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Small business financing sources and self -employment trends of mainland and island-born Puerto Ricans

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**SMALL BUSINESS FINANCING SOURCES AND SELF-EMPLOYMENT TRENDS
OF MAINLAND AND ISLAND-BORN PUERTO RICANS**

A Dissertation

by

YOLANDA RUIZ-VARGAS

**Submitted to the Graduate School of
The University of Texas – Pan American
in partial fulfillment of the requirements for the degree of**

DOCTOR OF PHILOSOPHY

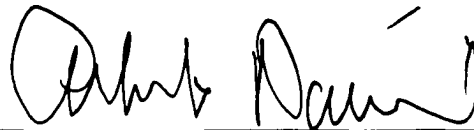
March 2000

Major Subject: International Business Administration

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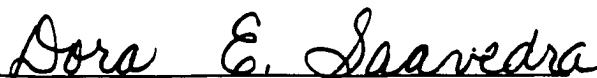
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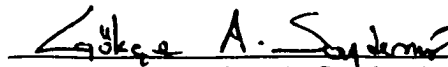
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A growing interest in studying the self-employment decision can be attributed to the conventional wisdom that small business formation is necessary for economic development. Extant research has also begun to explore the self-employment determinants of emerging populations, such as immigrants and African Americans, emphasizing that there is need for better policies aimed at helping these populations. Puerto Rico and Puerto Ricans epitomize this need to pursue these two areas of research. To specifically address these areas, this dissertation pursues two objectives: (1) to empirically analyze the self-employment trends of Puerto Ricans and mainland Puerto Ricans against other groups (Dominicans, Cubans, Mexicans) in both Puerto Rico and the United States, and (2) to explain why differences exist in small business financing sources among various groups (Island-born Puerto Ricans, mainland Puerto Ricans and immigrants) in Puerto Rico.

Econometric techniques such as switching regressions and multinomial logit models are employed for the stated purposes. Moreover, the econometric analysis draws upon several data sources: selected samples from both the United States and Puerto Rican

Censuses of Population and Housing, and a small business survey developed by the Center for Economic Development at the University of Puerto Rico.

Clearly, understanding the factors that may influence the self-employment decision among different ethnic groups in Puerto Rico and the United States can promote the creation of policy initiatives that foster entrepreneurial growth among these groups. In this light, the results from this study add to extant development literature regarding the role of small businesses on economic growth and to the importance of formulating adequate policies to ensure that small entrepreneurs have access to capital markets.

The results of this dissertation suggest that in both Puerto Rico and the United States, Puerto Rican participation in the self-employment sector did not increase as rapidly as compared to Cubans, Dominicans/Mexicans, and other immigrants/Hispanics during the 1980s. Moreover, the analysis using the Public Use Microdata Samples (PUMS) data do not show evidence of selection into the self-employment sector among Puerto Ricans, although the Integrated Public Use Microdata Series (IPUMS) sample does show a positive selection into the self-employment sector for the Puerto Rican sample during the 1980s.

This dissertation then finds evidence to suggest that Puerto Ricans have lower levels of entrepreneurial involvement. The estimation results from a multinomial logit of financing sources, employing the aforementioned survey, support the hypothesis that mainland Puerto Ricans and immigrants have greater access to credit markets than Island-born Puerto Ricans. The results employing the Census data are also consistent with the view that Puerto Ricans and immigrants are negatively selected into the entrepreneurial sector.

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CHAPTER I

INTRODUCTION

There has been growing recent interest in studying why individuals choose to become self-employed. This interest stems, in part, from the fact that much of the recent economic growth experienced in the United States is attributed to small business development. Supported by findings from this line of inquiry, extant research has also begun to explore the self-employment determinants of emerging groups, such as immigrants and African Americans. The basic policy premise of this work is that this information may be used to better design policies aimed at the economic improvement of these populations.

This line of research is expanded here by studying the self-employment tendencies of Puerto Ricans in United States and Puerto Rico. Puerto Rico and Puerto Ricans in general have experienced recent economic changes that might have affected the self-employment tendencies of Island residents and mainland Puerto Ricans. In particular, Puerto Rico's economy has benefited from Section 936 of the Internal Revenue Code. This code allows United States subsidiary firms to receive tax exemptions on the profits earned there, and it has generated much needed employment on the Island. Recently, however, the U.S. Congress has eliminated Section 936, creating concerns over alternative sources of employment. These concerns have seemingly promoted the

participation of Puerto Ricans in the self-employment sector. To further this participation, the Commonwealth administration developed the *Economic Development Model*¹ in 1993 to promote native entrepreneurial formation as a complement to capital imports. This model involves both the private and public sectors that provide external support to the small business sector. The success of the *Economic Development Model*, however, depends on the degree to which native entrepreneurs have access to funds from Island financial institutions. With regard to mainland Puerto Ricans, independent of their citizenship status, they are perceived in the literature as being disadvantaged against other Hispanic groups, thus showing signs of a developed “permanent underclass” for this group (e.g., Brimelow, 1992). Several studies in the literature also focus on an “enclave” theory, which states that certain groups (e.g., Hispanics) might more rapidly attain economic parity via the self-employment sector, particularly those who live in areas with high ethnic concentrations (Borjas, 1986; Wilson & Portes, 1980; Yuengert, 1994).

This dissertation pursues two objectives: (1) to empirically analyze the self-employment trends of Island and mainland Puerto Ricans against other groups in both Puerto Rico and the United States, and (2) to explain whether differences in small business financing sources exist among various groups in Puerto Rico.

¹ The Economic Development Model presents the strategic planning guidelines to promote the economic development of Puerto Rico. One of the goals of this model is to develop the human and physical infrastructure of the Island to reach and support economic levels comparable to those found in the United States. To accomplish this goal, the public sector must become more effective and efficient, providing the private sector with policies and regulations that can enable the economic development of Puerto Rico (Economic Productivity Council, 1994). Indeed, a similar approach has been established in El Salvador. In 1992, the Salvadoran government developed a plan to encourage the growth of micro enterprises for females in the informal sector. Its main objective is to provide women with credit, training, and access to productive inputs (Dávila & Pagán, 1999).

To accomplish the aforementioned objectives, several hypotheses are tested. Using data from the PUMS of Puerto Rico, the proportion of Puerto Ricans in the self-employment sector is hypothesized to have increased from 1980 to 1990 but not at the same pace as for other groups. Furthermore, Puerto Ricans are tested for positive self-selection into self-employment during the 1980-1990 period. To determine whether they have different self-employment patterns in the United States, the self-employment propensities of Puerto Ricans between 1980 and 1990 are evaluated. It is hypothesized that from 1980 to 1990, the self-employment propensity of Puerto Ricans in the United States has increased as a result of their exposure to better opportunities than the other sampled groups. Thus, Puerto Ricans are presumed to negatively self-select into self-employment. The second objective is tested by postulating that (1) immigrants are relatively successful in obtaining funds from financial institutions because they are wealthier than native business owners, and (2) immigrants may be positively self-selected into the entrepreneurial sector because this sector has relatively high returns to skill.

The remainder of this dissertation is organized as follows. A literature review discussing the main theories of entrepreneurship, along with the theoretical and empirical issues about self-employment is presented in Chapter II. The chapter also includes a discussion of credit access by small business owners. Chapter III formalizes the hypotheses to be tested, and the econometric models used to empirically test them are outlined in Chapter IV. Descriptions of the Public Use Microdata Samples of Puerto Rico (PUMS), Integrated Public Use Microdata Series of the United States (IPUMS) and the Survey of the Needs and Characteristics of Small and Medium Sized Enterprises of Puerto Rico (SNCE), along with summary statistics are shown in Chapters V and VI. The

empirical results of the self-employment trends of Puerto Ricans and mainland Puerto Ricans in both Puerto Rico and the United States are discussed in Chapter VII. Chapter VIII presents the empirical results of small business financing source differentials among ethnic groups in Puerto Rico. Finally, Chapter IX summarizes the empirical findings and discusses the policy implications of the results and the areas for future research.

CHAPTER II

CONCEPTUAL BACKGROUND

This chapter describes the main issues that comprise the basic framework of this dissertation. The first section discusses the theoretical background of entrepreneurship; the second and third sections analyze the theoretical and empirical evidence related to self-employment; the fourth explores the linkage between self-employment and minority groups. The last section evaluates how credit constraint issues may affect small business growth.

Theories of Entrepreneurship

The development of entrepreneurial theory can be classified according to different economic schools of thought beginning with Richard Cantillon under the Physiocratic School. In 1734, he introduced the term “entrepreneur” into the economic literature and observed the basic entrepreneurial elements that would influence the most important theories of entrepreneurial function.

Almost two centuries later, the German tradition based most of its entrepreneurial fundamentals on the contributions of Joseph Schumpeter (1934), who provided ample discussions regarding the entrepreneurial spirit. Schumpeter’s entrepreneurs were not motivated by economic rewards but by psychological factors. Schumpeter argued that self-employment arises as a result of the response of individuals facing structural

constraints and not because of their unique abilities (Schumpeter, 1934). The individual's innovative ability constitutes the essence of Schumpeter's fundamental theory of entrepreneurship.

The modern Austrian tradition perceives the entrepreneur as an arbitrageur looking for potential profits to capitalize on them. This type of entrepreneur exists, according to Kirzner (1973), because non-entrepreneurs are inefficient in their resource allocation. Furthermore, Kirzner states that entrepreneurs can operate without initial assets and without contributing anything to the production process. His entrepreneur type possesses a creative and/or perceptive responsibility similar to that of Schumpeter's innovator.

The most noticeable shortcoming of the previous traditions (German and Austrian) is that neither considers the importance of risk and uncertainty under such entrepreneurial attempts. Representatives of the "Chicago tradition" have discussed this concern. Based on Knight's (1921) distinction between risk and uncertainty², Schultz recognizes that entrepreneurs have the ability to deal with uncertain situations because they are rational economic individuals who reallocate labor and capital in response to their economic incentives (Schultz: 1975,1980).

Besides the economic foundations of entrepreneurial theory, the non-economic approaches promote the development of the entrepreneurial spirit. These approaches focus on specific psychological traits and/or particular sociological circumstances overlooked by economic theories. The main representatives of these approaches are Max

² Knight defined risk as a situation with known probabilities and insure results, while uncertainty was defined as a situation with uninsurable results.

Weber, David McClelland and Harvey Leibenstein. Weber focuses on the ethical influences of the entrepreneurial spirit, while McClelland emphasizes the possibility of isolating the motivational characteristics inherent in the entrepreneurial function (McClelland, 1976). On the other hand, Leibenstein (1968) argues that individuals have a degree of internal inefficiency caused by the dissimilarity between what they do (perform a managerial function) and what they can do (psychological capacity) to stimulate entrepreneurial spirit.

Self Employment: Theoretical Evidence

Contemporary economics literature also presents several theoretical models of self-employment. These models focus on different aspects of the individual's choice between self-employment and the wage/salary sector. Some researchers in the field stress that the difference between self-employment and wage/salary work relies on the degree of risk an individual is willing to take (Kanbur, 1979; Kihlstrom & Laffont, 1979). Conversely, Lucas (1978) takes 'entrepreneurial ability' to explain the choice of self-employment, assuming there is a distribution of managerial talent across individuals in the work force. He argues that those who have adequate skills and talents are more able to be self-employed.

Focusing on utility theory and assuming the existence of liquidity constraints, Evans and Jovanovic (1989) developed a model of selection into entrepreneurship where an individual chooses the work sector that provides the highest expected net income. For example, Blau (1987) found that the decision of being self-employed arises if the expected income provided by self-employment is greater than the one expected from the wage and/or salaried job. Similarly, Balkin (1989) asserts that in occupational choice

theory, the individual attempts to maximize returns to his/her human capital by choosing self-employment over wage work.

Attempting to provide a different focus to the self-employment issues, Coate and Tennyson (1992) developed a theoretical framework to explain the relationship between labor market discrimination and self-employment. In their work, they demonstrate that labor market discrimination may 'spill over' into markets relevant to self-employment potentially leading to statistical discrimination in these markets (e.g., credit markets). Their propositions lead to a different perspective than the existent literature. The literature implies that individuals, who are discriminated against in the labor market face a lower opportunity cost in the self-employment sector and as consequence, have a greater incentive to become self-employed. Coate and Tennyson (1992) find that labor market discrimination implies that self-employment returns depend on group membership. In other words, any individual that has been discriminated against in the labor markets, will receive lower returns from self-employment when compared to identically skilled individuals from a fairly treated group. As such, those individuals discriminated against in the labor market have less incentive and are less motivated to enter self-employment.

Self Employment: Empirical Evidence

Numerous empirical studies (Borjas, 1986; Borjas & Bronars, 1989; Evans & Leighton, 1989) have attempted to model and explain the factors affecting self-employment. These studies have been conducted at both the micro and macro levels. Most of the studies at the micro level have used U.S. data to identify the characteristics of self-employed individuals (Borjas, 1986; Borjas & Bronars, 1989; Evans & Leighton,

1989; Fairlie & Meyer 1996). In general, the findings from these studies show that self-employed individuals are more likely to be male, white, older, highly educated, married with children, and with higher level of assets. Employing micro data from England has yielded similar results (Blanchflower & Oswald, 1990; Rees & Shah, 1986).

Borjas and Bronars (1989) found that college education and age increase the probability of choosing self-employment over salaried work. Similarly, Quinn (1980) and Fuchs (1982) found a strong positive relationship between age and self-employment and showed that flexibility in hours worked contributes to a significantly higher propensity for self-employed older workers to postpone retirement compared with wage-salary workers.

Other studies have analyzed the characteristics of individuals who switch into self-employment from the wage/salary sector (Evans & Jovanovic, 1989; Holtz-Eakin, Joulfaian & Rosen, 1994). For example, Dunn and Holtz-Eakin (1996) found that parental self-employment and asset levels significantly increase the probability of being self-employed.

From a 'macro' level perspective, Phillips (1962) provides a comprehensive descriptive analysis of self-employment in the United States. Blau (1987) models the relationships between the proportion of self-employment and variables such as relative prices, technology, and tax structures. He finds that changes in the total factor productivity index (as a measure for technology) have a positive effect on the proportion of self-employment. Regarding the relationship between tax structures and self-employment, he finds that higher marginal tax rates in the upper income brackets have a positive effect on self-employment. Eisenhower (1995) employs aggregate time series

data for the United States, from 1959 to 1991, to evaluate the factors that explain an individual's choice toward self-employment. He finds that wealth, the probability of unemployment, and hours worked in the wage sector all had a positive impact on the chances of being self-employed. In the U.K, Cowling and Mitchell (1997) also used a time series analysis to explore the determinants of the increase in self-employment over the 1972-1992 period. They found that the earnings differential between self-employed and wage/salary individuals had a positive effect on the proportion of individuals in the self-employment sector.

Self-Employment and the Experience of Immigrants

Although self-employment research has been increasing during the last two decades, relatively little attention has been paid to the self-employment experience of immigrants. Several studies have used different theories to explain the self-employment choice of immigrants. For example, using the sojourners theory, Bonacich (1973) argues that self-employment is more common among immigrant groups that expect to spend a short time in the United States. Basically, immigrants choose occupations that allow them to accumulate enough money within a short period of time. Fairlie and Meyer (1996) did not find support for this theory. They found that immigrants who had been in the United States for more than 30 years have higher rates of self-employment than those with less than 10 years residence in the United States.

The literature suggests that for many members of ethnic groups, self-employment arises as an alternative to wage labor only because employers avoid hiring minority group members (Maxim, 1992). For example, Stanworth and Curran (1973) argued that immigrants are individuals whose skills and abilities are overlooked or rejected by the

host society. In addition, other studies suggest that disadvantages such as difficulty in speaking English, as well as poverty and discrimination, may cause certain groups to resort to self-employment (Moore, 1983; Sowell, 1981). It seems that these disadvantages may push immigrants toward self-employment. These findings are not consistent with the theoretical framework presented by Coate and Tennyson (1992), where they argue that “discriminated” self-employed individuals do not outperform their counterparts.

Although this theory explains why some individuals are pushed towards self-employment, it fails to explain the variation in self-employment rates across different groups (e.g. minority and immigrant groups). It should be noted, however, that other studies have demonstrated that for immigrant minorities self-employment represents an alternative for economic progress (Light, 1984; Zhou, 1992).

Moreover, recent literature shows that earlier waves of immigrants have higher earnings than recent waves. Earnings of immigrants who have been in the United States for 10 to 15 years (or longer) exceed the earnings of the native-born (Carliner, 1989; Chiswick, 1978; Long, 1980), according to empirical convention. While previous research has provided important insights regarding immigrants in the labor market, a significant aspect of this issue remains unexplored. It is particularly not uncommon in the sociological literature to assert that a major channel for immigrant assimilation has been the implied force behind the self-employment opportunities for immigrants (Bonacich & Modell, 1980; Cummings, 1980).

Borjas (1986) attempts to document the differences in self-employment propensities between the native-born and the foreign-born and analyzes the impact of assimilation and changes in cohort quality on the self-employment experience of the

immigrant population. He finds that immigrants have higher self-employment rates than native workers, although self-employment may be an important overlooked sector in the analysis of immigrant assimilation (Borjas, 1986). Indeed, Borjas and Bronars (1989) provide some evidence to suggest that large variance in self-employment rates across racial groups is partly due to consumer discrimination.³ According to them, consumer discrimination exists when white consumers dislike purchasing goods and/or services from blacks and other minorities.

The sociological literature has also analyzed the economic returns to immigrants in the self-employment sector. A debate seemingly exists over whether or not immigrants perceived a high level of earnings in the self-employment sector (Borjas, 1990; Wilson & Portes, 1980; Zhou, 1992). After extensive research, Portes & Zhou (1996) found that the choice of functional form of the earnings equation explained the various opinions regarding immigrant's earnings in the self-employment sector. It seems that when analyzing the average rate of return of self-employment, the results are consistent with Borjas (1986) and Bates (1989). On the other hand, if the analysis employs the linear form, then results will favor the positions of Portes & Zhou (1985), and Zhou (1992) among others.

Credit Access by Small Business Owners

One of the possible limitations for entrepreneurial growth is capital. This section outlines conceptual sources that might help explain differentials in access to financial

³ According to the consumer discrimination hypothesis, majority group members will openly avoid promoting minority group individuals and minority group members will also discriminate against their own group, because they wish to acquire goods and/or services from high status providers (Maxim, 1992).

markets across groups. These sources are not surprisingly different from those found in textbooks that discuss the factors that banks and other financial institutions use to evaluate the creditworthiness of prospective entrepreneurs. Most credit managers and/or bankers categorize these factors as the five “Cs” of credit: capital, collateral, character, capacity and conditions. These factors are considered as elements in the traditional loan evaluation methods used by banking organizations in the lending process.

A small business must have a stable capital base before a financial institution will grant a loan. *Capital* represents financial strength via the net worth of the applicant. The owner’s willingness to pledge *collateral* is considered by financial institutions as an indication of the owner’s commitment to making the venture a success. Conceptually, financing sources may differ across groups because of credit rationing. For example, Evans and Jovanovic (1989) suggest that business owners might face liquidity constraints that affect capital flows given imperfect information in capital markets. Specifically, they used U.S. micro data to test that people with greater family assets are more likely to switch to self-employment from wage/salary employment, *ceteris paribus*. In addition, empirical work by Holtz-Eakin et al. (1994) showed that individuals who generate higher levels of income seem to have less liquidity constraints and as a result greater access to financial markets, which might promote entrepreneurial growth among individuals. The results found by Blanchflower and Oswald (1998) are consistent with the existence of liquidity/capital constraints on potential entrepreneurs. After analyzing several British micro data, they found that the probability of self-employment depends on whether or not individuals received an inheritance or gift. According to Stiglitz and Weiss (1981), the higher probability or cost of default and collateral requirements among groups might

yield credit rationing. Credit rationing in this model owes to lenders' avoidance of adverse selection caused by high loan rates and collateral requirements.

In terms of *character*, and due to the abstract nature of this concept, researchers consider the educational level of small firm owners as a proxy for this source.

Furthermore, unmeasurable skills are captured by using a variation of the Roy model (Roy, 1951) proposed by Borjas and Bronars (1989). In particular, Borjas and Bronars (1989) find that minority groups are negatively selected into self-employment and positively selected into salaried jobs (unlike non-minority groups). In other words, high ability individuals are more likely to select salaried jobs.

Likewise, certain *conditions* surrounding loan requests also affect the owner's chance of receiving funds. Financial institutions consider factors related to the business operation such as potential growth in the market, competition, location and form of ownership (Van Auken & Carter, 1989).

Summary

This chapter explores the origins of entrepreneurship paying particular attention to a variety of theories that were used to explain the "entrepreneurial spirit." A discussion of theoretical and empirical evidence of self-employment is also presented.

The theoretical evidence emphasizes how risk aversion, liquidity constraints and occupational choices are used in the literature to explain self-employment choice over wage/salary work (Balkin, 1989; Evans & Jovanovic, 1989; Kanbur, 1979). The empirical literature presents the factors that seem to affect the self-employment decision over different periods of time and data sources. The studies seemingly agree that age, high levels of education, marital status, number of children positively influence the self-

employment decision (Borjas, 1986; Borjas & Bronars, 1989; Evans & Leighton, 1989; Fairlie & Meyer, 1996).

Because this dissertation investigates the self-employment trends of specific groups in both Puerto Rico and the United States, this chapter discusses the experience of immigrants in the self-employment sector. Issues such as consumer discrimination (Borjas & Bronars, 1989), employer discrimination (Maxim, 1992), and labor discrimination (Coate & Tennyson, 1992) appear to affect negatively the self-employment choice of immigrants. The limited participation of minority groups in the self-employment sector can also be explained by their inadequate access to credit markets. For this reason, an overview of the conceptual sources that might help explain differentials in access to financial markets concludes the discussion of this chapter.

CHAPTER III

HYPOTHESES

This dissertation pursues two related objectives: (1) the analysis of the self-employment trends of Puerto Ricans and mainland Puerto Ricans on the Island and in the United States against other groups⁴, and (2) whether variations across groups on the Island relate to differences in the availability of small business financing sources.

To accomplish the first objective, I identify the factors that may influence the self-employment decision among Puerto Ricans and other groups in the labor market of Puerto Rico. Following extant literature, socio-economic and human capital factors are the most important determinants of the self-employment decision. After controlling for these factors, I hypothesize that the proportion of Puerto Ricans in the self-employment sector may have increased from 1980 to 1990, but not at the same pace than the other groups, perhaps as the result of differences in group attributes and abilities between groups.

Formally, I hypothesize that:

H_{1a}: In Puerto Rico, the proportion of Puerto Ricans in the self-employment sector increased from 1980 to 1990, but not at

⁴ When self-employment trends in Puerto Rico are evaluated, the sample is decomposed into four groups: Puerto Ricans, mainland Puerto Ricans, Cubans and Dominicans. The analysis for the United States includes Puerto Ricans, mainland Puerto Ricans, Cubans, and Mexicans.

the same pace than that of mainland Puerto Ricans, Cubans and Dominicans.

H_{1b}: Puerto Ricans are positively self-selected into self-employment when compared to other sampled groups in Puerto Rico.

To investigate if self-employment patterns in the United States differ from those in Puerto Rico, self-employment propensities of Puerto Ricans between 1980 and 1990 are evaluated. Therefore, I hypothesize the following:

H_{1c}: The self-employment propensity of Puerto Ricans in the United States increased from 1980 to 1990 compared to other groups.

H_{1d}: Puerto Ricans in the United States negatively self-selected into self-employment during the 1980-1990 period.

Finally, to accomplish the second objective I test several propositions. First, immigrants are relatively successful in obtaining funds from financial institutions because they are wealthier than native business owners. As such, immigrants face fewer liquidity constraints (Evans & Jovanovic, 1989) and might represent a group with greater investment return potential. Also, immigrants might be highly represented in the financial sector, particularly in managerial positions, perhaps implying institutional discrimination against natives.

H_{2a}: In Puerto Rico, immigrants are more successful than natives in obtaining financial funds due to wealth differences between the two groups.

Lastly, immigrants could be positively self-selected into the entrepreneurial sector because this sector has relatively high returns to skill; therefore, financial institutions might attach a higher probability of business success to immigrants.

H_{2b}: Immigrants in Puerto Rico are positively self-selected into the entrepreneurial sector during 1990.

Summary

This chapter outlines the hypotheses that will empirically test the main objectives of this dissertation. The first set of hypotheses (H_{1a} and H_{1b}), which are based on the 1980 and 1990 PUMS of Puerto Rico, analyze the Puerto Rican behavior in the self-employment sector on the Island. The 1980 and 1990 IPUMS samples are used to test hypotheses H_{1c} and H_{1d}, which deal with the self-employment propensity of Puerto Ricans in the United States. Finally, and using the 1995 SNCE survey, the last set of hypotheses (H_{2a} and H_{2b}) evaluate the access to credit markets by several ethnic groups in Puerto Rico.

CHAPTER IV

ECONOMETRIC METHODOLOGY

This chapter includes a description of the econometric techniques and the list of the variables employed in this dissertation to evaluate the hypotheses outlined in Chapter III. The switching regression model evaluates the choice of being self-employed in both the PUMS and IPUMS samples for 1980 and 1990. The model also is estimated for pooled samples using interaction terms. Finally, a multinomial logit model is used to explore the determinants that affect differences in financing sources across the sampled groups

Switching Regression Models

The endogenous switching regression is commonly employed to model individual choice between labor market sectors (e.g., self-employment and wage employment). This framework has been applied to analyze the self-employment choice in Britain (Rees & Shah, 1986), to developing country labor markets (Blau, 1985), to the analysis of self-employment in the presence of consumer discrimination (Borjas & Bronars, 1989), and to model differences between immigrant and native self-employment (Yuengert, 1994).

The sectoral employment choice is modeled using a switching regression framework to explicitly account for endogeneity of self-employment as well as selectivity issues that arise when estimating the sectoral-specific earnings structure. Thus, in a single

likelihood function, the model incorporates the parameters that determine three fundamental relationships: the self-employment decision and the determinants of self-employment/salaried sectoral earnings.

Individuals choose the sector in which they receive the highest utility taking into account their human capital, the sectoral-specific labor market value of human capital, unobserved (and unmeasured) ability, and the explicit and implicit costs involved in the self-employment decision. The sectoral earnings and the self-employment/salaried income sector choice can be estimated using a three-equation switching regression model:

$$I^* = Z\gamma + \varepsilon \quad (1)$$

$$\ln Y_{SE} = X\beta_{SE} + u_{SE} \quad (2)$$

$$\ln Y_{WS} = X\beta_{WS} + u_{WS} \quad (3)$$

I^* represents an unobservable latent variable or index function that captures the likelihood of being self-employed. When I^* is positive, then we observe that the individual is self-employed ($I=1$) and if I^* is negative then the worker is employed in the wage/salary sector ($I=0$). Z is a vector of explanatory variables posited to affect the sectoral employment decision, while γ is a vector of parameters showing the impact of the explanatory variables. Equations 2 and 3 present the log of weekly earnings of self-employed and wage/salary workers. Following Mincer (1974), these earnings equations consist of human capital variables, personal attributes and other control variables. The X_i vector captures the observed influences on earnings with parameters β_{SE} and β_{WS} . Assuming that the variance of the errors equals one, the (1) – (3) system of equations can

be jointly estimated using maximum likelihood (see Amemiya, 1985; Maddala, 1983).

Table 4.1 presents the variables used to estimate Equations (1) through (3).

The correlation coefficients between ε and u_{SE} , u_{WS} (ρ_{SE} and ρ_{WS}) tell us the direction and the degree of selectivity in each sector (Borjas & Bronars, 1989; Maddala, 1983). If ρ_{SE} is positive, evidence of positive selection into self-employment exists; that is, high-ability individuals will choose self-employment. If the correlation coefficient is negative then the opposite result occurs, e.g., low-ability individuals select self-employment. For the salaried sector, if ρ_{WS} is negative then positive selection exists in this sector; if it is positive, then negative selection might occur.

Switching Regression Models – Pooled Samples

To test whether self-employment trends have changed from 1980 to 1990 in Puerto Rico and the United States a switching regression model that includes an interaction term between the sampled groups (Puerto Ricans, mainland Puerto Ricans, Dominicans/Mexicans, Cubans, Other Immigrants/Other Hispanics) and a binary variable (DUMMY 1990) is employed. The binary variable equals 1 if the individual was surveyed in the 1990 PUMS or 1990 IPUMS. If the coefficient for the variable is positive and significant it indicates that self-employment increased from 1980 to 1990.

The model assumes the form of

$$I^* = W\gamma + \varepsilon \quad (4),$$

I^* represents an index function that captures the likelihood of being self-employed. W is a vector of explanatory variables including age, years of education, experience, experience squared, gender, marital status, number of children, English proficiency, disability status,

Table 4.1

Switching Regression Model: Definition of Variables

Variable	
MALE	= 1 if individual is male; 0 otherwise
MARRIED	= 1 if individual is married; 0 otherwise
CHILDREN	= number of children
EDUCATION	= number of years of formal education
ENGLISH VERY WELL	= 1 if individual speaks English very well; 0 otherwise
ENGLISH NOT WELL	= 1 if individual speaks English, but not very well; 0 otherwise
NO ENGLISH	= 1 if individual does not speaks English; 0 otherwise
EXPERIENCE	= age - education - 6
EXPERIENCE²	= experience * experience
ARRIVAL	= years since arrival to Puerto Rico/United States
HOURS	= natural log of weekly hours
DISABILITY	= 1 if individual has a disability that impedes work; 0 otherwise
SELF-EMPLOYED	= 1 if individual is self-employed; 0 otherwise
DUMMY 1990	= 1 if year is 1990; 0 otherwise
PUERTO RICAN	= 1 if individual was born in Puerto Rico; 0 otherwise
MAINLAND PUERTO RICAN	= 1 if individual was born in United States from Puerto Rican parents; 0 otherwise
CUBAN	= 1 if individual was born in Cuba; 0 otherwise

(Table continues)

Variable	
DOMINICAN	= 1 if individual was born in Dominican Republic; 0 otherwise
MEXICAN	= 1 if individual was born in Mexico; 0 otherwise
OTHER IMMIGRANT	= 1 if individual can not be classified as either Cuban or Dominican; 0 otherwise
OTHER HISPANIC	= 1 if individual can not be classified as either Cuban or Mexican; 0 otherwise
CUBAN1990	= CUBAN * DUMMY 1990
MEXICAN1990	= MEXICAN * DUMMY 1990
DOMINICAN1990	= DOMINICAN * DUMMY 1990
MAINLAND PUERTO RICANS1990	= MAINLAND PUERTO RICAN * DUMMY 1990
OTHER HISPANICS1990	= OTHER HISPANICS * DUMMY 1990
OTHER IMMIGRANTS1990	= OTHER IMMIGRANTS * DUMMY 1990

binary variables for the sampled groups, and interaction terms between the sampled groups and the variable DUMMY 1990. If the coefficients for the interaction terms are positive and significant, participation in the self-employment sector by a specific sampled group increased from 1980 to 1990 relative to a reference group.

Multinomial Logit Models

To investigate whether funding differentials exist among diverse groups, an econometric model that compares the selection among different financing sources of small business owners is employed. The model assumes that individuals select a financing source according to their socio-economic status, the economic characteristics of the business, financing opportunities in the region of residence, and individual tastes and preferences. The model assumes a conditional probability function that indicates the likelihood that a business owner i selects financing source j . This function depends on a vector of i 's exogenous variables (X_i),

$$P(\text{financing source} = j) = \exp(X_i'\beta_j) / \sum_{j=1}^J \exp(X_i'\beta_j). \quad (5)$$

P follows a logistic conditional probability function and β_j represents $K \times 1$ vector of coefficients for choice j . These parameters are estimated using maximum likelihood estimation (Greene, 1997). A list of the variables used in the multinomial logit model is presented in Table 4.2.

To analyze the causes of national origin differences in financing sources, I first estimate (5) for a sample of native small business owners. Second, the estimated coefficients ($\hat{\beta}_j$) are used to generate the distribution of non-native-owned businesses

Table 4.2

Multinomial Logit Model: Definition of Variables

Variable	
MALE	= 1 if business owner is male; 0 otherwise.
AGE	= age of business owner
HIGH SCHOOL OR LESS	= 1 if the business owner has completed high school or less; 0 otherwise
COLLEGE	= 1 if the business owner has some college or a bachelor's degree; 0 otherwise
ADVANCED DEGREE	= 1 if the business owner has a master's or doctoral degree; 0 otherwise
ISLAND BORN PUERTO RICAN	= 1 if business owner is an Island-Born Puerto Rican; 0 otherwise.
MAINLAND PUERTO RICAN	= 1 if business owner is a mainland Puerto Rican; 0 otherwise.
IMMIGRANT	= 1 if business owner is an immigrant; 0 otherwise.
EMPLOYEES	= Number of employees
ESTABLISHED	= Years of business operation
BOUGHT	= 1 if the business had been bought from someone else; 0 otherwise.
INHERITED	= 1 if the business had been inherited; 0 otherwise.
FOUNDED	= 1 if the business had been founded by the owner; 0 otherwise.
CORPORATION	= 1 if business is organized as a corporation; 0 otherwise
PARTNERSHIP	= 1 if business is organized as a partnership; 0 otherwise

(Table continues)

Variable	
SOLE PROPRIETORSHIP	= 1 if business is organized as a sole proprietorship; 0 otherwise
FINANCIAL STATEMENTS	= 1 if business prepares financial statements; 0 otherwise
PONCE	= 1 if business is located in Ponce; 0 otherwise
MAYAGUEZ	= 1 if business is located in Mayagüez; 0 otherwise
ARECIBO	= 1 if business is located in Arecibo; 0 otherwise
METRO	= 1 if business is located in the San Juan Metropolitan area; 0 otherwise
RETAIL	= 1 if business is in the retail industry; 0 otherwise
WHOLESALE	= 1 if business is in the wholesale industry; 0 otherwise.
CONSTRUCTION	= 1 if business is in the construction industry; 0 otherwise
MANUFACTURING	= 1 if business is in the manufacturing industry; 0 otherwise.
TRANSPORTATION	= 1 if business is in the transportation industry; 0 otherwise.
FINANCE	= 1 if business is in the finance industry; 0 otherwise.
SERVICES	= 1 if business is in the service industry; 0 otherwise.
COMMERCIAL	= 1 if initial financing source is a commercial loan; 0 otherwise.
CREDIT LINES	= 1 if initial financing source is a credit line; 0 otherwise.
PERSONAL	= 1 if initial financing source is a personal loan; 0 otherwise.
REINVESTMENT	= 1 if initial financing source is reinvestment; 0 otherwise.
CREDIT CARDS	= 1 if initial financing source is credit cards; 0 otherwise.

financing sources given the financial market structure faced by native-owned businesses.

The predicted probability that the i th non-native-owned business mainly finances its operations by source j (\hat{P}_{ij}) given the characteristics of the non-native-owned business (X_j^n), is given by

$$\hat{P}_{ij} = \exp(X_j^n' \hat{\beta}_j) / \sum_{j=1}^J \exp(X_j^n' \hat{\beta}_j). \quad (6)$$

Adding the j th financing-source predicted probabilities for each non-native-owned business *across* this sample yields a predicted “financing source” distribution for non-native businesses. The predicted distribution is the distribution that would exist if financial markets treated native and non-native-owned small businesses equally. The extent of national origin inequality in financing sources can be quantified by a distribution dissimilarity index (DDI) of the form:

$$DDI = 0.5 \sum_{j=1}^J |P_j^n - \hat{P}_j^n|. \quad (7)$$

P_j^n represents the proportion of non-native-owned businesses that use (or have access to) financing source j and \hat{P}_j^n represents the (multinomial logit) predicted proportion of non-native-owned businesses that finance their operations through source j . Intuitively, the index is the proportion of non-native-owned businesses that would have to shift to other financing sources to equalize the distributions (the actual and the model-predicted) of the two groups.

Summary

This chapter describes the econometric techniques employed in this dissertation to test the hypotheses outlined in the previous chapter. A switching regression model is used to analyze the self-employment trends of the sampled groups in Puerto Rico and the United States. The model helps in identifying the factors that influence the self-employment decision as well as selectivity issues that arise when estimating the sectoral-specific earnings structure. In addition, a model that includes an interaction term between the outlined groups and a binary variable for 1990 is employed to test whether self-employment trends have changed from 1980 to 1990 in Puerto Rico and in the United States. After considering a set of socio-demographic variables, a multinomial logit model is employed to investigate whether funding differentials exist among different groups in Puerto Rico. The model also provides data to analyze the predicted distribution of financing among the ethnic groups.

CHAPTER V

DESCRIPTION OF DATA SETS

The econometric analyses described in the previous chapter are operationalized employing several data sources: selected samples from both the United States and Puerto Rican Census of Population and Housing; and a small business survey developed by a research center at the University of Puerto Rico. With the exception of the Survey of the Needs and Characteristics of Small and Medium Sized Enterprises (SNCE), all databases have been used in major studies that attempt to analyze specific characteristics of self-employed individuals.

Public Use Microdata Samples of Puerto Rico

The Public Use Microdata Samples (PUMS) of Puerto Rico contain records representing a 5% sample of the housing units in Puerto Rico. Each microdata file is a stratified sample of the population. Sampling was done household-by-household to allow the study of family relationships and housing unit characteristics. The 1980 samples are self-weighted, while each file for 1990 contains individual weights for both the housing and the individuals in the unit. The data were obtained from the machine-readable files of the Census of Population & Housing of Puerto Rico (U.S. Bureau of the Census: 1980, 1990).

Although the PUMS samples provide data for both household and individuals, this dissertation focuses only on individual information. PUMS variables such as age, gender, education, marital status, number of children, ethnicity, English proficiency, disability status

and class of worker are used in the empirical analysis. This study does not include the race variable because the PUMS does not include that information for Puerto Rico. The PUMS samples are used to test the hypotheses of the propensity of Puerto Ricans in the self-employment sector in Puerto Rico for 1980 and 1990. Also, the 1990 PUMS is used to explain differentials in financing sources among small businesses in Puerto Rico.

Integrated Public Use Microdata Series of the United States (IPUMS)

The Integrated Public Use Microdata Series (IPUMS) consists of compatible-format individual-level representative samples of the United States from thirteen federal censuses (1850-1990), compiled by the Historical Census Project at the University of Minnesota (Ruggles & Sobek, 1997). The samples are clustered because they are not individual-level samples; instead, they are samples of households or dwellings. The 1960 and subsequent samples employed contain stratification schemes based not only on geography but also on such characteristics as household size, race, and group quarters membership. In some cases, the positive effects of stratification outweigh the adverse effects of clustering, so the IPUMS sample designs can actually yield smaller standard errors than would be obtained through a simple random sample of similar size.

The IPUMS assigns uniform codes across all the samples and brings relevant information to facilitate the analysis of social and economic change. The series include data on a broad range of population characteristics, including demographics, immigration, internal migration, labor-force participation, occupational structure, education, ethnicity, and household composition. As with the PUMS sample, only individual data is used for the study. A variety of socio-demographic variables, such as, age, gender, education, marital status, number of children, ethnicity, English proficiency, disability status and class of worker are

employed in the econometric analysis. The 1% IPUMS data helps in the testing of the hypotheses of the Puerto Rican participation in the self-employment sector in the United States for 1980 and 1990.

Survey of the Needs and Characteristics of Small and Medium Sized Enterprises

The Survey of the Needs and Characteristics of Small and Medium Sized Enterprises (SNCE) was developed by the Center for Economic Development of the University of Puerto Rico (Vega & Romaguera, 1995). It was conducted to develop a descriptive profile of small business owners in Puerto Rico. The objective of the survey was to provide information that might be used as a framework for the development of policies and programs that support the entrepreneurial sector in Puerto Rico. The survey contains basic economic information on a sample of 305 small and medium-sized businesses, such as sources of financing, age of the business, education of the owner, number of employees, industry, region, and the owners' general perceptions of the business environment in Puerto Rico.

The SNCE is a unique data source because it is the only source of available information regarding small businesses in Puerto Rico. The survey does not provide information on specific financial data that may be helpful in the analysis of financing differentials. Although the sample composition of this survey does not resemble the Census information, these data are used because they provide valuable information for the purposes of this study. The SNCE is used to identify the financing sources used by the sampled groups (Island-born Puerto Ricans, mainland Puerto Ricans, and immigrants) in Puerto Rico.

Summary

This chapter presents a description of all data sets used in this study. The 1980 and 1990 PUMS samples of Puerto Rico, which provide basic socio-economic and demographic

information, are used to evaluate and compare the participation of Puerto Ricans in the self-employment sector against other ethnic groups (Cubans, Dominicans and other immigrants). To evaluate if self-employment trends of Puerto Ricans differ in the United States from the trends in Puerto Rico, the 1980 and 1990 IPUMS samples are employed in a switching regression model. The Housing Census Project at the University of Minnesota was responsible for the compilation of the IPUMS samples data. Finally, the 1995 SNCE survey is used by a multinomial logit model to test whether there are variations in financing sources among Island-born Puerto Ricans, mainland Puerto Ricans, and immigrants. This survey is a very unique data set that provides information about small businesses in Puerto Rico.

CHAPTER VI

SAMPLE SELECTION AND STATISTICS

This study utilizes data from both the 1980 and 1990 5% PUMS and 1% IPUMS samples to analyze the changes in self-employment trends in Puerto Rico and the United States. The empirical analysis is limited to a sub-sample of individuals between 18-65 years old, who worked at least a week, and had positive income⁵ during the previous year under analysis. Owing to the nature of this study, individuals are classified into self-employed and wage/salaried workers. Following previous studies, both incorporated and unincorporated⁶ self-employed workers are treated identically (Borjas, 1986; Dennis, 1996; Yuengert, 1994).

The PUMS and IPUMS samples are classified into four different groups: Puerto Ricans, Mainland Puerto Ricans, Cubans, and Dominicans⁷. These groups are defined according to the individual's place of birth. As such, Puerto Ricans are those individuals who were born in Puerto Rico, while mainland Puerto Ricans are those who were born in the United States from Puerto Rican parents. To determine if differences in financing sources exist among small business owners in Puerto Rico, the SNCE sample was partitioned into three major groups: Island-born Puerto Ricans, Puerto Ricans born in the United States, and immigrants.

⁵ Total income is the sum of wage and business non-farm income.

⁶ Self-employed individuals are classified as incorporated workers when they are employees of their own corporation.

⁷ Due to the nature of the population composition in the United States, the group classification for the IPUMS samples include Mexicans instead of Dominicans.

Selected Summary Statistics

A general overview of the self-employment and incomes trends among the outlined groups for both the PUMS and IPUMS samples during the 1980-1990 period is shown in Tables 6.1.1 and 6.1.2. Although each group increased its participation in the self-employment sector from 1980 to 1990, both Puerto Ricans and mainland Puerto Ricans show the lowest percentage change, as compared to the other groups in Puerto Rico (Table 6.1.1). In terms of real income, mainland Puerto Ricans increased their self-employment income by about 23% during the 1980-1990 period.⁸ Besides this, the empirical results show that mainland Puerto Ricans were less likely to engage in self-employment activities (refer to Chapter VII for details). Although Cubans have relative low self-employment income, they tend to prefer the self-employment sector (see Chapter VII for further details). The statistics from the IPUMS sample presented in Table 6.1.2 show that mainland Puerto Ricans and Mexicans had the highest percentage change in self-employment rates, although Mexicans generated the lowest percentage change in self-employment income. On the other hand, Puerto Rican self-employed individuals in the United States had the highest percentage change in income from 1980 to 1990, thus their participation in the self-employment sector did not increase as expected during that period (refer to Chapter VII).

Table 6.2.1 presents a profile for the outlined groups included in the 1980 PUMS sample. A the sample. The table further shows that Cubans tend to be more likely to engage in self-employment activities than any other group. They also report the highest level of work s can be seen, Cubans are, on average, the oldest and most educated group in the sample.

⁸ Weekly income for 1980 is expressed in 1990 dollars.

Table 6.1.1

Self-Employment Rates and Incomes: PUMS Sample- Puerto Rico

Group	Self-Employment Rates			Mean Weekly Income of Salaried Workers			Mean Weekly Income of Self-employed Workers		
	1980	1990	Change	1980	1990	Change	1980	1990	Change
<i>Puerto Ricans</i>	9.06	10.31	13.80	154.98	165.82	6.99	148.99	148.16	-0.01
<i>Mainland Puerto Ricans</i>	4.94	5.34	8.09	157.49	170.51	8.27	159.42	196.04	22.97
<u>Comparison Groups</u>									
<i>Cubans</i>	19.89	28.63	43.94	252.55	289.28	14.54	351.54	320.09	-8.95
<i>Dominicans</i>	13.36	17.72	32.63	146.45	145.47	-0.01	198.32	166.35	-16.12
<i>Other Immigrants</i>	8.62	15.89	84.34	217.83	234.91	7.85	267.16	292.25	9.39

Notes:

^a The self-employment rate is the percentage of all working individuals between 18 and 65 years old who are self-employed.

^b Weekly income for 1980 is expressed in 1990 dollars.

^c The percentage change in the self-employment rates is calculated dividing the difference in self-employment rate between 1980 and 1990 by the self-employment rate in 1980.

^d The percentage change in mean weekly income is calculated dividing the difference in weekly income between 1980 and 1990 by the mean weekly income in 1980.

^e The comparison groups in this sample were selected considering the large representation of these populations on the Island.

Sources:

1980 and 1990 Public Use Microdata Samples

Government of Puerto Rico, Department of Labor, Cost of Life Division Staff (personal communication, February 2, 2000)

Table 6.1.2

Self-Employment Rates and Incomes: IPUMS sample- United States

Group	Self-Employment Rates			Mean Weekly Income of Salaried Workers			Mean Weekly Income of Self-employed Workers		
	1980	1990	Change	1980	1990	Change	1980	1990	Change
<i>Puerto Ricans</i>	3.30	4.80	45.45	310.74	343.28	10.47	328.65	333.52	1.42
<i>Mainland Puerto Ricans</i>	1.83	3.15	72.13	298.73	331.62	11.00	409.08	396.35	-3.11
<u>Comparison Groups</u>									
<i>Cubans</i>	9.78	13.21	35.07	336.95	359.53	6.70	420.30	422.76	0.01
<i>Mexicans</i>	3.86	5.74	48.70	281.63	255.75	-9.19	335.43	247.16	-26.32
<i>Other Hispanics</i>	6.08	7.99	31.41	314.44	280.12	-10.91	407.58	319.48	-21.62

Notes:

^a The self-employment rate is the percentage of all working individuals between 18 and 65 years old who are self-employed.

^b Weekly income for 1980 is expressed in 1990 dollars.

^c The percentage change in the self-employment rates is calculated dividing the difference in self-employment rate between 1980 and 1990 by the self-employment rate in 1980.

^d The percentage change in mean weekly income is calculated dividing the difference in weekly income between 1980 and 1990 by the mean weekly income in 1980.

^e The comparison groups in this sample were selected considering the large representation of these populations in United States.

Sources:

1980 and 1990 Integrated Public Microdata Series
U.S. Department of Labor, Bureau of Labor Statistics

Table 6.2.1

Descriptive Statistics: 1980 PUMS sample – Puerto Rico

Variable	Puerto Ricans	Mainland Puerto Ricans	Cubans	Dominicans	Other Immigrants
	Mean	Mean	Mean	Mean	Mean
Age	36.56	26.36	43.81	37.81	36.05
Married	0.74	0.56	0.78	0.71	0.71
Male	0.63	0.51	0.64	0.58	0.64
Education	10.98	13.19	13.33	10.18	12.79
Experience	19.59	7.26	24.49	21.63	17.27
Children	0.74	0.44	0.46	0.98	0.56
Self-employed	0.09	0.05	0.20	0.13	0.09
Disability	0.04	0.02	0.02	0.03	0.03
English Very Well	0.31	0.76	0.45	0.19	0.62
English Not Well	0.31	0.15	0.31	0.24	0.17
No English	0.38	0.08	0.24	0.57	0.21
Arrival	----	----	13.12	10.04	3.03
Hours	3.55	3.56	3.63	3.54	3.64
Natural log of weekly income	4.70	4.72	5.26	4.69	5.07
N	29,974	1,173	558	464	1,253

Note:

^a Group classifications are based on individual's country of birth, with the exception of mainland Puerto Ricans which are classified according to both their country of birth and parent's ethnicity.

The table further shows that Cubans tend to be more likely to engage in self-employment activities than any other group. They also report the highest level of work experience and weekly income. These statistics are in line with previous findings in the literature suggesting that individuals with such characteristics are more likely to be self-employed (Borjas, 1986; Borjas & Bronars, 1989). On the other hand, about 4.3% of Puerto Ricans had a disability that might impede their ability to work. With the exception of Puerto Ricans and Dominicans, more than 50% of the sampled groups spoke English very well. These last two factors (disability and English proficiency) may push these groups into self-employment. One interesting point is that, on average, mainland Puerto Ricans are the youngest group in the sample, and still a highly educated sample. The age gap between the mainland Puerto Ricans and the other sampled groups ranges from 9-18 years. This gap could explain their lower level of business experience as compared to other groups.

As presented in Table 6.2.2, the descriptive statistics for the 1990 PUMS sample follow a similar pattern to that of the 1980 sample. On average, Puerto Ricans had completed about 12 years of education, with only 32% speaking English very well. It is interesting to note that both Cubans and Dominicans tend to have a higher participation rate in the self-employment sector than Puerto Ricans.

Table 6.2.3 presented the descriptive statistics for those individuals sampled from the 1980 IPUMS. As expected, almost 100% of the sample spoke English very well. The Mexican sample posted the highest male representation as compared to the other groups, with 71% of male individuals in the sample. Although mainland Puerto Ricans in the

Table 6.2.2

Descriptive Statistics: 1990 PUMS sample- Puerto Rico

Variable	Puerto Ricans	Mainland Puerto Ricans	Cubans	Dominicans	Other Immigrants
	Mean	Mean	Mean	Mean	Mean
Age	37.74	28.72	44.89	36.85	38.91
Married	0.68	0.61	0.77	0.62	0.72
Male	0.61	0.54	0.65	0.54	0.62
Education	11.98	13.42	13.78	10.28	13.94
Experience	19.78	9.32	25.12	20.58	18.99
Children	0.73	0.57	0.58	0.99	0.60
Self-employed	0.10	0.05	0.29	0.18	0.16
Disability	0.05	0.03	0.04	0.04	0.02
English Very Well	0.32	0.71	0.54	0.15	0.67
English Not Well	0.29	0.16	0.23	.26	0.19
No English	0.39	0.13	0.23	0.59	0.14
Arrival	----	17.28	20.78	11.52	14.61
Hours	3.57	3.58	3.67	3.57	3.62
Natural log of weekly income	5.10	5.15	5.70	5.00	5.49
N	38,803	3,051	489	920	881

Note:

^a Group classifications are based on individual's country of birth, with the exception of mainland Puerto Ricans which are classified according to both their country of birth and parent's ethnicity.

Table 6.2.3

Descriptive Statistics: 1980 IPUMS Sample – United States

Variable	Puerto Ricans	Mainland Puerto Ricans	Cubans	Mexicans	Other Hispanics
	Mean	Mean	Mean	Mean	Mean
Age	37.12	27.98	40.98	33.42	35.42
Married	0.68	0.51	0.70	0.70	0.62
Male	0.65	0.61	0.56	0.71	0.56
Education	10.12	12.24	11.94	8.00	11.74
Experience	21.01	9.75	23.06	19.43	17.69
Children	1.38	0.72	0.97	1.65	1.08
Self-employed	0.03	0.02	0.10	0.04	0.06
Disability	0.03	0.04	0.02	0.02	0.03
English very well	1.00	0.99	1.00	0.99	0.99
English not well	----	0.01	----	0.01	0.01
No English	----	----	----	----	----
Arrival	----	----	15.40	12.12	6.13
Hours	3.61	3.57	3.66	3.65	3.61
Natural log of weekly income	5.21	5.17	5.31	5.11	5.23
N	3,392	983	3,148	9,102	10,500

Note:

^aGroup classifications are based on individual's country of birth, with the exception of mainland Puerto Ricans which are classified according to both their country of birth and parent's ethnicity.

United States tended to have more years of education than the rest of the sample, it appears on average that they had the lowest level of experience (about 10 years).

As in Puerto Rico, mainland Puerto Ricans were the youngest group in the sample.

However, the difference between mainland Puerto Ricans and the other sampled groups ranges from 5-13 years. Cubans have a higher level of participation in the self-employment sector. A possible explanation for this could be the difference in length of times these groups have spent in the United States (Borjas & Bronars, 1989).

The 1990 IPUMS sample statistics outlined in Table 6.2.4 show that both Puerto Ricans and Cubans reported more than 20 years of experience in 1990. According to the data, Mexicans had the lowest level of education, with an average of about 9 years of schooling. About one-half of the sample of mainland Puerto Ricans in the United States were female. A pattern similar to the one in Puerto Rico was found: Cubans had the highest level of experience and participation in the self-employment sector.

The descriptive statistics for both the PUMS and IPUMS samples tend to suggest that there is no evidence to support the hypotheses (H_{1a} and H1c) outlined in Chapter III. However, although this basic analysis begins to explore the issues of this study, a more comprehensive and empirical analysis is required to either support or reject the aforementioned hypotheses.

Table 6.2.5 shows a profile of the sampled groups in the 1995 SNCE. The statistics show a high concentration of small businesses in the San Juan Metropolitan area. Other major differences exist across the groups. Two thirds of immigrant-owned businesses were corporations (66.7%), compared to the other two groups that were mainly organized as sole proprietorships. According to Van Auken & Carter (1989),

Table 6.2.4

Descriptive Statistics: 1990 IPUMS Sample – United States

Variable	Puerto Ricans	Mainland Puerto Ricans	Cubans	Mexicans	Other Hispanics
	Mean	Mean	Mean	Mean	Mean
Age	39.33	30.55	43.22	33.05	35.53
Married	0.59	0.48	0.68	0.62	0.55
Male	0.58	0.52	0.58	0.70	0.55
Education	11.66	13.20	12.43	8.59	11.99
Experience	21.68	11.40	24.79	18.47	17.55
Children	1.15	0.80	0.92	1.40	0.96
Self-employed	0.05	0.03	0.13	0.06	0.08
Disability	0.03	0.02	0.02	0.02	0.02
English very well	0.98	0.98	0.98	0.98	0.99
English not well	0.02	0.02	0.01	0.01	0.01
No English	----	----	0.01	0.01	----
Arrival	22.99	----	21.02	13.39	8.74
Hours	3.62	3.60	3.68	3.65	3.62
Natural log of weekly income	5.84	5.81	5.91	5.54	5.70
N	4,337	2,444	3,619	20,703	185

Note:

^a Group classifications are based on individual's country of birth, with the exception of mainland Puerto Ricans which are classified according to both their country of birth and parent's ethnicity.

Table 6.2.5

Descriptive Statistics: 1995 SNCE sample – Puerto Rico

Variable	Island Born Puerto Ricans		Mainland Puerto Ricans		Immigrants	
	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error
Male	0.844	0.363	0.762	0.436	0.905	0.301
Age	49.498	13.574	41.048	10.571	50.714	7.170
High School or less	0.650	0.478	0.857	0.129	0.571	0.507
College	0.175	0.381	0.143	0.359	0.286	0.463
Adv. Degree	0.175	0.381	0.000	0.000	0.143	0.359
Employees	4.468	12.692	4.714	8.156	14.571	22.916
Established	15.764	12.519	11.571	7.865	13.619	8.599
Bought	0.274	0.447	0.191	0.402	0.286	0.463
Inherited	0.049	0.217	0.143	0.359	0.048	0.218
Founded	0.677	0.469	0.667	0.483	0.667	0.483
Corporation	0.137	0.344	0.238	0.436	0.667	0.483
Partnership	0.034	0.182	0.048	0.218	0.000	0.000
Proprietorship	0.829	0.377	0.714	0.463	0.333	0.483
Financial Statements	0.658	0.475	0.857	0.359	1.000	1.000
Ponce	0.152	0.360	0.000	0.000	0.000	0.000

(Table continues)

Variable	Island Born Puerto Ricans		Mainland Puerto Ricans		Immigrants	
	Mean	Standard Error	Mean	Standard Error	Mean	Standard Error
Mayagüez	0.114	0.319	0.286	0.463	0.095	0.301
Arecibo	0.175	0.381	0.191	0.402	0.095	0.301
Metro	.559	0.498	0.524	0.512	0.810	0.402
Retail	0.559	0.498	0.619	0.498	0.571	0.507
Wholesale	0.034	0.182	0.095	0.301	0.048	0.218
Construction	0.019	0.137	0.000	0.000	0.095	0.301
Manufacturing	0.015	0.123	0.000	0.000	0.095	0.301
Transportation	0.008	0.087	0.048	0.218	0.048	0.218
Finance	0.015	0.123	0.000	0.000	0.048	0.218
Services	0.350	0.478	0.238	0.436	0.095	0.301
Credit Lines	0.042	0.201	0.000	0.000	0.191	0.402
Personal	0.319	0.467	0.429	0.507	0.333	0.483
Reinvestment	0.065	0.246	0.143	0.360	0.048	0.218
Credit Cards	0.388	0.488	0.333	0.483	0.333	0.483
Commercial	0.152	0.360	0.095	0.301	0.095	0.301
N	263		21		21	

Note:

^a Group classifications are based on country of origin, with the exception of mainland Puerto Ricans which are classified according to both their country of birth and parent's ethnicity.

firms organized as corporations have a higher chance to obtain funds from credit markets. Small businesses were concentrated in the retail sector. In 1995, immigrant-owned businesses employed, on average, more workers than the two other groups. All immigrant-owned businesses prepared financial statements. However, the sampled businesses significantly differed in the initial financing source used. Puerto Ricans resorted mainly to credit cards as their initial financing source, whereas immigrants used both credit cards and personal loans as their primary financing source. Contrary to their Island-born counterparts, mainland Puerto Ricans used personal loans as their initial financing source.

Summary

This chapter discusses a selection of summary statistics from the data sets described in the previous chapter. A descriptive analysis of the self-employment rates in Puerto Rico indicates that the self-employment participation of Cubans, Americans, and other immigrants is higher than that of mainland Puerto Ricans and Puerto Ricans from 1980 to 1990. While analyzing the self-employment rates in the United States, the statistics show that in relative terms, the participation of mainland Puerto Ricans in the self-employment sector was higher than that for the other groups.

A detailed review of the Census samples for 1980 and 1990 shows that mainland Puerto Ricans and Cubans are the youngest and oldest groups, respectively. It seems that in Puerto Rico, Cubans, other immigrants and mainland Puerto Ricans have the highest levels of education with about 13 years of formal education. In terms of work experience, Cubans and Dominicans have, on average, more than 21 years of education and the

highest self-employment rates for both 1980 and 1990. The IPUMS sample of the United States parallels the Puerto Rican census data in several ways. Mainland Puerto Ricans are the youngest group in the sample, and the most educated. The Cuban sample has more experience compared to other groups.

The descriptive statistics of the SNCE sample provide information about the types of financing sources used by small businesses in Puerto Rico. The statistics show that Puerto Ricans tend to resort to the use of credit cards to finance their small business operations, while other groups resort to either personal or commercial loans. Nevertheless, while the foregoing analysis hints at possible differences in self-employment rates and financing-source differentials, a more rigorous empirical framework is needed to test the hypotheses of this dissertation.

CHAPTER VII

SELF-EMPLOYMENT TRENDS: EMPIRICAL RESULTS

This chapter presents the empirical results of the self-employment trends of Puerto Ricans and mainland Puerto Ricans against other groups (e.g. Dominicans, Cubans, Mexicans, other Hispanics) in both Puerto Rico and the United States. First, I test whether the proportion of Puerto Ricans in the self-employment sector in Puerto Rico increased from 1980 to 1990. The descriptive statistics suggest that the self-employment rate for Puerto Ricans *increased* from 1980 to 1990, but not at the same pace as that of mainland Puerto Ricans, Cubans, Dominicans, or other immigrants (see Table 6.1.1). Then, I test whether the self-employment propensity of Puerto Ricans in the United States increased from 1980 to 1990, as compared to the other sampled groups (mainland Puerto Ricans, Mexicans, Cubans, and other Hispanics); recall that the descriptive statistics showed that the self-employment rate for Puerto Ricans and mainland Puerto Ricans in the United States *increased* from 1980 to 1990.

The switching regression methodology is employed to test these hypotheses (see Chapter IV). The data used are the PUMS and IPUMS samples for 1980 and 1990. Variables included in Z and X contain human capital characteristics such as years of education, potential experience (and its square), marital status and gender. Also, there are some personal attributes included in the Z and X vectors, such as, the respondent's

number of children, English proficiency, years since arrival to the Island/United States, and disability status.

General Findings: PUMS sample

Tables 7.1.1 and 7.1.2 present the results of the index function [see equation (1)] for all groups in the sample. For 1980, the positive and statistically significant coefficient for EDUCATION indicates that Puerto Rican individuals with higher levels of education were more likely to choose self-employment over salaried work. It also seems that married individuals with a large number of children and with a disability were more likely to choose self-employment (CHILDREN, MARRIED and DISABILITY are significant at the ten and one percent level, respectively). Only for the group of other immigrants, the length of time since arrival to the Island seemed to affect their propensity of being self-employed (ARRIVAL is significant at the five percent level). According to the analysis, Dominicans who spoke English but not very well, and those who did not speak English were more likely to be self-employed, as compared to those Dominicans who spoke English very well. These results seem to be consistent with the studies of Moore (1983) and Sowell (1981), in which they state that certain disadvantages (such as speaking English), may cause certain groups to resort to self-employment.

The analysis shows some different trends in the 1990 PUMS sample. Additional factors seem to significantly affect the self-employment decision among the sampled groups. During this period, being married did not affect the self-employment decision of Puerto Ricans. Although CHILDREN is no longer significant, the analysis shows a negative relationship between the number of children and the self-employment

Table 7.1.1

Switching Regression Results for the Probability of being Self-employed
1980 PUMS Sample – Puerto Rico

	Mainland Puerto Ricans	Puerto Ricans	Dominicans	Cubans	Other Immigrants
	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)
Constant	-2.538* (1.371)	-2.706*** (0.076)	-3.504*** (0.611)	-2.580*** (0.555)	-2.375*** (0.392)
EDUCATION	0.032 (0.078)	0.025*** (0.003)	0.071*** (0.027)	-0.001 (0.020)	0.014 (0.019)
EXPERIENCE	0.019 (0.057)	0.035*** (0.003)	0.069** (0.027)	0.091*** (0.023)	0.044* (0.022)
EXPERIENCE ²	-0.008 (0.185)	-0.028*** (0.006)	-0.089* (0.048)	-0.151*** (0.046)	-0.034 (0.045)
MALE	0.376 (0.451)	0.567*** (0.039)	0.213 (0.286)	0.549* (0.334)	-0.009 (0.222)
MARRIED	0.161 (0.315)	0.147*** (0.029)	0.151 (0.247)	0.401* (0.212)	0.225 (0.160)
ENGLISH NOT WELL	-0.103 (0.396)	0.011 (0.028)	0.539* (0.293)	-0.141 (0.154)	-0.009 (0.176)
NO ENGLISH	0.131 (0.877)	-0.019 (0.031)	0.594* (0.305)	0.018 (0.198)	-0.086 (0.165)
ARRIVAL	----	----	0.000 (0.013)	-0.007 (0.010)	0.124** (0.006)
CHILDREN	-0.011 (0.101)	0.019* (0.011)	-0.021 (0.073)	0.069 (0.157)	-0.095 (0.086)

(Table continues)

	Mainland Puerto Ricans	Puerto Ricans	Dominicans	Cubans	Other Immigrants
	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)
DISABILITY	----	0.249*** (0.041)	-0.533 (1.564)	0.185 (0.526)	0.531 (0.353)
Log-Likelihood	-1,455.59	-40,698.13	-623.35	-792.87	-1,735.01
N	1,173	29,974	464	558	1,253

Notes

^a The dependent variable equals 1 when the individual is self-employed.

^b The reference category for the variable English is speaks English very well.

^c *, **, and *** indicate the significance levels at the 10, 5, and 1 percent, respectively, using two-tailed tests. Standard errors in parentheses.

Table 7.1.2

Switching Regression Results for the Probability of being Self-employed
1990 PUMS sample – Puerto Rico

	Mainland Puerto Ricans	Puerto Ricans	Dominicans	Cubans	Other Immigrants
	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)
Constant	-3.124*** (0.253)	-2.551*** (0.067)	-2.169*** (0.346)	-2.430*** (0.527)	-2.308*** (0.344)
EDUCATION	0.025* (0.015)	0.014*** (0.003)	-0.005 (0.015)	0.025 (0.024)	0.017 (0.017)
EXPERIENCE	0.083*** (0.015)	0.036*** (.003)	0.038** (0.016)	0.076*** (0.027)	0.048*** (0.019)
EXPERIENCE ²	-0.151*** (0.044)	-0.025*** (0.005)	-0.063** (0.028)	-0.112** (0.504)	-0.055 (0.039)
MALE	0.438** (0.113)	0.608*** (0.035)	0.384** (0.155)	-0.012 (0.225)	0.290* (0.164)
MARRIED	0.057 (0.094)	0.117 (0.022)	0.195 (0.121)	0.420** (0.194)	0.082 (0.134)
ENGLISH NOT WELL	-0.207 (0.135)	-0.056** (0.024)	0.349** (0.177)	0.230 (0.162)	-0.001 (0.157)
NO ENGLISH	-0.021 (0.135)	-0.022 (0.025)	0.548*** (0.186)	0.365* (0.201)	0.026 (0.184)
ARRIVAL	0.012*** (0.004)	-----	0.006 (0.006)	0.007 (0.009)	0.008 (0.006)
CHILDREN	0.031 (0.042)	-0.013 (0.012)	-0.053 (0.035)	-0.175 (0.119)	0.055 (0.061)

(Table continues)

	Mainland Puerto Ricans	Puerto Ricans	Dominicans	Cubans	Other Immigrants
	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)
DISABILITY	0.247 (0.173)	0.108*** (0.037)	0.366* (0.220)	-0.405 (0.461)	-0.294 (0.854)
Log-likelihood	-4,173.79	-58,165.96	-1,465.51	-811.65	-1,424.04
N	3,051	38,803	920	489	881

Notes

^a The dependent variable equals 1 when the individual is self-employed.

^b The reference category for the variable English is speaks English very well.

^c *, **, and *** indicate the significance levels at the 10, 5, and 1 percent, respectively, using two-tailed tests. Standard errors in parentheses.

propensity of Puerto Ricans. The empirical results show that for 1990, the main determinants of self-employment for mainland Puerto Ricans were education, experience, and years since arrival (all coefficients being positive and statistically significant). The estimates show that those Puerto Ricans that spoke English, but not very well, were less likely to be self-employed as compared to those who spoke English very well.

When analyzing the pooled samples and using a switching regression with interaction terms the analysis shows that in Puerto Rico the overall self-employment rate increased from 1980 to 1990 (see DUMMY 1990, positive and significant at the five percent level). However, the empirical results in Table 7.1.3 suggest that Cubans, Dominicans and other immigrants were more likely to be self-employed as compared to Puerto Ricans during the 1980-1990 period. When analyzing the change from 1980 to 1990, the results indicate that mainland Puerto Ricans on the Island were less likely to be self-employed as compared to Puerto Ricans. This finding *supports* the hypothesis that Puerto Rican participation in the self-employment sector increased from 1980 to 1990, but not at the same pace of the other groups. Therefore, it appears that factors different than socio-economic variables influence the self-employment decision of the sampled groups.

General Findings: IPUMS sample

Tables 7.2.1 and 7.2.2 present the results of the index function [see equation (1)] for all sampled groups. As opposed to the groups in the PUMS sample, the Mexican sample is included because this group represents the largest Hispanic population in the United States. In contrast, the Dominican group was chosen in Puerto Rico because they represent one of the largest groups of immigrants on the Island.

Table 7.1.3

Switching Regression Results for the Probability of being Self-employed
1980 - 1990 PUMS sample – Puerto Rico

	Pooled Sample
	Switch (γ)
Constant	-2.674*** (0.046)
EDUCATION	0.021*** (0.002)
EXPERIENCE	0.038*** (0.002)
EXPERIENCE ²	-0.034*** (0.004)
MALE	0.552*** (0.023)
MARRIED	0.138*** (0.016)
ENGLISH NOT WELL	-0.144 (0.017)
NO ENGLISH	0.002 (0.018)
ARRIVAL	0.006*** (0.002)
CHILDREN	0.006 (0.007)
DISABILITY	0.178*** (0.026)
DOMINICAN	0.186** (0.076)

(Table continues)

	Pooled Sample
	Switch (γ)
MAINLAND PUERTO RICANS	0.041 (0.064)
CUBANS	0.261*** (0.069)
OTHER IMMIGRANTS	-0.091* (0.054)
DUMMY 1990	0.034** (0.014)
CUBAN * 1990	0.147* (0.086)
DOMINICAN * 1990	0.167* (0.086)
MAINLAND PUERTO RICANS * 1990	-0.206*** (0.083)
OTHER IMMIGRANTS * 1990	0.214*** (0.075)
Log-likelihood	-112,132.60
N	77,561

Notes

^a The dependent variable equals 1 when the individual is self-employed.

^b The reference category for the variable English is speaks English very well.

^c The reference category for sampled groups is Puerto Ricans.

^d The reference category for the interaction terms is Puerto Ricans *1990.

^e *, **, and *** indicate the significance levels at the 10, 5, and 1 percent, respectively, using two-tailed tests. Standard errors in parentheses.

During 1980, highly educated and experienced Puerto Ricans in the United States preferred self-employment over salaried work. With the exception of the variables MARRIED, CHILDREN and DISABILITY, the determinants of the self-employment decision for the Puerto Rican sample in the United States resemble those found for Puerto Rico. As in Puerto Rico, none of the analyzed factors seemed to affect the self-employment decision for mainland Puerto Ricans during this period in the United States. All the self-employment determinants except for being married, the number of children and English proficiency had a significant impact on the self-employment choice by Mexican individuals.

A change in the composition of the determinants for each sampled group occurred during 1990. Contrary to 1980, the main determinants of the self-employment decision of mainland Puerto Ricans were education, experience and marital status. Experienced and highly educated male Mexican individuals with a large number of children were more likely to be self-employed. For the Cuban sample, in 1990, self-employment was positively associated with their tenure in the United States. English proficiency was not a significant determinant in the self-employment decision for any of the sampled groups in the United States for 1990.

Table 7.2.3 shows the empirical results of the index function [see equation 4] for a pooled sample of all sampled groups in the United States. The analysis suggests that mainland Puerto Ricans, Mexicans and other Hispanics were less likely to be self-employed than Puerto Ricans. The overall self-employment rate increased from 1980 to 1990. The interaction terms in the model show that Mexicans, other Hispanics and Cubans were more likely to be self-employed than Puerto Ricans during the 1980-1990

Table 7.2.1

Switching Regression Results for the Probability of being Self-employed
1980 IPUMS sample – United States

	Mainland Puerto Ricans	Puerto Ricans	Mexicans	Cubans	Other Hispanics
	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)
Constant	-3.521** (1.679)	-3.090*** (0.299)	-3.100*** (0.131)	-2.402*** (0.186)	-2.981*** (0.105)
EDUCATION	0.049 (0.116)	0.044*** (0.013)	0.061*** (0.006)	0.017* (0.009)	0.055*** (0.006)
EXPERIENCE	0.027 (0.083)	0.056*** (0.016)	0.042*** (0.009)	0.028*** (0.010)	0.038*** (0.006)
EXPERIENCE ²	0.016 (0.182)	-0.082*** (0.029)	-0.058*** (0.018)	-0.047** (0.020)	-0.053*** (0.013)
MALE	0.796 (0.772)	0.177* (0.102)	0.188*** (0.060)	0.418*** (0.071)	0.353*** (0.044)
MARRIED	-0.074 (0.633)	0.145 (0.111)	0.045 (0.071)	0.292*** (0.093)	0.176*** (0.049)
ENGLISH NOT WELL	----	----	-0.038 (0.305)	-0.138 (0.716)	0.357 (0.222)
NO ENGLISH	----	----	0.533 (0.0417)	1.051 (1.878)	-0.924 (2.224)
ARRIVAL	----	----	0.010*** (0.003)	0.004 (0.005)	0.000 (0.002)
CHILDREN	-0.073 (0.352)	-0.006 (0.030)	0.014 (0.015)	0.048* (0.027)	-0.001 (0.016)

(Table continues)

	Mainland Puerto Ricans	Puerto Ricans	Mexicans	Cubans	Other Hispanics
	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)
DISABILITY	0.193 (0.577)	-0.169 (0.217)	0.123* (0.678)	-0.054 (0.153)	0.123** (0.050)
Log-Likelihood	-1,018.17	-3,907.83	-11,501.61	-4,080.00	-12,971.88
N	983	3,392	9,102	3,148	10,500

Notes

^a The dependent variable equals 1 when the individual is self-employed.

^b The reference category for the variable English is speaks English very well.

^c *, **, and *** indicate the significance levels at the 10, 5, and 1 percent, respectively, using two-tailed tests. Standard errors in parentheses.

Table 7.2.2

Switching Regression Results for the Probability of being Self-employed
1990 IPUMS sample – United States

	Mainland Puerto Ricans	Puerto Ricans	Mexicans	Cubans	Other Hispanics
	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)
Constant	-3.733*** (0.325)	-3.006*** (0.209)	-2.497*** (0.069)	-2.759*** (0.164)	-2.618*** (0.066)
EDUCATION	0.074*** (0.019)	0.049*** (0.011)	0.028*** (0.004)	0.027*** (0.009)	0.034*** (0.004)
EXPERIENCE	0.066*** (0.020)	0.038*** (0.011)	0.032*** (0.005)	0.049*** (0.009)	0.047*** (0.004)
EXPERIENCE ²	-0.119** (0.049)	-0.037* (0.021)	-0.027*** (0.009)	-0.077*** (0.017)	-0.058*** (0.009)
MALE	0.294** (0.119)	0.226*** (0.072)	0.105*** (0.033)	0.065*** (0.063)	0.141*** (0.028)
MARRIED	0.215* (0.125)	0.075 (0.081)	0.025 (0.035)	0.039 (0.069)	0.140*** (0.032)
ENGLISH NOT WELL	----	0.154 (0.276)	-0.223 (0.150)	-0.394 (0.302)	0.056 (0.126)
NO ENGLISH		0.373 (0.339)	-0.323 (0.325)	0.645* (0.352)	0.041 (0.227)
ARRIVAL	----	-0.003 (0.003)	0.003* (0.002)	0.007** (0.003)	0.001 (0.001)
CHILDREN	0.034 (0.050)	-0.002 (0.028)	0.032*** (0.008)	0.055** (0.025)	-0.002 (0.012)

(Table continues)

	Mainland Puerto Ricans	Puerto Ricans	Mexicans	Cubans	Other Hispanics
	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)	Switch (γ)
DISABILITY	-0.049 (0.468)	0.103 (0.192)	0.130 (0.080)	0.021 (0.163)	0.056 (0.085)
Log- Likelihood	-2,482.90	-4,916.89	-23,402.37	-4,732.88	-23,359.53
N	2,444	4,337	20,703	3,619	18,507

Notes

^a The dependent variable equals 1 when the individual is self-employed.

^b The reference category for the variable English is speaks English very well.

^c *, **, and *** indicate the significance levels at the 10, 5, and 1 percent, respectively, using two-tailed tests. Standard errors in parentheses.

period. On the other hand, there was no difference in self-employment participation between mainland Puerto Ricans and Puerto Ricans from 1980 to 1990. The results *do not support* the hypotheses that the self-employment propensity of Puerto Ricans in the United States increased from 1980 to 1990 compared to other groups.

Estimates of the earnings functions, equations (2) and (3), are reported in the appendix (Table A1 through A6) for each group within the different samples. The coefficients of the human capital variables in the wage earnings function have the expected sign and most are statistically significant. However, the determinants of the self-employed earnings function seemed to change from 1980 to 1990. According to the 1980 PUMS sample, in Puerto Rico, Puerto Ricans who were married had high levels of education, some work experience, and relatively high earnings in both the self-employment and wage sector. The analysis shows a change for 1990: in the Puerto Rican sample, highly educated married individuals seemed to obtain a high level of earnings in the self-employment sector. Similarly, EDUCATION (significant at the one percent level) is the only significant determinant of the self-employed earnings for the mainland Puerto Rican sample. The variable ARRIVAL seems to have a positive and significant impact on the level of earnings generated by Cubans in the self-employment sector (and to a much lesser extent in the wage sector), while it only has an impact on the level of wage earnings received by Dominicans. Individuals who spoke English but not very well were less likely to have high earnings in both the self-employment and wage/salary sectors.

Table 7.2.3

**Switching Regression Results for the Probability of being Self-employed
1980 - 1990 IPUMS sample – United States**

	Pooled Sample
	Switch (γ)
Constant	-2.690*** (0.023)
EDUCATION	0.039*** (0.001)
EXPERIENCE	0.041*** (0.001)
EXPERIENCE ²	-0.054*** (0.003)
MALE	0.299*** (0.008)
MARRIED	0.172*** (0.010)
ENGLISH NOT WELL	-0.010 (0.021)
NO ENGLISH	-0.002 (0.032)
ARRIVAL	0.001*** (0.001)
CHILDREN	0.009*** (0.003)
DISABILITY	0.119*** (0.012)
MEXICAN	-0.354*** (0.027)

(Table continues)

	Pooled Sample
	Switch (γ)
MAINLAND PUERTO RICANS	-0.428*** (0.103)
CUBANS	0.391 (0.326)
OTHER HISPANICS	-0.135*** (0.021)
DUMMY 1990	0.024*** (0.010)
CUBAN * 1990	0.074* (0.041)
MEXICAN * 1990	0.250*** (0.029)
MAINLAND PUERTO RICANS * 1990	0.069 (0.115)
OTHER HISPANICS * 1990	0.131*** (0.025)
Log-likelihood	-287,726.30
N	226,384

Notes

^a The dependent variable equals 1 when the individual is self-employed.

^b The reference category for the variable English is speaks English very well.

^c The reference category for sampled groups is Puerto Ricans.

^d The reference category for the interaction terms is Puerto Ricans *1990.

^e *, **, and *** indicate the significance levels at the 10, 5, and 1 percent, respectively, using two-tailed tests. Standard errors in parentheses.

The IPUMS sample presents some interesting findings. The empirical results show that none of the factors analyzed to explain self-employment earnings for mainland Puerto Ricans in the United States during 1990 were statistically significant. These results could explain why mainland Puerto Ricans were negatively self-selected into self-employment during that period. The analysis also suggests that for 1980, there was a negative relationship between the level of work experience of Puerto Rican individuals and the earnings perceived in the self-employment sector. Finally, the results for the earnings function of the pooled samples show that both self-employment and wage/salary income increased from 1980 to 1990.

Selectivity – PUMS sample

This section focuses on the determination of self-selection into the self-employment sector given the correlation coefficients between the index function (equation 1) and the self-employment earnings error term for each sampled group (see Tables 7.3.1 and 7.3.2). A positive correlation coefficient for the self-employed sector indicates that there is positive self-selection toward this sector. On the other hand, a positive correlation coefficient for the wage/salary sector implies that negative selection exists.

For 1980, the selectivity parameters in the Puerto Rican sample reveal no evidence of selection into self-employment (correlation coefficient, ρ_{SE} , is not statistically significant). However, the correlation of the index function and the salaried earnings function is negative and statistically significant, indicating positive selection into wage employment. It seems that in Puerto Rico the most skilled Island-born workers chose

salaried employment over self-employment. The evidence is different for mainland Puerto Ricans. Note that for mainland Puerto Ricans evidence of negative selectivity exists into self-employment and positive selectivity into the wage/salary sector. This finding suggests that the most skilled mainland Puerto Ricans prefer salaried work over self-employment.

During 1990, the Puerto Rican sample reveals no evidence of selection into self-employment or wage employment (correlation coefficients are not statistically significant). However, it seems that mainland Puerto Ricans were positively selected into self-employment suggesting, contrary to 1980, that the most skilled individuals preferred self-employment over salaried work. It can be argued that mainland Puerto Ricans perhaps felt more confident in the self-employment sector as suggested by their level of experience and time since their arrival to the Island (see Table 7.1.2). The results from the analysis *do not support* the hypothesis that Puerto Ricans are positively self-selected into self-employment when compared to other sampled groups in the Puerto Rico.

Selectivity – IPUMS sample

The correlation coefficients from the Puerto Rican sample in the United States indicate that there was significant evidence of negative selection into self-employment and a positive and significant selection into the wage/salary sector. It seems that in 1980, the least skilled individuals chose self-employment over salaried work. Similar results can be found for mainland Puerto Ricans and Cubans. The results are consistent with those of Borjas and Bronars (1989), who found that minority groups are negatively selected into self-employment, perhaps because of consumer discrimination. However, in

Table 7.3.1

**Residual Correlation Coefficients of Switching Equations and Mincer's Earnings
Functions: PUMS samples – Puerto Rico**

	Mainland Puerto Ricans	Puerto Ricans	Dominicans	Cubans	Other Immigrants
Panel A: 1980					
ρ_{SE}	-0.999*** (0.001)	0.349 (0.248)	0.311 (5.546)	0.711 (0.545)	-0.932*** (0.048)
ρ_{WS}	-0.585*** (0.148)	-0.632*** (0.010)	-0.529*** (0.127)	-0.805*** (0.063)	-0.745*** (0.047)
Panel B: 1990					
ρ_{SE}	0.831*** (0.093)	0.131 (0.541)	0.190 (0.929)	-0.848*** (0.084)	-0.845*** (0.105)
ρ_{WS}	-0.234 (0.177)	-0.009 (0.182)	-0.758*** (0.045)	-0.682*** (0.144)	-0.813*** (0.045)
Notes:					
^a A positive correlation coefficient for the self-employed sector, ρ_{SE} , implies that there is positive selection toward that sector. A positive correlation coefficient for the wage/salary sector, ρ_{WS} , implies that that there is negative selection toward this particular sector.					
^b *, **, and *** indicate the significance levels at the 10, 5, and 1percent , respectively, using two-tailed tests. Standard errors in parentheses.					

Table 7.3.2

**Residual Correlation Coefficients of Switching Equations and Mincer's Earnings
Functions: IPUMS samples - United States**

	Mainland Puerto Ricans	Puerto Ricans	Mexicans	Cubans	Other Hispanics
Panel A: 1980					
ρ_{SE}	-0.999*** (0.000)	-0.969*** (0.016)	0.246 (1.111)	-0.735*** (0.148)	0.213 (0.849)
ρ_{WS}	-0.755*** (0.117)	-0.807*** (0.013)	-0.735*** (0.014)	-0.602*** (0.034)	-0.714*** (0.014)
Panel B: 1990					
ρ_{SE}	-0.929*** (0.050)	0.143 (5.666)	-0.925*** (0.757)	-0.863*** (0.033)	0.221 (1.289)
ρ_{WS}	-0.579*** (0.083)	0.252 (0.178)	-0.011 (0.541)	0.243 (0.176)	-0.243*** (0.069)

Notes:

^a A positive correlation coefficient for the self-employed sector, ρ_{SE} , implies that there is positive selection toward that sector. A positive correlation coefficient for the wage/salary sector, ρ_{WS} , implies that there is negative selection toward this particular sector.

^b *, **, and *** indicate the significance levels at the 10, 5, and 1 percent, respectively, using two-tailed tests. Standard errors in parentheses.

1990, and consistent with the results from the PUMS sample, the selectivity parameters in the Puerto Rican sample reveal no evidence of selection into self-employment or salaried work (correlation coefficients, ρ_{WS} and ρ_{SE} , are not statistically significant). In this case, the results *support* the hypothesis that Puerto Ricans in the United States were negatively self-selected into self-employment during 1980, but it *fails to support* the hypothesis for 1990.

Selectivity – Pooled samples

Table 7.3.3 shows the correlation coefficients of both the PUMS and IPUMS samples over the 1980 –1990 period. The coefficients suggest that, in general, there was no evidence of selectivity into the self-employment sector in Puerto Rico or United States during the period of analysis. However, the results seemed to indicate that there was positive selection into the wage/salary sector in both the PUMS and IPUMS samples during 1980-1990.

Summary

This chapter presents the empirical results of the self-employment trends of Puerto Ricans and mainland Puerto Ricans in both Puerto Rico and the United States. After controlling for socio-demographic factors, the results indicate that Puerto Rican participation in the self-employment sector from 1980 to 1990 do not increase at the same pace of mainland Puerto Ricans, Cubans and Dominicans. The results also indicate that the self-employment propensity of Puerto Ricans in the United States did not increase from 1980 to 1990 compared to mainland Puerto Ricans, Cubans and Mexicans.

Table 7.3.3

**Residual Correlation Coefficients of Switching Equation and
Mincer's Earnings Functions**
Pooled Samples – Puerto Rico and United States

	PUMS sample	IPUMS sample
1980-1990		
ρ_{SE}	0.212 (0.211)	0.187 (0.136)
ρ_{WS}	-0.542*** (0.008)	-0.595*** (0.004)

Notes:

^a A positive correlation coefficient for the self-employed sector, ρ_{SE} , implies that there is positive selection toward that sector. A positive correlation coefficient for the wage/salary sector, ρ_{WS} , implies that there is negative selection toward this particular sector.

^b *, **, and *** indicate the significance levels at the 10, 5, and 1 percent, respectively, using two-tailed tests. Standard errors in parentheses.

Therefore, it appears that factors different than socio-economic variables influence the self-employment decision of the sampled groups.

The results presented in this chapter show that there is no evidence of self-selection into self-employment for Puerto Ricans in Puerto Rico during 1980 or 1990. The results suggest that in 1980 for Puerto Ricans in the United States (Island-born) are negatively self-selected into self-employment but not in 1990. Thus, consumer discrimination, apparently is not a concern in Puerto Rico but it could be a determining factor in the self-selection into the self-employment sector in the United States although it may have subsided to the point where there is no evidence of self-selection to self-employment in 1990.

CHAPTER VIII

SMALL BUSINESS FINANCING SOURCES: EMPIRICAL RESULTS

The empirical analysis discussed in the previous chapter suggests that almost all sampled groups were more likely to be self-employed, than Puerto Ricans in both Puerto Rico. Attempting to understand why this is the case, this chapter focuses on the credit access of small businesses in Puerto Rico employing the unique data set, the Survey of the Needs and Characteristics of the Small and Medium- Sized Enterprises (SNCE). As the literature suggests the lack of capital or the inaccessibility to adequate credit sources may restrict small business growth in the economy.

General Findings

To empirically analyze whether differences in small business financing sources exist among Puerto Ricans, mainland Puerto Ricans and immigrants, an econometric model that compares the selection among different financing sources of small business owners is employed. The available sources for financing, according to the SNCE, were commercial loans, credit lines, personal loans, credit cards and reinvestment. According to the analysis, the financing sources used to finance small business operations in Puerto Rico differ across groups (see Table 8.2). It seems that Island-born Puerto Ricans resort to reinvestment and personal loans to finance their operations, while mainland Puerto Ricans used personal and commercial loans to finance operations. On the other hand,

immigrants resort mainly to commercial loans and credit lines when looking for financing for their operations.

Table 8.1 reports the estimated coefficients of the multinomial logit model for Island-born Puerto Ricans (see Table 4.3 for definitions of variables). The reported coefficients reflect the effects of a change in the independent variables on the likelihood of choosing a particular financing source over a base-financing source (in this case, commercial loans). The coefficients of the variable FINANCIAL STATEMENTS (significant at the five percent level) suggest that native-owned businesses that prepare financial statements are less likely to use credit lines, personal loans, reinvestments or credit cards as a financing source than commercial loans. In terms of marginal effects, (Table 8.1 in bold), if native-owned businesses prepare financial statements, the probability of selecting commercial loans as a financing source will increase by 38.2% points. Similarly, the coefficients of the variable EMPLOYEES reveal that the higher the number of employees that native-owned businesses have, the more likely the business will use commercial loans.⁹

Table 8.2 presents the actual and predicted shares of financing sources resulting from assigning non-native-owned businesses to financing sources according to the native-owned business multinomial logit model. The initial comparison of the actual distribution of financing sources used by native and non-native-owned businesses reveals large

⁹ The partials were estimated by, $\frac{\partial P_j}{\partial X_i} = P_j(\beta_j - \sum_{j=1}^J P_j \beta_j)$, where $\frac{\partial P_j}{\partial X_i}$ represents the marginal effects of the independent variables on the probability of choosing a particular financing source for Island-born Puerto Ricans. Partial derivatives were evaluated at the sample mean of each variable (Greene, 1997).

Table 8.1

Multinomial logit estimates and marginal effects of financing alternatives for Island-born Puerto Ricans

	Commercial Loans	Credit Lines	Personal Loans	Reinvestments	Credit Cards/Savings
Constant		-3.420 (1.734)	-0.95 (1.345)	0.752 (1.294)	0.359 (1.962)
Ponce		-0.518 (0.931)	0.495 (0.655)	0.524 (0.639)	-12.153 284.610
	-0.039	-0.127	0.073	0.105	-0.012
Mayagüez		0.388 (0.858)	0.157 (0.760)	0.147 (0.769)	0.329 (1.019)
	-0.051	0.049	0.002	0.000	0.000
Arecibo		0.565 (0.660)	0.171 (0.651)	0.195 (0.606)	-0.393 (0.971)
	-0.069	0.074	-0.005	-0.000	-0.001
Corporation		1.386 (0.746)	-1.279 (1.001)	0.116 (0.728)	0.999 (1.190)
	-0.023	0.265	-0.256	0.013	0.001
Partnership		0.444 (1.216)	-20.256 (707.33)	-21.608 (712.000)	-9.446 (592.870)
	3.276	1.954	-2.092	3.138	-0.000
Established		-0.015 (0.022)	0.003 (0.022)	-0.002 (0.020)	0.053 (0.035)
	0.001	-0.002	0.001	0.000	0.000
Employees		-0.017 (0.018)	-0.074 (0.059)	-0.103 (0.055)	-0.252 (0.136)
	0.016	0.005	-0.006	-0.015	-0.000
Financial Statements		-1.615 (0.642)	-1.396 (0.552)	-1.926 (0.528)	-1.223 (0.749)
	0.382	-0.107	-0.060	-0.215	-0.000

(Table continues)

	Commercial Loans	Credit Lines	Personal Loans	Reinvestments	Credit Cards/Savings
Bought		0.090 (0.594)	-0.490 (0.521)	-0.261 (0.494)	-1.080 (0.903)
	0.050	0.047	-0.066	-0.030	-0.001
Inherited		1.550 (1.123)	0.848 (1.212)	1.750 (1.095)	-12.415 (485.190)
	-0.320	0.129	-0.011	0.215	-0.013
College		0.976 (0.664)	-0.583 (0.714)	-0.004 (0.621)	-0.236 (0.919)
	-0.030	0.179	-0.127	-0.022	0.000
Advanced Degree		0.5660 (0.825)	0.190 (0.768)	-0.203 (0.731)	-0.271 (1.018)
	-0.035	0.094	0.018	-0.077	-0.000
Male		0.958 (0.803)	0.666 (0.609)	0.038 (0.558)	0.439 (0.852)
	-0.116	0.126	0.064	-0.074	-0.000
Age		0.020 (0.024)	-0.031 (0.021)	-0.029 (0.020)	-0.057 (0.028)
	0.003	0.006	-0.004	-0.005	-0.000
Retail		-0.113 (0.736)	0.454 (0.631)	0.159 (0.603)	-0.555 (0.828)
	-0.037	-0.043	0.067	0.014	-0.001
Wholesale		-0.502 (1.146)	-0.987 (1.564)	0.058 (1.431)	-11.598 (519.770)
	0.101	-0.044	-0.134	0.088	-0.011
Construction		12.614 (674.470)	24.199 (769.510)	25.938 (769.510)	25.561 (769.510)
	-4.862	-0.233	1.987	3.096	0.012
Manufacturing		0.722 (1.799)	-15.052 (949.890)	0.109 (2.047)	-13.469 (1122.800)
	0.956	0.690	-2.353	0.717	-0.011

(Table continues)

	Commercial Loans	Credit Lines	Personal Loans	Reinvestments	Credit Cards/Savings
Transportation		-12.173 (1730.300)	-13.920 (1815.900)	-0.329 (3.663)	-10.744 (1582.300)
	1.833	-1.403	-1.663	1.238	-0.005
Finance		-0.521 (1.697)	0.537 (1.682)	-14.396 (816.46)	-13.614 (919.440)
	1.299	0.635	0.804	-2.728	-0.010
Credit Lines		3.471 (1.172)	1.542 (1.467)	1.952 (1.490)	-8.963 (509.220)
	-0.522	0.400	0.012	0.120	-0.010
Personal		2.251 (0.828)	3.960 (0.738)	2.383 (0.790)	2.767 (1.342)
	-0.641	0.087	0.409	0.144	0.001
Reinvestment		2.147 (0.993)	1.484 (1.352)	3.083 (0.981)	-9.276 (380.540)
	-0.526	0.132	-0.001	0.406	-0.011
Credit Cards		1.844 (0.797)	1.958 (0.735)	3.285 (0.701)	2.847 (1.298)
	-0.559	0.053	0.071	0.433	0.001
χ^2			235.573		
N			263		

Notes:

^a The logit coefficients are followed by the standard errors (in parentheses) and the partial derivatives (in bold) evaluated at the sample means. The partials for dummy variables are interpreted as the difference in predicted probability between zero and one.

^b The reference region is Metro; the reference business organization is sole proprietorship; the reference "start-up" category is "original founder"; the reference educational category is high school or less; services is the reference industry; commercial is the reference initial financing course category.

differences in the financing sources selected by the groups. By performing a χ^2 goodness-of-fit-test, the null hypothesis that these distributions are identical was rejected.¹⁰

Although the logit model underpredicts the number of immigrants that should use commercial loans as a financing source, the model predicts that immigrants still use or select commercial loans as their main financing source. For example, 52.38% of immigrant-owned businesses use commercial loans, while the model predicts that share should be about 33.12%. In comparison with mainland Puerto Ricans, who primarily resort to personal loans, Island-born Puerto Ricans mainly finance their operations through profit reinvestment. Immigrants have a tendency to use less profit reinvestment to finance their operations: the model overpredicts the number of immigrants that should use this source as a financing alternative. For example, about 4.76% of immigrant-owned businesses use profit reinvestment as a financing source, while the model predicts that share to be about 20.46%. The distribution dissimilarity index (DDI) for mainland Puerto Ricans shows that 16.02% of the business owners in this group would have to change financing sources to have a similar distribution to that predicted by the model. For immigrants, 23.04% would have to shift to new financing sources for the actual and predicted distributions to be identical.

¹⁰ The χ^2 goodness-of-fit-statistics were 13.46 and 29.49 for the mainland Puerto Ricans and immigrants samples respectively. They were estimated by $\sum_{j=1}^5 (I_j - \hat{I}_j)^2 / \hat{I}_j$ where I_j and \hat{I}_j represent the total actual and predicted number of non-native owned-businesses who resort to financing source j , the null hypothesis being that the two distributions are identical. The null is rejected at the 0.05 level of significance for both distributions. The critical $\chi^2_{.95(4)} = 9.49$.

Table 8.2

Actual and (multinomial logit) predicted shares of financing alternatives
(Figures are in percentages)

Financing Alternatives	Island-Born Puerto Ricans	Mainland Puerto Ricans		Immigrants	
	Actual	Actual	Predicted	Actual	Predicted
Commercial Loans	25.48	28.57	26.98	52.38	33.12
Credit Lines	13.31	4.76	11.99	23.81	31.15
Personal Loans	26.24	42.86	28.43	14.29	11.86
Reinvestment	28.90	19.05	25.86	4.76	20.46
Credit Cards/ Savings	6.08	4.76	6.74	4.76	3.41
N	263		21		21
DDI			16.02		23.04

Sources of Financing Differentials

The 1990 5% PUMS is employed next to examine the sources of the financing source differentials among the three major groups analyzed in this section: Puerto Ricans, mainland Puerto Ricans and immigrants. That is, PUMS data serve to investigate why immigrant-owned businesses have more access to commercial loans. Particularly, the analysis focuses on how well the factors used by financial institutions (five C's of credit) explain the immigrants' access to credit markets, as compared with the other groups (Puerto Ricans and mainland Puerto Ricans).

It should be noted that the previous analysis hints at some possible sources for this differential. The 1995 SNCE shows that the educational level and the form of ownership could explain the differences. Immigrants have a higher educational level than Puerto Ricans and mainland Puerto Ricans. About 42.9% of the immigrant business owners have completed college or have earned an advanced degree, compared to 35% of Puerto Ricans and 14.3 percent of mainland Puerto Ricans. This supports the idea that education is an important determinant in funding across groups. Also, immigrants have a tendency to organize their businesses as corporations compared to the other groups. About 67% of immigrant-owned businesses are corporations, while the other two groups are mainly organized as sole proprietorships (see Table 6.2.6). This fact lends credence to the assumption that the characteristic *condition* is a determinant in getting easy access to credit markets.

Unfortunately, the 1995 SNCE data does not provide enough information to analyze the characteristics related to capacity, condition, collateral and capital of business owners. To support the results obtained from the multinomial logit model, data from the

1990 5% PUMS are employed. The descriptive statistics of the total population show that immigrants have a higher participation in the self-employed sector than Puerto Ricans or mainland Puerto Ricans (refer to Table 6.1.1). It seems that there is a high representation of females in the non-native-owned businesses. Only 15% of Puerto Ricans business owners are female compared to the other two groups who have 25% of females as business owners. In terms of education, mainland Puerto Ricans and immigrants have a higher educational level compared to Puerto Ricans. Thus, immigrants are seemingly at an advantage when accessing credit markets.

Following Borjas and Bronars (1989), the skill composition of salaried workers and the self-employed should be considered to gain insights on the *unmeasured ability* of groups. In theory, skilled immigrants have more incentives to enter the salaried sector than skilled mainland and/or Puerto Ricans. On the other hand, unskilled immigrants have more incentives to choose self-employment as their labor choice than unskilled mainland or Puerto Ricans individuals. Therefore, immigrants are more likely than Puerto Ricans to be negatively selected into self-employment and positively selected into salaried jobs. To analyze whether immigrants are more likely to be self-selected into self-employment than the other groups we estimate earnings regressions correction for selectivity bias (Heckman, 1979). A probit model was first estimated to analyze the factors that are related to self-employment choice (for example, self-employed = 1, and salaried sector = 0).¹¹ The results from this estimation were then used to create the

¹¹ The variables included in the probit regression were age, age², education, experience, experience², and gender.

Inverse Mills ratio, which is included in the earnings regressions to correct for selectivity bias. The sign of the coefficient of the selectivity bias term can be used to measure the degree of self-selection for each choice. A positive (negative) coefficient of the Inverse Mills ratio in the self-employment (salaried) earnings function implies that those which are more likely to be self-employed (salaried) also tend to have higher earnings in that sector.

Table 8.3 presents the coefficients of the selectivity variables in the self-employment and salaried income regressions. The coefficients of the selectivity variable in the self-employment income regression are negative for both Puerto Ricans and immigrants and positive for the mainland Puerto Ricans. The results imply that there is negative selection into self-employment for Puerto Ricans and immigrants and positive selection into self-employment among mainland Puerto Ricans although the coefficients were not statistically significant. The findings *do not support* the hypothesis that immigrants in Puerto Rico were positively self-selected into the entrepreneurial sector during 1990.

On the other hand, the selectivity coefficients were negative for the Puerto Rican and Immigrant samples, while the coefficient was positive and significant for the mainland Puerto Rican sample. These coefficients show that both Puerto Ricans and immigrants are positively selected into the salaried sector, while the mainland Puerto Ricans are negatively selected into this sector. Among Puerto Ricans and immigrants, the least skilled individuals enter self-employment and the most able persons remain in the salaried sector. These results are consistent with those of Borjas and Bronars (1989). Thus, it seems that neither immigrants nor Puerto Ricans have a relative advantage in

Table 8.3

Coefficients of selectivity variables in income regressions

National Origin	Sector	
	Self-Employment	Salaried
Puerto Ricans	-0.540	-0.242
Mainland Puerto Ricans	9.094	2.262*
Immigrants	-4.953	-2.554**

Note:
^a *, and ** indicate the significance levels at the 10 and 5 percent, respectively.

unmeasured characteristics. As suggested by Bates (1991), lenders such as commercial banks approve larger loans to borrowers who possess relatively large inputs of equity capital as well as human capital. According to Stiglitz and Weiss (1981), those borrowers with high amounts of collateral or equity capital (financial assets) will be more likely to have greater access to credit markets. In addition, empirical work by Holtz-Eakin, et al. (1994) showed that individuals who generate higher levels of income seems to have less liquidity constraints and as a result greater access to financial markets. These views are consistent with the capital and collateral concepts discussed above. Using the amount of interest and dividend income received by those in the self-employed sector as a proxy for equity capital, we find that immigrants have a higher interest/dividend income mean.¹²

Table 8.4 presents this income distribution. On average, in 1989 immigrants received \$963.55 in interest/dividend income, compared to Puerto Ricans that received \$436.40, and mainland Puerto Ricans who earned \$480.23 during the same year. Also, immigrants received about 25% more operational income than the other groups. Immigrant business owners received \$262.43 of weekly operational income as compared to \$210.82 and \$146.79 by mainland Puerto Ricans and Puerto Ricans (see Table 8.5). Following Bates (1991), Stiglitz and Weiss (1981), and Holtz-Eakin, et al. (1994) if we consider income proxies for owner's wealth, this analysis *supports* the hypothesis that immigrant-owned businesses face fewer liquidity constraints than Puerto Rican owned businesses. As shown by Evans and Jovanovic (1989), businesses tend to reinvest more earnings back into the business relative to unconstrained firms because the return on

¹² Holtz-Eakin, et al. (1994) used the receipt of an inheritance (increase in personal assets) as a measure of "wealth" while this study uses the amount of dividend and interest income as proxies for equity capital.

Table 8.4

Mean distribution of income (interest, rent, royalty income)
(Figures are in dollars)

Sector	National Origin		
	Puerto Ricans	Mainland Puerto Ricans	Immigrants
Self Employed	436.40	480.23	963.55
N	89547	3081	10146

Source: 1990 Public Use Microdata Samples- Puerto Rico

Table 8.5

Means distribution of natural log of weekly income

National Origin	Population μ	
	Self-employed	Salaried
Puerto Ricans	4.989	5.111
Mainland Puerto Ricans	5.351	5.132
Immigrants	5.570	5.369

Source: 1990 Public Use Microdata Samples- Puerto Rico

capital investment is higher for the constrained firms. Adding to the support of the findings, previous studies had established that immigrant groups with middle-class or elite origins tend to have greater access to financial markets (Portes & Zhou, 1992; Zhou, 1992).

Finally, immigrant access to credit markets might be linked to their participation rate in the Puerto Rican financial sector. According to the PUMS data, in 1990 immigrants had a higher participation in managerial positions in the financial sector than Island-born and mainland Puerto Ricans (see Table 8.6). Furthermore, using the income earned by those workers in managerial positions as a proxy for economic power in the financial sector, I find that immigrants also have a higher income share in comparison with their share of employment in this sector (see Table 8.7). These findings are consistent with the hypothesis that immigrants' better access to commercial loans is related to their high rate of participation in financial managerial positions. According to the results, immigrants seem to be perceived as "good borrowers" by the financial institutions in Puerto Rico. As the empirical analysis demonstrates, immigrant business owners have more access to credit markets, particularly to commercial loans perhaps because they are wealthier than native business owners.

Summary

This chapter analyzes whether differences in financing sources exist among small businesses in Puerto Rico. The results from the multinomial logit model show that immigrants have more access to credit markets than Puerto Ricans. To provide additional support for these findings data from the 1990 PUMS were employed. The analysis shows that immigrants are wealthier and have more economic power (as measured by their

Table 8.6

Distributions of Occupations and National Origin in the Financial Sector
(Figures are in Percentages)

Occupations	Puerto Ricans	Mainland	
		Puerto Ricans	Immigrants
Managers & Related	31.10	21.08	45.45 ¹
Other	68.90	78.92	54.55
N	20,217	1,494	957

¹ Cubans (34.48 %), Dominicans (18.62%), Others (46.90%)

Table 8.7

Income and Employment Shares for Managers in the Financial Sector
(Figures are in Percentages)

National Origin	Self Employed		Managers in the Financial Sector	
	Employment Shares	Income Shares	Employment Shares	Income Shares
Puerto Ricans	87.13	81.21	89.34	87.34
Mainland Puerto Ricans	3.00	3.86	4.48	3.36
Immigrants	9.87	14.93	6.18	9.30
N	102,774		7,038	

Source: 1990 Public Use Microdata Samples: Puerto Rico

participation in managerial positions in the financial sector) than Island-born Puerto Ricans. The empirical results outlined in this chapter hint at the possibility that *some* of the observed difference in self-employment trends observed in the previous chapter might be related to differences in credit access among groups.

CHAPTER IX

CONCLUSIONS AND POLICY IMPLICATIONS

Self-employment decisions have been extensively studied in both the economic and sociological literatures. Particular attention has been given to the experience of minorities and immigrants in the self-employment sector.

In this dissertation, I study the self-employment tendencies of Puerto Ricans in both Puerto Rico and the United States. First, the self-employment conditions in Puerto Rico for 1980 and 1990 are analyzed. The results suggest that those groups experienced an increase in overall self-employment rates from 1980 to 1990. After controlling for socio-economic factors, there was *support* for the hypothesis that in Puerto Rico, the proportion of Puerto Ricans in the self-employment sector increased from 1980 to 1990, but not at the same pace than that of mainland Puerto Ricans, Cubans and Dominicans. When analyzing the correlation coefficients of the index and earnings function, I found no evidence of self-selection into the self-employment sector in the Puerto Rican sample for 1980 or 1990. Mainland Puerto Ricans, however, were seemingly negatively self-selected into self-employment in 1980 and positively selected in 1990. These latter results may be explained by the fact that mainland Puerto Ricans had significantly higher levels of human capital. Thus, the findings from the analysis *do not support* the hypothesis that Puerto Ricans are positively self-selected into self-employment, when compared to other groups in Puerto Rico.

Second, I evaluate the self-employment conditions in the United States of several Hispanic groups. As in Puerto Rico, the empirical analysis suggests that in the United States there was an increase in the self-employment rates of these populations from 1980 to 1990. Similar to the PUMS sample, however, Mexicans, other Hispanics and Cubans were more likely than Puerto Ricans to engage in self-employment activities in the United States. These results *do not support* the hypothesis that the self-employment propensity of Puerto Ricans in the United States increased from 1980 to 1990, compared to other groups. Further, the correlation coefficients between the index and earnings function suggest evidence of negative selection into the self-employment sector in the United States among Puerto Ricans; no evidence of self-selection exists in 1990. Thus, the results *support* the hypothesis that Puerto Ricans in United States were negatively self-selected into self-employment during the 1980s.

To understand the different patterns of self-employment in Puerto Rico, an analysis of the access to credit markets by different groups in Puerto Rico was performed. First, I hypothesize that immigrants were relatively more successful in obtaining funds from financial institutions, because they were wealthier than native business owners during the time of the 1990 PUMS survey. Using the estimations from the multinomial logit model and the PUMS data, the results tend to *support* this hypothesis. It can be argued that these results reflect the fact that immigrants had the highest participation rate in financial managerial positions in Puerto Rico. Then, I hypothesize that immigrants were positively selected into the entrepreneurial sector. There was *no support* for this hypothesis: Puerto Ricans and immigrants were seemingly negatively selected into the entrepreneurial sector.

With regards to policy implications, understanding the factors that might influence the self-employment decision among different ethnic groups in Puerto Rico and the United States may promote the creation of policy initiatives to foster entrepreneurial growth among these groups, particularly when the results from this study hint at differences in the self-employment trends for each group. It has been suggested by a former Secretary of Labor that Puerto Ricans do not have a strong entrepreneurial culture and rather see themselves as wage/salary labor (Rivera, 1995). As such, it would be necessary to develop, promote, and support educational programs designed to stimulate entrepreneurial thinking at an early age and to provide technical and managerial skills to the entrepreneurial sector.

The results from this study also add to extant development literature regarding the role of small businesses on economic growth and to the importance of formulating adequate policies to facilitate the access to capital markets. In particular, several studies have shown that to foster small business growth in developing economies, appropriate policies are needed to facilitate small entrepreneurs' adequate access to capital markets for the accumulation of physical and human capital (Barham, et al. 1996; Binks & Ennew, 1996; Daniels & Mead, 1998; Rondinelli & Kasarda, 1992; Yamada, 1996). In Puerto Rico, several steps have indeed been taken to provide small business owners such financial support. For example, the government and the private sector have created several programs that promote small business growth. One such example, is the Economic Development Bank of Puerto Rico that provides loans to those businesses that cannot resort to financial institutions due to their lack of collateral or business experience.

Finally, findings presented here provide a basic framework that can be used by future and present small firm owners to understand the dynamics of the Puerto Rican small business financial markets, particularly the importance of the factors which might influence the loan officer's decision-making process. The results may help financial institutions develop or modify their lending policies to foster small business formation among natives in Puerto Rico.

Much work is still required to shed light on the Puerto Rican self-employment experience. Some future extensions to this dissertation would require the creation of an in-depth data set that includes information on demographic variables (age, gender, education, marital status, number of children, ethnicity, race¹³, language proficiency, geographic region); socio-economic variables (employment status – actual and previous, hours worked, employment income, business experience, parent's business experience, form of ownership – if small business owner); financing variables (financing sources used, amount of financing, collateral used, asset levels); and macroeconomic variables (domestic unemployment and inflation rates, global economic indicators). The collection of this data would facilitate further research of the economics and financing issues of self-employed individuals in Puerto Rico.

Another possible extensions would involve, first, an analyses of the significance and contribution of the factors in the self-employment choice among the sampled groups vis-a vis previous studies that employ other techniques to evaluate the self-employment

¹³ The variable race was not included in this dissertation because the Puerto Rican Census (PUMS) does not include information regarding racial issues. Trying to overcome this limitation the Panel Study of Income Dynamics (PSID) was used to determine if race was a significant factor in the self-employment decision among the sampled groups. Unfortunately, the Puerto Rican sample in this survey was not enough to perform any empirical analyses.

decision (e.g. Fairlie, 1999). Second, the 2000 Census Data could be used to replicate the Census work here to determine whether self-employment trends have continued to change in both Puerto Rico and the United States. Third, a longitudinal study evaluating the migratory patterns of the sampled groups could be useful in providing specific information about the self-employment trends in Puerto Rico and the United States. Finally, regarding financing choices and entrepreneurial growth in Puerto Rico, another extension to this study may include the creation of a survey that collects both financial and capitalization data for small businesses. This information could be merged with data on accessibility to existing programs to investigate the entrepreneurial success of the se programs in Puerto Rico.

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Table A1:

Estimates from Mincer's Earnings Function: 1980 PUMS – Puerto Rico

	Mainland		Puerto Ricans		Dominicans	
	β_{SE}	β_{WS}	β_{SE}	β_{WS}	β_{SE}	β_{WS}
Constant	6.132*** (1.684)	1.479*** (0.199)	1.553** (0.777)	2.661*** (0.036)	-0.295 (15.129)	-2.098*** (0.269)
HOURS	0.343 (0.409)	0.453*** (0.039)	0.166*** (0.029)	0.241*** (0.008)	0.616*** (0.208)	0.403*** (0.058)
EDUCATION	0.153** (0.076)	0.099*** (0.011)	0.097*** (0.008)	0.074*** (0.001)	0.087 (0.236)	0.064*** (0.011)
EXPERIENCE	0.008 (0.047)	0.052*** (0.010)	0.034*** (0.010)	0.028*** (0.001)	0.120 (0.239)	0.038*** (0.010)
EXPERIENCE ²	-0.119 (0.128)	-0.084** (0.037)	-0.039*** (0.012)	-0.035*** (0.002)	-0.181 (0.312)	-0.048** (0.019)
MALE	-0.277 (0.359)	0.129*** (0.048)	0.485*** (0.120)	0.239*** (0.010)	0.936 (1.006)	0.456*** (0.078)
MARRIED	0.209 (0.413)	0.090* (0.049)	0.231*** (0.058)	0.130*** (0.010)	-0.313 (0.731)	0.015 (0.081)
ENGLISH NO WELL	0.916* (0.504)	-0.098 (0.071)	-0.278*** (0.048)	-0.166*** (0.012)	-0.532 (1.783)	-0.236** (0.107)
NO ENGLISH	0.045 (0.564)	-0.126 (0.098)	-0.278*** (0.050)	-0.237*** (0.012)	-0.129 (2.098)	-0.229** (0.101)
ARRIVAL	----	----	----	----	-1.111 (0.000)	-0.178 (0.164)

(Table continues)

	Cubans		Other Immigrants	
	β_{SE}	β_{WS}	β_{SE}	β_{WS}
Constant	2.312 (2.239)	2.294*** (0.269)	7.757*** (2.043)	1.426*** (0.214)
HOURS	0.074 (0.157)	0.437*** (0.065)	0.165 (0.453)	0.512*** (0.050)
EDUCATION	0.067*** (0.023)	0.046*** (0.112)	0.070* (0.040)	0.088*** (0.008)
EXPERIENCE	0.059 (0.066)	0.055*** (0.010)	-0.043 (0.066)	0.051*** (0.006)
EXPERIENCE ²	-0.112 (0.118)	-0.095*** (0.202)	0.038 (0.124)	-0.072*** (0.014)
MALE	0.826** (0.372)	0.530*** (0.089)	-0.152 (0.352)	0.322*** (0.052)
MARRIED	-0.138 (0.399)	0.128 (0.085)	-0.179 (0.378)	0.103* (0.059)
ENGLISH NO WELL	0.001 (0.204)	-0.157* (0.081)	-0.509 (0.418)	-0.206*** (0.077)
NO ENGLISH	0.196 (0.251)	-0.239** (0.108)	-0.621* (0.375)	-0.269*** (0.064)
ARRIVAL	1.130 (10.279)	0.035 (0.419)	-0.587 (1.497)	-0.094 (0.170)

Note: *, **, and *** indicate the significance levels at the 10, 5, and 1 percent respectively, using two-tailed tests. Standard errors in parentheses.

Table A2:

Estimates from Mincer's Earnings Function: 1990 PUMS – Puerto Rico

	Mainland		Puerto Ricans		Dominicans	
	β_{SE}	β_{WS}	β_{SE}	β_{WS}	β_{SE}	β_{WS}
Constant	-2.35 (2.207)	0.942*** (0.124)	2.120 (1.624)	1.847*** (0.036)	3.926** (1.992)	2.489*** (0.269)
HOURS	0.0829 (0.203)	0.616*** (0.023)	0.321*** (0.026)	0.534*** (0.006)	0.267** (0.114)	0.504*** (0.050)
EDUCATION	0.198*** (0.048)	0.105*** (0.006)	0.097*** (0.008)	0.077*** (0.002)	0.041* (0.021)	0.035*** (0.010)
EXPERIENCE	0.088 (0.058)	0.053*** (0.006)	0.012 (0.018)	0.030*** (0.001)	-0.006 (0.028)	0.023** (0.010)
EXPERIENCE ²	-0.053 (0.151)	-0.088*** (0.016)	-0.008 (0.015)	-0.039*** (0.002)	0.039 (0.045)	-0.037** (0.017)
MALE	1.037*** (0.273)	0.240*** (0.031)	0.430 (0.307)	0.158*** (0.023)	0.201 (0.009)	0.381** (0.072)
MARRIED	0.117 (0.295)	0.151*** (0.032)	0.123* (0.068)	0.158*** (0.010)	-0.002 (0.187)	0.116 (0.071)
ENGLISH NO WELL	-0.838*** (0.285)	-0.156*** (0.041)	-0.346*** (0.053)	-0.176*** (0.011)	-0.837** (0.336)	-0.180* (0.100)
NO ENGLISH	-0.590 (0.660)	-0.113** (0.049)	-0.413*** (0.047)	-0.239*** (0.011)	-0.731* (0.434)	-0.244** (0.104)
ARRIVAL	0.012 (0.013)	0.003** (0.002)	----	----	0.002 (0.009)	0.165*** (0.004)

(Table continues)

	Cubans		Other Immigrants	
	β_{SE}	β_{ws}	β_{SE}	β_{ws}
Constant	4.862*** (1.362)	0.944** (0.392)	5.738*** (1.309)	1.795*** (0.237)
HOURS	0.477*** (0.180)	0.767*** (0.088)	0.316 (0.249)	0.523*** (0.049)
EDUCATION	0.049 (0.038)	0.077*** (0.015)	0.059 (0.038)	0.075*** (0.011)
EXPERIENCE	-0.556 (0.043)	0.027* (0.014)	-0.012 (0.047)	0.040*** (0.010)
EXPERIENCE ²	0.085 (0.082)	-0.028 (0.028)	0.020 (0.095)	-0.038* (0.022)
MALE	0.008 (0.202)	0.638*** (0.105)	0.041 (0.339)	0.446*** (0.070)
MARRIED	-0.029 (0.306)	0.364*** (0.110)	0.093 (0.293)	0.322*** (0.076)
ENGLISH NO WELL	-0.396 (0.245)	-0.287** (0.125)	-0.511 (0.357)	-0.440*** (0.089)
NO ENGLISH	-0.413 (0.264)	-0.437*** (0.140)	-0.792 (0.548)	-0.372*** (0.116)
ARRIVAL	0.027** (0.013)	0.008* (0.005)	0.000 (0.015)	0.007** (0.003)

Note: *, **, and *** indicate the significance levels at the 10, 5, and 1 percent respectively, using two-tailed tests. Standard errors in parentheses.

Table A3:

Estimates from Mincer's Earnings Function: 1980 IPUMS – United States

	Mainland		Puerto Ricans		Mexicans	
	β_{SE}	β_{WS}	β_{SE}	β_{WS}	β_{SE}	β_{WS}
Constant	9.019*** (3.211)	2.591*** (0.214)	9.407*** (1.511)	2.732*** (0.098)	1.607 (4.377)	3.145*** (0.074)
HOURS	1.409 (1.354)	0.343*** (0.052)	0.210 (0.171)	0.362*** (0.023)	0.401** (0.172)	0.240*** (0.019)
EDUCATION	-0.142 (0.176)	0.068*** (0.011)	0.033 (0.041)	0.053*** (0.004)	0.0311 (0.074)	0.041*** (0.002)
EXPERIENCE	-0.135 (0.123)	0.052*** (0.008)	-0.099** (0.039)	0.030*** (0.004)	0.658 (0.055)	0.030*** (0.002)
EXPERIENCE ²	0.217 (0.230)	-0.088*** (0.021)	0.180** (0.071)	-0.042*** (0.007)	-0.142* (0.081)	-0.051*** (0.005)
MALE	-2.110* (1.280)	0.237*** (0.056)	0.142 (0.276)	0.309*** (0.026)	0.374 (0.315)	0.386*** (0.019)
MARRIED	-0.622 (0.487)	0.087 (0.054)	-0.377 (0.262)	0.113*** (0.027)	0.229 (0.198)	0.121*** (0.021)
ENGLISH NO WELL	----	----	----	----	0.119 (3.407)	0.038 (0.098)
NO ENGLISH	----	----	----	----	0.447 (6.280)	0.104 (0.218)
ARRIVAL	----	----	----	----	0.018 (0.015)	0.011*** (0.001)

(Table continues)

	Cubans		Other Hispanics	
	β_{SE}	β_{ws}	β_{SE}	β_{ws}
Constant	5.021*** (0.838)	2.297*** (0.118)	1.454 (2.871)	2.307*** (0.053)
HOURS	0.198** (0.079)	0.464*** (0.028)	0.363*** (0.071)	0.413*** (0.013)
EDUCATION	0.045*** (0.014)	0.050*** (0.004)	0.080* (0.045)	0.066*** (0.002)
EXPERIENCE	-0.003 (0.017)	0.027*** (0.004)	0.052* (0.031)	0.038*** (0.002)
EXPERIENCE ²	0.007 (0.033)	-0.050*** (0.007)	-0.086** (0.044)	-0.056 (0.004)
MALE	0.042*** (0.163)	0.451*** (0.028)	0.663** (0.296)	0.387*** (0.015)
MARRIED	-0.051 (0.159)	0.172*** (0.030)	0.104 (0.169)	0.160*** (0.016)
ENGLISH NO WELL	----	----	-0.091 (0.385)	0.271** (0.118)
NO ENGLISH	----	----	-0.892 (0.276)	0.031 (0.251)
ARRIVAL	0.008 (0.009)	0.011*** (0.002)	0.013*** (0.004)	0.010 (0.010)

Note: *, **, and *** indicate the significance levels at the 10, 5, and 1 percent respectively, using two-tailed tests. Standard errors in parentheses.

Table A4:

Estimates from Mincer's Earnings Function: 1990 IPUMS – United States

	Mainland		Puerto Ricans		Mexicans	
	β_{SE}	β_{WS}	β_{SE}	β_{WS}	β_{SE}	β_{WS}
Constant	9.156*** (1.681)	2.374*** (0.095)	2.661 (18.698)	3.022*** (0.074)	7.357*** (0.314)	3.426*** (0.040)
HOURS	0.139 (0.234)	0.460*** (0.021)	0.110 (0.137)	0.412*** (0.018)	0.510*** (0.059)	0.323*** (0.009)
EDUCATION	-0.009 (0.049)	0.089*** (0.004)	0.080 (0.242)	0.055*** (0.003)	-0.009 (0.009)	0.029*** (0.022)
EXPERIENCE	-0.013 (0.049)	0.059*** (0.004)	0.056 (0.189)	0.026*** (0.003)	-0.039*** (0.012)	0.023*** (0.002)
EXPERIENCE ²	0.016 (0.118)	-0.102*** (0.009)	-0.101 (0.189)	-0.038*** (0.005)	0.017 (0.020)	-0.004*** (0.003)
MALE	-0.033 (0.329)	0.247*** (0.025)	0.847 (1.104)	0.246*** (0.020)	0.379*** (0.084)	0.292*** (0.011)
MARRIED	-0.398 (0.324)	0.114*** (0.027)	0.476 (0.394)	0.119*** (0.020)	0.139 (0.085)	0.116*** (0.010)
ENGLISH NO WELL	----	----	0.068 (0.914)	0.016 (0.095)	0.396 (0.304)	-0.042 (0.043)
NO ENGLISH	----	----	-0.115 (4.815)	-0.182 (0.157)	1.034 (0.978)	0.045 (0.071)
ARRIVAL	----	----	-0.002 (0.014)	0.006*** (0.010)	0.009** (0.004)	0.014*** (0.001)

(Table continues)

	Cubans		Other Hispanics	
	β_{SE}	β_{ws}	β_{SE}	β_{ws}
Constant	6.580*** (0.519)	2.533*** (0.097)	1.822 (4.024)	2.693*** (0.37)
HOURS	0.382*** (0.093)	0.552*** (0.023)	0.499*** (0.046)	0.466*** (0.009)
EDUCATION	0.036** (0.017)	0.051*** (0.003)	0.067* (0.039)	0.061*** (0.001)
EXPERIENCE	-0.058*** (0.019)	0.008** (0.003)	0.027 (0.056)	0.031*** (0.001)
EXPERIENCE ²	0.092** (0.037)	-0.017*** (0.006)	-0.037 (0.070)	-0.004*** (0.003)
MALE	-0.146 (0.145)	0.288*** (0.031)	0.602*** (0.174)	0.272*** (0.010)
MARRIED	-0.005 (0.120)	0.099*** (0.023)	0.068 (0.163)	0.104*** (0.011)
ENGLISH NO WELL	1.237** (0.509)	0.005 (0.116)	0.171 (0.306)	-0.040 (0.051)
NO ENGLISH	-3.095*** (0.370)	-0.276 (0.309)	-0.242 (0.677)	-0.012 (0.108)
ARRIVAL	0.016** (0.006)	0.018*** (0.001)	0.008*** (0.003)	0.007*** (0.001)

Note: *, **, and *** indicate the significance levels at the 10, 5, and 1 percent respectively, using two-tailed tests. Standard errors in parentheses.

Table A5:

Estimates from Mincer's Earnings Function:
1980 – 1990 PUMS Sample – Puerto Rico

	β_{SE}	β_{WS}
Constant	1.706*** (0.639)	1.943*** (0.023)
HOURS	0.269*** (0.018)	0.409*** (0.005)
EDUCATION	0.095*** (0.005)	0.077*** (0.001)
EXPERIENCE	0.023*** (0.008)	0.033*** (0.001)
EXPERIENCE ²	-0.025*** (0.009)	-0.040*** (0.001)
MALE	0.448*** (0.102)	0.233*** (0.006)
MARRIED	0.142*** (0.038)	0.157*** (0.006)
ENGLISH NO WELL	-0.319*** (0.031)	-0.179*** (0.008)
NO ENGLISH	-0.346*** (0.032)	-0.237*** (0.008)
ARRIVAL	0.009*** (0.003)	0.005*** (0.001)
DOMINICAN	0.328*** (0.101)	0.044* (0.024)

(Table continues)

	β_{SE}	β_{WS}
MAINLAND PUERTO RICAN	-0.159* (0.082)	-0.058*** (0.017)
CUBAN	0.410*** (0.109)	0.218*** (0.031)
OTHER IMMIGRANTS	0.199*** (0.075)	0.115*** (0.019)
DUMMY 1990	0.271*** (0.026)	0.335*** (0.006)

Note: *, **, and *** indicate the significance levels at the 10, 5, and 1 percent respectively, using two-tailed tests. Standard errors in parentheses.

Table A6:

Estimates from Mincer's Earnings Function:
1980 – 1990 IPUMS Sample – United States

	β_{SE}	β_{WS}
Constant	1.475*** (0.435)	1.804*** (0.010)
HOURS	0.398*** (0.013)	0.543*** (0.002)
EDUCATION	0.080*** (0.005)	0.007*** (0.000)
EXPERIENCE	0.043*** (0.005)	0.041*** (0.000)
EXPERIENCE ²	-0.070*** (0.008)	-0.063*** (0.001)
MALE	0.772*** (0.041)	0.425*** (0.003)
MARRIED	0.099*** (0.029)	0.121*** (0.003)
ENGLISH NO WELL	0.008 (0.038)	0.002 (0.008)
NO ENGLISH	0.035 (0.061)	0.009 (0.013)
ARRIVAL	0.007*** (0.001)	0.004*** (0.000)
MEXICAN	-0.197*** (0.041)	-0.157*** (0.005)

(Table continues)

	β_{SE}	β_{ws}
MAINLAND PUERTO RICAN	-0.010 (0.136)	0.015 (0.012)
CUBAN	-0.096** (0.049)	-0.126*** (0.009)
OTHER HISPANICS	-0.093*** (0.027)	-0.109*** (0.004)
DUMMY 1990	0.461*** (0.166)	0.479*** (0.003)

Note: *, **, and *** indicate the significance levels at the 10, 5, and 1 percent respectively, using two-tailed tests. Standard errors in parentheses.