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## Teachers' salaries in Latin America: How much are they (under or over) paid?

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How Much Are They (Under or Over) Paid?**

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August 2011

# Teachers' Salaries in Latin America: How Much Are They (Under or Over) Paid?

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## ABSTRACT

### **Teachers' Salaries in Latin America: How Much Are They (Under or Over) Paid?\***

This paper documents the extent to which teachers are underpaid vis-à-vis workers in other professional and technical occupations in Latin America circa 2007. These labor earnings differences, attributed to observable socio-demographic and job characteristics, are assessed using a matching methodology (Ñopo, 2008). Teachers' underpayment is found to be stronger than what has been previously reported in the literature, especially among pre-school and primary teachers. Nonetheless, behind the region averages there is an important cross-country heterogeneity. Teachers' underpayment is more pronounced among males, older workers, household heads, part-timers, formal workers, those who work in the private sector, and (mostly) among those with complete tertiary education. Two amenities of the teaching profession, namely the longer job tenure and the flexible job schedules within the year, are also explored. Even after accounting for the possible compensating differentials of these two amenities, teachers' underpayment vis-à-vis that of other professional and technicians prevail.

JEL Classification: J31, J44, J8, O54

Keywords: wage differentials, professional labor markets, Latin America

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## 1. Introduction

Research shows that teacher's performance is a critical factor to explain students' academic success in the school system (Goldhaber and Brewer 1997; Rivkin et al 2005; Darling-Hammond 2001; Rocoff 2004, OECD 2009; Barber and Mourshed 2007; Clotfelter et. al. 2007; Kukla-Acevedo 2009). Also, the effectiveness of educational policies and the effect of other inputs depend on the quality of the daily work of teachers. Therefore, to improve the quality of education it is essential to pay special attention to teachers and to implement policies to attract, motivate and retain the most talented individuals in the profession.

In this context, the analysis of teachers' salaries is relevant since in many countries, and Latin America is no exception, they are often perceived to be lower than those of other professionals. If this is the case, low incomes would discourage the best students to choose education major in College, with negative effects on the pool of future teachers. These low incomes would damage their motivation to teach (OECD 2009; Figlio and Kenny 2006; Ortega 2010, Player 2009, Heutel 2009, Loeb and Page, 2000) and cause good teachers to leave the profession (Imazeki 2005; Harris and Adams, 2007; Scafidi et al 2007). These effects would produce inefficiencies in the educational process and negative effects in students' learning. This concern over teacher quality and motivation has generated renewed interest in both the sufficiency of teacher pay to recruit and retain high quality instructors, and the efficacy of the salary structure (including incentives) to motivate teachers' performance.

A series of studies have analyzed the issue of teachers' salaries in Latin America examining whether they are under or over-paid.<sup>1</sup> Most of them use National Household Surveys to estimate Mincer wage equations with different control variables, and some studies use the Blinder-Oaxaca wage gap decomposition. The results are mixed, indicating that there is no robust empirical evidence showing that teachers receive lower/higher salaries than a comparative group of workers.

Psacharopoulos et al. (1996) use data for 12 Latin American countries to compare average wages without finding a clear pattern; in some countries teachers' pay is higher than the comparative group and vice versa. Liang (1999) finds that in 11 out of 12 countries analyzed, hourly wages for teachers are actually higher than their counterparts' in the labor force with similar observable characteristics. Hernani-Limarino (2005) examines the robustness of conditional wage differentials to the methods used and the definition of the comparable group for 17 Latin American countries. He concludes that in some countries (i.e. Chile) teachers earn more than the comparable workers; in others they receive lower salaries (i.e. Nicaragua), while in others the answer depends on the control group and the method used to estimate the wage gap. He also estimates conditional wage

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<sup>1</sup> There are also several studies addressing this issue for non-Latin American countries, for instance, Taylor (2008), Allegretto et al (2008), Podgursky and Tongrut (2006), Harris and Adams (2005), Stoddard (2005) for United States, Asadullah (2006) for Bangladesh; Komenan and Grootaert (1990) for Cote D' Ivoire; Zymelman and DeStephano (1989) for Sub-Saharan African countries.

differentials for different quantiles of the conditional wage distribution, concluding that teachers are over or under-paid depending on their position in such conditional distribution.

In terms of country studies, Saavedra (2004) finds for Perú that earnings comparisons between teachers and other occupations depend on the geographic zone, in Lima teachers earn less than comparable workers, while in the rest of the country they enjoy a wage premium. Mizala and Romaguera (2005) find for Chile that, once differences in observed characteristics are accounted for, teachers' salaries are similar to those they would receive in other occupations; however, they find relevant differences between men and women, female teachers earn more than their counterparts, while male teachers earn less than similar workers in other sector of the labor market. In Bolivia, Mexico and Guatemala, teachers enjoy a wage premium, explained by the fact that they are public workers, i.e., teachers working in the public sector earn higher salaries than comparable private sector teachers and similar workers in other occupations (Piras and Savedoff 1998; Lopez-Acevedo 2004; Rivas and Lavarreda 2008). Furthermore, Herreros et al. (2003) for Argentina and Urquiola et al. (2000) for Bolivia show that whether teachers are well paid depends on the comparison group, even when differences in observable characteristics are accounted for. Conditional wage differentials are favorable to teachers when compared with all workers; nevertheless, the differentials are not favorable to teachers when compared with workers who had completed at least secondary education.

In sum, the available empirical evidence shows that the sign and the magnitude of the conditional wage differential between teachers and other workers crucially depends on the definition of the comparison group. Moreover, there is some evidence of intra-country heterogeneity, for instance, regarding gender and geography.

The aim of this paper is to revisit the question of conditional labor earnings differentials between teachers and other professionals and technicians in Latin America, but with a renewed methodological approach. The extent to which earnings differentials can be attributed to differences in observable socio-demographic and job characteristics will be assessed with the non-parametric matching methodology developed in Nopo (2008). This is an extension of the Blinder-Oaxaca (BO) decomposition for which teachers and non-teachers are matched when showing exactly the same combination of observable characteristics. The method does not require any estimation of earnings equations and, by construction, it allows a more precise salaries comparison for teachers and their counterparts than what the literature has been able to do so far. Furthermore, this approach allows us to obtain not only more precise estimates of the average wage gap between teachers and non-teachers, but also a comprehensive exploration of its distribution. Additionally we explore two amenities that may explain, to a certain extent, lower teachers' earnings in the form of compensating differentials: job tenure and job schedules. While the former is claimed to be longer among teachers, especially in the public sector; the latter are claimed to be more flexible among teachers (that is, more vacation weeks per year).

The results obtained depict a picture in which the extent to which teachers are underpaid is stronger than what has been previously reported in the literature, especially for pre-school and elementary teachers. Nonetheless, behind the region averages there is an important cross-country heterogeneity. Teachers' underpayment is more pronounced among males, older workers, household heads, part-timers, informal workers, those who work in the private sector, and among those with complete tertiary education. These results are also found after adjusting earnings by job-break periods, although the earnings gap in this case is smaller, and if rather than hourly, monthly and yearly earnings are used. That is, the amenity of part-time schedules, larger vacations periods and more job stability (that in many circumstances could be used as a way of managing the family-work trade-off) are compensating lower earnings.

The rest of the paper proceeds as follows. In the next section we discuss the data sources, our approach to harmonize them across countries and some descriptive statistics comparing teachers with other workers. In section three we present the empirical analysis of the extent to which pay differentials can be attributed to differences in observable characteristics, followed by an analysis on job tenure, addressing the differences between workers in the public and private sector, and the role of job schedules on earnings gaps. In the fourth and final section we summarize the conclusions.

## **2. The Data**

The data sources are household and labor surveys, with national or urban representativeness. Table 1 reports the specifics of each data source, including the particular survey name, the year and the number of observations, both for the whole data set of the working sample and for the school teachers, office workers, and (other) professionals and technicians populations within the sample (that is, those who will be part of the analysis in subsequent sections). The data will be used considering the expansion factors such that the relative size of each sample proportionally corresponds to the size of each country. Outliers for income in the main occupation were dropped from the data set. This comprised 0.25% of school teachers, 0.25% of office workers and 1.08% of the other professionals and technicians within the working sample.

**Table 1**  
**Data Sources**

Office Workers/Other Professionals and Technicians/Teachers (non tertiary) Working Populations*													
Country	Name Of The Survey	Year	Coverage	Full Set		Pre-School and Elementary Teachers		Secondary Teachers		Office Workers		Other Professionals and Technicians	
				Number of observations	Expanded observations	Number of observations	Expanded observations	Number of observations	Expanded observations	Number of observations	Expanded observations	Number of observations	Expanded observations
Brazil	Pesquisa Nacional por Amostra de Domicilio (PNAD)	2008	National	157775	76800000	3829	1870619	1055	494701	16070	7787565	19798	9647079
Chile	Encuesta de Caracterizacion Socioeconomica Nacional (CASEN)	2009	National	82905	6021479	1521	111737	278	31928	4812	480221	8568	1027836
Ecuador	Encuesta de Empleo, Desempleo y Subempleo (ENEMDU)	2006	National	9147	2404002	522	115693	254	56255	901	246601	1093	293211
El Salvador	Encuesta de Hogares de Propositos Multiples (EHPM)	2009	National	24299	1961864	518	41415	54	4758	1055	102038	1788	203243
Honduras	Encuesta Permanente de Hogares de Propositos Multiples (EPHPM)	2007	National	26203	1910929	688	50867	205	14618	897	59120	2807	188640
Mexico	Encuesta Nacional de Ingresos y Gastos de los Hogares (ENIGH)	2008	National	44373	39900000	35	26909	71	50962	5298	4664039	3323	3015056
Nicaragua	Encuesta Nacional de Hogares sobre medicion de Niveles de Vida (EMNV)	2005	National	11024	1652432	377	48401	64	9292	258	52396	592	118800
Panamá	Encuesta de Hogares (EH)	2007	National	18843	1269338	395	24953	220	14764	1801	141066	1702	131078
Uruguay	Encuesta Continua de Hogares (ECH)	2007	Urban	25432	532842	592	12238	418	9023	3343	72151	2841	61053
All countries				400001	132452886	8477	2302832	2619	686301	34435	13605197	42512	14685996

\* Working populations in each country are identified as those earning a salary in the main occupation.



From now on we restrict our attention to the school teachers, office workers and other professionals and technicians within the data sources, which represents 23.6% of the total number of workers. From those occupational categories we compare those who declare themselves as being teachers with the rest of workers within those categories (the former group represents 2.2% and the latter 21.4% of workers). The occupational categories used in each country for teachers (devoted to the pre-school, primary and secondary education) and non-teachers, are shown in Table 2. University teachers and those with particular specialties (e.g. teachers for students with special needs, language instructors, sports instructors, driving instructors, and dance or art instructors) are not considered for the analysis. They are neither part of the teachers nor the non-teachers group within this paper. Then, when we refer here to teachers or school teachers, we will be referring to the same group: pre-school and elementary teachers, and secondary teachers.

**Table 2**  
**Occupational Codes Included in the Definition of Teachers and Comparison Groups**

Country	Code	Description
CIUO codes for teachers*	232	Profesores de la enseñanza secundaria
	233	Maestros de nivel superior de la enseñanza primaria y preescolar
	331	Maestros de nivel medio de la enseñanza primaria
	332	Maestros de nivel medio de la enseñanza preescolar
Brazil	2311	Professores de nível superior na educação infantil
	2312	Professores de nível superior do ensino fundamental (primeira à quarta série)
	2313	Professores de nível superior no ensino fundamental de quinta à oitava série
	2321	Professores do ensino médio
	2331	Professores do ensino profissional
	2332	Instrutores de ensino profissional
	3311	Professores de nível médio na educação infantil
	3312	Professores de nível médio no ensino fundamental
	3313	Professores de nível médio no ensino profissionalizante
	3321	Professores leigos no ensino fundamental
Mexico	1310	Profesores de Preparatorias y equivalentes
	1320	Profesores de Enseñanza Secundaria
	1330	Profesores de Enseñanza Primaria
	1340	Profesores de Enseñanza Preescolar
Panamá	266-278	Profesores de universidades y otros establecimientos de la enseñanza superior
	279-290	Profesores de la enseñanza secundaria
	291-293	Profesores y maestros de enseñanza primaria
	294-297	Profesores y maestros de enseñanza preescolar
CIUO Codes for other professionals and technicians (all countries)	Group 2	Profesionales Científicos e Intelectuales
	Group 3	Técnicos y profesionales de nivel medio
CIUO codes for office workers (all countries)	Group 4	Empleados de Oficina

\* Used in Chile, Ecuador, El Salvador, Honduras, Nicaragua and Uruguay.

Table 3 shows the descriptive statistics for observable characteristics in all countries' data sets and allow us to profile the population groups considered. Data suggests that the panorama of the teaching profession is such that teaching is predominantly a female occupation (approximately eight out of ten teachers are women) as opposed to the other professional and technical occupations (where more than half are men). Office workers tend to be substantially younger than teachers while the other professionals and technicians show an age-distribution that is similar to that of teachers. Among teachers, those in elementary and primary levels are slightly younger than those in secondary. Teachers, especially secondary teachers, are more educated than other professionals and technicians which in turn are more educated than office workers.

Teachers tend to live in households where there is more presence of kids (12 years old or younger), elders (65 years or older) and also presence of another wage earner, not being in most of the cases household heads. This gives credence to the idea that the choice of becoming a teacher is linked to a choice regarding a lifestyle where having a family and raising kids has special importance. A characteristic for which there are important differences between teachers and non-teachers is on job schedule. While nine out of ten non-teachers declare working full time, it is 44.65% of teachers who declare working part-time (30 hours or less per week). Teachers declare working in more formal conditions than their non-teaching peers, at least regarding access to social security (which is the proxy-measure for formality adopted here). Teachers are over represented in the public sector: 75.7% of teachers work in the public sector while only 21.6% of office workers and 26.2% of other professionals and technicians declare working in such sector.

**Table 3**  
**Descriptive Statistics**

	Office Workers	Other Professionals and Technicians	Other Professionals and Technicians or Office Workers	Pre-School and Elementary Teachers	Secondary Teachers	All School Teachers
	(1)	(2)	(3)=(1 & 2)	(4)	(5)	(6)=(4 & 5)
<i>Personal Characteristics</i>						
Men (Gender)	43.8%	55.3%	49.8%	12.4%	34.3%	17.5%
Age Groups						
24 and under	29.7%	15.2%	22.2%	10.5%	7.9%	9.9%
25 to 34	31.2%	32.4%	31.8%	32.0%	29.7%	31.5%
35 to 44	20.9%	25.3%	23.2%	30.9%	28.2%	30.3%
45 to 54	13.2%	17.9%	15.6%	19.9%	24.9%	21.1%
54 and over	5.0%	9.1%	7.1%	6.7%	9.3%	7.3%
Education Level						
None or primary incomplete	5.0%	3.9%	4.4%	0.3%	0.0%	0.2%
Primary complete or secondary incomplete	20.6%	9.9%	15.0%	3.2%	1.3%	2.8%
Secondary complete or tertiary incomplete	68.4%	69.7%	69.1%	88.6%	75.2%	85.5%
Tertiary complete	5.9%	16.6%	11.5%	7.9%	23.5%	11.5%
Presence of Children ( $\leq 12$ years) in the Household	43.3%	38.9%	41.0%	47.4%	38.4%	45.4%
Presence of Elder ( $\geq 65$ years) in the Household	12.6%	13.2%	12.9%	14.2%	14.3%	14.2%
Head of the Household	35.3%	46.6%	41.2%	30.4%	40.2%	32.7%
Presence of Other Household Member with Labor Income	76.3%	72.7%	74.4%	78.8%	77.2%	78.4%
<i>Labor Characteristics</i>						
Part time workers ( $\leq 30$ hours)	6.7%	13.4%	10.2%	45.7%	41.0%	44.6%
Formality (has social security)	69.4%	65.8%	67.5%	87.4%	86.3%	87.1%
Works in the public sector	21.6%	26.2%	24.2%	77.2%	70.4%	75.7%
<i>By Country</i>						
Brazil	57.2%	65.7%	61.6%	81.2%	72.1%	79.1%
Chile	3.5%	7.0%	5.3%	4.9%	4.7%	4.8%
Ecuador	1.8%	2.0%	1.9%	5.0%	8.2%	5.8%
El Salvador	0.4%	1.3%	0.9%	2.2%	2.1%	1.5%
Honduras	34.3%	20.5%	27.1%	1.2%	7.4%	2.2%
Mexico	0.4%	0.8%	0.6%	2.1%	1.4%	2.6%
Nicaragua	1.0%	0.9%	1.0%	1.1%	2.2%	1.9%
Panamá	0.7%	1.4%	1.1%	1.8%	0.7%	1.3%
Uruguay	0.5%	0.4%	0.5%	0.5%	1.3%	1.5%

Source: Authors' compilations.

Next, Table 4 shows descriptive statistics regarding relative earnings of the comparison groups with respect to teachers. Earnings are computed as hourly earnings, measured in terms of purchasing power parity (PPP, US\$, 2000). Hourly earnings for each individual are computed dividing the monthly income by the number of hours worked in a week and multiplied by 4.2 which is the average number of weeks in a month. Both, the monthly income and the number of hours worked per week are considered only for the main occupation so there is no bunching of multiple occupations in the computation of hourly earnings.<sup>2</sup> Average school teachers' hourly earnings have been set equal to 100 for each country.

Table 4 shows that, on average, teachers earn slightly more than the combined group of other professionals and technicians and office workers. When disaggregating the comparison group, however, it can be seen that teachers earn less than other professionals and technicians but almost 40% more than office workers. When disaggregating the group of teachers it can be seen that secondary teachers earn more than their pre-school counterparts, but neither earn more than other professionals and technicians.

Males earn more than females in all groups under analysis. People that live with kids, live with elder people, are not household heads, live with other wage earner, work in the informal job market, and work in the public sector earn less than those who don't (although the latter is not true for secondary teachers). Individuals' earnings show a life cycle pattern, but this is less pronounced among teachers. Additionally, more educated professionals earn more than their less educated peers. However, this income premium decreases with tertiary educational attainment, especially among secondary teachers.

With the exception of Nicaragua, on average, office workers earn less than teachers. On the other hand, with the exception of Honduras, Mexico and El Salvador, other professionals and technicians who are not devoted to the teaching profession earn more than teachers. In most countries under analysis, El Salvador being the only exception, pre-school and elementary teachers earn less than secondary teachers. All in all, the hourly earnings gap is more pronounced in Nicaragua where other professionals and technicians earn around 89% more than teachers. However, Nicaragua's working population is small within the sample, so this won't lead to overestimate the earnings gap later on. At the other extreme is Mexico where teachers earn almost 22% more than other professionals and technicians.

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<sup>2</sup> The monthly income corresponds to the monthly earnings received from the main occupation in the month previous to the survey. The job schedule is captured with survey questions of the type: "¿Cuántas horas trabajaba normalmente por semana nesse trabalho? ¿Cuántas horas trabaja efectivamente en su empleo o actividad principal? Señale horas semanales, ¿cuántas horas efectivas al día trabajó la semana pasada? ¿Cuántas horas trabajó la semana pasada en la ocupación principal? El mes pasado, ¿cuántas horas a la semana trabajó en este negocio o empresa? ¿Cuántas horas por semana trabaja regularmente como...?; ¿Cuántas horas, días y en qué jornada trabajo efectivamente la semana anterior?". So, it can be inferred that teachers are referring not only to their effective class time but to their whole job schedule (including preparation, grading, meeting times and the like).

**Table 4**  
**Relative Hourly Earnings**

	Relative Hourly Earnings (Base: Average School Teacher Earnings in each Country=100)					
	Office Workers	Other Professionals and Technicians	Other Professionals and Technicians or Office Workers	Pre-School and Elementary Teachers	Secondary Teachers	All School Teachers
	(1)	(2)	(3)=(1 & 2)	(4)	(5)	(6)=(4 & 5)
<i>Average Hourly Earnings</i>	60.25	131.30	97.13	91.16	129.65	100.00
<i>Personal Characteristics</i>						
Men						
No	55.86	112.96	82.24	90.33	123.90	96.47
Yes	65.88	146.13	112.15	97.03	140.67	116.71
Age Groups						
24 and under	40.07	62.97	48.23	58.87	83.32	63.35
25 to 34	55.92	113.03	86.09	79.90	117.54	88.05
35 to 44	70.60	138.47	109.07	96.63	126.92	103.10
45 to 54	88.11	173.21	138.78	106.53	150.64	118.51
54 and over	90.33	208.18	168.27	124.76	159.61	135.01
Education Level						
None or primary incomplete	44.13	57.16	50.04	41.98	32.73	41.90
Primary complete or secondary incomplete	43.87	66.85	51.68	69.80	99.22	72.88
Secondary complete or tertiary incomplete	63.07	131.93	99.12	89.73	125.58	96.96
Tertiary complete	98.41	184.05	162.83	117.77	144.31	130.27
Presence of Children (<12 years) in the Household						
No	62.49	138.24	103.21	94.98	135.72	105.53
Yes	57.32	120.42	88.41	86.94	119.92	93.35
Presence of Elders (>65 years) in the Household						
No	60.50	132.23	97.61	91.25	130.09	100.16
Yes	58.51	125.20	93.92	90.64	127.04	99.03
Head of Household						
No	52.29	105.00	77.11	87.73	118.62	94.03
Yes	74.86	161.39	125.75	99.00	146.06	112.29
Presence of Other Household Member with Labor Income						
No	67.60	149.42	112.93	94.12	138.09	104.77
Yes	57.97	124.50	91.71	90.37	127.16	98.69
<i>Labor Characteristics</i>						
Part time						
No	59.57	121.49	90.57	85.29	114.25	92.38
Yes	69.74	194.93	155.17	98.14	151.83	109.47
Formality						
No	49.23	99.80	76.85	61.45	102.57	71.46
Yes	65.12	147.65	106.89	95.46	133.93	104.22
Work in the Public Sector*						
No	52.52	138.15	99.63	76.48	146.02	94.98
Yes	87.84	164.74	134.87	95.42	125.95	101.61
<i>By Country</i>						
Brazil	59.33	150.42	109.73	90.31	136.65	100.00
Chile	65.57	127.45	107.74	93.98	121.07	100.00
Ecuador	58.41	106.53	84.54	90.91	118.69	100.00
El Salvador	52.82	95.17	81.02	101.27	88.97	100.00
Honduras	48.56	79.77	72.33	99.51	101.69	100.00
Mexico	60.37	78.37	67.44	96.38	101.91	100.00
Nicaragua	118.38	189.44	167.69	96.34	119.04	100.00
Panamá	73.10	109.51	90.64	91.57	114.24	100.00
Uruguay	75.10	121.81	96.51	96.91	104.19	100.00

Source: Authors' compilations.

The descriptive statistics depict a picture in which office workers are clearly different not only than other professionals and technicians but also, and more importantly, than school teachers. In other pieces of the literature office workers have been part of the analysis, but here, based on the exploration of descriptive statistics outlined above, we restrict the comparison group to that of other professional and technicians. In the next section we compute and decompose earnings gaps between teachers (preschool and primary, and secondary) and other professionals and technicians.

### **3. Results**

#### **3.1 The teaching profession vis-à-vis that of other professionals and technicians**

Table 4 shows that, on average, other professionals and technicians earn 31.3% more than teachers. However, as shown in the previous section teachers and other professionals and technicians are strikingly differentiated regarding their socio-demographic composition. Therefore is appropriate to think that these differences in observable characteristics play a role explaining the earnings differentials. Hence, controlling the earnings gap by observable characteristics must provide a better estimation of the underlying earnings gap than only considering the “original earnings gap” (the gap without controlling for anything, the 31.3%).

The extent to which the earnings differential can be attributed to differences in observable characteristics is explored next. This analysis is performed using matching comparisons such that each teacher is paired with a professional or technician with the same observable characteristics. The characteristics are gender, age, education, presence of kids (12 or younger) in the household, presence of elders (65 or older) in the household, whether the individual is the head of the household or not, presence of other wage earners in the household, part-time work, formality, and whether the individual works in the public sector. These variables are sequentially added as matching variables and the results are reported in Table 5. The decompositions are sequentially calculated for other professionals and technicians vis-à-vis that of (i) all school teachers, (ii) preschool and elementary teachers, and (iii) secondary school teachers.

The structure of Table 5 is as follows. Each column corresponds to earnings gap decomposition after matching on a set of observable characteristics. The first column corresponds to decomposition where only gender is taken into account. That is, each male teacher is compared to a male professional or technician and each female teacher to a female professional or technician. Moving to the right of the table, each column adds a matching variable such that in the last column of the table teachers and other professionals and technicians that are compared have the same observable characteristics on the 9 variables. That is, when moving a column to the right on Table 5 the comparison gets restricted to individuals with the same observable characteristics, adding one characteristic at a time. The lines of the table show the overall earnings gap on the first line (the original earnings gap), the four components of the earnings gaps on the second to fifth

lines and the two measures of the overlapping supports on the sixth and seventh lines<sup>3</sup>. The earnings gap that prevails on the restricted situation, in which teachers' earnings are compared to those of non-teachers' with the same characteristics, is denoted by  $\Delta_0$  in the table.

As already mentioned, the pay gap between teachers and other professionals and technicians reaches 31.3% of average teachers' earnings. The first column shows that teachers' underpayment vis-à-vis other professionals and technicians is explained to a certain extent by gender, to the point that when controlling for gender, non-teachers earn 27.3% more than teachers (the unexplained earnings gap  $\Delta_0$ ) as opposed to the original 31.3%. When introducing age on top of gender characteristics as control variables, the earnings gap reaches 31.3%. When adding education in to the analysis (that is, when comparing teachers and non-teachers with the same gender, age and education) the earnings gap increases almost 21%. This means that, although teachers are more educated than other professionals and technicians, their higher schooling attainment is not properly rewarded by the labor markets. When adding presence of kids (12 or younger), presence of elders (65 or older), whether the individual is the household head or not and presence of other wage earner in the household, the situation does not change much. However, after adding part-time work and formality the unexplained part of the earnings gaps increases 14% and 3.6% respectively. Part-time work substantially explains the earnings gap. All in all, when comparing teachers and non-teachers with the set of 9 observable characteristics that Table 5 depicts (which will be referring ahead as the "full set"), non-teachers earn almost 74.8% more than teachers.

Comparing pre-school and primary teachers with the same comparison group (other professionals and technicians) the gap is higher, 44%. Qualitatively the results are the same: the unexplained earnings gap between teachers and non-teachers increases substantially after the addition of education and part-time work. When using the 9 observable characteristic in the matching, the unexplained earnings gap reaches 80.1%. For secondary teachers vis-à-vis other professionals and technicians the earning gap is 1.3%. It increases to 32.8% after adding education and increases in 7.4% after adding part-time work. When using the 9 observable characteristic in the matching, non-teachers earn almost 62.6% more than teachers.

The last column of Table 5 adds working in the public sector as a control variable. However, this information is not available for Mexico, so the last column reports the results for only 8 countries. Although the original earnings gap for these 8 countries is slightly higher (45.1% as opposed to the 31.3% that has been previously reported for the 9 countries), the inclusion of public sector as a control variable reduces the unexplained component of the earnings gap.

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<sup>3</sup> The matching methodology used in this paper serves to decompose the original earnings gap into four elements ( $\Delta_0$ ,  $\Delta_{NT}$ ,  $\Delta_T$  and  $\Delta_X$ ) by matching teachers and non-teachers with the same observable characteristics. As in the traditional Blinder-Oaxaca decomposition,  $\Delta_0$  is the unexplained component of the gap (that share of the earnings gap that cannot be attributed to differences in characteristics of the individuals). The other three components correspond to differences in observable characteristics between the comparing groups. See Ñopo (2008) for extra methodological details.

**Table 5**  
**Earnings Gap Decompositions**

	Gender	+ Age	+ Education	+ Kid(s) in the Household	+ Elder(s) in the Household	+ Household Head	+ Other Wage Earner in the Household	+ Part-time Work	+ Formality	+ Public Sector*
<i>All School Teachers vis-à-vis Other Professionals and Technicians</i>										
Δ	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%	31.3%	45.1%
Δ0	27.3%	31.3%	51.8%	53.0%	53.3%	54.8%	56.8%	71.2%	74.8%	68.1%
ΔNT	0.0%	-4.2%	-14.1%	-16.7%	-19.0%	-19.1%	-19.1%	-17.0%	-20.2%	-2.0%
ΔT	0.0%	-0.1%	-0.1%	-0.2%	-0.2%	-0.4%	-0.4%	-1.8%	-0.9%	-2.9%
ΔX	4.0%	4.2%	-6.3%	-4.7%	-2.8%	-4.0%	-6.0%	-21.1%	-22.4%	-18.1%
% CS Other Professionals and Technicians	100.0%	90.9%	72.5%	66.0%	61.1%	54.9%	47.7%	40.1%	33.1%	28.5%
% CS All School Teachers	100.0%	99.8%	98.5%	97.1%	95.1%	92.3%	88.2%	77.7%	70.8%	61.5%
<i>Pre-school and Elementary Teachers vis-à-vis Other Professionals and Technicians</i>										
Δ	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	44.0%	59.3%
Δ0	39.0%	41.9%	57.3%	59.1%	59.4%	60.2%	61.3%	78.7%	80.1%	74.6%
ΔNT	0.0%	-7.6%	-14.4%	-15.1%	-16.9%	-15.7%	-12.3%	-11.9%	-15.5%	5.2%
ΔT	0.0%	0.0%	-0.1%	-0.3%	-0.4%	-0.3%	-0.3%	-1.7%	-0.6%	-1.4%
ΔX	5.1%	9.7%	1.3%	0.3%	1.8%	-0.1%	-4.7%	-21.1%	-20.1%	-19.1%
% CS Other Professionals and Technicians	100.0%	82.5%	65.7%	59.9%	55.5%	49.2%	42.0%	35.0%	29.0%	23.5%
% CS Pre-School and Elementary Teachers	100.0%	99.9%	98.4%	97.0%	95.0%	92.4%	88.3%	77.8%	71.3%	61.8%
<i>Secondary Teachers vis-à-vis Other Professionals and Technicians</i>										
Δ	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	1.3%	10.0%
Δ0	-0.1%	6.2%	39.0%	38.5%	38.8%	41.9%	46.2%	53.6%	62.6%	51.8%
ΔNT	0.0%	-4.3%	-23.2%	-30.6%	-33.6%	-35.9%	-34.9%	-28.9%	-34.4%	-18.8%
ΔT	0.0%	-0.1%	-0.2%	-0.1%	0.3%	-0.6%	-0.7%	-2.1%	-1.1%	-6.2%
ΔX	1.3%	-0.4%	-14.3%	-6.5%	-4.3%	-4.1%	-9.3%	-21.3%	-25.7%	-16.7%
% CS Other Professionals and Technicians	100.0%	86.3%	54.0%	44.2%	39.9%	34.1%	27.7%	22.1%	17.4%	13.5%
% CS Secondary Teachers	100.0%	99.8%	98.8%	97.7%	95.1%	92.2%	87.8%	77.3%	69.3%	60.4%

Source: National household surveys

\* Mexico not considered. Unexplained earnings gaps for the full set were 75.6% for all teachers, 80.1% for pre-school and primary teachers, and 64.7% for secondary teachers.

In Figure 1, we report confidence intervals for the unexplained earnings gap between teachers and non-teachers for our different specifications.



**Figure 1**  
**Unexplained Earnings for Different Specifications for School Teachers vis-à-vis Professional and Technicians**

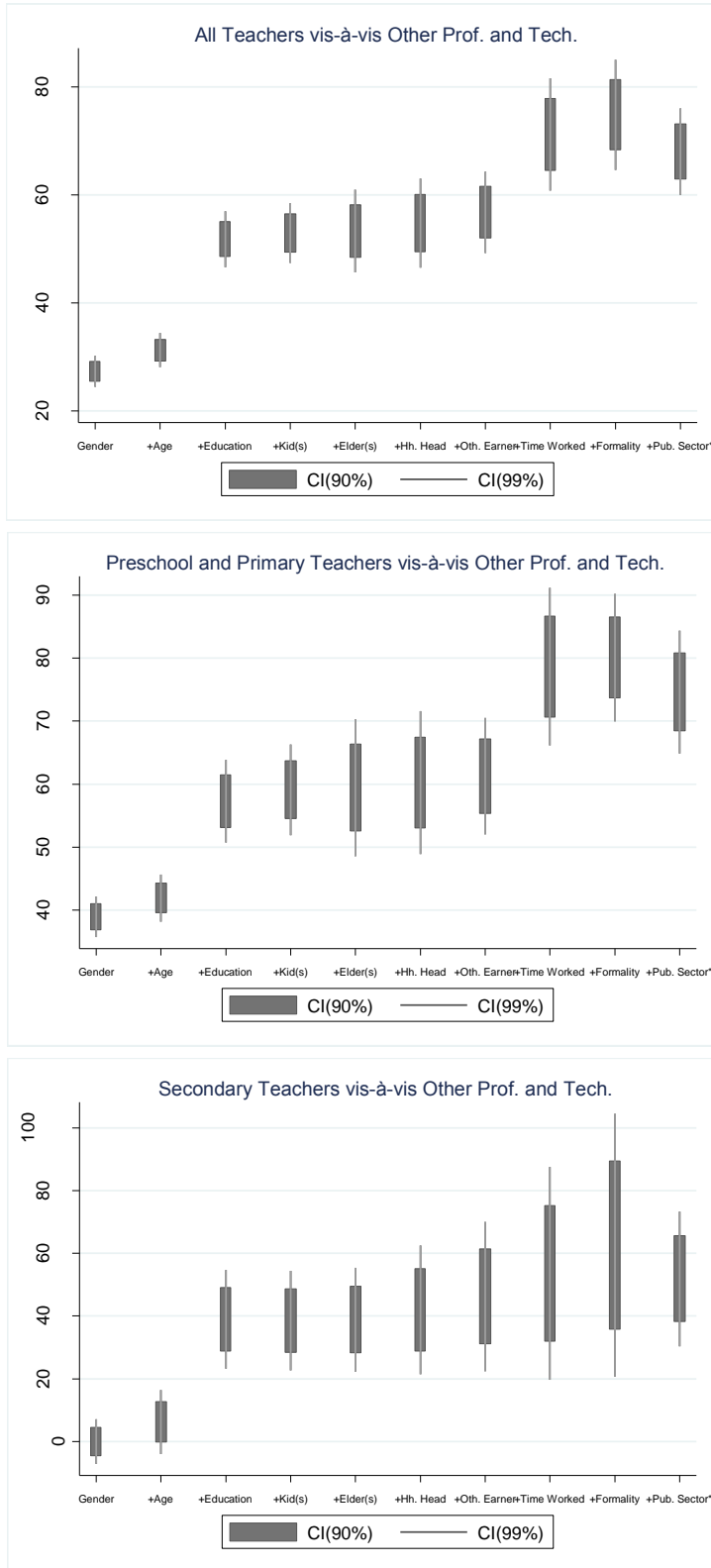


Table 6 presents the four components of the earnings gap decomposition using the full set of control variables by country for average teachers, pre-school and elementary school teachers, and for secondary school teachers, respectively vis-à-vis other professionals and technicians, and provides evidence of notable cross-country heterogeneity behind the region averages reported in Table 3<sup>4</sup>. For two of the three specifications Nicaragua's unexplained earnings gap is the widest. Mexico's unexplained gap is the widest if considering only pre-school and primary teachers. However this result must be considered with care due to the small common support. Interestingly, although Mexico, Honduras and El Salvador show negative original earnings gaps, suggesting that school teachers earn more than other professionals and technicians, after controlling for the full set of observable characteristics the earnings gap goes from negative to positive. Only for secondary teachers the unexplained earnings gap remains negative in Mexico. Even more interestingly, in Chile the school teacher's earnings gap is smaller after controlling for the full set of characteristics than the original gap. This last result seems to be driven by pre-school and primary teachers.

**Table 6**  
**Earnings Gap Decompositions by Country after matching on the full set of characteristics**

	Brasil	Chile	Ecuador	El Salvador	Honduras	Mexico	Nicaragua	Panamá	Uruguay
<i>School Teachers vis-à-vis Other Professionals and Technicians</i>									
$\Delta$	50.4%	27.4%	6.5%	-4.8%	-20.2%	-21.6%	89.4%	9.5%	21.8%
$\Delta 0$	81.7%	13.8%	36.9%	6.2%	20.3%	12.3%	87.7%	23.6%	24.4%
$\Delta NT$	-5.0%	-3.8%	-13.2%	-4.1%	-13.3%	-11.0%	-22.2%	-13.5%	2.3%
$\Delta T$	-0.3%	2.2%	-19.3%	-13.0%	-18.0%	-10.2%	4.1%	-0.5%	-5.4%
$\Delta X$	-25.9%	15.2%	2.1%	6.0%	-9.2%	-12.7%	19.7%	-0.1%	0.5%
% CS Other Professionals and Technicians	44.0%	39.6%	21.6%	11.1%	13.5%	2.0%	11.6%	16.5%	9.6%
% CS All School Teachers	79.3%	75.1%	28.9%	18.4%	26.1%	35.7%	13.1%	44.5%	24.8%
<i>Pre-school and Elementary Teachers vis-à-vis Other Professionals and Technicians</i>									
$\Delta$	66.6%	35.6%	17.2%	-6.0%	-19.8%	-18.7%	96.6%	19.6%	25.7%
$\Delta 0$	87.0%	15.3%	33.9%	5.2%	8.2%	91.3%	89.7%	32.8%	22.8%
$\Delta NT$	2.6%	1.1%	-9.0%	-6.1%	-2.2%	-79.1%	-9.7%	-17.6%	8.1%
$\Delta T$	0.6%	1.0%	-20.1%	-13.1%	-17.6%	-3.0%	6.7%	-0.4%	-3.8%
$\Delta X$	-23.6%	18.2%	12.3%	8.0%	-8.3%	-27.9%	9.9%	4.8%	-1.4%
% CS Other Professionals and Technicians	39.2%	35.0%	16.1%	9.4%	10.3%	0.4%	10.0%	11.1%	5.0%
% CS Pre-School and Elementary Teachers	78.9%	76.3%	28.0%	17.8%	25.2%	29.5%	11.5%	45.4%	23.5%
<i>Secondary Teachers vis-à-vis Other Professionals and Technicians</i>									
$\Delta$	10.1%	5.3%	-10.2%	7.0%	-21.6%	-23.1%	59.1%	-4.1%	16.9%
$\Delta 0$	68.2%	9.8%	40.7%	13.9%	55.7%	-17.6%	76.8%	10.6%	26.0%
$\Delta NT$	-21.9%	-22.0%	-24.8%	10.2%	-45.7%	3.9%	-41.8%	-14.1%	-0.4%
$\Delta T$	-2.9%	7.0%	-19.3%	-9.4%	-19.6%	-13.4%	-9.6%	0.0%	-7.6%
$\Delta X$	-33.3%	10.5%	-6.8%	-7.7%	-12.0%	3.9%	33.7%	-0.7%	-1.1%
% CS Other Professionals and Technicians	24.1%	13.1%	8.5%	1.7%	4.2%	1.6%	2.8%	8.7%	5.7%
% CS Secondary Teachers	80.8%	71.0%	30.8%	23.5%	29.2%	39.0%	21.6%	42.8%	26.6%

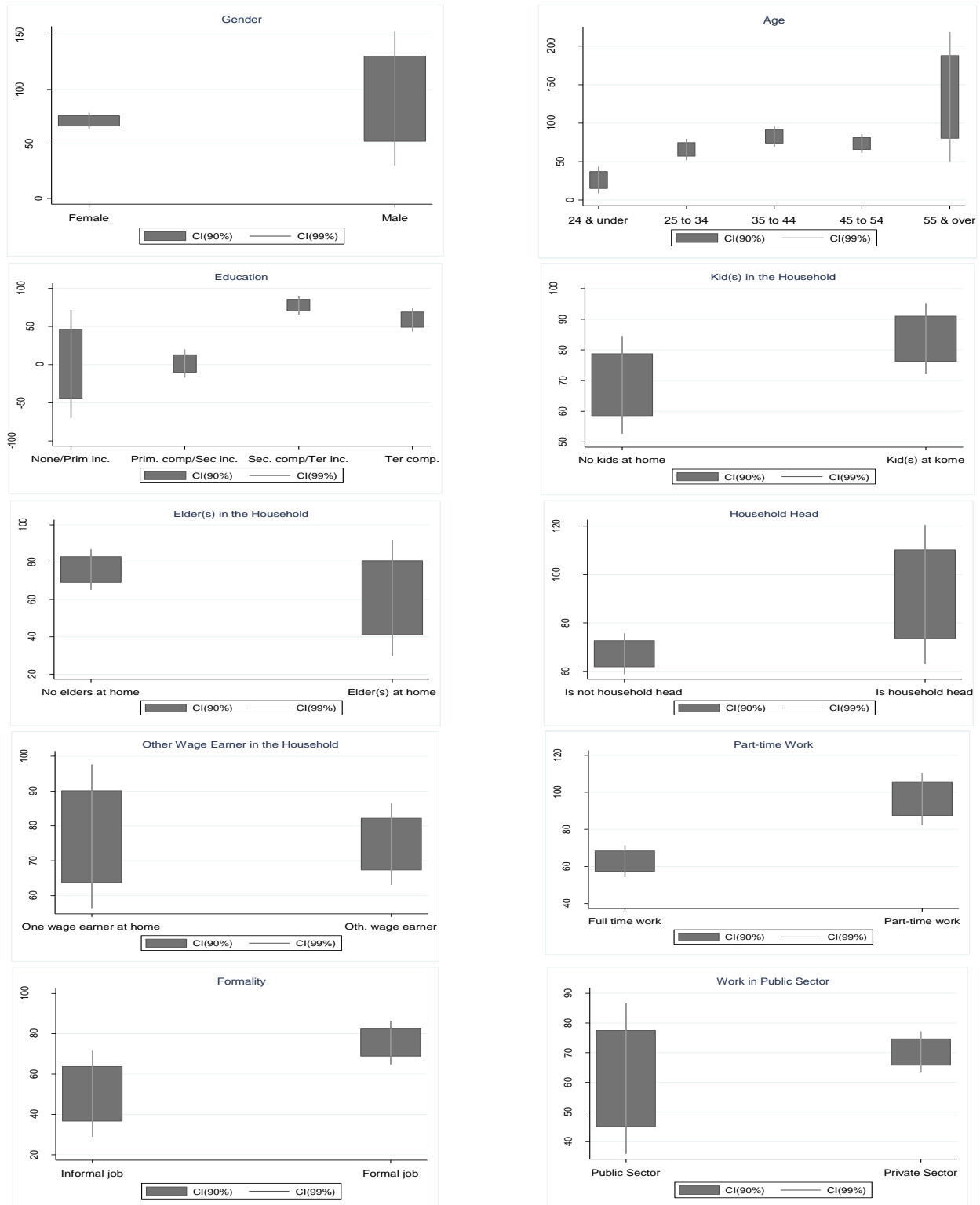
Source: National household surveys

<sup>4</sup> Confidence intervals by country can be found on Figure A1 of the appendix.

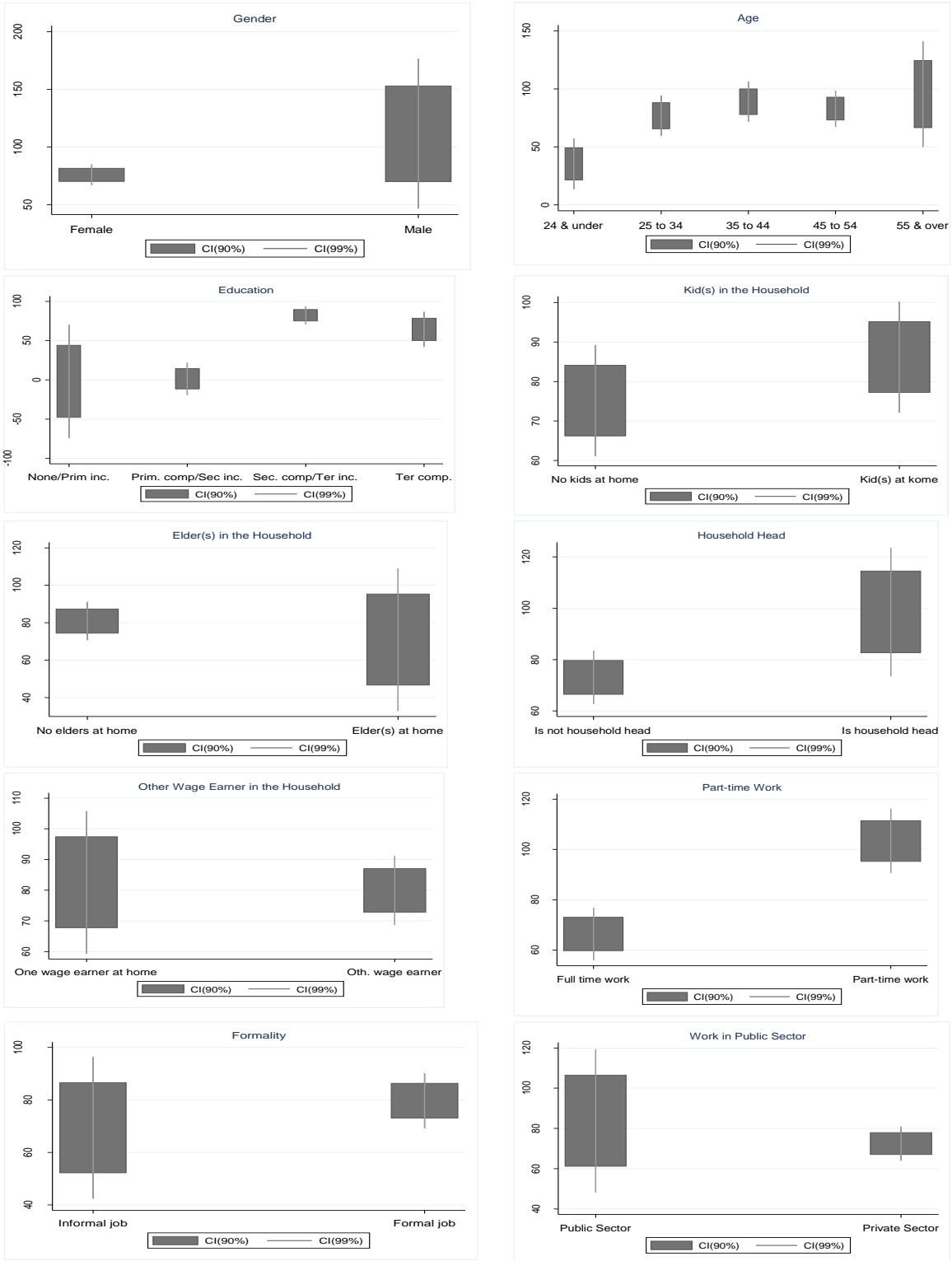
### **3.2 Distribution of the Unexplained Earnings Gap**

An advantage of the matching approach over the traditional regression-based decompositions is that it is informative not only about the average unexplained gap but also about its distribution. The following analysis report confidence intervals for the unexplained earnings gap between teachers and non-teachers by different characteristics, after controlling for all demographic and job-related characteristics. It provides further evidence of the heterogeneity of the unexplained component of the earnings gap. In general, teachers' underpayment is more pronounced among males, older workers, those with complete tertiary education, household heads, part-timers, formal workers and seemingly for those who work in the private sector. Distributions also suggest that having a family life might come at a cost in income, especially raising kids.

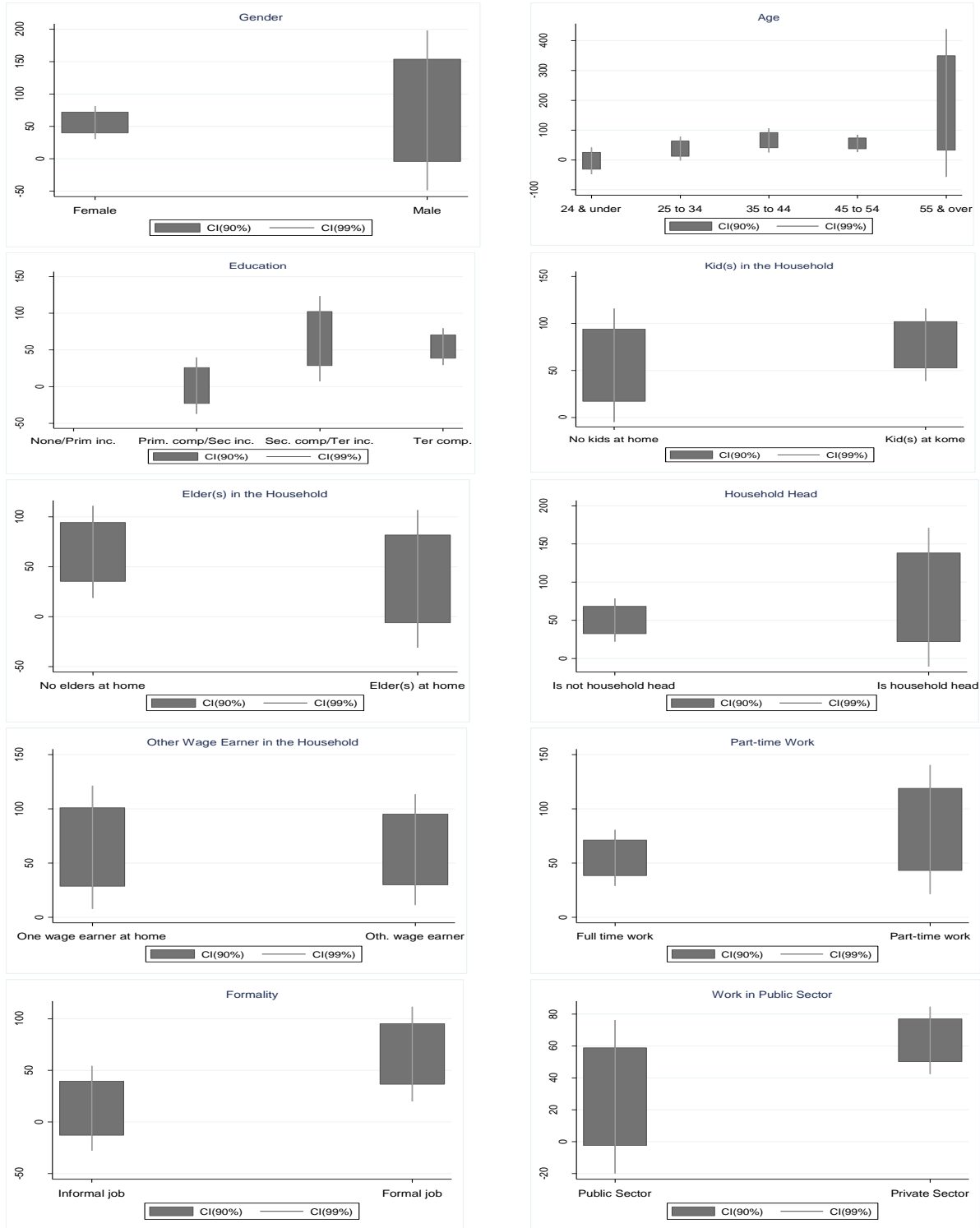
**Figure 2**  
**Confidence Intervals for the Unexplained Earnings Gap by Different Characteristics for**  
**All Teachers versus Other Professional and Technicians**  
**(after matching on the full set of characteristics)**



**Figure 3**  
**Confidence Intervals for the Unexplained Earnings Gap by Different Characteristics for**  
**Pre-School and Elementary School Teachers versus Other Professionals and Technicians**  
**(after matching on the full set of characteristics)**



**Figure 4**  
**Confidence Intervals for the Unexplained Earnings Gap by Different Characteristics for**  
**Secondary School Teachers versus Other Professionals and Technicians**  
**(after matching on the full set of characteristics)**



The distributions of income disparities are far from homogeneous throughout the conditional hourly earnings distribution. Figure 5 shows that, when considering the full set of observable variables, there are no major differences in hourly earnings between teachers and professional and technicians for the first percentiles of the distribution. On the other hand, there are major differences in favor of teachers when considering the original earnings gap. However, in both cases, it is at the top of the distribution of hourly earnings that the highest differences are found. The typical teacher who is in the upper part of the earnings distribution faces an income penalty compared with other professionals and technicians<sup>5</sup>.

**Figure 5**  
**Unexplained Earnings Gap between Teachers and**  
**Other Professionals and Technicians along percentiles**  
**of the earnings distribution**

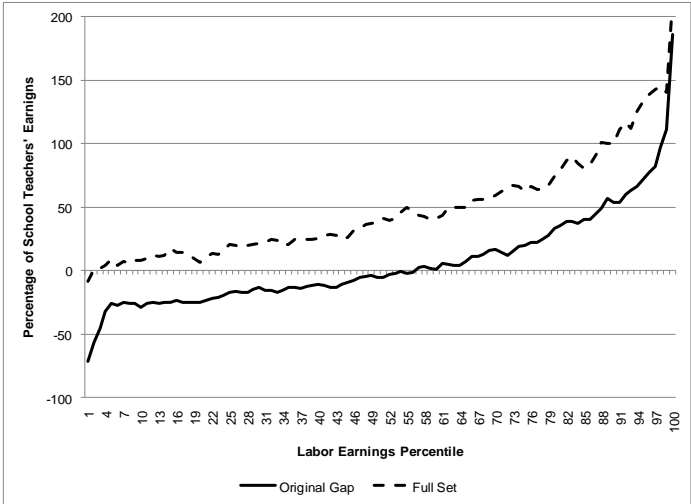


Figure 6 presents a similar analysis to the one in Figure 5 for those teachers in pre-school and primary school levels compared with other professionals and technicians. The Figure shows a similar result to the one obtained for all teachers; it presents evidence that the earnings gap in the bottom percentiles of the distribution do not considerably contribute to the aggregate measure of unexplained earnings differences between teachers and other professionals and technicians; the average earnings gap in Latin America is driven by pay differences at the top percentiles of the earnings distribution.

<sup>5</sup> It is important to highlight the fact that the results below must be interpreted carefully. Results in the bottom five percentiles, as well in the upper five percentiles, are not robust. For that reason, the unexplained earnings gap along percentiles of the earnings distribution must be interpreted after the percentile 5 and before the percentile 95.

**Figure 6**  
**Unexplained Earnings Gap between Pre-School and Elementary Teachers and Other Professionals and Technicians along percentiles of the earnings distribution**

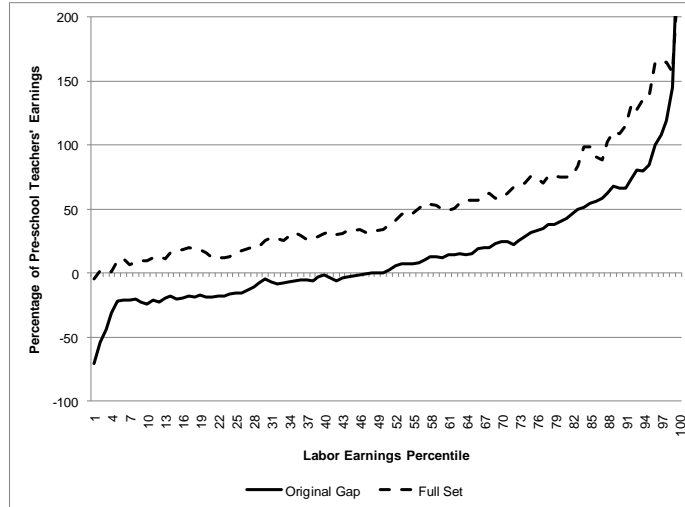


Figure 7 presents the analysis for those teachers in secondary school level compared with other professionals and technicians. The Figure presents evidence of a negative earnings gap in the bottom percentiles of the distribution. When considering the full set of variables, up to the 22<sup>th</sup> percentile secondary school teachers earn a premium, however, teachers who are in the upper part of the conditional earnings distribution face an income penalty, especially when considering the full set.

**Figure 7**  
**Unexplained Earnings Gap between Secondary Teachers and Other Professionals and Technicians along percentiles of the earnings distribution**





These results show that there are important differences along the earnings distribution. In general, teachers in the highest percentiles of the earnings distribution earn less than other professionals and technicians, while teachers in the bottom percentiles tend to have similar earnings than comparable workers, moreover, in the case of secondary school teachers those who are in the bottom percentiles of the distribution earns a premium. In other words, the average earnings gap between teachers and comparable workers in Latin America are driven by pay differences at the top percentiles of the earnings distribution; this can be explained by the fact that in many countries teachers are rewarded through a single salary schedule which implies a salary structure much more compressed than the one of other professionals and technicians.

### **3.3 Exploring some amenities of the teaching profession and their role on the earnings gaps: schedules and tenure.**

Typical policy discussions about the choice of a teaching career highlight the extra amenities that come with a teaching job. Two of the most salient of those amenities are the shorter (and flexible) job schedule, on the one hand, and the more stability that the profession enjoys, on the other. As it is typical in economics, these extra amenities have to come at a price. In this case such price would be expressed in terms of earnings disparities between teachers and their peers. Next, we make an attempt to explore the extent to which these two amenities are linked to the earnings gaps.

First we assess the role of job schedules on the earnings gaps. For this we will look into the pay differences reported for hourly earnings adjusted by job-break periods (or vacations). These adjusted hourly earnings are the hourly earnings prorated according to the following: for teachers, we assume a two-month paid vacation period so that teachers earnings are multiplied by the 12/10 ratio; for non-teaching dependant workers, we assume a one-month paid vacation period so that related earnings are multiplied by the 12/11 ratio; and we assume no paid vacations for independent workers (that is, adjusted hourly earnings in this case are the same as non-adjusted). The ratio numerator corresponds to the months of a year (12): that is, the number of times a worker earns a salary in a year. The ratio denominator corresponds to the number of month that a worker actually works according to our assumptions. Then, the prorated hourly earnings are linear transformation of the non-adjusted hourly earnings, and a measure of the relative hourly earnings when job-periods are accounted for. As before, for the remaining stages of our analysis these earnings are measured in terms of purchasing power parity (PPP, US\$, 2000), and average teachers' (adjusted) earnings have been set equal to 100 for each country.

Tables 7 presents the earnings gap decompositions for prorated (adjusted) hourly earnings for average teachers, pre-school and elementary school teachers, and for secondary school teachers, respectively vis-à-vis other professionals and technicians. The table reports that the earnings gap computed for prorated hourly earnings is much smaller than that of non-adjusted hourly earnings: the unexplained earnings gap for pre-school teachers is 15% smaller; secondary teachers' is 10%

smaller; overall earnings gap is 14% smaller. The previous result indicates that not considering job-break periods (vacations) can lead to overestimate the earnings gap.

**Table 7**  
**Earnings Decompositions for prorated hourly earnings**

Decompositions Using the "Full Set" of Observable Characteristics			
	School Teachers vis-à-vis Other Professionals and Technicians	Pre-School and Elementary Teachers vis-à-vis Other Professionals and Technicians	Secondary Teachers vis-à-vis Other Professionals and Technicians
$\Delta$	17.4%	28.8%	-9.5%
$\Delta 0$	57.2%	61.8%	46.2%
$\Delta NT$	-19.0%	-14.8%	-31.7%
$\Delta T$	-0.9%	-0.6%	-1.1%
$\Delta X$	-19.9%	-17.7%	-22.8%
% CS Other Professionals and Technician	33.1%	29.0%	17.4%
% CS Teachers	70.8%	71.3%	69.3%

Source: National household surveys

So far we have considered hourly earnings as these are more accurate estimates of what a worker truly earns (earnings per unit of time working). But, do the previous results hold even if we consider monthly earnings and yearly earnings (the equivalent of prorated hourly earnings)? We address this question next.

Monthly earnings correspond to the monthly income received from the main occupation in the month previous to the survey. Yearly earnings are computed with the same procedure used to compute prorated earnings, but multiplying these "prorated monthly earnings" by 12. Outliers were dropped out, this comprised 0.07% of teachers and 1.15% of other professionals and technicians. The results in Table 8 show that, after considering the full set of observable characteristics, using monthly and yearly earnings leads to an overestimation of the original earnings gap, as well as the unexplained earnings gap. Interestingly, adding part-time work is negatively related to the earnings gap (not shown), which is the cost of not considering earnings per unit of time working (or hourly earnings). Once more, considering job break periods leads to a smaller earnings gap, but still positive, statistically significant and economically relevant.

**Table 8**  
**Earnings Decompositions for Monthly and Yearly Earnings**

Decompositions Using the "Full Set" of Observable Characteristics			
	School Teachers vis-à-vis Other Professionals and Technicians	Pre-School and Elementary Teachers vis-à-vis Other Professionals and Technicians	Secondary Teachers vis-à-vis Other Professionals and Technicians
<i>Monthly earnings</i>			
$\Delta$	64.6%	79.4%	28.8%
$\Delta 0$	75.6%	79.6%	66.2%
$\Delta NT$	-31.0%	-25.3%	-52.0%
$\Delta T$	5.1%	4.9%	6.4%
$\Delta X$	14.8%	20.2%	8.1%
% CS Other Professionals and Technicians	33.1%	29.0%	17.4%
% CS Teachers	70.7%	71.2%	69.1%
<i>Yearly earnings</i>			
$\Delta$	47.5%	60.7%	15.4%
$\Delta 0$	57.6%	61.3%	48.9%
$\Delta NT$	-28.7%	-23.7%	-47.4%
$\Delta T$	5.1%	4.9%	6.4%
$\Delta X$	13.4%	18.3%	7.5%
% CS Other Professionals and Technicians	33.1%	29.0%	17.4%
% CS Teachers	70.7%	71.2%	69.1%

Source: National household surveys

In what follows, we assess the role of job tenure, which is claimed to be longer among teachers. Unfortunately such information on job tenure is available only in six out of the nine surveys, those of: Brazil, Chile, Ecuador, Nicaragua, Panama and Uruguay. Table 9 presents the number of observations for both, the working sample and the population groups considered so far. Outliers for income are dropped once more<sup>6</sup>. The new (more restricted) data set contains 73% of the data previously considered; 93.5% of the teachers' group sample and 76.7% of the non-teachers' group sample (that is, other professionals and technicians). Earnings are computed as before for both, adjusted and non-adjusted hourly earnings. Average school teachers' earnings have been set equal to 100 for each country for both, adjusted and non-adjusted hourly earnings. We start exploring non-adjusted hourly earnings.

<sup>6</sup> This comprised 0.3% of school teachers, 0.2% of office workers and 1.5% of other professionals and technicians.

**Table 9**  
**Samples Size and Average Earnings, by Group**

<b>Other Professionals and Technicians/Teachers (non tertiary) Working Populations for the "Job tenure" Subsample*</b>								
<b>Country</b>	<b>Full Sample</b>		<b>Pre-School and Elementary Teachers</b>		<b>Secondary Teachers</b>		<b>Other Professionals and Technicians</b>	
	<i>Number of observations</i>	<i>Expanded observations</i>	<i>Number of observations</i>	<i>Expanded observations</i>	<i>Number of observations</i>	<i>Expanded observations</i>	<i>Number of observations</i>	<i>Expanded observations</i>
Brazil	157775	76800000	3829	1870619	1055	494701	19798	9647079
Chile	81463	5918783	1495	109033	275	31767	8429	1015545
Ecuador	9147	2404002	522	115693	254	56255	1093	293211
Nicaragua	11024	1652432	377	48401	64	9292	592	118800
Panamá	18842	1269300	395	24953	220	14764	1702	131078
Uruguay	25432	532842	592	12238	418	9023	2841	61053
All countries	303683	88577359	7210	2180937	2286	615802	34455	11266766

\* Working populations in each country are identified as those earning a salary in the main occupation

Figure 8 presents the Kernel density estimation of job tenure with a 2 bandwidth (the smoothing factor) for the population groups of our analysis, which consists in a non-parametric estimation of probability density function of the job tenure variable. The left panel of the figure shows that teachers are more tenured along the distribution until the 35<sup>th</sup> year of job tenure, after which there are no differences between teachers and their peers. 42% of teachers show between 0 and 5 years of tenure, while such percentage for office workers and other professionals and technicians are 72% and 57% respectively. At the other extreme of the distribution, 19% of teachers show 20 or more years of tenure while such percentage for office workers and other professionals and technicians are 8% and 12.7% respectively.

More interesting results emerge if private and public sector workers are compared separately. It is believed that there is greater job stability for professionals and technicians in the public sector, especially among teachers. In fact, professionals and technicians are more tenured in the public sector than in the private sector. The right panel of Figure 8 shows that 35.3% of public sector school teachers show between 0 and 5 years of tenure, while 63.9% of private sector school teachers show so; 43.9% of the other professionals and technicians who work in the public sector school show between 0 and 5 years of tenure, while 61.6% of private sector's other professionals and technicians show. On the other hand, 23.6% of public sector school teachers show 20 or more years of tenure, while only 6.4% of private school teachers show so; regarding other professionals and technicians, such magnitudes are 21.7% and 9.5%, respectively. Additionally, when looking at average tenure (not reported, but available from authors upon request) school teachers have an average of 11 years of tenure in the public sector and other professionals and technicians 10.5 years, while in the private sector this averages are 6 and 7 year respectively. This in turn suggest that tenure is a differentiating factor between teachers and the comparison groups, especially in the public.

**Figure 8**  
**Kernel Density Function (6 countries with data on job tenure), 2 bandwidth**

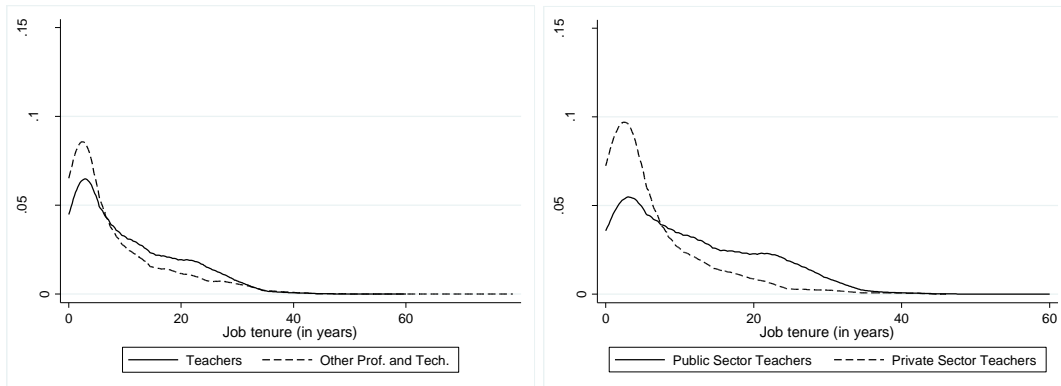
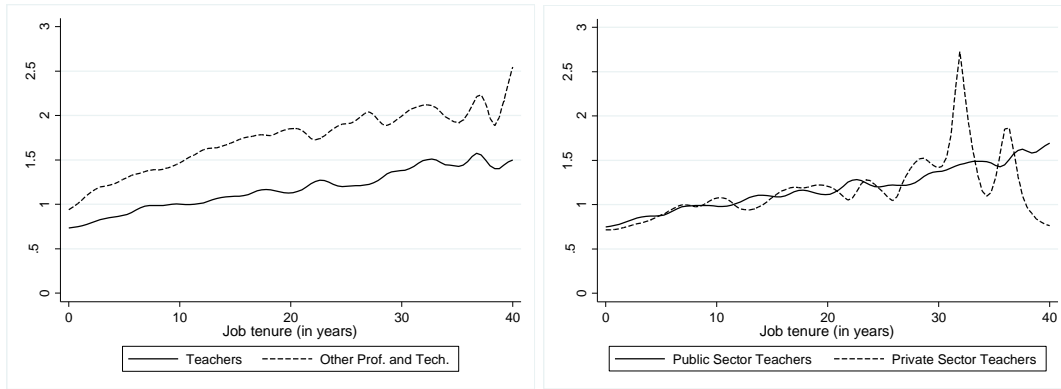


Figure 9 presents a Kernel regression performed on the data set: the Y's, the dependent variable, being the hourly earnings and the X's, the independent variable, being the tenure years in the job. The Kernel regression consists in a non-parametric estimation of the conditional expectation of the Y's, conditioned to the X's, so that we find a non-linear relation between hourly earnings and the job tenure variable.

Figure 9 shows that not only other professional and technicians earn more than teachers, but also the earnings gaps between these two groups increases with tenure. The returns to tenure are lower for teachers. However, the earnings gap persists for teachers vis-à-vis other professionals and technicians. Teachers' earnings in the private sector are much volatile than in the public sector, especially for those with longer tenure. Nonetheless, the non-parametric regressions relating job tenure and earnings are qualitatively similar for the public and private sector. These results hold as well after considering job break periods (see Figure A2 in the appendix).

**Figure 9**  
**Kernel Regression**  
**(6 countries with data on job tenure)**



Next, continuing with our analysis on job tenure, Table 10 presents the earnings gaps decompositions for average teachers, pre-school and elementary school teachers, and for secondary school teachers, respectively vis-à-vis other professionals and technicians using the more restricted job-tenure data subset. The results show that working in the public sector reduces the earnings gap in 8% between teachers vis-à-vis other professionals and technicians; that is, a decrease of 6% in the earnings gap regarding primary and preschool teachers and of almost 13% regarding secondary teachers. Results also show that job tenure is indeed a variable that explains the earnings gap. Adding job tenure as a control variable reduces the earnings gap in almost 19% for the group of average teachers; in 17.4% for pre-school and elementary teachers; in nearly 22.6% for secondary teachers.

Regarding prorated hourly earnings: adding working in the public sector as a control variable reduces the earnings gap in 6% for the group of average teachers; in 4.2% for pre-school and elementary teachers; in 10.2% for secondary teachers; adding job tenure reduces the earnings gap in 16.5%, 15.2%, and 19.9, respectively.

**Table 10**  
**Earnings Gap Decompositions**  
**(6 countries with data on job tenure)**

	School Teachers versus Professionals vis-à-vis Other Professionals and Technicians			Pre-School and Elementary Teachers vis-à-vis Other Professionals and Technicians			Secondary Teachers vis-à-vis Other Professionals and Technicians		
	Full Set	+ Public Sector	+ Job Tenure	Full Set	+ Public Sector	+ Job Tenure	Full Set	+ Public Sector	+ Job Tenure
<i>Hourly earnings</i>									
$\Delta$	47.0%	47.0%	47.0%	62.0%	62.0%	62.0%	10.6%	10.6%	10.6%
$\Delta 0$	76.5%	68.5%	49.7%	81.4%	75.5%	58.1%	64.7%	51.8%	29.2%
$\Delta NT$	-5.9%	-0.4%	27.2%	1.3%	7.0%	33.1%	-23.6%	-17.5%	13.0%
$\Delta T$	-0.6%	-2.8%	-10.7%	0.0%	-0.9%	-9.4%	-1.8%	-6.7%	-13.2%
$\Delta X$	-23.0%	-18.3%	-19.2%	-20.7%	-19.5%	-19.8%	-28.7%	-17.0%	-18.5%
% CS Other Professionals and Technicians	42.2%	29.1%	6.8%	37.4%	24.0%	5.4%	22.2%	13.9%	2.0%
% CS Teachers	73.7%	63.5%	18.7%	73.9%	63.9%	18.9%	73.1%	61.8%	18.1%
<i>Adjusted hourly earnings</i>									
$\Delta$	31.3%	31.3%	31.3%	44.8%	44.8%	44.8%	-1.2%	-1.2%	-1.2%
$\Delta 0$	58.6%	52.7%	36.2%	63.0%	58.8%	43.6%	48.1%	37.9%	18.0%
$\Delta NT$	-6.3%	-1.6%	23.1%	0.0%	4.9%	28.4%	-22.0%	-17.0%	10.6%
$\Delta T$	-0.6%	-2.8%	-10.7%	0.0%	-0.9%	-9.4%	-1.8%	-6.7%	-13.2%
$\Delta X$	-20.4%	-17.0%	-17.4%	-18.2%	-18.0%	-17.9%	-25.5%	-15.4%	-16.6%
% CS Other Professionals and Technicians	42.2%	29.1%	6.8%	37.4%	24.0%	5.4%	22.2%	13.9%	2.0%
% CS Teachers	73.7%	63.5%	18.7%	73.9%	63.9%	18.9%	73.1%	61.8%	18.1%

Source: National household surveys

Using monthly and yearly earnings we obtain similar results (Table 11). Job tenure does explain the earnings gap, the same after considering public sector as a control variable. However, in this case the effect of public sector in the earnings gap is negligible for pre-school and primary teachers. In general, the results are pretty much the same.

**Table 11**  
**Earnings Gap Decompositions for Monthly and Yearly Earnings**  
**(6 countries with data on job tenure)**

	School Teachers versus Professionals vis-à-vis Other Professionals and Technicians			Pre-School and Elementary Teachers vis-à-vis Other Professionals and Technicians			Secondary Teachers vis-à-vis Other Professionals and Technicians		
	Full Set	+ Public Sector	+ Job Tenure	Full Set	+ Public Sector	+ Job Tenure	Full Set	+ Public Sector	+ Job Tenure
<i>Monthly earnings</i>									
$\Delta$	79.1%	79.1%	79.1%	95.9%	95.9%	95.9%	37.4%	37.4%	37.4%
$\Delta 0$	76.8%	74.7%	58.1%	80.6%	80.1%	63.3%	67.6%	61.5%	45.1%
$\Delta NT$	-18.1%	-7.8%	34.4%	-10.2%	3.3%	44.2%	-41.9%	-32.0%	11.6%
$\Delta T$	5.2%	6.2%	2.9%	5.2%	7.0%	3.4%	5.5%	5.0%	2.6%
$\Delta X$	15.1%	6.0%	-16.3%	20.3%	5.4%	-15.0%	6.1%	3.0%	-21.9%
% CS Other Professionals and Technicians	42.1%	29.1%	6.8%	37.3%	24.0%	5.4%	22.1%	13.8%	2.0%
% CS Teachers	73.6%	63.4%	18.7%	73.8%	63.9%	18.8%	73.0%	61.7%	18.1%
<i>Yearly earnings</i>									
$\Delta$	60.4%	60.4%	60.4%	75.4%	75.4%	75.4%	23.1%	23.1%	23.1%
$\Delta 0$	58.7%	57.7%	42.7%	62.1%	62.6%	47.4%	50.2%	45.7%	30.7%
$\Delta NT$	-17.2%	-8.4%	29.5%	-10.4%	1.4%	38.2%	-38.4%	-30.2%	9.2%
$\Delta T$	5.2%	6.2%	2.9%	5.2%	7.0%	3.4%	5.5%	5.0%	2.6%
$\Delta X$	13.7%	4.9%	-14.7%	18.4%	4.4%	-13.6%	5.7%	2.5%	-19.5%
% CS Other Professionals and Technicians	42.1%	29.1%	6.8%	37.3%	24.0%	5.4%	22.1%	13.8%	2.0%
% CS Teachers	73.6%	63.4%	18.7%	73.8%	63.9%	18.8%	73.0%	61.7%	18.1%

Source: National household surveys

## Conclusions

This paper examines whether teachers' salaries in Latin America are similar to those of other professionals and technicians. Since the available empirical evidence has shown that the sign and magnitude of the conditional earnings differential between teachers and other workers depend crucially on the definition of the comparison group, we use the methodology developed in Ñopo (2008). This approach emphasizes earnings differences in the supports of the distributions of observable characteristics and provides insights into the distribution of unexplained pay differences.

The results show that teachers are underpaid in Latin America; even though, behind the region averages there is an important cross-country heterogeneity. Teachers are more educated than other professionals and technicians but their years of education are not rewarded in the labor market, in fact, higher education has a penalty in the top percentiles of the earnings distribution. Also part-time work is a job characteristic that to a large extent explains teachers' underpayment, mainly for pre-school and elementary school teachers. Moreover, job tenure and job schedules do have an important role in explaining the earnings gap: the first is positively related with the earnings gap, and the second states that not considering job-brake periods (vacations) may lead to overestimate the earnings gap. This could be explained as some sort of compensating differential, that is, the amenity of part-time schedules, larger vacations periods and more job stability (that in many circumstances is used as a way of managing the family-work trade-off) are compensating with lower earnings. It could be hypothesized that those individuals with prospects of raising a family, with the desire of devoting time to it opt for the teaching profession, accepting the possibility of lower earnings. But this would require further exploration.

Working in the public sector appears to have explanatory power, as is negatively related to the earnings gap. However, looking at monthly and yearly earnings, these results do not hold for pre-school and primary teachers. Anyway, as results are not conclusive we encourage further exploration regarding this issue.

The analysis performed provides evidence of the heterogeneity of the unexplained component of the earnings gap. In general, teachers' underpayment is more pronounced among males, older workers, those more educated (with tertiary education complete), urban, part-timers, and formal workers. Moreover, important differences along the earnings distribution were found. In general, teachers in the highest percentiles of the earnings distribution earn less than other professionals and technicians, while teachers in the bottom percentiles tend to have similar or higher earnings than comparable workers. Thus, the average earnings gap between teachers and comparable workers in Latin America is driven by pay differences at the top percentiles of the earnings distribution. This can be explained because in many countries teachers are rewarded through a single salary schedule which implies a salary structure much more compressed than the one of other professionals and technicians.



This salary structure is appealing to teachers as a fair way to compensate everyone, because it does not make distinctions that might disturb relationships among them. In this scheme equal pay is provided regardless of differing efforts and abilities; salaries are unrelated to the activities performed at the schools; being seniority and the level of education the primary basis for any pay increase, which means that in the teaching profession loyalty rather than actual job performance is rewarded.

This system implies that teaching probably attracts people with a preference for job stability and security, and at the same time equal pay regardless of performance penalizes the highly effective teachers who should be earning more. Thus, the single salary schedule might not be attractive to high performing teachers. For this reason, several countries are reforming traditional systems of recruiting teachers as well as mechanisms of paying and rewarding them, in order to attract and retain highly qualified individuals into teaching, and to get teachers to work hard to raise student learning (OECD, 2009).

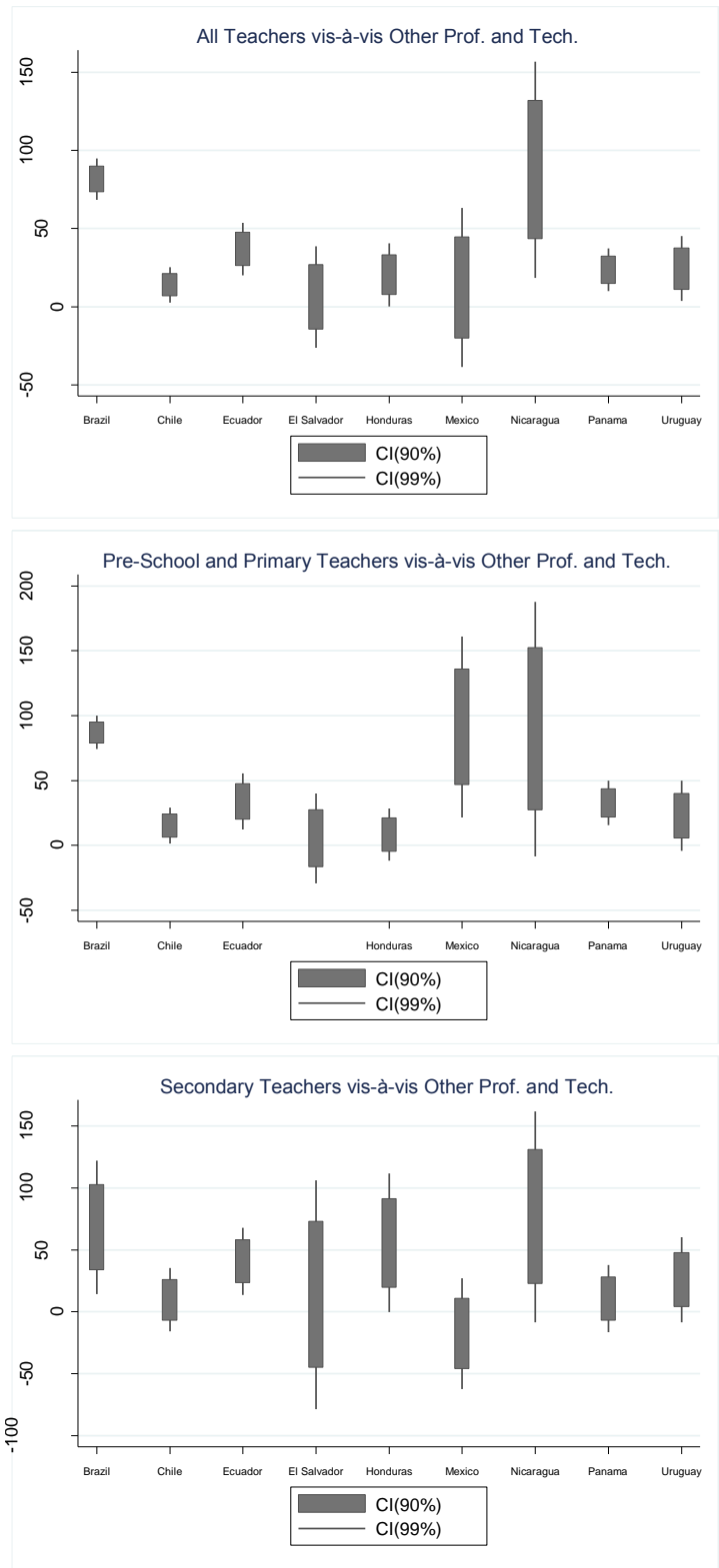
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**Figure A1**  
**Unexplained Earnings by country using the full set of observable characteristics for**  
**School Teachers vis-à-vis Professional and Technicians**



**Figure A2**  
**Kernel Regression**  
**(6 countries with data on job tenure using prorated hourly earnings)**

