

# Understanding the Gender Wage Gap in Mexico, 1880-1980

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## 1. Motivation, Research Questions and Contributions

Economic disparities between men and women are persistent features of labour markets that can be traced back to the early stages of economic development. However, our knowledge about the gender wage gap's evolution over the twentieth century is limited to few developed countries' economies (Goldin, 1990, 2014; Blau, Ferber and Winkler, 2006; Olivetti and Petrongolo, 2016). For Latin American countries, including Mexico, evidence on long-term trends in the gender wage gap (GWG) is scant or inexistent, because information on wages or labour earnings disaggregated by sex are very difficult to find before 1970 (Camou, 2017, p.25).

This study offers a first attempt to address this gap in the literature by answering three questions for the case of Mexico. First, what were the trends and levels in the GWG from the late nineteenth century to the late twentieth century for different occupations in paid work? Second, what are the potential explanations behind the observed trends and levels? Finally, how do these trends compare with those in advanced economies? The contribution of this study is twofold. First, I provide a digitization of more than 50,000 images from three different historical archives to assemble the same number of novel datasets. My second and most important contribution of this study is to offer evidence of the long-term evolution of the GWG in Mexico from 1880 to 1980.

## 2. Data and Methodology

### 2.1. Data Sources<sup>1</sup>

#### a) Teachers in Mexico City

Most of the existing evidence on the GWG in Mexico focuses on industrial workers. Teachers have received little attention, although women increasingly entered the teaching profession from the end of nineteenth century

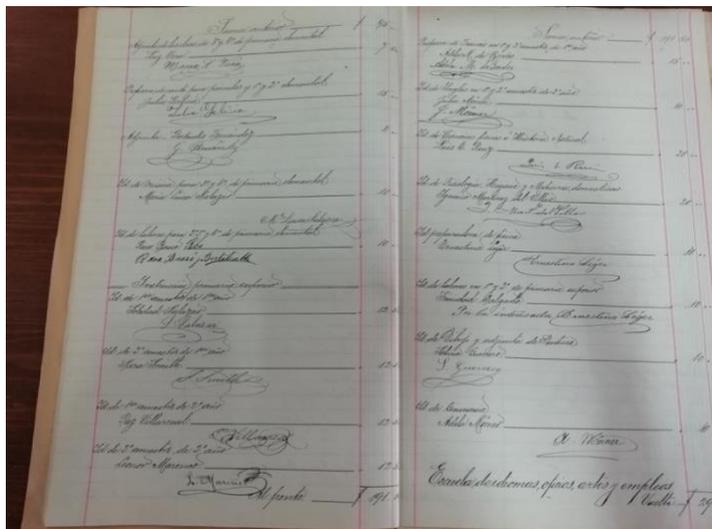
My first wage series tracks the evolution of wages of the teacher's wages as documented in the monthly payroll at Vizcaínas School in Mexico City from 1880 to 1980. I digitized monthly payment records for every year.

This source reports the teacher's name, the monthly wage, the class taught, and the level at which the class was taught (see Figure 1). The annual wage used for the calculations is the annual gross wage (includes any benefits such as food rations) which was obtained by multiplying the monthly wages in January of each year by twelve. Finally, the sex was inferred using the teacher's name.

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<sup>1</sup> All the sources presented here were digitized in Mexico City during 2019 to 2020. The transcription was done manually twice to minimize errors.

**Figure 1.** Example of Vizcaínas´ Payroll (1901,1910)



Del frente-----	517 50
Adjunta de Dibujo Guadalupe Márquez <i>G. Márquez</i>	7 50
Profesora en primer año de Piano Adela Bustillos <i>Adela Bustillos</i>	15
Id. en segundo año de Piano Emilia M. de Ghulia <i>E. M. de Ghulia</i>	15
Id. en Selfeo Julio M. Morales <i>J. Morales</i>	40
Id. en Bordado Vicenta Coroná <i>Vicenta Coroná</i>	12 50
Id. en labores de Ip. y So. año superior Mercedes Santos <i>M. Santos</i>	10
Id. en Modas y Confecciones Ignacia Burgos <i>I. Burgos</i>	10
Adjunta Lucrovia Laredo <i>L. Laredo</i>	7 50
Profesora en Encajes Juana Fernández Durán <i>Juana Fernández Durán</i>	20
A la vuelta-----	655

#### b) Unskilled Workers at Hospitals and Schools

The second data source comes from the national government’s Federal Expenditures Budgets from 1880 to 1980, which detail daily and annual wages. I digitized these records directly from the Ministry of Finance’s Historical Archives. In terms of the format, the first column records the number of workers in each occupation, followed by the daily wage and the total amount of income implied in the annual budget representing 365 days of work (see Figure 2).

Although historians have argued that federal budgets do not provide gender-disaggregated data (Porter 2018, p.32) I show that it is possible to unpack gender differences by analysing of these historical records. I identified workers’ sex through the gender-differentiated indefinite articles “un” (a, masculine) and “una” (a, feminine), which in Spanish refers to men and woman respectively.

Following (Humphries and Weisdorf, 2015) I compare two unskilled occupations: laundering, a role performed exclusively by women, against janitor work, reserved only for men. This selection in part demonstrates the high levels of occupational segregation, although these two occupations performed cleaning activities in public hospitals and school facilities. The janitors’ duties are related to keeping establishments clean and orderly (Guerrero, 2009) while launderers mostly washed clothes but also performed other cleaning tasks, requiring strength as the main input (Sarasúa, 2003).

Figure 2. Example of the Federal Budget Expenditures

The image shows a page from a budget document titled 'Presupuesto de Egresos'. It contains a detailed table with multiple columns, including 'Rubro', 'Subrubro', 'Descripción', and 'Monto'. The table is organized into sections, such as 'SECCION XXIII' and 'SECCION XXIV'. The text is in Spanish and lists various government expenditures.

This image shows another page from the same budget document, continuing the 'Presupuesto de Egresos' section. It features a similar table structure to the first image, with columns for budget categories and amounts. The text is in Spanish and details various government spending items.

c) Industrial Data (1940-1980)

The third data source Survey of Occupations and Industrial Salaries (ETSI). I digitized it directly from the *Banco de México* Library. The survey was conducted yearly by the Ministry of Industry and Commerce from 1938 to 1980. This survey is the best source available for this period.

The ETSI is divided into two waves, first 1938-1963 and second 1964-1980. The first wave covers only six industrial regions (Distrito Federal, Guadalajara, Monterrey, Orizaba, Puebla, and Torreon) and 33 industrial sectors. Since 1964, the survey added six additional regions (Chihuahua, Leon, Mexicali, Estado de Mexico, San Luis Potosi, and Cajeme), and 22 industrial activities. This source tabulates distributions of average weekly time worked, weekly wage and hourly wage by occupation. It also includes information on workers' sex. To maintain comparability over time, I use the four cities that appear in both waves (Mexico City, Guadalajara, Monterrey and Puebla), which accounted for 65% of the national labourer workforce over the period in 19 sectors.

Figure 3. Example of Industrial Survey (1943,1980)

The image shows a page from the Industrial Survey data for 1943 and 1980. The table is titled 'ACTIVIDADES POR DISTRICTO INDUSTRIAL Y POR OCUPACION (F)'. It has columns for 'Sector Industrial', 'Ocupación', 'Salario medio pagado en la semana', and 'Salario nominal'. The data is presented in a grid format, comparing different industrial sectors and occupations across the two time periods.

This image shows a detailed page from the Industrial Survey data for 1943 and 1980, focusing on the 'FABRICACION DE CALZADO Y PANTUFLOS DE CUALQUIER MATERIAL, EXCEPTO LOS DE MUELE Y PLASTICO' sector. The table includes columns for 'Sexo', 'Tiempo medio trabajado', 'Salario medio pagado', and 'Salario nominal'. It provides a breakdown of data for different occupations within this specific industrial sector.

## 2.2. Computing the Gender Gap

I compute three gender gap measures:

First, I calculate the GWG in Mexico City for the first two data sources (teachers and unskilled cleaning workers, 1880-1980):

$$\text{Gender wage gap}_{it} = \frac{\text{Men's gross average annual wage}}{\text{Women's gross average annual wage}} \quad (1)$$

where  $i$  denotes the occupation analysed and  $t$  is the year.

Second, for the occupation-industry data from 1940-1980, I calculate the gap for every single occupation performed by women and men across every manufacturing sector across the four main industrial cities. I then aggregate the GWGs for a given year at different levels, which is the unweighted average of all the gender gaps in that year:

$$\text{Female – Male Occupations Gender wage gap}_{ijct} = \frac{\text{Men's gross hourly wage}_{ijct}}{\text{Women's gross hourly wage}_{ijct}} \quad (2)$$

where  $i$  is denotes the occupation analysed,  $j$  is the manufacturing sector in city  $c$ , and  $t$  is the year.

Lastly, I calculate the GWG at the manufacturing sector level, to capture the entire occupational distribution, including the occupations performed by men only. I then aggregate the GWGs for a given year, which is the unweighted average of all the gender gaps at manufacturing level in that year:

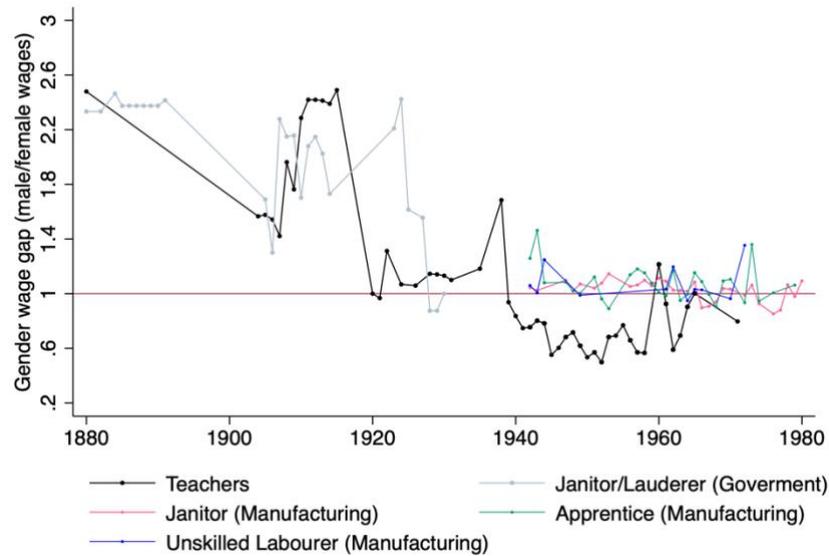
$$\text{All – Occupations Gender wage gap}_{cjt} = \frac{\text{Men's gross hourly wage}_{cjt}}{\text{Women's gross hourly wage}_{cjt}} \quad (3)$$

where  $j$  is the manufacturing sector in city  $c$ , and  $t$  is the year.

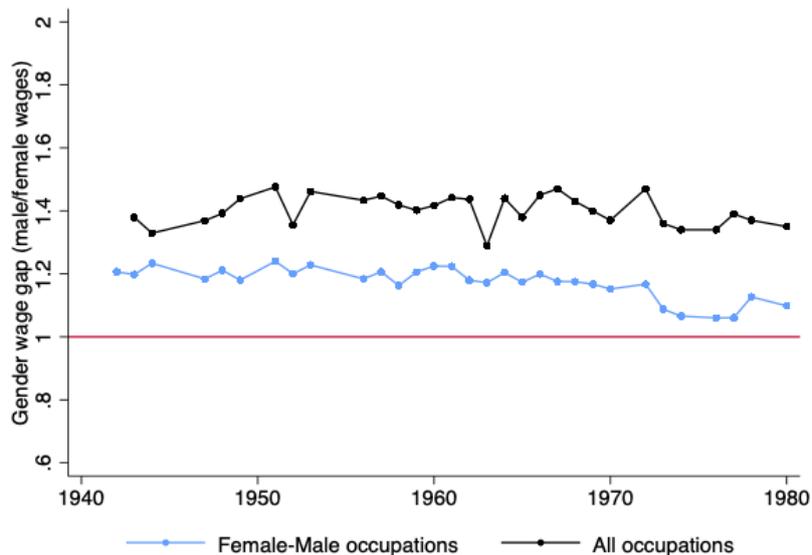
## 3. Results

Figure 4 gives an overview of the evolution of the GWG in occupations in Mexico City. The black line shows the GWG for teachers, the grey line for unskilled workers in the public sector, and the red line for the same unskilled occupation (janitor) in the manufacturing sector in Mexico City. Finally, the blue and green lines show the GWG for an unskilled labourer and an apprentice respectively, in the manufacturing sector in Mexico City from 1940 to 1980. The results show substantial gender inequality at the turn of nineteenth century followed by a decreasing trend until 1908, prior to Mexican the Revolution (1910-1920). The gap widened between 1908 and 1915, when it reached the levels observed in the 1880s. The gap then declines sharply in the 1920s to remain constant and at low levels since then. The constant level of the GWG is also confirmed by the data from the manufacturing sector from 1940 to 1980, as shown in Figure 5.

**Figure 4.** Gender Wage Gap in Occupations in Mexico City, 1880-1980



**Figure 5.** Gender Wage Gap in Manufacturing Sector (All regions) 1940-1980



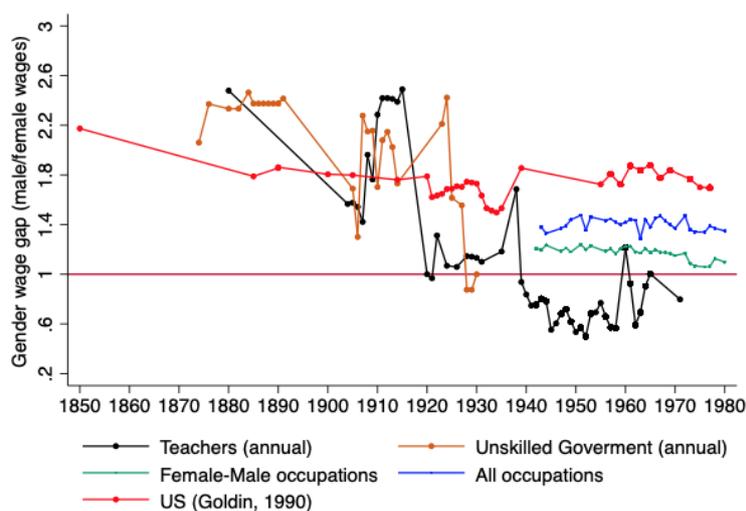
The GWG levels in the late nineteenth century, as represented in Figure 4, are consistent with the upper and lower GWG bounds from other historical studies that estimate the gap around 1900 in the Mexican countryside (Rosenzweig, 1965; Vallens, 1978; Fowler-Salamini and Vaughan, 1994). Porter (2003) calculates the GWG in 1929 at industry level for 32 industries from official tabulations. In her estimations, in 10 of the 32 industries analysed the GWG ranges from 1.0 to 1.2; this supports the evidence that GWG could be, in fact, very low in the 1920s at occupational level. In the rest of the 22 industries the gap ranges from 1.3 to 2.2. This needs to be interpreted with caution since it is difficult to know the hourly wage. My data can only offer evidence of hourly wage rates since 1940.

In terms of international comparisons, Mexican GWG improved 1880 to 1940 (even if improvements were interrupted during the Mexican Revolution) and stagnated from 1940 to 1980 as in the US (see Figure 6). This stagnation did not happen in Sweden where the improvements continued in the twentieth century. Mexico's GWG levels from 1940 to 1980 suggest they were lower than the ones observed in both US and Sweden (Svensson, 2003). This result might be explained by the lower occupational segregation (see Figure 5) by sex in Mexico from 1960 to 1980 relative to US or UK (Jacobs and Lim, 1992).

At occupational level, Wright (1889) estimates the GWG for composers in Boston between 1.2 to 1.4 in 1880. The GWG for composers in Sweden circa 1900 was 1.3 (Burnette and Stanfors,

2019). Evidence for teachers in Edinburgh in primary schools puts the GWG between 1.1. to 1.25 in 1890 (Webb, 1891). My results challenge the stylized fact that GWG was low in Latin America compared with advanced economies before 1950 and it reversed after that (Frankema, 2012).

**Figure 6.** GWG Trends in Mexico and US (1880-1980)



#### 4. Discussion

Wage structure movements over time can explain the movements in GWG trends (Blau and Kahn, 2003). Arroyo-Abad and Astorga-Junquera, (2017) estimate long-term wage inequality trends in Mexico. The GWG trends presented here coincide with the long-term trends in wage inequality from 1880 to 1910 which peaked around 1880 and declined until 1910. This result was reinforced by industrialization in this period decreasing the premium for ‘male’ strength and therefore narrowing the GWG. From 1950 to 1980 wage inequality fell consistent with the low GWG levels observed from 1940 to 1980.

The improvement in the GWG seen over the twentieth century was only interrupted for a short period during the Mexican Revolution. We need more research to understand the GWG in this period. It is worth noting that some similar erosion in the GWC was found in US during World War II (Aldrich, 1989). The rapid decline in the GWG in the 1920s can be related to the improvements in women’s working conditions such as the minimum wage mandated by the Constitution of 1917. After the Revolution women started to mobilize, claiming citizenship as a reward for their active participation in the armed conflict. While women only got the vote in 1953, divorce was legally recognized in 1914 and obstacles to work for married women (namely marriage bars) started to disappear at the end of 1920s decade (Olcott, 2006).

The results of a relatively low and constant GWG within and across occupations from 1940 to 1980 seems paradoxical. It clashes with the secular increase in the female labour participation force (FLPF) observed in census data since 1930. Nevertheless, census data often fails to measure FLPF accurately (Humphries and Sarasúa, 2012). Recent evidence indicates that FLPF did not increase until 1970 (Gómez-Galvarriato and Madrigal, 2017). If this is the case, then the paradox does not really exist. This would suggest that most of the improvement in the GWG since 1920s did not arise from the supply side and the explanation should be found in the demand side of the labour market which overall favoured women over men.

At the same time, the improvement in the GWG observed since the 1920s can be related to shifts in industrial and occupational compositions, namely the decline of female employment in the manufacturing sector and the rise of women’s participation in the clerical sector (Goldin, 1990) where women have an advantage over men. The rise in women’s participation in the Mexican clerical sector has been documented by (Porter, 2018). This gendered sectoral shift from industry into the clerical occupations could be the result of a composition effect of the labour force, where more educated

women left the manufacturing sector, leaving the most unskilled woman in industrial work, thereby impeding the improvement in the gap observed in previous decades.

## 5. Conclusion

Drawing on a variety of 50,000 newly digitized records I argue that the GWG in Mexico improved over twentieth century as a result of the interaction between labour market forces, social norms and legal changes. Industrialization that substituted manual work for mechanisation equalized the productive attributes of women relative to men, narrowing the GWG only interrupted by Mexican Revolution. I also show that 1920s is the period where we can locate major improvements in the GWG. The long term GWG trends for the unskilled suggest some improvement in the unexplained part of the GWG observed over time, potentially related to wage discrimination. Thus, most of the gap that we observed previous to 1920s could be attributed substantially to non-observed productive attributes and occupational segregation by sex. In addition, the results challenge the stylized fact that GWG was low in Latin America countries compared with advanced economies before 1950 and it reversed after that.

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