Gender Imbalances and Labor Market Outcomes: Evidence from Large-Scale Mexican Migration *

Emily Conover Melanie Khamis Sarah Pearlman

November 10, 2017

Abstract

We estimate the effects of a lower male/female sex ratio on female labor market participation and outcomes in Mexico, where international migration has led to a relative scarcity of men. We identify this effect by using an instrumental variables strategy that relies on historical migration patterns. Our results indicate that in states where there are relatively fewer men, women are more likely to participate in the labor market, have white collar or "brain" jobs, earn higher wages and work fewer hours. These results are robust to the inclusion of state, age-cohort, and year fixed effects, and to different measures of migration and sources of data. Remittances do not explain our main findings, instead they result from increased schooling for women who stay behind.

JEL Classification: J21, J16, J31, O15.

Keywords: Sex ratio, Mexico, female labor force participation, female labor market outcomes, migration.

* Contact information: Emily Conover, Department of Economics, Hamilton College, econover@hamilton.edu; Melanie Khamis, Department of Economics, Wesleyan University and IZA, mkhamis@wesleyan.edu; Sarah Pearlman (corresponding author), Department of Economics, Vassar College, sapearlman@vassar.edu. Comments welcome. Thank you to participants at the World Bank/IZA conference on Labor and Development, the PACDEV, CSAE and NEUDC and LACEA conferences, AALAC Middlebury conference, UC Berkeley labor lunch, Colgate-Hamilton, Wesleyan, University of Oklahoma, and Rutgers University Economics Seminars. We also would like to thank: Randy Akee, David Card, Ira Gang, Daniel Hicks, Rachel Heath, Jenny Hunt, Adriana Kugler, Annemie Maertens, Laura Schechter, Dean Scrimgeour, Chad Sparber, Shing-Yi Wang and Mutlu Yuksel for helpful suggestions and comments at early stages of this project. Daniel Kraynak provided excellent research assistance.

1 Introduction

The natural ratio of men to women is approximately one to one (Sen 1990).[1] However many factors including sex-selective abortion, war, violence, incarceration and migration can alter this ratio and lead to missing men or missing women. We focus on the case of absent men, which can have important consequences on marriage, fertility, human capital acquisition and labor markets. When men are scarce women are less likely to marry and have children, and more likely to marry lower educated mates and bear children out-of-wedlock (Abramitzky et al. 2011, Angrist 2002, Charles and Luoh 2010). Women also are more likely to enter and remain in the labor force. For example, Acemoglu et al. (2004) find that the large-scale deployment of men in the U.S. during WWII led to higher female labor force participation after the war, while Goldin (1991, 2006) -despite finding that many women who entered the labor force during the war exited by 1950-documents the period as a tipping point with continued increases in the labor force participation of women thereafter. Meanwhile, Angrist (2002) finds that decreases in the relative number of men among specific immigrant groups in the U.S. led to increases in labor force participation among women in those same immigrant groups.

In this paper we examine the case of Mexico, where large-scale international migration - which has been largely young and male- has led to a decline in the ratio of men to women.[2] Raphael (2013) finds that the decline in the relative number of men has important impacts on women who remain in Mexico, decreasing marriage rates and child bearing, and increasing educational attainment and labor force participation.[3] The latter findings complement recent

[1]The natural rate is about 1.04 with slightly more male birth than female birth (Fisher 1930, Angrist 2002). For a general overview on sex ratios and differences in mortality across countries see Cullen et al. (2015)

[2]For example, in the year 2000 the ratio of men to women age 18 to 25 in Mexico was 0.91, while the corresponding ratio in the U.S. among Mexican born individuals was 1.51. Early arrival data to the U.S. show this ratio to be 1.99 for 1900-1909, 1.50 for 1910-1919 and even 2.20 for 1920-1929 (Angrist 2002).

[3]The strongest impacts Raphael (2013) finds are for education: moving from a specific state where men are

work which shows that the effects of migration on education in Mexico vary by gender. For example, Antman (2015) shows that as a result of the remittances that stem from migration, and women's increasing control over these resources given the absence of men, investments in the education of girls increase relative to boys.

Evidence from these papers on the impacts of male migration on female education and labor force participation leads to our research question, which is whether the increases in women's human capital attainment are large or sustained enough to change their labor market outcomes, such as occupational choice, wages and hours worked. Specifically, we study whether the relative scarcity of men results in Mexican women entering higher skilled and better paying jobs. Theoretically this is an open question. There is substantial evidence that Mexican migrants tend to be young, male, from rural areas, and from the middle of the education and wage distribution (Durand et al. 2001, Chiquiar and Hansen 2005).[4] This suggests that if women are entering the labor force and taking available labor market opportunities, they could be doing so in the middle of the education and wage distribution. Alternatively, increased investments in education triggered by migration could allow women to acquire jobs at the higher end of the distribution.

Given these ambiguities, we empirically examine what happens to women's labor market outcomes when the sex ratio changes. To do this we use Mexican census data from 1990 to 2015. In addition to time variation, we exploit variation across Mexican states and age groups. We start by documenting the dramatic decline in the sex ratios in Mexico, particularly for young

relatively scarce to one where they are abundant leads to a 20% increase in enrollment and a 6% increase in years of education among 20-25 year old women.

[4]There is a larger debate in the migration literature on negative and positive selection with evidence for both sides, see (Moraga 2011, McKenzie and Rapoport 2010). We do not think, however, that any impacts of male migration on female labor market outcomes depend on a story of positive selection. Specifically, negative selection into migration would mean that lower educated men are more likely to migrate, while higher educated men would be more likely to stay in Mexico. In this case, there still might an effect on women's labor market outcomes through increases in education, delayed marriage or childbearing. There also might be an effect through remittances, which could drive increases in education for women and subsequent increases in labor force participation and higher skilled jobs.

cohorts and recent census years. We also examine the extent to which international migration explains this variation, and find that the percentage of households with an international migrant is negatively and significantly related to the sex ratio, and that migration explains a large portion in the variation across states.

We next estimate the impact of declining sex ratios on women's labor market outcomes. To control for the potential endogeneity of the sex ratio we create a demand-pull instrument. This instrument, which uses predicted migration, exploits the fact that most Mexican migrants go to the U.S., and their destinations are largely driven by historic patterns and migration networks (Durand et al. 2001, Munshi 2003).[5] Using three different migration data sources with data at the Mexican and U.S. state level, we document this historical persistence and show that our instrument is a good predictor of sex ratios. We provide numerous tests of the instrument, showing the relationship is not driven by particular sending or receiving states or by our measure of demand for Mexican labor, and is only based on U.S. locations where historical networks exist.

We find that declines in the relative number of men have significant impacts on women's labor market outcomes. A one standard deviation decline in the sex ratio (0.05) leads to a 3-4 percentage points increase in women's labor force participation, a 3-4 percentage point increase of women in white collar and a 5-6 percentage point increase in "brain-intensive" jobs. We also find that women's wages increase between 3-5 percent, while the female share in the top twenty-five percent of earners goes up by 1-2 percentage points, providing further evidence that women move into higher skilled occupations in the absence of men. These results all constitute large changes relative to their respective means, and are robust to several different

[5]Mexico is the largest source country of U.S. immigration, at about one third of the US foreign-born population (Hanson and McIntosh 2010).

model specifications. In sum we find strong evidence that the absence of men results in women entering higher skilled and higher paid jobs over time.

The contribution of our paper is twofold. First, we add to the small but growing literature on the impact of absent men in developing countries. Most papers study this question in the context of developed countries, but often the factors leading to declining ratios of men to women, such as international migration, wars and violence, are more prevalent in developing countries. Furthermore, understanding the impacts on female outcomes is important given that increases of female incomes and employment outside the home may benefit the status, education and health of both women and children, which in turn increases their country's development and growth (Duflo 2012).

Second, our paper advances the current literature by examining the impacts of absent men not just on labor force participation, but on labor market outcomes for working women. Given their increased educational attainment, this intensive margin analysis is a logical extension of the previous literature. It also complements work which has examined female labor force participation and occupational choice more generally in Mexico. For example, Pagan and Sanchez (2000) have studied the changes of outcomes such as self-employment or employment in specific sectors in Mexico from the beginning of the early 1990s. Evidence from Juhn et al. (2013, 2014) on the effect of trade liberalization on female labor market outcomes finds that female wages and employment in blue collar occupations improve but not in white collar occupations. We add to this literature by considering another factor– an exogenous shock to the sex ratio due to out-migration of males– on female labor market outcomes in the sending country.

The rest of the paper is structured as follows: section 2 describes the main data sources and shows descriptive statistics; section 3 discusses our empirical strategy; section 4 presents the results and tests of the instrument; section 5 explores mechanisms through which changing sex ratios may impact women's labor market outcomes; and section 6 concludes.

2 Data

To examine the evolution of sex ratios we use data from the 1990, 2000 and 2010 Mexican Census and the 2015 Intercensal Survey, accessed through the IPUMS International webpage (IPUMS).[6] For each census year we make 8 year age groups by state. We have five cohorts, two younger cohorts (18-25 and 26-33 years old), and three older cohorts (34-41, 42-49 and 50-57 years old). Together this yields a total of 640 age group-state-year combinations.

Figure 1 panel A shows the average sex ratios in Mexico for each of the years in our sample. The figure shows that similar to most countries, the sex ratio for younger age groups (ages 0 to 9) is well over one, reflecting the slightly higher natural number of male births. The sex ratio declines sharply starting in the 18 to 25 age group, where the ratio is well below one for all years, and remains below one for all remaining cohorts. The sex ratios for older cohorts also are lower in 2015 than in the previous years, showing that for these cohorts the problem of "absent men" became more, rather than less, acute over time. Our findings mirror those of other paper, which also find that in later periods when Mexican migration increased, migrants were predominantly male (Hanson and McIntosh 2010, Durand et al. 2001, Raphael 2013). In particular, Durand et al. 2001 find that the distribution of migrants is male dominated in all

[6]The reasons for why we do not use the following years in our analysis are as follows: the 1960 and 1970 Census are missing two states– Baja California Sur and Quintana Roo– which did not exist as separate entities until 1974. The 1980 Mexican census data copies for some major administrative districts were destroyed and are not available anymore (Rabell 2000, Raphael 2013). The 1995 population and dwelling counts predates the ACS, which began in 2001 and is used to construct the stock of missing men in non-Census years and 2010. The 2005 intercensal survey does not have information on hours, occupation or income. Nevertheless, our results are similar if we include the 1960 and 1970 data and are available upon request.

periods and that it even has increased over time (77% male in 1970-1974 while 87% male by 1990-92).

To show that the ratios in Mexico are distinctive, we compare them to those from the U.S. and Brazil, a country with similar income levels to Mexico, using Census data from IPUMS. The results, presented in Figure 1 panel B, confirm that Mexico's trajectory is unique. In the year 2000, in the U.S. the sex ratio for the 18 to 25 age group was 1.04, while that for Brazil was 0.999. For Mexico the ratio was 0.9, which means that relative to the U.S. or Brazil there was one fewer man for every ten women in that age group. This large gap between the sex ratios in Mexico and the other countries remains through the 34 to 41 age groups, highlighting the distinctive problem of missing men in Mexico.

2.1 International Migration

In the case of Mexico the changing sex ratios can be explained by international migration, particularly to the U.S. In Appendix 1 we use a simple theoretical framework to show how the sex ratio in any period is a function of the earlier sex ratio, and the out and return migration rates for men. In this section we test these theoretical predictions using census data, which contains information on international migration starting in the year 2000.

To measure migration incidence we use the percentage of households in a state that reports having a household member migrate abroad in the past five years. We then regress the sex ratio for each age group on the migration incidence for each state by census year. Panels A and B of Table 1 shows a negative and significant relationship between the incidence of international migration and the ratio of men to women in all age groups for both census years 2000 and 2010. For example, the coefficient on international migration incidence in the first column implies that, in the year 2000, a one standard deviation increase in the percentage of households with international migrants (3.1 percentage points) is associated with a decline in the ratio of men to women age 18-25 of 0.04. Furthermore, international migration can explain a large percentage of the variation in sex ratios across states. In the year 2000, 53% of the variation in the sex ratios of 18-25 year olds and 67% of the variation in the sex ratios of 26-33 year olds can be explained by international migration incidence.

To further test if international migration explains sex ratio imbalances in Mexico we examine the relationship between another potential cause of missing men-homicides– and sex ratios in the year 2010. From 2007 to 2010 Mexico experienced a dramatic increase in homicides due to a drug war, which began in late 2006 after the federal government launched an attack on drug trafficking organizations. The homicides have been concentrated among young men and in a small number of states (authors' calculations using data from the National Institute of Statistics and Geography, INEGI). Given this variation across age groups and states, homicides over this period also might explain changing sex ratios. As shown in panels C and D of Table 1, however, this is not the case. Using two measures of homicides-the total per 10,000,000 inhabitants in the year 2010 and the totals for 2007 to 2010 per 10,000,000 inhabitants-we find no significantly negative relationship between either measure and the sex ratio for any age group. The R-squared values also are quite low, showing that homicides explain little of the variation in sex ratios across states.[7]

Finally, we calculate sex ratios for Mexican born individuals in the U.S., the main destination country for Mexican immigrants. We use data from the U.S. Census and American

[7] It also is possible that missing men can lead to lower homicide rates, since young men tend to be not only the main victims, but also the main perpetrators of violence. However, some of states that experienced the highest levels of violence also have experienced high levels of out-migration, which suggests this does not explain the lack of a significant relationship between homicides and sex ratios.

Community Survey, accessed through IPUMS. The results, presented in panel C Figure 1, show a clear sex imbalance for all years. The sex ratios are well above one for almost all cohorts and years, and in some years and age groups are as high at 1.5, which means there are 15 men for every 10 women in a particular age group. This provides further evidence that large-scale international migration of men led to declining ratios of men to women in Mexico.

2.2 Labor Market Outcomes

We use the Mexican Census and Intercensal Survey to define various labor market outcomes for women. We start with labor force participation, defined as the percentage of women in an age group and in a state that reports having an occupation.[8] We next consider the percentage of women in the labor force who are employed in jobs defined as white collar/blue collar jobs, as "brain"/"brawn" jobs and as "male dominated" jobs. White collar jobs are defined using two digit occupational codes and include categories such as professionals, technicians, managers, administrators, directive officials, and office workers. All other categories are defined as blue collar. "Brain" jobs are defined using one digit occupational categories (ISCO codes), and include legislators, senior officials, managers, professionals, technicians, associate professionals, and clerks (ISCO=1, 2, 3 or 4). All other categories, which include service workers, agricultural and fishery workers, crafts and related trade workers and elementary occupations are defined as "brawn." This categorization follows the current literature on brawn-intensive and brain-intensive occupations, which a number of authors have employed in the Mexican context (Vogl 2014, Rendall 2013, Bhalotra et al. 2015).

[8] We choose this over employment status as the coverage is higher. The overlap between the two, however, is quite high. For example, in 1990 98.7% of those who are employed report an occupation, while in 2000 and 2010, 98% and 99.1%, respectively, do so.

We also consider the percentage of women who are employed in traditionally male dominated professions. These are defined as "brain" occupations in which, as of 1960, more than 75% of the labor force was male. They include occupations such as engineers, chemists, lawyers, doctors, writers, and managers in both public and private firms. Finally we look at wages, measured by the log of average monthly earned income, and hours worked.[9] We also consider the percentage of women who fall within the top 25% of earners for a given state and year. All earned income values are converted to year 2000 pesos using CPI data from INEGI. We note that hours worked data are only available for the 1990, 2000 and 2010 census, making the sample size for this outcome smaller.

Summary statistics for all of the labor market measures are shown in Table A1 while summary statistics by census year and age group, which shows the variation across both, are shown in Table 2. The table starts with labor force participation, and illustrates the steady increase for women over time. For example, for the 26 to 33 age cohort (second column) average participation rises from 25.2% in 1990 to 46.3% in 2015. The table also shows an increase in women's participation in higher skilled jobs over time. For example, for the 26 to 33 age cohort, the incidence of white collar jobs among working women rises from 59.5% in 1990 to 61.9% in 2015. Meanwhile, the percentage of women in male dominated professions remains relatively low across all age groups. This suggests that, despite the increase in women participating in white collar jobs, the segregation within more specific job types may not have declined much.

In terms of income, we do not see increases in average monthly income over time across cohort. We do see, however, an increase in the percentage of women who are in the highest earner category. This suggests income gains are concentrated at the higher end of the income

[9]Income is restricted to those who worked more than zero hours, had non-zero income, and did not have a top coded income.

distribution. Finally, weekly hours worked from 1990 to 2015 remains relatively constant with a slight decline for most age groups. This suggests any increase in earnings is not coming from large changes in hours worked.

3 Empirical Strategy

To estimate the effect of changes in the male-female sex ratio on female labor market outcomes, we use the following specification:

$$LMOutcome_{cst} = \beta_0 + \beta_1 \Big(\frac{Men}{Women}\Big)_{cst} + X'_{st}\gamma + \delta_c + \delta_t + \delta_s + \epsilon_{cst} \tag{1}$$

The dependent variable is a particular labor market outcome for women in an 8 year age group c, in state s and year t. We focus on the years in which women are most active in the labor force, between 18 and 57 years old. This is modeled as a linear function of the sex ratio, industry controls (X_{st}), and state, year, and age group fixed effects. If a decline in men relative to women led to increases in women entering the labor market and in certain high skilled occupations, then we expect β_1 to be negative. If this has subsequent effect on wages, we would expect β_1 to be negative as well. The impact on hours worked, however, is ambiguous, since depending on whether the income or substitution effect dominates, workers may reduce or increase hours worked with higher paying jobs.

There are two concerns over the endogeneity of the sex ratio. First, there are concerns that the sex ratio could be influenced by women's re-location decisions, if for instance, women with characteristics that impact their labor market outcomes move to states with more (or less) favorable sex ratios. As a result, the sex ratios may reflect the out-migration of men, but also the in-migration of women with certain characteristics. Thus to ensure that the sex ratios do not purely reflect the changing location decisions of women, we limit the sample to non-movers, defined as those who reside in their state of birth. This is the closest we can come to eliminating movers, as the census does not include location histories.[10]

The larger concern about endogeneity, however, stems from labor demand shocks. For example, if an industry that employs a large section of the population shrinks, men may migrate in search of work while women who stay face reduced employment opportunities. To control for this we include the percentage of the state's labor force by census year that is employed in each industry, as defined by 2 digit codes. This captures some changes in the employment landscape for men and women over time.[11]

More importantly, we instrument for the sex ratios using a measure of predicted migration that relies on shocks to the demand for Mexican migrant labor from the U.S. The instrument exploits the fact that international migration is the key source of changes in sex ratios over time and the vast majority of Mexican migrants go to the United States.[12] Specifically, male migration is a function of the supply of labor from Mexico and the demand for Mexican labor in U.S. markets. The supply of labor likely is endogenous to the labor market outcomes of women who stay behind, but the demand for Mexican labor is not if it is driven by factors that are idiosyncratic to U.S. markets. We thus can use a measure of this demand as an instrument for sex ratios. Key to the feasibility of this demand measure is the fact that Mexican states have historically been sending migrants to different locations in the U.S. and labor demand, in turn,

[10] Movers make up 23.5% of individuals in our Census sample. For comparison we estimate labor force outcomes and sex ratios for the sample that includes movers. These second stage results from our instrumental variable regressions (outlined below) are presented in Appendix Table A2. The results do not differ greatly from the main ones, suggesting that internal migrants are not a major concern for our analysis.

[11] Later we report results omitting these controls as robustness.

[12] For example, in the year 2010 international migration explained 56% of the variation across states in the sex ratios of 18-25 year olds, while homicides explain only 3% of the variation. Thus this large event which affected young men in particular states does little to explain sex ratios.

varies across these locations. We use this variation to predict sex ratios across Mexican states and time, as we detail below.

3.1 Instrumental Variable Strategy

To generate an exogenous measure of the demand for Mexican migrants in the U.S. we create a measure of predicted male migration that follows that developed by Card (2001):[13]

The instrumental variable is defined as:

$$PredictedMaleMigration_{cst} = \frac{\sum_{g=1}^{51} M_{gt}\tau_{gct}\lambda_{gs}}{N_{cst}} \tag{2}$$

Where: M_g is the number of male migrants from Mexico in U.S. state g as of a given year. This stock is a function of the demand conditions in U.S. state and supply conditions in the sending Mexican state. τ_{gc} is the fraction of Mexican male population in U.S. state g as of a given year that are in age group c. This captures differences in migration patterns by age group. The combination of sending Mexican state and U.S. receiving state is determined by λ_{gs}, or the fraction of Mexicans in U.S. state g that are from Mexican state s. These weights are time invariant and rely on the persistence of migration patterns over time, thus isolating the demand pull shock from the stock of Mexican men as explained in the next section. Since the sex ratio should be independent of the size of a Mexican state, we divide by N_{cst}, the number of Mexican men in age group c, Mexican state s, in year t. The instrument therefore is the percentage of men in each age group and year predicted to be missing in each Mexican state.

To calculate both M_g τ_{gc} and we use data from 1% micro samples from the U.S. Census and the American Community Survey (ACS), as accessed through IPUMS for 1990, 2000, 2010

[13] The use of an exogenous instrument for local migration demand is also similar to a Bartik-style instrument (see Theoharides 2014).

and 2015. For each census or ACS year we calculate the total number of Mexican born men in each age group living in each U.S. state.[14]

To calculate λ_{gs} we ideally would have historical migration patterns from a year prior to any of our census periods for all Mexican states going to all receiving states in the U.S. However, historical information that is representative at the state level both in Mexico and the U.S. is scarce and unrepresentative, as it does not cover all receiving U.S. states. We therefore rely on data from more recent years to assign Mexican men in specific U.S. states to specific states in Mexico. The data we use come from three different sources, described in detail in section 3.2. We thus construct three sets of weights and compare the results.

3.2 Weighting Matrix Data Sources

The first data source we use for the weighting matrix is the EMIF Norte Survey (*Encuestas sobre Migración en las Fronteras Norte y Sur de México*, or Surveys on Migration to the Northern and Southern borders of Mexico) (EMIF).[15][16] Using a probabilistic sampling methodology for mobile populations, this dataset collects information on migrants, 15 years old and older, coming from Mexico and in transit to the US. Most migrants crossing to the US travel through one of 23 locations. Migrants are interviewed in locations in the northern Mexican border and at airports during 12 months of the year. Since the majority of migrants are male and we are interested in changes in the sex ratio, we use migration patterns for men. In the survey, migrants are asked the state where they were born, and the US state to which they plan to travel. We

[14]Table A3 presents τ_{gc} values for the year 2000 for the 12 largest receiving U.S. states. The table shows that variation exists in the distribution of Mexican men across age groups. Thus the number of younger and older age groups that leave different Mexican states varies depending on their receiving state in the U.S.

[15]According to EMIF methodology document, 94 percent of migrants travel through one of 8 locations `http://www.colef.mx/emif/metodologia/docsmetodologicos/Metodologia%20Emif%20Norte%20y%20Sur.pdf`

[16]We thank Anne Le Brun for suggesting this data source in a Card style instrumental variable.

use this information to calculate a matrix of migration flows from a particular Mexican state to a particular US state. The data are first collected in 1995 and, in order to abstract from the idiosyncrasies of any given year, we use an aggregate collected in several rounds from 1995 to 2011.[17] There are 2,415,855 observations in the aggregated dataset.

The second data source is a module on international migration included in the 2002 National Survey of Employment (ENE), conducted by INEGI. This survey is representative at the state level in Mexico and asks households about members who have migrated abroad in the past five years. Members are asked the state in Mexico where the migrant lived before leaving and the specific state in the U.S. where they arrived. The survey therefore captures migration flows over the 1997 to 2002 period.

The third data source comes from recently released information from Mexican consulates in the United States on the issuance of identification cards, known as *matrículas consulares* (MC) or consular registration card. *Matrículas consulares* are issued to individuals living abroad as proof of Mexican citizenship. The cards issued follow the same security standards as the Mexican passport and can serve as identification also in the United States (Riosmena and Massey 2010).[18] Both legal and illegal immigrants can apply for them, and it is estimated that 40% of all Mexicans living in the U.S. have one.[19] The data are compiled by the Institute for Mexicans Living Abroad, a government agency that is part of Mexico's State Department. The data are available on an annual basis from 2008 to the present, and to abstract from the immediate impact of the financial crisis, we use data from 2010. These data therefore capture the number of immigrants from particular states in Mexico that applied for a MC from a particular state in the

[17] Specifically, we use data from surveys in 1995, 2001, 2002, 2008, and 2011.

[18] Mexican consulates began issuing these certificates in 1871. http://www.ime.gob.mx/es/estadisticas-de-mexicanos-en-estados-unidos

[19] Correspondence from Direccion IME Global on 17th July 2014.

U.S. in 2010.

To provide more clarity on the instrument, we calculate the average predicted male migration to the US across states for the year 2000, a year in which sex ratios were very low, and compare the results using the three migration data sources. These means are shown in Table 3. The means are the predicted proportion of male migrants by age group, such that the value of .195, found in the first row in column one, means that 19.5% of the men between the ages of 18 and 25 from a given state, on average, are expected to reside in the U.S. rather than that Mexican state. These predicted values vary across states depending on the size of the population and migration incidence. The table shows that predicted migration is highest for the 26 to 33 year age group, and slowly declines in subsequent age groups. Unsurprisingly, the lowest level of migration is predicted for the 50 to 57 year old age group. The table also shows consistency across all three weighting data sources. This further supports the assertion that migration patterns are largely driven by historic factors and likely do not change dramatically over time.

The exclusion restriction partially rests on the argument that the weights are a result of historic migration patterns and therefore are independent of shocks within states in Mexico that compel people to migrate. Previous research has documented that new migrants tend to go to areas where earlier cohorts from the same origin have gone (Bartel 1989, Conover 1987). To the extent however, that new migrants follow pre-established migration patterns, we can then use more recent information on migration patterns. While weights prior to 1995 do not exist for all the U.S.-Mexican state combination, we do have multiple years of EMIF data and can examine the correlation of these weights over time. Using 1995 and 2011 data, the correlation of the lambdas are .83, corroborating the idea that migration patterns are stable over time. We provide more checks of the assumption that the weights capture historic migration networks in

Section 4.2.

4 Results

4.1 First Stage Regression

In the first stage regression predicted male migration is used as an exogenous determinant of the ratio of men to women in an age group, state, and year. The instrument captures stocks rather than flows of migrants, and thus predicts the number of Mexican men in an age group living in the U.S. as of any given year, rather than the number who have left over a certain time period. We estimate this first stage regression using the following equation:

$$\left(\frac{Men}{Women}\right)_{cst} = \alpha_0 + \alpha_1 PredictedMaleMigration_{cst} + X_{st}'\gamma + \delta_c + \delta_t + \delta_s + \epsilon_{cst} \qquad (3)$$

The first stage results are shown in Table 4. Each cell contains the estimated coefficient on the sex ratio for age group c, in state s and year t. We show estimates including state fixed effects (δ_s) or industry controls (X_{st}), and both. All results include age group and year fixed effects. Standard errors are clustered at the state-age group level. Overall the first stage results are strong. For all three sources of the weighting matrix the predicted migration value is negative and significant, showing that higher numbers of men predicted to be in the U.S. are associated with lower male to female ratios in the sending states in Mexico. Thus predicted migration to the U.S., appear to be strongly correlated to sex ratios across age groups, states and years.

4.2 Instrument Robustness Check

Before proceeding we provide several checks of the validity of the instrument. The exclusion restriction holds if the predicted number of male migrants is independent of factors that determine both women's labor market outcomes and the incentives for men to move. This exogeneity, in turn, relies on the time-invariant weights and rests on the argument that these weights capture historic trends rather than contemporaneous supply shocks. Given the unobservable nature of the supply shocks we cannot directly test these assumptions. We instead provide several indirect robustness checks to bolster our argument that the instrument is valid.

We start by examining the assumption that the weighting system reflects historic networks of migrants and that it is through these networks that information about demand conditions is received by men in Mexico. This is key to the argument that the instrument captures a response to demand conditions in the U.S. rather than supply conditions in Mexico. If this assumption holds an increase in employment opportunities for Mexican men in U.S. states where men from a given Mexican state historically have not gone should have no impact on the sex ratio in that Mexican state.[20] To check this assumption we randomly assign stocks of men between the observed minimum and maximum numbers in U.S. states for each of the weighting matrices. We repeat this exercise 1000 times and use the mean value to construct a new instrument. As shown in column (2), although the coefficients remain negative, they are nearly 15% of the size of those from the original instrument. This suggests that male out-migration responds strongly to conditions in U.S. states where there is an established network, but weakly where these networks are negligible.

We next address concerns that in some cases migration networks are so strong that the stock of Mexican men in the receiving U.S. state reflects supply conditions in the sending state. In this case the instrument may simply allocate "absent men" back to where they came from, and will cease to be exogenous to local supply conditions that affect women's labor market outcomes. For example, the majority of men in the U.S. state of Alaska come from the Mexican state

[20]For example, if men from Oaxaca do not migrate to Arizona, an increase in job opportunities in Arizona should do little to predict gender ratios in Oaxaca.

of Michoacán (the EMIF average weight is 68%). If Michoacán sends most of its migrants to Alaska, and if there are no changes in these patterns over time, the instrument will largely assign these men back to Michoacán. In this case the number of predicted absent men will be a function of supply shocks in the sending location.

To address this we create a new instrument that removes strong connections between sending and receiving states. We first define strong connection as one where the weights for both the sending and receive state exceed 15% (above the 90th percentile). In other words, more than 15% of migrants from a given Mexican state go to a particular U.S. state, and more than 15% of migrants in that U.S. state are from a particular Mexican state.[21] We next define strong connections as those where the weights for a sending Mexican state are at or exceed 50% in any U.S. state. For example, the Alaska-Michoacán connection described above is removed. The results are shown in Columns (3) and (4), respectively, of Table 5. The results are very close to the ones that use the original weights, which suggests strong connections do not drive our first stage results.

We also examine whether the first stage results are driven by particular receiving and sending states. For receiving states the concern is that Mexican immigrants travel to a handful of locations in the U.S., in which case the instrument might not capture historic migration patterns across the entire U.S. but instead show a response to U.S. demand conditions of only a few specific states. For example, in the face of supply shocks all Mexican states may send men to California, the largest receiving state in the U.S., regardless of pre-existing networks or demand

[21] The double weighting comparison achieves two things. First it ensures that U.S. states that have small Mexican migrant populations and are not major receiving areas remain. For example, while the majority of Mexican migrants in Alaska are from Michoacán, less than 1% of migrants from Michoacán actually go to Alaska. Second, it ensures that large receiving states like California and Texas are not eliminated. Many Mexican states send the majority of their migrants to these two states, but in order for supply shocks in specific sending areas to explain the stock of migrant men the sending areas have to dominate the overall composition.

conditions in California.[22] To test this we remove the largest receiving states in the U.S. Using the EMIF average weights, we define the largest U.S. receiving states as those in which either all Mexican states or all but one Mexican state has a presence. This exercise removes four states: California, Texas, Arizona and Florida. We then re-estimate the predicted migration flows using U.S. states except these four, and estimate the relationship between these modified predicted demand and the sex ratios. These results are shown in Column (5) of Table 5. They show that the first stage is not driven by these main receiving U.S. states, as the coefficients on the modified demand remain negative and significant. This provides more evidence that the instrument indeed captures U.S. demand shocks.

A related concern is that the correlation between predicted migration flows and sex ratios is due to a small number of states with high rates of international migration, in which case the instrument would fail to predict sex ratios for the vast majority of Mexican states. To test this we remove Mexican states with the highest level of international migration in the year 2000 (the first census where this information was included). We define high migration states as those where more than 10% of households said they had an international migrant (95th percentile). This removes two states: Michoacán and Zacatecas. The results, in Column (6) of Table 5, show the first stage results are not driven by these two states. The coefficient on predicted demand remains similar in size, negative and significant for all three weighting mechanisms, providing further evidence that the results are not driven by a few key sending states.

Finally we consider alternative measures of the demand for Mexican born male labor using annual data from the Annual Social and Economic Supplement of the Current Population

[22] Data from earlier U.S. Censuses show persistence in the ranking of U.S. states as recipients of Mexican migrants. In 1940 and 1950 this correlation is 0.93, indicating that U.S. states that were the largest recipients of Mexican migrants in 1940 continued to be in 1950.

Survey (CPS), as accessed through IPUMS. The advantage of the CPS is that it is collected annually, allowing us to examine changes over shorter time periods than the Census. The disadvantage, however, is that the sample is much smaller than the Census or the ACS, which leads to noise in the number of observations in age-cohort-U.S. state cells in any given year. To alleviate this concern we consider Mexican born and Hispanic men (this includes other Latin American immigrants) and the median number of employed individuals over a five year period. Specifically, we calculate *changes* to the median number of Mexican born and Hispanic men in each age group, employed in different U.S. states in the five years previous to the year in question. For example, for the year 2000 we calculate the difference between the median number of Mexican born and Hispanic male workers in the 1995-1999 period and 1990-1994 period. We then allocate the changes from the CPS using our three weighting measures, arguing that, respectively, these constitute measures of changing demand for Mexican male labor. The results of the first stage are shown in column (6) of Table 5. The coefficients are very similar to those from our original instrument, providing evidence that our first stage is robust to using changes in employment from an alternative data source as our measure of demand for Mexican male labor. [23]

4.3 Second Stage Regressions

The second stage results are shown in Table 6. Each cell contains the estimated coefficient on the sex ratio for an age group c, in state s, and year t. Standard errors, clustered at the age group-state level, are presented in parentheses. For each outcome we report second stage IV coefficients for all three weighting matrices and OLS coefficients for comparison.

[23] We do not use changes for our original instrument given the lack of a consistent time period across all of the years. For example, since there is not 1980 data for Mexico, we would have to use a 20 year change for 1990 (compare to 1970) data.

The results show that decreases in the number of men to women have strong impacts on the labor market outcomes of women. Starting with labor force participation in column (1), all of the coefficients are negative and significant, with the IV coefficients ranging from -0.666 to -0.822. This means a one standard deviation decrease in the male to female ratio (approximately 0.05) results in an increase in women's labor force participation of 3-4 percentage points. Given that a women's labor force participation rate averages 35, this constitutes an increase of 10-12%– a non-trivial amount. We also find that among women in the labor force, they are more likely to be in white collar or brain jobs if the sex ratio is low. Specifically, according to the coefficients in column (2), a one standard deviation decrease in the male to female ratio leads to an increase in the percentage of women in white collar jobs that ranges from 3 to 4 percentage points (7%-9% of the mean). Meanwhile, the percentage of women in brain jobs is predicted to increase between 14% and 16% of the mean. We therefore find strong evidence that "absent men" increase women's participation in high skilled jobs.

We also find evidence that the increasing prevalence of women in higher skilled jobs is reflected in earnings. On average, a one standard deviation decline in the ratio of men to women is associated with an increase in log monthly earned income that ranges from 3% to 5%. Using ENE and MC migration weights, we also see 1-2 percentage point increase (6%-10%) in the percentage of women in the top 25% of earners. This suggests the gains from higher skilled jobs might be concentrated at the upper end of the earnings distribution. Finally, for hours worked we find a robust positive coefficient, indicating that as men become relatively scarce, the average number of hours women work in a week falls by 1-2%.

In sum, we find that declines in the number of men relative to women leads to significant increases in women's labor force participation and their number in high skilled professions.

Meanwhile, we find increases average wages and a decline in hours work, but we are unable to statistically discern a robust impact on the fraction of women in male dominated professions.

4.4 Robustness Checks

We check the robustness of the results to changing the controls included, using alternative data sources for our historical migration weights, and using an alternative measure of demand for Mexican male labor in the U.S. for our instrument.

We start by examining the robustness of our results to removing industry controls, due to concerns over their endogeneity. The second stage results from a model that excludes these controls are shown in Table 7. The results are largely consistent with those presented in Table 6. Specifically, labor force participation, white collar and "brain" jobs show increase female involvement when the sex ratio falls. We also see some indication (at the 10% statistical level) of an increase in women's participation in male dominated professions. The results for log monthly earned income, top 25% of earners and weekely hours work are consistent in sign, but not always significant across all three migration data sources.[24]

We also estimate results using historic weights from two sources. The first is migration rates from 1924 collected by Foerster (1925). This measure consists of data from Mexicans arriving at border ports and at districts in Los Angeles, San Antonio and El Paso, during April 1924. The numbers of migrants arriving is reported by state of birth from 28 Mexican states. The second is a representative sample collected by Taylor on Mexican migrants in different locations in California, Texas and Illinois (Taylor, 1930 and 1932).[25] These historic weights pre-date our

[24]We also estimate a model with lagged industry controls, using industry composition from the previous Census period. These results, shown in Table A5 also are similar to our original ones, providing further evidence that the contemporaneous industry controls are not driving our results.

[25]For California, he reports data from 29 different Mexican states of birth, of migrants registered by the Associated Labor Bureau, Imperial Valley, between April 1926 and June 1927 (Taylor 1930). For Illinois, the data document the state of origin in Mexico for about 28 states and cover Mexican immigrants in Chicago and the

sample and would be ideal, except they only cover three U.S. states. We therefore do not consider them in the main analysis, but use them to check whether the direction of the results observed persists.[26] The second stage results are shown in Table 8. Although the instrument is weaker, the direction of the results is consistent to those from our original model.

Finally, we present second stage results using *changes* in the stock of men from the CPS allocated back to each Mexican state as our measure of changing demand for Mexican male labor. Consistent with our main findings, results reported in Table 9 show increases in female labor force participation, white collar and "brain" jobs, income and a reduction in weekly hours work. Our findings therefore are not driven by using the *stock* of Mexican born men from the U.S. Census and ACS in our instrument.

4.5 Other Outcomes

One question that arises is whether or not women increasingly move into any type of job once men leave, or rather they move more intensively into higher skilled jobs. To answer this question we estimate the instrumental variables model using the percent of women in the labor force in blue collar or "brawn" jobs as outcome variables. These results are shown columns 1 and 2 of Table 10, and the positive coefficients indicate that women are 3 to 6 percentage points less likely to be employed in either type of job when men are relatively scarce (6 to 10% of the mean). The impact of absent men therefore results in women entering higher skilled and higher paying jobs, but not lower skilled jobs.[27]

Calumet region for the late 1920s (Taylor 1932). For Mexican residents of Dimmit County and Zavala County, Texas, Taylor found data on the place of baptism and Mexican state of origin covering the late 19th century until the late 1920s (Taylor 1930).

[26] There is a high correlation between the historic weights and the EMIF average weights for the 3 states with data. For Texas the correlation between the two sources is 0.52. For California, the correlation is 0.24. For Illinois, the correlation is 0.45.

[27] We also estimated the effects of migration on the men who remain in Mexico, and found that men who stay behind are are significantly more likely to enter "brawn" jobs, show no evidence of entering white collar jobs, and

5 Channels

One of the main channels through which the absence of men can impact women's labor market outcomes is through human capital accumulation. Specifically, as a result of there being fewer men, women may acquire more education. This may be due to fewer marriage market opportunities (Raphael 2013); an increase in the resources available to invest in education due to remittances; an increase in the availability of high skill jobs due to an absence of male candidates; or an increase in time since women have less to do in the home (Goldin 1991). We therefore investigate two human capital accumulation outcomes: total years of schooling and whether or not a woman went to college, defined as more than 16 years of schooling. The results shown in Table 10 indicate that a decline in the sex ratio of one standard deviation (approximately 0.05) leads to an increase in education of 0.6 to 0.9 years. Given that women get on average 8 years of education, this constitutes an increase of 8% to 11%. Meanwhile, for college education we find negative coefficients in all cases, and one significant coefficient. This provides some evidence– although weak– that the additional schooling comes at later years.[28]

Next, we want to determine whether our results could be driven by remittances sent by the absent men to their family members in Mexico. First, we look at the effects of remittances on the labor market outcomes by defining high and low remittance states using various cutoffs from the distribution of the percentage of households in a given state that report receiving remittances in the year 2000 Census data.[29] Given the potential sensitivity of the definition of high remittances, we define high remittance states using three cutoff points in the distribution (top 50%, top 75%

have weak and much smaller in magnitude evidence of entering "brain jobs". Our results for women therefore do not reflect uniform changes in the composition of low and high skill jobs for men and women.

[28]For marriage (defined as never having married), as shown in column 5 of Table 10, we find no significant results. Where never married is an indicator variable that takes a value of one for single women, and zero for married, widowed, divorced, separated or in a consensual partnership.

[29]The remittance module is only included in the year 2000 and 2010 Censuses.

and top 90%) and check for consistency of the results. The list of states in each group is at the bottom of Table 11. We re-estimate the IV results for labor market outcomes using the EMIF weights, our preferred weighting mechanism, and include an interaction of the sex ratio with a high remittance dummy variable to test for significant differences across the two types of states.[30] The results are shown in Table 11. The reduction in hours worked appears to be driven by high remittance states. As shown in column 7, the coefficient on the interaction term is positive and significant across two definitions of high remittance states. We also see some evidence of a smaller decrease in income in these high remittance states (column 5) which is consistent with fewer hours worked. These results are consistent with a story of income effects, in which remittances reduce the amount women need to work outside the home. Meanwhile, the other outcomes, increase female labor force participation, % women in white collar jobs and % women in "brain" jobs do not appear to have strong evidence indicating that the response differs across high and low remittance states. This implies that the effect of having relatively fewer men on these variables, is present even in the absence of high remittances.

Second, to further investigate whether remittances explain the higher levels of schooling attained by women, we estimate the IV results for the outcomes listed in Table 10 by remittance level. The results in Table A4 show that the interaction term for high remittance states is mostly insignificant or when significant not consistently so across the different cut-off levels. This indicates that high remittances do not explain the increased schooling observed when men are relatively scarce. In summary, in this section we document that the increase in high skilled female labor force participation observed appears to result from women acquiring more education, and that this investment in human capital is not driven by remittances.

[30]We prefer the EMIF because, unlike the MC data, it is representative at both the state and national level; and unlike the ENE, it is representative of both individuals and entire families who move to the U.S.

6 Conclusion

In this paper we explore the impact of absent men on the labor market outcomes of working age women in Mexico. Mexico is a developing country that experienced dramatic changes in the relative ratio of men to women due to the international migration of men. The absence of potential employees and of potential mates may have changed the labor market opportunities of women. Using a model which instruments for the sex ratio and predicts migration stemming from U.S. demand, we find that declines in the relative number of men have large effects on the labor market outcomes of women. We document effects not only on the extensive margin, with women entering the labor force, but also along the intensive margin, with women entering higher skilled and higher paid jobs over time.

We use three different data sources for our instrumental variable strategy and find the results to be consistent across them. We also run a series of robustness checks with different controls and the results remain. Unlike men who stay, women are less likely to enter low skill jobs when there is a relative scarcity of men. These differences in type of employment for women could be explained by looking at potential mechanisms. In particular we find that increased educational attainment may explain these results since women who face lower relative number of men have more years of schooling. Additionally we find some evidence that women in high remittance states decrease hours worked which is consistent with a story of income effects.

As documented in different contexts, once women enter the labor force, the cost of working declines and the gains from working increase (Acemoglu et al. 2004, Angrist 2002). Once in the work place, gender differences in occupations and roles seem to continue to matter (Blau and Kahn 2017). Male migration in Mexico, may have contributed, either by necessity or by a change in women's opportunities, to a break in those societal norms that defined the economic roles of women. This change *need not* emerge from migration, but it allows us to better understand what drives women to participate in higher skilled and higher paid jobs. Women may be observing higher skilled job opportunities becoming available and thus prepare themselves for these positions by seeking more education.

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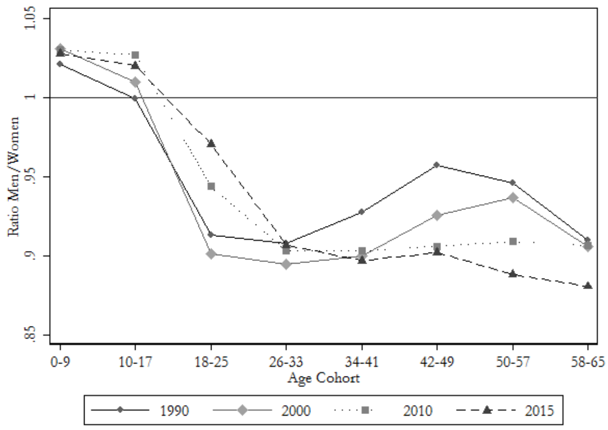
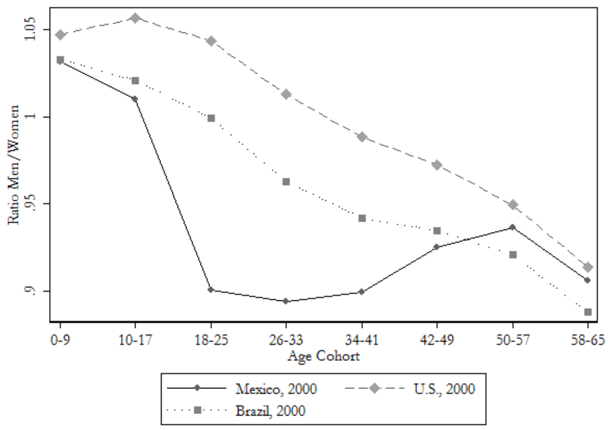
7 Figures and Tables

Figure 1: Sex Ratios

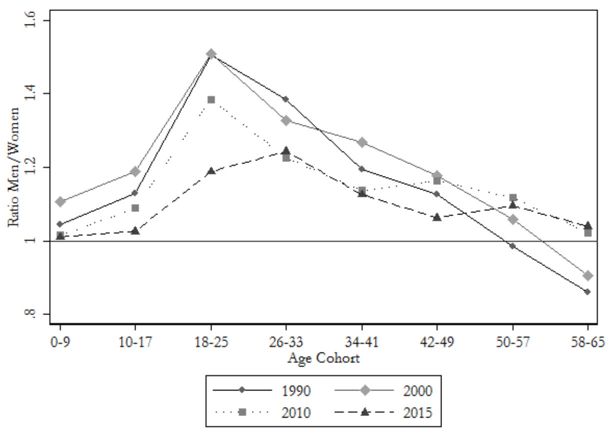
Panel A: By Census Year and age group, Mexico



Panel B: Comparison of Mexico, U.S. and Brazil



Panel C: For Mexican Born residents of the U.S.



Source: Brazil, Mexican, U.S. Census and ACS, accessed through IPUMS.

Table 1: Sex Ratios and International Migration

	(1)	(2)	(3)	(4)	(5)
Age groups:	18-25	26 to 33	34 to 41	42 to 49	50 to 57
			International Migration		
			Panel A: 2000		
% HH with international	-0.013***	-0.014***	-0.011***	-0.005*	-0.006*
	(0.002)	(0.002)	(0.002)	(0.003)	(0.003)
R^2	0.53	0.67	0.58	0.10	0.11
Observations	32	32	32	32	32
			Panel B: 2010		
% HH with international	-0.029***	-0.032***	-0.019***	-0.016***	-0.021***
	(0.005)	(0.006)	(0.005)	(0.005)	(0.007)
R^2	0.56	0.49	0.34	0.26	0.25
Observations	32	32	32	32	32
			Homicides		
			Panel C: 2010		
Homicides per 10,000,000	0.043	0.053	-0.001	0.008	-0.003
	(0.032)	(0.039)	(0.029)	(0.028)	(0.037)
R^2	0.06	0.06	0.00	0.00	0.00
Observations	32	32	32	32	32
			Panel D: 2007-2010		
Homicides per 10,000,000	0.012	0.017	-0.005	0.002	-0.004
	(0.012)	(0.015)	(0.011)	(0.011)	(0.014)
R^2	0.03	0.04	0.01	0.00	0.00
Observations	32	32	32	32	32

Source: Sex ratios and the percent of households (HHs) with international migrants are from the Mexican Census, accessed through IPUMS. Homicides are from municipal death records compiled and made available by INEGI. Note: Standard errors in parenthesis. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Table 2: Summary Statistics on Labor Market Outcomes

age group	18-25	26-33	34-41	42-49	50-57
Women's Labor Force Participation (%)					
1990	25.3	25.2	21.6	17.1	11.2
2000	35.3	39.2	41.5	36.3	27.4
2010	33.0	45.1	47.5	46.0	36.0
2015	31.3	46.3	47.1	45.7	35.9
Women in White Collar Jobs (%)					
1990	48.3	59.5	46.7	38.4	27.0
2000	31.7	40.5	39.1	30.8	21.9
2010	58.6	61.8	56.1	55.1	49.5
2015	56.5	61.9	54.2	52.0	48.9
Women in "Brain" Jobs (%)					
1990	48.6	59.3	45.9	36.9	24.8
2000	32.8	41.8	40.1	31.6	22.2
2010	33.1	40.6	34.9	34.1	25.8
2015	32.9	43.6	36.9	35.4	31.4
Women in Male Dominated Professions (%)					
1990	5.3	10.3	8.5	7.2	6.0
2000	4.5	9.0	7.9	6.9	4.7
2010	3.8	7.6	6.0	5.7	4.7
2015	4.6	8.3	6.3	5.7	5.4
Log(Average Earned Monthly Income), women					
1990	7.76	8.03	8.04	8.08	7.97
2000	7.62	7.95	8.10	8.05	7.86
2010	7.77	8.09	8.12	8.21	8.15
2015	7.73	8.02	8.03	8.06	8.05
Women in Top 25 of Income (%)					
1990	9.1	19.2	22.1	22.1	19.3
2000	8.3	22.1	28.0	25.7	20.2
2010	8.7	21.4	21.5	25.5	21.3
2015	10.2	23.0	23.0	24.2	23.6
Weekly Hours Worked, for women					
1990	42.8	39.6	40.2	40.8	41.6
2000	43.3	40.3	38.7	38.8	38.0
2010	42.1	40.5	39.9	39.4	38.9

Source: Hours worked are only available in the 1990, 2000 and 2010 Census. Income is scaled to 2000 year peso values using CPI information provided by INEGI. The size of the 1990-2015 sample is 640. The size of the 1990-2010 sample is 480. White collar jobs are defined using two digit occupational codes and include categories such as professionals, technicians, managers, administrators, directive officials, and office workers. See section 2.2 for details on definition of categories. Additional summary statistics are available in Appendix Table A1.

Table 3: Predicted Male Migration to the U.S., year 2000

Weighting Source:		EMIF	ENE	MC
		(1)	(2)	(3)
18-25 age group	mean	0.195	0.213	0.195
	std. dev	0.136	0.177	0.137
26-33 age group	mean	0.292	0.315	0.291
	std. dev	0.215	0.269	0.214
34-41 age group	mean	0.280	0.306	0.282
	std. dev	0.200	0.259	0.198
42-49 age group	mean	0.245	0.256	0.237
	std. dev	0.160	0.210	0.157
50-57 age group	mean	0.174	0.195	0.179
	std. dev	0.113	0.163	0.113
Total	mean	0.235	0.257	0.237
	std. dev	0.173	0.222	0.172

Source: Authors' calculations. Note: First row number is the mean values across states. The second row number is the standard deviation.

Table 4: First Stage Regression

Outcome variable:	Sex ratio (men/women)		
	(1)	(2)	(3)
Predicted Migration, EMIF	-0.207***	-0.149***	-0.228***
	(0.028)	(0.018)	(0.028)
R^2	0.58	0.50	0.61
Predicted Migration, ENE	-0.135***	-0.097***	-0.155***
	(0.021)	(0.012)	(0.022)
R^2	0.56	0.48	0.59
Predicted Migration, MC	-0.186***	-0.151***	-0.206***
	(0.025)	(0.014)	(0.025)
R^2	0.58	0.52	0.60
State Fixed Effects	Yes	No	Yes
Industry Controls	No	Yes	Yes
Observations	640	640	640

Source: Mexican Census, accessed through IPUMS. Note: Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: year, age group fixed effects. Some regressions contain state fixed effects and % of the state's workforce employed in different industries by year (2 digit code). Hours worked are only available in the 1990, 2000 and 2010 census. *** p-value$<$0.01, ** p-value$<$0.05, * p-value$<$0.1.

Table 5: Instrument Robustness Checks

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Actual Weights	Random Weights	Excluding Strong Connections	Excluding Strong Connections2	Excluding Largest Receiving	Excluding Largest Sending	Alternative Demand CPS Change
Predicted Migration, EMIF	-0.228***	-0.034***	-0.295***	-0.228***	-0.460***	-0.301***	-0.211***
	(0.028)	(0.011)	(0.030)	(0.028)	(0.063)	(0.037)	(0.038)
R^2	0.61	0.57	0.62	0.61	0.59	0.61	0.55
Predicted Migration, ENE	-0.155***	-0.034***	-0.175***	-0.154***	-0.356***	-0.194***	-0.162***
	(0.022)	(0.011)	(0.028)	(0.022)	(0.051)	(0.033)	(0.030)
R^2	0.59	0.57	0.59	0.59	0.59	0.58	0.55
Predicted Migration, MC	-0.206***	-0.034***	-0.225***	-0.206***	-0.360***	-0.244***	-0.251***
	(0.025)	(0.011)	(0.029)	(0.025)	(0.063)	(0.034)	(0.035)
R^2	0.60	0.57	0.60	0.60	0.58	0.59	0.56
Observations	640	640	640	640	640	600	640

Source: Mexican Census, accessed through IPUMS. Note: Dependent variable=Sex ratio (men/women). Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: state, year, age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code). Column(3) excludes connections where both the U.S. and Mexican weights exceed 15%. Column (4) excludes connections where only the U.S. weight exceeds 50%. Column (5) excludes largest receiving states: California, Texas, Arizona and Florida. Column (6) excludes main sending states: Michoacán and Zacatecas (immigration rates grater than 10% of HHs). *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Table 6: Second Stage, IV Results

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Female Labor Force Participation	% Women in White Collar Jobs	% Women in "Brain" Jobs	% Women in Male Dominated Professions	log Monthly Earned Income by Women	% Women in Top 25% Income	Weekly Hours Worked by Women
				OLS			
Sex ratio (men/women)	-0.419***	-0.232***	-0.457***	-0.042**	-0.355***	-0.063	-1.241
	(0.064)	(0.053)	(0.046)	(0.018)	(0.129)	(0.040)	(1.871)
R^2	0.89	0.90	0.85	0.81	0.84	0.88	0.61
				Weighting Matrix: EMIF			
Sex ratio (men/women)	-0.693***	-0.676***	-1.065***	-0.020	-0.645**	-0.125	8.865*
	(0.145)	(0.152)	(0.141)	(0.035)	(0.292)	(0.085)	(5.039)
R^2	0.89	0.88	0.81	0.81	0.84	0.88	0.58
A-P F statistic	66.12	66.12	66.12	66.12	66.12	66.12	41.60
K-P ChiSquared	52.40	52.40	52.40	52.40	52.40	52.40	41.47
				Weighting Matrix: ENE			
Sex ratio (men/women)	-0.666***	-0.815***	-1.167***	-0.048	-1.092**	-0.396***	11.499*
	(0.167)	(0.192)	(0.176)	(0.042)	(0.465)	(0.152)	(6.706)
R^2	0.89	0.87	0.79	0.81	0.83	0.86	0.56
A-P F statistic	49.09	49.09	49.09	49.09	49.09	49.09	23.15
K-P ChiSquared	35.33	35.33	35.33	35.33	35.33	35.33	20.89
				Weighting Matrix: MC			
Sex ratio (men/women)	-0.822***	-0.764***	-1.197***	-0.047	-0.871**	-0.244**	13.474*
	(0.155)	(0.173)	(0.172)	(0.039)	(0.358)	(0.103)	(7.201)
R^2	0.88	0.88	0.79	0.81	0.84	0.87	0.54
A-P F statistic	65.68	65.68	65.68	65.68	65.68	65.68	32.31
K-P ChiSquared	44.19	44.19	44.19	44.19	44.19	44.19	28.70
Observations	640	640	640	640	640	640	480

Source: Mexican Census, accessed through IPUMS. Note: Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: state, year, age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code). Hours worked are only available in the 1990, 2000 and 2010 census. See section 2.2 for details on definition of categories. A-P stands for Angrist-Pischke F statistic. K-P stands for Kleinbergen-Paap rk LM ChiSquared statistic. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Table 7: Second Stage, Robustness Checks (No Industry Controls)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Female Labor Force Participation	% Women in White Collar Jobs	% Women in "Brain" Jobs	% Women in Male Dominated Professions	log Monthly Earned Income by Women	% Women in Top 25% Income	Weekly Hours Worked by Women
	Weighting Matrix: EMIF						
Sex ratio (men/women)	-0.649***	-0.688***	-1.011***	-0.049	-0.237	-0.066	8.426
	(0.155)	(0.177)	(0.157)	(0.039)	(0.325)	(0.091)	(7.060)
A-P F statistic	56.43	56.43	56.43	56.43	56.43	56.43	38.46
K-P ChiSquared	52.11	52.11	52.11	52.11	52.11	52.11	42.10
	Weighting Matrix: ENE						
Sex ratio (men/women)	-0.652***	-0.919***	-1.158***	-0.095*	-0.953*	-0.405**	14.420*
	(0.184)	(0.237)	(0.208)	(0.049)	(0.525)	(0.193)	(8.592)
R^2	0.88	0.86	0.78	0.78	0.80	0.85	0.50
A-P F statistic	40.46	40.46	40.46	40.46	40.46	40.46	25.42
K-P ChiSquared	37.18	37.18	37.18	37.18	37.18	37.18	25.33
	Weighting Matrix: MC						
Sex ratio (men/women)	-0.765***	-0.801***	-1.164***	-0.080*	-0.516	-0.192	10.014
	(0.165)	(0.197)	(0.185)	(0.045)	(0.391)	(0.125)	(8.306)
R^2	0.87	0.87	0.78	0.78	0.81	0.86	0.53
A-P F statistic	56.11	56.11	56.11	56.11	56.11	56.11	32.57
K-P ChiSquared	44.99	44.99	44.99	44.99	44.99	44.99	31.23
Observations	640	640	640	640	640	640	480

Source: Mexican Census, accessed through IPUMS. Note: Dependent variable=Sex ratio (men/women). Robust Standard Errors, clustered at state-age group level in parentheses. Hours worked are only available in the 1990, 2000 and 2010 census. See section 2.2 for details on definition of categories. A-P stands for Angrist-Pischke F statistic. K-P stands for Kleinbergen-Paap rk LM ChiSquared statistic. *** p-value$<$0.01, ** p-value$<$0.05, * p-value$<$0.1.

Table 8: Second Stage Robustness Checks, Historic Weights

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Female Labor Force Participation	% Women in White Collar Jobs	% Women in "Brain" Jobs	% Women in Male Dominated Professions	log Monthly Earned Income by Women	% Women in Top 25% Income	Weekly Hours Worked by Women
Sex ratio (men/women)	-0.128	-1.086	-1.111*	-0.199	-6.912**	-3.033**	3.215
	(0.402)	(0.667)	(0.633)	(0.166)	(3.343)	(1.491)	(10.081)
R^2	0.84	0.78	0.70	0.69	-0.35	-1.25	0.50
A-P F statistic	6.47	6.47	6.47	6.47	6.47	6.47	7.05
K-P ChiSquared	9.05	9.05	9.05	9.05	9.05	9.05	8.80
Observations	640	640	640	640	640	640	480

Source: Mexican Census, accessed through IPUMS. Historic weights from Foerster (1925) and Taylor (1930). Note: Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: state, year, age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code). Hours worked are only available in the 1990, 2000 and 2010 census. See section 2.2 for details on definition of categories. A-P stands for Angrist-Pischke F statistic. K-P stands for Kleinbergen-Paap rk LM ChiSquared statistic. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Table 9: Second Stage, IV with *Changes* in Stock of Men using CPS Data

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Female Labor Force Participation	% Women in White Collar Jobs	% Women in "Brain" Jobs	% Women in Male Dominated Professions	log Monthly Earned Income by Women	% Women in Top 25% Income	Weekly Hours Worked by Women
Weighting Matrix: EMIF							
Sex ratio (men/women)	-0.421**	-1.650***	-1.814***	-0.137**	-1.553***	-0.123	20.513***
	(0.209)	(0.309)	(0.301)	(0.061)	(0.545)	(0.146)	(7.754)
R^2	0.88	0.74	0.63	0.77	0.78	0.87	0.44
A-P F statistic	30.59	30.59	30.59	30.59	30.59	30.59	20.29
K-P ChiSquared	26.44	26.44	26.44	26.44	26.44	26.44	20.60
Weighting Matrix: ENE							
Sex ratio (men/women)	-0.270	-1.819***	-1.798***	-0.192***	-2.506***	-0.766***	29.166***
	(0.193)	(0.328)	(0.290)	(0.069)	(0.630)	(0.217)	(9.157)
R^2	0.88	0.70	0.63	0.75	0.71	0.78	0.31
A-P F statistic	29.82	29.82	29.82	29.82	29.82	29.82	23.34
K-P ChiSquared	29.63	29.63	29.63	29.63	29.63	29.63	22.48
Weighting Matrix: MC							
Sex ratio (men/women)	-0.593***	-1.752***	-1.895***	-0.189***	-2.255***	-0.587***	22.462***
	(0.176)	(0.269)	(0.255)	(0.059)	(0.508)	(0.150)	(6.979)
R^2	0.88	0.71	0.60	0.75	0.73	0.82	0.41
A-P F statistic	50.28	50.28	50.28	50.28	50.28	50.28	39.17
K-P ChiSquared	41.11	41.11	41.11	41.11	41.11	41.11	34.09
Observations	640	640	640	640	640	640	480

Source: Mexican Census, accessed through IPUMS. Note: Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: state, year, age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code). Hours worked are only available in the 1990, 2000 and 2010 census. See section 2.2 for details on definition of categories. A-P stands for Angrist-Pischke F statistic. K-P stands for Kleinbergen-Paap rk LM ChiSquared statistic. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Table 10: Other Outcomes, Second Stage, IV Results

	(1)	(2)	(3)	(4)	(5)
	Female % in Blue Collar Jobs	Female % in "Brawn" Jobs	Years of Schooling for Women	% Women Who are College Educated	% Women Who Never Married
			OLS		
Sex ratio (men/women)	0.232***	0.460***	-6.669***	-0.136***	0.033
	(0.053)	(0.046)	(0.736)	(0.028)	(0.032)
R^2	0.90	0.85	0.96	0.90	0.99
			Weighting Matrix: EMIF		
Sex ratio (men/women)	0.676***	1.077***	-12.733***	-0.034	-0.023
	(0.152)	(0.141)	(1.614)	(0.067)	(0.065)
R^2	0.88	0.81	0.95	0.89	0.99
			Weighting Matrix: ENE		
Sex ratio (men/women)	0.815***	1.168***	-17.306***	-0.109	0.063
	(0.192)	(0.176)	(2.528)	(0.077)	(0.085)
R^2	0.87	0.79	0.93	0.90	0.99
			Weighting Matrix: MC		
Sex ratio (men/women)	0.763***	1.207***	-16.072***	-0.172***	0.006
	(0.173)	(0.173)	(1.965)	(0.065)	(0.073)
R^2	0.88	0.79	0.94	0.90	0.99
Observations	640	640	640	640	640

Source: Mexican Census, accessed through IPUMS. Note: Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: state, year, age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code). *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Table 11: Outcomes by High and Low Remittance States, EMIF Weights

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Female Labor Force Participation	% Women in White Collar Jobs	% Women in "Brain" Jobs	% Women in Male Dominated Professions	log Monthly Earned Income by Women	% Women in Top 25% Income	Weekly Hours Worked by Women
	High Remittance States= Top 50%						
Sex ratio (men/women)	-0.596***	-0.454***	-0.785***	-0.003	-1.318***	-0.073	-7.374
	(0.206)	(0.165)	(0.147)	(0.046)	(0.363)	(0.084)	(5.962)
Sex ratio (men/women) x High remittance state (50%)	-0.111	-0.252	-0.317	-0.019	0.763*	-0.059	18.330***
	(0.208)	(0.207)	(0.193)	(0.049)	(0.417)	(0.116)	(6.487)
R^2	0.89	0.89	0.82	0.81	0.83	0.88	0.60
	High Remittance States= Top 75%						
Sex ratio (men/women)	-0.752***	-0.423***	-0.810***	-0.011	-1.283***	-0.092	-5.200
	(0.153)	(0.140)	(0.139)	(0.036)	(0.338)	(0.079)	(4.731)
Sex ratio (men/women) x High remittance state (75%)	0.096	-0.417*	-0.420*	-0.015	1.053**	-0.053	21.512***
	(0.202)	(0.230)	(0.215)	(0.049)	(0.440)	(0.125)	(6.976)
R^2	0.88	0.89	0.83	0.81	0.83	0.88	0.61
	High Remittance States= Top 90%						
Sex ratio (men/women)	-0.660***	-0.629***	-1.003***	-0.019	-0.916***	-0.045	3.427
	(0.148)	(0.158)	(0.156)	(0.034)	(0.322)	(0.079)	(4.905)
Sex ratio (men/women) x High remittance state (90%)	-0.081	-0.114	-0.151	-0.004	0.659	-0.192	11.550
	(0.238)	(0.268)	(0.241)	(0.061)	(0.572)	(0.166)	(7.846)
R^2	0.89	0.89	0.82	0.81	0.84	0.88	0.60
Observations	640	640	640	640	640	640	480

Source: Mexican Census, accessed through IPUMS. Note: Dependent variable=Sex ratio (men/women). Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: state, year, and age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code), and a dummy for high remittance states. High remittance states are defined as those above threshold for the % of households that receive remittances as of the 2000 Census (excluding Baja Sur and Quintana Roo). The 90th percentile includes Durango, Michoacán, Nayarit and Zacatecas. The 75th percentile also includes Guanajuato, Guerrero, Jalisco, and San Luis Potosí. The 50th percentile also includes Aguascalientes, Colima, Chihuahua, Hidalgo, Morelos, Oaxaca, and Sinaloa. See section 2.2 for details on definition of labor market categories. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Appendix –(For online publication)

1 Theoretical Framework

This section details a simple theoretical framework, which follows Raphael (2013), to show that the sex ratio in any period is a function of the earlier sex ratio, and the out and return migration rates for men.

Let M_{cs}^{t} be the total number of men in state s and age group c in time t, where $t-1$ would designate the previous period. Assuming no mortality and that only international migration drives migration flows,[31] then the difference $M_{cs}^{t} - M_{cs}^{t-1}$ is the change in the number of men. It can be shown that if the out and in migration rates are similar for men and women, the sex ratios do not change over time. Given that the in country migration rates are roughly balanced across sexes this is less likely to drive changes in sex ratios.[32]

Let M_{csm}^{t} equal the number of men in an age group and state that migrate internationally m between $t-1$ and t, and M_{csr}^{t} equal the number of men in an age group and state that return from abroad r between $t-1$ and t. The number of men in a given age group and state, in year t can be expressed as a function of the number of men in the previous period minus international migrants plus returning migrants.

$$M_{cs}^{t} = M_{cs}^{t-1} - M_{csm}^{t} + M_{csr}^{t} \tag{1}$$

The age group of women can be expressed in the same manner:

$$W_{cs}^{t} = W_{cs}^{t-1} - W_{csm}^{t} + W_{csr}^{t} \tag{2}$$

To simplify the sex ratios further, we assume there is no in or out international migration for women, which means $W_{cs}^{t} = W_{cs}^{t-1}$. The sex ratio in any given year can be written as a function of the ratios in the previous year and the in r and out m migration rates for men:

$$\frac{M_{cs}^{t}}{W_{cs}^{t}} = \frac{M_{cs}^{t-1} - M_{csm}^{t} + M_{csr}^{t}}{W_{cs}^{t-1}} = \frac{M_{cs}^{t-1}}{W_{cs}^{t-1}} - \frac{M_{csm}^{t}}{W_{cs}^{t-1}} + \frac{M_{csr}^{t}}{W_{cs}^{t-1}} \tag{3}$$

This can be re-written to show that the sex ratio in any period is a function of the earlier sex ratio, and the out and return migration rates for men.

$$\frac{M_{cs}^{t}}{W_{cs}^{t}} = \frac{M_{cs}^{t-1}}{W_{cs}^{t-1}} - \left[\frac{M_{cs}^{t-1}}{W_{cs}^{t-1}} + 1\right] outmigration_{cst} + \left[\frac{M_{cs}^{t-1}}{W_{cs}^{t-1}} + 1\right] returnmigration_{cst} \tag{4}$$

[31] This is based on data showing large differences in international migration rates but negligible differences in national migration rates by sex.

[32] For example, according to the 2009 Encuesta Nacional de la Dinámica Demográfica (ENADID, or the National Survey of Demographic Dynamics), a nationally representative survey that captures national and international migration over the past five years, 76% of international migrants to the U.S. over the 2004-2009 period were men, while only 50% of national migrants were men.

Table A1: Summary Statistics

	N	Mean	Std.Dev.	Min	Max
Panel A: Explanatory Variables of Interest					
Sex ratio (men/women)	640	0.93	0.05	0.81	1.13
Predicted migration, EMIF	640	0.21	0.17	0.01	0.95
Predicted migration, ENE	640	0.23	0.21	0.01	1.14
Predicted migration, MC	640	0.21	0.17	0.01	0.84
Predicted migration, Historical	640	0.17	0.26	0.00	2.08
Panel B:Control Variables					
Labor force in agriculture, fishing, forestry (%)	640	0.18	0.12	0.01	0.60
Labor force in mining (%)	640	0.01	0.01	0.00	0.05
Labor force in manufacturing (%)	640	0.16	0.07	0.04	0.34
Labor force in electricity, gas and water (%)	640	0.01	0.00	0.00	0.01
Labor force in construction (%)	640	0.09	0.01	0.05	0.12
Labor force in wholesale and retail trade (%)	640	0.16	0.03	0.08	0.23
Labor force in hotels and restaurants (%)	640	0.06	0.03	0.01	0.24
Labor force in transport and communications (%)	640	0.05	0.01	0.02	0.09
Labor force in financial services and insurance (%)	640	0.01	0.01	0.00	0.04
Labor force in public administration and defense (%)	640	0.04	0.01	0.02	0.09
Labor force in real estate and business services (%)	640	0.04	0.03	0.00	0.14
Labor force in education (%)	640	0.06	0.01	0.04	0.09
Labor force in health and social work (%)	640	0.03	0.01	0.01	0.06
Labor force in other services (%)	640	0.06	0.02	0.03	0.13
Panel C: Labor Market Outcomes					
Women's Labor force participation (%)	640	0.35	0.12	0.05	0.62
Women in White Collar Jobs (%)	640	0.47	0.14	0.08	0.78
Women in "Brain" Jobs (%)	640	0.37	0.11	0.08	0.72
Women in Male Dominated Professions (%)	640	0.06	0.03	0.00	0.19
Log (Average Earned Monthly Income), Women	640	7.99	0.26	7.27	8.91
Women in Top 25 of Income (%)	640	0.20	0.09	0.03	0.55
Weekly Hours Worked, for Women	480	40.34	2.10	32.11	56.55
Panel D: Other Outcomes					
Women in Blue Collar Jobs (%)	640	0.53	0.14	0.22	0.92
Women in "Brawn" Jobs (%)	640	0.63	0.11	0.28	0.89
Years of Schooling, Women	640	8.00	2.43	1.57	12.98
College Educated Women (%)	640	0.09	0.06	0.00	0.34
Never Married Women (%)	640	0.20	0.17	0.02	0.72
Women Who Have No Children (%)	640	0.20	0.19	0.00	0.71

Source: Hours worked are only available in the 1990, 2000 and 2010 Census. Income is scaled to 2000 year peso values using CPI information provided by INEGI. See section 2.2 for details on definition of labor market categories.

Table A2: Second Stage Results, Movers Included

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Female Labor Force Participation	% Women in White Collar Jobs	% Women in "Brain" Jobs	% Women in Male Dominated Professions	log Monthly Earned Income by Women	% Women in Top 25% Income	Weekly Hours Worked by Women
				OLS			
Sex ratio (men/women)	-0.313***	-0.352***	-0.441***	-0.020	-0.372**	-0.075	1.489
	(0.064)	(0.053)	(0.048)	(0.018)	(0.171)	(0.047)	(1.486)
R^2	0.90	0.90	0.86	0.84	0.86	0.89	0.69
				Weighting Matrix: EMIF			
Sex ratio (men/women)	-0.887***	-0.966***	-1.122***	-0.065	-1.512***	-0.322***	9.058*
	(0.218)	(0.229)	(0.208)	(0.050)	(0.462)	(0.121)	(4.828)
R^2	0.88	0.88	0.81	0.84	0.84	0.88	0.67
A-P F statistic	33.69	33.69	33.69	33.69	33.69	33.69	33.69
K-P ChiSquared	34.99	34.99	34.99	34.99	34.99	34.99	34.99
				Weighting Matrix: ENE			
Sex ratio (men/women)	-0.784***	-0.949***	-0.975***	-0.073	-1.274**	-0.410***	7.209
	(0.267)	(0.259)	(0.239)	(0.060)	(0.563)	(0.149)	(5.734)
R^2	0.89	0.88	0.83	0.84	0.85	0.87	0.68
A-P F statistic	28.83	28.83	28.83	28.83	28.83	28.83	28.83
K-P ChiSquared	22.53	22.53	22.53	22.53	22.53	22.53	22.53
				Weighting Matrix: MC			
Sex ratio (men/women)	-1.001***	-0.970***	-1.110***	-0.097	-1.411***	-0.318**	10.299
	(0.251)	(0.263)	(0.256)	(0.062)	(0.544)	(0.144)	(6.760)
R^2	0.87	0.88	0.81	0.83	0.85	0.88	0.67
A-P F statistic	32.82	32.82	32.82	32.82	32.82	32.82	32.82
K-P ChiSquared	27.23	27.23	27.23	27.23	27.23	27.23	27.23
Observations	480	480	480	480	480	480	480

Source: Mexican Census, accessed through IPUMS. Note: Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls:state, year, age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code). Hours worked are only available in the 1990, 2000 and 2010 census. See section 2.2 for details on definition of labor market categories. A-P stands for Angrist-Pischke F statistic. K-P stands for Kleinbergen-Paap rk LM ChiSquared statistic. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Table A3: Percent of Mexican Born Men in a U.S. State (τ), for the 12 largest U.S. receiving states, year 2000

	age group					Summary	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
State	18-25	26-33	34-41	42-49	50-57	young	older
Arizona	21.2	21.4	17.5	10.7	5.7	42.7	33.9
California	17.9	23.4	19.9	12.2	6.5	41.3	38.6
Colorado	25.1	24.7	15.9	9.1	4.2	49.8	29.2
Georgia	33.0	28.1	14.0	6.2	2.6	61.1	22.8
Illinois	20.7	24.9	18.3	11.4	6.0	45.6	35.8
New Jersey	31.9	26.8	17.5	6.6	2.4	58.6	26.6
New Mexico	14.4	18.8	18.0	14.7	8.9	33.2	41.6
New York	30.0	28.7	16.5	6.4	3.0	58.6	25.9
North Carolina	34.5	28.0	13.8	6.1	2.3	62.5	22.1
Oregon	25.6	27.9	18.2	7.8	3.2	53.5	29.2
Texas	18.7	21.1	18.6	12.5	6.9	39.8	38.0
Washington	22.5	27.1	17.3	8.3	4.7	49.6	30.3

Source: U.S. Census, accessed through IPUMS. Note: Percent of Mexican born men in a U.S. state that are in a specific age group. Column (6) is the sum of columns (1) and (2). Column (7) is the sum of columns (3) to (5).

Table A4: Other Outcomes by High and Low Remittance States, EMIF Weights

	(1)	(2)	(3)	(4)	(5)
	Female % in Blue Collar Jobs	Female % in "Brawn" Jobs	Years of Schooling for Women	% Women Who are College Educated	% Women Who Never Married
	High Remittance States= Top 50%				
Sex ratio (men/women)	0.455***	0.803***	-11.739***	-0.005	0.054
	(0.165)	(0.146)	(2.512)	(0.067)	(0.090)
Sex ratio (men/women) x High remittance state (50%)	0.251	0.311	-1.126	-0.033	-0.087
	(0.208)	(0.192)	(2.640)	(0.067)	(0.105)
R^2	0.89	0.82	0.95	0.89	0.99
	High Remittance States= Top 75%				
Sex ratio (men/women)	0.422***	0.828***	-11.905***	-0.053	0.051
	(0.140)	(0.139)	(1.690)	(0.058)	(0.057)
Sex ratio (men/women) x High remittance state (75%)	0.419*	0.411*	-1.366	0.031	-0.121
	(0.231)	(0.216)	(2.359)	(0.071)	(0.096)
R^2	0.89	0.83	0.95	0.89	0.99
	High Remittance States= Top 90%				
Sex ratio (men/women)	0.629***	1.029***	-12.998***	-0.035	0.037
	(0.159)	(0.157)	(1.693)	(0.062)	(0.050)
Sex ratio (men/women) x High remittance state (90%)	0.113	0.117	0.644	0.002	-0.144
	(0.268)	(0.242)	(2.615)	(0.087)	(0.119)
R^2	0.89	0.81	0.95	0.89	0.99
Observations	640	640	640	640	640

Source: Mexican Census, accessed through IPUMS. Note: Dependent variable=Sex ratio (men/women). Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: year fixed effects, age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code), and a dummy for high remittance states. High remittance states are defined as those above threshold for the % of households that receive remittances as of the 2000 Census (excluding Baja Sur and Quintana Roo). The 90th percentile includes Durango, Michoacán, Nayarit and Zacatecas. The 75th percentile also includes Guanajuato, Guerrero, Jalisco, and San Luis Potosí. The 50th percentile also includes Aguascalientes, Colima, Chihuahua, Hidalgo, Morelos, Oaxaca, and Sinaloa. See section 2.2 for details on definition of labor market categories. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.

Table A5: Second Stage, IV Results, Lagged Industry Controls

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Female Labor Force Participation	% Women in White Collar Jobs	% Women in “Brain” Jobs	% Women in Male Dominated Professions	log Monthly Earned Income by Women	% Women in Top 25% Income	Weekly Hours Worked by Women
				OLS			
Sex ratio (men/women)	-0.418***	-0.213***	-0.434***	-0.039**	-0.310**	-0.073*	-0.445
	(0.063)	(0.051)	(0.048)	(0.018)	(0.139)	(0.037)	(1.911)
R^2	0.89	0.90	0.85	0.81	0.82	0.88	0.65
				Weighting Matrix: EMIF			
Sex ratio (men/women)	-0.725***	-0.700***	-1.114***	-0.005	-0.322	0.013	13.310***
	(0.154)	(0.142)	(0.138)	(0.034)	(0.305)	(0.085)	(4.829)
R^2	0.88	0.89	0.80	0.81	0.82	0.88	0.59
A-P F statistic	65.05	65.05	65.05	65.05	65.05	65.05	45.75
K-P ChiSquared	49.49	49.49	49.49	49.49	49.49	49.49	40.83
				Weighting Matrix: ENE			
Sex ratio (men/women)	-0.658***	-0.866***	-1.215***	-0.058	-0.775*	-0.259**	11.811**
	(0.168)	(0.171)	(0.165)	(0.039)	(0.425)	(0.127)	(5.923)
R^2	0.88	0.87	0.79	0.81	0.82	0.88	0.61
A-P F statistic	57.63	57.63	57.63	57.63	57.63	57.63	32.23
K-P ChiSquared	38.29	38.29	38.29	38.29	38.29	38.29	26.67
				Weighting Matrix: MC			
Sex ratio (men/women)	-0.862***	-0.766***	-1.234***	-0.035	-0.474	-0.084	13.309**
	(0.156)	(0.149)	(0.156)	(0.036)	(0.331)	(0.087)	(5.758)
R^2	0.87	0.88	0.78	0.81	0.82	0.88	0.59
A-P F statistic	72.73	72.73	72.73	72.73	72.73	72.73	42.20
K-P ChiSquared	45.46	45.46	45.46	45.46	45.46	45.46	32.31
Observations	635	635	635	635	635	635	475

Source: Mexican Census, accessed through IPUMS. Note: Robust Standard Errors, clustered at state-age group level in parentheses. All regressions include the following controls: state, year, and age group fixed effects, % of the state's workforce employed in different industries by year (2 digit code). Hours worked are only available in the 1990, 2000 and 2010 census. See section 2.2 for details on definition of categories. A-P stands for Angrist-Pischke F statistic. K-P stands for Kleinbergen-Paap rk LM ChiSquared statistic. *** p-value<0.01, ** p-value<0.05, * p-value<0.1.