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## ***The Heterogeneity of Self-Employment: The Example of Asians in the United States***



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# **The Heterogeneity of Self-Employment: The Example of Asians in the United States<sup>\*)</sup>**

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Self-employment rates differ widely across industries and across racial and ethnic categories. The former is relatively easy for economists to explain while the latter differences are more difficult. Self-employment is rare in industries for which production is characterized by substantial economies of scale. Self-employment is more common in services than in manufacturing, although it is greatest in agriculture. There are also substantial differences in self-employment across countries, with the evidence suggesting an inverse relationship between self-employment and economic development.<sup>i</sup> For the United States, self-employment rates tend to be higher in less densely populated states because self-employment rates are greater when average firm size is smaller (Lunn and Steen, 2000).

According to some people, differences in self-employment rates across racial and ethnic categories are due to discrimination. Self-employment rates are higher for whites than other racial/ethnic groups, and are higher for men than for women. The numerous programs initiated by state and local governments to assist minority- and women-owned businesses usually offer discrimination against minorities and women as a rationale for the programs.<sup>i</sup> However, self-employment rates often differ widely across more narrowly defined groups within broader racial or ethnic classifications. Within the United States, there is a relatively large gap between self-employment rates of Mexicans and Cubans, and a larger gap between Koreans and Laotians. Fairlie (1996) reports self-employment rates for Russians of 24.9 percent and 10.5 percent for Belgians.<sup>ii</sup> These differences in self-employment rates within broader classifications (Hispanics, Asians, and Europeans) suggest that discrimination may not be the primary cause. In this paper, we examine self-employment rates among various ethnic groups within the broader classification of Asian to illustrate the heterogeneity of the self-employed, and to discuss the implications of this heterogeneity.

## I. Previous Work

Self-employment itself is a heterogeneous activity, ranging from part-time work as an input contractor to heading up firms with hundreds of employees and millions of dollars of revenues. It is also not limited to sole proprietorships, since some corporate forms of governance are strictly for tax and liability reasons, and the head perceives herself or himself as self-employed. A number of factors likely enter into the decision whether to pursue self-employment or to pursue employment for wages or salary, including the expected earnings in each state, expected variation in earnings in each state, the desire for independence, risk aversion, and the number of hours one would work.

DeWit (1993) surveys models of self-employment, beginning with a basic model that treats all individuals as identical and then adding numerous complications to the analysis. These complications include entrepreneurial ability differences, capital requirements, uncertainty, and dynamic considerations. He has a brief section on empirical work, noting that there is not a close relationship between the theoretical determinants and the empirical determinants.

There is uncertainty as to whether the self-employed are “better” on average than those working for wages and salaries, or whether the self-employed are often the “misfits” who can’t hold a job or get along with authority figures. Evans and Leighton (1990) find that the self-employed are more likely to have experienced unemployment than are wage workers. In another study, they found that those who switched from wage work to self-employment were receiving relatively low wages and had had bouts of unemployment (Evans and Leighton, 1989). Robinson and Sexton (1994) found that the self-employed are more educated than workers in the wage and salary sector, while Bates (1995) reports that the effects of education, as well as some other variables, differ across industries. Lunn and Steen (2000)

also found substantial differences across broadly-defined industries. They found that education positively affected the self-employment decision in agriculture, manufacturing of nondurable goods, wholesale trade in nondurable goods, retail trade, personal services, and finance, but negatively affected the self-employment decision in durable goods manufacturing, durable goods wholesale trade, transportation, and business and repair services. They also found that immigrant status had a positive effect in some industries (manufacturing, wholesale trade, transportation, retail trade, and professional services) but a negative effect in others (agriculture, finance, and personal services). Further, the self-employment rates of immigrants within any industry were almost always higher than the self-employment rates of those workers born in the United States. In a number of cases, the self-employment rate of immigrants was more than 50 percent greater than the self-employment rate of natives.

There is support for the idea that people face liquidity constraints and must accumulate assets before entering into self-employment. Blanchflower and Oswald (1998) found that the self-employed in Britain often had received an inheritance. Dunn and Holtz-Eakin (1996) found only a small effect of financial assets on self-employment. However, parents' wealth exerted a relatively strong influence through human capital channels. Sanders and Nee (1996) examined self-employment among immigrants, and found that, "...self-employment is facilitated by social capital present in the family and by personal human capital/class resources of immigrants (p. 244)."

Clearly, there remain a number of unanswered questions concerning the determinants of self-employment. In fact, it appears that the determinants of self-employment differ across industries and perhaps across ethnic groups. Further, immigrants tend to choose self-employment more often than those born in the United States. We focus on Asians in this paper because Asians offer considerable variability in self-employment rates and employment in industries, and are among the groups immigrating to the United States in large numbers.

## II. Data

The data used for the analyses in this paper are taken from the 5% Public Use Microdata Samples (PUMS) of the 1990 Census of Population and Housing. This dataset includes a five-percent sample of the population from each state and the District of Columbia. There are a variety of demographic data available, including age, marital status, level of education and number of children within the household. The PUMS data include information on immigrant status, including both the length of time residing in the United States and the country of birth for immigrants.

The data reported also include a variety of information on employment, including industry and occupation, hours worked and earnings. For the purposes of this study, a person is classified as self-employed if they report themselves to be self-employed in either an incorporated or unincorporated business, professional practice or farm. For industry categories, workers were grouped into a total of 13 industries: agriculture, mining, construction, manufacturing (nondurable goods), manufacturing (durable goods), transportation and utilities, wholesale trade (durable goods), wholesale trade (nondurable goods), retail trade, finance, business and repair services, personal services, and professional services. Results for workers in public administration are not reported separately due to extremely small numbers of self-employed workers, but are included in the calculation of group self-employment rates (such as in Table 1).

The PUMS data also include detailed information on race, ethnicity and national origin. In this paper, the sample of Asian workers used for the analysis was based on answers to the race question in the survey.<sup>iii</sup> Our sample includes individuals who report their race as Chinese, Taiwanese, Filipino, Japanese, Asian Indian, Korean, Vietnamese, Cambodian,

Hmong, Laotian, Thai, Bangladeshi, Burmese, Indonesian, Malayan, Okinawan, Pakistani, Sri Lankan and other Asian, but excludes Eskimos, Aleuts and Pacific Islanders (such as Hawaiians and Polynesians). All Asian workers aged 18 and over from each of the fifty states and the District of Columbia were included in our dataset, for a total of 140,805 workers. To be reported as an individual ethnic group in our paper, a classification must have at least 1000 workers in the five-percent sample. Those groups with less than 1000 workers were grouped together for analysis as Other Asians.

### III. Self-Employment Rates Among Asians

Table 1 presents self-employment rates by ethnic groups within the broad classification of Asian. For Asians as a group, the self-employment rate is 10.3 percent.<sup>iv</sup> There is considerable variation among the groups within the classification of Asian. Koreans have the highest rate of self-employment at 24.1 percent, while Laotians have the lowest rate at 3.1 percent. Table 1 also presents information about the percentage of each group that are immigrants, with several groups over 99 percent (Vietnamese, Cambodian, and Laotian). Japanese workers are the only group where natives outnumber immigrants.

Table 2 offers more information on the differences in immigration across groups. Different groups migrated to the United States in large numbers at different times. For four of the groups (Asian Indians, Koreans, Pakistanis and Other Asians), over 20 percent of the workers in the 1990 Census had immigrated in the five years just previous to 1990, and for all of the groups except the Japanese, at least 10 percent of the sample were recent migrants. Over half of the workers in the sample in 1990 that identified themselves as Cambodian or Laotian had migrated to the United States during the early 1980s, while over 40 percent of the Korean, Vietnamese, and Thai workers in the 1990 Census had migrated to the United States in the 1970s. It is likely that inter-group differences in self-employment rates are affected by the differences in length of time members in the groups have been in the United States.

Self-employment rates vary across industries, as do the proportion of groups working in specific industries. Hence, part of the differences in self-employment rates across ethnic groups is attributable to the different patterns of employment. Table 3 presents the percentage distribution of all workers (both wage workers and self-employed) by industry for each ethnic group and the distribution of self-employed workers by industry for each ethnic group. There are some relatively large differences across groups. For example, around 40 percent or more of all workers who identify themselves as Vietnamese, Cambodian, and Laotian work in manufacturing industries while less than 20 percent of the members of other ethnic groups work in manufacturing. Manufacturing has relatively low rates of self-employment, so it is not likely that these groups will reflect high rates of self-employment. Over 30 percent of Koreans work in retail trade while only 13 percent of Laotians work in retail trade. Similarly, Laotians are not represented in professional services to a great extent (less than 9 percent) while over a third of Asian Indians are in professional services employment. Pakistanis are highly represented in transportation compared to the other Asian groups and Taiwanese are highly represented in finance.

Of the Laotians who are self-employed, almost 18 percent are in manufacturing as compared to about 8 percent of the self-employed Koreans. Pakistanis are the only group for which more than 10 percent of the self-employed are working in transportation while the same is true for Taiwanese and Filipinos in finance. Almost half of the Koreans who are self-employed are in retail trade. Again, we see considerable heterogeneity in the distribution of self-employed workers across industries.

The self-employment rates by ethnic group and industry are presented in Table 4. Koreans (24.14%) have the highest self-employment rate overall and have the highest rate in many of the industries. The exceptions are agriculture (Japanese), retail, finance, and personal

services (Taiwanese), and transportation and professional services (Pakistanis). The boldface type in Table 4 indicates that the self-employment rate for the group in that industry is more than 20 percent higher than the rate for all Asians, and italics indicate the rate is at least 20 percent lower than the rate for all Asians. The Koreans and Taiwanese are most similar in that both groups have self-employment rates that are consistently more than 20 percent higher than the rate for all Asians. The Cambodians, Filipinos and Laotians are similar in that they are consistently well below the average for all Asians in most industries.

As noted above, both Bates (1995) and Lunn and Steen (2000) found that the impact of education on the probability of self-employment varied across industries. Table 5 shows that there are substantial differences in the average level of education of the Asian ethnic groups. Less than six percent of the Taiwanese have less than a high school education and 65 percent have a college degree or more. By contrast, almost half of the Laotians do not have a high school degree and only 5 percent have a college degree or more. Other highly educated groups include the Japanese, Asian Indians and Pakistanis, while others with low rates of education include Cambodians, Vietnamese, and Thais.

Borjas (1994) has argued that the “quality” of immigrants has fallen in recent years, with quality measured by educational and skill variables. We calculated percentages of each group for the education variables in Table 5 broken down by when the person immigrated and the patterns for each time period were similar to the pattern in Table 5. There has not been a systematic deterioration in education levels over the time periods, although the ethnic groups with the highest rates of immigration in the last two decades do have lower education levels than Asians as a whole.

Table 6 provides the means of other variables that will be used in the probit analysis. There is not a lot of variation in the average age or hours worked in the previous week across groups. Neither is there much variation in urbanization, with Japanese the only group where less than 94 percent of the sample live in urban areas. There is a great deal of variation in the value of the home; however, it should be kept in mind that the value is zero for a renter. There are some differences in the proportion of women in the labor force across the groups, with the share of the sample of workers made up of women exceeding 50 percent for Filipinos and Thais, but less than 22 percent of Pakistanis.

#### **IV. Probit Analysis**

Our basic model can be found in the specification (2) of Table 7. The probability of self-employment is a function of age, hours worked, education, gender, marital status and number of children, whether the person is disabled or not, whether the person is an immigrant or not and whether the person lives in an urban area or not. We also include the value of the person's home as a measure of wealth. Education is measured by a series of dummy variables for high school graduate, some college, a college degree, and some post-graduate work. The omitted category is less than a high school education. Immigration is measured by a series of dummy variables for when the person immigrated. The variable for immigration in the PUMS data set is not continuous so we must use dummy variables; the omitted category is native born workers. The dependent variable is equal to 0 if the person works for wages or salary and 1 if the person is self-employed. Due to the nature of the dependent variable, we estimate the equations by probit. The probit coefficients have been transformed so that we report the estimate for the change in probability of self-employment for an infinitesimal change in a continuous variable and the estimate for the change in probability of self-employment for a change in the dummy variable from 0 to 1.<sup>v</sup>

Table 7 provides 3 specifications for self-employment. The dataset includes all Asian workers in the sample. The first specification provides a basic model without the dummy variables for immigration or for industries. The next column adds the variables for

immigration and the final column adds industry dummy variables. Most of the coefficients are statistically significant, which is not unexpected given the large sample. There are some interesting changes going across the columns for education and whether the person resides in a city or not. In specification (1) the probability of self-employment increases for high school graduates but decreases for those with some college or a college degree. The coefficient is positive but not statistically significant for those with post-graduate work. The same pattern holds when the immigration dummies are added, but it does not hold in specification (3) when the industry dummies are added and where all of the education dummy variables are positive and statistically significant. For those that had been positive, the coefficients increased in magnitude also. The addition of the industry dummies attenuates the affect of living in the city—it remains negative but the coefficient is smaller in absolute value and is no longer statistically significant. However, most of the persons in the sample live in urban areas. Immigration before 1984 is associated with at least a one percent increase in the rate of self-employment.

We perform additional probit analyses on two types of subsets of the data. One specification is similar to specification (3), however, we run regressions for each ethnic group separately. The second type of analysis consists of separate regressions for each industry, with dummy variables added for the ethnic groups. These analyses will help identify differences in the propensity for self-employment across industries and across Asian ethnic groups.

Table 8 provides the probit estimates for each ethnic group but with dummy variables for immigration and industry. For some groups, the immigration variables were dropped because either there were so few native born workers in the group or some of the immigration categories contained very few observations. Consistently, the age and age squared variables indicate that the probability of self-employment increases at a decreasing rate with age. The number of hours worked in a week also positively affects the probability of self-employment for all groups. The value of the house also is positive and statistically significant for all groups except Laotians, where it is not statistically significant. In general, those who say they have a disability are more likely to be self-employed, as are those who are married. Women are less likely to be self-employed than men for almost all groups, although the coefficient is not statistically significant in the cases of Vietnamese, Laotians, Pakistanis, and other Asians. The presence of additional children usually increases the probability of being self-employed.

Differences across groups show up with respect to many of the education, immigration, and industry variables. All the education dummy variables are positive for six of the groups—Chinese, Asian Indians, Koreans, Laotians, Thais, and Pakistanis. All the education coefficients are statistically significant for Chinese, and the three highest levels of education are statistically significant for Koreans. The only group for which all the coefficients are negative is Taiwanese, although only the coefficient for post-graduate work is statistically significant.

In general, immigrants are somewhat more likely to be self-employed than native-born persons in the data set, although the most recent immigrants (one to five years prior to the Census) generally are less likely to be self-employed (Koreans are an exception here). For all Asians, the increase in probability associated with immigration is greatest for those who migrated in the 1970s or first half of the 1980s. This result is especially strong among Korean workers. Compared to native born Korean-Americans, the probability of self-employment for Koreans who immigrated between 1980 and 1984 is more than 14 percentage points higher, and is 10.7 percentage points higher for those who immigrated during the 1970s. The coefficients for the other groups are much smaller in magnitude than for the Koreans, and are negative for some of the groups.

The omitted industry in this analysis is professional services, a category that contains almost one-fourth of the sample (24.51%).<sup>vi</sup> The self-employment rate for all Asians in professional services is 9.01 percent. For the sample of all Asians (Table 7), working in



mining, manufacturing, and transportation and utilities reduces the probability of self-employment compared to professional services. Table 8 shows that this pattern holds for almost all ethnic groups, although the coefficient is not always statistically significant. For all Asians (Table 7), working in any of the other industries increases the probability of self-employment. This pattern holds for most of the ethnic groups, although there are some exceptions. Several of the ethnic groups are less likely to be self-employed in wholesale trade in durable goods than in professional services, although the coefficient is statistically significant only in the cases of Filipinos and Japanese. The probability of self-employment is significantly lower in construction for Asian Indians.

While there are not many sign changes across ethnic groups for the industry dummy variables, there are some relatively large differences in the coefficients. For example, the coefficients in retail trade range from about a 1 percent greater probability of self-employment when compared to professional services (Filipinos) to 19 percentage points higher for Taiwanese and 25 percentage points higher for Koreans. There is also considerable variation in the coefficients across ethnic groups for personal services, business and repair services and wholesale trade in nondurable goods

Regressions by industry with dummy variables for ethnic groups are presented in Table 9. The effect of education on self-employment varies across industries. For manufacturing, increases in education positively affect the probability of self-employment to a point, although post-graduate work does not have a positive effect. For the wholesale and retail sectors, more education increases the probability of self-employment. The service industries show mixed results with respect to education. The probability of self-employment increases with education in personal services, but declines with education in business and repair services. Professional services are unusual because of the requirement for advanced degrees in many of the occupations in this classification. More education consistently reduces the probability of self-employment in construction and transportation.

Marriage generally has a positive affect on the probability of self-employment, although the coefficients in several industries are not statistically significant. Noteworthy are the signs and statistical significance on the marriage coefficient for construction, retail trade, and both business and repair services and personal services. Being married leads to at least a three percent increase in the probability of being self-employed, holding other factors constant. These are industries where firms often are small and the spouse may help in running the firm or perform certain key duties. Of these industries, though, only retail trade has a positive and statistically significant coefficient on the variable for the number of children. Often, retail trade is a family affair.

Immigration does not exhibit as much variation across industries as it did across ethnic groups. One industry that is an outlier, though, is transportation. The immigration dummy variables consistently are positive and, for the most part, statistically significant. This holds even for the variable indicating the most recent immigrants. The majority of the self-employed in transportation are in taxi service, trucking, and in services incidental to transportation.

The dummy variables for ethnic groups show substantial variability and in the patterns we would expect given the information in Tables 5 and 8 (Other Asians are the omitted ethnic group). The coefficients for Koreans are positive in every industry and statistically significant in all except transportation and wholesale trade (durables). The coefficients on Taiwanese are usually positive as well, although the coefficient on Koreans is typically greater (finance and personal services are exceptions where the coefficient on Taiwanese are greater). For most of the industries, the probability of self-employment is lower for Cambodians and Laotians than for Other Asians. For retail trade, all of the groups have higher probabilities of self-employment than Other Asians except Filipinos and Japanese. Pakistanis are the only Asians with a positive and statistically coefficient in transportation and utilities. Even after

controlling for a number of personal and family characteristics, the pattern of self-employment presented in Table 4 tends to be confirmed.

## V. Using Koreans to Predict Self-Employment Rates

We have seen that the effects of education and other variables differ across Asian ethnic groups. The same would be true if we ran probit regressions on whites, blacks and Hispanics as well. A procedure that has been used to determine whether discrimination exists or not is to take the coefficients for one group, say whites, and combine them with the characteristics of the members of another group. This provides an estimate of the self-employment rate of the other group if the characteristics were receiving the same “weight” as those of whites. The difference between the estimated rate and the actual rate of the group is taken as an estimate of the extent of discrimination in the market against the members of the non-white group.<sup>vii</sup>

Koreans are the group with the highest self-employment rate, so we use them as the base group. Using the coefficients from the probit equation for Koreans, we estimate self-employment rates for each group. Table 10 provides the results. The second column provides the predicted rate, the third column the actual rate and the fourth column the ratio of the predicted to the actual self-employment rates. All of the groups would have higher self-employment rates if the market “weighted” each variable the way it weights the variable for Koreans. For Laotians and Filipinos, the predicted rates are more than three times the actual rates. Since all are Asians, a protected group in most affirmative action programs, it is hard to see how such large differences are due to discrimination. The heterogeneity of self-employment among Asians must be due to factors other than discrimination, as well as to characteristics that we cannot control for with the variables in the PUMS dataset.

The sociological literature might suggest factors such as networks among extended families, networks among specific ethnic groups, and other cultural differences between groups. These tend to be variables that are difficult to quantify and include in regression analysis. In the next section, we examine Chinese workers in more detail to see if patterns of self-employment differ according to the national origin of the person.

## VI. Self-Employment among Chinese

Chinese reside in most countries in Asia and many Chinese in the United States came to the United States from locations other than China. Table 11 presents self-employment rates for Chinese workers from locations in Asia for which there were at least 100 observations. There were Chinese from other locations as well (e.g., Canada, Europe), but we limit this analysis to native Chinese-Americans and immigrants from Asia. It should also be noted that location is determined by place of birth, so it is likely that for some persons their place of birth was not where they grew up. There is considerable variation in the self-employment rates of Chinese workers from different places of birth. However, it is interesting to note that the Chinese born in Korea have the highest self-employment rate in the data set.<sup>viii</sup> One might expect that Chinese who came from more capitalist-friendly countries might select self-employment more than those from mainland China, but this does not appear to be the case. The self-employment rate for the Chinese from China exceeds that for the rate for Chinese from Hong Kong or Singapore. The rate for Chinese-Americans born in Cambodia is also high, while the rate for workers born in the United States is lower than that for the group of Chinese-Americans as a whole.

It is not possible to replicate all the estimates in Table 9 because the number of observations in several industries is too small. Table 12 reports the results of a probit analysis examining the determinants of self-employment for Chinese workers. The results are reported

for the entire sample and for selected industries with sufficient numbers of Chinese workers. The pattern of coefficients on the other explanatory variables is similar to those for the industries in Table 9, so only the transformed coefficients on place of birth dummy variables are presented here. Chinese workers born in Mainland China are the omitted category.

Most of the coefficients are not statistically significant. If we look at the sign of the coefficients only, Chinese born in Taiwan and Korea are the only groups that never have a negative coefficient. The coefficients in the probit specification for all industries indicate that the probability of self-employment relative to Chinese from China is greater for those who were born in Korea, Singapore, and Taiwan, while the probability is lower for those born in Burma and the United States. Taiwan is the only birthplace of Chinese workers that consistently provides greater probabilities for self-employment than China itself. A few of the coefficients for Korea are positive and statistically significant, but the low numbers of Chinese from Korea makes it difficult to assess the economic significance of the results.

Almost half of the Chinese workers are in the retail or professional services industries, so an examination of these two industries is warranted. In retail, Chinese born in Cambodia, Korea, and Taiwan are more likely to be self-employed than Chinese from China, while those from the United States and Indonesia are less likely to be self-employed. A different pattern emerges in the professional services industries. While the coefficients for Korea and Taiwan are positive, neither is statistically significant. Instead, Chinese born in Hong Kong, the Philippines, and Thailand are more likely to be self-employed in professional services.

The results from the probit analysis involving only the Chinese are not readily generalizable. As noted earlier in the paper, the differences in self-employment rates among different ethnic groups within the broader classification of Asian suggest that discrimination cannot be the explanation. Obviously, though, the model used in this paper also does not explain the differences adequately. Instead, it appears that factors that are difficult to quantify are at work, and we suggest that cultural factors are at least partially responsible. But this raises a question—do Chinese from different national locations participate in a common culture or are they also influenced by the culture in which they were born? Based on the range of self-employment figures for Chinese workers, it appears that birthplace matters. However, the patterns in Tables 11 and 12 do not offer an easy answer as to how place of birth affects the self-employment decision.

## VII. Summary and Caveats

In this paper we have attempted to explain differences in self-employment rates among different ethnic groups from Asia by differences in individual characteristics such as age, marital status, educational achievement, immigration, and industry. We found that there were still substantial differences across many of the Asian ethnic groups. Some caveats are in order before we discuss our conclusions. First, the individuals are classified into a specific ethnic group by their self-reporting on the race variable in the Census forms. Secondly, the PUMS data refer to a point in time in 1990, and many dynamic concerns that would be of interest in examining the decision to self-employment are not included. Third, some of the distinctions are arbitrary, such as the difference between Taiwanese and Chinese. Again, though, we rely on the reporting of the people themselves.<sup>ix</sup>

We offer the following conclusions based on the analysis reported in this paper:

1. Self-employment is a heterogeneous activity and one cannot use highly aggregated data when investigating the determinants of self-employment. The factors important to the self-employment decision differ across industries, and also seem to differ across

- Asian ethnic groups. We know of no reason to think that groups in other broad categories, e.g., whites and Hispanics, would be homogeneous when Asians are not.
2. It is inappropriate to regress self-employment on a set of explanatory variables that include race/ethnic dummy variables defined broadly (white, black, Asian, etc.) and conclude a negative coefficient supports a claim of discrimination in the marketplace. Such an approach requires homogeneity that does not exist.
  3. While it may be that better data sets would provide deterministic results regarding self-employment, we doubt that this is the case, and conclude that cultural or other factors that are not easily measured are very important factors in explaining group differences in rates of self-employment. Economists may need to turn to the sociologists and others for some ideas here.<sup>x</sup>
  4. Ethnic-oriented businesses account for much of the self-employment of Asians, but cannot explain all of the relatively high rates of self-employment of some Asian groups. According to the data, many Koreans own grocery stores and many Chinese run restaurants, but the self-employment rates of Koreans are relatively high in almost all industries. The same is true for Taiwanese.

Finally, we would like to see additional work exploring the heterogeneity of self-employment. While we do not consider self-employment as exactly equivalent to entrepreneurship, both concepts involve assessing uncertain futures and require access to financial resources. As long as the economy becomes more service oriented and less reliant on manufacturing, self-employment likely will continue to increase. Further, as long as the United States permits relatively large numbers of immigrants, self-employment likely will be a popular choice among these recent arrivals.

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## ENDNOTES

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<sup>1</sup> See Acs and Evans (1994). Blau (1987) discusses reasons for a reversal in the downward trend in non-agricultural self-employment found in the 1970s in developed nations.

<sup>i</sup> For further information on such programs, see Lunn and Perry (1993), LaNoue and Sullivan (1995), and Boyle and Rhodes (1996).

<sup>ii</sup> Again, the numbers are for the United States, so Russians are either recent immigrants or Americans of Russian ancestry.

<sup>4</sup> There are also two questions on ancestry in the survey. Using this classification to obtain a sample resulted in closely comparable results to the ones reported in this paper.

<sup>iv</sup> All self-employment rates reported in the paper are based on population weights. The self-employment rate of whites in the PUMS data is 10.6%; blacks—3.6%; Hispanics—6.5%; and Native Americans—7.0%.

<sup>v</sup> This is the `dprobit` command in Stata. See *Stata Reference Manual*, Release 6, Volume 3 (P-St) for further details. We used version 6.0 of Stata.

<sup>vi</sup> Professional services include physicians, dentists, and other health care professionals, lawyers, accountants, and engineers, as well as day care services. Physicians make up the largest group of self-employed for four of the ethnic groups—Asian Indians, Pakistanis, Filipinos, and Other Asians.

<sup>vii</sup> Cities and states that have racial preference programs for public contracting are required to have specific evidence of discrimination against minorities and/or women in the relevant markets. Many government bodies have commissioned predicate studies to provide the needed evidence of discrimination. In at least two recent cases (Miami and Denver), the authors of the predicate studies used the method described here to determine whether minorities and women were self-employed at lower rates than white males. See *Engineering Contractors Association v. Dade County* and *Concrete Works of Colorado, Inc. v. the City and County of Denver, Colorado*.

<sup>viii</sup> The number of Chinese from Korea is relatively small though (145), so one should be careful in concluding too much from these figures.

<sup>ix</sup> It may be that people whose families were on Taiwan prior to the Communist Revolution in Mainland China refer to themselves as Taiwanese while those arriving since the revolution refer to themselves as Chinese.

<sup>x</sup> For example, see Sanders and Nee (1996)

**Table 1**  
Self-Employment Rate and Percent Immigrant of Asian Workers

	Self-Employment Rate	Percent Immigrant
Chinese	11.05%	80.04%
Taiwanese	18.70%	96.39%
Filipino	4.38%	83.82%
Japanese	10.07%	31.61%
Asian Indian	10.84%	96.50%
Korean	24.14%	94.87%
Vietnamese	8.34%	99.79%
Cambodian	5.72%	99.56%
Laotian	3.06%	99.44%
Thai	11.58%	98.24%
Pakistani	13.30%	97.54%
Other Asian	7.59%	77.71%
All Asians	10.32%	80.08%

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS).



**Table 2**  
Percentage of Asian Immigrants by Year

	1985-1989	1980-1984	1970-1979	1960-1969	Before 1960	Total % Immigrant
Chinese	18.44%	20.11%	25.48%	11.83%	4.19%	80.04%
Taiwanese	18.78%	29.93%	29.55%	16.98%	1.14%	96.39%
Filipino	17.81%	18.74%	31.23%	12.82%	3.22%	83.82%
Japanese	8.92%	3.12%	7.08%	6.76%	5.73%	31.61%
Asian Indian	24.60%	24.25%	36.38%	10.31%	0.96%	96.50%
Korean	20.45%	23.65%	40.70%	8.39%	1.68%	94.87%
Vietnamese	14.81%	35.73%	47.63%	1.47%	0.15%	99.79%
Cambodian	13.90%	61.69%	23.51%	0.35%	0.11%	99.56%
Laotian	14.60%	56.33%	28.06%	0.39%	0.05%	99.44%
Thai	14.33%	16.98%	54.58%	12.06%	0.28%	98.24%
Pakistani	26.25%	30.37%	34.74%	5.75%	0.42%	97.54%
Other Asian	20.40%	18.62%	23.81%	10.71%	4.16%	77.71%
All Asians	17.55%	20.49%	29.31%	9.73%	3.00%	80.08%

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS).

**Table 3**  
Percentage of Ethnic Groups in Industries as Workers and as Self-Employed

	Chinese		Taiwanese		Filipino		Japanese	
	All Workers	Self-Employed	All Workers	Self-Employed	All Workers	Self-Employed	All Workers	Self-Employed
Agriculture	0.48%	1.30%	0.29%	0.36%	1.67%	3.81%	3.28%	18.86%
Mining	0.22%	0.04%	0.26%	0%	0.11%	0%	0.14%	0.04%
Construction	2.37%	3.14%	2.91%	3.50%	3.00%	4.77%	3.88%	4.34%
Manufacturing (nondurables)	9.17%	3.81%	5.83%	3.63%	5.69%	2.51%	4.65%	2.19%
Manufacturing (durables)	10.29%	2.62%	10.32%	2.96%	10.91%	1.95%	10.01%	2.18%
Transportation	6.07%	2.57%	4.73%	2.58%	7.13%	3.88%	8.23%	2.61%
Wholesale Trade (nondurables)	2.27%	2.31%	3.42%	2.44%	1.63%	0.80%	3.07%	1.25%
Wholesale (durables)	2.71%	4.48%	4.07%	5.64%	1.79%	2.03%	3.20%	2.95%
Retail Trade	24.65%	41.55%	18.30%	36.13%	14.95%	12.91%	17.81%	19.44%
Finance	9.06%	7.75%	11.46%	11.88%	9.41%	11.02%	8.57%	6.83%
Business Services	4.24%	5.45%	4.63%	2.41%	4.18%	7.81%	4.55%	9.64%
Personal Services	4.68%	7.54%	3.73%	8.22%	7.50%	7.08%	6.10%	7.23%
Professional Services	23.79%	17.45%	30.05%	20.25%	32.03%	41.43%	26.51%	22.45%
	Asian Indian		Korean		Vietnamese		Cambodian	
	All Workers	Self-Employed	All Workers	Self-Employed	All Workers	Self-Employed	All Workers	Self-Employed
Agriculture	0.71%	1.38%	0.67%	1.02%	1.46%	6.45%	0.99%	3.24%
Mining	0.28%	0%	0.06%	0.01%	0.27%	0%	0.08%	0%
Construction	2.86%	2.31%	3.20%	4.26%	2.15%	3.17%	1.94%	0.70%
Manufacturing (nondurables)	6.64%	3.15%	7.30%	4.08%	9.52%	4.73%	12.32%	7.34%
Manufacturing (durables)	13.00%	2.00%	8.16%	1.97%	29.46%	4.37%	28.49%	1.30%
Transportation	5.51%	4.46%	3.75%	1.66%	4.10%	2.11%	3.43%	0.97%
Wholesale Trade (nondurables)	2.09%	2.12%	1.73%	1.35%	2.19%	1.26%	2.73%	0.86%
Wholesale (durables)	1.85%	1.85%	3.10%	3.81%	1.73%	1.18%	3.41%	4.21%
Retail Trade	15.81%	23.48%	31.24%	46.59%	19.21%	35.39%	19.38%	61.77%
Finance	7.25%	5.20%	5.73%	3.33%	4.78%	4.14%	3.38%	1.94%
Business Services	4.81%	4.31%	5.58%	5.67%	5.10%	8.66%	3.44%	1.13%
Personal Services	4.50%	10.18%	11.09%	16.67%	6.94%	18.93%	5.53%	7.67%
Professional Services	34.70%	39.55%	18.38%	9.57%	13.09%	9.62%	14.90%	8.86%

	Laotian		Thai		Pakistani		Other Asian	
	All Workers	Self-Employed	All Workers	Self-Employed	All Workers	Self-Employed	All Workers	Self-Employed
Agriculture	1.72%	7.99%	0.77%	1.13%	0.90%	0.97%	1.30%	3.06%
Mining	0.24%	0%	0.05%	0%	0.08%	0%	0.13%	0%
Construction	2.37%	0%	1.71%	1.47%	3.94%	4.57%	3.39%	7.42%
Manufacturing (nondurables)	19.20%	7.21%	9.17%	4.70%	5.54%	1.61%	7.08%	3.33%
Manufacturing (durables)	38.24%	10.24%	9.74%	1.78%	8.20%	1.40%	12.15%	3.49%
Transportation	2.39%	1.94%	4.64%	1.29%	8.34%	13.82%	6.50%	5.27%
Wholesale Trade (nondurables)	1.49%	1.40%	1.65%	1.45%	1.95%	0.99%	1.66%	1.71%
Wholesale (durables)	3.21%	5.20%	2.36%	3.38%	1.55%	3.15%	1.71%	1.70%
Retail Trade	13.04%	36.54%	30.47%	48.33%	26.23%	27.88%	20.49%	21.63%
Finance	1.79%	5.59%	4.98%	1.04%	6.63%	1.70%	7.24%	7.80%
Business Services	3.22%	6.13%	4.85%	4.97%	5.43%	6.65%	5.26%	8.14%
Personal Services	4.46%	7.60%	9.58%	8.00%	3.96%	2.25%	6.04%	9.40%
Professional Services	8.63%	10.16%	20.02%	22.46%	27.25%	35.02%	27.07%	27.04%

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS).

**Table 4**  
Self- Employment Rate by Ethnic Group and Industry

	Chinese	Taiwanese	Filipino	Japanese	Asian Indian	Korean	All Asians
Agriculture	31.33%	23.81%	10.86%	<b>62.42%</b>	21.85%	37.40%	35.31%
Mining	<b>2.03%</b>	0.00%	0.00%	<b>3.09%</b>	0.00%	<b>5.13%</b>	1.19%
Construction	15.22%	<b>23.05%</b>	7.55%	12.17%	9.08%	<b>32.98%</b>	13.90%
Manufacturing (nondurables)	4.77%	<b>11.93%</b>	2.10%	5.32%	5.32%	<b>13.85%</b>	5.20%
Manufacturing (durables)	<b>2.92%</b>	<b>5.50%</b>	0.85%	2.37%	1.73%	<b>5.99%</b>	2.06%
Transportation	4.86%	<b>10.47%</b>	2.58%	3.46%	<b>9.10%</b>	<b>11.00%</b>	5.14%
Wholesale Trade (nondurables)	<b>11.73%</b>	<b>13.70%</b>	2.33%	4.42%	<b>11.40%</b>	<b>19.24%</b>	8.39%
Wholesale (durables)	<b>19.00%</b>	<b>26.57%</b>	5.38%	10.06%	11.21%	<b>30.38%</b>	14.71%
Retail Trade	19.36%	<b>37.85%</b>	4.11%	11.89%	16.68%	<b>36.93%</b>	17.99%
Finance	9.82%	<b>19.87%</b>	5.56%	8.67%	8.06%	<b>14.40%</b>	8.50%
Business Services	14.74%	9.95%	8.88%	<b>23.05%</b>	10.06%	<b>25.14%</b>	15.07%
Personal Services	18.52%	<b>42.25%</b>	4.48%	12.89%	<b>25.40%</b>	<b>37.21%</b>	17.96%
Professional Services	8.42%	<b>12.91%</b>	6.15%	9.22%	<b>12.80%</b>	<b>12.89%</b>	9.01%
All Industries	11.05%	<b>18.70%</b>	4.38%	10.07%	10.84%	<b>24.14%</b>	10.32%
	Vietnamese	Cambodian	Laotian	Thai	Pakistani	Other Asian	All Asians
Agriculture	38.12%	19.17%	14.43%	17.63%	14.75%	18.79%	35.31%
Mining	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	1.19%
Construction	12.71%	2.12%	0.00%	10.33%	15.85%	<b>17.39%</b>	13.90%
Manufacturing (nondurables)	4.28%	3.49%	1.17%	6.16%	3.97%	3.74%	5.20%
Manufacturing (durables)	1.28%	0.27%	0.83%	2.20%	2.33%	2.29%	2.06%
Transportation	4.43%	1.66%	2.51%	3.35%	<b>22.64%</b>	<b>6.45%</b>	5.14%
Wholesale Trade (nondurables)	4.94%	1.85%	2.91%	<b>10.59%</b>	6.97%	8.21%	8.39%
Wholesale (durables)	5.88%	7.24%	5.02%	17.23%	<b>27.65%</b>	7.90%	14.71%
Retail Trade	15.90%	18.68%	8.70%	19.08%	14.52%	8.40%	17.99%
Finance	7.48%	3.37%	9.69%	2.50%	3.51%	8.58%	8.50%
Business Services	14.67%	1.93%	5.90%	12.30%	16.73%	12.30%	15.07%
Personal Services	<b>23.54%</b>	8.12%	5.29%	10.04%	7.75%	12.38%	17.96%
Professional Services	6.35%	3.48%	3.65%	<b>13.50%</b>	<b>17.56%</b>	7.94%	9.01%
All Industries	8.34%	5.72%	3.06%	11.58%	<b>13.30%</b>	7.59%	10.32%

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS).

**Table 5**  
Education by Ethnicity for Asians

Ethnicity	Less than High School	High School	Some College	College Graduate	Post College
Chinese	18.52%	14.49%	22.05%	24.18%	20.76%
Taiwanese	5.86%	11.84%	17.17%	23.76%	41.37%
Filipino	10.47%	16.80%	31.67%	33.47%	7.58%
Japanese	6.00%	22.23%	31.46%	28.31%	12.00%
Asian Indian	9.57%	11.19%	17.06%	26.13%	36.05%
Korean	13.58%	25.16%	25.87%	22.56%	12.83%
Vietnamese	27.54%	20.07%	32.61%	15.03%	4.75%
Cambodian	44.24%	21.84%	25.19%	6.65%	2.07%
Laotian	49.37%	27.00%	18.44%	3.87%	1.32%
Thai	21.49%	17.01%	28.15%	20.03%	13.31%
Pakistani	10.17%	14.23%	20.84%	24.31%	30.45%
Other Asian	15.69%	19.09%	32.73%	19.04%	13.46%
All Asians	14.41%	17.64%	26.53%	25.68%	15.75%

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS).

**Table 6**  
Means of Variables Used in Probit Analysis by Ethnicity

Ethnicity	Age	Hours Worked per week	% Female	% Married	Number of Children	% Disabled	Value of home (000's)	% Residing in City
Chinese	38.09	40.08	0.457	0.675	0.84	0.057	127.85	0.978
Taiwanese	39.73	39.93	0.415	0.790	1.06	0.045	168.64	0.979
Filipino	38.13	39.70	0.537	0.653	1.09	0.065	110.01	0.945
Japanese	40.79	40.05	0.476	0.607	0.61	0.048	138.57	0.917
Asian Indian	37.13	40.70	0.349	0.756	1.07	0.056	107.39	0.969
Korean	38.03	42.29	0.494	0.718	0.96	0.089	96.99	0.970
Vietnamese	34.62	39.16	0.405	0.584	1.25	0.070	81.16	0.978
Cambodian	33.51	38.58	0.426	0.665	1.89	0.081	53.05	0.978
Laotian	33.40	38.85	0.413	0.689	1.84	0.099	34.01	0.941
Thai	37.24	40.05	0.571	0.653	0.89	0.071	91.35	0.956
Pakistani	36.12	42.14	0.219	0.703	1.21	0.064	76.51	0.969
Other Asian	34.35	38.21	0.414	0.557	1.03	0.062	72.31	0.948
All Asians	37.87	40.16	0.463	0.666	0.98	0.063	111.79	0.958

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS).

**Table 7**  
Probit Analysis, All Asians

	(1)	(2)	(3)
	dF/dx	dF/dx	dF/dx
Age	0.006644 <sup>c</sup>	0.00584 <sup>c</sup>	0.00697 <sup>c</sup>
Age squared	-0.0000457 <sup>c</sup>	-0.0000358 <sup>c</sup>	-0.0000544 <sup>c</sup>
Hours worked	0.0023196 <sup>c</sup>	0.002255 <sup>c</sup>	0.00172 <sup>c</sup>
High School*	0.00702 <sup>c</sup>	0.01032 <sup>c</sup>	0.013288 <sup>c</sup>
Some College*	-0.00769 <sup>c</sup>	-0.0048 <sup>b</sup>	0.01171 <sup>c</sup>
College Graduate*	-0.018007 <sup>c</sup>	-0.0152 <sup>c</sup>	0.01052 <sup>c</sup>
Post College*	0.00129	0.003903	0.05261 <sup>c</sup>
Female*	-0.02693 <sup>c</sup>	-0.02773 <sup>c</sup>	-0.02346 <sup>c</sup>
Married*	0.02884 <sup>c</sup>	0.02645 <sup>c</sup>	0.0239 <sup>c</sup>
Disabled*	0.02379 <sup>c</sup>	0.02220 <sup>c</sup>	0.01870 <sup>c</sup>
Number of children	0.004055 <sup>c</sup>	0.002175 <sup>c</sup>	0.002417 <sup>c</sup>
Value of house	0.000203 <sup>c</sup>	0.000204 <sup>c</sup>	0.0001869 <sup>c</sup>
Resides in city*	-0.014884 <sup>c</sup>	-0.02175 <sup>c</sup>	-0.00494
Immigrated between 1985-90*		-0.00313	-0.008181 <sup>c</sup>
Immigrated between 1980-84*		0.03614 <sup>c</sup>	0.02912 <sup>c</sup>
Immigrated between 1970-79*		0.03730 <sup>c</sup>	0.03158 <sup>c</sup>
Immigrated between 1960-69*		0.01159 <sup>c</sup>	0.012197 <sup>c</sup>
Immigrated before 1960*		0.01003 <sup>b</sup>	0.014756 <sup>c</sup>
Agriculture*			0.307004 <sup>c</sup>
Mining*			-0.05964 <sup>c</sup>
Construction*			0.063129 <sup>c</sup>
Nondurables Manufacturing*			-0.01140 <sup>c</sup>
Durables Manufacturing*			-0.057241 <sup>c</sup>
Transportation and Utilities*			-0.02187 <sup>c</sup>
Wholesale Trade (durables)*			0.016347 <sup>c</sup>
Wholesale Trade (nondurables)*			0.0833 <sup>c</sup>
Retail Trade*			0.12321 <sup>c</sup>
Finance*			0.01937 <sup>c</sup>
Business and Repair Services*			0.10651 <sup>c</sup>
Personal Services*			0.13842 <sup>c</sup>
Pseudo-R squared	0.0949	0.0999	0.1714
Number of observations	140805	140805	140805

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS). Professional Services are the omitted category in specification (3).

- represents dummy variables. a,b,c represent statistical significance at the 10, 5, and 1 percent levels.

**Table 8a**  
 Probit Analysis of Self-Employment, Asians

	Asian Indian	Korean	Vietnamese	Cambodian
	dF/dx	dF/dx	dF/dx	dF/dx
Age	0.013027 <sup>c</sup>	0.026441 <sup>c</sup>	0.007518 <sup>c</sup>	0.002436
Age squared	-0.00013 <sup>c</sup>	-0.00025 <sup>c</sup>	-7.5E-05 <sup>c</sup>	-2.5E-05
Hours worked	0.002196 <sup>c</sup>	0.003668 <sup>c</sup>	0.001292 <sup>c</sup>	0.000997 <sup>c</sup>
High School*	0.006236	0.013541	0.002282	0.004246
Some College*	0.020202 <sup>b</sup>	0.05205 <sup>c</sup>	0.002859	0.024461 <sup>c</sup>
College graduate*	0.011974	0.064994 <sup>c</sup>	-0.00888	0.011246
Post College*	0.025802 <sup>c</sup>	0.055934 <sup>c</sup>	0.039627 <sup>c</sup>	0.100355 <sup>b</sup>
Female*	-0.02947 <sup>c</sup>	-0.07375 <sup>c</sup>	-0.00384	0.001145
Married*	0.014456 <sup>b</sup>	0.077584 <sup>c</sup>	0.015729 <sup>c</sup>	0.008582
Disabled*	-0.00149	0.029508 <sup>b</sup>	-0.01113	0.048452 <sup>c</sup>
Number of children	0.004965 <sup>b</sup>	0.013714 <sup>c</sup>	0.001771	0.001467
Value of house	0.000245 <sup>c</sup>	0.000429 <sup>c</sup>	0.000143 <sup>c</sup>	6.95E-05 <sup>b</sup>
Resides in city*	-0.10378 <sup>c</sup>	0.02205	0.022676 <sup>a</sup>	NA
Immigrated 1-5 years ago*	-0.03911 <sup>c</sup>	0.047232 <sup>a</sup>	-0.00846	NA
Immigrated 6-10 years ago*	-0.0137	0.142311 <sup>c</sup>	0.022602	NA
Immigrated 11-20 years ago*	0.002584	0.107373 <sup>c</sup>	0.017111	NA
Immigrated 21-30 years ago*	-0.00698	0.073603 <sup>c</sup>	-0.00601	NA
Immigrated 31+ years ago*	0.008238	0.007437	-0.03473	NA
Agriculture*	0.117807 <sup>c</sup>	0.342228 <sup>c</sup>	0.363384 <sup>c</sup>	0.159379 <sup>c</sup>
Mining*	NA	-0.0434	NA	NA
Construction*	-0.02397 <sup>b</sup>	0.216414 <sup>c</sup>	0.072644 <sup>c</sup>	0.006815
Nondurables Manufacturing*	-0.04312 <sup>c</sup>	0.005681	-0.00962	0.007205
Durables Manufacturing*	-0.08368 <sup>c</sup>	-0.11067 <sup>c</sup>	-0.06207 <sup>c</sup>	-0.03453 <sup>c</sup>
Transportation and Utilities*	-0.0258 <sup>c</sup>	-0.04521 <sup>b</sup>	-0.01106	-0.0137
Wholesale Trade (durables)*	-0.01403	0.044105	-0.00368	-0.00446
Wholesale Trade (nondurables)*	0.015351	0.183275 <sup>c</sup>	0.006456	0.054608 <sup>a</sup>
Retail Trade*	0.080008 <sup>c</sup>	0.252141 <sup>c</sup>	0.084516 <sup>c</sup>	0.101049 <sup>c</sup>
Finance*	-0.02328 <sup>c</sup>	0.001921	0.008123	0.008026
Business and Repair Services*	0.01144	0.14772 <sup>c</sup>	0.081784 <sup>c</sup>	0.003157
Personal Services*	0.121501 <sup>c</sup>	0.274578 <sup>c</sup>	0.161537 <sup>c</sup>	0.024153
Pseudo-R squared	0.1957	0.2240	0.1432	0.3088
Number of observations	15649	14017	32226	1409

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS). Professional Services are the omitted industry category.

\* represents dummy variables. a,b,c represent statistical significance at the 10, 5, and 1 percent levels.

**Table 8b**  
 Probit Analysis of Self-Employment, Asians

	Laotian	Thai	Pakistani	Other Asian
	dF/dx	dF/dx	dF/dx	dF/dx
Age	0.003853 <sup>b</sup>	0.013741 <sup>c</sup>	0.025977 <sup>c</sup>	0.00592 <sup>b</sup>
Age squared	-3.8E-05 <sup>a</sup>	-0.00012 <sup>b</sup>	-0.00025 <sup>c</sup>	-4.3E-05
Hours worked	7.27E-05	0.001435 <sup>c</sup>	0.002377 <sup>c</sup>	0.001398 <sup>c</sup>
High School*	0.011385	0.013372	0.000213	-0.01455
Some College*	0.018704 <sup>b</sup>	0.025644	0.035067	-0.00637
College graduate*	0.019497	0.037781 <sup>a</sup>	0.024316	0.001796
Post College*	0.050105	0.093893 <sup>c</sup>	0.020667	-0.00437
Female*	-0.00197	-0.02196 <sup>a</sup>	-0.00583	-0.00611
Married*	-0.0022	0.013778	0.016759	0.010916
Disabled*	0.02182 <sup>b</sup>	-0.00331	-0.02495	0.008944
Number of children	0.000227	0.010762 <sup>a</sup>	-6.4E-05	-0.00266
Value of house	6.42E-05	0.000217 <sup>c</sup>	0.000265 <sup>c</sup>	8.45E-05 <sup>a</sup>
Resides in city*	-0.02674 <sup>b</sup>	-0.02643	-0.09273 <sup>b</sup>	0.023371
Immigrated 1-5 years ago*	-0.01711	-0.02442	NA	-0.01874
Immigrated 6-10 years ago*	-0.01364	-0.02029	NA	-0.02152
Immigrated 11-20 years ago*	-0.01077	-0.00941	NA	0.010021
Immigrated 21-30 years ago*	NA	0.005827	NA	0.007745
Immigrated 31+ years ago*	0.161449	0.12553	NA	-0.00927
Agriculture*	0.102399 <sup>c</sup>	0.237592 <sup>c</sup>	0.156937 <sup>a</sup>	0.133432 <sup>b</sup>
Mining*	NA	NA	NA	NA
Construction*	NA	-0.00357	0.072026	0.123849 <sup>c</sup>
Nondurables Manufacturing*	-0.0098	-0.01093	-0.06613 <sup>b</sup>	-0.01893
Durables Manufacturing*	-0.01402	-0.06665 <sup>c</sup>	-0.08216 <sup>c</sup>	-0.03696 <sup>a</sup>
Transportation and Utilities*	-0.00162	-0.05949 <sup>b</sup>	0.071574 <sup>b</sup>	-0.01404
Wholesale Trade (durables)*	0.007623	0.034625	-0.04159	0.064051
Wholesale Trade (nondurables)*	0.00859	0.0344	0.071001	-0.00674
Retail Trade*	0.054277 <sup>c</sup>	0.112568 <sup>c</sup>	0.041948 <sup>a</sup>	0.055322 <sup>c</sup>
Finance*	0.023763	-0.05772 <sup>b</sup>	-0.07796 <sup>c</sup>	0.046267 <sup>a</sup>
Business and Repair Services*	0.02845	0.018135	0.026409 <sup>c</sup>	0.098441
Personal Services*	0.016377	0.031986	-0.00107 <sup>c</sup>	0.129039
Pseudo-R squared	0.1831	0.1811	0.2092	0.1589
Number of observations	1898	1968	1368	1661

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS). Professional Services are the omitted industry category.

\* represents dummy variables. a,b,c represent statistical significance at the 10, 5, and 1 percent levels.



**Table 9**  
 Probit Analysis of Self-Employment by Industry, All Asians

	Agriculture	Construction	Nondurables Manufacturing	Durables Manufacturing
	dF/dx	dF/dx	dF/dx	dF/dx
Age	0.004239	0.011221 <sup>c</sup>	0.002966 <sup>b</sup>	0.001578 <sup>b</sup>
Age squared	2.77E-05	-0.0001 <sup>c</sup>	-2.5E-05 <sup>a</sup>	-1.6E-05 <sup>b</sup>
Hours worked	0.002205 <sup>c</sup>	0.000349	0.000755 <sup>c</sup>	9.41E-05
High School*	0.046849	-0.02919 <sup>a</sup>	0.009552	0.00738 <sup>b</sup>
Some College*	0.017481	-0.0154	0.030066 <sup>c</sup>	0.001887
College graduate*	0.046275	-0.05707 <sup>c</sup>	0.018955 <sup>c</sup>	-0.00015
Post College*	0.065433	-0.07607 <sup>c</sup>	-0.00358	-0.00018
Female*	-0.17411 <sup>c</sup>	-0.06335 <sup>c</sup>	-0.01893 <sup>c</sup>	-0.00336 <sup>a</sup>
Married*	0.043111	0.034381 <sup>b</sup>	0.000558	0.006583 <sup>c</sup>
Disabled*	0.063814	0.032383	0.00205	0.007964 <sup>b</sup>
Number of children	-0.00969	-0.00432	0.001084	0.000761
Value of house	0.000495 <sup>c</sup>	0.000153 <sup>c</sup>	0.000143 <sup>c</sup>	3.29E-05 <sup>c</sup>
Resides in city*	0.101315 <sup>c</sup>	-0.01355	0.001066	-0.00535
Immigrated 1-5 years ago*	-0.10752 <sup>b</sup>	-0.03913 <sup>b</sup>	-0.00913	-0.0019
Immigrated 6-10 years ago*	-0.01637	0.041972 <sup>b</sup>	0.01177	-0.00025
Immigrated 11-20 years ago*	0.032793	0.000254	0.016111 <sup>b</sup>	-0.00309
Immigrated 21-30 years ago*	0.099212 <sup>b</sup>	0.009512	-0.002	-0.00257
Immigrated 31+ years ago*	0.048957	0.026369	0.002292	-0.00146
Chinese*	0.148418	-0.0262	0.015052	0.000975
Taiwanese*	-0.04211	0.121124 <sup>a</sup>	0.05933 <sup>a</sup>	0.015869
Filipino*	-0.15443 <sup>a</sup>	-0.09594 <sup>c</sup>	-0.02076	-0.01292 <sup>c</sup>
Japanese*	0.307301 <sup>c</sup>	-0.05953 <sup>b</sup>	0.012526	-0.00128
Asian Indian*	0.051157	-0.04863 <sup>a</sup>	0.013817	-0.00451
Korean*	0.233734 <sup>b</sup>	0.12686 <sup>c</sup>	0.095736 <sup>c</sup>	0.025706 <sup>c</sup>
Vietnamese*	0.324105 <sup>c</sup>	-0.02602	0.016436	-0.00722
Cambodian*	0.031743	-0.09251 <sup>a</sup>	0.008766	-0.01419 <sup>b</sup>
Laotian*	0.044792	NA	-0.01818	-0.00895
Thai*	0.190936	-0.03696	0.031138	-0.00147
Pakistani*	0.074724	0.047233	-0.00762	0.000156
Pseudo-R squared	0.2517	0.1084	0.1111	0.0674
Number of observations	1912	3850	9704	16910

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS). Other Asians are the omitted ethnic group category. \* represents dummy variables. a,b,c represent statistical significance at the 10, 5, and 1 percent levels.

**Table 9a**  
Probit Analysis of Self-Employment by Industry, All Asians

	Transportation and Utilities	Wholesale Trade Durables	Wholesale Trade Nondurables	Retail Trade
	dF/dx	dF/dx	dF/dx	dF/dx
Age	0.000804	0.006764 <sup>b</sup>	0.018836 <sup>c</sup>	0.010462 <sup>c</sup>
Age squared	5.59E-06	-5.9E-05 <sup>a</sup>	-0.00018 <sup>c</sup>	-7.6E-05 <sup>c</sup>
Hours worked	0.001035 <sup>c</sup>	0.000533	0.001401 <sup>c</sup>	0.003491 <sup>c</sup>
High School*	-0.01505 <sup>b</sup>	0.02613	0.035986	0.021159 <sup>c</sup>
Some College*	-0.02549 <sup>c</sup>	0.01629	0.06841 <sup>c</sup>	0.05004 <sup>c</sup>
College graduate*	-0.02503 <sup>c</sup>	0.014627	0.067563 <sup>c</sup>	0.078358 <sup>c</sup>
Post College*	-0.02851 <sup>c</sup>	0.00048	0.060219 <sup>b</sup>	0.06000 <sup>c</sup>
Female*	-0.01418 <sup>c</sup>	-0.01357	-0.05149 <sup>c</sup>	-0.01329 <sup>c</sup>
Married*	0.008132	0.017689	0.001724	0.061287 <sup>c</sup>
Disabled*	0.001798	0.055447 <sup>c</sup>	0.007151	0.020088 <sup>c</sup>
Number of children	-0.00053	0.004546	0.013143 <sup>b</sup>	0.008976 <sup>c</sup>
Value of house	-7.96E-06	0.000194 <sup>c</sup>	0.000241 <sup>c</sup>	0.000289 <sup>c</sup>
Resides in city*	-0.00118	-0.08497 <sup>b</sup>	0.010013	-0.04999 <sup>c</sup>
Immigrated 1-5 years ago*	0.055227 <sup>c</sup>	-0.01109	0.016732	-0.02947 <sup>c</sup>
Immigrated 6-10 years ago*	0.053758 <sup>c</sup>	0.036366 <sup>b</sup>	0.060394 <sup>b</sup>	0.04502 <sup>c</sup>
Immigrated 11-20 years ago*	0.045932 <sup>c</sup>	0.030425 <sup>a</sup>	0.070055 <sup>c</sup>	0.05505 <sup>c</sup>
Immigrated 21-30 years ago*	0.029386 <sup>c</sup>	0.007204	0.066612 <sup>b</sup>	0.03595 <sup>c</sup>
Immigrated 31+ years ago*	0.000224	-0.02751	0.056898	0.048616 <sup>c</sup>
Chinese*	-0.00722	0.015976	0.072737	0.040752 <sup>b</sup>
Taiwanese*	0.014975	0.002363	0.097794	0.175151 <sup>c</sup>
Filipino*	-0.03194 <sup>c</sup>	-0.05652 <sup>b</sup>	-0.05034	-0.08254 <sup>c</sup>
Japanese*	-0.01048	-0.03317	0.020014	-0.00609
Asian Indian*	0.001531	-0.00261	0.015805	0.040783 <sup>b</sup>
Korean*	0.020814	0.062613	0.198316 <sup>c</sup>	0.18906 <sup>c</sup>
Vietnamese*	-0.01758	-0.02435	-0.01444	0.061131 <sup>c</sup>
Cambodian*	-0.03209 <sup>a</sup>	-0.0419	0.038613	0.115331 <sup>c</sup>
Laotian*	-0.03054	-0.03432	-0.03779	0.030787 <sup>c</sup>
Thai*	-0.02229	0.009195	0.030818	0.068594
Pakistani*	0.06305 <sup>c</sup>	-0.00992	0.133022	0.018954 <sup>c</sup>
Pseudo-R squared	0.0990	0.1420	0.1642	0.2310
Number of observations	8165	2826	3224	27208

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS). Other Asians are the omitted ethnic group category. \* represents dummy variables. a,b,c represent statistical significance at the 10, 5, and 1 percent levels.

**Table 9b**  
 Probit Analysis of Self-Employment by Industry, All Asians

	Finance	Business and Repair Services	Personal Services	Professional Services
	dF/dx	dF/dx	dF/dx	dF/dx
Age	0.006836 <sup>c</sup>	0.017033 <sup>c</sup>	0.012422 <sup>c</sup>	0.004383 <sup>c</sup>
Age squared	-4.5E-05 <sup>c</sup>	-0.00016 <sup>c</sup>	-0.0001 <sup>c</sup>	-3E-05 <sup>c</sup>
Hours worked	0.00011	0.000715 <sup>b</sup>	0.002755 <sup>c</sup>	0.001028 <sup>c</sup>
High School*	-0.01636	-0.02322	0.038012 <sup>c</sup>	-0.01904 <sup>c</sup>
Some College*	0.00574	-0.01471	0.058622 <sup>c</sup>	-0.03295 <sup>c</sup>
College graduate*	0.011322	-0.0133	0.057102 <sup>c</sup>	-0.04328 <sup>c</sup>
Post College*	0.015228	-0.04721 <sup>c</sup>	0.120632 <sup>c</sup>	0.014172 <sup>b</sup>
Female*	-0.0609 <sup>c</sup>	-0.04496 <sup>c</sup>	-0.01725 <sup>b</sup>	-0.03401 <sup>c</sup>
Married*	-0.00826	0.049033 <sup>c</sup>	0.071696 <sup>c</sup>	-0.00142
Disabled*	0.026954 <sup>c</sup>	-0.00722	0.013699	0.010507 <sup>a</sup>
Number of children	0.007382 <sup>c</sup>	0.003463	0.005058	0.008059 <sup>c</sup>
Value of house	0.000169 <sup>c</sup>	0.000141 <sup>c</sup>	0.000234 <sup>c</sup>	0.000244 <sup>c</sup>
Resides in city*	-0.03342 <sup>a</sup>	-0.0028	0.013771	-0.0401 <sup>c</sup>
Immigrated 1-5 years ago*	-0.0131	-0.08502 <sup>c</sup>	-0.09673 <sup>c</sup>	-0.0148 <sup>c</sup>
Immigrated 6-10 years ago*	0.005223	-0.0252 <sup>a</sup>	-0.02957 <sup>b</sup>	-0.00449
Immigrated 11-20 years ago*	-0.00031	-0.02162	-0.0226	0.013452 <sup>c</sup>
Immigrated 21-30 years ago*	0.002909	-0.01258	-0.0196	0.012049 <sup>b</sup>
Immigrated 31+ years ago*	0.055196 <sup>c</sup>	-0.00825	0.016046	0.009241
Chinese*	0.008064	0.015946	0.024546	-0.0079
Taiwanese*	0.054881 <sup>b</sup>	-0.03365	0.187994 <sup>c</sup>	-0.00671
Filipino*	-0.02969 <sup>b</sup>	-0.04395 <sup>a</sup>	-0.11504 <sup>c</sup>	-0.01347 <sup>a</sup>
Japanese*	-0.01229	0.060496 <sup>a</sup>	-0.03604	0.001133
Asian Indian*	-0.01106	-0.01397	0.086639 <sup>c</sup>	0.006481
Korean*	0.037943 <sup>b</sup>	0.109249 <sup>c</sup>	0.171494 <sup>c</sup>	0.030595 <sup>c</sup>
Vietnamese*	0.001769	0.024515	0.133997 <sup>c</sup>	-0.00207
Cambodian*	-0.00935	-0.1048 <sup>b</sup>	-0.05982	-0.02463
Laotian*	0.00527	-0.05077	-0.06236	-0.02738
Thai*	-0.03543	-0.02311	-0.04402	0.023909
Pakistani*	-0.04834 <sup>b</sup>	0.028607	-0.03378	0.02509 <sup>a</sup>
Pseudo-R squared	0.1393	0.1067	0.2079	0.1849
Number of observations	10609	6121	8665	34081

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS). Other Asians are the omitted ethnic group category. \* represents dummy variables. a,b,c represent statistical significance at the 10, 5, and 1 percent levels.

**Table 10**  
Predicted and Actual Rates of Self-Employment

Ethnic Group	Predicted Self-Employment Rate	Actual Self-Employment Rate	<u>Predicted Rate</u> Actual Rate
Chinese	19.17	11.23	1.71
Taiwanese	25.11	19.13	1.31
Filipino	16.03	4.41	3.63
Japanese	14.24	10.28	1.39
Asian Indian	20.18	11.52	1.75
Korean	24.86	24.82	1.00
Vietnamese	15.45	8.52	1.81
Cambodian	14.95	6.06	2.47
Laotian	11.58	3.03	3.82
Thai	20.57	11.46	1.79
Pakistani	22.16	13.28	1.67
Other Asian	13.72	7.26	1.89
All Asians	17.94	10.49	1.71

**Table 11**  
Self-Employment of Chinese and Taiwanese by Place of Birth

Place of Birth	Self-Emp. Rate
<b>CHINESE:</b>	
USA	8.16%
Burma	7.43%
Cambodia	19.67%
China	12.90%
Hong Kong	8.63%
Indonesia	9.81%
Korea	27.18%
Malaysia	9.19%
Philippines	13.26%
Singapore	11.37%
Taiwan	12.91%
Thailand	15.03%
Vietnam	8.82%
Other Asia	8.61%
<b>TAIWANESE</b>	
USA	0%
Taiwan	19.03%
Other	26.70%

**Table 12**  
Probit Analysis—Chinese Workers by Place of Birth

Place of Birth	All Industries	Manufacturing (nondurables)	Manufacturing (durables)	Retail Trade
USA	-0.0304 <sup>c</sup>	-0.0185	-0.0074	-0.0913 <sup>c</sup>
Burma	-0.0333 <sup>b</sup>	0.0029	-0.0106	-0.0206
Cambodia	0.0234	0.1252 <sup>c</sup>	NA	0.1671 <sup>c</sup>
Hong Kong	0.0053	-0.0196 <sup>b</sup>	0.0028	-0.0169
Indonesia	0.0181	0.0831	NA	-0.1221 <sup>b</sup>
Korea	0.0363 <sup>c</sup>	NA	0.1432	0.0908 <sup>b</sup>
Malaysia	0.0149	0.0185	0.0156	-0.0437
Philippines	0.0147	0.0308	0.1516 <sup>a</sup>	-0.0493
Singapore	0.0246 <sup>b</sup>	0.1272 <sup>b</sup>	0.6864	0.0546
Taiwan	0.0060 <sup>c</sup>	0.0487 <sup>c</sup>	0.0152 <sup>a</sup>	0.0409 <sup>c</sup>
Thailand	0.0272	NA	0.0305	-0.0091
Vietnam	0.0071	0.0465 <sup>c</sup>	-0.0160 <sup>a</sup>	0.0187
Other Asian	0.0142	NA	NA	-0.0382

Place of Birth	Finance	Personal Services	Professional Services
USA	-0.0405 <sup>b</sup>	0.0058	-0.0005
Burma	-0.0514 <sup>b</sup>	0.4025 <sup>b</sup>	0.0172
Cambodia	0.0459	-0.0476	-0.0153
Hong Kong	-0.0084	0.1129 <sup>c</sup>	0.0164 <sup>a</sup>
Indonesia	NA	0.0777	0.0085
Korea	0.5393 <sup>c</sup>	NA	0.0807
Malaysia	0.0106	-0.0550	0.0382
Philippines	-0.0128	-0.1140	0.0487 <sup>c</sup>
Singapore	0.0034	-0.0150	0.0256
Taiwan	0.0630 <sup>c</sup>	0.1632 <sup>c</sup>	0.0132
Thailand	NA	NA	0.1010 <sup>b</sup>
Vietnam	-0.0110	0.1549 <sup>c</sup>	-0.0433 <sup>b</sup>
Other Asian	0.0586	0.0955	-0.0311

Data Source: 1990 U.S. Census of Housing and Population: 5% Public Use Microdata Samples (PUMS). The omitted place of birth variable is China. a,b,c represent statistical significance at the 10, 5, and 1 percent levels.

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## Liste aller bisher erschienenen Diskussionspapiere

**Nr.6: Lunn, John; Steen, Todd P.**, The Heterogeneity of Self-Employment: The Example of Asians in the United States, 2000

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