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**Working Paper**

## Evolution of gender wage gaps in latin america at the turn of the twentieth century: An addendum to new century, old disparities

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at the Turn of the Twentieth Century:  
An Addendum to “New Century, Old Disparities”**

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July 2010

# **Evolution of Gender Wage Gaps in Latin America at the Turn of the Twentieth Century: An Addendum to “New Century, Old Disparities”**

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## **ABSTRACT**

### **Evolution of Gender Wage Gaps in Latin America at the Turn of the Twentieth Century: An Addendum to “New Century, Old Disparities”\***

This paper complements the findings of Atal, Ñopo and Winder (2010) on gender and ethnic wage gaps for 18 Latin American countries circa 2005 by analyzing gender wage gaps for the same countries between circa 1992 and circa 2007. During this span the overall gender earnings gaps dropped about 7 percentage points, while the unexplained component dropped between 3 and 4 percentage points, depending on the control variables used. The gap declined most notably among workers at the bottom of the earnings distribution, with children at home, the self-employed, part-time workers and those in rural areas – the segments of the labor market that were previously reported as having the highest unexplained gender disparities. Most of the reduction in unexplained gaps occurred within segments rather than due to the composition of labor markets. The paper additionally finds a limited role for job tenure in explaining gender wage gaps.

JEL Classification: C14, D31, J16, O54

Keywords: gender, wage gaps, Latin America, matching

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## **1. Introduction: New Century, Old Disparities**

Atal, Ñopo and Winder (2010), using a matching comparisons approach, provided an overview of gender and ethnic wage gaps for 18 Latin American countries. This study reported that, in spite of advances towards equality in the region, noticeable gender wage gaps remain. Reported gender earnings gaps range from 9 to 27 percent of average females' wages, depending on the observable characteristics that are utilized to control for individuals' expected productivity. The study also reported that the highest unexplained gender earnings gaps are found among older, informal, self-employed workers and those in small firms.

This concentration of higher earnings gaps in certain segments of the markets suggests at least two explanations. First, those segments of the labor markets where the unexplained gender earnings gaps are higher are also typically regarded as low-productivity segments. Thus, it is possible to claim that low-productivity females have lower bargaining power than males and higher-productivity females, such that they have to face greater earnings penalties with respect to the rest of the labor market. Second, the labor market segments with higher unexplained gender earnings gaps are also segments in which there is more flexibility for labor market participation. Then, it can be claimed that females need flexibility in order to participate in labor markets, possibly due to family or household responsibilities, and must accept lower earnings than equally productive males who do not need such flexibility.

This addendum complements the findings of the earlier report by analyzing the evolution of gender earnings gaps in the same 18 countries for a period of 15 years, from 1992 to 2007. The methodological approach to analyzing the evolution of gaps is the same as in the previously outlined paper, based on the wage gap decomposition proposed by Ñopo (2008). The data sources are also the same: household surveys with national representativeness, but from different periods. Last but not least, it is important to highlight that this paper will compare two data points in time, one circa 1992 and the other circa 2007. No inferences about trajectories of the variables under analysis during the period will be made. Metaphorically, this will be the comparison of two photographs but not the film of what happened at the turn of this new century.

## **2. Evolution of Gender Wage Gaps in Latin America at the Turn of the Twentieth Century**

Table 1 shows the data sources for the study (name of the surveys, years taken and sample sizes) for each country. As mentioned above, the first year is circa 1992 and the last one circa 2007, with some variability due to data availability, especially in the first year. It can be noted that for five of the 18 countries, the surveys changed from the first to the last year utilized. In some others, there is information from national statistical offices documenting methodological changes in their surveys (expansion of their sampling frameworks, changes in their sampling stages and procedures and changes in their questionnaires). We are considering only surveys that are representative, at least at the national level, to guarantee the comparability of the results. The sample sizes reported in the table are those of working individuals for whom full information on earnings and observable characteristics is available. It is interesting to note the substantial improvement in sample sizes of the surveys for 15 of the 18 countries.

**Table 1. Data Sources**

Country	First Year	Name of the Survey	Sample Size
Argentina	1992	Encuesta Permanente de Hogares (EPH)	16,787
	2006	Encuesta Permanente de Hogares-Continua (EPH-C)	28,681
Bolivia	1997	Encuesta Nacional de Empleo (ENE)	9,609
	2007	Encuesta Continua de Hogares - MECOVI (ECH )	5,356
Brazil	1992	Pesquisa Nacional por Amostra de Domicilios (PNAD)	108,303
	2008	Pesquisa Nacional por Amostra de Domicilios (PNAD)	159,515
Chile	1992	Encuesta de Caracterización Socioeconómica Nacional (CASEN)	41,207
	2006	Encuesta de Caracterización Socioeconómica Nacional (CASEN)	86,595
Colombia	1992	Encuesta Nacional de Hogares - Fuerza de Trabajo (ENH-FT)	21,891
	2006	Gran Encuesta Integrada de Hogares (GEIH)	34,637
Costa Rica	1992	Encuesta de Hogares de Propósitos Múltiples (EHPM)	9,984
	2007	Encuesta de Hogares de Propósitos Múltiples (EHPM)	17,079
Dominican Republic	2000	Encuesta Nacional de Fuerza de Trabajo (ENFT)	7,521
	2007	Encuesta Nacional de Fuerza de Trabajo (ENFT)	9,781
Ecuador	1995	Encuesta de Condiciones de Vida (ECV)	8,431
	2006	Encuesta de Condiciones de Vida (ECV)	17,050
El Salvador	1991	Encuesta de Hogares de Propósitos Múltiples (EHPM)	9,225
	2007	Encuesta de Hogares de Propósitos Múltiples (EHPM)	19,815
Guatemala	2000	Encuesta Nacional de Condiciones de Vida (ENCOVI)	24,262
	2006	Encuesta Nacional de Condiciones de Vida (ENCOVI)	20,097
Honduras	1997	Encuesta Permanente de Hogares de Propósitos Múltiples (EPHPM)	9,230
	2007	Encuesta Permanente de Hogares de Propósitos Múltiples (EPHPM)	23,727
Mexico	1992	Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH)	14,119
	2008	Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH)	43,280
Nicaragua	1993	Encuesta Nacional de Hogares sobre Medición de Nivel de Vida (EMNV)	4,629
	2005	Encuesta Nacional de Hogares sobre Medición de Nivel de Vida (EMNV)	10,440
Panama	1991	Encuesta de Hogares, Mano de Obra (EMO)	8,432
	2006	Encuesta de Hogares (EH)	16,722
Paraguay	1995	Encuesta de Hogares (Mano de Obra) (EH)	6,797
	2007	Encuesta Permanente de Hogares (EPH)	7,461
Peru	1997	Encuesta Nacional de Hogares (ENAHO)	9,609
	2007	Encuesta Nacional de Hogares (ENAHO)	33,086
Uruguay	1992	Encuesta Continua de Hogares (ECH)	10,428
	2007	Encuesta Continua de Hogares (ECH)	56,114
Venezuela	1992	Encuesta de Hogares Por Muestreo (EHM)	90,261
	2006	Encuesta de Hogares Por Muestreo (EHM)	51,180

*Source:* Authors' compilation.

Next, Table 2 shows relative labor earnings for males and females in the two periods under study. In each year earnings are normalized such that the average for females is set equal to 100. Then, average male earnings (minus 100) can be directly read as the gender wage gap, which declined from 16.32 to 8.85 percent of average female wages. Note that the table provides average relative earnings for different segments of the labor markets without controlling for any observable variable that is presumably linked to productivity (and hence earnings). In that sense, the table shows only referential information about how relative wages are distributed across the labor markets for males and females.

It is interesting to note that the patterns are remarkably similar across years. There is a life cycle pattern of earnings such that working youth shows the lowest earnings, then, as individuals age, earnings improve up to a mature age when earnings slightly drop. There is also a clear pattern of earnings progression along the educational ladder. The presence of children (six years old or younger) in the household is linked to lower labor earnings, but the presence of other wage earners at home seems to be linked to no significant earnings differences. It is also the case that for both females and males, hourly labor earnings are significantly higher in urban areas among employers as well as part-time workers.

**Table 2. Relative Wages<sup>1</sup>**

	Period 1 (CIRCA 1992)		Period 2 (CIRCA 2007)	
	(Base: Average female wage = 100)		(Base: Average female wage = 100)	
	Male	Female	Male	Female
<b>All</b>	116.32	100.00	108.80	100.00
<b>Age</b>				
15 to 24	78.37	72.55	71.07	69.11
25 to 34	120.99	110.50	106.01	101.00
35 to 44	139.17	115.86	121.00	109.24
45 to 54	134.37	105.91	132.53	114.14
55 to 64	113.43	86.68	119.01	104.66
<b>Education</b>				
None	61.98	52.61	55.83	52.31
Primary Incomplete	90.71	65.14	73.96	61.17
Primary Complete	104.76	80.56	84.07	67.25
Secondary Incomplete	106.40	83.56	87.85	72.95
Secondary Complete	147.98	124.23	116.23	90.65
Tertiary Incomplete	193.79	157.42	156.70	132.21
Tertiary Complete	271.56	214.88	242.63	203.57
<b>Presence of Children in the Household</b>				
No	119.37	102.25	110.92	101.52
Yes	100.29	82.56	86.97	79.18
<b>Presence of other wage earner in the Household</b>				
No	124.37	107.84	109.75	103.91
Yes	111.09	98.09	108.30	98.94
<b>Urban</b>				
No	78.37	66.12	71.69	69.24
Yes	130.44	107.21	116.98	103.83
<b>Type of Employment</b>				
Employer	197.83	181.85	195.88	187.87
Employee	113.57	103.66	107.42	102.43
Self - Employed	104.54	83.04	92.22	81.45
<b>Time Worked</b>				
Part time	148.27	121.04	130.43	114.87
Full time	120.80	102.38	111.34	101.17
Over time	96.98	61.13	93.47	69.66

*Source:* Authors' compilation based on national statistics.

As noted above, these differences in labor earnings are just descriptive statistics, and they do take into account that combinations of observable individual and job characteristics play a role in the determination of labor earnings. As a matter of fact, males and females differ in a number of these observable characteristics. Table 3 below shows the distribution of observable individual and job characteristics for males and females for the two periods under comparison. It should be noted that not all observable characteristics used in the analysis of the original “New Century, Old Disparities” can be used here, because some of them are not available for some

<sup>1</sup> Time worked is divided in three categories: part-time workers (less than 35 hours per week), full-time workers (35 to 48 hours per week) and over-time workers (more than 48 hours per week).

countries in their surveys circa 1992. This is particularly the case for some variables related to individuals' jobs. Nonetheless, most of the variables are available and comparable.

These descriptive statistics shows demographic changes among the working population, as will be discussed below. The percentages of males within the 55 to 64 years old range are higher than those of females for both periods. Nonetheless, there is an increase for both females and males in those percentages from 1992 to 2007. That is, workers are staying longer in the labor market, but gender differences in retirement age remain. Regarding education, the data show that the gender gap in educational attainment has been widening during this 15-year span. The data for 1992 already showed that 16 percent of females had (complete or incomplete) tertiary levels of education, while only 11 percent of working males in the region achieved such levels. By 2007 the percentages increased for both, but faster for females: 26 percent of females and 17 percent of males had attained at least some tertiary education.

Another characteristic that has shown conspicuous changes during this period is fertility, as the percentages of females and males who live with children at home almost halved. By 2007, only around 7 percent of the working population had a child aged six years or under at home. Another gender-related demographic change revealed in the data is related to marital or cohabitation arrangements. While the percentage of males who live with another wage earner at home has increased 5 percentage points, the corresponding percentage for females has dropped 2 percentage points. Both demographic changes are symptomatic of a process of changes in household and gender dynamics that the societies (and the labor markets) have been experiencing.

The data also show that the process of urbanization of Latin American societies that was so prevalent some decades ago is still occurring. The percentages of urban workers increased approximately 8 points during this 15-year span. During this period there is also a slight decrease in self-employment and overtime work and a slight increase in part-time work for both females and males.

**Table 3. Descriptive Statistics**

	Period 1 (CIRCA 1992)		Period 2 (CIRCA 2007)	
	Male	Female	Male	Female
<b>Age (%)</b>				
15 to 24	24.14	25.95	20.11	18.67
25 to 34	29.48	30.38	27.29	28.07
35 to 44	23.69	24.72	24.37	26.37
45 to 54	14.48	13.19	18.46	18.95
55 to 64	8.21	5.76	9.77	7.94
<b>Education (%)</b>				
None	7.99	7.74	4.05	3.38
Primary Incomplete	37.29	31.02	24.71	18.68
Primary Complete	14.38	12.14	14.41	12.03
Secondary Incomplete	16.56	14.95	19.95	17.29
Secondary Complete	13.13	17.80	19.63	22.57
Tertiary Incomplete	4.50	6.60	7.05	10.35
Tertiary Complete	6.16	9.75	10.21	15.70
<b>Presence of Children in the Household (%)</b>				
No	84.02	88.57	91.15	93.19
Yes	15.98	11.43	8.85	6.81
<b>Presence of other wage earner in the Household (%)</b>				
No	39.41	19.61	34.55	21.25
Yes	60.59	80.39	65.45	78.75
<b>Urban (%)</b>				
No	27.11	17.55	18.06	11.07
Yes	72.89	82.45	81.94	88.93
<b>Type of Employment (%)</b>				
Employer	6.01	2.16	5.64	2.88
Employee	68.38	71.90	70.65	73.80
Self - Employed	25.61	25.94	23.71	23.32
<b>Time Worked (%)</b>				
Part time	11.29	31.41	13.54	32.20
Full time	56.89	48.60	57.78	50.08
Over time	31.83	19.98	28.68	17.71

*Source:* Authors' compilation from national statistics.

Having shown the changes in earnings, socio-demographics and individuals' job characteristics, the discussion now turns to the interplay among those variables in explaining gender wage gaps. Table 4 shows the decomposition exercise for the two periods under analysis and for a sequence of sets of observable characteristics. The structure of the table is the same as in the first table of matching decomposition results in "New Century, Old Disparities," where each column represents one decomposition exercise and the matching variables are added sequentially without replacement.

As noted above, the overall wage gap dropped from 16.32 percent of average female wages to 8.85 percent during this 15-year span. As in "New Century, Old Disparities," when gender differences in observable characteristics are taken into account, the unexplained gender

wage gaps increase notably. This is particularly the case after adding education (which makes the unexplained gap to move up 12 percentage points in both periods) and after adding time worked (which makes the unexplained gap increase between 3 and 4 percentage points in both periods). The other observable characteristics do not greatly change the unexplained earnings gap. The unexplained gender earnings gaps moves in the same direction in the two periods under analysis when adding control characteristics. That is, the role of observable characteristics in explaining gender earnings gaps is qualitatively similar in both periods.

The components of the gender earnings gap attributable to the confinement of males or females to certain segments of the labor markets where there are no peers of the opposite sex are almost non-existent. The only circumstance in which Delta-M and Delta-F are different than zero with statistical significance (at the 99 percent level) is when all controls are utilized in Period 1. In some other circumstances Delta-M is statistically significant, and in even fewer other circumstances is Delta-F statistically different than zero.

On a related note, the measure of the common supports increase for both males and females in Period 2 with respect to Period 1. Although this is probably linked to the bigger sample sizes that the data shows for Period 2, it can also be indicative of a reduction in gender differences in observable characteristics.

**Table 4. Gender Wage Gap Decompositions**

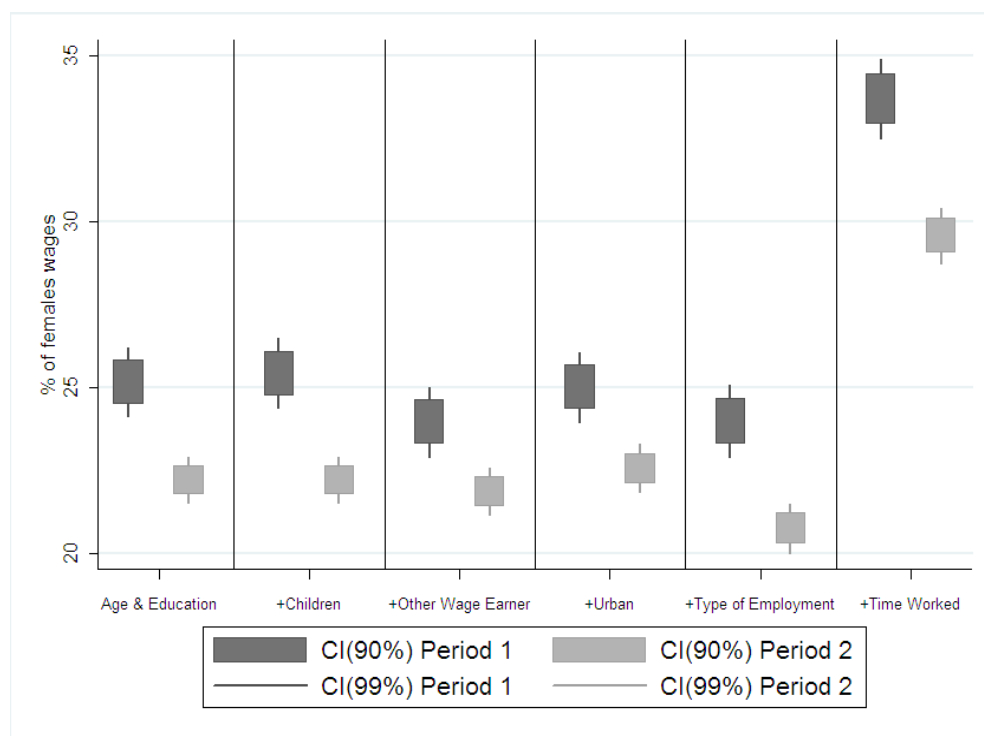
Period 1 (CIRCA 1992)							
	Age	+ Education	+ Presence of Children in the Household	+ Presence of Other Wage Earner in the Household	+ Urban	+ Type of Employment	+ Time Worked
$\Delta$	16.32%	16.32%	16.32%	16.32%	16.32%	16.32%	16.32%
$\Delta O$	13.44%	25.17%	25.42%	23.96%	25.00%	23.99%	33.68%
$\Delta M$	0.00%	0.39%	0.50%	0.80%	0.02%	2.23%	1.29%
$\Delta F$	0.00%	-0.01%	0.05%	-0.02%	0.13%	0.26%	-1.43%
$\Delta X$	2.88%	-9.23%	-9.65%	-8.41%	-8.83%	-10.16%	-17.22%
% CS Males	100.00%	99.46%	98.20%	93.47%	89.34%	79.62%	65.55%
% CS Females	100.00%	99.88%	99.52%	98.88%	97.40%	92.79%	80.66%

Period 2 (CIRCA 2007)							
	Age	+ Education	+ Presence of Children in the Household	+ Presence of Other Wage Earner in the Household	+ Urban	+ Type of Employment	+ Time Worked
$\Delta$	8.80%	8.80%	8.80%	8.80%	8.80%	8.80%	8.80%
$\Delta O$	9.73%	22.21%	22.21%	21.88%	22.56%	20.75%	29.56%
$\Delta M$	0.00%	0.03%	0.04%	-0.25%	-0.89%	-0.33%	-2.07%
$\Delta F$	0.00%	0.01%	0.02%	0.07%	0.16%	0.37%	0.43%
$\Delta X$	-0.92%	-13.44%	-13.47%	-12.90%	-13.03%	-11.98%	-19.12%
% CS Males	100.00%	99.86%	99.26%	97.42%	95.28%	89.61%	79.42%
% CS Females	100.00%	99.97%	99.78%	99.41%	98.74%	96.36%	89.04%

The reduction of the unexplained earnings gaps during the 15-year span under analysis can also be seen in Figure 1. The figure reports confidence intervals for the unexplained gender earnings gaps for a sequence of combinations of matching variables during Period 1 and Period 2 (the sequence follows the same pattern as in Table 4). The confidence intervals for Period 1 do not intercept with their corresponding confidence intervals for Period 2 in any of the pairs of unexplained earnings gaps shown. The reduction in unexplained earnings gaps is statistically significant and robust to different specifications. At this point it is worth noting that the non-parametric matching performed is equivalent to a fully flexible functional form of propensity scores and earnings regressions, making the robustness statement outlined above a strong one.<sup>2</sup> It is also worth noting that the jump in unexplained gender earnings gap after controlling for time worked is statistically significant for both periods under analysis.

**Figure 1. Evolution of the Unexplained Earnings Gaps for Different Specifications**



<sup>2</sup> Although not reported here, the difference in original earnings gaps between Period 1 and Period 2 is statistically significant at any conventional confidence level.

The drops in unexplained earnings gaps can arise as a result of a general trend of gaps dropping for all segments of the labor markets, or can also be the result of changes over time of the distribution of individuals' observable characteristics. If it were the case that females had moved to segments of the markets with more (less) evidence of unexplained earnings gaps during this 15-year span, one would expect an increase (reduction) in earnings gaps. To disentangle the effects of general trends versus changes in labor markets composition, we propose a “matching after matching” exercise. This consists of performing a matching exercise between matched females circa 1992 and matched females circa 2007.

According to the matching approach each matched set corresponds to a hypothetical world in which males and females have the same distribution of observable characteristics. Then, performing a matching between matched females circa 1992 and circa 2007 would preserve the distribution of males' characteristics as well (which, by construction, are the same as those of females for each corresponding year). As a result, the distributions of observables characteristics for matched individuals in this “matching after matching” exercise will: (i) be the same between males and females, and (ii) be the same between circa 1992 and circa 2007. The jump in unexplained gender earnings gaps that remains in the *matched set of matched individuals* would be one that corresponds to a counterfactual situation in which there is no change over time in the distribution of observable characteristics (or no changes in the composition of the labor markets)

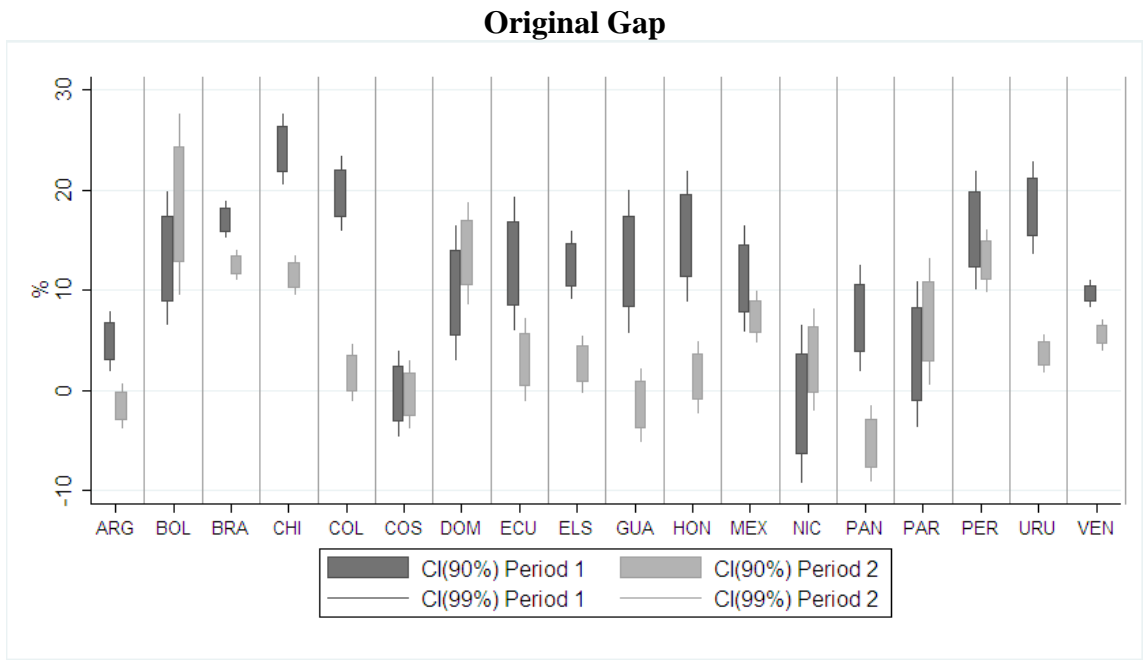
The results of this exercise are reported in Table 5. In all cases, the first stage of matching is performed with all observable characteristics utilized in Table 4 and Figure 1. After that, the matching after matching exercise is performed with each observable characteristic, one at a time, and each result is shown in each row. The sole exception is the last row of Table 5, which shows the decomposition exercise when all observable characteristics are simultaneously considered in the second stage matching. The results invariably show that in the hypothetical situation of no changes over time in the distribution of characteristics, the drop in unexplained gender earnings gaps would have been even higher than what has been observed. This is more pronounced when using age and education independently, but even more when using the whole set of observable characteristics.

**Table 5. Decomposition of the Change in the Unexplained Earnings Gap**

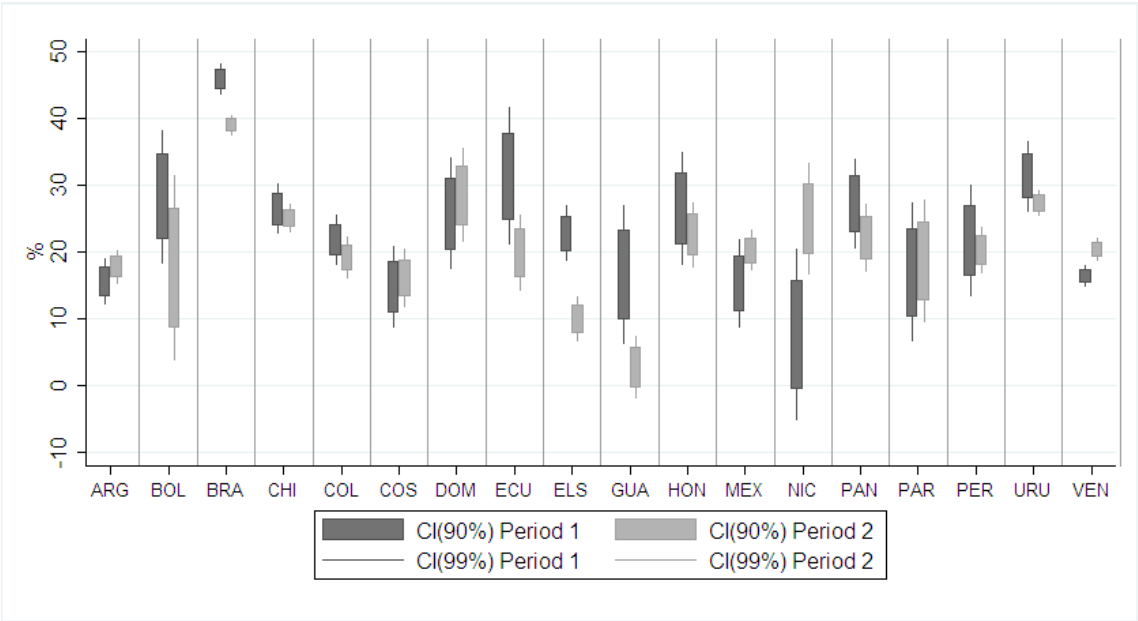
	Counterfactual Jump if no Change in X's	Part of the Jump due to changes in X's	Total Change
Age	-7.19	3.08	-4.12
Education	-7.37	3.26	-4.12
Presence of Children in the Household	-4.56	0.45	-4.12
Presence of Other Wage Earner in the Household	-4.24	0.13	-4.12
Urban	-5.43	1.32	-4.12
Type of Employment	-4.23	0.11	-4.12
Time Worked	-4.60	0.49	-4.12
<b>Full Set</b>	<b>-12.03</b>	<b>7.92</b>	<b>-4.12</b>

The cross-country heterogeneity previously reported in “New Century Old Disparities” is also present in these data. Figure 2 below shows confidence intervals for the original wage gap and the unexplained component of the gender earnings gaps by country, after controlling for the full set of observable characteristics. It can be seen that the original earnings gap attains maxima in Chile for Period 1 and Bolivia for Period 2, but these measures of earnings gaps incorporate within them the differences in observable characteristics. Regarding unexplained gender earnings gaps, the most salient result, consistent with what was previously reported in “New Century, Old Disparities,” is that Brazil shows the largest gaps across the period, although the data show that they have been decreasing. Currently, Brazil, El Salvador and Guatemala are the countries showing the most dramatic drops in unexplained gender earnings gaps. Contrary to the regional tendency of reductions in unexplained earnings gaps, Venezuela and Nicaragua show increases in those gaps during the 15-year span. To a lesser extent (and one that is not statistically significant) this has also been the case in Argentina and Mexico.

**Figure 2. Confidence Intervals for the Original and Unexplained Gender Earnings Gap by Country**



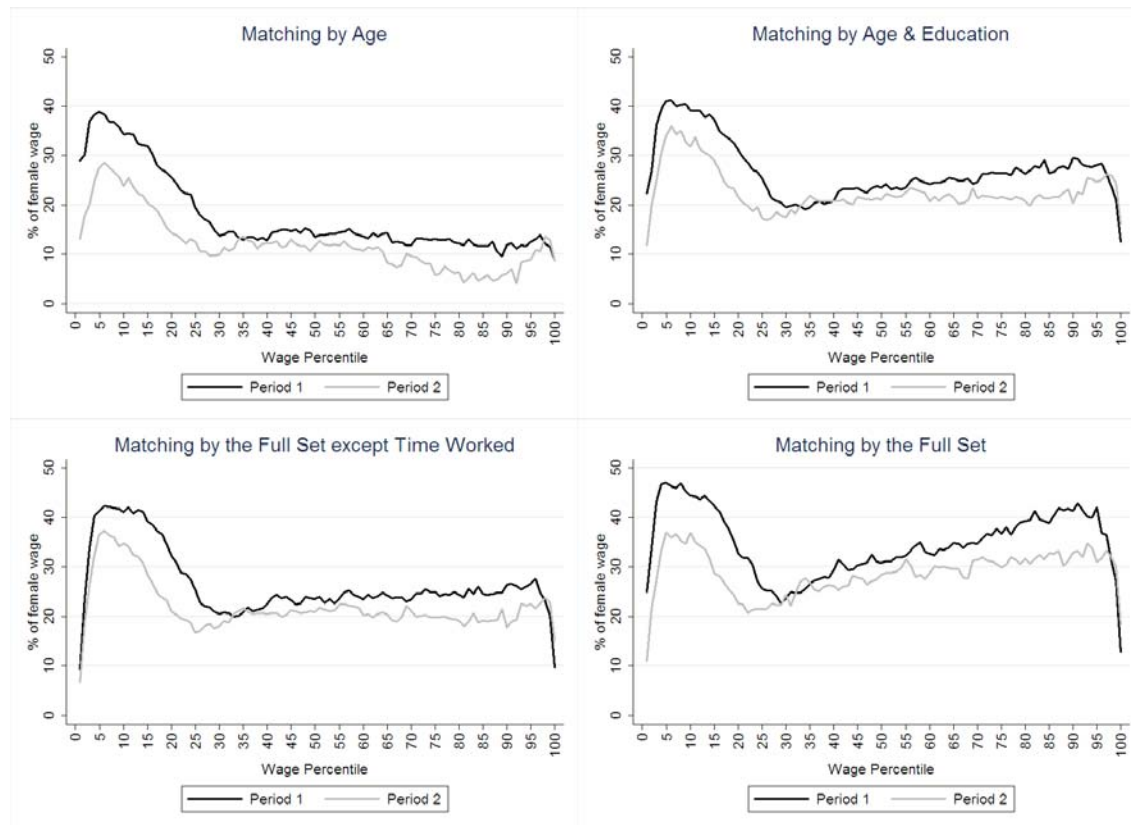
**Unexplained Gap (after Controlling for Full Set of Characteristics)**



Turning next to explore the distribution of the unexplained components of the earnings gap, Figure 3 shows a comparison of unexplained gaps along the earnings percentiles for the two periods. The comparison is made for four different sets of matching variables, and the results suggest that most of the reduction in the average unexplained gender wage gaps in Latin America occurred at the extremes of the earnings distribution. The unexplained gender earnings gaps at the middle of the distribution (between percentiles 35 and 60) remained almost unchanged. The gaps at the bottom of the distribution dropped around 10 percentage points (for instance at the 5<sup>th</sup> percentiles of the distributions of earnings the unexplained gender gaps dropped from a range of 38-48 to a range of 28-38) The gaps at the top of the distribution dropped between 3 and 9 percentage points (for instance at the 90<sup>th</sup> percentiles of the distributions of earnings the unexplained gender gaps dropped from a range of 10-42 to a range of 7-33).

The U shape of the curve of unexplained gender earnings gap with respect to the percentiles of the earnings distributions that was relatively clear circa 1992 has smoothed for 2007 such that nowadays it is more homogenous along the distribution. Nonetheless, there is still a pattern of higher unexplained earnings gaps at the bottom of the distributions of earnings. The association of the problem of gender wage gaps with that of poverty or low income-generation is still prevalent in the region.

**Figure 3. Unexplained Gender Wage Gap by Percentiles of the Wage Distribution of Males and Females (all countries)**



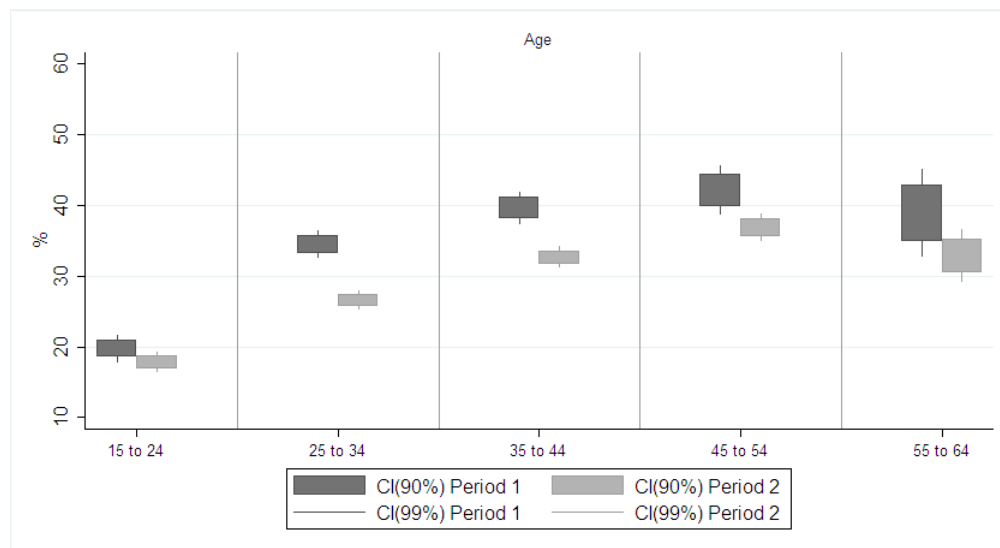
A country-by-country disaggregation of these plots of unexplained gender earnings gaps with respect to earnings percentiles, but focusing on the decomposition that results from using the full set of matching characteristics only, can be found in the Appendix. The results shown there indicate that the regional averages in Figure 3 hide a great deal of cross-country heterogeneity. Probably, the most common pattern that these data show is the reduction of unexplained gender earnings gaps at the bottom of the distribution in eight of the 18 countries of the sample (Brazil, Costa Rica, Ecuador, El Salvador, Guatemala, Honduras, Mexico and Paraguay). In four other countries the unexplained earnings gaps at the bottom of the distribution actually increased, although slightly (Bolivia, Colombia, Peru and Venezuela).

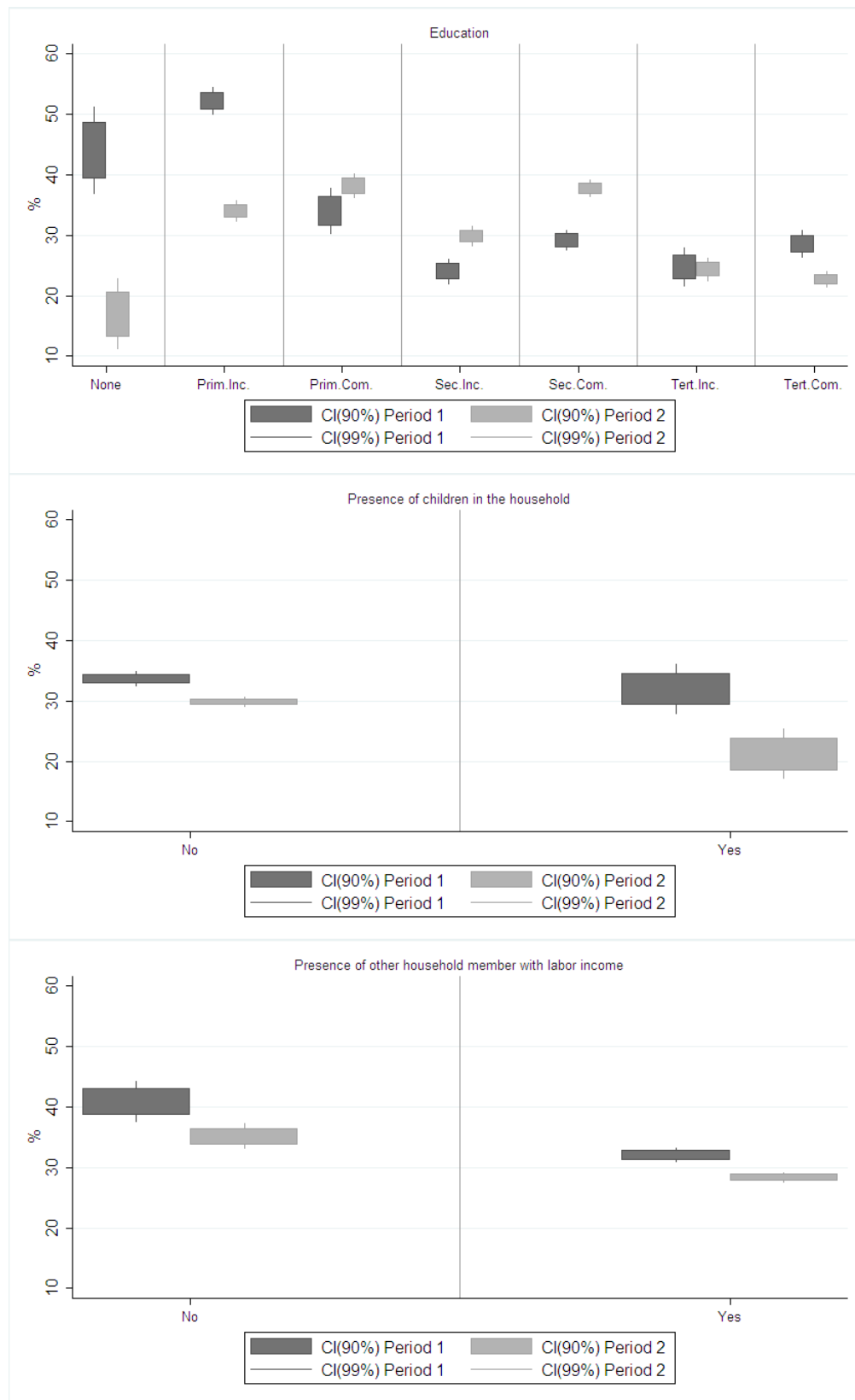
Having explored changes over time in the patterns of unexplained gender earnings gaps across the earnings distributions, we turn next to an exploration of unexplained gender earnings gaps for different segments of the labor market; the results are shown in the panels of Figure 4. A

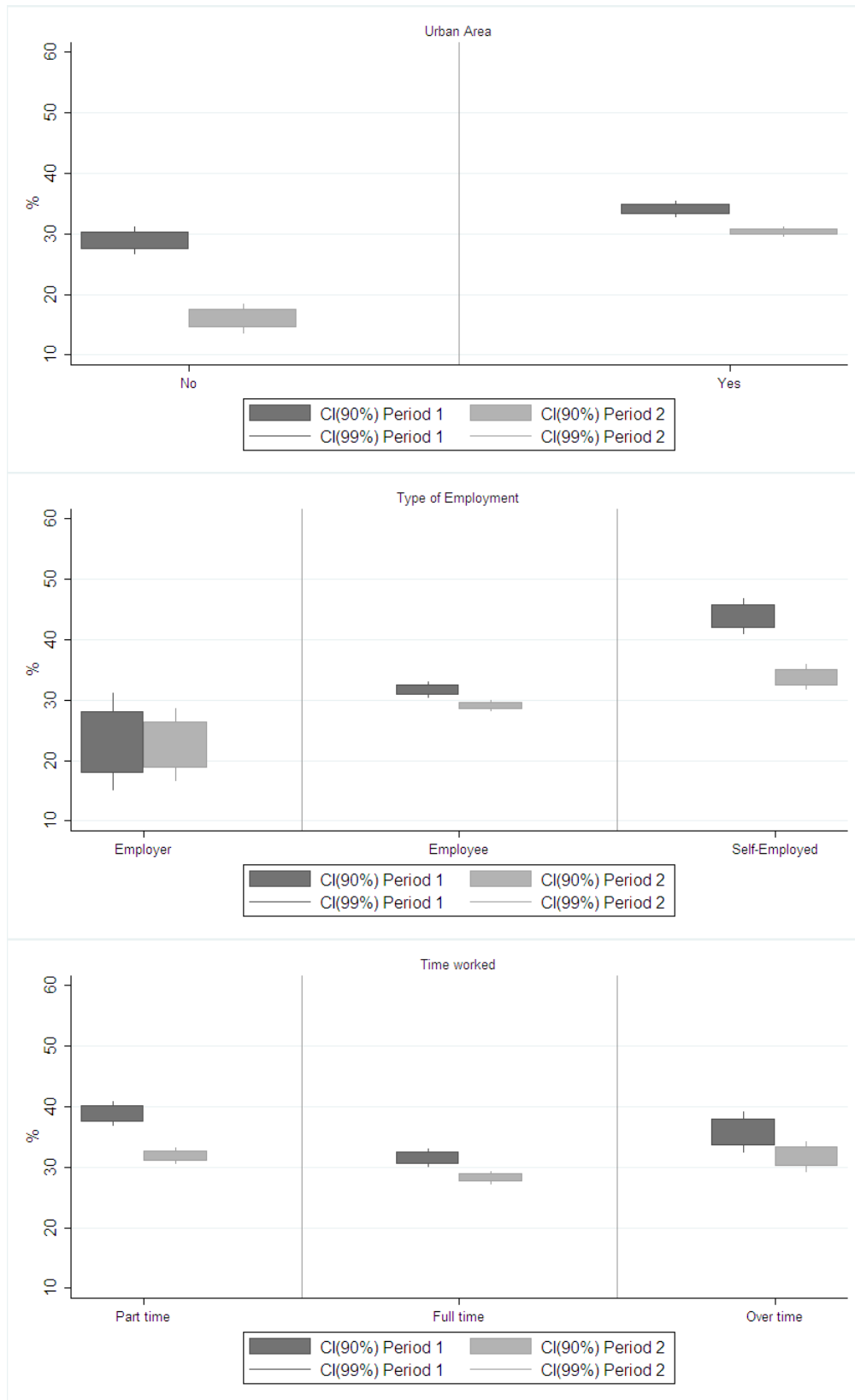
notable pattern from the overall comparison of these panels is that the segments of the labor markets for which the unexplained gender earnings gaps are higher (or lower) are similar during the period under analysis.

The results show that the unexplained gender earnings gaps decreased for all age groups, but especially for those between 25 and 44 years old. Regarding education, the earnings gaps increased for those in the middle of the distribution of educational attainment and dropped for those at the extremes, especially among those with no education. In this case the confidence interval for unexplained wage gaps dropped from 40-49 to 13-21. The unexplained gaps also show an important drop among people who live with children under 6 at home, in rural areas, among the self-employed and among part-time workers.

**Figure 4. Confidence Intervals for the Unexplained Gender Wage Gap by Different Characteristics (after Controlling for Full Set of Characteristics)**







### 3. The Role of Job Tenure

It has been previously claimed in the literature and public discussion that fertility, home responsibilities and cultural norms of time intra-household allocation result in lower opportunities for women to accumulate experience in the labor markets. Six of the 18 countries in the sample have data on job tenure for the period under analysis (Brazil, Ecuador, Nicaragua, Panama, Paraguay and Uruguay). Some other countries have recently added information about job tenure on their household surveys, but for comparability purposes we restrict the attention to those countries with information on both periods only.

Table 6 shows gender differences in job tenure for the six countries with data available. It can be seen that most workers, males and females are with the current jobs for between 1 and 5 years. On the lowest extreme (less than one year at their jobs), where there is approximately one-fifth of the labor force, there is evidence of a slightly higher prevalence of women, with almost no changes during the 15-year span. At the other extreme, however, there is a slight evidence of an increase in the percentages of the labor force with long job tenures for both genders but especially for females. When comparing averages (not reported in the table), it can be seen that the gender gap in job tenure has not changed dramatically during the period. Males, on average, tend to stay between 17 and 18 months longer at their jobs than females.

**Table 6. Distribution of the Female and Male Labor Force by Job Tenure (Brazil, Ecuador, Nicaragua, Panama, Paraguay and Uruguay)**

Tenure	Period 1 (CIRCA 1992)		Period 2 (CIRCA 2007)	
	Males	Females	Males	Females
Less than 1 year	19.53	21.81	19.39	22.96
1 year	12.20	13.87	11.59	13.18
1 to 5 years	28.81	31.27	27.67	29.54
5 to 10 years	16.51	15.58	16.31	15.00
10 to 20 years	14.85	12.70	15.38	12.66
More than 20 years	8.10	4.77	9.65	6.66

Next, Table 7 shows the same wag gap decomposition exercise as in Table 4 but restricts the analysis to the six countries for which data is available. The total gender earnings gap for this subsample is similar to the one for the whole sample in the first period but slightly higher in the second period. In this case, the drop in total earnings gap for the 15-year span is 5.5 instead of

7.5 percentage points. Similarly, the 15-year drop in unexplained earnings gaps after controlling for different sets of observable characteristics is smaller for this six-country subsample than for the whole 18-country sample. However the leitmotiv of this table is the last column, which uses job tenure as a matching variable on top of the previous characteristics. The table shows that the addition of job tenure reduces the unexplained gender gap in earnings by 7.35 and 4.88 percentage points for Period 1 and Period 2, respectively. Gender differences in job tenure seem to explain a substantial part of gender earnings gaps. It should be noted, however, that within the context of a model of earnings determination, job tenure is an endogenous variable. Individuals with higher earnings would have higher propensity to stay at their job (and hence accumulate longer tenure). The decomposition exercise undertaken here does not take such endogeneity into account.

**Table 7. Gender Wage Gap Decompositions. The Role of Job Tenure  
(Brazil, Ecuador, Nicaragua, Panama, Paraguay and Uruguay)**

<b>Period 1 (CIRCA 1992)</b>								
	Age	+ Education	+ Presence of Children in the Household	+ Presence of Other Wage Earner in the Household	+ Urban	+ Type of Employment	+ Time Worked	+ Job Tenure
$\Delta$	16.73%	16.73%	16.73%	16.73%	16.73%	16.73%	16.73%	16.73%
$\Delta 0$	16.65%	35.01%	35.50%	34.46%	35.62%	35.28%	45.25%	37.90%
$\Delta M$	0.00%	0.08%	0.11%	-0.10%	-0.52%	0.63%	-0.48%	6.03%
$\Delta F$	0.00%	-0.02%	-0.01%	-0.07%	-0.17%	-0.51%	-1.21%	-12.01%
$\Delta X$	0.09%	-18.34%	-18.87%	-17.55%	-18.20%	-18.67%	-26.83%	-15.19%
% CS Males	100.00%	99.84%	99.36%	97.43%	95.45%	89.61%	79.56%	45.64%
% CS Females	100.00%	99.91%	99.66%	99.36%	98.39%	96.20%	88.89%	57.72%
<b>Period 2 (CIRCA 2007)</b>								
	Age	+ Education	+ Presence of Children in the Household	+ Presence of Other Wage Earner in the Household	+ Urban	+ Type of Employment	+ Time Worked	+ Job Tenure
$\Delta$	11.17%	11.17%	11.17%	11.17%	11.17%	11.17%	11.17%	11.17%
$\Delta 0$	12.22%	31.09%	31.02%	31.21%	31.63%	29.54%	38.19%	33.31%
$\Delta M$	0.00%	-0.02%	-0.07%	-0.30%	-0.90%	-0.70%	-1.92%	2.49%
$\Delta F$	0.00%	0.00%	0.01%	0.02%	0.09%	0.20%	-0.01%	-9.20%
$\Delta X$	-1.05%	-19.91%	-19.78%	-19.76%	-19.65%	-17.87%	-25.09%	-15.44%
% CS Males	100.00%	99.94%	99.52%	98.57%	97.07%	93.37%	86.49%	53.56%
% CS Females	100.00%	99.99%	99.88%	99.69%	99.26%	97.96%	93.65%	65.47%

The average result for the six countries for which data are available hides an interesting cross-country heterogeneity. An exploration of the role of job tenure is presented in Figure 5

below. For Period 1 and Period 2, the figure shows confidence intervals for the unexplained gender earnings gaps after controlling for the previously labeled “Full Set” of observable characteristics, paired with the unexplained gap after adding job tenure to that set. The results for both periods are the same: (i) the addition of job tenure reduces the average unexplained gender earnings gap in all countries, but in a statistically significant way only in Brazil and Uruguay; and (ii) the dispersion of the unexplained gender earnings gap is higher after adding job tenure to the set of matching characteristics.

**Figure 5. Gender Earnings Gap by Country. The Role of Job Tenure  
(Brazil, Ecuador, Nicaragua, Panama, Paraguay and Uruguay)**

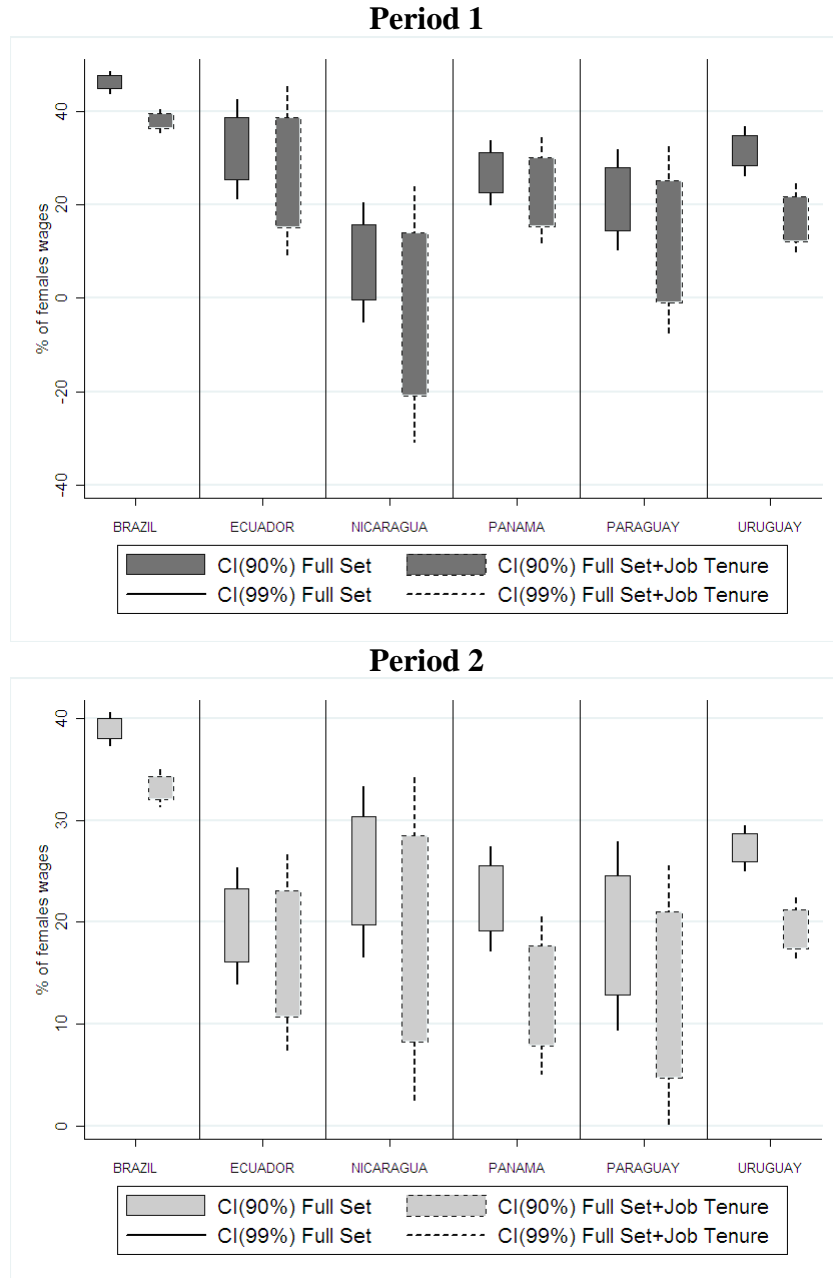
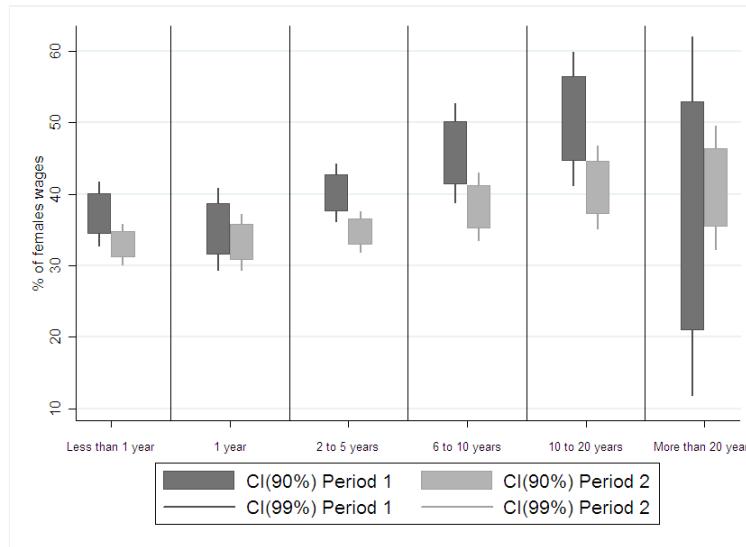


Figure 6 examines heterogeneity within unexplained gender earnings gaps along the distribution of job tenure. The results indicate that for both periods the unexplained earnings gap has been increasing with job tenure and are slightly smaller and less dispersed circa 2007 (which can also be a result of the bigger sample size available in 2007 discussed before).

**Figure 6. Confidence Intervals for the Unexplained Gender Wage Gap by Job Tenure  
(after Controlling for Full Set of Characteristics, including Job Tenure)  
(Brazil, Ecuador, Nicaragua, Panama, Paraguay and Uruguay)**



#### 4. Detecting Changes in Earnings Gaps over Time: A Cohort Analysis

One of the recurrent results obtained from the analysis of gender earnings gaps across the age distribution of the working population is the presence of a life cycle pattern wherein unexplained gender earnings gaps are smallest among the youngest individuals, increasing as workers age up to their mid-50s. After that, the gaps decrease slightly. This age analysis, however, has been done only statically (in the sense that it has used only information from surveys at one point in time). With data for two points in time it is possible to analyze the issue in greater depth, examining what happened to cohorts of workers as they aged.

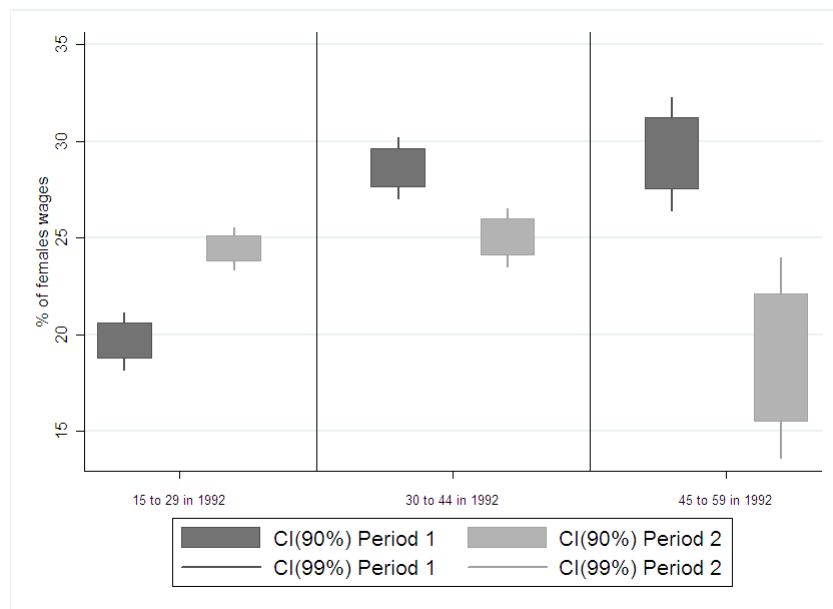
As noted above, the average time spanned between the two available data points is 15 years. Then, the age cohorts that will be used for the analysis in this section will have the same length. That is, we will consider individuals whose age in 1992 was between: (i) 15 and 29, (ii) 30 and 44, and (iii) 45 and 59 years old. Then, for these three groups we will inquire for unexplained gender earnings gaps circa 1992 and circa 2007. There are, however, two countries for which the time span between surveys is significantly smaller than 15: the Dominican Republic and Guatemala. These two countries are dropped from the analysis on this section.

Figure 7 shows the results for the analysis outlined above for two sets of matching characteristics: one after controlling for age and education, and one after controlling for the full set of observable characteristics (excluding job tenure). The results from both sets of matching

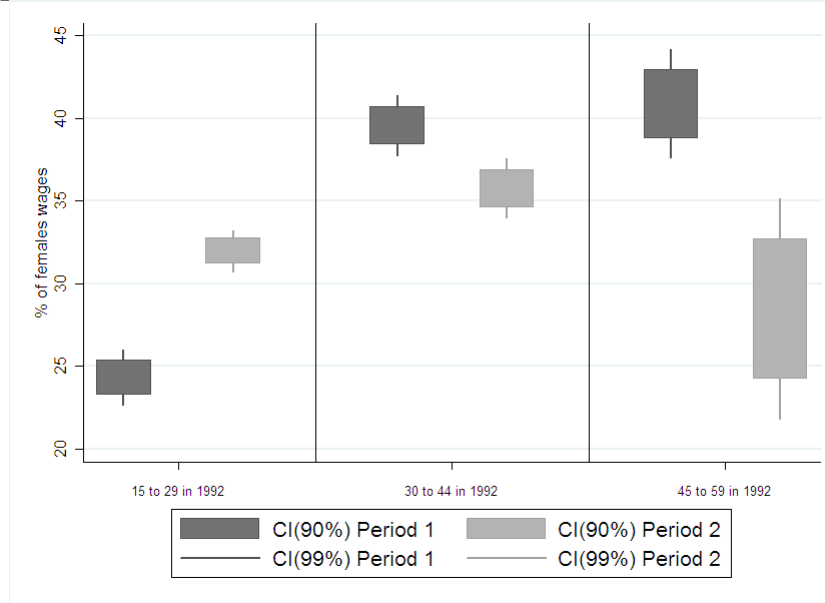
characteristics are qualitatively similar: the unexplained gender earnings gaps for the two older cohorts decreased as individuals aged. For the youngest cohort the gap increased. For this cohort, the secular trend of reduction of gender earnings disparities during this period was outweighed by the increase in gender earnings gaps that workers face as they enter adulthood (that is, as they move from being 15-29 to be 30-44 years old).

**Figure 7. Unexplained Gender Wage Gap by Cohort  
(excluding the Dominican Republic and Guatemala)**

**a. Unexplained Gender Wage Gap after Controlling for Age and Education**



### b. Unexplained Gender Wage Gap after Controlling for Full Set of Characteristics



The jumps in unexplained gender earnings gaps shown for the three cohorts are disaggregated for different segments of the market in Table 8. It is worth highlighting that the analysis of this table corresponds to one of pseudo-panels in the sense that we are not able to follow the same individuals in both periods, but instead we compare the same segments of the labor markets in Period 1 and Period 2. The results suggest interesting differences across the life cycle. The biggest jumps in absolute magnitude of the unexplained earnings gaps occurred among those with primary and secondary complete for the youngest cohort and among the lowest educated individuals for the other two cohorts. For the oldest cohorts, the unexplained earnings gaps falls among the lowest-educated individuals, which may suggest that the earnings penalty faced by low-educated females can be alleviated with maturity (and perhaps experience). Regarding presence of children in the household, the biggest jumps in unexplained gender gaps occurred for those with children in the two youngest cohorts and for those with children in the oldest cohort. For those with children at home, the evolution of their unexplained gender earnings gaps has been negative for all three cohorts. Regarding the presence of other income generators at home, the data shows no differences for the two oldest cohorts.

The drops in gender earnings gaps have been similar for those with and those without other wage earners. For the youngest cohort, however, some differences arise such that the biggest jump in gaps occurred among those with another person in the household generating

income. As in the case of presence of children, in this case for those with no other wage earner at home, the unexplained gender earnings gap dropped for all cohorts. That is, those females who had no other option than generating income to maintain their households had been successful at reducing their gender earnings disparities. The reductions in unexplained earnings gaps also happened for the three cohorts in rural areas. It moved substantially among employers as well: up for the two youngest cohorts and down for the oldest one.

**Table 8. Changes in the Unexplained Earnings Gap by Cohorts and Characteristics**

	Cohort		
	15 to 29 in 1992	30 to 44 in 1992	45 to 59 in 1992
<b>Overall</b>	7.67	-3.79	-12.42
<b>Education</b>			
None	8.91	-51.56	-7.22
Primary Incomplete	-4.09	-17.35	-43.07
Primary Complete	19.45	0.38	19.77
Secondary Incomplete	12.83	12.63	-15.85
Secondary Complete	22.45	5.78	-1.06
Tertiary Incomplete	11.56	-0.59	18.12
Tertiary Complete	-1.44	-2.44	-4.30
<b>Presence of Children in the Household</b>			
No	9.01	-4.37	-12.55
Yes	-10.34	-14.04	-3.36
<b>Presence of other wage earner in the Household</b>			
No	-3.16	-3.91	-10.29
Yes	9.01	-3.80	-13.14
<b>Urban</b>			
No	-1.79	-16.73	-23.47
Yes	8.05	-3.51	-12.10
<b>Type of Employment</b>			
Employer	21.50	5.87	-45.98
Employee	7.54	-1.84	-12.71
Self - Employed	5.44	-11.04	-5.99
<b>Time Worked</b>			
Part time	5.85	-7.92	-8.93
Full time	8.20	-2.87	-15.45
Over time	4.11	-1.99	-15.16

As already highlighted, not only the gender earnings gaps within segments, but also the composition of the segments of the labor force have been subject to change during the 15-year span under analysis. Then, the counterfactual question that arises is the following: To what extent do the changes reported above correspond to earnings gap changes within the segments of the labor markets, and to what extent do they correspond to changes in the composition of those segments? As in the exercise performed in Table 5, we perform here a “matching after matching” exercise but within the cohorts in this pseudo-panel. These results are shown in Table 9. The

evidence points towards the same results, which attributes a small role to the composition of the labor markets to the 15-year changes in unexplained gender earnings gaps. Most of the changes in earnings gaps during this period can be attributed to changes that happened within the segments of the labor markets. Then, Table 8 above acquires a special role as it permits to point the segments of the labor markets within which most of the reductions in gender earnings gaps happened.

**Table 9. Decomposition of the Change in the Unexplained Earnings Gap by Cohort:  
The Role of Each Characteristic**

Cohort	Decomposition	Education	Presence of Children in the Household	Presence of other wage earner in the Household	Urban	Type of Employment	Time Worked	Full Set
15 to 29 in 1992	Counterfactual Jump if no Change in X's	5.21	6.98	7.30	6.52	7.82	6.54	6.98
	Part of the Jump due to changes in X's	2.47	0.70	0.38	1.16	-0.14	1.14	0.70
	<b>Total Jump</b>	<b>7.67</b>	<b>7.67</b>	<b>7.67</b>	<b>7.67</b>	<b>7.67</b>	<b>7.67</b>	<b>7.67</b>
30 to 44 in 1992	Counterfactual Jump if no Change in X's	-4.82	-5.13	-3.91	-5.67	-3.05	-4.20	-6.72
	Part of the Jump due to changes in X's	1.04	1.35	0.13	1.89	-0.72	0.42	2.94
	<b>Total Jump</b>	<b>-3.79</b>	<b>-3.79</b>	<b>-3.79</b>	<b>-3.79</b>	<b>-3.79</b>	<b>-3.79</b>	<b>-3.79</b>
45 to 59 in 1992	Counterfactual Jump if no Change in X's	-16.55	-12.54	-12.40	-14.29	-11.56	-12.91	-28.75
	Part of the Jump due to changes in X's	4.13	0.12	-0.02	1.86	-0.86	0.49	16.33
	<b>Total Jump</b>	<b>-12.42</b>	<b>-12.42</b>	<b>-12.42</b>	<b>-12.42</b>	<b>-12.42</b>	<b>-12.42</b>	<b>-12.42</b>

## 5. Concluding Remarks

This paper, an addendum to Atal, Ñopo and Winder (2010), has explored changes in gender earnings gaps and its associated factors at the turn of last century and the beginning of this new one in Latin America. Between 1992 and 2007, overall gender earning gaps fell by about 7 percent of average females' earnings. During this period important changes in the composition of the labor markets occurred. These can be viewed as the result of a still ongoing process of urbanization of Latin American societies and another of changes in gender dynamics within households. Nowadays, workers are more educated (a more marked improvement for females) and have less children at home. Male workers are more likely to have other income earners at home, while with female workers the situation is exactly the opposite: the likelihood of finding them within households with other income generator has decreased.

While overall gender earnings gaps fell 7 percentage points, their unexplained component has dropped between 3 and 4 percentage points, depending on the set of controlling characteristics, and these drops have been statistically significant. The other 3 to 4 points are due to changes in the distributions of observable characteristics of males and females within the common supports.

The cross-country heterogeneity in gender earnings gaps seen in Atal, Ñopo and Winder (2010) for one snapshot is confirmed in this addendum. Not only does this paper confirm cross-country heterogeneity in gap levels but also in progress towards reduction of the gaps. At the 90 percent confidence level, 12 of the 18 countries did not display statistically significant changes in the unexplained wage gap, four countries had a drop, and two of them showed statistically significant increases. The most salient case is Brazil, the country that shows the highest unexplained gender earnings gap but also the most auspicious progress towards the reduction of that gap. Exploring unexplained gender earnings gaps across different segments of the labor markets also reveals some heterogeneity in progress towards reducing those gaps. The most notable declines in unexplained gender earnings gaps are found among people at both extremes of the earnings distributions, those who live with children under the age of six at home, in rural areas, the self-employed and part-time workers.

For a subset of countries for which data on job tenure were available it was found that this variable alone was able to explain between 5 and 7 percentage points of the gender earnings gaps. This pattern also shows cross-country heterogeneity, Brazil and Uruguay being the countries where job tenure matter the most. A cohort analysis reveals that the youngest cohort (those who in 1992 were between 12 and 29 years old) experienced an increase in the unexplained earnings gap, probably as a consequence of a life cycle pattern in gender earnings gaps. The other two cohorts showed statistically significant declines in unexplained earnings gaps as individuals aged during this 15-year span. The results suggest a limited role of recompositions of segments of the labor markets and a more important role for changes in earnings gaps within those segments. This finding is in line with explanations of secular trends pointing towards reductions of gender earnings gaps.

## References

- Atal, J., H. Ñopo and N. Winder. 2010. "New Century, Old Disparities. Gender and Ethnic Wage Gaps in Latin America" IZA Discussion Paper No. 5085, July 2010.
- Ñopo, H. 2008. "Matching as a Tool to Decompose Wage Gaps." *Review of Economics and Statistics* 90(2): 290-299.

## Appendix

### Unexplained Gender Wage Gap by Percentiles of the Wage Distribution of Males and Females (after Controlling for Full Set of Characteristics) by Country

