Attracting and retaining qualified teachers in Argentina: Impact of the structure and level of compensation

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Abstract

In this paper, we compare teachers' salaries to those of workers in other occupations in Argentina. We ask, do teachers in Argentina fare well or poorly in the labor market as compared to observationally-equivalent workers in other fields?

Our findings suggest that a *national* pay raise, or even a national policy on teacher compensation, may not be the best policy for attracting and retaining qualified teachers in Argentina. Our results call for adjustments by province in the real relative salaries of teachers, so that the profession may be attractive to highly qualified individuals in all areas. Our findings also highlight the need for changing the uniformity in the structure of rewarding seniority in teaching.

1.   Introduction

In March of 1997 Argentina's teachers unions put up a tent in front of Congress to demand across-the-board increases in teacher salaries. Two years later, the tent is still up. Teachers have been protesting against a proposal by the National Ministry of Culture and Education (NMCE) to reform the teaching career, including changing the structure of teacher compensation. In March of 1998, the NMCE publicly announced a proposal to levy a new tax on transportation vehicles to finance an increase in teacher salaries. Congress approved the proposal in September of that year, though it is still unclear how the salary increase will be implemented.

In this period of intense national debate, more information is needed about whether the rewards to the teaching profession are sufficient to attract, retain, and motivate the highly qualified individuals that are needed to implement the ambitious education reform agenda that the country launched in 1994. In particular, more information is required to answer two questions. First, is the *level* of the total package of monetary compensation of the profession (e.g. wages, benefits, and pension) and non-monetary rewards (e.g. social status, work flexibility, intrinsic rewards) adequate to attract people with the necessary skills to become high-quality teachers? Second, does the *structure* of the total compensation package lead those attracted to the teaching profession to perform to the best of their abilities and continue to develop their professional capacity?

Because teachers are key in the education process, and because their salaries often account for (at least) three-quarters of the education budgets of Argentine provinces, these are very important questions. But, they are also very complex questions, to which we seek to make a modest empirical contribution. In this paper, we compare teachers' earnings to those of workers

in other occupations. We ask, do teachers in Argentina fare well or poorly in the labor market as compared to observationally-equivalent workers (e.g. same gender, age, educational attainment) in other fields?

The paper is organized as follows: in Section 2, we discuss our data and methodology. Section 3 contains a brief overview of the Argentine education system and the structure of teacher compensation. In Section 4, we present our analysis of the teacher profile for the entire nation. Section 5 contains our findings of the relative teacher earnings analysis by metropolitan area. In Section 6, we discuss our findings and their policy implications, especially regarding the structure of teacher compensation. In Section 7, we present some conclusions and suggestions for future research.

A limitation of our analysis is the use of teachers wages as the only indicator of the adequacy of compensation. While we recognize that wages are but one indicator of teacher compensation, unfortunately, data on other aspects of teacher compensation (monetary and non-monetary, such as pension and benefit plans as well as flexible schedules and greater job security) are unavailable in Argentina at this time. It is usually argued that the non-salary components of the teacher compensation package in Argentina constitute an important factor in making the profession attractive. Better data on the full compensation package of teachers and other workers in Argentina is needed to thoroughly understand the dynamics of teacher incentives and the teacher labor market.

Our paper is only a first step toward understanding the influence of teacher compensation on who chooses to enter and stay in teaching in Argentina. To thoroughly understand the dynamics of the teacher labor market in Argentina, other indicators are necessary. For example, to better assess whether the profession is attracting sufficient highly qualified individuals, we

would need to analyze the enrollment and flows into and out of teacher training institutes. Similarly, to learn whether the profession is able to retain sufficient numbers of highly qualified teachers, we would need to study the turnover rates (taking into account the effects of benefits and pension schemes on teachers' decisions their positions versus simply requesting leaves of absence). Also, a key question left unanswered here is how pension and other non-salary benefits affect who becomes and stays in the teaching profession. The data available were inadequate to address these very important issues.

Nevertheless, our paper contributes to inform the debate on teacher earnings and working conditions in Argentina. By using complementary sources of information, the paper constitutes a useful step in characterizing the earnings structure and the relative earnings of teachers in Argentina, as well as the (often ignored) variation in relative earnings across provinces.

2. Data And Methodology

We use two datasets: the 1994 National Census of Teachers and the October 1997 *Encuesta Permanente de Hogares* (*EPH*), a household survey conducted in Argentina's metropolitan areas. The census contains comprehensive information on all of the nation's teachers, their characteristics and those of their jobs. However, it does not contain any information on earnings. The *EPH* contains information on general worker characteristics for individuals of all ages and occupations, including gender, hours worked per week, educational attainment, age, experience, and earnings. However, the *EPH*'s occupational categories are broad; one cannot directly identify teachers. Instead, one can only identify individuals who report that their occupation is in education. In addition, the *EPH* does not contain specific information on teachers that is of interest to answer our research question, such as whether they

work in the private or public sector. Because both data sets have advantages and shortcomings, we draw on both sources in addressing the different components of our research question.

Our empirical strategy includes first analyzing the national-level data from the Census and presenting tables that describe the characteristics of teachers and their profession in Argentina. Given that the education system is decentralized and that there may be important regional variations in teacher labor markets, we use the *EPH* to analyze how teachers in the nation's main metropolitan areas fare in terms of earnings relative to comparable workers in other occupations (see the Technical Appendix for a presentation of our linear regression model and a description of the variables used in our analyses).

One must recall that in Argentina teachers are also paid during the three months of annual vacation. One of the limitations of our data is that they do not allow us to account for this difference in compensation between teachers and non-teachers. Hence, when in our analyses we compare teachers' reported hourly earnings to those of observationally-equivalent workers in other occupations, we may underestimate teachers' earnings.

3. Overview Of The Education System, The Structure Of Teacher Compensation, And The Evolution Of Teacher Salaries In Argentina

3.1. Brief Overview of the Education System

The Argentine education system has experienced significant reforms in very recent years. In 1992, with the passing of the *Ley de Transferencia de los Servicios Educativos,* the system was decentralized to the provincial level. Although each provincial government has its own ministry of education responsible for managing the province's education system, probably as a result of a long history of centralization, the National Ministry of Education and Culture (NMCE) continues to have an important role in financing and policy-making. For example, the NMCE maintains authority over the provincial ministries in education evaluation and in teacher training.

In 1993, the Federal Education Law was passed, which established a new structure for the Argentine education system. It is now divided into three levels: *educación inicial* (pre-school), *educación general básica* (primary and lower secondary), and *educación polimodal* (upper secondary). Curricular contents were developed by the Federal government for each level, and the law also mandated ten years of obligatory education, which include the last year of *educación inicial* and all nine years of *educación general básica* (NMCE 1997).

In 1995, the Higher Education Law was passed, which assigns the provinces the responsibility for higher, non-university education, including teacher training institutions. At the same time, this law maintained at the national government the responsibility for higher, university education.

These major changes have important implications for the Argentine teacher force. Among others, evaluation of educational outcomes, through annual student achievement examinations, are beginning to take place. In addition, a federally-run teacher training network (*Red Federal de Formación Docente Continua*) was established to update the skills of new and existing teachers to better match the curricular contents of the new education structure (NMCE 1997).

3.2. Teacher Compensation Structure

The structure of teacher compensation in Argentina differs for primary and secondary school teachers. Whereas primary education teachers are salaried employees, secondary school teachers are paid an hourly wage based on 45-minute instruction periods (or *horas cátedra)*. All teachers earn monthly wages not only for the months in which schools are in session, but also for the three months of annual vacation. This section draws heavily from two excellent reviews by Morduchowicz (1997a and 1997b).

Three factors determine the level of teacher compensation in Argentina: (1) years of teaching experience, (2) bonuses for specific tasks, and (3) promotions within the education hierarchy.

1.   *Years of Teaching Experience.* In Argentina, 22 years of teaching experience are required to earn the highest salary within a position, and the difference in earnings between a teacher at the beginning and the end of the career in the same position is around 120 percent. On average, the base salary increases between 20 and 30 percent every five years only as a result of teaching experience.

2.   *Bonuses for Specific Tasks.* Teachers receive bonuses for specific tasks, such as accepting a position in a remote or unfavorable area, or assuming management roles within the same position. There are so many situations or justifications for which teachers can receive such

bonuses, that some argue that "the limits are set by the imagination of those responsible for formulating the salary policies" (Morduchowicz 1997b, p.9 [our translation]).

3.   *Promotions within the Hierarchy.*   For primary school teachers, the hierarchy includes: (a) grade teacher; (b) vice-director; (c) director; and (d) supervisor.   Promotions to each of these positions are determined by a competitive process and the teacher's work history, as determined by a points system.

The competitive process consists of a written and an oral examination.   Each examination is scored on a 50 point scale, and passing requires obtaining a minimum score of 25 points.   The average score of both examinations is used for the final score.

The exact number of points required for each position is set each year according to the supply of positions: the lower the supply, the higher the number of points required for the position.   Thus, a teacher can qualify for a position one year but not the next.

The number of points assigned to a teacher are based on the following categories: educational attainment, years of teaching experience, performance evaluation, diplomas and certificates from teacher training courses, cultural and pedagogic antecedents (refers to a teacher's intellectual productions, such as textbooks, articles published, conferences, etc.), and other degrees.   The maximum number of points that a teacher can obtain for each category are presented in Table 1. It is worth highlighting that performance on the job is the least valued category in the promotion system, while prior education and experience are the most valued.

Insert Table 1 about here

As a consequence of this system, "schools in Argentina are organizations in which (a) years of experience is still one of the main incentives; (b) promotions imply leaving the work one

had been doing; and (c) promotions depend on the leaving or retiring of those who hold higher positions in the school hierarchy" (Morduchowicz 1997b, p. 3 [our translation]).

3.3   The Evolution of Teacher Salaries

Although Argentine teacher unions often argue that real teacher salaries have declined over time, the available evidence seems to suggest otherwise. Teacher salaries by province, in real pesos, remained relatively stable in the period 1989 through 1997.   As Figure 1 shows, in the period 1989-97 teacher salaries evolved similarly in all the provinces for which data is available. There was a decline in the period 1989-90, followed by increases in the period 1990-1993, and a slight decline or leveling-off in the period 1994-1997. The measures do not take into account cost-of-living differences among provinces and hence the higher money salaries in some provinces do not necessarily indicate that the purchasing power is also higher.

Insert Figure 1 about here

Although real teacher salaries have remained relatively stable over the 1989-1997 time period, in all provinces they have declined relative to real national GNP per capita, as Table 2 shows. This suggests that, relative to other workers, the (at least financial) status of the teaching profession has sharply declined in recent years.   In the city of Buenos Aires, for example, teachers earned about 11 percent more than the GDP per capita in 1989. By 1996, teachers in the capital earned only about 60 percent of the country's GDP per capita in Argentina.

Insert Table 2 about here

Although the table above suggests variation in the relative earnings of teachers by province over time, it may be under- or over-stating these differences because it compares the mean salaries of teachers in each province to the national-level GDP per capita. Although reliable data

were unavailable on GDP by province prior to 1997, in Table 3 we present the ratio of mean teacher salary for selected provinces to each province's average GDP per capita in 1997.

Insert Table 3 about here

The table confirms that there are important variations in teacher's relative pay by province. We can compare these ratios to the ratio of teachers salaries to GDP per capita in other countries. In Table 4, we present these ratios for the sample of OECD countries for which data is available.

Insert Table 4 about here

In OECD countries, the average ratio of teacher salary to GDP per capita is 1.4, and it ranges from 0.2 in Turkey to 3.1 in Korea. However, only in four OECD countries do teachers earn on average less than the GDP per capita. If we interpret this ratio is an indicator of the relative investment of a country in its teaching force, then the majority of OECD countries are investing more in teachers on average than in other professions. In this context, it appears that Argentina, with a ratio of mean teacher salary to GDP per capita of 0.8, is not investing sufficiently in its teaching force.

The OECD ratio for Argentina is close to the 0.75 ratio of mean teacher earnings to the earnings of non-agricultural workers in Argentina in 1989 estimated by Psacharopoulos *et al.* (1996). However, in a study using data from 1991, Carnoy and Welmond found the ratio of average primary teacher salary to GDP per capita in Argentina to be the lowest of a sample of many OECD and developing countries, 0.51 (although it is not clear that these figures are strictly comparable to those above).

Argentina's teachers, thus, appear to be relatively underpaid. But public primary school teachers in Argentina work, on average, about the same number of hours per year as OECD

countries, as Table 5 shows. In secondary education, Argentina teachers report to work a greater number of hours than the average of OECD countries.

Insert Table 5 about here

4.   Profile of the Teacher in the Argentine Labor Market

Several distinctive issues characterize the profile of the teacher in Argentina. First, nearly all teachers work either in the public sector or in the state-supported private sector. Second, nearly all teachers are female. Third, the formal education of teachers is often from specialized teacher training institutes. Fourth, understanding the hours worked by teachers is complex, because many teachers work substantial hours outside the classroom. As a result, neither "*horas cátedra*" nor "*horas cargo*" correspond to total hours worked. Fifth, as explained in the previous section, the empirical evidence supports the notion that years of teaching experience are a key factor for progressing within the profession. Sixth, many teachers take on additional jobs to supplement their income. Last, public school teachers appear to over-use the leave of absence option, generating the need to hire large numbers of substitute teachers.[1]

4.1   *Most teachers work in public schools*

The 1994 census found that in that year Argentina had 591,806 active teachers, and 70% of them were teaching in public schools. The Census also documented the variation in the total number of teachers by sector between provinces, as Table 6 shows. The public education system is the main source of employment of teachers, with the exception only of the Capital Federal. Public school teachers comprise between 70 and 90 percent of all teachers in most provinces, and a significant portion of provincial government budgets is invested in education. The percent of provincial government budgets spent on education in 1996 ranged from 20 percent in Tierra del

Fuego to 34 percent in Santa Fe, with an average of about 28 percent (World Bank 1998b, p. 95).

Teacher salaries account on average for at least 90% of a province's education expenditures in Argentina.

Not only does the public school system employ the majority of teachers, but also in Argentina a great number of private schools receive public funds that account for a substantial fraction of their resources. Usually, these funds are used to cover the salaries of private school teachers whose pay scales are set by the national teacher union to be equal to those of public sector teachers.

Insert Table 6 about here

4.2 *Most teachers are women*

A second feature of the Argentine teacher labor market is that eighty percent of all active teachers are women. This figure is close to the percentage of women among primary teachers in the United States (86%) but higher than the OECD averages of 75% female primary teachers, 57% lower secondary female teachers, and 50% general upper secondary teachers (OECD 1998). The *EPH* for the largest metropolitan area, Gran Buenos Aires, also reports that the proportion of all teachers who are female is eighty percent. In contrast, the proportion of workers in other occupations who are female is only 35 percent.[2]

It is interesting to explore how the percentages of females in the profession vary by position and level within the education system. Table 7 presents the percentages of females by position and title for each education level for the entire nation.

Insert Table 7 about here

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[1] Our findings in this section complement those of Marshall 1998.
[2] We conducted the majority of our analyses for this section using the Gran Buenos Aires *Encuesta Permanente de Hogares (EPH)* following Pessino (no date), who arguest that since Gran Buenos Aires is the largest metropolitan

Although teaching is indeed a female-dominated profession, there are differences by gender among the three levels of education. Males are more prevalent in teaching the higher the education level. The percentage of female teachers declines from almost 100 percent in pre-school to roughly 20 percent in secondary (see Table 7). Even though the trend of increased male participation in teaching in higher education levels is common in developed countries, there also tend to be more male teachers in these countries at the primary level. For example, in Denmark the percentages of female teachers are 58%, 45%, and 30% for primary, secondary, and tertiary, respectively (OECD 1997, p. 124).

Whereas in many countries females have limited access to positions of higher responsibility, such as principal and vice-principal, the evidence presented in Table 7 suggests that this is not the case in Argentina. Within education levels, the percent of females in each position and with each title is the same or higher for the more prestigious positions and titles. For example, in primary schools, 90% of all educators with permanent title (titulares) are female, and 83% of all interim educators (interinos) are female. Similarly, about 88% of primary school principals/vice-principals and teachers are female.

4.3   *Most teachers obtained their credential from a teacher training institute*

At both the primary and secondary level, the majority of teachers obtained their credential from a teacher training institute (higher, non-university institutions). But the proportion is much higher among primary school teachers (60 percent) than among secondary school teachers (37 percent). While a substantial proportion of secondary school teachers have university degrees (about 23 percent), few primary school teachers (less than 5 percent) have completed university education. And a high proportion of both primary and secondary school teachers only have

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area in Argentina, it is the most representative of national patterns. Using Census data we verify that about one-third of all teachers in Argentina are in Gran Buenos Aires.

finished secondary school – almost 32 percent of all active primary and secondary school teachers. Very few primary and secondary school teachers have only primary education or post-graduate schooling (See Figure 2).

Insert Figure 2 about here

A comparison of teachers to workers in other occupations using the *EPH* suggests that teachers in Gran Buenos Aires are on average more educated than other workers, with an average of 14.5 years of education versus a non-teacher average of only 10.1 years of education.

4.4 *Teachers state that they work a significant amount of hours outside the classroom on teacher-related activities, but many would like to work more hours*

The issue of teachers' hours of work is complicated by the necessity to account for time worked outside the time in front of the classroom (e.g. for class preparation, grading, etc.). This is made more complex because in Argentina secondary school teachers work under different conditions than do primary school teachers. Instead of being hired for teaching a particular grade for about six hours per day as are primary school teachers, secondary school teachers are hired to teach a particular subject area to a group of students. As a result, most secondary school teachers divide their time among several schools, teaching the same or similar subjects to different groups of students.

One must, therefore, distinguish between *horas cargo,* or hours of work corresponding to each position (for the few teachers in secondary schools who are hired as full-time staff – see Table 9), and *horas cátedra,* the hours that teachers are required to be in the classroom in secondary schools. Each *hora cátedra* consists of 45 minutes of instruction (implicitly accounting for the 1/3:2/3 ratio of outside/inside classroom work). Secondary school teachers can teach their *horas cátedra* in more than one school. In contrast, each *hora cargo* consists of

hours of work that teachers are required to do at a particular school site, based on their position (*cargo).* At the primary school level, teachers are more typically paid by position or *cargo*, which for budgetary reasons only is assumed to be equivalent to 25 *horas cátedra.* This equivalence did not historically affect teachers. For example, a teacher with three assigned *horas cátedra* likely has a "cargo" or teaching position. As a result, the number of *cargos* in a province seldom match the equivalent number of *horas cátedra.* However, this is likely to change as a result of the recent requirement of a minimum of 12 *horas cargo* per secondary school teacher.

It is expected to work 40 hours or more per week in most blue- and white-collar jobs. To be in front of students for 40 hours per week would imply about 60 hours a week of total work. Consequently, in most countries it is accepted (and, indeed, established) that teachers teach an average of less than forty hours per week. However, it is not erroneous to expect teachers (and reward them) to work for a *total* of 40 hours per week, including both teaching and non-teaching (but school-related) activities.

In the census, primary school teachers report to work about 25 hours per week in the workplace, *and* they also report working about 12 hours per week outside the workplace (see Table 8). This ratio of about one-half hour of work outside the classroom for each hour worked in the teaching workplace is nearly equivalent to what is generally recommended. In total, therefore, primary teachers work an average of 37 hours per week –a number still smaller but much closer to the average of 43 hours of work per week reported in the household survey by workers in other occupations.

Insert Table 8 about here

In secondary schools one must distinguish between *profesores* and *maestros.* The former generally have a bachelor's degree in a particular subject area, whereas the latter usually have

only completed teacher training in secondary school institutions. As Table 9 shows, most secondary school teachers are *profesores* who work by the hour of instruction (*hora cátedra).*

Insert Table 9 about here

Table 9 also suggests that in her usual job, the average secondary school teacher (*profesor*) is directly working in the classroom about 9 hours (twelve 45-minute periods) per week, spends about 3 hours (ideally) in preparing for class (twelve 15-minute periods), and spends about 2.5 additional hours per week for school activities that do not directly involve teaching. The few hours worked in the typical secondary school position imply that secondary school teachers often have to seek other jobs to make ends meet, a potential source teacher frustration, and one that likely affects the quality of education that secondary school students receive.

In the *EPH* for Gran Buenos Aires, teachers report working on average more than ten hours per week *less* than non-teachers (teachers report to work an average of 32.4 hours per week, whereas non-teachers work an average of 42.9 hours). However, a substantial minority of teachers (22.4 percent) who report working less than 35 hours per week also report that they *would like to work more hours*. In contrast, among non-teachers, the proportion working less than 35 hours per week who report that they would like to work more hours is only 15 percent. Thus, almost one-fourth of all teachers in Gran Buenos Aires report feeling under-worked.

   4.5 *Years of teaching experience are highly valued for progressing within the profession*

A highly debated issue is the current practice of rewarding teachers almost exclusively based on *antigüedad*, or years of teaching experience. In particular, this issue is highly controversial due to the current policy of basing salary increases and promotions almost entirely on seniority.

Insert Table 10 about here

Table 10 suggests that experience is valued for being promoted to the highest positions in the education system. At all levels, principals and vice-principals have, on average, 19 to 20 years of experience, whereas teachers average only half as many years of experience.

Using *EPH* data allows us to compare teachers' average age and experience to those of other workers. In Gran Buenos Aires, teachers are on average slightly older than are non-teachers (39.4 v. 38.4 years, respectively) and they also tend to have more years of experience in the current occupation (10.8 years of experience is the average for teachers; for non-teachers the average is 8.2 years). Once again, the data from the *EPH* closely mirrors that of the census.

4.6 *For many teachers their income is a substantial contribution to their household income*

Although the teacher census does not provide any information on teacher pay, the figures presented in Table 11 indicate that a substantial minority of teachers at all education levels supplements their earnings with other paid jobs. A related question is whether teachers' earnings are an important contributor to their total household earnings. In Argentina (as in many countries), a common perception is that the mostly female teacher force works mainly to attain personal satisfaction and is thus satisfied with low salaries. The finding that the income of almost half of all teachers in Argentina is the only or main source of household income suggests that teachers also work to provide their households with financial stability. In addition, the result that for close to half of all teachers, their earnings are a complementary source of income to the household suggests that teachers' financial rewards are not enough to support most households.

Insert Table 11 about here

4.7   *Large numbers of substitute teachers in public schools prevail, as many teachers take leaves of absence during the school year*

In the current debate about the teaching profession in Argentina, a controversial issue is whether a significant number of teachers are on leave of absence. If this is the case, then there is reason for concern because of the potential waste of resources. The 1994 Census provides information only on long-term leaves of absence (4 or more months). However, teachers who were on leave *at the time of the survey* are excluded from this table. Approximately an additional ten percent of teachers were on long term leave than are reported in Table 12.[3] Thus, Table 12 is likely underestimating the proportion of educators on leave.

Insert Table 12 about here

In contrast to the relatively small percent of educators reporting to be on long-term leave, the percent of substitutes (*suplentes)* is substantial, as Figure 3 shows.

Insert Figure 3 about here

As one can see in Figure 3, the percent of all active teachers in public schools who are substitutes ranges from 18 percent in pre-school and secondary, to almost 20 percent in primary. The corresponding figure for private schools is much lower; only between 7 and 8 percent of all active private school teachers are substitutes.   This difference in the proportions of substitutes between public and private schools may reflect the highly bureaucratic promotion process that prevails in the public education system. In addition, only half of all secondary school teachers are *titulares,* or tenured teachers, whereas the proportion is close to 60 percent in pre-school and primary. This lower proportion of tenured teachers at the secondary school level than in pre-

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[3] Information provided by Ms. Hilda Lanza, Subsecretary of Educational Evaluation, National Ministry of Culture and Education, Argentina.

school and primary possibly reflects differences in teacher hiring practices between these systems.

Having about one-fifth of teachers at all levels of the public education system as substitutes is reason for concern, due to its pedagogical, organizational, and financial implications.   On the pedagogic side, the instructional process needs to be coherent and consistent to maximize student learning; instability in who leads the instructional process may create obstacles to achieving this coherence. On the organizational side, short-term leaves of absence generate pressures for administrators to find adequate substitutes, not an easy task particularly when there are large numbers of classrooms for which substitutes are needed. Last, on the financial side, hiring large numbers of substitutes on a regular basis results in the allocation of additional resources to salaries (particularly in Argentina, where teachers on leave continue to earn their salaries), resources that could be otherwise used for much needed educational inputs, such as teaching materials.

5. Analysis of Teachers' Earnings

We used the October 1997 *Encuesta Permanente de Hogares* (*EPH*) to analyze how teachers' earnings compare to the earnings of comparable workers in other professions. Using available data from several cities, we performed linear regression analyses of the (natural log of) earnings on worker characteristics that contribute to explain earnings, such as gender, highest level of education attainment, experience, average hours of work per week, and whether the worker is a teacher. To better understand differences in relative teacher pay across geographical areas, we conducted our analyses for each city separately. For a description of our model and the names and definitions of the variables used in our analyses, please see the Technical Appendix.

The earnings functions work rather well, with all the usual factors having the expected sign, plausible magnitudes, and the overall regressions have reasonable explanatory power. Using Gran Buenos Aires as an example, being female reduces estimated wages by about 20 percent. Having completed a secondary or technical degree raises estimated wages by 77 and 72 percent, respectively, as compared to having completed only primary school, while a university more than doubles expected wages with respect to primary school completion.

At the beginning of an individual's career, each year of labor market experience is associated with about a 4 percent increase in estimated wages per year. But as the individual progresses through his or her career, the relationship between experience and wages becomes less steep. By 10 years of experience, the expected increase in wages is only 3 percent per year, and expected earnings peak at about 20 years of experience.

The fitted regression models suggest that teachers' earnings relative to the earnings of comparable workers in other occupations vary tremendously by city. The findings fall into four general types. First, there are several cities where teachers appear to earn more than comparable workers. Second, there are cities where teachers appear to earn consistently less than comparable workers. Third, there are a group of cities in which teachers' relative earnings differ by years of teaching experience. Importantly, Gran Buenos Aires, with almost one-third of the nation's teaching force, is in this category. Last, in the majority of cities included in the survey, when controlling for worker characteristics, teachers' earnings do not differ significantly from those of comparable workers in other professions. This is likely due to lack of statistical power; many of these cities are small, and thus the sample sizes and particularly the numbers of teachers are not adequate for linear regression analysis to identify precisely enough the impact on wages of being a teacher.

5.1   *Teachers' relative earnings appear <u>higher</u> than those of comparable workers*

In two metropolitan areas, San Juan and San Miguel de Tucumán, teachers can expect to earn higher salaries than comparable workers in other occupations. In Figure 4, we present predicted earnings by years of experience in San Juan for prototypical male and female teachers and non-teachers to illustrate the expected earnings profiles in cities where teachers' relative earnings are estimated to be higher than those of non-teachers (see Table A2 in the Technical Appendix for the underlying fitted models). As expected given our model specification, all the curves follow a similar shape -- that of an inverse U. This indicates that at the beginning of their careers workers have low predicted earnings, but these are growing. At a certain point in their careers, the predicted earnings begin to decline, as workers are less valued in the market. The pattern holds for both teachers and non-teachers, male and female.

However, it is interesting that in these cities, the *level* of the curves is higher for male and female teachers, and lower for male and female non-teachers, suggesting that teachers are better off in these areas than are non-teachers. It is also interesting to point out that male teachers and non-teachers earn more than do their female colleagues.   Since the *EPH* does not provide sufficient information to identify teachers by their position or level in the education system, we can only hypothesize that the higher male salaries are likely related to males' stronger presence in higher positions and higher education levels.

<u>Insert Figure 4 about here</u>

5.2   Female t*eachers' relative earnings are <u>lower</u> than those of comparable workers*

In Capital Federal, La Plata, and Paraná, being a female teacher implies earning consistently lower salaries than comparable workers in other occupations. As Figure 5 shows using La Plata as the example for this type of city, the curves for these cities follow the same

inverse-U shape as those for San Juan and San Miguel de Tucumán, but it is non-teachers who have higher overall levels of predicted earnings.

Insert Figure 5 about here

Among males, the difference is small, almost unnoticeable. However, in Capital Federal non-teachers tend to earn more than teachers at all levels of experience. In addition, in all three cities male teachers and non-teachers have higher predicted earnings at all levels of experience than their female colleagues.

5.3   *Teachers' relative earnings differ by years of experience*

In the large metropolitan areas of Gran Buenos Aires and Partidos de la Provincia de Buenos Aires, as well as in the city of Río Gallegos, the comparison between teacher and non-teacher earnings is more complex. In these areas, the effect of experience on predicted earnings is different for teachers than for non-teachers. As shown in Figure 6, using Gran Buenos Aires as the example for this type of city, the curves for teachers are less steep than those for non-teachers, indicating that the earnings premium due to experience is greater in other occupations than in teaching.

In the two areas within the Province of Buenos Aires (GBA and the Partidos), teachers' predicted earnings are lower than are those of comparable workers in other occupations for the greater part of their professional lives. In the figure, the curves for teachers are below those for non-teachers in the middle portion of the graphs, from about 10 to about 40 years of experience. While at the beginning of their careers teachers tend to earn slightly more than non-teachers, the curves cross at 10 years of experience and reach their maximum point at the end of their teaching careers.

Insert Figure 6 about here

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In Río Gallegos, the findings are slightly different: although the earnings premium due to experience is smaller for male and female teachers than for non-teachers, they have higher predicted earnings than non-teachers throughout the greater part of their working lives.

It is important to highlight that about one-third of all teachers in Argentina are in the Province of Buenos Aires. The figures for the Province of Buenos Aires indicate that, for the majority of their working lives, more than one-third of all teachers in Argentina earn less than do comparable workers in other occupations. In Table 13 we present our estimates of the teacher premia – the ratio of predicted teachers' earnings to predicted non-teachers' earnings – for Gran Buenos Aires. At five years of experience, female teachers are predicted to earn 10 percent and male teachers 15 percent more than do their non-teacher counterparts. Given that on average teachers have ten or more years of experience (as shown in Table 10), we can conclude that the average teacher receives smaller earnings per hour than workers with identical observed characteristics. It is troubling that teachers who remain in the profession for the majority of their working lives appear increasingly underpaid.

<u>Insert Table 13 about here</u>

This result supports the notion that the profession may be *attracting* qualified individuals. As teachers accumulate experience, however, their relative earnings decline, indicating that the teacher profession is likely not *retaining* the best who initially selected to become teachers. But how the wage structure affects recruitment and retention decisions depends in complicated ways on foresight and expectations and the occupational specificity of human capital accumulation. That is, even though teachers might earn less than comparable workers after 20 years experience if the return to seniority in teaching is no transferable to other occupations it may still be the case

their earnings as teachers are much higher than by leaving teaching and moving into another occupation.

In addition, this analysis is complicated by the existence of pensions and benefits. As teachers' relative earnings decline, they have on the one hand an incentive to earn wages in other occupations but not to resign and lose their accumulated pension and health benefits from teaching. As a result, many teachers obtain temporary leaves of absence from the teaching profession to pursue other occupations with higher wages.

The finding that for the majority of Argentina's teachers, their relative earnings rise less with experience than those of comparable workers in other occupations is particularly striking given the current national debate over teachers' returns to *antigüedad*. For example, at 15 years of experience, female teachers in Gran Buenos Aires are predicted to earn 7 percent *less* than female non-teachers; at 20 years, female teachers are predicted to earn almost 11 percent *less* than female non-teachers. Male teachers' relative earnings also decline with experience in Gran Buenos Aires, although the decline is less steep. Thus, our findings suggest that in other professions the returns to *antigüedad* are larger, not smaller, than in teaching.

5.4 *Teachers' relative earnings seem to be no different from those of comparable workers*

In Bahia Blanca, Corrientes, Jujuy, La Rioja, Comodoro-Rivadavia, Mar de Plata, Río Cuarto, Córdoba, La Pampa, Mendoza, Neuquén, Rosario, Salta, San Luis, and Santa Fe, the estimated coefficients on the "educator" variable are close to zero in magnitude and lack statistical significance. Thus, in these cities it appears that the estimated earnings of teachers are not different from those of observationally equivalent workers in other occupations (see Part B of the Technical Appendix for a discussion of the lack of statistical significance).

6. Discussion

Our findings do not provide convincing arguments that all teachers are better off than non-teachers in Argentina, nor do they suggest that teachers are always worse off. In contrast, they suggest that teachers' earnings relative to those of comparable workers in other occupations are high in some areas and low in others. In addition, they point to changes in the structure of teacher compensation, so as to provide incentives (and rewards) for more than experience. Teachers unions should be aware of this when arguing for across-the-board salary increases, but more on the issue of structure of compensation below.

In Table 14, we use census data to estimate the proportion of teachers in each category of relative earnings (less than, more than, or equal to comparable workers; and earnings varying by years of experience) described in the previous section. Because the household survey is conducted in metropolitan areas and the census is by province, we use the number of teachers in each province where cities are located to make the approximations. We include all teachers in the Province of Buenos Aires in the third category (earnings varying by years of experience). Using these estimates, about 48 percent of all teachers in Argentina are under-paid during the greater part of the careers as compared to workers with identical observed characteristics. It is likely that the proportion is much higher due to the low sample sizes of the provinces where we cannot confidently reject the null hypothesis that teachers' relative earnings differ from those of comparable workers in other occupations.

Insert Table 14 about here

Before drawing any conclusions, we must return to the policy issue of whether teacher's salaries should be raised, or the structure of compensation changed. The two key questions are:

1)   Should additional public resources be devoted to raising teacher compensation in Argentina?, and

2)   If so, how should that compensation be *structured* so as to obtain the maximum educational benefit?

These questions are obviously inter-linked. Teacher compensation can be raised in a variety of ways, including across the board, only for those above a certain threshold of performance, and/or in conjunction with a change in the *structure* of teacher compensation. If there are ways of raising teacher compensation that have less effects on educational outcomes than others (e.g. across-the-board increases v. structuring pay to encourage new and better teaching methods), then it is plausible that additional public resources should *not* be devoted to these types of compensation increases. Almost certainly the recommendation depends on the details of the proposed changes.

Is there a case to be made for using public resources to raise teacher compensation? This leads us to ask two additional questions. First, should additional public resources be devoted to education? Second, is the education budget such that, even with the best possible design of teacher compensation, raising per teacher wages would have a higher educational return per dollar than other uses (e.g. classroom materials, improving the curriculum, improving evaluations, reducing class sizes)?[4] In this section, we discuss four broad types of policies to change teacher compensation: (1) across-the-board pay increases; (2) performance-based pay; (3) pay for knowledge, skills, and competencies; and (4) individual and school-level bonuses.

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[4] Filmer and Pritchett (1997) marshal evidence from a large number of countries and cases to suggest that, typically, political economy considerations (crudely put, teachers strike, books do not) will lead teacher compensation as a component of the education to be "too high" in the sense that the marginal product per dollar of that input is lower than the marginal product per dollar devoted to other items. Whether this is the case in Argentina is an open question.

6.1   *Across-the-board pay increases*

There are several problems with across-the-board wage increases as a mechanism for improving the average quality of teaching.   We can analyze the effects of this kind of compensation increase on three issues: (a) attracting qualified candidates to the teaching profession; (b) motivating those in the profession to give their best performance; and (c) encouraging continuing in-service investments in up-grading capabilities and skills.

If the objective of the pay increase is to raise the quality of those attracted to the profession, there are several difficulties with across-the-board wage increases.   First, career choices depend not just on current but also on expected wages.   A one-time wage increase may not signal a real change in future earnings.   Second, there is the usual stock-flow problem. Because only a relatively small minority of teachers enter the occupation in any given year, an across-the-board salary increase would need to be given and maintained for a considerable time before one could observe any appreciable impact on the quality of the stock of teachers.

Most important is the question of whether an increase in the average quality of the recruitment pool would significantly increase the average quality of entering teachers.   If the process of selecting teachers is not effective in choosing those who will become the most successful teachers, then the potential gains from the reform will be dissipated.   Ballou and Podgursky (1997) show using U.S. data that even relatively large increases in the wages of teachers (over time and across districts) did not translate into correspondingly large changes in the quality of teacher entrants.

If the means by which higher wages are to improve performance is through better teacher motivation, there are several cases to consider.   First is the case when teachers are underpaid in *absolute* levels.   There is no question that in this case, teachers would need a second full-time job

to make a living wage and that this would affect their morale, motivation, and even physical capacity to do a proper job of teaching. However, there is no evidence that this is the case in Argentina – either from the wage or direct data on the fraction of teacher holding other jobs.[5]

The second case is when teachers are underpaid in *relative* terms – that is, when teachers are paid at a lower level than comparable workers in other occupations. The evidence is more mixed in this case. In few jurisdictions was there solid evidence that teachers may be systematically underpaid. But in the Province of Buenos Aires, with one-third of the nation's teachers, teachers in the middle of their careers appear to be underpaid by 15-20 percent relative to workers in other occupations of equivalent experience, education, and gender. Whether this magnitude is sufficient to demoralize teachers and prevent them from exerting their best efforts is an open question, especially as there are a number of features of the analysis (e.g. the annual working hours of teachers, pensions and benefits, employment security) that would suggest these wage per hour calculations might overstate the degree to which teachers were underpaid.

Increasing the variation in teacher pay and centering the variation more on performance and qualifications and less on experience is likely to contribute to improve the quality of education in Argentina. The current system leads to lock step pay increases for all, which creates incentives for those with market potential to move into other occupations while retaining their benefits by not renouncing their teaching position. This contributes to explain the concern in Argentina with the returns to seniority in teaching and the abuses in the system of granting leaves of absence. However, teachers do not, in general, appear to have higher returns to seniority than workers in other occupations. The more problematic issue, then, may be the *uniformity* of teachers' returns to seniority.

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[5] Secondary school teachers are an exception, but in their case it is more a matter of the structure of the profession where part-time jobs are the rule than an issue of payment *per se.*

The observed variance in (natural log of) hourly earnings among non-teachers in Gran Buenos Aires with 5 years of experience is 72% higher than that of teachers. At 10 years of work experience, the difference in the observed variance in (natural log of) hourly earnings between non-teachers and teachers is 426%. This difference in the variance between the two occupations at the same experience levels is striking. Teachers, whether effective or not, can count on their earnings to increase at predictable rates throughout their working lives. In contrast, non-teachers' higher earnings variation suggests that factors other than seniority contribute significantly to explain workers' earnings in non-teaching occupations.

Insert Table 15 about here

Several recent studies have found that increases in the level of teacher compensation (though not across-the-board) lead to increases in student performance (Hanushek *et al.* 1999, Ladd 1999, Lavy 1999, Loeb and Page 1998). In contrast, previous research suggested that pay increases had little or no effects on student outcomes (Ballou and Podgursky 1997, Hanushek 1989). We suggest that this is because in evaluating the effects of changes in teacher compensation, more attention must be given to the structure of pay. The experience of other countries seems to suggest that once teacher pay levels are within a "reasonable" range, that is teachers are not grossly underpaid, further across-the-board salary increases alone are not of great value. In short, our reading of the data is that an across-the-board wage increase would be very difficult to justify, especially if there are other alternatives.

6.2   *Performance-based pay*

The arguments are fairly strong that even in cases where teacher pay should be increased, the increase should be devoted to strengthening the link between compensation and education quality. However, while nearly all would agree with the objective of linking teacher

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compensation to performance, the exact mechanisms to achieve this linkage are far from clear. There are six features of the market in (non-higher) education in Argentina (many of which are common to other countries) that make any pay for performance scheme in the public sector in education problematic, if not impossible:

1) The output of education is multidimensional and complex;

2) Educational output is produced in teams;

3) Government is a monopsonist in the teacher labor market;

4) Teacher unions are a monopolist in the teacher labor market;

5) Students (and their parents) have little "exit" options that may generate pressure on line management; and

6) There is an inherent tension in the public sector between discretion and accountability.

Analysts usually focus on one of these aspects as the "reason" for which pay for teacher performance is impossible. For instance, it is common to complain that performance pay is impossible because educational output is complex and difficult to assess, and because it is produced in teams. But these characteristics characterize production in perhaps the bulk of production in a modern economy and is true of many professions. But if the other market characteristics are not present, these features alone do not prevent pay for performance.

This said, all the above factors must be taken into account in designing teacher compensation schemes, as they may be real constraints. Cohen and Murnane's (1985) analysis of merit pay programs – defined as individualized additional pay based on high-stakes performance evaluations – found that these programs survived in very few school district in the U.S. They found that it was impossible to build a merit pay program which teachers' deemed

"fair," and that in the absence of this perceived fairness over time the program would be attacked and its support diminished.

One lesson we draw form this experience is the need to evaluate all the six factors. While a headmaster at a private school may set pay or give raises based on subjectively-assessed performance, if there is little exit pressure on poorly performing schools to enforce school-level accountability then giving some discretion to a school principal is unlikely to improve educational outcomes. Similarly, if a single private school chose to compensate teachers through a structure that teachers deemed unfair, they could choose to teach in another school. In contrast, when the government devises a compensation structure that governs the pay of nearly all teachers, they are left with no "exit" option.

6.3   *Pay for knowledge, skills, and competencies*

If across-the-board salary increases are not desirable and pay for performance is difficult, if not impossible, where are we left? Recent research suggests designing compensation schemes that focus not only on student outcomes but also on specific qualities of teachers. Odden and Kelley (1997) propose a knowledge- and skills-based compensation system, where teacher pay is linked to:

- Mastery of the *content* of the materials to be taught; and

- Mastery of a variety of pedagogic *methods* for conveying the materials.

Several states in the U.S. are already implementing compensation schemes with these characteristics. Among developing countries, Mexico implemented in 1994 a program that heavily links content knowledge and educational outcomes to teacher pay. Chile also recently established the *Sistema Nacional de Evaluación de Desempeño,* a program of teacher evaluation linked to increases in pay (Mizala and Romaguera 1998).

In the case of Mexico, the salary incentive program, called *Carrera Magisterial* (CM), is voluntary for primary and secondary school teachers. Teachers who choose to join the CM program agree to participate in an annual global evaluation and to have annual salary increases linked to the results of these evaluations. This evaluation is based on five factors (Velázquez 1996):

- teacher performance evaluations (explained below) (35 points)

- professional skills, as demonstrated in annual written examinations of teachers and their students (25 points)

- educational attainment (15 points)

- completion of accredited courses to update skills (15 points)

- years of teaching experience (10 points)

By 1997, close to 50 percent of the Mexican teacher force had joined the CM program. Its effects on teacher and student performance are still to be evaluated.

The Mexican program is just one example of how teacher compensation can be linked to the many factors that affect teacher performance and educational outcomes. Programs may tie compensation to negative or positive outcomes. For example, teacher compensation programs may be designed so as to not allow teachers who do not demonstrate a mastery of the content materials to be hired or retained in the profession. In contrast, these programs could create a career path of positions for teachers, where as mastery of content knowledge and pedagogic skills increases, teachers are promoted to higher positions – from apprentice to journeyman, to specialist, and, finally, to master. Across each of these positions, there would be a compensation increase.

6.4   *Individual and School-Level Bonuses*

Another option to create incentives for performance is to establish bonuses, either at the individual or the school level, for teachers and/or schools serving specific populations, such as at-risk youth, rural children, etc. In general, when given a choice teachers tend to select schools with high-achieving, high socio-economic status students. Recent research in the U.S. has shown that teachers' mobility across school districts is related to student characteristics, and that many teachers choose to work in schools without difficult-to-serve children (Hanushek *et al.* 1999). Bonuses could also be granted to teachers who assume additional work – such as monitoring the library or computer laboratory, or managing extra-curricular activities – during additional hours to allow students more time for its access.

These bonuses would be different from the current "bonuses for specific tasks" described in Section III.2, in that the criteria for winning them would be clearly specified *ex ante*. Additionally, they could be granted not to the particular individuals, but to schools that serve these populations. A recent study found that school-level financial incentive programs can have positive effects on student achievement (Ladd 1999).

We clarify that teacher compensation is but one tool for policy makers to generate incentives to attract and retain the best and brightest into the teaching profession. Individuals are attracted to teaching for various reasons, and existing teachers seldom highlight pay as a key factor for choosing to teach. However, preliminary results from recent research in Peru and Venezuela do point to the influence on teacher motivation and performance of the level and structure of compensation (Bruni Celli 1999, Saavedra 1999). In addition, although past research on the link between teacher pay and student outcomes is mixed, two recent papers using a unique data set matching teachers and students over time do find that teacher quality is an important

determinant of student learning and that teachers respond to pay differences (Rivkin *et al.* 1998, Hanushek *et al*. 1999).

7.   Conclusions

Our findings suggest that a *national* pay raise, or even a national policy on teacher compensation, may not be the best policy for attracting and retaining qualified teachers in Argentina. Our results call for adjustments by province in the real relative salaries of teachers, so that the profession may be attractive to highly qualified individuals in all areas. More research is needed using provincial-level data. Since labor markets vary substantially across provinces, there appears to be no reason to focus on a national change in teacher compensation.

Our findings also highlight the need for changing the uniformity in the structure of rewarding seniority in teaching. One desiderata in designing the structure of pay is to retain the best performing individuals and to motivate improvements in performance. This would suggest an overall system of compensation in which either pay becomes more variable as individuals distinguish themselves or that, although increases in pay may not be variable across individuals, poor performing individuals are encouraged (or forced) to leave. It may also point to innovations in teacher compensation schemes, such as the use of individual or school-based bonuses to encourage improvements in performance.

An issue often raised in the policy debate regarding the quality of the teaching force in Argentina is the need to have more highly educated teachers at the primary and secondary school level – teachers with university degrees and beyond. Our estimates of earnings differentials by education level suggest that increasing the proportion of the teacher force with complete university education will have substantial budgetary implications for Argentina. Although

beyond the scope of this paper, characterizing these financial implications is important for planning the development of Argentina's education system.

Our paper is only a first step toward understanding the influence of teacher compensation on who chooses to enter and stay in teaching in Argentina. To thoroughly understand the dynamics of the teacher labor market in Argentina, other indicators are necessary. For example, to better assess whether the profession is attracting sufficient highly qualified individuals, we would need to analyze the enrollment and flows into and out of teacher training institutes.[6] Similarly, to learn whether the profession is able to retain sufficient numbers of highly qualified teachers, we would need to study the turnover rates (taking into account the effects of benefits and pension schemes on teachers' decisions their positions versus simply requesting leaves of absence). Also, it is necessary to understand how the pension and other non-salary benefits affect who becomes and stays in the teaching profession. More research is needed on this front.

A common argument is that teachers trade off lower salaries than comparable workers in favor of the increased job stability in the teaching profession. Although we have do not have indicators of job stability in Argentina, the high percentages of substitute teachers found in the Census data appear to suggest that the public school system is increasingly relying on teachers who do not receive the benefit of job stability. This question should be explored in future research.

We also highlight the need for more research on hours worked by teachers. It is crucial to focus policy dialogue efforts on building consensus in support of the teaching profession and to recognize that teachers' workday must include *paid* time for not only classroom teaching but also class preparation, interaction with other teachers, meeting with students outside class, school

administration duties (where applicable), and – in all cases – professional development activities. Also, in the Argentine context there is a need for analyzing differences among provinces in the duration of the school year.

Finally, in the Argentine context the policy discussion is not just about the *level* of teacher pay, but also about alternative mechanisms for raising average compensation (the level) while also creating incentives to improve teaching quality. While there are many issues to be addressed in such an approach, it is clearly the way forward.

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[6] The enrollment in teacher training institutes as an indicator of the "supply" of entrants into teaching will be precarious, as there is a common perception that many enroll in teacher training institutes mainly to improve their education (as a "remedial" high school), with no intention of ever becoming teachers.

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Appendix A

The names and descriptions of the variables used in our analyses are presented in Table A1.

<u>Insert Table A1 about here</u>

In addition to these variables, in our regression models we also included the quadratic transformation of *experience*, (*experience^2*), and two-way interaction terms between *teacher* and *female*, and *teacher* and the two variables representing experience.

Our regression model is:

$ln(hourly\ earnings) = $ β$_0$ + β$_1$ *Female* + β$_2$ *Secondary* + β$_3$*Technical* + β$_4$*University* + β$_5$*Experience* + β$_6$ (*Experience)^2* + β$_7$*Weekly Hours of Work* + β$_8$*Teacher* + β$_9$*Female* Teacher* + β$_{10}$*Experience* Teacher* + β$_{11}$(*Experience)^2 * Teacher*

In this model, β$_8$ is the main effect of the variable of interest, as it represents the estimated difference between teachers' earnings and those of comparable workers in other occupations. We fit this model to all cities and retain the interaction terms only where statistically significant. In Table A2 we present the estimated coefficients, standard errors, and R-squared statistics for the fitted regression models in cities where the estimated coefficient of the variable of interest (or its interaction terms) is statistically significant.

<u>Insert Table A2 about here</u>

Appendix B

As is usual, the interpretation of a lack of statistical significance is complicated. Table A3 presents the estimated coefficients for the educator dummy variable for each regression model. We include the estimated standard error, 95% confidence interval, as well as the number of educators in the sample and total sample size. The 95% confidence interval reports the amount by which teachers could be under- or over-paid before this particular sample and procedure could detect it. As is to be expected, the small sample sizes lead to imprecision.

So, for instance, in Mar de Plata the point estimate suggests that teachers' earnings relative to those of comparable workers are lower by 19 percent. However, the estimate is not statistically significantly different from zero. But with only 48 observations on teachers (about 8 percent of the total sample), it is unlikely the procedure would be unable to identify the effect as "statistically significant" unless teachers were making more than 40 percent less than comparable workers!

That said, the central tendency of the point estimates (the average is −1.4 percent) does not suggest that there is *generally* a large negative premia that is hidden by imprecision, but rather a variety of province specific differences (some positive, some negative) that are both typically smallish and imprecisely estimated.

Insert Table A3 about here

Table 1: Maximum Number of Points by Category

Category	Maximum points that can be obtained	Percent of total points (%)
Highest degree attained	9	23
Years of teaching experience	9	23
Performance Evaluation	3	7.5
Courses	6	15.5
Cultural Antecedents	6	15.5
Other degrees	6	15.5
Total Points	39	100.0

Source: Morduchowicz 1997b, pp. 15-16.

Table 2: Ratio of Constant Provincial Mean Teacher Salary to Constant National GDP per Capita (1989=Base)

Year	Entre Ríos	Chaco	La Pampa	Mendoza	San Juan	Tierra del Fuego	Buenos Aires	Jujuy	Córdoba
1989	0.86	0.84	0.79	0.86	0.93	1.68	1.11	0.70	0.55
1990	0.66	0.58	0.76	0.63	0.54	0.73	1.04	0.75	0.91
1991	0.66	0.58	0.70	0.86	0.71	1.45	0.76	0.68	1.12
1992	0.61	0.63	0.70	0.77	0.62	1.05	0.77	0.49	0.68
1993	0.52	0.53	0.66	0.65	0.68	1.20	0.65	0.42	0.62
1994	0.45	0.46	0.57	0.58	0.61	1.04	0.56	0.48	0.58
1995	0.49	0.51	0.62	0.64	0.68	1.14	0.62	0.53	0.64
1996	0.46	0.48	0.59	0.60	0.51	1.00	0.59	0.51	0.61

Sources: Perotti 1997 and World Bank 1998a

Table 3: Ratio of Current Provincial Mean Teacher Salary to Current Provincial GDP per Capita in 1997, Selected Provinces[7]

Province	Mean Teacher Salary: GDP per capita
Chaco	1.6
Entre Ríos	0.9
La Pampa	0.7
Mendoza	1.2
San Juan	1.1
Tierra del Fuego	0.5

Sources: Perotti 1997 and Provincial Governments' Records, kindly provided to us by Marcelo Becerra, local staff at The World Bank's Buenos Aires office.

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[7] Provincial mean teacher salaries were only available for these provinces.

Table 4: Ratio of Primary School Teacher Salaries After 15 years of Experience to GDP per capita in 1996 (in equivalent US dollars converted using PPPs)[8]

Country	Ratio
Turkey	0.2
Hungary	0.7
Czech Republic	0.8
Argentina	0.8
Norway	0.9
Italy	1.1
Sweden	1.1
Austria	1.2
Belgium	1.2
Finland	1.2
United States	1.2
Denmark	1.3
France	1.3
Greece	1.3
New Zealand	1.3
Netherlands	1.4
United Kingdom	1.6
Australia	1.7
Germany	1.7
Switzerland	1.7
Ireland	1.8
Portugal	1.9
Spain	1.9
Korea	3.1
Mean	1.4

Source: OECD 1998.

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[8] The ratios presented in Table 4 do not reflect the total compensation package for teachers.

Table 5: Number of teaching hours per year in public institutions by level of education (1996)

	Teaching time (1996)			
	Primary education	Lower secondary education	Upper secondary education (general)	Upper secondary education (vocational)
Hungary	551	473	473	473
Sweden	624	576	528	612
Thailand	634	543	543	513
Czech Republic	635	607	580	580
Brazil	667	667	667	667
Austria	684	658	623	636
Norway	713	611	505	589
Russian Federation	721	721	721	788
Uruguay	732	534	534	534
Italy	748	612	612	612
Denmark	750	750	480	750
Malaysia	762	778	778	813
Germany	772	715	671	676
Greece	780	629	629	629
Portugal	783	644	574	574
Argentina	788	875	875	875
United Kingdom	800	740	n/a	n/a
New Zealand	804	776	747	n/a
Jordan	833	833	694	788
Chile	860	860	860	860
Belgium *	861	741	657	953
Switzerland	871	850	669	n/a
France	900	647	636	636
Spain	900	900	630	630
Ireland	915	735	735	735
United States	958	964	942	n/a
Netherlands	975	910	910	900
Philippines	1117	1176	1176	n/a
Indonesia	1140	912	912	912
Korea	n/a	456	428	456
OECD Country mean	**791**	**700**	**633**	**652**

* Belgium: The index of change refers only to the French Community of Belgium.
Source: OECD 1998.

Table 6: Active Teachers by Sector and Province, 1994.

Province	Total	Sector					
		Public	%	Private	%	Both	%
TOTAL	591,806	416,510	70.38	138,681	23.43	36,615	6.19
Formosa	8,658	7,930	91.59	448	5.17	280	3.23
Chaco	16,962	15,462	91.16	977	5.76	523	3.08
Neuquén	9,152	8,292	90.60	674	7.36	186	2.03
Catamarca	7,155	6,445	90.08	397	5.55	313	4.37
La Rioja	5,218	4,676	89.61	320	6.13	222	4.25
Jujuy	11,190	9,803	87.61	765	6.84	622	5.56
Corrientes	14,310	12,306	86.00	1,385	9.68	619	4.33
La Pampa	6,536	5,543	84.81	662	10.13	331	5.06
Río Negro	11,235	9,364	83.35	1,411	12.56	460	4.09
San Juan	10,762	8,949	83.15	1,293	12.01	520	4.83
Santiago del Estero	12,268	10,163	82.84	1,475	12.02	630	5.14
San Luis	6,245	5,144	82.37	694	11.11	407	6.52
Santa Cruz	4,580	3,770	82.31	449	9.8	361	7.88
Chubut	7,348	6,043	82.24	851	11.58	454	6.18
Tierra del Fuego	2,052	1,684	82.07	230	11.21	138	6.73
Misiones	13,482	10,713	79.46	1,953	14.49	816	6.05
Mendoza	25,421	19,734	77.63	4,351	17.12	1,336	5.26
Entre Ríos	22,695	17,542	77.29	3,706	16.33	1,447	6.38
Salta	16,376	12,633	77.14	2,543	15.53	1,200	7.33
Tucumán	21,809	15,420	70.70	4,691	21.51	1,698	7.79
Santa Fe	50,694	34,678	68.41	13,016	25.68	3,000	5.92
Córdoba	50,441	33,142	65.70	13,755	27.27	3,544	7.03
Buenos Aires	196,491	125,814	64.03	55,995	28.5	14,682	7.47
Capital Federal	60,726	31,260	51.48	26,640	43.87	2,826	4.65

Source: MCyE 1996, p. 261.

Table 7: Percent of Females by Position, Title, and Education Level

Position/Level	Pre-School	Primary	Secondary
Rector/Vice-Rector (Principal/VP)	98.20	88.63	63.89
Preceptor	99.50	86.97	65.85
Profesor	n/a	n/a	68.33
Maestro (Teacher)	95.63	88.96	21.57
Title/Level	Pre-School	Primary	Secondary
Titular	97.07	90.90	67.54
Interino	94.36	83.11	63.26
Suplente	97.30	89.57	66.89
Other	92.66	85.80	67.67

Table 8: Primary School Teachers' Reports of Average Hours per Week Spent on Teaching and Non-Teaching Activities

	In the Teaching Workplace	Outside the Teaching Workplace	Paid Activities Unrelated to Teaching
Maestro (Teacher)	25.15	11.88	0.80

Table 9: Weekly Mean *Horas Cargo* and *Horas Cátedra* by Position for Public Secondary School Educators

	Horas Cargo	*Horas Cátedra*	% of all Educators in that Position
Profesor	2.5	12.2	74.1
Maestro (Teacher)	21.0	4.4	4.5

Table 10: Mean Years of Experience by Position and Level, with Percentage of Total Educators in the Position by Level

	Pre-School	%	Primary	%	Secondary	%
Rector/ Vice-Rector (Principal/VP)	18.62	11.5	20.13	8.1	19.84	2.4
Preceptor	14.14	8.5	12.22	1.0	11.14	9.1
Profesor	n/a		n/a		11.03	74.1
Maestro (Teacher)	8.19	72.9	9.95	82.0	11.49	4.5

Table 11: Educators' Earnings in Total Household Income

Educators report that their earnings in total household income...	Percent of Educators[9]
...are the only source	22.18
...are the main source	23.34
...are a complementary source	43.13
... do not contribute	6.54

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[9] The percentages do not add up to 100 because of missing reponses.

Table 12: Percent of Public School Educators Who Were On Leave During 4 or More Months of the School Year, by Position and Level[10]

Position/Level	Pre-School	Primary	Secondary
Rector/Vice-Rector (Principal/VP)	2.38	1.84	4.40
Preceptor	1.88	2.80	2.68
Profesor	N/a	n/a	3.04
Maestro (Teacher)	3.33	2.83	2.40

[10] We do not report the figures for private school educators here because they do not differ substantially from those for public school educators.

Table 13: Estimated Teacher Premia by Years of Experience in Gran Buenos Aires

Years of Experience	Females	Males
5	10.50%	15.74%
10	-0.68%	4.79%
15	-7.18%	-1.74%
20	-10.56%	-5.26%
25	-11.62%	-6.49%

Table 14: Estimated Teachers in Each Category of Relative Earnings

Category	Cities	Total Teachers[e]	Percent of All teachers[e]
Teachers' estimated earnings are *higher* than comparable workers	San Juan, San Miguel de Tucumán	32,571	5.50%
Teachers' estimated earnings are *lower* than comparable workers	Capital Federal, La Plata, Paraná	83,421	14.10%
Teachers' estimated earnings *differ* by experience relative to those of comparable workers	Gran Buenos Aires, Partidos de Buenos Aires, Río Gallegos	201,071	33.98%
Teachers' estimated earnings are (approximately) *equal* to comparable workers	Bahía Blanca, Comodoro-Rivadavia, Córdoba, Corrientes, Jujuy, La Pampa, La Rioja, Mar de Plata, Mendoza, Neuquén, Río Cuarto, Rosario, Salta, San Luis, Santa Fe	274,743	46.42%
	Total:	591,806	100.00%

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[e] We estimate the number and percentage of teachers in each category by extrapolating from the city to the Province. We use the absolute numbers of active teachers presented in Table 3 to make these estimates.

Table 15: Comparison of the variation in (natural log) hourly earnings between teachers and comparable workers in other occupations[11]

Ratio of Other Worker: Teacher Earnings	Experience	
	5 years	10 years
Variance	1.72	4.26
Coefficient of Variation	1.6	2.14

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[11] Comparing the observed variances in (log) hourly earnings of teachers and non-teachers can be tricky because their means differ and the size of the sub-sample of teachers is much smaller than that of non-teachers. Thus, we also compared the coefficient of variation of the (log) hourly earnings of both groups at different years of experience. The coefficient of variation can be a better measure of the variability of distributions that have different means. Our comparisons using this statistic strongly support the comparisons using simple variances. At five years of experience, we find that the coefficient of variation for non-teachers is more than 60 percent greater than that for teachers. At ten years of experience, the difference between the two coefficients of variation increases to 217 percent.

Table A1: Names and definitions of the variables used in our analyses

Variable Name	Definition
ln(hourly earnings)	Continuous variable representing the natural log of a worker's reported hourly earnings
Female	dichotomous variable that takes on the value 1 if the respondent is female and 0 if male
Secondary	dichotomous variable that takes on the value 1 if the respondent stated that he or she has completed secondary school
Technical	dichotomous variable that takes on the value 1 if the respondent stated that he or she has completed technical school
University	dichotomous variable that takes on the value 1 if the respondent stated that he or she has completed a university degree
Experience[12]	continuous variable representing potential work experience. It is constructed by subtracting years of education and 6 additional years from the respondent's age.[13]
Weekly Hours of Work[14]	average hours worked per week, as estimated by respondents[15]

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[12] Although the *EPH* does ask respondents about years of experience in their current occupation, their answers are grouped into categories. This categorization limits the possible variation in earnings due to experience, one of our key question variables. As a result, we decided to create a continuous variable representing experience.

[13] Given that the questionnaire asks about levels of education completed, instead of about years of education, we estimated years of education from the level of education completed. For example, if the individual had completed primary school only (or less than primary), we subtracted 13 years (7 + 6). Similarly, we subtracted 18 years (12+6) from age for individuals with complete secondary schooling, 20 years (14+6) from age for those with complete technical school, and 22 years (16+6) from age for those with an university degree.

[14] We follow Piras and Savedoff 1998 in including hours of work per week in our model.

[15] The responses regarding hours of work per week were also grouped by the survey into 7 discrete categories. We took median values of these categories and constructed a new variable representing weekly hours of work. Specifically,

If the original category was:	We substituted the following value:
1 = from 1 to 19 hours per week	10
2 = from 20 to 29 hours per week	25
3 = from 30 to 40 hours per week	35
4 = from 41 to 45 hours per week	43
5 = from 46 to 61 hours per week	53
6 = 62 or more hours per week	63
7 = did not work during the week	0

In all our analyses, we included observations with values greater than zero of weekly hours of work.

Table A2: Fitted Linear Regression Models of Ln Hourly Earnings on Worker Characteristics, by City (October 1997 *EPH* data)

	Gran Buenos Aires	Capital Federal	La Plata	Parana	Partidos de la Provincia Buenos Aires	Rio de Gallegos	San Juan	Tucuman
Intercept	1.129***	1.403***	1.058***	0.552***	1.098***	1.030***	0.550***	0.506***
	(0.042)	(0.085)	(0.068)	(0.101)	(0.049)	(0.083)	(0.080)	(0.086)
Female	-0.221***	-0.302***	-0.216***	-0.212***	-0.205***	-0.145***	-0.300***	-0.266***
	(0.021)	(0.040)	(0.034)	(0.048)	(0.025)	(0.034)	(0.040)	(0.044)
Secondary	0.570***	0.496***	0.371***	0.563***	0.531***	0.532***	0.572***	0.480***
	(0.024)	(0.047)	(0.038)	(0.054)	(0.029)	(0.039)	(0.046)	(0.052)
Technical	0.542***	0.489***	0.439***	0.552***	0.530***	0.681***	0.447***	0.477***
	(0.048)	(0.102)	(0.077)	(0.084)	(0.054)	(0.072)	(0.066)	(0.100)
University	1.160***	1.067***	0.881***	1.020***	1.061***	1.059***	1.166***	1.157***
	(0.031)	(0.051)	(0.045)	(0.067)	(0.046)	(0.056)	(0.059)	(0.065)
Experience	0.039***	0.033***	0.044***	0.052***	0.040***	0.061***	0.048***	0.042***
	(0.002)	(0.004)	(0.004)	(0.005)	(0.003)	(0.004)	(0.004)	(0.005)
Experience^2	-0.001***	-0.000***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***	-0.001***
	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)	(0.000)
Weekly Hours of Work	-0.015***	-0.016***	-0.014***	-0.013***	-0.016***	-0.015***	-0.013***	-0.011***
	(0.001)	(0.001)	(0.001)	(0.002)	(0.001)	(0.001)	(0.001)	(0.001)
Teacher	0.174	-0.290*	-0.144***	-0.171*	0.346*	0.401**	-0.023	0.208**
	(0.108)	(0.135	(0.056)	(0.080)	(0.142)	(0.145)	(0.101)	(0.077)
Female * Teacher		0.259~					0.242*	
		(0.156)					(0.121)	
Experience * Teacher	-0.034**				-0.050***	-0.038**		
	(0.010)				(0.013)	(0.014)		
Experience^2 * Teacher	0.001**				0.001**	0.001*		
	(0.000)				(0.000)	(0.000)		
R-squared	0.373	0.392	0.342	0.332	0.321	0.361	0.372	0.416
n	3834	1060	1173	746	2774	1381	1261	844

Standard errors in parentheses; * p-value < 0.05; ** p-value < 0.01; *** p-value < 0.001.

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Table A3: Estimated Coefficients on Educator Variable in Regressions for Cities where Teachers' Relative Earnings do not Appear Different from Those of Non-Teachers

City	Coefficient Estimate (Standard Error)	95% Confidence Interval		Total Sample	Teachers in Sample
Bahía Blanca	0.012 (0.096)	-0.176	0.200	654	53
Córdoba	-0.048 (0.073)	-0.191	0.095	1015	86
Corrientes	-0.056 (0.073)	-0.200	0.087	1130	101
Comodoro-Rivadavia	-0.137 (0.076)	-0.286	0.011	1037	78
Jujuy	0.130 (0.084)	-0.035	0.296	711	81
La Pampa	-0.041 (0.054)	-0.147	0.065	1356	131
La Rioja	0.145 (0.086)	-0.023	0.313	1773	164
Mar de Plata	-0.187 (0.108)	-0.398	0.025	634	48
Mendoza	0.112 (0.078)	-0.041	0.266	1169	92
Neuquén	0.064 (0.087)	-0.107	0.236	759	64
Río Cuarto	-0.140 (0.093)	-0.323	0.043	693	58
Rosario	0.004 (0.064)	-0.121	0.129	1153	78
Salta	-0.039 (0.059)	-0.155	0.077	1473	152
San Luis	-0.039 (0.059)	-0.154	0.077	1466	152
Santa Fe	0.005 (0.068)	-0.128	0.138	1076	118

Figure 1: Evolution of Teacher Salaries by Province, 1989-1997
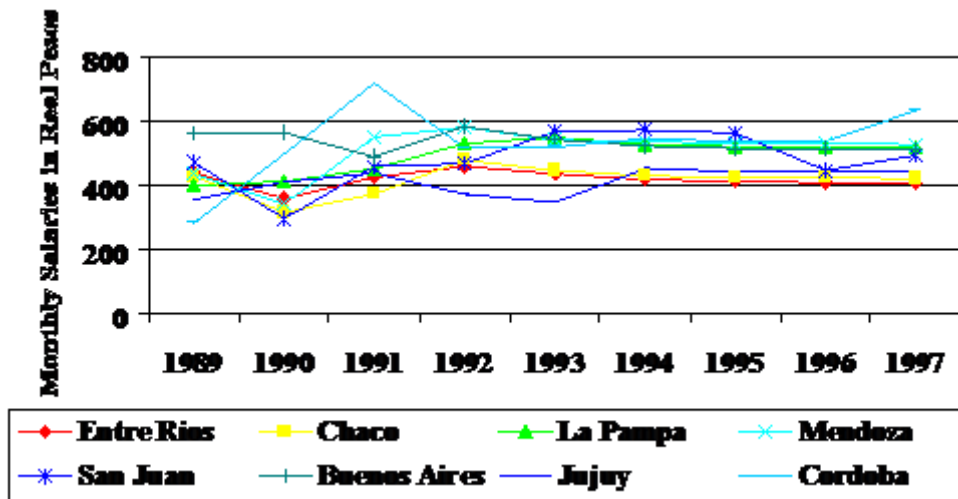
Source: Perotti 1997

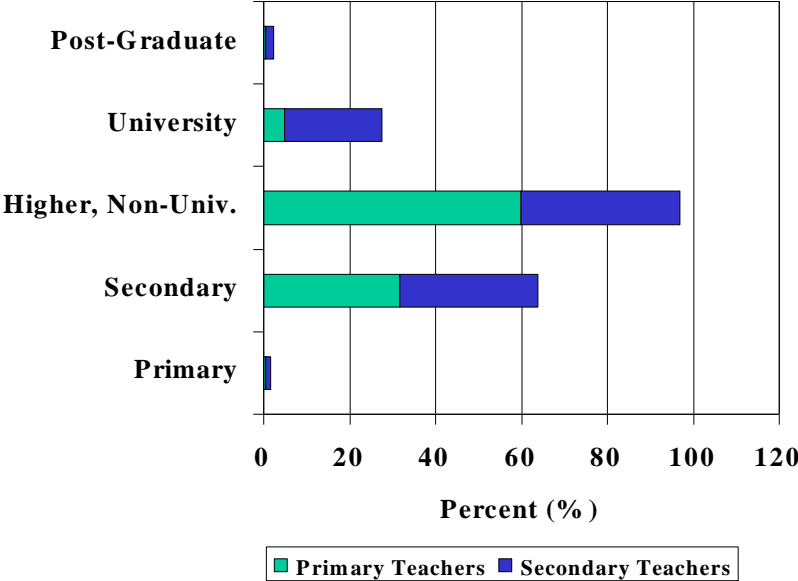Figure 2: Active Teachers by Highest Level of Education, National Level

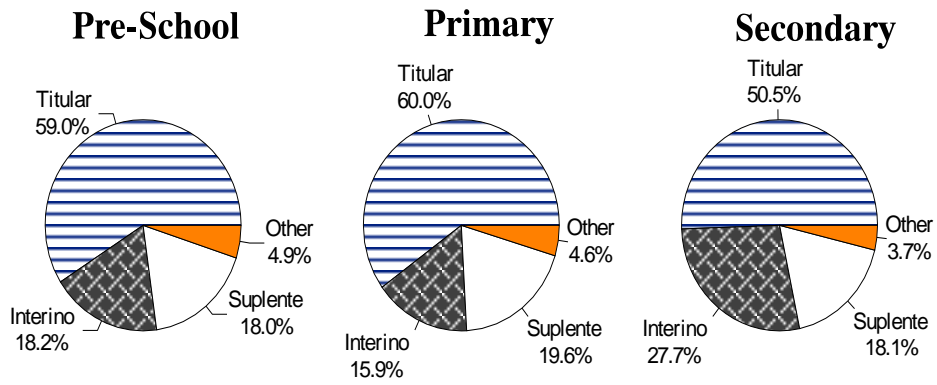Figure 3: Percent of Teachers (*Profesores* for Secondary) with each Title in Public Schools, by Level

Pre-School

Titular
59.0%

Other
4.9%

Suplente
18.0%

Interino
18.2%

Primary

Titular
60.0%

Other
4.6%

Suplente
19.6%

Interino
15.9%

Secondary

Titular
50.5%

Other
3.7%

Suplente
18.1%

Interino
27.7%

Figure 4: Prototypical Fitted Curves of Predicted (Ln) Hourly Earnings by Years of Experience for Teachers and Non-Teachers in San Juan, by Gender
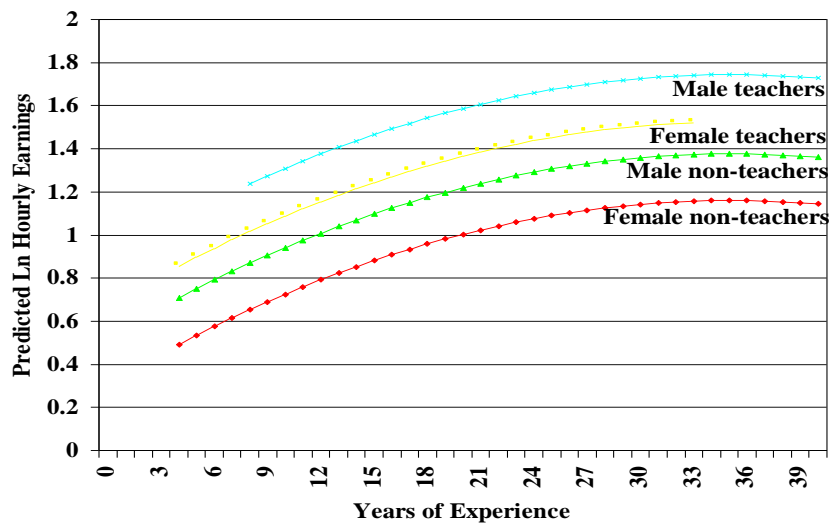
Figure 5: Prototypical Fitted Curves of Predicted (Ln) Hourly Earnings by Years of Experience for Teachers and Non-Teachers in La Plata, by Gender
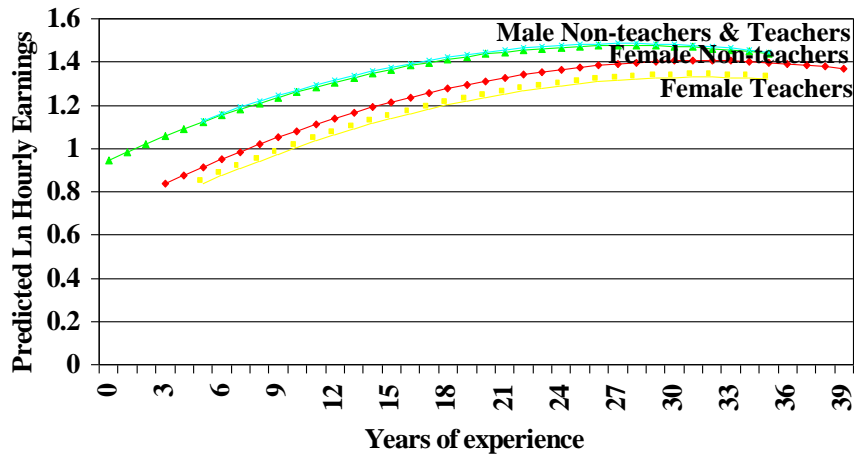
Figure 6: Prototypical Fitted Curves of Predicted (Ln) Hourly Earnings by Years of Experience for Teachers and Non-Teachers in Gran Buenos Aires, by Gender