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The Bracero Program and Effects on Human Capital Investments in Mexico, 1942 to 1964

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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 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.

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

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

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

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

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 fro

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.[1] 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 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

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.[2]

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.[3] 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 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).[4]

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

[4] Alston and Ferrie

agricultural development. As Ezequiel Padilla, Minister of Foreign Affairs in Mexico, pointed out to American Ambassador, George Messersmith:

own way to get to the recruitment center in Mexico.

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 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 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.[6]

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

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 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.

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

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).[9] 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)

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

Mexico was eager to have a bilateral policy in place. As a result, centers opened in northern cities (see Figures 6 and 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

1964).[10] In Table 2 I list these locations and in Figures 4-12 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).[11] 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

Secondly, I collect state-level characteristics from the *Anuarios Estadisticos de los Estados Unidos Mexicanos* from the years 1942-1967. These statistical yearbooks of

I summarize the data from the *Anuarios* in Table 3.[16] 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.[17] 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

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

These OLS models suggest a positive relationship between bracero migration and primary school enrollments.

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 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 6. All of the IV estimates are larger than the corresponding OLS estimates, consistent

year. The results of the estimation are given separately for males and females in Table 7 and Table 8, respectively.

The first important result from this analysis is that the effect of bracero migration on

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

since state budgets are already set. The earliest any effect should be felt is one year later.[21] 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 5. The results are mixed, with an increase in the number of braceros leaving a state associated with a 0.08% decrease in the number of primary schools and a 0.2% increase in the number of pesos spent on education by

sensitive to the inclusion of this measure of PRI strength. The results of the estimation are presented in Table 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 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.

CONCLUDING REMARKS

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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.

Scruggs, O. (1960). The First Mexican Farm Labor Program. *Arizona*

FIGURES AND TABLES

Figure 1 – Comparing Bracero Flows to Other Migrant Flows to the United States

Figure 2 - Average Bracero Flow by Distance Bin

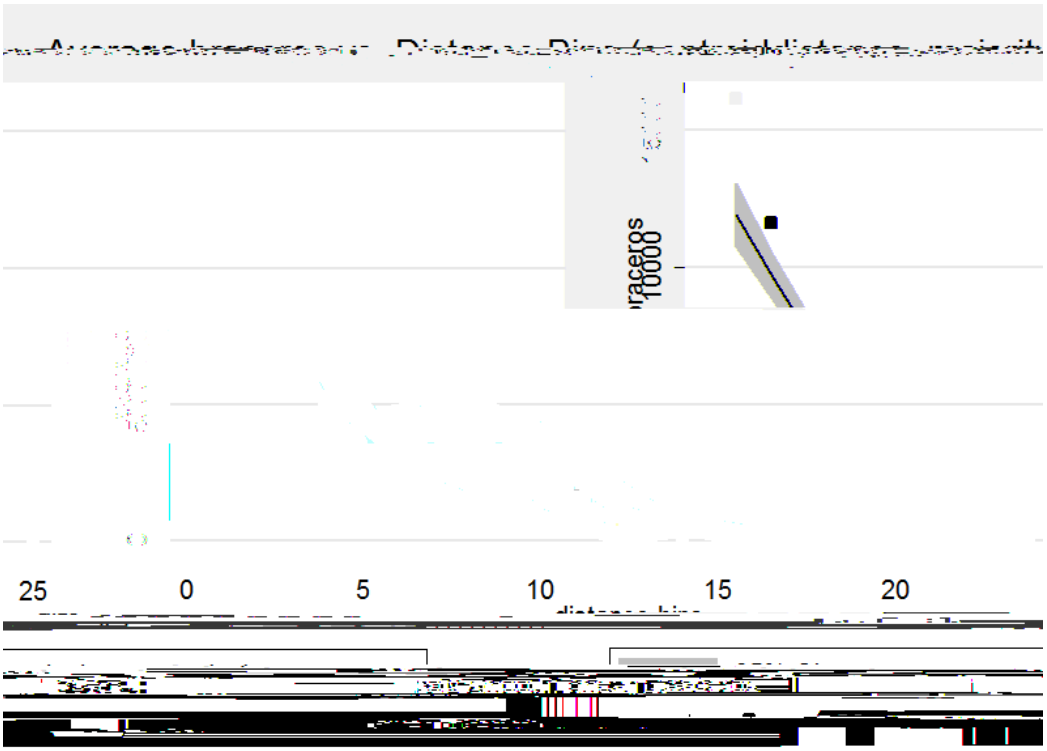


Figure 3 - Average Log Bracero Residual by Residual Distance Bin

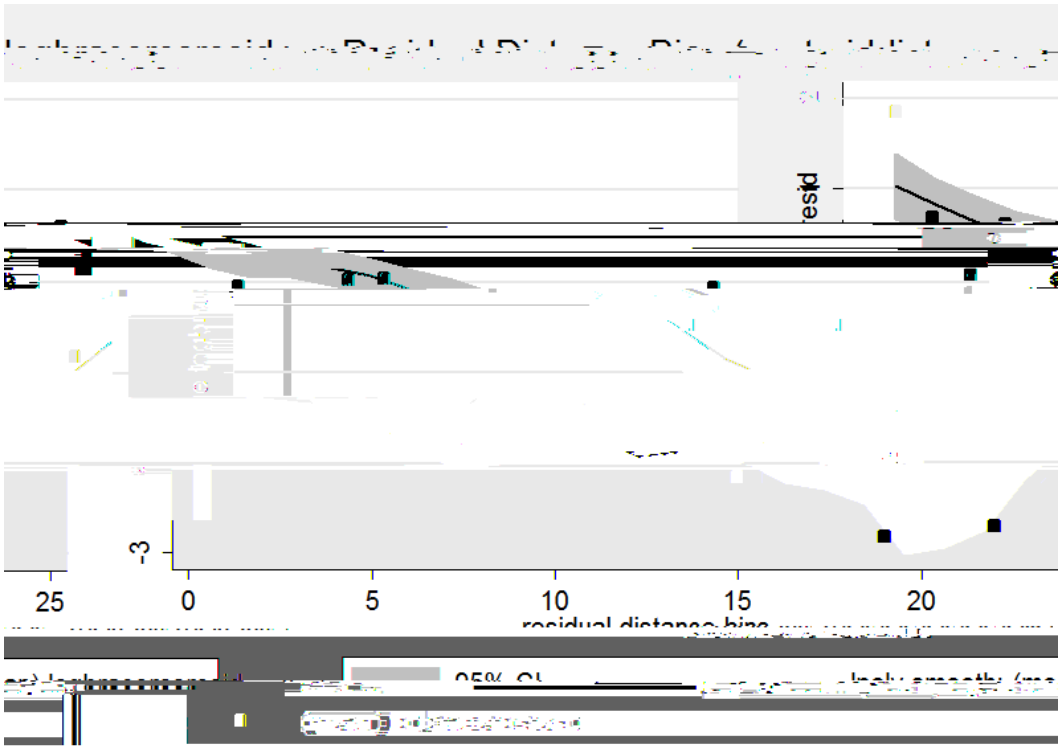


Figure 4

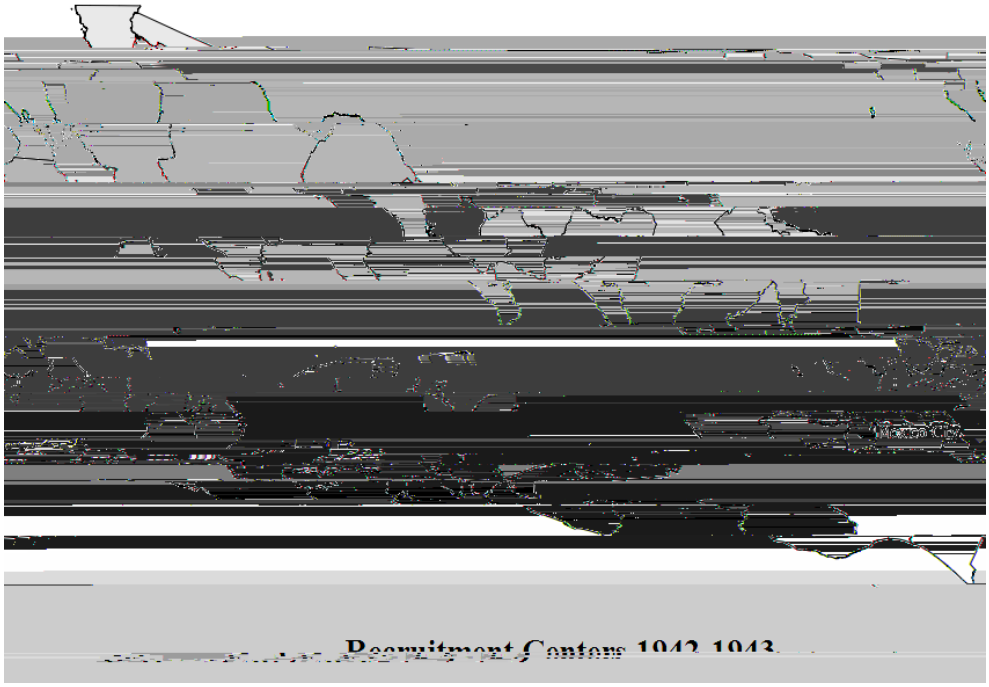
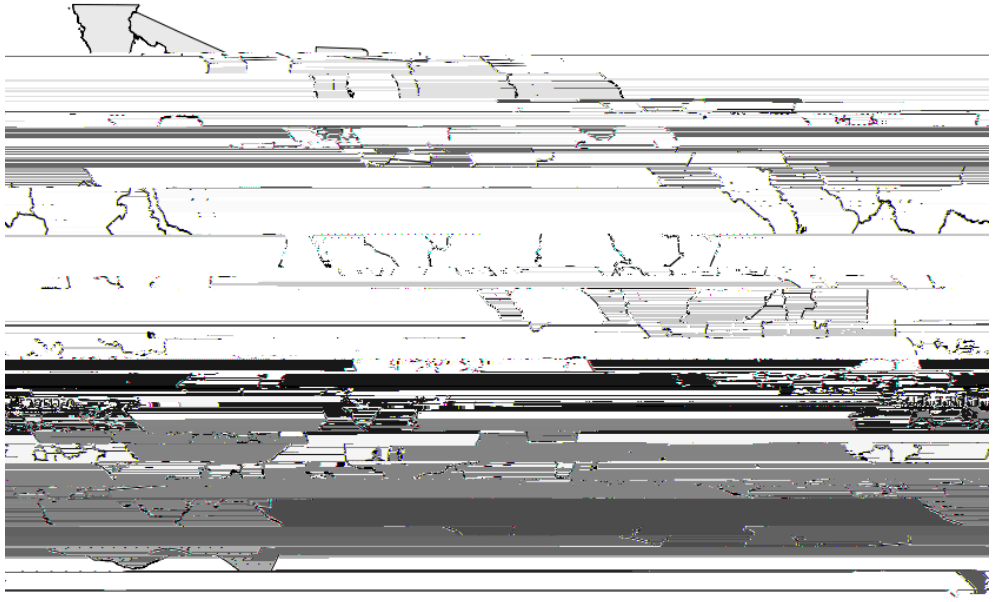


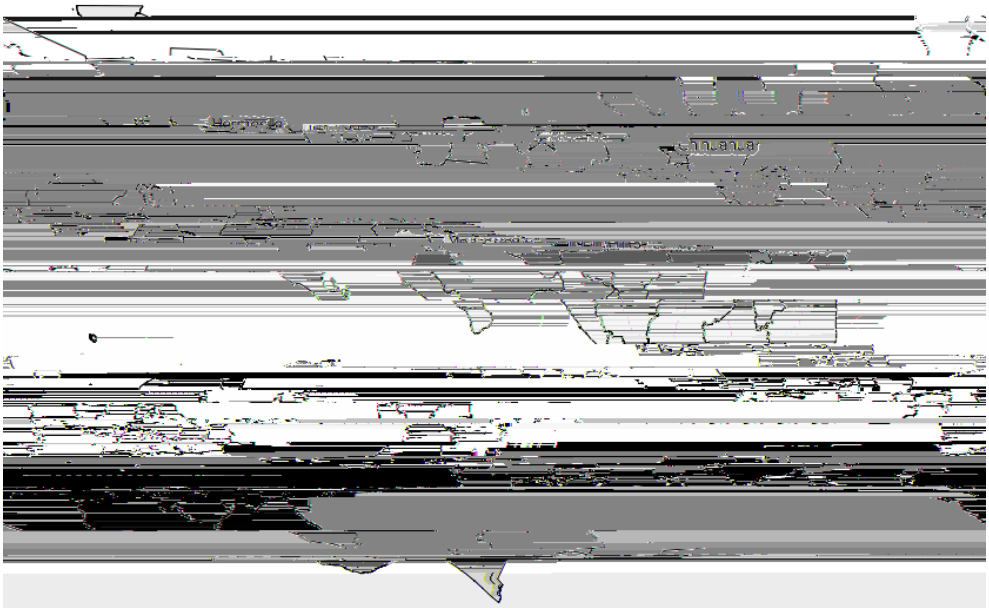
Figure 5



Recruitment Centers 1944-1946

Figure 6

Figure 7



Centers August 1, 1949-August 10, 1951 **Recruitment**

Figure 8

Figure 9

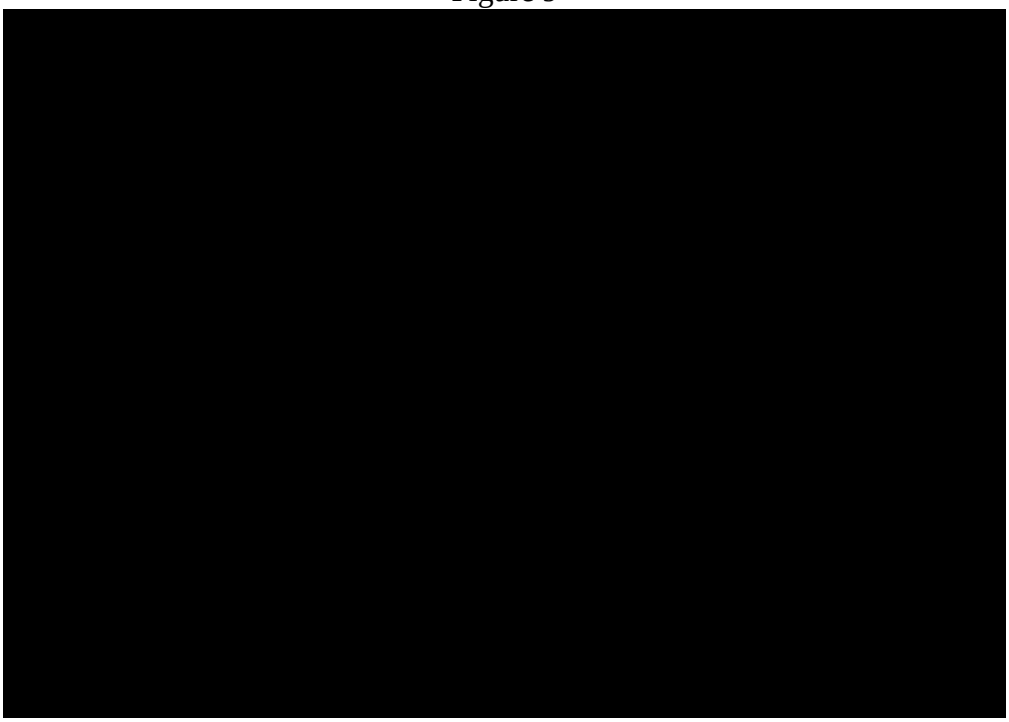
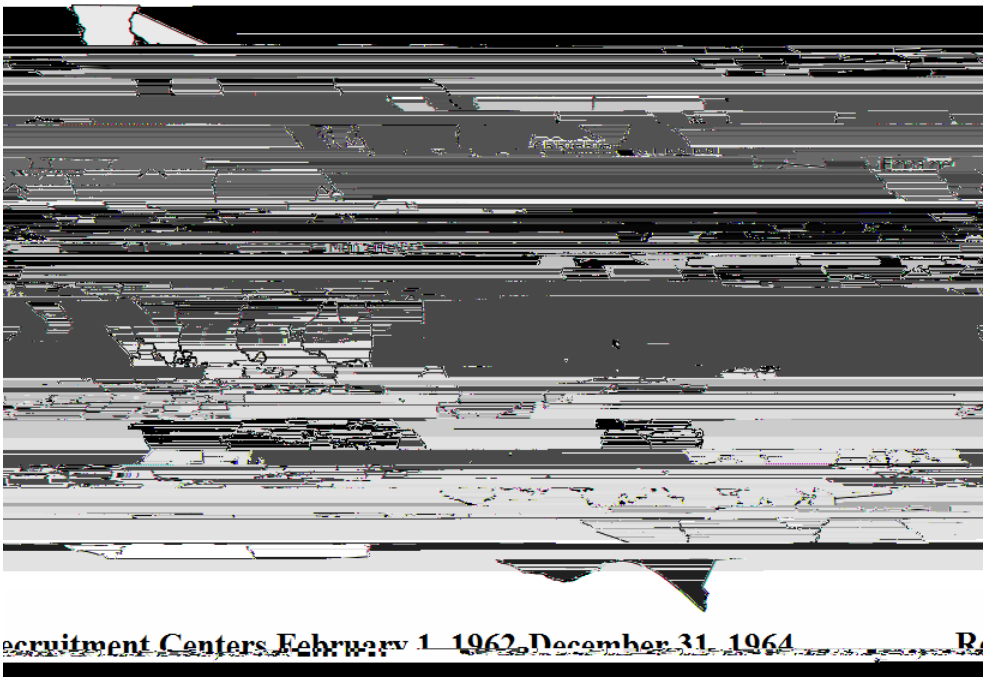


Figure 12



Sources for Recruitment Center Maps: 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)

Figure 13—Average Enrollment Changes by Age and Gender vs. Estimated Enrollment Effect

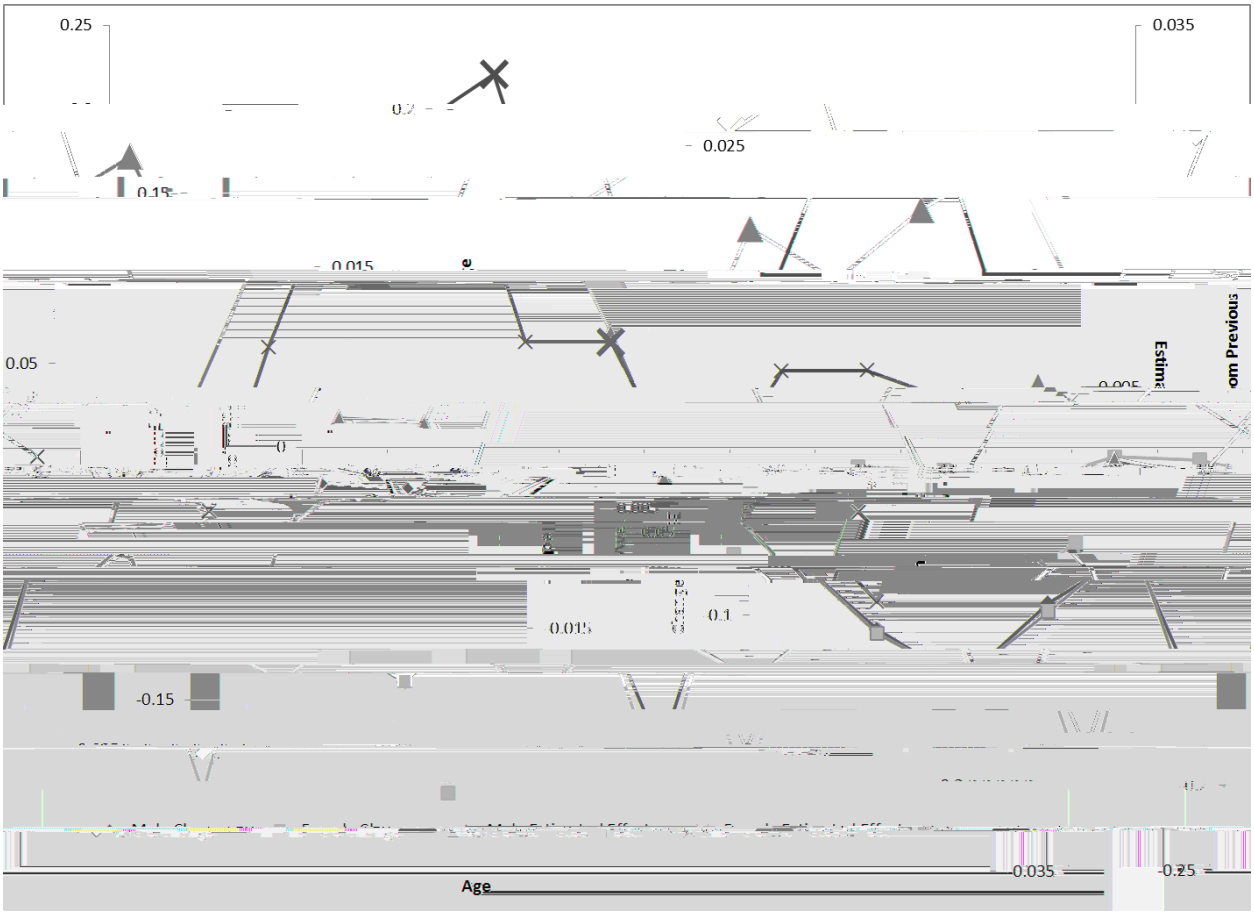


Table 1 – First Stage Relationship

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

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 2 – Recruitment Centers

Table 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	

Table 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)	

Table 5 – OLS Results (Data from the *Anuarios*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	logurbanprimaryenrolled	logruralprimaryenrolled	logprimaryenrolled	logprimaryschools_1	logstateeducationspending_1	logpostprimaryenrolledtotal	logpostprimaryenrolledmen	logpostprimaryenrolledwomen
logbraceros	0.00711	0.0137*	0.00654	-0.00861*	0.0175	0.00451	-0.00150	0.00856
	(0.00641)	(0.00736)	(0.00549)	(0.00477)	(0.0156)	(0.0176)	(0.0176)	(0.0223)
Constant	8.946***	8.830***	9.612***	5.067***	11.44***	6.833***	5.956***	6.237***
	(0.0781)	(0.0557)	(0.0519)	(0.0361)	(0.207)	(0.163)	(0.184)	(0.199)
Observations	589	580	589	620	558	374	374	374
R-squared	0.981	0.939	0.986	0.984	0.917	0.966	0.963	0.948

Standard errors clustered at the state X regime level.
*** p<0.01, ** p<0.05, * p<0.1

Table 6 – IV Results (Data from the *Anuarios*)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
VARIABLES	logurbanprimaryenrolled	logruralprimaryenrolled	logprimaryenrolled	logprimaryschools_1	logstateeducationspending_1	logpostprimaryenrolledtotal	logpostprimaryenrolledmen	logpostprimaryenrolledwomen
logbraceros	0.0723*	0.0551*	0.0713**	0.0174	0.168***	0.101	0.0170	0.146
	(0.0398)	(0.0311)	(0.0343)	(0.0211)	(0.0582)	(0.102)	(0.0924)	(0.136)
Constant	8.709***	8.685***	9.377***	4.973***	10.90***	7.660***	7.456***	6.741***
	(0.172)	(0.122)	(0.142)	(0.0883)	(0.295)	(0.895)	(0.818)	(1.197)
Observations	589	580	589	620	558	374	374	374
R-squared	0.975	0.936	0.979	0.982	0.903	0.962	0.963	0.940
KP F-Stat	29.93	27.06	29.93	29.47	25.86	5.698	5.698	5.698

Standard errors are clustered at the state x regime level.
*** p<0.01, ** p<0.05, * p<0.1

Table 7 – IV Results by Age for Males (Data from IPUMS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
VARIABLES	6 Year Olds	7 Year Olds	8 Year Olds	9 Year Olds	10 Year Olds	11 Year Olds	12 Year Olds	13 Year Olds	14 Year Olds	15 Year Olds	16 Year Olds	17 Year Olds	18 Year Olds
logbraceros	0.00218	0.00243	0.00203	0.0181*	0.0138	0.0197**	0.0241***	0.00965	-0.00692	-0.00614	-0.000918	-0.00243	0.00543
	(0.00793)	(0.00641)	(0.00971)	(0.0108)	(0.0114)	(0.0100)	(0.00750)	(0.00824)	(0.0110)	(0.00720)	(0.00738)	(0.00874)	(0.00408)
Observations	619	620	620	620	619	619	619	619	620	618	620	619	620
R-squared	0.331	0.362	0.435	0.505	0.534	0.467	0.348	0.356	0.294	0.206	0.151	0.089	0.045
Number of id	32	32	32	32	32	32	32	32	32	32	32	32	32
KP F-Stat	36.95	36.98	36.98	36.98	36.49	36.91	36.94	36.95	36.98	36.58	36.98	36.95	36.98

Standard errors clustered at the state level.
*** p<0.01, ** p<0.05, * p<0.1

Table 8 – IV Results by Age for Females (Data from IPUMS)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)
VARIABLES	6 Year Olds	7 Year Olds	8 Year Olds	9 Year Olds	10 Year Olds	11 Year Olds	12 Year Olds	13 Year Olds	14 Year Olds	15 Year Olds	16 Year Olds	17 Year Olds	18 Year Olds
logbraceros	-0.00344	-0.00539	-0.0129	0.00837	0.0261***	0.0309***	0.00880	0.00878*	-0.00523	0.00637	0.00639	0.00379	-0.000752
	(0.00774)	(0.00989)	(0.00788)	(0.0101)	(0.00933)	(0.0103)	(0.00626)	(0.00490)	(0.00874)	(0.00600)	(0.00589)	(0.00400)	(0.00197)
Observations	620	620	619	619	618	619	619	619	620	620	618	618	616
R-squared	0.374	0.436	0.412	0.545	0.508	0.407	0.347	0.245	0.240	0.184	0.148	0.135	0.050
Number of id	32	32	32	32	32	32	32	32	32	32	32	32	32
KP F-Stat	36.98	36.98	36.49	36.91	36.42	36.95	36.95	37.02	36.98	36.98	35.85	36.63	36.31

Standard errors clustered at the state level.
*** p<0.01, ** p<0.05, * p<0.1

Table