

Gender Wage Gap in STEM and Non-STEM Professionals in Mexico, 2005-2025

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Abstract

This research examines the evolution and underlying mechanisms of the gender wage gap among Mexican professionals, comparing STEM and Non-STEM university graduates over a 21-year period (2005-2025). Data from the National Survey of Occupation and Employment (ENOE) were analyzed using the Oaxaca-Blinder decomposition technique, corrected for self-selection arising from the employment decision. The findings reveal that the gender wage gap is larger and to the disadvantage of women in the STEM sector, while in the Non-STEM sector, the difference remains slightly in favor of women. The evidence strongly suggests that, in scientific and technological fields, wage inequality does not originate in observable human capital differences, but rather in a structural differential valuation of women's skills and competencies. This differential valuation likely reflects mechanisms of implicit discrimination operating in highly specialized occupations.

Introduction

Gender wage inequality is a persistent phenomenon in Mexico with records dating back several decades (Brown et al., 1999; Pagán & Ullibarri, 2000; Popli, 2013; Arceo-Gómez &

Campos-Vázquez, 2014; Rodríguez-Pérez & Castro-Lugo, 2014). In 1979, the Mexican government ratified the Convention on the Elimination of All Forms of Discrimination Against Women. Article 11, paragraph "d" of said convention commits states to ensure equal pay between men and women, ensuring the same right to equitable remuneration and treatment for work of equal value. Nearly five decades after the signing of the convention, in Mexico, some groups of women continue to receive lower wages than their male counterparts in similar positions, although the wage gap has narrowed over time (Rodríguez et al., 2017; Rodriguez, 2018; Cuellar & Moreno, 2022).

Higher education drives professional development because it provides individuals with the necessary skills and training to access higher-paying positions with greater responsibility. The expansion of educational offerings and the requirements of the Mexican labor market have significantly increased the number of university graduates. This increase is particularly noticeable among women. In fact, data from the National Association of Universities and Higher Education Institutions (ANUIES) show that in the 2023-2024 school cycle, there were 2.64 million women enrolled in undergraduate programs in Mexico, compared to a lower number of men (ANUIES, 2024).

If women predominantly graduate from careers that traditionally offer low salaries while men select careers with higher remunerations: the type of career selected could be a factor that widens the gender wage gap. Specialized areas in Science, Technology, Engineering, and Mathematics (STEM) are a priority for the development and growth of countries and traditionally offer higher incomes. In Mexico, 20% of female university students choose careers in this field, while almost half of men enroll in these areas. The analysis of the wage differences of Mexican professionals is relevant given the considerable investment of time and resources involved in obtaining a higher education academic degree. In addition, investigating the gender wage gap based on the type of graduation career is fundamental to identify if the income differential persists in high-demand and highly remunerated fields such as STEM areas.

The objective of this research is to quantify and analyze the evolution of the gender wage gap among Mexican professionals over the last two decades. To this end, the study population is separated into two groups according to their graduation major: 1. STEM Group: composed of professionals with training in Science, Technology, Engineering, and

Mathematics, 2. Non-STEM Group: composed of the rest of the university graduates. The analysis is based on microdata from the National Survey of Occupation and Employment (ENOE), covering the period from 2005 to 2025.

The estimation of the gender wage difference is carried out using the Oaxaca-Blinder econometric decomposition methodology, adjusted with Heckman's correction to mitigate the potential self-selection bias in labor participation.

The results indicate that the wage gap is larger for STEM graduates than for Non-STEM graduates. In most of the years analyzed, a wage advantage is observed for male STEM graduates; the average difference in the studied period is 10.1 percentage points (pp) and is mainly explained by the returns component of the Oaxaca-Blinder decomposition. Meanwhile, in the Non-STEM area, women have a slight average advantage of 0.41 pp.

This study makes three contributions to the knowledge on gender wage inequality. First, it provides empirical evidence on the evolution of the wage gap for the university-educated population in Mexico, covering a 21-year period at the national level. Second, the study goes beyond descriptive analysis by examining the mechanisms of wage inequality for STEM graduates. It shows that the wage advantage observed in favor of men is mainly due to the returns component of the Oaxaca-Blinder decomposition; it is argued that this component is the manifestation of a differential valuation of the observable characteristics of men and women. As a result, the coefficients of the wage regressions are numerically different with a disadvantage for women. Finally, it incorporates evidence that the female concentration in certain occupations is an element that contributes to explaining the gender wage differential for STEM graduates. Altogether, the findings suggest that unequal returns are associated with the wage devaluation of women within the same field of high specialization.

The document is organized as follows: the first section reviews the theoretical and empirical literature on gender inequality. Subsequently, it analyzes how the distribution of enrollment by gender is concretely reflected in labor incomes and the occupational structure of university graduates. The third section describes the data and the method used. The fourth section presents the results, the fifth the discussion, and the last section sets out the conclusions.

Conclusions

This research examines the evolution and underlying mechanisms of gender wage differences among Mexican professionals from STEM and Non-STEM careers over 21 years (2005 to 2025), applying the Oaxaca-Blinder decomposition corrected for self-selection. The results reveal a marked heterogeneity in the mechanisms of the gender wage gap. It is documented that, despite the reduction over time, the wage gap is consistently larger and to the disadvantage of women in the STEM sector, while in the Non-STEM sector, the difference remains slightly in favor of women.

The wage disadvantage for female STEM graduates is mainly explained by the returns component. This is crucial as it suggests that the inequality is not due to differences in the observable characteristics of individuals, but to a structural differential valuation of women's skills and competencies. The lower wage coefficients obtained for women are a reflection of norms, customs, and biases deeply rooted in the set of rules governing labor; that is, it is the consequence of the unequal valuation that the institutional structure of the labor sector in Mexico assigns to the productive characteristics of men and women.

The persistence of a wage gap for STEM graduates in Mexico, largely attributable to unobservable factors, aligns with international evidence pointing to income inequalities in science and engineering. The possible explanations identified in the literature, such as occupational segregation, lower female representation in STEM, difficulties in balancing work and family life, and the presence of gender stereotypes and biases in organizational structures, coincide with the patterns observed in this study and suggest complex mechanisms operating in the highly skilled labor market.

The limitations of the study consider the cross-sectional nature of the ENOE data, as it prevents the direct tracking of individual occupational trajectories of professionals to be able to observe the long-term causal effects of segregation and discrimination. A second limitation comes from the Oaxaca-Blinder method, because although it is robust for the decomposition, the returns component is not a direct measure of discrimination, but rather an aggregate component that groups unobserved factors and unequal valuations. As a research agenda, it remains to explore individual occupational trajectories through

panel studies, as well as to analyze the impact of specific policies aimed at promoting female participation in STEM areas and combating gender biases in the workplace.