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Abstract

Emigration in Mexico predominantly involves young men, with millions of individuals crossing borders, while female labor force participation (FLFP) remains significantly below international levels. This paper explores the interplay between these two phenomena, revealing that higher FLFP substantially reduces male emigration. Using robust econometric methods and panel data from ENNVIH, we estimate that when women work, the probability of male household members migrating decreases by 30 pp. Our analysis employs a twofold novel instrumental variable identification strategy to ensure the causal interpretation of our results: the rollout of full-time schools, and the price of washing machines. Our findings underscore the potential of gender-focused labor policies not only to empower women but also to mitigate migration pressures, contributing to household stability and broader economic development.

JEL Codes : F22, J15, J16

Keywords: Female labor force participation, migration, Mexico.

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1. Introduction

Mexican emigration is a phenomenon of profound social and economic significance. With 12 million emigrants in 2021, Mexico ranks as the second-largest source of international migrants globally, surpassed only by India (IOM, 2024). According to the World Migration Report, the Mexico-United States migration corridor is the largest in the world, hosting 11 million Mexican-born individuals in the United States (U.S.) (IOM, 2024). Remittances, a direct consequence of this migration, accounted for 3.5% of Mexico's GDP in 2023, highlighting their economic relevance (Li Ng, 2024). However, this mass emigration raises critical challenges. The growing political pressure from the United States to curb migration often results in policies that negatively impact Mexicans, migrants from other countries transiting through Mexico, and, to a lesser extent, U.S. denizens (for example, Koleyni (2021) analyzes the effects of U.S. tariffs on Mexico and Romer Witten, 2018 evaluates the impact of parent and child separation at the U.S. border on mental health). Beyond political dynamics, emigration entails a significant loss of present and future human capital for countries of origin, making it imperative for such nations to explore strategies to mitigate the outflow of their citizens.

This paper examines female labor force participation (FLFP) as a potential mechanism to reduce Mexican male emigration. An additional source of income within the household could narrow the gap between potential household earnings abroad and in the country of origin, thereby altering migration incentives. Moreover, as women contribute more to household income, they may gain greater bargaining power in family decision-making, including those related to migration, which could encourage male household members to stay.

The literature on migration and gender equity, both internationally and in Mexico, is vast and diverse. Studies such as Pedraza (1991), Kanaiaupuni (2000), David and Winters (2001), Curran and Rivero-Fuentes (2003), Boyd and Grieco (2014), Lu and Li (2020), and Sharp (2021), explore migrant characteristics compared to non-migrants, with a strong emphasis on education, health, and family income. In Latin America, Edwards and Ureta (2003) and Acosta (2011) examine remittances in El Salvador, finding positive effects on schooling and reductions in child labor, particularly among girls. Similarly, Hildebrandt et al. (2005) and McKenzie and Rapoport (2011) study Mexico, revealing mixed impacts: while migration lowers infant mortality, it also reduces preventive health inputs and school attendance.

The determinants of migration and self-selection processes have been another focal point in the literature. For the Mexican case, Kanaiaupuni (2000) shows that migrant networks benefit both men and women, though gender roles shape migration differently. Cerrutti and Massey (2001) find that parental migration patterns influence children's migration behavior, with sons following fathers and daughters following mothers. Kandel and Massey (2002) further demonstrate that parental migration increases the likelihood of children aspiring to migrate, often at the expense of their education.

Global studies expand on these findings. Garip (2008) highlights the role of socioeconomic status and infrastructure in migration within Thailand, while Fuchs-Schündeln and Schündeln (2009) identify education and marital status as key factors in East-West migration within Germany. Liu (2013) examines migration between Africa and Europe, emphasizing the importance of weak ties and resource availability. This study contributes to this literature by focusing on how rising female labor participation in

Mexico influences male migration, shedding light on shifting household dynamics and their broader implications.

To analyze the effect of female labor participation on reducing male migration in Mexico, panel data from two primary sources were used: the National Household Living Standards Survey (ENNVIH[1]) and the National Survey of Occupation and Employment (ENOE). ENNVIH, a longitudinal survey representative at national and regional levels, offers comprehensive data spanning a decade (2002–2012). The analysis employs robust controls to isolate the impact of female labor from other factors like education, income, and household dynamics. ENNVIH yielded the most reliable results, with additional findings from ENOE available upon request.

The remainder of this paper is organized as follows. Section 2 reviews the process of emigration and gender inequality in Mexico. Section 3 describes the data sources, and the econometric methodology employed to estimate the causal relationship between female labor participation and male migration. Section 4 presents the main results, including robustness checks, and a discussion of their implications. Finally, Section 5 concludes with policy recommendations and suggestions for future research.

2.   Emigration in Mexico

The phenomenon of migration (mostly towards the United States) accelerated drastically in the late 1980s, coinciding with a period of deep economic crisis in Mexico; it remained at very high levels throughout the 1980s and significantly decreased (reduced by half) in the 1990s and 2000s. Since 2010, net migration has plummeted, even becoming

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[1] https://www.ennvih-mxfls.org/

positive on two occasions in 2011 and 2016 (see Figure 1). However, the pandemic slowed down the decreasing trend in the influx of Mexicans to the US.

According to the U.S. Current Population Survey, in 2018, 12.3 million Mexicans were living in the U.S., while the population of Mexican origin was 38.5 million (of which 26.2 million are second and third generation). These figures are revealing for both the U.S. and Mexico. In the former, it implies that roughly one in ten Americans is of Mexican origin, and in the latter, one in ten Mexicans lives in the United States.

Figure 1: Net Migration in Mexico (1960-2021)
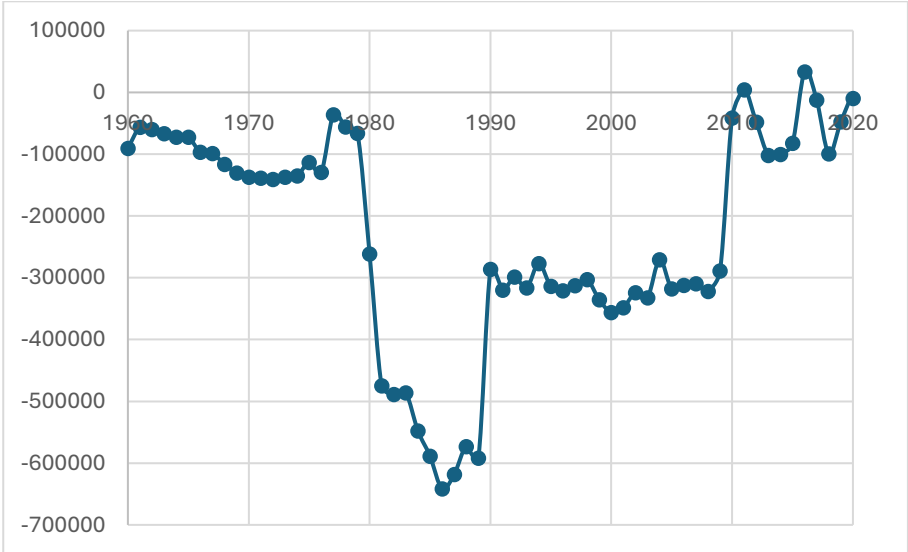
Source: World Bank

According to Mexico's National Statistical Institute, INEGI, the population that migrates to other countries mainly does so between the ages of 18 and 29. Additionally, in working age, more than two-thirds of migrants are men, as shown in Figure 2.

Figure 2: Mexican International Migrants by Gender and Age
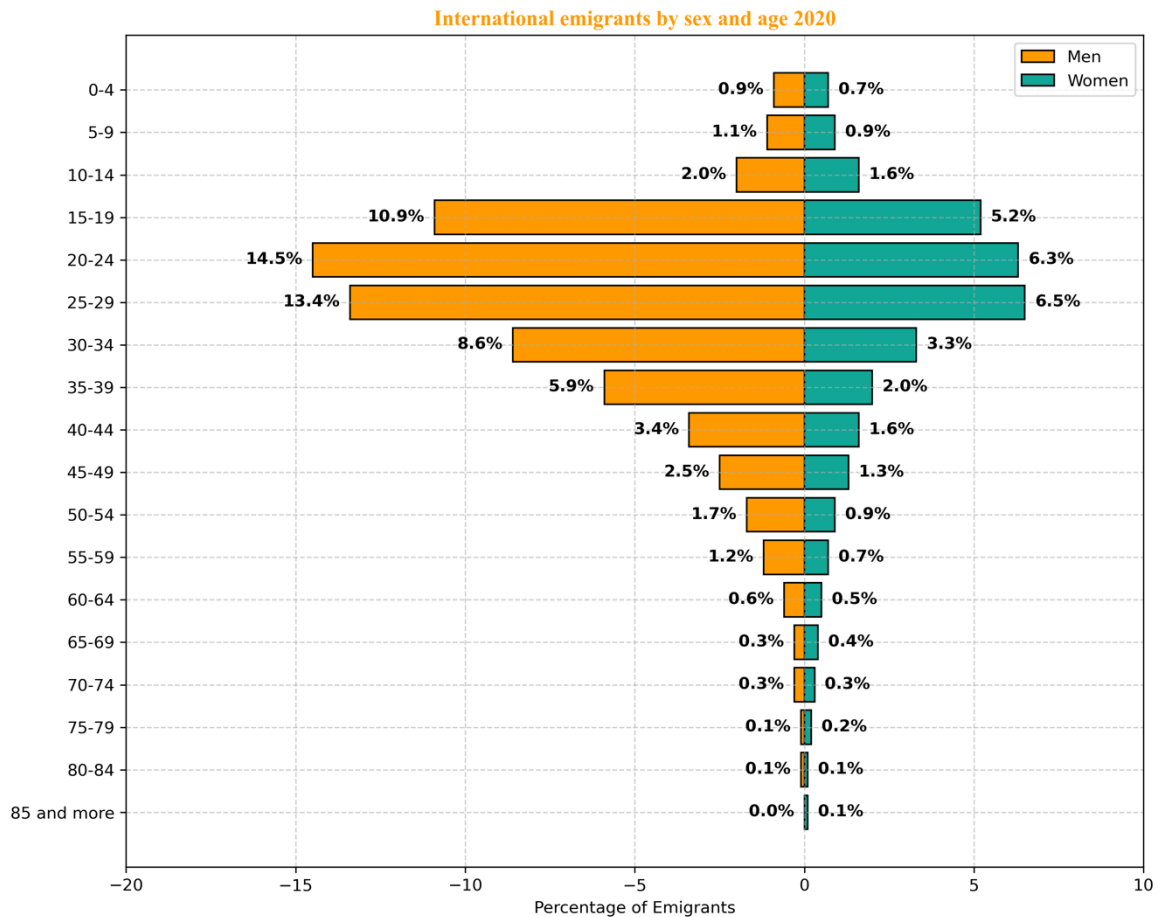
Source: INEGI Population and Housing Census 2020
(https://cuentame.inegi.org.mx/poblacion/migracion.aspx?tema=P)

All the above reflects not only the great importance of the migration phenomenon for both nations but also the complexity of their relationship. For Mexico, in particular, this phenomenon is often conceived as a pressure relief valve for social and economic issues, as a non-trivial segment of its population emigrates, reducing the need for job and housing creation (although it also diminishes the stock of human capital). The familial ties maintained generate substantial remittances, which alleviate poverty issues in Mexico. The importance of remittances for Mexico has grown in recent decades, reaching 4% of GDP in 2020 (see Figure 3). This trend seems to have gained strength during the

pandemic, with remittances increasing (in nominal terms) by 27% in 2021 and 13% in 2022.

Figure 3: Net Remittance Flow as a Percentage of GDP
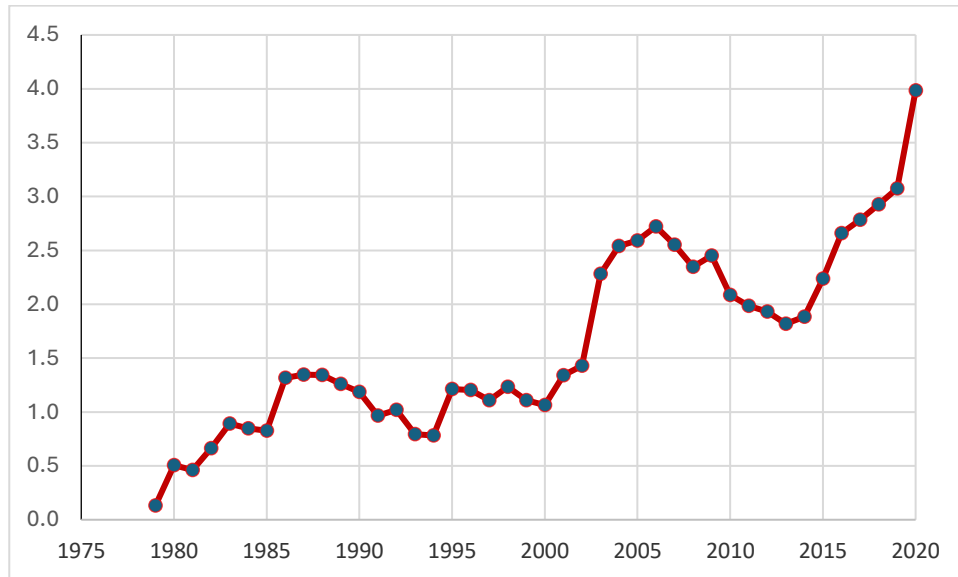
Source: Federal Reserve Bank of St. Louis (FRED)

Male migration in Mexico has been a topic of study for decades due to its impact on the country's social and economic dynamics. The search for better job and economic opportunities has led many people, mostly men, to emigrate from their places of origin to larger cities or other countries. Structural causes of migration include insufficient growth, poverty and inequality, high demographic growth in cities, and significant rural lag, among others.

The significant phenomenon of migration in Mexico occurred during a historical period when, like in many other parts of the world, there were significant, albeit markedly insufficient, advances in gender equity. Two textual quotes from Carbonell (2018) summarize the situation in Mexico regarding this matter:

"*The historical-legislative process of the emancipation of Mexican women has been a continuous stage with timid advances and setbacks [...] two different substrates are mixed: on the one hand, the value element of indigenous culture with its sectoral and geographical diversities, and what the Spanish culture represented in the process of conquest and colonization.*"

"*The advances in gender equality in Mexico in past centuries were practically non-existent [...] However, especially from this century onwards, a series of legislative and social reforms aimed at consolidating full equality between men and women have been taking place, although the centuries of inequitable situations have meant that today almost all aspects of civil life still show daily inequalities against one sex in favor of the other, and in this case, women have been disadvantaged, although it is hoped that in the not too distant future, full gender equality can be achieved.*"

According to INEGI's gender atlas, in Mexico, the average gender wage gap in the second quarter of 2019 (average hourly income) was 50 cents, although it can be close to or exceed $7 pesos in some states (Colima, Chiapas, and Sinaloa). In Mexico City, it is $4.05. The size of this gender gap depends on the methodology and sample used for its estimation. Among the male and female population, the gap can be as high as 70%, while among the working population, it is reduced to less than 10%.

On the other hand, the female labor participation rate in the country is low compared to international levels, with only 44.3% in 2021. The average in Latin America and the Caribbean is 49.8%, and 47.1% in G20 countries, of which Mexico is a member. Additionally, the male labor participation rate in Mexico was 76.7% that year (ILO 2023).

In terms of education, significant gender disparities persist, particularly notable is the fact that, according to ENIGH 2018, women represent

60% of the population over 15 years without any educational level approved.

Regarding violence, it is worth mentioning that the national female homicide rate (in 2017) was 5.42, an alarming figure, especially when considering the heterogeneity among states. While in Baja California, Baja California Sur, and Guerrero, the rate is 11.47, 19.03, and 11.38 respectively, in Nuevo León, Aguascalientes, and Coahuila, it is 2.32, 1.18, and 2.42 respectively.

All of the above helps to understand the context in which this study is conducted, aiming to provide evidence regarding the relationship between Mexican male migration decisions and women's labor situation. By showing evidence that female labor reduces male migration, policies that promote and support female labor participation in areas with higher male migration could be implemented. This would contribute to the social and economic stability of the country and could improve the quality of life for many families.

This work identifies the effect of female labor participation on male migration. This is relevant because, although female labor participation in Mexico has been increasing, which would have relevant effects on women's roles in the household, it is still low compared to international levels.

3.   Data and Methods

It is important to note that the increase in female labor participation in Mexico in recent decades can be understood, at least to some extent, by the growing presence of women in higher education and the increasing need to contribute to family income. According to the last three economic censuses by INEGI, it is possible to know the following: In 2008, women's employment represented 39.9% of the total

employed personnel; in 2013, 41.1%; and in 2018, 41.3%. Additionally, the education level of women aged 15 and older has been increasing. In 1990, 21.3% of women in this age range had completed secondary or higher education, and by 2020, 44.9% had that level of education. Both factors (increased labor participation and education level) allow women to access better job opportunities and higher income levels, which may be affecting male migration.

3.1 Data Source

To statistically support the effect of female labor on reducing male migration in Mexico, panel data estimates are used. This approach allows for identifying key variables influencing men's migration decisions and examining how female labor participation may be affecting these decisions. The robustness of the results largely depends on the controls included in the regression analysis, which, if adequate and sufficient, allow for correctly identifying the effect of female labor participation on migration decisions (in this case) without it being biased by other causes (education, income, number of children, security, etc.). To address the topic comprehensively, two primary sources of information were used: (i) the National Household Living Standards Survey (ENNVIH in Spanish) and (ii) the National Survey of Occupation and Employment (ENOE in Spanish). Additional tests show that the most robust results were obtained based on ENNVIH information. This is probably because ENOE is designed to measure employment conditions, and consequently, the number of migrants it observes is limited. The corresponding results using ENOE are available upon request.

ENNVIH is a longitudinal and multi-thematic survey representative of the Mexican population at the national, urban, rural, and regional levels. ENNVIH has been developed and managed by researchers from the

Universidad Iberoamericana (UIA) and the Center for Research and Teaching in Economics (CIDE) in collaboration with researchers from Duke University. Currently, ENNVIH contains information for a 10-year period compiled through three surveys conducted in 2002, 2005-2006, and 2009-2012. The ENNHIV data set is publicly available.

3.2 Methods

The objective of this article is to estimate the causal effect of female paid work on the probability of a household man migrating abroad. One challenge in estimating this causal relationship is the potential endogeneity between the decision to migrate and female work. According to migration theories that place the migration decision within the household (Stark and Bloom 1985; Taylor 1985), women's decision to work and the decision to migrate can be made jointly, both aimed at improving the household situation or due to a third variable affecting both decisions (e.g., global economic crises). To limit this potential source of bias, we initially opted for a model where female labor participation (as well as the other controls) occurs in a period prior and distant (four years) to the male migration decision; this is, all the controls are lagged. The estimation results are included in Appendix B.

Although this model provides evidence that female labor diminishes the probability of migration of men, the results should be taken with cautious as the identification strategy may not be sufficient, considering what has already been mentioned earlier. This is why we opt for an instrumental variables strategy where two instruments are employed:

On the first hand we use an IV strategy that mimics Padilla-Romo and Cabrera-Hernández (2019).[2] Padilla-Romo and Cabrera-Hernández use the implementation of full-time schools (FTS) in Mexico as an instrument to estimate the causal effect of extended school hours on female labor force participation (FLFP). This instrument takes advantage of the gradual and geographically differentiated rollout of the FTS program, which increased the time children spent in school, potentially freeing up mothers' time to participate in the labor market. The validity of this instrument relies on two key pillars:

1. **Relevance**: FTS significantly alters mothers' available time by reducing childcare responsibilities during school hours. This establishes a direct link between FTS availability and the likelihood of mothers entering the labor force. The authors show that FTS

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[2] We would like to thank Francisco Cabrera Hernández for not only explaining to us the instrument but also for lending us his precious dataset. Padilla-Romo and Cabrera-Hernández utilize data from the **ENOE**, a nationally representative panel survey conducted quarterly in Mexico. This dataset provides comprehensive information on household characteristics, labor market outcomes, and demographic variables, making it well-suited for analyzing FLFP. To construct the instrument, the authors leverage the phased rollout of the **FTS program**, which extended school hours in certain public schools across Mexico. The rollout, determined by policy priorities and budget constraints, introduced exogenous variation in the availability of FTS at the municipal level. This variation serves as the basis for the instrumental variable, capturing the increase in the likelihood of children attending FTS as a function of municipal program implementation. By linking municipal-level program data to individual and household-level survey responses, the authors effectively isolate the causal impact of FTS availability on FLFP, controlling for potential confounders and exploiting the temporal and geographical dimensions of the program's expansion. Padilla-Romo and Cabrera-Hernández sourced data on FTS from the official records of Mexico's **Full-Time Schools Program**, administered by the Ministry of Public Education (SEP). These records provide municipal-level information on the program's rollout, including the number of participating schools and implementation timelines. This data was linked to household-level data from the ENOE, generating the exogenous variation needed to construct the instrumental variable and estimate the causal impact of FTS availability on female labor force participation.

increases FLFP, particularly among mothers with young children, validating the relevance of the instrument.

2. **Exogeneity**: The rollout of FTS is unrelated to individual characteristics of mothers or families that could influence their decision to work. Instead, the program's introduction is driven by public policy and external budgetary allocations, ensuring that the effect of FTS on FLFP is not confounded by endogenous factors such as prior income, education levels, or cultural attitudes.

On the second hand, we also include the relative price of washing machines (WM hereafter). Hackett and Márquez-Padilla (2024) leverage the relative price of WM as an instrumental variable to estimate the causal effect of female labor force participation (FLFP) on fertility in Mexico. Their approach draws on the "Engines of Liberation" model, which posits that time-saving household technologies, such as WM, enable women to allocate more time to market activities by reducing the time burden of domestic chores. The instrument is well-suited to address endogeneity issues because the sharp decline in WM prices during the 1990s, driven by Mexico's trade liberalization through the GATT and NAFTA, constitutes an exogenous shock. This decline affected households uniformly, irrespective of their initial labor market or fertility preferences, satisfying both the relevance and exogeneity criteria for a valid instrument.

In our study, we adapt the instrumental variable framework developed by Hackett and Márquez-Padilla (2024) to instrumentalize the female labor force participation (FLFP) on its relationship with male migration in Mexico. The underlying logic is similar: the decline in WM prices influences the likelihood of women working by reducing their time

burden at home, and this change in household dynamics can, in turn, affect male migration decisions.

By employing the relative price of WM and FTS as instruments for woman works, we address potential endogeneity concerns, ensuring that our estimates capture the causal relationship between female work and male migration, and provide robust evidence on how gendered labor dynamics influence migration behavior, offering insights into the broader implications of economic and social policies on household decision-making, this is, we provide robust and policy-relevant results.

As for the other controls, we include the years of school (man), years of school (man) squared, income (man), income (man) squared, number of children. We consider that these school and income may have non-linear relationships with migration.[3] We also control violence (the rate of homicides at the County level is employed). The equations to be estimated are as follows. The first stage,

$$WW_{i,t} = \alpha_0 + \alpha_1 FTS_{i,t} + \alpha_2 WM_{i,t} + \beta_2 X_{i,t} + \beta_3 TE_t + \beta_4 SE_i + \epsilon_{i,t}, \qquad (1)$$

And the second stage,

$$MM_{i,t} = \beta_0 + \beta_1 WW_{i,t} + \beta_2 X_{i,t} + \beta_3 TE_t + \beta_4 SE_i + \epsilon_{i,t}. \qquad (2)$$

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[3] This is, intuition—correct but somewhat naive—dictates that as people have more education and/or earn more money, they migrate less. It is true that highly educated people (or with high incomes) can handle difficult situations much better and have less stressful options than migration. However, such intuition does not take into account that the migration process is neither cheap nor simple. The lack of sufficient income and/or certain skills (some of which are generally acquired in school) discourages people from considering migration. In other words, a more refined (and potentially accurate) intuition would consider that people with extremely low levels of income/education migrate less because they cannot afford/solve it. As their income/education increases, they migrate more. This remains true up to a certain level of income/education, and beyond that threshold, the initial intuition starts operating (more income/education reduces migration).

where the dependent variables, $WW_{i,t}$, and $MM_{i,t}$ are binary variables that takes the value of one if the woman works / the man migrates. $X_{i,t}$ is a row vector that includes the controls: years of school, years of school squared, man income, man income squared, No of children, and homicides. We also include time and state fixed effects, TE_t, and SE_i.

The descriptive analysis based on ENNVIH data reveals patterns regarding migration in Mexico (descriptive statistics and figures have been relegated to Appendix A). Figure A.1 illustrates the relationship between household socioeconomic strata and the decision to migrate. it suggests that the likelihood of migrating is higher in lower socioeconomic strata for both men and women. However, this trend diminishes in higher strata, where migration becomes less frequent. This indicates that migration incentives are closely tied to economic constraints: households in lower strata may view migration as a strategy to improve their conditions, while higher strata have local economic alternatives that reduce the need for migration.

Figure A.2 explores the relationship between education levels and the decision to migrate, with separate observations for men and women. The graph suggests a nonlinear pattern: individuals with lower education levels appear more likely to migrate, possibly due to fewer local opportunities. As education increases, the likelihood of migration seems to decline, reflecting improved access to local or regional job markets. However, there is a slight uptick in migration among those with the highest education levels, which could indicate a pursuit of specialized opportunities abroad. This suggests that education plays a nuanced role in shaping migration decisions, with its impact varying across the spectrum of attainment.

4.   Econometric Results

Table 1 presents the results from both the first and second stages of the instrumental variable regression. The first stage confirms the validity of the instruments, with both FTS and the relative price of WM exhibiting positive and statistically significant effects on woman works. The second stage provides strong evidence supporting the main hypothesis: female labor participation significantly reduces male migration. The coefficient of WW is -0.349, indicating that when a woman works, the likelihood of male migration decreases by approximately 30 percentage points.[4]

Regarding the control variables, the results align with expectations based on existing literature. Male education and income show nonlinear effects, with initial increases being associated with a higher likelihood of migration, but this relationship reverses at higher levels. The number of children is positively correlated with male migration, suggesting an effect of family support responsibilities. Regional and economic variables, such as homicide rates and state fixed effects proxying local employment opportunities, exhibit varying degrees of significance, but their inclusion primarily serves to enhance the robustness of the main results rather than offering standalone interpretive value.

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[4] The coefficient of -0.349 can be interpreted as approximately a 34.9 percentage point reduction in the probability of male migration when a woman in the household works Both the dependent and independent variables are binary and untransformed, allowing the coefficient to represent the average change in the probability of migration.

Table 1. Baseline model (first & second stage)

FIRST STAGE	Woman works	SECOND STAGE	Man migrates
Variables		**Variables**	
Full-Time Schools, FTS	0.008*	**Woman works**	-0.349**
	(0.005)		(0.149)
Years of school, man	0.009***	**Years of school, man**	0.004***
	(0.001)		(0.002)
Years of school, man (squared)	-0.000	**Years of school, man (squared)**	0.000
	(0.000)		(0.000)
Income, man	0.000***	**Income, man**	0.000***
	(0.000)		(0.000)
Income, man (squared)	-0.000***	**Income, man (squared)**	-0.000***
	(0.000)		(0.000)
No. of Children	0.008***	**No. of Children**	0.008***
	(0.001)		(0.001)
Homicides, County	-0.000	**Homicides, County**	-0.000
	(0.000)		(0.000)
Washing Machine, WM	0.012***		
	(0.003)		
Constant	0.179	**Constant**	0.155***
	(0.113)		(0.047)
FE, State	X	**FE, State**	X
FE, Time	X	**FE, Time**	X
Observations	94,936	**Observations**	94,936
R-squared	0.066		
F	9.977	**IV**	FTS & WM

Source: own elaboration with ENNVIH data. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1

Robustness Analysis

Tables 2a (first stage) and 2b (second stage) provide robustness checks for the causal relationship between female labor force participation (FLFP) and male migration. The analysis explores various model specifications, incorporating additional controls and alternative formulations to ensure the reliability of the results.

In the first stage (Table 2a), both instruments—FTS and the relative price of WM—show consistent and statistically significant effects on FLFP, confirming the relevance of these instruments. The coefficients indicate

that FTS increases the likelihood of female labor participation, supporting its validity as an instrument. Similarly, the sharp decline in WM prices, driven by trade liberalization, continues to exhibit a positive and significant association with FLFP.

In the second stage (Table 2b), the variable "Woman Works" remains negative and statistically significant across all specifications, reinforcing the conclusion that female labor reduces the likelihood of male migration. The coefficients range between -0.308 and -0.398, suggesting that a one-unit increase in FLFP reduces male migration probability by 30 pp to 40 pp. These consistent results underscore the robustness of the findings, even after accounting for potential endogeneity.

An important robustness check involves excluding male income as a control variable to address potential concerns about overcontrolling. Despite its omission, the results remain consistent: female labor force participation (FLFP) continues to exhibit a significant negative effect on male migration probability. This indicates that the relationship between FLFP and migration is not merely a reflection of household income dynamics but rather highlights the direct impact of female economic activity on migration decisions. The stability of the coefficients across these specifications reinforces the robustness of the findings.[5]

In summary, the robustness checks confirm the stability and reliability of the main findings. The evidence strongly supports the conclusion that

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[5] Male income and years of education show nonlinear effects on migration. Initially, higher income and education increase migration likelihood, reflecting greater resources and skills. However, at advanced levels, this trend reverses as local opportunities become more appealing. These findings, while insightful, should be interpreted with caution.

promoting female labor participation can effectively reduce male migration, emphasizing the policy relevance of gender-focused economic initiatives.

Table 2a: Robustness checks, first stage

Variables	[baseline] Woman works	[1] Woman works	[2] Woman works	[3] Woman works	[4] Woman works	[5] Woman works
Full-Time Schools, FTS	0.008*	0.008	0.008	0.008*	0.008	0.008
	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)
Years of school, man	0.009***	0.009***	0.009***	0.006***	0.006***	0.006***
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Years of school, man (squared)	-0.000	-0.000	-0.000	0.000	0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income, man	0.000***	0.000***	0.000***			
	(0.000)	(0.000)	(0.000)			
Income, man (squared)	-0.000***	-0.000***	-0.000***			
	(0.000)	(0.000)	(0.000)			
No. of Kids	0.008***	0.008***	0.008***	0.001	0.001	0.001
	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)	(0.001)
Homicides, County	-0.000			-0.000		
	(0.000)			(0.000)		
Violence against women		0.005			0.005	
		(0.004)			(0.004)	
Income, man (log)				0.024***	0.024***	0.024***
				(0.001)	(0.001)	(0.001)
Washing Machine, WM	0.012***	0.011***	0.012***	0.012***	0.011***	0.012***
	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)	(0.003)
Constant	0.179	0.169	0.179	0.177	0.166	0.176
	(0.113)	(0.113)	(0.113)	(0.116)	(0.116)	(0.116)
FE, State	X	X	X	X	X	X
FE, Time	X	X	X	X	X	X
Observations	94,936	94,936	94,936	94,936	94,936	94,936
R-squared	0.066	0.066	0.066	0.101	0.101	0.101
F	9.977	8.195	9.977	9.834	7.969	9.843

Source: Own elaboration with ENNVIH data. Standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$

Table 2b: Robustness checks, second stage

Variables	[baseline] Man migrates	[1] Man migrates	[2] Man migrates	[3] Man migrates	[4] Man migrates	[5] Man migrates
Woman works	-0.349**	-0.398**	-0.348**	-0.308**	-0.362**	-0.306**
	(0.149)	(0.170)	(0.149)	(0.148)	(0.169)	(0.148)
Years of school, man	0.004***	0.004***	0.004***	0.002	0.002	0.002
	(0.002)	(0.002)	(0.002)	(0.001)	(0.001)	(0.001)
Years of school, man (squared)	0.000	0.000	0.000	0.000***	0.000***	0.000***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Income, man	0.000***	0.000***	0.000***			
	(0.000)	(0.000)	(0.000)			
Income, man (squared)	-0.000***	-0.000***	-0.000***			
	(0.000)	(0.000)	(0.000)			
No. of Kids	0.008***	0.009***	0.008***	0.005***	0.005***	0.005***
	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Homicides, County	-0.000			-0.000**		
	(0.000)			(0.000)		
Violence against women		0.004			0.004	
		(0.003)			(0.003)	
Income, man (log)				0.016***	0.017***	0.016***
				(0.003)	(0.004)	(0.003)
Constant	0.155***	0.155***	0.153***	0.145***	0.145***	0.143***
	(0.047)	(0.052)	(0.047)	(0.043)	(0.049)	(0.043)
FE, State	X	X	X	X	X	X
FE, Time	X	X	X	X	X	X
Observations	94,936	94,936	94,936	94,936	94,936	94,936
IV	FTS & WM	FTS & WM	FTS & WM	FTS & WM	FTS & WM	FTS & WM
1st stage F	9.977	8.195	9.977	9.834	7.969	9.843

Source: Own elaboration with ENNVIH data. Standard errors in parentheses. * $p<0.10$, ** $p<0.05$, *** $p<0.01$

5.   Concluding remarks

This document offers results that are estimated to be of interest to both migration policy and gender equity agendas. On the one hand, the decision to migrate has among its substantive causes the search for better economic conditions. Although this constitutes a non-trivial reduction in the pressures of job creation and socioeconomic improvement for the Mexican state, as well as a substantial source of

foreign flows through remittances, these benefits can only be assumed as short-term. International migration is primarily a massive loss of human capital. This, in turn, has a negative impact on the ability to create value and thus on the improvement of long-term prosperity conditions, which are difficult to restore. On the other hand, significant gender inequalities persist in Mexico that must also be addressed as a priority. The results of this study suggest that economic policies promoting female labor participation could have a positive impact by reducing international male migration. It is estimated that women's work reduces men's migration probability by approximately 30pp. This allows us to conclude that there is a significant opportunity in migration policy by designing policies that promote women's participation in the labor market.

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Appendix A: Main Statistics of the ENNVIH Data

A.1 Descriptive Statistics and Analysis from the ENNVIH

Figure A.1 shows the differences in economic strata for migrants and non-migrants for each period available in ENNVIH. Stratum 4 represents people with incomes of less than $2500.00 pesos, stratum 3 represents people with incomes between $2500.00-$14900.00 pesos, stratum 2 represents people with incomes between $10000.00 and $15000.00 pesos, and stratum 1 represents people with incomes of more than $15000.00 pesos. The line in the boxes indicates the average of the targeted population (men/women).

**Figure A.1: Descriptive Statistics. Socioeconomic Stratum of Men and Women**
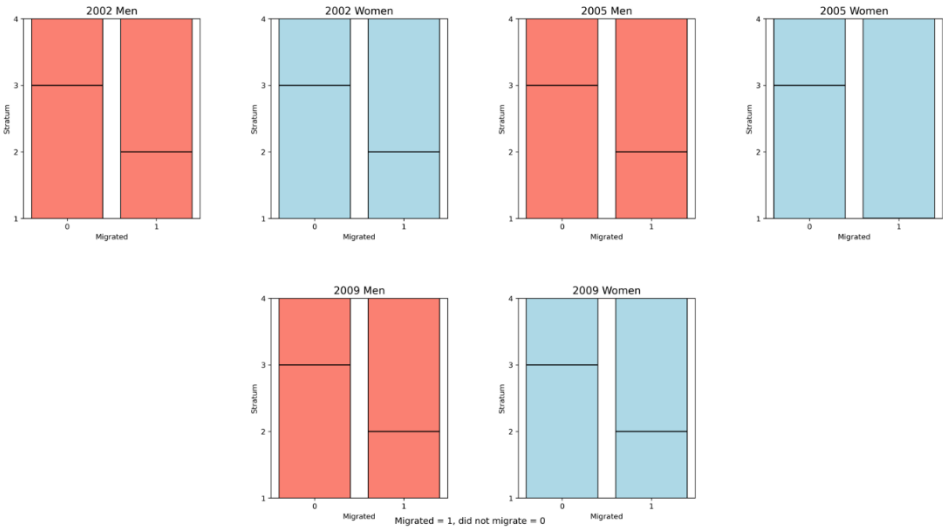
Note: The red and blue bars represent the socioeconomic stratum of men and women; 0 means that they did not migrate, 1 means that they migrated. The line within the boxes represents the average income level. The y-axis indicates income by quartile. Source: INEGI.

Figure A.1 suggests that migration depends on income and, more importantly, is a costly enterprise, so migrants require a relatively high-income level to migrate up to a certain threshold. Education and migration (Figure A.2): a similarly counterintuitive relationship between

migration and education can be identified (the latter measured through years of education). Unobserved characteristics such as ability and intelligence allow people to access better job opportunities in other cities or countries. If education enhances such unobserved characteristics, it is reasonable to assume that people with more years of education migrate more (again, up to a certain threshold). Figure A.2 shows this relationship. It is observed that, on average, for the periods of 2005 and 2009, women and men who migrate have more years of education.

Figure A.2: Descriptive Statistics. Schooling of Men and Women
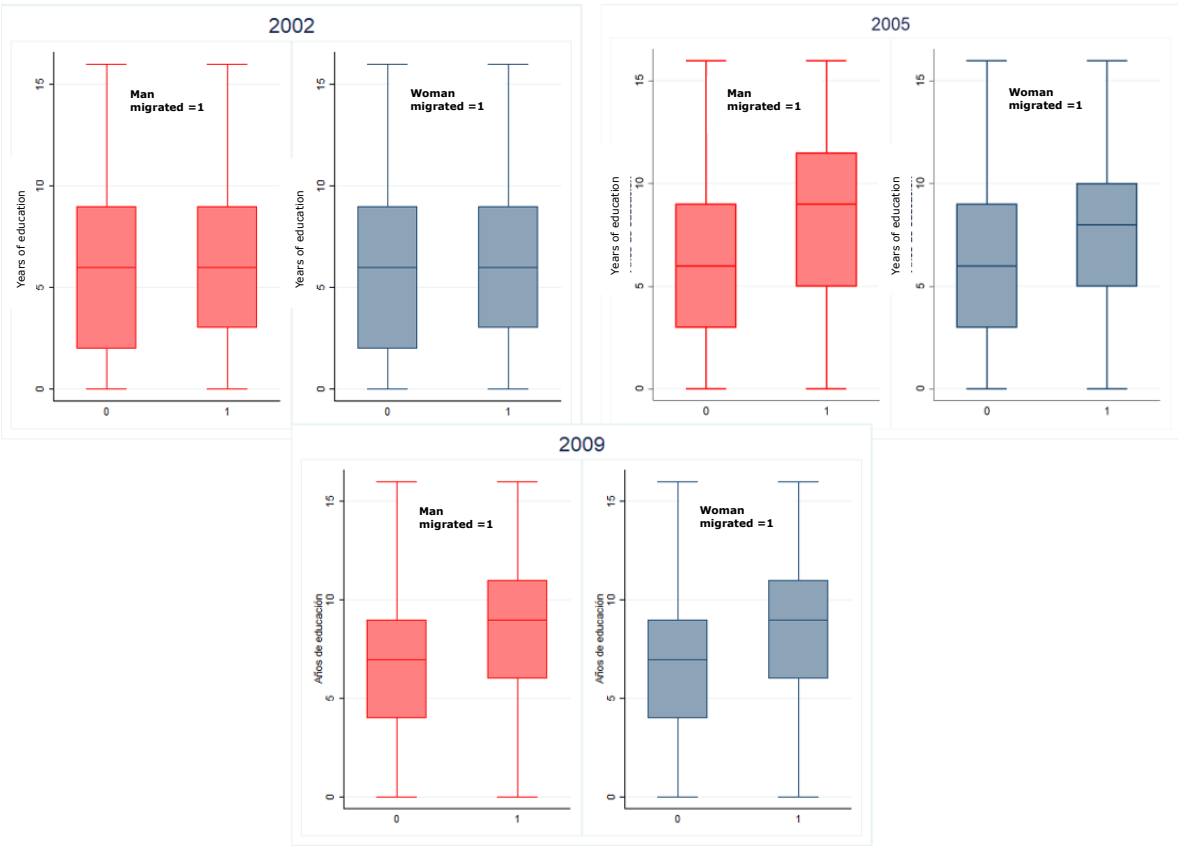
Note: The red bars represent the average years of education of men; 1 is for women who migrated. The blue bars represent the average years of education of women such that 1 is that the man migrated. Source: INEGI.

Table A.1: Main Statistics of the Data

Variable	Obs	Mean	Std. Dev.	Min	Max
Man migrated	31136	0.08068	0.27234	0	1
Individual income	31136	1061.25	2700.43	0	29151.91
Years of school	28768	5.67520	4.38742	0	16
Number of children	31136	0.89103	1.48491	0	10
Homicides	31136	12.95	0	12.95	12.95
Woman worked	31136	0.10056	0.30075	0	1
Partner's income	31136	154.32	1035.71	0	29151.91
	2005				
Man migrated	31248	0.01626	0.12646	0	1
Individual income	31248	1149.33	3046.96	0	35662.39
Years of school	30372	6.22149	4.47120	0	16
Number of children	31248	0.94822	1.54387	0	12
Homicides	31248	10.69584	0.16119	9.43	11.

Source: INEGI.

Appendix B: Estimations using OLS

The estimated equation is:

$$MM_{i,t} = \beta_0 + \beta_1 WW_{i,t-1} + \beta_2 X_{i,t-1} + \beta_3 TE_t + \beta_4 SE_i + \epsilon_{i,t} \qquad \text{(B.1)}$$

The specification B.1 has all controls lagged.

	Man migrated	
	(1)	(2)
Woman works	-0.019***	-0.019***
Man income	0.135444	0.136723
Squared man income	- 0.067	-0.068
Education years	0.001***	0.001***
Squared education years	- 3.44e-05	3.92e-05
Woman income	-9.25e-07***	-8.99e-07***
No. of children		-0.0006***
No. of homicides per state		3.81e-05
State FE	Yes	Yes
Year FE	Yes	Yes
Constant	0.069***	0.073***
Observations	56,034	56,034

Source: Own elaboration with ENNVIH data. Standard errors in parentheses. * p<0.10, ** p<0.05, *** p<0.01