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## Gender Wage Gaps in Central American Countries: Evidence from a Non-Parametric Approach

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IDB WORKING PAPER SERIES No. 111

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## Evidence from a Non-Parametric Approach

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## **Abstract\***

This paper compares gender wage gaps for Costa Rica, Honduras, Nicaragua and El Salvador from the mid-1990s to the mid-2000s using the non-parametric matching methodology introduced by Ñopo (2008), which allows an analysis not only of average gaps but also their distributions. While a simple comparison of average wages would suggest small or even negative gaps, the wage gap is substantial when workers with comparable human capital characteristics are considered. Although the gender wage gap declined from the mid-1990s to 2000, the gap appears to increase thereafter. The results also indicate that females have access barriers to certain human capital profiles, which contributes to wage gaps. The unexplained component of the gender wage gaps is more pronounced among poorer individuals. In Nicaragua, particularly, these unexplained gaps are negative for those at the lowest extreme of the earnings distribution.

**Keywords:** Gender, Race, Wage gaps, Central America

**JEL codes:** C14, D31, J16, O54

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\* Research Department, Inter-American Development Bank. The comments of Juan Pablo Atal and Melisa Morales are gratefully acknowledged. The usual disclaimer applies: any mistake within the paper is our own and the findings herein do not necessarily represent the views of the Inter-American Development Bank or its Board of Directors. Corresponding author: Ñopo ([hugon@iadb.org](mailto:hugon@iadb.org)) 1300 New York Ave. NW. Washington, DC 20577.

## 1. Introduction

Female participation in labor markets has increased significantly in Latin America since the 1950s. There are many reasons behind this worldwide phenomenon, such as increases in women's political participation and in women's number of completed years of education (Psacharopoulos and Tzannatos, 1993). In addition, recent evidence points toward a rise in the prevalence of part-time jobs and women's preference for them (López Bóo, Madrigal and Pagés, 2009), allowing the insertion of more women each year into Latin American labor markets. Even though the gender gap in education has closed, and in many Latin American countries females presently achieve more years of education than males (Duryea et al., 2007), there still remain important gender differences in fields of specialization and occupations, not to mention labor force participation and wages.

Countries in Central America are not the exception to the patterns followed by the rest of Latin America. The *Informe Estado de la Región 2008* shows that Central America has a relative young labor force (29 percent under 25 years of age) and one in which females are still underrepresented, making up 38 percent of the labor force. While overall regional unemployment rate is 4.3 percent, and females are more affected than their male counterparts (4.8 percent vs. 4.1 percent). Almost two-fifths of the economically active labor force lives in rural areas, where the unemployment rate is 5.3 percent, higher than in urban areas. On the other hand, 39 percent of the labor force has not completed primary education and 58 percent has barely achieved that, with no further instruction.

There have been important empirical advances toward understanding gender disparities in many of Latin America's labor markets, but there are still few studies on this subject for Central America. Among the first works to address Central American countries is Psacharopoulos and Tzannatos (1993). Using historical census data and household surveys in a set of Latin American countries including Costa Rica and Honduras, they investigate the reasons for the observed male-female gap in labor earnings and find that gender differences in human capital characteristics cannot account for the observed earnings differential. They also find that women workers in the public sector are paid more than their counterparts in the private sector and that women in the public sector have greater pay equality to men than their counterparts in the private

sector. These differences reflect the fact that women in the public sector tend to be more educated than women in the private sector, as well as relative to men in the public sector. Similar results are shown in Panizza and Qiang (2005) for Costa Rica and El Salvador. They found a premium of more than 10 percent associated with working in the public sector. While this premium is often higher for women than men, it still does not compensate for the wide overall gender wage gap.

Dávila and Pagán (1999) analyze the sources of inter-country differences between El Salvador and Costa Rica in the gender wage gap during the late 1980s from an occupational segregation approach. They report that Salvadoran and Costa Rican women are underrepresented in occupational categories such as managerial, services, agricultural labor, and laborer occupational categories and they are overrepresented in professional, administrative support/clerical, and transportation jobs. They also found that the differences in the gender wage gap are explained by differences in weekly hours worked and differences in occupational attainment between Costa Rican and Salvadoran women. More recently, Deutsch et al. (2005), using data for urban Costa Rica in 1989, 1993 and 1997, found that occupational segregation did not decrease during this period. Human capital endowments served to reduce the gender gap in earnings, but a larger problem involved returns to that human capital; in particular, occupational segregation is much more severe among the less educated than among the more educated. Furthermore, in all the years studied, differences in wages that cannot be explained by differences in human capital characteristics account for the largest share of the wage gap.

Corley, Perardel and Popova (2005) show recent trends in low- and high-skilled occupational wages across countries. They find that between 1990 and 2000 Nicaragua had particularly strong wage growth in both high-skilled and low-skilled occupations. Also, in El Salvador the gender wage gap in the manufacturing sector has increased from 5 percent (1996) to almost 16 percent (2003). The opposite occurred in Costa Rica, however, where that gap has been reduced from 28 percent (1996) to 18 percent (2006). Finally, a similar exercise—but focusing on high and low educational attainment groups—can be found in Pisani and Pagán (2004), who found that in Nicaragua workers with higher levels of education were most likely to be employed in the much higher paying formal sector and conversely, those with lower education were most likely to be



found in low-paying informal sector work. They also found that women have suffered the most in terms of diminished earnings in both educational groups.

In this study we analyze wage gaps by gender in Costa Rica, El Salvador, Honduras and Nicaragua, using National Household Surveys for three moments in each country: one around the mid-1990s, a second around the early 2000s and a third around the mid-2000s. Our paper tries to contribute to the existing literature on gender wage gaps in Central America by using a novel non-parametric approach that allows us to carry out an analysis not only of average wage gaps but also of their distributions. The paper is organized as follows. This introductory section has reviewed the wage gap literature available for Central America, and in Section 2 we describe the data sets available and present some descriptive statistics. Section 3 explains the methodology used and presents wage gaps decompositions for the four countries, and Section 4 analyzes the main findings of the wage gaps decompositions in each country. Finally, Section 5 concludes and makes some policy recommendations.

## 2. The Data: Descriptive Statistics

The data for this study are taken from the official household surveys in each country. We use information for Honduras, Nicaragua, Costa Rica and El Salvador in three different points in time: first, the mid-1990s; second, the early 2000s and third, the mid-2000s. Overall, the surveys are representative at a national level and for the rural/urban disaggregation. In each of the surveys used, there were no major changes in definitions and sampling procedures, making it possible to obtain comparable measures across years (with the sole exception of marital status in El Salvador, as explained below). Table 1 presents the data sources for each country and years used in the analysis.

**Table 1. Data Sources**

Country	Survey	Years
Costa Rica	Encuesta de Hogares de Propósitos Múltiples	1995, 2000, 2006
Honduras	Encuesta Permanente de Hogares de Propósitos Múltiples	1997, 2002, 2007
Nicaragua	Encuesta Nacional de Hogares sobre Medición de Niveles de Vida	1998, 2001, 2005
El Salvador	Encuesta de Hogares de Propósitos Múltiples	1995, 2000, 2005

*Source:* MECOVI – IADB.

The population under consideration is made up of all working females and males who show positive earnings in the surveys. That is, we exclude all those out of the labor force, unemployed or employed with zero salaries. We recognize that selection into salaried employment (or self-employment) is not random; however, we do not take into account selection issues for this analysis. In that sense, our estimators should be interpreted as those that arise among those who work with positive earnings and not necessarily representative of the population as a whole. In Table 2 we present descriptive statistics for the selected samples of the four countries.

It is not surprising that women represent only between 30 and 40 percent of the paid workforce; roughly one out of three working individuals in these countries is a female. Female presence has nonetheless been increasing in the period under consideration, especially in Honduras and Costa Rica. Moreover, between one-half and two-thirds of the sample covers urban areas, with a clear increasing trend in the same two countries that showed an increase in female presence.

These Central American countries show patterns of gender schooling gaps similar to those in the rest of the region, with a marked reversal in recent decades (Duryea et al., 2007). On average, females display around one more year of schooling than their male counterparts. In Costa Rica, around half of workers in our samples report being a head of household, and that percentage is slightly lower in the other three countries. Marital arrangements seem to be largely similar across countries and stable over time. With the sole exception of El Salvador in 1995,<sup>1</sup> around one out of every four workers is single; and around five or six out of every 10 workers are in a (formal or informal) marital union. Age groups display a parallel pattern across countries, with almost 40 percent of the sample in each country located in the range of 25-40 years of age.

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<sup>1</sup> It should be noted that the category of “informal union” was not included in the Salvadoran survey until 2000.

**Table 2. Descriptive Statistics, Samples of Working Individuals with Positive Earnings**

	HONDURAS			COSTA RICA			NICARAGUA			EL SALVADOR		
	1997	2002	2007	1995	2000	2006	1998	2001	2005	1995	2000	2005
Gender												
% Females	35.94	36.66	40.39	30.58	33.03	36.05	36.24	36.34	34.51	41.99	44.96	44.55
Area:												
% Living in urban areas	51.33	57.61	60.98	46.20	61.43	61.07	61.68	65.84	59.41	66.23	69.39	68.36
Average income (by hour/ national currency)												
Males	7.71	14.72	23.58	282.33	559.43	997.49	6.07	7.81	9.35	7.84	11.34	1.37
Females	6.84	15.10	23.12	280.86	568.94	1016.80	5.54	8.24	9.32	6.26	10.20	1.20
Average years of schooling												
Males	4.95	5.10	6.99	7.35	7.70	8.28	5.21	5.14	5.21	6.38	7.13	7.67
Females	6.16	6.08	7.90	8.87	9.42	9.98	6.22	6.73	6.67	6.34	6.99	7.82
Marital Status:												
Single	27.27	34.55	41.13	35.08	32.70	32.04	21.49	23.11	22.96	65.39	24.32	24.92
Formal or informal partners	57.29	57.71	53.49	57.31	58.56	56.28	59.99	57.81	57.60	31.36	55.47	55.43
Divorced or separated	12.36	5.08	3.48	6.22	7.53	10.33	14.69	15.60	15.89	1.01	16.10	16.17
Widow	3.08	2.65	1.90	1.39	1.21	1.36	3.83	3.49	3.55	2.24	4.11	3.48
% Reported as head of the household	47.80	48.07	42.91	52.24	50.46	49.99	46.31	45.45	44.40	45.11	46.55	47.51
Age Groups:												
% of population younger than 15 years	3.59	2.90	3.51	2.57	1.50	1.09	3.45	2.49	2.30	3.11	1.58	1.57
% of population between 15 and 24 years	27.72	29.75	30.36	26.65	24.84	22.52	26.82	25.99	24.88	27.08	24.82	22.38
% of population between 25 and 40 years	36.87	36.65	37.51	41.65	41.00	37.95	38.28	38.72	34.60	38.45	39.08	42.73
% of population between 41 and 64 years	26.90	26.83	26.08	26.47	30.42	36.04	26.61	28.57	32.59	27.12	29.85	29.30
% of population older than 65 years old	4.91	3.87	2.54	2.66	2.24	2.40	3.84	4.22	5.63	4.24	4.68	4.02
Sample size	10,139	28,451	24,113	12,152	12,831	16,265	5,769	6,325	9,671	10,907	20,668	18,359

*Source:* Authors' calculations using data from Honduras (Encuesta Permanente de Hogares de Propósitos Múltiples); Costa Rica (Encuesta de Hogares de Propósitos Múltiples); Nicaragua (Encuesta Nacional de Hogares sobre Medición de Niveles de Vida); and El Salvador (Encuesta de Hogares de Propósitos Múltiples). Only observations with positive hourly income are considered.

### 3. Wage Gap Decompositions: The Four Countries at a Glance

A simple statistical comparison of females' and males' wages shows the presence of, although small, male-female gaps (see line  $\Delta$  in Table 3). This is somewhat surprising given that females display, on average, more years of schooling than their male counterparts. The counterfactual question that arises, then, is what males' wages would look like if their observable human capital characteristics were similar to those of the female working population. To answer that question we use the wage gap decomposition technique developed by Ñopo (2008). According to that approach, the wage gap is broken into four additive components. Three can be attributed to the existence of differences in individuals' characteristics ( $\Delta_X, \Delta_M$ , and  $\Delta_F$ ), and the fourth ( $\Delta_0$ ) to the existence of unobservable characteristics that determine wages (among them, the presence of discrimination). In that sense, the wage gap can be expressed as

$$\Delta = (\Delta_M + \Delta_X + \Delta_F) + \Delta_0$$

where:

$\Delta_M$  is the component of the gap that can be attributed to the existence of human capital profiles for which there are males but not females. A typical example of this is the fact that married individuals in their mid-forties with a university degree and working in managerial positions are traditionally males but not females. In other words, CEOs tend to be males and not females and, for that reason, this is labeled the "CEO effect."

$\Delta_F$  is due to the existence of human capital profiles for which there are females but not males. A typical example of this is the presence of women in their late thirties, single but declared as household heads, with elementary or middle school education. It is unusual to find men with those characteristics. In other words, household maids tend to be females and not males and, for that reason, this is labeled the "Maid effect."

$\Delta_X$  is the component of the gap due to differences in the distribution of observable characteristics among females and males whenever the comparison is possible (that is, within the common support of observable characteristics).

$\Delta_0 =$  is the component of the gap that cannot be explained by differences in the observable characteristics of human capital between males and females (in instances this appears to represent discrimination).

We consider only characteristics that can be described with discrete variables and use perfect matching in order to estimate those four components. That is, through the matching procedure we try to find those males and females with exactly the same combinations of observable human capital characteristics (such as age, schooling, marital status, and headship of the household, among others).

Next we present the results from the matching technique applied to wage gaps decompositions in the four Central American countries. Table 3 compares national-level results for each country after matching on two sets of individual characteristics. The first set considers only area and education, while the second additionally encompasses age, head of the household, marital status and occupation. We report only these two sets of matching decompositions, but all the other intermediary decompositions in which one additional matching variable at a time was added (age, head of the household, marital status and occupation, respectively) are available upon request.

Table 3 shows the wage gaps and different decompositions for the four countries. Regarding the statistical (or original) gender wage gap (i.e.,  $\Delta$ , which compares average wages of all females and males in the economy), Costa Rica stands out as a country with a negative gender wage gap. That is, females earn more than males in this country, although that gap is relatively small (and likely not statistically different than zero). In order of magnitudes, Nicaragua appears next as a country with gender wage gaps that are positive (i.e., on average males display higher earnings than females) but still small. Next, Honduras shows slightly higher gender wage gaps, and El Salvador is the country with the highest gaps in the sample. Summarizing, the set of countries can be grouped into two: those with low gaps (Costa Rica and Nicaragua) and those with higher wage gaps (El Salvador and Honduras).

It is also interesting to note that, while the decomposition shows out-of-common-support components ( $\Delta_F, \Delta_M$ ) that are close to zero when controlling only for area and

education, those components become noticeable after the inclusion of a richer set of control variables. This is a reflection of the “curse of dimensionality” that is behind most non-parametric methods, which in the particular case of matching could be expressed as the likelihood of finding female-male matches decreases as the number of control variables (the “dimension”) increases.

One interesting regularity is that in the four countries the unexplained component of the gap ( $\Delta_0$ ) surpasses the original measure of the gender wage gap ( $\Delta$ ). This result is a consequence of the fact that, as shown above, females have more years of education than males. The extent to which  $\Delta_0$  surpasses  $\Delta$  varies across countries and time. For the two countries with high wage gaps (El Salvador and Honduras), the portion of the gap that cannot be explained by gender differences in observed characteristics tends to be closer to the total wage gap in the mid-1990s than in later years, especially when controlling for the broader set of individual characteristics. For countries with lower gaps (Costa Rica and Nicaragua) the unexplained components are higher than the original wage gaps.

Regarding the out-of-common-support components, in most cases  $\Delta_M$  (the one that exists because there are certain combinations of characteristics that males achieve but females do not, the “CEO effect”) is positive and  $\Delta_F$  (the one that exists because there are certain combinations of characteristics in which females are confined but males do not, the “maid effect”) is negative. Additionally, in the two countries with high wage gaps the former dominates the latter, while in the two countries with low wage gaps the opposite is true. Tables 4 and 5 next provide analogous results to those shown in Table 3, but for rural and urban areas, respectively.

The rural wage gap decomposition (Table 4) shows an even higher unexplained component of the gender wage gap than at the national levels in three of the four countries (the exception being El Salvador). The national findings on out-of-common-support components also prevail in rural areas, both in the high and low wage gap countries.

For the urban wage gap decomposition (Table 5), the situation changes slightly. We can identify again two patterns, distinguishing between the high and low wage gaps

countries. On the one hand, for Costa Rica and Nicaragua we still find an unexplained component of the gap that is higher than the original gap; on the other, Honduras and El Salvador (the high wage gap countries) show a situation that looks similar to a traditional gender wage gap decomposition as the unexplained component—although, being the higher component of the decomposition, it is no longer higher than the original gap.

Regarding the out-of-common-support components for the low wage gap countries, we observe that for Nicaragua the pattern found at the national and rural levels remains when we control for an urban sample. In the case of Costa Rica, however, the relationship between  $\Delta_F$  and  $\Delta_M$  changes from its previously observed course (at a national and rural level), with  $\Delta_M$  now dominating  $\Delta_F$ . In the case of the high wage gap countries (Honduras and El Salvador), the results found for the national and rural samples ( $\Delta_M$  dominating  $\Delta_F$ ) break in the mid-2000s, and thereafter after  $\Delta_F$  dominates  $\Delta_M$ .

**Table 3. National Gender Wage Gaps after Controlling for Observable Characteristics**

		<b>Costa Rica</b>		<b>El Salvador</b>		<b>Honduras</b>		<b>Nicaragua</b>	
		<i>Area and education</i>	<i>Area, education, age, head of household, marital status and occupation</i>	<i>Area and education</i>	<i>Area, education, age, head of household, marital status and occupation</i>	<i>Area and education</i>	<i>Area, education, age, head of household, marital status and occupation</i>	<i>Area and education</i>	<i>Area, education, age, head of household, marital status and occupation</i>
Mid-1990s	$\Delta$	<b>-1.9%</b>	<b>-1.9%</b>	<b>24.7%</b>	<b>24.7%</b>	<b>11.4%</b>	<b>11.4%</b>	<b>5.1%</b>	<b>5.1%</b>
	$\Delta O$	14.6%	11.8%	30.1%	22.9%	26.0%	10.1%	22.3%	30.1%
	$\Delta M$	0.0%	22.9%	0.0%	21.4%	0.1%	10.7%	0.0%	15.0%
	$\Delta F$	0.0%	-28.7%	-0.1%	-12.1%	0.0%	-4.9%	0.0%	-24.6%
	$\Delta X$	-16.5%	-7.8%	-5.3%	-7.5%	-14.8%	-4.5%	-17.2%	-15.4%
Early 2000s	$\Delta$	<b>-3.5%</b>	<b>-3.5%</b>	<b>12.9%</b>	<b>12.9%</b>	<b>0.0%</b>	<b>0.0%</b>	<b>-4.6%</b>	<b>-4.6%</b>
	$\Delta O$	15.7%	7.8%	16.7%	11.0%	16.4%	8.9%	12.9%	18.6%
	$\Delta M$	0.0%	15.2%	0.1%	15.9%	0.0%	8.3%	0.0%	9.9%
	$\Delta F$	0.0%	-19.2%	-0.1%	-3.9%	0.0%	-8.2%	-0.1%	-17.5%
	$\Delta X$	-19.2%	-7.3%	-3.9%	-10.0%	-16.5%	-9.0%	-17.4%	-15.5%
Mid-2000s	$\Delta$	<b>-2.9%</b>	<b>-2.9%</b>	<b>14.3%</b>	<b>14.3%</b>	<b>2.6%</b>	<b>2.6%</b>	<b>2.6%</b>	<b>2.6%</b>
	$\Delta O$	17.2%	12.2%	20.6%	20.5%	14.2%	12.3%	20.3%	16.4%
	$\Delta M$	0.0%	7.8%	0.1%	-9.3%	0.1%	7.5%	0.1%	11.6%
	$\Delta F$	0.0%	-7.2%	-0.2%	4.8%	0.0%	-7.3%	0.0%	-14.8%
	$\Delta X$	-20.2%	-15.7%	-6.1%	-1.6%	-11.6%	-9.9%	-17.8%	-10.5%

*Source:* Authors' calculations using data from Honduras (Encuesta Permanente de Hogares de Propósitos Múltiples); Costa Rica (Encuesta de Hogares de Propósitos Múltiples); Nicaragua (Encuesta Nacional de Hogares sobre Medición de Niveles de Vida) and El Salvador (Encuesta de Hogares de Propósitos Múltiples).



**Table 4. Rural Gender Wage Gaps after Controlling For Observable Characteristics**

		<b>Costa Rica</b>		<b>El Salvador</b>		<b>Honduras</b>		<b>Nicaragua</b>	
		<i>Rural Area and education</i>	<i>Rural, education, age, head of household, marital status and occupation</i>	<i>Rural Area and education</i>	<i>Rural, education, age, head of household, marital status and occupation</i>	<i>Rural Area and education</i>	<i>Rural, education, age, head of household, marital status and occupation</i>	<i>Rural Area and education</i>	<i>Rural, education, age, head of household, marital status and occupation</i>
Mid-1990s	$\Delta$	<b>0.1%</b>	<b>0.1%</b>	<b>25.8%</b>	<b>25.8%</b>	<b>18.6%</b>	<b>18.6%</b>	<b>-7.9%</b>	<b>-7.9%</b>
	$\Delta O$	12.7%	16.3%	26.0%	22.0%	25.8%	23.1%	0.3%	16.1%
	$\Delta M$	0.0%	17.8%	0.0%	20.4%	0.4%	24.0%	0.0%	17.0%
	$\Delta F$	0.0%	-25.4%	-0.3%	-10.2%	0.0%	-26.0%	0.0%	-34.0%
	$\Delta X$	-12.5%	-8.6%	0.1%	-6.3%	-7.5%	-2.5%	-8.2%	-6.9%
Early 2000s	$\Delta$	<b>-1.0%</b>	<b>-1.0%</b>	<b>13.8%</b>	<b>13.8%</b>	<b>-4.3%</b>	<b>-4.3%</b>	<b>-17.7%</b>	<b>-17.7%</b>
	$\Delta O$	11.1%	8.5%	14.2%	13.0%	6.9%	3.2%	-10.7%	0.0%
	$\Delta M$	0.0%	15.4%	0.0%	19.9%	0.2%	22.0%	0.0%	19.4%
	$\Delta F$	0.0%	-18.3%	0.0%	-14.6%	0.0%	-9.9%	-0.5%	-38.4%
	$\Delta X$	-12.1%	-6.6%	-0.5%	-4.6%	-11.4%	-19.6%	-6.5%	1.2%
Mid-2000s	$\Delta$	<b>-1.1%</b>	<b>-1.1%</b>	<b>21.5%</b>	<b>21.5%</b>	<b>4.4%</b>	<b>4.4%</b>	<b>8.7%</b>	<b>8.7%</b>
	$\Delta O$	16.8%	8.5%	24.8%	34.4%	13.5%	20.9%	13.0%	9.2%
	$\Delta M$	0.0%	11.0%	0.0%	-8.5%	0.1%	15.1%	0.2%	16.4%
	$\Delta F$	0.0%	-12.1%	0.0%	-3.8%	0.0%	-17.7%	0.0%	-16.0%
	$\Delta X$	-17.9%	-8.5%	-3.3%	-0.6%	-9.1%	-13.9%	-4.5%	-0.9%

*Source:* Authors' calculations using data from Honduras (Encuesta Permanente de Hogares de Propósitos Múltiples); Costa Rica (Encuesta de Hogares de Propósitos Múltiples); Nicaragua (Encuesta Nacional de Hogares sobre Medición de Niveles de Vida) and El Salvador (Encuesta de Hogares de Propósitos Múltiples).

**Table 5. Urban Gender Wage Gaps after Controlling For Observable Characteristics**

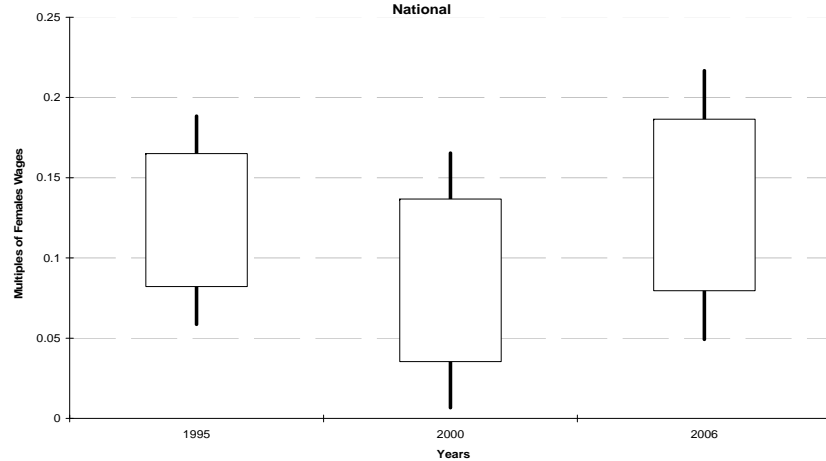
		<b>Costa Rica</b>		<b>El Salvador</b>		<b>Honduras</b>		<b>Nicaragua</b>	
		<i>Urban and education</i>	<i>Urban, education, age, head of household, marital status and occupation</i>	<i>Urban and education</i>	<i>Urban, education, age, head of household, marital status and occupation</i>	<i>Urban and education</i>	<i>Urban, education, age, head of household, marital status and occupation</i>	<i>Urban and education</i>	<i>Urban, education, age, head of household, marital status and occupation</i>
Mid-1990s	$\Delta$	<b>6.5%</b>	<b>6.5%</b>	<b>33.1%</b>	<b>33.1%</b>	<b>20.9%</b>	<b>20.9%</b>	<b>24.0%</b>	<b>24.0%</b>
	$\Delta\theta$	16.2%	6.8%	31.0%	23.5%	26.1%	7.6%	28.3%	37.0%
	$\Delta M$	0.0%	29.6%	0.0%	20.0%	0.0%	15.1%	0.0%	10.8%
	$\Delta F$	0.0%	-26.4%	-0.1%	-11.0%	0.0%	-5.6%	0.0%	-18.0%
	$\Delta X$	-9.7%	-3.5%	2.2%	0.6%	-5.2%	3.8%	-4.3%	-5.8%
Early 2000s	$\Delta$	<b>4.1%</b>	<b>4.1%</b>	<b>17.4%</b>	<b>17.4%</b>	<b>13.3%</b>	<b>13.3%</b>	<b>11.8%</b>	<b>11.8%</b>
	$\Delta\theta$	18.3%	7.4%	17.3%	10.4%	18.5%	9.6%	19.4%	23.1%
	$\Delta M$	0.0%	17.0%	0.1%	17.1%	0.0%	6.5%	0.0%	8.0%
	$\Delta F$	0.0%	-18.7%	-0.1%	-2.2%	0.0%	-10.4%	0.0%	-12.8%
	$\Delta X$	-14.2%	-1.6%	0.1%	-7.9%	-5.2%	7.5%	-7.6%	-6.4%
Mid-2000s	$\Delta$	<b>2.5%</b>	<b>2.5%</b>	<b>18.1%</b>	<b>18.1%</b>	<b>7.0%</b>	<b>7.0%</b>	<b>17.2%</b>	<b>17.2%</b>
	$\Delta\theta$	17.5%	15.3%	18.9%	15.5%	14.4%	10.3%	22.4%	19.3%
	$\Delta M$	0.0%	4.9%	0.1%	-4.0%	0.1%	5.5%	0.0%	16.8%
	$\Delta F$	0.0%	-2.3%	-0.3%	6.0%	0.0%	-6.6%	0.0%	-12.4%
	$\Delta X$	-15.0%	-15.4%	-0.6%	0.6%	-7.4%	-2.1%	-5.2%	-6.5%

*Source:* Authors' calculations using data from Honduras (Encuesta Permanente de Hogares de Propósitos Múltiples); Costa Rica (Encuesta de Hogares de Propósitos Múltiples); Nicaragua (Encuesta Nacional de Hogares sobre Medición de Niveles de Vida); and El Salvador (Encuesta de Hogares de Propósitos Múltiples).

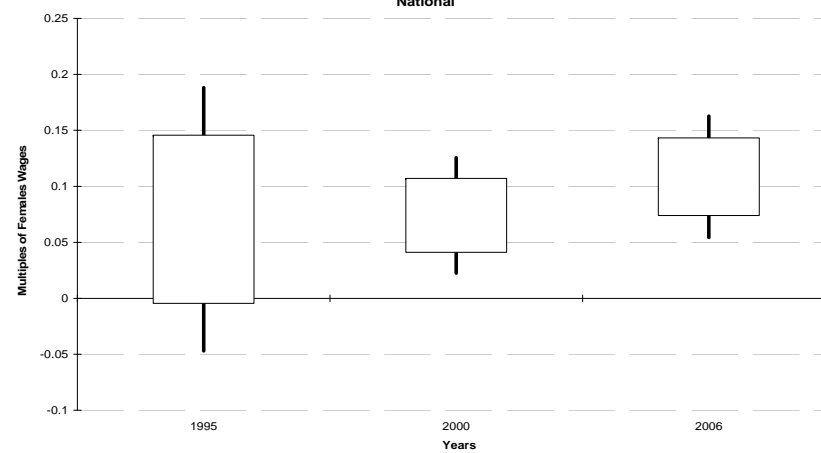
The decompositions described in Tables 3-5 are descriptive of the mean gaps, without reference to either their distributional aspects or to sample variability. Next, in Figures 1 to 3 (panels a through d), we present confidence intervals for the unexplained component of the gender wage gap that remains after controlling for the full set of individual characteristics at the national, rural and urban levels, respectively. The extremes of the boxes represent 90 percent confidence intervals for the mean unexplained gender wage gaps, and the extremes of the bars that exceed the boxes represent a 95 percent confidence interval.

Although we cannot statistically rule out the hypothesis that the gender wage gaps have remained constant over time, some slight tendencies are worth mentioning. Overall, with the exception of urban El Salvador (Figure 3.c), the figures show a reduction of the gaps between the mid-1990s and 2000, but the gaps begin to increase in the first half of this decade.

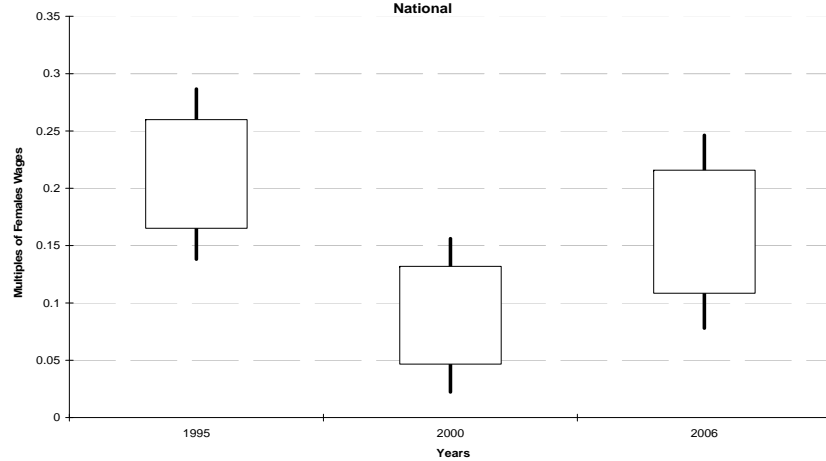
**Figure 1.a**  
Costa Rica 1995-2006  
National



**Figure 1.b**  
Honduras 1997-2006  
National



**Figure 1.c**  
El Salvador 1995-2005  
National



**Figure 1.d**  
Nicaragua 1998-2005  
National

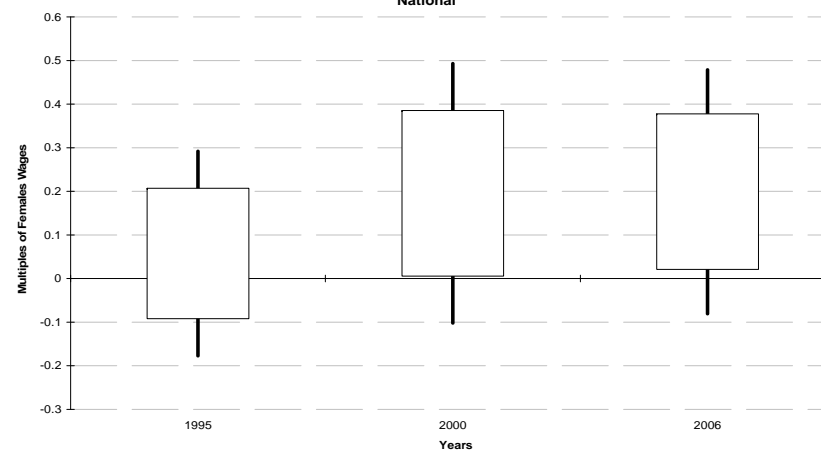


Figure 2.a  
Costa Rica 1995 - 2006  
Rural Sample

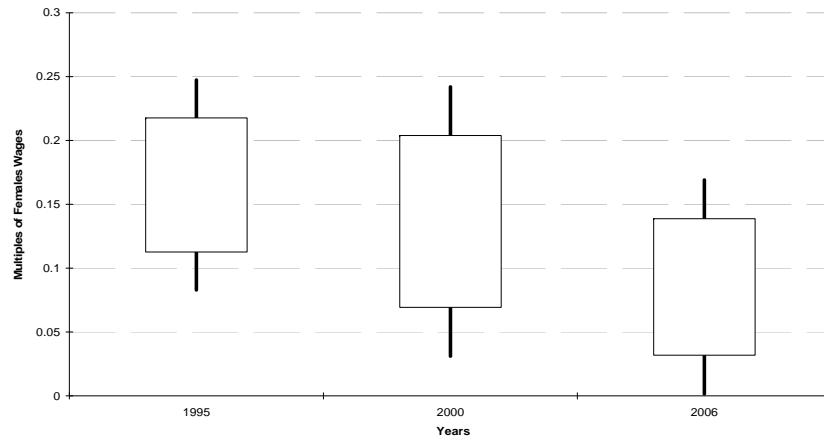


Figure 2.b  
Honduras 1997 - 2007  
Rural Sample

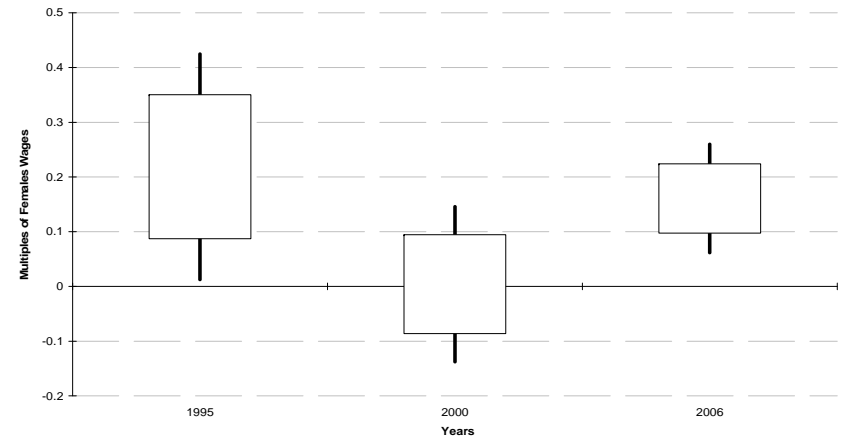


Figure 2.c  
El Salvador 1995 - 2005  
Rural Sample

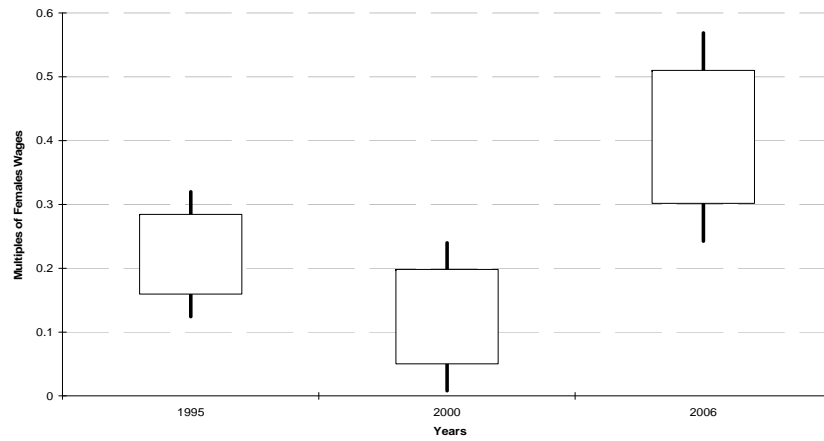


Figure 2.d  
Nicaragua 1998 - 2005  
Rural Sample

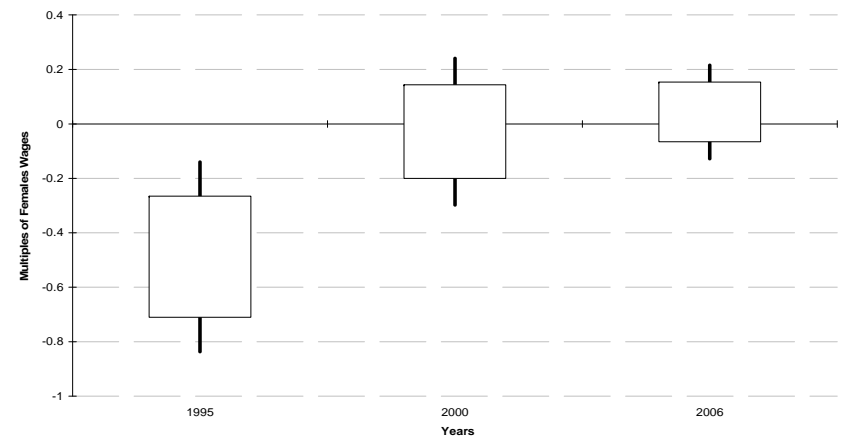


Figure 3.a  
Costa Rica 1995 - 2006  
Urban Sample

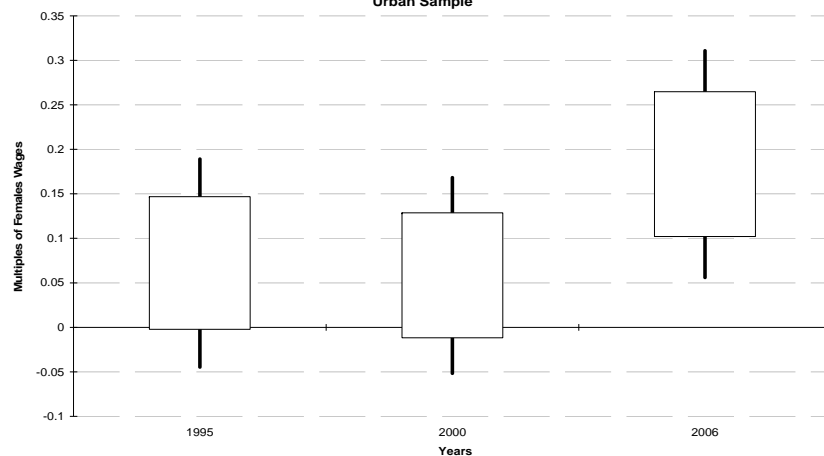


Figure 3.b  
Honduras 1997 - 2007  
Urban Sample

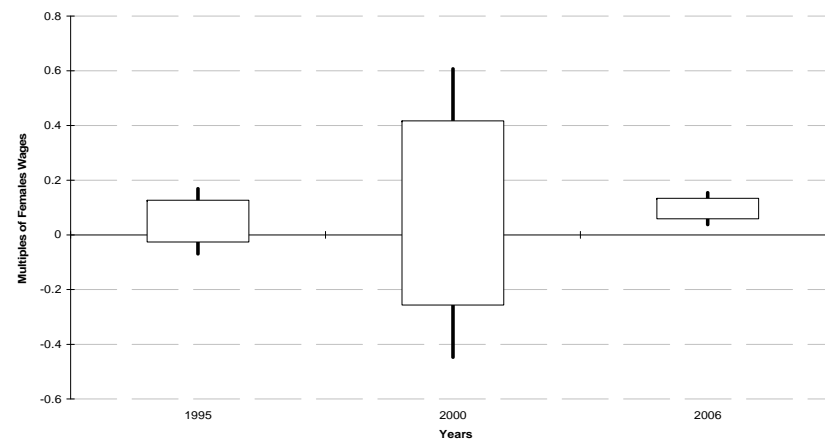


Figure 3.c  
El Salvador 1995 - 2005  
Urban Sample

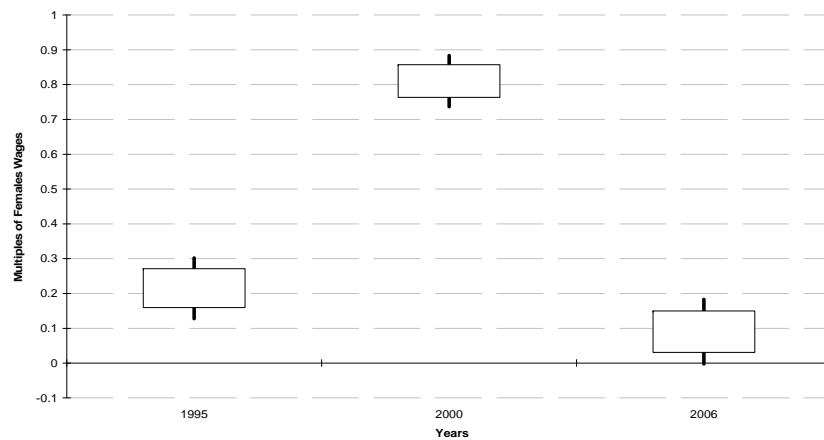
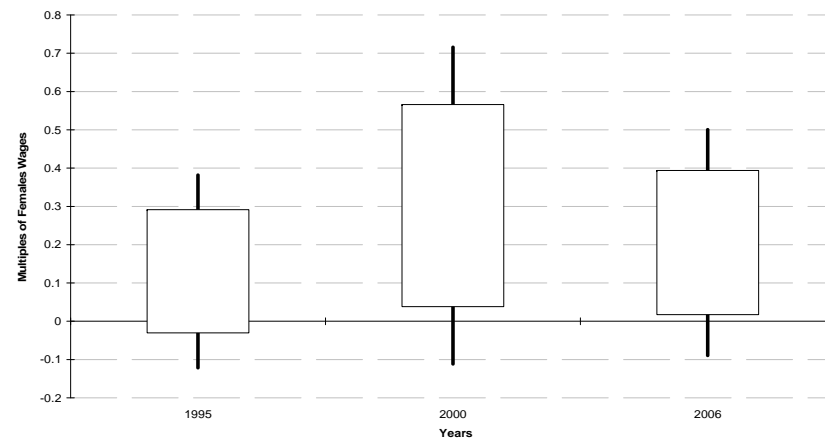


Figure 3.d  
Nicaragua 1998 - 2005  
Urban Sample



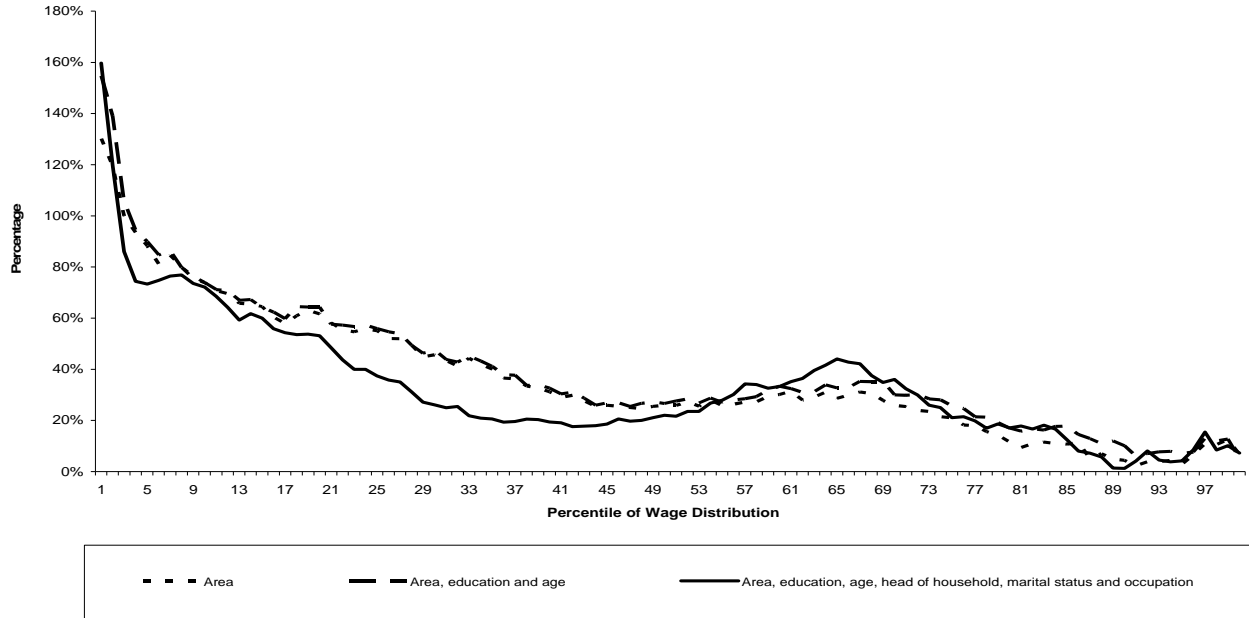
## 4. Exploring the Unexplained Component of the Gaps

The wage gap decomposition based on the matching technique used here allows us to explore not only the average measure of unexplained differences but also its distribution. In this section we present results for the empirical distributions of  $\Delta_0$  for each country, using the latest survey available and three different sets of individual characteristics: i) area; ii) area, education and age; and iii) area, education, age, household head, marital status and occupation.

### 4.1 El Salvador

Figure 4 shows measures of unexplained gender differences in wages ( $\Delta_0$ ) for the year 2005 in El Salvador, considering the three sets of controlling characteristics outlined above. The measures of the wage gap are computed considering the wages of the representative male and female at each percentile of the wage distributions of males and females, respectively. Overall, there is a concentration of much of the unexplained gaps at the bottom of the wage distributions. Qualitatively, the three plots are similar. First, between the 1<sup>st</sup> and 10<sup>th</sup> percentiles the gaps are large but decrease rapidly, moving from 160 percent to 80 percent in these first 10 percentiles). Then, between the 11<sup>th</sup> and 55<sup>th</sup> percentiles there is still a decrease of the gender gap along the percentiles, but the rate of decrease is slower, moving from 80 percent to 30 percent within this interval). It is also in this interval where the use of extra controls (being head of households, marital status and occupation) noticeably reduces the measure of unexplained gaps. Then, there is a peak of unexplained wage differences around the 65<sup>th</sup> percentile. Thereafter the measure of the gap reduces along the percentiles to end up with values close to zero at the top of the wage distributions.

Figure 4  
El Salvador 2006  
Relative Gender Wage Gap (After Matching) by Percentiles

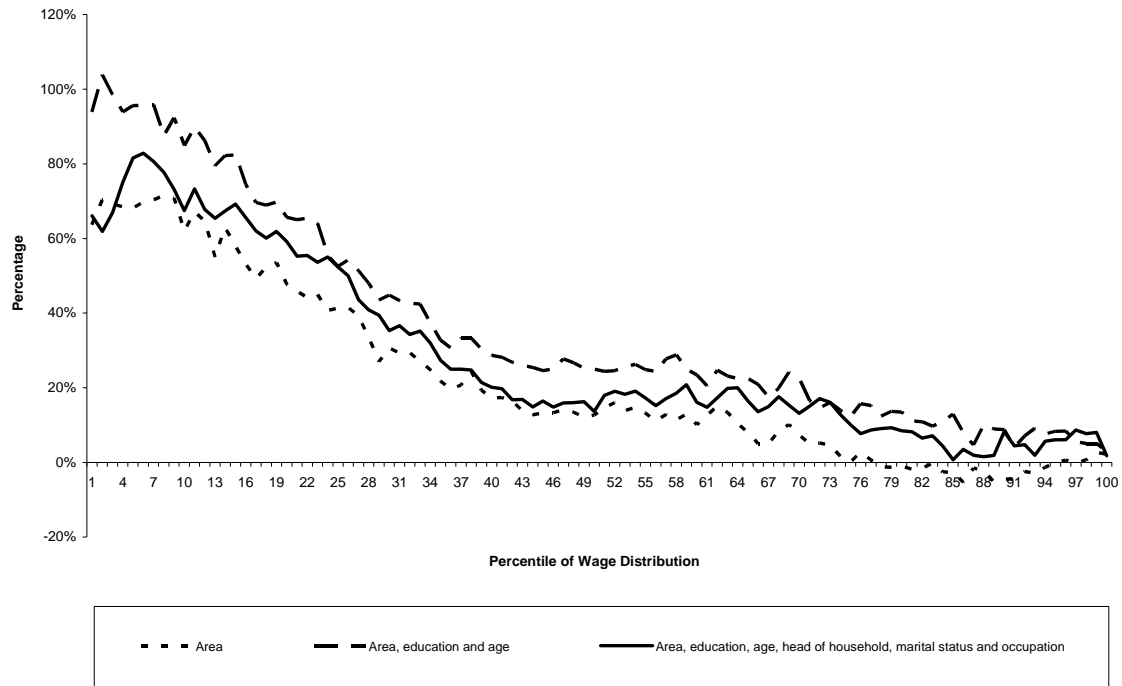


#### 4.2 Honduras

Figure 5 presents the results for Honduras, where, as in El Salvador, the higher unexplained differences in wages are also found at the lower percentiles of the wage distribution. At the lowest percentile of the wage distribution the unexplained gender wage gap is between 60 percent and 100 percent, declining to 20-30 percent around the 40<sup>th</sup> percentile. Then, for higher percentiles of the wage distribution the unexplained gender gap also decreases but at a slower rate. Finally, as in El Salvador, we find that for the upper part of the wage distributions (85<sup>th</sup> percentile and above) the unexplained gender wage gap is almost zero for all three sets of controlling characteristics.

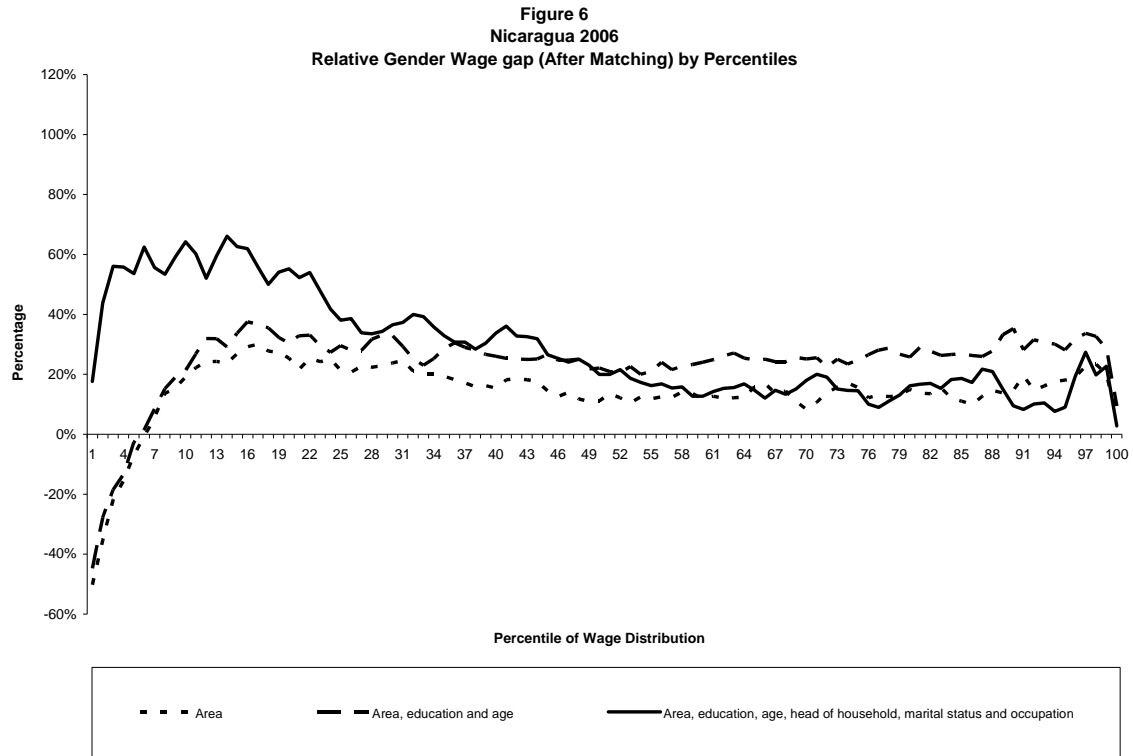


Figure 5  
Honduras 2006  
Relative Gender Wage Gap (After Matching) by Percentiles



### 4.3 Nicaragua

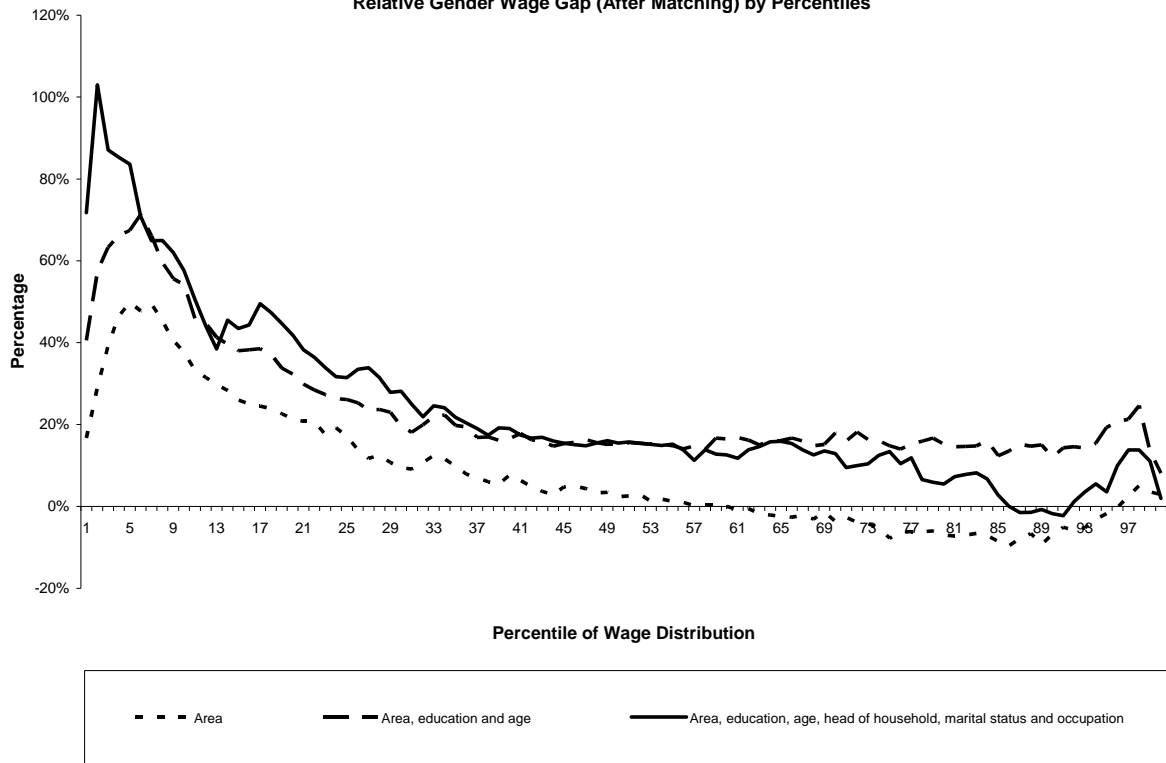
Figure 6 presents the results for Nicaragua. It is interesting to note that the unexplained gender gaps in this country behave slightly differently than the previous cases. At the lowest percentiles of the wage distributions the gap is negative when the smaller sets of controls are used and are positive only for the richest set (the one that controls for area, education, age, household headship, marital status and occupation). Then, the unexplained gap is increasing with the wage percentiles up to the 15<sup>th</sup> percentile. After that point the gap decreases with the percentiles but at a slow rate compared to the other two countries so that in statistical terms the unexplained gap can be assumed to be constant between the 30<sup>th</sup> and 95<sup>th</sup> percentiles.



#### ***4.4 Costa Rica***

Figure 7 presents the analogous plots of the relative unexplained part of the wage gap for Costa Rica (Figure 7). The pattern is similar to those in Honduras and El Salvador, with higher gaps at the lowest percentiles and gaps that are almost zero at the upper extreme of the distributions of wages.

**Figure 7**  
**Costa Rica 2006**  
**Relative Gender Wage Gap (After Matching) by Percentiles**

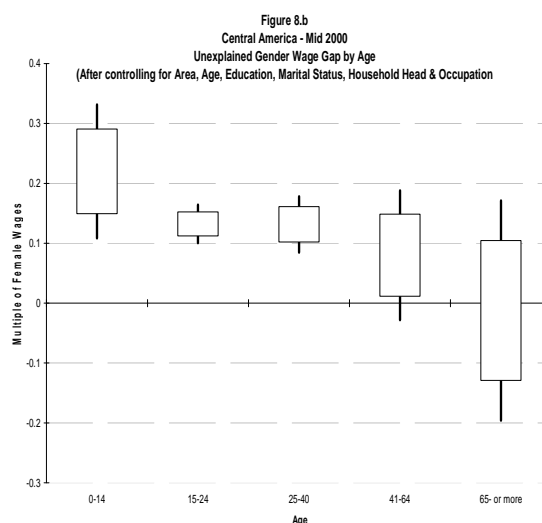
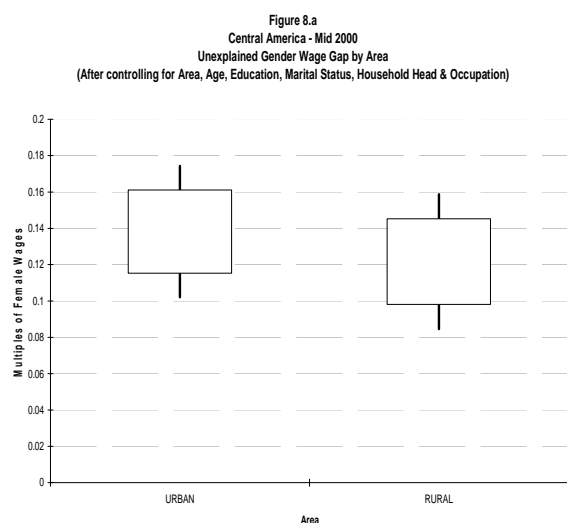


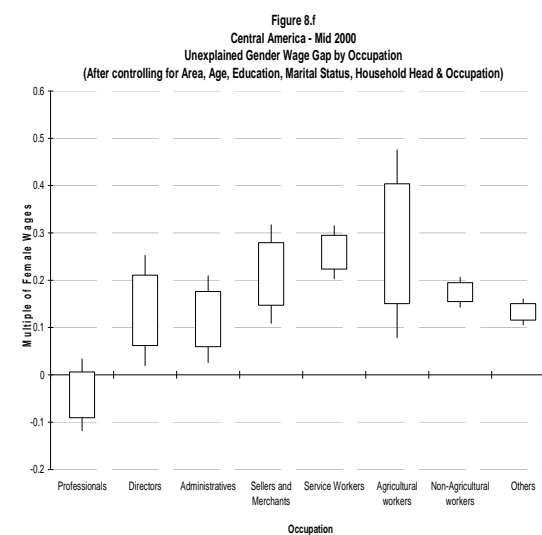
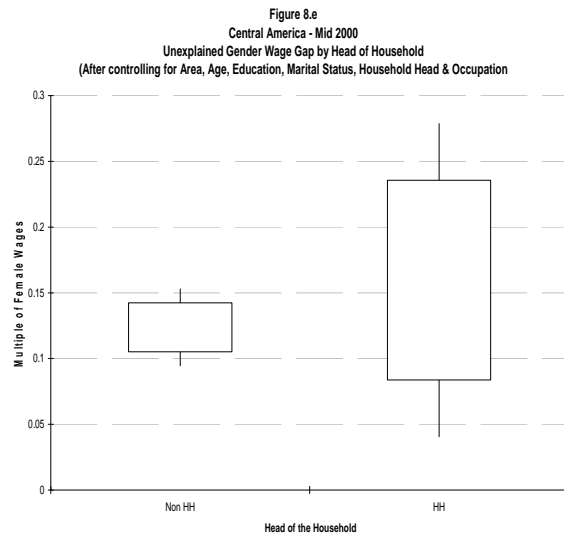
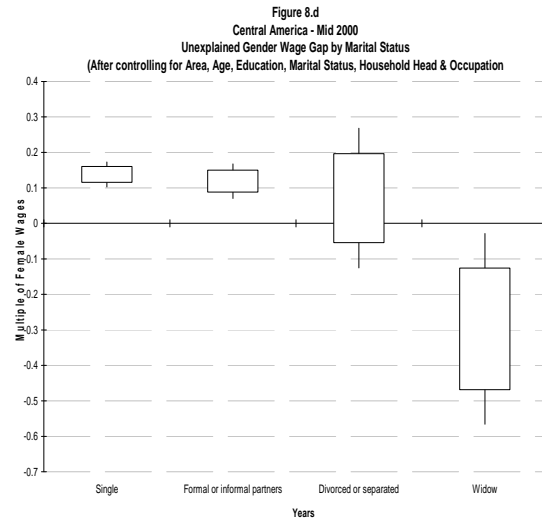
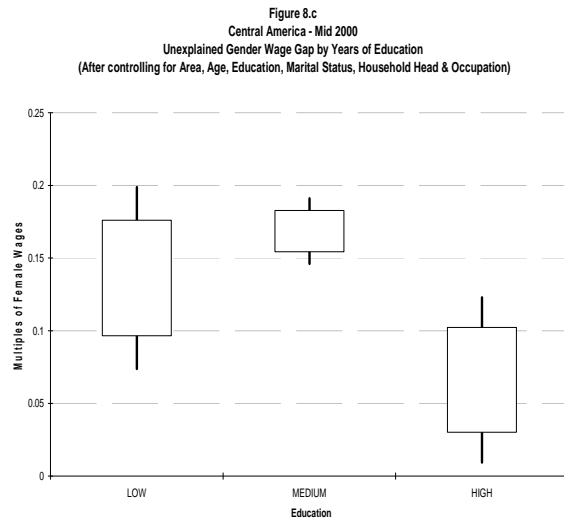
Overall, Figures 4-7 show more similarities than differences in the distribution of unexplained gender differences in pay in the four countries. The patterns of higher gaps at the bottom of the earnings distribution and almost zero gaps at the top are generalized among the four. For that reason we pooled the four data sets for the remainder of the analysis, preserving the expansion factor of each of them to guarantee representativeness of the pooled set. As for the results shown immediately above, we use the latest available data sets in our samples (mid-2000s). Also, the matching methodology helps in avoiding problems of comparability of income in the four different currencies by normalizing wages such that the average female wage is set to 1 (and hence, average male wages are directly interpreted as one plus the gender wage gap).

With this we explore the extent to which the unexplained gender wage gaps (after controlling for the richest set of observable characteristics) differ across different segments of labor markets. Next, in Figures 8.a to 8.f we show confidence intervals for the unexplained component of the gender wage gap when distinguishing by area, age, years of education, marital status, head of household and occupation. As before, the extremes of the boxes represent 90

percent confidence intervals for the mean unexplained gender wage gaps and the extremes of the bars that exceed the boxes represent a 95 percent confidence interval.

The results depicted in the figures illustrate that the gender wage gaps do not statistically differ between rural and urban areas (Figure 8a), they decrease with age and they even become statistically indistinguishable from zero among the oldest cohort of individuals, those above the traditional retirement age (Figure 8.b). In contrast with other countries in the Latin American region, the unexplained gender wage gap seems to be higher among those with medium education, between 6 and 11 years of completed schooling (Figure 8.c). It is noteworthy that the unexplained gaps are lower among widowed people, among whom the gap is remarkably negative at a 95 percent confidence level (Figure 8.d). Although the average unexplained gaps do not statistically differ between those who are heads of household and those who are not, it is clear that the dispersion of the former is higher (Figure 8.e). When exploring the unexplained gender difference in pay across occupations we find that they are high and disperse among agricultural workers and negative among professionals (Figure 8.f).





## 5. Conclusions

This paper portrays a picture of the evolution of gender wage gaps in four Central American countries during the last decade. For that purpose we use a novel approach that focuses on the comparisons of females and males with the same observable characteristics, extending the idea behind the Blinder-Oaxaca decomposition and placing it into a non-parametric scheme. This allows an analysis not only of the average gaps but also of their distributions.

Some facts suggest improvements in gender equity conditions in the labor markets for the countries under study: on the one hand, the increase in female participation (more notably in

Costa Rica and Honduras), and on the other, females' schooling overachievement with respect to males during the period under study. However, we found that after comparing males and females with the same observable characteristics (area, age, education, marital status, being a household head and occupations), the gender wage gaps are still substantial but the magnitude differ across them. We can there discuss two groups of countries: those with low gender wage gaps (Costa Rica and Nicaragua) and those with higher gender wage gaps (El Salvador and Honduras).

Our results suggest a bouncing effect in the wage gaps over the period of study (a decrease from the mid-1990s to the early 2000s, followed by an increase from the early 2000s to the middle 2000s), as well as a higher unexplained part of the wage gap at the lower and medium levels of education (between 0 and 11 years of schooling) and among those engaged in agricultural occupations. Finally, our results show a regular pattern in the four countries under study: the unexplained part of the gender wage gaps are more pronounced among poorer individuals than in the top part of the income distribution.

In rural areas in Costa Rica, Honduras and Nicaragua, the wage gap decomposition shows higher unexplained wage gaps than those found at the national levels. At the urban level, there is a difference between the high and low wage gap countries. For Costa Rica and Nicaragua, the unexplained component of the gap is higher than the original gap. For El Salvador and Honduras the situation looks similar to the traditional gender wage gap decomposition, where the unexplained part of the wage gap is smaller in magnitude than the original wage gap.

Overall, Central America remains one of most unequal regions in the hemisphere, with high incidence of poverty. In addition, as our results show, the gender wage gaps in these countries are underlain by an income problem; a more pronounced difference in the lower part of the income distribution was found after controlling by the full set of individual characteristics. Thus, reducing wage gaps requires an amalgamation of efforts from different actors, most notably government, employers and employees. Government efforts have to be directed toward an array of actions including the following: investment in schools, health facilities and transport and communications infrastructure; empowering and promoting the compliance of existent laws; and building and/or strengthening institutions that address work environment and gender equality issues. Employees have to be more avid in defending their rights to an adequate work environment through the proper channels. Of course, employers must for their part make the following investments: physical infrastructure, training, and employee assistance programs;

direct communication with their employees; and complying with government regulations and overall promoting equal gender conditions within them. So, policies and government plans that address these issues will not only produce a better and more equal work environment for females and males but will also contribute to closing the enormous gender wage gap that still exists among the poorest in Central American countries.

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