

COETHNIC NETWORKING AND IMMIGRANT SELF-EMPLOYMENT
IN THE UNITED STATES

by

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ABSTRACT

In this paper, I investigate self-employment among the immigrant population in the United States. Besides education, language skills or years of settlement, coethnic networking is another important influence on the propensity for self-employment. I use instrumental variables based on a “shift-share” of national levels of immigration into metropolitan areas. I let this term interact with the self-employment rate of that immigrant group to reflect the different propensities for self-employment among different immigrant groups.

I find that immigrants are more likely to become self-employed in the United States than natives, although the difference is not substantial. Among the immigrant population, having a family, owning a home and having a good command of English are positively correlated with being self-employed. Network size alone has a negative and significant effect on the probability of becoming self-employed. However, this relationship is modified by the nationwide group self-employment rate. There is a positive network effect in groups with high self-employment rate, and a negative effect in groups with low self-employment rate. There is also a strong positive interaction effect among immigrants who have a good command of English or a bachelor’s degree.

CHAPTER 1: INTRODUCTION

Business ownership is a risky venture, but also a very rewarding experience, offering individuals the potential for greater independence, higher self-esteem and life satisfaction. Self-employment, particularly in creating small and medium enterprises, injects new dynamism into an economy, creates new jobs and opportunities and may fill gaps in provision of goods and services overlooked by large corporations. Among small business owners, the foreign-born have always been heavily overrepresented. Small enterprise played an important role in the economic progress of many immigrant groups, from Italians and Greeks to Koreans and Iranians. CITE New York City, Los Angeles, Miami and many other large cities are home to flourishing enclaves of ethnic economic activity. Nevertheless, there has been a great deal of variation among ethnic groups in term of self-employment. Waldinger and Alrich (1990) note that at the turn of the twentieth century, there were high rates of business activity among Russian Jews compared to much lower levels of entrepreneurship among French Canadians or Poles. In recent decades, there are also disparities when we compare Koreans or Cubans, whose business activity has been rapidly developing, with Mexicans or Haitians. Therefore, it is of interest to investigate how cultural interaction within an immigrant group influences the development of ethnic business entrepreneurship in large cities.

A community is often built upon the shared values of its members. For an ethnic community, these shared values can be common beliefs, cultural practices, linguistic traditions, or shared history (Anderson, 2006). Members of the same ethnic community will often search out one another first in times of need. Ethnic immigrants settling into a new country are more likely to ask for help from their coethnic members with finding products, services and work opportunities specifically catering to their own ethnic community. This premise, together with

my experience of interacting with Vietnamese expatriate communities in different parts of the world, forms the basis for my thesis exploring the relationship between an immigrant's access to a coethnic network and his likelihood of becoming self-employed in a host country.

The thesis contains two parts. Part one is a general study of what factors determine self-employment, and whether being an immigrant influences the propensity to be self-employed in the United States. One can view the first part as an updated version of Borjas' (1986) study of immigrant self-employment. This part of my study seeks to answer the question: How do self-employment rates of immigrants compare to those of the native-born?

In the second part of the project, I look within the immigrant population and examine the determinants of self-employment propensity for this population. I focus particularly on how the size of an immigrant's coethnic network affects self-employment propensity and how the size interacts with the underlying tendency of the ethnic group to be self-employed. The size of the network is likely to affect the self-employment propensity. Where there is an established ethnic market, immigrants are able to identify potential customers, labor supply and capital for their business. Borjas (1986) argues that the formation of ethnic enclaves in big cities creates and expands opportunities for immigrants to become self-employed. These opportunities come about as immigrants from a particular national group are in a better position to understand and serve the needs of the customers in that group. Furthermore, from the supply side, information asymmetries between immigrants and the rest of the population, such as better knowledge of consumer preferences, sources of credit and knowledge of ethnic languages, create the comparative advantage for more immigrants to become entrepreneurs in their own community.

I also examine how the underlying self-employment rate of the ethnic group affects an individual's choice of self-employment. From a behavioral economics point of view, this is

known as the endogenous social effect, wherein the propensity of an individual to behave in some way varies with the prevalence of that behavior in some reference group containing the individual (Manski, 1993). Different ethnic groups tend to have different cultural values, behavioral patterns, and distinct group traits that are valued by their members. Certain characteristics, such as risk-taking, group solidarity and communication are favorable to the creation of business entrepreneurship. Light (1972) introduces the cultural theory, in which he argues that some groups of immigrants are more predisposed to entrepreneurship than others due to their sociocultural background. Therefore, if an immigrant group has a high self-employment rate; it is possible that its culture values risk-taking, group co-operation, thrift and other favorable characteristics for self-employment, and that many members of this group, by exhibiting the aforementioned characteristics, are more inclined towards running their own business in the process.

Thus in this second part, I try to answer the questions: Does access to a more extensive coethnic network encourage an immigrant to become self-employed? Does the underlying tendency of an ethnic group to be self-employed affect the relationship between the size of the network and an individual's self-employment propensity? Again, Borjas (1986) provides a useful starting point: he uses the fraction of a metropolitan area's population that is Hispanic as an explanatory variable for the self-employment propensity among Hispanic immigrants. However, his study is limited to Hispanic immigrants, does not include fixed effects for different immigrant groups and geographical areas and does not account for the quality of this "enclave effect." The empirical approach I use in this study allows me to overcome these limitations.

In this project I bring a new approach to estimating immigrant self-employment, allowing there to be separate effects for the size of the network and the overall propensity of the ethnic

group to be self-employed as well as allowing an interaction between these effects. Although much has been written on the topic of self-employment, immigrants and their ethnic networks, surprisingly few researchers attempt to quantify this relationship beyond a categorical variable that describe an immigrant's ethnicity. As a result, they often ignore the "enclave effect," defined by Borjas (1986) as the concentration of immigrants in specific geographic areas and the resulting effect on creating and expanding opportunities for immigrants to become self-employed.

This enclave effect is related to the effect of social networks on individual behavior researched by sociologists, for example, social pressure and information spillovers. Social scientists argue that like-minded individuals tend to develop a similar culture that encourages certain social outcomes. One example is the effect of social networks on welfare use, researched by Bertrand et al. (2000): social contacts in a poor neighborhood may provide more information about welfare eligibility than job availability. As a result, the number of welfare applicants in such a neighborhood would tend to increase in the presence of close-knit social networks. One way of defining these social networks is to separate individuals in a neighborhood into language groups, based on the assumption that people in the United States who speak a non-English language at home interact mainly with others who speak that language. Similarly, in the case of an immigrant enclave, immigrant group members are more likely to interact with one another when they are more prevalent in the area. However, in the context of immigrant-owned businesses catering to the needs of their compatriots such as grocery stores, restaurants or legal offices, differentiating immigrants according to their countries of origin can be a better approach to defining these social networks. For example, both Puerto Ricans and Mexicans speak Spanish. However, a Mexican grocery store owner or a Mexican lawyer may be considered more qualified

to provide goods and services to other Mexicans in his or her neighborhood than a Puerto Rican grocery storekeeper or a Puerto Rican lawyer.

Once networks are defined, we can measure the impact of social links among the “coethnics” in an area, defined as the network effect in this paper. One way to quantify the network effect is to follow Borjas’ (1986) approach of using the fraction of the residents in a metropolitan area who are Hispanic as an explanatory variable. To proxy for the network effect, I therefore use the fraction of an immigrant group’s population residing in a metropolitan area. I use the natural log of this fraction as an explanatory variable in the regression model.

My next premise is that immigrants are more likely to become self-employed if they interact with more self-employed people. In a seminal paper on social interactions, Manski (1993) provides three different explanations for why individuals belonging to the same group tend to behave similarly: the endogenous effect, the exogenous effect and the correlative effect. When there is an endogenous effect in a group, the propensity of an individual to behave in some way varies with the behavior of that group. When there is an exogenous effect, the propensity of an individual to behave in some way varies with the exogenous characteristics of the group. In the case of a correlated effect, individuals in the same group tend to behave similarly because they have similar individual characteristics or face similar institutional environments.

To clarify this distinction, I look at the distribution of self-employed persons from an immigrant group in a metropolitan area. There is an endogenous effect if, all else equal, an immigrant’s propensity for self-employment tends to vary with the average self-employment rate of that immigrant group in that area, in that state, or in the whole country. There is an exogenous effect if self-employment probability tends to vary with the socio-economic composition of the reference group; in other words, I may expect to see higher likelihood of self-employment

among high-skilled or educated immigrants. There is a correlated effect if immigrants from the same area are equally likely to become self-employed since they have similar family backgrounds or equal access to information about business opportunities.

There are aspects of immigrant self-employment that support all three aforementioned social effects: immigrants need to rely on contacts with existing immigrant business owners to become self-employed. By obtaining information on credit borrowing, supply sources, customer tastes or simply management skills from current self-employed compatriots, immigrants aspiring to have their own businesses build up the necessary knowledge to start up their own companies. A high group self-employment rate therefore implies the ease of obtaining support in running one's immigrant business, thus a group endogenous effect on increased propensity for self-employment of an individual member of that group.

The exogenous effect can also be observed. Many immigrant groups have similar cultural backgrounds and are composed of similar socio-economic characteristics. Their members, by embracing the group's cultural traditions, achieve similar socio-economic outcomes. In a case study of Korean entrepreneurship in Los Angeles, Light and Bonacich (1988) emphasize the importance of information sharing, high work ethics and diligence, expected patterns of nepotism and employer paternalism, satisfaction and patience with poorly remunerated work, and utilization of rotating credit associations in financing their business as key factors contributing to flourishing Korean entrepreneurship. The bulk of emigrants from Korea were also from the urban middle class, with previous occupations and prior trainings in other businesses before coming to the United States. These factors were likely to contribute to a high self-employment rate among Koreans in America.

Living in a city with many immigrant entrepreneurs also encourages self-employment: there are ethnic business associations established in the localities to provide networking and support among the current and potential business owners of a particular ethnicity. Some of the examples include the Korean Business Associations across big cities in the United States, the German-American Business Association in California, or Immigration and Business Law Offices for immigrants in many cities. This implies a group correlated effect, also identified as the enclave effect: immigrants from the same area have similar family backgrounds or equal access to information about business opportunities to participate in entrepreneurship.

Therefore, by incorporating group self-employment rate and network size in my model, I attempt to study the endogenous and the correlated effect of an immigrant group on its member's propensity for being self-employed. The exogenous effect is also of interest and will be explored as I examine the interaction effect on selected samples of high-skilled and low-skilled immigrants.

Nevertheless, there are challenges in this empirical strategy. First, unobserved economic factors not included in the model, such as positive general business conditions of a particular region, may attract immigrants to that region and create more local self-employment opportunities in the region. Thus cities with larger networks would be more likely to have high levels of immigrant self-employment, implying a positive bias in the estimated coefficient for the network effect on self-employment rate in an OLS model. Second, these unobserved economic factors, such as the general business conditions or the local unemployment rate, may also influence the local group-specific self-employment rate.

To address the first problem of locational choice with respect to other omitted factors that influence self-employment probability, I use the historical distribution of immigrants from

countries in metropolitan areas for which data are available in 1970 as an instrument for the recent distribution of the immigrant population. This instrument reflects the propensity for immigrants to settle in a geographic area that already has a sizeable community of immigrants from their origin country, and assumes that the determinants of the historical distribution of immigrants are likely to be uncorrelated with recent changes in the business and economic conditions in the local areas. For this instrument to work, it must be the case that unobservable factors affecting the self-employment propensity of an immigrant are uncorrelated with the historical distribution of immigrants—for example, immigrants who have an unobservably high motivation to become self-employed are not more (or less) responsive to the presence of an enclave. Since some immigrant groups have shown a greater likelihood of forming enclaves, I control for group fixed effects. These fixed effects will help with the potential problem of self-selection into enclave residence to the extent that responsiveness to the existence of enclaves varies only at the group level. To address the problem of correlation between local economic shocks and self-employment rate in that area, I use the national self-employment rate for each immigrant group instead of the local group-specific employment rate in the interaction term.

I find that the foreign-born in the United States are more likely to be self-employed than the native-born. Network size, surprisingly, negatively influences the probability of being self-employed. However, the interaction between network size and nationwide group self-employment rate modifies this relationship. In a group with low self-employment rate, more coethnic networking reduces the likelihood of self-employment. On the other hand, in a group with high self-employment rate, more coethnic networking increases the likelihood of self-employment. There are also evidences of exogenous effect in my model: strong interaction effect

among immigrants with either good command of English or a post-secondary school education, and negative interaction effect among those with poor language skills or no education degree.

CHAPTER TWO: BACKGROUND

2.1 Trends in Self-Employment in the United States

The proportion of people who are self-employed in the United States has been falling steadily since the late-1940s, despite the increase in absolute number of self-employed persons in nonagricultural sectors over the same time period. This time period reflects the structural shift to a postindustrial economy in the United States, hence a decline in agriculture and manufacturing, accompanied by an explosion of employment in the service sector. In particular, the overall shrinkage of the agricultural sector and the consequent decline in agricultural employment, an area in which a large proportion of employment comprises the self-employed, directly contributes to this decreasing trend in self-employment rates. (Appendix Table 1)

On the other hand, Hipple (2004) provides another explanation for this decline in self-employment: businesses tend to incorporate, often for tax purposes. As a result, firm owners will appear in official statistics as wage and salary workers. Statistics from Appendix Tables 1 and 2 reveal this phenomenon: Between 1990 and 2003, self-employment rate in unincorporated nonagricultural sectors declined from 7.5 to 6.9 percent. On the other hand, the percentage of self-employed persons in incorporated nonagricultural sectors increased from 2.9 to 3.6 over the same period.

This notion of incorporation also brings up a discussion on the definition of self-employment. It is also possible to differentiate two types of self-employed persons: small business owners and corporate chairpersons. As Gollin (2008) notes, the latter usually appear in the late stage of economic development, due to a concentration of production in larger units and a consequential decline in self-employment and family enterprises. The empirical work researched by Kuznets (1966) attributes this to a series of shifts in the structure of production:

from small to large firms, from self-employment to wage work, and from unincorporated enterprises to large corporations.

As a result, there is also another explanation for this declining trend, which takes into account the productivity of the workforce. According to OECD (2009), self-employment rates among OECD countries range from under 9% in Luxembourg, Norway and Denmark to well above in Korea, Mexico, Brazil, Greece, Turkey and China. Generally, one will find higher self-employment rates in countries with lower income, although Italy with a self-employment rate of 26.4% and Spain are two outstanding exceptions. Over the twelve-year period from 1995 to 2007, self-employment rates fell in most countries, except for small increases in Germany, Czech Republic and Slovakia. Such a phenomenon is explained by Gollin (2008), who shows that self-employment rates in an economy decrease as the productivity of the workforce rises. Therefore we are likely to see a lower rate of self-employment in higher-income countries like the US compared to a lower-income country, such as Mexico or Ukraine.

2.2 The Demand Side: Opportunities for Self-Employment among Immigrants

Immigrant status per se may also impact the quest for entrepreneurship. In the United States, Borjas (1986), Yuengert (1995) and Fairlie and Meyer (2005) all report that immigrants are more likely to be self-employed than natives. To explain for this phenomenon, I look at literature on how immigrants are drawn towards self-employment from a demand-side point of view, and then at literature on how immigrants are prepared to take up opportunities and open businesses for themselves.

Despite skepticism, immigrant self-employment tends to confer socioeconomic benefits upon local areas where businesses are located. Immigrant firms service low income, nonwhite

neighborhoods that are generally ignored and underserved by large corporations. As their businesses grow, they also restore the prosperity of these neighborhoods they settled in. The case study on Korean entrepreneurship by Light and Bonacich (1998) highlights several important benefits: the city of Los Angeles benefitted from sales tax collected from Korean businesses, the firms injected money and skill into the local economy, and a distinctly cultural Koreatown was developed out of a deteriorating neighborhood in the city.

The entry of immigrants into a business is determined largely by opportunities presented to them. From a demand-side point of view, market conditions are important to the creation of a business: there has to be demand for the services it offers. Waldinger and Alrich (1990) note that the initial market for immigrant business owners arises within the immigrant community itself, given the specific set of needs and preferences that are best served by members of that community. Demand for specific ethnic consumer products provides the initial niche for immigrant entrepreneurs: from tropical goods among the Hispanics, oriental vegetables among Asians, and cultural products such as newspapers, clothes and jewelry of a particular origin.

However, immigrant businesses cannot afford to stay limited to their own ethnic market, since it can become too small with increasing competition, new entrants and low purchasing power among the ethnic population. Fairlie and Meyer (1996) point out that the only way for immigrant business to survive and grow is to branch out: one successful story is the self-employment experience of Cuban refugees in Miami, Florida. Cuban entrepreneurs first settled in a depressed area in the center of the city, expanded their customer base in retail businesses and then branched out into other industries, such as construction and garments. Today, the vibrant Cuban local economy in Miami has turned the city into an attractive destination for trade and investments from Latin America. (Levine, 1985)

2.3 The Supply Side: The Prerequisites for Immigrant Businesses

On the supply side, the literature provides insights on how endowments acquired by immigrants prepare them for self-employment. These endowments may exist in the form of group characteristics, interaction between immigrants, or individual characteristics. These theories look at immigrants either as groups or as individuals with socioeconomic characteristics that may determine self-employment.

Among theories that focus on group characteristics, each theory finds support in at least one ethnic or racial group. However they usually have their own limitations and counter examples in other researches. One theory that explains the higher probability of becoming self-employment among immigrants is the disadvantage theory, supported by Light (1972, 1979), Sowell (1981) and Moore (1983). Disadvantages such as difficulties in speaking English, poverty, unemployment and discrimination cause certain immigrant groups to favor self-employment. Many immigrants in high-income countries come from developing countries. Usually their education and work experience can be of lesser quality and difficult to transfer to the host-country labor market. As a result, they have little access to the formal job market in the host country. Their limited range of income-generating job opportunities encourages them to acquire business skills. New immigrants usually start out by seeking employment within their own ethnic community. Coethnic employment may offer a way out by recognizing their education and work experience – but employment can be poorly paid and offer little chance for upward mobility. Diminished opportunity for salary employment therefore “pushes” immigrants towards self-employment as a mean to sustain income.

However, Fairlie and Meyer (1996) do not find support for the disadvantage theory: a problem with speaking English is negatively related to male self-employment. They find that the more advantaged immigrant groups, measured by their level of wage earnings, have the higher self-employment rates than those who are disadvantaged. The disadvantage theory may explain why certain immigrant groups are pushed towards self-employment, but it does not explain the large variation in self-employment rates across the disadvantaged groups. For example, the theory cannot explain why African Americans have a consistently lower self-employment rate than Chinese Americans, even though both groups qualify as disadvantaged groups using their definitions.

Another theory on group self-employment focuses on the aspect of resource mobilization among immigrants. One example of ethnic resources is the tradition of buying and selling among immigrants from certain countries. Using data from the 1980 US Census, Yuengert (1995) finds that immigrants from countries with large self-employment sectors have high self-employment rates in the US. Nevertheless, Fairlie and Meyer (1996), using the 1990 US census data, does not find support for this home-country self-employment hypothesis. Alrich and Waldinger (1990) also introduce counterexamples to this hypothesis: high self-employment rates among Greek immigrants who came from fishing villages and rural areas.

Another important resource among immigrants, which is the central focus of this research project, is the access to coethnics and family members. These strong ties are very important to immigrant entrepreneurs, who usually start out with few resources and lack access to formal channels of credit or technical assistance. According to Walrich and Aldinger (1990), contacts with coethnics provide the informal credit-raising mechanisms, reliable information about local permits, laws, management practices and sources of supplies, as well as business partners and

labor. Borjas (1986) finds that immigrants have a higher self-employment propensity than natives and these self-employment opportunities mostly occur in the retail-trade sector. An important reason for this difference was, according to Borjas, that the formation of ethnic enclaves of immigrants coming from the same country provides self-employment opportunities for them.

However, Yuengert (1995), using the 1980 US census data, does not find support for the enclave hypothesis: self-employment rates were no higher in cities with high concentrations of immigrants. Although Light and Bonacich (1988) attribute the success of Korean entrepreneurship to access to Korean rotating credit association, research by Light, Kwuon and Zhong (1990) reveals that most rotating credit associations generally provide capital on a short-term basis. It is also hard to tell whether these associations play their role as loans providers or a saving mechanism among the Korean community.

There are other theories that focus on the individual choice of worker status, either as salary-employed or self-employed, by comparing earnings in the two sectors and introducing factors that affect both this choice and the earnings associated with it. Le (1999) compiles a comparative study on empirical research of self-employment. Based on existing literature, he identifies eight important factors influencing self-employment: educational attainment and general intelligence, labor market experience, other individual and family background characteristics, economic conditions, financial capital, occupational status, race and group characteristics.

One of the most important determinants of self-employment choice is educational attainment. Educational attainment influences the decision to become self-employed through a number of ways. On one hand, education furnishes the knowledge of a person and presumably

enhances his managerial ability in the process, thus increasing the propensity to become self-employed. On the other hand, education may also empower the individual with specific skills suitable for a particular professional job, which depresses the likelihood of business ownership. Most studies show a positive relationship between the self-employment probability and education, as reported by Borjas (1986), Rees and Shah (1986) and Evans and Leighton (1989). However, studies by Evans (1989), de Wit and van Winden (1989), de Wit (1989) and Kidd (1993) show the opposite effect: high level of education discourages owning a business. Le (1999) offers an explanation for this phenomenon: differences in specification of the estimating equation. For example, Evans (1989) includes control for occupational prestige, a variable that is positively correlated with both educational attainment and self-employment probability. If no control is provided for occupational prestige, the education coefficient in regression models can be positively biased. De Wit and van Winden (1989) and de Wit (1993) control for being employed in one of several sectors such as agriculture, trade, hotel and repairs and also find a negative and statistically significant effect of education on the propensity to become self-employed. The inclusion of industry dummy variables in models of self-employment, therefore, is important to control for the positive correlation between occupational choice and educational attainment.

Just like natives, there are immigrants who see a business opportunity that can be realized given their skills and knowledge. In order to realize this opportunity, an immigrant would like to run his own enterprise. Someone who has management knowledge, work experience and a good education will be motivated towards self-employment. Financial wealth and the ease of access to capital is another important factor. Family matters, too. Fairlie and Woodruff (2005) point out

that an individual having a self-employed parent is found to be roughly two to three times as likely to be self-employed as someone who does not have a self-employed parent.

From these different research conclusions on self-employment, I would like to test several hypotheses on immigrant self-employment. First, immigrants are more likely to become self-employed than natives. Second, immigrants with good access to an ethnic enclave are more likely to become self-employed. To define good access, I look at both the group characteristics, in this case the self-employment rate of an immigrant group, and the amount of networking among members of that group, also known as the network effect. Third, in terms of individual characteristics, I am curious to find out whether access to capital, language skills and education will increase an immigrant's likelihood of becoming self-employed. By testing these hypotheses, I look at how an individual choice of becoming self-employed is influenced both by group and individual characteristics, previously explored but rarely combined in research literature.

2.4 Measuring the Network Effect Among Coethnics

The topic of ethnic networking has been explored previously, both inside and outside the realm of immigrant entrepreneurship. The extent of ethnic networking is usually determined by the size of an ethnic "enclave," based on place of work or residence. This approach has been used by Borjas (1986) and Evans (1989) to examine the issue of immigrant self-employment.

Borjas (1986) argues that enclaves of Hispanics open up self-employment opportunities for immigrants. These opportunities arise because immigrants from a particular national group are assumed to have a comparative advantage in serving the needs of their compatriots. The comparative advantage is created by informational asymmetries between the immigrants and the rest of the population, better understanding of consumer preference and knowledge of language

of that particular immigrant group. He compares six immigrant groups: immigrant and native-born Mexicans, Cubans, Other Hispanics, measuring ethnic enclave size as the fraction of the Standard Metropolitan Statistical Area's population that is Hispanic. Borjas concludes with two important results: Hispanics are more likely to be self-employed in areas which have larger Hispanic populations, and the enclave effect on the self-employment probability is larger for immigrants than for the ethnic native-born. However, this conclusion also poses an endogeneity problem of the distribution of immigrants: immigrants do not choose their work and residence location randomly, and therefore, location decisions may be correlated with unobserved determinants of the propensity to become self-employed.

Evans (1989) tested two hypotheses about the propensity to become self-employed for the male immigrant population in Australia: members in a larger immigrant group (group size hypothesis) and in a group with higher percentage of adults who are not fluent in the host country's language (isolated labor pool hypothesis) are more likely to establish their own businesses. The ethnic group size is defined as the number of persons of all ages in the respondent's ethnic group and is set to zero for immigrants from English-speaking countries. Unfortunately, this approach is insensitive to the composition of the neighborhood in which the group resides: an immigrant group of ten persons in an area with a population of a hundred people is likely to face very different self-employment opportunities from that same group residing in another area of a thousand people. Furthermore, it may be an immigrant's sharing a common ethnic language, rather than the lack of English proficiency, that encourages his interaction with other coethnic members, as Bertrand et al. (2000) hypothesize, and therefore his propensity to be self-employed. Despite these shortcomings, Evans finds both hypotheses to be supported by her sample.

Besides self-employment, Cortes (2008), Saiz (2007) and Bertrand et al. (2000) examine the effect of immigrant networking on other economic issues, utilizing instrumental variables as a method of overcoming the endogeneity problem recognized in their studies. Cortes (2008) studies the effect of low-skilled immigration on prices in U.S. metropolitan areas, asking what impact higher immigration levels have on wages and prices. A key problem in this study is that immigrants do not choose their locations randomly, so unobserved factors that attract immigrants to a city may also have impacts on prices. To identify the impact of immigration on prices and wages, she constructs an instrument using the tendency of immigrants to settle in a city with a large enclave of immigrants from the same country. Since the historical migration patterns of immigrants are unlikely to be correlated with the current performance of cities, these patterns can be viewed as exogenous determinants of current immigrant levels. The instrument is the predicted number of new low-skilled immigrants in a city in a given decade, and it is calculated as the percentage of all immigrants from one country in the 1970 Census living in a particular city, multiplied by the total number of low-skilled emigrants from that country to the U.S. in that decade. For example, if a third of Mexican immigrants in 1970 were living in Los Angeles, the instrument allocates 33 percent of all Mexicans in the 1990s to Los Angeles.

Saiz (2006) studies the effect of immigration on housing rents and utilizes instrumental variables based on a “shift-share” approach to national levels of immigration into a metropolitan area. The instrument variable is similar to Cortes’ (2008): it is the predicted number of new immigrants in a city at a given time and it is calculated as the share of immigrants from a country living in that city in 1983, multiplied by the predicted number of new immigrants from that country at the given time.

Bertrand et al. (2000) examine the role of social networks in welfare participation using data on language spoken at home. The size of social network is measured by contact availability. They calculate contact availability as the proportion of people in an area that belong to a language group, divided by the proportion of people in the United States from that language group. The calculation of contact availability in their study suggests a viable approach to quantifying the coethnic networking effect: higher contact availability within a language group suggests a high concentration of same language group members in a geographical area.

CHAPTER THREE: DATA AND METHODOLOGY

3.1 Quantity & Quality of Network, and How to Measure Them

I use as a proxy for the quantity of the coethnic network of an immigrant the percentage of the population of his immigrant group living in a city, and for the quality of his coethnic network the nationwide self-employment rate of his immigrant group. The reason for doing so is to eliminate any possible local economic shock that may influence both a local self-employment rate of an immigrant group and the self-employment probability of its members. To estimate the network effect on an individual's self-employment rate, I consider two different possibilities: first, that the size of his or her network alone affects his self-employment propensity, and second, that the size of the network interacts with the self-employment knowledge of his coethnics (represented by the self-employment rate in this case) to affect his or her propensity to become self-employed.

To examine these possibilities, I use the following equation:

$$SelfEmp_{ijkt} = \ln(Network_{jkt})\alpha + X_i\beta + \gamma_j + \delta_k + \psi_t + \varepsilon_{ijkt}$$

where $SelfEmp_{ijkt}$ is the self-employment probability of individual i from immigrant group k in city j in year t . X_i is a vector of individual-specific characteristics, γ_j , δ_k , and ψ_t are fixed effects for cities, countries of origin, and years, respectively, and ε_{ijkt} is the error term.

In this equation, $Network_{jkt}$ is a measure of the size of the immigrant community from country k living in city j as a fraction of the total population in that city, and is calculated as:

$$Network_{ijkt} = \frac{Immigrants_{jkt}}{\sum_k Immigrants_{jkt} + Natives_{jt}}$$

Since the network effect suffers from the problem of endogenous location choice – that is, immigrants are likely to choose to live in areas where they see the possibility of greater economic opportunity, I use an instrumental strategy to identify the network effect. The instrumental variable is based on the “shift-share” strategy of Altonji and Card (1991), Cortes (2008) and Saiz (2006), and uses the distribution of immigrants in 1970 and the fact that immigrants tend to settle in cities where their co-ethnic migrants have earlier chosen to settle. Thus the instrument is:

$$\widehat{Network}_{ijkt} = \frac{\widehat{Immigrants}_{jkt}}{\sum_k \widehat{Immigrants}_{jkt} + \widehat{Natives}_{jt}}$$

where

$$\widehat{Immigrants}_{jkt} = \frac{Immigrants_{jk1970}}{Immigrants_{k1970}} \times Immigrants_{kt}$$

and

$$\widehat{Natives}_{jt} = \frac{Natives_{j1970}}{Natives_{1970}} \times Natives_t$$

To examine the second possibility—that the size of the network interacted with the quality of that network is the key variable affecting an immigrant’s self-employment propensity—I interact the *Network* variable with the average self-employment propensity among individuals from country *k* in year *t*: *SelfEmp*_{kt}. The specification is thus:

$$\begin{aligned} SelfEmp_{ijkt} = & \ln(\widehat{Network}_{jkt})\alpha_1 + \widehat{SelfEmp}_{kt}\alpha_2 + \\ & + \ln(\widehat{Network}_{jkt}) \times \widehat{SelfEmp}_{kt}\alpha_3 + X_i\beta + \gamma_j + \delta_k + \psi_t + \varepsilon_{ijkt} \end{aligned}$$

where the instruments are the instruments presented above and those instruments interacted with the average self-employment propensity.

For this instrument to work, three conditions must hold:

1. The unobserved factors determining that more immigrants decided to choose to locate in city j and not city j' in 1970 are not correlated with changes in the relative economic opportunities offered by the two cities in the following decades.
2. The total number of immigrants in time t is exogenous to differential shocks within a given city.
3. The only channel through which historical distribution in 1970 affects an immigrant's self-employment choice is its effect on the actual distribution of immigrants of immigrants across cities at the time t .

Since immigrants have shown a greater likelihood of being attracted to certain industries for better self-employment opportunities, e.g. restaurants and small services, I control for industries. These industry dummies will help with the potential problem of self-selection into industries to the extent that responsiveness to an industry varies only between industries. As mentioned before, this inclusion also makes sense in the light of studies by De Wit and van Winden (1989) and de Wit (1993): the inclusion of industry dummy variables in models of self-employment is important to control for the positive correlation between occupational choice and educational attainment.

Since some immigrant groups have shown a greater likelihood of forming enclaves, I control for group fixed effects. These fixed effects will help with the potential problem of self-selection into enclave residence to the extent that responsiveness to the existence of enclaves varies only at the group level.

As there are varying levels of economic development between regions in the US, I control for metropolitan area fixed effects. These fixed effects will help with the potential

problem of self-selection into residence to the extent that responsiveness to local economic conditions varies only between different areas.

To address the problem of correlation between local economic shocks and self-employment rate in that area, I use the national self-employment rate for each immigrant group instead of the local group-specific employment rate in the interaction term.

These specifications are not without weaknesses, however. There can be other endogenous problems. For example, changes of the quality of the cohort of immigrants over time influence both individual characteristics and self-employment choice. In recent decades, there are more low-skilled immigrants from certain countries coming to the US. As a result, they have lower self-employment rates as a group and also lower scores on other indicators such as education or language skills.

There are also possible violations of the three given assumptions for the instrument. The wish to re-unite with a relative in a certain city j rather than another in j' can still be correlated with changes in economic opportunities offered by the two cities over decades: an immigrant's relative is doing very well in city j since this city has been enjoying high economic growth. His other relative is not doing so well in city j' , since that city has been stagnant in growth. As a result, the immigrant prefers to relocate to city j . This locational decision is based on a measure of desire to re-unite with a certain relative. However, this desire to re-unite is modified by changes in the relative economic opportunities between the two cities, which is a violation of the first identification assumption. Furthermore, certain immigrants are highly concentrated in a city, for example, Cubans in Miami. Therefore, it is still possible that the national count of immigrants in a given time t is still endogenous to differential shocks to a city. Last, a region's economic

success is dependent on the existence of immigrant enclaves; these enclaves help attract more immigrants seeking self-employment to that region.

3.3 Data

To estimate these models I use cross-sectional Census data from the years 1970, 2000 and 2007, taken from the Integrated Public Use Microdata Series project. The data were chosen for their large number of observations and detailed information about individuals and households. For the first part of the thesis, I use the 2000 5% Census, restricted to people aged 21-64 and reported working in the labor force. The total number of observations for this sample is 5,065,803. A statistical summary for the sample is presented in Table 1. These statistics give us a general idea about self-employment in the United States. The self-employment rate for immigrants, at 9.93%, is actually lower than the rates among natives and the general population at 10.3%. However, on average, self-employed persons earn higher income than the general population. Mean annual incomes for self-employed natives and immigrants are at \$51,682 and \$47,451, respectively. The means for the general subsamples of natives and immigrants are at \$38,605 and \$33,757, respectively. I also find a higher percentage of married individuals in the self-employed samples. About 74% of self-employed natives are married and 75% of self-employed immigrants are married, whereas the rate for the general population is only at 63%. One of the explanations can be that business owners are generally older with more labor market experience and as such, more likely to have a family. Also, many family-owned businesses rely on employment by family workers. In terms of education, the statistics show no difference between the general and self-employed populations. Since the Census has no data on how an individual has access to means of financing, I choose home ownership status as a proxy for

financial wealth. Looking at the data, I find that there are higher ownership rates in the self-employed populations. 67.5% of self-employed immigrants and 83.7% of self-employed natives own their home, which are higher than the average rates in their pools. Given these statistics, I expect to see significant and positive effects of home ownership and marriage, among other factors, on the propensity for self-employment in the regression model. Of course, while these effects show correlation; they do not necessarily show causality.

3.4. Selected Sample of Immigrants

For part two of the research project, I focus my attention on selected immigrant groups. I use Census data for 2000 and results from the American Community Survey (ACS) in 2007, which has a smaller sample size than the 2000 Census. One potential problem with focusing on immigrants is ending up with groups with small population counts, which may generate unwanted “noise” in the regression model. I find this to be a significant problem in this study, due to the nature of the formula used to specify the instrument. As such, I establish several selection rules for the regression sample. First, the individual should be between the ages of 21 and 64. The individual must be residing in a metropolitan area as defined by the 1970 Census to allow consistency in calculating the instrument. The individual must report his or her work status as either being self-employed or employed. Finally, the individual must have been born in one of 29 selected countries before migrating to the United States (see Appendix Table 1 for a list of the countries used). No native is included in the final regression sample.

The selection rule for countries of origin is simple. Before applying any selection rules, I look at the ACS 2007 data and select only country groups that have at least a count of 2,000 in the sample. There are two reasons for doing this. First, the average self-employment rate among

immigrants is 9.9%. For a group that has a count of less than 2,000, its measured self-employment rate may fluctuate substantially between years. For example, I may find 200 Danes in my sample, 40 of whom are self-employed in 2007. In the Census for 2000, there are 2000 of them, 200 of whom are self-employed. This would represent a large jump in the estimated self-employment rate for Danes from 10% to 20% in 7 years. Second, I have 117 metropolitan areas defined by the 1970 Census. Many immigrant groups will certainly have zero populations in several cities, and as a result, there would be many network sizes of zero. For a group that has a count of less than 2,000, they are likely to have a very large number of zero network sizes, which renders the study of a networking effect on self-employment unrealistic for that group. As results show later, even after constructing the 29 immigrant groups based on these criteria, the results in the smaller (ACS) sample are still sensitive to the omission or inclusion of smaller immigrant groups.

Statistics on self-employment and the sizes of city-level networks among immigrant groups can be found in Table 2. There are several interesting observations. Cubans and Mexicans are the groups with the highest average network sizes. Both groups also have the highest standard deviations of network size, which suggests that the population density of these immigrant groups vary greatly across different metropolitan areas. Cubans also have a higher self-employment rate than Mexicans.

On the other hand, immigrants from Iran and Korea have the highest group self-employment rates, at 20.5% and 22.6% respectively. Interestingly these numbers coincide with other research on these immigrant groups. Fairlie (2008) recently conducted a study that found Iranian immigrants among the top 20 immigrant groups with the highest rate of business ownership at 21.5%. Most Iranian immigrants are highly educated and came to the United States

following the Islamic Revolution in 1979. Korean businessmen are well known for their textile trade in big cities in the Northeast, New York included. They also maintain strong contact via local Korean American Business Association in these cities. Unfortunately, such information is not captured in their network sizes. These immigrant groups are spread out in low density over many different metro areas, hence their low average network sizes. This offers an area of improvement in the future, where I hope to incorporate such information as the existence of immigrant business association into the calculation of network sizes.

Also, there is an upward trend in self-employment rate across all groups from year 2000 to year 2007. It must be noted that the self-employment rates for most of these immigrant groups are higher than the immigrant self-employment rate of 9.9% in the United States. This is due to the fact that the data has been restricted to immigrants living in metropolitan areas and reported working in the labor force.

CHAPTER FOUR: RESULTS AND DISCUSSIONS

4.1 Self-Employment in the Full Population Sample

I find that being an immigrant has a positive and significant effect on the probability of becoming self-employed (Table 3) for the full sample in column (1). On average, an immigrant is 0.9 percentage point more likely to run his or her own business. However, this effect is not particularly large compared to the effects for other socioeconomic characteristics. For example, being male is correlated with a five percentage point increase in the probability of self-employment while being married is correlated with a two percentage point increase. Education also has a positive and significant effect on self-employment: individuals who complete at least a high school degree are 1.3-2 percentage points more likely to own a business than those who do not. Married individuals are also 2 percentage points more likely to be self-employed: a lot of business owners tend to utilize labor within their own families. Furthermore, self-employed individuals tend to be older and married, after years of accumulating necessary labor market experience and training before going into self-employment. Finally, individuals who own their own homes are 2.2 percentage points more likely to be self-employed. One possible explanation for this relationship is that home ownership indicates who has access to financing options, although it is also possible that the direction of causality is reversed or that a third factor is driving the relationship.

English language seems important for running a business. This finding is consistent across the full sample in (1), the sample of native-born in (2) and the sample of foreign-born in (3). However, among the immigrants, while knowing English has a positive and significant effect on self-employment probability, speaking good English is not necessary. A good command of English has no significant effect on self-employment for an immigrant. It is possible that this

result indicates that immigrants who speak good English are more likely to have found paid-employment opportunities that can be more rewarding. Coethnic networking will aid in this process.

There are also interesting observations among the industry dummies. These dummies are created in comparison with employment in the agricultural sector. Appendix Table 1 reveals that there is a very high rate of self-employment rate in the agricultural sector in the United States. Therefore, I am not surprised to see most coefficients for industries in all samples are negative and significant. However, working in mining & construction, wholesale & retail trade, or services has a positive and significant effect on self-employment for immigrants, in comparison to those in the agricultural sector. This is consistent with Borjas' (1986) finding that immigrant self-employment mostly occur in the retail trade sector.

What can we conclude from the results of this first regression exercise? For the entire population, the results are consistent with hypotheses presented earlier and with findings from Borjas (1986). Married individuals have higher self-employment rates, perhaps due to shared accountability among family members in running the business. Higher education levels increase the individual's ability to provide a service that other persons may desire or empower him or her with management abilities. The probability for immigrants to become self-employed is higher, albeit not large in magnitude. Immigrants are in general a more enterprising group who are willing to take more risks and find new opportunities and challenges in their new host countries. However, immigrants as a group have variations in terms of business participation rates. As I have discussed before, resource mobilization from an ethnic community is an important aspect for any immigrant wishing to develop his or her own business. In the next section, I will explore how network size alone affects the propensity for self-employment among immigrants.

4.2 Networking Effect and Self-Employment among Immigrants

In this model, I include the log of the network size, which intends to measure the amount of contact that an immigrant has with members of his or her own immigrant group, and is calculated as the density of that immigrant group in a metro area, taking into account the historical distribution of immigrants in 1970. The results of models of network effects on immigrant self-employment are presented in Table 4 for data from the 2000 Census. It is interesting to note that network size has a negative and significant effect on the propensity for self-employment in the OLS model in column (1). I find no significant effect of network size on self-employment. The results for some of the control variables are fairly consistent with those for the full population sample in the first part. Being male is associated with a 2.6 percentage point increase and being married is associated with a 1.6 percentage point increase in the probability of self-employment. An immigrant owning a house is 2.4-2.5 percentage points more likely to be self-employed.

The estimated coefficient for network size in Table 4 does not support Borjas' (1986) enclave hypothesis: in a larger network, immigrants are actually less likely to be self-employed. However, it is also of interest to study what kind of network an immigrant is connected to. Manski's (1993) endogenous social effect suggests that an immigrant are more likely to be self-employed if he belongs to a group that has a high self-employment rate. I will test this hypothesis in the next section, in which I interact the log of the network size with nationwide self-employment rate for each immigrant group living in a metropolitan area.

4.3 Interaction Effect and Self-Employment among Immigrants

The results of models of the interaction effect on immigrant self-employment are presented in Table 5 for data from the 2000 Census. Results in the first three columns are estimated using ordinary least squares, and the remaining three columns are estimated using the instrument discussed previously. The coefficients on the demographic variables are consistent across specifications and are fairly consistent with those for the full population sample in the first part. Being male is associated with a 2.5 percentage point increase and being married is associated with a 1.5 percentage point increase in the probability of self-employment. An immigrant owning a house is 2.3-2.4 percentage points more likely to be self-employed.

While those who complete high school or quit college do not exhibit a significantly different propensity for self-employment than those with less education, immigrants who have at least a bachelor's degree in fact are about 1 percentage point less likely to operate their own business. There are a few explanations for this. Immigrants with a bachelor's degree may prefer paid-employment over self-employment opportunities or in the case that they are indifferent to the two employment options; employers may prefer employing those with a college degree.

Turning to the variables of primary interest, I find that the OLS model returns positive and significant effect of coethnic networking on self-employment probability in columns 1-3. This networking effect is magnified as more controls are included. The difference across columns (1) to (3) and (4) to (6) is generated by the inclusion of controls for immigrant groups and metropolitan areas. I am concerned that unobservable characteristics about individuals may drive my results. As such, including fixed effects for immigrant groups and areas take into account these unobservable characteristics hidden in the groups and areas. For example, the coefficient for the interaction effect increases from 0.058 to 0.083 when I provide the fixed effects for metropolitan areas in column 2. The inclusion of the dummies for different immigrant

groups increases the magnitude of the interaction effect further to 0.115. The inclusion of these controls take into account the fact that the networking effect is correlated with unobserved economic conditions and opportunities particular to each geographical area and unobserved characteristics of each immigrant group that make its members more or less likely to be self-employed. It is possible that these controls are likely to be a function of network effect. But if they are endogenous, I expect them to bias the results down. However, in this case, the controls increase the coefficient of the interaction term. This requires further investigation in the future.

Columns 4-6 of table 4 present the IV estimates of the regression equation. The coefficient for the interaction effect is not significant until both the fixed effects for metro area and immigrant groups are included in column (6). Using the results in the last column, the main effect of coethnic network size is estimated to be -0.0093 and the interaction effect is estimated to be 0.0673. To interpret these coefficients, let us consider two scenarios. In the first scenario, we predict how moving a member of an immigrant group with a low self-employment rate into a different area would affect his or her propensity for self-employment. If a Mexican from an area with an average concentration of Mexicans, i.e. network size at mean value (0.0716, from Table 2), is moved to an area with low concentration of Mexicans, i.e. low network size, or to another with high concentration of Mexicans, how would his or her self-employment probability change? Here, we define a low concentration as one standard deviation below the mean network size for Mexicans (0.0167, from Table 2) and high concentration as one standard deviation above (0.1265).

When a Mexican moves to an area with low concentration of Mexicans, assuming all other factors remaining the same; his or her self-employment likelihood is increased by:

$$\begin{aligned}\overline{\Delta SelfEmp} &= -.0093 \times [\log(.0167) - \log(.0716)] + .0673 \times [\log(.0167) - \log(.0716)] \times .0712 \\ &= .0066\end{aligned}$$

Similarly, when this Mexican moves to an area with high concentration of Mexicans, assuming all other factors remain the same, his or her self-employment likelihood is decreased by:

$$\begin{aligned}\overline{\Delta SelfEmp} &= -.0093 \times [\log(.1265) - \log(.0716)] + .0673 \times [\log(.1265) - \log(.0716)] \times .0712 \\ &= -.0026\end{aligned}$$

This result is interesting. For an immigrant belonging to a group with low self-employment rate, moving him or her to an area with a larger network of coethnics will reduce the self-employment likelihood. One explanation is that living among other immigrants, for example, Mexicans, grant more access to other paid-employment opportunities elsewhere.

Let us now consider the second scenario, where we predict how moving a member of an immigrant group with a high self-employment rate into a different area would affect his or her propensity for self-employment. If a Korean from an area with an average concentration of Koreans, i.e. network size at mean value (0.0033, from Table 2), is moved to an area with low concentration of Koreans, i.e. low network size, or to another with high concentration of Koreans, how would his or her self-employment probability change? Here, we define a low concentration as one standard deviation below the mean network size for Koreans (0.0011, from Table 2) and high concentration as one standard deviation above (0.0055).

When a Korean moves to an area with low concentration of Koreans, assuming all other factors remaining the same, his or her self-employment likelihood is reduced by:

$$\begin{aligned}\overline{\Delta SelfEmp} &= -.0093 \times [\log(.0011) - \log(.0033)] + .0673 \times [\log(.0011) - \log(.0033)] \times .2258 \\ &= -.0065\end{aligned}$$

Similarly, when this Korean moves to an area with high concentration of Koreans, assuming all other factors remain the same, his or her self-employment likelihood is increased by:

$$\begin{aligned}\overline{\Delta SelfEmp} &= -.0093 \times [\log(.0055) - \log(.0033)] + .0673 \times [\log(.0055) - \log(.0033)] \times .2258 \\ &= .0030\end{aligned}$$

Of course, the magnitude of these percentage changes in self-employment probability is dependent on which group and which metropolitan area an immigrant belongs to. Table 6 reflects this variation in network effect conditional upon group self-employment rate for immigrants living in areas with mean network sizes. In this case, I observe that for immigrant groups with low self-employment group rate i.e. lower than 13.8%, moving their members to another area with more coethnics decreases the propensity for self-employment. On the other hand, for groups with high self-employment rate, moving their members to another area with more coethnics will increase the self-employment probability.

Two very important conclusions can be made about the estimated coefficients of the interaction term. First, the results are consistent with Manski's (1993) endogenous social effect: individual self-employment choice tends to vary with group characteristics, in this case, the group self-employment rate. Second, from the previous section, I find that network size has a negative relationship on the propensity for self-employment. However, this relationship is modified by the group self-employment rate. More coethnic contact among immigrants within a group suggests two outcomes: increased likelihood of self-employment if the immigrant has a high group self-employment rate, and decreased likelihood of self-employment if the immigrant has a low group self-employment rate.

4.4. Results from Year 2007, Interaction Effect, and Size of Immigrant Group

In Table 7, I repeat the analysis in Table 5 using data from the 2007 ACS. The results from the OLS models are quite similar to the results using the 2000 Census, but the IV results are statistically indistinguishable from zero and wrong-signed. Since the 2007 dataset is considerably smaller than the 2000 dataset, one likely explanation is that there may be too many zero values of network sizes in the considerably smaller 2007 dataset. For example, either many metro areas may not have any immigrants in 1970, or it is unlikely that a Vietnamese immigrant in Akron, Ohio is included in the ACS 2007.

It is unclear why no effect is distinguishable in these data, but the difference between the OLS results (which are similar to the OLS results for the 2000 data) and the IV results suggests that the instrument performs poorly in the 2007 data. In Table 8, I report the estimates from the first-stage regressions for the instruments of the interaction term and network size. The instruments are good predictors for the shares of immigrants and their interaction effect with group self-employment rate. The magnitudes of the coefficients suggest that, at the migration levels in 2007, an increase of 10 percent in the predicted network size based on historical distribution in 1970 increases the network size between 3.8 percent and 6.6 percent. A unit increase in the instrumented interaction term increases the interaction term between 0.8 to 1.0. This suggests the quality of the data may cause the poor performance in the 2007 dataset.

To rectify this situation, I select data using different size criteria for immigrant groups and report the coefficients for the interaction effect in Table 9. High values of network sizes among Mexicans from Table 2 raise concerns that my results are driven completely by this one group. Therefore, I also run the regression omitting Mexicans to see whether the high variations in the group's network size are causing statistical insignificance in the IV results.

Three observations can be seen in Table 9. First, in the 2000 data, filtering out immigrant groups of smaller sizes realigns the coefficient estimates more closely in the OLS and IV models. For groups with greater than 15,000 or 20,000 observations, the coefficients in both the OLS and IV models are all around 0.12. Second, dropping Mexicans still provide the same estimate value of .07 for the interaction term in this subsample. Third, the IV results for the 2007 data are negative and statistically indistinguishable from zero. This suggests that the size of the immigrant group as a whole is not causing the poor performance of the instruments. It is still possible, however, that the size of an immigrant group in a metropolitan area is a cause. A regression model that filters out areas with zero or near zero network sizes can be tested in the future to verify this.

4.5. Interaction Effects and Characteristics of Immigrant Group

The results from the main table also pose several questions: Are there certain characteristics that result in a larger network effect on self-employment decisions? For example, my results seem to confirm the hypothesis that better educated immigrants tend to prefer professional employment to owning a small enterprise. Furthermore, do these characteristics contribute to the difference in IV results across year? By separating the regression sample into pools of people with different characteristics, we can examine these questions more closely. The regression results are reported in Table 10.

I am interested in looking at three characteristics of immigrant groups: their duration of stay in the United States, their education level and their language skills. While the OLS model reports positive and statistically significant interaction effects in most groups, the IV model shows that not all groups achieve significant interaction effect. What has been remarkable,

however, is that the IV model for year 2000 shows that high-skilled immigrants in group 5 and group 8, defined as those who have a college degree or speak good English, exhibit higher propensity to become self-employed if they are better connected with their coethnic peers. The coefficient of the interaction term is actually higher in these subsamples, at 0.1353 for those with a college degree or higher, and .0943 for those who speak good English. These results suggest the interaction effect is stronger among the high-skilled immigrants.

Although I am skeptical about results for column 4 in 2007, the highly negative and statistically significant network effect for group 2 and group 9 seems to be consistent with my assumption on how labor market experience and language skills influence self-employment probability: among immigrants who have just arrived in the United States (less than 10 years) or those who do not have a good command of English, they are less likely to become self-employed as they have more coethnic contact. This finding is somewhat consistent with the earlier finding that more coethnic contact among immigrants within a group reduces likelihood of self-employment if the immigrant has a low group self-employment rate. There is a relationship between language skills, education and self-employment for a group. Based on the disadvantage theory discussed in earlier chapters, if an immigrant group has a low self-employment rate, it is possible that many of its members have poor language skills and low educational attainment. These factors discourage them from becoming self-employed.

CHAPTER FIVE: CONCLUSION

I find that an immigrant in the United States is slightly more inclined towards becoming self-employed than a native. Among immigrants, the network effect has a negative and statistically significant effect on their propensity for self-employment. However, this relationship changes as group self-employment rate comes into the picture. As an immigrant population becomes denser in a metropolitan area, the exchange of information about business opportunity among coethnics increases, thus increasing its members' propensity to become self-employed. This finding is consistent with previous research showing that there exists an enclave effect among immigrants, and those with high access to these enclaves are more likely to own a business (Borjas, 1986).

While the OLS model generously reports positive and significant network effect on self-employment propensity in most samples, the IV model allows me to discern which sample has a “true” positive and significant network effect. However, the use of an instrument variable in a small data set like the American Community Survey 2007 is not meaningful: the existence of many metro areas with zero population of a particular immigrant group renders the coefficient of the network effect insignificant. Subsamples based on size of immigrant groups do not improve the performance of the instrument. However, in a future research, I will utilize the IV specification on a subsample conditional on immigrant group size in a given metropolitan area to confirm whether zero network sizes cause the failure of the IV in the 2007 data set.

Regarding the effect of education on self-employment probabilities, there are a few conclusions. For the general population, a higher level of educational attainment is associated with a higher propensity for self-employment. However, among the immigrants in the United States, there is a reverse trend: better-educated, well-English-spoken immigrants are less likely to

become self-employed. In my regression model, having put in industry dummies, I find a negative and significant effect of education on self-employment probability among immigrants with a college degree or more. This finding is consistent with results by Evans (1989), de Wit and van Winden (1989) and de Wit (1993). One possible explanation is that immigrants with either a college degree or English fluency have better access to the formal labor market for employment and therefore move away from self-employment. The disadvantage theory suggests that immigrants who face barriers in entering the formal labor market given their incompatible qualifications turn to self-employment. This finding can be considered consistent with the disadvantage theory, given the fact that those who have no such barriers turn away from self-employment.

On the other hand, I find that for the subsamples of these high-skilled immigrants, who either speak English well or graduate from college, the interaction effect among them are positive and higher than in a full sample. In other words, high-skilled immigrants who have a “denser” network contact with their coethnics are much more likely to become self-employed. This is a very interesting finding that also requires more study on networking behaviors among high-skilled immigrants in the United States. From the 2007 dataset, I also find certain evidence that new immigrants and those with poor English skills exhibit a highly negative and statistically significant network effect on self-employment probability. However, I am cautious to draw any strong conclusion from this finding, given the quality of the dataset. These results suggest the possibility of how network mechanism works: conditional on English fluency, networks influence in either direction. In a future research, I would like to study how these factors also determine the strength of the network effect. Educational attainment, English fluency and other factors such as years since entry may be included in the interaction term.

It must also be noted that it is always difficult to distinguish networks from omitted variable bias. People with unobserved characteristics that influence self-employment choice, such as high desire to own a business, may disproportionately belong to a group with high self-employment rate and in an area with a large network. Hence, the observation that the network size, interacted with the nationwide group self-employment rate, is correlated with individual propensity for self-employment may simply reflect omitted personal or group characteristics rather than a causal relationship. This weakness in research has also been acknowledged in Bertrand et al. (2003)

Finally, I have several directions for future research. Although as important as an immigrant's entry into self-employment, an immigrant's exit from self-employment has been neglected in the literature. This is a new area in literature that provides excellent opportunities for future research. One needs to take into consideration how a number of factors, such as learning ability and the continual availability of capital, influence the survival of an immigrant business. Given the benefits of an immigrant business, I would also like to look at how the US government has been promoting the growth of ethnic entrepreneurship. Waldinger and Alrich (1990) note that the Small Business Act, signed in 1965, provides credit lending to economically disadvantaged individuals. However, this program ignores individuals with high motivation for owning a business. A closer look at how effective the Small Business Act has been will provide more insights on this problem.

TABLES

TABLE 1
SUMMARY STATISTICS FOR PART ONE, FULL POPULATION IN 2000

| Variable | Population Mean (Standard Deviation) | Native Mean (SD) | Self-employed Native Mean (SD) | Immigrant Mean (SD) | Self-employed Immigrant Mean (SD) |
|---------------------------------------------|-----------------------------------------|---------------------|-----------------------------------|------------------------|--------------------------------------|
| Self-employment | .1026 (.3035) | .1031 (.3041) | 1 | .0993 (.2991) | 1 |
| Annual total income | 37,969 (44,333) | 38,605 (44,336) | 51,682 (73,077) | 33,757 (44,082) | 47,451 (71,970) |
| Is an immigrant (Born outside of the US) | .1312 (.3376) | 0 | 0 | 1 | 1 |
| Age | 40.43 (11.05) | 40.64 (11.06) | 44.68 (10.21) | 39.04 (10.85) | 43.44 (10.22) |
| Male | .5338 (.4989) | .5269 (.4993) | .6662 (.4716) | .5794 (.4937) | .6415 (.4796) |
| Married | .6328 (.4821) | .6296 (.4829) | .7411 (.4381) | .6539 (.4757) | .7503 (.4329) |
| Single | .2082 (.4060) | .2061 (.4045) | .1144 (.3183) | .2221 (.4157) | .1219 (.3272) |
| High-school educated | .4431 (.4968) | .4531 (.4978) | .4440 (.4969) | .3766 (.4845) | .3738 (.4838) |
| Some college | .2429 (.4288) | .2529 (.4347) | .2323 (.4223) | .1764 (.3811) | .1742 (.3793) |
| College and more | .2799 (.4490) | .2799 (.4489) | .3047 (.4603) | .2803 (.4491) | .3075 (.4615) |
| Speak some English | .0588 (.2353) | .0108 (.1035) | .0096 (.0975) | .3766 (.4845) | .3968 (.4892) |
| Speak good English | .9320 (.2518) | .9890 (.1044) | .9903 (.0983) | .5545 (.4982) | .5590 (.4965) |
| Home ownership | .7149 (.4515) | .7410 (.4381) | .8374 (.3690) | .5423 (.4982) | .6749 (.4684) |
| Years in the US (Immigrants only) | 17.51 (11.98) | - | - | 17.51 (11.98) | 20.58 (12.05) |
| Agriculture | .0185 (.1346) | .0175 (.1310) | .0912 (.2879) | .0251 (.1565) | .0223 (.1475) |
| Mining & Construction | .0864 (.2809) | .0869 (.2817) | .1790 (.3833) | .0827 (.2754) | .1317 (.3382) |
| Manufacturing | .1518 (.3588) | .1489 (.3559) | .0441 (.2053) | .1713 (.3768) | .0490 (.2159) |
| Wholesale & Retail Trade | .1395 (.3465) | .1401 (.3471) | .1268 (.3328) | .1353 (.3421) | .1637 (.3700) |
| Transportation & Communication | .0746 (.2628) | .0759 (.2649) | .0519 (.2219) | .0661 (.2485) | .0592 (.2359) |
| Finance, Insurance & Real Estate | .0668 (.2496) | .0683 (.2522) | .0711 (.2570) | .0569 (.2317) | .0523 (.2226) |
| Services | .4036 (.4906) | .3994 (.4898) | .4358 (.4959) | .4311 (.4952) | .5219 (.4995) |
| Government | .0589 (.2354) | .0630 (.2430) | 0 (0) | .0314 (.1745) | 0 (0) |

a. Data for the five columns are composed of people between 21 and 64 years old in the 2000 Census 5% extract who reported working in the labor force. (sample size: 5,065,803)

b. For columns 2-5, statistical summary is obtained conditioned upon immigrant and self-employment status.

TABLE 2
 STATISTICS ON SELF-EMPLOYMENT AND NETWORK EFFECT
 AMONG IMMIGRANT GROUPS

| Country of Birth | Self- Employment Rate (2000) | Self- Employment Rate (2007) | Mean Network Size | SD Network Size | Min Network Size | Max Network Size |
|--------------------|------------------------------------|------------------------------------|-------------------------|--------------------|------------------------|------------------------|
| Brazil | 16.64% | 21.24% | 0.0014 | 0.0013 | 0.0000 | 0.0103 |
| Canada | 12.08% | 13.42% | 0.0028 | 0.0022 | 0.0000 | 0.0091 |
| China | 9.55% | 10.81% | 0.0067 | 0.0064 | 0.0000 | 0.0266 |
| Colombia | 11.58% | 14.85% | 0.0047 | 0.0038 | 0.0000 | 0.0121 |
| Cuba | 12.58% | 14.90% | 0.0670 | 0.0503 | 0.0000 | 0.1098 |
| Dominican Republic | 8.29% | 11.43% | 0.0114 | 0.0072 | 0.0000 | 0.0182 |
| Ecuador | 8.36% | 10.38% | 0.0039 | 0.0023 | 0.0000 | 0.0072 |
| El Salvador | 8.81% | 10.36% | 0.0071 | 0.0100 | 0.0000 | 0.0563 |
| England | 11.38% | 14.37% | 0.0014 | 0.0007 | 0.0000 | 0.0040 |
| France | 11.96% | 13.88% | 0.0007 | 0.0004 | 0.0000 | 0.0018 |
| Germany | 9.76% | 10.35% | 0.0023 | 0.0014 | 0.0000 | 0.0064 |
| Guatemala | 9.46% | 11.93% | 0.0033 | 0.0025 | 0.0000 | 0.0215 |
| Haiti | 4.85% | 6.03% | 0.0037 | 0.0041 | 0.0000 | 0.0112 |
| Honduras | 7.75% | 11.68% | 0.0029 | 0.0070 | 0.0000 | 0.0468 |
| India | 9.30% | 9.32% | 0.0049 | 0.0037 | 0.0000 | 0.0382 |
| Iran | 20.54% | 26.18% | 0.0015 | 0.0011 | 0.0000 | 0.0091 |
| Italy | 16.83% | 17.51% | 0.0023 | 0.0016 | 0.0000 | 0.0048 |
| Jamaica | 6.67% | 9.18% | 0.0063 | 0.0046 | 0.0000 | 0.0114 |
| Japan | 10.84% | 11.95% | 0.0028 | 0.0044 | 0.0000 | 0.0202 |
| Korea | 22.58% | 22.91% | 0.0033 | 0.0022 | 0.0000 | 0.0155 |
| Mexico | 7.12% | 8.83% | 0.0716 | 0.0549 | 0.0000 | 0.3639 |
| Other USSR/Russia | 11.11% | 12.36% | 0.0014 | 0.0010 | 0.0000 | 0.0033 |
| Pakistan | 13.57% | 15.82% | 0.0009 | 0.0012 | 0.0000 | 0.0166 |
| Peru | 10.03% | 12.85% | 0.0019 | 0.0013 | 0.0000 | 0.0053 |
| Philippines | 4.98% | 5.83% | 0.0159 | 0.0260 | 0.0000 | 0.1392 |
| Poland | 13.46% | 14.29% | 0.0031 | 0.0017 | 0.0000 | 0.0087 |
| Puerto Rico | 5.17% | 5.90% | 0.0080 | 0.0086 | 0.0000 | 0.0206 |
| Ukraine | 10.50% | 13.62% | 0.0010 | 0.0011 | 0.0000 | 0.0068 |
| Vietnam | 9.97% | 12.53% | 0.0062 | 0.0110 | 0.0000 | 0.0949 |

a. Data are composed of people between 21 and 64 years old in the 2000 Census 5% and 2007 ACS extracts who reported working in the labor force and lived in a metropolitan area designated by 1970 definition. (*sample size: 784,310*)

TABLE 3
DETERMINANTS OF THE PROBABILITY OF BEING SELF-EMPLOYED, 2000 CENSUS

| <i>Dependent variable: Self-employment probability</i> | | | |
|--------------------------------------------------------|-----------------------|-----------------------|-----------------------|
| <i>Estimation Technique:</i> | (1) | (2) | (3) |
| <i>Sample</i> | OLS | OLS | OLS |
| | Full | Native | Immigrant |
| Is an immigrant (Born outside of the US) | .0089 (.0028)*** | - | - |
| Age | .0061 (.0004)**** | .0058 (.0003)**** | .0072 (.0004)**** |
| Age ² | -.0000 (.0000)**** | -.0000 (.0000)**** | -.0001 (.0000)**** |
| Male | .0455 (.0012)**** | .0483 (.0015)**** | .0320 (.0019)**** |
| Married | .0200 (.0010)**** | .0210 (.0010)**** | .0177 (.0015)**** |
| Widowed / Divorced / Separated | .0064 (.0008)**** | .0062 (.0008)**** | .0093 (.0017)**** |
| High-school educated | .0144 (.0027)**** | .0004 (.0025) | .0144 (.0030)**** |
| Some college | .0193 (.0023)**** | .0064 (.0027)* | .0137 (.0031)**** |
| College and more | .0291 (.0022)**** | .0179 (.0035)**** | .0166 (.0029)**** |
| Speak some English | .0305 (.0053)**** | .0223 (.0100)** | .0156 (.0020)**** |
| Speak good English | .0229 (.0080)*** | .0257 (.0102)** | .0037 (.0037) |
| Home ownership | .0218 (.0010)**** | .0195 (.0010)**** | .0292 (.0020)**** |
| Public Sector | -.2946 (.0188)**** | -.4224 (.0117)**** | -.0990 (.0188)**** |
| Mining & Construction | -.1093 (.0188)**** | -.2314 (.0121)**** | .0612 (.0091)**** |
| Manufacturing | -.2673 (.0194)**** | -.3962 (.0122)**** | -.0691 (.0069)**** |
| Wholesale & Retail Trade | -.1980 (.0196)**** | -.3309 (.0120)**** | .0220 (.0084)*** |
| Transportation & Communication | -.2311 (.0194)**** | -.3634 (.0120)**** | -.0082 (.0090) |
| Finance, Insurance & Real Estate | -.1884 (.0202)**** | -.3133 (.0130)**** | -.0082 (.0113) |
| Services | -.1732 (.0198)**** | -.3024 (.0124)**** | .0286 (.0091)*** |
| Observations | 5,065,803 | 910,538 | 910,538 |
| Adjusted R ² | .053 | .060 | .042 |

a. Data are composed of people between 21 and 64 years old in the 2000 Census 5% extract who reported working in the labor force. (*sample size: 5,065,803*)

b. Industry dummies are created in comparison with employment in the agricultural sector.

c. Metropolitan area fixed effects are 283 dummies for the metropolitan areas in the 2000 Census.

d. Heteroskedasticity-consistent standard errors are in parentheses. Asterisks indicate significance levels: * is 10 percent, ** is 5 percent, *** is 1 percent, **** is .1 percent

TABLE 4
NETWORK EFFECT ON IMMIGRANT SELF-EMPLOYMENT, YEAR 2000

| <i>Dependent variable: Self-employment probability</i> | | |
|--------------------------------------------------------|-----------------------|-----------------------|
| <i>Estimation Technique:</i> | (1) OLS | (2) IV |
| Log of Network Size | -.0038 (.0012)*** | -.0033 (.0022) |
| Years in the U.S. | .0004 (.0000)**** | .0003 (.0001)**** |
| Age | .0060 (.0004)**** | .0057 (.0005)**** |
| Age ² | -.0000 (.0000)**** | -.0000 (.0000)**** |
| Male | .0255 (.0022)**** | .0255 (.0024)**** |
| Married | .0162 (.0011)**** | .0152 (.0012)**** |
| Widowed / Divorced / Separated | .0102 (.0018)**** | .0108 (.0019)**** |
| High-school educated | .0040 (.0028) | .0035 (.0028) |
| Some college | -.0050 (.0034) | -.0054 (.0035) |
| College and more | -.0076 (.0028) | -.0065 (.0030)** |
| Speak some English | .0103 (.0020)**** | .0103 (.0020)**** |
| Speak good English | -.0005 (.0028) | .0001 (.0030) |
| Home ownership | .0249 (.0013)**** | .0244 (.0013)**** |
| Industry dummy variables | Yes | Yes |
| Immigrant group fixed effects | Yes | Yes |
| Metropolitan area fixed effects | Yes | Yes |
| Observations | 641,248 | 582,966 |
| Adjusted R ² | .0551 | .0544 |

a. Data are composed of people between 21 and 64 years old in the 2000 Census 5% extract who reported working in the labor force and lived in a metropolitan area designated by 1970 definition. Restricted to 29 immigrant groups (*sample size: 641,248*)

b. The omitted industry is employment in the agricultural sector. Industry dummies are included in all regressions since omitting the dummies make little substantive difference.

c. Immigrant group fixed effects are 29 group dummies. Metropolitan area fixed effects are 117 dummies for the metropolitan areas designated by the 1970 definition.

d. Heteroskedasticity-consistent standard errors, clustered by metropolitan area, are in parentheses. Asterisks indicate significance levels: * is 10 percent, ** is 5 percent, *** is 1 percent, **** is .1 percent

TABLE 5
INTERACTION EFFECT ON IMMIGRANT SELF-EMPLOYMENT, YEAR 2000

| <i>Estimation Technique:</i> | <i>Dependent variable: Self-employment probability</i> | | | | | |
|---------------------------------|--------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | OLS | OLS | OLS | IV | IV | IV |
| Log of Network Size * | .0575 | .0830 | .1153 | -.0271 | .0153 | .0673 |
| Group self-employment rate | (.0369) | (.0327)** | (.0195)**** | (.0359) | (.0409) | (.0283)** |
| Log of Network Size | -.0030 | -.0105 | -.0145 | .0053 | -.0047 | -.0093 |
| | (.0028) | (.0021)**** | (.0016)**** | (.0032) | (.0029) | (.0035)**** |
| Years in the U.S. | .0004 | .0003 | .0004 | .0003 | .0003 | .0003 |
| | (.0000)**** | (.0001)*** | (.0001) | (.0001) | (.0001)**** | (.0001)**** |
| Age | .0064 | .0060 | .0060 | .0061 | .0057 | .0058 |
| | (.0004)**** | (.0004)**** | (.0004)**** | (.0005)**** | (.0005)**** | (.0005)**** |
| Age ² | -.0000 | -.0000 | -.0000 | -.0000 | -.0000 | -.0000 |
| | (.0000)**** | (.0000)**** | (.0000)**** | (.0000)**** | (.0000)**** | (.0000)**** |
| Male | .0253 | .0258 | .0255 | .0252 | .0258 | .0255 |
| | (.0021)**** | (.0021)**** | (.0022)**** | (.0024)**** | (.0023)**** | (.0023)**** |
| Married | .0154 | .0165 | .0161 | .0141 | .0157 | .0152 |
| | (.0015)**** | (.0011)**** | (.0011)**** | (.0016)**** | (.0013)**** | (.0012)**** |
| Widowed / Divorced / Separated | .0091 | .0103 | .0101 | .0101 | .0114 | .0108 |
| | (.0020)**** | (.0020)**** | (.0018)**** | (.0020)**** | (.0020)**** | (.0019)**** |
| High-school educated | .0028 | .0031 | .0038 | .0029 | .0025 | .0034 |
| | (.0034) | (.0029) | (.0028) | (.0035) | (.0029) | (.0028) |
| Some college | -.0040 | -.0060 | -.0052 | -.0037 | -.0070 | -.0054 |
| | (.0039) | (.0039) | (.0034) | (.0040) | (.0038)* | (.0035) |
| College and more | -.0064 | -.0076 | -.0077 | -.0048 | -.0075 | -.0065 |
| | (.0032)* | (.0031)** | (.0028)*** | (.0034) | (.0032)** | (.0030)** |
| Speak some English | .0114 | .0108 | .0103 | .0112 | .0104 | .0103 |
| | (.0020)**** | (.0023)**** | (.0020)**** | (.0019)**** | (.0022)**** | (.0020)**** |
| Speak good English | -.0004 | -.0008 | -.0003 | -.0000 | -.0008 | .0002 |
| | (.0029) | (.0029) | (.0028) | (.0033) | (.0031) | (.0030) |
| Home ownership | .0229 | .0240 | .0249 | .0220 | .0231 | .0244 |
| | (.0018)**** | (.0014)**** | (.0013)**** | (.0017)**** | (.0013)**** | (.0013)**** |
| Group Self-Employment Rate | 1.2678 | 1.3619 | - | .8383 | .9985 | - |
| | (.2232)**** | (.1964)**** | | (.1947)**** | (.2349)**** | |
| Industry dummy variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Immigrant group fixed effects | No | No | Yes | No | No | Yes |
| Metropolitan area fixed effects | No | Yes | Yes | No | Yes | Yes |
| Observations | 641,248 | 641,248 | 641,248 | 641,248 | 641,248 | 582,966 |
| Adjusted R ² | .0515 | .0546 | .0553 | .0507 | .0538 | .0545 |

a. Data are composed of people between 21 and 64 years old in the 2000 Census 5% extract who reported working in the labor force and lived in a metropolitan area designated by 1970 definition. Restricted to 29 immigrant groups (*sample size: 641,248*)

b. The omitted industry is employment in the agricultural sector. Industry dummies are included in all regressions since omitting the dummies make little substantive difference.

c. When immigrant group fixed effects are not in use, group self-employment rate is used as a control for immigrant groups. This is a specification requirement for the use of interaction effect.

d. Immigrant group fixed effects are 29 group dummies. Metropolitan area fixed effects are 117 dummies for the metropolitan areas designated by the 1970 definition.

e. Heteroskedasticity-consistent standard errors, clustered by metropolitan area, are in parentheses. Asterisks indicate significance levels: * is 10 percent, ** is 5 percent, *** is 1 percent, **** is .1 percent

TABLE 6
GROUP SELF-EMPLOYMENT RATE AND NETWORK EFFECT

| Country of Birth | Self-Employment Rate (2000) | Mean Network Size | SD Network Size | Δ in SE likelihood in a small network size | Δ in SE likelihood in a large network size |
|--------------------|-----------------------------|-------------------|-----------------|---------------------------------------------------|---------------------------------------------------|
| Brazil | 16.64% | 0.0014 | 0.0013 | -0.005 | 0.001 |
| Canada | 12.08% | 0.0028 | 0.0022 | 0.002 | -0.001 |
| China | 9.55% | 0.0067 | 0.0064 | 0.009 | -0.002 |
| Colombia | 11.58% | 0.0047 | 0.0038 | 0.002 | -0.001 |
| Cuba | 12.58% | 0.067 | 0.0503 | 0.001 | 0.000 |
| Dominican Republic | 8.29% | 0.0114 | 0.0072 | 0.004 | -0.002 |
| Ecuador | 8.36% | 0.0039 | 0.0023 | 0.003 | -0.002 |
| El Salvador | 8.81% | 0.0071 | 0.01 | - | -0.003 |
| England | 11.38% | 0.0014 | 0.0007 | 0.001 | -0.001 |
| France | 11.96% | 0.0007 | 0.0004 | 0.001 | -0.001 |
| Germany | 9.76% | 0.0023 | 0.0014 | 0.003 | -0.001 |
| Guatemala | 9.46% | 0.0033 | 0.0025 | 0.004 | -0.002 |
| Haiti | 4.85% | 0.0037 | 0.0041 | - | -0.005 |
| Honduras | 7.75% | 0.0029 | 0.007 | - | -0.005 |
| India | 9.30% | 0.0049 | 0.0037 | 0.004 | -0.002 |
| Iran | 20.54% | 0.0015 | 0.0011 | -0.006 | 0.002 |
| Italy | 16.83% | 0.0023 | 0.0016 | -0.002 | 0.001 |
| Jamaica | 6.67% | 0.0063 | 0.0046 | 0.006 | -0.003 |
| Japan | 10.84% | 0.0028 | 0.0044 | - | -0.002 |
| Korea | 22.58% | 0.0033 | 0.0022 | -0.006 | 0.003 |
| Mexico | 7.12% | 0.0716 | 0.0549 | 0.007 | -0.003 |
| Other USSR/Russia | 11.11% | 0.0014 | 0.001 | 0.002 | -0.001 |
| Pakistan | 13.57% | 0.0009 | 0.0012 | - | 0.000 |
| Peru | 10.03% | 0.0019 | 0.0013 | 0.003 | -0.001 |
| Philippines | 4.98% | 0.0159 | 0.026 | - | -0.006 |
| Poland | 13.46% | 0.0031 | 0.0017 | 0.000 | 0.000 |
| Puerto Rico | 5.17% | 0.008 | 0.0086 | - | -0.004 |
| Ukraine | 10.50% | 0.001 | 0.0011 | - | -0.002 |
| Vietnam | 9.97% | 0.0062 | 0.011 | - | -0.003 |

a. Data are composed of people between 21 and 64 years old in the 2000 Census 5% and 2007 ACS extracts who reported working in the labor force and lived in a metropolitan area designated by 1970 definition. (*sample size: 784,310*)

b. The last two columns reflect the change in self-employment probability when moving an immigrant from an area with mean network size to either one with smaller or one with larger network size. Smaller network size here is defined as one standard deviation below the mean, and larger network size is defined as one standard deviation above the mean. For countries where one standard deviation below the mean network size is less than zero, no change in self-employment likelihood is calculated.

TABLE 7
NETWORK EFFECTS ON IMMIGRANT SELF-EMPLOYMENT, YEAR 2007

| <i>Estimation Technique:</i> | <i>Dependent variable: Self-employment probability</i> | | | | | |
|-----------------------------------|--------------------------------------------------------|-------------|-------------|-------------|-------------|-------------|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| | OLS | OLS | OLS | IV | IV | IV |
| Log of Network Size * | .0909 | .0921 | .1282 | -.0198 | -.0247 | -.0504 |
| Group self-employment rate | (.0299)*** | (.0439)** | (.0280)**** | (.0357) | (.0637) | (.0583) |
| Log of Network Size | -.0072 | -.0126 | -.0175 | .0047 | .0011 | .0027 |
| | (.0029)** | (.0036)**** | (.0030)**** | (.0039) | (.0059) | (.0065) |
| Years in the U.S. | -.0000 | -.0001 | -.0000 | -.0001 | -.0001 | -.0001 |
| | (.0001) | (.0001) | (.0002) | (.0001) | (.0001) | (.0002) |
| Age | .0088 | .0085 | .0087 | .0084 | .0082 | .0084 |
| | (.0009)**** | (.0009)**** | (.0009)**** | (.0011)**** | (.0010)**** | (.0010)**** |
| Age ² | -.0001 | -.0001 | -.0001 | -.0001 | -.0001 | -.0001 |
| | (.0000)**** | (.0000)**** | (.0000)**** | (.0000)**** | (.0000)**** | (.0000)**** |
| Male | .0110 | .0115 | .0111 | .0109 | .0113 | .0112 |
| | (.0032)**** | (.0031)**** | (.0033)**** | (.0034)*** | (.0034)**** | (.0035)*** |
| Married | .0121 | .0135 | .0120 | .0109 | .0124 | .0115 |
| | (.0027)**** | (.0024)**** | (.0024)**** | (.0029)**** | (.0025)**** | (.0025)**** |
| Widowed / Divorced / Separated | .0130 | .0139 | .0136 | .0129 | .0136 | .0132 |
| | (.0033)**** | (.0031)**** | (.0032)**** | (.0035)**** | (.0032)**** | (.0033)**** |
| High-school educated | .0098 | .0092 | .0106 | .0085 | .0074 | .0091 |
| | (.0043)** | (.0043)** | (.0037)*** | (.0041)** | (.0041)* | (.0035)** |
| Some college | .0026 | -.0002 | .0013 | .0031 | -.0007 | .0015 |
| | (.0064) | (.0062) | (.0056) | (.0066) | (.0064) | (.0035) |
| College and more | -.0038 | -.0061 | -.0078 | -.0026 | -.0060 | -.0059 |
| | (.0047) | (.0046) | (.0041)* | (.0048) | (.0048) | (.0045)** |
| Speak some English | .0133 | .0142 | .0132 | .0099 | .0106 | .0103 |
| | (.0059)** | (.0059)** | (.0054)**** | (.0056)* | (.0056)* | (.0051)** |
| Speak good English | .0035 | .0040 | .0029 | -.0007 | -.0008 | -.0000 |
| | (.0055) | (.0053) | (.0049) | (.0052) | (.0051) | (.0045) |
| Home ownership | .0269 | .0284 | .0249 | .0255 | .0274 | .0287 |
| | (.0026)**** | (.0022)**** | (.0024)**** | (.0026)**** | (.0024)**** | (.0025)**** |
| Group Self-Employment Rate | 1.4925 | 1.4402 | - | .9413 | .9985 | - |
| | (.1683)**** | (.2599)**** | | (.1616)**** | (.2349)**** | |
| Industry dummy variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Immigrant group fixed effects | No | No | Yes | No | No | Yes |
| Metropolitan area fixed effects | No | Yes | Yes | No | Yes | Yes |
| Observations | 143,062 | 143,062 | 143,062 | 126,380 | 126,380 | 126,380 |
| Adjusted R ² | .0385 | .0422 | .0434 | .0386 | .0424 | .0435 |

a. Data are composed of people between 21 and 64 years old in the 2007 ACS extract who reported working in the labor force and lived in a metropolitan area designated by 1970 definition. Restricted to 29 immigrant groups (*sample size: 143,062*)

b. The omitted industry is employment in the agricultural sector. Industry dummies are included in all regressions since omitting the dummies make little substantive difference. Furthermore, the use of industry dummies removes positive bias of education effect.

c. When immigrant group fixed effects are not in use, group self-employment rate is used as a control for immigrant groups. This is a specification requirement for the use of interaction effect.

d. Immigrant group fixed effects are 29 group dummies. Metropolitan area fixed effects are 117 dummies for the metropolitan areas designated by the 1970 definition.

e. Heteroskedasticity-consistent standard errors, clustered by metropolitan area, are in parentheses. Asterisks indicate significance levels: * is 10 percent, ** is 5 percent, *** is 1 percent, **** is .1 percent

TABLE 8
FIRST STAGE REGRESSION RESULTS FOR YEAR 2007

| | DEPENDENT VARIABLE | | | | | |
|---------------------------------------|---------------------------------------|-----------------------|-----------------------|-----------------------|----------------------|-----------------------|
| | Log of <i>Network</i> * Group SE Rate | | | Log of <i>Network</i> | | |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| Log of <i>Network</i> * Group SE Rate | .9742 (.0048)**** | 1.005 (.0010)**** | .8261 (.0054)**** | 1.9868 (.0399)**** | .7463 (.0078)**** | 1.6788 (.0418)**** |
| Log of <i>Network</i> | -.0232 (.0005)**** | -.0261 (.0002)**** | -.0266 (.0006)**** | .5180 (.0042)**** | .6566 (.0017)**** | .3784 (.0045)**** |
| Industry dummy variables | Yes | Yes | Yes | Yes | Yes | Yes |
| Immigrant group fixed effects | No | No | Yes | No | No | Yes |
| Metropolitan area fixed effects | No | Yes | Yes | No | Yes | Yes |
| Observations | 126,380 | 126,380 | 126,380 | 126,380 | 126,380 | 126,380 |
| Adjusted R ² | .933 | .947 | .957 | .814 | .864 | .899 |

NOTE – OLS estimates. All regressions include industry, immigrant group and metropolitan area fixed effects. Standard errors clustered at the metropolitan area fixed effects are reported in parentheses. Asterisks indicate significance levels: * is 10 percent, ** is 5 percent, *** is 1 percent, **** is .1 percent

TABLE 9
INTERACTION EFFECTS AND SIZE OF IMMIGRANT GROUP

| | <i>Dependent variable: Self-employment probability</i> | | | |
|----------------------------------------------------|--------------------------------------------------------|----------------------|----------------------|-------------------|
| | Coefficient: Coethnic Contact * Self-employment Rate | | | |
| | Year 2000 | | Year 2007 | |
| | (1) OLS | (2) IV | (3) OLS | (4) IV |
| Groups selected in the sample | | | | |
| 1. Full 29 groups | .1153 (.0195)**** | .0673 (.0283)** | .1282 (.0280)**** | -.0504 (.0583) |
| 2. Mexicans excluded | .1212 (.0209)**** | .0692 (.0298)** | .1302 (.0271)**** | -.0393 (.0578) |
| 3. Groups with count above 20,000 in the sample | .1226 (.0214)**** | .1335 (.0359)**** | .1106 (.0411)**** | -.0232 (.0729) |
| 4. Groups with count above 15,000 in the sample | .1190 (.0193)**** | .1153 (.0305)**** | .1175 (.0379)*** | -.0081 (.0701) |
| 5. Groups with count above 10,000 in the sample | .1005 (.0189)*** | .0611 (.0286)** | .1232 (.0311)**** | -.0408 (.0578) |

NOTE - All regressions include industry, immigrant group and metropolitan area fixed effects. Standard errors clustered at the metropolitan area fixed effects are reported in parentheses. Asterisks indicate significance levels: * is 10 percent, ** is 5 percent, *** is 1 percent, **** is .1 percent

TABLE 10
INTERACTION EFFECTS AND CHARACTERISTICS OF IMMIGRANT GROUP

| <i>Dependent variable: Self-employment probability</i> | | | | |
|------------------------------------------------------------|------------------------------------------------------|----------------------|----------------------|---------------------|
| Groups selected in the sample | Coefficient: Coethnic Contact * Self-employment Rate | | | |
| | Year 2000 | | Year 2007 | |
| | (1) OLS | (2) IV | (3) OLS | (4) IV |
| 1. Full 29 groups | .1153 (.0195)**** | .0673 (.0283)** | .1282 (.0280)**** | -.0504 (.0583) |
| 2. Only those who have been in the US less than 10 years | .0930 (.0226)**** | .0437 (.0413) | .0652 (.0365)* | -.2014 (.1032)* |
| 3. Only those who have been in the US for 10 years or more | .1157 (.0210)**** | .0485 (.0334) | .1499 (.0360)**** | -.0126 (.0580) |
| 4. Only those who have been in the US for 20 years or more | .0919 (.0215)**** | .0378 (.0376) | .1771 (.0371)**** | -.0386 (.0565) |
| 5. Only those with a college degree or higher | .1573 (.0236)**** | .1353 (.0374)**** | .1545 (.0350)**** | -.0521 (.0833) |
| 6. Excludes those who have had a college degree or higher | .0814 (.0206)**** | .0226 (.0325) | .0813 (.0206)**** | -.0888 (.0758) |
| 7. Excludes those who did not go to high school | .0712 (.0501) | .0042 (.0739) | -.0440 (.1110) | -.3091 (.2231) |
| 8. Only those who speak good English | .1149 (.0194)**** | .0943 (.0282)**** | .1425 (.0275)**** | .0469 (.0457) |
| 9. Excludes those who speak good English | .0715 (.0267)*** | .0217 (.0433) | .0157 (.0505) | -.2447 (.0943)** |

NOTE - All regressions include industry, immigrant group and metropolitan area fixed effects. Standard errors clustered at the metropolitan area fixed effects are reported in parentheses. Asterisks indicate significance levels: * is 10 percent, ** is 5 percent, *** is 1 percent, **** is .1 percent

APPENDIX

APPENDIX TABLE 1
UNINCORPORATED SELF-EMPLOYMENT, ANNUAL AVERAGES, SELECTED YEARS,
1950-2003 (in thousands)

| Year | All industries | | | Nonagricultural industries | | | Agriculture | | |
|------|----------------|---------------|---------|----------------------------|---------------|---------|----------------|---------------|---------|
| | Total employed | Self-employed | Percent | Total employed | Self-employed | Percent | Total employed | Self-employed | Percent |
| 1950 | 58,918 | 10,359 | 17.6 | 51,758 | 6,019 | 11.6 | 7,160 | 4,340 | 60.6 |
| 1960 | 65,778 | 9,098 | 13.8 | 60,318 | 6,303 | 10.4 | 5,458 | 2,795 | 51.2 |
| 1970 | 78,678 | 7,031 | 8.9 | 75,215 | 5,221 | 6.9 | 3,463 | 1,810 | 52.3 |
| 1980 | 99,303 | 8,642 | 8.7 | 95,938 | 7,000 | 7.3 | 3,365 | 1,642 | 48.8 |
| 1990 | 118,793 | 10,097 | 8.5 | 115,570 | 8,719 | 7.5 | 3,223 | 1,378 | 42.8 |
| 1995 | 124,900 | 10,482 | 8.4 | 121,460 | 8,902 | 7.3 | 3,440 | 1,580 | 45.9 |
| 2000 | 136,891 | 10,215 | 7.5 | 134,427 | 9,205 | 6.8 | 2,464 | 1,010 | 41.0 |
| 2003 | 137,736 | 10,295 | 7.5 | 135,461 | 9,344 | 6.9 | 2,275 | 951 | 41.8 |

Source: Hipple (2004), Division of Labor Force Statistics, Bureau of Labor Statistics.

APPENDIX TABLE 2
INCORPORATED SELF-EMPLOYMENT, ANNUAL AVERAGES, SELECTED YEARS,
1990-2003 (in thousands)

| Year | All industries | | | Nonagricultural industries | | | Agriculture | | |
|------|----------------|---------------|---------|----------------------------|---------------|---------|----------------|---------------|---------|
| | Total employed | Self-employed | Percent | Total employed | Self-employed | Percent | Total employed | Self-employed | Percent |
| 1990 | 118,793 | 3,444 | 2.9 | 115,570 | 3,332 | 2.9 | 3,223 | 133 | 4.2 |
| 1995 | 124,900 | 4,224 | 3.4 | 121,460 | 4,011 | 3.3 | 3,440 | 213 | 6.2 |
| 2000 | 136,891 | 4,458 | 3.3 | 134,427 | 4,316 | 3.2 | 2,464 | 142 | 5.8 |
| 2003 | 137,736 | 4,956 | 3.6 | 135,461 | 4,810 | 3.6 | 2,275 | 146 | 6.4 |

Source: Hipple (2004), Division of Labor Force Statistics, Bureau of Labor Statistics.

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