



Inter-American Development Bank
Banco Interamericano de Desarrollo

Office of the Chief Economist
Working paper #375

How Much Do Teachers Earn?¹

BY

Claudia Piras* and William D. Savedoff

Office of the Chief Economist
Inter-American Development Bank

1300 New York Avenue, NW
Washington, DC 20577

Email Address: claudiapi@iadb.org and bills@iadb.org
responsible for correspondence

Banco Interamericano de Desarrollo
Oficina del Economista Jefe
Documentode Trabajo #375
July 1998

Abstract

In the continuing debate over how to improve education systems, many people argue that teachers salaries need to be increased. This paper seeks to establish a reliable method for analyzing the issue using household survey data from Bolivia. We break the question of **How much do teachers earn?** into three distinct parts. The first part shows that teachers' monthly incomes are less on average than the rest of the labor market, but that their hourly earnings are higher. Teachers earn more than they would in the private sector, but less than in other unionized public sector jobs. Next, we show that teachers are relatively well off in the overall distribution of income after accounting for other sources of income and life choices. The final section discusses the implications of these findings for policies to improve recruitment, retention, and motivation of high quality teachers.

JEL classification: I20; J31

Keywords: Teacher salaries; Salary wage differentials; Costs

Acknowledgements

This paper benefitted from data and reports that were provided by the IDB's Social Programs and Sustainable Development Department. We would also like to acknowledge the continuing interest, suggestions, and support of Ruthanne Deutsch, Marcelo Cabrol, Alejandro Grisanti, Carlos Herran and other colleagues who participated in our workshops, as well as the thoughtful comments of Paul Schultz and Andrew Morrison.

© 1998

Inter-American Development Bank
1300 New York Avenue, N.W.
Washington, D.C. 20577

The views and interpretations in this document are those of the authors and should not be attributed to the Inter-American Development Bank, or to any individual acting on its behalf.

The Office of the Chief Economist (OCE) publishes working paper series and books, on diverse economic issues. To obtain a complete list of OCE publications, and to read or download them, please visit our Web Site at:
<http://www.iadb.org/oce/32.htm>

1. Introduction

The payroll for teachers in Latin America's education systems generally represents more than 90% of the public education budget. Despite this, relatively little is known about how much teachers are paid or how their actual earnings affect recruitment, motivation, and retention of qualified personnel. This ignorance is not an accident. The ministries of education in the region have few incentives to collect accurate information on staff pay and its effects because such information is irrelevant to the actual process of budgeting and financial management. As a result, numerous and apparently conflicting claims are made in the political debates surrounding education. It is common to hear unions and politicians attributing the poor performance of the school systems to wages that are too low. *There are two great lies*—Bolivia's President Gonzalez Sanchez de Lozada has said about teachers in his country. *We say we pay them, and they say they work*.² But to inform these policy discussions, it is not clear what the appropriate wage level should be. Wages are *too low*—compared to what?

Wage levels can be compared to government-set minimum wages, to so-called *living wages*—and even to past earnings levels. However, to understand the impact of wages on recruitment, motivation, and retention, the relevant standard is the income of people in other occupations with comparable personal characteristics (e.g. education, age, experience).³ If we are interested in discussing the implications of teachers' salaries for education, we must pay attention to the opportunity costs that people face in the labor market. By looking at the operation of the labor market we can get an understanding of who may be attracted to a particular profession, what incentives they have to perform on the job, and whether they will stay.

The most common studies of teachers' earnings simply report the pay scale of the education ministries. These pay scales are of little use to the required analysis because the ministries are frequently incapable of reporting how many teachers are at each pay level, let alone providing information on the characteristics of the teachers in each category. It is also difficult to control for the differences in hours actually worked, or to consider the effects of benefits and other sources of income that also have an impact on an individual's career choice. The most recent effort of this kind is Carnoy (1997) which uses UNESCO data on teachers earnings to make cross-country comparisons.

Several studies have sought to get a better picture of how much teachers are paid relative to some relevant reference group, but very few of them have tried to answer it doing specific analyses within a specific country's labor markets. An ILO (1991) study on teachers compares their income in 1982 and 1985 with those of other occupations in seven Latin American cities, but could not properly adjust for differences in the characteristics of teachers and other workers. More recently, a paper by Psacharopoulos *et al.* (1996) looked at this same issue using data from 12 Latin American countries in 1989. In this case, the analysis was done based on the mean earnings ratio of teachers and a comparison group, consisting of public and private sector employees above 15 years of age, excluding agricultural workers. The results showed great variability among the countries studied, with no clear pattern of over or under payment across the region.⁴ The evidence is suggestive but imprecise since the study only controlled fully for individual differences between teachers and other employers in its analysis of household survey data from Chile. In that country teachers wages were higher on average than non-agricultural employees, but much of this difference could be attributed to the teachers'

higher levels of schooling. Another study which used household survey data, Mulcahi-Dunn and Arcia (1996), demonstrated that in Ecuador, although entry level wages are low, the majority of teachers are squarely in the middle class. Furthermore, they found that teachers are compensated as well as other professionals in the labor market who have similar characteristics (namely gender, location, education and years of experience).⁵

This paper builds on these prior studies by analyzing how much teachers earn in Bolivia using standard and accepted methods of labor market analysis. It breaks the question of "How much do teachers earn?" into three distinct parts. The first part is descriptive, comparing teachers to the rest of the population in terms of their average earnings and personal characteristics. The second part focuses on whether teachers are paid what they "deserve" in the labor market by estimating econometrically the returns to personal characteristics; decomposing the earnings differences between teachers and the rest of the labor market; and by comparing non-monetary benefits. The third part goes beyond teachers' hourly earnings to incorporate other sources of income and life choices (i.e. second jobs, hours worked, second wage earners). It asks whether the decision to become a teacher implies accepting lower total income, relative to other households, as a consequence of associated life choices.

2. Teachers in Context: Descriptive Statistics

The data used in this study come from the 1993 household survey of Bolivia conducted by the Instituto Nacional de Estadística, known as the *Encuesta Integrada de Hogares, 8va. Ronda*. The survey covers 4,140 households and contains 19,433 individual observations. The geographical coverage is restricted to urban population and includes the capital cities of each of the 9 Bolivian departments. The size of the subsample used for this study can be seen in Table 1. The first row shows the total number of observations in the sample and subsamples. The second line refers to the number of observations with no missing variables, which were used in the econometric analysis. "Income earners" are defined as individuals who reported positive earnings; while "teachers" are defined as individuals who reported teaching in primary or secondary schools as their primary occupation.

In terms of the measurement of income, the data from the *Encuesta Integrada de Hogares* provides information on income from the primary job, secondary job, other sources of income (interest, pension, etc.), non-monetary benefits associated with the job and hours worked in each job. We also have detailed information about the salary structure and non-monetary benefits of teachers in Bolivia, which we used as a complementary source.

Are teachers different from the rest of the population, or more specifically, from the rest of the income earners? The data from the *Encuesta Integrada de Hogares* contains information on several personal characteristics, such as age, gender, ethnic origin, family size, as well as life choices made by individuals, such as occupation, years of schooling, sector of activity, union affiliation, regional location, etc. All the variables have a standard definition, except the variable "Region", which the survey defines as whether the worker lives in the capital cities of the three more prosperous departments in Bolivia: La Paz, Cochabamba and Santa Cruz, or not. The mean values for those

variables are listed in Table 2, disaggregated between income earners who are teachers and those who are not. The means presented in Table 2 are calculated using only the data from those individuals for whom there was complete information regarding all of the variables used in the analysis.

In comparison with income earners who are not teachers, teachers are almost twice as likely to be female, are about two years older than the rest of the income-earning population, and are less likely to be of indigenous origin. They have almost twice as many years of schooling, and a significantly higher proportion of them are public sector employees and union members. However, in terms of their family size and geographical location they do not differ significantly from the rest of the labor force.⁶ It should be noted that the education variable is truncated at 16 years; also, average education may be higher than most people expect for Bolivia, but this is due to restricting the sample to urban populations with positive earnings.

Depending on the measure of income, there are apparently different answers to the question posed by the title of this paper. Clearly, the average hourly wage in the individual's primary job is higher for teachers than for other income earners ¢ Bs.4.40 per hour compared to Bs.3.40 per hour. However, total monthly income from the individual's primary job is significantly lower for teachers ¢ Bs.387 per month compared to Bs.580 per month. This apparent contradiction is due to the differences in hours worked. Teachers work, on average, less than half as many hours as other workers ¢ 96 hours per month compared to 199 hours per month for non-teachers.

To further complicate matters, career choices and hours worked are affected by life choices related to household formation. The monthly *household* income of teachers is almost 16% higher than other income earners even though, *as individuals*, they work fewer hours and have lower monthly *individual* incomes. Teachers, then, tend to be in households with more than one wage earner or source of income. The high share of teachers who are women, in an economy where women's participation in the monetary economy is still relatively low, may explain a large part of this higher monthly household income.

3. Are teachers overpaid or underpaid?

In this section, we assess whether teachers are overpaid or underpaid in the labor market, taking into account the individual characteristics of workers, the decisions that influence their earnings, and the number of hours worked. In order to address this question, we start by estimating a Mincerian earnings function for the total sample of income earners separating estimates for teachers and non-teachers so as to understand better the differences in wage determination. This method allows us to compare teachers earnings relative to other income earners, controlling for personal characteristics which are generally associated with differences in earnings. At the end of the section we analyze the effect of non-monetary benefits on labor market behavior.

Earnings differences: controlling for individual characteristics

Analyses of labor market behavior tend to focus on hourly earnings as the appropriate measure of an individual's earning power. This analysis uses the individual's primary hourly earnings as the

dependent variable because it is an appropriate unit of Awork_i .⁷ Teachers in most countries work fewer hours than other income earners, and Bolivia is no exception. For this reason, it is important to correct the analysis for the difference in hours worked. It is also important because the number of hours worked can be viewed as an endogenous factor, a choice by the individual which varies by both their earnings opportunities and their preferences. Although the case can be made that sometimes individuals face restrictions on the amount of hours they can work, in practice there are numerous ways that individuals can overcome such restrictions. Teachers can take on a second teaching job, or other kind of secondary occupation, to increase their monthly earnings, even if their primary teaching post does not allow them to expand their hours.

The explanatory variables which were used include the number of years of schooling, the years of labor market experience (defined as $\text{Age} - \text{years of schooling} - 6$), and experience squared. Dummy variables were introduced to control for differences which can be attributed to gender; indigenous origin; the regional location of the worker (defined as 1 for the three more prosperous departments in Bolivia: La Paz, Cochabamba and Santa Cruz, and 0 for the rest); marital status; public sector employees; and union membership. Equation (1) shows the wage equation which was estimated for the entire sample of income earners.

$$\ln(W/hr)_i = \alpha + \beta_N N X_i + \beta_T T X_i + v_i \quad (1)$$

where W/hr represents the hourly earnings in the primary job, β represents the vector of estimated regression coefficients, and X represents the vector of personal endowments and job characteristics, such as schooling, experience, gender, marital status, indigenous origin, regional location, public employment and union affiliation. The subscripts T and N indicate teachers and non-teachers, respectively; while i represents the particular individual and v the error term. Dummy variables T , N were introduced to distinguish teachers from non-teachers, where $T = 1$ if the individual is a teacher and 0 otherwise, and $N = 1$ if the individual is a non-teacher and 0 otherwise. Equation (1) collapses to a simple earnings equation for teachers because the second term is 0, while for non-teachers, the third term is 0.

The OLS estimates for this earnings equation can be found in Table 3. It shows how returns to different factors vary between the teacher and non-teacher populations. Standard tests were applied to determine whether these mean differences were statistically significant.

The estimation for non-teachers, which can be identified with the labor market as a whole, confirms that there are significant and positive returns to schooling and experience in Bolivia. For non-teachers, gender has quite a large impact on earnings, with an advantage of 33% in earnings simply for being a male. Given the higher ratio of women among teachers than in the rest of the labor market, such an important difference in the returns between men and women would be expected to have a significant impact on the earning profile of teachers.

Among non-teachers, indigenous origin has a negative coefficient, suggesting that indigenous workers face discrimination in the labor market which gives them earnings which are, on average, 21% below those of non-indigenous workers. Marital status is also included in the model.⁸ Our finding is that among non-teachers being married has a positive impact on income, a married worker earns 13%

more than a non-married one.

Another important characteristic in the earnings equation is the geographic location of the worker. On average, a non-teacher living in the area near Bolivia's three big economic centers (La Paz, Santa Cruz and Cochabamba) will earn 30% more than in other regions of the country. Such differential can be an endogenous result, because people with higher ability and greater earning power are more likely to move to more prosperous locations. An alternative explanation for the difference in nominal earnings across regions is that they compensate for differences in the cost of living. In such a case, the regional difference is only nominal and not *Real*.⁹ The exact interpretation of this coefficient is not critical to the purpose of understanding teachers' earnings; however, it is important to control for these differences regardless of whether they are caused by endogeneity, differences in the regional labor markets, or compensating differentials.

The last two dummy variables δ public employees and union membership δ are very important for the analysis. The dummy variable for public employee workers among non-teachers shows a positive sign, with a difference of 19% in favor of those working for the government. Union affiliation for non-teachers also proves to have a positive and significant impact on earnings, more than 15%.

Earnings differentials: Do teachers have different earnings profiles?

In the previous section, we discussed the returns to personal and job features for non-teachers, which characterizes the behavior of the labor market as a whole. The additional terms in the equation for teachers only allows us to test the significance of the differences in earnings and decompose the earnings differentials between the share which can be attributed to differences in characteristics and to differences in returns to those characteristics. Essentially, this method allows us to test for and estimate the differences in the earnings structures of each group.¹⁰

The first thing to note is that teachers have a slightly lower return on years of schooling than other workers, with less than 8% for an additional year of schooling compared to more than 10% for non-teachers. Teachers also realize gains of 3.5% in wages for the first year of experience which is similar, but somewhat less, than the 4.2% return to experience for non-teachers. Nevertheless, these mean differences were not statistically significant at the 10% level and suggest that the labor market may be in a rough equilibrium in terms of the returns to education and experience.

By contrast, the coefficients for gender, ethnicity, marital status and region reveal significant differences between the groups with regard to wages. As reported in the previous section, non-teachers who are male earn 33% more than women, and those of indigenous origin earn 21% less than non-indigenous people. However, such variables are not statistically significant among teachers, suggesting greater gender and ethnic equality in the public sector. Similarly, marital status has a significant impact on the earnings of non-teachers -- with married workers earning 13% more than non-married individuals -- but does not affect the salaries of teachers. Unlike these other variables, regional location does affect the earnings of both teachers and non-teachers. Working in any of the 3 departments of Bolivia where most of the economic activity is concentrated has a positive impact on earnings. However, the premium associated with location is only 13% among teachers compared to 30% among non-teachers. Given that the government is the most important employer in the

education market, and that wage determination is more rule-bound, it makes sense that gender, race, marital status and location play a relatively insignificant role in distinguishing earnings among teachers. Negotiations between the teachers union and the government have explicitly set out to eliminate differences in earnings, and these findings are consistent with the information we have regarding the characteristics that are taken into account in the public teachers= salary schedule (*escalafón docente*). The difference between coefficients for gender, indigenous origin and regional location are significant at the 0.10 level.

The last two variables, whether the job is in the public sector and whether the individual is a union member, have strongly different effects on teachers and non-teachers. While being in the public sector increases earnings by 19% for non-teachers, it reduces income by 17% for teachers. This means that among teachers, those who work in private schools have an advantage in terms of wages per hour over those working in the public sector after controlling for other factors. This difference between coefficients is significant at the 0.05 level.

Finally, union affiliation influences the salaries of non-teachers, who earn 16% more if they belong to a union, but it does not appear to affect teachers= earnings. This unusual result can be explained by the nature of the negotiating process that takes place between the government and the teachers union, and ends in a sole contract that determines the wages of all teachers working in the public system regardless of their individual union status.

It is apparent that teachers do have different earnings profiles than non-teachers. The main difference seems to be the consequence of wage setting in the public sector, where most teachers are concentrated. Whereas gender, ethnicity, and marital status, all have large impacts on earnings among non-teachers, these factors do not enter public sector wage scales and are thereby attenuated in their effects. With regard to geographic location, the public sector tends to compress differentials across regions in Bolivia as in other countries; hence, the lower coefficient on geographic location for teachers than for non-teachers. However, the constant term is much higher for teachers than non-teachers. This level difference between the two groups more than compensates for the lower coefficients on the individual characteristics. In other words, the earnings profile for teachers starts out higher, but has a flatter slope.

The coefficients on being in the public sector and union membership reinforce the conclusions above that teachers are paid above the market largely as a consequence of being in the public sector and being unionized. However, they may perceive that they are less well paid if they compare themselves to other public sector, unionized, employees.

The other dissimilarities in the earnings profile do not suggest major differences in the way teachers are compensated in the labor market. Their returns to experience and schooling are statistically similar to non-teachers.

Earnings Differentials: Decomposing the Difference

The previous section proved there are differences in the earning profiles of teachers and non-teachers. Our aim in this section is to undertake an analysis of wage differentials by placing a dollar value on the advantage or disadvantage of being a teacher. In order to do this, this section employs the technique suggested by Oaxaca (1973), which has been used extensively in the literature on gender

differentials, as an alternative method to measure discrimination. The mean difference in log earnings between teachers and non-teachers is decomposed into the shares that can be attributed to differences in characteristics and shares related to differences in returns to those characteristics.

The difference between non-teachers and teachers earnings is represented by equation (2), to which the term $\beta_N X_T$ is added and subtracted. This additional term can be interpreted as the mean earnings teachers would receive if they had the earnings of non-teachers.

$$\text{Ln}(W_T/\text{hr}) - \text{Ln}(W_N/\text{hr}) = \beta_T X_T - \beta_N X_N + \beta_N X_T - \beta_N X_T \quad (2)$$

By grouping terms we get equation (3), which is known as the traditional Oaxaca decomposition equation.

$$\text{Ln}(W_T/\text{hr}) - \text{Ln}(W_N/\text{hr}) = \beta_N (X_T - X_N) + (\beta_T - \beta_N) X_T \quad (3)$$

The left-hand side of equation (3) is the difference between teachers earnings and non-teachers earnings market as predicted by the regression model. The first term on the right-hand side shows the portion of the predicted earnings gap which is explained by the difference in the characteristics of teachers and non-teachers, such as years of schooling, age, and location evaluated at the beta weights estimated for the non-teacher sample wage function. In effect, it asks the question: what would be the difference in earnings of teachers and non-teachers purely as a consequence of their different characteristics? Thus, for example, if the higher educational attainment of teachers was the explanation for their higher than average earnings, it would all be accounted for in this first right-hand term.

The second term on the right-hand side of equation (3) shows the fraction of the wage differences that are explained by factors *other* than the differences in mean characteristics and which are captured by different returns to those factors. It corresponds to asking the question: how much more do individuals with the average characteristics of a teacher earn compared to what they would earn if their characteristics were compensated at the rate prevailing in the rest of the labor market. If teachers had the same characteristics as non-teachers, but were compensated less per year of schooling or experience, then this second right-hand term would fully account for the average wage difference.

One further modification to equation (3) allows us to make an important distinction between factors which are related to the job (public sector, unionized) and those which are specifically related to the individual (age, schooling, etc.). The vector of characteristics, X , can be partitioned into X^j (with the two variables for public sector and unionized) and X^p (with all of the remaining variables). Similarly, β can be rewritten as β^j and β^p for the corresponding coefficients. The first right-hand term in equation (3) is then split into two parts \mathfrak{C} one for the share of the wage difference which can be attributed to differences in *personal* characteristics and a second for the share attributable to differences in *job* characteristics. The resulting equation and results are:

$$\text{Ln}(W_T/\text{hr}) - \text{Ln}(W_N/\text{hr}) = \beta_N^p (X_T^p - X_N^p) + \beta_N^j (X_T^j - X_N^j) + (\beta_T - \beta_N) X_T \quad (4)$$

$$0.70 = 0.60 + 0.24 - 0.14$$

Equation (4) shows the results of applying the decomposition analysis to the Bolivian data. It shows that the total differential in the log of hourly earnings between teachers and non-teachers is 0.70. Subtracting the first term is equivalent to saying that if teachers had the same *personal* characteristics as non-teachers (particularly lower levels of schooling) they would still have an advantage of about 0.10. In other words, after controlling for age, sex, schooling, region, ethnicity, and marital status, teachers still earn about 10% more than non-teachers.¹¹ Over three-quarters of teachers are unionized and employed in the public sector. This also gives them an advantage over the majority of non-teachers. However, if we control for their higher concentration in public and unionized employment (subtracting an additional 0.24), we find that teachers would earn less than non-teachers by a factor of 0.14 if they did not have the advantages of being unionized and in the public sector.

These estimates demonstrate two important factors in the determination of teachers earnings. First, it demonstrates the importance that is played by being in the public sector and being unionized. Second, it shows that if teachers were to seek alternative employment in the labor market, on average they would earn about 10% less. Therefore, we can conclude that *Bolivian teachers in 1993 were being remunerated above the private market, given their personal attributes.*

Earnings Differentials: Do non-monetary benefits make a difference?

Since wages are only part of the total compensation that workers receive in their job, we extend the analysis to investigate other benefits to which workers are entitled. The higher earnings of teachers could be compensation for lower benefits such as pensions, health plans, or in-kind compensation. This hypothesis can be tested in the same information base utilizing data about non-monetary benefits. Table 4 presents the results of the survey. The evidence shows that teachers actually are more likely to receive non-monetary benefits than other workers, particularly the *aguinaldo*¹² and social security.

Higher earnings could also be compensation for other job characteristics such as job instability and fewer vacations. However, in the case of Bolivia, teachers cannot be laid off or removed from their job unless they commit a very serious fault or crime, giving the occupation a quasi-permanent status. Teachers also receive vacations which are more than twice that of most occupations in the Bolivian labor market. Although these are not all of the non-monetary factors which affect working conditions and benefits, they suggest that the teachers higher wages are not offset by non-monetary factors.

Some examples of earnings for different profiles

As a complement to the previous discussion of earning differentials we estimated the log of hourly earnings for different sets of personal and job characteristics. In Table 5, we apply the estimated coefficients from equation (1) to particular combinations of years of schooling, age and gender, as well as occupation, public employment and union affiliation. This analysis allow us to compare the predicted earnings differences for different categories of people rather than at the *mean* as decomposed above. The differences show what a person with a given set of personal attributes would be earning if he or she chose to be a teacher rather than some other occupation, chose to work in the public rather than the private sector, or belonged to a union or not. By this means, we can identify the order of preferences for a given type of person for different kinds of jobs based on

predicted earnings. For example, a 25 year old male with 14 years of schooling would rank his job alternatives in terms of earnings as follows: 1) a non-teacher in the unionized public sector 2) a teacher in the non-unionized private sector, 3) a teacher in the unionized public sector , and lastly 4) a non-teacher in the non-unionized private sector.

In order to study the role of education in earnings we computed the same estimates for people with 14 and 16 years of schooling. The first thing to notice is that the order of preferences is the same for both levels of education. A second issue is that 2 years of education don't make a big difference to the amount of earnings, particularly when compared to other dimensions, such as age and gender. The returns for increasing two additional years of schooling, from 14 to 16 years, are about 10%.

The second variable that we analyzed is age. We compared the potential earnings of people at 25 years of age to those who are 50. The order of preferences does change between age groups due to the lower returns to experience that the teaching profession pays. While teaching may be an attractive occupation for a 25 year old (mostly in the private sector), it loses its economic appeal for a 50 year old. However, in absolute terms, there is a significant difference in the amounts earned by individuals of different age groups, with older teachers earning about 36% more than younger ones, and older workers in the private sector making 76% more than younger ones of the same profile.

Finally, we consider gender. There is a large difference between the earnings of male and female workers. Because of this significant discrimination in the labor market (on the order of 30%), the fact that the public sector offers teachers similar pay regardless of their gender makes these jobs attractive to women but of less interest to men -- who have better-paying alternatives in the labor market. This results in a clear difference in the order of preferences between gender groups.

Earnings Differentials: Summary

After carefully reviewing the determinants of hourly wages, we can state that teachers in Bolivia earn more on average than workers with similar characteristics in the private labor market. Being a teacher in the public sector assures a significantly higher level of hourly earnings than for people with comparable education, experience, location, gender, marital status, and ethnicity. Non-monetary benefits and working conditions do not seem to explain this wage premium because they tend to reinforce the advantage enjoyed by teachers. To answer how much teachers earn, we can see that they earn well compared to the market; however, they are not compensated as well as other public sector employees.

4. How do teachers' welfare compare with other working groups?

Thus far, we have looked at teachers hourly earnings to evaluate their opportunity costs in the labor market, taking into account personal and job characteristics that affect income, as well as non-monetary benefits. In this section we ask the question **How much do teachers earn?** in a different way. Rather than evaluating teachers' earnings relative to the labor market, which focus on *hourly* earnings, we look at two related measures of *monthly income* that can be associated with teachers' welfare. First, we want to address the question of whether teachers' total income is below that of

other groups, and the extent to which this may be explained by the proportion of workers that take second jobs. Second, we discuss the income distribution of teachers as parts of households relative to the population as a whole.

Second jobs are not the norm for teachers

Table 6 shows the average total income of workers with only one source of income (primary job) and of those with more than one source of income. It also presents the proportion of workers in each category. About half of those surveyed have more than one source of income, and this percentage is not significantly different for those living in the three more prosperous departments of Bolivia, for the indigenous population, or for those affiliated with a union. By contrast, a somewhat higher percentage of female workers (58%) tend to have more than one income, compared to men (40%).

Perhaps the most interesting finding is that only 18% of public employees have second sources of income, and among teachers, only 24% of them do. There are two possible explanations for this difference. The first one is that there might be legal constraints for most public employees, and therefore for most teachers, to have a secondary job on top of the one they hold as civil servants. The other alternative is that public employees and teachers choose not to have more than one job. These results are quite revealing, given the general perception that almost every teacher is *forced* to have more than one job in order to make ends meet.

Another significant difference between groups is that teachers, as well as public employees in general, duplicate their total average income when they have more than one income source. Meanwhile, other workers attain a more moderate increase of between 19% and 50%. While only a small percentage of teachers decide to take a secondary job, being able to earn such a significant marginal income must mean that teachers place a high value on their free time. This behavior is consistent with the notion that many of the teachers are women, living in households with another wage earner. In many cases, they may decide to take on the teaching profession because of its relatively short schedule, which allows them to spend more time with their family.

When we compare the hourly income in the primary job of those teachers with only one source of income to those teachers that take a second job, we find that the first group earns Bs. 4.16 per hour, while the second group earns Bs. 5.13. Therefore, it does not appear that teachers are *forced* into lower paying secondary jobs in order to complement their salaries. Rather, those that take second jobs are finding more remunerative opportunities in these alternative occupations.

Teachers are doing well compared to the distribution of income

The last question we want to answer is how teachers stand in relation to the overall distribution of income. For that purpose we first look at the distribution of individuals by total income per month. As Table 7 shows teachers' monthly incomes have a roughly normal distribution which is centered around the middle of the national distribution. Some 57% of teachers are located in the first 5 deciles while 90% of teachers are in the middle six deciles (3 through 8). Average monthly income for teachers is lower than for the average income earner, Bs. 472 compared to Bs. 709, because they work fewer hours, but the median is practically the same. In conclusion, teachers tend to be close

to the center of the income distribution of workers.

However, the income distribution of teachers' households shows quite different results. The distribution of monthly household income for teachers is skewed to the right. Households with teachers seem to be in a better economic position than most other households in Bolivia. In those households where there is a teacher, 42% of them belong to the top 3 deciles, that is, total household income is higher than for 70% of all households. Both the mean and the median are above the mean and median of all households, which may be explained by the higher percentage of working women in families with two earners.

Overall, the argument that teachers are so badly paid that they cannot maintain a decent standard of living does not bear scrutiny. Teachers' hourly wages are comparable to or above what they can earn in the labor market. Teachers who extend their working hours with second jobs earn incomes that are comparable to or above non-teachers. In other cases, teachers' consumption possibilities are maintained by the existence of other household sources of income.

6. Conclusions

This paper has demonstrated that there are several ways to answer the question **A**How much do teachers earn?**@** Each answer has different implications for the political debate over teachers' compensation.

he first answer is that teachers' hourly earnings in Bolivia are comparable or better than similar employees in other occupations. *On average, after controlling for a variety of factors, the 3/4 of teachers who are unionized and employed in the public sector earn 10% more than workers with comparable characteristics who are in non-public sector occupations. Non-monetary benefits and job stability appear to reinforce this advantage for teachers. This premium should help recruit, motivate, and retain more qualified individuals in the profession.* Since this survey, the Bolivian government has been raising teachers' salaries above the rate of other public employees. If this policy has been effective, teachers' wage advantage may be even higher today.

Another feature of teachers' earnings that should improve motivation and retention is that factors which are not related to productivity -- such as gender, ethnicity, and location -- play a relatively insignificant role in the determination of wages, compared to non-teachers. On the other hand, the reliance on limited rule-bound factors in determining promotion and wages may also discourage capable individuals who can be more productive in ways that are not recognized by centralized or bureaucratic processes.

In comparison with other occupations in the unionized public sector, however, teachers' pay is relatively low. Morale, motivation, and retention may be negatively affected when teachers compare their compensation to other professions in the public sector. However, this may not be the appropriate standard for evaluating human resource policies in the education sector. It may simply be an indication of a need for civil service reform, more generally.

As for the welfare implications of teacher compensation, there is little evidence that teachers are being relegated to the lower income deciles. Teachers' monthly income is concentrated in the middle deciles of the individual income distribution; whereas 69% of them are concentrated in the top 5

deciles by monthly household income. Therefore, the restriction on hours worked in teaching does not seem to limit those who seek to complement their earnings, while others may be attracted to the profession specifically for its lower demand on time.

It is hoped that similar studies can be conducted on teachers' earnings in other countries of Latin America so that we can learn more about the determinants of teachers' pay. Such studies will not only provide information for public debates over education, but also serve as an instrument for better human resource management by public officials responsible for hiring teachers. In particular, this study has important implications for teacher recruitment on the one hand, and for motivating and retaining good teachers on the other.

The implications for teacher recruitment are varied. First, the current pay structure for teachers attracts women because it does not generate the kinds of discrimination they face in occupations in the private sector. Second, the current system attracts those who are interested in part time work (such as women who, for cultural reasons, are expected to assume a greater share of family responsibilities). Third, it attracts those who prefer job stability and secure benefits. Without more detailed studies, it is only possible to speculate about the effects of these pay schedules in terms of unobserved characteristics, such as dedication, innovation, and productivity. For example, the rigidity of the remuneration formulas in the teachers' contracts may discourage people who are willing to take greater risks or who might be more productive and want to get remunerated according to performance rather than tenure.

In terms of motivation and retention, the story is very similar. Women will continue to prefer teaching to alternative employment in the private sector. However, for men the story differs since private sector employment becomes more attractive as they age. Another issue affecting morale and retention relates to the reference group used by teachers. If they compare themselves to the private sector, they may feel well paid. However, if they compare themselves to other unionized public sector workers, they are going to feel disadvantaged and discouraged. Finally, the rigidity of the teachers contracts leaves little room for recognizing teacher performance, so those who see less effective teachers receiving comparable pay increases simply because of their time in the job may become discouraged.

The debate over teachers earnings is important toward improving the education system in Bolivia as elsewhere. If the goal is to improve the pool of teachers, increasing pay uniformly will not necessarily be effective. Rather, recruitment, motivation and retention of good teachers must rely upon substantive evaluations of how much teachers actually earn, what their alternatives are in the labor market, and how the structure of contracts attracts or discourages qualified and productive individuals. It requires a reevaluation of the role of job stability and benefits, possibilities of recognizing individual performance (monetarily or in other ways), and whether the part-time nature of the contract should be retained or modified. Once the question "How much do teachers earn?" is carefully addressed in its various meanings, this complex task will be easier to manage.

Tables

Figure 1: Description of the Data (observations)

| | Total Survey | Income Earners | Teachers |
|-----------------------------|--------------|----------------|----------|
| N in sample | 19,433 | 7,499 | 299 |
| N with no missing variables | 16,275 | 6,420 | 298 |

Figure 2: Mean Sample Characteristics

| | Income Earners | |
|-----------------------------------|----------------|----------|
| | Non-Teachers | Teachers |
| Male | 0.59 | 0.31 |
| Age | 35.7 | 38.1 |
| Family size | 5.4 | 5.1 |
| Schooling | 8.6 | 15.4 |
| Indigenous | 0.52 | 0.45 |
| Married | 0.63 | 0.73 |
| Region | 0.61 | 0.58 |
| Public administration | 0.10 | 0.89 |
| Union membership | 0.21 | 0.77 |
| Primary Income (Bs/hour) | 3.4 | 4.4 |
| Primary Income (Bs/month) | 580.3 | 387.2 |
| # of hours/month | 198.8 | 95.6 |
| Total Household Income (Bs/month) | 1,316.7 | 1,524.3 |

Figure 3: Determinants of Earnings in Bolivia, 1993

| Variable | Teacher | Non-Teacher |
|-------------|--------------------|----------------------|
| Schooling | 0.0789** (2.61) | 0.1022** (40.61) |
| Exper | 0.0353* (1.94) | 0.0424** (18.03) |
| Expersq | -0.0006 (1.16) | -0.0005** (13.18) |
| Male # | -0.049 (0.50) | 0.3326** (16.02) |
| Indig # | -0.0029 (0.03) | -0.2079** (10.01) |
| Married | 0.0046 (0.04) | 0.1275** (5.30) |
| Region # | 0.1343 (1.47) | 0.2988** (14.81) |
| Public # | -0.1696 (1.10) | 0.1930** (5.66) |
| Union | 0.0449 (0.39) | 0.1608** (6.38) |
| Constant | 0.9704* (2.11) | -1.1485** (29.78) |
| Adjusted R2 | 0.41 | |
| N | 6420 | |

Source: Instituto Nacional de Estadística (1993)

* significant at the 95% level. ** significant at the 99% level

differences between coefficients significant at the 10% level

T-stat in parenthesis

Teacher coefficients report the sum of Bt and Bn

Figure 4
Non-monetary Benefits

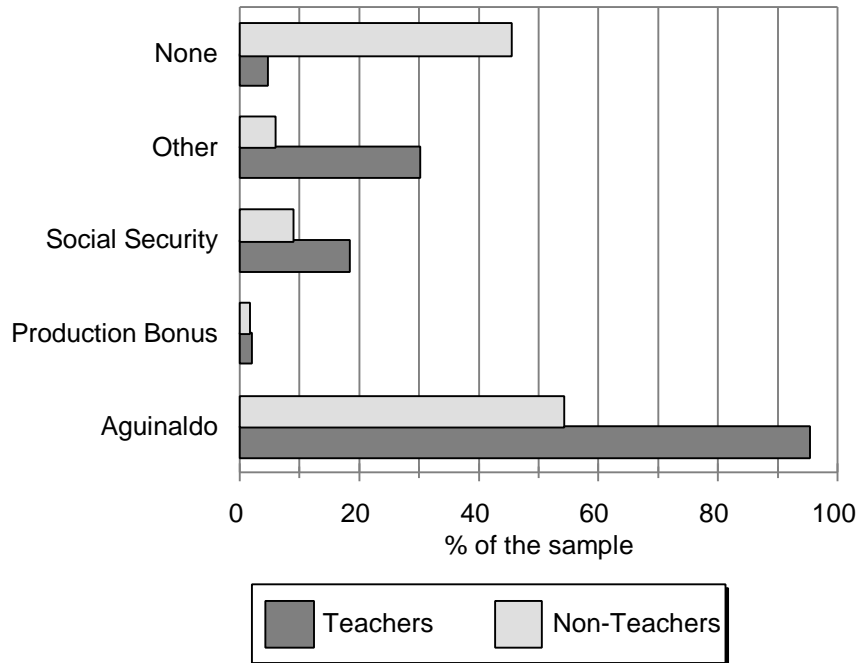


Figure 5: Logarithm of the estimated hourly wage of Bolivian workers in 1993. (Bolivianos)

| | | S=14 years | | | | S=16 years | | | |
|-------------|-------------------|---------------|--------|-------------|--------|---------------|--------|-------------|--------|
| | | 25 years | | 50 years | | 25 years | | 50 years | |
| | | Male | Female | Male | Female | Male | Female | Male | Female |
| Teacher | Public/Union | 1.00 | 1.05 | 1.40 | 1.45 | 1.10 | 1.14 | 1.55 | 1.60 |
| | Private/Non-union | 1.12 | 1.17 | 1.53 | 1.58 | 1.22 | 1.27 | 1.68 | 1.73 |
| Non-teacher | Public/Union | 1.32 | 0.99 | 1.92 | 1.59 | 1.45 | 1.12 | 2.10 | 1.77 |
| | Private/Non-union | 0.97 | 0.63 | 1.57 | 1.24 | 1.09 | 0.76 | 1.75 | 1.42 |

Note: For the variables indigenous origin, regional location and marital status we used the average values of these

BOLIVIA 1993

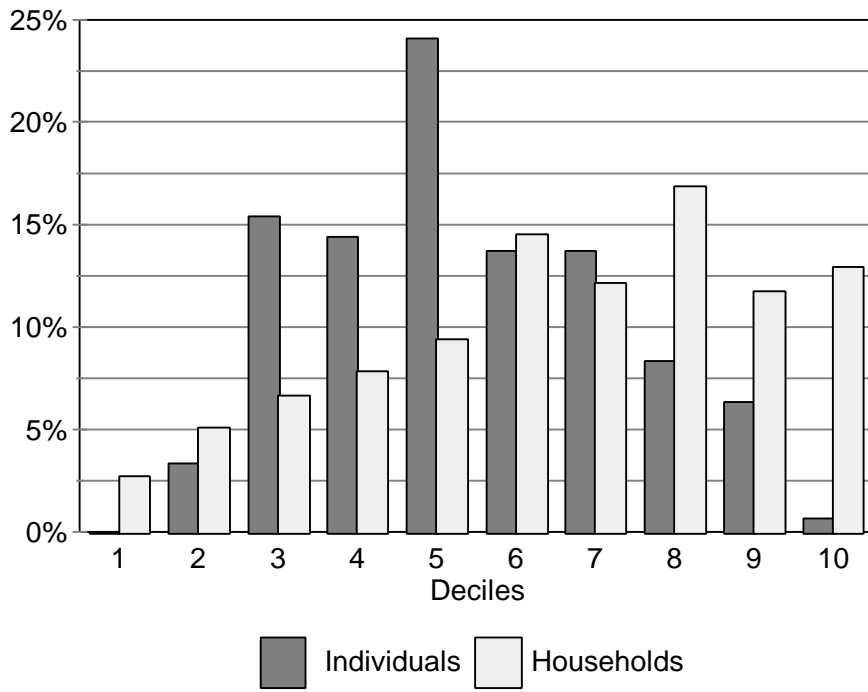
Figure 6: Total income per month of different groups of workers

| | Only 1 Income | More than 1 Income | Total |
|------------------------------|-----------------------------------|------------------------------------|-------------------------|
| Total | N = 3917 P = 52% Y = 625 | N = 3582 P = 48% Y = 800 | N = 7499 Y = 709 |
| Region | N = 2384 P = 52% Y = 721 | N = 2162 P = 48% Y = 916 | N = 4546 Y = 814 |
| Public Administration | N = 787 P = 82% Y = 680 | N = 173 P = 18% Y = 1363 | N = 960 Y = 803 |
| Teachers | N = 226 P = 76% Y = 380 | N = 73 P = 24% Y = 758 | N = 299 Y = 472 |
| Union | N = 806 P = 53% Y = 750 | N = 729 P = 47% Y = 1123 | N = 1535 Y = 927 |
| Indigenous | N = 1738 P = 44% Y = 550 | N = 2171 P = 56% Y = 682 | N = 3909 Y = 623 |
| Male | N = 2545 P = 60% Y = 715 | N = 1710 P = 40% Y = 1083 | N = 4255 Y = 863 |
| Female | N = 1372 P = 42% Y = 456 | N = 1872 P = 58% Y = 542 | N = 3244 Y = 506 |

N= # of workers, P=percentage, Y=average income

Income Distribution of Teachers

Total Income of Individuals and HH



References

- Barro, R. and Lee, J. (1996). International Measures of Schooling Years and Schooling Quality. *American Economic Review*. 86 (2).
- Bee, M. and Dolton, P. (1995). The Remuneration of School Teachers: Time Series and Cross-Section Evidence. *The Manchester School*. Vol. 63 (1). 1-22.
- Carnoy, M. and Welmond, M. (1997). Do Teachers Get Paid Too Much? A Worldwide Comparison of Teacher Pay. Mimeo.
- Edwards, A. C. (1989). Understanding Differences in Wages Relative to Income Per Capita: The Case of Teachers=Salaries. *Economics of Education Review*. 8 (2). 197-203.
- Heckman, J. (1979). Sample Selection Bias as a Specification Error. *Econometrica*. 47. 153-161.
- International Labour Office (ILO) (1991). *Teachers in Developing Countries: A Survey of Employment Conditions*. Geneva: ILO.
- Kenny, L. and Denslow, D. (1980). Compensating Differentials in Teachers=Salaries. *Journal of Urban Economics*. 7. 198-207.
- Komenan, A. and Grootaert, C. (1990). Pay Differences Between Teachers and Other Occupations: Some Empirical Evidence from Côte D'Ivoire. *Economics of Education Review*. 9 (3). 209-217.
- Mulcahi-Dunn, A. and Arcia, G. (1996). An Overview of Teacher=s Salaries and Living Standards in Ecuador. Center for International Development. Research Triangle Institute. N.C. Mimeo.
- Oliveira Associates (1997). Salário Dos Professores. Relatório Apresentado ao Consed. Brasília.
- Panagides, A. and Patrinos, H. (1994). Union-Nonunion Wage Differentials in the Developing World: A Case Study of Mexico. Policy Research Working Paper No. 1269. The World Bank: Washington, D.C.
- Psacharopoulos, G., Valenzuela, J. and Arends, M. (1996). Teacher Salaries in Latin America: A Review. *Economics of Education Review*. 15 (4). 401-406.
- Ransom, M. and Bernstein, S. (1993). Sex Differences in the Academic Labor Market in the Affirmative Action Era. *Economics of Education Review*. 12 (1). 21-43.
- Savedoff, W. (1995). *Wages, Labour, and Regional Development in Brazil*. Avebury/Ashgate Publishing: Aldershot, U.K.
- Union Bank of Switzerland. (1991). *Prices and Earnings Around the Globe*. Economic Research Department. Zurich.
- Union Bank of Switzerland. (1994). *Prices and Earnings Around the Globe*. Economic Research Department. Zurich.
- Verdugo, R. and Schneider, M. (1994). Gender Inequality in Female-dominated Occupation: The earnings of Male and Female Teachers. *Economics of Education Review*. 13 (3). 251-264.
- Wolff, L., Schiefelbein, E. and Valenzuela, J. (1993). Improving the Quality of Primary Education in Latin America: Towards the 21st. Century. Regional Studies Program Report No. 28. The World Bank. LACTD. Washington, D.C.

Notes

¹ The views and interpretations in this paper are those of the authors and should not be attributed to the Inter-American Development Bank, or to any individual acting on its behalf.

² *Flunking out: Latin America's Schools*. *The Herald*. July 27, 1997.

³ This paper focuses on the impact of wages upon teacher recruitment, motivation, and retention; however, other factors, including intrinsic rewards, vocational commitment, working conditions, schedules, and the direct costs of study, clearly have a substantial impact. It is only our contention that the impact of wages is significant, poorly analyzed, and certainly an important complement to these other factors.

⁴ For a study that focuses only on Brazil, analyzing average and median teacher salaries, see Oliveira Associates (1997). The study finds that teachers' wages are not dissociated from the market, but does not control for personal characteristics at the individual level.

⁵ Studies that compare teachers' wages over time have also been conducted, but the implications are not readily apparent. Twenty years ago, the average teacher's education level in the region was more than twice the regional average education level; whereas, today that difference has fallen by 50%. It would be expected, then, that the premium associated with relatively scarce educational skills would have fallen. The implications for recruitment and productivity depend upon whether or not the decline in relative wages is offset by the increasing pool of educationally qualified entrants. For studies that have data for teachers' salaries over time see Barro and Lee (1996), Psacharopoulos, et al, (1993), wage reports by Union Bank of Switzerland for 7 Latin American cities, and Wolff, Schiefelbein and Valenzuela (1993).

⁶ The differences of means between both samples were tested, and all of them turned out significant at a 5% confidence level, except for family size and region.

⁷ The natural log of hourly earnings will be used, as in the rest of the literature, because earnings approximately follow log normal distribution and improves the fit of these models.

⁸ Previous studies in other countries have found that marital status has strong positive effects on earnings of men but is not a significant predictor of earnings of women. In Bolivia, however, marital status appears to have a positive influence both on men and women's earnings. We did a regression on a women only sample and found that being married has a positive coefficient of 0.105, while for the same regression on a men only sample the coefficient is 0.143. Both coefficients were statistically significant.

⁹ Empirical studies on this topic have found a relationship between costs of living and wages. That is, when the cost of living rises in some areas, wages increase such that real wages are held constant. (Kenny and Denslow, 1980). For an empirical discussion of this problem in Brazil, see Savedoff (1995).

¹⁰ By splitting the sample to estimate separate coefficients for teachers and non-teachers we are assuming that there are no significant omitted variables which also determine selection into the teaching profession. This problem could be addressed by introducing instrumental variables which predict who will be a teacher but without also affecting earnings. It was impossible to find a variable that would serve as such an instrumental variable in the sample. We conducted a probit analysis to see if it would be possible to find variables which would predict which individuals were likely to become teachers. None of the personal characteristics in the survey had any significant explanatory power. Komenan and Grootaert in an empirical study of teachers - non-teachers pay differences in Cote D'Ivoire (1990) applied Heckman's two-stage technique to test for selection bias and couldn't find evidence of the problem. See Heckman (1979) for a discussion of the selection problem with regard to occupational choice.

¹¹ Note that, strictly speaking, 0.10 represents the difference between log means. It is only approximately equivalent to a percentage difference at values close to 0.

¹² The *aguinaldo* is a bonus salary paid at the end of the year.