



Ethnic and Racial Self-Employment Differences and Possible Explanations

Robert W. Fairlie, Bruce D. Meyer

The Journal of Human Resources, Volume 31, Issue 4 (Autumn, 1996), 757-793.

Stable URL:

<http://links.jstor.org/sici?sici=0022-166X%28199623%2931%3A4%3C757%3AEARSDA%3E2.0.CO%3B2-O>

Your use of the JSTOR archive indicates your acceptance of JSTOR's Terms and Conditions of Use, available at <http://www.jstor.org/about/terms.html>. JSTOR's Terms and Conditions of Use provides, in part, that unless you have obtained prior permission, you may not download an entire issue of a journal or multiple copies of articles, and you may use content in the JSTOR archive only for your personal, non-commercial use.

Each copy of any part of a JSTOR transmission must contain the same copyright notice that appears on the screen or printed page of such transmission.

The Journal of Human Resources is published by University of Wisconsin Press. Please contact the publisher for further permissions regarding the use of this work. Publisher contact information may be obtained at <http://www.jstor.org/journals/uwisc.html>.

The Journal of Human Resources
©1996 University of Wisconsin Press

JSTOR and the JSTOR logo are trademarks of JSTOR, and are Registered in the U.S. Patent and Trademark Office. For more information on JSTOR contact jstor-info@umich.edu.

©2002 JSTOR

Ethnic and Racial Self-Employment Differences and Possible Explanations

Robert W. Fairlie
Bruce D. Meyer

ABSTRACT

We show that self-employment rates differ substantially across 60 ethnic and racial groups in the United States. These differences exist within broad combinations of groups such as Asians and Hispanics, and are almost as great after regression controls, including age, education, immigrant status, and time in the country. We then provide evidence on a number of theories of self-employment. An ethnic/racial group's self-employment rate is positively associated with the difference between average self-employment and wage/salary earnings for that group. Ethnic/racial groups that emigrate from countries with high self-employment rates do not have high self-employment rates in the United States. Finally, we find that the more advantaged ethnic/racial groups, measured by wage/salary earnings, self-employment earnings, and unearned income, and not the more disadvantaged groups, have the highest self-employment rates.

I. Introduction

Self-employment rates differ dramatically across ethnic and racial groups in the United States. For example, 1990 Census of Population data indicate that only 4.4 percent of employed African-American men and 2.0 percent of

Robert W. Fairlie is an assistant professor of economics at the University of California, Santa Cruz. Bruce D. Meyer is a professor of economics and a faculty fellow at the Center for Urban Affairs and Policy Research at Northwestern University. The authors would like to thank Wayne Atkins for help with the early stages of this project, and Theresa Devine, Christopher Jencks, Carolyn Moehling, Kevin Murphy, Harvey Rosen, Steve Trejo, Chris Udry, three anonymous referees, and seminar participants at the Econometric Society Meetings, the University of Chicago, UCLA, and UC Santa Barbara for their comments. The data used in this article can be obtained beginning in February 1997 through January 2000 from Robert W. Fairlie, Department of Economics, University of California, Santa Cruz, CA 95064.

[Submitted May 1995; accepted February 1996]

employed African-American women work for themselves. In contrast, Korean-American men and women have self-employment rates of 27.9 percent and 18.9 percent, respectively. While there are many good studies of a few groups, there is little evidence on these differences from nationally representative surveys that allow cross-group comparisons with comparable data. In this paper, we document the enormous differences in self-employment rates across a large number of ethnic/racial groups. In addition, we examine many of the possible explanations for these differences.

Understanding the ethnic/racial character of self-employment is important for at least two reasons. First, conflicts between ethnic and racial groups in the United States have often been aggravated by business ownership patterns. The racial conflict between Koreans and African-Americans in many large cities, in large part due to the presence of Korean-owned businesses in black communities, is just the latest example.¹ Second, self-employment has historically been a route of economic advancement for some ethnic groups.² The success of Chinese and Japanese immigrants in the United States is substantially due to their ownership of small businesses.³ Self-employment has also been proposed as a route out of poverty and is currently being promoted by many states and the federal government as a way to leave the welfare and unemployment insurance rolls.⁴

In Section II, we begin by describing the 1990 Census data that we use to document the differences in self-employment rates reported in Section III. Next, we check the extent to which differences in individual-level observable characteristics such as age, education, and year of immigration, can account for the differences across ethnic/racial groups. Section V reviews theories from sociology and economics that have been offered as explanations for the group differences in self-employment. We describe limitations of these theories and provide evidence for and against these theories from our data and other sources. In Section VI, we examine more thoroughly three explanations for the ethnic/racial differences in self-employment rates. Section VII concludes.

II. Data

We use the 1990 Census of Population because it has detailed race and ethnicity questions and includes enough individuals to examine a large number of ethnic/racial groups. With individual responses for approximately 12.5 million individuals, the Census allows us to examine 60 different ethnic/racial groups which would be impossible with other data sets.

1. See In-Jin Yoon (1991b) for a description of the causes and character of the racial tensions between Koreans and African-Americans in Chicago.

2. Glazer and Moynihan (1970, p. 36) argue that "business is in America the most effective form of social mobility for those who meet prejudice."

3. See Light (1972) for a description of the history of Chinese and Japanese in the United States and Loewen (1971) for a description of Chinese in Mississippi.

4. See Guy, Doolittle, and Fink (1991) for a description of the program promoting self-employment among AFDC recipients and Benus et al. (1992) for a description of the program promoting self-employment among unemployment insurance recipients.

While much more detail can be found in Fairlie and Meyer (1994), we briefly describe our methods here. We study individuals who work in nonagricultural industries and who are at least 16 years old. In addition, we include only individuals who worked at least 20 weeks and usually worked at least 15 hours per week last year (1989).⁵ As in most previous studies of self-employment, agricultural industries are excluded. Self-employed workers are defined as those individuals who identify themselves as mainly self-employed in their own not incorporated or incorporated business on the class of worker question.⁶ Since the labor force participation decision is affected by many factors which we do not want to model, we analyze those who are currently working. For the same reason, the self-employment rate is defined in the usual way as the fraction of those working that are self-employed.

We identify a large number of ethnic/racial groups by interacting the ancestry, race, and Spanish origin variables in the Census. In some cases we combine ethnic groups, generally by geographical location. A few examples of how we define specific ethnic/racial groups illustrates our general approach. The Scandinavian group includes individuals who report a Danish, Norwegian, or Swedish ancestry as well as the large number of individuals who are less specific and report a Scandinavian ancestry. The ethnic groups, Central American, South American, and persons from the Caribbean, include large numbers of individuals who report a black race, white race, and/or Spanish origin. We create three separate ethnic/racial groups from each of these original ethnic groups. The ethnic/racial group, African-American, is comprised of those people whose race is black and ancestry is African-American. These individuals are a separate group from Black Africans because the latter group's members are more specific about their exact origin and are almost entirely first generation immigrants.⁷ By law, the Census does not include questions on religion. Although we cannot say anything about most religious groups, following some previous studies, we can learn about the Russian Jewish population by using its rough correspondence with Russian.⁸

The Census ancestry question is open-ended, which means that respondents write down their ancestry or ethnic origin instead of choosing among a set of

5. In our sample, 81.9 percent of the men and 67.2 percent of the women worked at least 40 weeks in 1989 and 35 hours per usual week in 1989. We check some of the analyses with a full-time, full-year subsample defined in this way.

6. We include the incorporated self-employed who are many of the more successful business owners.

7. A few additional classifications of ethnic/racial groups require description. Spaniards are individuals who report an ancestry of Spain or a region in Spain, whereas the Spanish category includes individuals who are no more specific about their ancestry than Spanish or Hispanic. The Native American and British ancestry groups are divided into two racial groups each, depending on the individual's response to the race question. The specific ancestries that constitute the majority of the geographical groups, Oceania, Other South Asian, and Southwest Asian, are Australia, Pakistan, and Cambodia, respectively. See Fairlie and Meyer (1994) for complete definitions of all included ethnic/racial groups.

8. Neidert and Farley (1985) use this approximation in an analysis of U.S. Census data. Using the religion question on the NORC General Social Survey for the years 1972-85, Lieberson and Waters (1988) find a strong correspondence between Jews and those with Russian ancestry. While they find that most of those with Russian ancestry are Jews, most Jews are not of Russian ancestry. They also indicate that comparisons between Russians and other whites likely underestimate differences between Jews and non-Jews.

alternatives. Respondents are also allowed to report more than one ancestry. To avoid the complications of assuming a dominant ancestry or analyzing the numerous permutations of dual ancestries, we exclude individuals who report multiple ancestries in most of the analyses.⁹ This restriction eliminates 30.3 percent of the original sample and excludes mostly white Europeans who have been in the United States a long time (98.6 percent of these individuals are white). In addition, we exclude the 15.1 percent of the original sample who wrote in a religious group, did not respond, or gave responses that are not meaningful to the analysis such as American or United States. Therefore, we create our main sample from the 3.0 million (54 percent) of the 5.6 million working adults in the 5-percent sample who have valid single ancestry responses.¹⁰ We could take an even more restrictive approach and study immigrants, but they are only 10.1 percent of the workforce. We take the middle ground and focus on the larger group of individuals who are not necessarily immigrants, but have distinct backgrounds because they do not have multiple ancestries.

To avoid analyzing all 3.0 million observants, we randomly draw a large enough sample from each ethnic/racial group to obtain a precise estimate of its self-employment rate and average earnings in self-employment and wage/salary work. We require a minimum of 750 observations for each included group and use sampling weights to obtain approximately 5,000 observations if more than that many are available for the group.

A discussion of possible biases in using Census ancestry and race variables to define groups can be found in Lieberman and Waters (1988). They examine the 1980 Census questions as well as those questions used by the Current Population Survey (CPS) in earlier years. While we use the 1990 Census, the questions are similar in most respects (see below for some exceptions) and most of the issues are the same. The issues include how to handle groupings of certain ancestries as well as multiple ancestries, the effects of self-identification and question order, and the consistency of responses over time. Inevitably, there is some grouping of dissimilar groups into larger ethnic categories, in part dictated by Census responses that are not as specific as would be ideal. This mixing is likely to be especially important for some Europeans and would likely have the tendency to reduce group differences.

Two issues of particular importance in the 1980 Census are self-identification and question order. While reported ancestry partly reflects personal identification rather than the country of origin of oneself or one's ancestors, the 1990 Census eliminated a particularly problematic part of the 1980 instructions which asked for the ancestry with which a person "identifies." The responses to ancestry questions also seem to be sensitive to the order of example ancestries that are provided in instructions. In particular, the 1980 responses for English and German

9. Alternative methods for handling multiple ancestry responses and problems with these methods are described in Lieberman and Waters (1988).

10. We check our main results using an augmented sample that includes the six largest dual ancestry groups, White German-Irish, White British-White German, White British-Irish, Irish-Scottish, White German-Scandinavian, and White French-White German. These groups account for almost half of all individuals who report multiple ancestries.

differ appreciably from the 1990 Census numbers. While this sensitivity is particularly worrisome, the 1990 data agree much more closely with earlier CPS data (and what several researchers have taken to be truth) than the 1980 Census.¹¹

Overall, the ancestry responses are likely to be most reliable for non-Europeans, blacks, and Hispanics, and for single ancestry groups. These groups are those on which we focus much of our attention. We base this conclusion on the earlier discussion, and evaluations of the consistency of responses to ethnic origin questions in the CPS. A summary is provided by Lieberman and Waters (1988, p. 48) who indicate that:

First, non-European groups are far more consistent about who they are: Puerto Ricans, blacks, and Mexicans are exceptionally high in their consistency. Second, white groups that have been here for the longest time and have substantial mixed components are less consistent than less mixed groups with shorter spans in the country.

III. Self-Employment by Ethnic/Racial Group

Table 1 documents the substantial variation in self-employment rates across our 60 ethnic/racial groups.¹² For men, self-employment rates range from 3.2 percent for Laotians to 28.6 percent for Israelis, a ratio of nine. Both African-American and Black Central American women have a self-employment rate of 2.0 percent, while Korean women have a self-employment rate of 18.9 percent. The U.S. self-employment rates for men and women are 10.8 and 5.8 percent, using the entire 5-percent sample from the 1990 Census. It is evident that self-employment rates differ enormously by ethnic/racial group for both men and women.

There are also large differences within broad ethnic and racial groups. All of the European groups have self-employment rates near or above the U.S. rates for men and women, however, the range across these groups is large. White French, Portuguese, and Belgians have the lowest self-employment rates among European groups equal to 10.5 percent for men and close to 7.0 percent for women, whereas Russians (24.9 percent for men and 12.3 percent for women) and Greeks (23.0 and 10.1 percent) have the highest self-employment rates. It is evident that broad categories such as European or white would hide important differences across groups.

The Middle Eastern group which contains Lebanese, Syrians, Iranians, Iraqis, Saudi Arabians, and Palestinians has high self-employment rates (23.1 and 10.2 percent). Other ethnic/racial groups with origins in either the Middle East or neighboring countries, such as Armenians (24.1 and 9.7 percent), Israelis (28.6 and 10.3 percent), and Turks (18.6 and 8.5 percent), tend to have high self-employment rates.

11. See Lieberman and Waters (1988) and Cresce, Lapam, and Rolark (1992).

12. The self-employment rate patterns across ethnic/racial groups are similar for 1980. See Fairlie and Meyer (1994) and Fratoe (1986). Also, see Razin and Langlois (1994) for patterns in Canada.

Asian self-employment rates differ substantially across ancestry groups. The self-employment rates of Filipinos (5.1 and 3.3 percent) and Laotians (3.2 and 2.3 percent) are at or near the bottom of the distribution of self-employment rates, whereas the Korean rates (27.9 and 18.9 percent) are at or near the top. Large Asian groups such as Asian Indians (11.7 and 7.4 percent), Chinese (13.5 and 9.1 percent), Japanese (11.1 and 6.1 percent), and Vietnamese (8.3 and 8.7 percent) have self-employment rates that are spread around the average.

There are many studies focussing on the number and success of Koreans in self-employment.¹³ Min (1984) reviews previous studies on Korean entrepreneurship and states that about one-third of Korean immigrant families in the United States are involved in small businesses. Yu (1982) finds that in 1980, 40 percent of all employed Korean men in Los Angeles were self-employed. Our estimate of the national rate for Korean men is lower than Yu's estimate for Los Angeles, but is still extremely high compared to other ethnic/racial groups.

The self-employment rates of men and women in Hispanic ethnic/racial groups are typically below the average U.S. rates. Mexicans (6.8 and 4.4 percent) and Puerto Ricans (3.6 and 2.3 percent) have low self-employment rates, while Cubans have moderately high self-employment rates (15.5 and 5.9 percent). There are many studies that analyze Cuban self-employment, motivated in part by the success of Cuban-owned businesses, especially in Miami, Florida.¹⁴ The Cuban self-employment rate for men is higher than the U.S. rate. More striking, however, is that their rate is substantially higher than the self-employment rates of other Hispanic groups.

Overall, black ethnic/racial groups have the lowest self-employment rates of any broad group. African-Americans, the largest black group, have a self-employment rate of only 4.4 percent for men and 2.0 percent for women. There is a large body of research describing the dearth of black-owned businesses in the United States.¹⁵ Blacks from Central America (5.0 and 2.0 percent) and South America (4.4 and 2.1 percent) also have very low self-employment rates.

Black Africans (7.1 and 3.2 percent) and Blacks from the Caribbean (6.8 and 3.0 percent) have low self-employment rates compared to the U.S. rates, but have rates that are notably higher than the African-American rates. These two groups contain a much higher percentage of immigrants (56.7 and 88.3 percent, respectively) than African-Americans (0.8 percent). Sowell (1983) argues that because of the different socioeconomic backgrounds of West Indian blacks and African-Americans, the economic status of the two groups in the United States is very different. West Indian slaves, in contrast to American slaves, were allowed to manage their own plots of land and profit from any surplus they might produce. Glazer and Moynihan (1970) argue that West Indian immigrants were more entrepreneurial than native blacks, but over time they have merged into the African-

13. Light (1984), Light and Bonacich (1988), and Min (1984, 1988) are good sources of references to studies of Korean entrepreneurship.

14. See Light (1984), Portes and Bach (1985), and Aldrich and Waldinger (1990) for references.

15. Earlier studies include Myrdal (1944), Cayton and Drake (1946), Frazier (1957), Kinzer and Sagarin (1950), and Glazer and Moynihan (1970). Recent work includes Bates (1989), Borjas and Bronars (1989), Meyer (1990), and Fairlie (1994, 1996).

American group to the point where their children do not perceive themselves as being any different. Nationally, we find that Blacks from the Caribbean have higher self-employment rates than African-Americans. If we remove all workers who are in the taxicab service industry, however, we find that the Black Caribbean rate for men (5.4 percent) is only slightly higher than the African-American rate (4.4 percent).¹⁶ Overall, while there are important differences in self-employment rates among black groups, it appears as though being black, independent of ethnic origin, is associated with a low self-employment rate.

In general, male and female rates have similar rankings across ethnic/racial groups, but female rates are typically around 55 percent of male rates.¹⁷ Only four of the 60 groups reported in Table 1 have female/male self-employment ratios that lie outside of the range from 0.35 to 0.75. The Vietnamese are the only ethnic/racial group with a higher estimated self-employment rate for women than for men.

In Fairlie and Meyer (1994), we also estimate self-employment rates using the 1980 Census. The most striking change in self-employment rates from 1980 to 1990 is the sharp increase in the female self-employment rate.¹⁸ This increase occurred for virtually every ethnic/racial group included in our study and was especially large for several groups. Overall, the ranking of ethnic/racial groups by self-employment rates in 1980 is extremely similar to 1990. A few groups that experienced a large increase in the self-employment rate for men from 1980 to 1990 are the Vietnamese (148 percent), Spanish from the Caribbean (87.6 percent), Slovaks (69.5 percent), and Laotians (66.5 percent). The male self-employment rate decreased from 1980 to 1990 for only a handful of groups.

IV. The Role of Individual Characteristics

Part of the group differences reported in Table 1 are undoubtedly due to differences in the distribution of individual characteristics such as age, education, and year of immigration. Empirical studies of self-employment generally find that education is an important determinant of who is self-employed.¹⁹ Another important determinant of self-employment is the year in which an individual immigrated to the United States. Borjas (1986) finds that immigrants within several racial groups are more likely to be self-employed than the native born. There are large differences across ethnic/racial groups in the mean value of many individual characteristics, especially education and immigrant status.

To account for these differences we report in Table 2 probit models with and without controls for these characteristics. The dependent variable is equal to 1 if the person is self-employed and equal to 0 if the person is a wage/salary worker.

16. The Black African rate also drops sharply to 5.3 percent after removing the taxicab industry.

17. The Pearson correlation between the male and female rates is 0.865, and the Spearman correlation between the ranks of the rates is 0.848.

18. See Devine (1994) for evidence of the rise in female self-employment from 1975 to 1988 and a discussion of its potential causes.

19. See Aronson (1991) for a reference to these studies.

Table 1
Self-Employment Rates by Ethnicity/Race and Sex, 1990 Census

Ethnicity/Race	Male				Female			
	Self-Employment Rate	Standard Error	Sample Size	Percent of Workforce	Self-Employment Rate	Standard Error	Sample Size	Percent of Workforce
Black African	7.1	(0.508)	3,029	0.20	3.2	(0.445)	1,942	0.14
White African	16.1	(0.953)	1,738	0.06	9.2	(1.187)	701	0.03
African-American	4.4	(0.474)	2,177	6.97	2.0	(0.325)	2,532	9.29
Armenian	24.1	(0.856)	2,850	0.10	9.7	(0.707)	1,972	0.08
Asian Indian	11.7	(0.646)	3,140	0.37	7.4	(0.674)	1,828	0.25
Belgian	10.5	(0.788)	2,077	0.07	7.1	(0.789)	1,404	0.05
Black British	6.1	(1.322)	423	0.01	2.9	(0.875)	413	0.02
White British	13.4	(0.707)	2,897	5.92	7.3	(0.653)	2,016	5.18
Canadian	14.8	(0.726)	2,798	0.11	7.0	(0.589)	2,185	0.11
French Canadian	10.1	(0.618)	2,915	0.64	5.2	(0.553)	2,073	0.55
Black Caribbean	6.8	(0.549)	2,485	0.42	3.0	(0.377)	2,564	0.54
Spanish Caribbean	8.9	(0.590)	2,699	0.11	4.1	(0.444)	2,335	0.12
Black Central American	5.0	(1.012)	533	0.02	2.0	(0.625)	567	0.03
Spanish Central American	5.5	(0.473)	2,887	0.51	4.6	(0.506)	2,092	0.46
Chinese	13.5	(0.715)	2,764	0.67	9.1	(0.647)	2,294	0.68
Cuban	15.5	(0.736)	2,837	0.34	5.9	(0.539)	2,207	0.31
Czechoslovakian	12.4	(0.712)	2,890	0.29	6.0	(0.593)	2,159	0.26
Dutch	12.3	(0.699)	2,853	0.70	6.2	(0.590)	2,076	0.61
Filipino	5.1	(0.501)	2,235	0.51	3.3	(0.373)	2,656	0.72
Finnish	11.4	(0.689)	2,817	0.12	6.9	(0.604)	2,158	0.11
White French	10.5	(0.654)	2,800	1.27	7.6	(0.623)	2,203	1.20

White German	11.2	(0.659)	2,927	11.39	6.2	(0.606)	2,079	10.09
Greek	23.0	(0.819)	3,051	0.33	10.1	(0.729)	1,962	0.26
Hawaiian	6.1	(0.643)	1,700	0.06	4.6	(0.604)	1,441	0.06
Hungarian	13.6	(0.687)	2,972	0.29	7.1	(0.631)	1,991	0.25
Irish	10.6	(0.657)	2,693	5.78	5.9	(0.552)	2,177	5.65
Israeli	28.6	(1.670)	816	0.03	10.3	(1.665)	428	0.02
Italian	15.2	(0.734)	2,745	3.60	5.8	(0.559)	2,070	3.18
Japanese	11.1	(0.698)	2,555	0.37	6.1	(0.529)	2,395	0.41
Korean	27.9	(0.990)	2,531	0.26	18.9	(0.840)	2,576	0.31
Laotian	3.2	(0.520)	1,278	0.04	2.3	(0.575)	874	0.04
Latvian	17.1	(1.530)	712	0.02	8.3	(1.312)	520	0.02
Lithuanian	14.7	(0.715)	2,930	0.16	7.4	(0.642)	2,028	0.13
Mexican	6.8	(0.513)	2,896	4.00	4.4	(0.531)	1,844	3.03
Middle Eastern	23.1	(0.790)	3,357	0.37	10.2	(0.812)	1,634	0.21
Native American	7.2	(0.610)	2,759	0.53	4.5	(0.478)	2,433	0.55
White Native American	10.1	(0.632)	2,872	0.70	5.7	(0.544)	2,215	0.65
Oceania	10.6	(1.521)	459	0.02	6.1	(1.438)	330	0.01
Pacific Islander	5.9	(0.694)	1,334	0.05	3.6	(0.645)	1,030	0.04
Polish	10.7	(0.644)	2,713	1.81	4.8	(0.514)	2,141	1.70
Portuguese	10.5	(0.625)	2,803	0.32	6.3	(0.538)	2,228	0.30
Puerto Rican	3.6	(0.379)	2,907	0.58	2.3	(0.365)	2,256	0.54
Rumanian	18.7	(0.894)	2,262	0.08	8.8	(0.779)	1,475	0.06
Russian	24.9	(0.882)	2,859	0.64	12.3	(0.768)	2,148	0.58
Scandinavian	13.2	(0.741)	2,811	1.88	6.1	(0.607)	2,177	1.81
Scottish	12.1	(0.634)	3,211	0.93	8.5	(0.725)	1,787	0.61
Slovak	11.0	(0.648)	2,847	0.38	5.4	(0.539)	2,058	0.34
Black South American	4.4	(0.931)	646	0.03	2.1	(0.602)	734	0.04
Spanish South American	11.3	(0.659)	2,816	0.29	7.4	(0.605)	2,181	0.27
White South American	11.9	(1.571)	466	0.02	8.7	(1.617)	361	0.02
Other South Asian	5.7	(0.764)	1,131	0.04	4.8	(0.809)	892	0.04

Table 1 (continued)

Ethnicity/Race	Male				Female			
	Self-Employment Rate	Standard Error	Sample Size	Percent of Workforce	Self-Employment Rate	Standard Error	Sample Size	Percent of Workforce
Southwest Asian	13.6	(0.965)	1,521	0.05	8.8	(1.403)	520	0.02
Spaniard	11.9	(0.655)	2,947	0.13	6.1	(0.575)	2,079	0.11
Spanish	7.2	(0.560)	2,758	0.79	5.5	(0.533)	2,257	0.79
Swiss	17.0	(0.752)	3,162	0.12	9.3	(0.747)	1,903	0.09
Thai	12.2	(1.196)	892	0.03	8.7	(0.890)	1,162	0.05
Turkish	18.6	(1.499)	821	0.03	8.5	(1.520)	376	0.02
Ukrainian	13.1	(0.687)	2,925	0.16	6.2	(0.602)	2,005	0.14
Vietnamese	8.3	(0.566)	2,978	0.20	8.7	(0.697)	2,004	0.17
Yugoslavian	12.8	(0.680)	2,928	0.27	5.9	(0.581)	2,041	0.23
U.S. Total	10.8	(0.018)	3,080,007	100.00	5.8	(0.015)	2,523,271	100.00

Notes: (1) The sample consists of nonagricultural workers who are at least 16 years old and who worked at least 20 weeks and usually worked at least 15 hours per week last year (1989). (2) The self-employment rate is the percentage of all those working who are self-employed. (3) All self-employment rates are calculated using weights provided by the Census.

Table 2
Probit Equations for Self-Employment, 1990 Census

Explanatory variables	Specification					
	Men			Women		
	(1)	(2)	(3)	(4)	(5)	(6)
	Yes No	No No	Yes No	Yes No	No No	Yes No
Ethnic/racial dummies		0.0530 (0.0143)	0.0002 (0.0147)		0.0456 (0.0195)	-0.0038 (0.0199)
Industry dummies		0.1015 (0.0142)	0.0280 (0.0148)		0.0862 (0.0198)	0.0341 (0.0203)
High school graduate		0.1915 (0.0136)	0.0595 (0.0146)		0.1657 (0.0203)	0.0782 (0.0213)
Some college		-0.1838 (0.0207)	-0.1383 (0.0238)		0.0453 (0.0283)	0.0710 (0.0325)
College graduate		-0.0092 (0.0170)	0.0744 (0.0209)		0.0538 (0.0243)	0.0796 (0.0295)
Immigrated 1985 to 1990		0.0869 (0.0176)	0.1328 (0.0212)		0.1359 (0.0236)	0.1176 (0.0289)
Immigrated 1975 to 1979		0.1101 (0.0194)	0.1553 (0.0225)		0.1337 (0.0250)	0.1408 (0.0298)
Immigrated 1970 to 1974		0.0221 (0.0217)	0.0886 (0.0241)		0.0765 (0.0284)	0.1327 (0.0314)
Immigrated 1965 to 1969		-0.0056 (0.0256)	0.0584 (0.0277)		0.0613 (0.0338)	0.1176 (0.0362)
Immigrated 1960 to 1964		0.0080 (0.0244)	0.0509 (0.0257)		0.0410 (0.0341)	0.0723 (0.0357)
Immigrated 1950 to 1959		0.0557 (0.0355)	0.1028 (0.0365)		0.0917 (0.0518)	0.1018 (0.0530)
Immigrated before 1950						

Table 2 (continued)

Explanatory variables	Specification					
	(1)	Men		Women		(6)
		(2)	(3)	(4)	(5)	
Problem speaking English		-0.0790 (0.0194)	-0.0750 (0.0207)		0.0488 (0.0250)	0.0083 (0.0266)
Age		0.0505 (0.0023)	0.0504 (0.0023)		0.0417 (0.0031)	0.0418 (0.0031)
Age squared/100		-0.0337 (0.0024)	-0.0353 (0.0025)		-0.0318 (0.0034)	-0.0323 (0.0034)
Currently married		0.1937 (0.0150)	0.1661 (0.0154)		0.2661 (0.0206)	0.2172 (0.0211)
Widowed		0.1576 (0.0467)	0.1532 (0.0472)		0.1298 (0.0358)	0.0917 (0.0364)
Divorced		0.1046 (0.0218)	0.0990 (0.0222)		0.0820 (0.0271)	0.0621 (0.0276)
Currently separated		0.0367 (0.0354)	0.0934 (0.0361)		0.0044 (0.0430)	0.0378 (0.0438)
Children		0.0198 (0.0041)	0.0392 (0.0042)		0.0186 (0.0059)	0.0428 (0.0061)
Limiting disability		0.0283 (0.0204)	0.0306 (0.0207)		0.0653 (0.0309)	0.0664 (0.0313)
Veteran of military		-0.1975 (0.0115)	-0.1733 (0.0117)		-0.1317 (0.0569)	-0.0922 (0.0576)
African-American		-0.6345 (0.0560)	-0.5544 (0.0577)	-0.5708 (0.0685)		-0.4881 (0.0701)

Black Caribbean	-0.4064 (0.0483)	-0.4372 (0.0513)	-0.4316 (0.0637)	-0.4019 (0.0676)
Chinese	0.0103 (0.0415)	-0.0867 (0.0444)	0.0817 (0.0552)	0.0036 (0.0589)
Cuban	0.0846 (0.0407)	-0.0150 (0.0442)	-0.1225 (0.0590)	-0.2104 (0.0636)
Filipino	-0.5575 (0.0534)	-0.6756 (0.0566)	-0.4206 (0.0627)	-0.5592 (0.0665)
White German	-0.0951 (0.0419)	-0.0144 (0.0430)	-0.0807 (0.0591)	-0.0109 (0.0604)
Greek	0.3660 (0.0384)	0.3690 (0.0397)	0.1529 (0.0563)	0.2035 (0.0578)
Korean	0.5453 (0.0392)	0.4654 (0.0428)	0.5406 (0.0501)	0.4622 (0.0546)
Mexican	-0.4001 (0.0460)	-0.3495 (0.0486)	-0.2689 (0.0655)	-0.2714 (0.0681)
Native American	-0.3437 (0.0458)	-0.2554 (0.0472)	-0.2979 (0.0611)	-0.2503 (0.0627)
Puerto Rican	-0.6984 (0.0522)	-0.6166 (0.0548)	-0.5216 (0.0692)	-0.4031 (0.0722)
Russian	0.4576 (0.0385)	0.3868 (0.0396)	0.2928 (0.0536)	0.2963 (0.0550)
Region dummies	No	Yes	No	Yes
Self-employment rate	0.127	0.127	0.067	0.067
Average derivative adjustment factor	0.201	0.198	0.126	0.123
Sample size	140,835	140,835	105,189	105,189
Log likelihood	-51,677	-50,906	-25,120	-24,327

Notes: (1) The sample consists of nonagricultural workers who are at least 16 years old and who worked at least 20 weeks and usually worked at least 15 hours per week last year (1989). (2) The dependent variable is equal to 1 if a person's chief job activity is self-employment. (3) Standard errors are in parentheses below the coefficient estimates. (4) All equations include a constant. (5) The omitted categories for education, immigration, and marital status are never graduated from high school, native born, and never married, respectively. (6) The average derivative is equal to the adjustment factor multiplied by the coefficient.

Formally, we assume that individual i in group j is self-employed if

$$(1) \quad x_i'\beta + \alpha_j + \varepsilon_i \geq 0,$$

where x_i is a vector of individual characteristics for person i , β is the vector of coefficients on these characteristics, and α_j is the coefficient on a dummy variable for ethnicity/race j which captures all omitted characteristics of group j . If we assume that ε_i is normally distributed, then the probability that individual i is self-employed is $\Phi(x_i'\beta + \alpha_j)$, where Φ is the cumulative normal density function.

In the specifications which include controls for individual characteristics, we find that each higher level of education is associated with a higher probability of self-employment.²⁰ We include dummy variables for several time periods of immigration in our equations. For each specification reported, most of the coefficients on periods of immigration are positive and statistically significant, except for the most recent time period, 1985 to 1990.²¹ The coefficient for this period is negative and significant for each specification for men, but is positive and usually insignificant for women. Other variables in the equations are important in determining who is self-employed. The probability of self-employment increases with an individual being older, married, widowed, divorced, separated (compared to never married), having more children, or having a disability. Individuals who are military veterans and men who have a problem speaking English have lower probabilities of being self-employed. Although there are some differences, most of the variables reported have similar effects in both the male and female equations.

Ethnicity/race remains an important determinant of self-employment after controlling for these observable characteristics. The dispersion of the ethnicity/race coefficients drops slightly after including the available individual characteristics. The absolute value of the dummy variables (which are deviations from White British) fall in 42 cases and rise in 17 cases for men and fall in 36 cases and rise in 23 cases for women. A large fraction of these dummy variables are individually statistically significant and likelihood ratio tests for the significance of the entire group of dummies have extremely large values for both sexes. Another important finding is that the coefficients on some of the individual characteristics change after including the ethnic/racial dummy variables. In particular, the coefficients on the education variables become smaller and many of the coefficients on the periods of immigration become larger. These results provide further support for the importance of controlling for ethnicity and race when studying self-employment.

Although not reported, we estimate probit equations for men and women that control for industry of employment. It is possible that groups with high self-employment rates locate in industries that lead to self-employment. After including dummy variables for 13 industry classifications, the ethnic/racial coefficients

20. The effect on the probability of self-employment of a one unit increase in each independent variable (average derivative) can be calculated by multiplying its coefficient by the adjustment factor reported at the bottom of the table. The adjustment factor is equal to the sample average of $\phi(\alpha_j'\beta + \hat{\varepsilon}_i)$.

21. In analogous equations estimated on the 1980 Census, we find a similar pattern in which the most recent period of immigration (1975 to 1980) is the only period of immigration that does not increase the probability of being self-employed. See Fairlie and Meyer (1994).

change only slightly. While some coefficients become slightly smaller in absolute value, a substantial number become larger. Of the 59 ethnic/racial group coefficients, 38 coefficients in the male sample and 45 coefficients in the female sample are smaller in absolute value after controlling for industry, while the others are larger.

The probit equations of Table 2 indicate that individual characteristics and industry can explain part of the differences in self-employment rates. To measure the quantitative effect of controlling for these variables on group differences in self-employment rates, we calculate adjusted self-employment rates for each group. We use the demographic and ethnicity/race dummy variable coefficients from Specifications (3) and (6) in Table 2 along with a common distribution of individual characteristics, specifically those from a 1/1000 random sample from the 1990 Census.²² The adjusted self-employment rate for ethnic/race group j is

$$(2) \quad P_j = \frac{1}{N} \sum_{i=1}^N \Phi(x_i \hat{\beta} + \hat{\alpha}_j),$$

where $\hat{\beta}$ and $\hat{\alpha}_j$ are estimated using the ethnicity/race weighted subsample for a given gender, i indexes individuals in the random sample for that gender, and N is the number of observations in this random sample. These adjusted self-employment rates are reported for all ethnic/racial groups in Table 3.²³

The range of the adjusted self-employment rates is smaller than the range of the unadjusted self-employment rates, but overall the two sets of rates are very similar. The Spearman correlation between the ranks in the two sets is 0.951 for men and 0.931 for women.²⁴ For men, only 6 of the 60 groups have at least a 20 percent change in the self-employment rate after adjusting. Among women, only 11 groups have adjusted self-employment rates that are at least 20 percent more or less than their unadjusted self-employment rates. The largest change from actual to adjusted self-employment rates is for Filipinos (-31.4 percent for men and -37.1 percent for women). This result implies that the low Filipino self-employment rates are not due to a lack of measurable characteristics associated with a high self-employment rate, but are due to something else. There still is substantial variation across ethnic/racial groups. For example, the adjusted self-employment rates for men range from a low of 2.6 percent for Laotians to a high of 23.7 percent for Koreans. Thus, even after controlling for group differences in individual variables typically used to estimate earnings equations, there are enormous differences in self-employment rates across ethnic/racial groups in the United States.

22. We use a distribution of individual characteristics to calculate adjusted self-employment rates due to the nonlinearity of the probit equation determining self-employment. The 1/1000 sample includes 60,328 men and 49,207 women.

23. Although not reported, we calculate standard errors for the adjusted rates using the delta method. The standard error of P_j is the square root of $dP_j/d\hat{\alpha}_j \text{Var}(\hat{\alpha}_j) dP_j/d\hat{\alpha}_j$, where $\hat{\alpha}_j = (\hat{\beta}' \hat{\alpha}_j)$. We find that these standard errors are very similar to the ones for the unadjusted self-employment rates reported in Table 1.

24. The Pearson correlation between the two rates is 0.983 for men and 0.958 for women.

Table 3
Regression Adjusted Self-Employment Rates by Ethnicity/Race and Sex, 1990 Census

Ethnicity/Race	Male Self-Employment Rate	Female Self-Employment Rate
Black African	6.8	3.3
White African	13.3	7.3
African-American	4.5	2.4
Armenian	20.1	8.1
Asian Indian	9.3	5.8
Belgian	11.0	7.3
Black British	6.2	2.6
White British	12.1	6.6
Canadian	12.6	6.1
French Canadian	10.3	5.9
Black Caribbean	5.7	3.0
Spanish Caribbean	8.7	4.3
Black Central American	4.5	1.5
Spanish Central American	5.9	4.1
Chinese	10.6	6.8
Cuban	12.0	4.5
Czechoslovakian	12.4	6.0
Dutch	12.4	6.0
Filipino	3.5	2.1
Finnish	11.2	6.3
White French	10.8	7.4
White German	12.0	6.6
Greek	20.9	9.7
Hawaiian	6.2	4.3
Hungarian	12.3	6.8
Irish	10.5	5.9
Israeli	23.5	9.9
Italian	14.5	6.3
Japanese	10.1	4.5
Korean	23.7	14.7
Laotian	2.6	1.9
Latvian	13.7	6.9
Lithuanian	13.3	7.3
Mexican	6.7	3.9
Middle Eastern	20.3	9.2
Native American	8.0	4.1
White Native American	10.9	5.9
Oceania	9.5	5.3
Pacific Islander	5.0	2.9

Table 3 (continued)

Ethnicity/Race	Male Self-Employment Rate	Female Self-Employment Rate
Polish	10.3	5.1
Portuguese	9.5	5.7
Puerto Rican	4.0	3.0
Rumanian	16.0	7.2
Russian	21.4	11.3
Scandinavian	13.2	6.3
Scottish	11.2	7.7
Slovak	10.6	5.4
Black South American	4.3	2.3
Spanish South American	10.6	6.5
White South American	12.6	8.9
Other South Asian	4.8	4.3
Southwest Asian	11.1	7.2
Spaniard	9.6	4.9
Spanish	7.4	5.2
Swiss	15.2	8.4
Thai	9.7	5.8
Turkish	17.0	7.3
Ukrainian	12.0	6.2
Vietnamese	7.3	6.6
Yugoslavian	12.0	5.8

Notes: (1) The sample consists of nonagricultural workers who are at least 16 years old and who worked at least 20 weeks and usually worked at least 15 hours per week last year (1989). (2) The self-employment rate is the percentage of all those working who are self-employed. (3) All self-employment rates are calculated using weights provided by the Census. (4) The adjusted self-employment rates control for differences across ethnic/racial groups in the values of the variables listed in Table 2. These rates are estimated using a 1/1000 sample which has a sample size of 60,238 for men and 49,207 for women. (5) The standard errors are very similar to the ones for the unadjusted self-employment rates reported in Table 1 (see text for more details).

A. Estimates with Metropolitan Area Controls

It is possible that a significant part of the ethnic/racial differences in self-employment rates is due to differences in the cities in which the groups are primarily located. To examine this question we reestimate the probit regressions of Table 2 substituting MSA/PMSA controls for the Census division controls. This change necessitates using a slightly different sample that has the required MSA/PMSA identifiers. The inclusion of these controls has virtually no effect on our ethnic/racial coefficients. For example, the coefficients from the equation

with city controls have a correlation of 0.988 with those from Specification (3) in Table 2 and have a correlation of 0.994 with the coefficients from this specification using a comparable sample.

B. Estimates from Other Samples

In case there is something unusual about our main sample which includes relatively equal numbers of individuals from all of our ethnic/racial groups, in additional estimates we restrict the coefficients on the controls (age, education, etc.) to be those from our 1/1000 random sample. This random sample is representative of the U.S. working population, and thus includes more (less) observations for large (small) ethnic/racial groups. The correlation between the ethnic/racial coefficients using this sample and our original coefficients is 0.988, implying that the difference in samples is not important.²⁵

As an additional check of our results, we examine the group self-employment rates for immigrants only. This restriction reduces the number of groups we can examine from 60 to 52. The correlation between the ethnic/racial coefficients using this immigrant sample and the original coefficients is very high (0.954), again indicating that the patterns we find are not specific to our sample.

V. Theories of Self-Employment and Their Limitations

The sociology and economics literatures have offered some explanations for patterns of self-employment rates and have provided theories of the determinants of self-employment in general. For the sake of brevity, we only present some of the more prominent theories and discuss their limitations using evidence from our data and other sources.²⁶

Several authors argue that self-employment is more common among immigrant groups called sojourners that expect to spend a short time in the United States (Bonacich 1973). It is argued that sojourners select occupations that not only allow them to accumulate wealth rapidly, but also ones that do not require extended periods of residence. Light (1979) argues that Jews who settled in the United States do not fit this theory. Historically, they were more highly represented in trade than any of the sojourning white ethnic groups, even though these Jews had no intention of leaving the United States. Another ethnic group that does not fit the theory is Koreans. Min (1984) discovers that recent Korean immigrants came to the United States permanently, and indicate in personal interviews that they do not consider themselves sojourners. Aldrich and Waldinger (1990) argue that a key weakness of the theory is that it would be more logical for sojourners to choose a less risky wage/salary job over opening a small busi-

25. In all cases where we report correlations between our main coefficients and alternative ones, we also regressed each set of coefficients on the other to confirm that there was not an appreciable change in the scale of the coefficients.

26. See Aldrich and Waldinger (1990) and Light (1984, 1992) for excellent surveys.

ness. They also refer to several case studies in which sojourners avoid self-employment or are no more successful in self-employment than those not sojourning. More generally, our results reported in Table 2 demonstrate that immigrants who have been in the country for more than 30 years have higher self-employment rates than immigrants who have been in the country less than 10 years and are presumably more likely to be sojourners.

A second theory argues that disadvantages such as a difficulty speaking English, poverty, unemployment, and discrimination cause certain groups to favor self-employment.²⁷ By lowering the returns to wage/salary work, these disadvantages may push minorities and immigrants towards self-employment. We find contrary evidence in our estimates using all ethnic/racial groups which indicates that a problem speaking English is negatively related to male self-employment (see Table 2). The disadvantage theory explains why some minority and immigrant ethnic groups are pushed towards self-employment, but it has difficulty explaining the large variation in self-employment rates across minority and immigrant groups. For example, the theory alone cannot explain why African-Americans have a lower self-employment rate than Chinese-Americans even though they are relatively more disadvantaged as a group. We return to disadvantage theory in Section VI.

One of the central sociological approaches (see Light, 1984) focuses on attributes promoting self-employment called ethnic resources. An example of an ethnic resource is cultural endowments such as traditions of buying and selling among immigrants from certain countries. Frazier (1957) argues that a main cause of the lack of African-American entrepreneurs is the absence of a tradition in the field of business enterprise for this group. Fairlie and Meyer (1996) demonstrate, however, that recent estimates of the rate of intergenerational transmission of self-employment imply that very little of the current black/white gap in the self-employment rate can be attributed directly to the lack of business experience several generations ago. Furthermore, Aldrich and Waldinger (1990) report examples of high self-employment rates among groups with little or no business experience in the past, including Greeks running restaurants who originated in fishing villages and rural areas.

A second example is an ethnic group's ability to transfer information related to running a business among co-ethnics. In economic terms this factor would be called sector-specific human capital. There is substantial evidence that experience as an employee of a small business and transfers of information are important.²⁸ This explanation is also consistent with the strong patterns of industry concentration for many groups presented in Fairlie and Meyer (1994). To explain the large variation in self-employment rates by ethnicity, there must exist different levels of initial business experience across ethnic groups or different abilities at transferring information across ethnic groups.

Another ethnic resource is the access of some groups to co-ethnics and family

27. See Light (1972, 1979), Sowell (1981), and Moore (1983).

28. See Portes and Zhou (1991) for evidence on the importance of prior employment at a small business for Dominicans and Cubans. Meyer (1990) finds strong effects of prior employment at a small business on the probability of starting one's own business.

members that may provide an edge in hiring low-paid and trusted workers. These workers may have limited job opportunities because they have problems speaking English. One should note that the vast majority of the self-employed do not have any employees (besides themselves), so that this argument cannot explain much of the large differences in self-employment rates.²⁹ In addition, small business owners do not exclusively hire co-ethnics. Kim and Hurh (1985) estimate that among the Korean-owned stores in South Chicago which hire at least one employee, 68 percent hire at least one black employee and 33 percent hire at least one Hispanic employee.³⁰

An ethnic group's access to rotating credit associations provides another advantage. It appears that most Korean rotating credit associations generally provide very short-term capital, however, and it is hard to distinguish their role in providing loans from their role as a saving mechanism.³¹ Furthermore, it may be that their primary role is providing group encouragement to save.

A final example of an ethnic resource is preferences for special goods and services that co-ethnics may have an advantage in providing, such as Kosher wine that Jewish entrepreneurs sold to other Jews, and pasta that Italians sold to each other.³² These products may serve as an initial niche for ethnic entrepreneurs. On the other hand, Aldrich and Waldinger (1990) argue that these ethnic markets can be limiting. Further success depends on the ability of the entrepreneurs of an ethnic group to expand outside of these markets. Portes (1987) provides an example of how Cubans in Miami started out by serving mainly their own ethnic community and then expanded to industries such as clothing and construction in which there was a much broader market. The special demands theory cannot explain why, as Light (1972) argues, some groups such as the Chinese and Japanese historically were successful in catering not only to the exotic tastes of their co-ethnics, but also to the tastes of the general public.

The special demands argument is sometimes combined with the argument that residential concentration of some ethnic groups provides a large market and more opportunities for co-ethnics to become self-employed. Borjas (1986) argues that the reason immigrants have higher self-employment rates is because of their ability to provide special goods and services to co-ethnics residing in geographic enclaves. There is contrary evidence on the importance of ethnic enclaves in Aldrich and Waldinger (1990) who cite evidence from early in this century on the self-employment rates of Jews. Jewish self-employment rates were higher in areas outside the main enclave in New York City. Aldrich and Waldinger argue that competition from co-ethnics can limit business opportunities for some groups. Another example is provided in Sengstock (1974). She reports that the

29. See U.S. Bureau of the Census (1987) which indicates that about 80 percent of small businesses have no employees (besides the owner). His argument may explain, however, why some ethnic groups are more successful at running larger enterprises that do have employees.

30. Additional evidence is provided by Yoon (1991a) who finds that 70 percent of the total employees in his sample of Korean-owned stores located in black neighborhoods of Chicago are African-American.

31. See Light, Kwuon, and Zhong (1990) for an excellent description of Korean rotating credit in Los Angeles.

32. This is an old argument that can be found in Kinzer and Sagarin (1950), Glazer and Moynihan (1970), and Light (1972).

high concentration of Iraqi-owned grocery stores in the inner city of Detroit has caused these owners to expend substantial amounts of money and effort in competing with each other for customers. Razin and Langlois (1994) also find that the geographic concentration of a group's members in Canada is not favorable to self-employment for most groups.

Each of these theories presented above finds some support in at least one ethnic or racial group, but all of the theories have counter examples or other weaknesses. A second group of theories, mostly from economics, focus more on individual characteristics that would promote self-employment rather than on group characteristics. Nevertheless, mean values of these individual characteristics may differ across ethnic/racial groups, partly explaining group rates of self-employment. Each author emphasizes a different individual characteristic that promotes self-employment. Lucas (1978) emphasizes managerial ability, Kihlstrom and Laffont (1979) emphasize risk aversion, while Evans and Jovanovic (1989) emphasize wealth and liquidity constraints. Unfortunately, the key determinants of self-employment in these theories are not easily observed. Measures of managerial ability and risk aversion are not readily available. Measures of assets are sometimes available, but using them in a cross-section can provide misleading results because high assets may be a consequence rather than a cause of self-employment. Empirical studies using longitudinal data generally find that higher levels of assets increase the probability of entering self-employment.³³

These last theories emphasize that individuals may choose whether to be self-employed or wage/salary workers by comparing earnings (and possibly other factors) in the two sectors. We do observe many variables that affect both self-employment and wage/salary earnings. These variables include education, age, immigrant status and time in the country, language skills, and other individual characteristics. By altering the difference between self-employment and wage/salary earnings, these variables may affect the self-employment decision. This economic approach to self-employment only provides a partial explanation for ethnic and racial differences in self-employment. It moves the question one step backward to the determination of differences in self-employment earnings across ethnic/racial groups. The approach implies that self-employment rates and earnings are jointly determined, however, so that there is value in examining them together. Past work in this style includes Rees and Shah (1986) and Borjas and Bronars (1989).

VI. Explaining the Ethnic/Racial Group Indicator Variables

The previous section provided evidence for and against many theories of self-employment differences across groups. We now more deeply investigate three theories for which we can provide additional evidence. The theories are the importance of home country self-employment rates, the sectoral choice

33. See Evans and Jovanovic (1989), Evans and Leighton (1989), Meyer (1990), Holtz-Eakin, Joulfaian, and Rosen (1994), and Fairlie (1994).

model of self-employment and disadvantage theory. Our estimates of the differences in self-employment rates across ethnic/racial groups from the 1990 Census provide a natural set of differences to explain. We estimate a series of regressions in which the unit of observation is the ethnic/racial group and the dependent variable is the coefficient on the ethnicity/race dummy variable for that group from our probit equations for self-employment. This coefficient provides a good measure of the self-employment rate after controlling for basic demographic characteristics. Specifically, we estimate equations of the form

$$(3) \hat{\alpha}_j = z_j' \delta + \varepsilon_j,$$

where j indexes ethnic/racial groups as before.

Note that since we are implicitly arguing that inequality (1) should be expanded to be

$$(4) x_i' \beta + z_j' \delta + \varepsilon_j + \varepsilon_i > 0,$$

estimating Equation (3) provides an easy way of estimating the coefficients on z without estimating a computationally difficult random effects probit model. As well as estimating Equation (3) by ordinary least squares (OLS), we estimate it using generalized least squares (GLS). More precisely, we take the variance of the errors to be a scalar covariance matrix plus the variance matrix of the estimated dummy variable coefficients (the α 's).³⁴

A. Home Country Self-Employment Rates

We explore the possibility that differences in self-employment rates may be due to immigrants from different countries having different levels of entrepreneurial skills because owning a business is more or less common in their country of origin. Yuengert (1995) examines the role that home country self-employment rates play in accounting for the large difference between immigrant and native self-employment rates in the United States. Using a sample of both natives and immigrants, he estimates an individual level self-employment equation which includes a measure of the self-employment rate of an individual's home country. He finds evidence that the ratio of the individual's home country self-employment rate to the overall U.S. rate has a positive and statistically significant effect on the probability of being self-employed.³⁵ Furthermore, he estimates that 54.7 percent of the native/immigrant self-employment rate gap is due to immigrant groups generally having higher home country self-employment rates than the native rate.

Yuengert's analysis utilizes both the native/immigrant difference and variation across immigrant groups to estimate the correlation between home country and

34. We use the method specified in Borjas (1987) to estimate σ_α^2 . See Borjas and Sueyoshi (1994) for more details.

35. The significance of his result is likely overstated because he does not allow for a group level component of the error term in his individual level equations, in other words, ε_j is set equal to zero. See Borjas and Sueyoshi (1994) for a discussion of the econometric issues.

U.S. self-employment rates.³⁶ A more powerful test of the home country self-employment hypothesis, however, is to determine whether self-employment rates among immigrant groups in the United States are positively related to their home country rates. The exclusion of natives from the sample prevents the immigrant/native difference in rates from determining the estimate of the relationship. Therefore, to extend Yuengert's analysis we explore this hypothesis by estimating a series of regressions in which the ethnicity/race dummy variable coefficient for 29 different immigrant groups is the dependent variable.³⁷ These coefficients come from Specification (3) of Table 2 estimated on the immigrant only sample. To explain these rates we include the male nonagricultural self-employment rate for the home country of each group, calculated from data published by the International Labour Office (ILO).³⁸ We also try a subsample of 22 countries that excludes former and current Communist countries and Southwest Asia (which seems to have an anomalously high self-employment rate).

Table 4 reports the results from these regressions using both OLS and GLS methods and using home country self-employment rates for two alternative years as the independent variable. We measure home country self-employment rates in 1970 or the closest year available, and we measure the self-employment rate at the beginning of the median decade of immigration for that group. In all of the specifications, the coefficient on the home country self-employment rate is statistically insignificant and not very large in magnitude. The largest elasticity implied by the point estimates is 0.16.³⁹ These results suggest that the self-employment rate of an ethnic/racial group's home country is not a major determinant of the group's self-employment rate in the United States.

B. The Sectoral Choice Model of Self-Employment

Individuals may choose self-employment because they earn more there than in wage/salary work. We examine if ethnic/racial groups with high self-employment rates have high average self-employment earnings relative to average wage/salary earnings. More precisely, we test the key part of the economic model of self-employment by examining if the ethnic/racial coefficients from the self-employment probits are related to the difference between the ethnic/racial group coefficients from the log self-employment and wage/salary earnings equations.

36. His estimate of a positive coefficient on the ratio of the home country self-employment rate to the United States rate may largely reflect the immigrant/native difference in self-employment rates. The ratio of self-employment rates for natives is equal to one that is smaller than the ratio for most of the immigrant groups included in his analysis.

37. See Table 4 for a list of the included ethnic/racial groups.

38. Many ethnic/racial groups are excluded from this analysis either because they are native to the United States or data on self-employment rates are not available for their home countries. In the two cases where our ethnic group was an amalgamation of countries with ILO data, we averaged the rates using each country's fraction of the immigrant workforce as weights.

39. Yuengert's estimates imply an elasticity of 0.49. We calculate this estimate using an immigrant self-employment rate of 11.7 percent and a home country self-employment rate of 16.6 percent. The latter rate is twice the native rate. It is likely that his inclusion of natives in the analysis accounts for his larger elasticity estimate.

Table 4
Second-Stage Regressions Explaining Ethnic/Racial Self-Employment Coefficients from Probit Equation—1990 Census Immigrant Men

	Specification			
	(1)	(2)	(3)	(4)
Estimation technique	OLS	GLS	OLS	GLS
Sample size	29	29	22	22
1. Home country self-employment rate in 1970	0.108 (0.459)	0.113 (0.520)	0.486 (0.901)	0.613 (0.996)
R-squared	0.002	0.002	0.014	0.019
2. Home country self-employment rate in median year of immigration	0.133 (0.520)	0.140 (0.517)	0.496 (0.897)	0.626 (0.991)
R-squared	0.002	0.003	0.015	0.019

Notes: (1) Elasticities can be calculated by multiplying the reported coefficient by 0.259. These elasticities are estimated using the self-employment rate in the first-stage sample (0.158) and the average home country self-employment rate in 1970 (0.170). The average home country self-employment rate in the median year of immigration is 0.184. (2) The first-stage sample consists of immigrant male non-agricultural workers who are at least 16 years old and who worked at least 20 weeks and usually worked at least 15 hours per week last year (1989). (3) The variables included in the probit equation are the same as those listed in Table 2 except we remove the Immigrated Before 1950 and Veteran of Military variables. (4) Home country self-employment rates are obtained from the International Labour Office and represent rates in approximately 1970 or the beginning year of the median decade in which the ethnic/racial group immigrated to the United States. (5) Specifications (3) and (4) exclude former and current Communist countries and Southwest Asia. (6) The second-stage regressions include a constant. (7) For the GLS estimates, we use $\Omega = \sigma_u^2 I_N + V_{dd}$, where V_{dd} is estimated using the covariance matrix of the ethnic/racial coefficients in the probit equation and σ_u^2 is estimated following Borjas (1987). (8) Standard errors are in parentheses below the coefficient estimates. (9) The included groups are Asian Indian, Canadian, Black Caribbean, Cuban, Czechoslovakian, Dutch, Filipino, White French, White German, Greek, Hungarian, Irish, Israeli, Italian, Japanese, Korean, Mexican, Middle Eastern, Polish, Portuguese, Puerto Rican, Rumanian, Scandinavian, Southwest Asian, Spaniard, Swiss, Thai, Turkish, and Yugoslavian.

In order to implement this procedure we estimate annual self-employment and wage/salary earnings equations for full-time, full-year workers in our sample of men (see Appendix 1 for the estimates).⁴⁰ The explanatory variables we use include those typically used in earnings equations, such as education, year of immigration, marital status, number of children, and regional dummies. While most variables have similar effects on earnings in both sectors, higher levels of education have a stronger effect on the earnings of the self-employed.

In Table 5, we report the results of several regressions of the form (3) where z is a constant and the difference between ethnic/racial coefficients from the self-employment and wage/salary earnings equations. Formally, we estimate

40. We do not analyze women because the sample sizes are too small.

Table 5
Second-Stage Regressions Explaining Ethnic/Racial Self-Employment
Coefficients from Probit Equation—1990 Census Men

	Specification			
	(1)	(2)	(3)	(4)
I. OLS first-stage earnings equations				
Estimation technique (second-stage)	OLS	GLS	OLS	GLS
Sample size	59	59	47	47
Difference between ethnic/racial coefficients from self-employment and wage/salary earnings equations	0.568 (0.314)	0.568 (0.311)	0.557 (0.262)	0.555 (0.259)
R-squared	0.054	0.054	0.091	0.091
II. Selectivity corrected first-stage earnings equations				
Estimation technique (second-stage)	OLS	GLS	OLS	GLS
Sample size	59	59	47	47
Difference between ethnic/racial coefficients from self-employment and wage/salary earnings equations	0.780 (0.036)	0.763 (0.035)	0.694 (0.044)	0.695 (0.041)
R-squared	0.890	0.851	0.849	0.851

Notes: (1) Elasticities can be calculated by multiplying the reported coefficient by 1.628. These elasticities are estimated using the self-employment rate in the first-stage sample (0.129). (2) The first-stage sample consists of non-agricultural workers who are at least 16 years old and who worked at least 40 weeks and usually worked at least 35 hours per week last year (1989). (3) The variables included in the Probit equation are the same as those listed in Table 2. (4) The second-stage sample for specifications (3) and (4) consists of the ethnic/racial groups with the lowest standard errors for the difference between ethnic/racial coefficients from the self-employment and wage/salary earnings equations. We find a clear break point in both distributions of standard errors, and thus only include the 47 ethnic/racial coefficients with standard errors below both break points. (5) The second-stage regressions include a constant.

(6) For the GLS estimates, we use $\Omega = \sigma_u^2 I_N + V_{dd}$, where V_{dd} is estimated using the covariance matrix of the ethnic/racial coefficients in the probit equation and σ_u^2 is estimated following Borjas (1987). (7) Standard errors are in parentheses below the coefficient estimates.

$$(5) \hat{\alpha}_j = \delta_1 + (\hat{\alpha}_j^s - \hat{\alpha}_j^w) \delta_2 + \varepsilon_j,$$

where $\hat{\alpha}_j^s$ and $\hat{\alpha}_j^w$ are the ethnicity/race coefficients from the self-employment and wage/salary earnings equations, respectively. Specifications (1) and (2) include all 59 ethnic/racial groups, whereas Specifications (3) and (4) include only the 47 groups that have the most precisely measured log earnings coefficients.⁴¹ We find

41. We find a clear break point in the size of the standard error for the difference between the coefficients from the log self-employment and wage/salary earnings equations between the 47th and 48th group.

that the coefficient on the difference between the log earnings coefficients in self-employment and wage/salary work is positive and usually significant in each of the specifications.

While these results are favorable to the theory, they are even more telling since the sectoral choice model implies that a test of the model without a selection correction in the earnings equations would likely be biased against supporting the model (see Appendix 2 for details). While the sign of the bias in OLS can be shown under reasonably weak conditions, standard methods to correct for selection require a choice of error distribution. We use Heckman's two-step estimator under the assumption of normally distributed errors.⁴² While the bias in the OLS coefficients works against us finding the expected relationship, we should note that the significance of the coefficients here and below is likely overstated since we have not adjusted the variance matrices for our use of estimated quantities as explanatory variables (see Murphy and Topel, 1985 and Pagan 1986). The bottom panel of Table 5 corrects for selection bias in the earnings equations. While we might expect alternative assumptions to give estimates of a different magnitude, we would expect such estimates to change from the OLS estimates in the direction of our results based on normal errors. The coefficients on most of the variables included in our self-employment earnings equation are fairly similar after correcting for selection (see Appendix 1). The coefficients on the ethnic/racial dummy variables are generally the same sign, but are much larger in absolute value after correcting for selection. The coefficient on the inverse Mills' ratio variable is positive, although not statistically significant at the .05 level. In the log wage/salary earnings equation the coefficient on the selectivity variable is statistically significant. Correcting for selectivity bias does not change the estimates for the individual variables substantially, though most of the coefficients on the ethnic/racial group indicator variables become smaller in absolute value with the selection correction.

As just mentioned, the OLS estimates are likely biased against finding a relationship between self-employment rates and relative earnings in the two sectors. The equations that use the log earnings differences estimated with the selection correction indicate a very strong relationship between the difference in earnings coefficients and the probit coefficients. There is a positive and statistically significant relationship between the two variables in every equation that uses estimates from the earnings equations with the selection correction. Overall, the results of Table 5 provide evidence supporting the hypothesis that ethnic/racial groups experiencing high average self-employment earnings relative to wage/salary earnings have high self-employment rates. Apparently, the sectoral choice model of self-employment offers some insight into why there are large differences in self-employment rates across ethnic/racial groups.

42. There is evidence in other work (see Goldberger 1983, for example) of sensitivity of the parameter estimates to the assumption of normality. The assumption of normality could in principle be relaxed (see Ahn and Powell 1990, for example), but given our extremely large sample and large number of explanatory variables it would be computationally difficult.

C. Disadvantage Theory

We now test two of the main tenets of disadvantage theory using our ethnic/racial coefficients. In Table 6, we report regressions of the Form (3) in which we include the ethnic/racial coefficients from equations for self-employment earnings, wage/salary earnings, and unearned income as independent variables, separately as well as together. Disadvantage theory states that many minority or immigrant groups are pushed into self-employment because of their low prospec-

Table 6
Second-Stage Regressions Explaining Ethnic/Racial Self-Employment Coefficients from Probit Equation—1990 Census Men

	Specification			
	(1)	(2)	(3)	(4)
I. OLS first-stage earnings equations				
Estimation technique (second-stage)	OLS	GLS	OLS	GLS
Sample size	59	59	47	47
1. Ethnic/racial coefficient from self-employment earnings equation	0.828 (0.187)	0.821 (0.186)	0.619 (0.159)	0.617 (0.157)
R-squared	0.255	0.251	0.253	0.251
2. Ethnic/racial coefficient from wage/salary earnings equation	1.863 (0.305)	1.846 (0.304)	1.292 (0.284)	1.290 (0.281)
R-squared	0.396	0.389	0.315	0.315
3. Ethnic/racial coefficient from unearned income equation	0.326 (0.057)	0.321 (0.057)	0.199 (0.058)	0.198 (0.058)
R-squared	0.363	0.352	0.207	0.204
4. Ethnic/racial coefficient from self-employment earnings equation	0.079 (0.260)	0.093 (0.257)	0.229 (0.250)	0.231 (0.246)
Wage/salary earnings equation	1.091 (0.572)	1.082 (0.569)	0.742 (0.588)	0.738 (0.579)
Unearned income equation	0.164 (0.081)	0.157 (0.081)	0.056 (0.080)	0.056 (0.079)
R-squared	0.438	0.428	0.333	0.333

Table 6 (continued)

	Specification			
	(1)	(2)	(3)	(4)
II. Selectivity corrected first-stage earnings equations				
Estimation technique (second-stage)				
Sample size	OLS 59	GLS 59	OLS 47	GLS 47
1. Ethnic/racial coefficient from self-employment earnings equation	0.717 (0.044)	0.706 (0.043)	0.610 (0.053)	0.613 (0.051)
R-squared	0.826	0.802	0.749	0.758
2. Ethnic/racial coefficient from wage/salary earnings equation	0.160 (0.484)	0.151 (0.482)	0.035 (0.394)	0.018 (0.391)
R-squared	0.002	0.002	0.000	0.000
3. Ethnic/racial coefficient from unearned income equation	0.326 (0.057)	0.321 (0.057)	0.199 (0.058)	0.198 (0.058)
R-squared	0.363	0.352	0.207	0.204
4. Ethnic/racial coefficients from self-employment earnings equation	0.723 (0.046)	0.698 (0.042)	0.644 (0.045)	0.643 (0.040)
Wage/salary earnings equation	-1.157 (0.179)	-1.182 (0.167)	-1.169 (0.174)	-1.190 (0.156)
Unearned income equation	0.073 (0.034)	0.085 (0.031)	0.090 (0.032)	0.091 (0.029)
R-squared	0.901	0.870	0.878	0.879

Notes: (1) Elasticities can be calculated by multiplying the reported coefficient by 1.628. These elasticities are estimated using the self-employment rate in the first-stage sample (0.129). (2) The first-stage sample consists of non-agricultural workers who are at least 16 years old and who worked at least 40 weeks and usually worked at least 35 hours per week last year (1989). (3) The variables included in the Probit equation are the same as those listed in Table 2. (4) The second-stage sample for (3) and (4) consists of the ethnic/racial groups with the lowest standard errors for the difference between ethnic/racial coefficients from the self-employment and wage/salary earnings equations. We find a clear break point in both distributions of standard errors, and thus only include the 47 ethnic/racial coefficients with standard errors below both break points. (5) The second-stage regressions include a constant and the specified variable(s). (6) For the GLS estimates, we use $\Omega = \sigma_u^2 I_N + V_{dd}$, where V_{dd} is estimated using the covariance matrix of the ethnic/racial coefficients in the probit equation and σ_u^2 is estimated following Borjas (1987). (7) Standard errors are in parentheses below the coefficient estimates. (8) Unearned income includes interest, dividend, and net rental income.

tive returns to wage/salary work due to factors such as discrimination, language barriers, and incompatible education or training. To further distinguish among disadvantaged ethnic/racial groups in their propensities for self-employment, the theory relies on different levels of ethnic and class resources among these groups as an explanation. One example of an ethnic resource is a group's access to inexpensive co-ethnic labor. These two propositions suggest that self-employment rates should be higher among ethnic/racial groups that have lower wage/salary earnings. The relationship between the self-employment rates and the wage/salary earnings coefficients estimated by OLS is positive and significant, and for the selection corrected coefficients is weak and insignificant. These results indicate that ethnic/racial groups with lower levels of wage/salary earnings are not more likely to be self-employed. In addition, we find a significant and positive relationship between the ethnic/racial coefficients from log self-employment earnings equations and the probit coefficients in all of the reported regressions. These two findings suggest that self-employment rates are higher among more advantaged ethnic/racial groups as measured by earnings, thus contradicting the disadvantage theory.

One of the most important examples of a class resource that distinguishes among disadvantaged ethnic/racial groups in their propensities for self-employment is the group's level of assets. In addition, economic theory and past empirical research indicate that asset levels are important in determining who becomes self-employed. We do not include a measure of assets in the probit equations reported in Table 2 because using this measure in a cross-section can provide misleading results due to high assets being a consequence rather than a cause of self-employment. One method of partially correcting for this problem is to use the average level of assets among wage/salary workers in an ethnic/racial group as an estimate. We estimate this average taking nonlabor income among wage/salary workers to be proportional to assets. We use the ethnic/racial coefficients from a log unearned income regression as the explanatory variable in our second stage regressions.⁴³ The results in Table 6 indicate a strong positive relationship between the log unearned income coefficients and the probit coefficients. These results are consistent with high levels of assets among certain ethnic/racial groups enabling them to have high rates of self-employment. Our estimation technique does not, however, entirely rule out the possibility that groups with high levels of self-employment accumulate more assets.

The final set of regressions reported in Table 6 include all three independent variables together. Generally, the coefficients on the various types of earnings are statistically insignificant in the regressions using estimates from OLS. In the selectivity corrected regressions, we find a positive and significant coefficient for log self-employment earnings and a negative and significant coefficient for wage/salary earnings. This result supports the earlier finding that the difference between the two log earnings coefficients is a positive and significant determinant of the probit coefficients. The negative coefficient for wage/salary earnings appears to provide support for the disadvantage theory. Our reading of the literature, how-

43. This regression includes controls for individual characteristics. Unearned income includes interest, dividends, and net rental income and does not include Social Security or public assistance income.

ever, is that those proposing the disadvantage theory have argued that the ethnic/racial groups which suffer from more overall disadvantage in the labor market are the ones which are more likely to turn to self-employment.⁴⁴ By controlling for self-employment earnings, we are analyzing the relationship between group self-employment and relative disadvantage in the two sectors, not between group self-employment and overall disadvantage. Our results are consistent with high self-employment rates being associated with advantaged groups which have both high self-employment earnings and high wage/salary earnings. Lastly, the coefficient on unearned income is positive and statistically significant supporting the earlier finding when this variable is included separately.

To summarize, we do not find evidence suggesting that ethnic/racial groups which face disadvantages in wage/salary work or have access to cheap co-ethnic labor (both measured by wage/salary earnings) have higher self-employment rates. To the contrary, we find that more advantaged ethnic/racial groups in terms of having higher earnings in self-employment and wage/salary work and in terms of having more assets have higher propensities for self-employment.

D. Estimates including Dual Ancestry Groups

In this paper, we have chosen to focus on the majority of the working population that is from a single ancestry group. This focus allows us to examine differences in ancestry where they are the most stark and avoids the many complications involved in handling the various possible permutations of multiple ancestries. Our results, however, are less easily applied to the ancestry combinations which are increasingly common with more time in the country. To extend our results in that direction, we have reestimated the specifications of Tables 5 and 6 including the six largest dual ancestry groups. Together these groups account for 44 percent of those with multiple ancestries. The estimates from this exercise are very similar to the original ones; no conclusions would be changed. Tables with these estimates are available upon request from the authors.

E. The Inclusion of Similar Groups

We should also note that it is likely that there is a slight understatement of the standard errors in Tables 4 through 6 due to the similarity of some groups which are treated as independent observations. Since the number of such groups is small, even perfect correlation between these groups would not cause much understatement. Nevertheless, we have examined the dependence between different racial groups from Africa, Canada (Canadian, French Canadian), the Caribbean, Central America, and South America. We also include the pairs White Native American and Native American, and Czechoslovakian and Slovak. This examina-

44. We acknowledge, however, that a different test of this theory involves examining the relationship between self-employment rates and wage/salary earnings, all else equal. This interpretation of the theory combined with the inclusion of self-employment earnings resembles the economic model.

tion reveals that the residuals are far from perfectly correlated. For example, the nine pairs of residuals from similar groups from Specification (1) in the top panel of Table 5 show a moderate correlation (0.37 with a p-value of 0.33), with the residuals having the same sign in five of the nine cases.

VII. Conclusions

We use the 1990 Census to analyze the self-employment rates of a large number of ethnic/racial groups with a nationally representative data set. We show that self-employment rates differ substantially across ethnic/racial groups in the United States, for both men and women and within broad combinations of ethnic/racial groups such as Europeans, Asians, blacks, and Hispanics. The level of education and time since immigration are important determinants of self-employment, but controlling for these and a large number of other demographic variables does not greatly change the overall pattern of dispersion in self-employment rates. Our results also demonstrate that estimates of the determinants of self-employment can easily be badly biased if their correlation with ethnicity and race are not incorporated. Furthermore, aggregating ethnic/racial groups into broad categories misses dramatic differences within these categories.

We critically discuss explanations that have been proposed for these differences. Each of the theories finds some support in at least one ethnic or racial group, but all of the theories have counter examples or other weaknesses. We then estimate a series of regressions with our ethnic/racial differences in self-employment rates as the dependent variable. We find that those groups with high self-employment rates do not come from countries with high self-employment rates. We also test the key implication of a model where individuals choose self-employment or wage/salary work based on a comparison of potential earnings in each sector. We find that an ethnic/racial group's average self-employment earnings relative to average wage/salary earnings appear to be important in determining the self-employment rate of that ethnic/racial group. Finally, we find that the more advantaged ethnic/racial groups, measured by wage/salary earnings, self-employment earnings, and unearned income, and not the more disadvantaged groups, have the highest rates of self-employment. This last result suggests that, while it may be important for some groups, discrimination and language difficulties do not usually lead to self-employment. Instead, it seems that high relative returns to self-employment for many ethnic groups makes self-employment preferable.

Appendix 1

Log Full-Time Earnings Equations for Self-Employment and Wage/Salary Work, 1990 Census—Men

Explanatory Variables	Specification			
	(1)	(2)	(3)	(4)
Selection Correction Sample (Type of Work)	No Self- Employed	No Wage/ Salary	Yes Self- Employed	Yes Wage/ Salary
High school graduate	0.1965 (0.0429)	0.1428 (0.0071)	0.1965 (0.0449)	0.1418 (0.0078)
Some college	0.3339 (0.0425)	0.2699 (0.0072)	0.3519 (0.0502)	0.2653 (0.0079)
College graduate	0.8604 (0.0408)	0.6006 (0.0073)	0.9037 (0.0702)	0.5882 (0.0082)
Immigrated 1985 to 1990	-0.3015 (0.0743)	-0.2167 (0.0105)	-0.4098 (0.1590)	-0.1999 (0.0119)
Immigrated 1980 to 1984	-0.2979 (0.0593)	-0.1598 (0.0099)	-0.2269 (0.1102)	-0.1778 (0.0112)
Immigrated 1975 to 1979	-0.1500 (0.0569)	-0.0801 (0.0105)	-0.0235 (0.1730)	-0.1137 (0.0124)
Immigrated 1970 to 1974	0.0201 (0.0597)	-0.0180 (0.0115)	0.1637 (0.1947)	-0.0610 (0.0137)
Immigrated 1965 to 1969	0.0528 (0.0638)	0.0055 (0.0121)	0.1379 (0.1281)	-0.0201 (0.0136)
Immigrated 1960 to 1964	0.0111 (0.0733)	0.0732 (0.0140)	0.0767 (0.1141)	0.0522 (0.0156)
Immigrated 1950 to 1959	0.0636 (0.0666)	0.0683 (0.0136)	0.1176 (0.0986)	0.0505 (0.0151)
Immigrated before 1950	0.0903 (0.0984)	0.0995 (0.0220)	0.1886 (0.1636)	0.0712 (0.0241)
Problem speaking English	-0.1342 (0.0598)	-0.1987 (0.0098)	-0.2070 (0.1127)	-0.1834 (0.0111)
Age	0.0616 (0.0074)	0.0693 (0.0012)	0.1003 (0.0502)	0.0633 (0.0016)
Age squared/100	-0.0659 (0.0076)	-0.0704 (0.0014)	-0.0920 (0.0345)	-0.0681 (0.0016)
Currently married	0.3677 (0.0491)	0.2035 (0.0066)	0.4862 (0.1602)	0.1816 (0.0079)
Widowed	0.2956 (0.1417)	0.1181 (0.0283)	0.4144 (0.2131)	0.1005 (0.0309)
Divorced	0.1087 (0.0673)	0.0892 (0.0102)	0.1777 (0.1127)	0.0802 (0.0114)
Currently separated	0.2560 (0.1117)	0.0756 (0.0162)	0.3205 (0.1425)	0.0680 (0.0180)
Children	0.0399 (0.0119)	0.0025 (0.0020)	0.0789 (0.0515)	-0.0072 (0.0026)

Appendix 1 (continued)

Explanatory Variables	Specification			
	(1)	(2)	(3)	(4)
Selection Correction Sample (Type of Work)	No Self- Employed	No Wage/ Salary	Yes Self- Employed	Yes Wage/ Salary
Limiting disability	-0.4531 (0.0640)	-0.1733 (0.0116)	-0.4373 (0.0702)	-0.1766 (0.0128)
Veteran of military	-0.0377 (0.0336)	-0.0144 (0.0055)	-0.1792 (0.1850)	0.0201 (0.0076)
African-American	-0.0907 (0.2166)	-0.2239 (0.0226)	-0.6702 (0.7751)	-0.1232 (0.0284)
Black Caribbean	-0.2698 (0.1643)	-0.1823 (0.0227)	-0.7019 (0.5795)	-0.0877 (0.0280)
Chinese	-0.3054 (0.1233)	-0.1604 (0.0225)	-0.3439 (0.1383)	-0.1507 (0.0247)
Cuban	-0.1238 (0.1227)	-0.1106 (0.0225)	-0.1437 (0.1311)	-0.1060 (0.0247)
White German	-0.0141 (0.1218)	-0.0423 (0.0209)	-0.0209 (0.1274)	-0.0399 (0.0230)
Greek	0.1299 (0.1059)	0.0027 (0.0218)	0.4374 (0.4097)	-0.0979 (0.0269)
Filipino	-0.0126 (0.1839)	-0.2192 (0.0229)	-0.6209 (0.8027)	-0.0929 (0.0302)
Korean	-0.0430 (0.1109)	-0.2253 (0.0248)	0.3698 (0.5422)	-0.3850 (0.0335)
Mexican	-0.0820 (0.1517)	-0.1650 (0.0217)	-0.4057 (0.4439)	-0.0941 (0.0257)
Native American	-0.6045 (0.1506)	-0.2302 (0.0218)	-0.8457 (0.3463)	-0.1774 (0.0252)
Puerto Rican	-0.3799 (0.1879)	-0.1654 (0.0212)	-0.9550 (0.7621)	-0.0637 (0.0270)
Russian	0.3267 (0.1046)	0.2168 (0.0222)	0.6423 (0.4195)	0.1068 (0.0278)
Selection variable			1.0376 (1.3300)	-0.6873 (0.0876)
Region dummies	Yes	Yes	Yes	Yes
Mean log earnings	10.213	10.154	10.213	10.154
Sample size	14881	100514	14881	100514
R-square	0.1031	0.2583	0.1031	0.2588

Notes: (1) The sample consists of non-agricultural workers who are at least 16 years old and who worked at least 40 weeks and usually worked at least 35 hours per week last year (1989). (2) The dependent variable is log earnings. (3) Standard errors are in parentheses below the coefficient estimates. (4) Specifications 3 and 4 use Heckman's 2-Step Estimator to correct for sample selection. (5) Observations with self-employment earnings less than 1 are recoded as 1. Therefore, the minimum value for log self-employment earnings is zero. (6) All equations include a constant. (7) The omitted categories for education, immigration, and marital status are never graduated from high school, native born, and never married, respectively.

Appendix 2

Biases in OLS Estimates of the Sectoral Choice Model

To see the result that the OLS earnings equation estimates are likely to be biased against supporting the sectoral choice model, write earnings in each sector for a person in group j as

$$(A1) \quad y^k = \alpha_j^k D_j + x' \beta^k + \varepsilon^k,$$

where y^k is income, D_j is the dummy variable for the j th ethnic group, α_j^k is the coefficient for this group, x is a vector of other control variables with coefficients β^k , ε^k is an error term, and $k = s$ or w for self-employment or wage/salary work, respectively. In the simplest sectoral choice model a person chooses self-employment if $y^s \geq y^w$ or $\varepsilon^s - \varepsilon^w \geq (\alpha_j^w - \alpha_j^s) D_j + x' (\beta^w - \beta^s) \equiv \Delta$. This inequality implies that we only observe y^s when $\varepsilon^s - \varepsilon^w \geq \Delta$ and y^w when $\varepsilon^s - \varepsilon^w < \Delta$. The resulting selection mechanism implies that the ethnic group dummy D_j will be correlated with the error terms in (A1) in the sample where earnings are observed since the conditional expected values of ε^s and ε^w are $E[\varepsilon^s | \varepsilon^s - \varepsilon^w \geq \Delta]$ and $E[\varepsilon^w | \varepsilon^s - \varepsilon^w < \Delta]$, respectively.

We want to determine the sign of the bias in the relationship between the ethnic coefficients from the probit self-employment choice equation and estimates of $\alpha_j^s - \alpha_j^w$ from the selected income samples for each group. Theoretically the former coefficients are strictly proportional to $\pi = \alpha_j^s - \alpha_j^w$, though determinants besides income likely affect individuals' choices. To see the sign of the bias, note that if π is large then Δ is small, implying that the expected values of ε^s and ε^w are small and large, respectively. Thus, when the probit ethnic/racial coefficient is large because π is large, the conditional expectation of ε^s will be small and the conditional expectation of ε^w will be large, both of these effects understating the relative return to work in self-employment. Note that this result does not require a distributional assumption on the error terms, rather it requires the fairly weak assumption that ε^s is positively associated with $\varepsilon^s - \varepsilon^w$ and ε^w is negatively associated with $\varepsilon^s - \varepsilon^w$.

References

- Ahn, Hyungtaik, and Powell, James L. 1990. "Semiparametric Estimation of Censored Selection Models with a Nonparametric Selection Mechanism." Working paper, University of Wisconsin-Madison.
- Aldrich, Howard E., and Roger Waldinger. 1990. "Ethnicity and Entrepreneurship." *Annual Review of Sociology* 16(1):111-35.
- Aronson, Robert L. 1991. *Self-Employment: A Labor Market Perspective*. Ithaca: ILR Press.
- Bates, Timothy. 1989. "The Changing Nature of Minority Business: A Comparative Analysis of Asian, Nonminority, and Black-Owned Businesses." *The Review of Black Political Economy* 18(2):25-42.
- Benus, Jacob M., Michelle L. Wood, Christopher J. Napierala, and Terry R. Johnson. 1992. "Massachusetts UI Self-Employment Demonstration." In *Self-Employment*

- Programs for Unemployed Workers*, Unemployment Insurance Occasional Paper 92-2, U.S. Department of Labor, Employment and Training Administration, Unemployment Insurance Service.
- Bonacich, Edna. 1973. "A Theory of Middleman Minorities." *American Sociological Review* 38(5):583-94.
- Borjas, George. 1986. "The Self-Employment Experience of Immigrants." *Journal of Human Resources* 21(4):487-506.
- . 1987. "Self-Selection and the Earnings of Immigrants." *American Economic Review* 77(4):531-53.
- Borjas, George, and Stephen Bronars. 1989. "Consumer Discrimination and Self-Employment." *Journal of Political Economy* 97(3):581-605.
- Borjas, George, and Glen Sueyoshi. 1994. "A Two-Stage Estimator for Probit Models with Structural Group Effects." *Journal of Econometrics* 64(1-2):165-82.
- Cayton, Horace R., and St. Clair Drake. 1946. *Black Metropolis*. London: Jonathan Cape.
- Cresce, Arthur R., Susan J. Lapam, and Stanley J. Rolark. 1992. "Preliminary Evaluation of Data from the Race and Ethnic Origin Questions in the 1990 Census." Paper presented at the annual meeting of the American Statistical Association.
- Devine, Theresa J. 1994. "Changes in Wage-and-Salary Returns to Skill and the Recent Rise in Female Self-Employment." *American Economic Review* 84(2):108-13.
- Evans, David, and Linda Leighton. 1989. "Some Empirical Aspects of Entrepreneurship." *American Economic Review* 79(3):519-35.
- Evans, David, and Boyan Jovanovic. 1989. "An Estimated Model of Entrepreneurial Choice Under Liquidity Constraints." *Journal of Political Economy* 97(4):808-27.
- Fairlie, Robert W. 1994. "The Absence of the African-American Owned Business: An Analysis of the Dynamics of Self-Employment." Center for Urban Affairs and Policy Research, Northwestern University, Working Paper WP-94-9.
- . 1996. *Ethnic and Racial Entrepreneurship: A Study of Historical and Contemporary Differences*. Forthcoming. New York: Garland Publishing.
- Fairlie, Robert W., and Bruce D. Meyer. 1994. "The Ethnic and Racial Character of Self-Employment." National Bureau of Economic Research, Working Paper No. 4791.
- . 1996. "Trends in Self-Employment among Black and White Men: 1910-1990." Working Paper.
- Frazier, E. Franklin. 1957. *The Negro in the United States*, 2nd Edition. New York: Macmillan.
- Fratoo, Frank. 1986. "A Sociological Analysis of Minority Business." *The Review of Black Political Economy* 15(2):5-29.
- Glazer, Nathan, and Daniel P. Moynihan. 1970. *Beyond the Melting Pot: the Negroes, Puerto Ricans, Jews, Italians, and Irish of New York City*, 2nd Edition. Cambridge: MIT Press.
- Goldberger, Arthur S. 1983. "Abnormal Selection Bias." In *Studies in Econometrics, Time Series, and Multivariate Statistics*, ed. Samuel Karlin, Takeshi Amemiya, and Leo A. Goodman, 67-84. New York: Academic Press.
- Guy, Cynthia, Fred Doolittle, and Barbara Fink. 1991. *Self-Employment for Welfare Recipients: Implementation of the SEID Program*. New York: Manpower Demonstration Research Corporation.
- Holtz-Eakin, Douglas, David Joulfaian, and Harvey S. Rosen. 1994. "Entrepreneurial Decisions and Liquidity Constraints." *RAND Journal of Economics* 25(2):334-47.
- Kihlstrom, Richard, and Jean-Jacques Laffont. 1979. "A General Equilibrium Entrepreneurial Theory of Firm Formation Based on Risk Aversion." *Journal of Political Economy* 87(4):719-48.

- Kim, Kwang Chung, and Won Moo Hurh. 1985. "Ethnic Resources Utilization of Korean Immigrant Entrepreneurs in the Chicago Minority Area." *International Migration Review* 19(1):82-111.
- Kinzer, Robert H., and Edward Sagarin. 1950. *The Negro in American Business: the Conflict between Separatism and Integration*. New York: Greenberg.
- Liebersohn, Stanley, and Mary C. Waters. 1988. *From Many Strands: Ethnic and Racial Groups in Contemporary America*. New York: Russell Sage Foundation.
- Light, Ivan. 1972. *Ethnic Enterprise in America*. Berkeley: University of California Press.
- . 1979. "Disadvantaged Minorities in Self-Employment." *International Journal of Comparative Sociology* 20(1-2):31-45.
- . 1984. "Immigrant and Ethnic Enterprise in North America." *Ethnic and Racial Studies* 7(2):195-216.
- . 1994. "The Ethnic Economy." in *Handbook of Economic Sociology*, ed. Neil J. Smelser and Richard Swedberg, 647-71. Princeton: Princeton University Press.
- Light, Ivan, and Edna Bonacich. 1988. *Immigrant Entrepreneurs: Koreans in Los Angeles, 1965-1982*. Berkeley: University of California Press.
- Light, Ivan, Im Jung Kwuon, and Deng Zhong. 1990. "Korean Rotating Credit Associations in Los Angeles." *Amerasia* 16(2):35-54.
- Loewen, James W. 1971. *The Mississippi Chinese: between Black and White*. Cambridge: Harvard University Press.
- Lucas, Robert E. 1978. "On the Size Distribution of Firms." *The Bell Journal of Economics* 9(2):508-23.
- Meyer, Bruce. 1990. "Why Are There So Few Black Entrepreneurs?" National Bureau of Economic Research, Working Paper No. 3537.
- Min, Pyong Gap. 1984. "From White-Collar Occupations to Small Business: Korean Immigrant Occupational Adjustment." *The Sociological Quarterly* 25(3):333-52.
- . 1988. *Ethnic Business Enterprise: Korean Small Business in Atlanta*. New York: Center for Migration Studies.
- Moore, Robert L. 1983. "Employer Discrimination: Evidence from Self-Employed Workers." *The Review of Economics and Statistics* 65(3):496-501.
- Murphy, Kevin M., and Robert H. Topel. 1985. "Estimation and Inference in Two-Step Econometric Models." *Journal of Business & Economic Statistics* 3(4):370-79.
- Myrdal, Gunnar. 1944. *An American Dilemma: the Negro Problem and Modern Democracy*. New York: Harper and Brothers.
- Neidert, Lisa J., and Reynolds Farley. 1985. "Assimilation in the United States: An Analysis of Ethnic and Generation Differences in Status and Achievement." *American Sociological Review* 50(6):840-50.
- Pagan, Adrian. 1986. "Two Stage and Related Estimators and Their Applications." *Review of Economic Studies* 53(4):517-38.
- Portes, Alejandro. 1987. "The Social Origins of the Cuban Enclave Economy of Miami." *Sociological Perspectives* 30(4):340-72.
- Portes, Alejandro, and Robert L. Bach. 1985. *Latin Journey, Cuban and Mexican Immigrants in the United States*. Berkeley: University of California Press.
- Portes, Alejandro, and Min Zhou. 1991. "Gaining the Upper Hand: Old and New Perspectives in the Study of Ethnic Minorities." Working Paper, University of Chicago.
- Razin, Eran, and Andre Langlois. 1994. "Metropolitan Characteristics and Entrepreneurship among Immigrants and Ethnic Groups in Canada." Forthcoming in *International Migration Review*.
- Rees, Hedley, and Anup Shah. 1986. "An Empirical Analysis of Self-Employment in the U.K." *Journal of Applied Econometrics* 1(1):95-108.

- Sengstock, Mary C. 1974. "Iraqi Christians in Detroit: An Analysis of an Ethnic Occupation." In *Arabic Speaking Communities in American Cities*, ed. Barbara C. Aswad, 21-38. New York: Center for Migration Studies of New York.
- Sowell, Thomas. 1981. *Markets and Minorities*. New York: Basic Books.
- . 1983. *The Economics and Politics of Race: An International Perspective*. New York: William Morrow and Company, Inc.
- U.S. Bureau of the Census. 1987. *1982 Characteristics of Business Owners*. Washington, D.C.: GPO.
- Yoon, In-Jin. 1991. "The Changing Significance of Ethnic and Class Resources in Immigrant Business." *International Migration Review* 25(2):303-31.
- . 1991. "Immigrant Entrepreneurship: Korean Business in Chicago." Working Paper, University of Chicago.
- Yu, Eui-Young. 1982. "Occupation and Work Patterns of Korean Immigrants." In *Koreans in Los Angeles: Prospects and Promises*, ed. Eui-Young Yu, Earl H. Phillips, and Eun-Sik Yang, 49-73. Los Angeles: Koryo Research Institute and Center for Korean-American and Korean Studies, California State University.
- Yuengert, Andrew M. 1995. "Testing Hypotheses of Immigrant Self-Employment." *Journal of Human Resources* 30(1):194-204.