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Date of Ph.D.: May of 2020

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Sessions interested in attending: Entrepreneurship, Labor Studies

Summary of current research:

My research interests lie in the areas of labor economics and applied microeconomics, with an emphasis on economics of immigration. My own personal background was the main reason why I became interested in better understanding the problems of immigrants, particularly Hispanics and Latinos. My dissertation comprised three essays related to immigration and self-employment. The first two chapters analyzed the relationship between entrepreneurship and immigration while the last chapter studied family firms.

My current work belongs to two areas. The first one investigates the different paths that immigrants follow to become entrepreneurs in the US, the extent to which self-employment is used by immigrants as a transitory occupation, the role of assimilation in immigrants' outcomes in a host country, and female entrepreneurship. My second area of research focuses on the agricultural labor force in the US. Unlike other labor markets, the agricultural labor market has received considerably less attention by economists despite its importance for the food security of the nation. I am investigating the reasons behind the decline in the farm labor supply, the migration and occupational choice decisions of agricultural workers in Mexico and the US, the impact of legalization reforms on the agricultural labor supply, and the role of automation and mechanization in food production.

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April 16, 2021

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PROFESSIONAL POSITIONS

NORTH CAROLINA STATE UNIVERSITY

August 2020-present:

Assistant Professor, Department of Agricultural and Resource Economics

Economics Graduate Faculty, Member, Department of Economics, Poole College of Management

Extension Economist, College of Agriculture and Life Sciences

EDUCATION

WASHINGTON UNIVERSITY IN ST. LOUIS

Ph.D. in Economics, May 2020

Dissertation title: Essays on Immigration and Entrepreneurship
Committee: Barton Hamilton (chair), George-Levi Gayle, Costas Azariadis

M.A. in Economics, 2016

ITAM (MEXICO CITY)

M.A. in Economic Theory

UNIVERSITY OF COSTA RICA

Licenciatura in Economics

B.A. in Economics (highest honors)

RESEARCH INTERESTS

Labor economics, applied microeconomics, economics of immigration, entrepreneurship, agricultural economics

WORKING PAPERS

Immigrant Entrepreneurship in the United States: The Role of Pre-Migration Work Experience

Business Ownership and Mexico-US Immigration

Agricultural Labor Force: The Rise of the H-2A Visa Program

Family CEOs, Turnover, and Firm Performance (with Barton Hamilton and Andrés Hincapié)

WORK IN PROGRESS

Undocumented Immigration, Legalization, and Agricultural Labor in the US

Robots or hands? Mechanization and Agriculture in the US

Voluntary or Forced? Paths to Immigrant Entrepreneurship in America

PUBLICATIONS (peer-reviewed)

Determinants and differences in tax moral in Central America. An analysis from the 2005 Latinobarometer (published in Spanish as Determinantes y diferencias en la moral fiscal en Centroamérica. Un análisis desde el Latinobarómetro 2005. (2011). Revista de Ciencias Económicas, Universidad de Costa Rica, 29.1)

Market power, economies of scale and scope in the Costa Rican banking system during the period of 1997-2009 (published in Spanish as Poder de mercado, economías de escala y de ámbito en el sistema bancario costarricense durante el periodo 1997-2009. (2014). Serie de Divulgación Económica, IICE, Universidad de Costa Rica, 28)

OTHER PUBLICATION

Fernández, C; González, G; **Gutiérrez Li, A**; Lucke, R; Rojas, F; Yong. M. (2010). *Analysis of the contribution of recreational and commercial fisheries to the Costa Rican economy*. Technical report. IICE, University of Costa Rica. Sponsored by The Billfish Foundation.

RESEARCH EXPERIENCE

ITAM, Center for Economics Research (CIE)

Research assistant, 2013-2014

UNIVERSITY OF COSTA RICA, Economics Institute of Research (IICE)

Economics researcher, 10/2010-12/2011

Research assistant, 05/2008-09/2010

CENTRAL BANK OF COSTA RICA (BCCR)

Summer internship, 06/2013-07/2013

TEACHING EXPERIENCE

WASHINGTON UNIVERSITY

Instructor

Political Economy, Summer 2017, Summer 2016

Teaching Assistant

Economics and Society (for Prof. Costas Azariadis), Spring 2018

Political Economy (for Prof. Valerio Dotti), Fall 2017

Intermediate Macroeconomic Theory (for Prof. Costas Azariadis), Spring 2017

Introduction to Microeconomics (for Prof. Sudeshna Bandyopadhyay), Fall 2016

Understanding the Financial Crisis (for Prof. Fernando Martin), Spring 2016

Behavioral and Experimental Economics (for Prof. Brian Rogers), Fall 2015

Professional Development in Teaching:

Preparation in Pedagogy Program, certificate awarded in September of 2019

Professional development program facilitated by the Teaching Center at Washington University that provides formalized training in pedagogy. The program emphasizes evidence-based classroom strategies supported by current educational research.

Workshops taken:

Fostering an Inclusive Classroom Climate

Addressing Diversity and Inclusion

Leading Engaging Discussions

Responding Effectively to Student Writing

Developing Effective Summative Assessments

Facilitating Challenging Conversations

Writing a Teaching Philosophy Statement

Creating a Teaching Portfolio

UNIVERSITY OF COSTA RICA

Teaching Assistant

Several courses in the Economics and Mathematics departments, 2005-2011

STUDENT ADVISING AT NC STATE UNIVERSITY

Year denotes anticipated completion date.

Graduate Students

Committee member:

Eve Oh, Ph.D. in Economics, 2021

Undergraduate Students

Mentor and supervisor of research assistants:

Tyler Stocks, 2021

Jason Oliva-Milla, 2023

HONORS AND AWARDS

Mentee, Diversity Initiative for Tenure in Economics, Duke University, 2020-present

University fellowship, Washington University, 2014-2019

Summer research fellowship, Washington University, 2016-2019

Preparation in pedagogy certificate, Teaching Center, Washington University, 2019

Travel award, Washington University, 2016, 2017, 2019, 2020

Travel award, Institute for Humane Studies, 2019, 2020

Master studies fellowship, ITAM, 2012-2014

Academic excellence scholarship, University of Costa Rica, 2006-2011

Graduation with highest honors, University of Costa Rica

Dr. Frankin Chang Díaz scholarship for English studies, American-Costa Rican Cultural Center (CCCN), 2009-2010

COMPETITIVE GRANTS

North Carolina Christmas Tree Association, P.I., $3,000, 2020-2021

National Institute of Food and Agriculture (USDA), Co-P.I., $23,500, 2021-2025, in process

CONFERENCES AND PRESENTATIONS

2022

American Economic Association/ASSA Annual Meeting (scheduled)

2021

Triangle Applied Microeconomics Conference (virtual)

Western Economic Association International Annual Meeting (virtual)

CSMGEP-CSWEP/WEAI (virtual)

Midwest Economics Association Annual Meeting (virtual)

2020

DITE (virtual)

ITAM Alumni Conference (virtual)

Western Economic Association International Annual Conference (session cancelled)

2019

Southern Economic Association Annual Conference, Fort Lauderdale FL

Latin American Meeting of the Econometric Society, Puebla Mexico

Economics Graduate Student Conference, St. Louis MO

Midwest International Trade Fall Conference, St. Louis MO

Indiana University, Bloomington IN

Midwest Economics Association/Society of Labor Economists Annual Meeting (presenter and discussant), St. Louis MO

Washington University, St. Louis MO

2018

Washington University, St. Louis MO

2017

Washington University, St. Louis MO

EXTENSION

Outreach Workshops and Presentations

Agricultural Labor Outlook, Extension Agent Educational Series, ARE/NCSU November 2020 (virtual meeting), 23 attendees

Committee Service

Farmworker Pesticide Education Program, NCSU, September 2020-present

Ongoing Projects

Survey of North Carolina Christmas Trees growers' labor needs, November 2020-present

Understanding the Economic Contribution of Farmworkers, November 2020-present

Sustainable Practices, Economic Contributions, Consumer Behavior, and Labor Management in the U.S. Environmental Horticulture Industry (interdisciplinary multi-state Hatch project), November 2020-present

OTHER ACADEMIC ACTIVITIES

Dissertation Writing Retreat, Writing Center, Washington University, August 2017

NBER Entrepreneurship Research Boot Camp, Boston MA, July 2017

Summer School in Socioeconomic Inequality, HCEO, University of Chicago, July 2016

PROFESSIONAL ENGAGEMENT

Referee

Agricultural Economics, Revista de Ciencias Económicas, Economics Graduate Student Conference

Reviewer

BARD US-Israel Binational Agricultural Research and Development Fund, AAEA annual conference abstract reviewer

Memberships

American Economic Association

Society of Labor Economists

Midwest Economics Association

SKILLS

Computer

Stata, Matlab, R, Eviews, Python, LaTeX

Languages

English (Fluent), Spanish (native); Mandarin, Cantonese, French, and German (basic)

MEDIA MENTIONS

Introducing Dr. Alejandro Gutierrez-Li. College of Agriculture and Life Sciences, ARE November Newsletter (Nov 2, 2020), available online here: https://cals.ncsu.edu/agricultural-and-resource-economics/news/introducing-dr-alejandro-gutierrez-li/

North Carolina Farm Bureau Report (November 6, 2020), available online here: https://www.youtube.com/watch?v=mX7y34JMsY8

Immigrant Entrepreneurship in the United States: The Role of Pre-migration Work Experience

Alejandro Gutiérrez-Li[1]

Abstract

Immigrant entrepreneurship in the United States has grown steadily in the last four decades. In this paper, I study the occupational choices of legal permanent residents in the US and their associated earnings in paid and self-employment. Making use of a unique data set with pre- and post-migration individual-level information, I analyze the role of home country work experience of immigrants in their probability of becoming entrepreneurs in the US and their earnings after migration. To control for endogenous sector selection in the estimation of earnings distributions, I follow a novel identification strategy based on extremal quantile regressions that does not require exclusion restrictions or a large support variable. I find that foreign work experience in paid and self-employment is an important predictor of entrepreneurship after migration. However, it has a limited impact on earnings which are instead influenced by human capital, assimilation, and demographic characteristics. Overall, my results highlight the role played by immigrants' labor market performance in their home countries to better understand their outcomes in the US.

JEL codes: L26, F22, J61, M13, J24, C51

Keywords: Entrepreneurship, self-employment, human capital, labor supply

[1]Contact: alejandro-gli@ncsu.edu. I would like to thank Costas Azariadis, Barton Hamilton, and George-Levi Gayle for their guidance, support, and advice on this project. I also benefited from comments and suggestions from Chris Cronin, Sanghmitra Gautam, Rebecca Lessem, Arnaud Maurel, Carl Sanders, Laura Veldkamp, and seminar participants at the 2019 MEA/SOLE Annual Meetings, the 2019 Midwest International Trade Fall Conference, the 2019 LACEA-LAMES Meeting, the 2019 Southern Economic Association Annual Meeting, the 2019 Economics Graduate Student Conference, the DITE 2020 Annual Meeting, Indiana University Bloomington, North Carolina State University, and Washington University in St. Louis. I thank the Department of Economics at Washington University in St. Louis for financial support. Any remaining errors are mine.

1 Introduction

Almost 45 million immigrants currently live in the United States. Of those, roughly 13 million have lawful permanent status and are fully incorporated into the American labor market (Baker, 2016). The numbers have increased over the last four decades and today, around 15% of the US population is foreign-born, reaching historical peaks (Pew Research Center, 2015). At the same time, the immigrant self-employment share has risen from around 7% in 1980 to close to 20% in 2010, in clear contrast to the steady decline in native-born entrepreneurship and startup rates (Fairlie and Lofstrom, 2015). The outcomes of immigrants affect the American economy in many ways, which has led to vigorous political debates recently. From an economics point of view, however, the driving factors behind the entrepreneurship decisions of immigrants and their productivity in the US remain poorly understood.

In this paper, I analyze the occupational choices of immigrants between paid and self-employment in the US and their associated earnings in either sector[2]. In particular, I study the role of pre-migration work experience in both of these aspects taking into consideration that individuals are only observed in the sector where they work in and that their decisions are not random. Most of the previous literature on immigrant entrepreneurship has not considered the role that the labor market performance of immigrants in their home countries plays in their outcomes in the US. I find that home country work experience has a significant influence in the decision to become self-employed after migration, although I do not find evidence that it affects earnings in the US. My results highlight the importance of pre-migration labor market information to get a better understanding of the experiences of immigrants in the US, which is of interest from the point of view of immigration policies intended at attracting individuals with the proclivity to open firms and create jobs in the country.

I make use of the two waves of the New Immigrant Survey (NIS) in my analyses. The NIS contains a rich set of immigrants' information regarding demographics and other social and economic characteristics of individuals who were granted legal permanent residency in 2003. Contrary to other data sets used to study the outcomes of immigrants, the NIS has data on the labor history of individuals prior to migrating. Specifically, it asked respondents to provide retrospective information about their first job after the age of 16 and the

[2]I use the terms foreign-born and immigrant, and self-employment and entrepreneurship, as synonyms throughout the paper.

last job they had before moving to the United States. This unique feature allows me to incorporate aspects of the pre-migration work history of immigrants that most previous studies have missed. The NIS also has post-migration data on three US jobs, which facilitates a deep analysis of the link between pre- and post-migration labor market outcomes of immigrants. I find that home country work experience in both paid and self-employment matters for immigrants' occupational choices but not earnings in the US, providing evidence that omitting this information could have led to an incomplete understanding of the determinants of immigrants' performance in a host country.

The analysis of this paper focuses on two fundamental aspects of the experiences of immigrants in the US labor market. The first one relates to their occupational choices between paid and self-employment. The second one pertains to the earnings associated with working in either sector. Individuals choose a sector to work in based on their comparative advantage, non-pecuniary benefits, and expected earnings potential in either type of occupation. Likewise, immigrants are only observed in the job they have chosen. This self-selection could lead to biased estimates of the earnings distributions in both sectors if not properly controlled for (Heckman, 1979). I deal with this challenge by following a novel estimation approach based on extremal quantile regressions that does not require an exclusion restriction or a large support variable. Identification is based on the independence between the explanatory variables and selection for large values of the outcome (D'Haultfœuille et al., 2018).

I find that home country work experience is an important determinant of self-employment in the US. Immigrants who worked only as entrepreneurs before moving are approximately 3.7 percentage points more likely to be self-employed in the US, while individuals with home experience in both types of jobs are around 4.3 percentage points more likely to be entrepreneurs after migration compared to people who only worked in salaried occupations. These findings are relative to an unconditional post-migration self-employment probability of around 9%. The number of years since an immigrant left his home country and education levels are also determining factors of US self-employment. Interestingly, pre-migration experience does not appear to influence earnings in the US after controlling for sector selection, which could be due, among other reasons, to an imperfect transferability of human capital across borders or the sorting of individuals into occupations in which they developed a preference from the home country but are not necessarily more productive. Instead, variables associated with human capital like schooling and better English skills play a relevant role at explaining earnings.

Having a better understanding of the factors that influence the entrepreneurship decisions of immigrants is relevant both from a macroeconomic and a microeconomic perspective. From a macroeconomic point of view, the significant role of the foreign-born in the creation of new firms and jobs in the US has direct implications for innovation and overall economic growth. Some examples include firms like Ebay (founded by a French immigrant), Google (founded by a Russian immigrant), LinkedIn (founded by a French immigrant), or Youtube (founded by a Taiwanese immigrant) which have a prominent role in the current economy. At the same time, the immigrant population in the US is not homogeneous. From a microeconomic perspective, there is evidence that self-employment has served as a route out of poverty for certain immigrant groups with lower skills (Fairlie and Woodruff, 2007) and a faster way to ascend the income and wealth ladders than paid employment (Light, 1972); (Holtz-Eakin et al. 2000).

Most of the literature on immigration has focused on how the foreign-born fare in the salaried labor markets, particularly in terms of wage growth, discrimination, or crowding-out effects on the native-born. Surprisingly, much less attention has been paid to the outcomes of immigrants as entrepreneurs in spite of its growing relevance for the economy (Borjas, 1986); (Kerr and Kerr, 2016). Other studies have considered the self-employment experiences of particular groups (e.g. Mexicans or East Asians) and not of a representative sample of immigrants from different countries. The NIS has information on immigrants from many nations, which allows a more complete understanding of the phenomenon as a whole.

Immigrants are perceived to be an under-utilized lever for spurring economic growth in the US and for job creation (Kerr and Kerr, 2016). In that context, recent policy initiatives have been implemented to foster immigrant self-employment in the country[3]. Several studies have shown that immigrants have higher self-employment rates than those of the native-born in many developed nations[4]. Likewise, the share of businesses owned by immigrants has gone up substantially over the last four decades, to the point that nearly 20% of all firms in the US in 2010 were owned by this group (Fairlie and Lofstrom, 2015). The factors influencing the self-employment outcomes of immigrants are not the same affecting the native-born population. Immigrants' performance is also determined by their assimilation to a different country, their unequal access to financial capital, their lack

[3]Some examples include: The International Institute of St. Louis which has funding opportunities to help immigrants implement their business ideas; Offices of New Americans in major metropolitan areas which provide support to entrepreneurs; The Startup Bill which has a specific section to encourage immigrant entrepreneurship (and create a visa for this purpose), among others.

[4]See Fairlie and Lofstrom (2015) for details and references.

of the necessary host-country human capital to compete in the labor market (e.g. English skills), and their pre-migration outcomes.

While the rates of self-employment of immigrants have gone up over the last forty years, the fraction of Americans engaging in entrepreneurial activities has been declining consistently. This phenomenon is well documented in the literature (Pugsley and Sahin, 2015) and has led to some concerns given the evidence backing up the importance of startups and innovation for job creation and productivity growth (Haltiwanger et al., 2014). At the same time, there are current proposals to modify the American immigration system to one based on skills rather than family relations, as has been done in other developed countries such as Canada, Australia, and New Zealand. Some of these initiatives (like the Startup Bill that has been introduced in Congress several times) prioritize the allocation of visas to individuals with the highest productivity potential. For this reason, a good understanding of the factors that could make a potential immigrant more productive in the US is fundamental for an informed public policy. To my knowledge, no previous paper has analyzed the relationship between pre-migration self-employment experience and earnings in the US.

The rest of the article is organized as follows. Section 2 provides a theoretical background and analyzes the related literature. Section 3 describes the data. Section 4 presents the econometric framework of the paper. Section 5 shows the main results and section 6 concludes.

2 Theoretical Background

In the first part of this section, I describe the main factors that the literature has considered to explain the self-employment decisions of immigrants. Some of these variables include human and financial capital, family and household characteristics, home country business experience, ethnic enclaves, and legal status (Fairlie and Lofstrom, 2015). I then provide the theoretical predictions associated with the impact of some of these factors on the occupational choices of newcomers. In the second part of this section, I explain how this paper relates to previous research on immigrant entrepreneurship.

2.1 Determinants of Self-employment

The two most commonly used variables associated with immigrants' human capital are education and proficiency in the language spoken in the host country. Education has been found to play an important role in the success or failure of small firms, although there is still no strong consensus on its directional impact on entry into self-employment. On one hand, more educated individuals could have access to better opportunities in the wage sector, thus having higher opportunity costs of entrepreneurship. Higher costs, in turn, could reduce the likelihood of choosing self-employment. On the other hand, education could allow individuals to obtain analytical or communication skills that could increase the success of a business and hence the probability of choosing entrepreneurship (Fairlie and Lofstrom, 2015). In addition, evidence shows that education can have a differential impact on the self-employment probabilities across ethnic groups. For instance, Fairlie and Woodruff (2007) found that low education levels explain the lower business ownership rates of Latinos in the US. On the contrary, the high rates of self-employment among Asians are in part explained by their relatively higher levels of schooling (Fairlie, 2005).

The impact of English skills on the likelihood of self-employment is not clear. While having a better command of the language has been found to have a positive association with the odds of choosing entrepreneurship, other researchers have found that English fluency can facilitate access to jobs in the salaried sector, thus decreasing the probability of self-employment (Fairlie and Lofstrom, 2015). In principle, limited English skills could hinder interactions with customers and suppliers but could also reduce the potential to get a wage job.

Age and the number of years since an immigrant left the home country are variables that can influence the propensity to choose self-employment. Acquiring the necessary resources

to start a business can take time, in particular if it is done in a country different from where a person was born. Hence, one could expect a positive (although not necessarily linear) relationship between these two variables and the likelihood of entrepreneurship (Borjas, 1986)[5]. The number of years since migration is considered a proxy for assimilation, since it relates to the time a person has been outside of the place where he or she is more culturally comfortable, therefore raising the odds of the person adapting to the new country. More time abroad could allow an immigrant to develop stronger local networks, acquire valuable human capital (like better English skills), and accumulate wealth.

Family and household composition are elements that have been found to affect the occupational choices of the native-born population. For example, having a partner with access to health insurance could allow individuals to choose more freely which sector to work in. Some small businesses are generally run by families, where different generations are involved including the children of the household head. In addition, individuals with a higher number of kids might value more the time flexibility that self-employment allows, thus being more likely to choose that sector. Previous studies have considered marital status, the number of kids, and the education levels and occupation of the spouse as variables that can be associated with non-pecuniary benefits of entrepreneurship (Hamilton et al., 2019)[6].

This paper focuses on the role of pre-migration work experience in the self-employment decisions and earnings of immigrants in the US. The relationship between pre- and post-migration outcomes is not well understood in the literature from neither a theoretical nor an empirical point of view (Fairlie and Lofstrom, 2015). Theoretically, individuals who worked in self-employment before migrating could have developed a preference for this sector (or acquire entrepreneurship-specific skills) thus being more likely to choose this activity in the US (Yuengert, 1995). Nevertheless, it could be the case that barriers to entry (e.g. licensing) or the role of other factors such as limited education or English skills, could force immigrants with home country self-employment experience to choose a different activity in the US. Likewise, skills that could make an individual more prone to be self-employed in the home country may not be perfectly transferable or valuable in the host economy (Hendricks and Schoellman, 2017).

[5]Notice, however, that this prediction relies on the assumption that age and years since migration are relatively less relevant for paid employment earnings growth.

[6]To account for the role of family composition in the self-employment decisions of immigrants I control in the estimations for the number of kids the person had before moving to the US. Although the total number of kids is available in the data (and the marital status after migration), only variables determined before the person moved to the US can be considered since, otherwise, they could be endogenous to the migration decision. The NIS also asked (in the first round) about asset holdings, but not about the time of their acquisition (so it is not possible to know if it was before or after the person came to the US).

The majority of empirical studies that have analyzed the role of home country self-employment experience of immigrants in post-migration entrepreneurship have relied on aggregate measures of experience, or proxies and averages of the self-employment rates in the sending economies and have obtained mixed results (Fairlie and Lofstrom (2015); Fairlie and Woodruff (2010); Fairlie and Meyer (1996); Yuengert (1995)). In contrast, I exploit individual-level data on immigrants' jobs before moving to the US[7].

To my knowledge, no previous paper has analyzed the role of home country work experience (in paid or self-employment) in earnings after migration. While experience running a business could enhance an individual's productivity in this type of occupation (hence making him more likely to have higher earnings growth in the US), it is not clear whether those skills are equally valuable in the host economy. In addition, self-employment is widespread in many developing countries and, in general, individuals who select into this sector could have been forced to do so or could be of the "low ability" type. If this was the case, one should not necessarily expect an earnings premium after migration. In summary, it is not clear, based on the previous literature, whether one should expect paid or self-employment experience to affect occupational choices and earnings in the US (either positively, negatively, or at all).

2.2 Related literature

This paper contributes to different strands of literature. Most of the research on immigrant self-employment has focused on separate analyses of the experiences of immigrants from particular countries of origin or ethnicities. Although insightful, the conclusions of these papers pertain only to the individual experiences of specific groups like the Mexican or the East Asian immigrants, but preclude a more general understanding of the phenomenon as a whole (Fairlie and Lofstrom, 2015)[8]. In this paper, I use data on im-

[7]The only exception is Akee et al. (2013) who used the first round of the NIS only and found a positive association between pre- and post-migration self-employment. However, their measure of home country self-employment experience did not consider the separate impact that paid employment experience could have on US entrepreneurship. Likewise, the authors did not analyze the earnings of immigrants in the US. In contrast, I use the two rounds of the NIS data which provide additional information about the labor market outcomes of immigrants after more years in the US, since some of the people interviewed in the first round were just arriving to the country by then, precluding an analysis of changes over time (the second round took place during a big financial crisis).

[8]Other work has provided descriptive information about the composition of immigrant entrepreneurs in the US. Using data from the 2010 American Community Survey, Fairlie and Lofstrom (2015) find that the majority of immigrant business owners are from Mexico, India, South Korea, Vietnam, China, and Cuba. Immigrant small business owners concentrate in the industries of leisure and hospitality (28%), transportation and warehousing (26%), and retail trade (22%). The countries of origin with the highest

migrants from many countries and regions of the world which allows a direct comparison of outcomes across groups. My work also relates to a nascent literature (e.g. Akee et al. (2013), Hendricks and Schoellman (2017), and Lessem and Sanders (2018)) that highlights the importance of pre-migration characteristics to understand how immigrants perform in host countries' labor markets.

Several studies on immigrant entrepreneurship have compared the outcomes of immigrant business owners to those of the native-born population. It has been well documented that immigrants have higher rates of business creation than the native-born population in developed economies like the United States, Canada, the United Kingdom, and Australia (Fairlie and Lofstrom, 2015)[9]. In the US, for example, the share of self-employment by immigrants grew from 6.8% in 1980 to 18.4% in 2010. In addition, the immigrant share of the labor force in 2012 was 16%, while their fraction of the population was around 14% (Immigrant Small Business Owners, 2012). According to Kerr and Kerr (2016), the rates of self-employment and new business formation are growing among immigrants but decreasing among the American-born.

Other authors have analyzed different elements associated with what immigrants bring to the host countries, but their focus has been on the impact on the wage/salaried markets. Less attention has been paid to the analysis of the consequences of immigrant self-employment. One dimension has been through studies of business and job creation. Using data from the Longitudinal Employer Household Dynamics (LEHD) database, Kerr and Kerr (2016) found that firms created by immigrants perform better than those created by the native-born relative to employment growth over three- and six-year horizons. In contrast, they did not find any advantage in terms of payroll growth. Other authors have suggested that there might exist displacement effects by immigrant entrepreneurs on the self-employment opportunities of the native-born (Fairlie and Meyer, 2003).

Another dimension by which the impact of immigrant self-employment on the host economies has been analyzed is through the indirect benefits obtained by the receiving countries as immigrants move up the ladder. There is evidence that self-employment has

rates of business ownership are Greece, Israel/Palestine, Syria, and Iran (Immigrant Small Business Owners, 2012).

[9]One reason for this pattern could be immigrants' selection (Borjas, 1987). Other studies point to complementary explanations. Vandor and Franke (2016), using experimental evidence, suggest that cross-cultural experiences increase the ability to recognize entrepreneurial options by facilitating the use of knowledge gained internationally to identify arbitrage opportunities and creative recombination of products. Hunt (2011) finds that the impact of immigrants on the labor outcomes of the native-born differs by entry visa.

historically served as a route out of poverty for certain immigrant groups with lower skills (Fairlie and Woodruff, 2007) and a faster way to ascend the income and wealth ladders than paid employment (Light, 1972). For example, Holtz-Eakin et al. (2000) found that upward mobility among low income self-employed households is higher than upward mobility of salaried workers. Other authors have analyzed what the impact of immigrant entrepreneurship has been on both the host economies (e.g. in terms of contributions to the welfare system) and the sending countries. For example Dustmann and Kirchkamp (2002) found that most returning migrants engage in entrepreneurial activities in their home countries.

The topic of immigrant entrepreneurship intersects different fields. Studies in the sociology literature have shown that immigrants have used self-employment to circumvent some of the requirements that wage or salaried jobs entail, such as good English skills, the capacity of employers to assess foreign education, legal status, lack of networks, or discrimination (Sanders and Nee, 1996). Sowell (1981), for instance, found that self-employment was chosen by first-generation immigrants to achieve upward mobility, particularly in the case of Japanese and Jewish newcomers. In addition, there is evidence that the formation of ethnic enclaves around particular business activities allowed some immigrant groups to achieve considerable economic success via concentrated entrepreneurship (Kerr and Mandorff, 2015).

3 Data

3.1 New Immigrant Survey

I use data from the two waves of the New Immigrant Survey (NIS). The NIS is a nationally representative sample of immigrants to the United States who were granted legal permanent residency ("green cards") in 2003. The project has a panel structure and was conducted in two waves. In the first round, immigrants were interviewed between June of 2003 and June of 2004. A follow-up interview took place between June of 2007 and December of 2009. The first wave sampled 12,448 immigrants and 8,573 completed the questionnaires, for a response rate of 68.9% which is normal in this type of surveys[10]. The number of completed interviews during round two was 3,902, for a response rate of 46.1%[11]. Since the main goal of this paper is to analyze the role of home country work experience in US outcomes, I focus my attention on working age men who worked before migrating and for whom the specific sector of work is known. A full explanation of the sample selection can be found in Appendix B.

The NIS data is very useful for the purpose of this paper. First, it contains a rich set of immigrants' information regarding demographics and other social and economic characteristics. Most importantly, and contrary to other data sets used to study immigrants' outcomes, the NIS has data on the labor history of individuals prior to migrating. Specifically, it asked respondents to provide retrospective information about their first job after the age of 16 and the last job they had before moving to the United States. This novel feature is not generally present in most similar data sets, which lack home country information on the labor market outcomes of immigrants. Likewise, the NIS has post-migration labor market data on three US jobs, allowing an analysis of the link between pre- and post-migration entrepreneurship and of different paths that could have led to self-employment in the US[12].

One characteristic of the NIS data set is that it is not representative of all immigrants in the US[13]. Specifically, it misses illegal immigrants or temporary legal migrants and does

[10] See Hersch (2008) for details on non-response rates of similar types of surveys.

[11] According to Jasso et al. (2017), the drop in the response rate was mainly due to the lack of cooperation by the USCIS to provide contact information of immigrants, the downturn of the economy in the years between waves, and an increase of anti-immigrant sentiments.

[12] See Figure A1 in Appendix A for an example of different paths that immigrants could have followed to become entrepreneurs in the US.

[13] For example, Lessem and Sanders (2018) document, using data from the 2003 Current Population Survey, that individuals in the NIS are more educated than the average immigrant in the US.

not include data about individuals who did not migrate to the US. The results of this paper apply to the specific subset of legal permanent residents. On the other hand, the main advantage of the NIS data is that it has information on pre-migration outcomes of immigrants, which data sets that are more representative of the migrant population generally do not have.

Another limitation of the NIS data is that some of the variables were only measured in the first round. In particular, English skills and education levels were not asked in round two or retrospectively about the first US job (if different from the round one occupation). To avoid introducing bias due to this feature of the data I only consider education obtained prior to migrating in the estimations. Regarding English skills, it is possible to know if an individual was born in an English speaking country or if he only speaks English at home, which restricts the size of the bias regarding this variable. In Appendix C, I describe how I defined each of the variables used in the empirical analyses.

As mentioned above, the response rate in round two of the NIS was low. This drawback could reduce the precision of parameter estimates and the ability to make inferences, although it does not necessarily introduce bias (Jasso et al., 2017). To get a sense of the potential selection (on observable characteristics) of respondents and non-respondents, I estimated a Probit regression of the probability of participating in round two. The results (shown in Table 4) include all of the variables used in the estimations in the paper and dummies for the types of visas immigrants had before becoming permanent residents. None of the variables of interest have a statistically significant impact on the probability of responding in the second round. Only immigrants who came to the US under a refugee visa were less likely to respond, but they do not constitute the majority of individuals in the sample.

3.2 Legal Permanent Residents and Selection

As explained above, legal permanent residents (LPRs) are a particular type of legal immigrant. In the first part of this subsection, I describe the main characteristics of this migratory status based mostly on the information from the Annual Flow Report of Lawful Permanent Residents of the Department of Homeland Security (DHS, 2018). I then explain how LPRs may differ from the general population of immigrants in the US to get a sense of the possible degree of selection of this group.

Legal permanent residents or "green card holders" are a subset of legal immigrants with permission to live and work indefinitely in any place in the US, own property, and attend

schools and universities. LPRs are also allowed to join the Armed Forces and to apply for US citizenship under certain requirements. In contrast, other individuals (sometimes called non-immigrants) can travel legally to the US but with limitations to the amount of time they can stay in the country or the type of activities they can perform (e.g. foreign students enrolled in American institutions of higher education), precluding in many cases their integration to the US labor markets.

An individual can become a LPR through different channels. The most common ones include: being sponsored by a close family member who is either a LPR or a US citizen, being sponsored by an employer for having certain skills[14], investing resources in the US and creating a minimum number of jobs, being a foreign national from a country with low levels of historic immigration to the US[15], or being granted refugee or asylee status. Likewise, an individual could already be in the US under a different visa and then apply and obtain LPR status (known as adjustee) or apply from abroad, obtain an immigrant visa, seek admission to the US, and become a LPR when admitted at a port of entry (also known as new arrival).

The EB-5 visa is one of the few options for immigrants willing to open a business in the US. It requires, among other things, to invest at least $1,000,000 and create a minimum of 10 full time jobs in two years. If the investments are made in some rural areas or places with high unemployment rates, the minimum investment is $500,000. Around 7.1% of employment-based immigrant visas every year are made available to individuals with the purpose of opening businesses in the country. As an example, in the fiscal year of 2014 the US granted 8,773 of such visas, 7,616 or 87% of which went to citizens of mainland China (Seals, 2015). The EB-5 visa has been widely criticized since it is more restrictive than the immigrant entrepreneurship visa that other countries have. In addition, it does not necessarily lead to permanent residency or serves the purpose of promoting innovation. Many concerns have been raised regarding the EB-5 visa as a way to "buy" permanent residency in the US in a fraudulent way[16].

Historically, the number of new LPRs granted has increased over time from around a quarter of a million back in the 1950s to around a million per year since 1999. 1,127,167

[14]Employment-based preferences have five categories of workers. EB-1 or priority workers include some multinational executives or outstanding researchers, EB-2 individuals with "exceptional ability", EB-3 skilled and unskilled workers meeting some conditions, and EB-4 "special immigrants" like priests. Most of the immigrants under the EB1, 2, or 3 visas must be sponsored by a US employer.

[15]This is done through diversity visas allocated based on a random selection process or lottery system.

[16]There are abundant examples in the news, e.g., https://www.bisnow.com/national/news/capital-markets/eb5-mastroianni-usif-brook-lenfest-doug-litowitz-defamation-lawsuit-chinese-97342

people obtained LPR status in 2017. Every year, in general, roughly two thirds of new LPRs are family-sponsored immigrants. In addition, in the more recent years, nearly 40% have been from Asian countries and a third from North America. Mexico has been the leading source country of new LPRs each year since 1978, and over 15% of all LPRs granted in 2017 were from that country.

Legal permanent residents are not representative of the population of immigrants in the US. Applying for a green card requires not only meeting some of the conditions explained above but also having the resources to do so. For this reason, one could expect the characteristics of a LPR to differ from those of an average immigrant in the US. Lessem and Sanders (2018) used the NIS data to study occupational upgrading. The authors documented, using the full sample of immigrants in the 2003 Current Population Survey, that only 45% of all immigrants in the US have attended college. In contrast, almost 60% of individuals in my sample came to the US with at least thirteen years of schooling. Differences in observable characteristics could be suggestive of the presence of selection in terms of latent factors like ability as well.

Hendricks and Schoellman (2017) worked with the NIS data to analyze wage gains at migration. The authors found evidence of immigrants' selection on characteristics like education and wages by comparing their NIS sample to data from the 2004 American Community Survey. Likewise, they found that individuals from poor countries were more selected on these variables than immigrants from developed nations. With the caveat that LPRs are a selected sample of immigrants, it is worth mentioning that the role of pre-migration characteristics on post-migration outcomes is still an open question and so far, only the NIS data allows to learn something about the relationship between these two variables.

3.3 Descriptive Statistics

The main sample consists of 1,884 men with pre- and post-migration information. Individuals could have worked only in the paid or in the self-employment sector (or in both) before and after migration. Table 1 presents the distribution of job types held by immigrants before and after they came to the US. The fraction of individuals who worked as entrepreneurs in the US is lower than the fraction that did in their home countries. For example, 7.6% of immigrants worked only in self-employment before moving to the US, compared to 3.4% who did after migrating. Likewise, while 9.4% of individuals came with work experience in both sectors, only 5.6% had both types of occupations in the US.

Table 2 shows the mean values in percentages of the main variables considered in the paper. Close to 91% of all immigrants (1,715 out of 1,884) worked only for wages or salaries in the US. The remaining 169 individuals worked in self-employment at some point, but could have worked in the paid employment sector as well[17]. The first three rows present the distribution of home country jobs by sector. A larger fraction of the immigrants that chose entrepreneurship in the US have self-employment experience from the home country compared to individuals working in paid employment after migration. 9.47% of entrepreneurs in the US worked only in self-employment before moving and 14.20% did in both paid and self-employment. In contrast, only 7.46% of wage workers in the US worked solely in self-employment and 8.98% did in both sectors before moving.

Two variables associated with immigrants' human capital are their education levels and their proficiency in the language spoken in the receiving country. In this paper, I include a dummy variable equal to one if an immigrant came with thirteen or more years of schooling before moving to the US and 0 otherwise. As seen in Table 2, a higher fraction of individuals working in the paid employment sector in the US have more than high school education from their home countries, since 59.07% of them do compared to 55.03% of immigrants working in self-employment. On the contrary, individuals who worked in self-employment after migration have, on average, better English skills than salaried workers, since a larger fraction reports speaking and/or understanding the language well or very well.

The last four columns of Table 2 show the distribution of immigrants' regions of origin. Of the immigrants that only worked in the paid employment sector, the highest fraction (around a third) were from Asian countries, while approximately 30% came from Latin America and the Caribbean. In the case of entrepreneurs, the majority came from either Latin America and the Caribbean (close to 40%) or "Western" countries/regions like Europe, Canada, or Oceania (27.21%).

Table 3 shows the average age and number of years since immigrants left their home countries broken down by the sub-samples for each US job. These are the two time-varying variables considered in the paper. The round one job corresponds to the 2003/2004 occupation whereas the round two job refers to the one reported in 2007 to 2009 when the second wave of the NIS was conducted. Some immigrants came to the US before the first round took place; the category Pre-2003 job pertains to the occupations they had when they first came. The average age of immigrants in both sectors was very similar, except

[17]I consider these two groups since the sub-samples of individuals working only in self-employment jobs after migration or in both sectors are small to consider the two categories separately.

for the sample of the first round job when immigrants in self-employment were older by approximately three years. Regarding years since migration, entrepreneurs came to the US earlier than wage workers in all samples. In the first round, individuals left their home countries, on average, almost seven years before wage workers did. The difference reduces in the second round to about two years. This is not surprising given that starting a business may require more time to accumulate the necessary resources to do so.

Figure 1 shows the distribution of the visa types that individuals in the sample had before obtaining their green card. The results are broken down for individuals who worked only in paid employment in the US and those who had at least one self-employment job after migrating. The visa type that the highest percentage of individuals in wage or salary occupations had prior to obtaining permanent residency was employment. This is not surprising since one path to get a green card is being sponsored by a firm through employment preferences. In the case of individuals in self-employment, around a third came under a family-sponsored visa. A family visa does not restrict the type of occupation an individual may have (in terms of paid or self-employment), thus allowing persons to choose their preferred sector freely.

Figure 2 shows the distribution of log hourly earnings (in 2003 dollars) in paid and self-employment. In the estimations, I restrict the analyses to individuals earning between \$1 and \$200 an hour. The distributions are clearly distinct, which suggests that there are differences in the earnings potential in each sector that could be due to the individuals that sort into each type of occupation.

4 Econometric Framework

The occupational choices of immigrants between paid and self-employment can be formalized in different ways. One possibility is through the lens of a simple generalized Roy (1951) model in which individuals endogenously choose their job based on their comparative advantage in either activity. Both pecuniary and non-pecuniary aspects influence their decisions. In this section, I start by laying out a simple theoretical model to better understand the elements included in the estimation of the sector selection by immigrants. I then explain the empirical strategy associated with the estimation of earnings distributions controlling for sample selection and the underlying identifying assumptions.

4.1 Sector Earnings

Earnings of an individual i working in period t in paid employment are a function of a vector of observable characteristics X_{it}, a vector of home country work experience E_{hc_i}, and a random term $\varepsilon_{it}^{pe} \sim N(0, \sigma_{pe}^2)$:

$$y_{it}^{pe} = X_{it}\beta^{pe} + \theta^{pe}E_{hc_i} + \varepsilon_{it}^{pe} \tag{1}$$

Analogously, earnings in self-employment are defined as:

$$y_{it}^{se} = X_{it}\beta^{se} + \theta^{se}E_{hc_i} + \varepsilon_{it}^{se} \tag{2}$$

where $\varepsilon_{it}^{se} \sim N(0, \sigma_{se}^2)$.

4.2 Utility

An individual i of working age can choose between paid (pe) or self-employment (se). Utility in either sector is a function of earnings (y_{it}^k), a vector of other variables that influence preferences but not income[18] (Z_{it}), and a random term:

$$U_{it}^k = y_{it}^k + \alpha^k Z_{it} + \eta_{it}^k \tag{3}$$

where $\eta_{it}^k \sim N(0, \sigma_{\eta^k}^2)$.

[18] As suggested by Hamilton (2000), non-pecuniary benefits could influence individuals' choices.

4.3 Sector Choice

An individual i chooses to be self-employed instead of a salaried worker whenever the utility of that option is higher, that is, when

$$U_{it}^{se} \geq U_{it}^{pe} \iff y_{it}^{se} + \alpha^{se} Z_{it} + \eta_{it}^{se} \geq y_{it}^{pe} + \alpha^{pe} Z_{it} + \eta_{it}^{pe}$$

Substituting the sector earnings equations (1) and (2) yields:

$$[X_{it}\beta^{se} + \theta^{se} E_{hc_i} + \varepsilon_{it}^{se}] + \alpha^{se} Z_{it} + \eta_{it}^{se} \geq [X_{it}\beta^{pe} + \theta^{pe} E_{hc_i} + \varepsilon_{it}^{pe}] + \alpha^{pe} Z_{it} + \eta_{it}^{pe}$$

Arranging terms:

$$[X_{it}(\beta^{se} - \beta^{pe})] + (\alpha^{se} - \alpha^{pe}) Z_{it} + (\theta^{se} - \theta^{pe}) E_{hc_i} + \varepsilon_{it}^{se} - \varepsilon_{it}^{pe} + \eta_{it}^{se} - \eta_{it}^{pe} \geq 0$$

which can be written as:

$$X_{it}\gamma + \alpha Z_{it} + \kappa E_{hc_i} + \nu_{it} \equiv I_{it} \geq 0 \tag{4}$$

where $\gamma \equiv (\beta^{se} - \beta^{pe})$, $\alpha \equiv (\alpha^{se} - \alpha^{pe})$, $\kappa \equiv (\theta^{se} - \theta^{pe})$, and $\nu_{it} \equiv (\varepsilon_{it}^{se} - \varepsilon_{it}^{pe}) + (\eta_{it}^{se} - \eta_{it}^{pe})$.

Thus, an individual chooses self-employment when $I_{it} \geq 0$ and paid employment otherwise. From equation (4) it can be seen that the decision to become self-employed can be broken down into four parts. First, individual characteristics incorporated in the vector X_{it}. Second, factors that affect the job choice but not earnings in either sector considered in Z_{it}. Third, elements associated with the pre-migration labor market experience of immigrants included in the vector E_{it}, and a stochastic term. Notice that the error term ν_{it} is also normally distributed.

I estimate the probability that an immigrant i works as an entrepreneur in the US through a Probit regression where the dependent variable equals one if the individual chooses self-employment at time t and zero if paid employment. I model the choice as a function of the following factors:

- *Home country work experience*: immigrants could have worked in paid or self-employment (or in both sectors) before coming to the US. To take into account different degrees of pre-migration entrepreneurship experience I consider two dummy variables:

$$bothse_i = \begin{cases} 1 & \text{if } i \text{ only worked in self-employment before migrating} \\ 0 & \text{otherwise} \end{cases} \tag{5}$$

$$onese_i = \begin{cases} 1 & \text{if } i \text{ worked in paid and self-employment before migrating} \\ 0 & \text{otherwise} \end{cases} \tag{6}$$

- *Individual characteristics*: age, age squared, years since the person left the home country (*yrs*) and its square, a dummy for having a family visa before becoming permanent resident (*famvisa*), and a dummy for having children before migrating (*ch*)
- *Human capital*: included through a dummy for having at least thirteen years of education from the home country (*ed*) and a dummy for having good English skills (*en*)[19]
- *Region fixed effects*: considered in the dummy variables defined in Appendix C and included in the vector R
- *Time fixed effects*: to account for changes in other factors over time like macroeconomic conditions; included in the vector T consisting of dummy variables for different periods of time[20]

Hence, the probability to become self-employed can be written as:

$$\begin{aligned} Pr(SE_{it} = 1) = \Phi(&\alpha_0 + \alpha_1 bothse_i + \alpha_2 onese_i + \alpha_3 age_{it} + \alpha_4 age_{it}^2 + \alpha_5 yrs_{it} + ... \\ &\alpha_6 yrs_{it}^2 + \alpha_7 eng_i + \alpha_8 ed_i + \alpha_9 ch_i + \alpha_{10} famvisa_i + \alpha_{11}' R_i + \alpha_{12}' T) \end{aligned} \tag{7}$$

where Φ is the standard normal cumulative distribution function.

4.4 Identification and Selection-corrected Earnings Regressions

The estimation of earnings regressions is challenging since individuals do not randomly choose their occupation. If agents endogenously decide to work in paid or in self-

[19] Check Appendix C for the detailed definitions.

[20] Recall that the second round of the NIS was conducted between 2007 and 2009, when a big financial crisis took place.

employment based on their comparative advantage in either activity, OLS earnings estimates would be biased due to non-random selection. One common way to deal with this problem is through the use of exclusion restrictions or variables that determine selection (in this case the probability of choosing self-employment in the US) but not the outcome (here earnings) as in (Heckman 1979)[21] [22]. Another option is to include independent variables with a large support. Unfortunately, finding suitable instruments, exclusion restrictions, or large support variables is very difficult or impossible in practice. In this paper, I follow a novel procedure proposed by D'Haultfœuille et al. (2018) that does not require instruments, exclusion restrictions, or large support regressors and is distribution-free. Identification is mainly based on the testable condition that selection becomes independent of the covariates for large values of the outcome.

I introduce here the main features of the estimation approach and the identifying assumptions. The detailed explanation of the algorithm and model can be found in D'Haultfœuille et al. (2018) and D'Haultfœuille et al. (2013), from which this subsection is based. Let Y^* be the outcome of interest and $X = (X_1, X_2)$ a vector of covariates excluding the intercept. The econometrician only observes D, $Y = DY^*$, and X, where D is the selection dummy. The main interest is to estimate the average marginal effects of each variable in the vector X_1 on Y^*. Thus, we can write the outcome equation as:

$$Y^* = X_1'\beta_1 + \varepsilon$$

The objective is to identify and estimate β_1. To achieve this goal, the following two main assumptions are needed[23].

Assumption 1 Homogeneous effect of X_1

For any $\tau \in (0,1)$, the $\tau - th$ conditional quantile of ε satisfies:

$$Q_{\varepsilon|X}(\tau|X) = \beta_0(\tau) + X_2'\beta_2(\tau)$$

Thus,

[21] Alternatively, one can estimate earnings by maximum likelihood. Identification in such case relies on distributional assumptions about the error terms that do not necessarily hold or can be credibly tested.

[22] Other examples of sample selection problems relate to the estimation of the wages of unionized and non-unionized workers, female labor supply, housing demand, and market equilibrium (see Maddala (1983) for references).

[23] An additional technical assumption about the tail and regularity of the residual is required. As explained by D'Haultfœuille et al. (2018), it is satisfied by most well-known distributions, in particular the logarithmic one used here for the log of earnings.

$$Q_{Y^*|X}(\tau|X) = X_1'\beta_1 + \beta_0(\tau) + X_2'\beta_2(\tau)$$

so that β_1 is not a function of the quantile τ. Notice that the support of the elements in X_1 is not restricted, so that it can contain binary variables.

Assumption 2 Independence at infinity

There exists $h \in (0, 1]$ such that for all x $\in$ Support(X),

$$\lim_{y\to\infty} P(D = 1|X = x, Y^* = y) = h$$

This assumption says that for large values of the outcome selection becomes independent of the covariates at infinity since h does not depend on x. The intuition is that, if selection is endogenous, it can be expected that the effect of the outcome on selection will dominate the effect of the independent variables, for arbitrarily large values of the outcome.

D'Haultfœuille et al. (2018) prove that under the assumptions above, β_1 can be identified and the estimator is consistent and asymptotically normal. The authors show that these assumptions are testable since they imply that, for large quantile indices, the estimators of β_1 obtained using different quantile indices are very close. They construct a J-test to evaluate whether the conditions are met. Their algorithm is based on extremal quantile regressions, in which the optimal quantile is chosen to minimize both the variance and bias of the estimator.

I estimate different specifications of the earnings regressions in each sector k, where k is either paid or self-employment[24]. I consider the main factors included in the Probit regressions except the household variable associated with having children before migration[25]. I estimate different models since the estimation approach allows the researcher to choose which variables belong to X_1 (are quantile-independent) and there is no theoretical reason behind the decision. Nevertheless, the J-test can be used to assess the validity of the different specifications.

For example, a model in which all of the independent variables have an homogeneous effect on the outcome can be written as:

[24] D'Haultfœuille et. al (2019) explain the estimation procedure in Stata.

[25] Variables like the number of children of an individual are normally used as exclusion restrictions that could potentially influence selection but not the outcome. In this case, the variable for having children before moving does not appear to impact selection. Other potential variables suffered from the same problem, thus precluding the application of a Heckman two-step approach.

$$log(w_{it}^k) = \beta_1^k bothse_i + \beta_2^k onese_i + \beta_3^k age_{it} + \beta_4^k age_{it}^2 + \beta_5^k yrs_{it} + \beta_6^k yrs_{it}^2 + \beta_7^k eng_i + ... \\ \beta_8^k ed_i + \beta_9^k famvisa_i + \beta'^k_{10} T + \beta'^k_{11} R_i + \varepsilon_{it}^k \quad (8)$$

To check the robustness of the results, I estimate three sets of models for earnings in each sector. The specifications differ in terms of the variables that are chosen to have an homogeneous effect on the outcome as follows[26]:

- Model 1: *bothse* and *onese*
- Model 2: $bothse, onese, age, age^2, yrs, yrs^2, eng,\ famvisa$, and ed
- Model 3: $bothse, onese, age, age^2, yrs, yrs^2, eng, ed,\ famvisa$, and *region dummies*

As shown by D'Haultfœuille et al. (2013), the extremal quantile approach can be applied to the identification of generalized Roy models. This includes the estimation of models in which individuals make decisions between sectors like the occupational choice model presented here, and the associated estimation of earnings regressions as specified above. It is worth mentioning that an implicit assumption associated with the independence at infinity condition is that there exist factors that could make an individual very attracted to or productive in one sector but not in the other. While it is possible that "high ability" individuals could be very productive in either occupation, previous work has found that there are characteristics that could make an individual very successful in self-employment but not in paid employment and vice versa. (Hamilton et al., 2019) in a study of personality traits and entrepreneurship, found that there are personality traits that could be beneficial for earnings in one of the two sectors only. Likewise, even though some agents could have above average earnings in both occupations, the only condition needed is that they are more productive (relative to themselves) in one of the two.

[26]I also estimated additional specifications with different numbers of independent variables. The results were very similar.

5 Results

One of the two main questions of this paper is whether home country work experience in paid and in self-employment influences the probability of choosing entrepreneurship in the US. Table 5 presents the results of different models of pooled Probit regressions of self-employment in the US that allow to answer this question. The model shown in column (1) includes the two main variables of interest with no additional factors: the first one is a dummy equal to one if the immigrant only worked in self-employment before moving to the US. The second one is a dichotomous variable equal to one if the person worked in both paid and self-employment in his home country. The base category are individuals who only worked in the wage or salary sector before migrating. These variables capture the degree of self-employment experience that a person can have from the home country. When included separately from any other regressors, these two variables are statistically significant in explaining self-employment in the US.

Although the experience variables are relevant when considered in isolation, it could be that their impact vanishes or reduces when including other factors that could influence entrepreneurship in the US. For this reason, I estimate additional models to test whether this is the case or not. The specification in (2) in Table 5 considers a model in which, in addition to foreign work experience, I control for age and years since the person left his home country (and their squares). Age is meant to capture differences in the propensity to become an entrepreneur over different stages of the life of an individual. Years since the person left the home country captures different factors associated with time in the US.

Years since migration could be related to assimilation to the US in terms of culture, acquisition of valuable human capital, and the development of networks. On the other hand, it could also serve as a proxy for asset accumulation or access to the financial resources necessary to open a firm. Both age and years since migration could have a non-linear impact on the probability of becoming an entrepreneur. For this reason, I include square terms to assess whether their impact is concave or not. The results in model (2) evidence that age does not have a statistically significant influence on the probability of self-employment. Nevertheless, years since migration has a positive (and quadratic) impact on US self-employment as expected. The addition of these variables does not change the fact that home country experience is relevant at explaining entrepreneurship in the US.

A third model of US immigrant entrepreneurship adds, to the variables included in model (2), the measures of English skills and education. Recall that the good English variable is a dummy equal to one if the person has good English skills and zero other-

wise. The variable associated with education equals one if the person has at least thirteen years of schooling from the home country and zero otherwise. These variables measure two important dimensions related to an immigrant's human capital. Neither of the two is statistically significant as can be seen from model (3). However, the positive and statistically significant role of pre-migration work experience remains and, indeed, both variables show a higher marginal effect that in the previous two models. Likewise, the years since the person left his home country keep having a significant effect on the probability of becoming an entrepreneur in the US.

Model (4) incorporates dummy variables for regions of origin to take into account differences in the probability of entrepreneurship based on where a person is from. It also adds a dummy variable equal to one if the individual had children prior to coming to the US and zero otherwise. Relative to Asian immigrants (the base category), individuals from Latin American or the Caribbean, and from Europe, Canada, or Oceania[27] are more likely to engage in self-employment in the US. Controlling for these additional factors does not change the result that home country work experience is a relevant determinant of US entrepreneurship. The role of years since migration also remains.

The last specification, shown in model (5), controls for different periods of time through dummy variables. Their inclusion is to take into consideration any macroeconomic factors that could have changed over time and might affect individuals' occupational choices (recall that the second wave of the NIS took place during the big financial crisis). I also add a dichotomous variable equal to one if the immigrant had a family visa before obtaining a green card, since Figure 1 shows that around a third of immigrants in self-employment in the US transitioned to permanent residency from a family-sponsored visa. Thus, the final specification predicts US immigrant entrepreneurship based on a) home country work experience, b) personal, demographic, and household characteristics, c) human capital, d) region fixed effects, and e) time fixed effects. Notice that, again, the impact of pre-migration work experience remains statistically significant and positive after controlling for a variety of different elements that have been found to be important in other studies of entrepreneurship.

The results from the last column in Table 5 illustrate that the impact of home country jobs is economically considerable. Relative to individuals who only worked in paid employment before moving, immigrants who were only entrepreneurs at home were around 3.7 percentage points more likely to be self-employed in the US, while individuals who worked

[27] See Appendix C for a description of each variable.

in both sectors were approximately 4.3 percentage points more likely (the unconditional probability of self-employment in the US was 9%). This could suggest that individuals may have acquired skills or preferences for self-employment not only by working in this sector but also by trying both types of occupations before moving. In addition, immigrants who left their home countries longer time ago, came with better English skills, and had a family visa before obtaining permanent residency (and thus had complete flexibility to choose a sector of work since the first moment they came to the US) were more likely to choose entrepreneurship in the US.

The second main question of this paper is if pre-migration work experience affects earnings in the US. Table 6 contains the results of Ordinary Least Squares (OLS) earnings regressions in self-employment. Notice that, in general, individuals with entrepreneurship experience from the home country tend to face a penalty in terms of earnings. This is the case since both pre-migration work experience variables have negative coefficients in all models, although they are only statistically significant in the first two. After controlling for human capital factors (education and English skills) in a third specification (model 3), I find that education has a significant (and positive) impact on self-employment earnings. The last two specifications (columns 4 and 5) add additional factors but the qualitative results do not change.

Table 7 presents the results of OLS paid employment earnings regressions. A very robust finding across all the specifications is that having worked in the self-employment sector before moving to the US implies having lower paid employment earnings growth in the US compared to people who only had pre-migration salaried jobs. In addition, age and the number of years since the person migrated impact wages/salaries in the form of an inverted U-shape. The effects of these variables are as expected since individuals tend to earn more up to a certain point above which income growth starts to decrease. Likewise, having good English skills and higher levels of schooling (in terms of having completed high school) positively influences earnings in the US. The regression in (5) controls for both period and region of origin fixed effects. Immigrants from Latin America or the Caribbean and African countries tend to have lower salaries than Asians (the base category) as do individuals who had a family visa before getting a green card.

The OLS earnings regressions in Table 6 and Table 7 evidence that foreign work experience does not have, in general, a statistically significant impact on self-employment earnings. However, both variables have a negative and very significant influence on paid employment earnings across the different specifications. The omitted category of pre-migration

work experience are people who only worked in the wage sector. Hence the negative coefficients mean that individuals who worked in self-employment (either uniquely or at some point before migrating) earn less in paid employment relative to immigrants who were only salaried workers at home. The results from the OLS regressions, nevertheless, are naive in the sense that they ignore endogenous sector selection.

The log earnings regressions in self- and paid employment controlling for sample selection can be found in Tables 8 and 9 respectively[28]. As explained in the previous section, the extremal quantile estimation approach of the earnings distributions assumes that the effects of a subset of the explanatory variables are homogeneous and do not depend on a quantile. In addition, independence at infinity is also a necessary condition. These assumptions are verifiable by means of a J-test of model specification, which allows to compare the validity of different models where the number of variables that depend on a quantile is chosen by the econometrician. Controlling for endogenous sector selection through the extremal quantile algorithm allows me to estimate the causal effects of the covariates of interest on paid and self-employment earnings.

Table 8 shows the results of different models of self-employment earnings estimated through the extremal quantile approach. I present different specifications to test whether the qualitative conclusions hold if some coefficients are allowed to vary by quantile[29]. The specification in (1) only considers homogeneous effects of the pre-migration experience variables. In this case, neither of the two has a statistically significant impact on earnings. A second model takes as independent all of the variables except the ones associated with region and time effects. Again, the home country work experience variables are not significant, and only education impacts earnings in this sector but weakly. The p-value of this model increases substantially.

The last column in Table 8 corresponds to a model in which only the time effects vary by quantile. As in the case of the OLS regressions, the pre-migration work experience dummies do not have a statistically significant impact on self-employment earnings, although the coefficient of the variable for having worked only in self-employment is positive. In addition, having more years of schooling carries a premium for entrepreneurial earnings. This was also the case in the OLS regressions, albeit the impact is stronger after controlling for endogenous selection both in terms of magnitude and degree of statistical significance. In

[28]The coefficients are interpreted as average marginal effects. The estimation algorithm does not return a constant term, see D'Haultfœuille et al. (2018) for details.

[29]I also estimated alternative models using fewer explanatory variables as in the case of the Probit and OLS regressions. The results were very similar.

spite of influencing entry into self-employment (as seen by the results in Table 5), having a family visa does not carry with it a premium in terms of earnings.

Table 9 presents the results of different models of paid employment earnings. The first column shows that the home country work experience variables do not influence earnings when considered in a model in which these are the only covariates with homogeneous effects. This specification is valid for standard confidence values (the p-value of the J-test is 0.6775). The model in the second column allows for variation by region and time. The pre-migration variables do not impact earnings neither, while the other regressors have the expected effect: education and schooling have a positive and significant impact on earnings, and older and more assimilated individuals enjoy higher earnings.

The last column of Table 9 shows the results of a specification in which only the period variables have a quantile-dependent effect. Although less strong than the previous two models (as seen by the lower pvalue), the results of this specification are very similar. The home country (self-employment) experience variables have a negative impact on US earnings as in the case of the OLS estimations, but they are not statistically significant, stressing the importance of controlling for sample selection. Age and the number of years since the person left his home country have a positive and quadratic effect on earnings. Likewise, good English skills and more years of schooling impact wages positively, and the effects are stronger than in the OLS case. Having a family visa before obtaining a green card has a negative and statistically significant impact on paid employment earnings after migration.

In summary, the results show that pre-migration work experience is a significant determinant of the occupational choices of legal permanent residents in the United States. Nevertheless, work experience from the home country does not appear to affect earnings after migration. Previous research on self-employment has found that individuals choosing entrepreneurship may opt into this sector because of the non-pecuniary benefits associated with it. Hamilton (2000) found that most self-employed individuals choose this occupation despite having lower initial earnings and lower earnings growth than in the salaried sector. The author's results are consistent with the findings of Hurst and Pugsley (2011) who showed that many small business owners became entrepreneurs because they enjoy having greater autonomy or because they like being their own boss. It could be the case that immigrants who had a business before coming to the US may have developed a preference for working in self-employment and thus have a higher probability of choosing this sector after migrating. If home country experience was only affecting an individual's preferences

but not his income potential, then an impact on post-migration earnings should not be expected.

In a study of personality traits and entrepreneurship, (Hamilton et al., 2019) found that the characteristics that make an individual more likely to have higher earnings in self-employment are not always the ones making the person more likely to choose entrepreneurship. The authors suggest the possible existence of misalignments, by which some individuals may choose to open a business of a low-quality idea because of the non-pecuniary benefits of doing so. On the other hand, there could be agents with an expected high productivity in self-employment but who do not want to work in this sector. Likewise, the authors found that there might be traits that could be beneficial for earnings in one of the two sectors only.

The findings of this paper could also be explained by the fact that immigrants may face difficulties exploiting their human capital in a host country. It is possible that immigrants' skills do not transfer perfectly after they move, since they could face barriers to entry (like licensing, discrimination, patents, or accreditation) precluding them from fully exploiting their potential in a new country. Likewise, skills acquired abroad may not be (as) valuable in the US. Hendricks and Schoellman (2017) using the NIS data, documented limitations to skill transferability across borders. They found that most immigrants moved to lower-paying jobs in the US relative to the occupations they had back in their countries of origin, which generally limited their post-migration earnings. Likewise, it could be that individuals working in self-employment in their home countries were forced into this sector due to the lack of the necessary skills demanded by salaried occupations or because they were of the "low ability" type[30]. If this was true, pre-migration self-employment experience would not necessarily lead to a premium in post-migration earnings.

[30]Recall that close to 40% of individuals in self-employment in my sample are from Latin America or the Caribbean. In this region of the world, self-employment is usually associated with the informal sector and the lack of options in the paid employment sector for some individuals with below average levels of schooling.

6 Conclusions

Immigrant entrepreneurship in the United States has increased substantially over the last four decades. In this paper, I studied the impact of pre-migration work experience of legal permanent residents in the US on their post-migration labor market outcomes. Making use of a novel data set, I assessed whether home country paid and self-employment experience influence immigrants' occupational choices and earnings in the US. Most of the previous research has not analyzed the link between home and host country jobs of immigrants. To my knowledge, this is the first paper to study the relationship between home country self-employment experience and earnings of immigrants in the US.

I find that home country work experience is an important determinant of self-employment in the US. Immigrants who worked only as entrepreneurs before moving are approximately 3.7 percentage points more likely to be self-employed in the US, while individuals with home experience in both types of jobs are around 4.3 percentage points more likely to be entrepreneurs in America compared to people who only worked in salaried occupations. These results are relative to an unconditional post-migration self-employment probability of around 9%. The number of years since an immigrant left his home country and education levels are also determining factors of US self-employment.

Pre-migration experience, in contrast, does not appear to influence post-migration earnings after controlling for sector selection. This could be due to an imperfect transferability of human capital across borders or the sorting of individuals into occupations in which they developed a preference from the home country but do not have a comparative advantage in terms of income potential. Instead, variables associated with human capital like schooling and better English skills play a relevant role in explaining earnings. Why exactly this is the case and how the results could be different for other immigrant groups (like the illegal population or women) are questions left for future research.

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Tables and Figures

Table 1: Pre- and Post-migration Jobs

	Home country job	**United States job**
Only Paid Employment	1,562	1,715
Fraction	0.829	0.910
Only Self-employment	144	64
Fraction	0.076	0.034
Paid and Self-employment	178	105
Fraction	0.094	0.056
Number of individuals	**1,884**	**1,884**

Notes: this table shows the type of job held by individuals before and after migrating to the US. The first row of each group corresponds to the number of immigrants. Calculations are my own based on data from the New Immigrant Survey (NIS).

Table 2: Descriptive Statistics

Variable	**P.E. in the US**	**S.E. in the US**
only self-emp. before US	7.46	9.47
paid and self-emp. before US	8.98	14.20
only paid emp. before US	83.6	76.3
more than 12 years of schooling before US	59.07	55.03
good English skills	56.68	62.13
from Latin America and the Caribbean	29.33	40.24
from Europe, Canada, and Oceania	21.22	27.21
from Asia	31.37	21.30
from other countries	18.08	11.24
Number of individuals	**1,715**	**169**

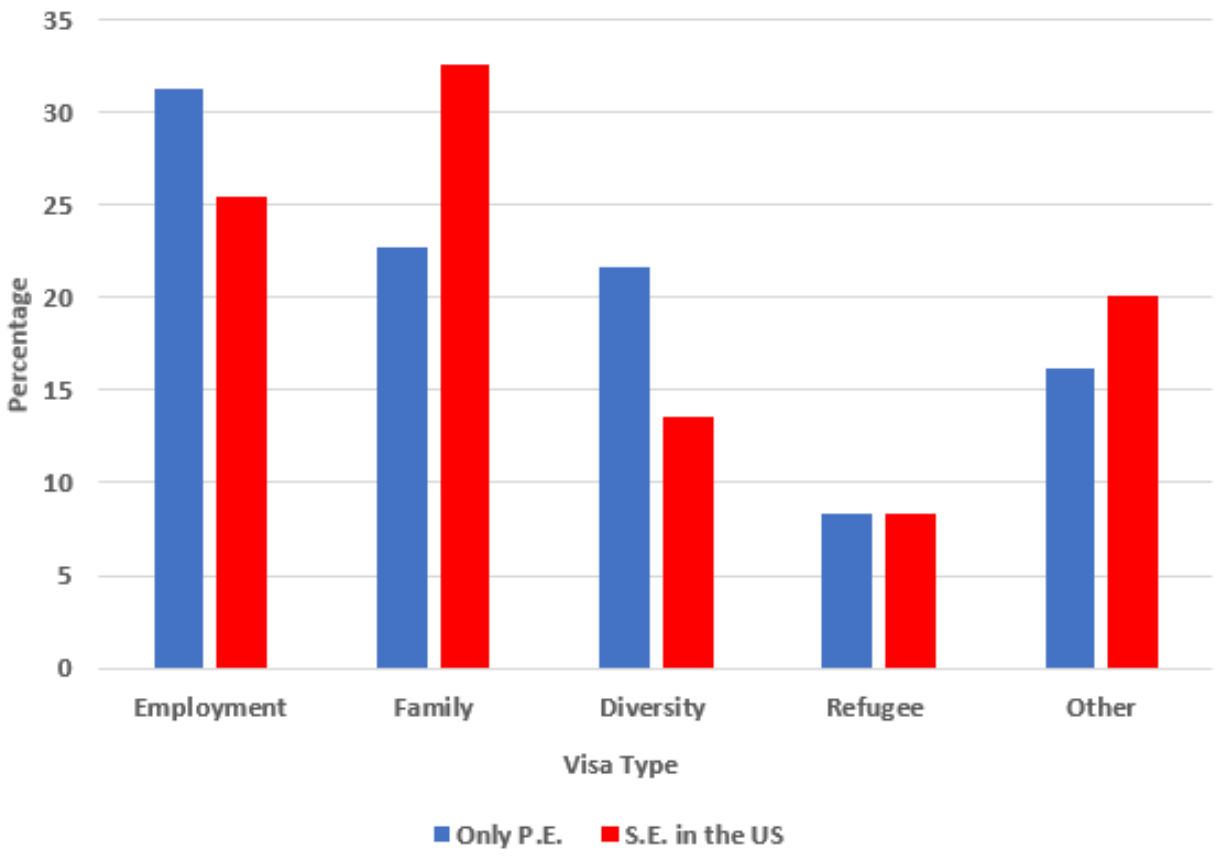
Notes: this table shows the mean values or percentages of the main variables used in the paper. The statistics are broken down for the sub-samples of individuals who worked only in paid employment in the US (first column) and the ones who worked in self-employment at some point after migration (second column). See Appendix C for a description of each variable. Calculations are my own based on data from the New Immigrant Survey (NIS).

Table 3: Descriptive Statistics by Round

	Pre-2003 Job		**Round 1 Job**		**Round 2 Job**	
	P.E.	**S.E.**	**P.E.**	**S.E.**	**P.E.**	**S.E.**
years left home	3.17	3.24	7.72	13.96	11.50	13.86
age	31.02	30.97	37.23	40.36	42.29	42.07
N	**842**	**34**	**1,460**	**85**	**698**	**81**

Notes: this table shows the mean values or percentages of the time-varying variables used in the paper. The statistics are broken down for the sub-samples of individuals who worked only in paid employment (P.E.) in the US and the ones who worked in self-employment (S.E.) at some point after migration. See Appendix C for a description of each variable. Calculations are my own based on data from the New Immigrant Survey (NIS).

Figure 1: Immigrant Self-employment by Visa Type



Notes: this figure shows the distribution of visas immigrants had prior to obtaining legal permanent residency by the type of job held in the US. Employment includes employment preferences visas. Family includes spouses, children or parents of US citizens, spouses of permanent residents, or family fourth preference visas. Refugee includes refugees, asylees, or parolees. Other includes legalization and any other type of visa (except diversity). Calculations are my own based on data from the New Immigrant Survey (NIS).

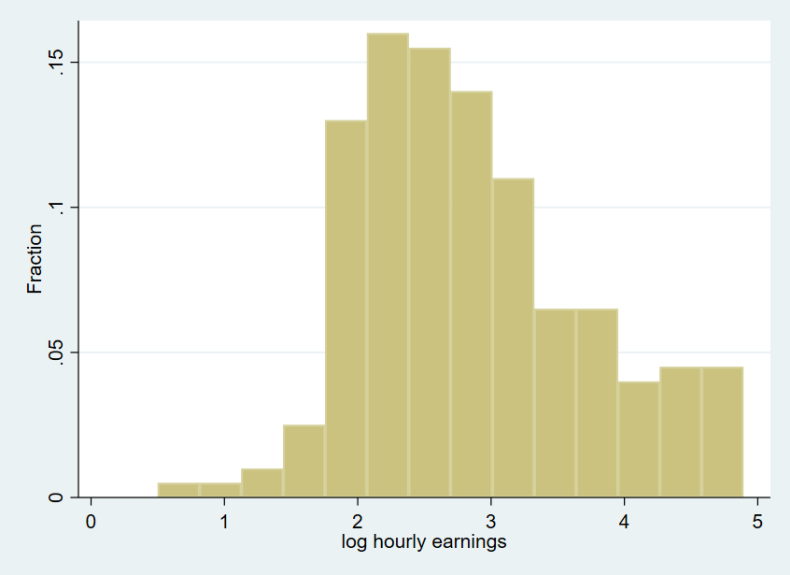
Table 4: Round 2 Participation: Probit Regression

	Marginal Effects
only self-emp. before US	-0.0592
	(0.0465)
paid and self-emp. before US	-0.0232
	(0.0413)
age	0.00200
	(0.00181)
years left home	0.000796
	(0.00186)
good English	0.0309
	(0.0292)
more 12 years educ. home	-0.00514
	(0.0291)
European	0.0467
	(0.0373)
African	-0.00754
	(0.0437)
Latino	0.0141
	(0.0369)
had children before mig.	0.0144
	(0.0334)
family visa	-0.0522
	(0.0392)
employment visa	-0.0206
	(0.0421)
diversity visa	0.0000439
	(0.0504)
refugee visa	-0.113**
	0.0497)
N	1,545

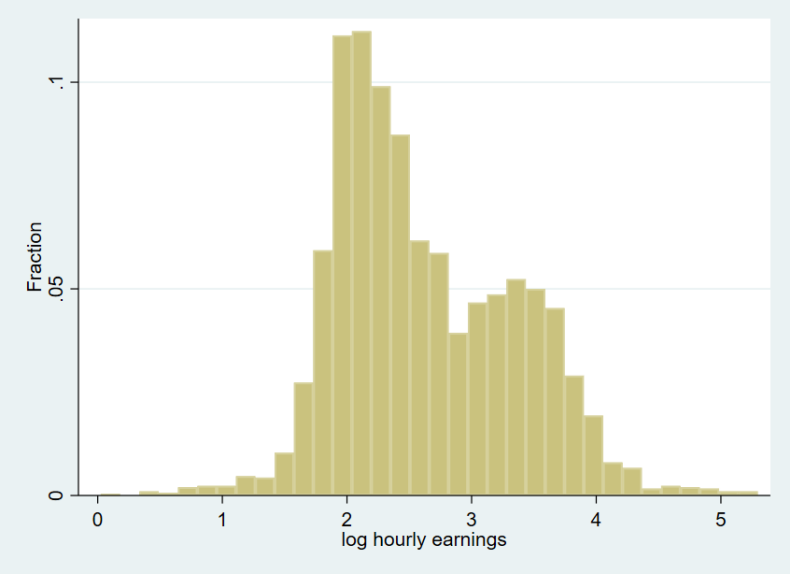
Notes: the dependent variable is a dummy equal to one if an individual in the round one sample was also part of the round two sample, and 0 if an individual was in the first round sample but not in the second one. Coefficients correspond to marginal effects. Standard errors in parentheses. See Appendix C for a description of each variable. Calculations are my own based on data from the New Immigrant Survey (NIS). Asians are the base category for regions and other visas for visa types. * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

Figure 2: Log Hourly Earnings Distributions

Self-employment



Paid employment



Notes: the figures above show the distribution of log hourly earnings in 2003 US dollars of post-migration jobs calculated from NIS data. The top panel corresponds to self-employment and the bottom panel to paid employment.

Table 5: Pooled Probit Regressions of US Self-employment

	(1)	(2)	(3)	(4)	(5)
only self-emp. before US	0.0340*	0.0360*	0.0389*	0.0372*	0.0362*
	(0.0201)	(0.0202)	(0.0210)	(0.0209)	(0.0204)
paid and self-emp. before US	0.0518***	0.0511***	0.0528***	0.0468**	0.0427**
	(0.0187)	(0.0188)	(0.0192)	(0.0184)	(0.0180)
age/10		-0.0164	-0.0159	-0.0132	0.00275
		(0.0293)	(0.0298)	(0.0303)	(0.0311)
age sq./100		0.00216	0.00222	0.00152	-0.000707
		(0.00356)	(0.00361)	(0.00360)	(0.00366)
years left home/10		0.0656***	0.0640***	0.0600***	0.0567***
		(0.0125)	(0.0127)	(0.0135)	(0.0142)
years left home sq./100		-0.0107***	-0.0104***	-0.00870**	-0.00796**
		(0.00345)	(0.00350)	(0.00353)	(0.00369)
good English			0.00975	0.0186*	0.0182*
			(0.00947)	(0.00952)	(0.00954)
more 12 years educ. home			-0.00175	0.00457	0.00750
			(0.00959)	(0.00970)	(0.00960)
Latino				0.0406***	0.0322**
				(0.0146)	(0.0142)
European				0.0359**	0.0352**
				(0.0146)	(0.0145)
African				0.000491	-0.00171
				(0.0150)	(0.0147)
had children before mig.				0.0165	0.0170
				(0.0121)	(0.0120)
family visa					0.0326***
					(0.0117)
time fixed effects	NO	NO	NO	NO	YES
N	3,275	3,200	3,200	3,200	3,200

Notes: the dependent variable is a dummy equal to one if the person worked in self-employment and zero if in paid employment. Standard errors in parentheses. See Appendix C for a description of each variable. Calculations are my own based on data from the New Immigrant Survey (NIS). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Marginal effects are shown. Asians are the base category for regions.

Table 6: Pooled OLS Earnings Regressions: Self-employment

	(1)	(2)	(3)	(4)	(5)
only self-emp. before US	-0.298	-0.257	-0.209	-0.192	-0.197
	(0.202)	(0.203)	(0.200)	(0.204)	(0.203)
paid and self-emp. before US	-0.288*	-0.335*	-0.275	-0.206	-0.220
	(0.165)	(0.176)	(0.175)	(0.179)	(0.178)
age/10		0.896**	0.688	0.586	0.355
		(0.418)	(0.420)	(0.435)	(0.445)
age sq./100		-0.105**	-0.0835*	-0.0749	-0.0504
		(0.0490)	(0.0489)	(0.0502)	(0.0509)
years left home/10		-0.0161	0.0651	0.125	-0.0823
		(0.183)	(0.183)	(0.188)	(0.201)
years left home sq./100		0.0135	-0.00504	-0.0241	0.0213
		(0.0452)	(0.0450)	(0.0463)	(0.0484)
good English			0.0926	0.0106	0.0607
			(0.131)	(0.139)	(0.138)
more 12 years educ. home			0.324**	0.292**	0.281**
			(0.130)	(0.134)	(0.132)
Latino				-0.238	-0.190
				(0.185)	(0.185)
European				-0.119	-0.128
				(0.178)	(0.179)
African				0.163	0.122
				(0.232)	(0.229)
family visa					-0.0208
					(0.133)
constant	2.928***	1.133	1.277	1.680*	2.185**
	(0.0689)	(0.815)	(0.814)	(0.907)	(0.912)
time fixed effects	NO	NO	NO	NO	YES
N	203	200	200	200	200

Notes: standard errors in parentheses. See Appendix C for a description of each variable. Calculations are my own based on data from the New Immigrant Survey (NIS). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Asians are the base category for regions.

Table 7: Pooled OLS Earnings Regressions: Paid Employment

	(1)	(2)	(3)	(4)	(5)
only self-emp. before US	-0.412***	-0.399***	-0.167***	-0.104**	-0.0909**
	(0.0512)	(0.0495)	(0.0449)	(0.0434)	(0.0430)
paid and self-emp. before US	-0.229***	-0.215***	-0.0968**	-0.0901**	-0.0740**
	(0.0455)	(0.0441)	(0.0395)	(0.0380)	(0.0377)
age/10		0.929***	0.683***	0.639***	0.543***
		(0.0842)	(0.0762)	(0.0738)	(0.0756)
age sq./100		-0.121***	-0.0850***	-0.0826***	-0.0712***
		(0.0106)	(0.00955)	(0.00923)	(0.00942)
years left home/10		0.374***	0.353***	0.376***	0.338***
		(0.0371)	(0.0338)	(0.0332)	(0.0352)
years left home sq./100		-0.0768***	-0.0760***	-0.0769***	-0.0685***
		(0.0116)	(0.0105)	(0.0102)	(0.0105)
good English			0.421***	0.399***	0.399***
			(0.0254)	(0.0250)	(0.0251)
more 12 years educ. home			0.360***	0.311***	0.286***
			(0.0253)	(0.0252)	(0.0251)
Latino				-0.261***	-0.212***
				(0.0301)	(0.0307)
European				-0.0113	-0.0132
				(0.0291)	(0.0288)
African				-0.445***	-0.452***
				(0.0327)	(0.0326)
family visa					-0.185***
					(0.0272)
constant	2.671***	0.819***	0.725***	1.023***	1.119***
	(0.0140)	(0.156)	(0.141)	(0.143)	(0.148)
time fixed effects	NO	NO	NO	NO	YES
N	3,072	3,000	3,000	3,000	3,000

Notes: standard errors in parentheses. See Appendix C for a description of each variable. Calculations are my own based on data from the New Immigrant Survey (NIS). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Asians are the base category for regions.

Table 8: Extremal Quantile Earnings Regressions: Self-employment

Variable/Model	(1)	(2)	(3)
only self-emp. before US	-0.1347	-0.1347	0.1375
	(0.3919)	(0.3766)	(0.4608)
paid and self-emp. before US	-0.1119	-0.1119	-0.1617
	(0.2465)	(0.2690)	(0.3279)
age/10		0.5695	0.7190
		(0.6691)	(0.8592)
age sq./100		-0.0828	-0.0956
		(0.0749)	(0.0989)
years left home/10		-0.0986	-0.2043
		(0.3532)	(0.3999)
years left home sq./100		0.0007	0.0045
		(0.0871)	(0.1028)
good English		0.0287	-0.0733
		(0.2629)	(0.2612)
more 12 years educ. home		0.3331	0.4340**
		(0.2075)	(0.2215)
family visa		-0.1119	-0.0906
		(0.2012)	(0.1974)
Latino			-0.2376
			(0.3333)
European			-0.1112
			(0.3411)
African			0.4263
			(0.4033)
time fixed effects	YES	YES	YES
J-test (pvalue)	0.7667	0.9562	0.9274
N	200	200	200

Notes: the dependent variable is log hourly earnings in 2003 US dollars. The covariates shown under each model correspond to the variables that are quantile-independent (except in the case of time fixed effects). Standard errors in parentheses. See Appendix C for a description of each variable. Calculations are my own based on data from the New Immigrant Survey (NIS). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Asians are the base category for regions.

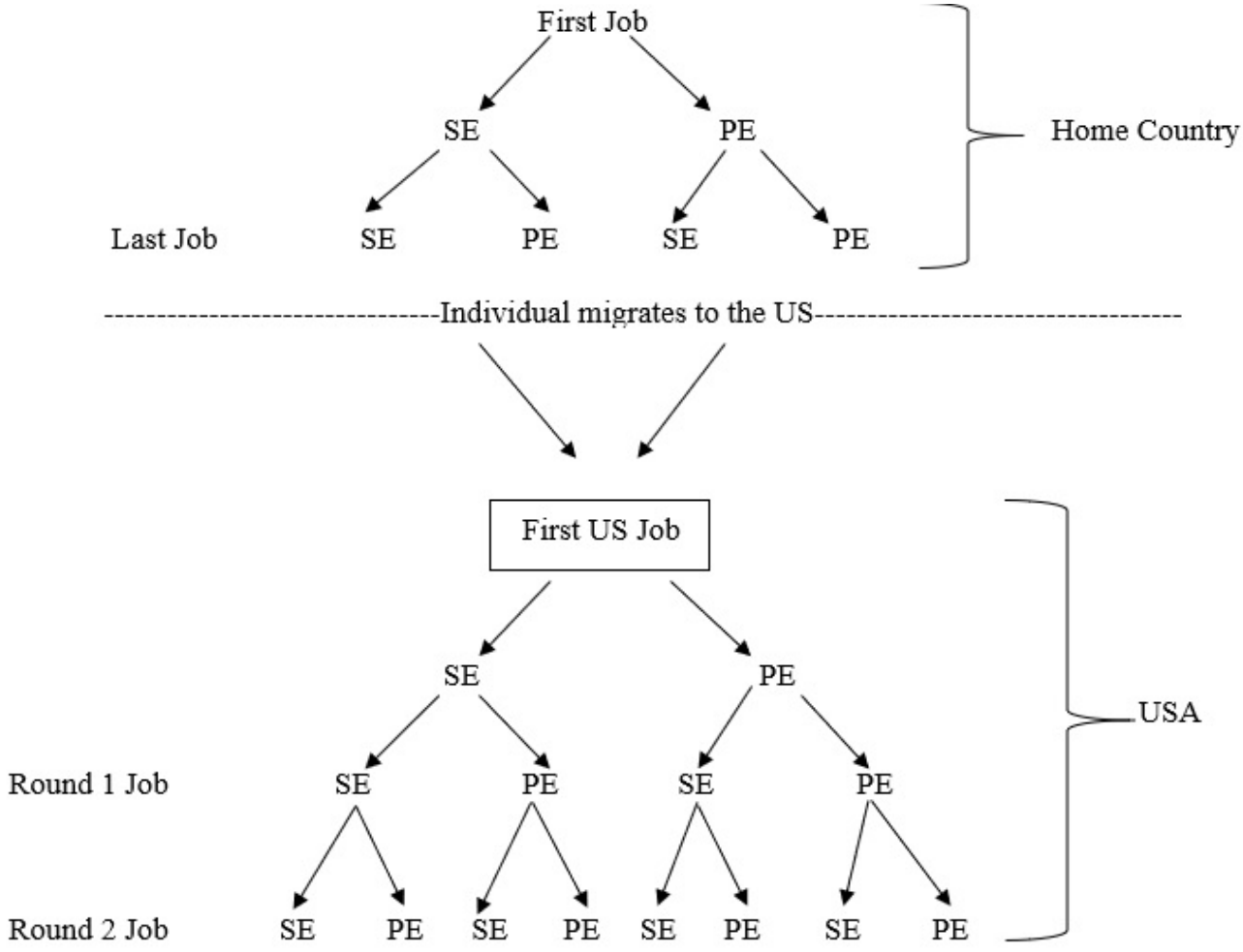
Table 9: Extremal Quantile Earnings Regressions: Paid employment

Variable/Model	(1)	(2)	(3)
only self-emp. before US	-0.0395	-0.0162	0.0299
	(0.0608)	(0.0780)	(0.0660)
paid and self-emp. before US	-0.0362	-0.0154	0.0015
	(0.0429)	(0.0524)	(0.0690)
age/10		0.5773***	0.6459***
		(0.0859)	(0.1429)
age sq./100		-0.0743***	-0.0805***
		(0.0099)	(0.0176)
years left home/10		0.3534***	0.3433***
		(0.0554)	(0.0775)
years left home sq./100		-0.0638***	-0.0585***
		(0.0140)	(0.0215)
good English		0.4722***	0.5153***
		(0.0552)	(0.0619)
more 12 years educ. home		0.4316***	0.4461***
		(0.0597)	(0.0648)
family visa		-0.1941***	-0.2115***
		(0.0327)	(0.0506)
Latino			-0.1304*
			(0.0749)
European			0.1335***
			(0.0451)
African			-0.3286***
			(0.0848)
time fixed effects	YES	YES	YES
J-test (pvalue)	0.6775	0.6326	0.1643
N	3,000	3,000	3,000

Notes: the dependent variable is log hourly earnings in 2003 US dollars. The covariates shown under each model correspond to the variables that are quantile-independent (except in the case of time fixed effects). Standard errors in parentheses. See Appendix C for a description of each variable. Calculations are my own based on data from the New Immigrant Survey (NIS). * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$. Asians are the base category for regions.

Appendix A NIS labor market data

Figure A1: Paths to self-employment in the US



Notes: this figure shows an example of some of the possible paths that immigrants in the US could have followed to become entrepreneurs. This is based on the five jobs data in the NIS. Immigrants were asked about two home country jobs: their first job after the age of 16 and their last job before moving to the US. Post-migration jobs included: the first job in the US, the current job reported in the first round of the survey (2003-2004), and the job in the second round (2007-2009). PE and SE stand for paid and self-employment, respectively.

Appendix B Sample selection

The New Immigrant Survey (NIS) was conducted in two waves. The first round took place between 2003 and 2004 and sampled immigrants obtaining legal permanent residency in those years, their spouses, and some of their children. A subsequent round was done between 2007 and 2009. This paper uses information on the sample of main immigrants. The NIS intended to interview around 12,500 main immigrants and had a success rate of approximately 68.6% since 8,573 individuals participated in the first wave.

From the initial sample of 8,573 immigrants, one observation is lost since the number of years of education reported is not valid. 40 additional individuals are dropped since age information was not provided. Two persons do not have data on country or region of origin and hence are discarded. 26 additional observations are lost due to missing information on schooling. Since the main goal of this paper is to analyze the role of pre-migration labor market experience, I only consider people who worked at some point before migrating to the US. This results in a loss of 3,449 observations.

After keeping the sample with home country labor market outcomes (5,055 individuals), I discard individuals with missing information on sector of employment (before and after migrating), English skills, and year when they left the home country. In addition, I do not include individuals with inconsistent job start dates or who reported working in a country other than the US after migrating. Finally, I restrict the analyses to working age men (18 to 65 years old). This results in a final sample size of 1,884 immigrants.

Appendix C Variable Descriptions

This section presents the definitions and construction of the variables used in the estimations. The data are from the New Immigrant Survey (NIS).

Age Age is measured in years and divided by 10 in the estimations. The analyses are restricted to individuals between 18 and 65 years old.

English skills Good English is a dummy equal to one if at least one of the following two possibilities is met:

1. The individual answered no to the question: have you ever spoken any language other than English?

2. The individual answered very well or well to the questions: how well do you understand spoken English?, and, how well would you say you speak English?

The variable is equal to 0 if the answers to the questions in two were not well or not at all.

English questions were only asked in the NIS at the time of the 2003/2004 survey. For this reason, the level of English proficiency is assumed to be constant across the different job spells. Arguably, one would expect changes to English skills over time. The changes would probably be less pronounced between the first and the second round jobs than between the first job after migration and any round job (if the person came to the US long time ago), since the maximum number of years between the two rounds is six. In addition, one would expect immigrants to have better or equal English skills in 2007/2009, after living more time in the US.

Visa types The public-use NIS data set contains information on the broad categories of visas through which immigrants later became legal permanent residents. Each category corresponds to a grouping made by the NIS based on the more disaggregated visa information provided to them by the U.S. Citizenship and Immigration Services (USCIS) formerly the Immigration and Naturalization Service (INS). The broad categories are:

1. Other
2. Spouse of US citizen
3. Spouse of legal permanent resident
4. Parent of US citizen

5. Child of US citizen
6. Family fourth preference
7. Employment preferences
8. Diversity immigrants
9. Refugee/asylee/parolee
10. Legalization

In the paper, I pool some of these categories and work with the following classification:

a. **Family visas**: includes 2 to 6 above
b. **Employment visas**: includes 7 above
c. **Diversity visas**: includes 8 above
d. **Refugee visas**: includes 9 above
e. **Other visas**: includes 1 and 10 above

Family visa In my analyses, I include a dummy variable equal to one if the person had a family visa before becoming a legal permanent resident, and equal to zero if otherwise.

Self-employment in the US Dummies for self-employment at the different US jobs are defined as follows. Each variable takes the value of one if the individual indicated to be self-employed and of zero if the answer was "working for someone else".

Only self-emp. before US Is a dummy equal to one if the immigrant only worked in self-employment before moving to the US and zero otherwise.

Paid and self-emp. before US Is a dummy equal to one if the immigrant worked in self-employment and in paid employment jobs before moving to the US.

Countries and regions In the public-use NIS data set the country of origin of most immigrants is disclosed, except for countries with very low numbers of individuals. For this subset, only the region of origin is known. The countries included are: Canada, China, Colombia, Cuba, Dominican Republic, El Salvador, Ethiopia, Guatemala, Haiti, India, Jamaica, Korea, Mexico, Nigeria, Peru, Philippines, Poland, Russia, Ukraine, United Kingdom, and Vietnam.

Individuals from other countries (with low legal migration rates to the US) are classified by the NIS in one of the following categories: Europe and Central Asia; East Asia, South

Asia, and the Pacific; Other North America; Latin America and the Caribbean; African Sub-Saharan; Middle East and North Africa; Oceania; and the Artic Region.

I group countries into the four regions defined below:

a. **Europe, Canada, and Oceania**: includes Canada, Poland, Russia, Ukraine, United Kingdom, other countries in Europe and Central Asia, other in North America, and Oceania

b. **Latin America and the Caribbean**: includes Colombia, Cuba, Dominican Republic, El Salvador, Guatemala, Haiti, Jamaica, Mexico, Peru, and any other country in this region

c. **Asia**: includes China, India, Korea, Philippines, Vietnam, and other countries in East and South Asia and the Pacific

d. **Other**: includes Ethiopia, Nigeria, and African Sub-Saharan, Middle Eastern and North African countries, and the Artic Region

Education abroad This is a dummy variable equal to one if the individual completed at least 13 years of education before moving to the US and 0 otherwise.

Had children before moving This is a dummy variable equal to one if the immigrant had biological children before moving to the US and 0 otherwise.

Years since left the home country This variable is defined as the difference between the year the immigrant was interviewed (or the year he first worked after moving if asked about the first job in retrospective) and the year the person said to have left his country of birth to live in another country for at least 60 days. Close to 86% of all immigrants in the round one sample said they moved to the United States. The variable is measured in years and divided by 10 in the estimations.

Earnings Earnings of the three US jobs considered in the paper (first after migration, first round, and second round jobs) are constructed as follows. First, I only keep earnings observations when individuals reported the location of their job to be the US. Second, I make use of the NIS-provided PPP earnings variables in current prices. Third, I convert all data to 2003 US dollars using CPI series from the FRED database of the St. Louis Fed[31].

[31] Available online at: https://fred.stlouisfed.org/categories/9

The NIS allowed immigrants to report their income with a high degree of flexibility. Individuals were given the option to indicate their earnings in their preferred currency and unit of time (hour, week, every two weeks, month, year, or other). They were also asked about the number of weeks in a year that they worked at a job and the usual number of weekly hours worked at that job. In the case of individuals in self-employment, the NIS asked about their earnings in their main job and their profits separately. With the information above, I constructed hourly earnings for every individual and applied the natural logarithm for the values used in the earnings regressions.