The relationship between economic development and female labour force participation: A within-country analysis of Mexico.

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Isaac López-Moreno Flores

Abstract

Are women less likely to work in regions with a high percentage of industrial jobs? Claudia Goldin (1994) showed that female labour participation rates (FLPRs) tend to decline in middle-income countries. Her argument is that, during structural transformation, a higher percentage of industrial jobs is usually associated with lower FLPRs since activities within this sector tend to be performed by men. After developing a novel empirical strategy, I evaluated this hypothesis using micro-data obtained from four rounds of Mexico's ENOE household survey between 2005 and 2019. The regression analysis is based on a probit model that estimates women's likelihood of being economically active depending on the percentage of jobs in agriculture, industry, and services in the municipality where they live. Surprisingly, a higher percentage of industrial jobs at the municipal level is positively associated with higher female labour participation. Expectedly, a higher percentage of service jobs showed an even stronger positive relationship. Conversely, a higher percentage of agricultural jobs decreases women's likelihood of being economically active. The previous results hold after controlling for individual, household, and municipal characteristics. An exploratory data analysis revealed that only 10% of Mexico's agricultural workforce are women while 90% are men, even when the estimations contemplate unpaid family farm workers and even self-consumption. The results indicate that the low FLPRs in Mexico do not stem from women's limited participation in industrial occupations. Instead, can be partially explained due to the low involvement of women in agricultural activities. Hence, this descriptive paper discovered an upward trend between FLPRs and different stages of economic development within Mexico. This represents new evidence for the literature which has usually found a U-shaped pattern in both cross-country (using cross-section and panel data) and within-country analyses (using cross-section and time series).

Keywords: Female labour force participation, sectoral distribution of employment, economic development, structural transformation.

JEL Codes: J16, J21, J23, J43, O54

1 Introduction

The U-shaped female labour force function in economic development formulated by Goldin (1994) indicates that female labour participation rates (FLPRs) tend to be high in agricultural countries, they experience a decline in countries with a high percentage of industrial jobs, and they rise again in developed countries with a service-oriented economy. Since the publication of this research paper, other authors have found evidence to support the existence of a U-shaped curve both cross-country analysis using cross-sectional data (Clark et al., 2003; Heath & Jayachandran, 2016; Psacharopoulos & Tzannatos, 1989; Verick, 2014) as well as cross-country analysis using panel data (Luci, 2009; Mammen & Paxson, 2000; Olivetti, 2013). Nevertheless, Gaddis & Klasen (2014) have challenged the findings of some of the previously studies by criticizing the databases, the empirical strategies and the econometric techniques implemented in their analyses.

On the other hand, there are fewer studies making within-country analyses of the relationship between FLPRs and different stages of economic development. Goldin (1986) insightful economic history analysis corrected US census data of married women and reinforced the hypothesis that their FLPRs followed a U-shaped trend over time. Subsequent analysis made by Olivetti (2013) also confirmed that FLPRs from the US show a curve pattern during their structural transformation process. Notwithstanding, Gaddis & Klasen (2014) also mentioned that the U-shaped pattern does not necessary hold in within-country studies. In this case, they highlight a research by Lahoti & Swaminathan (2016) that did not find evidence to validate a U-shaped curve in India.

A theoretical underpinning of Goldin's theory is that the level of economic development and the type of jobs available in labour markets often influence the likelihood of a woman being economically active. However, even when there is a growing literature on this research area, there are no studies analysing the relationship between female labour participation and the percentage of jobs in agriculture, industry, and services in local labour markets. Hence, this paper contributes to the literature of the feminization U by performing the first within-country analysis using microdata and a repeated cross-sectional dataset that captures both the sectoral distribution of employment in Mexican regions and the structural transformation over time.

The research questions that this study aims to answer is: Are Mexican women less likely to work in regions with a high percentage of industrial jobs? The question is inspired by a specific hypothesis of the U-shaped theory developed by Goldin. The hypothesis suggests that one of the main reasons behind low FLPRs in middle-income countries like Mexico is the abundance of industrial jobs, since activities in this sector tend to be performed by men for several reasons. Most of the research papers analysing the U-shaped relationship have taken this specific hypothesis as a stylized fact. Nevertheless, there are no studies that have empirically evaluated it.

Mexico is an interesting case study to answer these research questions for several reasons. First, because the country is part of the declining portion of the U-shaped relationship observed across countries (See Figure 1.1), and it has one of the lowest female labour participation rates in Latin America (See Figure 1.3). Second, because researchers could argue that low FLPRs could be related to the fact that Mexico is the Latin-American country with the highest percentage of jobs in the industrial sector (See Figure 1.2). Third, because Mexico has regional disparities, where the northern and central states have labour markets dominated by the industrial or the service sectors, while in the southern part of the country there is still a large percentage of jobs in the agricultural sector (See Figure 1.5) Finally, because Mexico has incredible microdata with a level of disaggregation that allows me to study the current relationship between FLPRs and different levels of economic development not only across-states but also within them.

While most studies in this subject perform an econometric analysis using aggregated data, this paper uses highly disaggregated data to study the relationship between female labour participation and sectoral distribution of employment in local labour markets. The data source is the ENOE household survey, which is the largest survey in the country and the main source of information about Mexico's labour markets. This survey has been conducted quarterly since 2005, but the extended version is only available in the first quarter of each year. Therefore, this paper considered the datasets from the first quarters of 2005, 2010, 2015, and 2019 to cover a period of 15 years and evaluate the hypothesis at four different points in time.

To execute the regression analysis, I had to develop an empirical strategy relying on microdata. Hence, the econometric analysis is based on a probit model where the dependent variable takes value of 1 if the respondent is economically active and 0 otherwise. The three key explanatory variables are the percentage of jobs in agriculture, industry, and services at the municipal level. These variables capture the sectoral distribution of employment at a local level and their sum is always equal to 100. Therefore, my regression analysis is capturing both the sectoral distribution of employment and the structural transformation process of different regions in Mexico during the 21st century.

The regression analysis includes control variables that could also be affecting women's likelihood of being part of the labour force. These control variables encompass individual characteristics of the respondent such as age, marital status, level of education, number of children, among others. It also considers variables related to household characteristics, such sex, age, and educational level of the household head, the number of kids and number of household members, and whether the household location is in rural or urban areas of Mexico. Finally, the analysis also includes control variables at the municipal level such as the average age of women in the municipality, the percentage of people that migrated from their hometown to keep or obtain their job, the percentage of women that are single, the percentage of people in the municipality from a low socio-economic stratum, among others.

The results obtained from the regression analysis are compelling. Contrary to the hypothesis, there is a positive and statistically significant relationship between female labour force participation and a higher percentage of industrial jobs at a local level. In line with the theory, the results show a stronger positive relationship between female labour force participation and a higher percentage of jobs in the service sector. Finally, contrary to the theory, results show that there is a negative and statistically significant relationship between female labour participation and a higher percentage of jobs in the agricultural sector. It is also worth noting that the regression analysis considers both paid and unpaid labour in farms and businesses, and the results hold after controlling for individual, household, and municipal characteristics.

Previous results are not enough to establish a causal relationship between the sectoral distribution of employment and female labour participation. Nevertheless, national statistics indicate that during 2019, the total female labour force was distributed as follows: around 3% in agriculture, 17% in industry and almost 80% in services. Moreover, from the total labour force engaged in agriculture, 90% were men and only 10% were women. This demonstrates coherence behind the results derived from the regression analysis and national statistics indicating that the engagement of Mexican women in industrial jobs is at least five times bigger than their participation in agricultural activities.

This research makes several contributions to the literature that studies the relationship between female labour force participation and different stages of economic development. The main contribution is my results contradict the "stylized fact" indicating that low FLPRs in a country like Mexico are related to the high percentage of jobs in the industrial sector. Instead, it shows that FLPRs is lower in agricultural regions of Mexico. Moreover, this is the first paper using the percentage of jobs in agriculture, industry, and services as a proxy of economic development. Finally, this study includes an innovative empirical strategy that can be replicated by other researchers to execute more within-country studies based on microdata. This is relevant since this kind of analysis offers a level of disaggregation that cannot be found in cross-country studies or within-country studies using time series.

The study is structured as follows. Section 2 contains a literature review of different studies that have analysed the U-shaped relationship. Section 3 presents different figures that provide relevant insights of Mexico's economy and its labour markets. Section 4 is dedicated to the methodology of the research paper, providing detailed information about the database, empirical strategy, and the economic model. Section 5 presents the results obtained from the regression analysis. Section 6 contains an extensive complementary data analysis that help to understand the results. Finally, section 7 presents the conclusion of the paper.

2 Literature Review

This section summarizes the literature around the U-shaped feminization hypothesis. It starts by explaining the main details of the female labour force function in economic development proposed by Claudia Goldin (1994). It also summarizes the literature that have found evidence to support the hypothesis. It also highlights arguments from recent papers that have criticized the methodology of previous studies that have validated the feminization U. This section concludes by highlighting open debates in this research topic and how this paper fills some of these gaps by performing a within-country analysis.

Goldin (1994) developed a whole theory of how the structural transformation of an economy in combination with factors such as fertility rates, educational attainment, marital status, and other sociological and cultural factors, are playing a role in the U-shaped pattern of FLPRs observed across countries. This theory can be divided into three parts that explain how female labour participation changes depending on whether women are living in an agricultural, industrial, or service-oriented economy.

The first part of this theory indicates that when countries are at the initial stage of economic development, women participate in the labour markets to a great extent. Goldin argues that at this point, incomes are extremely low and most of the jobs are in the agricultural sector. In this context, women have very low levels of education, fertility rates are high, and women are usually working on family farms, in-home workshop production, or as own-account workers. Particularly, she argues that women are more likely to work in agrarian economies if they are oriented to the production of sugarcane, rice, cotton, peanuts, poultry, dairy, livestock, and tree crops.

The second part of the theory argues that when an agrarian economy experiences an industrialization process, FLPRs tend to decline for several reasons. One of the reasons is because jobs in the growing industrial sector will tend to be occupied by men. In certain cases, this could be due to employers' preferences to hire men. In other cases, it could be because men tend to have higher levels of education than women at this stage of economic development. Moreover, another reason could be because women will prefer not to engage in industrial activities that require a lot of physical effort (such as construction or mining).

Goldin also explained that the decline of FLPRs at this stage can be explained due to a strong income effect and a complex demand effect. She argues that the industrialization process tends to be accompanied by a rise in wages that usually leads to lower FLPRs. The argument is that the husbands' additional earnings could help to afford the exit of women from physically demanding activities in the agricultural sector. Moreover, the agricultural sector itself is experiencing and industrialization, which implies the introduction of new technologies that tend to decrease the demand for female labour in this sector. Finally, lots of products previously by women working at households, farms, and small businesses may become unprofitable to make since the same goods will now be produced following an industrial process with lower production costs and more competitive selling prices.

Apart from all these factors, Goldin (1994) argued that one of the main drivers for the decline of FLPRs in this context is the existence of a social stigma towards women working in blue-collar jobs, especially those that are married. According to her theory, a husband will not let her wife work because it could be perceived as a reflection of his poor ability to be the only provider for the family.

The third part of the theory indicates that during the last stages of economic development there is an expansion of job opportunities in the service sector that will increase female labour participation for different reasons. First, because there is no social stigma towards white-collar jobs as they are not risky, and they do not require a lot of physical effort. Hence, the husband will not be judged as negligent by society. Additionally, she argues that at this stage of economic development women have higher levels of education, and there is usually no gender gaps in education, which increases the probability of women taking job opportunities in the service sector. Therefore, the combination of greater education for women, lower fertility rates, better salaries in the growing service sector, and the lack of social stigmas towards white-collar jobs generates the conditions that facilitates the rise of FLPRs.

Since the publication of this research paper, other authors have found evidence to support the feminisation U hypothesis observed across countries. Some researchers have validated the hypothesis using cross-sectional data (Clark et al., 2003; Heath & Jayachandran, 2016; Psacharopoulos & Tzannatos, 1989; Verick, 2014) while other have used panel data (Luci, 2009; Mammen & Paxson, 2000; Olivetti, 2013).

On the other hand, Gaddis & Klasen (2014) argued that most of the empirical assessments validating the U-shaped relationship observed across countries have several methodological problems. First, they criticized those studies based on simple cross-sectional correlations between FLPRs and GDP per capita as a proxy of economic development (e.g. Clark et al., 2003; Heath & Jayachandran, 2016; Psacharopoulos & Tzannatos, 1989; Verick, 2014). They argue that using cross-sectional data leads to the 'Kuznets fallacy' since the relationship should also hold in a time-series context.

Gaddis and Klasen (2014) also highlighted various mistakes in the empirical strategy or in the econometric methods that previous researchers had employed to support the feminisation U. They criticised Çağatay and Özler (1995) for not exploiting the panel feature of their data, Mammen and Paxson (2000) for using a static model rather than a dynamic panel method, and Luci (2009) and Tam (2011) for not taking into consideration the potential endogeneity of GDP. Finally, they also mentioned that estimates of GDP per capita adjusted at purchasing power parities (PPP) have large margins of error, so they should not be used to make empirical evaluations of the U-shaped feminization hypothesis.

Based on these critiques, they decided to use sector-specific growth in value added and employment as an alternative measure of the structural transformation process. Additionally, their analysis was done using dynamic panel data methods instead of using a static model. Their results show that the U-shaped vanishes when they use a dynamic model. Moreover, the results indicated that changes in sector-specific growth in agriculture, industry and services have different effects on FLPRs, but that they are particularly small in magnitude, so they concluded that there is little evidence to consider them as key drivers of FLPRs.

Gaddis and Klasen (2014) also recognised that some authors might judge their data on sector specific growth as a 'noisy' measure of structural change. They mentioned that a potential concern of their results is that other researchers could consider that using sectoral growth could bias the coefficients towards zero. However, they argued that their data is "at least as problematic" as the data that had previously been used in other studies to test the U-shaped feminisation hypothesis.

In a more recent study, Klasen (2019) also argued that the U-shaped hypothesis does not necessarily hold in within-country studies. He presented as an example the study by Lahoti and Swaminathan (2016), which followed a similar approach to Gaddis and Klasen (2014). They executed a state-level analysis in India using data from 1983 to 2012 to assess the U-shaped hypothesis. To do so, they analysed the relationship of FLPRs with net state domestic product (NSDP), as well as with sector-specific growth in value-added and employment across the 28 Indian states. However, they did not find evidence to support the U-shaped hypothesis.

Nevertheless, there are also studies that found evidence of FLPRs following a U-shaped pattern within countries across time. For instance, Goldin (1986, 1990) showed that FLPRs in the United States followed a U-shaped pattern between 1890 and 1940. To do so, she had to make an economic history assessment, which showed that FLPRs in the United States were underestimated in the late 19^{th} century. After this correction, she found that FLPRs were high when the United States was primarily agricultural, there was a decline during the industrialization process, and finally, there was a rise of FLPRs during the service sector expansion. Olivetti (2013) provided additional evidence showing that from 1890-2005, the United States showed a consistent U-shaped relationship between FLPRs and different stages of economic development.

Gaddis and Klasen (2014) argued that while today's advanced economies may have experienced the U-shaped pattern during their process of economic development, today's developing countries may not be following the same path. This is in line with Olivetti (2013), who found that the U-shaped pattern is more muted when early developed OECD countries are not included in the cross-country analysis. She mentioned that a possible explanation to these results is that today's developing countries are not stigmatizing industrial jobs as much as today's advanced economies did, since industrial jobs are less brawn intensive than before.

Considering the previous discussion, the goal of this paper is to contribute to the literature by following a different approach. Instead of using GDP per capita or sector-specific growth, the paper uses "sectoral distribution of employment" as an alternative measure to capture the different stages of economic development. Moreover, instead of using time-series data, the paper relies on micro-data obtained from Mexico's National Household Surveys on Employment and Occupations (ENOE). Finally, this paper uses a repeated cross-sectional dataset, and it develops an innovative empirical strategy to be the first one showing the current dynamics between FLPRs and the percentage of jobs in agriculture, industry and services across different regions within a country.

3 Background

This section has three different objectives. The first goal is to show that the U-shaped hypothesis holds up in a cross-country analysis after using "sectoral distribution of employment" as a proxy of economic development. The second is to show that Mexico is not an outlier of the U-shaped hypothesis in a cross-country comparison. Instead, it shows that the country is part of the downward portion of the curve. The third goal is to provide valuable insights about Mexico using different figures that illustrate the economic situation and the labour market characteristics of the country.

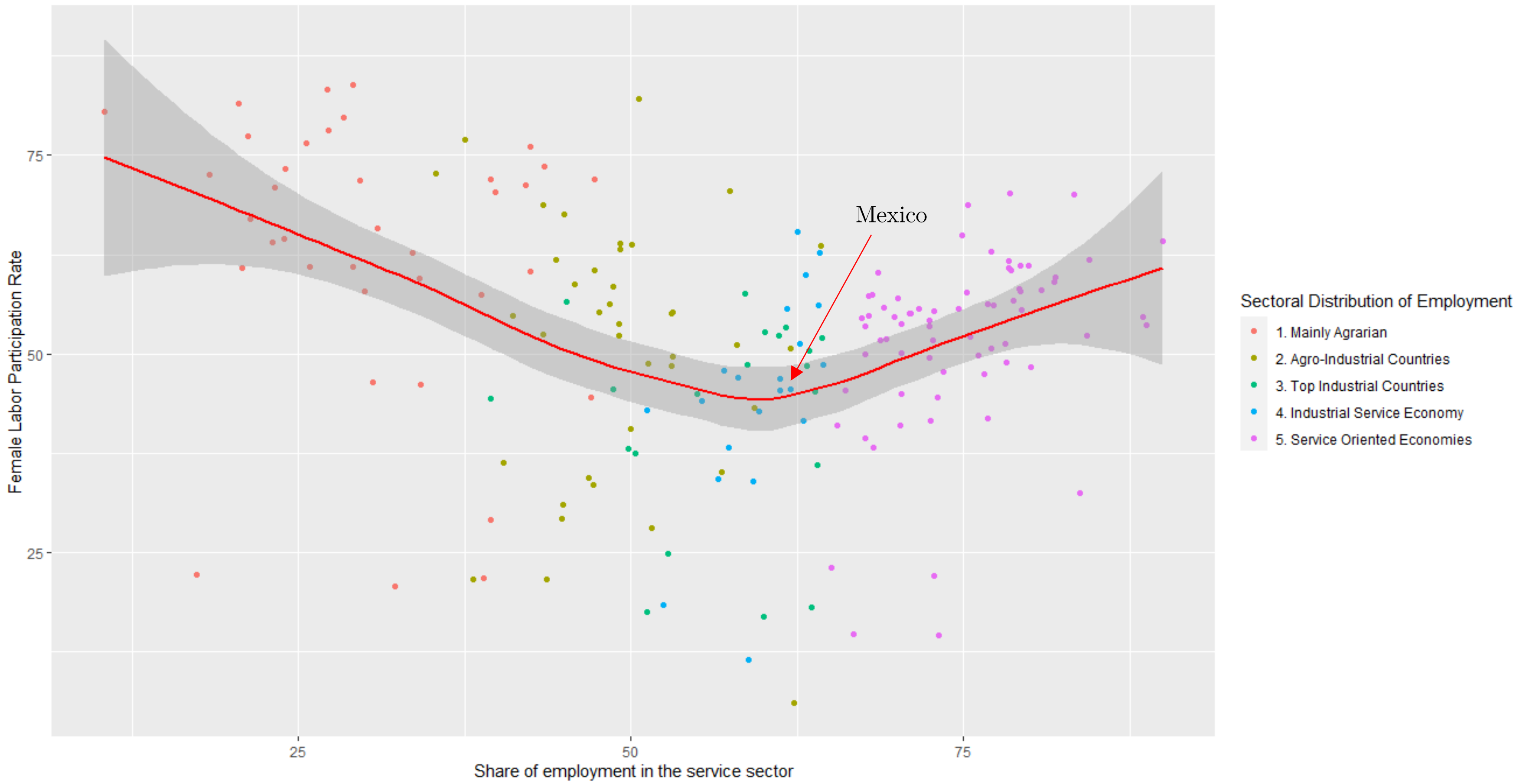
3.1 Cross-country analysis

Despite the growing number of studies analysing the feminization U, most of them do not show the relationship between FLPRs and the percentage of jobs in agriculture, industry, and services as a share of total employment. Figure 1.1 illustrates the relationship across countries between their FLRPs and the share of jobs in the service sector. The data were obtained from the World Bank and it covers 187 countries during 2019. The figure also includes five categories based on the sectoral distribution of employment of each country.

On the left-hand side of the figure are those countries with the highest percentage of jobs in the agricultural sector. They were classified as mainly agrarian if the percentage of jobs in the agricultural sector ranged from 40% to 80%. In the centre of the figure are the top industrial countries, which have more than 30% of jobs in this sector. On the right-hand side of the figure are the service-oriented countries, which have more than 65% of their jobs in this sector.

This figure includes two complementary categories based on the sectoral distribution of employment. Those countries classified as agro-industrial have between 25% and 40% of their jobs in the agricultural sector, and less than 30% of their jobs in the industrial sector. Those classified as industrial-service economies have more than 50% of their jobs in the service sector and fewer than 30% of their jobs in the industrial sector. Although this is an arbitrary classification, it helps to classify five different stages of economic development based on the sectoral distribution of employment across countries.

Figure 1.1 - FLPRs and sectoral distribution of employment across countries (2019)



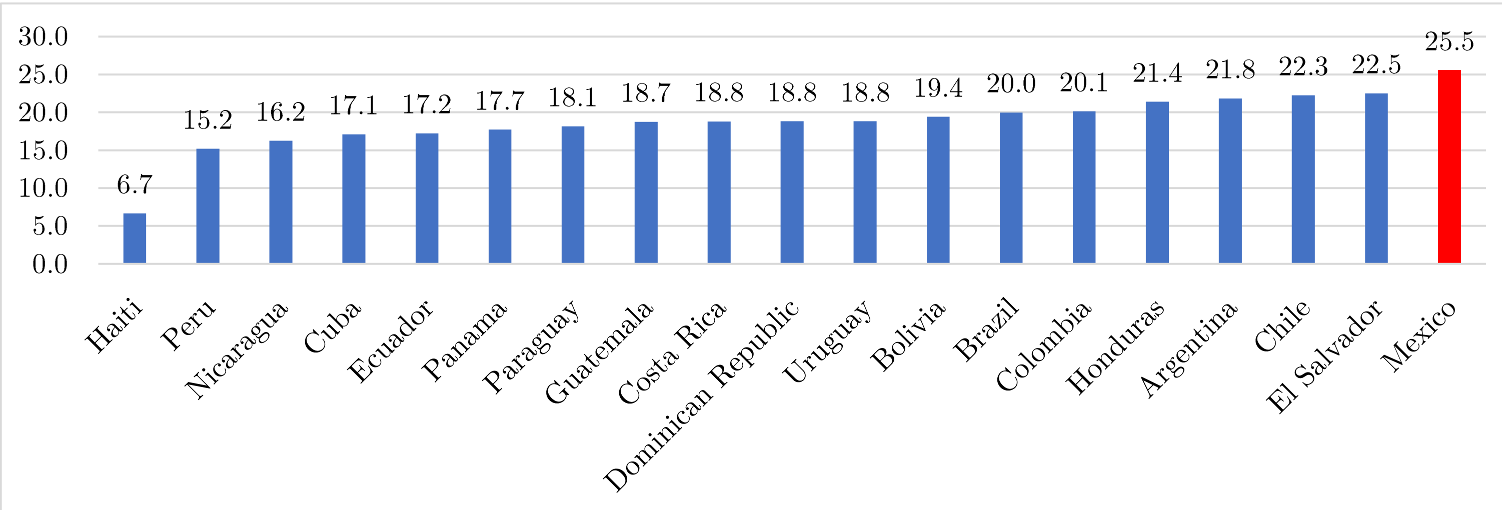
Source: World Bank, World Development Indicators. Employment in services (% of total employment), Labor force participation rate female (% of female population ages 15+) (modeled ILO estimate)

The figure shows that FLPRs are higher in agricultural countries, experience a decline in industrial countries and rise again in service-oriented countries. The Gaussian regression illustrates that there is a U-shaped pattern between the share of jobs in the service sector and FLPRs across countries. The figure also shows that Mexico is an industrial-service country, and it is part of the downward portion of the U-shaped curve.

Figure 1.9, included in the appendix, shows three additional scatterplots that are useful to compare the relationship between FLPRs and the percentage of jobs in each economic sector. The first scatterplot shows that FLPRs are higher in countries where there is a greater percentage of jobs in the agricultural sector as a share of total employment. The second shows that FLPRs decrease as the percentage of jobs in the industrial sector increases. Finally, the last scatterplot shows that FLPRs are higher in countries where the service sector accounts for a higher share of total employment. Therefore, these three figures show that, across countries, there is a U-shaped pattern between FLPRs and the share of jobs in each economic sector.

In addition to this evidence, I present some interesting facts about Mexico compared to other Latin American countries. Figure 1.2 shows the percentage of industrial jobs as a share of total employment in 2019. It also illustrates that Mexico has the highest percentage of jobs in this sector compared to the other countries in the region. Moreover, Figure 1.3 shows the female labour participation rate among Latin-American countries. In this case, Mexico shows one of the lowest FLPRs in the region, just behind Guatemala, Cuba, Venezuela, and El Salvador.

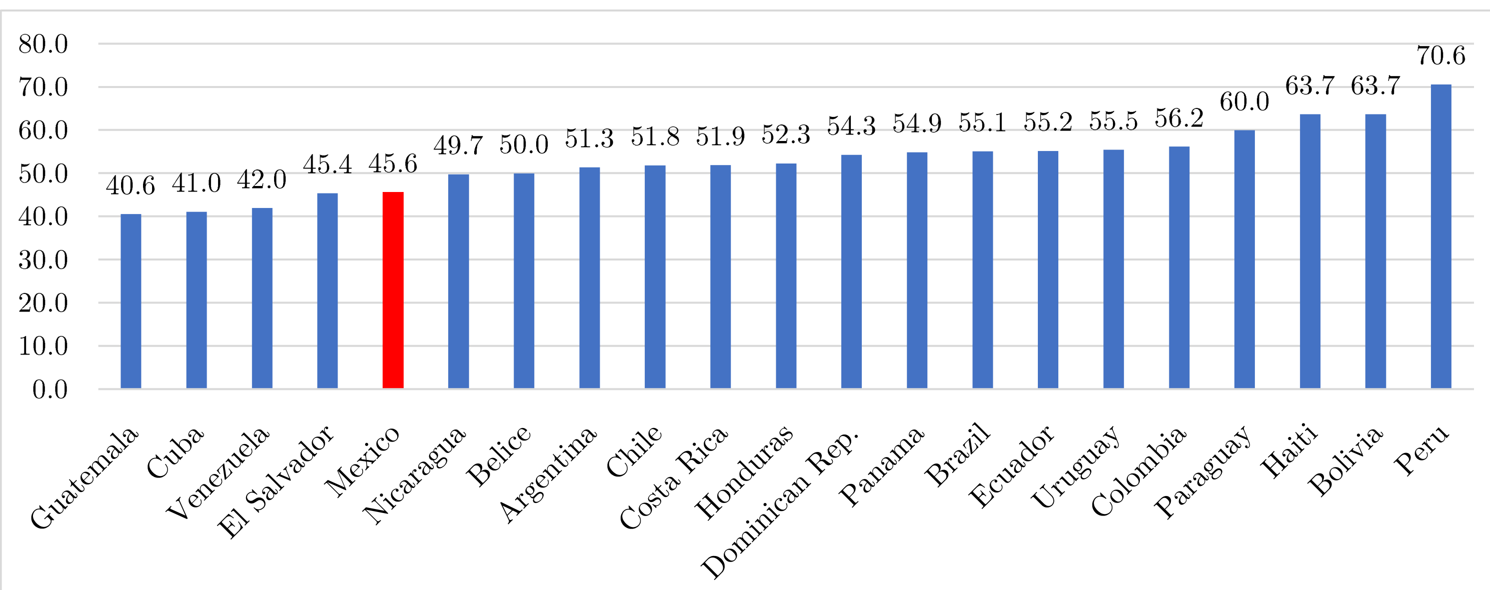
Figure 1.2 - Jobs in the industrial sector as a share of total employment
in Latin American countries (2019)



Source: World Bank, World Development Indicators

Employment in industry (% of total employment).

Figure 1.3 - Female labour participation rates in Latin American Countries (2019)



Source: World Bank, World Development Indicators,

Female Labour Participation (% of female population ages 15+).

This brief cross-country analysis shows evidence that supports the U-shaped hypothesis across countries, since agricultural and service-oriented countries have higher FLPRs than industrial countries. Moreover, Figure 1.1 showed that Mexico is part of the downward portion of the U. The analysis also highlights that in 2019 Mexico had the highest share of industrial jobs among Latin-American countries and the second lowest FLPR in the region. Based on this evidence, some researchers could infer that low FLPRs could be associated with the high percentage of jobs in the industrial sector and the social stigma towards women working on blue-collar jobs. Nevertheless, the following within-country analysis of Mexico shows that the low FLPRs in the country are not necessarily linked to the high percentage of jobs in the industrial sector.

3.2 Within-country analysis

As discussed above, Mexico has one of the lowest FLPRs in Latin America. Unfortunately, the lack of women's involvement of women in labour markets often entails significant economic losses. Cuberes and Teignier (2018) estimated that the Mexican gender gap in labour force participation is leading to an economic loss of 22% in the final output of GDP. On the other hand, there is a large body of literature documenting that the sustained increase in female labour participation was one of the main reasons behind the accelerated economic growth in Asian countries (Bloom & Williamson, 1998; Bloom et al., 2009; Bloom & Finlay, 2009). Considering the relevance of female labour participation for both economic growth and economic development, it is highly relevant to investigate potential reasons behind the low engagement in labour markets among women in Mexico.

Kaplan & Piras (2019) analysed gender gaps in Mexico’s labour markets and found that the country has the second largest gender gap in labour force participation in Latin America. They noted that it has the sixth highest male labour participation rate in the region, while the FLPR is the fourth lowest. They argued that one of the reasons behind low FLPRs in Mexico is the high percentage of young women who neither study, work nor are looking for a job: that figure is the fourth highest in the region (only lower than in Guatemala, Honduras and El Salvador), while the percentage of young men in the same condition is the lowest in the entire region.

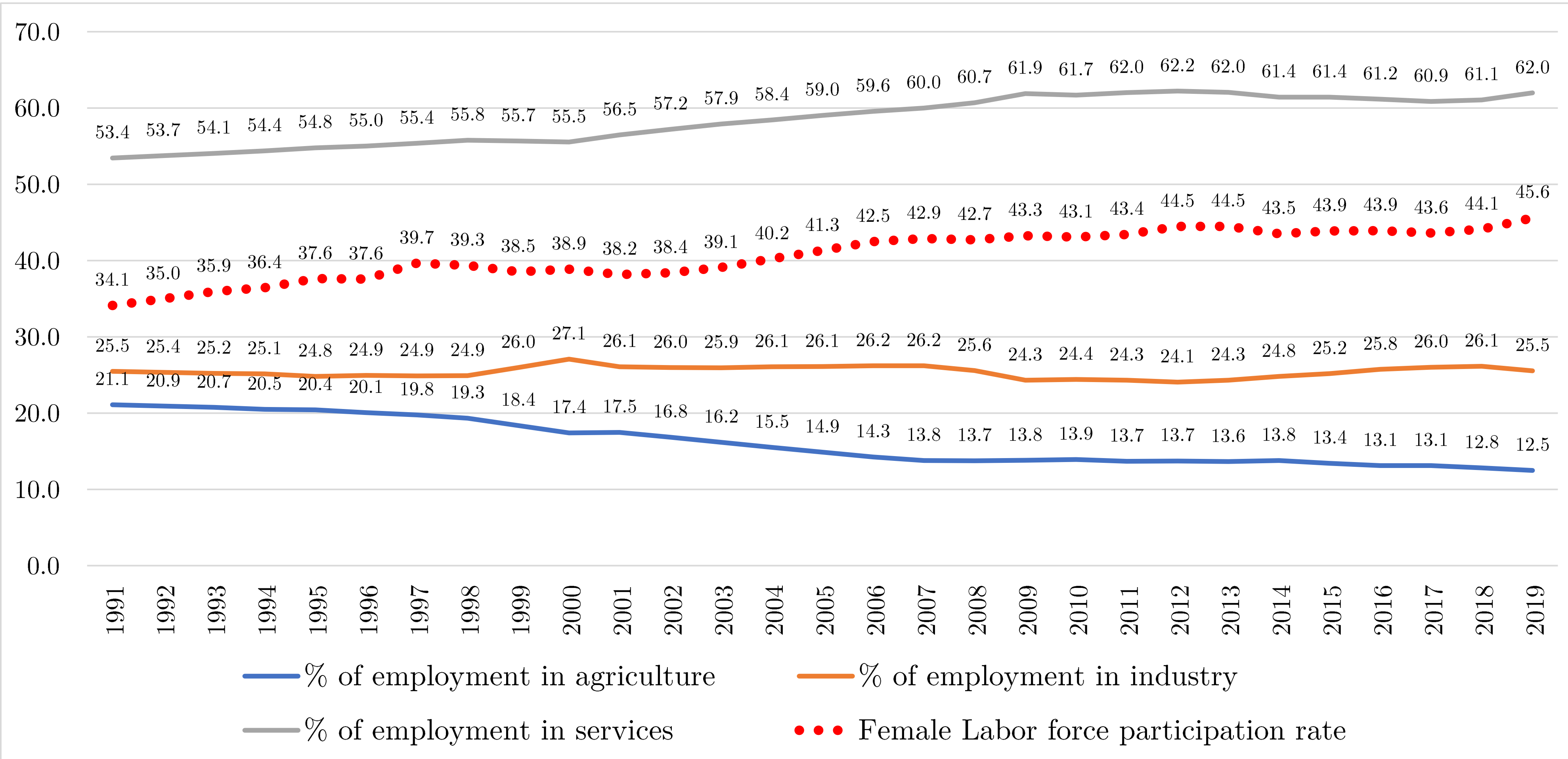
Kaplan & Piras (2019) also highlighted that the labour force participation of single or divorced women is similar to that in other Latin American countries, but the participation rate of married women is the lowest in the region. In addition, they showed that Mexican women with high levels of education have lower labour participation rates compared to other countries in the region. For example, the participation rate for women with at least 14 years of schooling is the second lowest in the region (only higher than Bolivia’s). Finally, they showed that Mexican women have the highest number of hours dedicated to unpaid work in Latin America.

Even though these factors are usually determinants of female labour participation, there is still scant evidence of how the sectoral distribution of employment at the local level affects women's ability to supply labour. The purpose of this study is to fill this gap by analysing how the distribution of jobs in agriculture, industry and services relates to the likelihood of women participating in labour markets. This sub-section therefore includes different figures that show key labour statistics from Mexico during the past few years.

It is important to illustrate that Mexico has made progress in its process of economic development during the last decades. This can be observed in Figure 1.4, which captures the labour shifts of the country from 1991 to 2019, as well as FLPRs during the same period. The figure shows that the industrial sector has accounted for around 25% of total employment over the past 30 years. During the same period, there is also a decline of 10 percentage points in agricultural jobs and a rise of 10 percentage points in services.

Figure 1.4 shows that in the last decades Mexico has maintained its levels of industrialisation, decreased its agricultural activities, and increased the size of the service sector, which accounted for more than 60% of the total employment share in 2019. Finally, the figure illustrates that female labour participation rates have increased by more than 10 percentage points during the same period.

Figure 1.4 - Female labour participation rate and structural transformation in Mexico (1991- 2019)



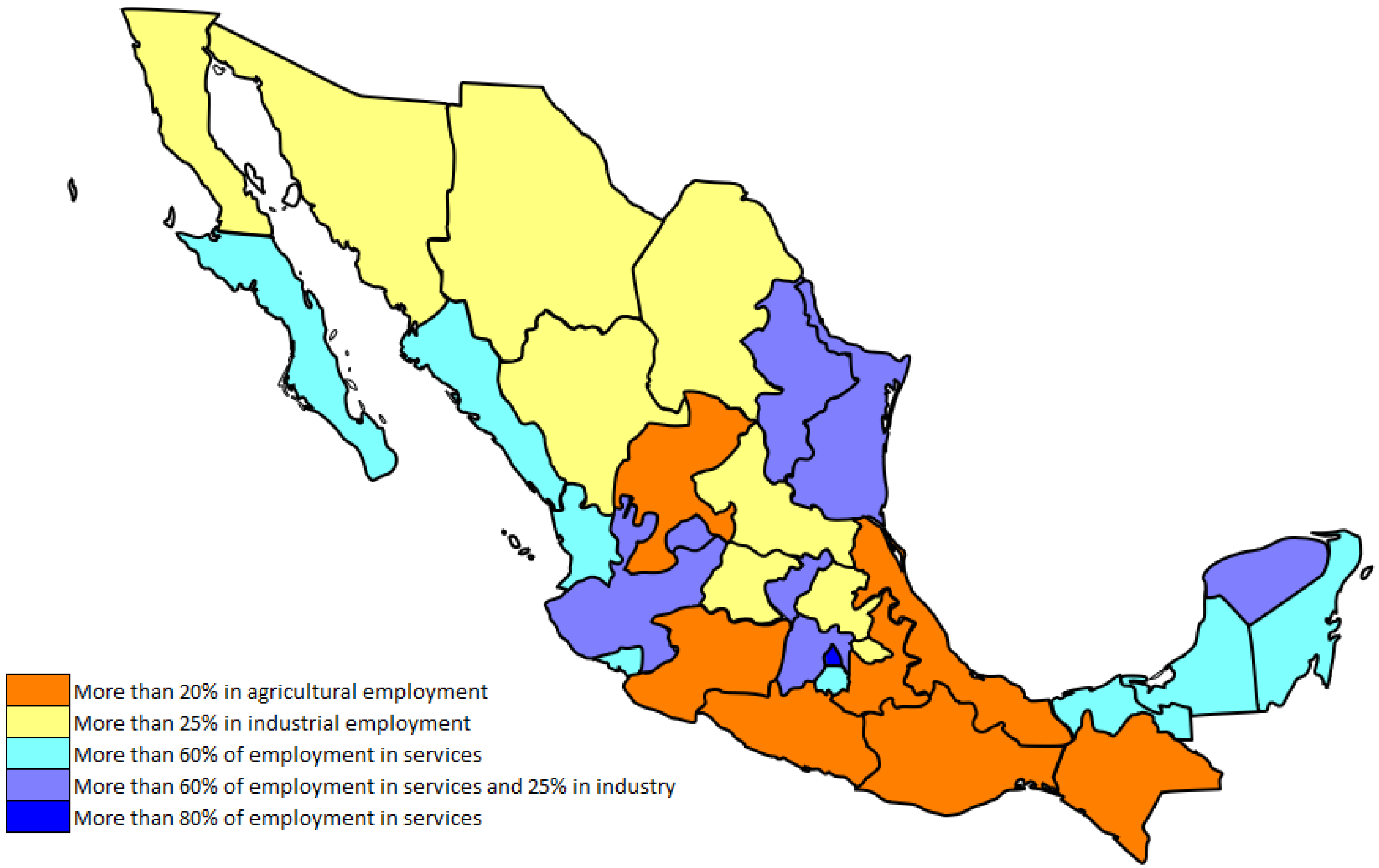
Source: World Bank, World Development Indicators.

It is also necessary to present an overview of the sectoral distribution of employment across mexican states. Figure 1.5 is a map with five different categories that illustrates the most relevant economic sectors in each state. The orange states, located in the southern part of Mexico, are those with the highest rates of agricultural employment. In all of them, there is a higher number of people working in agriculture than in industry. These mexican states have a similar sectoral distribution of employment to countries like Guatemala, Mongolia, Ecuador and Nigeria, where at least 20% of their total workforce is engaged in agriculture.

The yellow states from Figure 1.5 have between 25% and 38% of their jobs in industrial activities, similar to Central European countries like Serbia, Romania, Poland and Slovenia. Most of them are located in the northern part of the country, since they usually have plenty of *maquiladoras* dedicated to the manufacturing sector. The light-blue states have a service-oriented economy without a high percentage of jobs in the industrial sector. These states have a sectoral distribution of employment similar to countries like Colombia and Paraguay, where the share of employment in agricultural and industrial activities is roughly the same.

The purple-coloured states are those with a service-oriented economy and with a high percentage of jobs in the industrial sector. They have more than 60% of jobs in services and 25% in industrial activities, which is similar to countries like Austria, Germany and Russia. Finally, Mexico City is the only mexican state with a dark blue colour, as it is the only one with more than 80% of their jobs in the service sector. This is a similar distribution of employment to economies like Singapore, Macao and Hong Kong.

Figure 1.5 - Map of the sectoral distribution of employment in Mexican states (1st quarter of 2019)



Source: Made by the author with data from ENOE.

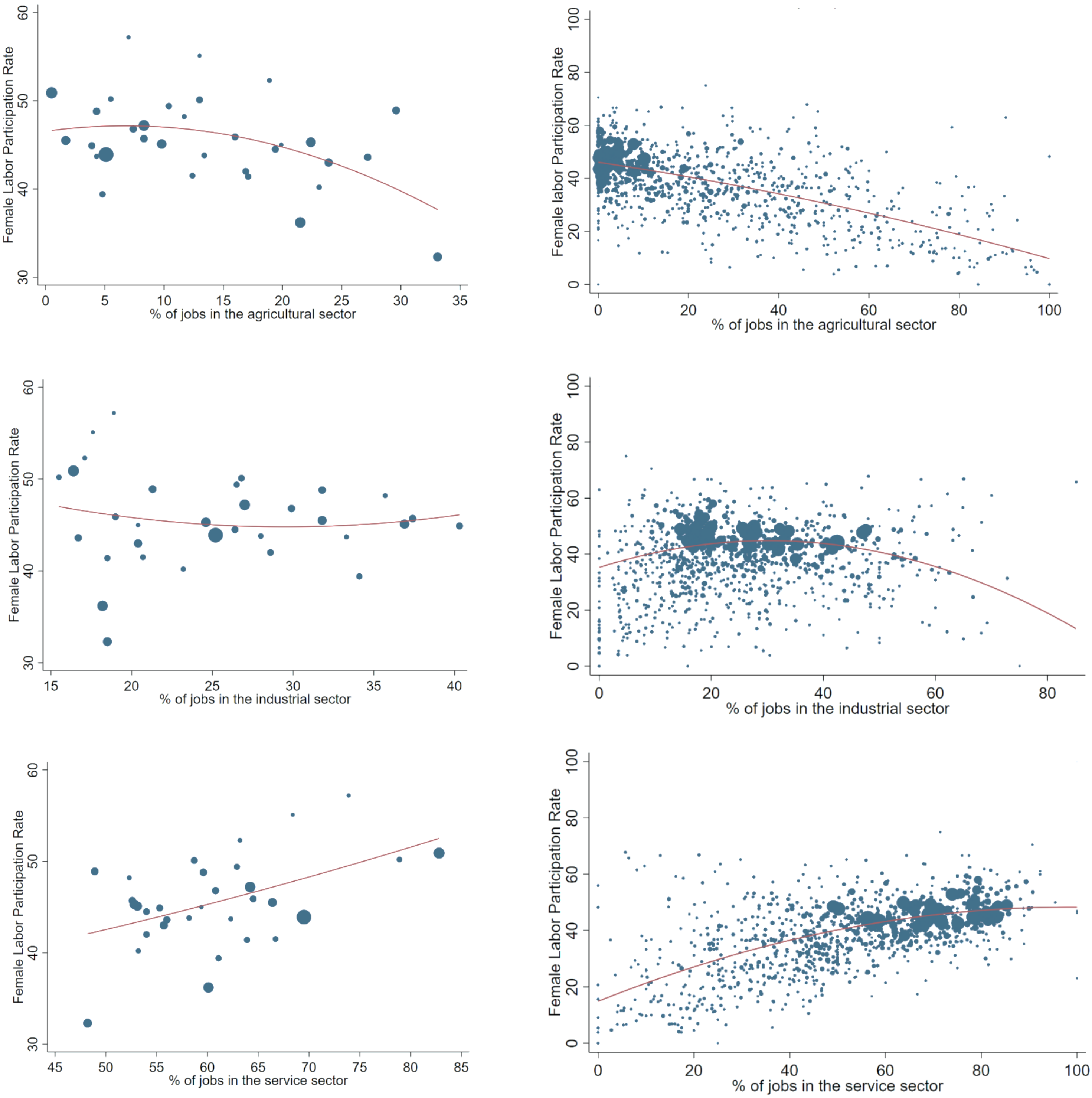
It is also pertinent to show the relationship between the percentage of jobs in each economic sector and FLPRs within Mexico. Figure 1.6 includes six scatterplots showing the correlation between these two variables considering two different subnational territorial divisions of Mexico. The left side of the figure shows FLPRs and the percentage of jobs in agriculture, industry and services for each of the 32 Mexican states. The right side of the figure shows the relationship between the same variables but at the municipal level. The data were obtained from the ENOE survey, based on the first quarter of 2019.

The scatterplots show that FLPRs are lower in states and municipalities where there is a higher share of agricultural employment. They also illustrate the FLPRs tend to increase in regions of Mexico with a higher share of service jobs. On the other hand, the relationship between industrial jobs and FLPRs is not that evident. At the state level it seems like there is no relationship, while at the municipal level it shows an inverted U. Notwithstanding, none of them show the alleged negative relationship between lower FLPRs and higher percentage of jobs in the industrial sector.

To finish this within-country analysis, I present two additional figures to illustrate interesting aspects about the participation of women in Mexico's labour markets. Figure 1.7 shows the percentage of men and women in agriculture, industry, and services as a share of their total labour force. This figure shows that only around 3% to 4% of all women in the labour force are working in agriculture, around 17% are engaged in industrial jobs, while almost 80% are working in the service sector.

Figure 1.6 - FLPR and % of jobs in each economic sector
(Mexican states and Mexican municipalities, first quarter of 2019)

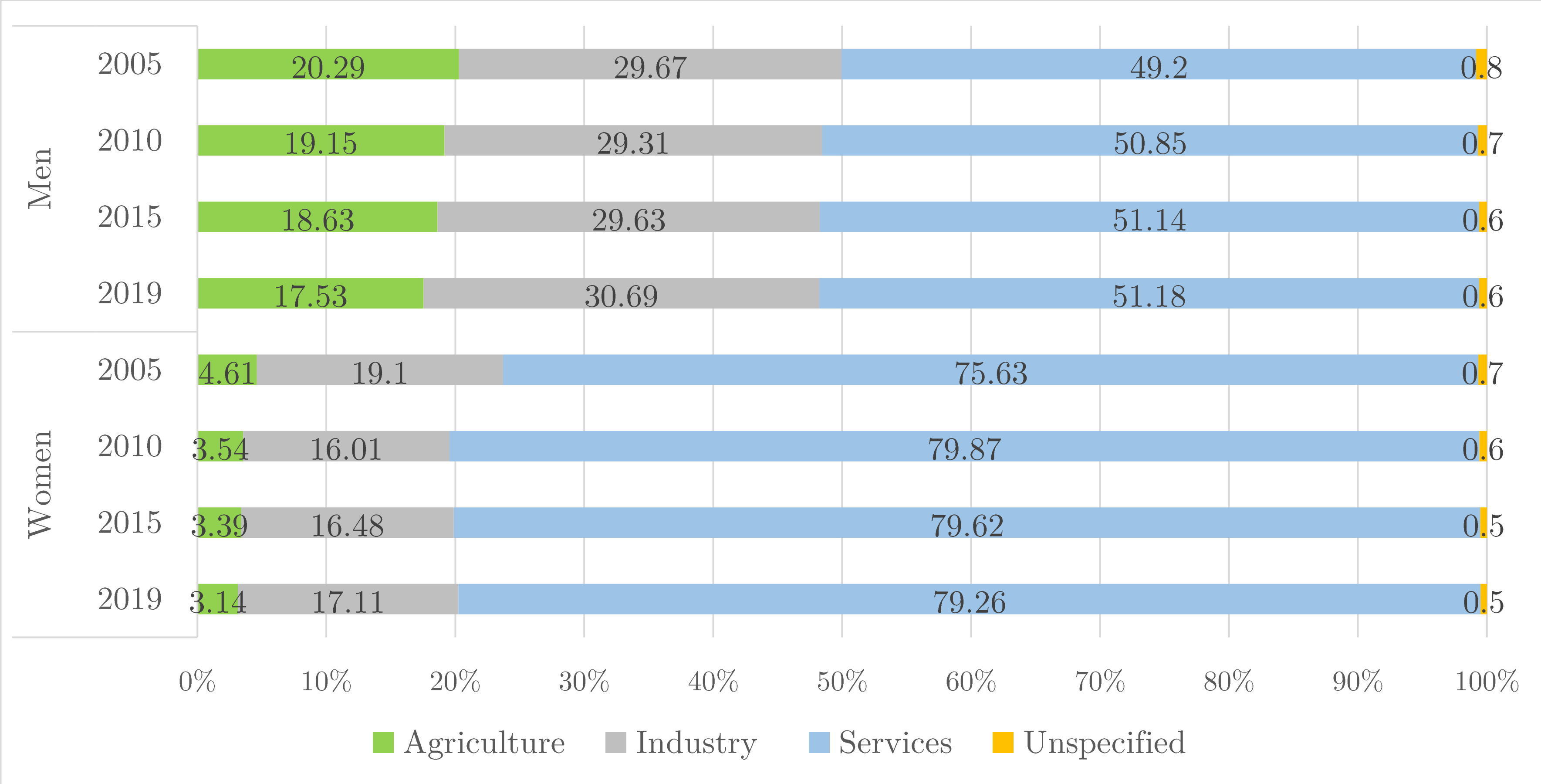
Mexican states *Mexican municipalities*



Note: The size of the dots varies depending on the total population in each state.

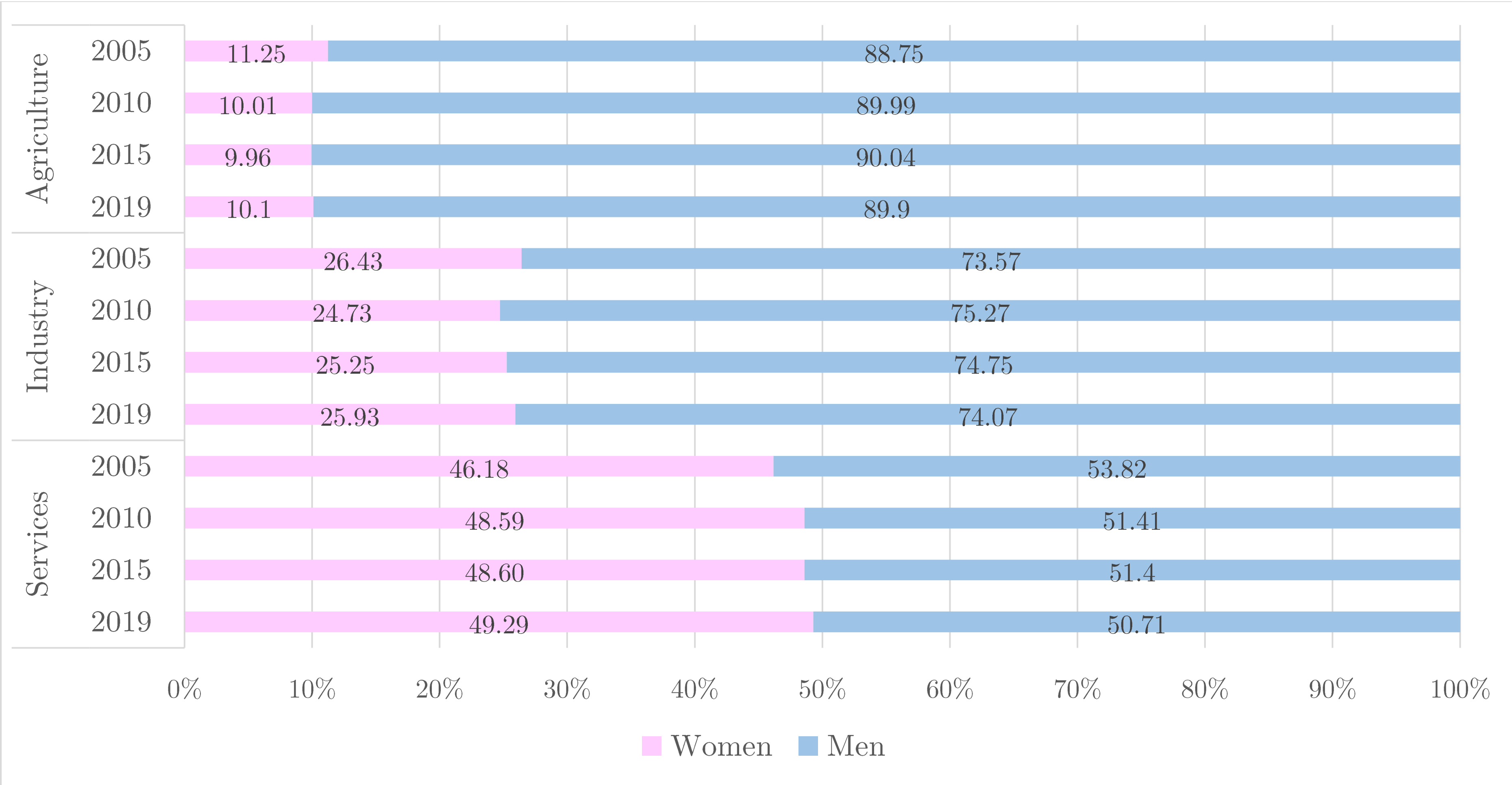
Note: The size of the dots varies depending on the total number of surveys carried out in each municipality.

Figure 1.7 - Percentage of men and women in agriculture, industry, and services as a share of their total workforce



Source: Made by the author with data from the ENOE household survey.

Figure 1.8 - Percentage of men and women in agriculture, industry, and services
as a share of the total workforce in each economic sector.



Source: Made by the author with data from the ENOE household survey.

Moreover, Figure 1.8 shows the percentage of men and women in agriculture, industry, and services as a share of the total labour force in each economic sector. The figure shows that considering all the labour force in agriculture, 90% of them are men, and only 10% are women. In the case of the industrial sector, three-quarters of the workforce are men and one-quarter are women. Finally, the figure shows that the distribution of the workforce in the services sector is similar between men and women.

This within-country analysis has been useful to show the sectoral distribution of employment across Mexican states. It has also highlighted that there is no negative relationship between higher industrial jobs and lower female labour participation rates. On the other side, the scatterplots indicate that female labour participation in agricultural regions of Mexico tend to be low. This is corroborated by observing that of all women in the workforce, only 4% work in agriculture, while of the entire workforce employed in agriculture, only 10% are women. The following section delves into this topic by analysing the relationship with an innovative empirical strategy.

4 Methodology

This section outlines fundamental aspects regarding the methodology that was followed to execute the econometric analysis of this research. It commences with a description of the databases utilised. The next sub-section describes all the details of the empirical stategy to estimate the sectoral distribution of employment at the municipal level, relevant information about the control variables included in the analysis, and an explanation of how female labour participation can be studied using microdata instead of aggregated data. Subsequently, a comprehensive exposition of the econometric model is provided, culminating with the presentation of the descriptive statistics of the variables included in the econometric model.

4.1 Dataset

Most of the studies that have analysed the U-shaped hypothesis are based on aggregated data. Conversely, this study uses micro-level data obtained from the extended version of the ENOE survey, which is carried out by the National Institute of Statistics and Geography (INEGI), Mexico's national statistical office. The ENOE household surveys are the main source of information for most of the labour market statistics for the country. They were introduced in 2005 and collect employment statistics in quarterly periods by making household surveys. The sample in each dataset is large enough to adequately represent rural and urban areas in each of Mexico's 32 states. In addition, the surveys include information on the labour status of individuals and integrate socio-demographic information like educational level, marital status, number of children and access to social security, among others.

It is worth noting that, during the first quarter of each year, INEGI conducts an amplified survey, while in the second, third and fourth quarters, it conducts a basic survey. Therefore, this study considered four cross-sectional datasets using the ENOE surveys from the first quarters of 2005, 2010, 2015 and 2019. The surveys from the first quarter of these years were considered because they provide the most detailed information, whereas surveys conducted during the other three quarters omit specific questions that are exclusively available in the amplified survey.

Although there is usually a five-year difference between the selected surveys, I used the survey from the first quarter of 2019 because no survey was conducted during the first quarter of 2020 due to the covid-19 pandemic. Additionally, I considered relevant to have five-year intervals since this timeframe helps to take in consideration possible changes in the sectoral distribution of employment across Mexican municipalities. Therefore, such period spanning capture both the structural transformation of local economies and the changes in female labour participation over the years.

4.2 Empirical strategy

It is important to start this section emphasizing that this research is not an empirical evaluation of the U-shaped feminization hypothesis. This study is not carrying out an economic history analysis to determine whether FLPRs were high when Mexico was an agricultural country, if they declined during the industrial boom, or if they have been increasing during the service sector expansion. If such an approach had been chosen, this research would have turned into a similar analysis to previous research on this topic. Instead, I have chosen to follow a different approach that allows me to make an original contribution to the literature.

4.2.1 Estimation of female labour participation using microdata

According to both the International Labour Organization (ILO) and INEGI, the labour force participation rate should be estimated by considering individuals who are over 15 years old. This approach helps to determine the proportion of the working-age population that is either employed or actively seeking employment, also known as the 'economically active population'. Mexico's National Statistical Office (INEGI) determines if an individual is economically active based on ILO's conventions. Based on the previous explanation, I used the variable "economically active" to analyse female labour participation at the individual level. It is worth noting that people attending an educational institution, engaged in household duties, infirm, disabled, or retired are not considered part of the non-economically active population. This binary variable takes value of 1 if the individual is economically active and 0 otherwise. Hence, this approach allowed me using microdata to study the likelihood of being economically active at the individual level.

4.2.2 Estimation of sectoral distribution of employment using microdata

This is the first paper that estimates the sectoral distribution of employment at the municipal level to use it as a proxy of economic development at the local level. These estimations captured the percentage of jobs in agriculture, industry, and services as a share of the total employment in each municipality. As previously explained, Gaddis & Klasen (2014) criticised the studies that used GDP per capita, and proposed 'sector-specific growth' as an alternative variable to test the U-shaped hypothesis. Nevertheless, they recognised that this variable might raise concerns as it could be considered a noisy measure of the structural transformation process.

Due to the lack of consensus on this subject, my research proposes an alternative way to analyse the relationship between FLPRs and different stages of economic development. As stated above, Goldin (1994) implied that the sectoral proportion of jobs in local labour markets have an influence on FLPRs. Hence, this paper uses the percentage of jobs in each economic sector as an alternative variable to study the U-shaped feminization hypothesis. I sustain that these variables are a good alternative as they capture the sectoral composition of employment in local labour market while it can also be used as a proxy of different stages of economic development. The motivation of using these variables is based on Perkins et al (2013), who argued that, at the lowest levels of income per capita, agriculture dominates both as a share of GDP and as a share of total employment. Conversely, when industry and services start growing, agriculture will account for a smaller share of GDP and total employment.

To estimate the sectoral distribution of employment at the municipal level, I considered all individuals who reported being employed within each municipality, regardless of their sex. Then, I estimated the percentage of respondents that were working in agriculture, industry, and services after considering all respondents that were living in the same municipality. It is worth noting that I obtained these estimations after using the weight variable provided by INEGI, also known as expansion factor[1], which indicates the weight of each respondent in the sample. As you may know, people that are interviewed in household surveys are selected through a random process and they also have different selection probabilities. Hence, Mexico's National Statistical Office (INEGI) needs to estimate the weight of each respondent in the sample, which is equal to the inverse of the probability of being sampled.

Omitting this sampling weight leads to biased estimates, which are far from the true values. Hence, using sampling weights is useful to have a more precise estimation of the percentage of jobs in agriculture, industry, and services at the municipal level. For instance, using the weight variable is also useful to obtain preciser estimations of people living in rural areas. Table 1.1 shows a comparison between respondents from rural and urban areas compared to estimations of rural and urban populations in Mexico after using the sampling weights. The table shows that there are more respondents from urban areas than from rural areas while the estimations show that in Mexico there are more people living in rural areas than in urban areas.

Table 1.1 – Rural and urban respondents compared with rural and urban population.

	ENOE surveys			
	2005, 1Q	**2010, 1Q**	**2015, 1Q**	**2019, 1Q**
Total respondents from rural populations	121,178	125,150	124,932	115,718
Total respondents from urban populations	189,757	187,017	189,002	205,684
Total Sample Size	310,935	312,167	313,934	321,402
% of respondents from rural populations	38.97%	40.09%	39.80%	36.00%
% of respondents from urban populations	61.03%	59.91%	60.20%	64.00%
Estimations after using the weight variable				
Rural population in Mexico	45,610,450	49,824,887	53,919,098	53,975,674
Urban population in Mexico	34,790,028	38,172,950	41,012,411	46,940,369
Total population in Mexico	80,400,478	87,997,837	94,931,509	100,916,043
% of rural population in Mexico	56.73%	56.62%	56.80%	53.49%
% of urban population in Mexico	43.27%	43.38%	43.20%	46.51%

[1] The sampling weight (known in Mexico as "factor de expansion") can be interpreted as the number of units in the population that each unit in the sample represents. For instance, if a person in the sample is categorised as "non-economically active" and their "expansion factor" is equal to 308, this means that there are 308 people in Mexico that are non-economically active and share the same socio-demographic characteristics. Hence, the "expansion factor" is a variable calculated by INEGI that assigns a given weight to each individual in the sample to obtain more precise estimations.

On the other hand, a limitation of this empirical strategy is that the ENOE survey is not representative at the municipal level. Hence, the biggest municipalities are more likely to have a precise estimation of the sectoral distribution of employment, as they have a larger sample size. Meanwhile, the small municipalities will have larger measurement errors, as they have fewer respondents. Nevertheless, I addressed this concern to a certain degree. My empirical strategy is that after estimating the percentage of jobs in agriculture, industry and services for each municipality in the sample, all respondents in municipality "x" got the corresponding values for the sectoral distribution of employment in the municipality where they are living.

In other words, if a respondent lives in a small municipality, where only a few respondents had a job, the estimations of sectoral distribution of employment at the municipal level may be less reliable, but their weight in the total sample will also be smaller. For instance, each round of the ENOE survey considered for this research had more than 300,000 respondents. Hence, a municipality with 8,000 employed respondents has 100 times more weight in the sample than a municipality with only 80 employed respondents. Although this is an innovative empirical strategy to study female labour participation using microdata, I also recognise that the previous explanation could be considered as a modest solution.

4.2.3 Control variables

This sub-section includes a detailed explanation of different control variables that were included in the econometric model since they are potentially related to female labour participation. These variables encompass individual attributes of the respondents, household characteristics, and features of the respondents' living environment. Figure 1.10, included in the appendix section, presents different charts that show the relationship between female labour participation rates and some of the control variables discussed in this section.

The first two control variables at the individual level are age and ‘age squared’ since the relationship between labour status and age tends to be non-linear. I also control for educational attainment, which is a categorical variable that shows the highest level of education of each respondent in the household. The literature on this topic indicates that the relationship between a woman’s level of education and her participation in labour markets differs across countries, so it is incorrect to assume a positive and linear relationship.

Klasen et al. (2021) offer an overview of this research subject and provide micro-level evidence on the differences in this relationship after analysing eight developing countries. They explain that, in some developing countries, educational attainment and female labour participation show a U-shaped pattern, while other countries show a common linear relationship. Figure 1.10 shows that Mexican women with low education levels have the lowest labour force participation rates, while highly educated women have the highest. Therefore, educational attainment is included in the model as a control variable that seems to have a positive and linear relationship with female labour participation.

The econometric model also includes a control variable that captures if the respondent is living in a household from a low, medium-low, medium-high or high socioeconomic strata. INEGI (2020) indicates that this variable is built using multivariate statistical methods based on 34 indicators that capture the economic situation of the individuals, as well as the physical characteristics and the equipment in their households. Some of the indicators considered are access to medical services, educational attainment, illiteracy, a solid floor in the household (cement, wood, mosaic), household overcrowding, access to electricity, water and drainage piping as well as possession of items such as televisions, cars, cell phones, refrigerators and washing machines. Based on the previous explanation, the variable 'socio-economic stratum' can be used as a proxy of the financial situation of the household members.

It is important to include this control variable as there are studies indicating that it could be a determinant for female to engage in economic activities. For instance, Verick (2014) argued that poor women in low-income countries are the most likely to participate in the labour market, usually in subsistence activities and informal jobs. On the other hand, Lampietti and Stalker (2000) found that, in six out of the nine Latin American countries considered for the analysis, poor women had lower FLPRs than non-poor women. For the case of Mexico, Figure 1.10 shows that women from low socioeconomic strata have the lowest FLPRs.

Another control variable included in the model is the marital status of each woman, since Goldin (1994) explained that married women are usually less likely to work in blue-collar jobs. Surprisingly, Figure 1.10 shows that in Mexico married women have higher labour force participation rates than single women. Nevertheless, it worth noting that the dataset includes all women above 15 years old. Hence, a considerable proportion of single women in the sample are teenagers who are still studying in high school or university.

A similar pattern is observed with the control variable that captures the number of children that each woman in the sample has given birth to. Figure 1.10 shows that women without children have similar FLRPs to married women. This could be counter-intuitive, since women without children are usually more likely to work, as they do not have a care burden. Nevertheless, the sample is considering every woman above 15 years old as this is the proper way of estimating labour force participation rates according to ILO standards.

According to estimates obtained by López-Acevedo et al. (2021), residing in a Mexican urban household is linked with an 11.1 percentage point increase in woman's likelihood of being employed in both 2007 and 2017. Hence, I included "*urban*" location as a control variable that takes value of 1 if the household is in an urban area and 0 if it is in a rural area. This is particularly relevant because this variable can also be correlated to the estimations of sectoral distribution of employment at the municipal level. For instance, rural areas tend to be agriculture-oriented, while urban areas tend to have a higher percentage of jobs in industry and services.

Falk and Leoni (2010) found that population density is positively associated with FLPRs in Austria. Their interpretation is that densely populated areas provide a larger and better array of employment opportunities for female workers. Hence, I also included a control variable that can be considered a proxy of population density in Mexico. This categorical variable takes value of 1 if the household is in an area with more than 100,000 inhabitants, 2 if it has between 15,000 and 99,000 inhabitants, 3 if it has between 2,500 and 14,999 inhabitants, and 4 if it has less than 2,500 inhabitants.

The regression analysis also included other control variables that capture household characteristics that tend to have a relationship with female labour participation. The model includes variables that capture the age, sex, and education level of the household head. Moreover, the regression analysis includes control variables that capture the total number of household members, and the number of kids below 5 years old in the household.

Finally, the econometric analysis also includes control variables that depict characteristics of the municipality. It is relevant to include these controls in the model since the variable of interest in this analysis are the percentage of jobs in agriculture, industry, and services at the municipal level. Hence, the econometric analysis needs to control for characteristics of the municipality where the respondents live. By doing so, it is easier to assess whether there is a statistically significant relationship between the likelihood that a woman is economically active and the sectoral distribution of employment in the municipality where they are living. The control variables at the municipal level are:

- Average age of women in the municipality.
- Percentage of women in the municipality with elementary schooling or less.
- Percentage of women in the municipality with secondary schooling.
- Percentage of women in the municipality with high-school education.
- Percentage of single women in the municipality.
- Percentage of women in the municipality in a relationship (married/free union).
- Percentage of people in the municipality of low socioeconomic stratum.
- Percentage of people in the municipality of medium-low socioeconomic stratum.
- Average number of sons or daughters among women between 20-35 years old, (used as a proxy of the fertility rate in the municipality).

Apart from these control variables at the municipal level, I also included a control variable that captures the percentage of people in the municipality who have migrated from their city or locality to keep or obtain their current job, since within-country migration is easier than migration across countries. This is a relevant control variable since the framework of the U-shaped hypothesis considers female labour participation across countries. Since migration between municipalities of the country is easier than migration between countries, it is important to include this variable as a control in the regression analysis.

4.2.4 Descriptive statistics

To conclude this section, Table 1.2 shows the descriptive statistics of all the variables that were considered in the regression analyses.

Table 1.2 – Descriptive statistics

	Women						Men					
	Obs.	%	Mean	Std. Dev.	Min	Max	Obs.	%	Mean	Std. Dev.	Min	Max
Dependent variable												
Economically Active	613,154	-	0.444	0.497	0	1	550,681	-	0.777	0.417	0	1
Main dependent variables												
% of jobs in agriculture	613,154	-	10.285	16.896	0	100	550,681	-	10.526	17.230	0	100
% of jobs in industry	613,154	-	25.041	10.345	0	100	550,681	-	25.151	10.460	0	100
% of jobs in services	613,154	-	64.106	16.710	0	100	550,681	-	63.734	16.890	0	100
% of unspecified jobs	613,154	-	0.569	1.356	0	27.42	550,681	-	0.589	1.401	0	27.42
Individual characteristics												
Age	613,154	-	39.660	17.609	15	98	550,681		38.668	17.478	15	98
Marital status												
Free Union	75,547	12.32	-	-	-	-	72,283	13.13	-	-	-	-
Separated	28,811	4.7	-	-	-	-	13,325	2.42	-	-	-	-
Divorced	13,137	2.14	-	-	-	-	5,909	1.07	-	-	-	-
Widowed	46,022	7.51	-	-	-	-	11,667	2.12	-	-	-	-
Married	263,724	43.01	-	-	-	-	255,261	46.35	-	-	-	-
Single	185,864	30.31	-	-	-	-	192,191	34.9	-	-	-	-
Missing values	49	0.01	-	-	-	-	45	0.01	-	-	-	-
Level of education												
No studies at all	38,870	6.34	-	-	-	-	25,905	4.7	-	-	-	-
Preschool	306	0.05	-	-	-	-	276	0.05	-	-	-	-
Primary school	161,873	26.4	-	-	-	-	135,404	24.59	-	-	-	-
Secondary school	161,956	26.41	-	-	-	-	157,299	28.56	-	-	-	-
High school	102,557	16.73	-	-	-	-	107,695	19.56	-	-	-	-
Teacher training college	7,341	1.2	-	-	-	-	3,265	0.59	-	-	-	-
Technical career	42,777	6.98	-	-	-	-	16,037	2.91	-	-	-	-
Bachelor's degree	90,589	14.77	-	-	-	-	96,573	17.54	-	-	-	-
Master's degree	5,851	0.95	-	-	-	-	6,693	1.22	-	-	-	-
Ph.D. degree	634	0.1	-	-	-	-	1,083	0.2	-	-	-	-
Missing values	400	0.07	-	-	-	-	451	0.08	-	-	-	-

	Women						Men					
	Obs.	%	Mean	Std. Dev.	Min	Max	Obs.	%	Mean	Std. Dev.	Min	Max
Household characteristics												
Total household members	613,154	-	4.497	2.067	1	27	550,681	-	4.501	2.065	1	27
Number of kids in the household (5 years old or less)	613,154	-	0.423	0.714	0	8	550,681	-	0.386	0.688	0	8
Household located in urban/rural area	613,154	-	0.621	0.485	0	1	550,681	-	0.613	0.487	0	1
Population size of the household location												
More than 100,000 inhabitants	373,749	60.96	-	-	-	-	331,556	60.21	-	-	-	-
Between 15,000 and 99,999	73,024	11.91	-	-	-	-	65,125	11.83	-	-	-	-
Between 2,500 and 14,999	73,724	12.02	-	-	-	-	66,086	12	-	-	-	-
Less than 2,500 inhabitants	92,657	15.11	-	-	-	-	87,914	15.96	-	-	-	-
Socioeconomic strata												
Low	81,920	13.36	-	-	-	-	76,847	13.95	-	-	-	-
Medium-low	296,761	48.4	-	-	-	-	270,567	49.13	-	-	-	-
Medium-high	168,893	27.54	-	-	-	-	146,769	26.65	-	-	-	-
High	65,580	10.7	-	-	-	-	56,498	10.26	-	-	-	-
Household head characteristics												
Age of the household head	610,503	-	50.02	14.78444	15	98	549,489	-	49.41	14.55243	15	98
Sex of the household head	610,503	-	0.31	0.4613919	0	1	549,489	-	0.15	0.36149	0	1
Level of education of the household head												
No studies at all	46,919	7.69	-	-	-	-	39,992	7.26	-	-	-	-
Preschool	374	0.06	-	-	-	-	357	0.06	-	-	-	-
Primary school	212,162	34.78	-	-	-	-	190,242	34.55	-	-	-	-
Secondary school	138,122	22.64	-	-	-	-	128,128	23.27	-	-	-	-
High school	75,130	12.32	-	-	-	-	70,977	12.89	-	-	-	-
Teacher training college	7,889	1.29	-	-	-	-	5,895	1.07	-	-	-	-
Technical career	30,002	4.92	-	-	-	-	21,437	3.89	-	-	-	-
Bachelor's degree	88,471	14.5	-	-	-	-	82,111	14.91	-	-	-	-
Master's degree	9,404	1.54	-	-	-	-	8,390	1.52	-	-	-	-
Ph.D. degree	1,515	0.25	-	-	-	-	1,486	0.27	-	-	-	-
Missing values	3,166	0.52	-	-	-	-	1,666	0.3	-	-	-	-

	Women						Men					
	Obs.	%	Mean	Std. Dev.	Min	Max	Obs.	%	Mean	Std. Dev.	Min	Max
Municipal characteristics												
% of people who migrated to keep or maintain their current job	612,610	-	2.679	3.629	0	100	-	-	-	-	-	-
% of women in the municipality with primary school or less	613,154	-	33.036	14.168	0	100	-	-	-	-	-	-
% of women in the municipality with secondary school	613,154	-	26.503	6.588	0	100	-	-	-	-	-	-
% of women in the municipality with high school	613,154	-	16.653	5.450	0	60	-	-	-	-	-	-
% of women in the municipality that are single	613,154	-	30.041	5.358	0	66.67	-	-	-	-	-	-
% of women in the municipality that are married	613,154	-	43.343	7.664	0	100	-	-	-	-	-	-
% of women in the municipality that are in a free-union relationship	613,154	-	12.429	6.697	0	100	-	-	-	-	-	-
% of people in the municipality from a low socioeconomic stratum	613,154	-	14.172	26.548	0	100	-	-	-	-	-	-
% of people in the municipality from a medium-low socioeconomic stratum	613,154	-	49.111	24.457	0	100	-	-	-	-	-	-
Average children per woman aged 20-35 in the municipality	613,117	-	1.286	0.342	0	4.33	-	-	-	-	-	-
Average age of women in the municipality	613,154	-	39.566	2.713	26.67	59.79	-	-	-	-	-	-
Year/quarter												
1st quarter of 2005	150,393	24.53	-	-	-	-	133,154	24.18	-	-	-	-
1st quarter of 2010	152,094	24.81	-	-	-	-	136,520	24.79	-	-	-	-
1st quarter of 2015	152,944	24.94	-	-	-	-	138,216	25.1	-	-	-	-
1st quarter of 2019	157,723	25.72	-	-	-	-	142,791	25.93	-	-	-	-

	Women						Men					
	Obs.	%	Mean	Std. Dev.	Min	Max	Obs.	%	Mean	Std. Dev.	Min	Max
Mexican states												
Aguascalientes	18,621	3.04	-	-	-	-	16,654	3.02	-	-	-	-
Baja California	20,117	3.28	-	-	-	-	19,521	3.54	-	-	-	-
Baja California Sur	12,934	2.11	-	-	-	-	12,767	2.32	-	-	-	-
Campeche	17,275	2.82	-	-	-	-	15,832	2.87	-	-	-	-
Coahuila	20,106	3.28	-	-	-	-	18,958	3.44	-	-	-	-
Colima	16,455	2.68	-	-	-	-	14,986	2.72	-	-	-	-
Chiapas	22,045	3.6	-	-	-	-	19,081	3.46	-	-	-	-
Chihuahua	18,568	3.03	-	-	-	-	17,065	3.1	-	-	-	-
Mexico City	16,401	2.67	-	-	-	-	14,251	2.59	-	-	-	-
Durango	18,496	3.02	-	-	-	-	16,138	2.93	-	-	-	-
Guanajuato	26,183	4.27	-	-	-	-	22,965	4.17	-	-	-	-
Guerrero	18,846	3.07	-	-	-	-	16,310	2.96	-	-	-	-
Hidalgo	16,781	2.74	-	-	-	-	14,172	2.57	-	-	-	-
Jalisco	22,315	3.64	-	-	-	-	20,251	3.68	-	-	-	-
México	28,042	4.57	-	-	-	-	25,199	4.58	-	-	-	-
Michoacán	19,140	3.12	-	-	-	-	16,516	3	-	-	-	-
Morelos	17,190	2.8	-	-	-	-	14,901	2.71	-	-	-	-
Nayarit	17,471	2.85	-	-	-	-	15,975	2.9	-	-	-	-
Nuevo Leon	20,576	3.36	-	-	-	-	19,998	3.63	-	-	-	-
Oaxaca	21,928	3.58	-	-	-	-	18,273	3.32	-	-	-	-
Puebla	23,516	3.84	-	-	-	-	20,292	3.68	-	-	-	-
Querétaro	18,151	2.96	-	-	-	-	16,062	2.92	-	-	-	-
Quintana Roo	14,513	2.37	-	-	-	-	14,339	2.6	-	-	-	-
San Luis Potosi	18,786	3.06	-	-	-	-	16,693	3.03	-	-	-	-
Sinaloa	17,989	2.93	-	-	-	-	16,683	3.03	-	-	-	-
Sonora	16,587	2.71	-	-	-	-	15,813	2.87	-	-	-	-
Tabasco	18,414	3	-	-	-	-	16,271	2.95	-	-	-	-
Tamaulipas	19,506	3.18	-	-	-	-	17,870	3.25	-	-	-	-
Tlaxcala	18,188	2.97	-	-	-	-	15,925	2.89	-	-	-	-
Veracruz	21,472	3.5	-	-	-	-	18,084	3.28	-	-	-	-
Yucatán	17,409	2.84	-	-	-	-	16,029	2.91	-	-	-	-
Zacatecas	19,133	3.12	-	-	-	-	16,807	3.05	-	-	-	-

4.3 Econometric model

The empirical analysis is based on a set of probit regressions to capture the relationship between female labour participation and the sectoral distribution of employment at the municipal level. The econometric model that was employed to obtain the main results of this study can be characterized with the following equation:

$$Y_{i,m,t} = \beta_0 + \beta_1 Share_{s,m,t} + \beta_2 Share^2_{s,m,t} + \beta_x X'_{i,m,t} + \beta_x HH'_{i,m,t} + \beta_x \vartheta'_{m,t} + \mu_{e,t} + \varepsilon_i, \quad (4)$$

Where Y is a binary variable that takes value of 1 if the respondent of the household survey is part of the economically active population, and 0 otherwise. *Share* is the first independent variable of the model, and it captures the percentage of jobs either in agriculture, industry, or services as a share of total employment. $Share^2$ is the second independent variable of the model, and it captures the squared values of the percentage of jobs in agriculture, industry, and services at the municipal level. This variable is included to account for any potential non-linear relationship between female labour participation and the percentage of jobs in any of the three economic sectors. β_1 and β_2 are the coefficient of interest throughout the paper. They will capture if there is a positive or negative relationship between the percentage of jobs in agriculture, industry or services at the municipal level and the likelihood that a woman is part of the economically active population.

X is a vector of potential explanatory variables that control for the individual characteristics of each respondent in the sample. The first two controls are "*age*" and "*age squared*" since the relationship between female labour participation and age is usually non-linear. I also control for educational attainment, which is a categorical variable that captures the highest level of education that each respondent in the sample has obtained. Moreover, this vector includes variables to control for marital status, and number of kids that each woman in the sample has given birth to.

HH is a vector of control variables that capture different household characteristics, which include: 1) socio-economic stratum of the household, 2) number of kids below five years old in the household, 3) total household members, 4) sex of the household head, 5) age of the household head, and 6) level of education of the household head. Moreover, the econometric model also includes two variables that capture characteristics of the household location: 1) population size of the locality, 2) rural or urban location.

ϑ is a vector of control variables that capture different characteristics of the municipality where each respondent lives. These control variables were estimated after using the sampling weights that INEGI assigns to each individual in the ENOE household survey. The control variables at the municipal level included in the model aim to test if the relationship between the dependent variable (female labour participation) and the main independent variables (share of jobs in agriculture, industry, or services at the municipal level) is not spurious or biased. After including these variables, I can evaluate whether the relationship is statistically significant or not.

Finally, $i \in \{1, \ldots, N\}$ is an index for each individual respondent, $m \in \{1, \ldots, M\}$ is an index for municipalities, $t \in$ {2005 1Q, 2010 1Q, 2015 1Q, 2019 1Q} is an index for the specific years and quarters considered for this study, $s \in$ {agriculture, industry, services} is an index that captures the percentage of jobs in each economic sector, and $e \in \{1, \ldots, 32\}$ is an index for the 32 states in Mexico. Finally, μ represents the fixed effects included in the model to control for unobserved heterogeneity across time or across Mexican states. The fixed effects considered the first quarter of 2005 and Mexico City as the base categories.

5 Results

The results derived from the regression analyses are compelling. As mentioned before, the study uses a repeated cross-sectional dataset of Mexico that covers the first quarters of 2005, 2010, 2015 and 2019. The results were obtained after running probit regressions that estimate whether the percentages of jobs in agriculture, industry or services at the municipal level have a positive or negative relationship with women's likelihood of being economically active.

In all cases, the regressions are restricted to women at least 15 years old, since this is the legal age to start working in Mexico and it is also used by INEGI and ILO as the minimum age for estimating FLPRs. All regressions were run using probability weights and they include fixed effects at the state level to control for unobserved heterogeneity across the 32 federal entities. Finally, the standard errors are clustered at the municipal level since the sectoral distribution of employment and the control variables at the local level were estimated using as a reference the territorial divisions of Mexican municipalities.

The results are presented in different formats. Table 1.3 shows the outcomes obtained from different probit regressions. Table 1.4 – included in the appendix – shows the average marginal probabilities of being economically active depending on sex and the percentage of jobs in agriculture, industry, and services at the municipal level. The results show that there is a non-linear relationship between variations in sectoral distribution of employment and female labour participation. Hence, Figure 1. is included to visualize and interpret the regressions results reported in Table 1.4.

One of the main aspects to highlight is that the results reject the hypothesis that a higher share of industrial jobs is associated with lower female labour participation. On the other hand, the results show that a higher percentage of agricultural jobs at the municipal level is negatively associated with a woman's likelihood of being economically active. This indicates that women living in agricultural municipalities are less likely to be part of the labour force. Finally, the regression results show that there is a strong and positive relationship between female labour participation and a higher percentage of jobs in the service sector.

Although it is not possible to make causal claims from these results, it is important to emphasise that the variables capturing the sectoral distribution of employment at the municipal level are statistically significant after controlling for both the individual characteristics of women, as well as the characteristics of the place where they live. It is also worth noting that the regression analysis considered both paid and unpaid jobs in farms and businesses. In fact, in Mexico an individual is considered part of the economically active population even if they are family workers without a salary or if they are only producing food for self-consumption. Therefore, there are no evidence indicating that the lack of female labour participation in agricultural activities is because INEGI is not considering unpaid agricultural labour.

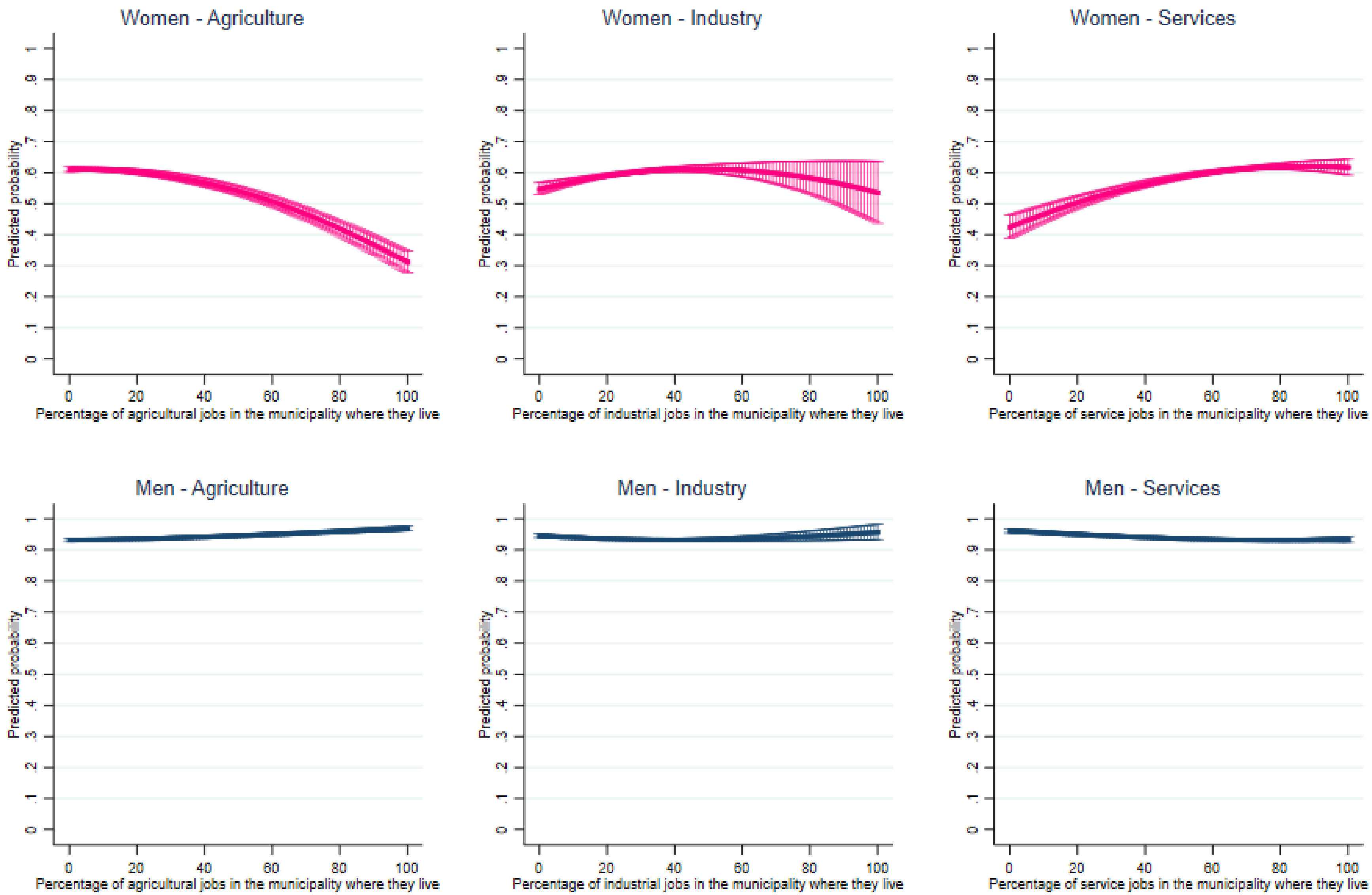
Based on these results, it seems that one possible explanation for the low levels of female labour participation in Mexico is that women living in agricultural communities are very unlikely to work. Moreover, the results indicating that there is a positive relationship between female labour participation and a higher share of industrial jobs is a meaningful contribution to the literature. Researchers have taken the previous hypothesis as a stylized fact even when this is the first paper that has empirically evaluated it. Therefore, this paper shows that the sectoral distribution of employment in local labour markets are explanatory variables of female labour participation, but not necessarily in the same way that the U-shaped feminization hypothesis suggests.

Table 1.3 - Probability that men and women are economically active depending on the percentage of jobs in agriculture, industry, and services at the municipal level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
VARIABLES	Women	Women	Women	Men	Women	Women	Women	Men	Women	Women	Women	Men
% of agricultural jobs at the municipal level	-0.0090***	-0.00593***	0.00065	0.00079								
	(0.0001)	(0.00045)	(0.00089)	(0.00094)								
% of agricultural jobs at the municipal level (squared)			-0.00008***	0.00003**								
			(0.00001)	(0.00001)								
% of industrial jobs at the municipal level					0.0034***	0.00257***	0.00687***	-0.00520***				
					(0.0003)	(0.00056)	(0.00157)	(0.00171)				
% of industrial jobs at the municipal level (squared)							-0.00007***	0.00006**				
							(0.00002)	(0.00003)				
% of service jobs at the municipal level									0.0089***	0.00490***	0.01129***	-0.00675***
									(0.0001)	(0.00053)	(0.00164)	(0.00149)
% of service jobs at the municipal level (squared)											-0.00006***	0.00004***
											(0.00001)	(0.00001)
Control variables at the individual level	X	✓	✓	✓	X	✓	✓	✓	X	✓	✓	✓
Control variables at the household level	X	✓	✓	✓	X	✓	✓	✓	X	✓	✓	✓
Control variables at the municipal level	X	✓	✓	X	X	✓	✓	X	X	✓	✓	X
Year/quarter fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
State fixed effects	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Clustered standard errors at the municipal level	X	✓	✓	✓	X	✓	✓	✓	X	✓	✓	✓
Constant	-0.0859***	-3.18415***	-3.12731***	-1.16940***	-0.1650***	-2.92330***	-2.96848***	-1.04266***	-0.8089***	-3.29559***	-3.40730***	-0.89741***
	(0.0113)	(0.17039)	(0.16905)	(0.06549)	(0.0123)	(0.17564)	(0.17628)	(0.06696)	(0.0161)	(0.18293)	(0.18489)	(0.07056)
Observations	613,153	609,070	609,070	548,764	613,153	609,070	609,070	548,764	613,153	609,070	609,070	548,764

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

Figure 1.9 – Predicted probability that Mexican men and women are economically active depending on the % of agricultural, industrial or service jobs in the municipality where they live



5.1 Robustness check

To the best of my knowledge, there is only one study that has analysed the relationship between FLPRs and sectoral employment rates within a country. Roncolato (2016) studied the feminization hypothesis in South Africa and found a U-shaped relationship between the share of non-agricultural employment at the municipal level and women's probability of being in the labour force. Although the empirical strategy of Roncolato (2016) is similar to mine, there are different aspects that vary between both studies.

One of the main differences is that she considers that structural change occurs after a decline of the share of employment in the agricultural sector. Hence, she uses "share of non-agricultural jobs" as the main independent variable of the econometric model. Conversely, my analysis considers three variables that show the percentage of jobs in agriculture, industry, and services. By following this approach, I estimated the relationship between being economically active and variations in sectoral distribution of employment commonly observed at different levels of economic development. Consequently, I was able to test the hypothesis indicating that a high percentage of jobs in the industrial sector tends to be associated with lower female labour participation.

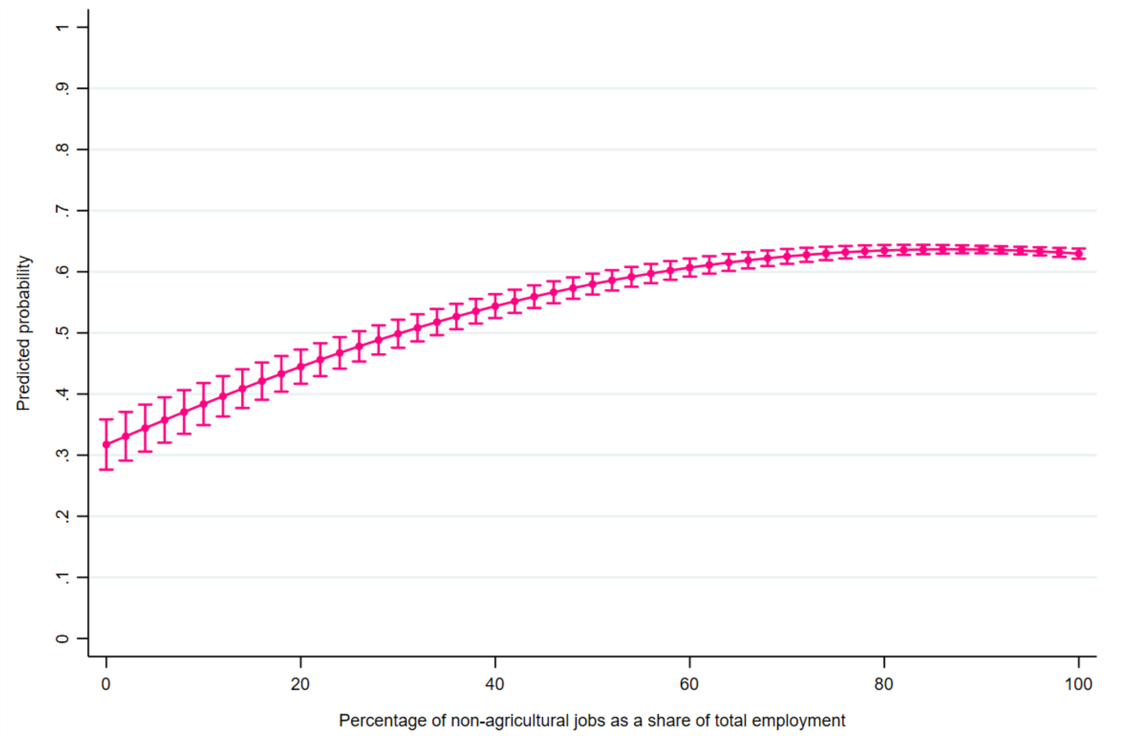
Another difference is that she was not able to control for integral migration in her analysis since the dataset does not include information on this subject. As she explained, it is much easier for workers within a country to move across borders of certain municipalities compared to moving across country borders. Fortunately, ENOE household surveys include a question asking respondent if they moved from their hometown to keep or maintain their current job.

Another difference is that she used a cross-sectional dataset from 2017, while my analysis uses a repeated cross-sectional dataset covering 4 different surveys between

2005 and 2019. By following this approach, my regression analyses not only considered the sectoral distribution of employment, but also structural transformation at the municipal level over a period of 15 years. Another minor difference between both studies is that she restricted the regression analysis to women between 15 to 65 years old, while I decided to follow ILO's standards that considers all women above 15 years old. Finally, in her analysis she excluded students, sick and disabled people from her sample, while I maintained them as part of the non-economically active population.

I decided to follow the empirical strategy of Roncolato (2016) to compare the outcomes and test if my previous results hold under her specifications. Figure 1. shows the average marginal probabilities that Mexican women are part of the labour force depending on the percentage of non-agricultural jobs at the municipal level. The regression results following her methodology and the average marginal probabilities obtained at the means of the covariates are included in the appendix.

Figure 1.10 – Predicted probability that Mexican women are economically active depending on the share of non-agricultural jobs at the municipal level.



As mentioned previously, Roncolato (2016) found a U-shaped pattern between female labour force participation and the share of non-agricultural jobs at the municipal level. Notwithstanding, my results are not showing a U-shaped pattern within Mexico. The previous figure confirms that women's probability of being in the labour force is lower in municipalities with a high percentage of jobs in the agricultural sector, and it increases as the share of non-agricultural jobs increases. Therefore, while Roncolato found a U-shaped pattern within South Africa, my results show an upward linear trend between female labour participation and the share of non-agricultural jobs at the municipal level.

6 Conclusion

Mexico is the Latin American country with the highest percentage of jobs in the industrial sector, while it also has one of the lowest FLPRs in the region. One of the main explanations for the downward portion of the U-shaped relationships is that middle-income countries are experiencing an expansion of the industrial sector, and FLPRs tend to experience a decline as there is a social stigma towards women working in blue-collar jobs. Several papers have found that women tend to be excluded from participating in blue-collar jobs during the structural transformation process. Pampel & Tanaka (1986) posited that women are usually excluded from early industrial jobs because of physical limitations, gender discrimination and the domestic demands attached to higher fertility rates. Following the same argument, Goldin (1994) contended that in developing countries there is usually a social stigma that excludes women from participating in industrial jobs, especially those that are married.

Due to the lack of studies empirically evaluating this 'stylised fact', this paper fills a gap in the literature by evaluating if there is a negative relationship between female labour participation and a high percentage of jobs in the industrial sector. To do so, I analysed the within-country relationship between FLPRs and the sectoral distribution of employment using micro-data that helps to provide empirical evidence at the local level. This is relevant since researchers have assumed that the existence of a social stigma towards blue-collar jobs is a universal norm in developing countries.

The regression analyses executed in this study revealed interesting results. First, it shows that there is no negative relationship between female labour participation and a higher percentage of industrial jobs at the municipal level. The exploratory data analysis also showed that in 2019 about 16% of economically active women worked in the manufacturing sector. Moreover, the scatterplots at the state and municipal levels do not show the assumed negative relationship between FLPRs and a higher percentage of jobs in the manufacturing sector. Finally, the probit regressions showed that the existence of a higher percentage of jobs in the industrial sector has a positive relationship with female labour participation.

On the other hand, the analysis showed that one of the potential reasons behind the low levels of female labour participation in Mexico is the lack of labour participation of women in agricultural activities. The exploratory data analysis showed that, in the first quarter of 2019, only 4% of the economically active women were working in the agricultural sector. Additionally, the scatterplots at both the state and municipal levels showed that female labour participation tends to decrease as the percentage of agricultural jobs increases. Finally, the probit regressions confirmed that the higher the percentage of agricultural jobs at the municipal level, the lower the probability that women are economically active. It is worth noting that the regression analysis considered both salaried and non-salaried employment and confirmed that the negative relationship holds even after controlling for individual, household, and municipal characteristics.

The previous results are particularly relevant because they have important policy implications for Mexico. The cultural beliefs of each country are difficult to change and usually take a long time to uproot in a society. Fortunately, it seems that the social stigma towards women working in blue-collar jobs is not strong in Mexico. Hence, designing and implementing policies to increase FLPRs in the industrial sector may be easier in Mexico than in other countries where social norms are more influential and difficult to change.

The regression analysis confirmed that women have a greater likelihood of being economically active in municipalities with a higher percentage of jobs in this sector, which is in line with most of the literature on this topic. Nevertheless, there are additional aspects related to the service sector that could be analysed in the future. For instance, the theory indicates that the rise in FPLRs in service-oriented economies is a result of the absence of a social stigma towards white-collar jobs. However, this hypothesis fails to recognise that not all jobs in the service sector are white-collar jobs, since some of the jobs in this sector are part of the informal sector. In the case of Mexico, there are plenty of informal jobs in this sector even when the country, state or municipality is at the final stage of the structural transformation process. Therefore, it would be interesting to examine whether there are differences in FLPRs in formal and informal jobs in the service sector.

It also important to note the main limitations of this research. The first is that this paper does not evaluate the U-shaped hypothesis considering historical trends. Perhaps it is true that, when Mexico was an agricultural country, FLPRs were particularly high. It can also be true that FLPRs experienced a decline during the expansion of the industrial sector. Nevertheless, the goal of this research was not to evaluate the U-shaped hypothesis from a long-term perspective. Instead, its goal is to take some of its theoretical underpinning and study the current within-country relationship between sectoral distribution and female labour participation rates.

It is important to emphasise the last point. This analysis should not be considered an empirical evaluation of the U-shaped feminisation hypothesis, since the paper is not undertaking a historical analysis of FLPRs in Mexico. As previously mentioned, the study is based on micro-data from Mexico's ENOE surveys available from the first quarter of 2005 onwards. According to World Bank data, the sectoral distribution of employment in Mexico during 2005 was 15% in agriculture, 26% in industry and 59% in services. Hence, to evaluate the U-shaped hypothesis in Mexico, it would be necessary to have historical data on FLPRs when most of the jobs in Mexico were in agriculture.

After exploring potential reasons for my results, and discuss the main limitations of the study, I would like to emphasise the value of this research paper in the current body of literature on this subject. First, my research followed an innovative empirical strategy that can be replicated by other researchers. Following this micro-econometric approach can provide valuable empirical evidence of the within-country relationship between FLPRs and the sectoral distribution of employment in local labour markets. Following this empirical strategy is particularly relevant because it offers a level of disaggregation that cannot be replicated in cross-country analysis using macro-level data.

This research also suggests that the percentage of jobs in agriculture, industry and services can be used as a variable that captures both the level of economic development and the structural transformation process. Moreover, the research provides empirical evidence that contradicts the premise of a negative relationship between female labour participation and a high percentage of jobs in the industrial sector. Instead, it shows that there is a lack of participation of women in agricultural activities, and one of the potential drivers is the lack of female labour demand in this sector. These are meaningful contributions to the literature given the lack of within-country studies evaluating specific hypotheses of the female labour force function developed by Goldin (1994).

7 References

Bloom, D. E., Canning, D., Fink, G., & Finlay, J. E. (2009). Fertility, female labor force participation, and the demographic dividend. *Journal of Economic Growth*, *14*(2), 79–101. https://doi.org/10.1007/s10887-009-9039-9

Bloom, D. E., & Finlay, J. E. (2009). Demographic Change and Economic Growth in Asia. *Asian Economic Policy Review*, *4*(1), 45–64. https://doi.org/10.1111/j.1748-3131.2009.01106.x

Bloom, D. E., & Williamson, J. G. (1998). Demographic Transitions and Economic Miracles in Emerging Asia. *The World Bank Economic Review*, *12*(3), 419–455. https://doi.org/10.1093/wber/12.3.419

Çağatay, N., & Özler, Ş. (1995). Feminization of the labor force: The effects of long-term development and structural adjustment. *World Development*, *23*(11), 1883–1894. https://doi.org/10.1016/0305-750X(95)00086-R

Clark, R. L., York, A., & Anker, R. (2003). Cross-national Analysis of Women in the Labour Market. In *Women in the Labour Market in Changing Economies: Demographic Issues*. Oxford University Press.

Cuberes, D., & Teignier, M. (2018). Macroeconomic costs of gender gaps in a model with entrepreneurship and household production: The case of Mexico. *World Bank Group*, 22.

Falk, M., & Leoni, T. (2010). Regional Female Labour Force Participation: An Empirical Application with Spatial Effects. In F. E. Caroleo & F. Pastore (Eds.), *The Labour Market Impact of the EU Enlargement: A New Regional Geography of Europe?* (pp. 309–326). Physica-Verlag HD. https://doi.org/10.1007/978-3-7908-2164-2_12

Gaddis, I., & Klasen, S. (2014). Economic development, structural change, and women's labor force participation: A Reexamination of the Feminization U Hypothesis. *Journal of Population Economics*, *27*(3), 639–681. https://doi.org/10.1007/s00148-013-0488-2

Goldin, C. (1986). The Economic Status of Women in the Early Republic: Quantitative Evidence. *The Journal of Interdisciplinary History*, *16*(3), 375–404. https://doi.org/10.2307/204496

Goldin, C. (1990). *Understanding the Gender Gap: An Economic History of American Women* (gold90-1). National Bureau of Economic Research. https://www.nber.org/books-and-chapters/understanding-gender-gap-economic-history-american-women

Goldin, C. (1994). The U-Shaped Female Labor Force Function in Economic Development and Economic History. *NBER Working Paper Series*, *Working Paper No. 4707*. https://doi.org/10.3386/w4707

Heath, R., & Jayachandran, S. (2016). *The Causes and Consequences of Increased Female Education and Labor Force Participation in Developing Countries* (Working Paper 22766). National Bureau of Economic Research. https://doi.org/10.3386/w22766

INEGI. (2020). *Cómo se hace la ENOE. Métodos y procedimientos*. 66.

Kaplan, D., & Piras, C. (2019). Brechas de género en el mercado laboral mexicano: Comparaciones internacionales y recomendaciones de política pública. *Revista de Economía Mexicana*, *Num. 4*, 28.

Klasen, S. (2019). What Explains Uneven Female Labor Force Participation Levels and Trends in Developing Countries? *The World Bank Research Observer*, *34*(2), 161–197. https://doi.org/10.1093/wbro/lkz005

Klasen, S., Le, T. T. N., Pieters, J., & Santos Silva, M. (2021). What Drives Female Labour Force Participation? Comparable Micro-level Evidence from Eight Developing and Emerging Economies. *The Journal of Development Studies*, *57*(3), 417–442. https://doi.org/10.1080/00220388.2020.1790533

Lahoti, R., & Swaminathan, H. (2016). Economic Development and Women's Labor Force Participation in India. *Feminist Economics*, *22*(2), 168–195. https://doi.org/10.1080/13545701.2015.1066022

Lampietti, J. A., & Stalker, L. (2000). Consumption Expenditure and Female Poverty: A Review of the Evidence. *The World Bank - Development Research Group*, *Policy Research Report on Gender and Development*(Working Paper Series No. 11).

López-Acevedo, G., Freije-Rodríguez, S., Vergara Bahena, M. A., Cardozo Medeiros, D., López-Acevedo, G., Freije-Rodríguez, S., Vergara Bahena, M. A., & Cardozo Medeiros, D. (2021). Changes in female employment in Mexico: Demographics, markets and policies. *Estudios Económicos (México, D.F.)*, *36*(1), 115–150. https://doi.org/10.24201/ee.v36i1.411

Luci, A. (2009). Female labour market participation and economic growth. *International Journal of Innovation and Sustainable Development*, *4*. https://doi.org/10.1504/IJISD.2009.028065

Mammen, K., & Paxson, C. (2000). Women's Work and Economic Development. *Journal of Economic Perspectives*, *14*(4), 141–164. https://doi.org/10.1257/jep.14.4.141

Olivetti, C. (2013). *The Female Labor Force and Long-run Development: The American Experience in Comparative Perspective* (Working Paper 19131). National Bureau of Economic Research. https://doi.org/10.3386/w19131

Pampel, F. C., & Tanaka, K. (1986). Economic Development and Female Labor Force Participation: A Reconsideration. *Social Forces*, *64*(3), 599–619.

Perkins, D. H., Radelet, S., Lindauer, D. L., & Block, S. A. (2013). *Economics of Development*. W.W. Norton.

Psacharopoulos, G., & Tzannatos, Z. (1989). Female Labor Force Participation: An international perspective. *The World Bank Research Observer*, *4*(2), 187–201. https://doi.org/10.1093/wbro/4.2.187

Roncolato, L. (2016). The Feminization U in South Africa: Economic Structure and Women's Labor Force Participation. *Feminist Economics*, *22*(4), 54–81. https://doi.org/10.1080/13545701.2016.1172721

Tam, H. (2011). U-shaped female labor participation with economic development: Some panel data evidence. *Economics Letters*, *110*(2), 140–142. https://doi.org/10.1016/j.econlet.2010.11.003

Verick, S. (2014). Female labor force participation in developing countries. *IZA World of Labor*. https://doi.org/10.15185/izawol.87

8 Appendix

Figure 1.9 – FLPRs and % of jobs in agriculture, industry, and services across countries (2019)

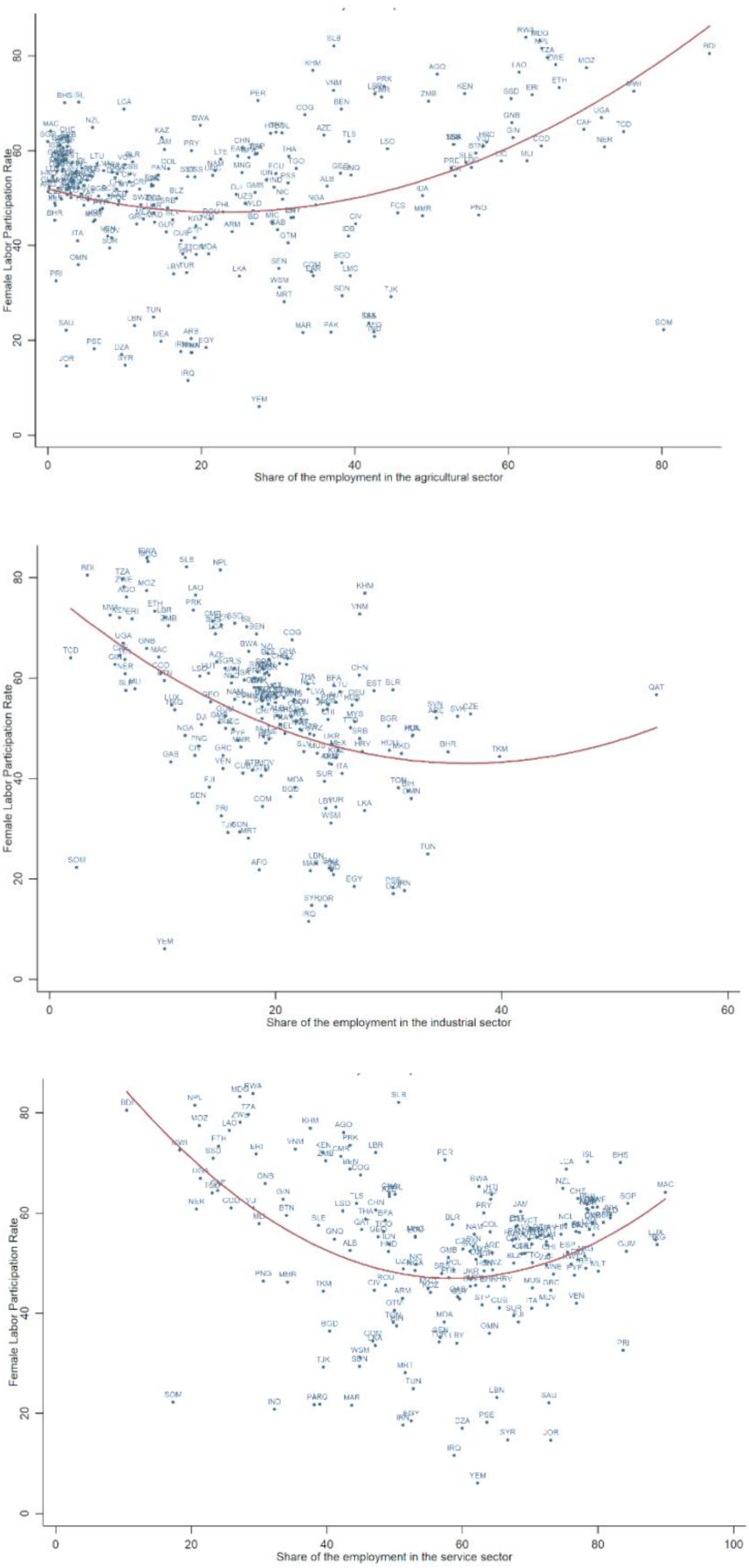
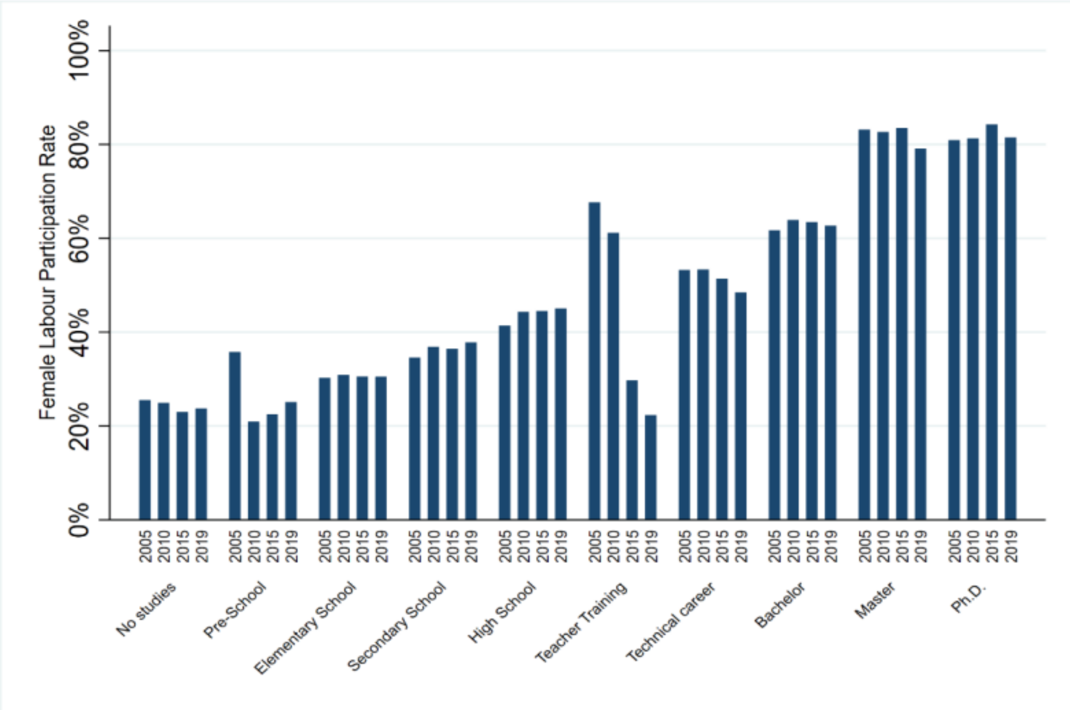
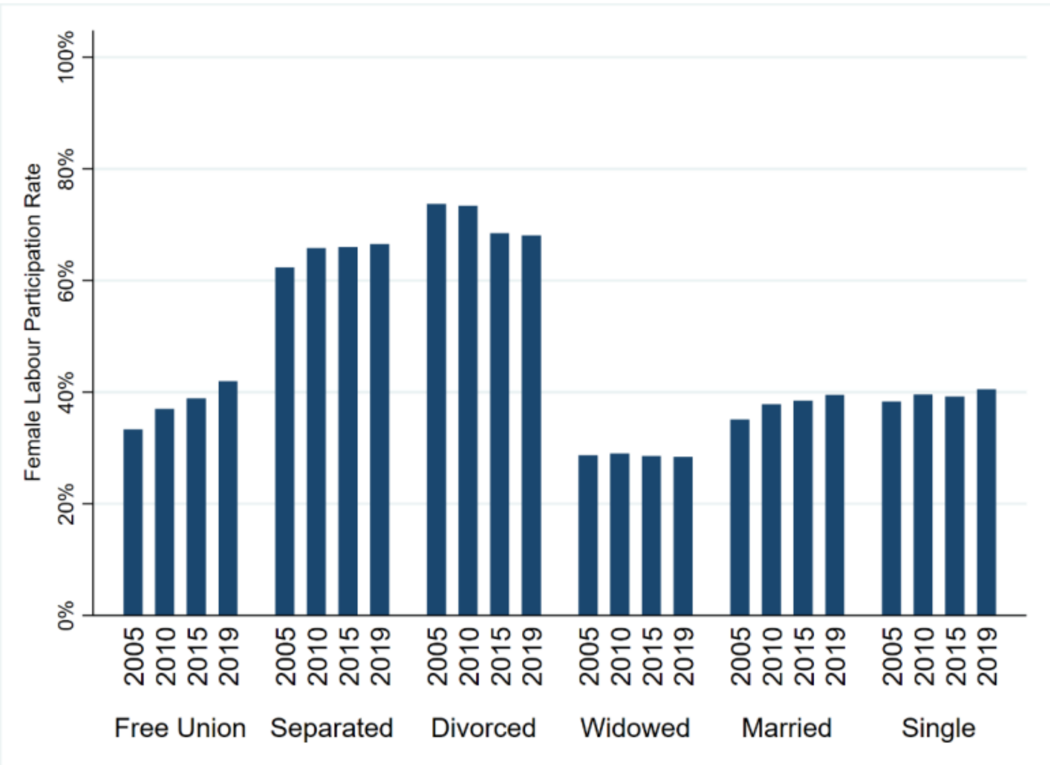


Figure 1.10 – Control variables.

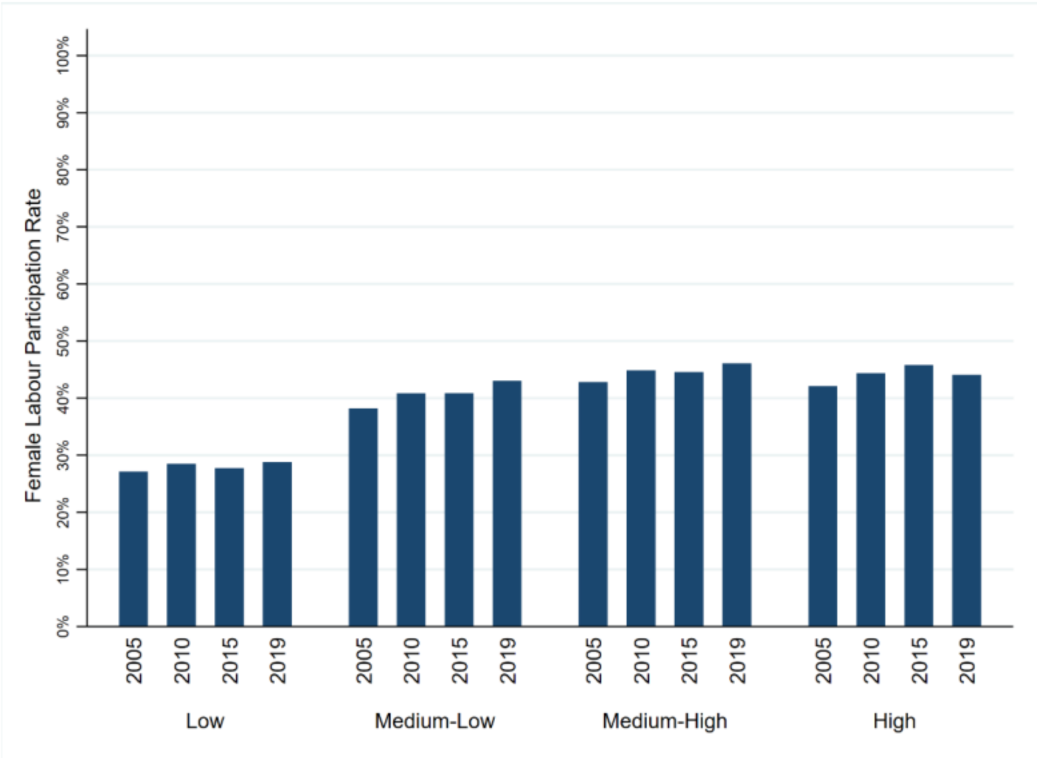
FLPRs depending on different education levels (2005 – 2019)



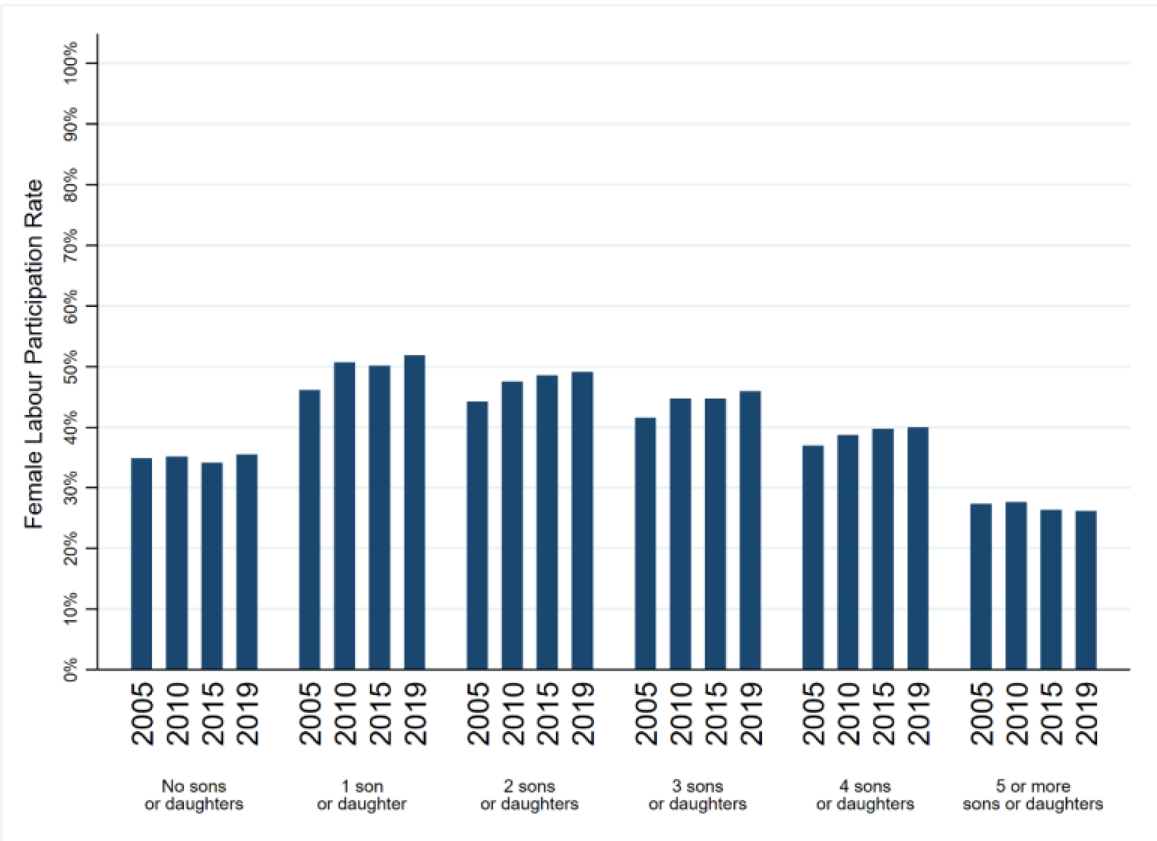
FLPRs depending on marital status (2005 – 2019)



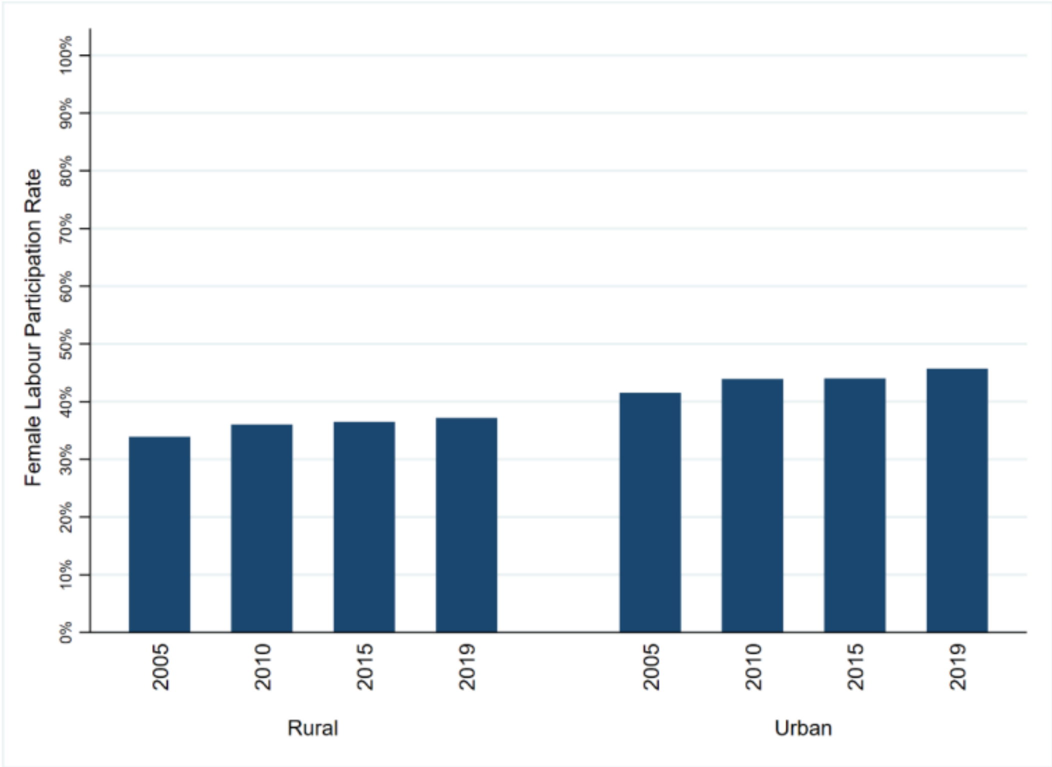
FLPRs depending on socioeconomic strata (2005 – 2019)



FLPRs depending on number of children (2005 – 2019)



FLPRs in rural and urban areas (2005 – 2019)



FLPRs depending on population size of the household location (2005 - 2019)

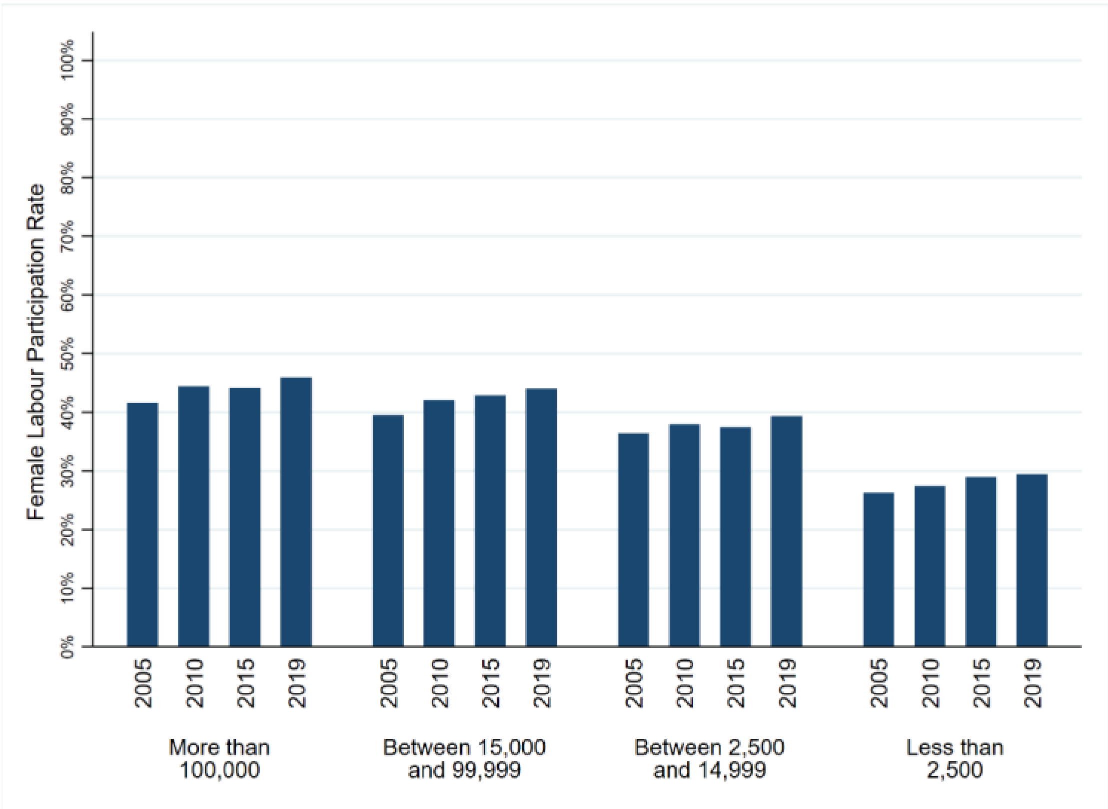


Table 1.4 - Average marginal probabilities of being economically active depending on sex and the % of jobs in agriculture, industry, and services at the municipal level.

	Women			Men		
% of jobs in	Agriculture	Industry	Services	Agriculture	Industry	Services
1	0.6105***	0.5484***	0.4256***	0.9336***	0.9467***	0.9622***
	(0.0041)	(0.0100)	(0.0191)	(0.0020)	(0.0032)	(0.0035)
2	0.6107***	0.5511***	0.4300***	0.9337***	0.9461***	0.9616***
	(0.0040)	(0.0094)	(0.0186)	(0.0020)	(0.0030)	(0.0034)
3	0.6108***	0.5537***	0.4344***	0.9339***	0.9456***	0.9611***
	(0.0038)	(0.0089)	(0.0181)	(0.0019)	(0.0029)	(0.0034)
4	0.6109***	0.5563***	0.4387***	0.9340***	0.9450***	0.9605***
	(0.0037)	(0.0084)	(0.0175)	(0.0019)	(0.0028)	(0.0033)
5	0.6110***	0.5588***	0.4430***	0.9341***	0.9445***	0.9599***
	(0.0036)	(0.0079)	(0.0170)	(0.0019)	(0.0027)	(0.0032)
6	0.6109***	0.5613***	0.4472***	0.9342***	0.9440***	0.9594***
	(0.0035)	(0.0074)	(0.0165)	(0.0019)	(0.0026)	(0.0032)
7	0.6108***	0.5637***	0.4514***	0.9344***	0.9435***	0.9588***
	(0.0034)	(0.0070)	(0.0160)	(0.0019)	(0.0025)	(0.0031)
8	0.6107***	0.5660***	0.4555***	0.9345***	0.9430***	0.9583***
	(0.0034)	(0.0066)	(0.0155)	(0.0019)	(0.0024)	(0.0031)
9	0.6104***	0.5683***	0.4596***	0.9347***	0.9425***	0.9577***
	(0.0034)	(0.0062)	(0.0151)	(0.0019)	(0.0023)	(0.0030)
10	0.6101***	0.5705***	0.4637***	0.9349***	0.9420***	0.9572***
	(0.0034)	(0.0058)	(0.0146)	(0.0019)	(0.0022)	(0.0030)
11	0.6098***	0.5727***	0.4677***	0.9350***	0.9416***	0.9566***
	(0.0034)	(0.0055)	(0.0141)	(0.0019)	(0.0022)	(0.0029)
12	0.6094***	0.5748***	0.4716***	0.9352***	0.9411***	0.9561***
	(0.0035)	(0.0051)	(0.0137)	(0.0019)	(0.0021)	(0.0029)
13	0.6089***	0.5768***	0.4755***	0.9354***	0.9407***	0.9556***
	(0.0036)	(0.0048)	(0.0132)	(0.0019)	(0.0020)	(0.0028)
14	0.6083***	0.5788***	0.4794***	0.9356***	0.9402***	0.9550***
	(0.0036)	(0.0046)	(0.0128)	(0.0019)	(0.0020)	(0.0028)
15	0.6077***	0.5807***	0.4832***	0.9358***	0.9398***	0.9545***
	(0.0037)	(0.0043)	(0.0124)	(0.0020)	(0.0019)	(0.0027)
16	0.6070***	0.5826***	0.4870***	0.9360***	0.9394***	0.9539***
	(0.0038)	(0.0041)	(0.0120)	(0.0020)	(0.0019)	(0.0027)
17	0.6063***	0.5844***	0.4907***	0.9362***	0.9390***	0.9534***
	(0.0040)	(0.0039)	(0.0116)	(0.0020)	(0.0019)	(0.0026)

18	0.6055***	0.5862***	0.4943***	0.9364***	0.9387***	0.9529***
	(0.0041)	(0.0038)	(0.0112)	(0.0020)	(0.0019)	(0.0026)
19	0.6046***	0.5879***	0.4979***	0.9367***	0.9383***	0.9524***
	(0.0042)	(0.0037)	(0.0109)	(0.0020)	(0.0019)	(0.0026)
20	0.6037***	0.5895***	0.5015***	0.9369***	0.9380***	0.9518***
	(0.0043)	(0.0035)	(0.0105)	(0.0021)	(0.0018)	(0.0025)
21	0.6027***	0.5911***	0.5050***	0.9371***	0.9376***	0.9513***
	(0.0044)	(0.0035)	(0.0102)	(0.0021)	(0.0018)	(0.0025)
22	0.6016***	0.5926***	0.5084***	0.9374***	0.9373***	0.9508***
	(0.0046)	(0.0034)	(0.0098)	(0.0021)	(0.0018)	(0.0025)
23	0.6005***	0.5941***	0.5118***	0.9376***	0.9370***	0.9503***
	(0.0047)	(0.0034)	(0.0095)	(0.0021)	(0.0018)	(0.0024)
24	0.5993***	0.5955***	0.5152***	0.9379***	0.9367***	0.9498***
	(0.0048)	(0.0033)	(0.0092)	(0.0022)	(0.0019)	(0.0024)
25	0.5980***	0.5969***	0.5185***	0.9382***	0.9364***	0.9493***
	(0.0050)	(0.0033)	(0.0089)	(0.0022)	(0.0019)	(0.0024)
26	0.5967***	0.5982***	0.5217***	0.9384***	0.9362***	0.9488***
	(0.0051)	(0.0033)	(0.0086)	(0.0022)	(0.0019)	(0.0023)
27	0.5953***	0.5994***	0.5249***	0.9387***	0.9359***	0.9483***
	(0.0052)	(0.0033)	(0.0083)	(0.0022)	(0.0019)	(0.0023)
28	0.5938***	0.6006***	0.5281***	0.9390***	0.9357***	0.9478***
	(0.0054)	(0.0034)	(0.0081)	(0.0023)	(0.0019)	(0.0023)
29	0.5923***	0.6017***	0.5312***	0.9393***	0.9355***	0.9473***
	(0.0055)	(0.0034)	(0.0078)	(0.0023)	(0.0019)	(0.0023)
30	0.5907***	0.6028***	0.5342***	0.9396***	0.9353***	0.9468***
	(0.0056)	(0.0034)	(0.0076)	(0.0023)	(0.0019)	(0.0023)
31	0.5891***	0.6038***	0.5372***	0.9399***	0.9351***	0.9464***
	(0.0057)	(0.0035)	(0.0074)	(0.0023)	(0.0020)	(0.0023)
32	0.5873***	0.6048***	0.5401***	0.9402***	0.9350***	0.9459***
	(0.0058)	(0.0035)	(0.0071)	(0.0023)	(0.0020)	(0.0022)
33	0.5855***	0.6057***	0.5430***	0.9405***	0.9348***	0.9454***
	(0.0060)	(0.0036)	(0.0069)	(0.0023)	(0.0020)	(0.0022)
34	0.5837***	0.6065***	0.5458***	0.9408***	0.9347***	0.9450***
	(0.0061)	(0.0037)	(0.0067)	(0.0024)	(0.0020)	(0.0022)
35	0.5818***	0.6073***	0.5486***	0.9412***	0.9346***	0.9445***
	(0.0062)	(0.0038)	(0.0065)	(0.0024)	(0.0020)	(0.0022)
36	0.5798***	0.6080***	0.5513***	0.9415***	0.9345***	0.9441***
	(0.0063)	(0.0038)	(0.0064)	(0.0024)	(0.0021)	(0.0022)

37	0.5777***	0.6087***	0.5540***	0.9418***	0.9344***	0.9437***
	(0.0064)	(0.0039)	(0.0062)	(0.0024)	(0.0021)	(0.0022)
38	0.5756***	0.6093***	0.5566***	0.9422***	0.9343***	0.9432***
	(0.0065)	(0.0040)	(0.0060)	(0.0024)	(0.0021)	(0.0022)
39	0.5734***	0.6099***	0.5591***	0.9425***	0.9343***	0.9428***
	(0.0066)	(0.0042)	(0.0059)	(0.0024)	(0.0021)	(0.0022)
40	0.5711***	0.6104***	0.5616***	0.9429***	0.9342***	0.9424***
	(0.0067)	(0.0043)	(0.0057)	(0.0024)	(0.0022)	(0.0022)
41	0.5688***	0.6109***	0.5641***	0.9432***	0.9342***	0.9420***
	(0.0068)	(0.0044)	(0.0056)	(0.0024)	(0.0022)	(0.0022)
42	0.5664***	0.6113***	0.5665***	0.9436***	0.9342***	0.9416***
	(0.0069)	(0.0046)	(0.0055)	(0.0024)	(0.0022)	(0.0022)
43	0.5639***	0.6116***	0.5688***	0.9440***	0.9342***	0.9412***
	(0.0070)	(0.0048)	(0.0053)	(0.0024)	(0.0023)	(0.0022)
44	0.5614***	0.6119***	0.5711***	0.9443***	0.9342***	0.9408***
	(0.0071)	(0.0050)	(0.0052)	(0.0024)	(0.0023)	(0.0022)
45	0.5588***	0.6122***	0.5734***	0.9447***	0.9343***	0.9405***
	(0.0072)	(0.0052)	(0.0051)	(0.0024)	(0.0024)	(0.0021)
46	0.5561***	0.6124***	0.5756***	0.9451***	0.9343***	0.9401***
	(0.0073)	(0.0054)	(0.0050)	(0.0024)	(0.0024)	(0.0021)
47	0.5534***	0.6125***	0.5777***	0.9455***	0.9344***	0.9397***
	(0.0074)	(0.0056)	(0.0049)	(0.0024)	(0.0025)	(0.0021)
48	0.5506***	0.6126***	0.5798***	0.9459***	0.9345***	0.9394***
	(0.0075)	(0.0059)	(0.0048)	(0.0024)	(0.0026)	(0.0021)
49	0.5477***	0.6126***	0.5818***	0.9463***	0.9346***	0.9390***
	(0.0076)	(0.0062)	(0.0047)	(0.0025)	(0.0026)	(0.0021)
50	0.5447***	0.6125***	0.5838***	0.9467***	0.9348***	0.9387***
	(0.0077)	(0.0065)	(0.0046)	(0.0025)	(0.0027)	(0.0021)
51	0.5417***	0.6124***	0.5857***	0.9471***	0.9349***	0.9384***
	(0.0078)	(0.0068)	(0.0045)	(0.0025)	(0.0028)	(0.0021)
52	0.5386***	0.6123***	0.5876***	0.9475***	0.9351***	0.9380***
	(0.0078)	(0.0072)	(0.0044)	(0.0025)	(0.0029)	(0.0021)
53	0.5355***	0.6121***	0.5894***	0.9479***	0.9352***	0.9377***
	(0.0079)	(0.0075)	(0.0043)	(0.0025)	(0.0030)	(0.0021)
54	0.5323***	0.6118***	0.5912***	0.9483***	0.9354***	0.9374***
	(0.0080)	(0.0079)	(0.0042)	(0.0025)	(0.0031)	(0.0021)
55	0.5290***	0.6115***	0.5929***	0.9487***	0.9356***	0.9371***
	(0.0081)	(0.0083)	(0.0042)	(0.0025)	(0.0032)	(0.0021)

56	0.5256***	0.6112***	0.5946***	0.9491***	0.9358***	0.9369***
	(0.0082)	(0.0088)	(0.0041)	(0.0025)	(0.0033)	(0.0020)
57	0.5222***	0.6107***	0.5962***	0.9496***	0.9361***	0.9366***
	(0.0084)	(0.0092)	(0.0040)	(0.0025)	(0.0035)	(0.0020)
58	0.5187***	0.6103***	0.5977***	0.9500***	0.9363***	0.9363***
	(0.0085)	(0.0097)	(0.0039)	(0.0025)	(0.0036)	(0.0020)
59	0.5151***	0.6097***	0.5993***	0.9504***	0.9366***	0.9361***
	(0.0086)	(0.0102)	(0.0039)	(0.0025)	(0.0037)	(0.0020)
60	0.5115***	0.6091***	0.6007***	0.9508***	0.9369***	0.9358***
	(0.0087)	(0.0107)	(0.0038)	(0.0025)	(0.0039)	(0.0020)
61	0.5078***	0.6085***	0.6021***	0.9513***	0.9372***	0.9356***
	(0.0088)	(0.0113)	(0.0037)	(0.0025)	(0.0040)	(0.0020)
62	0.5041***	0.6078***	0.6035***	0.9517***	0.9375***	0.9354***
	(0.0089)	(0.0118)	(0.0037)	(0.0025)	(0.0042)	(0.0020)
63	0.5002***	0.6070***	0.6048***	0.9522***	0.9378***	0.9351***
	(0.0091)	(0.0124)	(0.0036)	(0.0025)	(0.0044)	(0.0019)
64	0.4963***	0.6062***	0.6061***	0.9526***	0.9381***	0.9349***
	(0.0092)	(0.0130)	(0.0036)	(0.0025)	(0.0045)	(0.0019)
65	0.4924***	0.6054***	0.6073***	0.9531***	0.9385***	0.9347***
	(0.0093)	(0.0136)	(0.0036)	(0.0025)	(0.0047)	(0.0019)
66	0.4883***	0.6044***	0.6084***	0.9535***	0.9389***	0.9346***
	(0.0095)	(0.0143)	(0.0035)	(0.0026)	(0.0049)	(0.0019)
67	0.4842***	0.6035***	0.6096***	0.9540***	0.9393***	0.9344***
	(0.0096)	(0.0150)	(0.0035)	(0.0026)	(0.0051)	(0.0019)
68	0.4801***	0.6024***	0.6106***	0.9544***	0.9396***	0.9342***
	(0.0098)	(0.0157)	(0.0035)	(0.0026)	(0.0053)	(0.0019)
69	0.4759***	0.6013***	0.6116***	0.9549***	0.9401***	0.9341***
	(0.0100)	(0.0164)	(0.0036)	(0.0026)	(0.0055)	(0.0019)
70	0.4716***	0.6002***	0.6126***	0.9553***	0.9405***	0.9339***
	(0.0101)	(0.0171)	(0.0036)	(0.0026)	(0.0057)	(0.0019)
71	0.4672***	0.5990***	0.6135***	0.9558***	0.9409***	0.9338***
	(0.0103)	(0.0179)	(0.0036)	(0.0027)	(0.0059)	(0.0019)
72	0.4628***	0.5977***	0.6144***	0.9562***	0.9414***	0.9336***
	(0.0105)	(0.0187)	(0.0037)	(0.0027)	(0.0061)	(0.0019)
73	0.4583***	0.5964***	0.6152***	0.9567***	0.9418***	0.9335***
	(0.0107)	(0.0195)	(0.0038)	(0.0027)	(0.0063)	(0.0019)
74	0.4538***	0.5951***	0.6159***	0.9572***	0.9423***	0.9334***
	(0.0109)	(0.0203)	(0.0039)	(0.0027)	(0.0065)	(0.0019)

75	0.4492***	0.5936***	0.6166***	0.9576***	0.9428***	0.9333***
	(0.0111)	(0.0211)	(0.0040)	(0.0028)	(0.0067)	(0.0020)
76	0.4445***	0.5921***	0.6173***	0.9581***	0.9433***	0.9333***
	(0.0113)	(0.0220)	(0.0042)	(0.0028)	(0.0069)	(0.0020)
77	0.4398***	0.5906***	0.6179***	0.9586***	0.9438***	0.9332***
	(0.0116)	(0.0229)	(0.0043)	(0.0028)	(0.0072)	(0.0020)
78	0.4351***	0.5890***	0.6185***	0.9590***	0.9443***	0.9331***
	(0.0118)	(0.0238)	(0.0045)	(0.0029)	(0.0074)	(0.0021)
79	0.4302***	0.5873***	0.6190***	0.9595***	0.9448***	0.9331***
	(0.0120)	(0.0248)	(0.0047)	(0.0029)	(0.0076)	(0.0021)
80	0.4254***	0.5856***	0.6195***	0.9600***	0.9453***	0.9330***
	(0.0123)	(0.0257)	(0.0050)	(0.0030)	(0.0078)	(0.0022)
81	0.4204***	0.5838***	0.6199***	0.9605***	0.9459***	0.9330***
	(0.0125)	(0.0267)	(0.0052)	(0.0030)	(0.0081)	(0.0022)
82	0.4154***	0.5820***	0.6203***	0.9609***	0.9464***	0.9330***
	(0.0128)	(0.0277)	(0.0054)	(0.0030)	(0.0083)	(0.0023)
83	0.4104***	0.5801***	0.6206***	0.9614***	0.9470***	0.9330***
	(0.0130)	(0.0287)	(0.0057)	(0.0031)	(0.0085)	(0.0023)
84	0.4053***	0.5782***	0.6208***	0.9619***	0.9476***	0.9330***
	(0.0133)	(0.0298)	(0.0060)	(0.0031)	(0.0087)	(0.0024)
85	0.4002***	0.5762***	0.6211***	0.9623***	0.9482***	0.9330***
	(0.0136)	(0.0308)	(0.0063)	(0.0032)	(0.0090)	(0.0025)
86	0.3950***	0.5741***	0.6212***	0.9628***	0.9487***	0.9330***
	(0.0139)	(0.0319)	(0.0066)	(0.0032)	(0.0092)	(0.0026)
87	0.3898***	0.5720***	0.6214***	0.9633***	0.9493***	0.9330***
	(0.0141)	(0.0331)	(0.0069)	(0.0033)	(0.0094)	(0.0027)
88	0.3845***	0.5698***	0.6214***	0.9638***	0.9500***	0.9331***
	(0.0144)	(0.0342)	(0.0073)	(0.0033)	(0.0096)	(0.0028)
89	0.3792***	0.5676***	0.6215***	0.9642***	0.9506***	0.9331***
	(0.0147)	(0.0353)	(0.0076)	(0.0034)	(0.0098)	(0.0029)
90	0.3738***	0.5653***	0.6214***	0.9647***	0.9512***	0.9332***
	(0.0150)	(0.0365)	(0.0080)	(0.0034)	(0.0100)	(0.0030)
91	0.3684***	0.5629***	0.6214***	0.9652***	0.9518***	0.9333***
	(0.0153)	(0.0377)	(0.0084)	(0.0035)	(0.0103)	(0.0031)
92	0.3630***	0.5605***	0.6213***	0.9656***	0.9524***	0.9334***
	(0.0156)	(0.0390)	(0.0088)	(0.0035)	(0.0105)	(0.0033)
93	0.3575***	0.5580***	0.6211***	0.9661***	0.9531***	0.9335***
	(0.0159)	(0.0402)	(0.0092)	(0.0036)	(0.0107)	(0.0034)

94	0.3520***	0.5555***	0.6209***	0.9666***	0.9537***	0.9336***
	(0.0162)	(0.0415)	(0.0096)	(0.0036)	(0.0109)	(0.0035)
95	0.3465***	0.5529***	0.6206***	0.9671***	0.9544***	0.9337***
	(0.0165)	(0.0427)	(0.0101)	(0.0037)	(0.0111)	(0.0036)
96	0.3409***	0.5502***	0.6203***	0.9675***	0.9550***	0.9338***
	(0.0168)	(0.0441)	(0.0105)	(0.0037)	(0.0113)	(0.0038)
97	0.3354***	0.5475***	0.6199***	0.9680***	0.9557***	0.9339***
	(0.0172)	(0.0454)	(0.0110)	(0.0038)	(0.0115)	(0.0039)
98	0.3297***	0.5448***	0.6195***	0.9684***	0.9563***	0.9341***
	(0.0175)	(0.0467)	(0.0115)	(0.0038)	(0.0117)	(0.0041)
99	0.3241***	0.5419***	0.6191***	0.9689***	0.9570***	0.9343***
	(0.0178)	(0.0481)	(0.0120)	(0.0039)	(0.0119)	(0.0042)
100	0.3185***	0.5390***	0.6185***	0.9694***	0.9577***	0.9344***
	(0.0181)	(0.0495)	(0.0125)	(0.0039)	(0.0120)	(0.0044)
Observations	609,070	609,070	609,070	1,158,454	1,158,454	1,158,454

Standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Note: the average marginal probabilities were obtained after considering the means of the other covariates estimated from the regression analysis.