This is mainly driven by two components. The first is that the most successful self-employed immigrants, relative to natives, are 40 years old or older. The second reason can be seen in Fig. 4. The greatest difference in self-employment rates between natives and immigrants is for individuals in their forties and fifties. The observed overall higher self-employment rate among immigrants is caused by the higher self-employment rates of this age group. It is not surprising that the most successful self-employed immigrants, relative to natives, also have the highest relative self-employment rates. This is in fact what the theoretical model described above predicts.

Using the predicted earnings and the method described above, I also cal-

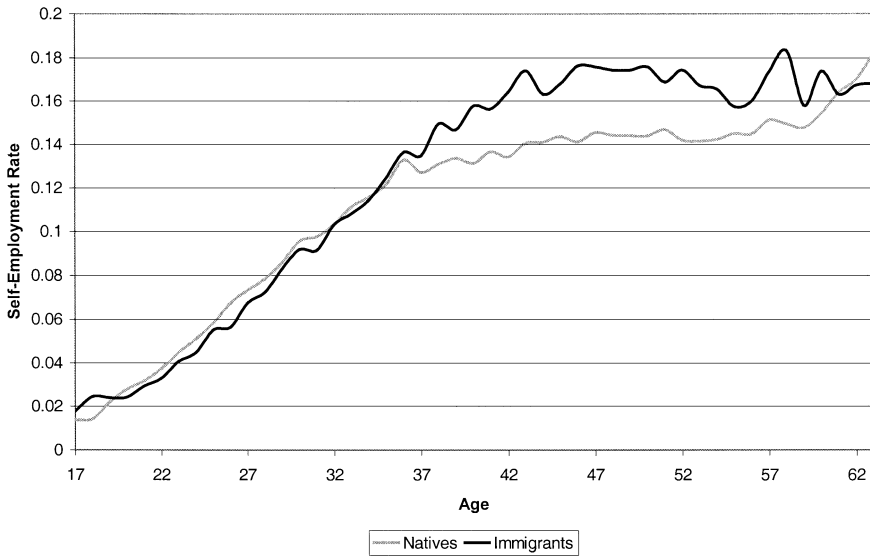


Fig. 4. Self-employment rates by age

culate the overall average immigrant-native earnings gap both when the self-employed are excluded and included in the sample. Without the self-employed, the predicted immigrant-native wage gap is about 12.7% (using the observed differences, the gap is 15.3%). When the self-employed are included, the predicted earnings gap decreases to around 10.8% (or 13.2% if no controls are included). The predicted gap is overstated on average by slightly more than 14% when the self-employed are not accounted for in the sample.

The estimated earnings models for wage/salary workers and the self-employed that include a correction term, Model 2 in Table 8, can also be used to predict earnings of the self-employed had they chosen the wage/salary sector. This gives us further insight into the effects of self-selection. Figure 5 displays the predicted age-earnings profile for wage/salary workers and the predicted age-earnings profiles for the self-employed had they chosen wage/salary work. These are calculated by applying the estimated coefficients for wage/salary workers and individuals' inverse Mills ratio to the self-employed as well as wage/salary employees. The predicted wage/salary earnings indicate that self-employed immigrants would barely reach earnings parity with wage/salary natives if they had selected the wage/salary sector. Furthermore, convergence is now delayed until approximately age 55. The predicted wage/salary earnings of self-employed immigrants is estimated to never reach the predicted wage/salary earnings of self-employed natives. Self-employed immigrants are predicted to do worse in the wage/salary sector compared to self-employed natives. Self-employed immigrants appear to be relatively more positively selected into self-employment than natives.

Is it possible that cohort effects may be the reason labor market assimilation appears to be more rapid for self-employed immigrants? It has been suggested that the drop in relative labor market performance of immigrants in the last decades is due to changes in U.S. immigration policy (see for example



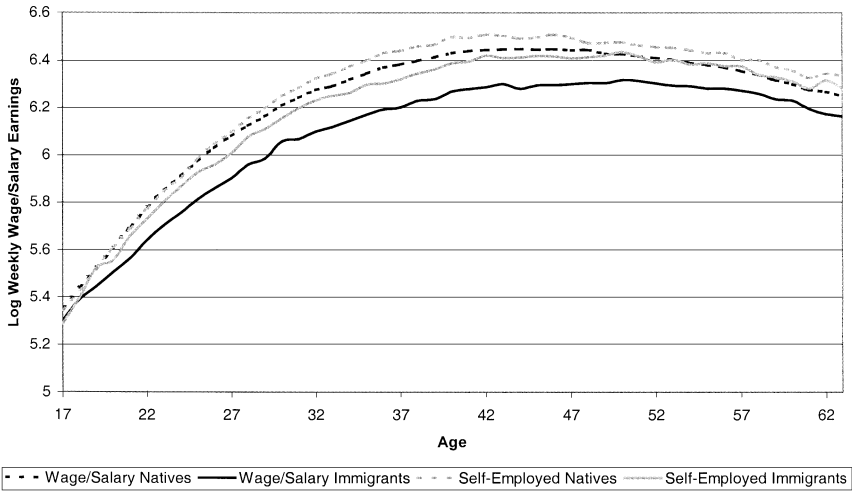


Fig. 5. Predicted age-wage/salary earnings profiles with self selection correction

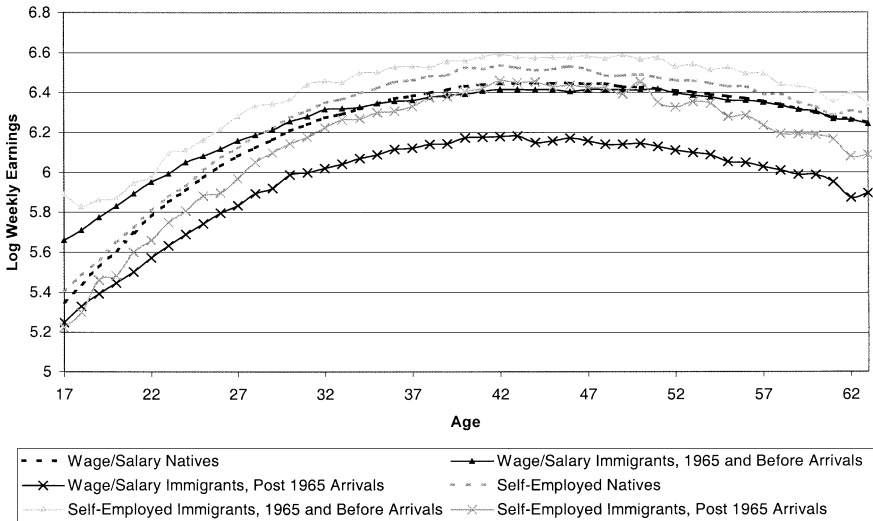


Fig. 6. Predicted age-earnings profiles by post 1965 arrival cohorts and 1965 and before arrival cohorts

Borjas 1994). The 1965 Amendments to the Immigration and Nationality Act repealed the national origin restrictions and made family re-unification the main criteria in deciding who is allowed to immigrate to the U.S. The effect of the policy change is believed to have led to changes in the national origin composition of immigrants toward immigrants of lower skill levels.

To ensure that cohort effects are not the cause of the observed relative attainment of self-employed immigrants, separate age-earnings profiles were derived for post 1965 arrival cohorts and 1965 and before arrival cohorts. Figure 6 shows these age-earnings profiles. It can be seen that the more recent

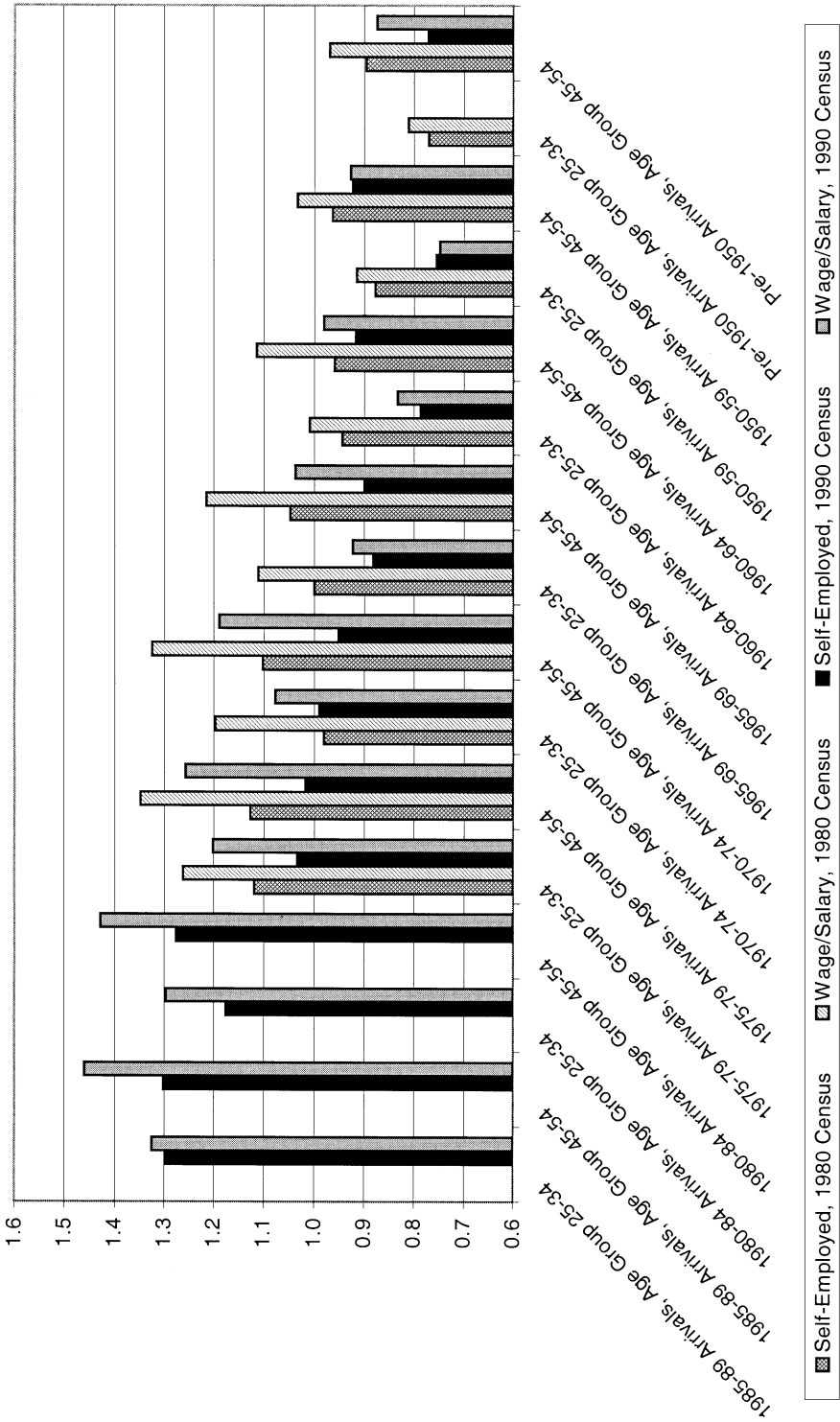


Fig. 7. Predicted relative weekly earnings, natives/immigrants, by arrival cohorts and age groups

arrival cohorts do not perform as well in the labor market as the earlier cohorts<sup>13</sup>. However, recent self-employed immigrants still do substantially better in the labor market than wage/salary immigrants. Their assimilation rate is greater and they also appear to be close to reaching earnings parity with self-employed natives. Self-employed immigrants who arrived in the earlier cohorts are also better performers in the labor market than wage/salary immigrants who arrived prior to 1965. The difference in earnings between post 1965 arrival cohorts and earlier cohorts appear to be smaller for self-employed immigrants.

Self-employed immigrants also appear to do better in the labor market than wage/salary immigrants when compared to natives of the same age. Figure 7 shows the predicted average weekly earnings for immigrants of two age groups, 25–34 and 45–54 year olds, relative to natives' average predicted earnings of the same age group. Although not presented here, the general findings for these age groups also hold for other age groups. For virtually all age groups and cohorts, self-employed immigrants perform better in the labor market, relative to natives of the same age, than immigrants in the wage/salary sector. For example, self-employed natives aged 25–34 in 1990 are predicted to earn 18% more than self-employed immigrants in this age group who arrived in the U.S. between 1980 and 1984 (i.e. a ratio of approximately 1.18). Wage/salary natives of the same age are predicted to earn 30% more than wage/salary immigrants in this age group and who arrived in the 1980–1984 period. The finding that self-employed immigrants display higher relative earnings than immigrant employees appear to hold for both the earlier and the more recent arrival cohorts. It seems unlikely that any cohort effects that are not absorbed by the estimated models are the driving forces behind the observed relative success of self-employed immigrants.

## 7. Conclusion and summary

Using data from the 1980 and 1990 U.S. Censuses, this paper shows that there are substantial differences between wage/salary immigrants and self-employed immigrants in terms of earnings and characteristics such as educational attainment. Self-employed immigrants have higher earnings, are more educated and display lower rates of limited English proficiency levels than wage/salary immigrants. Immigrants are more likely to be self-employed than natives but self-employment rates vary greatly across national origin groups and arrival cohorts.

Earnings of both self-employed and wage/salary immigrants declined relative to natives in the 1980's. The relative decline appears to be slightly stronger among the immigrants who chose wage/salary work.

Models of the self-employment decision are also estimated. Controlling for national origin groups affects the estimated impact of years of education on self-employment probabilities. Evidence of different roles of years of schooling in the self-employment decision between natives and immigrants is also found. Education has a greater influence on natives' self-employment probabilities compared to immigrants'.

The paper also finds evidence that the proportion of co-nationals living in the same SMSA has a positive impact on self-employment probabilities

for immigrants. This variable alone appears to explain differences in self-employment rates between Cuban immigrants and African immigrants. This supports Borjas' (1986) finding of enclave effects in explaining some of the differences in self-employment rates between natives and immigrants.

The ratio of average self-employment earnings to wage/salary earnings in an individual's SMSA affects self-employment rates of natives substantially less than it does for immigrants.

The estimated earnings models suggest that wage/salary immigrants will not reach earnings parity with wage/salary natives. Earnings of self-employed immigrants are predicted to converge with native wage/salary earnings at around age 30 and native self-employed earnings at around age 40. The higher earnings of the self-employed suggest that the immigrant native earnings gap is overstated if the self-employed are not included in the sample. Calculations indicate the gap may be overstated by up to 30% for some age groups, but on average, the gap is overstated by roughly 14%.

Estimated models with correction for self-selectivity indicate that self-employed immigrants would not reach earnings parity with self-employed natives had they chosen to work in the wage/salary sector. The greater relative difference for immigrants between expected earnings in the wage/salary sector and self-employment earnings, compared to the difference for natives, is quite plausibly one important reason why immigrants display overall higher self-employment rates.

## Appendix

**Table A1.** Definition of national origin groups

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**Mexico:**

Mexico

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**South and Central America:**

Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Falkland Islands, French Guyana, Guyana, Paraguay, Peru, Suriname, Uruguay, Venezuela, Belize, Costa Rica, El Salvador, Guatemala, Honduras, Nicaragua, Panama.

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**South East Asia:**

Bangladesh, Brunei, Burma, Cambodia, Indonesia, Laos, Macau, Malaysia, Philippines, Thailand, Vietnam.

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**North East Asia:**

China, Hong Kong, Japan, North Korea, Singapore, South Korea, Taiwan.

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**India/Pakistan:**

Bangladesh, Bhutan, India, Nepal, Pakistan, Sri Lanka.

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**Middle East/Egypt:**

Bahrain, Cyprus, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Turkey, United Arab Emirates, Yemen, Egypt.

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**Europe, Canada, Australia, New Zealand:**

Albania, Andorra, Austria, Belgium, Bulgaria, Czechoslovakia, Denmark, Faeroe Islands, Finland, France, Germany, Gibraltar, Greece, Hungary, Iceland, Ireland, Italy, Liechtenstein, Luxembourg, Malta, Monaco, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Spain, Sweden, Switzerland, United Kingdom, Vatican, Yugoslavia, Soviet Union, Canada, Australia, New Zealand.

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**Caribbean:**

Anguilla, Antigua and Barbuda, Aruba, Bahamas, Barbados, British Virgin Islands, Cayman Islands, Dominica, Dominican Republic, Grenada, Guadeloupe, Haiti, Jamaica, Martinique, Montserrat, Netherlands Antilles, St. Barthelemy, St. Kitts-Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, Turks and Caicos Islands.

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**Cuba:**

Cuba

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**Africa:**

Algeria, Angola, Benin, Botswana, British Indian Ocean Territory, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Djibouti, Equatorial Guinea, Ethiopia, Gabon, Gambia, Ghana, Glorioso Islands, Guinea, Guinea-Bissau, Ivory Coast, Juan de Nova Island, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mayotte, Morocco, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, Sao Tome and Principe, Senegal, Mauritius, Seychelles, Sierra Leone, Somalia, South Africa, St. Helena, Sudan, Swaziland, Tanzania, Togo, Tromelin Island, Tunisia, Uganda, Western Sahara, Zaire, Zambia, Zimbabwe.

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Table A2. Ethnic composition of national origin groups, percent of group population

Group	1980					1990				
	White	Black	Asian	Hispanic	Other	White	Black	Asian	Hispanic	Other
Natives	86.3	8.9	0.6	3.6	0.6	86.7	7.9	0.7	4	0.7
All immigrants	44.5	5	15.3	34.6	0.6	28.3	5.6	21.2	44.7	0.2
National origin group:										
Mexico	0.8	0.2	0.1	98.6	0.3	0.4	0.3	0.2	98.8	0.3
Central/South America	9.2	9.2	2	78.7	0.9	5.1	6.6	2.1	85.8	0.4
South East Asia	5.4	0.2	92.4	0.6	1.4	1.9	0.1	97.8	0.2	0
North East Asia	4.2	0.2	95.1	0.2	0.3	2	0.1	97.7	0.1	0.1
India, Pakistan, etc	5.9	0.3	92.3	0.1	1.4	3.9	0.2	95.1	0.2	0.6
Middle East/Egypt	95.2	0.2	1	1.1	2.5	97.6	0.2	1.5	0.6	0.1
Europe, CAN, AUS, NZ	96.6	0.4	0.3	2.4	0.3	96.3	0.6	0.4	2.7	0
Africa	48.5	36.7	9.5	2.3	3	32.8	55.9	10.1	1.2	0
Caribbean	4	68.9	2.4	23.6	1.1	2.6	72.4	2.2	22.5	0.3
Cuba	0.9	1.7	0.2	97.1	0.1	0.8	2.4	0.3	96.5	0

## Endnotes

- <sup>1</sup> Using the Current Population Survey, Bregger (1996) estimated that 6.7 million men were self-employed in 1994.
- <sup>2</sup> Total earnings in this paper is defined as the sum of annual earnings from wage/salary work and self-employment earnings. The reason for this is that an individual may report earnings from both sectors. A person is defined to be self-employed if he reports to be self-employed in own incorporated or not incorporated business, professional practice or farm and if he has no farm self-employment income, i.e. self-employed farmers are excluded from the study. All other working individuals are defined as wage/salary workers.
- <sup>3</sup> Individuals who reported a weekly wage over \$20,000, in 1989 dollars, are excluded from the study. Also, individuals who reported a weekly wage of less than \$50 are ignored. Since the 1990 Census is not a random sampling of the population, sample weights are used for all calculations and estimations.
- <sup>4</sup> The U.S. Immigration and Naturalization Service estimates that in 1990, 7.9% of the total U.S. population was foreign born. Given a self-employment rate of 12.2% for male immigrants, the proportion of self-employed immigrants of the total male population would be 0.96%, assuming men and women comprise an equal share of foreign born.
- <sup>5</sup> The goal of creating national origin groups is to obtain groups that are relatively homogenous within the group to reduce the observed heterogeneity among immigrants overall. The national origin groups used in this paper seem to be relatively homogenous in terms of the ethnic composition and educational attainment and appear to be reasonably defined groups. An earlier version of this paper contains more details about the national origin groups, see IZA Discussion Paper No. 54, August 1999.
- <sup>6</sup> The coding of educational attainment changed in the 1990 Census. The data from 1990 is recoded in the following fashion. No school completed, nursery school and kindergarten are coded as 0 years of education; first through fourth grade are recoded as 2.5 years; fifth through eighth grade as 6.5 years; ninth grade as 9 years; tenth grade as 10 years; eleventh or twelfth grade without a high school diploma as 11 years; high school graduate as 12 years; some college, no degree as 13 years; associate degree as 14 years; bachelor's degree as 16 years; master degree as 17 years and professional and doctorate degree as 20 years.
- <sup>7</sup> This variable is set equal to one if the respondent indicated that they did not speak English well or if they did not speak English at all.
- <sup>8</sup> The ethnic groups used are the mutually exclusive ones shown in Table A2, i.e. white, black, Asian, Hispanic and all other.
- <sup>9</sup> One concern with incorporating these variables into the self-employment decision models is that they may be determined endogenously and consequently lead to inconsistent estimators. However, given that the ratios are relative group characteristics by SMSA and not individual characteristics, this seems somewhat unlikely. The earnings ratio is not clearly endogenous, but may simply reflect entrepreneurial conditions or opportunities in an area.
- <sup>10</sup> The interquartile range for the earnings ratios are approximately 0.4 for immigrants and 0.15 for natives. This implies that the model predicts roughly 1.8% of the variation in immigrant self-employment rates over SMSAs and 0.25% of the variation in native self-employment rates.
- <sup>11</sup> Weekly earnings are calculated by adding up a person's earnings from wage/salary work and self-employment. This is divided by the number of weeks worked to obtain weekly earnings. Note that an individual may report earnings from both wage/salary work and self-employment. In these cases, both sources are included in the sum of earnings. In 1980 earnings were top coded at \$75,000 while in 1990 the top code was \$140,000. The real difference between the top code is approximately 10%. The reported top coded earnings in 1980 are adjusted by multiplying them by 1.1.
- <sup>12</sup> Models using log hourly earnings were also estimated. The general results reported in this paper also hold for this outcome measure. Overall, the earnings advantage the self-employed hold over wage/salary workers is somewhat reduced when reported hours worked are corrected for.
- <sup>13</sup> One possible reason for the higher earnings of the earlier arrival cohorts is that they consist of a greater proportion of immigrants who migrated at a relatively young age. Borjas (1995) finds that the assimilation process of immigrants who arrive in the U.S. at a young age have age-earnings profiles that are similar to the age-earnings profiles of natives.

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