

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

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ABSTRACT. Self-employment rates differ widely across industries and across racial and ethnic categories. The heterogeneity of self-employment is most pronounced among Asians working in the U.S. The self-employment rate of Koreans is almost eight times greater than the self-employment rate of Laotians. This paper examines the pattern of self-employment across more narrowly defined classifications of Asians and industries to illustrate the heterogeneity of self-employment, and discusses the implications of this heterogeneity.

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. Bates (1997) reports that the financial capital required to start a business in manufacturing and wholesaling is substantially more than the financial capital required to start a business in construction or professional services. 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.¹ For the United States, self-employment rates tend to be higher in less densely populated states because self-employment rates are greater when the average firm size is smaller (Lunn and Steen,

2000).² There is also evidence that immigrants opt for self-employment more than native-born Americans (Borjas, 1986; Lunn and Steen, 2000).

Self-employment rates are higher for whites than other racial/ethnic groups, and are higher for men than for women. A possible explanation for the difference is discrimination against minorities or women. The numerous programs initiated by state and local governments to assist minority- and women-owned businesses usually offer discrimination against firms owned by minorities and women as a rationale for the programs.³ 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.⁴ These differences in self-employment rates within broader classifications (Hispanics, Asians, and Europeans) suggest that relying on discrimination alone as an explanation for differences in self-employment rates may be inadequate and too simplistic. These intra-group differences also raise questions concerning the appropriate use of dummy variables for Asians or Hispanics in statistical models of self-employment. When intra-group variability is greater than inter-group variability, employing dummy variables for broadly defined groups treats the groups as more homogeneous than they really are.

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. In particular, we examine whether an economic model of self-employment based primarily on human capital variables can account for the heterogeneity of

Final version accepted on March 7, 2003

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self-employment across groups. Second, can the use of a dummy variable for Asians in a statistical model be used to identify the presence or absence of discrimination in the market? Finally, is the effect of immigrant status on the likelihood of self-employment the same across the more narrowly defined ethnic groups?

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. 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. Are some workers "pulled" into self-employment by the lure of higher pay and greater autonomy, or are workers "pushed" into self-employment because of unemployment, antipathy to authority, or, perhaps, discrimination in labor markets? 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. Messenger and Stettner (2000) report

that both push and pull factors are important in workers' decisions to be self-employed, especially for male workers. Lunn and Steen (2000) also found substantial differences across broadly defined industries, as well as higher self-employment rates for immigrants than for those born in the United States.

Changes in immigration laws in 1965 generated large flows of immigrants from Asia and Central and South America. The success of some immigrant groups, particularly Chinese and Koreans, has generated a substantial literature concerning factors that enabled these groups to achieve greater economic success. Much of this literature has been written by sociologists. Further, some of the Asian groups, particularly Koreans, pursued self-employment as a route to economic prosperity. 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)."

Boyd (1990) compared blacks and Asians with respect to self-employment. He found that marriage and children did not affect the probability of self-employment among blacks but had a positive effect on Asians. He also found evidence that Asians were able to rely on family and other support networks more than blacks.⁵ Min (1984) interviewed Korean businessmen in Atlanta to examine the reasons for the high self-employment rate of Koreans. The respondents perceived that they would be at a disadvantage in nonbusiness occupations because of cultural differences and a belief that American employers do not credit experience and education when obtained in other countries as much as they do when obtained in the U.S. The respondents also perceived self-employment as offering more economic mobility than other forms of employment. Kim, Hurh and Fernandez (1989) examined differences in self-employment among Koreans, Chinese and Asian Indians in the U.S. They speculate that an immigrant who obtained a college education in their native land would be more prone to self-employment than either immigrants without a college degree or those who obtained some post-graduate education in the U.S. They found this to be the case for Koreans and Chinese. They also noted

that, even after controlling for education levels, there were differences among the three groups, with Korean immigrants showing a consistently higher rate of business formation than Chinese immigrants, and Chinese immigrants a higher rate than Indian immigrants. Yoon (1991) argues that recent Korean immigrant businesses depart from traditional patterns of immigrant businesses by locating in black neighborhoods rather than Korean neighborhoods and that human capital is more important for recent immigrant businesses than social networks. Waters (1999) provides book reviews of five books that examined race and ethnicity and self-employment, and notes that all five books point to the overwhelming importance of social networks and ties in encouraging entrepreneurship.

The research on Asians, particularly Koreans, indicates that distinguishing between "pull" and "push" factors is not easy. On the one hand, educated Korean immigrants are "pushed" into self-employment because they cannot obtain work in their professions; on the other hand, educated Korean immigrants tend to be successful as entrepreneurs. The differences in the education levels and the self-employment rates between Koreans and some other groups, such as Laotians or Thai, are large, so the "pull" factor cannot be dismissed. The sociological literature focuses on the heterogeneity of Asian businesspeople more than the economic literature. Waters (1999) criticized Light and Rosenstein (1995) for including dummy variables for Asians and Hispanics as groups, rather than utilizing more narrowly defined groups. The economics literature suggests that the determinants of self-employment differ across industries and perhaps across ethnic groups.

In this paper, we focus on Asians 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. We estimate empirical models of self-employment that are similar to others in the economic literature, and that utilize measures of human capital and family support. After controlling for a number of factors, the differences between Asian ethnic groups remains great, suggesting that it is often inappropriate to treat Asians as a homogeneous group.

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 dataset includes 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 an incorporated or unincorporated business, professional practice or farm. 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 I).

The PUMS data also include detailed information on race, ethnicity and national origin. In this study, the sample of Asian workers used for the analysis was based on answers to the race question in the survey.⁶ 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 1,000 workers in the five-percent sample. Groups with

TABLE I
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).

less than 1,000 workers were grouped together for analysis as Other Asians.⁷

The PUMS data permit us to describe the heterogeneity among Asian ethnic groups but do not allow us to include all potentially important explanatory variables. Variables that measure the wealth of the owner, the size of the owner's firm, and the employment history of the owner, for example, are not available in the data. Further, the data cannot be used to examine either entry into self-employment or exit from self-employment. However, we can account for differences in education levels, whether the person is an immigrant or not and, if so, when they immigrated to the U.S., and the industries in which they work. Most importantly, the data include detailed information about ethnicity and national origin that are not available in other data sets that have been used to examine self-employment.

III. Self-employment rates among Asians

Table I presents self-employment rates by ethnic groups within the broad classification of Asian. The self-employment rate for all Asians is 10.3 percent.⁸ There is considerable variation among the groups. Koreans have the highest rate of self-employment at 24.1 percent, while Laotians have the lowest rate at 3.1 percent. Table I 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.

It is common for individuals to work in an industry before starting their own business. Table II 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 exhibit high rates of self-employment.⁹ 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 III. 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 III indicates that the self-employment rate for the group in that industry is more than 20 percent

TABLE II
Percentage of ethnic groups in industries as workers and as self-employed

	Chinese			Taiwanese			Filipino			Japanese			Asian Indian			Korea		
	All workers	Self-employed	All workers	All workers	Self-employed	All workers	All workers	Self-employed	All workers	All workers	Self-employed	All workers	All workers	Self-employed	All workers	All workers	Self-employed	All workers
Agriculture	0.48%	1.30%		0.29%	0.36%	1.67%		3.81%	3.28%	18.86%	0.71%	1.38%		0.67%	1.02%			
Mining	0.22%	0.04%		0.26%	0%	0.11%		0%	0.14%	0.04%	0.28%	0%	0.06%	0.01%				
Construction	2.37%	3.14%		2.91%	3.50%	3.00%		4.77%	3.88%	4.34%	2.86%	2.31%	3.20%	4.26%				
Manufacturing (nondurables)	9.17%	3.81%		5.83%	3.63%	5.69%		2.51%	4.65%	2.19%	6.64%	3.15%	7.30%	4.08%				
Manufacturing (durables)	10.29%	2.62%		10.32%	2.96%	10.91%		1.95%	10.01%	2.18%	13.00%	2.00%	8.16%	1.97%				
Transportation	6.07%	2.57%		4.73%	2.58%	7.13%		3.88%	8.23%	2.61%	5.51%	4.46%	3.75%	1.66%				
Wholesale Trade (nondurables)	2.27%	2.31%		3.42%	2.44%	1.63%		0.80%	3.07%	1.25%	2.09%	2.12%	1.73%	1.35%				
Wholesale (durables)	2.71%	4.48%		4.07%	5.64%	1.79%		2.03%	3.20%	2.95%	1.85%	1.85%	3.10%	3.81%				
Retail Trade	24.65%	41.55%		18.30%	36.13%	14.95%		12.91%	17.81%	19.44%	15.81%	23.48%	31.24%	46.59%				
Finance	9.06%	7.75%		11.46%	11.88%	9.41%		11.02%	8.57%	6.83%	7.25%	5.20%	5.73%	3.33%				
Business Services	4.24%	5.45%		4.63%	2.41%	4.18%		7.81%	4.55%	9.64%	4.81%	4.31%	5.58%	5.67%				
Personal Services	4.68%	7.54%		3.73%	8.22%	7.50%		7.08%	6.10%	7.23%	4.50%	10.18%	11.09%	16.67%				
Professional Services	23.79%	17.45%		30.05%	20.25%	32.03%		41.43%	26.51%	22.45%	34.70%	39.55%	18.38%	9.57%				

	Vietnamese			Cambodian			Laotian			Thai			Pakistani			Other Asian		
	All workers	Self-employed	All workers	All workers	Self-employed	All workers	All workers	Self-employed	All workers	All workers	Self-employed	All workers	All workers	Self-employed	All workers	All workers	Self-employed	All workers
Agriculture	1.46%	6.45%		0.99%	3.24%	1.72%		7.99%	0.77%	1.13%	0.90%	0.97%	1.30%	3.06%				
Mining	0.27%	0%		0.08%	0%	0.24%		0%	0.05%	0%	0.08%	0%	0.13%	0%				
Construction	2.15%	3.17%		1.94%	0.70%	2.37%		0%	1.71%	1.47%	3.94%	4.57%	3.39%	7.42%				
Manufacturing (nondurables)	9.52%	4.73%		12.32%	7.34%	19.20%		7.21%	9.17%	4.70%	5.54%	1.61%	7.08%	3.33%				
Manufacturing (durables)	29.46%	4.37%		28.49%	1.30%	38.24%		10.24%	9.74%	1.78%	8.20%	1.40%	12.15%	3.49%				
Transportation	4.10%	4.37%		28.49%	1.30%	2.39%		1.94%	4.64%	1.29%	8.34%	13.82%	6.50%	5.27%				
Wholesale Trade (nondurables)	2.19%	1.26%		2.73%	0.86%	1.49%		1.40%	1.65%	1.45%	1.95%	0.99%	1.66%	1.71%				
Wholesale (durables)	1.73%	1.18%		3.41%	4.21%	3.21%		5.20%	2.36%	3.38%	1.55%	3.15%	1.71%	1.70%				
Retail Trade	19.21%	35.39%		19.38%	61.77%	13.04%		36.54%	30.47%	48.33%	26.23%	27.88%	20.49%	21.63%				
Finance	4.78%	4.14%		3.38%	1.94%	1.79%		5.59%	4.98%	1.04%	6.63%	1.70%	7.24%	7.80%				
Business Services	5.10%	8.66%		3.44%	1.13%	3.22%		6.13%	4.85%	4.97%	5.43%	6.65%	5.26%	8.14%				
Personal Services	6.94%	18.93%		5.53%	7.67%	4.46%		7.60%	9.58%	8.00%	3.96%	2.25%	6.04%	9.40%				
Professional Services	13.09%	9.62%		14.90%	8.86%	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 III
Self-employment rate by ethnic group and industry

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

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

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 IV 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.

Table IV also 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 V. 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. Many of the variables are standard human capital measures that are used in empirical labor research, and have been used by other researchers on self-employment.¹⁰ 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 a one-unit 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 1.¹¹

Table V 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.¹² As Bates (1997) notes, the effect of education differs across industries. The addition of the industry dummies attenuates the affect of living in the city – it remains negative but the coefficient

TABLE IV
Means of variables used in probit analysis by ethnicity

Ethnicity	Less than High School	High School	Some College	College Graduate per week	Post College	Age	Hours Worked Children	% Female	% Married (000's)	Number of in City	% Disabled	Value of home	% Residing
Chinese	18.52%	14.49%	22.05%	24.18%	20.76%	38.09	40.08	0.457	0.675	0.84	0.057	127.85	0.978
Taiwanese	5.86%	11.84%	17.17%	23.76%	41.37%	39.73	39.93	0.415	0.790	1.06	0.045	168.64	0.979
Filipino	10.47%	16.80%	31.67%	33.47%	7.58%	38.13	39.70	0.537	0.653	1.09	0.065	110.01	0.945
Japanese	6.00%	22.23%	31.46%	28.31%	12.00%	40.79	40.05	0.476	0.607	0.61	0.048	138.57	0.917
Asian Indian	9.57%	11.19%	17.06%	26.13%	36.05%	37.13	40.70	0.349	0.756	1.07	0.056	107.39	0.969
Korean	13.58%	25.16%	25.87%	22.56%	12.83%	38.03	42.29	0.494	0.718	0.96	0.089	96.99	0.970
Vietnamese	27.54%	20.07%	32.61%	15.03%	4.75%	34.62	39.16	0.405	0.584	1.25	0.070	81.16	0.978
Cambodian	44.24%	21.84%	25.19%	6.65%	2.07%	33.51	38.58	0.426	0.665	1.89	0.081	53.05	0.978
Laotian	49.37%	27.00%	18.44%	3.87%	1.32%	33.40	38.85	0.413	0.689	1.84	0.099	34.01	0.941
Thai	21.49%	17.01%	28.15%	20.03%	13.31%	37.24	40.05	0.571	0.653	0.89	0.071	91.35	0.956
Pakistani	10.17%	14.23%	20.84%	24.31%	30.45%	36.12	42.14	0.219	0.703	1.21	0.064	76.51	0.969
Other Asian	15.69%	19.09%	32.73%	19.04%	13.46%	34.35	38.21	0.414	0.557	1.03	0.062	72.31	0.948
All Asians	14.41%	17.64%	26.53%	25.68%	15.75%	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 V
Probit analysis, all Asians

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

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.

Table VI 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 positively affects the probability of self-employment for all groups.¹³ The coefficient on the variable for the value of the house owned by the worker also is positive and statistically significant for all groups. 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,

TABLE VI
Probit analysis of self-employment, Asians

	Chinese dF/dx	Taiwanese dF/dx	Filipino dF/dx	Japanese dF/dx	Asian Indian	Korea
Age	0.00743 ^c	0.015642 ^b	0.002886 ^c	0.003254 ^c	0.013027 ^c	0.026441 ^b
Age squared	-5.6E-05 ^c	-0.00011	-2.3E-05 ^c	-6.11E-06	-0.00013 ^c	-0.00025 ^c
Hours worked	0.002014 ^c	0.001575 ^b	0.000356 ^c	0.000658 ^c	0.002196 ^c	0.003668 ^c
High School*	0.016567 ^c	-0.02824	-0.00121	-0.00537	0.006236	0.013541
Some College*	0.018805 ^c	-0.04128	-0.00074	-0.00181	0.020202 ^b	0.013541
College graduate*	0.01696 ^c	-0.04253	-0.00065	-4.4E-05	0.011974	0.05205 ^c
Post College*	0.016438 ^c	-0.12005 ^c	0.090287 ^c	0.041835 ^c	0.025802 ^c	0.064994 ^c
Female*	-0.02591 ^c	-0.06872 ^c	-0.01186 ^c	-0.04473 ^c	-0.02947 ^c	0.055934 ^c
Married*	0.024224 ^c	0.095863 ^c	0.004336 ^a	0.017733 ^c	0.014456 ^b	-0.07375 ^c
Disabled*	0.020373 ^c	0.001243	0.006624 ^a	0.030072 ^c	-0.00149	0.077584 ^c
Number of children	0.007573 ^c	0.024991 ^c	0.000609	0.005713 ^c	0.004965 ^b	0.029508 ^b
Value of house	0.000171 ^c	0.000302 ^c	9.47E-05 ^c	0.000181 ^c	0.000245 ^c	0.013714 ^c
Resides in city*	-0.06205 ^c	0.031529	-0.00848 ^b	0.001177	-0.10378 ^c	0.02205
Immigrated 1-5 years ago*	-0.03153 ^c	NA	-0.01549 ^c	-0.01411	-0.03911 ^c	0.047232 ^a
Immigrated 6-10 years ago*	0.012647 ^b	NA	-0.01057 ^c	0.042034 ^c	-0.0137	0.142311 ^c
Immigrated 11-20 years ago*	0.025841 ^c	NA	-0.00666 ^b	0.04889 ^c	-0.002584	0.107373 ^c
Immigrated 21-30 years ago*	0.010677 ^a	NA	0.001017	0.021598 ^c	-0.00698	0.073603 ^c
Immigrated 31+ years ago*	0.036735 ^c	NA	0.007889	0.009106	0.008238	0.007437
Agriculture*	0.220889 ^c	-0.03658	0.045788 ^c	0.43822 ^c	0.117807 ^c	0.342228 ^c
Mining*	-0.0713 ^b	NA	NA	-0.04386	NA	-0.0434
Construction*	0.030069 ^c	0.124821 ^b	0.014429 ^c	0.009849	-0.02397 ^b	0.216414 ^c
Nondurables Manufacturing*	-0.03865 ^c	-0.05216	-0.0143 ^c	-0.03026 ^c	-0.04312 ^c	0.005681
Durables Manufacturing*	-0.07016 ^c	-0.09996 ^c	-0.02897 ^c	-0.06387 ^c	-0.08368 ^c	0.11067 ^c
Transportation and Utilities*	-0.04455 ^c	-0.07805 ^b	-0.01636 ^c	-0.0527 ^c	-0.0258 ^c	-0.04521 ^b
Wholesale Trade (durables)*	0.028649 ^c	-0.04406	-0.01235 ^c	-0.03781 ^c	-0.01403	0.044105
Wholesale Trade (nondurables)*	0.077446 ^c	0.059459	0.014477 ^a	0.009512	0.015351	0.183275 ^c
Retail Trade*	0.078259 ^c	0.190195 ^c	0.013176 ^c	0.038097 ^c	0.080008 ^c	0.252141 ^c
Finance*	0.011529 ^a	0.044538	0.008435 ^b	0.002211	-0.02328 ^c	0.001921
Business and Repair Services*	0.06832 ^c	-0.02625	0.048418 ^c	0.149119 ^c	0.01144	0.14772
Personal Services*	0.10068 ^c	0.209189 ^c	0.010785 ^c	0.059697 ^c	0.121501 ^c	0.274578 ^c
Pseudo-R squared	0.1577	0.2101	0.1432	0.1941	0.1957	0.2240
Number of observations	32450	1400	32226	18980	15649	14017

	Vietnamese dF/dx	Cambodian dF/dx	Laotian dF/dx	Thai dF/dx	Pakistani dF/dx	Other Asian dF/dx
Age	0.007518 ^c	0.002436	0.003853 ^b	0.013741 ^c	0.025977 ^c	0.00592 ^b
Age squared	-7.5E-05 ^c	-2.5E-05	-3.8E-05 ^a	-0.00012 ^b	-0.00025 ^c	-4.3E-05
Hours worked	0.001292 ^c	0.000997 ^c	7.27E-05	0.001435 ^c	0.002377 ^c	0.001398 ^c
High School*	0.002282	0.004246	0.011385	0.013372	0.000213	-0.01455
Some College*	0.002859	0.02461 ^c	0.018704 ^b	0.025644	0.035067	-0.00637
College graduate*	-0.00888	0.011246	0.019497	0.037781 ^a	0.024316	0.001796
Post College*	0.039627 ^c	0.100355 ^b	0.050105	0.093893 ^c	0.020667	-0.00437
Female*	-0.00384	0.001145	-0.00197	-0.02196 ^a	-0.00583	-0.00611
Married*	0.015729 ^c	0.008582	-0.00022	0.013778	0.016759	0.010916
Disabled*	-0.01113	0.048452 ^c	0.02182 ^b	-0.00331	-0.02495	0.008944
Number of children	0.001771	0.001467	0.000227	0.010762 ^a	-6.4E-05	-0.00266
Value of house	0.000143 ^c	6.95E-05 ^b	6.42E-05	0.000217 ^c	0.000265 ^c	8.45E-05 ^a
Resides in city*	0.022676 ^c	NA	-0.02674 ^b	-0.02643	-0.09273 ^b	0.023371
Immigrated 1-5 years ago*	-0.00846	NA	-0.01711	-0.02442	NA	-0.01874
Immigrated 6-10 years ago*	0.022602	NA	-0.01364	-0.02029	NA	-0.02152
Immigrated 11-20 years ago*	0.017111	NA	-0.01077	-0.00941	NA	0.010021
Immigrated 21-30 years ago*	-0.00601	NA	NA	0.005827	NA	0.007745
Immigrated 31+ years ago*	-0.03473	NA	0.161449	0.12553	NA	-0.00927
Agriculture*	0.363384 ^c	0.159379 ^c	0.102399 ^c	0.237592 ^c	0.156937 ^c	0.133432 ^b
Mining*	NA	NA	NA	NA	NA	NA
Construction*	0.072644 ^c	0.006815	NA	-0.00357	0.072026	0.123849 ^c
Nondurables Manufacturing*	-0.00962	0.007205	-0.00098	-0.01093	-0.06613 ^b	-0.01893
Durables Manufacturing*	-0.06207 ^c	-0.03453 ^c	-0.01402	-0.06665 ^c	-0.08216 ^c	-0.03696 ^c
Transportation and Utilities*	-0.01106	-0.0137	-0.00162	-0.05949 ^b	0.071574 ^b	-0.01404
Wholesale Trade (durables)*	-0.00368	-0.00446	0.007623	0.034625	-0.04159	0.064051
Wholesale Trade (nondurables)*	0.006456	0.054608 ^a	0.00859	0.0344	0.071001	-0.00674
Retail Trade*	0.084516 ^c	0.101049 ^c	0.054277 ^c	0.112568 ^c	0.041948 ^a	0.055322 ^c
Finance*	0.008123	0.008026	0.023763	-0.05772b	-0.07796 ^c	0.046267 ^a
Business and Repair Services*	0.081784 ^c	0.003157	0.02845	0.018135	0.026409 ^c	0.098441
Personal Services*	0.161537 ^c	0.024153	0.016377	0.031986	-0.00107 ^c	0.129039
Pseudo-R squared	0.1432	0.3088	0.1831	0.1811	0.2092	0.1589
Number of observations	32226	1409	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.

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.¹⁴

In general, immigrants are somewhat more likely to be self-employed than native-born persons in the dataset, 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%).¹⁵ The self-employment rate for all Asians in professional services is 9.01 percent. For the sample of all Asians (Table V), working in mining, manufacturing, and transportation and utilities reduces the probability of self-employment compared to professional services. Table VI shows that this pattern holds for almost all ethnic groups, although the coefficient is not always statistically significant. For all Asians (Table V), 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 the personal services industries, business and repair services and wholesale trade in nondurable goods.

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.¹⁶

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 VII 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,

TABLE VII
Predicted and actual rates of self-employment

Ethnic group	Predicted self-employment rate	Actual self-employment rate	Predicted rate/Actual rate
Chinese	19.54	11.05	1.77
Taiwanese	25.33	18.70	1.35
Filipino	16.44	4.38	3.75
Japanese	14.92	10.07	1.48
Asian Indian	20.05	10.84	1.85
Korean	24.89	24.14	1.03
Vietnamese	15.56	8.34	1.87
Cambodian	15.08	5.72	2.64
Laotian	11.57	3.06	3.78
Thai	21.03	11.58	1.82
Pakistani	22.16	13.30	1.67
Other Asian	13.89	7.59	1.83
All Asians	18.31	10.32	1.77

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

the predicted rates are more than three times the actual rates. Unless non-Asians are discriminating on the basis of narrow ethnicity or Koreans and Taiwanese are discriminating against other Asians, it is hard to see how the differences among Asian groups are due to discrimination. It is reasonable to conclude that 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 suggests networks among extended families, networks among specific ethnic groups, and other cultural differences between groups as possible factors. These factors are difficult to quantify and include in regression analysis.

VI. A brief examination of some group-specific explanations

The sociological literature examining Koreans reports that Korean immigrants often choose to establish a business in groceries or liquor stores because of relatively low start-up costs, and later sell and move into more lucrative lines of business. We cannot test this directly, but can provide an indirect test. The proportion of Koreans who are self-employed in different industries differs by how long they have been in the U.S. For example, 16.75 of the self-employed among native-born Koreans are in retail and almost 32

percent in professional services, while the corresponding figures for those who have been in the U.S. for 6–10 years are 49.74 percent and 4.0 percent. Those who have been in the U.S. longer are closer to the pattern for those of Korean ancestry born in the U.S. These patterns are consistent with the behavior noted in the sociological literature.

Another group that can be examined more closely are the 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 VIII 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. Given the high self-employment rate of Koreans, it is interesting to note that the Chinese born in Korea have the highest self-employment rate among Chinese.¹⁷ 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

TABLE VIII
Self-employment of Chinese by place of birth

Place of birth	Self-employment rate
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%
United States	8.16%
All Chinese	11.05%

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

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. An alternate explanation is that entrepreneurial types may be more anxious to leave non-capitalistic environments than to leave capitalistic locales.¹⁸

There is also evidence that the differences in self-employment rates across Asian ethnic groups are more pronounced for the immigrants than for those born in the United States. For groups that have immigrated to the U.S. in large numbers only in recent years, there are not enough American-born in the sample to examine. However, for Koreans, Chinese, Japanese, Filipinos, and Asian Indians, there are enough observations. The proportion of the self-employed in each group in specific industries is relatively close for those in the group who were born in the U.S., while much more different for those who immigrated to the U.S. Certainly the backgrounds of the immigrants differ more widely too. As noted above, Koreans and Chinese tend to be highly educated relative to Vietnamese, Thai, Laotians, and Filipinos. Events in homelands also affected the willingness of people to emigrate to the U.S.¹⁹ For some people, specific policies in America also affected

who would emigrate from which countries. For example, Kim (1981) reports that the number of Korean physicians who migrated to New York City varied over time, depending on whether or not the regulating bodies in New York City perceived a shortage of health care professionals in the area.

Finally, while it is true that ethnic-oriented businesses account for much of the self-employment of Asians, this 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, as shown in Table III. The same is true for Taiwanese.

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.²⁰

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

1. Self-employment is a heterogeneous activity. In many situations it is inappropriate to use highly aggregated data when investigating the determinants of self-employment. The importance of push and pull factors differ across industries, and some factors are difficult to label as "push" or "pull." Immigrants appear to select self-employment for different reasons

- than workers born in the U.S. The factors important to the self-employment decision 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 (black, Asian, Hispanic etc.) and conclude a negative coefficient supports a claim of discrimination in the marketplace. This is so for at least two reasons – there are important cultural and social factors that lead to differences in self-employment rates, and the approach requires homogeneity across groups that does not exist.
 3. 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,²¹ although the factors cited by sociologists may be difficult to measure.
 4. The differences in the pattern of self-employment across cohorts suggest that the children of the recent immigrants will not choose self-employment as often or in the same industries as their parents. For most groups, Asians born in the U.S. exhibit different patterns of self-employment than Asian immigrants.

Self-employment is a path that many immigrants have chosen to facilitate their economic mobility. As long as the economy continues to be 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, the patterns of employment and self-employment shown in Tables I–III are likely to continue.

Notes

* Earlier versions were presented at the Midwest Economics Association Meetings in Chicago, April 2000 and at a workshop at the University of Goettingen in Germany. Helpful comments were received from discussant, Emily Hoffman, and from Marianne Ferber and Robin Klay, as well as two anonymous referees. Any remaining errors are the responsibility of the authors.

¹ Blau (1987) discusses reasons for a reversal in the

downward trend in non-agricultural self-employment found in the 1970s in developed nations.

² The self-employment rate will be relatively low when there are relatively large firms in a region since the employees are not self-employed.

³ For further information on such programs, see Lunn and Perry (1993), LaNoue and Sullivan (1995), and Boyle and Rhodes (1996).

⁴ Again, the numbers are for the United States, so Russians are either recent immigrants or Americans of Russian ancestry.

⁵ He also reports a negative impact of black public sector employment on the probability of self-employment.

⁶ 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.

⁷ The majority of persons in the Other Asian category labeled themselves as Other Asian.

⁸ 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%.

⁹ The decision to work in manufacturing instead of another industry may reflect long-range plans concerning self-employment versus work for wages.

¹⁰ For example, Bates (1995 and 1997), and Lunn and Steen (2000).

¹¹ 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.

¹² In regressions not reported, we found that the effect of education on the probability of self-employment differed across industries. The effect was positive in retail and personal services but negative in construction, transportation, and business and repair services.

¹³ It is certainly possible that the self-employed work longer hours and the causation flows the other direction.

¹⁴ The high level of education for Taiwanese, shown in Table IV, suggest that one should not infer support for the “push” hypothesis from the negative coefficients.

¹⁵ 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.

¹⁶ The method used is that of Oaxaca (1973). While it generally is used in wage equations, the method has been used for self-employment in Wainwright (2000).

¹⁷ The number of Chinese from Korea is relatively small though (145), so one should be careful in concluding too much from these figures.

¹⁸ We thank Marianne Ferber for this suggestion.

¹⁹ Kim (1981) and Min (1996) provide historical information for Koreans.

²⁰ 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.

²¹ For example, see Sanders and Nee (1996) and Light and Gold (2000).

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