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EVOLUTION OF PARAGUAY'S GENDER EARNINGS GAP FROM 2002 TO 2019*

EVOLUCION DE LA BRECHA DE INGRESOS LABORALES POR GENERO EN PARAGUAY EN EL PERIODO 2002 A 2019

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Abstract

This study analyzes the evolution of Paraguay's gender earnings gap from 2002 to 2019. It uses data from household surveys harmonized by the IDB. We estimate the gap using Blinder-Oaxaca and Ñopo decompositions and find that much of the gap cannot be explained by factors like experience, personal and family characteristics, industry, occupation, region, or setting and is likely tied to regulatory factors, biases, or discrimination. The gap is widest in the informal sector, especially among less educated and rural people. Regarding a nationwide widening or narrowing of the gap we find no clear trend during the period analyzed.

Keywords: *Gender economics, earnings gaps, discrimination.*

JEL classification: *J16, J31, J71.*

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Resumen

Se analiza la evolución de la brecha de género en ingresos laborales de Paraguay entre 2002 a 2019. Se realizan las descomposiciones de Blinder-Oaxaca y Ñopo con datos de encuestas de hogares armonizadas por el BID, encontrando que la brecha no está explicada por variables como experiencia, características personales y familiares, actividad, ocupación, región o zona, y está relacionada a factores regulatorios, sesgos o discriminación. La brecha es más amplia en el sector informal, especialmente entre la población rural y con menor educación. No se percibe un patrón claro de reducción o aumento de la brecha en el periodo analizado.

Palabras claves: *Economía de género, brechas de ingreso, discriminación.*

Clasificación JEL: *J16, J31, J71.*

1. INTRODUCTION

In recent years, the Latin America and Caribbean region has undergone a fundamental shift in the roles traditionally established for men and women: women have increased political representation; higher levels of education; and greater labor force participation. However, there are still ongoing challenges for women's labor inclusion and professional development opportunities (Frisancho and Queijo, 2022).[1]

These findings are similar to those of Ñopo (2012), who analyzes the challenges for labor inclusion and professional development opportunities for women in the region. This author highlights the latent regional problem of occupational and hierarchical segregation, as women are more likely to work in the informal sector and hold a smaller proportion of managerial positions. He also emphasizes the earning differences women experience. Although the region's gender equality indicators have been improving since the end of the last century (Chioda, 2011), and women have more significant political and labor force participation (Ñopo, 2012), men still earn more for similar jobs in most countries. This earnings gap is an unjustifiable form of inequality (ILO, 2019).

[1] The study evaluates the effect of gender inequalities in the Southern Cone countries (Brazil, Chile, Paraguay, and Uruguay) and presents evidence on the economic consequences and drivers of these inequalities, as well as the political tools that can help mitigate them. The study explains that Paraguay had the highest female employment rate in the region from 1991 to 2019, with a rate of 55% in 2019. On the other hand, Paraguay had the highest income gap in the region throughout that same period. The income gap has been narrowing in most countries, although at different rates. By 2019, the income gap was fairly similar across all five countries –ranging from 19 to 25 percent.

In addition, the COVID-19 crisis has primarily affected female labor force participation: 13 million women in the region lost their jobs, and female labor force participation rate fell by 16 percentage points. In contrast, male labor force participation rate fell by ten percentage points. The crisis shed light on the fact that women work in more vulnerable sectors, aggravated gender gaps, and reversed some of the progress that had been made (Bustelo *et al.*, 2021).

Paraguay is currently ranked 80th (out of 146 countries) on the World Economic Forum's Global Gender Gap Index (WEF, 2022), and 17th out of the 22 Latin American and Caribbean countries listed on the index. The country has a score of 0.707 out of 1, which is an improvement of 0.051 from its score of 0.656 in 2006 (the year the index was created). However, the country dropped 16 positions (from 64th to 80th) since the index was first published in 2006, although it should be noted that the index only covered 115 countries that year. Specifically, it ranks 78th in economic participation and opportunities, mainly due to low female labor force participation (ranked 94th) and income inequality between men and women in similar jobs (ranked 112th). In terms of political representation, women hold 16% of the seats in parliament, which earns Paraguay a ranking of 84th, which is 46 positions lower than its ranking in 2006.

The data from Paraguay's Household Surveys, harmonized by the IDB, align with these facts. As shown in Graph 1, women's hourly income in 2019 was on average 81% of men's. It was especially low among those over 56 years old (71%), without any education (65%), from a rural area (70%), or working in the informal sector (73%).[2]

Although the number of studies on this subject has recently increased in the region and the world, there is still limited information, especially regarding earnings gaps in Paraguay. Since there are various ways to analyze gender earnings gaps, it is difficult to compare the results of different studies and monitor how the gap is changing.

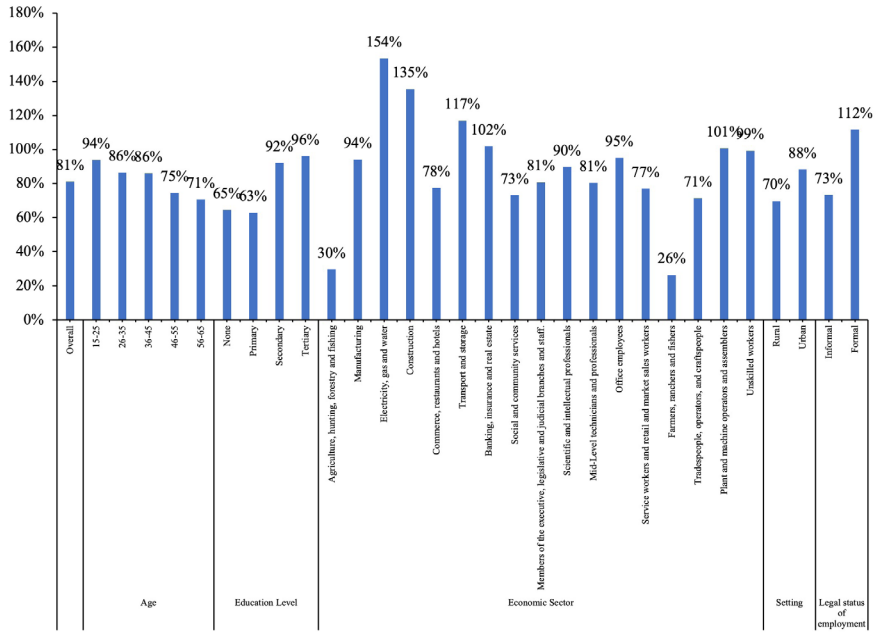
This study aims to enhance the current knowledge on the subject through a rigorous analysis of how the gender earnings gap has changed each year from 2002 to 2019. Its method is based on the research conducted in Bolivia by Urquidi, Valencia and Durand (2021). We use two analysis methodologies –the Blinder-Oaxaca decomposition and the Ñopo decomposition– to obtain results from both a parametric and non-parametric model. This allows us to compare changes year by year and identify the main variables driving changes in the gap.

The analysis results show that the earnings gap between men and women is widest in the informal sector, in groups with lower levels of education, and in rural areas. The difference in earnings is heterogeneous and favors men in most economic activities. Much of this gap is not explained by the different control variables, such as experience, personal and family characteristics, industry and economic activity, region of the country, or setting (urban or rural). This portion of the gap it thus likely related

[2] Economically active people who are not registered and do not contribute to the Paraguayan pension system are considered informal.

GRAPH 1

HOURLY EARNINGS OF WOMEN COMPARED TO HOURLY EARNINGS OF MEN IN 2019



Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

to regulatory factors, biases, or discrimination. In addition, our analysis shows no clear pattern of the gender earnings gap narrowing or widening during the period analyzed.

The study is organized as follows: The second section contains an analysis of the literature on gender earnings gap in Paraguay and Latin America and the Caribbean. The third section describes the data used and presents descriptive statistics on how the earnings gap has changed over the period analyzed in the study. The fourth section briefly describes the methodologies used to estimate the gender earnings gap. The fifth section presents the results of the analysis. The sixth section compares these results with those found in the literature. Finally, the seventh section analyses the study's conclusions and their implications.

2. LITERATURE REVIEW

The literature on the gender pay gap distinguishes between the gap caused by differences in people's individual characteristics and human capital, and the unexplained

part of the gap, which is mainly related to gender prejudice, bias, and discrimination (Atal *et al.*, 2009). To make this distinction, the two most popular econometric techniques used in recent years for earnings gap analysis using household surveys in different countries are: i) the Blinder-Oaxaca decomposition presented in Oaxaca (1973); and ii) the more recent Ñopo decomposition presented in Ñopo (2008).[3]

As shown by Chioda (2011), in 1980 women in Latin America and the Caribbean began to have greater labor force participation rates, a shift facilitated by economic growth, trade liberalization, urbanization, lower fertility rates, and an increase in educational levels. This trend accelerated after 2000, as the region's high growth rates drove an increase in demand for labor that allowed more women to join the work force. Public policies that directly promoted female labor also sped up this change (Gasparini and Marchionni, 2015). However, Ñopo (2012) points out that women are still overrepresented in informal, low-paid jobs and that the earnings gap remains significant.

Psacharopoulos and Tzannatos (1992) published a classic analysis of this issue. They studied the pay gap in 15 countries in Latin America and the Caribbean at the end of the 1980s and discovered that on average women were paid 65% of what men were for similar work. Two-thirds of this difference was not explained by educational level or human capital and therefore could be associated with regulatory issues, prejudice, or discrimination. A more recent study by Ñopo and Hoyos (2010) found that the explained earnings gap dropped from 16% to 9% between 1992 and 2007. The literature shows that a significant part of the reduction in the earnings gap is explained by higher educational levels among women (Chioda, 2011; Gasparini and Marchionni, 2015).[4]

Despite this significant narrowing of the explained gap, the unexplained gap dropped only four percentage points, from 34% to 30%. This reduction was most noticeable among workers at the lower end of the income distribution, those with children in their households, the self-employed, part-time workers, and those in rural areas. In other words, the gap narrowed the most in labor market segments that previously had the greatest gender disparities. The unexplained part of the gap mostly narrowed within the different labor market segments instead of being the product of a restructuring of labor markets.

The International Labour Organization (ILO) published its latest analysis of Latin America and the Caribbean in 2019. This analysis covered 17 countries and used the Ñopo decomposition technique. It found that the unexplained gap narrowed by an average of two to three percentage points between 2012 and 2017. The study also highlights that the gap is most persistent among low-income and self-employed

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[3] These techniques are explained in detail in the fourth section.

[4] As can be seen in Tables A1 in the appendix, the average years of education for women increased from 7.9 years to 10.4 years between 2002 and 2019, while that of men increased from 7.2 to 10.0 in this same period.

workers. Moreover, the 2019 Ongoing Permanent Household Survey of Paraguay shows that 35 percent of women work 30 hours a week or fewer, which is a high value compared to other countries in the region.

As shown in ILO (2019), Paraguay has historically had a high gender labor gap. In the 1980s, it had one of the highest female unemployment rates in the region, at as much as 12 percentage points. Over the same period, women's average income was only 57% of men's.

Although Paraguay's labor code establishes that work of "equal efficiency, nature or duration must receive remuneration of equal value" (Law No. 213, 1993), the study by the ILO (2019) finds that the gender earnings gap continues to hover around 12%. Additionally, there is a remarkably large unexplained gap of 24% for self-employed workers, while for employees the unexplained gap is under 6% and not statistically significant.

The earnings gap is present in the lower deciles of income distribution, reaching around 13% the lowest decile, while in the higher deciles it is absent. Also, the ILO finds major gaps in the types of occupations between men and women. This is true of academia: women make up 49% of the Paraguay's researchers, but only 22% of those working in the fields of science, technology, engineering, and mathematics (STEM).

On the other hand, Paraguay stands out for its drop in female labor force participation in rural areas between 2002 and 2019. The country lost a significant portion of agricultural jobs among women.

Meanwhile, Penha, López, and da Cunha Cassuce (2021) analyzed trends in gender pay discrimination in the Paraguayan formal sector from 2017 to 2019, focusing on the metropolitan area and areas near the border with Brazil.[5] They found that although the pay gap has decreased, there are still income inequalities of 5%, and 17% for the unexplained component.

Finally, Heikel and Piras (2014) performed a diagnostic analysis of the situation of women in Paraguay and found that the main gender gaps in the country are tied to valuing women's educational credentials less. Other relevant variables are the tendency to push women into care-related jobs; higher rates of open unemployment and visible underemployment, and fewer opportunities to find employment at large companies. Likewise, women make up the majority of the population with no income. Finally, women's difficulties in improving their employability are affected by extra-economic factors such as family structure and composition, the way domestic work is divided up, the limited coverage of services that could help alleviate the burden of child-rearing, the opportunity cost of delegating domestic responsibilities, and socio-cultural perceptions. These variables generally do not affect men.

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[5] They employ the Mincer (1974) wage equations, the Heckman (1979) methodology, and the Blinder-Oaxaca (1973) decomposition.

The studies described above give an overview of the gender earnings gap in Paraguay. However, they use different empirical models and population study groups, so they cannot be used to chart year-by-year changes in the gender gap under a single methodology. Given the importance of this issue, this study aims to help show the year-by-year changes in the gender earnings gap in Paraguay between 2002 and 2019 using temporally comparable methodologies.

3. DATA AND DESCRIPTIVE STATISTICS

This study uses data from the IDB Harmonized Household Surveys data bank. It draws information from 18 consecutive surveys between 2002 and 2019. The first year is 2002, when Paraguay first applied the Permanent Household Survey with a sample framework with regional representativeness. This framework replaced the previous methodologies of the Integrated Household Survey and Household Sample Survey conducted by Paraguay's National Institute of Statistics. In addition, 2020 is excluded to keep the pandemic's labor market effects from distorting the historical analysis. An analysis of these effects merits a separate study. The study uses the harmonized version of the Permanent Household Survey from 2002 to 2017 and the reconciled version of the Ongoing Permanent Household Survey from 2018 onward, due to a change in methodology at Paraguay's National Institute of Statistics.

These two types of surveys (Permanent Household Surveys and Ongoing Permanent Household Surveys) have to be harmonized for their data to be comparable. We were able to successfully harmonize for all variables used in the study except the variable indicating main occupation. However, although the classification is slightly different, occupation variables were created for the same purpose in each survey, so they can be used to disaggregate the various occupations and compare different years.

The design and level of representativeness of these surveys are similar for the different years, as they all represent the entire population of Paraguay and gather data from the principal regions of the country.[6] Table 1 shows the sample for people ages 15 to 65, the age range used in the analysis every year, and its representativeness of the entire population of Paraguay,[7] breaking down the analysis by gender and age group.

The proportions of the sample are very close to the proportions of the population they represent, and the model is evenly distributed between genders. The relative proportions of age groups is in line with population aging in Paraguay and most countries in the region (Cardona Arango and Pelaez, 2012). From 2002 to 2014, the number of samples gradually increased, with the exception of the very extensive samples of 2003 and 2004. The years 2015, 2016, and 2017 had more observations

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6 The regions included in the survey are Asunción, San Pedro, Caaguazú, Itapúa, Alto Paraná, Central, and the rest of the country.

7 We apply frequency weights.

TABLE 1

NUMBER OF OBSERVATIONS IN THE SURVEYS AND THEIR REPRESENTATIVENESS
BY GENDER AND AGE GROUP

	2022		2003		2004		2005		2006		2007		2008		2009		2010	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender																		
Men	5,026	50%	12,407	50%	10,197	50%	5,801	50%	6,690	50%	6,261	50%	5,860	50%	5,665	50%	6,320	50%
Representativeness	1,571,888	50%	1,623,506	49%	1,679,041	50%	1,737,662	50%	1,752,307	50%	1,803,737	49%	1,855,960	50%	1,959,172	50%	1,999,632	51%
Women	5,039	50%	12,343	50%	10,064	50%	5,772	50%	6,733	50%	6,336	50%	5,881	50%	5,647	50%	6,330	50%
Representativeness	1,589,278	50%	1,657,255	51%	1,691,424	50%	1,731,877	50%	1,781,112	50%	1,852,878	51%	1,882,928	50%	1,931,049	50%	1,954,757	49%
Age																		
15-25	3,732	37%	9,285	38%	7,655	38%	4,237	37%	4,916	37%	4,650	37%	4,237	36%	4,042	36%	4,317	34%
Representativeness	1,156,391	37%	1,212,720	37%	1,256,035	37%	1,258,113	36%	1,308,325	37%	1,336,735	37%	1,312,696	35%	1,378,191	35%	1,347,214	34%
26-35	2,244	22%	5,245	21%	4,207	21%	2,543	22%	2,775	21%	2,573	20%	2,551	22%	2,314	20%	2,767	22%
Representativeness	701,854	22%	706,010	22%	725,847	22%	766,868	22%	729,440	21%	764,946	21%	837,359	22%	810,861	21%	876,670	22%
36-45	1,908	19%	4,692	19%	3,794	19%	2,197	19%	2,489	19%	2,384	19%	2,063	18%	2,029	18%	2,268	18%
Representativeness	610,162	19%	639,744	19%	644,695	19%	674,535	19%	646,409	18%	685,139	19%	667,946	18%	715,086	18%	706,851	18%
46-55	1,340	13%	3,374	14%	2,770	14%	1,591	14%	2,029	15%	1,882	15%	1,755	15%	1,746	15%	1,996	16%
Representativeness	426,453	13%	444,829	14%	458,541	14%	475,692	14%	523,255	15%	550,664	15%	541,488	14%	582,129	15%	616,109	16%
56-65	841	8%	2,154	9%	1,835	9%	1,005	9%	1,214	9%	1,108	9%	1,135	10%	1,181	10%	1,302	10%
Representativeness	266,306	8%	277,458	8%	285,347	8%	294,331	8%	325,990	9%	319,131	9%	379,399	10%	403,954	10%	407,545	10%
Total	10,065	100%	24,750	100%	20,261	100%	11,573	100%	13,423	100%	12,597	100%	11,741	100%	11,312	100%	12,650	100%
Representativeness	3,161,166	100%	3,280,761	100%	3,370,465	100%	3,469,539	100%	3,533,419	100%	3,656,615	100%	3,738,888	100%	3,890,221	100%	3,954,389	100%

Table 1 (Continued)

	2011		2012		2013		2014		2015		2016		2017		2018		2019	
	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%
Gender																		
Men	6,166	49%	6,685	50%	6,716	49%	6,511	49%	9,921	49%	12,076	50%	11,219	50%	5,859	49%	5,814	49%
Representativeness	2,046,246	49%	2,109,744	50%	2,136,187	49%	2,199,366	49%	2,211,367	49%	2,166,532	50%	2,219,766	50%	2,273,928	50%	2,280,152	49%
Women	6,350	51%	6,802	50%	6,970	51%	6,689	51%	10,187	51%	11,990	50%	11,251	50%	6,001	51%	5,934	51%
Representativeness	2,108,034	51%	2,112,713	50%	2,207,561	51%	2,270,142	51%	2,326,064	51%	2,172,434	50%	2,214,069	50%	2,262,957	50%	2,336,434	51%
Age																		
15-25	4,236	34%	4,780	35%	4,644	34%	4,479	34%	6,722	33%	7,708	32%	7,062	31%	3,553	30%	3,472	30%
Representativeness	1,399,413	34%	1,485,381	35%	1,477,614	34%	1,525,284	34%	1,510,443	33%	1,436,313	33%	1,468,559	33%	1,426,685	31%	1,436,881	31%
26-35	2,657	21%	2,923	22%	3,061	22%	2,953	22%	4,409	22%	5,430	23%	5,076	23%	2,648	22%	2,672	23%
Representativeness	883,038	21%	943,227	22%	969,129	22%	1,016,938	23%	1,023,968	23%	1,052,585	24%	1,065,558	24%	1,153,839	25%	1,166,912	25%
36-45	2,233	18%	2,266	17%	2,397	18%	2,168	16%	3,428	17%	4,298	18%	4,137	18%	2,275	19%	2,237	19%
Representativeness	747,033	18%	706,481	17%	771,402	18%	720,895	16%	783,277	17%	792,793	18%	834,100	19%	844,809	19%	885,033	19%
46-55	1,959	16%	2,100	16%	2,132	16%	2,045	15%	3,118	16%	3,773	16%	3,357	15%	1,880	16%	1,804	15%
Representativeness	661,735	16%	644,993	15%	651,825	15%	684,355	15%	698,950	15%	626,959	14%	604,722	14%	647,188	14%	644,719	14%
56-65	1,431	11%	1,418	11%	1,452	11%	1,555	12%	2,431	12%	2,857	12%	2,838	13%	1,504	13%	1,563	13%
Representativeness	463,061	11%	442,375	10%	473,778	11%	522,036	12%	520,793	11%	430,316	10%	460,896	10%	464,364	10%	483,041	10%
Total	12,516	100%	13,487	100%	13,686	100%	13,200	100%	20,108	100%	24,066	100%	22,470	100%	11,860	100%	11,748	100%
Representativeness	4,154,280	100%	4,222,457	100%	4,343,748	100%	4,469,508	100%	4,537,431	100%	4,338,966	100%	4,433,835	100%	4,536,885	100%	4,616,586	100%

Source: Prepared by the authors based on Paraguay Household Surveys harmonized by the IDB.

TABLE 2

WOMEN'S HOURLY EARNINGS COMPARED TO MEN'S

		2003	2004	2005	2006	2007	2008	2009	2010
Overall	82.10%	87.14%	85.16%	88.74%	82.12%	87.28%	90.63%	85.56%	97.70%
Age									
15–25	140.6%	127.3%	114.4%	116.7%	108.4%	108.3%	101.2%	101.1%	147.1%
26–35	107.4%	102.1%	104.9%	107.1%	85.2%	115.6%	111.7%	126.0%	95.8%
36–45	62.8%	82.7%	84.1%	85.4%	79.6%	79.1%	79.2%	65.4%	104.9%
46–55	67.6%	85.3%	60.7%	59.7%	71.5%	73.5%	71.4%	76.8%	105.4%
56–65	35.9%	70.6%	65.9%	46.5%	62.9%	42.8%	56.2%	61.4%	49.7%
Level of Education									
None	60.5%	88.2%	87.8%	111.7%	88.4%	65.7%	84.4%	65.0%	95.1%
Primary	72.1%	96.8%	98.2%	82.9%	79.6%	85.0%	81.1%	88.9%	95.7%
Secondary	95.4%	95.9%	84.4%	65.6%	71.0%	95.8%	80.5%	87.6%	93.4%
Tertiary	81.8%	70.1%	55.5%	79.6%	85.9%	67.4%	89.5%	107.9%	105.4%
	55.3%	230.4%	15.2%	54.6%			58.1%	50.6%	5.9%
Economic Sector									
Agriculture, hunting, forestry, and fishing	69.8%	151.4%	138.7%	132.2%	115.1%	82.8%	135.7%	115.9%	94.6%
Mining and quarrying	38.8%	ins. data	55.2%	74.4%	51.4%	ins. data:	1055.8%	220.2%	ins. data:
Manufacturing	74.5%	78.8%	77.7%	65.9%	54.2%	69.0%	66.6%	63.3%	67.4%
Electricity, gas, and water	40.2%	64.8%	109.2%	113.8%	180.3%	47.1%	64.7%	47.2%	137.6%
Construction	173.8%	557.7%	140.0%	188.8%	196.5%	283.4%	114.5%	152.3%	155.9%
Retail, restaurants, and hotels	61.5%	73.8%	67.0%	67.8%	62.4%	70.5%	68.7%	81.9%	101.8%
Transportation and storage	130.3%	92.1%	78.3%	91.2%	94.9%	517.4%	108.7%	102.2%	457.6%
Banking, insurance, and real estate	51.0%	87.8%	109.0%	108.2%	90.5%	224.8%	72.2%	84.1%	131.4%
Social and community services	68.3%	67.3%	65.2%	59.4%	66.4%	61.7%	67.3%	73.1%	73.9%
Occupation									
Professional and technical	91.6%	82.3%	75.4%	87.6%	91.5%	84.8%	79.1%	90.6%	94.3%
Director or senior officer	53.0%	84.2%	53.3%	41.0%	47.6%	151.5%	59.7%	69.2%	120.9%
Administrative and intermediate level	87.5%	116.7%	96.9%	79.7%	105.5%	100.9%	86.9%	92.6%	105.6%
Merchants and vendors	66.1%	68.4%	73.7%	68.1%	62.0%	53.1%	69.0%	81.5%	91.1%
Services	83.9%	92.4%	81.6%	80.6%	71.4%	73.9%	73.7%	85.0%	84.9%
Agricultural workers	71.7%	153.9%	145.1%	133.6%	120.2%	92.1%	138.6%	116.4%	95.7%
Non-agricultural laborers, machinery operators, and transportation services	62.0%	62.3%	72.9%	78.3%	68.3%	76.0%	65.7%	71.9%	190.3%
Armed forces	120.9%	ins. data	n.a.	226.0%	ins. data	ins. data	ins. data	ins. data	ins. data
Other	1750.6%	ins. data	ins. data	ins. data	ins. data	ins. data	ins. data	ins. data	ins. data
Members of the executive, legislative, and judicial branches and staff.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Scientific and intellectual professionals	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Technicians and mid-level professionals	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Office employees	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Service workers and retail and market sales workers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Farmers, ranchers, and fishers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.

		2003	2004	2005	2006	2007	2008	2009	2010
Tradespeople, operators, and craftspeople	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Plant and machine operators and assemblers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Unskilled workers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.
Setting									
Rural	70.5%	110.5%	111.8%	122.7%	95.1%	77.0%	90.2%	90.4%	99.4%
Urban	77.0%	83.4%	75.5%	67.8%	74.1%	89.5%	82.8%	85.5%	95.6%
Legal Status of Employment									
Informal	74.3%	96.0%	87.0%	82.7%	77.0%	81.1%	83.8%	83.5%	101.4%
Formal	111.2%	91.0%	93.9%	90.4%	111.0%	124.8%	101.4%	120.6%	103.6%

Table 2 (Continued)

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Overall	89.22%	92.61%	87.59%	78.54%	78.82%	74.87%	75.95%	86.12%	81.13%
Age									
15–25	97.4%	108.1%	107.5%	95.0%	103.2%	107.5%	95.5%	104.6%	93.9%
26–35	79.8%	89.1%	94.9%	89.5%	95.6%	87.3%	86.0%	88.2%	86.4%
36–45	85.7%	79.3%	77.9%	74.1%	79.7%	82.9%	84.8%	80.6%	86.1%
46–55	124.9%	96.3%	75.2%	73.5%	72.7%	67.3%	62.7%	67.7%	74.6%
56–65	53.8%	76.4%	83.9%	68.9%	54.5%	44.9%	75.4%	69.7%	70.7%
Level of Education									
None	87.1%	83.8%	83.1%	85.6%	50.7%	56.9%	69.4%	45.1%	64.5%
Primary	86.5%	81.1%	81.1%	65.5%	77.1%	70.8%	63.0%	64.6%	63.0%
Secondary	97.5%	85.4%	84.9%	82.7%	83.1%	82.8%	92.1%	96.4%	92.1%
Tertiary	63.3%	93.7%	80.2%	79.5%	79.8%	68.7%	73.3%	85.5%	96.1%
	0.0%	53.0%	0.0%		4.6%	24.1%	88.0%		
Economic Sector									
Agriculture, hunting, forestry, and fishing	189.3%	124.2%	106.9%	66.8%	30.5%	53.7%	70.0%	30.7%	29.6%
Mining and quarrying	91.7%	ins. data	ins. data	ins. data	ins. data	76.5%	ins. data		
Manufacturing	74.9%	101.2%	77.9%	85.7%	101.4%	76.2%	84.7%	78.9%	94.2%
Electricity, gas, and water	114.3%	131.1%	83.9%	35.0%	77.9%	105.3%	57.1%	128.3%	153.5%
Construction	149.0%	80.9%	109.2%	123.6%	119.1%	146.6%	200.4%	133.6%	135.5%
Retail, restaurants, and hotels	59.6%	67.4%	65.7%	90.3%	73.6%	72.0%	75.9%	82.9%	77.5%
Transportation and storage	106.0%	67.8%	139.0%	87.9%	112.9%	80.9%	99.5%	109.5%	117.0%
Banking, insurance, and real estate	165.7%	100.9%	89.8%	59.3%	72.8%	86.8%	66.0%	89.4%	102.0%
Social and community services	60.5%	76.7%	73.0%	75.0%	79.4%	66.6%	72.2%	75.7%	73.1%
						0.0%		81.6%	
Occupation									
Professional and technical	79.5%	90.1%	88.5%	86.4%	88.3%	79.8%	91.5%	n.a.	n.a.
Director or senior officer	54.0%	110.1%	87.0%	74.4%	72.9%	64.7%	63.1%	n.a.	n.a.
Administrative and intermediate level	82.9%	99.5%	74.0%	90.9%	87.1%	95.8%	87.0%	n.a.	n.a.
Merchants and vendors	57.1%	71.9%	60.5%	89.8%	73.1%	64.5%	67.0%	n.a.	n.a.
Services	82.1%	78.4%	80.5%	90.3%	79.0%	82.3%	83.8%	n.a.	n.a.
Agricultural workers	194.7%	126.2%	111.4%	68.1%	33.4%	57.1%	75.3%	n.a.	n.a.
Non-agricultural laborers, machinery operators, and transportation services	81.1%	67.1%	76.9%	75.9%	80.9%	59.4%	75.9%	n.a.	n.a.
Armed forces	ins. data	ins. data	128.9%	52.9%	ins. data	105.7%	ins. data	74.3%	140.8%

	2011	2012	2013	2014	2015	2016	2017	2018	2019
Other	ins. data	ins. data	ins. data	75.4%	ins. data	5.4%	ins. data	n.a.	n.a.
Members of the executive, legislative, and judicial branches and staff.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	92.4%	80.8%
Scientific and intellectual professionals	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	94.0%	89.7%
Technicians and mid-level professionals	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	86.6%	80.5%
Office employees	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	103.7%	95.1%
Service workers and retail and market sales workers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	67.7%	77.1%
Farmers, ranchers, and fishers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	25.4%	26.3%
Tradespeople, operators, and craftspeople	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	47.2%	71.4%
Plant and machine operators and assemblers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	74.2%	100.7%
Unskilled workers	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	n.a.	108.8%	99.4%
Setting									
Rural	125.1%	92.4%	88.5%	82.0%	70.2%	70.3%	65.3%	58.2%	69.8%
Urban	75.6%	87.0%	83.0%	78.4%	83.6%	79.2%	87.4%	92.3%	88.3%
Legal status of employment									
Informal	88.4%	86.5%	82.3%	75.4%	75.0%	70.8%	74.5%	74.1%	73.3%
Formal	96.8%	106.2%	102.5%	95.9%	104.1%	105.2%	107.0%	104.9%	111.6%

Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.
n.a. Not Applicable. When survey categories are not compatible.
ins. data: There is not enough data to calculate the percentage.

than previous years, a trend that halted when Paraguay changed its methodology from the Permanent Household Survey to the Ongoing Permanent Household Survey in 2018, returning to samples sizes close to those of 2005.

Table 2[8] presents the first attempt to calculate the gender earnings gap, estimating women's hourly labor income relative to men's. The results are separated by age, educational level, economic activity, occupation, geographic area, and legal status of employment.

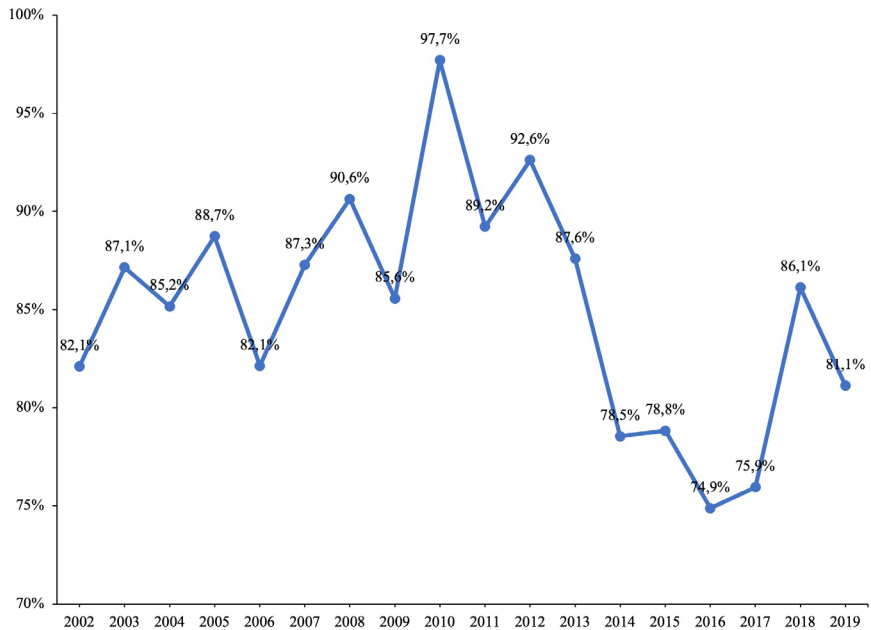
In addition, Table A1 in the appendix shows the distribution of the characteristics of the employed population that earns income by year and gender, providing an overview of the general characteristics of both men and women.

Graph 2 shows how women's hourly income has changed relative to men's. Women's earnings increased compared to men's until 2010, when they reached approximately 98% of men's earnings. However, 2010 was an unusual year for the Paraguayan economy, which grew at a high rate (11 pp of GDP growth) as it rebounded from the country's recession in 2009. The gender earnings gap could therefore be affected by the sudden drop in jobs and wages in 2009 and their rapid recovery in 2010. A specific analysis in future research would be required to comprehensively understand what happened to the income gap in 2010.

[8] We used earning from a person's main activity and applied frequency weights.

GRAPH 2

WOMEN'S HOURLY EARNINGS RELATIVE TO MEN'S



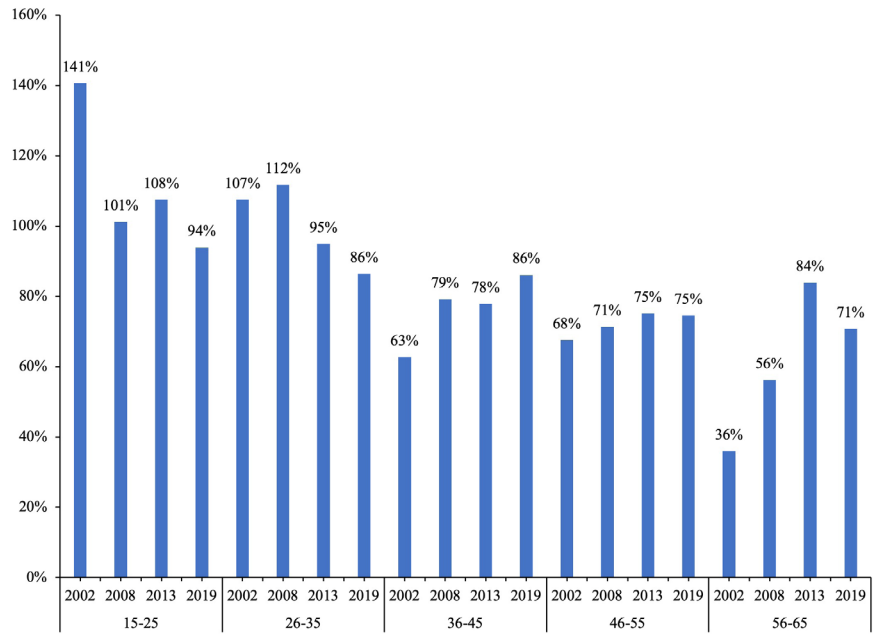
Source: Authors' calculations based on Paraguayan Household Surveys harmonized by the IDB.

From this year onward, women's average earnings decreased compared to men's, causing this indicator to fall to around 75% in 2016. After 2016, the gap again started to narrow, and in 2019 –the year before the pandemic– women's average hourly earnings were 81% of men's. This worsening of the earnings gap in the 2010s is related to the overall deterioration of labor earnings. According to the INE of Paraguay, labor income from the main occupations decreased from 2,717 thousand guaraníes per month in 2011 to 2,562 thousand guaraníes in 2019 (at constant 2021 prices), despite high economic growth rates over the same period.

Graph 3 breaks down the analysis by age group. The gap increases with age. This trend is consistent throughout the years analyzed, although the differences among the various groups get smaller over time.

GRAPH 3

WOMEN'S HOURLY EARNINGS RELATIVE TO MEN'S, YEARLY GRAPH BY AGE GROUP



Source: Own calculations based on Paraguayan Household Surveys harmonized by the IDB.

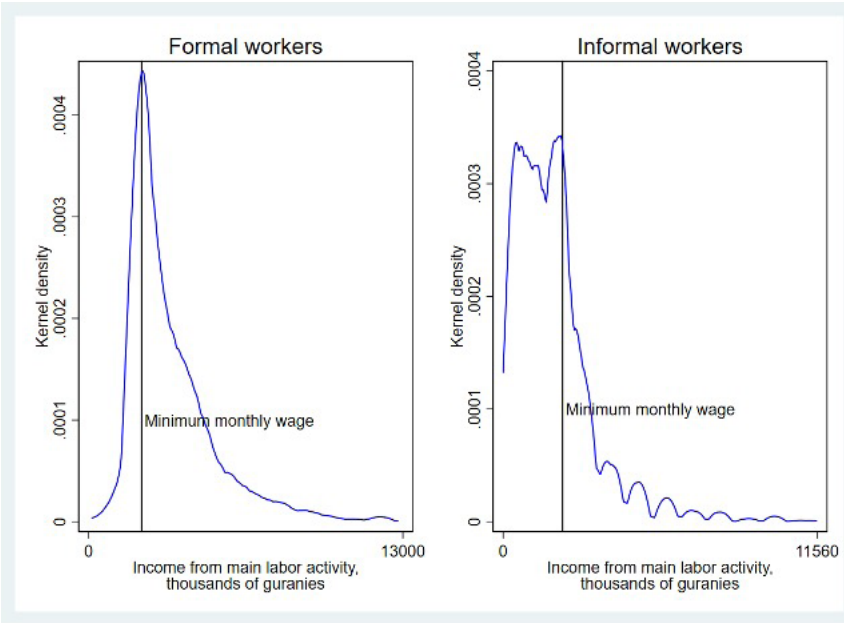
Graph 4 shows the distribution of people's earnings according to the legal status of their employment (formal or informal)[9] in 2019. Formal employees' earnings cluster around Paraguay's minimum monthly wage[10] to a greater extent than those of informal workers. This fact decreases the dispersion of observations and could be one reason why the gender gap among formal workers is smaller.

[9] We estimated kernel density using an Epanechnikov distribution of income from the main labor activity of formal workers from the 0 to 99th percentile, avoiding outliers that degrade the graphical analysis –using analytical weighting factors. For more information on estimating and interpreting kernel density, see Chen (2017).

[10] In 2019, Paraguay's minimum monthly wage was increased to 2,192,839 PYG, equivalent to US$355 at the time.

GRAPH 4

DISTRIBUTION OF MONTHLY EARNINGS BY LEGAL STATUS OF EMPLOYMENT IN 2019



Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

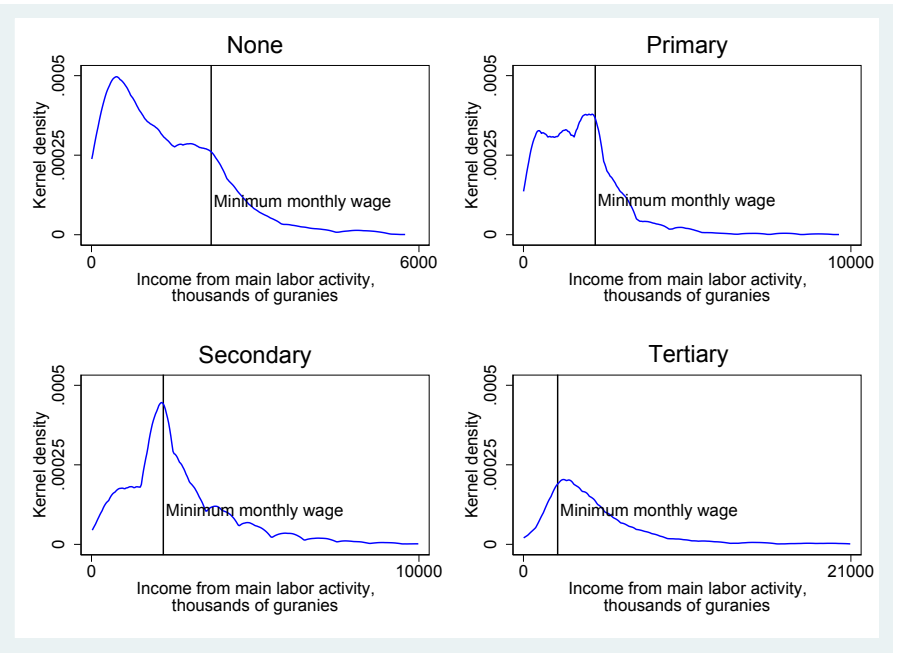
Meanwhile, educational level has a non-linear relationship to the earnings gap that is shaped like an inverted U. The gap decreases as educational level increases up to the secondary level, after which the gap increases again for the tertiary level of education. Notably, the difference is much smaller among formal workers than informal workers.

Graph 5 shows the distribution of earning by educational level in 2019. There is a significant cluster of income around the minimum monthly wage. This cluster does not occur among people with higher education, where earnings are more widely dispersed. This fact could be a key to explaining the lower gender earnings gap among people who have completed secondary school.

The analysis by economic sector finds high variance between years because of the way the survey is structured: it does not stratify results by industry. In any case, men earn markedly more in: i) manufacturing, ii) commerce, restaurants, and hotels, and iii) social and community services. On the other hand, women earned significantly more than men in the construction industry, although low female presence in this industry should be taken into account (Table A1 in the appendix). Men's and women's hourly

GRAPH 5

DISTRIBUTION OF MONTHLY EARNINGS, BY EDUCATIONAL LEVEL IN 2019



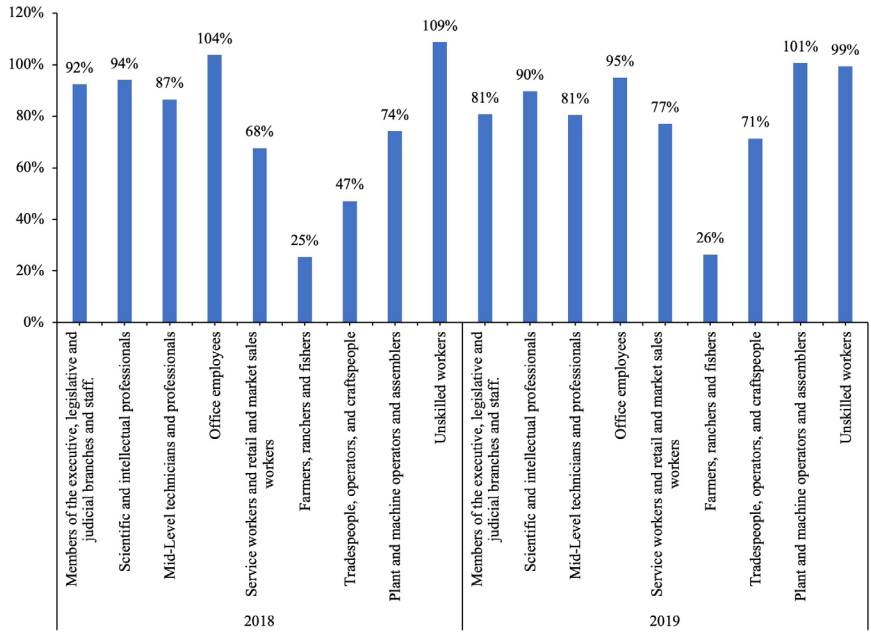
Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

earnings ratios are so varied across the other sectors that we cannot reach conclusions regarding the income gap in these industries.

Finally, Graph 6 shows an analysis of the gender earnings gap by occupation. From 2017 to 2019, mean earned more in almost all fields: i) members of the executive, legislative and judicial branches and staff; ii) scientific and intellectual professionals; iii) technicians and mid-level professionals; iv) service workers and retail and market vendors; v) farmers, ranchers, and fishers; vi) tradespeople, operators, and artisans, and vii) plant and machine operators and assemblers. In the office employees and unskilled workers categories, it seems women earn more or there is no gap between the two genders.

GRAPH 6

WOMEN'S HOURLY EARNINGS RELATIVE TO MEN'S, BY OCCUPATION



Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

4. METHODOLOGY

As discussed above, we used two methodologies to estimate the gender earnings gap: i) the Blinder-Oaxaca decomposition and ii) the Ñopo decomposition.

a. Blinder-Oaxaca decomposition

This first strategy for quantifying changes in the gender earnings gap breaks the gap down into two parts. The first is the part explained by the different control variables used to measure human capital, such as education, work experience, occupation, etc. The second is the part these variables cannot explain, which could reflect gender-differentiated regulations, such as prejudices, biases, or discrimination of the type described by Becker (2005). This unexplained gap is generated by personal or statistical preferences, where employers use group characteristics to evaluate individual attributes. For example, suppose companies believe that women of childbearing age are more likely

than older women to have babies and, therefore, to have interruptions in their careers. Based on this assumption, they would pay lower wages to women of childbearing age to compensate for the higher probability of losing the worker, as Hoyos *et al.* (2010) assert. The Blinder-Oaxaca method uses Mincer-type wage equations (1974), which, as explained in Jann (2008), divide the earnings difference into:

i) a part explained by group differences and individual characteristics such as education or work experience.

ii) a second unexplained residual component.

These equations have two groups, men (M) and women (W), the explained variable Y, which is the logarithm of income per hour from the main labor activity, and a group of explanatory variables X, such as education, experience, etc. The aim is to ascertain the average difference in earnings between the two groups that is explained by the explanatory variables X.

$$EGap = E(Y_M) - E(Y_W) \tag{1}$$

$E(Y_g)$ refers to the expected logarithm of earnings, which is the variable of interest, and g can be M if the equation is calculated for men or W if it is calculated for women. A Mincer-type equation is used to explain the income as follows: $Y_g = \alpha_g + \sum_{i=1}^{k} X_{ik}\beta_{gik} + \varepsilon_{gi}$. This expression can be substituted into equation [1]:

$$EGap = E\left(\alpha_M + \sum_{i=1}^{k} X_{ik}\beta_{Hik} + \varepsilon_{Hi}\right) - E\left(\alpha_W + \sum_{i=1}^{k} X_{ik}\beta_{Mik} + \varepsilon_{Mi}\right) \tag{2}$$

$$EGap = \widehat{\alpha_M} + \sum_{i=1}^{k} \bar{X}_{ik}\widehat{\beta_{Mik}} - \widehat{\alpha_W} - \sum_{i=1}^{k} \bar{X}_{ik}\widehat{\beta_{Wik}} \tag{3}$$

By rearranging, we can identify the contribution of the explanatory variables to the differences between the groups:

$$EGap = \left(\widehat{\alpha_M} - \widehat{\alpha_W}\right) + \sum_{i=1}^{k} \bar{X}_{ik}\left(\widehat{\beta_{Mik}} - \widehat{\beta_{Wik}}\right) + \sum_{i=1}^{k}\left(\bar{X}_{Mik} - \bar{X}_{Wik}\right)\widehat{\beta_{Mik}} \tag{4}$$

The last component of this equation represents the part of the earnings gap explained by the explanatory variables, while the first two components represent the unexplained differences.

The model was estimated using the following specification:

$$\begin{aligned} lyhour_i = {} & \beta_0 + \sum_{i=1}^{3}\beta_i gmedu_i + \beta_4 exp_i + \beta_5 exp_i^2 + \sum_{i=6}^{9}\beta_i gage_i + \beta_{10} married_i + \beta_{11} men6_i + \\ & \sum_{i=12}^{17}\beta_i sector + \sum_{i=18}^{23}\beta_i \text{region}_i + \beta_{24} formal_i + \beta_{25} zone_i + \beta_{26} self employ_i + \varepsilon_i \end{aligned} \tag{5}$$

Where:

- $lyhour_i$ Is the logarithm of nominal hourly earnings.
- $gmedu_i$ are the dichotomous variables indicating the three maximum educational levels people have achieved, as listed in Table 2. The base category is no education at all.
- exp_i are the estimated years of experience, calculated as age minus years of education.
- $gage_i$ are four dichotomous variables indicating the age groups in Table 2, using the 15-25 age group as the base category.
- $married_i$ is a dichotomous variable that takes a value of 1 if the person is married.
- $men6_i$ is a dichotomous variable that has a value of 1 if children under six years old live in the household.
- $sector_i$ are six dichotomous variables that refer to people's different economic activities, using agriculture, hunting, forestry, and fishing as the base category.
- $region_i$ are six dichotomous variables for the different regions of the country, using Asunción as the base category and comparing it with: San Pedro, Caaguazú, Itapúa, Alto Paraná, Central Region, and All Other Regions.
- $formal_i$ is a dichotomous variable that takes a value of 1 if the person is formally employed.
- $zona_i$ is a dichotomous variable with a value of 1 if the person lives in an urban area.
- y $selfemploy_i$ is a dichotomous variable that takes a value of 1 if the person is self-employed or an independent contractor.

This decomposition is carried out independently for women and men. Although this method is prevalent in the literature, it has some limitations. First, it assumes a relationship between explanatory characteristics and earnings that might not necessarily be true. Second, the model provides information about how the gap is decomposed but does not imply a causal relationship. Finally, the method does not limit comparability to individuals with similar characteristics. Ñopo's (2008) model was created as an attempt to overcome the first and third limitations.

The occupational variable will be used later to analyze the robustness of the results. The original model excludes this variable to avoid the curse of dimensionality and because the occupational categories were changes in the last two years of the study.

b. Decomposition of Ñopo

Ñopo (2008) presents a non-parametric decomposition. Pursuing the same objective as the Blinder-Oaxaca model, it takes into account income disparities over the entire income distribution, not just in the average.

The Ñopo model limits the comparison of differences to only men and women with comparable characteristics (common support). This feature allows it to generate

a synthetic counterfactual of individuals by matching men and women with identical observable characteristics, without the need to assume any functional form of the relationship between the explanatory variables and income.

The matching is done using discrete characteristics and thus does not require the use of propensity score matching or any other notion of distance between the characteristics of men and women (Ñopo 2008).

This procedure generates three groups:

(i) women and men who are matched (common support);
(ii) women with observable characteristics for whom there are no comparable men, a scenario that the methodology has termed the Maid Effect;
(iii) men for whom there are no comparable women, which the method calls the CEO Effect.

The method causes men and women with identical characteristics to form part of a common support. The difference in income of this group is then broken down by observed and unobserved attributes. Meanwhile, the Maid Effect and CEO Effect are calculated for those who ended up outside this common support. The Maid Effect refers to women who, because of their characteristics, have no male peers for comparison. This is usually women with jobs with low hierarchical status that complement their home duties. In contrast, the CEO Effect refers to men with no female peers with comparable traits-traditionally those with high-status jobs to which women have no access.

Therefore, the model decomposes the income gap –more specifically, the difference in the logarithm of hourly income from the main labor activity– into four elements:

$$\delta = \delta_X + \delta_F + \delta_M + \delta_0 \tag{6}$$

Where δ represents the total difference in earnings by gender, δ_X represents the difference in earnings related to observable characteristics, δ_F reflects the CEO Effect, δ_M reflects the Maid Effect, and δ_0 represents the unexplained difference in earnings difference, which, as noted above, could be related to biases and discrimination. The unexplained component of this model follows the same logic as the Blinder-Oaxaca model so we can compare both estimates.

This model has limitations. Like Blinder-Oaxaca's model, Ñopo's method only provides information on how the gap decomposes; it does not imply a causal relationship. Furthermore, since the matching is built on discrete variables, for both men and women, the probability of finding a person with the same characteristics and endowments declines as the number of explanatory variables increases. This means that the common support decreases, as Enamorado *et al.* (2009) mentioned, a phenomenon referred to as the curse of dimensionality. For this reason, researchers

using Ñopo's model must carefully analyze whether to include new variables to explain differences in earnings.

Another methodological limitation of both Blinder-Oaxaca and Ñopo is that they can only handle observable characteristics, which in this study, are only those included in Paraguay's Permanent Household Survey. Therefore, the gender earnings gap could also be affected by variables not included in the survey, such as effort, the labor market, household work preferences, and attitude. These variables could be omitted from the analysis, which would skew the estimators by leaving out a relevant factor. For example, Chioda (2011) shows that men and women may not have identical preferences and attitudes towards work performed in the labor market.

We decided to perform both estimates in the study for better comparability and consistency. This approach will allow us to compare our estimates to those of studies that use either of the two methodologies. Additionally, the results of the two methodologies can be compared to each other since they follow the same logic.

The Ñopo model used $yhour_i$ (hourly income) as the dependent variable, rather than the logarithmic form of Blinder-Oaxaca. This change was made because the model's coefficients are interpreted as the difference in earnings, expressed as a percentage of men's average income. The explanatory variables used in this model are:

$$gmedu_i,\ gage_i,\ married_i,\ men6_i,\ sector_i,\ region_i,\ formal_i,\ zone_i \text{ y } selfemploy_i.$$

It is worth noting that we refrained from adding the variables that measure experience in order to keep the common support high, that is, to avoid the curse of dimensionality. We also made this decision because this variable is constructed with information on age and education, which form part of the regression's explanatory variables.[11] This decomposition is performed separately for women and men.

For the Blinder-Oaxaca estimates, we used robust standard errors and probability weights for consistency with the survey structure. In contrast, we used frequency weights for the Ñopo decomposition model, since that is what the methodology calls for.

Both models may suffer from a selection bias, since they include only the observed wages of employed persons. Given that labor force participation is higher among men than among women, women with lower earning potential may more frequently decide not to join the workforce, while earning potential may have less of an impact on men's labor force participation. If this is the case, the models presented in this study underestimate the gap. However, the increase in female participation could be mitigating this bias.

[11] Calculations not included in the model showed that adding these variables significantly decreased the common support and increased the standard deviation of the variables, without modifying the overall results.

5. RESULTS

Table 3 presents the estimates from the Blinder-Oaxaca decomposition: over the 18 years that were analyzed, the gender gap in hourly earnings fluctuated between 7% and 20%,[12] with no persistent pattern over time, as shown in Graph 7. The gender gap increases during the first years of the study before suddenly decreasing in 2010, which was an outlier year. After that period, the gender gap was generally close to 15%. The size and static nature of the gap after 2010 is probably related to the Paraguayan economy's performance on labor indicators in the 2010s.

In all years except 2004, the explained variables close the gap to such an extent that this component of the gap actually favors women, while the unexplained part accounts for the entirely of the overall gap. The explained gap favoring women is mainly due to the higher average years of schooling that women had (Table A1) and the considerable effect of those years of education on earnings. A second, less important factor is the fact that a higher proportion of women live in cities and wealthier regions. If we were to only consider the observable characteristics in the survey and their impact on earnings, theoretically women should, on average, earn more than men in most years. This shows that the gap favoring men in the country is due to factors that are not explained by the variables used in the study.

Table 4 shows the gap decomposition explained by the different explanatory variables added. Although some of these variables have different categories, the coefficients presented the overall effect. In other words, they show the sum of the effect that the distribution of women and men in each category has on the earnings gap.

The gap explained by education is negative and statistically significant, which means that the level of education of female workers, which on average is higher than that of male workers (Table A1), reduces the earnings gap. This effect ranges from 2% to 5% across the years analyzed.

On the other hand, personal and family characteristics such as age, marital status, and the presence of children in the household have a statistically positive and significant effect on the earnings gap, although their importance decreases over time. The occupational category variable (dichotomous for self-employed workers) has a positive and statistically significant explanatory effect on the gap for most years.[13]

Finally, the region of the country and setting (rural or urban) where male and female workers are located have a negative and statistically significant impact on the gap. The fact that female workers are more likely to be found in urban areas (Table A1) reduces gender income inequalities.

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[12] Calculated as $e^{Diference} - 1$, the explained gap is calculated as $e^{Explain} - 1$, while the unexplained gap is calculated as $e^{No\ explain} - 1$.

[13] Since the occupational variable was not added, the model does not distinguish between the different employee occupations, so it would not distinguish between a laborer and a manager.

TABLE 3

BLINDER-OAXACA DECOMPOSITION

LOGARITHM OF HOURLY EARNINGS

	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019
Differential																	
Estimate for men	7.860***	8.100***	8.156***	8.240***	8.267***	8.400***	8.552***	8.574***	8.698***	8.816***	8.878***	9.008***	9.082***	9.208***	9.191***	9.239***	9.284***	9.320***
	(0.0207)	(0.0138)	(0.0146)	(0.0181)	(0.0173)	(0.0157)	(0.0165)	(0.0191)	(0.0167)	(0.0178)	(0.0161)	(0.0163)	(0.0156)	(0.0191)	(0.0142)	(0.0159)	(0.0142)	(0.0137)
Estimate for women	7.788***	8.024***	8.065***	8.131***	8.105***	8.233***	8.401***	8.391***	8.610***	8.689***	8.735***	8.870***	8.992***	9.127***	9.061***	9.103***	9.145***	9.218***
	(0.0247)	(0.0182)	(0.0178)	(0.0237)	(0.0220)	(0.0219)	(0.0234)	(0.0259)	(0.0233)	(0.0218)	(0.0205)	(0.0203)	(0.0197)	(0.0244)	(0.0188)	(0.0201)	(0.0204)	(0.0183)
Difference	0.0717*	0.0762***	0.0908***	0.109***	0.162***	0.167***	0.152***	0.184***	0.0880**	0.127***	0.143***	0.139***	0.0902***	0.0808**	0.130***	0.136***	0.139***	0.102***
	(0.0322)	(0.0228)	(0.0230)	(0.0298)	(0.0280)	(0.0270)	(0.0286)	(0.0322)	(0.0287)	(0.0281)	(0.0261)	(0.0260)	(0.0252)	(0.0309)	(0.0236)	(0.0256)	(0.0249)	(0.0228)
Decomposition																	
Explained	-0.0305	-0.00742	0.0234	-0.0137	-0.0133	-0.00638	-0.00649	-0.00982	-0.0214	-0.0286	-0.0209	-0.0658***	-0.0224	-0.0837***	-0.0931***	-0.0559***	-0.0896***	-0.0832***
	(0.0221)	(0.0148)	(0.0138)	(0.0180)	(0.0186)	(0.0165)	(0.0182)	(0.0200)	(0.0178)	(0.0174)	(0.0162)	(0.0172)	(0.0158)	(0.0202)	(0.0151)	(0.0166)	(0.0161)	(0.0150)
Unexplained	0.102***	0.0836***	0.0674**	0.122***	0.176***	0.174***	0.158***	0.193***	0.109***	0.156***	0.164***	0.204***	0.113***	0.165***	0.223***	0.192***	0.229***	0.185***
	(0.0310)	(0.0224)	(0.0230)	(0.0305)	(0.0266)	(0.0275)	(0.0285)	(0.0304)	(0.0294)	(0.0270)	(0.0247)	(0.0241)	(0.0243)	(0.0291)	(0.0226)	(0.0273)	(0.0237)	(0.0220)
Decomposition (as a percentage of women's hourly earnings)																	
Total	7%	8%	10%	12%	18%	18%	16%	20%	9%	14%	15%	15%	9%	8%	14%	15%	15%	11%
Explained	-3%	-1%	2%	-1%	-1%	-1%	-1%	-1%	-2%	-3%	-2%	-6%	-2%	-8%	-9%	-5%	-9%	-8%
Unexplained	11%	9%	7%	13%	19%	19%	17%	21%	12%	17%	18%	23%	12%	18%	25%	21%	26%	20%
Remarks	5392	14059	12099	6938	7735	7348	6892	6568	7609	7551	8667	8607	8290	6381	7819	7267	6890	6914

t-statistic in parentheses

* $p < 0.05$,** $p < 0.01$,*** $p < 0.001$

Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

TABLE 4

COMPONENTS OF THE EXPLAINED DIFFERENCE-BLINDER-OAXACA

LOGARITHM OF HOURLY EARNINGS

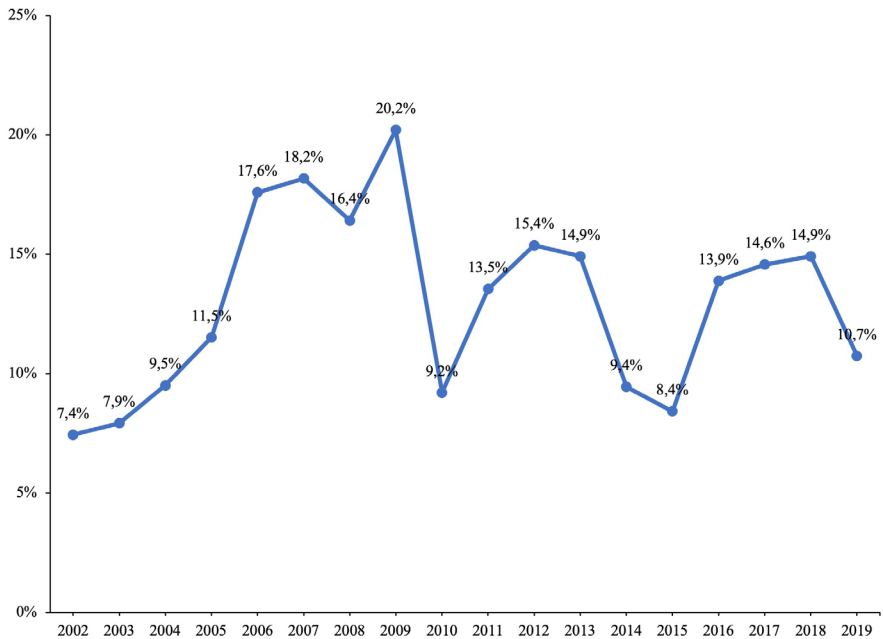
		2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	
Explained Difference	-0.0305	-0.00742	0.0234	-0.0137	-0.0133	-0.00638	-0.00649	-0.00982	-0.0214	-0.0286	-0.0209	-0.0658***	-0.0224	-0.0837***	-0.0931***	-0.0559***	-0.0896***	-0.0832***	-0.0306
Education	-0.0289***	-0.0300***	-0.0207**	-0.0325***	-0.0242**	-0.0288***	-0.0295***	-0.0187*	-0.0322***	-0.0378***	-0.0349***	-0.0417***	-0.0433***	-0.0499***	-0.0531***	-0.0495***	-0.0488***	-0.0342***	-0.0399***
Experience	-0.00734	-0.00459	0.00275	-0.00158	-0.00452	-0.00340	-0.00473	-0.00261	-0.00215	-0.00387	-0.000905	-0.00569	-0.00187	-0.0101	-0.0104	-0.00365	-0.00216	-0.00407	-0.00681
Personal and family characteristics	0.0464***	0.0258***	0.0163***	0.0127	0.0217**	0.0114	0.0167*	0.0107	0.0165**	0.0229**	0.00352	0.0124*	0.0127	0.0142	0.0206**	0.00112	0.00862	0.00368	0.0168*
Occupational category	0.0208**	0.0118***	0.0167***	0.00608	0.0217***	0.0225***	0.0230***	0.0252***	0.0178***	0.0171***	0.0277***	0.00989**	0.0178***	0.00795*	0.00651**	0.0136***	0.00903**	0.0101**	0.0147***
Economic activity	-0.0270	0.0114	0.0208*	0.0129	-0.0120	-0.00743	-0.00827	-0.0230*	0.00249	-0.0133	-0.0132	-0.0187	-0.00234	-0.0147	-0.0392***	-0.00823	-0.0413***	-0.0444***	0.00651
Region	-0.0199***	-0.0176***	-0.00388	-0.0116**	-0.0123***	-0.00188	-0.00656*	-0.00840**	-0.00935***	-0.00894*	-0.00283	-0.0123***	-0.00693*	-0.0172***	-0.0120***	-0.00782**	-0.00407	-0.00813***	-0.00839***
Legal status of employment	0.00303	-0.00179	-0.00357	-0.00354	0.00159	0.00593*	0.00348	0.00981**	0.00454*	-0.000201	0.00341	0.000339	0.000932	-0.00315	0.00198	-0.000143	-0.00382	-0.00172	-0.00919*
Setting (rural/urban)	-0.0177***	-0.00240	-0.00503*	0.00388	-0.00534*	-0.00473	-0.000540	-0.00287	-0.0192***	-0.00455	-0.00375	-0.0101**	0.000515	-0.0108**	-0.00747**	-0.00124	-0.00718**	-0.00446*	-0.00431

* p < 0.05,** p < 0.01,*** p < 0.001

Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

GRAPH 7

TOTAL EARNINGS GAP ESTIMATED USING BLINDER-OAXACA DECOMPOSITION



Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

Table 5 presents the results of the Ñopo decomposition. These results show men earning more than women every year except for 2010. As previously mentioned, 2010 was an unusual year for the Paraguayan economy because it was rebounding from the 2009 recession.

The gap is as large as 23%. As in the Blinder-Oaxaca model, the explanatory variables help close the gap. Most of the gap is caused by factors not explained by the analyzed variables, but also partially by what Ñopo (2008) refers to as the "Maid Effect." There are minor differences between the Blinder-Oaxaca and Ñopo estimates, which are mainly related to the structure of the models and the form of the dependent variable, which are used according to common practices in the international literature.

The common support for the different years, for both men and women, never dips below 44%. This value is similar to those of the models for Latin American and Caribbean countries used in Ñopo (2010, 2012), the control variables of which are very similar to those presented in this study. As is the case with the Blinder-Oaxaca model, the Ñopo decomposition shows no trend, and the gap fluctuates over time, although it mainly favors men.

TABLE 5

ÑOPO DECOMPOSITION

HOURLY EARNINGS

		2003	**2004**	**2005**	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
d **(Total)**	23%	5%	12%	17%	20%	12%	15%	11%	-1%	10%	10%	13%	23%	19%	25%	20%	19%	17%
d**o (Unexplained)**	37%	1%	12%	4%	22%	37%	21%	3%	13%	16%	18%	34%	8%	26%	23%	38%	18%	28%
d**m (Maid Effect)**	16%	13%	15%	17%	20%	8%	5%	10%	14%	0%	13%	6%	21%	9%	6%	-1%	10%	4%
d**f (CEO Effect)**	-4%	4%	-1%	3%	-7%	-10%	-2%	6%	-15%	7%	-9%	-3%	-1%	-6%	-2%	-9%	6%	-3%
d**x (Explained)**	-27%	-14%	-14%	-6%	-15%	-23%	-9%	-8%	-12%	-13%	-12%	-23%	-6%	-11%	-2%	-8%	-15%	-12%
% Men	51%	61%	59%	51%	55%	52%	47%	47%	49%	52%	55%	52%	48%	61%	63%	63%	45%	44%
% Women	58%	68%	67%	61%	66%	62%	59%	59%	61%	64%	65%	64%	63%	68%	72%	74%	54%	54%
Standard Error	12%	6%	7%	5%	5%	8%	8%	9%	4%	15%	5%	6%	6%	4%	3%	6%	12%	4%

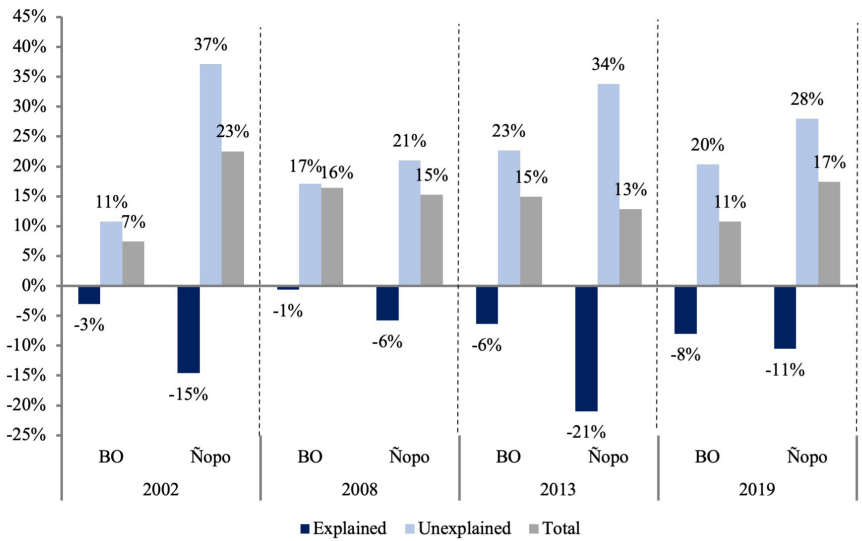
Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

Graph 8 compares the different gender earnings gaps calculated using the two methodologies. As in Graph 3, we use the years 2002, 2008, 2013, and 2019 to maintain a similar time interval and simplify the graph by leaving out years. The graph shows both explained and unexplained components. For the Ñopo model, we calculate the explained component as the sum of the explained component, the CEO Effect, and the Maid Effect. Moreover, the two models are expected to show significant differences in the unexplained and explained component due to the methodological differences between these models. Oaxaca-Blinder decomposes the gap by analyzing the effect of each explanatory variable on earnings and calculating the difference in the mean of these variables between women and men. In contrast, the Ñopo model analyzes the disparities over the entire income distribution, since it generates counterfactuals with the same observable characteristics for everyone within the common support.

For 2002, 2008, 2013 and 2019,, both methodologies consistently show an income gap favoring men that is generated by factors unexplained by the analysis variables. Based on just the explanatory variables, there would actually be a gap favoring women (again, mainly because of the higher average years of education that women had and the fact that a higher proportion of women tend to live in cities and wealthier regions).

GRAPH 8

TOTAL EARNINGS GAP ESTIMATED USING BLINDER-OAXACA AND ÑOPO DECOMPOSITION

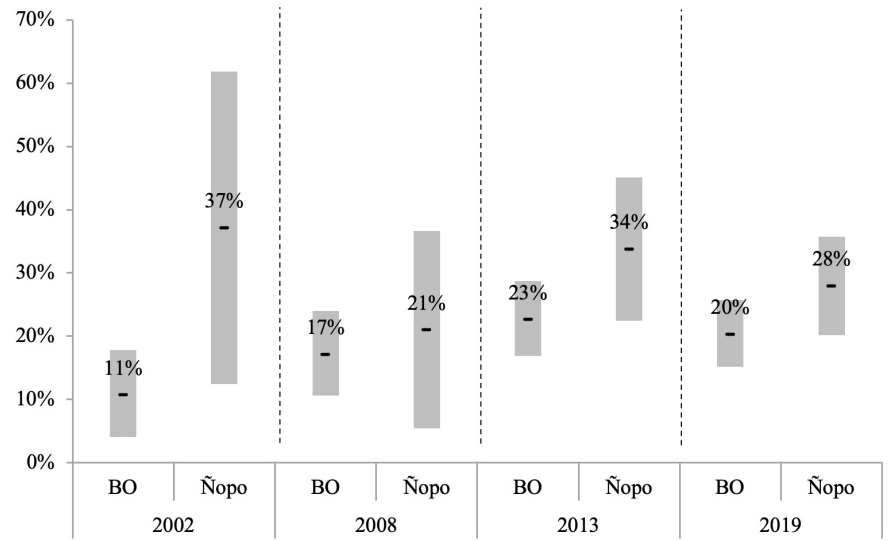


Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.

Meanwhile, Graph 9 shows how the unexplained gap changes over same periods as those chosen for Graph 8. Graph 9 includes confidence intervals of two standard deviations above and below the point estimation. This graph reveals that both methodologies show a statistically significant unexplained income gap for the different years analyzed-a gap that is statistically the same under both methods at 95% statistical significance. Since the Ñopo model restricts comparisons of differences to only men and women with comparable characteristics (common support), its confidence intervals are broader than those of the Blinder-Oaxaca model.

GRAPH 9

UNEXPLAINED EARNINGS GAP ESTIMATED USING BLINDER-OAXACA AND ÑOPO DECOMPOSITION



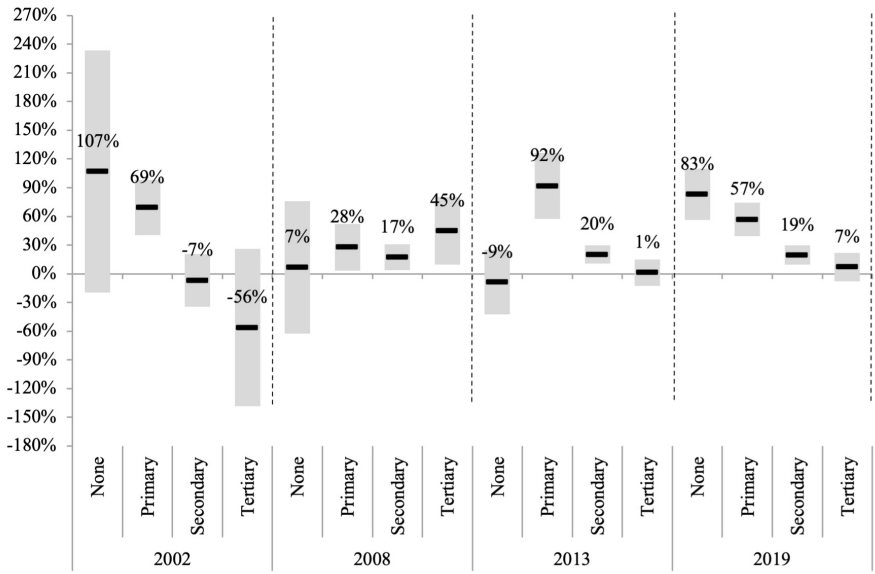
Source: Prepared by the authors based on the Paraguayan household surveys harmonized by the IDB.
Note: The bars represent the unexplained component at the 95% confidence interval.

Additionally, the Ñopo decomposition allows us to disaggregate the income gap by explanatory variable. Graph 10 presents the unexplained income gap by level of education, adding confidence intervals with a significance level of 68%. As the graph shows, the gap is generally higher for lower educational levels; however, this gap has decreased over time. In 2002, 2013, and 2019, the gap favoring men was larger for those with a primary education than a secondary one, and larger for those with a

secondary-level education than a tertiary one. However, the latter of the two differences is not statistically significant. In 2008, there were no clear difference.

GRAPH 10

UNEXPLAINED INCOME GAP ESTIMATED BY ÑOPO DECOMPOSITION
BY EDUCATIONAL LEVEL

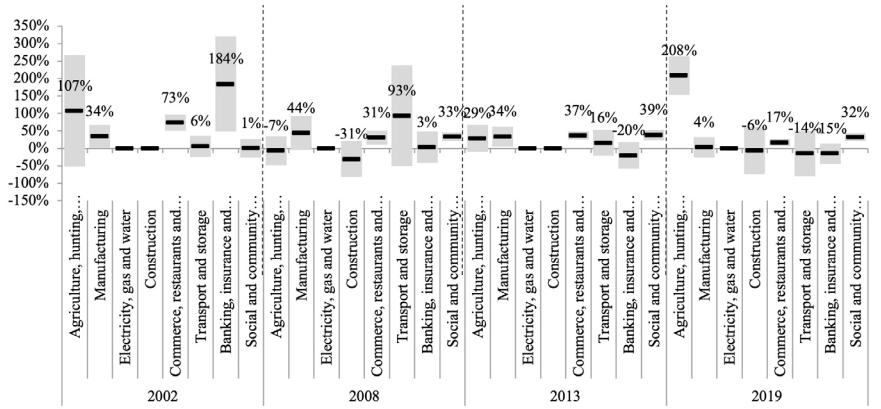


Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.
Note: The bars show the unexplained component at the 95% confidence interval.

Graph 11 presents the unexplained income gap by economic activity, with the same confidence intervals as the previous graphs. For example, the gap is statistically significant for agriculture, forestry, and fishing in 2019; for manufacturing in 2002, and 2013; for social and community services in 2008, 2013, and 2019; and for commerce, restaurants, and hotels for all years. The unexplained gap in banking, insurance, and real estate decreases over time and is not statistically significant in these fields in 2008, 2013, and 2019.

GRAPH 11

UNEXPLAINED INCOME GAP ESTIMATED USING THE ÑOPO DECOMPOSITION, BY ECONOMIC ACTIVITY



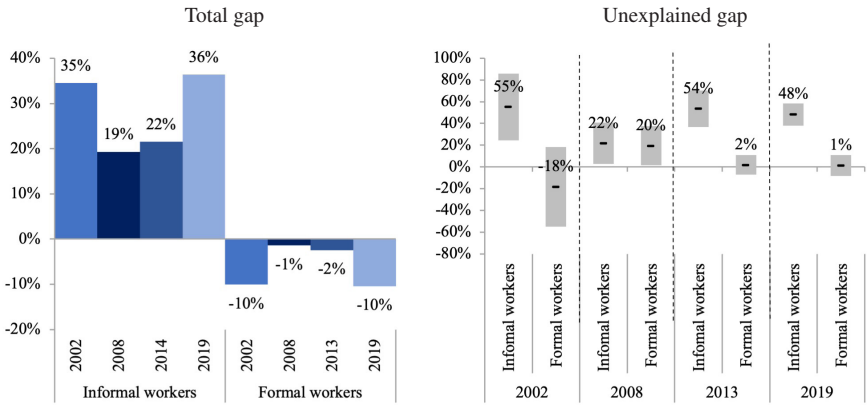
Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.
Note: The bars show the unexplained component at the 95% confidence interval.

Meanwhile, Graph 12 displays both the total and unexplained income gap by legal status of employment. It highlights a clear distinction between people working in the formal and informal sectors. There is a significant gap in people's income in the informal sector, whereas the gap among the legally employed is smaller and even favors women. The unexplained gap between the earnings of men and women is statistically higher in the informal sector in most of the years analyzed. This discrepancy may be caused by the lack of legislation governing the types of labor relations and business practices that are prevalent in the sector. This is relevant given that Paraguay has an overall informal employment rate of 76% (75% for women and 77% for men). This rate is calculated based on data on registration or contribution by a person to long-term social security from the 2020 Ongoing Permanent Household Survey. Additionally, 41% of all informal workers are women and 59% are men.[14]

[14] On the other hand, the report *Informal Employment 2015-2020,* presented by the National Institute of Statistics in June 2021, estimates the informal employment rate to be around 65% (66% among women and 64% among men). This report defines informal work as that performed for companies that are not registered in the Single Registry of Taxpayers (RUC).

GRAPH 12

INCOME GAP ESTIMATED BY DECOMPOSING ÑOPO BY FORMALITY

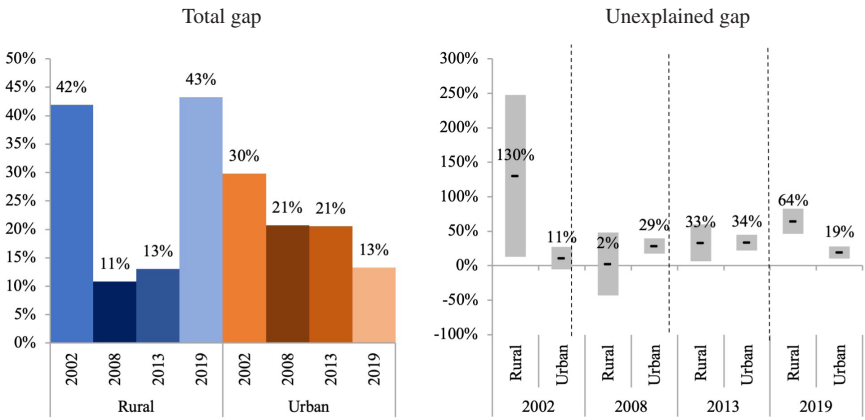


Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.
Note: The bars show the unexplained component at the 95% confidence interval.

Similarly, Graph 13 presents the total and unexplained income gap by setting. In 2002 and 2019, there was a larger overall income gap among people living in rural

GRAPH 13

INCOME GAP ESTIMATED USING THE ÑOPO DECOMPOSITION, BY SETTING



Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.
Note: The bars show the unexplained component at the 95% confidence interval.

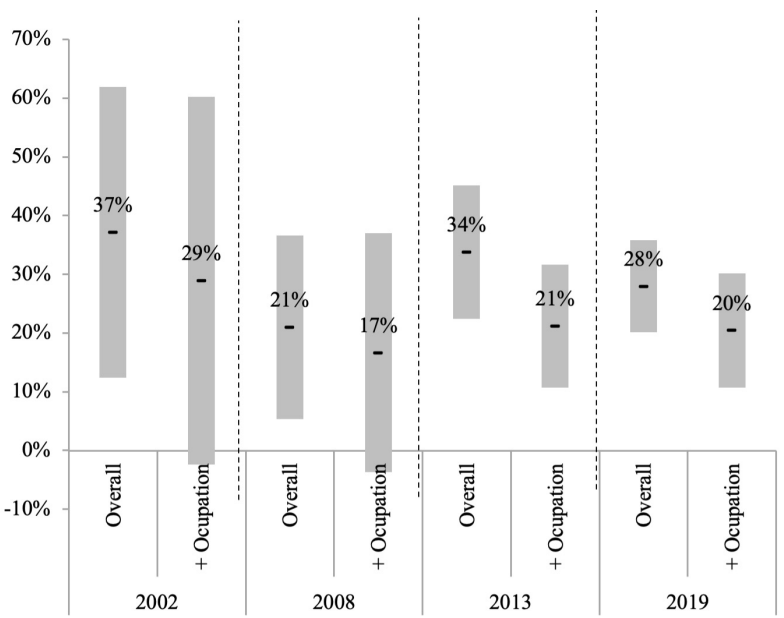
areas. However, this contrast is not statistically significant; also, this finding did not hold true for 2008 and 2013, when the gap was similar for people in rural and urban settings.

Finally, to evaluate the results' validity, we analyze how adding the occupation variable affects the estimates of the Ñopo model. In both the Blinder-Oaxaca and Ñopo decomposition models, this variable was left out to avoid the curse of dimensionality in the Ñopo model and because the occupational categories were changed in the last two years of the study, which could distort inter-year comparisons. Therefore, the only difference between the models is that in the Ñopo model, we left out the experience variable. Still, this variable uses information on age and years of schooling, and the common support uses both variables, so it is implicitly taken into account.

Graph 14 presents the unexplained gender earnings gap using the Ñopo decomposition with the occupational variable and compares the results with the estimates in Table 5. It uses confidence intervals of two standard deviations. The results for each year are statistically the same, and the confidence intervals are significantly wider. In

GRAPH 14

UNEXPLAINED INCOME GAP ESTIMATED USING THE ÑOPO DECOMPOSITION, ADDING THE OCCUPATIONAL VARIABLE



Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB.
Note: The bars show the unexplained component at the 95% confidence interval.

general, adding these characteristics to the analysis does not alter the conclusions. The conclusion is that there is an income gap that is not explained by the explanatory variables used in the literature and available in the Paraguayan Household Surveys.

Similarly, Table A2 presents women's participation by occupation and their average hourly income, providing an overview of women's access to different jobs and positions and their average income in these positions.

6. DISCUSSION

We based this study's analysis methodology on Urquidi, Valencia, and Durand, G. (2021). Our study uses the same variables, with the addition of setting and occupational category. Unlike the study conducted in Bolivia, we did not find a discernible trend that suggests the gap is narrowing over time. The unexplained income gap between men and women has remained relatively high over the past two decades, and women continue to need expanded opportunities to increase their earnings. But as was the case in the Bolivian study, the gap in this study is smaller for women with high levels of education and who are formally employed.

These results align with the literature on gender wage gaps in Paraguay. As was the case in Ñopo and Hoyos (2010), the country continues to have a very significant unexplained gap. But unlike other countries in Latin America and the Caribbean, Paraguay's explained income gap does not favor men.

Psacharopoulos and Tzannatos (1992) carry out a regional analysis that uses neither of the models in this study. But their linear regression models also find that observable characteristics like education help close the gap. However, they still find a significant unexplained gap.

In agreement with authors such as Ñopo (2012) and Gasparini and Marchionni (2015), we find education to be a relevant factor in closing the gender gaps, given the increase in the proportion of women who have completed secondary education (Tablas A2). The main difference of both papers is that Gasparini and Marchionni (2015) analyze changes in labor force participation in Latin America, while Ñopo (2012) examines the gender gap using additional variables that measure whether the person works part-time, whether there are other earners in the home, and whether they work in a small firm.

ILO (2019) finds that the unexplained gap persists and appears primarily among low-income and self-employed workers, which is consistent with our findings. The same study also finds that higher male labor force participation in rural areas and the earnings gap between rural and urban workers are variables that reduce the overall gender earnings gap. This study uses the additional control variables used in Ñopo (2012).

This overall income gap favoring men in Paraguay is also in line with the studies of Ortiz-Valverdi (2017), Serafini and Egas (2018), Penha, Lopez, and da Cunha Cassuce

(2021), and Heikel and Piras (2014). Serafini and Egas (2018) use a Blinder-Oaxaca decomposition model but add variables that measures the employment relationship type and company type. Their results are similar to ours: they found a statistically significant income gap favoring men in 2015 that is not explained by the control variables but by unobservable, discrimination-related characteristics.

Penha, Lopez, and da Cunha Cassuce (2021) also find results similar to ours. As in our study, in their study the explained component would reduce the salary difference between the groups, and the primary source of wage inequality was the unexplained component. They analyze the formal sector in Paraguay's border region using Blinder-Oaxaca and add variables that measure whether the person works in the public or private sector and whether they are the head of the household.

Ortiz-Valverdi (2017) uses a Blinder-Oaxaca model and, without adding any variables beyond those we use, finds results that are consistent with ours. The study observes that the most significant component in the salary difference between men and women is the unexplained portion attributed to discrimination in the labor market. It also finds that the variables that help close this gap are occupation, age, marital status, and hours spent working.

Finally, Penha, Lopez, and da Cunha Cassuce (2021) and Ortiz-Valverdi (2017) find a reduction in the earnings gap in Paraguay. They use 2017-2019 and 2009-2015 as their analysis period. But based on the more extended time period we used in our study, we did not find a persistent trend confirming a systematic reduction in the earnings gap.

7. CONCLUSIONS

The study concludes that there is a consequential and statistically significant earnings gap between men and women in Paraguay, at the aggregate level. It also finds no persistent trend that would suggest the gap is reducing over time. The gap is primarily explained by factors that cannot be unobserved in the Household Surveys, meaning that variables such as experience, personal and family characteristics, industry and economic activity, region of the country, or setting (rural or urban) fail to explain the gap. This could mean that the gap is more attributable to regulatory issues, biases, or discrimination than individual characteristics or preferences. The unexplained gap is wider among people with low levels of education, in rural areas, and who work informal jobs. The income gap is heterogeneous among different economic activities but statistically significant in most of them.

Among the characteristics analyzed in this study, education contributes the most to closing the gender gap in Paraguay. In contrast, personal and family factors such as age, marital status, and minors in the household generate an income gap in favor of men, as does being self-employed. On the other hand, region also helps reduce the income gap due to the high proportion of women who work in economically dynamic

areas such as Asunción and the central department. Setting also has a mitigating effect due to the high proportion of women who work in urban areas.

This study helps track year-by-year changes in Paraguay's gender earnings gap between 2002 and 2019. Its conclusions provide reliable data and estimates that are the foundation of evidence-based policymaking.

These conclusions could be complemented by future analyses that further disaggregate the data and study the income gap in groups of people with specific characteristics in more detail. They could also be brought into sharper focus by new resources, such as surveys conducted explicitly for this purpose, that can better quantify the income gap and what causes it. In addition, there is a need for study specific effects that the pandemic had and continues to have on the earnings gap in Paraguay.

APPENDIX

TABLE A1

DISTRIBUTION OF CHARACTERISTICS OF THE EMPLOYED POPULATION THAT EARNS INCOME, BY YEAR AND GENDER, MEN (M) AND WOMEN (W)

	2003		2004		2005		2006		2007		2008		2009	
	M	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**
Years of Education	7.2	7.9	7.7	8.2	7.7	8.0	8.1	8.5	8.0	8.4	8.2	8.6	8.4	8.9	8.6	9.1
None	31%	29%	28%	27%	27%	28%	24%	25%	25%	25%	23%	24%	23%	23%	21%	20%
Primary	49%	43%	48%	44%	50%	44%	50%	42%	49%	43%	49%	41%	47%	40%	46%	41%
Secondary	17%	25%	20%	25%	20%	23%	22%	27%	23%	27%	25%	29%	26%	31%	28%	34%
Tertiary	3%	3%	4%	4%	3%	4%	4%	5%	3%	5%	3%	5%	4%	6%	5%	6%
Years of Experience	21.7	20.8	21.3	21.3	21.0	21.6	20.8	21.3	21.2	21.0	21.2	21.3	21.1	21.1	20.7	21.2
15-25	30%	29%	30%	26%	32%	27%	30%	26%	31%	28%	30%	25%	29%	26%	31%	26%
26-35	24%	26%	24%	26%	24%	26%	25%	27%	22%	25%	23%	26%	25%	26%	23%	24%
36-45	22%	24%	22%	25%	22%	23%	23%	24%	21%	22%	21%	25%	21%	22%	20%	23%
46-55	16%	14%	15%	16%	15%	15%	15%	15%	16%	17%	18%	16%	16%	17%	17%	17%
56-65	8%	7%	8%	8%	8%	8%	8%	8%	9%	8%	9%	8%	10%	9%	10%	10%
Married	61%	57%	61%	59%	60%	60%	60%	59%	60%	58%	61%	60%	61%	58%	58%	58%
Children under six years of age in the household	47%	47%	47%	45%	44%	45%	43%	45%	42%	44%	41%	42%	40%	41%	40%	38%
Agriculture, hunting, forestry, and fishing	40%	18%	38%	19%	36%	23%	36%	21%	34%	21%	31%	22%	28%	17%	31%	19%
Mining and quarrying	0%	0%	0%	0%	0%	0%	0%	0%	1%	0%	1%	0%	0%	0%	0%	0%
Manufacturing	11%	10%	12%	10%	12%	11%	10%	8%	12%	8%	14%	9%	14%	9%	12%	10%
Electricity, gas, and water	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%
Construction	7%	0%	7%	0%	8%	0%	10%	0%	10%	0%	10%	0%	11%	0%	10%	0%
Retail, restaurants, and hotels	19%	29%	21%	26%	21%	25%	21%	26%	20%	28%	22%	27%	21%	29%	22%	30%
Transportation and storage	5%	2%	6%	1%	6%	1%	5%	2%	6%	1%	6%	2%	6%	2%	7%	2%
Banking, insurance, and real estate	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	1%	2%	1%	1%	1%
Social and community services	15%	39%	15%	42%	15%	38%	16%	42%	15%	41%	15%	40%	17%	42%	16%	38%
Urban	52%	66%	52%	64%	53%	63%	54%	66%	54%	64%	56%	64%	58%	65%	57%	65%
Formal	12%	14%	12%	13%	11%	12%	14%	16%	12%	13%	16%	15%	17%	16%	18%	17%

Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB. Frequency weights are used.

Table A1 (Continued)

2010		2011		2012		2013		2014		2015		2016		2017		2018		2019	
M	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**	**M**	**W**
8.5	9.0	9.0	9.6	8.8	9.4	9.2	10.0	9.3	10.0	9.5	10.3	9.3	10.2	9.4	10.2	9.6	10.2	10.0	10.4
21%	21%	20%	19%	20%	20%	18%	16%	17%	17%	16%	15%	17%	15%	17%	16%	16%	16%	15%	16%
47%	40%	44%	38%	45%	38%	43%	38%	43%	35%	42%	34%	44%	36%	42%	34%	40%	34%	38%	31%
27%	33%	31%	36%	31%	36%	32%	37%	35%	39%	37%	40%	33%	39%	35%	40%	36%	40%	40%	42%
4%	6%	6%	8%	4%	6%	7%	10%	6%	9%	6%	10%	6%	10%	6%	10%	7%	10%	8%	10%
21.6	21.4	21.6	21.0	21.0	21.2	21.0	20.1	21.1	20.9	21.1	21.2	20.7	20.2	20.6	20.6	20.4	20.6	20.3	20.7
28%	24%	27%	24%	29%	25%	27%	25%	28%	24%	26%	22%	27%	24%	27%	22%	25%	22%	25%	21%
25%	27%	24%	25%	25%	26%	25%	28%	25%	27%	26%	26%	27%	28%	27%	28%	29%	29%	28%	29%
20%	23%	20%	23%	19%	20%	21%	22%	18%	21%	19%	23%	20%	23%	21%	24%	21%	23%	22%	24%
18%	18%	18%	18%	17%	19%	17%	17%	17%	18%	17%	17%	16%	16%	15%	15%	16%	16%	15%	16%
10%	9%	11%	10%	10%	9%	11%	8%	11%	11%	11%	11%	10%	9%	11%	10%	10%	10%	11%	10%
61%	59%	61%	56%	61%	61%	61%	57%	60%	56%	62%	57%	63%	60%	62%	61%	61%	60%	61%	60%
39%	39%	35%	35%	38%	39%	35%	38%	36%	38%	35%	34%	39%	39%	39%	40%	38%	39%	38%	38%
29%	17%	28%	19%	27%	21%	26%	15%	25%	15%	22%	13%	15%	14%	22%	14%	21%	13%	21%	13%
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
13%	8%	12%	8%	13%	8%	12%	8%	14%	8%	15%	9%	13%	8%	14%	8%	14%	8%	14%	8%
1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%	1%	0%
12%	0%	11%	0%	10%	0%	12%	0%	12%	1%	12%	0%	13%	0%	13%	0%	13%	0%	14%	0%
21%	30%	23%	29%	24%	29%	23%	29%	24%	29%	25%	30%	23%	31%	25%	32%	24%	31%	24%	31%
6%	2%	6%	2%	7%	1%	6%	2%	6%	2%	6%	1%	6%	2%	5%	1%	5%	1%	5%	1%
2%	1%	1%	2%	1%	1%	2%	2%	2%	2%	2%	2%	2%	2%	2%	2%	7%	7%	6%	7%
16%	42%	17%	40%	17%	40%	18%	44%	17%	43%	18%	44%	17%	43%	18%	43%	15%	40%	16%	40%
57%	67%	58%	66%	59%	65%	57%	67%	58%	67%	58%	67%	60%	69%	61%	68%	61%	67%	62%	68%
19%	16%	19%	21%	21%	19%	23%	23%	23%	23%	23%	24%	22%	22%	23%	23%	24%	24%	25%	25%

TABLE A2

WOMEN'S PARTICIPATION BY OCCUPATION (%) AND AVERAGE HOURLY INCOME (₲)

	2004		2005		2006		2007		2008		2009	
	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)
Professional and technical	46%	10622	50%	11368	50%	9124	50%	10718	48%	12959	51%	13229	51%	13325	48%	15699
Director or senior officer	34%	8170	36%	16771	31%	11152	37%	11734	39%	10641	35%	33633	35%	11580	36%	14628
Administrative and intermediate level	53%	6072	47%	6991	52%	6313	57%	6059	49%	7399	54%	7253	47%	8522	50%	8467
Merchants and vendors	60%	2500	54%	3329	56%	3722	57%	3241	57%	3067	56%	4276	57%	4718	58%	6101
Services	70%	3093	74%	3397	73%	3426	73%	3448	70%	3605	72%	4037	71%	4749	67%	5107
Agricultural workers	21%	2175	24%	6378	29%	6756	27%	6019	27%	3797	31%	4614	27%	9545	29%	5904
Non-agricultural laborers, machinery operators, and transportation services	15%	2591	16%	2994	16%	3434	13%	3771	13%	3699	12%	4393	13%	4238	14%	5340
Armed Forces	20%	7015	0%	0	0%	0	4%	21346	0%	0	5%	9836	0%	0	0%	0
Other	21%	2491	0%	0	0%	0	0%	0	62%	0	0%	0	100%	0	41%	0
Total	**50%**	**3740**	**51%**	**5543**	**50%**	**5210**	**50%**	**5280**	**50%**	**4896**	**51%**	**6413**	**50%**	**7129**	**50%**	**7194**

Table A2 (Continued)

	2018		2019	
	(%)	(₲)	(%)	(₲)
Members of the executive, legislative, or judicial branches and staff.	40%	38414	41%	27056
Scientific and intellectual professionals	62%	32503	65%	31742
Technicians and Mid-Level Professionals	45%	18643	42%	19259
Office employees	50%	15181	52%	13950
Service workers and retail and market sales workers	60%	9260	61%	9858
Farmers, ranchers, and fishers	36%	3000	35%	3865
Tradespeople, operators, and craftspeople	13%	7551	15%	9798
Plant and machine operators and assemblers	5%	11105	4%	14614
Unskilled workers	45%	9896	47%	10094
Armed forces	9%	21902	18%	40082
Total	**50%**	**13232**	**51%**	**13466**

Source: Prepared by the authors based on the Paraguay Household Surveys harmonized by the IDB. Frequency weighs are used.

Table A2 (Continued)

2010		2011		2012		2013		2014		2015		2016		2017	
(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)	(%)	(₲)
49%	16731	53%	15912	50%	19195	54%	19223	53%	20904	54%	22777	53%	20866	52%	24365
33%	29299	35%	20461	33%	28839	38%	26404	34%	26877	40%	29306	37%	25088	36%	28998
45%	10025	51%	8880	52%	10101	49%	10017	51%	11519	55%	12021	52%	13418	51%	11669
58%	7878	59%	6421	58%	6644	60%	6771	57%	10639	57%	8550	57%	9062	58%	8242
71%	5899	65%	6297	67%	7400	73%	7517	71%	8130	70%	8831	70%	8730	70%	9110
27%	6682	31%	14421	36%	7534	29%	7708	30%	12118	29%	3004	28%	5329	30%	8056
12%	16938	12%	7229	12%	6990	12%	7666	11%	8331	12%	9426	11%	7073	11%	9077
0%	0	0%	0	0%	0	2%	24965	5%	10769	0%	0	9%	16595	4%	0
53%	0	12%	0	0%	0	71%	0	9%	6112	0%	0	22%	603	17%	0
49%	**9500**	**51%**	**9997**	**50%**	**9815**	**51%**	**10610**	**51%**	**12583**	**51%**	**11811**	**50%**	**11415**	**50%**	**12233**

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