MEXICAN MIGRATION TO THE UNITED STATES, 1920 TO 1965: GUEST WORKERS, SELECTION, AND ECONOMIC DEVELOPMENT IN MEXICO

by

EDWARD L. KOSACK

B.B.A., Loyola College in Maryland, 2005

M.A., Johns Hopkins University, 2009

M.A., University of Colorado, 2011

A thesis submitted to the

Faculty of the Graduate School of the

University of Colorado in partial fulfillment

of the requirement for the degree of

Doctor of Philosophy

Department of Economics

2015

This thesis entitled:
Mexican Migration to the United States, 1920 to 1965: Guest Workers, Selection, and Economic Development in Mexico
written by Edward L. Kosack
has been approved for the Department of Economics

_____
Professor Ann Carlos, Co-Chair

_____
Professor Brian Cadena, Co-Chair

Date:_____

The final copy of this thesis has been examined by the signatories, and we find that both the content and the form meet acceptable presentation standards of scholarly work in the above mentioned discipline.

Kosack, Edward L. (Ph.D., Economics)

Mexican Migration to the United States, 1920 to 1965: Guest Workers, Selection, and Economic Development in Mexico

Thesis directed by Professors Ann Carlos and Brian Cadena

Mexican migration in the early twentieth century was characterized by relatively unimpeded entry in the first part of the century, repatriation policies in the late 1920s and 1930s, and guest worker migration under the Bracero Program from 1942 to 1964. I utilize newly-collected, archival datasets and novel empirical techniques to better understand these episodes.

In the first paper we estimate the self-selection of Mexican migrants into and out of the United States in the 1920s. We use height to proxy migrant quality and to measure self-selection into migration in 1920. Migrants were positively selected on height compared to the Mexican population. We then link these migrants to the 1930 U.S. and Mexican censuses to obtain samples of permanent and return migrants and estimate the selection into return migration. Return migrants were not differentially self-selected on height relative to permanent migrants.

In the second paper I examine the development impacts of the Bracero Program. Exploiting a natural experiment in the institutional structure of the program, I use a state's proximity to the nearest recruitment center as an instrument for bracero out-migration to estimate the causal effect of bracero migration on human capital investments in sending states. IV estimates show that bracero migration caused increases in primary school enrollments and education spending. Analysis of heterogeneous effects reveals that the effect occurred for the marginal years of education and that the effect was relatively bigger for female children than for

male children. These results suggest that guest worker programs can serve as good development policy.

In the third paper, I examine the impact of the Bracero Program on entrepreneurial investments. Exploiting microdata and within person variation in migration choices, I estimate both an individual fixed effects model and a hazard model to ascertain the effect of bracero migration on the decision to start a new business. Results indicate that bracero migration caused an increase in the propensity to start new businesses, and that bracero trips were more likely to result in business investment than were illegal trips. This chapter provides further evidence of guest worker programs as good development policy.

DEDICATION

To my parents, who gave me the world and only ever asked me to do my very best in return.

ACKNOWLEDGMENTS

The journey undertaken to write this dissertation would most certainly have been impossible without the support, encouragement, and constructive commentary of those that helped along the way. Professor Ann Carlos taught me so very much about the academic life and I will cherish her lessons for many years to come. Without her tireless support, the selfless giving of her time, and her valuable feedback on both this dissertation and all endeavors I have undertaken, I would not have become the economist, the historian, or the scholar that I am today. Professor Brian Cadena was an important mentor in the process of writing this dissertation, lending an ear when I reached a roadblock in my research, providing invaluable advice and suggestions to improve the empirical rigor of my work, and giving me a strong foundation in the empirical tools of applied economics research. I also wish to thank Lee Alston, Francisca Antman, and Fernando Riosmena, the remaining members of my dissertation committee who have all taken time out of their busy schedules to read my work carefully and provide much-cherished feedback to improve it. Beyond just improving the work, the tough questions and encouraging comments from this committee energized me throughout the research process. This dissertation also benefited from the feedback I received at numerous conferences and seminars, and I wish to thank all of the participants at those events.

I must also take the opportunity to recognize the financial support that made the completion of this dissertation possible. The Department of Economics at the University of Colorado was especially generous in providing funds to travel to conferences and for data collection efforts in Mexico. I certainly appreciate the great support my chosen field of Economic History provides to graduate students and I am thankful for funds received from the Economic History Association, the Cliometrics Society, and the Canadian Network for

Economic History for travel to scholarly conferences. Much of the time spent writing this dissertation would have been difficult to come by without funding from the Dissertation Completion Fellowship, received from the Graduate School at the University of Colorado.

The six years I spent in Colorado working on this dissertation would have been impossible to bear without the many friends that became to me like a second family. Many thanks to my good friend, Zach Ward, who put up with me as a co-author, taught me a lot about doing historical research, and was a shoulder to lean on whenever I needed it. Priti Kalsi was the very first friend I made when I arrived in Colorado and, in addition to her invaluable comments for my research, her sense of humor, frequent hugs, and willingness to drop everything for a coffee break kept me sane during much of the writing of this dissertation. My friends Dustin Frye and Gisella Kagy are a couple that have spent lots of their time helping me to think about my research and improve it. More importantly, however, they were always available to take a break and relax with me when I needed it, and I will always cherish their amazing friendship. Zach Feldman is the friend I could count on to drop what he was doing to give advice on my work, and also to show up at my door unexpectedly for an evening of fun and relaxation. Steven Smith was a great person with whom to share an office. He was close by whenever I needed some help thinking through a problem or needed to take a break from work and just chat. Several other individuals gave their time to provide feedback on my papers, listen when I needed to talk, and make my time at Colorado much more enjoyable. For this I thank Yucheng Ding, Weisi Xie, Matt Van Wyhe, Pooja Khosla, Tim Larsen, Austin Smith, Rebecca Jennings, Lauren Calimeris, Shatanjaya Dasgupta, Erin Fletcher, Sheena Murray, Catherine Massey, Kristina Sargent, and Greg Madonia. The staff in the Department of Economics became especially close

friends and, besides the professional support that they provided, I benefited greatly from the friendships I made with Patricia Holcomb, Maria Oliveras, Lily Welch, and Joy Oge.

Lastly, but certainly not least of all, without the love and support and encouragement of my dear family, none of this would have been possible. My parents, Lori and Skip Kosack, sacrificed a lot to allow me to get to this point in my life. I owe everything to them for making me the person that I am today. Without their emotional support, the countless phone calls, and our regular visits, I would not have been able to get through my time here at Colorado. My sister, Katie Kosack, has been an unending source of encouragement. She inspired me to take risks and do the things that make me happy. My extended family has been extremely supportive and I thank them for all of their love and understanding in this crazy life that I have chosen. My family means very much to me and if they had not been behind me as I went on this journey, I most certainly would not have been able to finish.

Writing this dissertation was not easy. It was downright difficult at times. The only thing that made it possible was the help I received from all of those mentioned above along the way. As I write this acknowledgement of thanks and reflect on my experience of completing this dissertation at the University of Colorado, I realize how lucky I truly am to have surrounded myself with people as great as these. Thank you all! You have helped me more than you can possibly know!

CONTENTS

CHAPTER

TABLES

FIGURES

CHAPTER 1

INTRODUCTION

This dissertation analyzes both the determinants and the consequences of Mexican migration to the United States in the first half of the twentieth century, prior to the passage of the Hart-Cellar Act and the major overhaul of immigration policy in the United States. Mexican migration was characterized by relatively unimpeded entry in the first part of the century, repatriation policies in the late 1920s and 1930s, and guest worker migration under the Bracero Program from 1942 to 1964. I utilize newly-collected, archival datasets and novel empirical techniques to better understand these episodes in terms of who came to the United States, who returned home, and how migration impacted the lives of families back in the sending communities.

Laws passed during the early part of the twentieth century were aimed at curtailing the migration of people from Southern and Eastern Europe, while migration from Mexico was left relatively unchecked by policymakers. Although the law passed in 1917 that required both a literacy test and a head tax did apply to all migrants, the more restrictive quota laws passed in 1921 and 1924 did not apply to migrants from Mexico. Thus, this period represents a very interesting opportunity to study migration from Mexico to the United States with few institutional barriers. This chance to analyze migration decisions under purely economic incentives, without the added constraints from institutional restrictions, is a situation that we do not have today.

In the late 1920s and 1930s the economic downturn in the United States prompted policies aimed at the deportation and repatriation of Mexican workers. Moreover, the poor economic opportunities in the United States created incentives for workers to return to Mexico of

their own volition. These shocks, which prompted large waves of migration back to Mexico, are interesting natural experiments to better understand the composition of return migration and how that flow can affect the characteristics of the stock of migrants remaining in the United States.

With the involvement of the United States in World War II in 1942, a new era in migration policy came about with the start of the Bracero Program. This program, which lasted for 23 years until 1964, was a temporary or guest worker program that saw the movement of between four and five million agricultural laborers across the southern border. The Bracero Program, the largest guest worker program in the migration history of the United States, provides a unique opportunity to study the impacts of such a policy on a large scale. It can give further insights into the consequences of circular migration patterns, especially for the sending communities. These insights will provide important information for policymakers today who explore the possibility of implementing guest worker programs.

Using newly-collected, archival datasets and clever empirical techniques, I analyze these episodes of migration from Mexico in this dissertation and provide the answer to three very important questions. Who migrated to the United States from Mexico? How did return or circular migration affect the economies of both the United States and Mexico? What lessons can policymakers learn from these episodes of historical migration from Mexico? In response to the first question, I find that Mexican migrants in 1920 were positively selected from the home population. Even within occupational class, the United States received the highest quality workers, as measured by height. Regarding the second question, I find that there was no differential selection into return migration during the 1920s and so this phenomenon had no deleterious effect on the overall quality of the stock of migrants in the United States. Moreover, return or circular migration of temporary agricultural workers during the Bracero Program

provided positive income shocks in the sending communities that caused increases in human capital investments in children, as well as increases in investments in productive, entrepreneurial activities. Finally, in answering the third question, I show that migration policy can also be good development policy with guest worker programs like the Bracero Program improving the lives of participants and their families.

This dissertation makes a number of important contributions to the fields of economics. It provides a new anthropometric database of migrant heights from 1920 that can be used to answer a number of additional questions beyond the scope of this work. Our analysis of historical selection improves on previous work by directly accounting for selection into return migration. My work with the Bracero Program utilizes institutional features in a clever empirical strategy in order to isolate exogenous variation in bracero migration and estimate the causal impact of the program on investments in human capital in the sending communities. In addition, I provide a second strategy that uses within person variation in migration choice in an individual fixed effects framework to estimate the causal impact of bracero migration on investments in entrepreneurial activities. Finally, I improve our overall, historical understanding of the Bracero Program. The usual rhetoric in the literature emphasizes the negative aspects of the program. I show that despite these problems, there were definite economic benefits to growth and development for the sending communities.

CHAPTER 2

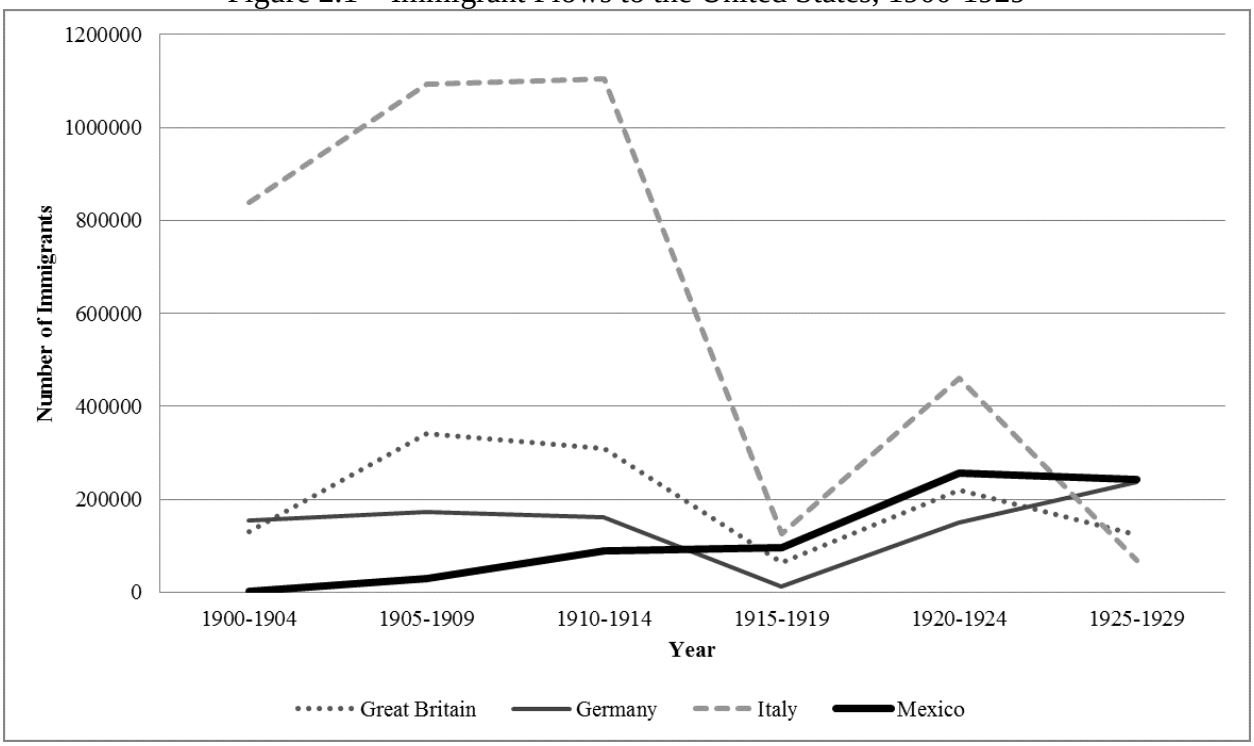
WHO CROSSED THE BORDER? SELF-SELECTION OF MEXICAN MIGRANTS IN THE EARLY TWENTIETH CENTURY

Introduction

Through the beginning of the twentieth century, Europeans dominated migrant flows to the United States, arriving freely with few laws restricting entry. This era of free mass migration ended abruptly in the 1920s with the Immigration Acts of 1921 and 1924 which imposed quotas to curtail European migration to the United States; however, migration from Mexico remained relatively unrestricted.[1] More individuals from Mexico arrived in the United States during the 1920s than did migrants from many European countries (see Figure 2.1). Mexican migrants became an increasingly important source of labor in the United States in the early twentieth century, yet little is known about those who decided to migrate and, among the migrants, those who decided to either stay or return.

[1] The Emergency Immigration Act of 1921 and Immigration Act of 1924 placed annual limits on European migration while imposing no restrictions on Western Hemisphere countries. While Mexican migrants were not limited by quotas, the Immigration Act of 1917 did require all migrants to pass a literacy test and to pay an eight dollar head tax. World War I also caused a steep drop in migration leading some economists to cite 1913 as the end of the "Age of Mass Migration" (Hatton and Williamson 1998).

Figure 2.1 – Immigrant Flows to the United States, 1900-1929



Notes: Immigrant flows are aggregated in five year bins.
Source: Historical Statistics of the United States (Carter et al., 2006)

In this paper we measure the pattern of selection into migration, and then examine whether there is any differential selection into return migration. Because only some individuals are willing to cross borders and leave their native land, the economic consequences of the quality of migrants relative to those who remain behind could affect the home and host economies through multiple channels (Borjas 1987). For the United States, the specific pattern of selection affects both migrant assimilation (Chiswick 1978; Borjas 1985; Ferrie 1999) and the return to migration (Abramitzky et al. 2012). For Mexico, whether those leaving were of higher or lower quality than those staying is important for understanding potential "brain drain" (Gibson and McKenzie 2011), as well as income inequality (McKenzie and Rapoport 2007).

If migrants were better than the general Mexican population in terms of productivity, education, or health, then they were positively self-selected.[2] To determine the pattern of selection one can compare the wages that Mexican migrants would earn in Mexico to the wages of those in Mexico who do not migrate (Borjas 1987). However, migrants and their wages are typically only observed in the host country. As prices for skills vary from country to country, comparing wages once migrants have crossed the border does not give the proper counterfactual. Techniques used to circumvent this problem and generate the appropriate comparison of migrants and non-migrants include propensity score matching (Chiquiar and Hanson 2005) and sibling fixed effects (Abramitzky et al. 2012).

Further, in many cases individual wages are not known. Some studies of historical selection use aggregated measures of human capital, such as occupational scores, to compare movers to stayers (Abramitzky et al. 2012; Collins and Wanamaker 2014). However, if occupations reported in the historical immigration statistics were not representative of an individual's place in the skill distribution because migrants listed downgraded occupations on arrival that reflected labor demand in the United States, then these data would systematically underestimate the true quality of a migrant worker. Additionally, occupational scores are not specific to the individual and do not allow us to look at how migrants differed from the home population within reported occupation or skill class.

We use height as an alternative measure of the historical self-selection of Mexican migrants. A long literature argues that greater stature is correlated with higher earnings, greater intelligence, and increased health; in other words, height is positively correlated with "quality"

[2] Borjas (1987) defined selection not only in terms of comparing migrants' wages to the home country's distribution, but also in terms of how they compared to the host country's distribution of wages. We follow the recent direction of the literature comparing migrants only to those in the home country (see Chiquiar and Hanson (2005)).

(Steckel 1995; Steckel 2009). A migrant's height does not change as he crosses the border into the United States, unlike occupation or wages. Further, height gives a partial measure of human capital that is specific to the individual, important when there is little variation in migrant occupation. Since the vast majority of Mexican migrants claimed laborer or miner as their occupation, we are able to determine if the United States received the better laborers or the better miners by using height data.

Much of the migration from Mexico to the United States was temporary, and many individuals returned home instead of settling permanently (Gratton and Merchant 2013). Measuring the selection into migration is not sufficient for understanding the effect of migrants on the labor force in both Mexico and the United States since return migrants might be differentially self-selected (Borjas and Bratsberg 1996). However, the direction of selection for return migrants is unclear. Return migrants may have been "target earners" who migrated to accumulate savings in order to start a business back home, making the direction of selection ambiguous (Mesnard 2004; Piore 1979). On the other hand, return migrants could have been those who unexpectedly failed in the United States labor market and would thus be negatively self-selected (Abramitzky et al. 2014). Further, pressure on Mexicans to leave the country or deportation drives that began to occur in the late 1920s and 1930s could have changed the quality of return migrants (Hoffman 1974).

We utilize newly collected data from individual border manifests for migrants crossing through border towns in Arizona and Texas in 1920. To determine the selection of the migrant population compared to the home population, we compare heights for migrants to samples of

heights for soldiers in the military and for those who applied for passports in Mexico.[3] Having estimated the self-selection of inflows, we estimate the self-selection of outflows. To do this, we link our sample of migrants who crossed the border in 1920 to the 1930 United States Census to create a sample of permanent migrants, and to the 1930 Mexican Census to create a sample of return migrants. We compare the heights of each sample to determine the self-selection of return migrants relative to permanent migrants.

We find that Mexican migrants in 1920 were positively self-selected on height from the Mexican population. They were four to five centimeters taller than soldiers in the military—typically members of the lower class of Mexican society—and they were only one and a half centimeters shorter than passport holders—typically members of the higher class of Mexican society (López-Alonso and Condey 2003). Our result holds within occupational skill class as the United States received the taller laborers, the taller skilled workers, and the taller professionals. We also find that although a substantial proportion of Mexican migrants returned home (between 13 and 44 percent), there was no differential self-selection on height into return migration. Our measured result of positive selection for migrant inflows is a good proxy for the change in the quality of the overall stock of Mexican migrants in the United States in the early twentieth century.

U.S.—Mexico Migration in 1920

There is an extensive literature on the history of migration between the United States and Mexico (see Lawrence Cardoso (1980), Patrick Ettinger (2009), and David Gutierrez (1995) for an overview). Indeed, Mexican migration patterns transformed dramatically during the early twentieth century. The Mexican Revolution pushed migrants out during the 1910s, while the

[3] The military and passport height data was collected by Moramay López-Alonso and is publicly available at the ICPSR (2003).

immigration quotas of 1921 and 1924 curtailed unskilled labor from Eastern and Southern Europe in the 1920s and pulled Mexican workers into the United States. We choose 1920 as a benchmark year, falling as it does directly between these two major events, to reveal how the self-selection process operated with limited, confounding institutional factors.

While there were some restrictions to entering the country in 1920, picking a year prior leads to several challenges for our analysis. First, most of the fighting in the Mexican Revolution occurred between 1910 and 1917, making it difficult to separate migrants moving for economic reasons versus those fleeing as refugees. Although some small amount of fighting continued in 1920, it was limited to the North while most of our sample comes from central Mexico. Second, the United States only started to systematically collect immigrant records for individuals crossing the Mexican border in 1907, and the process was not firmly in place by 1909, the year before the Mexican Revolution (Immigration Act of 1907, Sec. 32).

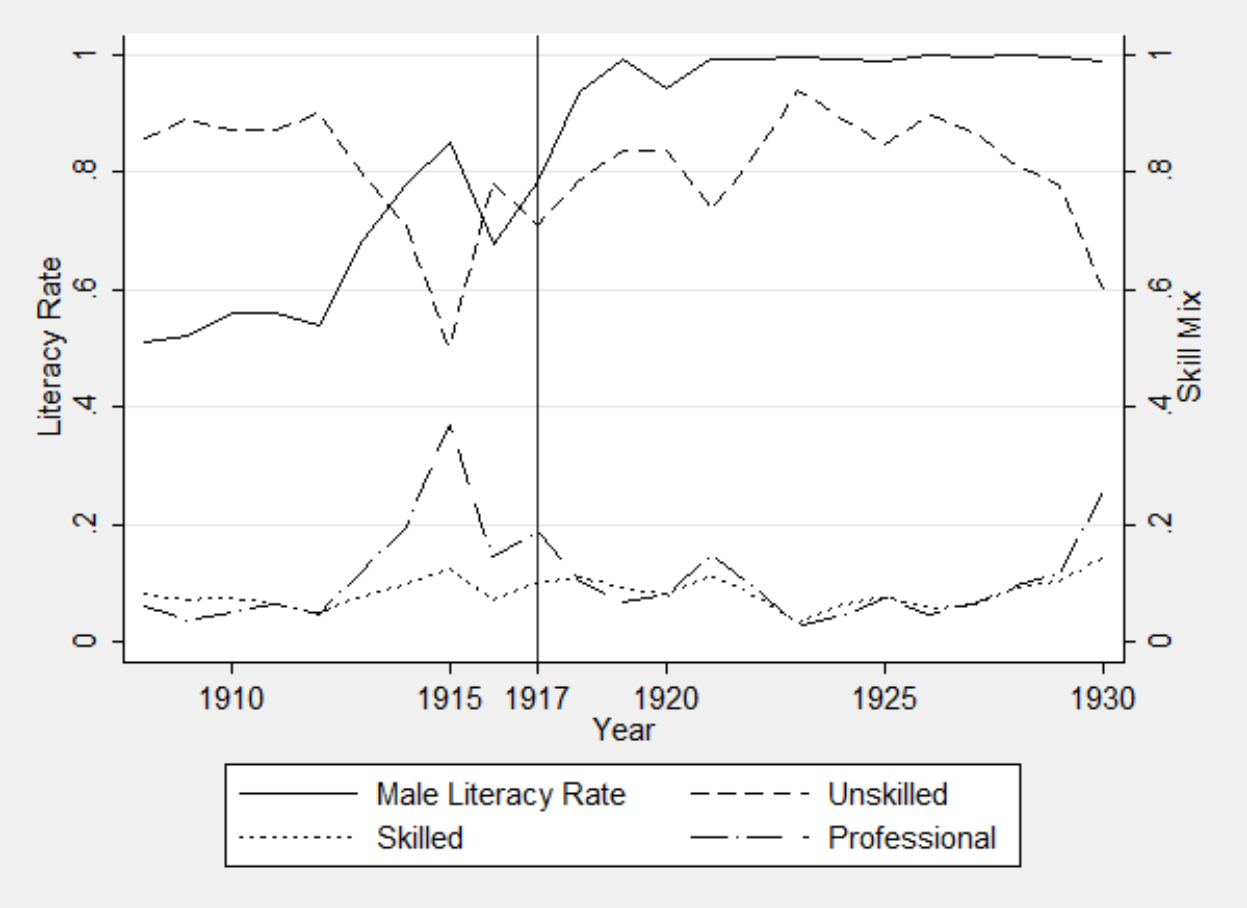
The Mexican Revolution, a multi-sided conflict, raged during the early 1910s although the major fighting subsided by 1917.[4] At the beginning of the Revolution, conflict occurred throughout Mexico as revolutionaries from different states fought to overthrow President Díaz, with the most intense fighting occurring between 1913 and 1916. Following the creation of a new constitution in 1917, major warfare subsided with only Pancho Villa skirmishing in small battles in the North. By 1920 most fighting halted as Villa surrendered and Álvaro Obregón was elected to the presidency (Knight 1986).

During the Revolution, thousands of Mexicans temporarily fled to the United States (United States Bureau of Immigration 1914). As refugees fled during the Revolution, migrant flows became more skilled between 1913 and 1916, the most intense period of fighting. By the

[4] See Knight (1986) for a review of the Mexican Revolution.

end of the 1910s, however, the skill mix of the inflow had returned to pre-Revolutionary levels (see Figure 2.2). Even though thousands crossed the border, the United States absorbed these migrants easily as World War I increased the demand for labor (Rockoff 2004). In fact, in 1917 the United States encouraged temporary Mexican migrants to work in agriculture, railroads, and mining, briefly suspending entry restrictions by allowing contract laborers, discontinuing the head tax, and waiving the literacy requirement (Cardenas 1975). By 1920 thousands of Mexicans traveled northward yearly to earn higher wages offered by employers in the United States, but many of these same migrants later returned home (Clark 1908; United States Bureau of Immigration 1920). In fact, Paul Taylor (1929), in his extensive study of Mexican migrants, notes that many employers in the 1920s perceived Mexicans to be more reliable than other workers and attempted to keep them from returning home after the harvest season.

Figure 2.2—Skill Composition and Literacy Rate of Mexican Migrants, 1908–1930



Notes: Skill classifications according to López-Alonso (2000). The vertical line at 1917 represents the year of the literacy requirement. Comparing the correlation between skill and literacy before and after the 1917 legislation provides evidence that the literacy requirement was not enforced (see text). The skill proportions add to one in each year. These numbers are based on authors' calculations from the Reports of the General Commissioner of Immigration (1908–1930). Before 1917 the literacy rate is calculated for males 14 years and older, after 1918 it was for 16 years and older.
Source: Annual Reports of the Commissioner General of Immigration 1908 to 1930.

As Congress was encouraging migration to the United States from Mexico, they simultaneously passed qualitative restrictions on migration in 1917 by requiring migrants to be able to read and write in their own language, potentially limiting illiterate Mexican individuals. However, the United States did not consistently enforce this law for Mexican migrants, first waiving the literacy requirement in 1917 and reissuing the waiver time to time until 1921 (Cardenas 1975; Cardoso 1976). The waiving of the literacy test is clear when comparing male

migrant literacy rates to the skill mix of inflows, as we show in Figure 2.2. Prior to the literacy test in 1917, literacy and migrant skill level were positively correlated, as expected. Following 1917, however, the migrant flow became less skilled but more literate. By 1920 the percent unskilled was even higher than just before 1917, while the literacy rate increased to 99.4 percent. Even when agricultural workers were waived from the literacy test and head tax, official statistics probably still recorded them as literate.

The literacy test did not appear to restrict migration from Southern and Eastern Europe substantially. Congress imposed quantitative restrictions in 1921 and 1924, dramatically reducing migration from Europe (Zeidel 2004). The quota system, however, placed no limits on migrants coming from the Western Hemisphere, and so Mexican migration was relatively unimpeded. Following the quotas, Mexican immigration increased dramatically as Mexicans acquired jobs due to a labor shortfall (Bloch 1929). The large increase in numbers would eventually lead to concerns over the racial origins of Mexican migrants (Foerster 1925), to the creation of the Mexican Border Patrol, and to the criminalization of undocumented entry in the 1920s (Ngai 2002).

Selection into Migration

Migrants are not a random draw from their home country's population. Borjas (1987) argued that we can predict the direction of self-selection for migrants based on the relative distribution of wages across economies. He finds that if the United States has a more unequal income distribution than the sending country, then we can expect positive selection into migration to the United States. If the migrants who leave from the home country are on average better (for example, more motivated, more educated, more productive, and so on) than those who

stay, then the self-selection is positive; if migrants are worse along these dimensions than stayers, then self-selection is negative.

Selection is influenced by the variation in expected benefits of migration across the human capital distribution of potential migrants. In the early twentieth century, the benefits of migration were immediate as job opportunities were plentiful for Mexican workers. In the southwestern United States, many farms, railroads, and mines hired migrants directly at the border (United States Bureau of Immigration 1920). Mexicans typically worked in these sectors in the Southwest, but throughout the 1920s meatpackers and manufacturers in the Midwest and Northeast would recruit Mexicans from cities in Texas to replace jobs typically given to Southern and Eastern Europeans (Taylor 1929). While low-skilled jobs were readily available, high-skilled jobs were not as prevalent. Also, wages were higher for these unskilled laborers than in Mexico, suggesting a significant return to migration for unskilled laborers, which could lead to negative self-selection (Clark 1908).

Selection is also influenced by the variation in costs of migration across the human capital distribution of potential migrants. While high wages abroad may entice a low-skilled individual to move, his mobility might be restricted by the costs of moving (for example, transportation, psychological, informational, or opportunity costs). Chiquiar and Hanson (2005) extend the Borjas (1987) model by adding costs to reconcile the theoretical prediction that contemporary Mexican migrants should be negatively self-selected with the empirical evidence that they are intermediately self-selected. This shift in the literature from focusing on the benefits of migration to the costs of migration has been used to explain differential patterns of Mexican migrant selection from urban and rural areas and from places with different intensities of migrant networks (Fernández-Huertas Moraga 2011; McKenzie and Rapoport 2010).

The benefits to migration were clear but high costs may have constrained individuals from traveling. While improvements in transportation from central Mexico to the United States border, especially the completion of the Mexican railroad in the late nineteenth century, lowered the cost of migration and subsequently spurred large waves of emigration, the cost of a ticket from central Mexico to the United States border was still high for poorer individuals (Clark 1908; Coatsworth 1981). Additionally, the 1917 migration legislation required all migrants to pay an eight dollar head tax. Although the enforcement of this law during 1920 is unclear, if low-earning individuals were unable to finance the trip abroad, then self-selection could have been positive.

While a handful of papers analyze the selection of migrants from Europe (Abramitzky et al. 2012, 2014; Hatton and Williamson 2006; Stolz and Baten 2012), little is known about selection of Mexican migration to the United States during the early twentieth century. Zadia Feliciano (2001) is the only paper to our knowledge that explores the historical self-selection of Mexican migrants, finding that in 1910 Mexicans in the United States had a higher rate of literacy than did the general Mexican population. We extend her results by incorporating evidence on immigrants following the Mexican Revolution, by using a measure (height) that is constant across borders, and by exploring the self-selection of return migrants which could alter the quality of the stock of Mexican migrants observed in the census.

Height as a Measure of Selection

Multiple metrics of human capital have been used in studies of selection, including income (Chiquiar and Hanson 2005), skill class (Hatton and Williamson 2006), occupational scores (Abramitzky et al. 2014; Collins and Wanamaker 2014), age-heaping (Stolz and Baten 2012; A'Hearn et al. 2009), and years of education and literacy (Feliciano 2001). We have no

data on the wages and education level of Mexican migrants in 1920, and so we use height to measure the quality of an individual migrant.

When income and wage data are not available, economists must rely on other measures to proxy for standard of living. In particular, height as a measure has been used since it is positively correlated with income and improved health and nutrition. (See Steckel (1995) and (2009) for a review of height studies.) Higher living standards with ample food during childhood increase height, while poor nutrition and health can stunt growth.

Not only does the average height of a society indicate overall health and well-being, but also taller people also earn more than their shorter counterparts within a country. For example, Paul Schultz (2002) shows that a one centimeter increase in height leads to an 8 to 10 percent increase in wages in Brazil and Ghana. The return to physical strength is especially important in developing countries where large sectors of the economy rely on the physical productivity of labor. Height is a determinant of wages in these countries since larger and stronger men (as measured by Body Mass Index) are rewarded in the labor market (Thomas and Strauss 1997). Mexican migrants worked in labor-intensive industries, such as mining, railroad construction, and farm labor, where improved physiology could lead to higher productivity (Clark 1908; United States Bureau of Immigration 1920).

Nicola Persico, Andrew Postlewaite, and Dan Silverman (2004) argue that higher wages for taller individuals are due to non-cognitive characteristics (for example, confidence), while others (Case and Paxson 2008; Schick and Steckel 2010) argue that early childhood inputs into health and nutrition can increase the cognitive functioning of an individual later in life. For example, taller individuals are more likely to remember their exact date of birth (Humphries and Leunig 2009) and taller individuals score higher on early childhood cognitive and non-cognitive

tests (Case and Paxson 2008). Either way, the evidence suggests that taller individuals, on average, earn higher wages. If the migrants who arrived in the United States were taller than those who remained in Mexico, then this would indicate a pattern of positive selection for Mexican migrants.

Data

Border Crossing Manifests

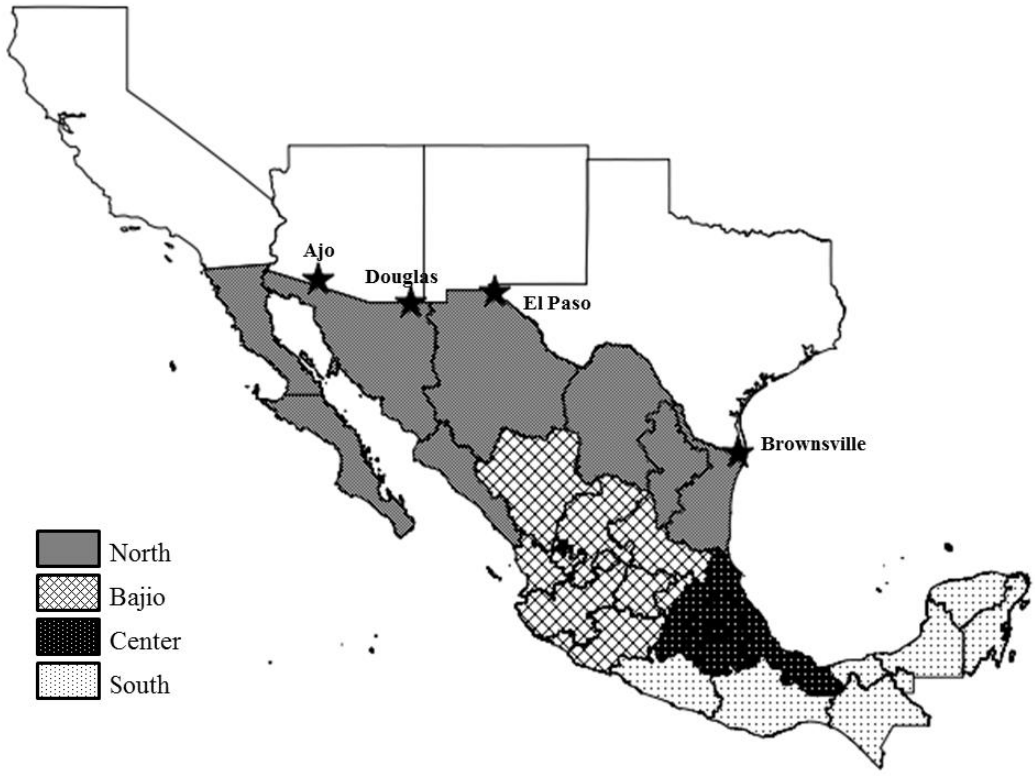
To understand exactly who migrated to the United States from Mexico in 1920, we construct a unique dataset from the manifest lists for those crossing at the border towns of Ajo, Arizona; Douglas, Arizona; Brownsville, Texas; and El Paso, Texas in 1920.[5] In Figure 2.3 we show the geographical coverage of our sample.[6] Height was recorded on each manifest by border officials and was often rounded to the nearest quarter inch. In addition to height, much more information about migrants upon arrival was recorded on the manifest, including demographic (age, sex, marital status), geographic (place of birth, place of last residence, intended destination), economic (occupation, savings), and network (join a friend, relative, or employer) data. We collect all available data for each adult male (18 years or older) classified as

[5] National Archives, Mexican Border Crossing Records, "Manifests of Alien Arrivals at Ajo, Lukeville, and Sonoyta (Sonoita), Arizona, January 1919–December 1952, and at Los Ebanos, Texas, December 1950–May 1955 (2 rolls)," no. A3377; "Nonstatistical Manifests and Statistical Index Cards of Aliens Arriving at Douglas, Arizona, July 1908–December 1952 (4 rolls)," no. M1759; "Statistical and Nonstatistical Manifests of Alien Arrivals at Brownsville, Texas, February 1905–June 1953, and Related Indexes (40 rolls)," no. M1502; and "Manifests of Statistical Alien Arrivals at El Paso, Texas, May 1909–October 1924 (96 rolls)," no. A3412.

[6] There is no systematic difference in the outcome of interest (height) across border towns after controlling for state and decade of birth fixed effects, suggesting that heights were consistently measured across border stations.

an immigrant.[7] In total, we have microdata for 3,671 male migrants who crossed the border in 1920.

Figure 2.3—Location of Border Stations and Regions in Mexico



Notes: Additional border stations were located in Lukeville, AZ; Naco, AZ; Nogales, AZ; Sasabe, AZ; Sonoyta, AZ; Columbus, NM; Andrade, CA; San Ysidro, CA; Del Rio, TX; Eagle Pass, TX; Laredo, TX; and Rio Grande City, TX. Region of birth is split into North, Bajio, Center, and South. North includes Baja California Sur, Baja California, Sonora, Sinaloa, Chihuahua, Coahuila, Nuevo León, and Tamaulipas. Bajío includes Jalisco, Colima, Michoacán, Nayarit, San Luis Potosí, Durango, Zacatecas, Aguascalientes, Querétaro, and Guanajuato. Center includes Distrito Federal, México, Morelos, Tlaxcala, Puebla, Veracruz, and Hidalgo. The South includes Guerrero, Oaxaca, Tabasco, Campeche, Yucatan, Quintana Roo, and Chiapas.
Source: United States shapefile from user cfitzpatrick, available at http://www.arcgis.com/home/item.html?id=f7f805eb65eb4ab787a0a3e1116ca7e5.
Mexico shapefile from INEGI, available at http://www.inegi.org.mx/geo/contenidos/geoestadistica/m_geoestadistico.aspx.
Latitude and longitude for border stations geocoded using GPS Visualizer, available at http://www.gpsvisualizer.com/geocode.

[7] An observation was collected if and only if the individual's intended length of stay was listed as permanent or indefinite, the last permanent residence was outside of the United States, the place of birth was outside of the United States, and the final destination was within the United States.

To determine the representativeness of our sample, we compare the characteristics of our migrants with those of similar migrants recorded in the 1920 United States Census. We use the 1 percent 1920 Integrated Public Use Microdata Series (IPUMS) sample to identify migrants who arrived in the previous year, who were literate, over the age of 18, and male (Ruggles et al. 2010). Our sample is representative of the distribution of skills for migrants recorded in the census with no statistical difference in occupational mix.[8] There is also no difference in marital status, although our sample is about two years younger and overrepresented by people moving to Texas.[9]

Our dataset captures only documented migrants.[10] Although Louis Bloch (1929), in a comparison of census numbers with net migration flows, estimates that undocumented entries could have been substantial for the decade from 1910 to 1920, he also admits that there is a lack of reliable information to make a study of this population feasible. To be precise, our results apply to those migrants who crossed through official border crossing stations, and not necessarily to all migrants.

The border-crossing data allow us to create a profile for the "typical," documented, male migrant who crossed the border from Mexico to the United States in 1920, as shown in Table 2.1. Male migrants to the United States were, on average, 29 years old, equally likely to be married as single, and almost universally recorded as literate. In Figure 2.3 we show the regional

[8] Results for the representativeness of the sample are available in the online appendix.

[9] The fact that our sample is overrepresented by people headed to Texas is an artifact of the majority of it being recorded from the El Paso and Brownsville border stations.

[10] Migrating to the United States was not technically illegal until later in the 1920s, when the United States government created the Border Patrol in an attempt to stop Mexicans and other European ethnicities that tried to enter the United States through the south (Foerster 1925; Ngai 2002). The Border Patrol began in 1925 with a force of 472 members (Carter et al. 2006, Table Ad1076-1084).

classification we use for the state of birth.[11] Immigrants came most often from central and northern Mexico, with very few coming from the southern states.[12] A large portion of our migrants were born in the Mexican states of Chihuahua, Guanajuato, and Jalisco, which are still high-sending states today, and most reported a final destination of Texas. Only 14 percent of migrants in the sample reported meeting someone (friend, relative, or employer) upon entry, much lower than Europeans in 1920 with 83 percent of Germans, 96 percent of Italians, and 97 percent of Greeks joining a network upon arrival.[13] On average, Mexican migrants brought $39 across the border.

[11] We follow the same region of birth classification as López-Alonso and Condey (2003) to maintain consistency across samples. A common birthplace for a migrant crossing at El Paso was Guadalajara, Jalisco. This represents a journey of about 1,266 kilometers.

[12] It is well noted that the construction of the Mexican railroad helped transport Mexicans to the United States. However, the railroad did not reach the southern states below Veracruz by 1920, which explains why few of our observations are from the southern Mexican states.

[13] Based on authors' calculations from the Report of the Commissioner General of Immigration (1920).

Table 2.1—Summary Statistics for Migrant, Military, and Passport Samples

Variable	Migrant Sample	Military Sample	Passport Sample
Height (centimeters)	168.66	163.83	170.15
	(6.09)	(6.72)	(7.3)
Age at arrival (years)	27.86	28.37	38.63
	(9.63)	(7.64)	(10.14)
Unskilled	0.87	0.77	—
	(0.33)	(0.42)	
Skilled	0.1	0.21	—
	(0.29)	(0.41)	
Professional	0.03	0.02	—
	(0.17)	(0.13)	
Literate	0.99	—	—
	(0.07)		
Married	0.49	—	—
	(0.5)		
Single	0.48	—	—
	(0.5)		
Widowed	0.02	—	—
	(0.15)		
Headed to California	0.07	—	—
	(0.26)		
Headed to Texas	0.81	—	—
	(0.39)		
Headed to Arizona	0.08	—	—
	(0.27)		
North	0.22	0.19	—
	(0.41)	(0.39)	
Bajio	0.75	0.3	—
	(0.43)	(0.46)	
Center	0.03	0.4	—
	(0.16)	(0.49)	
South	0	0.11	—
	(0.04)	(0.32)	
Meeting no one	0.86	—	—
	(0.34)		
Meeting friend	0.01	—	—
	(0.1)		
Meeting relative	0.13	—	—
	(0.33)		
Cash on hand ($)	38.73	—	—
	(300)		
Observations	3,671	3,884	1,249

Notes: Standard deviations are in parentheses. Proportions are reported unless otherwise noted.
Source: Border crossing manifests and López-Alonso (2003).

We classify migrants as unskilled, skilled, or professional workers based on their reported occupation.[14] The majority (about 87 percent) of immigrants in the sample were unskilled. It is because of this lack of variation in skill class that occupational rankings yield little information in determining self-selection. Height allows us to examine whether migrants, within a given occupational class, were better or worse than non-migrants remaining in Mexico.

Comparison Samples: Military and Passport Data

To make an inference about the selection of migrants from Mexico we need to compare the heights of migrants to those living within Mexico. Here we use two distinct samples—military soldiers and passport holders. Howard Bodenhorn, Timothy Guinnane, and Thomas Mroz (2013) warn that samples of historical heights are likely selected, which could lead to incorrect inferences about the underlying population. We acknowledge that both of these samples are not representative as the military sample is from the lower part of the height distribution of Mexico and passport records are from the upper part of the height distribution of Mexico (López-Alonso 2007, 2012; López-Alonso and Condey 2003). However, by comparing migrants to both samples and determining which sample migrants most closely resemble we can infer whether migrants were positively or negatively selected.

The *Secretaría Nacional de la Defensa* houses federal military records in the *Archivo de Concentración*, recording deceased soldiers in the *Sección de Personal Extinto* and deserters in the *Sección de Cancelados* (López-Alonso and Condey 2003).[15] Since the military did not have

[14] We follow López-Alonso's (2000) occupational classification.

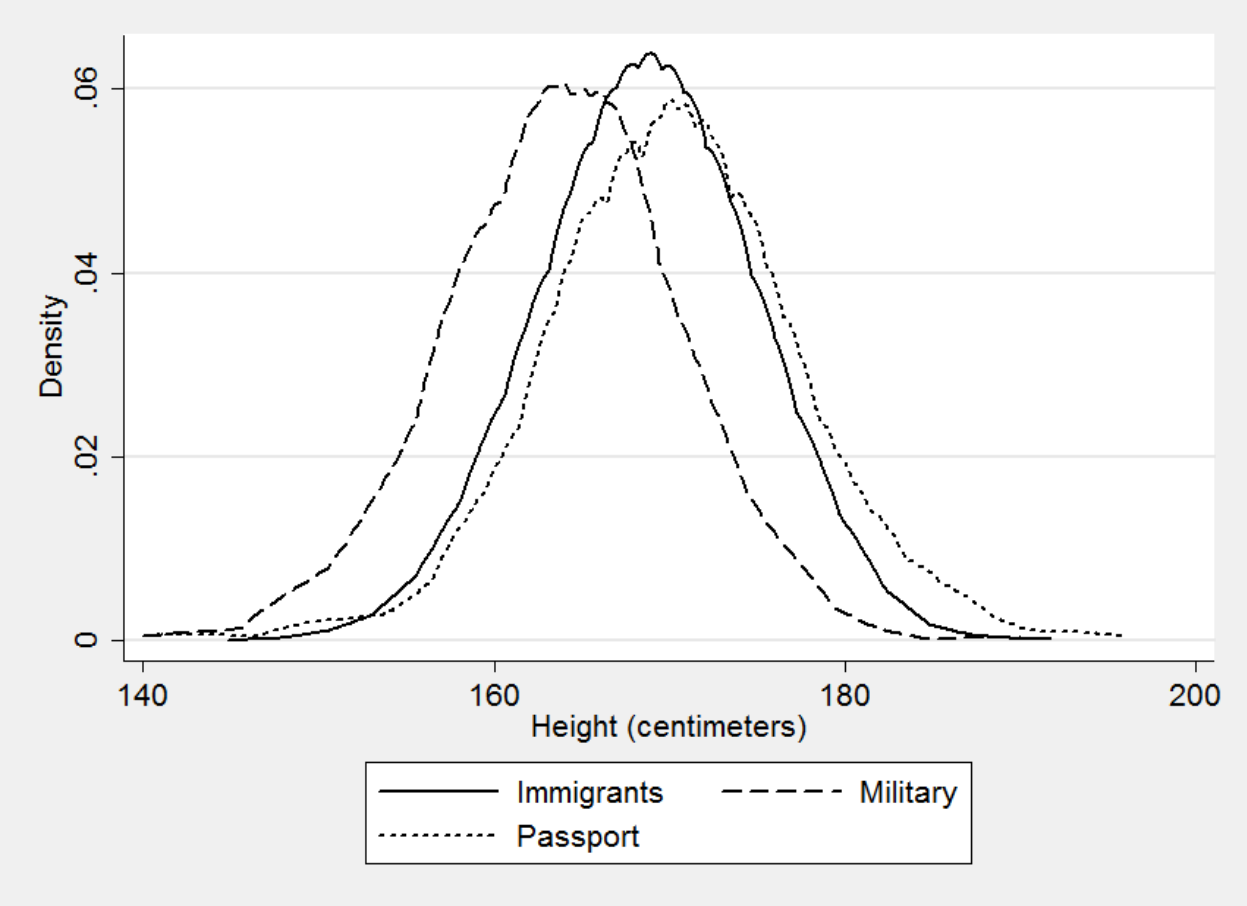
[15] Birth records did not become widely available until the 1930s, so the military kept track of members (who might potentially desert) by recording their height, place of birth, age, and occupation. The *Sección de Cancelados* contains information on members of the military who deserted the army before their service time ended, and the *Sección de Personal Extinto* contains individuals who died in service or retired, and then died afterwards (López-Alonso

required service until 1939, only those who made the choice to join the military appear in the data.

Characteristics of the military sample are also listed in Table 2.1. We show that 77 percent of military males were in unskilled occupations and that individuals were well represented across different regions of Mexico. At first glance, the military sample appears to be higher skilled than the migrant group, since 87 percent of migrants were unskilled compared to 77 percent of individuals in the military, implying negative self-selection. However, migrants may have reported intended occupation rather than previous occupation, leaving their true position in the skill distribution of Mexico unclear. Importantly, a comparison of average height reveals that migrants were nearly five centimeters taller than those in the military. We illustrate this comparison in Figure 2.4 by showing that the estimated height distribution for the migrant sample lies well to the right of the estimated height distribution for the military sample.

2012). The majority of the military data is for individuals who joined the Mexican Army between 1915 and 1935.

Figure 2.4—Heights: Immigrants, Soldiers, and Passport Applicants



Notes: Observations below 140 cm in height are dropped, although results are unchanged if they are included.
Source: Migrant heights are from border crossing manifests. Soldier and passport applicant heights are from López-Alonso (2003).

We also compare migrants to a sample of passport applications from Mexico collected by López-Alonso (2003) from the *Archivo de Pasaportes*. Unfortunately, this sample only includes age and does not give region of birth or skill classifications. Height was not measured for passports but was self-reported, possibly creating an upward bias since height tends to be over-reported (Spencer et al. 2002). Summary statistics in Table 2.1 show that passport applicants were only about one and a half centimeters taller than those immigrating to the United States. In Figure 2.4 we show that the estimated height distribution for the migrant sample lies very close to the estimated height distribution for the passport sample. While the average migrant was

nearly five centimeters taller than the average member of the military, he was similar in height to the average passport applicant.

Estimating Self-Selection into Migration

We utilize a linear regression model to explore the pattern of selection among Mexican migrants in 1920 as measured by migrant height. Although the analysis of the estimated densities in Figure 2.4 suggests a pattern of positive selection, it is possible that greater stature is simply correlated with other characteristics that are more prevalent in the migrant sample, such as a particular region of birth. Thus, we estimate Equation (1) to control for many of these additional characteristics that could confound our positive selection result.

$$Height_i = \beta_0 + \beta_1 Migrant_i + \delta' X_i + \varepsilon_i \quad (1)$$

An individual's height is regressed on a constant, an indicator variable for whether or not the individual is from the migrant sample, and a vector of controls. Final adult height may not be reached until 24 years of age and so individuals who are between 18 and 24 years might still be growing. We include dummy variables for age bins of 18–20 years and 21–23 years in order to account for this pattern.[16] We also include controls for decade of birth to account for any conditions that may have affected the height of all those born in Mexico during those times.[17] Furthermore, we include geographic controls to account for any spatial pattern in Mexican heights.[18] Finally, we include variables for occupational skill class which allows us to describe how migrants differed from others within skill class.

[16] The results are qualitatively similar in regressions that exclude those under 24 years of age.

[17] Results are robust to the inclusion of birth year fixed effects.

[18] For example, those born in the North region are significantly taller than those in other regions, consistent with a diet richer in protein, which leads to taller individuals (Steckel 2009).

Results of the selection regressions comparing the sample of male migrants to the sample of males in the Mexican military are presented in Table 2.2, Columns (1)–(4). First, our estimates reveal expected patterns in heights. For example, adults in the 18–20 year age bin were shorter than adults over 24 years old, while those in the 21–23 year age bin were only slightly shorter and the difference loses statistical significance, consistent with human growth patterns. Also, those in the skilled class were taller than those in the unskilled class, while those in the professional class were taller than individuals in either of the other two occupational skill classes, supporting the claim that height is correlated with income, productivity, and cognitive ability. Second, the result of positive selection as measured by height holds in each of these specifications, with the migrant sample measuring four to five centimeters taller than those individuals in the military sample. Migrants were taller than those in the military even though they reported lower-skilled occupations. Finally, in Column (4) we show that migrants were taller than those in the military within occupational skill class. Although the descriptive statistics show that those who chose to migrate tended to come from lower-skilled occupations, we find that within skill class the individuals who migrated tended to be taller than those who were in the military.

Table 2.2—1920 Selection Regressions Comparing Migrants to the Military and Passport Samples

	(1)	(2)	(3)	(4)	(5)	(6)
Comparison Sample:	Military	Military	Military	Military	Passport	Passport
Migrant	4.831***	5.062***	4.118***	4.160***	–1.484***	–1.432***
	(0.147)	(0.157)	(0.191)	(0.192)	(0.23)	(0.268)
Age, 18-20 years	—	–2.682***	–2.593***	–2.529***	—	–0.568
		(0.291)	(0.284)	(0.284)		(0.553)
Age, 21-23 years	—	-0.337	–0.278	–0.240	—	0.2
		(0.211)	(0.21)	(0.209)		(0.286)
Decade of birth, 1850	—	0.352	–0.445	–0.511	—	–0.857
		(0.917)	(0.886)	(0.83)		(1.288)
Decade of birth, 1860	—	–1.368**	–1.329**	–1.498**	—	–0.225
		(0.628)	(0.616)	(0.609)		(0.702)
Decade of birth, 1870	—	–0.912**	–0.866**	–0.920***	—	–0.158
		(0.354)	(0.346)	(0.347)		(0.547)
Decade of birth, 1880	—	–0.545*	–0.361	–0.381	—	0.184
		(0.279)	(0.272)	(0.271)		(0.512)
Decade of birth, 1890	—	–0.533**	–0.426*	–0.439*	—	0.491
		(0.231)	(0.225)	(0.225)		(0.487)
Born, Center region	—	—	1.033***	0.967***	—	—
			(0.346)	(0.343)		
Born, Bajio region	—	—	2.608***	2.652***	—	—
			(0.354)	(0.352)		
Born, North region	—	—	4.261***	4.300***	—	—
			(0.365)	(0.364)		
Skilled	—	—	—	0.924***	—	—
				(0.204)		
Professional	—	—	—	1.830***	—	—
				(0.429)		
Constant	163.8***	164.7***	162.6***	162.3***	170.1***	169.9***
	(0.108)	(0.211)	(0.365)	(0.367)	(0.206)	(0.417)
Observations	7,555	7,555	7,555	7,555	4,920	4,920
R-squared	0.124	0.138	0.165	0.169	0.01	0.014

* = Significant at the 10 percent level.
** = Significant at the 5 percent level.
*** = Significant at the 1 percent level.
Notes: Robust standard errors are in parentheses. The omitted categories are those over age 24, those born prior to 1850, those born in the South region, and unskilled workers.
Source: Border crossing manifests and López-Alonso (2003).

We also present in Table 2.2 the results of selection regressions comparing the sample of male migrants to the sample of males applying for Mexican passports in Columns (5) and (6). Column (5) again shows a simple comparison of means between migrants and passport applicants, while Column (6) includes controls for ages less than 24 years and decade of birth. Those in the migrant sample were, on average, just under a centimeter and a half shorter than those in the passport sample. Given that the difference in height is quite small and the fact that those holding passports probably came from the upper end of the distribution in Mexican society, this is additional evidence consistent with a pattern of positive selection into Mexican migration in 1920.

Robustness Checks

We present alternative specifications in Table 2.3 to address concerns about the Mexican Revolution and the effect of the 1917 literacy test requirement. It is possible that the self-selection result is not due to economic forces but rather because of refugees fleeing the Mexican Revolution. We test for differences in the pattern of selection by region of birth to determine whether positive selection was strongest in the North where fighting continued, and show the results in Table 2.3. Similar to the result found for the whole sample in the main specification, migrants born in the northern parts of Mexico were just over four centimeters taller than non-migrants and did not exhibit an abnormal or extraordinary pattern of selection that would give cause for concern.

Table 2.3—Alternative Sample Specifications for Migrant Selection Regressions

Sample Specification	Migrant	Sample Specification	Migrant
Baseline	4.160***	Only literate	3.356***
	(0.192)		(0.379)
Only North region	4.265***	Only unskilled	4.015***
	(0.335)		(0.213)
Only Bajio region	3.740***	Only skilled	4.294***
	(0.255)		(0.458)
Only Center region	5.916***	Only professional	5.274***
	(0.606)		(0.97)
Only South region	7.638**	—	—
	(3.638)		

* = Significant at the 10 percent level.
** = Significant at the 5 percent level.
*** = Significant at the 1 percent level.
Notes: Robust standard errors are in parentheses. The dependent variable in each regression is height. Each regression includes the full set of controls for age, location of birth, and occupation, but only the coefficient on migrant is reported. The comparison group is the military sample.
Source: Border crossing manifests and López-Alonso (2003).

It is possible that the pattern of positive selection resulted from the literacy test imposed in 1917, which could have barred low-quality Mexican migrants. While the degree of enforcement of the literacy test for Mexican migrants in 1920 is ambiguous as discussed earlier, we compare our sample of migrants to a subsample of 3,884 military deserters for whom we have literacy data, recognizing that there is a difference in how literacy is determined in the migrant and military samples. The literacy test required the migrant to read and write a paragraph of 25 words in a language of his choosing (Goldin 1994), while literacy in the military sample was determined by whether the soldier could sign his name (López-Alonso and Condey 2003). Our finding that migrants were positively selected still holds when comparing literate samples, and literate migrants were more than three centimeters taller than their counterparts in the military.

Our results indicate that documented migrants to the United States in 1920 were positively self-selected from the home distribution but does not account for undocumented entry. Bloch (1929) estimates that roughly 111,000 undocumented individuals entered the United States over the decade ending in 1920.[19] Using this number in combination with the official statistics for migration in the 1910s, a back of the envelope calculation suggests that the average undocumented migrant would need to have been 154.29 centimeters tall (9.5 centimeters shorter than the average male in the military and 14.5 centimeter shorter than the average documented migrant) to erase the height advantage over the military.[20] This means that even though institutional constraints could cause negatively self-selected individuals to migrate unofficially, it is unlikely that undocumented migration would cause a reversal of our positive selection result.

Accounting for Return Migration

Selection into Return Migration

Measuring just the selection into migration is not sufficient to understand its long-term impact, especially when return migration was prevalent as in the case of Mexico. Even though migrants were positively self-selected from the Mexican population, return migrants could be differentially selected from the overall set of migrants, changing the quality of the stock of

[19] This estimate in Bloch (1929) is based on estimates of the Mexican-born population in the United States found in official statistics. The Mexican-born population used is very similar to estimates made from IPUMS microdata (Gutmann et al. 2000; Gratton and Merchant 2013).

[20] The official migration statistics for the United States show that 219,004 individuals entered the country legally from Mexico from 1911 to 1920. Thus, the total flow from Mexico for the decade was 330,004, with undocumented entrants accounting for 33.6 percent and documented entrants accounting for 66.4 percent of that flow. If we use a weighted average of documented and undocumented migrants to measure selection, we can calculate how short the average undocumented migrant would need to be to erase the 4.83 centimeter advantage over the military.

migrants that remained in the United States permanently and the quality of the stock of labor in Mexico (Borjas 1985; Borjas and Bratsberg 1996).

Whether migrants who made the decision to return were positively or negatively self-selected from the migrant population is ambiguous. One possibility is that most migrants were "target earners" and returned when enough was saved to invest in capital back home, leaving their quality relative to permanent migrants unclear (Mesnard 2004; Angelucci 2012). Alternatively, if return migrants were those who failed in the labor market (Abramitzky et al. 2014), then return migrants would have been negatively self-selected.

Another possibility is that return migrants did not make the decision on their own and were not voluntarily "self"-selected, but were forcibly removed by federal officials as the labor market tightened at the onset of the Great Depression. Historians have placed emphasis on the injustices surrounding mass deportations of Mexicans, with some estimating that more than one million Mexicans, including children and U.S. citizens, left the United States either forcibly or under the threat of removal (Balderrama and Rodriguez 2006). There is a debate, however, over the size of the dramatic fall in the Mexican population during the 1930s and whether the decrease was due to deportation or voluntary departure (Gratton and Merchant 2013; Taylor 1934). Much of the mass departure could simply have been a result of the worsening economic conditions.

Most of this massive outflow of Mexicans occurred later during the 1930s, outside the years of this study, but there was a significant southward movement in the late 1920s. Some of this outward flow was due to official deportations under warrants, which increased almost 400 percent from 1,751 in 1925 to 8,438 in 1930 (Reports of the Commissioner General of Immigration 1925, 1930). This number of deportations in 1930 was larger than the 6,296 Mexicans leaving voluntarily, according to U.S. statistics. Mexican statistics, which are more

reliable than U.S. data, suggest that deportations may not have been as important. According to Mexican sources, 70,129 individuals returned during 1930, making official deportations a much smaller percentage of total repatriations (Hoffman 1974; Taylor 1929).[21] However, many more Mexicans may have left under the threat of deportation rather than being legally deported. Although the importance of deportations is under debate, the selection of return migrants on height could be altered by deportation pressures, depending on who was pressured to leave or forcibly removed.

Linked Sample

To estimate the selection of return migrants, we link our sample of 3,671 migrants forward to the 1930 United States Census for a sample of permanent migrants, and forward to the 1930 Mexican Census to get sample of return migrants. The link to the 1930 United States Census is based on four characteristics: first name, last name, year of birth, and country of birth (Mexico). We also link our sample to the 1930 Mexican census based on the same four characteristics, but are able to match on state of birth in Mexico. We follow the iterative matching procedure similar to Abramitzky, Boustan, and Eriksson (2014).[22] In order to limit bias from transcription errors, we also standardize names using the Double Metaphone algorithm.[23]

Our linking strategy produces a set of migrants who are uniquely linked to the United States Census or to the Mexican Census, linked to multiple people in the same census, not linked

[21] One significant discrepancy between the two sources is that Mexico enumerated every border crossing (including, for example, day trips), while the United States only include those who planned to leave permanently (Taylor 1929).

[22] A detailed description of the matching procedure as well as the linking matrix can be found in the online appendix.

[23] We use Ancestry.com to perform the linking process.

to either census, or linked to both censuses. Failure to link to either census is most likely due to death, name change, or transcription error, while linking to both censuses or multiple times to the same census is likely due to extremely common names. These groups are dropped from the sample. From the original 3,671 migrants, we have a sample of 632 individuals uniquely linked to the 1930 Mexican Census and 798 uniquely linked to the 1930 United States Census. [24]

There are 632 return migrants out of a total 1,430 uniquely linked migrants, which yields a 44.2 percent return rate after ten years of stay. This rate is likely an upper bound for the true rate of return since transcription error and name changes were more likely to occur in the United States. It is likely that transcription errors were more prevalent in the United States than in Mexico as Mexican enumerators were more familiar with Spanish names. Further, names changes were more likely to occur in the United States as some migrants anglicized their names to gain favor in the labor market (Biavaschi et al. 2013). By comparison, the return migration rate for males calculated with administrative data for the decade from 1920 to 1930 was approximately 13.3 percent.[25] However, these administrative records probably undercounted out-migrants and therefore provide a lower bound on out-migration rates (Bandiera et al. 2013; Taylor 1929).

[24] In addition to these matches, there are 1,765 migrants who are unlinked and 261 matched to both censuses. The enumeration date for the United States census was 1 April 1930, and the enumeration date for the Mexican Census was 15 May 1930, so it is possible that migrants left in between dates to be counted in both countries. However, given that migrants were already in the United States for ten years, this is unlikely.

[25] This is calculated as the total number of emigrants from 1921–1930 over the at-risk population to return home during the 1920s, given in proxy by the numbers of immigrants from 1916–1925 (since most migrants leave from the past five years). This rate formula is similar to the repatriation rate in Gould (1980) but does not correct for non-immigrants and non-emigrants since our migrant sample only contains immigrants and not the other categories.

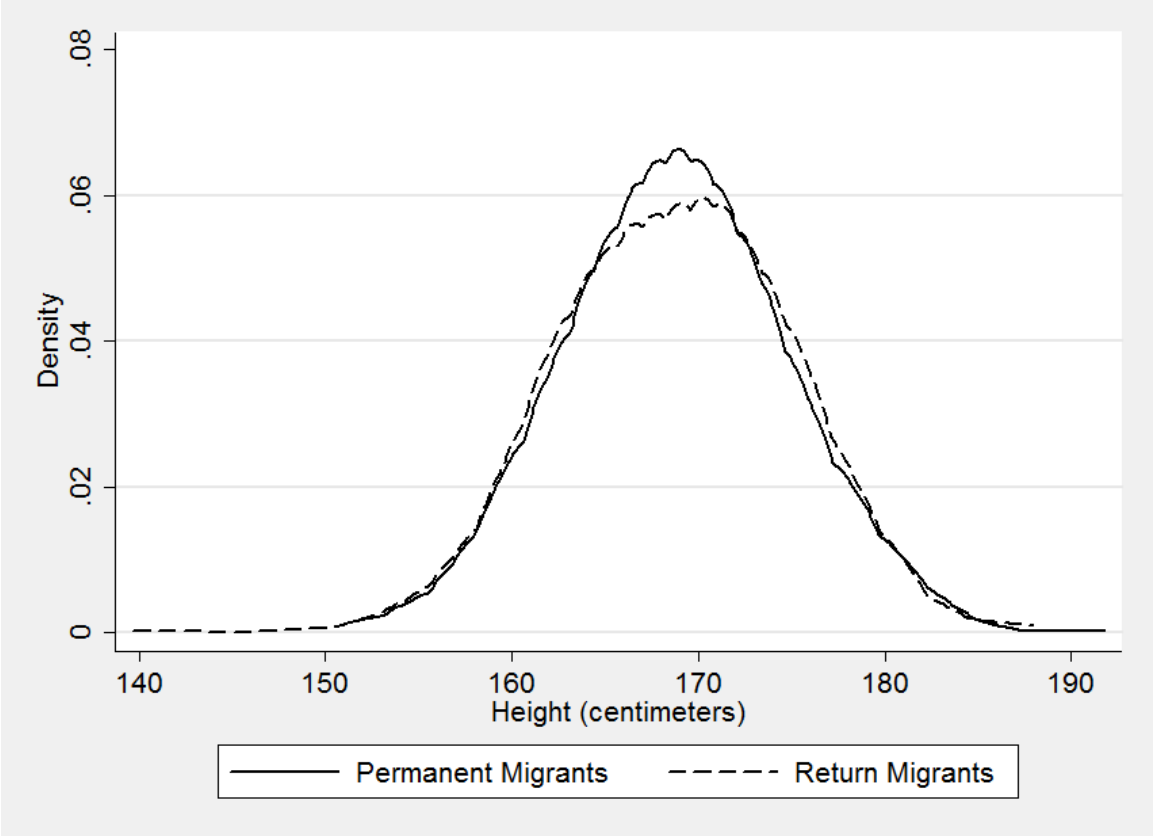
Despite the fact that permanent migrants and return migrants ended up in different countries, their characteristics upon arrival, as shown in Table 2.4, were remarkably similar. Return migrants and permanent migrants were statistically indistinguishable in terms of age, marital status, and cash on hand at arrival. Perhaps surprisingly, there was no difference in network connections, which could have supported migrants and altered return behavior. Importantly, there was also no statistically significant difference in heights, which suggests that return migrants were not differentially selected from the migrant population (see Figure 2.5).

Table 2.4—Summary Statistics for Permanent and Return Migrants

Variables	Permanent Migrants	Return Migrants	Difference
Height (centimeters)	168.7	168.7	–0.00623
	(5.943)	(6.126)	
Age at arrival (years)	27.77	27.88	0.112
	(8.720)	(8.916)	
Unskilled	0.855	0.888	0.0330*
	(0.353)	(0.316)	
Skilled	0.113	0.0854	–0.0273*
	(0.317)	(0.280)	
Professional	0.0326	0.0269	–0.00568
	(0.178)	(0.162)	
Literate	0.994	0.997	0.00310
	(0.0790)	(0.0562)	
Married	0.439	0.472	0.0329
	(0.497)	(0.500)	
Single	0.543	0.509	–0.0331
	(0.498)	(0.500)	
Widowed	0.0188	0.0190	0.0002
	(0.136)	(0.137)	
Headed to California	0.0877	0.0633	–0.0244*
	(0.283)	(0.244)	
Headed to Texas	0.799	0.831	0.0312
	(0.401)	(0.375)	
Headed to Arizona	0.0739	0.0633	–0.0106
	(0.262)	(0.244)	
North	0.256	0.225	–0.0310
	(0.436)	(0.418)	
Bajio	0.707	0.764	0.0575**
	(0.456)	(0.425)	
Center	0.0376	0.00949	–0.0281***
	(0.190)	(0.0970)	
South	0.000	0.00158	0.00158
	(0.000)	(0.0398)	
Meeting no one	0.846	0.860	0.0124
	(0.361)	(0.348)	
Meeting friend	0.00922	0.0100	0.00078
	(0.0957)	(0.0997)	
Meeting relative	0.144	0.129	–0.0149
	(0.351)	(0.335)	
Cash on hand ($)	29.24	34.11	4.87
	(92.26)	(183.3)	
Observations	798	632	—

* = Significant at the 10 percent level.
** = Significant at the 5 percent level.
*** = Significant at the 1 percent level.
Notes: Standard deviations are in parentheses. Proportions are reported unless otherwise noted. Permanent migrants are those migrants linked to the 1930 U.S. Census and return migrants are those linked to the 1930 Mexican Census.
Source: Border crossing manifests.

Figure 2.5—Heights: Permanent and Return Migrants



Notes: Observations below 140 cm in height are dropped, although results are unchanged if they are included. Permanent migrants are those migrants linked to the 1930 U.S. Census and return migrants are those linked to the 1930 Mexican Census.
Source: Migrant heights are from border crossing manifests.

Return migrants and permanent migrants were not similar in every way. Migrants born in the Center region were more likely to be permanent migrants, while those born in the Bajio region were more likely to be return migrants.[26] Those who listed their intended destination as California were least likely to become return migrants. The further distance between sending states and California likely increased the costs of returning, lowering return rates (Borjas and Bratsberg 1996). In addition, return migrants were slightly more likely to be unskilled, although the magnitude of this difference is small and only marginally statistically significant. While the

[26] It is possible that migrants moved back and forth across the border multiple times. The Report of the Commissioner General of Immigration in 1908, the closest report to the 1920s with available information, shows that 22.5 percent of arriving Mexican immigrants had been in the United States previously.

difference in occupational class suggests that return migrants were negatively selected on occupation, it is unknown whether occupation was intended or previous occupation, leaving their true position in the skill distribution unclear.

Estimating Selection into Return Migration

We revisit the observation from Table 2.4 and Figure 2.5 that permanent and return migrants had similar heights (168.7 centimeters) and test whether this result holds when controlling for age and region of birth. Specifically, we pool the return and permanent migrant samples and regress height on an indicator for whether the migrant was a return migrant.

The results of the regression of height on return migration status are presented in Panel A of Table 2.5. A simple correlation in the first column shows that return migrants were 0.006 centimeters shorter than permanent migrants, a statistically and economically insignificant difference. In regressions including age and region of birth fixed effects, heights of return and permanent migrants continue to be statistically indistinguishable. Although occupational structures upon arrival were slightly different between return and permanent migrants, once controlling for occupational structure there was still no differential selection of return migrants. Panel B shows alternative sample specifications for samples including only unskilled, skilled, or professional workers, and also including only people born in the North, Bajio, or Center region. All regressions show no economically or statically significant differences between return migrants and permanent migrants in terms of height. Overall, our analysis suggests that return migrants and permanent migrants had similar levels of human capital.

Table 2.5—Regression Results for Return Selection

	(1)	(2)	(3)	(4)	(5)	(6)
Panel A:						
Sample	All	All	All	All	Age at Arrival<40	Cross-Link
Return migrant	–0.00623	–0.0267	0.0586	0.0744	–0.0886	0.00594
	(0.322)	(0.323)	(0.321)	(0.321)	(0.339)	(0.303)
Decade of birth	—	X	X	X	X	X
Age bins	—	X	X	X	X	X
Region of birth	—	—	X	X	X	X
Occupational class	—	—	—	X	X	X
Observations	1,430	1,430	1,430	1430	1,268	1,599
Panel B:						
Sample	Unskilled	Skilled	Professional	North	Bajio	Center
Return migrant	0.0949	–0.211	0.193	0.260	0.0433	–2.046
	(0.340)	(1.128)	(1.808)	(0.673)	(0.370)	(3.864)
Decade of birth	X	X	X	X	X	X
Age bins	X	X	X	X	X	X
Region of birth	X	X	X	N/A	N/A	N/A
Occupational class	N/A	N/A	N/A	X	X	X
Observations	1,243	144	43	346	1,047	36

* = Significant at the 10 percent level.
** = Significant at the 5 percent level.
*** = Significant at the 1 percent level.
Notes: Robust standard errors are in parentheses. The dependent variable in each regression is height. Each regression has different sample specifications. Permanent migrants are those migrants linked to the 1930 U.S. Census and return migrants are those linked to the 1930 Mexican Census.
Source: Border crossing manifests.

Robustness of Results for the Linked Sample

Linked samples may not be representative of their underlying populations because the links are not made at random. Specifically, a migrant is more likely to be connected if he has a

unique name, and he will not be linked if there was a death, name change, or transcription error. While transcription error was likely random with respect to height, name changes could have occurred more often for migrants intending to reside permanently in the United States. If those migrants were more adept at English or at acquiring United States specific human capital, then our linked sample would underestimate the quality of permanent migrants.

Another concern is that mortality might bias results if taller individuals are healthier and likely live longer. We restrict the sample to migrants arriving under the age of 40 who were less likely to die within ten years. The results, shown in Column (5) of Panel A of Table 2.5, indicate that even with the restricted sample we find no differential selection into return migration.

Lastly, it is possible that households in Mexico reported migrants in the United States as members of the household to enumerators. This error would imply that links to both the United States and Mexican censuses were actually people who resided in the United States. We include 169 migrants who were uniquely linked to both the United States Census and the Mexican Census in our sample of permanent migrants and regress height on return migrant status. The result reported in Column (6) in Panel A of Table 2.5 confirms that return migrants defined in this manner were not differentially selected from the population.

Conclusions

In the early twentieth century, the United States labor market drew the taller workers from Mexico. Mexican migrants were over four centimeters taller than members of the Mexican military and only one and a half centimeters shorter than passport holders. The fact that Mexican migrants were positively self-selected is consistent with Borjas (1987) and Chiquiar and Hanson (2005) where migrants had high costs of travel or faced credit constraints, limiting the ability of

lower-quality Mexicans to migrate. This positive self-selection represents a "quality drain" or "productivity drain" from Mexico to the United States.

From our linked sample we find that return migrants were not differentially selected. Taller individuals migrated from Mexico, and migrants observed years later in the United States were just as tall. Time and return migration did not impact the quality drain on Mexico or the quality gain to the United States that resulted from positive self-selection into migration from Mexico.

This lack of selection on height for Mexican return migrants is in contrast to *negative* self-selection of most European return migrants during the early 1900s (Abramitzky et al. 2014).[27] It is possible that this result could be due to deportation or the threat of deportation, which forced different people out of the United States than would otherwise leave and thus likely altered the selection of return migrants. If the United States randomly deported Mexicans without respect to human capital or skill then this would lead to return migrants having the same human capital as permanent migrants, which we find. While purely economic forces might lead to the lowest performing migrants leaving the country, deportation policies expel both high- and low-quality migrants. However, other reasons (for example, proximity to Mexico) could also explain the different patterns in return migrant selection between Europeans and Mexicans.

A pattern of positive self-selection of Mexican migrants affects both Mexico and the United States in a variety of ways. The United States received the relatively more productive Mexican workers, and these workers would assimilate into the labor market more quickly than negatively selected migrants. For Mexico, the taller laborers, the taller miners, and the taller farmers left

[27] This non-negative selection is verified by official U.S. statistics which show that Mexican return migrants were positively self-selected on occupation in the year 1930, but this could be due to deportation pressures or limitations in the data (Ward 2014).

Mexico to work in the United States, draining Mexico of human capital and lowering the productivity of the average Mexican worker. However, the total effect on Mexican development is unclear as migration affects not only labor markets, but also can influence home country savings and investment by increasing remittances. It further affects the home country by changing political institutions if migrants return back home, by increasing technological diffusion with the transmission of techniques or capital goods across borders, or by influencing future migration with the strengthening of networks. This study provides a valuable step to better understanding the various effects of historical migration from Mexico to the United States on the economies of both nations.

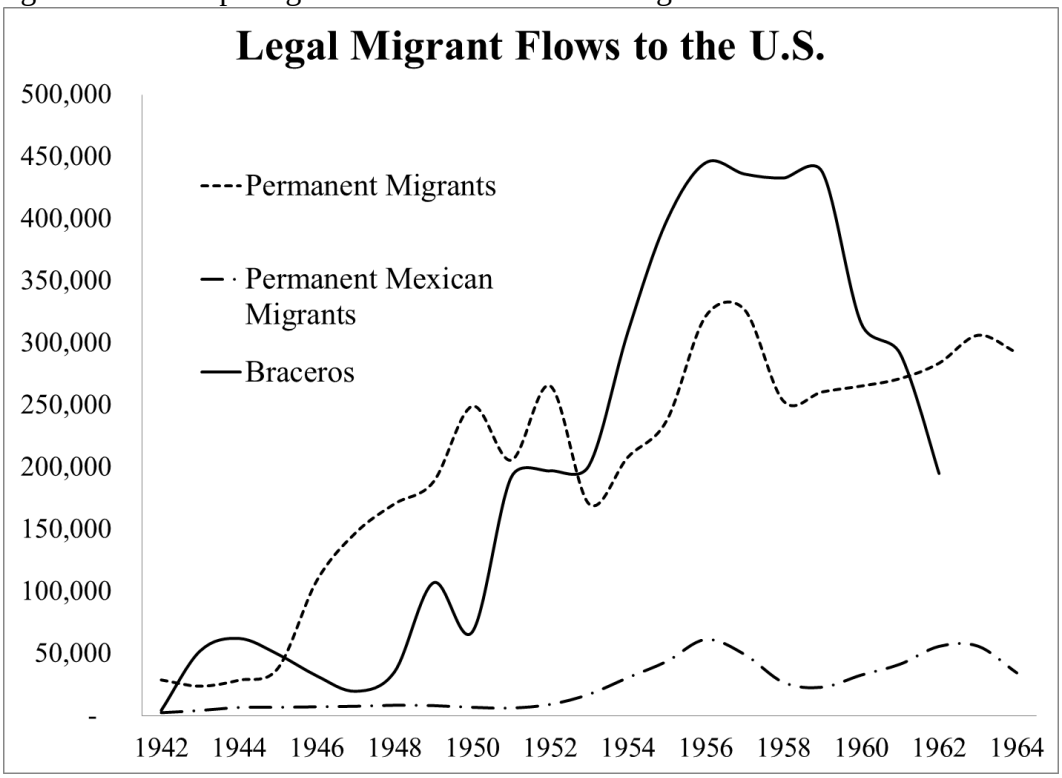
CHAPTER 3

THE BRACERO PROGRAM AND EFFECTS ON HUMAN CAPITAL INVESTMENTS IN MEXICO, 1942-1964

Introduction

The Bracero Program defined migration policy between the United States and Mexico for over two decades. Lasting from 1942 until 1964, the Bracero Program allowed over four million Mexican agricultural workers to migrate legally, making it the largest guest worker program in the migration history of the United States. In fact, flows of bracero migrants during that time exceeded permanent, legal migrant flows from all countries to the United States many times over. Figure 3.1 shows the magnitude of bracero flows relative to permanent, legal flows to the U.S. from Mexico and permanent, legal flows to the U.S. from the entire world. This was a guest worker program on a massive scale.

Figure 3.1—Comparing Bracero Flows to Other Migrant Flows to the United States



Source: Various sources; Available upon request.

In this paper I analyze the impact of the Bracero Program on economic development and public good provision in Mexico. I examine whether or not bracero migration encouraged investments in education and human capital, both by households and by the state. Specifically, I utilize a new, hand-collected dataset to analyze the causal effect of state-level bracero out-migration on various state-level education outcomes, including primary school enrollments, post-primary school enrollments, provision of primary schools, and education spending by state governments. Unique institutional features of the program allow for the use of an instrumental variables strategy and the estimation of causal impacts of the program.

For Mexico, the Bracero Program served to alter the trajectory of economic development in those communities that sent braceros. Bracero remittances created positive income shocks for households in the sending communities. Temporary, positive income shocks from income earned abroad can increase household investments, especially in credit-constrained environments (Yang, 2008). Income earned through migration can ease a liquidity constraint, allowing parents to cover high fixed costs of education and substitute away from child labor toward the education of children (Baland and Robinson, 2000). Empirical studies have found that migration and remitted income have caused increases in childhood health (Hildebrandt and McKenzie, 2005) and educational outcomes for children (Hanson and Woodruff, 2003; Antman, 2012), at least in the modern context. Higher earning potential abroad, however, could also have a detrimental impact on human capital investments. If the higher earnings abroad as agricultural labor lowered the return to Mexican education by offering a lucrative career path that did not reward additional years of school, then it could cause children (especially boys) to obtain less education (McKenzie and Rapoport, 2011).

The Bracero Program changed dramatically the family structure within the household as fathers were gone and mothers were in charge for some period of time (Rosas, 2011). The absence of the father in the household can negatively impact children and be detrimental to educational outcomes for children (Rosas, 2011; Sandefur and Wells, 1997). If fathers are not home, children may have to leave school to work and replace lost income (i.e., the father's absence might tighten the household income constraint). However, changing the bargaining position in a household bargaining model might shift household investment more toward a mother's preferences, and empirical evidence shows that when mothers are in charge of resources there are positive impacts on children, especially on girls (Duflo, 2003; Antman, 2011; Antman 2015).

Just as the results from the current literature on the impact of migration on education are mixed, the results on the impacts of temporary worker programs are also mixed. Traditional work in the history and sociology literature stresses the negative impact of the Bracero Program, including how it perpetuated illegal migration and did little to increase economic development (Reichert and Massey, 1982; Massey and Liang, 1989), how it disrupted families (Rosas, 2011), and how it provided very little in the way of investment opportunities back home in Mexico (Sandos and Cross, 1983). More recently, however, temporary worker programs have been shown to increase various development outcomes for Pacific Islanders (Gibson and McKenzie, 2010) and bracero migration has been shown to have increased short run investments in new businesses (Kosack, 2014).

Given the ambiguous a priori expectation about the direction of the impact of bracero migration on human capital investment, I take an empirical approach in this paper to identify the effect. I utilize a state-level dataset that I transcribed from the *Anuarios Estadisticos de los*

Estados Unidos Mexicanos to estimate the impact of bracero migration from a given state in a given year on primary school enrollments, post-primary enrollments, primary school provision, and education spending. I employ state and year fixed effects in an ordinary least squares regression to account for any omitted variables that do not vary in a state over time or that are constant across states in a particular year. The estimates, however, are likely to be negatively biased by negative year-to-year shocks that both increase bracero migration and decrease human capital investment. In order to overcome this, I take advantage of unique institutional features of the program and use the distance of a state to the nearest bracero recruitment center in Mexico as an instrument for bracero migration. Instrumental variables estimates are larger than OLS estimates, confirming the negative bias that one would expect. Finally, I utilize individual microdata from the IPUMS sample of the 1970 Mexican Census to investigate heterogeneity in the effect of bracero migration on education by age and by gender.

Utilizing this empirical strategy, I estimate the causal impact of the Bracero Program on human capital investments to be significant and positive. My results indicate that the program indeed increased investments by households in education as states that sent more braceros to the United States also experienced higher levels of primary school enrollments. Likewise, the program also induced greater human capital investments by the state governments. Sending more braceros to the United States caused increases in the state governments' expenditures on education. Decomposing the effect by age and gender reveals two important results. The positive effect exists for children aged nine to thirteen and so works at the marginal years of education just at the latter portion of primary school and the early part of secondary school. The effect is also stronger for girls than for boys, suggesting that mothers might be directing household resources more to their daughters than to their sons.

Identifying the direct benefits of bracero migration, both through household decisions and through decisions by the state to increase the provision of public goods, is important to development policy. If temporary worker programs can be shown to be a valuable tool, they can be used to improve the conditions of developing areas of the world. In the economic history literature, much has recently been written about historical migration (Abramitzky, Boustan & Eriksson, 2010; Armstrong & Lewis, 2009; Ferrie, 1994 & 1997; Greenwood, 2007 & 2008). In the development literature, much has been written about the impacts of migration on sending communities, especially for present day Mexico (Hildebrandt & McKenzie, 2005; McKenzie & Rapoport, 2011; Yang, 2008; Antman, 2012). We know little to nothing, however, about either the impacts of a temporary worker program or of early twentieth century Mexican migration. The work presented here will both increase our understanding of a more complete history of migration and provide a basis for the evaluation of the future use of guest worker programs.

Migration and Education

In theory, migration can have varying impacts on human capital investments and economic development. When credit is available and borrowing is possible, investments in education can be made in advance of the extra returns or extra income that will be realized as a result of that investment. In this case, temporary income shocks will not have any effect on investments unless they are substantial enough to alter permanent income. In a credit-constrained environment, however, investments are sensitive to current income shocks. Higher wages earned from a temporary stint in the United States can ease a liquidity constraint, allowing households to make higher investments in their children's education (Yang, 2008). Models of child labor, closely linked to the credit-constrained argument, can also be used to make predictions about the effect of migration on education. Baland and Robinson (2000) demonstrate

how child labor might be high because imperfect capital markets keep children from transferring higher future earnings to earlier periods of forgone earnings through borrowing. Temporary income shocks for parents might relieve the constraints faced in early childhood, allowing parents to cover the high fixed costs of education and send their children to school instead of putting them in the labor force.

On the other hand, a temporary worker program in place could alter career choices available to young men. In essence, this changes the return to schooling for these men in Mexico. If this new, lucrative career does not reward human capital accumulated in Mexican schools, it could discourage human capital investments.

The disruption to the family unit and the absence of the father also could have negative effects on child development and educational attainment (Sandefur and Wells, 1997). Although, transferring charge of the household to mothers during the father's absence could have positive impacts on education. Antman (2011) shows how shifting the equilibrium in a household bargaining model and giving control of household resources to mothers can improve female educational outcomes relative to male outcomes. Thus, the theoretical effect of bracero migration on childhood outcomes is ambiguous.

There exist empirical studies that specifically investigate the link between human capital investment and migration from Mexico. Hildebrandt and McKenzie (2005) and McKenzie and Rapoport (2011) study the impact of current migration on human capital investment in children, examining health outcomes and educational attainment, respectively. Both papers use the same household survey data from Mexico, and both utilize an instrumental variables strategy that uses historic migration rates as an instrument for current migration rates in order to circumvent the

selection biases inherent in all of these analyses.[28] Using these similar empirical methodologies, Hildebrandt and McKenzie find that migration seems to cause an increase in positive health outcomes for children such as higher birth weights and lower infant mortality, yet McKenzie and Rapoport find that migration reduces educational attainment for both boys and girls. On the other hand, a study by Hanson and Woodruff (2003) finds that children in Mexico that come from households with external migrants in the U.S. tend to complete more years of schooling. They conclude that remittances from migration must relax the household income constraint to allow for greater educational attainment. Thus, in terms of human capital investment, it is not immediately obvious whether migration from Mexico has a positive or negative impact on populations in the sending communities.

Gibson and McKenzie (2010) present evidence that temporary worker programs can have significant, positive development impacts. They show that a recent program that brings Pacific Islanders to work temporarily in New Zealand has positive effects on income, consumption, durable goods consumption and subjective standards of living. What remains to be shown is if this type of program can improve investments in human capital, and whether the positive impacts are generalizable to the unique relationship between the United States and Mexico.

Considerable work is done in the sociology and demography literature to better understand the implications of programs like the Bracero Program on migrant populations. Reichert and Massey (1982) argue that, although these programs may provide significant sums of money for migrants to remit home, they do little to increase actual economic development in the sending communities and they are not truly temporary in nature. In fact, they describe how guest worker programs actually perpetuate migration, both legal and illegal, by inducing a reliance on

[28] For further information regarding the use of historic migration rates as an instrument for current migration rates, see Woodruff and Zenteno (2007).

income that can only be earned abroad. Another study uses a unique micro dataset to test these theoretical hypotheses of the inherently "non-temporary" nature of these so-called temporary worker programs (Massey & Liang, 1989). The authors find that braceros were more likely to make repeated trips to the United States, that children of braceros were likely to become migrants, and that a significant portion of braceros eventually settled permanently in the United States. To my knowledge, this is the only study that uses micro data to systematically and empirically understand the individual characteristics of braceros. Finally, Sandos and Cross (1983) suggest that bracero earnings were unlikely to be used in investment given the lack of such opportunities and so were more likely used in a household's consumption. It remains to show whether or not the positive income shocks from remittances did actually increase human capital investments.

In addition to remittances, many thought that the Bracero Program could have negative effects for children and family life. Rosas (2011) finds that the program led to the separation of children and caretakers, thereby negatively impacting the psychological and physical well-being of the family and the children. This disruption could lead to negative impacts for the education of the children of braceros. On the other hand, it could be that female heads of household are more likely to invest in their children and so the absence of fathers will increase the educational opportunities for children. Again, the effect of the Bracero Program on household decisions related to education is not clear.

Historical Setting

The Bracero Program

As the United States found herself heavily involved in World War II, farmers called on the United States government to take action. The war both greatly reduced the labor supply and

increased demand for agricultural products. The farmers perceived a labor shortage and lobbied the government to allow the importation of migrant labor from Mexico for relief. Mexico decided to take an active role in the process and the resulting immigration program was a bilateral effort by both the United States and Mexico.[29]

The first major agreement was reached on July 23, 1942 by representatives of both the United States and Mexican governments, and put into effect by an exchange of diplomatic notes on August 4, 1942 (EAS 278, p.1069). This agreement established a number of terms and conditions under which the program was to operate and continued in force until December 31, 1947.[30] After negotiations between delegates from both countries, a temporary agreement was reached on February 17, 1948 and signed into force by an exchange of diplomatic notes on February 21, 1948 that allowed for the continuation of the program. This agreement, however, was terminated by the Mexican government, pursuant to notice given on October 18, 1948 (TIAS 1968, p.1232). After further negotiation, a new agreement was established on July 29, 1949 and entered into force by an exchange of diplomatic notes on August 1, 1949, which continued until it was terminated by Mexico on June 15, 1951 (TIAS 2260, p.1258). After the passage of Public Law 78 by Congress on July 12, 1951 which institutionalized the Bracero Program, transferred

[29] I refer to the collection of agreements between the United States and Mexico for the period 1942 to 1964 as the Bracero Program. In 1917, responding to similar shortages caused by the United States entering WWI, some provision was made for the contracting of labor from Mexico. Specifically, a proviso was placed in the immigration legislation of 1917 (which prohibited entry by immigrants contracted for labor) that allowed the Commissioner General of Immigration to bypass the requirements for entry and permit temporary migration by laborers from Mexico if conditions in the labor market should so require it. This earlier episode is sometimes referred to as the "First Bracero Program," (Scruggs, 1960).

[30] The agreement was relatively unchanged over this period, although there was a revision entered into force by an exchange of diplomatic notes on April 26, 1943 (EAS 351, p.1129).

control to the Secretary of Labor, and provided the legislative foundation for the United States to keep negotiating bilateral labor agreements with Mexico, talks between Mexico and the United States continued (Craig, 1971). On August 11, 1951, a new agreement was entered into force by an exchange of diplomatic notes (TIAS 2331, p.1940). Despite several amendments, this agreement remained in force until December 31, 1964, a date agreed upon for termination by an exchange of diplomatic notes (TIAS 5492, p.1804).[31]

From the Mexican point of view, the Bracero Program was controversial. Many interest groups in Mexico viewed the temporary worker program as particularly attractive. In terms of economic development, the program promised the easing of rural unemployment, the accumulation of substantial savings for poorer households from earnings abroad, and the import of agricultural skills and technology from the United States (Craig, 1971). Moreover, this was an opportunity for Mexico to ingratiate herself politically to the United States, with the beginnings of the Bracero Program serving as her part in the war effort. Lastly, from a balance of payments perspective, this program was the opportunity for the influx of American dollars from bracero remittances (Craig, 1971). On the other hand, opposition came from groups concerned that labor shortages resulting from sending agricultural labor abroad would stunt Mexico's own agricultural development. As Ezequiel Padilla, Minister of Foreign Affairs in Mexico, pointed out to American Ambassador, George Messersmith:

> "This Department considers itself under the obligation, first of all, of pointing out the importance for the country at present moment of conserving intact its human material, indispensable for the development of the program of continental defense to which the Government of Mexico is jointly obligated and in which, by very urgent recommendation of the Head of the Executive Power, the intensification of activities and especially agricultural production take first rank," (EAS 278, p.1069).

[31] Alston and Ferrie (1993) argue that the program ended in 1964 with agricultural advancements (the mechanization of cotton) and a withdrawal of political support by Southern politicians.

Not only that, but other groups worried that such a program would disrupt family life, expose the migrant to an immoral life and to Protestantism, engender greater economic dependence on the United States for the Mexican government, expose the migrant to politically radical ideas, and subject the Mexican citizen to racial discrimination and the humiliation of performing menial tasks (Craig, 1971). Thus, even before the program began, it was not obvious whether it would affect the country in a positive or negative way.

Although the rules governing the migration of braceros from Mexico to the United States changed slightly as the agreements were renegotiated, the general process to migrate remained relatively stable. First, growers or grower associations in the United States would certify with the United States government that a labor shortage existed and would provide the prevailing wage for the specific type of work in the region. Upon agreement by the appropriate agency in the United States government, an order would be sent to the Mexican authorities requesting a specific number of braceros for the work.

In Mexico, braceros arrived at the recruitment centers through one of two ways. Some were the recipients of permits or *permisos,* distributed to local mayors to hand out to individuals in their communities, who came to the recruitment centers with their permit promising a contract in hand. Others, known as *libres*, traveled to the recruitment centers without permits to wait in line with the hopes of being selected to receive a contract. Either way, the migrant had to pay his own way to get to the recruitment center in Mexico. Once selected to receive a contract, the bracero was transported from the Mexican center to a reception center in the United States and then to the place of employment, all at the expense of the employer. After performing the job for the time period for which they were contracted at the specified wage (including several other

benefits such as insurance, guaranteed work, food and housing, etc.), the worker was transported back to the recruitment center in Mexico at the expense of the employer.

Education in Mexico

In the post-revolutionary period, Mexico took several steps to socialize and centralize the provision of basic education. Article 3 of the new Constitution of 1917 guaranteed that education be free and nonreligious.[32] The *Secretaria de la Educacion Publica (SEP)* was created in 1921 to oversee all matters relating to education. The federal government was in charge of the training of new teachers, setting the curriculum, and providing the majority of the resources for the expansion of education in the country (Andrade de Herrara, 1996). The Constitution also provided that primary schooling, in addition to being free and nonreligious, was compulsory and mandatory (Santibanez, Vernez & Razquin, 2005). It is important to note, however, that mandatory referred to the fact that the government had to provide the primary education free of charge, not that parents had to send their children (Helper, Levine & Woodruff, 2006). Despite the fact that much of Mexico's education policy during the mid-twentieth century was highly centralized, states and municipalities did collect revenues to spend on education. Furthermore, the transfers from the federal government to the state governments were dependent on the amount of tax revenues collected in the state (Rodriguez, 1997; Helper et al., 2006).

Empirical Strategy

The number of braceros that leave each state in Mexico varies over the 23 year lifespan of the Bracero Program. I utilize this variation across states and over time to identify the impact

[32] The article was amended in 1933 to read that education was to be socialist. The article was further amended in 1946 under President Camacho to remove references to a socialist education.

of bracero out-migration on the economic outcomes of interest. The biggest challenge in identifying the causal effect of the Bracero Program on any number of outcomes is the selection of states into participation. For instance, if those states that experience the worst economic conditions are more likely to send braceros to the United States, and if these poor economic conditions are likely to be negatively correlated with economic outcomes of interest, then ordinary least squares (OLS) estimates of the impact of the program will be negatively biased.

I employ state and year fixed effects in an effort to overcome this bias. Year fixed effects will control for any potentially confounding factors that affect all Mexican states the same in a particular year. State fixed effects will control for any potentially confounding factors that are time invariant, or that remain constant for a particular Mexican state over the entire sample period. The fixed effects model is given by Equation 1.

$$\log(Outcome)_{S,T} = \beta_0 + \beta_1 \log(Braceros)_{S,T} + \delta_S + \mu_T + \epsilon_{S,T} \qquad (1)$$

It is highly likely, however, that an omitted variable bias remains from time-varying factors that are specific to a given state. If, for example, high unemployment in a given state in a given year is positively correlated with bracero out-migration and negatively correlated with outcomes such as primary school enrollment, then I would expect the fixed effects model to produce biased estimates. As noted previously, if states send more braceros in years when they experience poorer economic conditions (factors that are likely correlated with lower investments in human capital), I would expected the OLS estimates to be negatively biased.

In order to produce causal estimates of the impact of the Bracero Program on educational outcomes in Mexico, I utilize a natural experiment in the institutional features of the program to extract exogenous variation in the out-migration of braceros from a particular state in a given year. Specifically, I use the proximity of a given state to the nearest bracero recruitment center

in Mexico in a given year as an instrument for the number of braceros that leave that state in that particular year.

The instrumental variables approach relies on the validity of two key assumptions. Firstly, it is necessary that the correlation between the instrument and the endogenous variable is sufficiently strong. I provide evidence of a strong first stage relationship between the number of braceros that leave a particular state in a particular year and the proximity of that state to the nearest recruitment center in that year. Secondly, it must be that the instrument is uncorrelated with the error term in Equation 1. This exclusion restriction requires both the instrument to be as good as randomly assigned in the reduced form relationship and the instrument to affect the outcome only through the endogenous regressor. I provide evidence for the validity of the exclusion restriction as well.

Bracero Out-Migration and Proximity to the Nearest Recruitment Center

In order to migrate as a bracero to the United States, a laborer in Mexico had to first travel to a bracero recruitment center in Mexico. A person could meet with a recruiter in his local community and pay to initiate the process to become a bracero. He would then need to travel to the recruitment center at his own expense to complete the process and wait in line to be called for service. Alternatively, he could bypass the recruiter and travel directly to the recruitment center at his own expense to try and become a bracero there. Either way, he had to cover the costs of transportation to get himself from his home to the bracero recruitment center in Mexico (Galarza, 1964; Anderson, 1976).

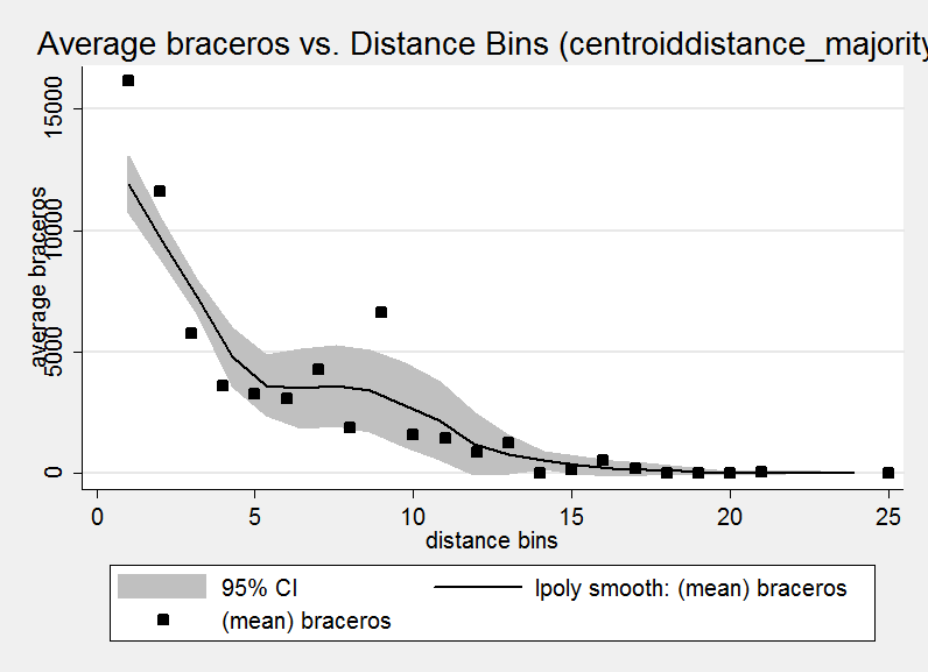
Travel within Mexico at this time was not easy, especially from rural locations. Some prospective braceros walked while others incurred the expense of transportation by bus or other means (Anderson, 1976). Those who were closer in distance to the bracero recruitment center

found it less costly to get there, and so were more likely to get to the center and hence more likely to be contracted to work as a bracero in the United States. Thus, distance to the nearest recruitment center is a real determinant of the number of braceros who leave for the United States.

In Figure 3.2 I provide a visual representation of the relationship between distance and bracero migration. I take the range of distances, divide it into 25 equal bins and graph the average for each bin. I also include a flexible polynomial fit through the data along with the 95% confidence interval. The figure shows a definite negative relationship between the number of braceros that leave a state and the distance to the nearest recruitment center. Those states that are closest to the recruitment center send the most braceros, and the number of braceros leaving declines as the state is located farther away from the center. In the regressions I run, however, I use the log of braceros and state and year fixed effects. To more closely match the actual variation in this specification, I reproduce the same picture in Figure 3.3 with the average of the residuals of the log of braceros (i.e., after state and year fixed effects are removed) against 25 equal bins of distance residuals (i.e., after state and year fixed effects are removed). Again, the figure shows a definite negative relationship between the migration of braceros and distance from recruitment centers, even if it is noisily estimated at the highest distances.[33]

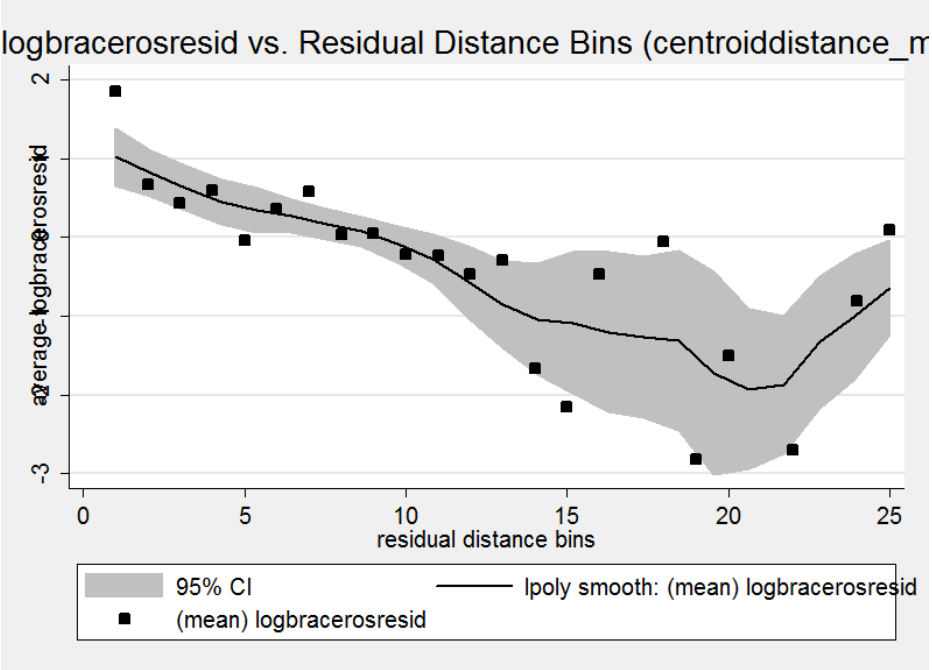
[33] I have redone the analysis with alternate measures of distance and the results are qualitatively unchanged. These results are available upon request.

Figure 3.2—Average Bracero Flow by Distance Bin



Source: Bracero data from *Anuarios*. Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

Figure 3.3—Average Log Bracero Residual by Residual Distance Bin



Source: Bracero data from *Anuarios*. Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

I conduct a more formal test of the first stage relationship between the proximity of a given state in a given year to the nearest recruitment center and the number of braceros that leave that state in that year for the United States using Equation 2.

$$\log(Braceros)_{S,T} = \alpha_0 + \alpha_1 Distance_{S,T} + \delta_S + \mu_T + u_{S,T} \quad (2)$$

This is a regression of the log of the number of braceros who leave a given state in a given year on a measure of the distance of that state to the nearest recruitment center, state fixed effects, and year fixed effects. Table 3.1 shows the result of this estimation.[34]

Table 3.1—First Stage Relationship

	(1)
VARIABLES	logbraceros
centroiddistance_majority	-0.00173***
	(0.000242)
Constant	4.235***
	(0.314)
F Test for Joint Significance	51
Observations	620
R-squared	0.824

Notes: Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1.
Source: Bracero data from *Anuarios*. Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

These results confirm the pattern in Figures 3.2 and 3.3. The closer a state is to a recruitment center in a given year (i.e., the lower the distance between the state and the nearest recruitment center), the more braceros leave that state for the United States in that year. This result is highly statistically significant. An F-test that the excluded instrument is equal to zero is

[34] The first stage results are qualitatively unchanged with alternate measures of distance. Results available upon request.

rejected with an F-statistic equal to 51. This is large enough to be sure that weak instruments will not cause inconsistency in the IV estimates (Bound, Jaeger & Baker, 1995).[35] Thus, the analysis confirms that there is a strong first stage relationship between the number of braceros that leave a particular state in a given year and the proximity of that state to the nearest recruitment center.

The Exclusion Restriction

The second assumption that the instrumental variables strategy requires is that the proximity of a state to the nearest recruitment center in a given year is not correlated with the error term in Equation 1. This exclusion restriction likely holds, given the unique institutional features of the Bracero Program.

What is known as the Bracero Program was actually a series of international agreements that were negotiated between the two nations over the years from 1942 to 1964. Over the 23 year lifespan of the program, the location of the recruitment centers changed (see Table 3.2 for a listing of recruitment centers by date). These changes resulted from negotiations between officials from the Mexican and United States governments. Every time these agreements were either extended or re-negotiated, each side worked hard to include changes that would benefit their own national goals. The international agreements that were signed actually specified the cities where recruitment centers were to be located. Thus, the location of the recruitment centers changed over time, and these changes were the result of bilateral negotiations between the United States and Mexico, not state-level economic conditions.

[35] This is the appropriate threshold when using standard errors robust to heteroskedasticity (i.e., White-corrected standard errors). In the IV regressions that I will estimate, the first stage will be checked with F-statistics that are adjusted for the appropriate level of clustering that I use.

Table 3.2—Recruitment Centers

Date	***Recruitment Centers***
1942	Mexico City
1944	Guadalajara, Jalisco Irapuato, Guanajuato
1947	Zacatecas, Zacatecas Chihuahua, Chihuahua Tampico, Tamaulipas Aguascalientes, Aguascalientes
1-Aug-1949	Hermosillo, Sonora Chihuahua, Chihuahua Monterrey, Nuevo Leon
11-Aug-1951	Aguascalientes, Aguascalientes Guadalajara, Jalisco Irapuato, Guanajuato Monterrey, Nuevo Leon Chihuahua, Chihuahua
19-May-1952	Monterrey, Nuevo Leon Chihuahua, Chihuahua Irapuato, Guanajuato Guadalajara, Jalisco Durango, Durango
10-Mar-1954	Mexicali, Baja California Monterrey, Nuevo Leon Chihuahua, Chihuahua Irapuato, Guanajuato Guadalajara, Jalisco Durango, Durango
14-Apr-1955	Hermosillo, Sonora Mexicali, Baja California Monterrey, Nuevo Leon Chihuahua, Chihuahua Irapuato, Guanajuato Guadalajara, Jalisco Durango, Durango
1-Feb-1962	Monterrey, Nuevo Leon Chihuahua, Chihuahua Empalme, Sonora

Source: Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

Mexico wished to keep the recruitment centers located as far south as possible. Firstly, the great farms of Mexico that fueled much of her agriculture were located in the North. Locating the recruitment centers farther south would help to prevent the Bracero Program from draining the precious supply of agricultural labor in the North that was needed to keep these farms functioning properly (Galarza, 1964; Delano, 2011; Durand, 2007). The possibility that

the Bracero Program would steal much needed labor from Mexico was a real concern of Mexican officials. Mexico could not let the United States' demand for braceros compete with her own demand for agricultural labor, thereby reducing her own agricultural productivity. She had an incentive to keep recruitment centers far away from agribusiness in the North.

Secondly, Mexico was very concerned about the problem of illegal migration to the United States. Recruitment centers located in northern parts of Mexico could lead to illegal migration for those rejected braceros who had already made the expensive trip to the center. It would be very easy for these individuals to cross the border and work illegally in the United States if they could not get a bracero contract (Galarza, 1964). Thus, to try and prevent illegal migration to the United States, Mexico had an incentive to keep the recruitment centers as far south as possible.

The United States, on the other hand, wished to locate the recruitment centers in Mexico as far north as possible. By international agreement, the employer in the United States was required to pay all transport and travel costs of the bracero from the recruitment center in Mexico to the place of employment and back at the end of the contract period (Anderson, 1976).[36] This was explicitly stated in the Individual Work Contract which said:

> "Transportation of the Worker, including transportation from the contracting center to the place of employment and return to the place of contracting, as well as food, lodging and other necessary expenses en route, including up to 35 kilograms of personal articles, but not including furniture, shall be at the expense of the Employer," (TIAS 2260, p.1063)

[36] In the initial phases of the program (1942-1947) these expenses were paid by the U.S. government. Later, they were covered by employers in the U.S. who paid into a revolving fund with the Department of Labor (Anderson, 1976).

In order to minimize costs for U.S. interests, the United States government had an incentive to locate the recruitment centers in Mexico as far north (i.e., as close to the U.S. border) as possible (Galarza, 1964; Durand, 2007).

The actual locations of these recruitment centers were borne of negotiations between the two sides. Both Mexico and the United States had distinct incentive to locate the recruitment centers in specific parts of Mexico; as far south as possible for the former and as far north as possible for the latter. Thus, the decision to open and close centers over time can be described as a story of bargaining power at the international level (Delano, 2011). For example, at the beginning of the program, Mexico was able to exercise greater bargaining power and have centers located farther south in the country since the U.S. was desperate for the labor (see Figures 3.4 and 3.5). In renegotiations right after the war, the U.S. was no longer desperate, but Mexico was eager to have a bilateral policy in place. As a result, centers opened in northern cities (see Figures 3.6 and 3.7). With the outbreak of the Korean War, Mexico once again regained the advantage in negotiations and exercised its power to open centers in places that they would like (see Figures 3.8 and 3.9). After the end of the Korean War the U.S. once again gained the advantage in negotiations and centers opened closer to the border (see Figures 3.10-3.12). The unique spatial and temporal pattern to the location of these centers that results is plausibly exogenous to the local, state-level conditions in Mexico that affected educational outcomes. Although an untestable assumption, the exclusion restriction is likely to hold as a result of this unique, institutional feature of the Bracero Program.

Figure 3.4—Recruitment Centers 1942-1943

Recruitment Centers 1942-1943

Figure 3.5—Recruitment Centers 1944-1946

Recruitment Centers 1944-1946

Figure 3.6—Recruitment Centers 1947-July 31, 1949

Recruitment Centers 1947-July 31, 1949

Figure 3.7—Recruitment Centers August 1, 1949-August 10, 1951

Recruitment Centers August 1, 1949-August 10, 1951

Figure 3.8—Recruitment Centers August 11, 1951-May 18, 1952

Recruitment Centers August 11, 1951-May 18, 1952

Figure 3.9—Recruitment Centers May 19, 1952-March 9, 1954

Recruitment Centers May 19, 1952-March 9, 1954

Figure 3.10—Recruitment Centers March 10, 1954-April 13, 1955

Recruitment Centers March 10, 1954-April 13, 1955

Figure 3.11—Recruitment Centers April 14, 1955-January 31, 1962

Recruitment Centers April 14, 1955-January 31, 1962

Figure 3.12—Recruitment Centers February 1, 1962-December 31, 1964

Recruitment Centers February 1, 1962-December 31, 1964

Sources for Figures 3.4-3.12: INEGI GIS files. City map coordinates found using Wikipedia.org and GeoHack. Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

Potential Threats to Identification

In further consideration of the validity of the planned identification strategy, it is important to distinguish between those factors that are not threats and those that are. Any characteristics of a state in Mexico that do not change over time will not threaten identification. The state fixed effects will eliminate any bias from these omitted variables. For example, proximity of a state to the border, proximity of a state to the capital, and relative size of the state (assuming no large population shifts in the 23 year period) are all factors that could threaten identification, but that are of no concern because of the inclusion of state fixed effects. Any national trends in Mexico that change over time, but that affect all states the same, will not threaten identification. The year fixed effects will eliminate any bias from these omitted variables. For instance, any national political, economic, or institutional factors that could

threaten identification are not of concern (so long as they affect all states equally) because of the inclusion of year fixed effects. Thus, the only factors that remain a potential threat to identification are those that vary over both space and time, and that cause a violation of the exclusion restriction.

One such factor is the extent of political control exercised by the PRI, the dominant political party at this time in Mexico. The PRI won national elections in all states in Mexico in each of the presidential elections during the time of the Bracero Program, and so the fact that a state voted to elect a PRI candidate to the presidency is not a potentially confounding factor since that does not vary across space or across time. However, the strength of the PRI in a particular state in a given year could vary and threaten identification. Specifically, if the PRI decided to funnel resources to areas where they were in danger of losing an election in hopes of gaining the support of the populace, then the placement of recruitment centers might not be exogenous to this political factor. In order to eliminate this potential threat, I will include a measure of PRI strength in the main IV equation to see what effect it might have. If it has no effect on the estimated coefficient measuring the effect of bracero migration, then it is not a concern.

Data

Data Sources and the Construction of the Sample

Firstly, I trace institutional changes in the Bracero Program over time, utilizing the international agreements that were signed between officials of the United States and Mexico as primary source materials. The locations for the bracero recruitment centers in Mexico are stipulated in these agreements. I use these agreements to identify the locations of the various recruitment centers in Mexico for each year of the program. Until the agreement of August 1, 1949, the locations of the recruitment centers were not included in the agreements and so I use

secondary source materials to identify the placement of the centers prior to this date (Galarza, 1964).[37] In Table 3.2 I list these locations and in Figures 3.4-3.12 I show the locations of these centers and how they change over time.

Using these locations, I create a measure of distance to the recruitment center for each state in Mexico at each point in time. In constructing this variable I must make assumptions to obtain distance measures at state by year level, which is the unit of analysis in this study. A point must be identified in each state to which distance can be measured from the city where the recruitment center was placed. In the main specification here, I use the centroid of the state, which I calculated using Geographic Information Systems (GIS).[38] Moreover, the recruitment centers change with the international agreements, which were negotiated in the middle of years. In order to associate a particular configuration of recruitment centers with a year, I must make an assumption about how long exposure to a recruitment center constitutes treatment. In the main specification here, I use a method whereby a year is associated with a recruitment center if the recruitment center was present for the majority (i.e., greater than six months) of the year.[39] This is the most conservative assumption I can make as recruitment centers could have had some effect even if there for less than six months. Using these assumptions, I have 720 state-by-year

[37] The agreement entered into force on February 21, 1948 actually references the placement of the recruitment centers, but only stipulates that they should be no farther south than a particular location in Mexico (TIAS 1968, p. 1235).

[38] Other methods include calculating distance to several, random points within a state and taking the average, or using a categorical measure of proximity or adjacency. Results using these alternate measures are qualitatively similar. Results available upon request.

[39] Another method would be to consider a recruitment center associated with a particular year if it existed for any part of that year. Results using this method are qualitatively unchanged. Results available upon request.

observations, measuring the shortest distance between the state's centroid and the nearest recruitment center city, over eight distinct configurations or regimes.[40]

Secondly, I collect state-level characteristics from the *Anuarios Estadisticos de los Estados Unidos Mexicanos* from the years 1942-1967. These statistical yearbooks of administrative data were compiled and made available by the national statistical agency in Mexico, the *Instituto Nacional de Estadistica y Geografia (INEGI)*. The independent variable of interest that I collect is the number of braceros leaving each state in a given year. For the years 1942 through 1954, the statistical yearbooks provide the number of braceros leaving a state, while they change the name to agricultural migrants for the years 1958 through 1964. The yearbooks provide no data about braceros for the years 1955 through 1957.[41] I also transcribe various educational outcomes at the state level. Primary school enrollments are available for all years except 1961. The number of primary schools is available for all years, with a distinction between rural and urban schools made through 1961. State spending on education is available for all years except for 1963. Post-primary school enrollments by gender, including several different types of post-primary schooling, are available from 1950 and later. This data collection process yields a dataset of state-by-year educational outcomes for 29 states, two territories and one federal district over the 24 year period, from 1942 to 1965.

Thirdly, I compile election data to be used in a robustness check of the main results. Mario Ramirez Rancano (1977) tabulates the results of presidential elections in Mexico. I use the number of PRI votes and non-PRI votes in each state in the elections of 1940, 1946, 1952, and 1958 and construct a state-level variable that measures the strength of a PRI win in the

[40] Distances are calculated as geodetic distances using STATA's *geodist* command.

[41] These data were all provided to INEGI from the Mexican Department of the Interior.

previous presidential election. Specifically, I calculate the percentage of votes for the PRI in the previous election.[42]

Fourthly, I utilize microdata from the one percent Integrated Public Use Microdata Series, International (IPUMS International) sample of the 1970 Mexican General Population and Housing Census to create state-level variables describing schooling by age and gender. The census provides a snapshot of individuals and their schooling outcomes. I use this along with some assumptions to create variables that describe the proportion of a given age and gender group in school in a given state and year (e.g., the proportion of six year old males who are in school in Guanajuato in 1947). The census provides the individual's gender, age, years of schooling, and state of birth. The first assumption I make is that an individual remains in their state of birth for the entirety of their childhood. The second assumption I make is that an individual starts school at age six, which is the age most children in Mexico start primary school. The third assumption I make is that children attend school continuously and without major breaks. Using the IPUMS sample and these assumptions, I count the number of individuals in a particular age and gender group for a given state and year. Then, I count the number of those individuals who were in school. For example, consider an individual in the 1970 IPUMS sample who was born in Sonora, is male, is 20 years old and completed 3 years of education. This individual would be counted as a six year old boy in Sonora in 1956, a seven year old boy in Sonora in 1957, etc. Furthermore, this individual would be counted as a six year old boy in school in Sonora in 1956, a seven year old boy in school in Sonora in 1957, an eight year old boy in school in Sonora in 1958, but a nine year old boy not in school in Sonora in 1959. Dividing

[42] Additional measures of the political strength of the PRI can be used. Results using additional measures are qualitatively unchanged. Results available upon request.

those in school by the total in each age-by-gender-by-state-by-year group gives an estimate of the proportion of each group in school by state and year.

Describing the Sample

I summarize the data from the *Anuarios* in Table 3.3.[43] As I described previously, data are missing for some states in certain years, and so the sample size varies for each variable. On average, 5,199 braceros leave a given state in a given year, although there is quite a bit of variation across the sample. Urban primary school enrollments are greater than rural primary enrollments. The average state has 71,777 students enrolled in urban primary schools and 52,543 students enrolled in rural primary schools for an average year. There is greater dispersion in urban primary enrollments than in rural primary enrollments.[44] The average state has 858 primary schools in a given year. The average state in an average year has 13,646 students enrolled in post-primary schools, although there is significant variation across space and time. Post-primary enrollments are generally higher for males than for females (i.e., a mean of 8,475 for the former and only 5,171 for the latter), although there is a greater dispersion in male, post-primary enrollment. Finally, state governments spend, on average, 10.1 million pesos a year on education. Again, there is significant variation in both the number of schools and education spending across states and across time.

[43] Mexico's Distrito Federal and two territories (Baja California Sur and Quintana Roo) could account for the outliers in this table. Main results omitting these entities are qualitatively similar. Results available upon request.

[44] The minimum for rural schools is zero because some states (i.e., Mexico D.F.) had no schools classified as rural in some years.

Table 3.3—Summary Statistics for Data from the *Anuarios*

Variable	N	Mean	Standard Deviation	Min	Max
Braceros	633	5,199	9,893	0	61,381
Primary School Enrollment, Urban	736	71,777	115,805	970	1,182,224
Primary School Enrollment, Rural	736	52,543	43,139	0	274,128
Primary School Enrollment	736	124,319	131,895	2,144	1,182,224
Primary Schools	768	858	648	33	4,612
Post-Primary Enrollment, Total	512	13,646	34,620	0	392,653
Post-Primary Enrollment, Male	512	8,475	23,328	0	268,322
Post-Primary Enrollment, Female	512	5,171	11,383	0	124,331
Education Spending by State Governments	693	10,100,000	16,300,000	0	118,000,000

Source: *Anuarios estadisticos de los Estados Unidos Mexicanos*, 1942-1967.

The aggregated microdata from the IPUMS sample of the 1970 Mexican census are shown in Table 3.4.[45] This table gives the mean proportion of a given age and gender group in school, averaged over all state-by-year observations. For example, on average, 80 percent of six year old males were in school over the sample period. One thing to note is that females are always less likely than males to be in school. This ranges from two percent to six percent less likely to be in school across all age groups. Moreover, there is a monotonic decrease in the likelihood of attending school. That is, six year olds are the most likely to be in school, seven year olds are less likely than six year olds but more likely than eight year olds, etc. The means here show that attending school was more likely than not for the first three to four years of primary school, but thereafter became relatively unlikely for both males and females in Mexico in the middle of the twentieth century.

[45] Mexico's Distrito Federal and two territories (Baja California Sur and Quintana Roo) could account for the outliers in this table. Main results omitting these entities are qualitatively similar. Results available upon request.

Table 3.4—Average Proportion in School by Age and Gender

Age	Male	Female
6	0.8054643	0.768339
	(0.1101761)	(0.1442048)
7	0.7413254	0.7046524
	(0.1304995)	(0.1625677)
8	0.6326289	0.5936208
	(0.1647499)	(0.1823135)
9	0.4931067	0.455125
	(0.1819704)	(0.1871338)
10	0.4002518	0.3572206
	(0.1798316)	(0.1763382)
11	0.3388912	0.3010337
	(0.1664998)	(0.1605308)
12	0.1589249	0.0970241
	(0.1129642)	(0.0727975)
13	0.1378911	0.0849989
	(0.1060098)	(0.0694879)
14	0.1136795	0.0709157
	(0.0944947)	(0.064018)
15	0.0803426	0.0492191
	(0.0745077)	(0.0526792)
16	0.0718197	0.0432559
	(0.0711832)	(0.0497726)
17	0.0569019	0.0356404
	(0.0629355)	(0.0451894)
18	0.0418812	0.0158379
	(0.0567469)	(0.0255897)

Source: Data constructed from the one percent IPUMS sample of the 1970 Mexican Census.

Estimation and Results

The Effect of Bracero Migration on Household Investments

I examine the impact of bracero program participation on human capital investments by households in a state. The household decision that I examine is a most fundamental one – whether or not to enroll a child in school. In this section, I will explore the effect of bracero migration on both primary and post-primary school enrollments.

I estimate the model given by Equation 1 using ordinary least squares, regressing the log of primary school enrollments on the log of bracero out migration and state and year fixed effects.[46] The results of the estimation are given in Table 3.5. For urban primary schools, a 10% increase in the number of braceros that leave a state is associated with a 0.07% increase in the number of students enrolled in urban primary schools, although this is not statistically significant. A 10% increase in the number of braceros that leave a state is associated with a 0.1% increase in the number of students enrolled in rural primary schools, a result that is statistically significant at the 10% level. Combining rural and urban enrollments, I show that a 10% increase in the number of braceros that leave a state is associated with a 0.07% increase in the number of students enrolled in primary school, although this is statistically insignificant. These OLS models suggest a positive relationship between bracero migration and primary school enrollments.

[46] For the IV estimation I cluster standard errors at the state x regime level because that is the level at which treatment (i.e., recruitment center placement) varies. To be consistent, I cluster the OLS results here at the same level.

Table 3.5—OLS Results (Data from the *Anuarios*)

	(1)	(2)	(3)	(4)
Panel A				
VARIABLES	logurbanprimaryenrolled	logruralprimaryenrolled	logprimaryenrolled	logprimaryschools_1
logbraceros	0.00711	0.0137*	0.00654	-0.00861*
	(0.00641)	(0.00736)	(0.00549)	(0.00477)
Constant	8.946***	8.830***	9.612***	5.067***
	(0.0781)	(0.0557)	(0.0519)	(0.0361)
Observations	589	580	589	620
R-squared	0.981	0.939	0.986	0.984
Panel B				
VARIABLES	logstateeducationspending_1	logpostprimaryenrolledtotal	logpostprimaryenrolledmen	logpostprimaryenrolledwomen
logbraceros	0.0175	0.00451	-0.00150	0.00856
	(0.0156)	(0.0176)	(0.0176)	(0.0223)
Constant	11.44***	6.833***	5.956***	6.237***
	(0.207)	(0.163)	(0.184)	(0.199)
Observations	558	374	374	374
R-squared	0.917	0.966	0.963	0.948

Notes: Standard errors clustered at the state x regime level; *** p<0.01, ** p<0.05, * p<0.1.
Source: Bracero and education data from *Anuarios*.

I also estimate the model using OLS, regressing the log of post-primary enrollments on the log of bracero out migration and state and year fixed effects. The results are given in Table 3.5. A 10% increase in the number of braceros leaving a given state in a given year is associated with a 0.04% increase total post-primary enrollment, a 0.01% decrease in male post-primary enrollment, and a 0.08% increase in female post-primary enrollment. The estimated coefficients on total post-primary enrollments, male enrollments and female enrollments are all statistically insignificant. The OLS results hint at a positive relationship between bracero migration and post-primary enrollment in general, although it might be slightly negative for males. This could be because males choose to migrate as braceros as they get older instead of pursing post-primary education. More importantly, however, these OLS results demonstrate that bracero migration is likely to have a bigger positive effect for females than for males, possibly because female heads of household direct resources to female children. It is important to remember that these

estimates are likely to be negatively biased, and the IV results will provide us with a relationship that has a causal interpretation.

I estimate the model using the instrumental variables strategy to obtain causal estimates of the impact of the migration of braceros on primary school enrollments. A two stage least squares process is applied to the model in Equation 1. The results of the IV estimation are given in Table 3.6. All of the IV estimates are larger than the corresponding OLS estimates, consistent with the likely negative bias in the OLS estimation that I explained previously. A 10% increase in the number of braceros that leave a state in a given year causes a 0.7%, 0.5%, and 0.7% increase in the number of children enrolled in urban primary schools, rural primary schools, and all primary schools, respectively. These estimates are statistically significant at the 10% level for urban and rural primary enrollments and at the 5% level for all primary enrollments. This effect is also economically significant. Consider an average state in an average year with 5,199 braceros leaving and 124,319 enrolled in primary schools. The estimated effect of 0.7% would imply that increasing the number of braceros that leave the state by about 520 braceros would increase total primary enrollments by 870 students.

Table 3.6—IV Results (Data from the *Anuarios*)

	(1)	(2)	(3)	(4)
Panel A				
VARIABLES	logurbanprimaryenrolled	logruralprimaryenrolled	logprimaryenrolled	logprimaryschools_1
logbraceros	0.0723*	0.0551*	0.0713**	0.0174
	(0.0398)	(0.0311)	(0.0343)	(0.0211)
Constant	8.709***	8.685***	9.377***	4.973***
	(0.172)	(0.122)	(0.142)	(0.0883)
Observations	589	580	589	620
R-squared	0.975	0.936	0.979	0.982
KP F-Stat	29.93	27.06	29.93	29.47
Panel B				
VARIABLES	logstateeducationspending_1	logpostprimaryenrolledtotal	logpostprimaryenrolledmen	logpostprimaryenrolledwomen
logbraceros	0.168***	0.101	0.0170	0.146
	(0.0582)	(0.102)	(0.0924)	(0.136)
Constant	10.90***	7.660***	7.456***	6.741***
	(0.295)	(0.895)	(0.818)	(1.197)
Observations	558	374	374	374
R-squared	0.903	0.962	0.963	0.940
KP F-Stat	25.86	5.698	5.698	5.698

Notes: Standard errors clustered at the state x regime level; *** p<0.01, ** p<0.05, * p<0.1.
Source: Bracero and education data from *Anuarios*. Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

The IV results for post-primary enrollments, although not statistically significant, are informative. The point estimates obtained through IV estimation imply that a 10% increase in the number of braceros leaving a given state in a given year leads to a 1% increase in total post-primary enrollments, a 0.2% increase in male enrollments, and a 1.5% increase in female enrollments. Most importantly, the IV estimates reveal that the effect on post-primary education is much larger for females than for males. This could be because males are choosing to become braceros instead of pursing post-primary education, because female heads of household have more control over household resources and direct those resources to female children, or both.

Heterogeneity in the Effect of Bracero Migration on Schooling

Simply looking at the aggregate effects on primary and post-primary enrollments could mask heterogeneity in the impact of bracero migration on enrollments by age and by gender. Using the IPUMS microdata and the constructed measure giving the proportion of each age and gender group in school for each state and year, I utilize the same instrumental variables strategy to explore the effect on each age and gender group. Specifically, I utilize two stage least squares to estimate the model given in Equation 1, using the proportion of a given age and gender group (e.g., six year old males) as the outcome. Again, I instrument the log of the number of braceros leaving a given state in a given year with the distance to the nearest recruitment center in that year. The results of the estimation are given separately for males and females in Table 3.7 and Table 3.8, respectively.

Table 3.7—IV Results by Age for Males (Data from IPUMS)

	(1)	(2)	(3)	(4)	(5)
Panel A					
VARIABLES	inschool61_prop	inschool71_prop	inschool81_prop	inschool91_prop	inschool101_prop
logbraceros	0.00218	0.00243	0.00203	0.0181*	0.0138
	(0.00793)	(0.00641)	(0.00971)	(0.0108)	(0.0114)
Observations	619	620	620	620	619
R-squared	0.331	0.362	0.435	0.505	0.534
Number of id	32	32	32	32	32
KP F-Stat	36.95	36.98	36.98	36.98	36.49
Panel B					
VARIABLES	inschool111_prop	inschool121_prop	inschool131_prop	inschool141_prop	inschool151_prop
logbraceros	0.0197**	0.0241***	0.00965	-0.00692	-0.00614
	(0.0100)	(0.00750)	(0.00824)	(0.0110)	(0.00720)
Observations	619	619	619	620	618
R-squared	0.467	0.348	0.356	0.294	0.206
Number of id	32	32	32	32	32
KP F-Stat	36.91	36.94	36.95	36.98	36.58
Panel C					
VARIABLES	inschool161_prop	inschool171_prop	inschool181_prop		
logbraceros	-0.000918	-0.00243	0.00543		
	(0.00738)	(0.00874)	(0.00408)		
Observations	620	619	620		
R-squared	0.151	0.089	0.045		
Number of id	32	32	32		
KP F-Stat	36.98	36.95	36.98		

Notes: Standard errors clustered at the state x regime level; *** p<0.01, ** p<0.05, * p<0.1.
Source: Bracero data from *Anuarios*. Enrollment data constructed from the one percent IPUMS sample of the 1970 Mexican Census. Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

Table 3.8—IV Results by Age for Females (Data from IPUMS)

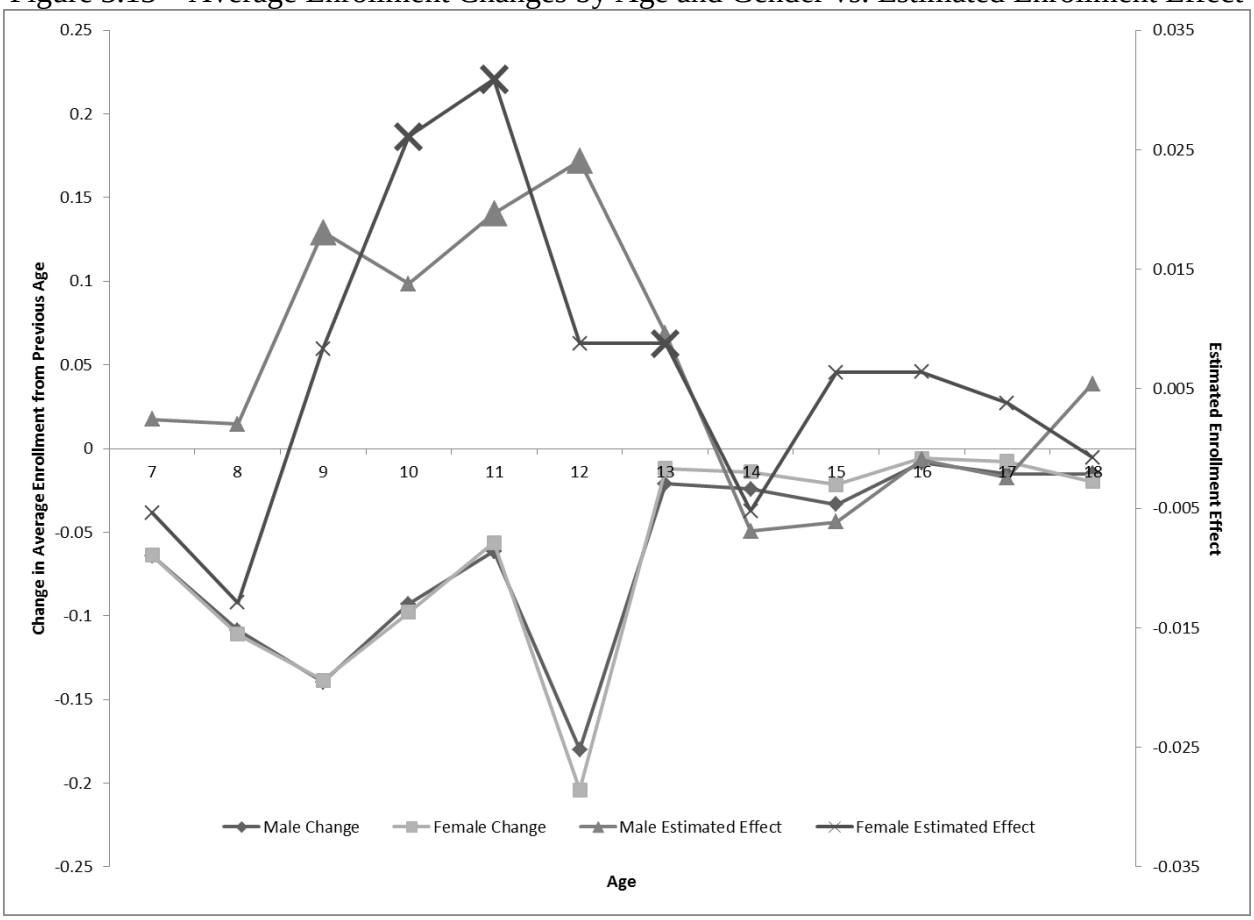
	(1)	(2)	(3)	(4)	(5)
Panel A					
VARIABLES	inschool62_prop	inschool72_prop	inschool82_prop	inschool92_prop	inschool102_prop
logbraceros	-0.00344	-0.00539	-0.0129	0.00837	0.0261***
	(0.00774)	(0.00989)	(0.00788)	(0.0101)	(0.00933)
Observations	620	620	619	619	618
R-squared	0.374	0.436	0.412	0.545	0.508
Number of id	32	32	32	32	32
KP F-Stat	36.98	36.98	36.49	36.91	36.42
Panel B					
VARIABLES	inschool112_prop	inschool122_prop	inschool132_prop	inschool142_prop	inschool152_prop
logbraceros	0.0309***	0.00880	0.00878*	-0.00523	0.00637
	(0.0103)	(0.00626)	(0.00490)	(0.00874)	(0.00600)
Observations	619	619	619	620	620
R-squared	0.407	0.347	0.245	0.240	0.184
Number of id	32	32	32	32	32
KP F-Stat	36.95	36.95	37.02	36.98	36.98
Panel C					
VARIABLES	inschool162_prop	inschool172_prop	inschool182_prop		
logbraceros	0.00639	0.00379	-0.000752		
	(0.00589)	(0.00400)	(0.00197)		
Observations	618	618	616		
R-squared	0.148	0.135	0.050		
Number of id	32	32	32		
KP F-Stat	35.85	36.63	36.31		

Notes: Standard errors clustered at the state x regime level; *** p<0.01, ** p<0.05, * p<0.1.
Source: Bracero data from *Anuarios*. Enrollment data constructed from the one percent IPUMS sample of the 1970 Mexican Census. Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

The first important result from this analysis is that the effect of bracero migration on schooling appears to occur at the margin. The majority of six year olds are in school, and so, not

surprisingly, there is little impact at this age. In the latter years of primary school and the early years of secondary school (ages nine through thirteen), however, schooling is less prevalent and I find significant, positive effects. At this time, these were the marginal years of education for the vast majority in Mexico. For males, a ten percent increase in the number of braceros leaving a state causes between a 0.1 and 0.2 percentage point increase in the proportion of nine, ten, eleven, twelve and thirteen year olds in school. These effects are statistically significant at ages nine, eleven and twelve. For females, a ten percent increase in the number of braceros leaving a state causes between a 0.1 and 0.3 percentage point increase in the proportion of nine, ten, eleven, twelve and thirteen year olds in school. These effects are statistically significant at ages ten, eleven and thirteen. The estimates are not statistically different from zero for ages below nine or for ages above thirteen. I graph the estimated effects on enrollment against the change in average enrollment from the previous age cohort in Figure 3.13. This figure illustrates how the biggest effects are found at the most marginal years of education (i.e., those ages with the biggest drops in enrollment over the previous age group). The Bracero Program increased schooling for both boys and girls, but only at the margin. That is to say, it operated at the intensive margin. It increased schooling by a few years for those students already in primary school, but did not cause new students to enter primary school.

Figure 3.13—Average Enrollment Changes by Age and Gender vs. Estimated Enrollment Effect



Source: Gender and age enrollment changes calculated from the one percent IPUMS sample of the 1970 Mexican Census. Estimated enrollment effects taken from Tables 3.7 and 3.8.

The second important result from this analysis is that the effect, although positive for both males and females, is generally greater for female children. For example, consider eleven year old males and eleven year old females. This is an age group for which the effect is statistically significant for both genders. A ten percent increase in the number of braceros leaving a state increases the proportion of eleven year old males in school in that state by 0.2 percentage points and increases the proportion of eleven year old females in school in that state by 0.3 percentage points. In percentage terms, taken at the average, this is a 0.6 percent increase for eleven year old males and a one percent increase for eleven year old females. The effect on female education is nearly double the effect on male schooling. Eleven year olds are too young

to migrate as braceros, so this is not likely to be because males are choosing migration over school. Figure 3.13 rules out the possibility that girls are simply more marginal students as enrollment changes are nearly identical for boys and girls. It is suggestive, however, of female heads of household controlling resources and directing those resources to all children but disproportionately more to their daughters.[47]

The Effect of Bracero Migration on Investments by the State

I examine the impact of bracero migration on human capital investments by the state and the provision of public goods for the citizenry. The first decision by a state that I analyze is the decision to provide schools. The second decision that I analyze is the decision to invest in education in terms of state government expenditures for education.

I estimate the model given by Equation 1 using ordinary least squares, although I lag the outcome variables to account for some level of inflexibility in government action. Specifically, any reaction to bracero migration, either as a result of increased tax revenues or political demand by returning braceros, are not likely to occur in the same year in which migration takes place since state budgets are already set. The earliest any effect should be felt is one year later.[48] I regress the log of both the number of schools and state education expenditures in the next year on the log of the number of braceros leaving the state in the current year, as well as state and year fixed effects. The results of this estimation are given in Table 3.5. The results are mixed, with an increase in the number of braceros leaving a state associated with a 0.08% decrease in

[47] This pattern could be explained by other phenomena. For example, it could be that male children must forgo schooling to work at home in place of their fathers who are working in the United States.

[48] This is a timing issue that I will continue to explore further. It is possible that effects might not be felt until the year following the next election. I plan to continue experimenting with different lag structures to better capture the actual decision-making process by state governments.

the number of primary schools and a 0.2% increase in the number of pesos spent on education by the state government. The estimate of the effect on education spending is not statistically significant. OLS estimation provides no evidence that bracero migration is related to positive investments by the State in human capital.

I estimate the model in Equation 1 using the instrumental variables strategy and two stage least squares to obtain causal estimates of the effect of bracero migration on both the provision of schools and education spending by the state government. The results of the IV estimation are given in Table 3.6. All of the IV estimates are larger than the corresponding OLS estimates, consistent with the likely negative bias in the OLS estimation. These results suggest that a 10% increase in the number of braceros that leave a state in given year causes a 0.2% increase in the number of primary schools in the state in the next year, and a 1.7% increase in the number of pesos spent on education by the state government in the next year. The point estimate for primary schools is not statistically different from zero.[49] The effect on state education spending, however, is highly statistically significant. To put the effect in perspective, consider an average state in an average year with 5,199 braceros leaving and 10.1 million pesos spent on education. This effect implies that, for the average in the sample, an increase in the number of braceros that leave a state by 520 individuals causes an increase in the amount spent on education in the next year by the state government of 171,700 pesos.

Robustness Check

The main threat to the identification strategy used here is a violation of the exclusion restriction and endogenous placement of the recruitment centers. In other words, the exclusion

[49] I am currently exploring alternate measures of school provision available in the statistical yearbooks. It might also be that the construction of new schools is a centralized decision by the federal government that would not respond as much to local political pressure.

restriction would fail if there were some factor that influenced both the placement of the recruitment centers and human capital investments. A major concern here is one of political maneuvering and the use of investments by the main political party to garner support. At this time, Mexican politics were dominated by the PRI. If the PRI sensed that they were losing support in a particular area, they could try to buy votes by making favorable investments in that area. For example, recruitment centers might be placed to make it easier for people to travel to the United States as braceros and they might have invested more in education in that area, all in an attempt to gain favor with the people and get their vote. If this were the case, one might see recruitment centers and greater educational investments by the government in a given state in a given year when PRI support is relatively low. To be very clear, there is no variation at the state level in national election results. The PRI presidential candidate won in every state during this time and so the year fixed effect accounts for PRI strength in terms of whether they won the election or not. The PRI, however, might have funneled resources to areas in which they won by relatively fewer votes.

To this end, I utilize presidential election data and include a variable that measures that percentage of the vote in a state that went for the PRI candidate in the last presidential election in the main IV regressions. I check to see whether the estimated coefficient on bracero migration is sensitive to the inclusion of this measure of PRI strength. The results of the estimation are presented in Table 3.9. The coefficient on PRI strength in the previous election is only statistically significant in the regressions for rural primary school enrollments and primary schools. In all other specifications it is statistically insignificant. More importantly, the estimated coefficients on bracero migration in this analysis are relatively unchanged when compared to the estimates in the main specification in Table 3.6. I conclude that political

maneuvering by the PRI is not a threat to this empirical strategy. Even if I control for it, however, I find increases in primary school enrollments and education spending resulting from bracero migration that are consistent with those in the main specification.

Table 3.9—Robustness of the Results to PRI Strength

	(1)	(2)	(3)	(4)
Panel A				
VARIABLES	logurbanprimaryenrolled	logruralprimaryenrolled	logprimaryenrolled	logprimaryschools_1
logbraceros	0.0741**	0.0456*	0.0697**	0.0123
	(0.0372)	(0.0274)	(0.0311)	(0.0190)
percentpri_last	-0.132	-0.469**	-0.213	-0.246**
	(0.183)	(0.223)	(0.160)	(0.103)
Constant	8.823***	9.148***	9.577***	5.217***
	(0.199)	(0.228)	(0.165)	(0.116)
Observations	588	579	588	619
R-squared	0.975	0.938	0.979	0.983
KP F-Stat	28.12	25.61	28.12	27.66
Panel B				
VARIABLES	logstateeducationspending_1	logpostprimaryenrolledtotal	logpostprimaryenrolledmen	logpostprimaryenrolledwomen
logbraceros	0.168***	0.116	0.0313	0.156
	(0.0602)	(0.106)	(0.0923)	(0.143)
percentpri_last	0.0882	0.471	0.438	0.287
	(0.504)	(0.393)	(0.308)	(0.531)
Constant	10.82***	7.112***	6.946***	6.406***
	(0.609)	(1.092)	(0.872)	(1.522)
Observations	557	374	374	374
R-squared	0.903	0.961	0.963	0.939
KP F-Stat	24.33	5.526	5.526	5.526

Notes: Standard errors clustered at the state x regime level; *** p<0.01, ** p<0.05, * p<0.1.
Source: Bracero and education data from *Anuarios*. Election data from Rancano (1977). Recruitment center locations from international agreements TIAS 1968, TIAS 2260, TIAS 2328, TIAS 2331, TIAS 2586, TIAS 2932, TIAS 3242, and TIAS 5160. Recruitment center locations taken from Galarza (1964).

Concluding Remarks

The Bracero Program was a massive guest worker program that allowed over four million Mexican workers to migrate and work temporarily in the United States from 1942 to 1964. Wages were specified by contract, along with other worker benefits. These wages were

relatively higher than what could be earned in the home communities, and so remittances from braceros created positive, albeit temporary, income shocks to their households. Moreover, their time in the United States exposed braceros to ideals and institutions, including those of educational opportunity for children. Furthermore, the Bracero Program temporarily changed the household structure, putting mothers in charge of household resources as fathers were absent. Whether or not these forces were enough to cause households and the state to make significant human capital investments is a topic relevant to both the history of economic development in Mexico and to the possible use of guest worker programs as development policy today.

Results from the IV estimation indicate that the program did induce households to make greater human capital investments in their children as more bracero out-migration from a state caused increases in primary school enrollments in that state. The effect of the Bracero Program on investments by the state is less clear as IV estimates indicate no significant effect on the provision of primary schools, but a significant and positive effect on education expenditures by the state governments. These results have important implications for long run economic growth in Mexico. By causing higher investments in human capital in the mid-twentieth century, it could increase opportunities and standards of living for many years to come. Identifying the Bracero Program as a policy that set regions on a path of long run economic prosperity is an important step to promoting guest worker programs as the ultimate aid policy with benefits to all agents involved.

CHAPTER 4

THE BRACERO PROGRAM AND ENTREPRENEURIAL INVESTMENT IN MEXICO

Introduction

The Bracero Program was a temporary worker program established between the United States and Mexico from 1942 to 1964. Over the life of the program, over four million agricultural workers were allowed to migrate legally to the United States to work for short periods of time at specified wages. Not only was this program advantageous to U.S. interests that obtained cheaper labor in their fields, but it potentially provided a boost to economic development in the communities in Mexico that sent braceros to the United States. The positive income shocks to bracero households might have been used for investment in activities that provided economic benefits. Much of the sociology and demography literature, however, speaks about the inextricable link between the Bracero Program and the phenomenon of illegal or undocumented migration. Controversy surrounds this guest worker program precisely because it is viewed by some as having created a gateway for undocumented migration and all of the problems that accompany it.

In this paper, I explore two distinct, yet related, questions. Firstly, I analyze whether or not bracero migration encouraged investment by individuals in productive activities, such as in starting new businesses. Secondly, I analyze whether or not bracero migration encouraged investment by individuals in these activities to a greater extent than did illegal migration. Both of these questions are a step in the direction to better understanding whether the Bracero Program, despite its problems, provided a boost to economic growth and development in those communities that sent workers to the United States.

The effect of bracero migration on entrepreneurial activity is ambiguous. In a capital-constrained world, positive, temporary income shocks can increase business activity by households, especially in those industries that require large capital investments (Yang 2008). The Bracero Program provided positive income shocks to households that sent workers to the United States through relatively high wages earned working in the United States. The trip to the United States, however, was not a cheap one. These workers paid bribes, transportation, and other costs. Moreover, while working in the United States, several deductions were taken from their pay. After paying all of these expenses, the positive income shocks might not have been as great as one would think. The remainder might have been used for household consumption or for financing future trips to the United States, not for investment in potentially productive activities at home.

Likewise, the question of whether an individual migrating as a bracero was more likely than an individual migrating illegally to start a new business upon his return home is equally ambiguous. Braceros working in the United States, all else equal, surely earned higher wages than did those who worked illegally since their wage was protected by contract and was supposed to reflect the prevailing wage paid to domestic workers. Illegal workers, however, did not face all of the same deductions from their pay. The illegal workers could stay longer in the United States, thus increasing the payout to their total trip, and they had greater flexibility in moving from farm to farm to find the best opportunity. Therefore, it is not clear that the payoff to individuals migrating as braceros would be higher than the payoff to illegal migrants. Again, this question will require an empirical approach to determine whether or not there existed a premium to bracero migration in terms of post-migration investment.

In this paper, I utilize individual-level data from the Mexican Migration Project (MMP) to develop a credible empirical strategy that addresses each of these questions. One could run an OLS regression of business investment on migration behavior to answer this question, although the estimates would likely be biased by unobservable characteristics that influence both migration behavior and investment behavior. The MMP, however, provides a detailed life history for individuals in the survey, including investment, migration, and demographic characteristics for each year of his or her life. I utilize the within person variation in migration behavior to difference out any unobservable characteristics of the individual that could bias the estimation. I also estimate Cox proportional hazard models to explore the timing of business investment relative to migration behavior.

Using these methods, I find that bracero migration did indeed increase the propensity to invest in new business upon the migrant's arrival back home in Mexico. Estimates suggest that there is an 80 to 100 percent increase in the propensity to start a new business in the year following a bracero trip to the United States. I also find that illegal migration is not associated with a similar increase in entrepreneurial activity upon return home to Mexico. These estimates are robust to ruling out alternative explanations such as correlation with major demographic characteristics or a particular pattern to migration that might indicate a purposeful investment strategy. All in all, these results suggest that bracero migration did provide the means necessary for individuals to invest in productive activities at home and that there was a premium to bracero migration over illegal migration in the opportunities afforded for entrepreneurship in Mexico.

Providing answers to these research questions, I make several important contributions. First of all, I better illuminate the migration history between the United States and Mexico, exploring the true impact of the program at the time, in spite of the criticisms and controversy

found in other literatures. Second, I provide evidence that a guest worker program between the United States and Mexico could be good development policy as it encourages individuals to invest in productive activities that might spur economic growth and development. Finally, I show that a program like the Bracero Program provides greater benefits to those that choose legal over illegal migration.

Migration and Development

Considerable work is done in the economics literature to describe the link between migration and economic development. Hildebrandt and McKenzie (2005) and McKenzie and Rapoport (2011) study the impact of current migration on human capital investment in children, examining health outcomes and educational attainment, respectively. Both papers use the same household survey data from Mexico, and both utilize an instrumental variables strategy that uses historic migration rates as an instrument for current migration rates. Using the similar empirical methodologies, Hildebrandt and McKenzie (2005) find that migration causes an increase in positive health outcomes for children, while McKenzie and Rapoport (2011) find that migration reduces educational attainment for children. Hanson and Woodruff (2003) find that children in Mexico that come from households with external migrants in the United States tend to complete more years of schooling. They conclude that remittances from migration must relax the household income constraint, allowing parents to make greater investments in their children.

In addition to these aspects of human development, other studies examine the impact of migration on investment behavior. Yang (2008) uses exchange rate shocks to show that migration from the Philippines causes increases in entrepreneurship, especially in relatively capital-intensive enterprises. He concludes that remittances earned abroad allow for this increase in investment. Woodruff and Zenteno (2007) find that migration in Mexico leads to an increase

in investment in microenterprise, especially in those industries where remittances allow for individuals to relieve capital constraints. These papers provide a nice analysis of migration in general, but not of the effect in particular of a temporary worker program in the context of Mexico and the United States.

Gibson and McKenzie (2010) present evidence that temporary worker programs can have significant, positive development impacts. They show that a recent program that brings Pacific Islanders to work temporarily in New Zealand has positive effects on income, consumption, durable goods consumption, and subjective well-being. Some work has been done specifically on the impacts of the Bracero Program. Reichert and Massey (1982) argue that, although the program might have provided significant sums of money for migrants to remit home, it did little to increase actual economic development in the sending communities. Sandos and Cross (1983) suggest that bracero earnings were unlikely to be used in investment, given the lack of opportunities, and so were more likely used for household consumption. Kosack (2014) shows that bracero migration increased human capital investment in the sending regions in Mexico, thereby increasing economic development. It will be important to understand whether or not the Bracero Program provided additional, positive development impacts in Mexico, such as in increase in capital investments that lead to entrepreneurial activity.

A Brief History of the Bracero Program

In 1917, the United States Congress took a first step to limit the widespread migration to the United States and passed an immigration act that required immigrants to be literate and to pay a head tax upon entry in the United States. It also prohibited entry by those immigrants that were entering as contract laborers or those individuals "who have been induced, assisted, encouraged, or solicited to migrate to this country by offers or promises of employment...to

perform labor in this country of any kind, skilled or unskilled." Also during 1917 the United States entered into World War I, simultaneously depleting the agricultural sector of its labor supply and increasing demand for agricultural foodstuffs in support of the war effort. Growers appealed to the United States for an exception to the new immigration bill so that they might maintain a steady flow of contracted, migrant labor from Mexico. They were granted their exception with a provision in the new law that allowed the Commissioner General of Immigration to bypass the requirements for entry under the new act and permit temporary migration by laborers from Mexico if conditions in the labor market should so require it (Scruggs, 1960). Thus, in 1917 growers were granted permission under this proviso to import Mexican labor and this continued, through extensions by the Secretary of Labor, well after the end of World War I, into the mid-1920s. This first episode, sometimes referred to as the ``First Bracero Program," was a unilateral policy that allowed farmers to contract directly with laborers and that placed certain demands on the farmers, such as promises to pay costs to return migrants to the border, to provide adequate housing, and to keep track of the worker while he was in the United States.[50]

The late 1920s and the 1930s were a time when the migration of temporary laborers from Mexico was all but stopped. The lack of war or other crisis to prompt a labor shortage as well as other developments such as the Great Depression which raised unemployment in the United States made such an importation unpopular and infeasible. As the United States found herself heavily involved in World War II, however, farmers once again called for the United States government to take action. As before, the war both greatly reduced the labor supply and increased demand for agricultural products. The farmers perceived a labor shortage and lobbied

[50] For a more complete description of this program, see Scruggs (1960).

the government to allow the importation of migrant labor from Mexico for relief. This time, Mexico decided to take an active role in the process and the resulting immigration program was a bilateral effort by both the United States and Mexico.

The first major agreement was signed on July 23, 1942 by representatives of both the United States and Mexican governments.[51] This agreement established a number of terms and conditions under which the program was to operate. First of all, the agreement outlined the contracting environment, stipulating that contracts were between the worker and the United States government.[52] These contracts were to be written in Spanish and supervised by the Mexican government, and the farmers to whom these workers were subcontracted were required to abide by all features of the agreement. Thirdly, the workers were to be paid wages equal to the prevailing wage for domestic agricultural workers in the region, and they were guaranteed pay for time that they might spend underemployed. Finally, the workers were guaranteed paid transportation from the recruitment centers to the place of work and back to the recruitment center at the end of the contract, housing and medical care of the same level enjoyed by domestic workers, and access to a savings fund (EAS 278). This agreement did not expire with the end of World War II, but rather continued in existence until December 31, 1947 (TIAS 1968).

From 1947 to 1951, bilateral cooperation between the two countries was weak. One bilateral agreement lasted a mere eight months, entered into force on February 21, 1948 and terminated by Mexico on October 19, 1948 (TIAS 1968). Another was entered into force on August 1, 1949 and terminated by Mexico on July 15, 1951 (TIAS 2260). For periods not

[51] This agreement was entered into force by an exchange of diplomatic notes on August 4, 1942 (EAS 278). It was later amended and replaced with an agreement entered into force by an exchange of diplomatic notes on April 26, 1943 (EAS 351).

[52] Specifically with the Farm Security Administration that was in charge of the program in the United States at this time.

covered by a bilateral agreement, agricultural workers continued to be used by the United States in a system of unilateral, direct recruitment, similar to that under the First Bracero Program (Craig, 1971).

This continued until the Korean War when military conflict yet again spurred agricultural interests to push the government for a formal temporary worker program. At this time, the Bracero Program was institutionalized with the passage of Public Law 78 by Congress on July 12, 1951. This law amended the Agricultural Act of 1949, giving the Secretary of Labor control over the temporary worker program. This law would be renewed time and time again (every two years) and served as the legislative foundation for the Bracero Program for 13 years from 1951 until its end in 1964. Recognizing their superior bargaining position in the midst of the Korean War, Mexico signed a bilateral accord in 1951 with the United States which, similar to the agreement from 1942, secured several important worker guarantees.[53] The agreement, however, was allowed to expire and when the United States attempted to renegotiate terms more favorable to growers, Mexico refused.[54] Only after an attempt by the United States to circumvent Mexican authority and pursue direct recruitment did Mexico agree to compromise and sign a new agreement in 1954.[55] This agreement included a number of concessions by Mexico to the demands of the United States (Craig, 1971).[56] This agreement was renewed time and time again

[53] This agreement was entered into force on August 11, 1951 by an exchange of diplomatic notes (TIAS 2331).

[54] This agreement was allowed to expire on January 15, 1954.

[55] This agreement was entered into force by an exchange of diplomatic notes on March 10, 1954.

[56] These concessions included vesting the Secretary of Labor with the power to determine wages, removing the authority of Mexico to unilaterally ``blacklist'' entire counties and prevent

until it was allowed to expire on December 31, 1964.[57] Around the same time the agreement was signed in 1954, the United States launched a coordinated attack against the employment of illegal labor in the United States called Operation Wetback. This drive against illegal labor and employers that hired illegal workers began on June 17, 1954 and saw the number of illegals plummet for the period from 1954 to 1959 (Craig, 1971).

The Bracero Program met its demise in 1964 when domestic opposition to the program in the United States reached a critical mass. At this point, however, the Bracero Program had left its permanent mark on the history of US-Mexico migration. Over its 23 year lifespan, over four million Mexican laborers came to the United States to labor as temporary agricultural workers, making this program the largest guest worker program in the history of the United States.

Much of the existing work concerning the Bracero Program lives outside of the traditional economics literature. The history literature takes a descriptive approach, detailing the various phases of the program. Scruggs (1960) describes the origins of the program in the very first episodes during World War I. Similarly, Scruggs (1962) traces the initial development of the program with the onset of World War II. Furthermore, Scruggs (1963) highlights a case study of the program as it was experienced in the state of Texas. Beyond simply describing the development of the program over time and the different players involved throughout, these histories lay an important foundation for future economic analysis.

Additionally, considerable work is done in the sociology and demography literature to better understand the implications of programs like the Bracero Program on migrant populations.

---

them from receiving braceros, and an opening of recruitment centers in Mexico closer to the border with the United States (TIAS 2932).

[57] The expiration date was agreed upon in the final extension entered into force by an exchange of diplomatic notes on December 20, 1963 (TIAS 5492).

Reichert and Massey (1982) argue that, although these programs may provide significant sums of money for migrants to remit home, they do little to increase actual economic development in the sending communities and they are not truly temporary in nature. In fact, they describe how guest worker programs actually perpetuate migration, both legal and illegal, by inducing a reliance on income that can only be earned abroad. Another study uses a unique micro data set to test these theoretical hypotheses of the inherently "non-temporary" nature of these so-called temporary worker programs (Massey & Liang, 1989). The authors find that braceros were more likely to make repeated trips to the United States, that children of braceros were likely to become migrants, and that a significant portion of braceros eventually settled permanently in the United States.

Much has also been written specifically about the political economy of the various bracero agreements. Grove (1996) discusses the program in the context of postwar state interventionism, but specifically as a form of insurance to correct a coordination problem that occurs between agricultural labor and growers. Timing is of the utmost importance in agriculture and contracting with migrant laborers allows the grower to reduce the problems associated with relatively undependable domestic labor. Postwar state interventionism is the subject of another work that analyzes the Bracero Program in the context of competing special interests and political alliance among different regional interests (Alston & Ferrie, 1993). They argue that the program was supported by the self-serving, regional motives of agricultural interests in the South and Southwest that desired cheap, dependable labor until technological advances, such as the mechanization of cotton, shifted their efforts away from the issue. The authors use an analysis of votes to support their argument. Basurto et al. (2001) analyze empirically the vote to extend the Bracero Program and find that legislators were influenced by

the competing special interests on both sides of the debate. In his book tracing the legislative development of the Bracero Program over the course of its entire 23 year life, Craig (1971) identifies the various special interests and specific parties that were involved in each policy change. He identifies the incentives of each party and describes how the outcomes were related to relative bargaining position of each group.

Data

In this paper, I use the Mexican Migration Project (MMP), a database created and maintained jointly by Princeton's Office of Population Studies and the University of Guadalajara, to understand and explain the impact of bracero migration on sending communities in Mexico. The MMP is a rich data source that provides detailed information about individuals, households, and communities in Mexico. This source is a series of household interviews conducted from 1987 to the present, covering 134 different communities. Figure 4.1 illustrates the geographical coverage of the survey. For each wave of the survey, communities were chosen according to anthropological criteria (in particular, a sufficiently low sex ratio) in order to ensure that the community has some level of out migration to the United States.[58] This is not a panel survey where the same communities are interviewed in each successive wave. Rather, during each round of surveying new communities are chosen such that a total of 134 have been selected from inception to present.

[58] Selection of communities in this survey is, therefore, not random. Communities are chosen specifically because they will have a substantial amount of out migration to the United States at the time of the survey. I use econometric techniques such as fixed effects regression models and instrumental variables techniques in order to overcome the selection problem.

Figure 4.1—Map Showing Geographical Coverage of MMP Survey

Source: MMP and INEGI.

Within each chosen community, households are selected randomly for the survey. They are asked detailed information from basic demographic data to retrospective life histories to various outcomes for all members of the household. Most importantly for the study, the database provides a retrospective life and migration history for each head of household surveyed. For each individual, therefore, I can identify each reported trip to the United States, the documentation used to migrate, and the length of the trip. Moreover, the survey includes retrospective data that describes the demographic and investment characteristics of the migrant heads of household throughout their life histories. That is, the survey provides time-varying characteristics that I use to identify characteristics of migrants at the time of each trip.

I use the MMP survey data to construct an individual level, panel data set for the Bracero period, 1942 to 1964. An individual is coded a bracero in year *t* if he is in the United States

during that year and he reports using bracero documentation on that trip, coded an illegal migrant in year *t* if he is in the United States during that year and he reports doing so illegally, and a non-migrant in year *t* if he does not report being in the United States during that year.[59] Also included in the panel is data on the individual's age, the level of education he attained, his cumulative experience in the United States, whether or not he was married, the number of children he had, the parcels of land he owned, the hectares of land he owned, the number of properties he owned, and the number of businesses he owned, all at year *t*. Finally, I create an indicator variable for each person-year observation that indicates whether or not the individual acquired a business in year *t*. The sample of individuals is restricted to adult males only and comprises an unbalanced panel with 82,805 person-year observations for 6,928 individuals. Table 4.1 gives summary statistics over all person-year observations in the panel.

Table 4.1—Summary Statistics over all Person-Year Observations

Variable	Observations	Mean	Standard Deviation	Minimum	Maximum
Age (years)	82,805	28.142	8.651	18	75
Education (years)	82,635	2.875	3.302	0	24
Married (%)	82,805	0.550	0.498	0	1
Children	82,761	1.939	2.746	0	18
Land (parcels)	82,805	0.176	0.502	0	4
Hectares	82,805	2.133	25.630	0	1440
Properties	82,805	0.218	0.438	0	6
Businesses	82,805	0.069	0.275	0	4
Business Acquired (%)	82,805	0.005	0.073	0	1
Bracero (%)	82,805	0.039	0.194	0	1
Illegal (%)	82,805	0.014	0.120	0	1

Source: MMP.

Table 4.2 gives information about how migrants compare in years when they travel as a bracero and years when they travel as an illegal migrant. On average, both illegal and bracero trips are made sometime between 27 and 28 years of age. At the time of a bracero trip, individuals are more likely to be married and have slightly more children. At the time of an

[59] Person-year observations are dropped in those instances where reports of migrating or of documentation used are missing. The only types of migration considered in this analysis are bracero and illegal migration. All other reported types are dropped since, in sum, they represent a very small portion of migration to the United States.

illegal trip, however, individuals have slightly more years of education. In terms of assets owned, individuals tend to own more parcels of land and more properties at the time of a bracero trip. Individuals tend to own more hectares of land and more businesses at the time of an illegal trip. At first glance, nothing stands out in terms of selection into one type of trip or the other, except for the fact that married people seem more likely to travel as a bracero than illegally.

Table 4.2—Mean Characteristics at Time of Migration by Trip Type

Variable	Bracero Trip	Illegal Trip
Age (years)	27.979	27.473
Education (years)	2.096	2.415
Married (%)	0.673	0.592
Children	2.424	2.292
Land (parcels)	0.274	0.215
Hectares	2.153	3.790
Properties	0.292	0.224
Businesses	0.059	0.091
Observations	3,238	1,201

Source: MMP.

An important aspect of the data is that I rely on information that is recalled and retrospective in nature. There are potential recall biases that must be considered when conducting the estimation. Smith and Thomas (2003) test the reliability of retrospective migration data and find that more salient events and non-local moves are much more likely to be remembered correctly than the daily details of one's life. I use migration trips that are international moves and purchases of large assets such as businesses. These are important life events and are more likely to be accurately recalled.

Empirical Strategies and Estimation

The Effect of Migration on Subsequent Business Investment

By increasing remittances to Mexico, the Bracero Program provided positive income shocks to participating households that could have been used for investment in new businesses. I

investigate whether an individual who migrated as a bracero experienced greater levels of subsequent investment than an individual who did not migrate. Moreover, I exploit variation in illegal migration to see whether those who migrated illegally experienced greater levels of subsequent investment than those who did not migrate. I first estimate the model given in Equation 1.

$$Business\ Acquired_{i,t+1} = \beta_0 + \beta_1 Bracero_{i,t} + \beta_2 Illegal_{i,t} + \theta_t + \epsilon_{i,t} \qquad (1)$$

This model includes year fixed effects to account for any macro trends that affect all individuals the same in a given year which could confound the estimates. I regress an indicator for whether or not an individual acquired a business in the next year on an indicator for whether they traveled to the United States as a bracero, an indicator for whether they traveled to the United States illegally, and year fixed effects.[60]

The results of the estimation are given in Column 1 of Table 4.3. Traveling as a bracero is associated with a 0.481 percentage point increase in the likelihood that an individual acquires a business in the next year. This result is statistically significant at the 1% level and, more importantly, is economically significant. Consider the average likelihood of business acquisition in the sample of 0.5%. This effect reveals that traveling as a bracero is associated with nearly a 100% increase in the average likelihood that an individual acquires a business in the next year. Moreover, there is no statistically significant effect on subsequent business acquisition for an illegal trip to the United States.

[60] The results are for the estimation of a Linear Probability Model.

Table 4.3—Initial Business Acquisition Regressions with and without Individual Fixed Effects

VARIABLES	(1) Business Acquired in t+1	(2) Business Acquired in t+1
Bracero	0.00481***	0.00586***
	(0.00185)	(0.00220)
Illegal	0.00266	-0.000192
	(0.00274)	(0.00373)
Constant	0.00395**	0.00471**
	(0.00183)	(0.00184)
Year Fixed Effects	Yes	Yes
Individual Fixed Effects	No	Yes
Observations	75,794	75,794
R-squared	0.001	0.002
Number of Individuals		6,547

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: MMP.

It is likely that those who choose to migrate are a self-selected group and that they possess characteristics, both observable and unobservable, that differ systematically from those that do not choose to migrate.[61] If these characteristics are correlated with business acquisition, then this selection on unobservable characteristics will cause omitted variables bias in my estimates. I address this problem by exploiting within person variation in migration and including individual fixed effects in the regression specification. In this way, I compare outcomes for the same individual in years when they migrated as a bracero to years when they did not migrate as a bracero (and the same for illegal migration), thereby differencing out any potentially omitted characteristics that do not vary within individual over time. I estimate the model given by Equation 2.

[61] These characteristics may include things like ambition, ability, willingness to take risks, etc. Since they are generally unobservable, they are omitted and could be a potential source of bias.

$$Business\ Acquired_{i,t+1} = \beta_0 + \beta_1 Bracero_{i,t} + \beta_2 Illegal_{i,t} + \theta_t + \gamma_i + \epsilon_{i,t} \quad (2)$$

I regress an indicator variable for whether or not a person acquired a business in the next year on an indicator for whether or not they traveled to the United States as a bracero, an indicator for whether or not they traveled to the United States illegally, year fixed effects, and individual fixed effects.[62]

The results of this estimation are given in Column 2 of Table 4.3. I show that an individual migrant is 0.586 percentage points more likely to acquire a business in the next year when they travel to the United States as a bracero than in years when they do not migrate. This is statistically significant at the 1% level and also economically significant. Given the average likelihood of business acquisition in the sample, this is over a 100% increase in the likelihood that an individual will acquire a business. Furthermore, the point estimate for the bracero effect increases with the inclusion of individual fixed effects. This implies that the estimates in Column 1 are negatively biased and might be evidence of negative selection on unobservable characteristics into bracero migration. For instance, if ability is a time invariant individual characteristic that leads to more business acquisition, then these results imply those with lower ability select into bracero migration. Again, there is no statistically significant effect of illegal migration on subsequent business acquisition.

The individual fixed effects model accounts for all time invariant, unobservable individual characteristics that could cause a bias in the estimates. It might be the case that individual-specific factors that do vary over time are correlated with both bracero migration and subsequent business acquisition. If this is true, then the estimates I obtain in the individual fixed effects model are still plagued by omitted variables bias.

[62] These results are for the estimation of a Linear Probability Model.

For example, it might be the case that individual migration patterns are linked to certain milestones in their lives. People might be more likely to migrate as braceros when they have families (i.e., if they are married and/or have children) to take care of, but less likely to start businesses if they can't take the financial risk with these dependents. People might be less likely to migrate once they gain higher levels of education since they have more opportunity in Mexico, but more likely to start businesses with their new knowledge. Older people might be less likely to migrate as the work in the fields in the United States is physically demanding, but more likely to start businesses as they have greater savings. The MMP survey provides information about the age, marital status, number of children, and educational attainment for individuals at each year in the life history. I use this information and estimate the model given in Equation 3.

$$Business\ Acquired_{i,t+1} = \beta_0 + \beta_1 Bracero_{i,t} + \beta_2 Illegal_{i,t} + \delta' X_{it} + \theta_t + \gamma_i + \epsilon_{i,t} \quad (3)$$

I regress an indicator variable for whether or not an individual acquires a business in the next year on an indicator for whether or not the individual migrated as a bracero, an indicator for whether or not the individual migrated illegally, a vector of controls (including marital status, age, number of children, and educational attainment), year fixed effects, and individual fixed effects.[63]

The results of this estimation are given in Column 1 of Table 4.4. The inclusion of these time-varying, individual characteristics does not change the estimates for the bracero effect on subsequent business acquisition in any substantial way.[64] It is still the case that a bracero trip leads to greater than a 100% increase in the average likelihood that an individual acquires a

[63] The results are given for a Linear Probability Model.

[64] They don't change the result for illegal migration either.

business. Furthermore, all of the controls have the expected sign (as explained previously). It does not appear that lifestyle or milestone "shocks" to an individual can account for the positive effect of bracero migration on business acquisition.

Table 4.4—Business Acquisition Regression with Time-Varying Characteristics

VARIABLES	(1) Business Acquired in t+1
Bracero	0.00594***
	(0.00220)
Illegal	-0.000160
	(0.00374)
Married	-0.000838
	(0.00116)
Age	0.000155
	(0.000118)
Education (years)	0.000653*
	(0.000386)
Children	-0.000656**
	(0.000292)
Constant	-2.96e-05
	(0.00343)
Year Fixed Effects	Yes
Individual Fixed Effects	Yes
Observations	75,595
Number of Individuals	6,534
R-squared	0.002

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: MMP.

It is possible that there remain unobservable shocks that an individual faces which affect both the decision to migrate as a bracero and the ability to invest in new businesses. It is important to note, however, that the shocks which drove most people to bracero migration were negative shocks. Failed crops, extreme poverty, drought, and other events which made life hard at home induced many to leave their families and make the long, arduous trip to the United

States. These extreme, negative shocks are likely to be negatively correlated with new business investment. Households that are facing conditions that make it hard to survive are unlikely to have the means to invest in new businesses. Thus, any remaining problems from omitted or unobserved factors are likely to cause my estimates to be negatively biased. The bias works against the positive effect on bracero migration that I find, and my estimate is likely to be a lower bound on the true effect.

In all versions of the model that I estimate, I find a statistically and economically significant, positive effect of bracero migration on business investment. All of the fixed effects regressions show a negative, statistically insignificant effect for illegal migration on business acquisition. This would imply that bracero migration provides a greater boost to individual investment in the next period than illegal migration.

The estimated effect of bracero migration is identified from two different types of people. The first type of person is a person that chooses only to migrate as a bracero over the time from 1942 to 1964. The second type of person is a person that chooses to migrate both as a bracero and as an illegal migrant during that time. The estimate is simply a weighted average over these two types. Similarly, the estimated effect of illegal migration is identified from two types of people. The first type of person is a person that chooses to migrate only illegally over the time from 1942 to 1964. The second type of person is the person that chooses both bracero and illegal trips over that time. Again, the estimate is simply a weighted average over these two types. These three types of individuals are likely to be very different and perhaps have different motives for migration. The estimated bracero effect might be most representative of "bracero only" types that choose bracero migration because they are most suited for it or because they are most suited to reap the benefits. To better understand the estimated impact of bracero migration

relative to illegal migration, I separate this effect. The effect on those individuals with both bracero and illegal migration experience will give a good idea of how the effect of bracero migration compares to the effect of illegal migration for those individuals that are actually willing to choose between the two types.

Firstly, I create an indicator variable for whether or not an individual is a type that migrates as both a bracero and an illegal migrant over the period from 1942 to 1964. I estimate the model given by Equation 2, except I add an interaction term between this new variable and the bracero indicator, as well as an interaction term between the new variable and the illegal indicator. The main effect of being a "both" type cannot be identified since it does not vary within individual. The results of the estimation are given in Column 1 of Table 4.5. The bracero interaction term is positive. This reveals that the bracero effect for types that switch between bracero and illegal migration is actually more positive than the effect for those that only choose bracero migration. Likewise, the illegal interaction term is negative. This reveals that the illegal effect for types that switch between bracero and illegal migration is actually more negative that the effect for those that only choose illegal migration. Thus, I find no evidence that the business acquisition "premium" to bracero migration is a result of a bracero "type" effect. In fact, I find that the premium to bracero migration is actually larger for those that avail themselves of the full menu of migration options.

Table 4.5—Business Acquisition Regressions for Different Types

VARIABLES	(1) Business Acquired in t+1	(2) Business Acquired in t+1
Bracero	0.00416*	0.0111*
	(0.00232)	(0.00591)
Illegal	0.00281	-0.00317
	(0.00569)	(0.00472)
Bracero*Both	0.00756	
	(0.00627)	
Illegal*Both	-0.00519	
	(0.00733)	
Constant	0.00471**	0.00161
	(0.00184)	(0.00236)
Year Fixed Effects	Yes	Yes
Individual Fixed Effects	Yes	Yes
Observations	75,794	3,924
R-squared	0.002	0.009
Number of Individuals	6,547	240

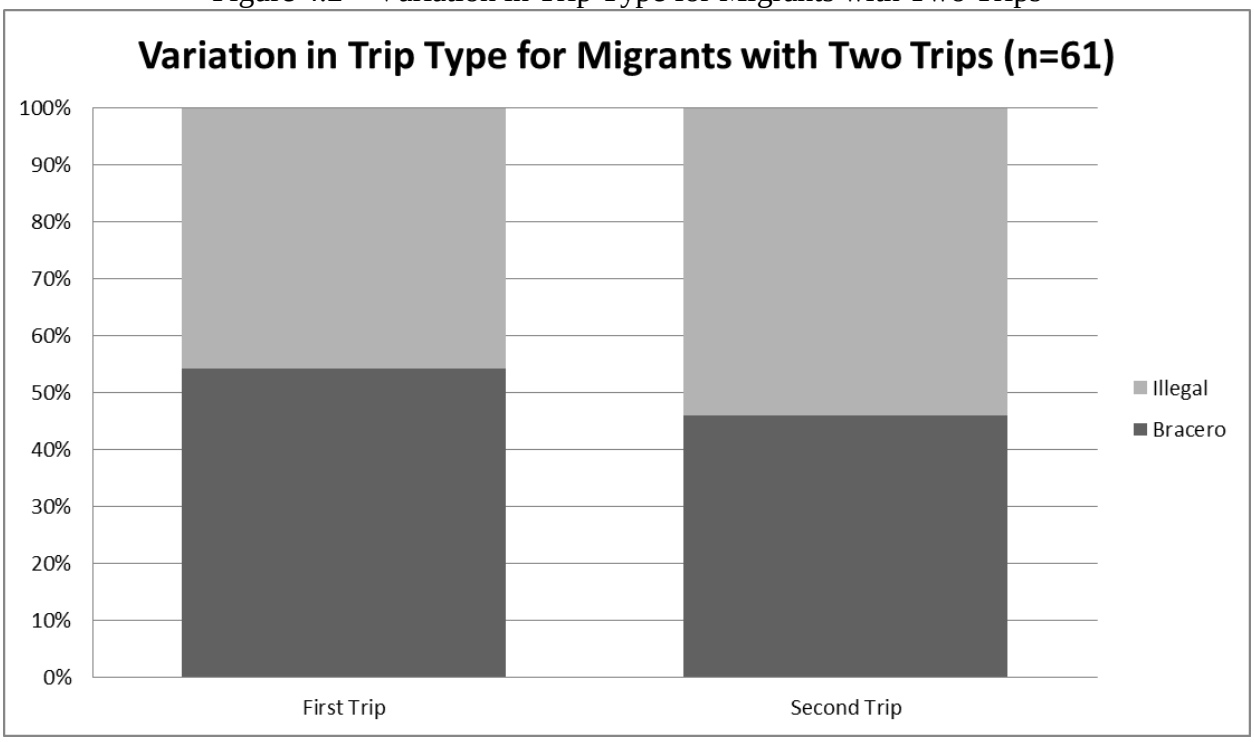
Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: MMP.

Secondly, I estimate the model in Equation 2 for the 240 individuals in the sample that are "switchers" or that choose both bracero and illegal migration over the time of the program. The results of this estimation are given in Column 2 of Table 4.5. I find that for "switcher" types, bracero trips are associated with a one percentage point increase in the likelihood of acquiring a business in the next year. Comparing this to the average level of business acquisition in the total sample, this is a 200% increase in the average likelihood of business acquisition. It is economically significant and statistically significant at the 10% level. I am not surprised by the loss in statistical significance since the sample size is dramatically reduced. Illegal trips are associated with a negative effect on subsequent business acquisition, although this estimate is not statistically significant. This is further evidence that for those individuals who can be reasonably

expected to choose between and take both bracero trips and illegal trips, the trips as braceros were much more advantageous in terms of their ability to contribute to subsequent investments. There seems to be a business acquisition "premium" to bracero migration relative to illegal migration.

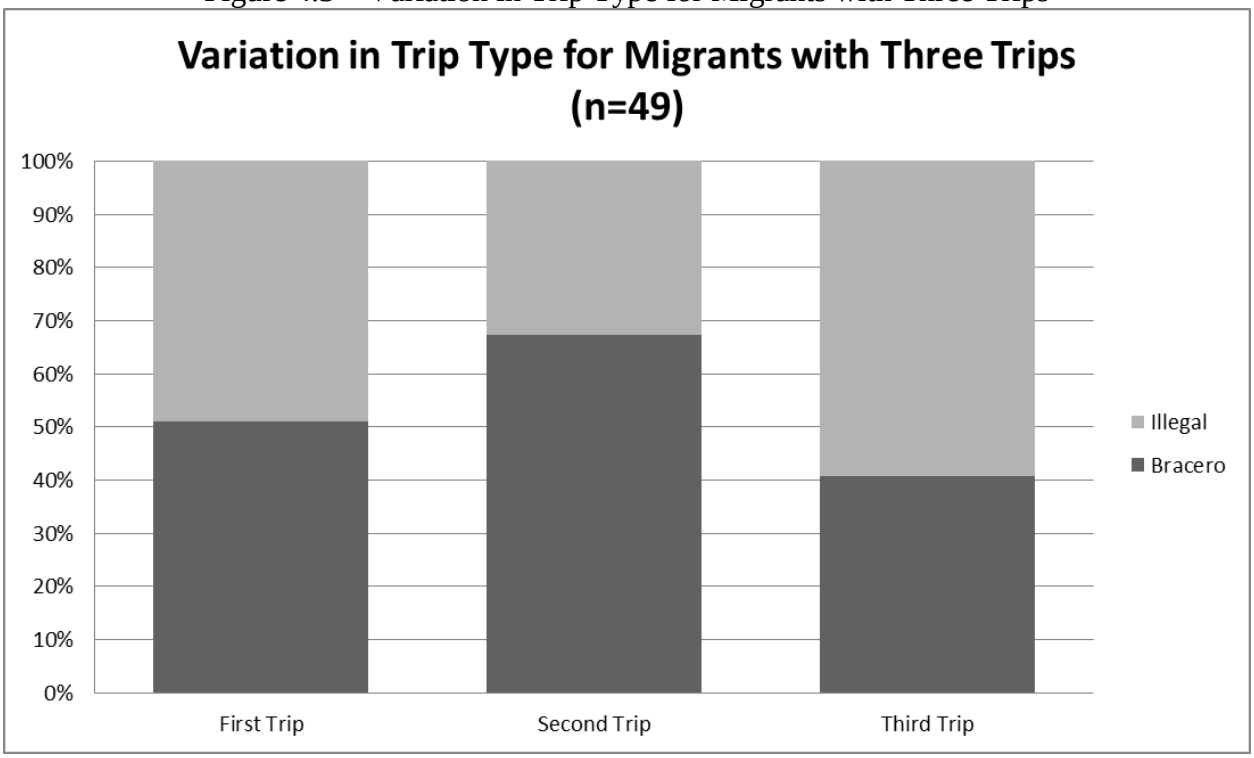
This might not be a true premium if there is a systematic pattern to individual migration. If "switchers" choose illegal migration for specific purposes and bracero migration for specific purposes, the estimated gap might simply be a result of this pattern. For example, if an individual who makes two trips were to always travel illegally first and then as a bracero second, I would expect their business acquisition to be greater after bracero migration. They might end their migrant career as a bracero and use accumulated earnings to acquire a business. To investigate this possibility, I provide some descriptive evidence to the contrary. Figures 4.2 through 4.4 show that there does not appear to be any pattern in terms of the relationship between trip number and the type of trip taken. For switchers with two, three, and four trips, the proportion going as braceros and the proportion going as an undocumented migrant is approximately 50 percent for each trip. Figures 4.5 and 4.6 show that specific combinations of trip histories for switchers with three and four trips do not overwhelmingly dominate in the sample of "switchers." Although certain combinations are more popular than others, pattern stands out that would suggest a pattern of strategic migration particularly for the starting of new businesses. This evidence suggests that there is no systematic pattern to illegal and bracero migration for "switcher" types, in terms of the order of the trips that are taken.

Figure 4.2—Variation in Trip Type for Migrants with Two Trips



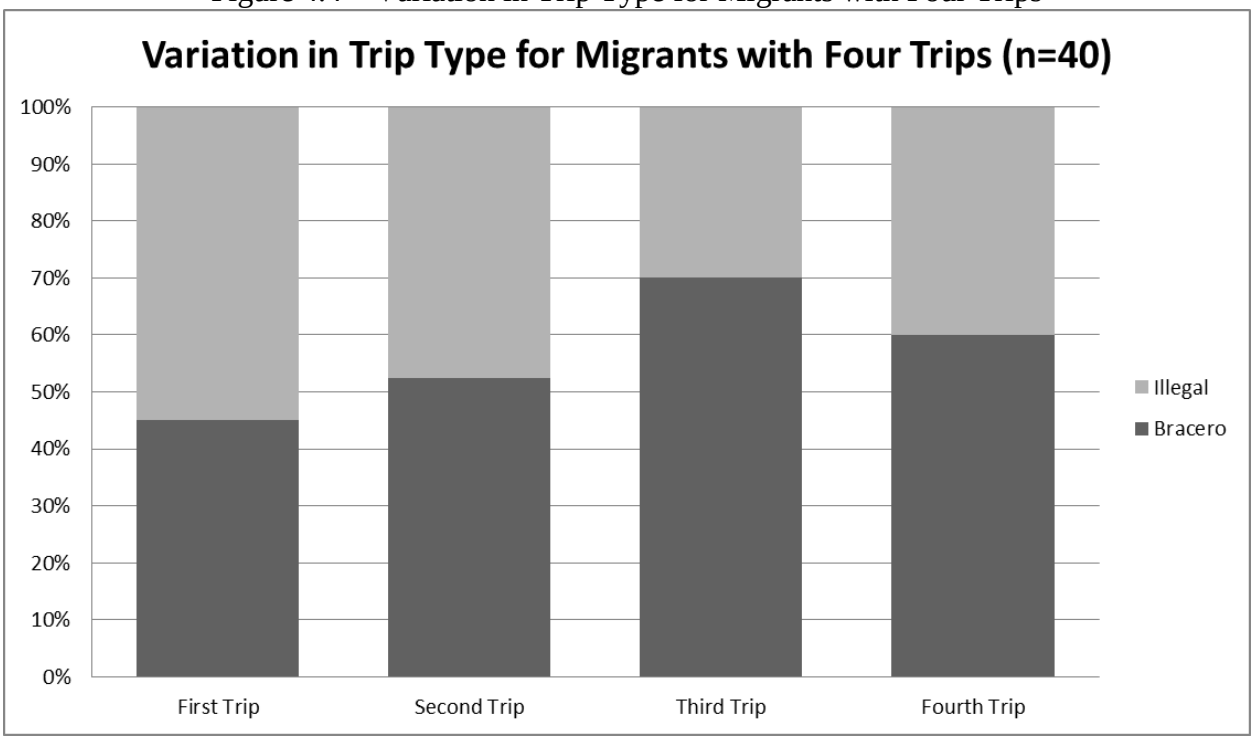
Source: MMP.

Figure 4.3—Variation in Trip Type for Migrants with Three Trips



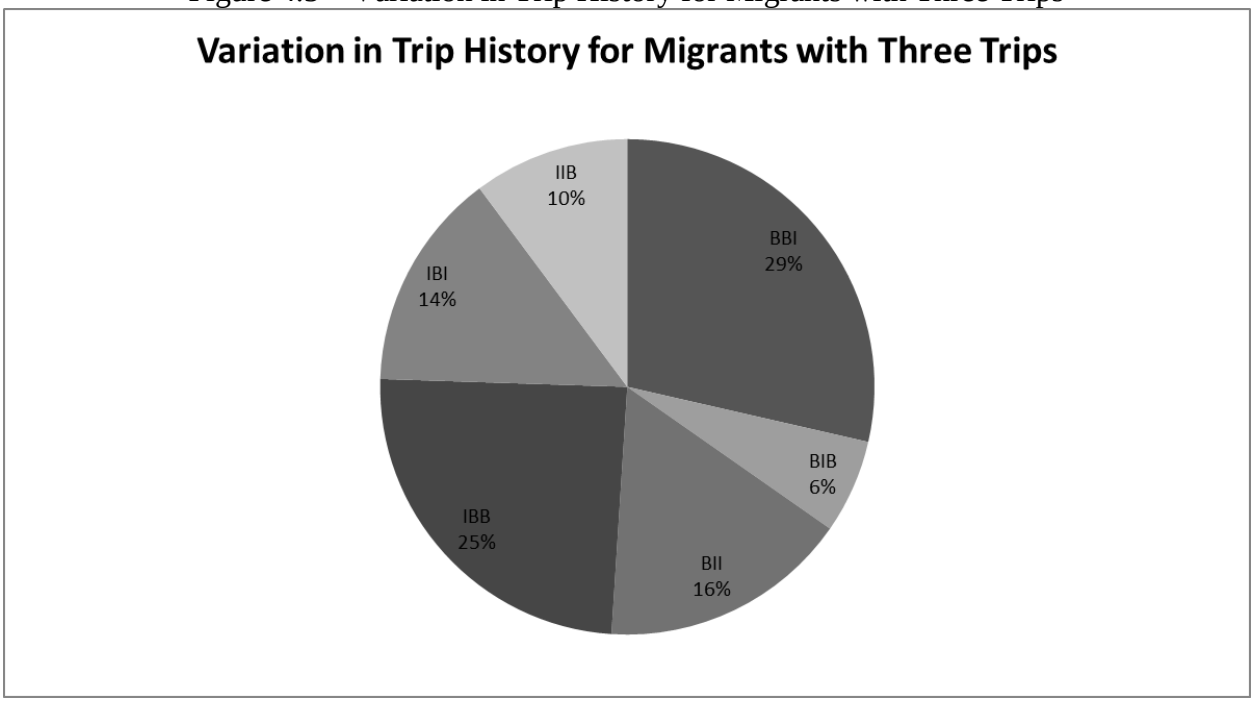
Source: MMP.

Figure 4.4—Variation in Trip Type for Migrants with Four Trips



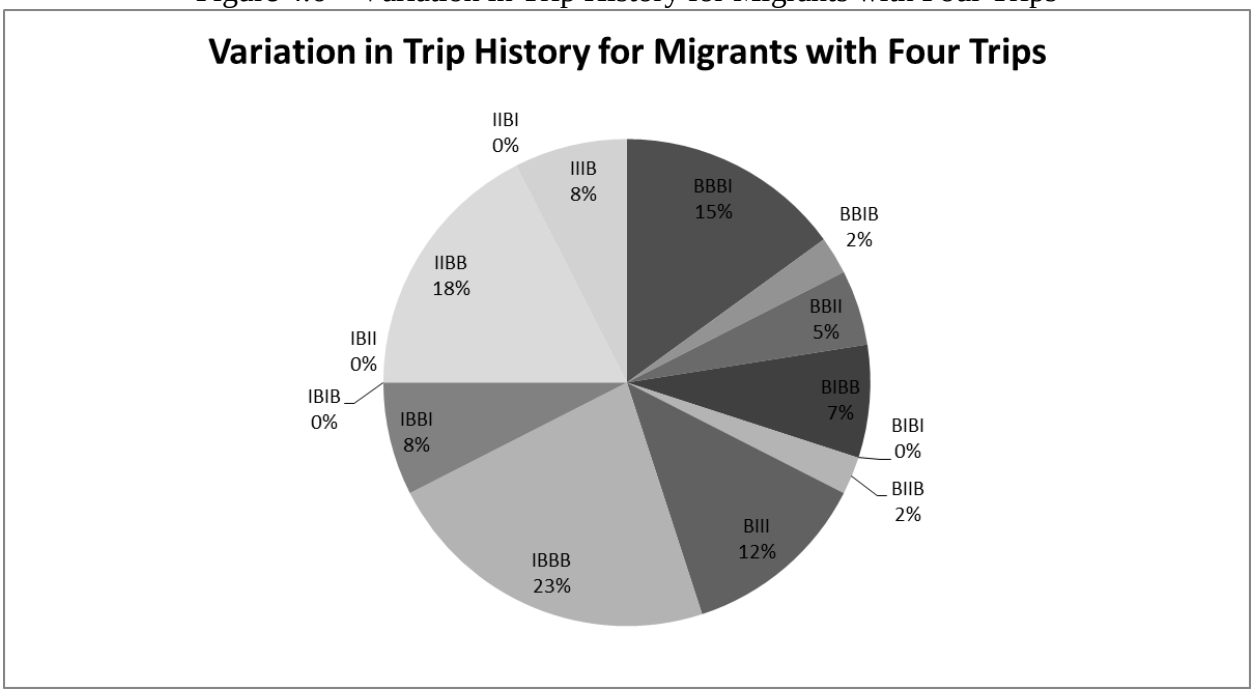
Source: MMP.

Figure 4.5—Variation in Trip History for Migrants with Three Trips



Source: MMP.

Figure 4.6—Variation in Trip History for Migrants with Four Trips



Source: MMP.

A final possibility to consider is trip duration. It might be that bracero migrants are more likely to start a business in the year following the trip because they are more likely to be home that year. If illegal trips to the United States lasted longer, then the effect on business starts might not appear until some years later. In Table 4.6 I explore this possibility. I regress an indicator for whether or not an individual started a business in the current year on an indicator for whether he left for a trip in any of the five years previous, the current year, or any of the five years after, for both bracero and illegal trips. The results show that only taking a trip as a bracero to the United States in at least one of the five years prior causes an increase to start a new business in the propensity to start a new business. These results suggest that, at least on a five year lag, it is not the delay from longer trips abroad driving the difference between the effect of bracero and illegal trips.

Table 4.6—Business Acquisition Regression with Lags and Leads

VARIABLES	(1) Busines Acquired
Bracero Previous Five	0.00341**
	(0.00149)
Bracero	0.000283
	(0.00174)
Bracero Ahead Five	0.000699
	(0.00143)
Illegal Previous Five	0.00248
	(0.00224)
Illegal	-0.00433
	(0.00299)
Illegal Five Ahead	-0.00292
	(0.00192)
Constant	0.000365
	(0.000543)
Year Fixed Effects	Yes
Individual Fixed Effects	Yes
Observations	82,805
R-squared	0.002
Number of Individuals	6,928

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: MMP.

Survival Analysis to Investigate the Timing of Business Investment

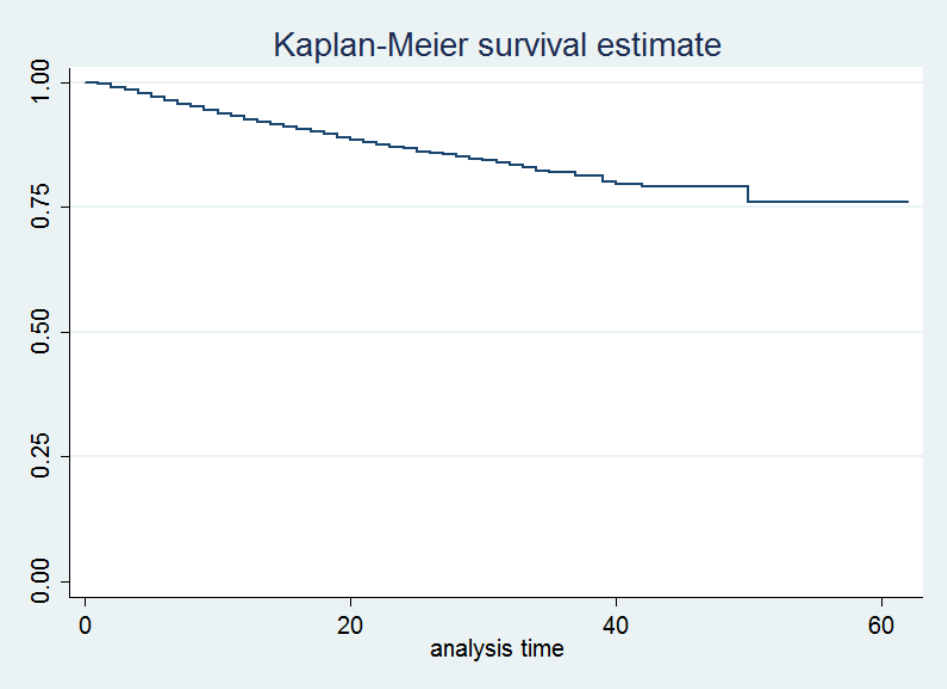
In order to explore the timing of business decisions, I use survival or duration analysis. In this case, the analysis will describe the time to "failure," which is an individual's time to starting his first new business. I create a sample of males who were born no later than 1946, in order to only capture those who could have participated in the Bracero Program. The sample is censored on the right at 1965 to only capture those business decisions that occurred immediately

after migrations during the time of the Bracero Program.[65] I create a sample with multiple records per individual (so that I can include covariates that change in value over time), and drop any person-year observations that occur before age 18. In the language of survival analysis, a "failure" is defined as the first business start and an individual becomes at risk of failure at age 18. If a person does not start his first business by 1965, he is considered "censored" on the right hand side. This scheme gives a sample of 6,824 subjects with a total of 111,364 records and 661 observed failures (i.e., new business starts).

In Figure 4.7, I show the Kaplan-Meier survival estimates for the entire sample. A visual inspection of the graph reveals that by the end of the analysis time only 75% of those at risk remain without a business. This evidence suggests that although not common, people in the sample were starting businesses. In Figure 4.8, I show the Kaplan-Meier failure estimates for the entire sample. These show the inverse of the estimates in Figure 4.7. By the end of the analysis time 25% of those at risk had "failed" by starting new businesses. Again, this shows that people in the sample were starting new businesses.

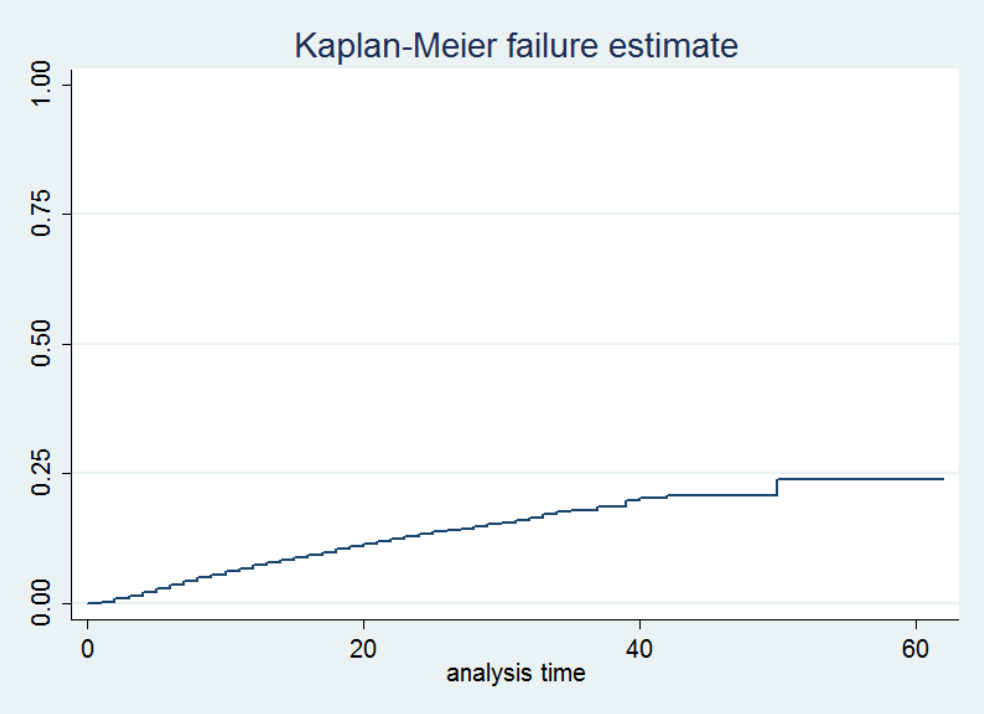
[65] This bound on the right hand side can be adjusted higher to account for longer-post migration periods of observation.

Figure 4.7—Kaplan Meier Survival Estimate



Source: MMP.

Figure 4.8—Kaplan Meier Failure Estimate



Source: MMP.

The Kaplan-Meier estimates do not show how covariates affect the hazard of starting a new business in the sample. I utilize a Cox proportional hazards regression model to explore the effect of covariates on new business starts.[66] The results of the estimation are reported in Table 4.7. In Column 1, I regress the time to starting the first business on an indicator for whether the individual took a trip to the United States as a bracero in the previous year. I find that bracero migration in the previous year increases the hazard of starting a new business by 87.5% compared to baseline, an effect that is both statistically and economically significant. I also find that other types of migration increase the hazard of new business creation, but these are not as significant. In Column 2, I regress the time to starting the first business on an indicator for whether the individual took an illegal trip to the United States in the previous year. I find that illegal migration in the previous year is associated with a 69.4% increase in the baseline hazard of starting a new business. This is smaller than the bracero effect and is only statistically significant at the 10% level. In Column 3 I include both indicators in the same regression and find consistent results. A bracero trip in the previous year is associated with a statistically significant 88.9% increase in the baseline hazard of starting a new business, while an illegal trip in the previous year is only associated with a 73.9% increase in the baseline hazard. Columns 4 through 6 repeat the same regressions, but include both year of birth and state of birth fixed effects. These account for any temporal or spatial factors that could confound the estimates. The resulting estimates are very similar to those in the first three columns. Bracero migration in the previous year is associated with a statistically significant increase in the hazard of starting a new business while an illegal trip in the previous year is associated with a smaller and less

[66] The Cox model does not require any specification or parameterization of the baseline hazard function. It only requires the assumption that the shape of the hazard function is the same for all subjects. I am currently working on tests of this proportionality assumption and so they are not included in this draft.

statistically significant increase in the same hazard. Overall, this analysis shows that a bracero trip in the previous year is associated with an increase of 80 to 90 percent in the baseline hazard of starting a new business.

Table 4.7—Survival Analysis for First New Business Starts

VARIABLES	(1) _t	(2) _t	(3) _t	(4) _t	(5) _t	(6) _t
Bracero Trip in Previous Year	1.875***		1.889***	1.791***		1.809***
	(0.331)		(0.334)	(0.323)		(0.327)
Illegal Trip in Previous Year		1.694*	1.739*		1.537	1.592
		(0.520)	(0.534)		(0.477)	(0.495)
Year of Birth Fixed Effects				X	X	X
State of Birth Fixed Effects				X	X	X
Observations	111,364	111,364	111,364	111,364	111,364	111,364

Notes: Robust seeform in parentheses. *** p<0.01, ** p<0.05, * p<0.1.
Source: MMP.

Concluding Remarks

The Bracero Program provided individual bracero migrants with greater income than what they could earn at home. I show that the braceros did indeed use these positive shocks to their income to make subsequent investments in productive assets, such as new businesses. These new businesses likely provided a boost to economic growth and development in the communities that sent braceros to the United States. This shows that guest worker programs can be used as effective development policy to help encourage investment in poor areas. Furthermore, I show that there was a business acquisition "premium" to bracero migration. Individuals who made bracero trips were more likely to make subsequent investments in new businesses than those who made illegal trips to the United States. Despite the criticisms that there was little difference between bracero and illegal migration, I show that there were real returns to bracero migration that did not accrue to illegal migration.

CHAPTER 5

CONCLUSIONS

Mexican migration to the United States is an issue that maintains a prominent position in today's economic and political debate. I take a historical approach, analyzing early episodes of migration from Mexico to the United States. This analysis makes several important contributions, both improving our understanding of the history of migration and providing insights for policymakers today.

In the first paper, my co-author and I build a novel database of migrant heights. We find that in an era of very few institutional restrictions on migration, migrants from Mexico were positively selected. This could have long-lasting impacts on economic development in Mexico and the United States, leading to a drain of quality workers in the former while affecting the composition of migrant networks and improving the overall quality of the migrant worker stock in the latter. To better understand this last point, we take our analysis one step further than the literature generally does to directly analyze the impact of return migration. We find that there was no differential selection into return migration and so the shocks that caused many to return home likely had little impact on the quality of the migrant stock in the United States.

In the second paper, I examine a historical guest worker program, the Bracero Program, and utilize a unique, institutional feature of this policy to identify the causal impact of temporary worker migration on human capital investments back home in Mexico. I find that bracero migration caused increases in school enrollments, especially at the marginal years of education and relatively more for girls than for boys. These effects likely improved human development in the sending communities and increased human capital so as to put these places on the path to greater economic growth.

In the third paper, I re-examine the Bracero Program, but look this time for the causal impact of that policy on investments in physical capital and entrepreneurial activities. Temporary worker migration caused increases in the likelihood of starting new businesses in Mexico. These productive investments likely improved the lives of the migrants and their families, while also fueling economic growth in the communities where they were made. Taken with the results from the second paper, this work provides an important lesson for policymakers today. It shows how good migration policy, such as a guest worker program, could be a good development policy as well.

My dissertation provides new evidence that both improves our understanding of the long migration history between Mexico and the United States and informs policymakers today. I show that the best workers from Mexico came to the United States when restrictions were low, that return migrants were indistinguishable from permanent migrants in terms of quality, and that temporary agricultural workers who came to the United States under the Bracero Program used the money they earned abroad to invest in both human and physical capital back home. More broadly I show how few restrictions and a circular flow of migrants can benefit the economies of both sending and receiving countries.

BIBLIOGRAPHY

Abramitzky, R., Boustan, L. P., & Eriksson, K. (2010). Europe's Tired, Poor, Huddled Masses: Self-selection and Economic Outcomes in the Age of Mass Migration. National Bureau of Economic Research, Inc., NBER Working Papers. ([URL:http://www.nber.org/papers/w15684.pdf] URL)

Abramitzky, R., Boustan, L. P., & Eriksson, K. (2012). Europe's Tired, Poor, Huddled Masses: Self-Selection and Economic Outcomes in the Age of Mass Migration. *American Economic Review 102*(2), 1832–56.

Abramitzky, R., Boustan, L. P., & Eriksson, K. (2014). A Nation of Immigrants: Assimilation and Economic Outcomes in the Age of Mass Migration. *Journal of Political Economy 122*(3), 467–506.

A'Hearn, B., Baten J., and Crayen, D. (2009). Quantifying Quantitative Literacy: Age Heaping and the History of Human Capital. *The Journal of Economic History 69*(3), 783–808.

Angelucci, M. (2012). US Border Enforcement and the Net Flow of Mexican Illegal Migration. *Economic Development and Cultural Change 60*(2), 311–57.

Alston, L. J., & Ferrie, J. P. (1993). The Bracero Program and Farm Labor Legislation in World War II. *The Sinews of War: Essays on the Economic History of World War II (Iowa State University Press, Ames, Iowa)*, 129-149.

Anderson, H. (1976). *The Bracero Program in California*. New York: Arno Press.

Andrade de Herrera, V. (1996) "Education in Mexico: Historical and Contemporary Education Systems." Chapter 3 in *Children of La Frontera: Binational Efforts to Serve Mexican Migrant and Immigrant Students*. By J.L. Flores. ERIC/CRESS, PO Box 1348, Charleston, WV 25325.

Antman, F. M. (2011). The Intergenerational Effects of Paternal Migration on Schooling and Work: What Can We Learn from Children's Time Allocations? *Journal of Development Economics, 96*(2), 200-208.

Antman, F. M. (2012). Gender, Educational Attainment, and the Impact of Parental Migration on Children Left Behind. *Journal of Population Economics, 25*(4), 1187-1214.

Antman, F.M. (2015). Gender Discrimination in the Allocation of Migrant Household Resources. *Journal of Population Economics*, Forthcoming.

Armstrong, A., & Lewis, F. (2009). Capital Constraints and European Migration to Canada: Evidence from the 1920s Passenger Lists. Queen's University, Department of Economics, Working Papers). ([URL:http://www.econ.queensu.ca/working_papers/papers/qed_wp_1230.pdf] URL).

Baland, J. M., & Robinson, J. A. (2000). Is Child Labor Inefficient? *Journal of Political Economy*, *108*(4), 663-679.

Balderrama, F. E., & Rodriguez, R. (2006). *Decade of Betrayal: Mexican Repatriation in the 1930s*. Albuquerque: University of New Mexico Press.

Bandiera, O., Rasul, I. & Viarengo, M. (2013). The Making of Modern America: Migratory Flows in the Age of Mass Migration. *Journal of Development Economics 102*, 23–47.

Basurto, L., DeLorme, C. D., Jr, & Kamerschen, D. R. (2001). Rent Seeking, the Bracero Program and Current Mexican Farm Labor Policy. *International Economic Journal*, *15*(1), 21-40.

Biavaschi, C., Giulietti, C., & Siddique, Z. (2013). "The Economic Payoff of Name Americanization." IZA Discussion Paper No. 7725, Bonn.

Bloch, L. (1929). Facts about Mexican Immigration before and since the Quota Restriction Laws. *Journal of the American Statistical Association 24*(165), 50–60.

Bodenhorn, H., Guinnane, T., & Mroz, T. (2013). "Problems of Sample-Selection Bias in the Historical Heights Literature: A Theoretical and Econometric Analysis." Yale Economics Department Working Paper No. 114, New Haven, CT.

Borjas, G. J. (1985). Assimilation, Changes in Cohort Quality, and the Earnings of Immigrants. *Journal of Labor Economics 3*(4), 463–89.

Borjas, G. J. (1987). Self-Selection and the Earnings of Immigrants. *The American Economic Review 77*(4), 531–53.

Borjas, G. J. & Bratsberg, B. (1996). Who Leaves? The Out-Migration of the Foreign-Born. *Review of Economic and Statistics 78*(1), 165–76.

Bound, J., Jaeger, D. A. & Baker, R. M. (1995). Problems with Instrumental Variables Estimation when the Correlation between the Instruments and the Endogenous Explanatory Variable is Weak. *Journal of the American Statistical Association*, *90*(430), 443-450.

Cardenas, G. (1975). United States Immigration Policy toward Mexico: An Historical Perspective. *Chicano Law Review 2*, 66–91.

Cardoso, L. A. (1976). Labor Emigration to the Southwest, 1916 to 1920: Mexican Attitudes and Policy. *The Southwestern Historical Quarterly 79*(4), 400–16.

Cardoso, L. A. (1980). *Mexican Emigration to the United States, 1897–1931: Socio-Economic Patterns*. Tucson: University of Arizona Press.

Carter, S. et al., eds. (2006). *The Historical Statistics of the United States: Millennial Edition.* 5 vols. New York: Cambridge University Press.

Case, A. & Paxson, C. (2008). Stature and Status: Height, Ability, and Labor Market Outcomes. *Journal of Political Economy 116*(3), 499–532.

Chiquiar, D. & Hanson, G. H. (2005). International Migration, Self-Selection, and the Distribution of Wages: Evidence from Mexico and the United States. *Journal of Political Economy 113*(2), 239–81.

Chiswick, B. R. (1978). The Effect of Americanization on the Earnings of Foreign-Born Men. *The Journal of Political Economy 86*(5), 897–921.

Clark, V. S. (1908). Department of Commerce and Labor. *Bulletin of the Bureau of Labor. Volume 16*.

Coatsworth, J. H. (1981). *Growth against Development: The Economic Impact of Railroads in Porfirian Mexico.* DeKalb: Northern Illinois University Press.

Collins, W. J. & Wanamaker, M. H. (2014). Selection and Economic Gains in the Great Migration of African Americans: New Evidence from Linked Census Data. *American Economic Journal: Applied Economics 6*(1), 220–52.

Craig, R. B. (1971). *The Bracero Program: Interest Groups and Foreign Policy*. Austin: University of Texas Press.

Delano, A. (2011). *Mexico and its Diaspora in the United States*. New York: Cambridge University Press.

Duflo, E. (2003). Grandmothers and Granddaughters: Old-Age Pensions and Intrahousehold Allocation in South Africa. *The World Bank Economic Review*, *17*(1), 1-25.

Durand, J. (2007). *Braceros: Las miradas Mexicana y Estadounidense*. Mexico: Universidad Autonoma de Zacatecas.

Ettinger, P. W. (2009). *Imaginary Lines: Border Enforcement and the Origins of Undocumented Immigration*. Austin: University of Texas Press.

Feliciano, Z. M. (2001). The Skill and Economic Performance of Mexican Immigrants from 1910 to 1990. *Explorations in Economic History 38*(3), 386–409.

Ferrie, J. P. (1994). The Wealth Accumulation of Antebellum European Immigrants to the U.S., 1840-60. *Journal of Economic History*, *54*(1), 1-33.

Ferrie, J. P. (1997). The Entry into the U.S. Labor Market of Antebellum European Immigrants, 1840-1860. *Explorations in Economic History*, *34*(3), 295-330.

Ferrie, J. P. (1999). *Yankeys Now: Immigrants in the Antebellum US 1840–1860*. Oxford: Oxford University Press.

Foerster, R. F. and United States. (1925). *The Racial Problems Involved in Immigration from Latin America and the West Indies to the United States: A Report Submitted to the Secretary of Labor*. Washington: Government Printing Office.

Galarza, E. (1964). *Merchants of Labor: The Mexican Bracero Story*. Charlotte: McNally & Loftin Publishers.

Gibson, J. & McKenzie, D. (2010). The Development Impact of New Zealand's RSE Seasonal Worker Policy. Working Paper.

Gibson, J. & McKenzie, D. (2011). Eight Questions about Brain Drain. *The Journal of Economic Perspectives 25(3),* 107–128.

Goldin, C. (1994). The Political Economy of Immigration Restriction in the United States, 1890 to 1921. In *The Regulated Economy: A Historical Approach to Political Economy*, edited by Claudia Goldin and Gary Libecap, 223–58. Chicago: University of Chicago Press.

Gould, J. D. (1980). European Inter-Continental Emigration. The Road Home: Return Migration from the USA. *Journal of European Economic History 9*(1), 41–112.

Gratton, B. & Merchant, E. (2013). Immigration, Repatriation, and Deportation: The Mexican-Origin Population in the United States, 1920–1950. *International Migration Review 47*(4), 944–75.

Greenwood, M. J. (2007). Modeling the Age and Age Composition of Late 19th Century U.S. Immigrants from Europe. *Explorations in Economic History, 44*(2), 255-269.

Greenwood, M. J. (2008). Family and Sex-specific U.S. Immigration from Europe, 1870-1910: A Panel Data Study of Rates and Composition. *Explorations in Economic History, 45*(4), 356-382.

Grove, W. (1996). The Mexican Farm Labor Program, 1942-1964: Government-Administered Labor Market Insurance for Farmers. *Agricultural History, 70*(2), 302.

Gutiérrez, D. G. (1995). *Walls and Mirrors: Mexican Americans, Mexican Immigrants, and the Politics of Ethnicity.* Oakland: University of California Press.

Gutmann, M. P., McCaa, R., Gutiérrez Montes, R., & Gratton, B. (2000). Los efectos demográficos de la Revolución Mexicana en Estados Unidos. *Historia Mexicana 50*(1), 145–65.

Hanson, G.H. & Woodruff, C. (2003). Emigration and Educational Attainment in Mexico. Working Paper.

Hatton, T. J. & Williamson, J. G. (1998). *The Age of Mass Migration: Causes and Economic Impact.* New York: Oxford University Press.

Hatton, T. J. & Williamson, J. G. (2006). International Migration in the Long Run: Positive Selection, Negative Selection, and Policy. In *Labor Mobility and the World Economy*, edited by Federico Foders and Rolf J. Langhammer, 1–31. Heidelberg: Springer.

Helper, S., Levine, D.I., & Woodruff, C. (2006). How Does Economic Liberalization Affect Investment in Education?: Evidence from Mexico. Paper prepared for the ERBD Policy Conference on Institutional Development, Market Integration and Growth in Emerging Markets, Tokyo, April 3, 2006.

Hildebrandt, N., & McKenzie, D. J. (2005). The Effects of Migration on Child Health in Mexico. *Economia: Journal of the Latin American and Caribbean Economic Association, 6*(1), 257-284.

Hoffman, A. (1974). *Unwanted Mexican Americans in the great depression: Repatriation pressures, 1929–1939*. Tucson: The University of Arizona Press.

Humphries, J. & Leunig, T. (2009). Was Dick Whittington Taller than those He Left Behind? Anthropometric Measures, Migration and the Quality of Life in Early Nineteenth Century London? *Explorations in Economic History 46*(1), 120–31.

Knight, A. (1986). *The Mexican Revolution*. Cambridge Latin American Studies. Vol. 54–55. Cambridge; New York: Cambridge University Press.

Kosack, E. (2014). The Bracero Program and Effects on Human Capital Investments in Mexico, 1942-1964. Working Paper.

Kosack, E. (2014). The Bracero Program and Individual Investment. Unpublished Manuscript.

López-Alonso, M. (2000). The Military Option: Health, Nutrition and Living Conditions of Mexican Soldiers. Unpublished Manuscript.

López-Alonso, M. (2003). Height of Mexican Men and Women from Military Passport Records, 1870-1950. [Computer File]. ICPSR version. Mexico City, Mexico: Secretaria de la Defensa (SDN) [producer]. Ann Arbor: Inter-University Consortium for Political and Social Research [distributor].

López-Alonso, M. (2007). Growth with Inequality: Living Standards in Mexico, 1850–1950. *Journal of Latin American Studies 39*(1), 81–105.

López-Alonso, M. (2012). *Measuring Up: A History of Living Standards in Mexico, 1850–1950*. Stanford: Stanford University Press.

López-Alonso, M. & Condey, R. P. (2003). The Ups and Downs of Mexican Economic Growth: The Biological Standard of Living and Inequality, 1870–1950. *Economics & Human Biology 1*(2), 169–86.

Massey, D. S., & Liang, Z. (1989). The Long-term Consequences of a Temporary Worker Program: The U.S. Bracero Experience. *Population Research and Policy Review, 8*(3), 199-226.

McKenzie, D. & Rapoport, H. (2007). Network Effects and the Dynamics of Migration and Inequality: Theory and Evidence from Mexico. *Journal of Development Economics 84*(1), 1–24.

McKenzie, D. & Rapoport, H. (2010). Self-Selection Patterns in Mexico-US Migration: The Role of Migration Networks. *The Review of Economics and Statistics 92*(4), 811–21.

McKenzie, D. & Rapoport, H. (2011). Can Migration Reduce Educational Attainment? Evidence from Mexico. *Journal of Population Economics, 24*(4), 1331-1358.

Mesnard, A. (2004). Temporary Migration and Capital Market Imperfections. *Oxford Economic Papers 56*(2), 242–62.

Mexican Migration Project. MMP134. Available: mmp.opr.princeton.edu.

Moraga, J. F. H. (2011). New Evidence on Emigrant Selection. *The Review of Economics and Statistics 93*(1), 72–96.

National Archives, Rocky Mountain Region. Mexican Border Crossing Records. Denver, Colorado.

Ngai, M. M. (2002). The Strange Career of the Illegal Alien: Immigration Restriction and Deportation Policy in the United States, 1924–1965. *Law and History Review 21*(1), 69–108.

Persico, N., Postlewaite, A., & Silverman, D. (2004). The Effect of Adolescent Experience on Labor Market Outcomes: The Case of Height. *Journal of Political Economy 112*(5), 1019–53.

Piore, M. J. (1979). *Birds of Passage: Migrant Labor in Industrial Societies*. Cambridge: Cambridge University Press.

Rancano, M. R. (1977). Estadisticas electorales: presidenciales. *Revista Mexicana de Sociologia, 39*(1), 271-299.

Reichert, J. S., & Massey, D. S. (1982). Guestworker Programs: Evidence from Europe and the United States and Some Implications for U.S. Policy. *Population Research and Policy Review, 1*(1), 1-17.

Rockoff, H. (2004). Until it's Over, Over there: The US Economy in World War I. NBER Working Paper No. w10580.

Rodriguez, V.E. (1997). *Decentralization in Mexico*. Boulder: Westview Press.

Rosas, A. E. (2011). Breaking the Silence: Mexican Children and Women's Confrontation of Bracero Family Separation, 1942-64. *Gender & History*, *23*(2), 382-400.

Ruggles, S. et al. (2010). *Integrated Public Use Microdata Series (IPUMS): Version 5.0* [Machine-Readable Database]. Minneapolis: University of Minnesota.

Sandefur, G. D., & Wells, T. (1997). *Using Siblings to Investigate the Effects of Family Structure on Educational Attainment*. Center for Demography and Ecology, University of Wisconsin--Madison.

Sandos, J. A., & Cross, H. E. (1983). National Development and International Labour Migration: Mexico 1940-1965. *Journal of Contemporary History*, *18*(1), 43-60.

Santibanez, L., Vernez, G., & Razquin, P. (2005). Education in Mexico: Challenges and Opportunities. Documented Briefing prepared by the RAND Corporation.

Schick, A. & Steckel, R. (2010). Height as a Proxy for Cognitive and Non-Cognitive Ability. NBER Working Paper No. 16570, Cambridge, MA.

Schultz, T. P. (2002). Wage Gains Associated with Height as a Form of Health Human Capital. *American Economic Review 92*(2), 349–53.

Scruggs, O. (1960). The First Mexican Farm Labor Program. *Arizona and the West*, *2*(4), 319.

Scruggs, O. (1962). The Bracero Program under the Farm Security Administration 1942–1943. *Labor History*, *3*(2), 149.

Scruggs, O. (1963). Texas and the Bracero Program, 1942-1947. *Pacific Historical Review*, *32*(3), 251.

Smith, J. P. & Thomas, D. (2003). Remembrances of Things Past: Test-retest Reliability of Retrospective Migration Histories. *Journal of the Royal Statistical Society. Series A (Statistics in Society)*, *166*(1), pp. 23-49.

Spencer, E. A. et al. (2002). Validity of Self-Reported Height and Weight in 4808 EPIC–Oxford Participants. *Public Health Nutrition 5*(4), 561–65.

Steckel, R. H. (1995). Stature and the Standard of Living. *Journal of Economic Literature 33*(4), 1903–940.

Steckel, R. H. (2009). Heights and Human Welfare: Recent Developments and New Directions. *Explorations in Economic History 46*(1), 1–23.

Stolz, Y. & Baten, J. (2012). Brain Drain in the Age of Mass Migration: Does Relative Inequality Explain Migrant Selectivity? *Explorations in Economic History 49*(2), 205–20.

Taylor, P. S. (1929). *Mexican Labor in the United States: Migration Statistics I.* Berkeley: University of California Press.

Taylor, P. S. (1934). *Mexican Labor in the United States: Migration Statistics IV.* Berkeley: University of California Press.

Thomas, D. & Strauss, J. (1997). Health and Wages: Evidence on Men and Women in Urban Brazil. *Journal of Econometrics 77*(1), 159–85.

United States Bureau of Immigration. "Annual Report of the Commissioner General of Immigration to the Secretary of Labor." Multiple Years, 1908–1930.

United States. "Agricultural Workers: Recommendations by Joint Migratory Labor Commission." TIAS 3242, pp. 1017-1030. Treaties and Other International Acts Series.

United States. "Mexican Agricultural Workers." TIAS 2328, pp.1917-1931. Treaties and Other International Acts Series.

United States. "Mexican Agricultural Workers." TIAS 2331, pp.1940-1996. Treaties and Other International Acts Series.

United States. "Mexican Agricultural Workers." TIAS 2586, pp.4341-4393. Treaties and Other International Acts Series.

United States. "Mexican Agricultural Workers." TIAS 2932, pp. 379-415. Treaties and Other International Acts Series.

United States. "Migratory Workers: Mexican Agricultural Workers." TIAS 5492, pp.1804-1806. Treaties and Other International Acts Series.

United States. "Migratory Workers: Mexican Agricultural Workers." TIAS 5160, pp. 2022-2064. Treaties and Other International Acts Series.

United States. "Migratory Workers." EAS 278, pp.1069-1075. Executive Agreement Series.

United States. "Migratory Workers." EAS 351, pp.1129-1135. Executive Agreement Series.

United States. "Migratory Workers." TIAS 1968, pp.1232-1241. Treaties and Other International Acts Series.

United States. "Migratory Workers." TIAS 2260. Treaties and Other International Acts Series.

Ward, Z. (2014). Birds of Passage: Return Migrants, Self-Selection and Immigration Quotas. Unpublished Manuscript.

Woodruff, C. & Zenteno, R. (2007). Migration Networks and Microenterprises in Mexico. *Journal of Development Economics, 82*(2), 509-528.

Yang, D. (2008). International Migration, Remittances and Household Investment: Evidence from Philippine Migrants' Exchange Rate Shocks. *Economic Journal, 118*(528), 591-630.

Zeidel, R. F. (2004). *Immigrants, Progressives, and Exclusion Politics: The Dillingham Commission, 1900–1927*. DeKalb: Northern Illinois University Press.

APPENDIX A

REPRESENTATIVENESS OF THE SAMPLE

To determine the representativeness of our migrant sample, we compare their characteristics with similar migrants recorded in the 1920 census. We use the 1% 1920 IPUMS sample to identify migrants who arrive in the previous year, who are literate, who are over the age of 18, and who are male (Ruggles et al., 2010). There are 148 Mexican migrants who meet these characteristics. The third column of Table A.1 reports the difference between the migrant and census samples. Estimating the self-selection of migrants is based on comparing skills of movers to stayers, so if our sample is unrepresentative of Mexican migrants in terms of skills then we would incorrectly infer the pattern of self-selection for Mexico as a whole. We confirm in column 3 that, in general, there is no statistically or economically significant difference in skill between our sample and those recorded in the census. While there is also no difference in marital status, our sample is about two years younger and overrepresented by people moving to Texas. The fact that our sample is overrepresented by people headed to Texas is an artifact of the majority of it being recorded from the El Paso and Brownsville border stations.

Table A.1—Summary Statistics for Migrant Sample and Comparison with 1920 Census

Variable	Migrant	Census	Difference
Height (centimeters)	168.66		
	(6.09)		
Age at Arrival (years)	27.86	29.81	-1.95**
	(9.63)	(10.30)	
Unskilled	0.87	0.86	0.02
	(0.33)	(0.35)	
Skilled	0.10	0.12	-0.03
	(0.29)	(0.33)	
Professional	0.03	0.02	0.01
	(0.17)	(0.14)	
Literate	0.99	1.00	-0.01
	(0.07)	(0.00)	
Married	0.49	0.48	0.01
	(0.50)	(0.50)	
Single	0.48	0.50	-0.02
	(0.50)	(0.50)	
Widowed	0.02	0.01	0.01
	(0.15)	(0.01)	
Headed to California	0.07	0.15	-0.08***
	(0.26)	(0.36)	
Headed to Texas	0.81	0.54	0.27***
	(0.39)	(0.50)	
Headed to Arizona	0.08	0.15	-0.07***
	(0.27)	(0.36)	
North	0.22		
	(0.41)		
Bajio	0.75		
	(0.43)		
Center	0.03		
	(0.16)		
South	0.00		
	(0.04)		
Meeting No One	0.86		
	(0.34)		
Meeting Friend	0.01		
	(0.10)		
Meeting Relative	0.13		
	(0.33)		
Cash on Hand ($)	38.73		
	(300.00)		
Observations	3,671	148	

Notes: Standard deviations in parentheses. Proportions unless otherwise noted. *** p<0.01, ** p<0.05, * p<0.1.
Sources: Border crossing manifests.

APPENDIX B

CREATING THE LINKED SAMPLE

In order to create a sample of return and permanent migrants, we match our initial sample of 3,671 migrants to both the 1930 Mexican Census (MC) and 1930 United States Census (USC). We use slightly different matching criteria for each census. The match to the MC is based on first name/last name, year of birth plus/minus two years, and state of birth, while that to the USC is based on first name/last name, year of birth plus/minus two years, and country of birth. We cannot produce more precise matches based on state of birth in Mexico to the USC because it does not list the state of birth in Mexico.

We follow an iterative procedure for matching, similar to Abramitzky, Boustan, and Eriksson (2014, web Appendix) and Ferrie (1996). The matching procedure is given here in detail.

1) We search forward to the 1930 MC and USC using name and exact year of birth and place of birth using Ancestry.com, and collect the top three closest matches.
2) We standardize the names of potential matches sample by using the Double Metaphone system, an algorithm that corrects for common transcription errors for foreign names.
3) If the person is linked to one individual, then we consider the individual as a unique within census match and stop here. If the migrant is linked to two or more individuals, we consider the individual as a duplicate within census match and stop here.
4) If the individual is not matched, we expand the birth year window to plus or minus one year and repeat steps (2) and (3). If this does not yield a match, we expand the window to plus or minus two years. Any individual that is not matched within a two-year window is termed unlinked.

5) The above process creates 429 *unique* links within both the MC and USC. However, they could be uniquely matched on different windows around the birth year (exact, plus/minus one, or plus/minus two). We allocate the more favorable link (smaller birth window) to that specific census, which moved 149 links to the USC and 258 links to the MC. This leads to 169 migrants that are *uniquely* linked to both censuses with the same name and birth year, which we term as *cross-links*. There are also 92 other cross-links that are either a duplicate match to the MC, USC, or both.

Table A.2 shows the results of the matching process displayed in a matrix of unlinked, unique, and duplicate to each census. We use the 632 matched uniquely and only to the MC as our sample of "return migrants" and the 798 matched uniquely and only to the USC as our sample of "permanent migrants." In addition, there are 1,765 unlinked and 261 cross-links. The rest of the 3,671 are matched to duplicates either in the MC or the USC. The forward matching rate to unique links only within one census is 21.7% for the USC and 17.2% for the MC, similar to other countries from Abramitzky, Boustan and Eriksson (2012).

Table A.2—Matching Matrix

		1930 Mexican Census			
		Unlinked	Unique	Duplicate	
1930	Unlinked	1,765	**632**	96	2,493
U.S.	Unique	**798**	169	28	995
Census	Duplicate	119	53	11	183
	Total	2,682	854	135	3,671

Source: Border crossing manifests, 1930 Mexican Census, 1930 United States Census.