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THE ECONOMIC EFFECTS OF UNIONS IN LATIN AMERICA: TEACHERS' UNIONS AND EDUCATION IN ARGENTINA

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Abstract^{*}

This paper considers the effects of trade unions on the education sector in Argentina. We have provided a substantial amount of new information and we have found useful preliminary results on some of the channels of union influence on the performance of this crucial sector. We find that those provinces where teacher unionism is fragmented, where union density is higher and where political relations with the governor are more conflictual, have more strikes (fewer class days). Based on estimates of education production functions both in this paper and elsewhere, we expect this to translate into lower student performance. We then find a number of weak conclusions related to the impact that unions have on several variables that affect students' performance (i.e., teachers' tenure, job satisfaction, class size, education budget and teachers' salaries). Reviewing these results, we conclude that the impact of unions on students' performance depends on the channel and kind of political market where unions operate, but not on the existence of unions per se.

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Introduction

Education is one of the main instruments for fostering human capabilities and overall freedoms so that individuals can lead the kind of lives they have reason to value. Education is also essential in building democratic values, improving human development and contributing to economic growth (Sen, 1999). Therefore, when an educational system is not performing well, the consequences are dire.

Several studies have pointed out that education remains a factor in reinforcing inequities rather than in reducing them due to the deficits of the Argentine educational system (IADB, 1996; Fiszbein, 1999). Low-income people do not have access to high quality education, and they generally fail to complete secondary education. Furthermore, achievement is poor compared to other countries that invest similar amounts in education. Hence, although Argentina's net enrollment ratios for primary and lower secondary education are high, there is a perception of poor quality.

There is a consensus in Latin America that good teaching is key to school improvement. As a result, attention to teachers' incentives and their impact on teaching performance has been growing in the region. In particular, career regulations and mechanisms for recruitment, selection and promotion of teachers, are receiving a great deal of attention.¹ However, reforms in these areas have been hard to achieve, among other reasons due to the opposition of teachers' unions to policies perceived as hurting their members.²

The objective of this study is to provide some empirical evidence on the effects of teachers' unions on the quality of education in Argentina. Of particular interest are "education production functions" and the impact of teachers' unions on variables that influence the learning experience of elementary students: days of class, teachers' tenure status,³ class size, budget allocations, and teachers' satisfaction. Also considered are other factors, such as the special laws

¹ For more details see the series of IADB studies in the project "Teachers in Latin America: Careers and Incentives," which can be downloaded at www.iadb.org/res.

² Corrales (1998) notes that "The magnetism and high levels of organization of teachers' unions, together with a union leadership that has a long-term horizon, no alternative career plan, no aversion to conflict, and a discriminating weapon against the government, explain why teachers' unions are to be expected to be intensely active in resisting reforms." See Murillo (1997) and Murillo and Maceira (2000) for further discussion of the political economy of reform in the social sectors and the role of unions.

³ This paper uses "tenure status" (henceforth TENURE), to refer to whether the teacher has a permanent, full-right, assignment to that position, as opposed to a "temporary" assignment. (In Spanish, *titular* as opposed to *suplente*.)

and rules that regulate teachers' careers and work environment, and their possible connection to the (political) role of unions.

This study provides new descriptive statistics on teachers' unions in Argentina and presents several empirical findings on the relation between unions and student performance. First, higher union density combined with union fragmentation and adversarial political alignments tends to decrease the effective number of class days, with an indirect negative effect on student performance. Second, there is a negative relation between union membership and job satisfaction, and students who have a more satisfied teacher perform better. Third, teacher tenure, a persistent union demand, has a positive effect on student performance. Fourth, unions have a positive effect on employment and thus, a negative effect on class size. Finally, education budgets and teachers' wages are mainly determined by fiscal variables; provincial unions are basically irrelevant except that they increase the share of salaries in the education budget. These empirical findings provide mixed conclusions regarding the effect of unions on educational outcomes, but provide a first picture of union influence in the learning process.

The paper is divided into six sections. Section 1 provides some brief background information on education in Argentina. Section 2 presents a sketch of the analysis to follow. Section 3 provides a brief description of the education production function estimation for elementary school students in Argentina. Section 4 describes teachers' unions and explains the empirical exercises to be performed to ascertain the impact of union characteristics on the variables that are important to explain educational outcomes. Section 5 presents the empirical results on the effects of unions. Section 6 concludes.

1. Background Information

Argentina has relatively high schooling rates. The enrollment ratio in primary education is 97 percent, literacy 96 percent and enrollment in secondary education 67 percent. The system has a total of 9.7 million students (70 percent in primary education), 650,000 teachers (540,000 teaching positions) and 52,177 schools; 76 percent of total enrollment attends public institutions. Average spending per student is around \$900 (\$740 in the case of primary education), although there are large variations across provinces.

Table 1. Public Expenditure on Education, 1997

Province	Millions of US\$	% of Total expenditure	US\$ per student	Personnel expenditure/ total expenditure
City of Bs. As.	924	29.4%	1,391	72.7%
Buenos Aires	3,230	30.7%	881	78.7%
Catamarca	135	28.2%	1,435	92.5%
Cordoba	739	26.1%	969	73.3%
Corrientes	209	23.0%	752	93.8%
Chaco	251	22.8%	912	90.3%
Chubut	145	20.9%	1,202	88.9%
Entre Rios	297	21.4%	947	83.4%
Formosa	135	16.6%	875	91.4%
Jujuy	166	30.9%	869	92.2%
La Pampa	113	22.5%	1,575	81.6%
La Rioja	110	25.5%	1,312	92.8%
Mendoza	362	30.0%	894	83.7%
Misiones	193	19.9%	672	97.8%
Neuquen	250	25.5%	1,687	86.3%
Rio Negro	182	25.9%	1,061	86.3%
Salta	202	23.1%	629	92.0%
San Juan	160	23.6%	1,001	88.1%
San Luis	95	25.5%	1,014	76.2%
Santa Cruz	141	20.4%	2,341	86.5%
Santa Fe	771	29.1%	961	74.9%
Sgo. del Estero	204	31.5%	962	98.5%
Tierra del Fuego	79	21.4%	2,566	78.4%
Tucuman	277	29.9%	829	86.4%
Total	9,370	27.2%	966	81.6%

Over 80 percent of spending is devoted to teachers' salaries, although there is substantial inter-provincial variation, and this level is high relative to other countries (Table 2). This high percentage could be the result of union strength in defending the salary share of the budget in a context of fiscal restraint. This view is supported by the priority granted by teachers' unions to salary demands as shown by an analysis of the demands of the main teachers' union in Argentina.⁴

⁴ Low salaries and payment delay represent almost half of the concerns expressed by teachers' unions. See Table 7.

Table 2. Expenditure on Education: International Comparison (1997)

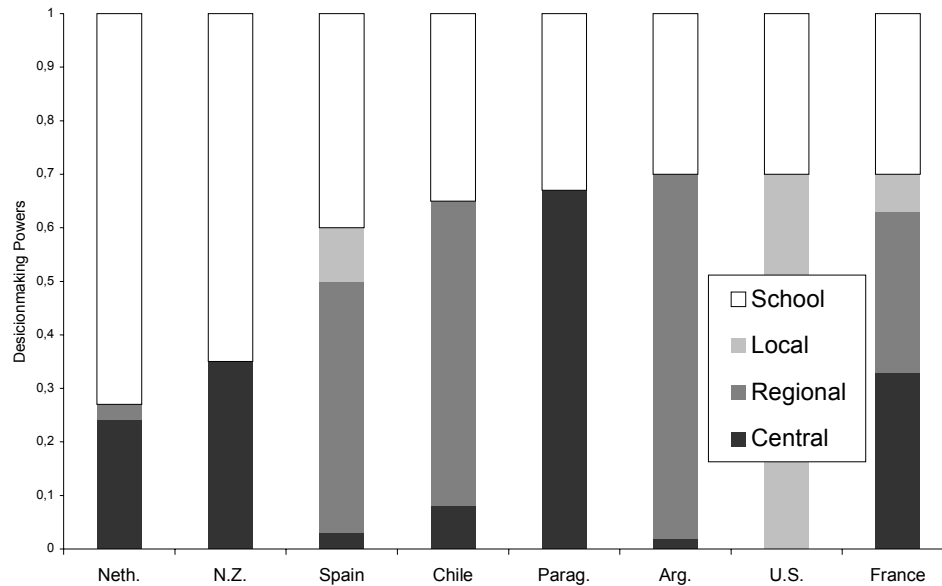
Country	Public Expenditure on education (as % of GNP)	Expenditure on teachers wages as a % of total current education expenditure	Student / Teacher ratio	Duration
Argentina	3.5	84.1	17	10
Australia	5.4	54.2	12	10
Brazil	5.1	-	23	8
Canada	6.9	62	16	10
Chile	3.6	-	30	8
Colombia	4.1	81.9	25	5
Korea Rep.	3.7	-	31	9
Mexico	4.9	-	28	6
Peru	2.9	40.1	28	6
Uruguay	3.3	41.5	20	6

Source: World Development Indicators.

Responsibility for primary and secondary education has been decentralized at the provincial level (primary since 1978 and secondary in 1993). Indeed, even at the peak of centralization in 1952, only 43 percent of elementary schools, as opposed to 75 percent of secondary schools and 83 percent of vocational schools, were national. Federal Education Law No. 24,049 of 1993 regulates the distribution of responsibilities between the nation and the provinces, and the provinces now play the leading role in financial, pedagogical and administrative matters; as well as in labor relations and teachers' career paths. The national government sets the national curriculum, evaluates the system, implements compensatory programs and promotes—with the provinces—teacher education programs.⁵ The involvement of the province rather than the school, municipal or the national level in the running of Argentina's educational system is high in international terms. The crucial role of the provincial level, as well as very limited school autonomy, is illustrated by the international comparison in Figure 1.

⁵ There is, however still an important element of centralization of political conflict over teachers' wages. The main federation CTERA has called several national strikes and mobilizations. The most salient recent episode was the so-called "*carpa blanca*," a tent with teachers hunger-striking in front of the National Congress, which led to the approval of a special national tax on automobiles to finance wage increases for teachers throughout the country (the so-called *incentivo docente*, i.e., "teaching incentive").

Figure 1: Level of Decisionmaking in Education Sector



Source: OECD, 1998

Because almost all schools depend on the provincial government, public education budgets, teachers' salaries, and working conditions and regulations (*Estatutos Docentes* and *Convenios Colectivos*) are mainly decided in the subnational arena. Hence, because education is decentralized at the provincial level and most unions are organized at the provincial level as well, the most appropriate level of analysis for the political and the labor-relations effects of unions is the provincial level.⁶

2. Influence of Unions in Education: A Sketch of the Empirical Strategy

There are several institutional features of the education system and of teachers' unions in Argentina that differentiate it from the US system in a way that makes it virtually impossible to replicate the groundbreaking study by Hoxby (1996).⁷

Education is "decentralized" at the provincial level, and most unions are organized at the provincial level as well. Budgets, teacher's salaries, working conditions and regulations

⁶ As described below, a micro-level relationship can also be traced between unions and teachers' job satisfaction, which can have a direct impact on the learning process of individual students.

(*Estatutos Docentes* and *Convenios Colectivos*) are negotiated between the provincial government and teachers' unions and apply to all teachers and schools independently of their affiliation or participation in the negotiation process, or in the election of union leaders. Consequently, all schools located in the same province are affected by teachers' unions, even those where teachers are not unionized. This institutional feature complicates the possibility of school-level cross-sectional analysis.⁸ Hence, in order to look for the potential effect of unions on education, the most disaggregated level possible is that of the province in both the provincial political and labor-relations arena.⁹

However, of ultimate interest are education outcomes such as student learning. And learning depends not only on variables that are decided at the provincial level, but also on the socioeconomic characteristics of the student's family, and on school/classroom factors. Hence, the analysis requires dealing with different levels of aggregation.

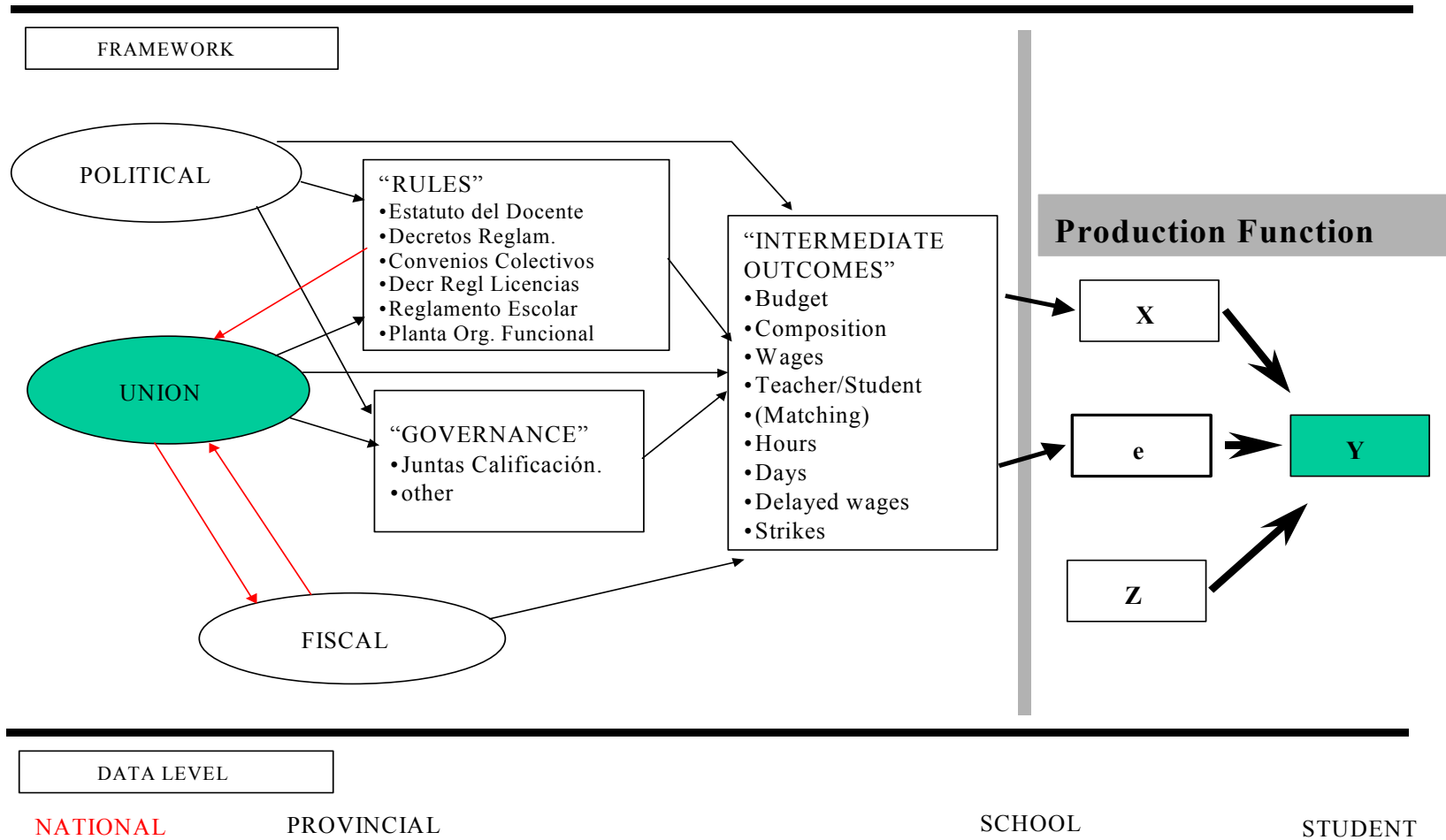
The analytical / empirical strategy can be best understood by reference to Figure 2.

⁷ One additional feature not emphasized in the text is that both unions' rules and the law, particularly the *Ley de Asociaciones Sindicales*, do not require unions to operate under democratic rules. Under such circumstances it might be inappropriate to assume that the union's objective function represents the preference of the "median" member.

⁸ That is, even if information were available on whether particular teachers in a particular school are unionized, it is not clear whether that should be expected to have any impact on the relevant variables (such as student learning). Even if the empirical analysis would show an impact, it is unclear given the institutional features of the Argentine case whether that should be attributed to "union effects" or to personal characteristics of the teacher that are correlated with the decision of whether to affiliate. Nicer people, more concerned about social issues, can be more likely to affiliate and these might be better teachers, or alternatively, they can be just card-carrying troublemakers with negative influence on learning. This caveat qualifies, thus, the analysis of the "unionization"–"job satisfaction" link with the micro-level data mentioned in footnote 6.

⁹ Of course, it is also quite likely that in the Argentine case one of the most important channels of union influence is in the National political arena, a hypothesis that will be addressed more indirectly, because of obvious empirical limitations.

Figure 2. Empirical Strategy Framework



This paper uses a data set that contains seventh-grade test scores in Mathematics and Language from a number of schools throughout the country; these can be matched to student questionnaires, teacher questionnaires and school-principal questionnaires to provide useful information about “inputs” to the education production function. In a simplified manner, it can be postulated (as in the right side of Figure 2) that student achievement is a function:

$$(1) \quad Y_{ij} = f(X_j; e_j; Z_i)$$

where Y_{ij} is the score of student i in school/classroom j ; X_j is a vector of school/classroom variables (inputs), e_j is a vector of (possibly unmeasured) “teacher” variables (such as effort, or “quality of the match”) that are supposed to affect student learning, and Z_i is a vector of socioeconomic characteristics of the student’s family. Presumably unions can affect some of the components of X or e , and hence, indirectly, educational outcomes.

Moving towards the left in Figure 2, unions operate mostly at the political level and to some extent at the labor-relations level, and hence they can directly affect some provincial-level variables which themselves, are either some of the X s, or determinants of some X s or e ’s. For instance they can have an impact on provincial education budgets, on budget composition, on teachers’ wages, on teacher/student ratios, on the quality of the match between teacher and school, on the number of hours of instruction, on the number of days of class, on strikes (and hence days of class lost, low morale, etc.), on whether wages to public teachers are paid on time, etc.¹⁰

There are several possible mechanisms/channels by which unions can affect those “intermediate” variables, although these mechanisms are somewhat different from those usually assumed in the “standard” empirical unions’ literature. One important difference is that in most provinces, collective bargaining has not been a practice in the educational sector due to legal limitations on public sector collective bargaining, which lasted until 1990. As a result, unions sometimes choose political strategies of influence through the discussion of public rules (teachers’ statutes), of their work conditions or the representation in governance institutions, such as Qualification Boards, which affect promotion and tenure.¹¹ Indeed, in addition to their

¹⁰ Occasionally, provincial sector employees, including teachers, are paid several months late. This has been one important source of labor conflict in the education sector.

¹¹ The decisions on the professional career of teachers are handled by the teaching profession through Qualification Boards (*Juntas de Calificaciones*). These boards use a system of points in which diplomas, tenure and courses

industrial action (i.e., strikes), they also choose expressive protests, such as the *carpa blanca* to make their demands more effective. This political character of labor relations in the education sector is further reinforced by the attitudes of employers (i.e., provincial governments) and the fiscal consideration emerging from the complicated relationship between provincial and national governments in a federal country. In particular, the interactions between presidents, governors, and unions, which are sometimes of different political affiliation and have different incentives regarding budget allocation and political unrest, complicate the context in which the educational process is taking place. Hence, some are codetermined by more general political and even fiscal variables (left end of Figure 2). For example, days of class are affected by strikes, which in turn may sometimes come as a response to delays in wage payments, and whether that delay occurs and whether it leads to strikes will depend on the provincial fiscal situation as well as on the nature of the relationship between the provincial government and teachers' unions. More generally, the nature of the relationship between political authorities and unions can explain some of the rigidities in teacher labor laws (such as the *Estatutos Docentes*).¹²

It can be postulated that the “intermediate variables” are a function of:

$$(2) \quad X_{jp} = g (U_p ; W_p)$$

where X_{jp} are those inputs that affect student performance and are presumably affected by the union's behavior. (For example X_{jp} could be the number of class days in school j located in province p). U_p is a vector of provincial teacher union characteristics; and W_p is a vector of control variables (e.g., the provincial fiscal situation).

In order to explore the effect that teachers' unions have on students' performance given our data constraints, two steps were performed. The first was to estimate the education production function (equation 1) on individual and school-level microdata. The second was to run separate cross-provinces regressions for each of the X that are presumably affected by teacher unions.¹³ This approach does not make it possible to claim a conclusive result on the

constitute the main factors. Those applicants with the highest scores have the first right to select among open positions, and school authorities and parents have no voice in the selection process. Presumably, teacher unions play an important role in some of the *Juntas*.

¹² See Spiller and Tommasi (2000) for a framework that explains overregulation as the outcome of the inability to strike efficient intertemporal political transactions.

¹³ The system of equations (1) and (2) is recursive. Thus as long as the error terms in the two equations are independent each can be estimated separately.

overall impact that unions have on education, but it provides evidence on the effect that unions have on some specific variables that affect student performance (i.e., class days, teacher's job satisfaction, tenure and class size). Taking into account the characteristics of the data available, this is the most informative way to look at the data.¹⁴

The next section presents the estimation of the education production function (EPF). Sections 4 and 5 examine the effects of the variables measuring union characteristics on (intermediate) educational outcomes.

3. Education Production Function Estimation

Most economic studies of school effectiveness follow the Educational Production Function (EPF) approach, asking the question of which policy inputs can increase outputs. Personal, family and other factors are treated as inputs and the student performance as the output of this EPF.¹⁵

Educational Production Functions studies classify the factors that influence students' performance as:

- a) personal factors such as sex, race, etc.;
- b) family factors such as socioeconomic level, family size and parents' education;
- c) factors relating to place of residence;
- d) school and teacher factors, such as school structure, number of school days, teacher experience and teacher dedication.

¹⁴ There are at least two other approaches to computing the impact that unions have on students' performance. The first is to estimate the reduced form of equations (1) and (2). While this strategy has the advantage of providing an estimate of the full effect of unions on education outcomes, it also has several disadvantages. First, we lose all the heterogeneity is lost across families, and to some extent across schools, since means within provinces must be used. Second, it is not possible to identify the partial effects of unions. From a theoretical perspective, unions affect education through several channels; for example, unions call for strikes and hence students have fewer class days and presumably perform worse; on the other hand, unions could also pressure the government for a higher education budget, leading to better performance. Lastly, another disadvantage of the reduced form estimation is the omitted variables problem. Since information is not available on provincial variables that might have important (direct or indirect) influence on student performance, this might induce biases in the coefficients of the union variables.

The second approach consists of two steps. The first is to estimate the education production function including provincial dummies. The second is to regress provincial dummies' coefficients on the union variables and controls. This approach has disadvantages similar to those of the first approach, but it also reduces significantly the number of observations (in the second regression only 24 observations are used).

¹⁵ There are several critiques of this approach. An excellent survey is Scheerens (1999).

In order to analyze school production it is essential to employ adequate measures of outcomes. This is not an easy task, since the objectives of education are multiple, and many of them hard to measure. A majority of studies in the EPF tradition measure output by standardized achievement test scores, although others have employed other measures such as student attitudes, school attendance rate, and high school continuation or dropout rates. This study uses test scores.¹⁶

The problem in statistical terms is to describe the relationships between test scores, school and teacher processes and characteristics of the pupil intake. The econometric model that is estimated assumes a linear relationship between test scores and the factors included in the regression.

Since 1993, the Ministry of Education has implemented a National Evaluation System in order to quantify students' knowledge in a variety of subjects and reveal complementary information to analyze its determinants. The observational units are: the student, the student's family, the student's teachers and school. Different grades have been tested in different years, as shown below.

Table 3. SINEC Surveys

Grade	Year						
	1993	1994	1995	1996	1997	1998	1999
3 rd		Lang.	Math	L & M	L & M	Math	L & M
6 th				L & M	L & M		L & M
7 th	L & M	L & M	L & M	L & M	L & M		L & M

Only data corresponding to seventh-grade students attending public schools in 1997 and 1999 are used in this paper. These years were chosen because there is reliable data on union variables for the period 1997-1999 (see next section). All private school observations are dropped because there is only one national private teachers' union, which makes it virtually impossible to explore how private teacher unionism affects outcomes through a cross-province analysis.

¹⁶ It is worth pointing out that an overall reading of the use of EPF throughout the world provides an ambiguous picture, where results are sometime inconsistent and not very robust (Hanushek, 1986, Hanushek, Kain and Rivkin, 1998, and Scheerens, 1999). This is particularly the case when the dependent variables are test scores. Still, the findings are constrained by data availability.

The regression includes student and family factors such as parents' education, kindergarten attendance and family wealth; classroom factors such as class size, peer effects and classroom structure; and teachers' factors such as teacher experience, education, tenure, dedication, and job satisfaction. Finally considered are school factors such as class days, principal's tenure and experience.

Among the variables listed above, four factors deserve special consideration since they are potentially affected by teacher union behavior. These are class days, class size, teacher tenure and job satisfaction. The relation between class days and students' scores is straightforward. It is expected that more class days improve student performance. More complex are the relations between performance and class size, teachers' tenure, and teachers' job satisfaction. One might expect a negative relation between class size and student learning. However, this is a well-studied relationship,¹⁷ and to date there is no conclusive evidence.¹⁸

The provincial teachers' labor codes (*Estatutos Docentes*) are very complex and protectionist, particularly for tenured teachers. Firing tenured teachers is extremely difficult, and absence regulations very lenient.¹⁹ Therefore, it could be argued that tenured teachers do not have the incentive to dedicate much effort to their work. However, it is also possible that the restrictions specified in the *Estatutos* prevent political discretion and provide a feeling of security to the tenured teacher, leading to better teaching quality.

Finally, it is reasonable to expect that more satisfied teachers devote more effort to their duties, improving teaching quality.²⁰ However, because job satisfaction reflects both objective

¹⁷ For example Hanushek, Kain and Rivkin (1998).

¹⁸ Many econometric studies show an insignificant effect. Also, as Hanushek observes (as cited by Bracey, 1998) "Japanese class sizes are much larger than U.S. class sizes. Japanese students performance is, on average, much better than U.S. students' performance." On the other hand, in the United States a series of experiments undertaken in recent years have proven quite the contrary (such as the California initiative and the Tennessee experiment). Some of these approximations state that the effects differ by level of the class size variable, and therefore equal effects should not be expected for class sizes of 20 students and class sizes of 15 or lower (Nye, Hedges and Konstantopoulos, 1999). Additionally, Gursky (1998) indicates that reducing class size can improve student achievement, particularly in earlier grades and low-achieving and low-income students.

¹⁹ There are jurisdictions, such as the City of Buenos Aires or the province of Chaco, where tenured teachers can take, on average, more than one hundred absence days during one year.

²⁰ Hammermesh (1999) argues that a more satisfied worker is more likely to invest in firm-specific human capital and increase his commitment. Locke (1976) suggests that job satisfaction could be used as a proxy to capture aspects of the workplace, such as mode of supervision, physical work conditions, and so forth that are not generally measured on data files, and that could have an impact on outcomes such as workers' productivity. He also suggests that job satisfaction could impact on workers' mental health and hence affect her productivity.

and subjective factors, such as teacher's psychological state, it is more complex to interpret than standard economic variables.²¹

Table 4 presents the results for the 1997 math test score. A summary of the other three regressions, variable descriptions and basic statistics are in Appendix 1.

Table 4. Regression Result
Dependent Variable: log of 1997 mathematics test score
(OLS clustered by School)

	Variable	Coefficient	t-value
School Factors	Class Days	0.004	4.076
	Principal tenure (yes=1, no=0)	0.029	1.076
	Principal experience	0.012	0.849
Teacher's Factors	Job Satisfaction	0.041	2.246
	Tenure (yes=1, no=0)	0.018	0.761
	Teacher Dedication	0.020	0.919
	Teacher Experience	0.013	1.776
	Teacher Education	0.011	0.831
Student and Family	Gender (female=1)	-0.019	2.051
	Father Education	-0.002	0.076
	Mother Education	0.012	3.400
	Kindergarten	0.043	2.871
	Family size	-0.012	2.708
	Repeated grade	-0.158	12.714
	Wealth	0.00002	2.700
Classroom Factors	Students/Teacher	0.004	1.859
	Positive Peer effect	0.046	6.211
	Negative Peer effect (-)	-0.015	1.256
	Classroom Structure	0.008	1.816
	Observations	11791	
	R2	0.14	

The findings indicate that students perform better when they have more class days and when their teacher is more satisfied with her job. The coefficients are highly significant in the four regressions (math and language, 1997 and 1999). One additional day of class results in an improvement of approximately 0.4 percent in student performance.²²

²¹ There is also the possibility of reverse causation: A teacher assigned to smart, well-behaved students may become more satisfied.

²² In Argentina, the average number of class days per year was 157 days in 1997, almost 20 percent less than in OECD countries.

There is not a clear relation between student performance and class size. While the coefficients for the 1997 language and math evaluations (shown above) are positive, there is a negative and statistically significant relation for the 1999 tests (see Appendix 1).

Regarding teacher tenure, higher scores are found among those students who have a tenured teacher (even after controlling for teacher experience). However, there are three reasons to interpret this result with caution: First, the coefficient is not statistically significant in any of the four evaluations. Second, it could be that tenure improves teacher performance, or it could just be that better teachers are awarded tenure. Finally, it is important to note that the National Evaluation Survey only includes those teachers who are actually teaching on the day the evaluation is conducted; all those teachers who are on leave of absence are not surveyed.

It additionally appears that the sample might have a severe bias. The analysis of the *Estatutos Docentes* shows that tenured teachers have an impressive number of leave days they can take during the year compared to *interinos* and *suplentes*. Thus, it can be presumed that being tenured increases the incentives/odds that the teacher is on leave.²³ Therefore, while there is evidence that students who have an active tenured teacher perform better than those who have an active non-tenured teacher, it cannot be claimed with a high level of confidence that “tenuring” teachers is an appropriate policy to improve education quality.

4. Teachers’ Unions

4.1 Background

Argentine teachers’ unions, organized mainly at the provincial level, have shown a very militant stance. Approximately 350,000 teachers are unionized, showing one of the highest unionization rates (55 percent) in the country.²⁴ Additionally, teachers’ unions have not only been active in the development of the educational system, but have also organized more demonstrations and strikes than most other sectors.²⁵

²³ Regrettably, it is impossible to compare the ratio (active tenure teachers / total active teachers) relative to (tenured teachers / total teachers) using census data. The last national survey, conducted in 1994, shows that 57 percent of teachers are tenured. The 1997 and 1999 samples of active teachers show that 61 percent and 53 percent, respectively, of active teachers are tenured.

²⁴ The unionization rate for the whole working force has been estimated in 28 percent.

²⁵ Among them, the *marcha blanca* and the *carpa blanca* had a significant impact. The *marcha blanca* took place in 1988, and was the major historical teachers mobilization. The *carpa blanca* was set up by teachers in front of Congress in 1997 in demand of a higher public education budget. The *carpa blanca* influenced political discourse

Table 5. Sectoral Union Participation in Total Conflicts

Sector	1996-97	Sector	1990	Sector	1988
Civil Service	25%	Teachers	29%	Civil Service	26%
Teachers	23%	Civil Service	14%	Teachers	15%
Transport workers	7%	Steelworkers	6%	Physicians	4%
Municipal employees	5%	Mechanicals	4%	Municipal employees	4%
Energy	5%	Railway carmen	4%	Railway carmen	3%
Steelworkers	4%	Banking	3%	Banking	3%
Aeronautics	3%	Physicians	3%	Health	2%
Banking	3%	Paper Mill workers	2%	Oil workers	2%
Oil workers	3%	Port workers	1%	Postmen	2%
Mechanicals	3%	Meat-cutters	1%	Port workers	2%

Source: Centro de Estudios para la Nueva Mayoría.

The origins of teachers' unions can be traced to the end of the nineteenth century. In 1892 the *Liga de Maestros*, Argentina's first teacher association, was established in the province of San Juan. Other provincial teacher associations followed in Buenos Aires, Cordoba, Tucuman, Mendoza, Corrientes, Santiago del Estero, Misiones, Entre Rios, Catamarca and Rio Negro, which failed several times to organize a national federation. The first national organization, the Union of the Argentine Teacher, was created in 1950 under the influence of the Peronist government and later became the UDA (Union of Argentine Teachers).²⁶ Hence, most of teachers' organizations created thereafter emerged in a decentralized fashion with some exceptions, such as UDA and AMET (Association of Teachers of Technical Schools), which affiliate teachers under national jurisdiction and had a national coverage from the start. A group of 147 provincial unions was founded in 1973, the Confederation CTERA (*Central de Trabajadores de la Educación de la República Argentina*). CTERA is the largest teacher organization in Argentina and has 200,000 members nationwide. Because it was founded in an attempt to reduce the fragmentation of the sector, successive mergers reduced their component unions to a single union per province. This confederation of provincial unions, which often had different partisan sympathies, opposed the education policies of both Menem administrations and

and finally enabled the teachers' union to participate in the design and Congressional approval of an extremely polemic financial law aimed at increasing teachers' salaries. (For a detailed analysis see Behrend, 1999).

²⁶ See Vásquez and Balduzzi (2000).

the Federal Education Law.²⁷ Additionally, its national leadership has sought collective centralization of demands to negotiate with the central government and had attempted to implement national collective bargaining after the approval of new labor relations regulations for the public sector in 1990.

CTERA, however, competes with other unions in almost every province. Rival provincial unions, together with SADOP (the private teacher's union), UDA and AMET have opposed some of CTERA's strategies. The fragmentation of the sector, thus, was not solved by CTERA and, at the provincial level, there are currently more than 150 unions that operate in primary and public education. In addition to political diversity, teachers' unions present significant differences across provinces in their density, legal recognition, and political ideology. Table 6 presents some information on teachers' unions in the provinces.

Table 6. Teachers' Unions (Primary and Public Education, 1999)

	Number of unions	Unions with <i>personería gremial</i>	Affiliates*	Jurisdictional coverage
Buenos Aires	96	14	100,965	(P, L)
Catamarca	2	0	2540	(P)
Chaco	9	1	13,856	(P, L)
Chubut	1	1	4,178	P
City of Bs. As.	8	1	21,299	P
Cordoba	5	2	27,874	(P,L)
Corrientes	4	1	9,075	(P,L)
Entre Rios	1	1	17,651	P
Formosa	6	0	1,718	(P,L)
Jujuy	1	1	3,478	P
La Pampa	1	0	2,785	P
La Rioja	1	0	3,735	P
Mendoza	1	1	11,835	P
Misiones	1	1	6,370	P
Neuquen	1	1	7,492	P
Rio Negro	1	1	8,214	P

²⁷ CTERA joined the Peronist CGT (General Confederation of Labor) in the mid-1980s after Mary Sánchez, a Peronist leader, won the national elections of the union. However, in 1989, after President Menem abandoned his populist campaign promises, CTERA joined the anti-government CGT Azopardo first and later founded with other public sector unions the Congress of Argentine Workers (CTA) with a clear opposition stance while Mary Sánchez left the Peronists and joined a new opposition party.

Table 6., continued

	Number of unions	Unions with <i>personería gremial</i>	Affiliates*	Jurisdictional coverage
Salta	3	1	15,025	P
San Juan	1	1	5,621	P
San Luis	1	0	1,510	P
Santa Cruz	1	1	3,535	P
Santa Fe	1	1	29,344	P
Santiago del Estero	4	1	4,646	P
Tierra del Fuego	1	0	790	P
Tucuman	1	1	8,988	P

Note: P for the province and L for local. (*See note 30 regarding affiliates)

Source: Authors' calculation based on data from Dirección Nacional de Asociaciones Sindicales.

4.2 Data

This section reviews the principal data sources used in this study to analyze the impact of teachers' unions on education in Argentina (Appendix 2 contains additional details). Of particular interest is that, despite the limitations of the data, this is the first database of its kind for the empirical study of teachers' unions in Argentina. Two sources have been used. The first is the official record of unions and affiliates provided by the Ministry of Labor, and the second is the *Encuesta de Desarrollo Social*, run by the Ministry of Social Development.

In the Ministry of Labor's data set, the unit of analysis is the union. The information includes the number of affiliates to the union, its legal status, and its jurisdictional coverage. The data set also provides some information about how these variables have changed during the last decade. The *Encuesta de Desarrollo Social* is a household survey with national coverage conducted in 1997 with more than 70,000 observations, where approximately 1,600 people reported their occupations as teachers. This survey makes it possible to determine several characteristics of teachers, including whether he/she participates in a labor union and the province where he/she lives. These two data sets, along with some interview-derived information, are used to construct indexes of the characteristics of teacher unionism in each province.

In order to know teachers' unions' objectives and demands, two sources are used. The first is a review of the corresponding literature on public sector unionism. The second consists of interviews and unions' internal documents where demands and goals are reported. From those documents it is evident that their main concern is wages. Low salaries and delays in payment are

the most important issues for teachers' unions (All of the 15 provincial unions surveyed are concern about salaries, representing almost half of total demands reported). Tenure and job security are also important issues according to what unions report.

Table 7. Reported Concerns of Union Members

Demand	Percentage of provincial unions demanding	Percentage of total demands reported
Salaries	100 %	41 %
Tenuring-Absence days	47 %	21 %
Job security	33 %	11 %
Employment	33 %	9 %
Health insurance	20 %	7 %
Unions Participation*	33 %	7 %
Teacher Training	13 %	5 %

Source: Own elaboration based on CTERA (2000), *Informe de la Situación en todas las Provincias*, which covers 15 provinces.

* Includes demands for a higher union participation in the education system, such as collective bargaining and *Juntas de Clasificación*.

4.3 Estimating Union Influence

As explained above, a number of institutional features of the education system and of teacher unionization in Argentina prevent the type of analysis disaggregated at the level of, say, school or school district, such as has been provided in the United States. For that reason most of the analysis of the impact of unions is performed at the provincial level.

The “intermediate variables” that this paper attempts to relate to (provincial level) union characteristics are variables that: (a) are significant predictors (or possible determinants of significant predictors) of educational outcomes in the education production function estimation, and (b) could be related to the theories on union effects. These include: days of class, teacher's tenure status, class size, and budget size and composition. Additionally, there is one variable found to be significant in the education production function, which is teacher satisfaction, for which a more disaggregated analysis is provided, using a complementary data set.²⁸

²⁸There are other channels for union effects such as the *Estatutos Docentes* and of *Juntas de Clasificaciones*. *Estatutos Docentes* are the by-laws ruling labor relations, which define job stability, leaves of absence, etc. These rules are believed to have a large impact on teachers' incentives, and teachers' unions report to care about them. The

Union Variables

Most of the “intermediate” variables under consideration (i.e., days lost, tenure, budget allocation) are linked to the interaction between unions and their employers—in the Argentine case, provincial governments. Hence these variables are affected by characteristics of the unions and by their political relationship to the provincial government. Presently considered is the impact of union strength, coordination, legal recognition, and political alignment on the (intermediate) dependent variables under study.

Strength: Measures of both union density (members/teachers) and of union participation (teachers answering that they have union participation) are considered. Membership or density is a traditional measure of union strength, which increases not only the effect of work stoppages but also provides financial resources for the organization (Golden 1997, Olson 1971).

The relationship between strength and strike propensity is not obvious. Following Hicks’s paradox on the impossibility of explaining strikes when there is complete information, strikes are usually explained as a result of asymmetric information (Kennan, 1986). In that case, strikes can result from the search for information by one of two parties. For instance, the union wants to know how much the employer would give in or the employer wants to know the concession threshold of the union (Hayes, 1984). Tsebelis and Lange (1995) thus model strikes as “bluffing” from unions that try to get better conditions from employers than what their real strength allows them. This interpretation also follows Hicks’s view that the striking union may be trying to maintain a “reputation for toughness” (Kennan, 1986). In this case, strikes occur when employers try to probe the union real strength. This argument also predicts that the propensity for strikes should be lower for strong unions, which do not need to bluff, or for weak unions, which cannot bluff, but higher for those in between. In particular, those unions whose density is decreasing and whose strength is unclear, but which still have a reputation for toughness, should be more prone to strike. The alternative view of strikes poses that union strength facilitates collective action and increases the propensity of the union to strike by increasing its ability to obtain concession by striking (Franzosi, 1995).

Junta de Calificaciones, where unions have representatives, are the boards in charge of teacher’s evaluation and promotion. These issues are left for further work.

Regarding the other dependent variables, the relation between union density and union demands (such as tenure, budget allocation, and employment) is more straightforward; these are traditional goals of unions. Stronger unions are in a better position to bargain with the government over these issues controlling for other fiscal and legal factors (Freeman and Medoff, 1986).

Fragmentation/Coordination: It can be assumed that coordination is more complicated with more than a single union having to bargain with the provincial government. Coordination problems tend to increase the propensity to strike because they make bargaining more difficult, in particular if at least one of the unions is belligerent (Golden, 1993; Murillo and Maceira, 2000). In this case, although each union is weak, they are more likely to go on strike due to difficulties in coordinating negotiations and their incentives to appear as more effective than their rivals in a sector where employees are discontented with salaries and work conditions. The existence of multiple unions thus makes coordination more difficult and weakens their bargaining power. Hence, other things being equal (e.g., density, sector, laws), a monopolistic union is stronger than multiple competing unions in the same sector. For that reason, monopolistic unions are more likely to obtain their demands regarding teachers' tenure, budget allocation, employment, and even policy preferences. However, their demands or policy preference can be the result of coordination problems, which combined with different political alignments, can radicalize the positions of teachers' unions regarding policy issues in addition to making bargaining more difficult.²⁹

Recognition: Also considered is the legal status of the union (if the union is *inscripta* or if it has *personería gremial*). In Argentina, those unions with *personería gremial* have several exclusive rights, such as representing all workers in collective negotiations, enforce the labor legislation and social security regulations, and cooperate with the government in dealing with problems

²⁹ In the case of very large provinces, unions are discarded that include less than 10 percent of affiliated teachers, because those unions are assumed to be either too small or specialized to guide a coordinated action against the provincial government.

affecting workers.³⁰ It is therefore presumed that in those provinces where the principal teacher union has *personería gremial*, the union is more likely to obtain its demands.

Political alignment: The political alignment of teachers' unions can induce a propensity to strike by providing national coverage, which makes unions more "strike-prone" according to Golden (1998). Alternatively, it can influence the union attitude towards the government of the provinces based on the provincial and national political dynamics because channels of communication and trust based on a long-term relationship where previous iterations were beneficial for both parties (Murillo and Maceira, 2000). This second argument follows the literature on "power resources" (Korpi, 1978) and the "political exchange" (Pizzorno, 1978)—that is, the idea that when unions lack political access to an allied government they are more likely to use industrial resources, such as strikes. Hence, it would be expected that a positive political alignment with the government increases trust and communication between the teachers' union and the government, facilitating bargaining rather than striking. It can also influence the attitudes of union leaders and the formation of preferences regarding policies of uncertain effect based on the politically created trust. The opposite is true for the lack of positive political alignments.

In Argentina, membership in CTERA (which rejected Menem's policies at the national level) interacting with a Peronist or conservative government should increase the propensity of the union to strike. Additionally explored will be the combination of political alignment and union fragmentation, following the argument that when political alignment facilitates trust between the provincial government and the union, union monopoly induces restraint and negotiation. However, union fragmentation contributes to increasing conflict even when some of the unions have a good relationship with the provincial government because they are afraid of being singled out as "sold-out" by rival unions in front of teachers (Murillo and Maceira, 2000). Additionally, the construction of the index of political alignment considered the diversity in partisan affiliations in CTERA unions across provinces as well as the existence of alternative unions and their own political alignments.

³⁰ Unions that are only *inscriptas* do not have any of the rights mentioned. They are, however, also allowed to call for strikes and collect contributions from their members.

Operationalizing the variables: To summarize, there are four key aspects that describe the characteristics of teacher unionism in each province: the number of members, the number of unions, their legal status and their political relation with the government. Table 8 provides a description of the variables used in the empirical estimation:

Table 8. Union Variables Description

Variable	Description	Source
Participation	Percentage of teachers who report participation in a labor union.	Encuesta Desarrollo Social
Membership ³¹	Affiliates/Teachers ratio	Ministry of Labor
Fragmentation	Number of unions per province with more than 10% of affiliated teachers.	Ministry of Labor
Fragmentation II	Unions per 10 thousand teachers.	Ministry of Labor
Recognition	Legal status. Is a dummy variable, where 1 means that the union has legal monopoly (<i>personeria gremial</i>).	Ministry of Labor
Political Alignment ³²	Political Alignment between the principal union and the governor. Values range from 0 to 1, where 0 means a highly conflictive relation.	Interviews with union leaders and experts, and press information

See Appendix 2 for more details.

Note: For all the variables the province is the unit of analysis.

Dependent Variables:

i. Lost Days: The section on EPF estimation describes the impact of days of class on student performance. The relationship between union influence and lost days is relatively straightforward. The number of effective class days is affected by strikes. Unions are needed to

³¹ A note should be devoted to the operationalization of union density. One natural measure would have been the affiliates/teachers ratio (membership). However, the official record of affiliates provided by the Ministry of Labor presents several problems: For some unions there is no information about affiliation; there are also some cases where a single provincial unions present a number of affiliates higher than the total number of provincial teachers. Thus, “participation” is used as a proxy of union density instead of “membership” in the regressions.

³² In most provinces, there is only one teachers union. In those where there are more than one, only the most important union (determined by density and legal status) is considered. Finally, in those provinces where any union could be defined as the principal one (such as in Buenos Aires, where two unions have almost equal membership), “Political Alignment” is computed by taking the average political relation between the governor and the unions.

A value of 1 is assigned to those provinces where the main union is affiliated with CTERA (a founding member of the left wing FREPASO party) and the governor is Peronist or right wing, with the exception of provinces where the union leaders were politically close to the local Peronist party. Conversely, those cases where the governor’s party is center-left (UCR or ALIANZA) and the union is affiliated with CTERA, were assigned lower values ranging from 0.33 to 0.66, depending on how specialists have characterized union leaders local

organize a strike although they need to have a reason to call their members into a work stoppage. Hence, the employer, in this case provincial governments, also has an impact on the emergence of conflicts in the education sector. For instance, delay in the payment of salaries provoked the reaction of public sector workers and teachers in many cases, following the argument that it is not low salaries, but rather the absence of income that is a source of mobilization (Scott, 1976). Hence, the loss of class days results from the interaction between provincial governments and teachers' unions; this effect will be controlled for with variables such as delay in payments. Additionally, other variables affect the cost of striking and thus, the capacity of unions to call for work stoppages. In particular, attendance bonuses have an impact on the cost for individual teachers and will be used as control variables.³³

ii. Teacher Tenure: According to the results of the EPF, teachers' tenure has a positive effect on student performance. Unions generally demand tenure for teachers. In fact, "titularización" or "tenuring" is the second most mentioned demand of CTERA following wages.³⁴ Unions demand tenure for their members because temporary employees are in a more precarious situation in terms of rights and also in terms of the risks they are willing to bear in collective action. Hence, tenure not only benefits temporary teachers, but also increases the homogeneity among union members and reduces the risks of striking because it is usually associated with job stability, thus making collective action easier for unions.

iii. Class Size: Public sector unions have a preference for a larger workforce. A growth in employment implies a larger constituency to represent that can increase the strength of the union, in particular in a sector characterized by job stability and where the salaries are defined in fiscal and political terms rather than according to productivity, as they are for tradable sectors. Additionally, teachers' unions have traditionally demanded a low teacher/student ratio to improve the work conditions of their affiliates. Of present concern is the impact of their demand

strategy. Finally, a value of 0 is assigned to those provinces where the main union is not affiliated with CTERA and has a historically close relationship with the ruling local party. Teacher union experts confirmed the coding.

³³ There are significant differences among provinces in this regard. For instance, the attendance bonus in Santa Cruz represents one third of the basic salary, but in Neuquen the bonus does not exist.

³⁴ For example, SUTEBBA (one of the main teacher's union in Buenos Aires) claims: "The Ley de Titularización was finally approved. We obtain job security for more than 40,000 teachers in Buenos Aires. It's a triumph for SUTEBBA, thanks to the unity and organization of our union. To pass the law we had to confront the government and

for enlarging employment in the education sector, and whether larger employment results in a smaller student/teacher ratio. That is, if they demand increasing employment but also obtained easier conditions for leaves or new employment results in a expansion of administrative positions, it is possible that the student/teacher ratio remains unchanged. Hence, the effect of unions on the effective student/teacher ratio is tested.

iv. Education Budget We cannot derive a direct effect from budget allocation to the education function defined above. However, the education budget should have an indirect effect in the learning process. Hoxby (1996) argues that whether unions perform a rent- seeking role or a collective voice role, they are always expected to increase the overall budget. Teachers' unions also affect the budget composition, pressing for higher wages. Thus, strong unions should lead to higher education budgets and salaries, or at least to a higher allocation of salaries in the education budget. Of particular interest is the effect of the present measures of union characteristics on the expenditures per student in each province, to assess their indirect impact on student performance.

v. Job satisfaction: According to the results of the education production function, teachers' satisfaction has a positive effect on students performance. But what is the impact of unions on job satisfaction? Unions are supposed to improve the working conditions of the workers covered, who should therefore express greater satisfaction with their jobs than otherwise comparable nonunion workers. However, most empirical studies have found a negative relation between unionized workers and job satisfaction.³⁵ Several reasons might explain this result. It is important to note that job satisfaction is a subjective variable,³⁶ so it is not necessarily related to the "objective" conditions of each employee relative to others (e.g., lower wages, poorer working conditions). Freeman and Medoff (1986) argue that unions galvanize worker discontent in order

the provincial legislature, but also the Federación Sarmiento (the other main teacher union in Buenos Aires) who were against the interests of the teachers." (Authors' translation from SUTEBA's web page, www.suteba.org.ar)

³⁵ Freeman (1977), Freeman and Medoff (1986).

³⁶ According to Locke (1976), job satisfaction depends not only on the objective circumstances in which an individual finds himself but also on his psychological state and thus on aspirations, willingness to voice discontent, the hypothetical alternatives to which the current job is compared, and so forth. Kalleberg (1977) provides a similar definition from the sociological perspective. He argues that job satisfaction depends on the personality of the worker

to make a strong case in negotiations with management. However, it is also possible that unionized workers report less satisfaction because they are truly worse off. As emphasized earlier, these measures of “unionization” at the individual level might be capturing personal characteristics of the worker. For instance, teachers who are more prone to conflict and dissatisfaction may also be more likely to join an organization such as a labor union.

Expected Results

- More strikes (and fewer class days) are expected in the cases in which union density is high in combination with legal recognition and the lack of political alignment between teachers’ union and the provincial governor. More strikes are also expected in those provinces where unionism is fragmented. Membership provides unions with the ability to call strikes (Franzosi, 1995), whereas union fragmentation and the lack of political alignment increase the incentives for conflict due to the lack of trust and coordination problems that make negotiation more difficult.
- As teachers’ unions demand tenure, it is expected that stronger unions (in terms of density, union monopoly and legal recognition) will be more effective in achieving tenure for their members.
- Stronger unions are expected to be more able to increase employment and therefore to reduce class size.
- It is expected that stronger unions in terms of density, union monopoly and legal recognition have the ability to obtain higher allocations of the education budget to salaries and higher education budgets. Positive political alignments should enhance the bargaining power of monopolistic unions. In contrast, union fragmentation and lower density are expected to result in lower education budgets and wages.
- There is no particular expectation regarding the relation between union membership and job satisfaction. While unions are supposed to improve teachers working conditions and hence improve their satisfaction, there are several reasons to expect a negative correlation.

and on the nature of the job he performs (which includes wages, fringe benefits, hours of work, degree of control, promotional opportunities, etc).

5. Empirical Results

As discussed in a previous section, students' scores are higher when they have more class days, when teachers are satisfied with their job, and when they have tenure. This section attempts to provide some new evidence on the relation between teacher union characteristics and these intermediate outcomes.

Regrettably there is no data set containing information on both students' performance and teacher unions in Argentina. But there are also certain characteristics in the labor relations in education that require a more aggregate analysis. Therefore an "indirect approach" (as explained in Section 2) is the most appropriate methodology to explore the relation between students performance and unionism.

In addition, this section also analyzes factors such as education budgets and teachers' salaries. These are among the most-reported concerns of unions members, and it is presumed that they could have an impact on student performance.³⁷

5.1 *Lost Days and Strikes*

More strikes (and thus fewer class days) are expected in those provinces where teacher unions are fragmented, have legal recognition, higher density, and a conflictive relation with the provincial government. In addition, attendance bonuses are expected to have a negative effect on strikes, and payment delays are expected to have a positive effect.

Complete information about teacher strikes in Argentina was not available before this study was begun. On the basis of searching and merging different sources of information, though, the variable STRIKES was constructed for the period 1997-1999.³⁸ $STRIKES_{it}$ measures the number of lost days by province, and by year, due to teacher strikes. The variable exhibits high variation across provinces; in the province of Neuquen, for example, an average of 20 days per year were lost due to teacher strikes, while in Santa Cruz there were almost no strikes. Variation over time of provincial averages is lower: The average number of class days lost due to strikes per province was 5.0 during 1997, 4.7 in 1998 and 8.7 in 1999.

³⁷ The last link is an issue that needs further work. Intuitively, it seems obvious that higher expenditure per pupil should improve performance, but if the quality of education is inadequate, increasing expenditures should not necessarily improve performance (IADB, 1996). In Argentina, it is also not obvious that higher wages would improve teachers' effort and productivity since there are several barriers that restrict the selection of teachers.

³⁸ For more details see Appendix 2.

Table 9. Class Days Lost due to Strikes

Provinces grouped by number of class days lost due to strikes	Average number of days lost	Teachers Participation Rate	Union Fragmentation	Political Alignment
Less than 3 days	1.2	3.1	1.3	0.44
Between 3 and 10	4.8	4.3	1.6	0.39
More than 10 days	17.6	7.2	1.4	0.18

Source: CEDI.

Table 9 groups the provinces according to the annual average number of class days lost due to teachers' unions strikes during the period 1997-1999. Higher union density and a more hostile political relation with the government is observed in those provinces with more class days lost.

While the previous table illustrates the potential relation between teacher's union characteristics and strikes, we need to control the results for other, presumably important factors such as attendance bonus and payment delays (Delays).³⁹ Table 10 reports the results of pooled provincial regressions.⁴⁰

Table 10. Regression Result

Dependent variable: STRIKES

OLS robust

Variable	Coefficient	t-value
Participation	0.40	2.53
Union Fragmentation	1.24	2.79
Recognition	0.54	0.45
Political Alignment	-4.12	-2.96
Delay	0.77	8.92
Attendance bonus	-0.22	-3.58
Constant	-1.74	-0.99
R-adjusted	0.90	
Observations	24	

³⁹ Regrettably, data on wage payment delays for public sector teachers does not exist. On the basis of discussions with union leaders and public officials, the number of provincial civil service strikes is used as a proxy for payment delays.

⁴⁰ Panel data specifications are discarded since most of the explanatory variables do not change over time.

There is evidence suggesting that higher density, union fragmentation and a hostile political relation with the government result in more strikes.⁴¹ A 10 percentage point increase in union density results in a reduction of 4 class days. In those provinces where there are two unions, students have 1.2 fewer class days compared to those provinces with only one union. Finally, in those provinces where there is a highly hostile political relation between the governor and teachers' unions, there are 4.1 fewer class days than in those provinces with no conflict.

Taking into account the positive effect that class days have on student performance, there is a reason to criticize the role unions play. However, union leaders argue that strikes are an instrument for improving teachers' working conditions and increasing the education budget, and consequently could lead to a better education system. While the validity of this claim could not be determined, the results show that the *means* unions use to obtain their demands have negative effects on students learning.

There is also evidence that attendance bonus and payment delays are significant factors in explaining strikes. The variable "Delay" is clearly the most important explanatory variable in the regression, since most of the variation in strikes across provinces is explained by payment delays.⁴² Thus, the government could reduce the number of class days lost by paying wages on time (!).

5.2. *Tenure*⁴³

Unions report an important concern with "tenuring." Therefore, a higher proportion of tenured teachers (compared to *suplentes and interinos*) is expected in those provinces where unionism is "stronger" (higher density, lower fragmentation and legal recognition). Regarding the relation

⁴¹ The coefficient for "recognition" is positive but not significant.

⁴² When "delay" is taken out of the regression, the R-adjusted reduces to 0.54.

⁴³ In Argentina, teacher's tenuring is regulated by the *Estatutos Docentes* and done in an individual basis. The procedure is quite similar across provinces: Only those teachers that satisfy certain conditions, such as age, education, and training courses—and in some cases only those who pass an examination—can be tenured. In some provinces, the *Junta de Calificaciones* (where unions have representatives) are the boards in charge of the evaluation. However, this mechanism is usually delayed as a consequence of bureaucratic procedures or political convenience. As a matter of fact, a significant proportion of teachers have been tenured through a different mechanism: *Leyes de Titularización* (i.e. "Tenuring Laws"). These laws apply to hundreds or even thousands of teachers at the same time and do not require teachers to fulfill any condition (such as age or education) in order to be tenured. Tenuring laws are usually consequence of the pressure exercised by teacher unions on the provincial government (see note 33). It is presumed that those teachers who have been awarded tenure through the first mechanism might be the best teachers, but that might not be the case for those teachers who have been tenured through the "tenuring laws." In order to analyze the impact that unions have on the "tenuring" process, it is

between tenure and union political alignment, governors who have a more conflictive political relation with unions are considered to be less likely to accept unions' demands, leading to a lower number of tenured teachers.

Regrettably, reliable data on teacher tenure is available only for the year 1994 (See Table 21 in Appendix), so strong evidence cannot be provided on the relation between union characteristics and teacher tenure. Table 11 correlates the variable TENURE⁴⁴ with different characteristics of unions.

Table 11. Tenure and Unions Characteristics
Correlation Coefficient

Unions Characteristics	TENURE
Membership	0.11
Participation	-0.26
Fragmentation	0.15
Fragmentation II	-0.45
Recognition	0.49
Political Alignment	0.07

The results are neither robust nor clear. Political Alignment and legal recognition are positively associated with TENURE as expected, but only the last coefficient is clearly different from zero. Union fragmentation and density are negatively or positively correlated with TENURE depending upon the proxy that is used.

5.3 Class Size

Teacher unions bargain for higher employment. Therefore, we expect a lower number of students per teacher in those provinces where unions have higher density and lower fragmentation. These expectations seem to be borne out by the data, as shown in Table 12.

necessary to consider their effect on both the *Juntas de Clasificación* and the legislative process (Tenuring Laws). This issue is left for further work.

⁴⁴ TENURE is defined as the percentage of tenured teachers over the total number of teachers in each province.

Table 12. Class Size and Unions Characteristics

Provinces grouped according to the students per teacher ratio	Average number of students per teacher	Union Density (participation)	Union Fragmentation
Less than 15 students per teacher	13.4	6.5 %	1.2
Between 15 and 18	16.6	3.2 %	1.1
More than 18	19.4	3.7 %	1.9

Note: Provinces are grouped according to the average number of students per teacher during the period 1997-1999.

Source: CEDI.

While teacher union characteristics are probably important factors explaining the students/teacher ratio, there are also other variables that should be considered, such as the provincial fiscal situation or regional GDP per capita.

Regarding the econometric specification, the same methodology is applied as that used in the STRIKES regression (pooling the original panel across provinces).

Table 13. Regression Result
Dependent Variable: Students/Teachers
OLS robust⁴⁵

Variable	Coefficient	t-value
Participation	-0.08	-0.62
Fragmentation	0.89	1.52
Recognition	-0.06	-0.06
Political Alignment	1.46	0.95
GDP per capita	-0.001	-4.47
Public Expenditure p/c	-322.5	-0.32
Constant	20.3	8.15
R2	0.42	
Observations	24	

All the coefficients have the expected sign, but none of the union variables is significant at a 90 percent level of confidence. (Only union fragmentation is significant at an 85 percent level of confidence: those provinces where there is only one single union have a lower number of students per teacher). Most of the variation across provinces is explained by GDP per capita: richer provinces have more teachers per student.

⁴⁵ Variables description and basic statistics are in Appendix 2.

In brief, there is only weak evidence to support the proposition that those provinces where teacher unions are “stronger” also tend to have a lower number of students per teacher. As a previous section explored the relation between class size and student performance and did not find any clear pattern, no effect of unions on performance through this channel can be claimed.

5.4 Budget, Composition and Wages

It is expected that stronger unions in terms of density, legal recognition and union monopoly have the ability to obtain higher education budgets and a higher allocation of the budget to salaries. Provincial educational budgets also depend on local revenues, but as Sanguinetti, Sanguinetti and Nicolini (2000) argue, national transfers to the provinces are also important, since the federal coparticipation regime is highly redistributive.

In order to explore these issues three regressions are run. In the first, the dependent variable is the log of public expenditure on education per student. The second looks at the share of public education spent on wages. Finally, the third regression explores the variation in teachers’ wages (relative to the average provincial income) across provinces. The first and third regressions use means from panel data for the period 1997-1999. The second regression is based on information for a single year (1997).

Table 14. Regression Results
Dependent Variable: Educational Expenditure and Wages
OLS Robust

Variable	(t-statistics in parentheses)		
	Public expenditure on Education per student	Share of public education spent on wages	Teachers’ Wages (relative to average income)
Participation	-0.001 (-0.18)	0.003 (1.07)	-0.484 (-0.46)
Fragmentation	0.038 (0.71)	0.014 (0.85)	2.296 (0.25)
Recognition	-0.185 (-1.68)	0.058 (1.89)	21.74 (1.22)
Political Alignment	-0.071 (-0.45)	0.011 (0.28)	-2.448 (-0.84)
Local Revenues	0.417 (8.38)	-0.052 (-4.33)	3.600 (0.56)
National Transfers	0.193 (1.92)	0.070 (2.84)	43.13 (3.06)
Constant	3.603 (4.28)	0.618 (2.82)	-194.8 (-1.49)
R2	0.85	0.61	0.45
Observations	24	24	24

The findings show that public education expenditure per student is higher in those provinces where local revenues and national transfers are higher. None of the teachers' unions variables is statistically significant, and they have the opposite sign of those expected. However, as expected, those provinces where teacher unions have higher density and legal recognition have a higher share of education budget allocated to wages. (Only "Recognition" is significant at a 90 percent level). Regarding the fiscal variables, national transfers have a positive and significant coefficient, but local revenues have a negative effect.

Finally, there is no statistically significant relation between teachers' unions and teacher wages (relative to the average provincial income). The only significant factor is national transfers, which have a positive effect. This leads to the following interpretation. Provinces that are more fiscally responsible (collect more taxes) tend to have higher expenditures per student. and a smaller share of that money goes to salaries. Provinces that are more generously treated by the Federal Government have bigger expenditure per student, but more of this money goes to salaries as they have higher teachers' wages. Provincial teacher unions are basically irrelevant, except that they increase the share of salaries in the education budget.⁴⁶

5.5. Job Satisfaction

In the education production function estimation it is found that the more satisfied the teacher is the better students perform. There is also the presumption that teachers' job satisfaction and union membership are related, so it could be argued that unions affect students performance through their impact on teachers' job satisfaction. However, from a theoretical perspective the relation between unions and satisfaction is unclear. Since the objective of this study is to provide new evidence on the relation between unions and student performance, empirical analysis rather than theoretical discussion will be emphasized.

The *Encuesta de Desarrollo Social* (EDS) provides a useful micro data set to explore these issues. It contains information for 1,534 teachers spread across all the provinces. The data include whether a teacher participates in a labor union, whether the teacher is satisfied with his/her job, and other important characteristics such as gender, age, income, and education.

⁴⁶ This does not mean that teacher unions have no impact. Actually, teachers unions impose strong pressure for higher wages and budgets, but they have do so in a centralized fashion. The most salient recent episode was the so-called "*carpa blanca*," a demonstration organized by CTERA, where teachers engaged in a hunger strike in front of

Table 15. Job Satisfaction and Union Participation

	Are you satisfied with your job?	
	YES (JS=1)	NO (JS=0)
Union Member	7.6 %	12.7 %
Not Member	93.4 %	87.3 %

Source: EDS.

As shown in Table 15, job satisfaction and union participation appear to be negatively correlated. While 12.7 percent of the “dissatisfied” teachers participate in a labor union, only 7.6 percent of the satisfied teachers are union members.

Regrettably, there is not enough information availability to determine the temporal relation between job satisfaction and participation. In other words, it could not be discerned whether job dissatisfaction was a consequence of union participation or whether dissatisfaction preceded the decision to participate in a union. Consequently, the data are not well suited to analyze what this negative correlation means. As mentioned in Section 4.3, there are at least three possible explanations for this pattern: The first is the “voice” argument provided by Freeman and Medoff (1986). The second reason is that unions worsen teachers’ working conditions. The third possibility is that a negative relation between job satisfaction and union participation might be capturing unobserved personal characteristics of the teacher. For instance, teachers who are more prone to conflict and dissatisfaction may also be more likely to join an organization such as a labor union.

From the evidence available, it seems that that the second hypothesis should be discarded (as shown, unions seem to increase teachers’ wages and employment).⁴⁷ The validity of the third hypothesis is explored by analyzing the relation between union participation and satisfaction, controlling for participation in other organizations such as ecological or human rights groups.⁴⁸

the National Congress. This demonstration led to the approval of a special national tax on automobiles to finance wage increases for all teachers throughout the country (the so-called *incentivo docente*, i.e., “teaching incentive”).

⁴⁷ Although that might possibly come at the expense of dissatisfaction along other dimensions; alternatively, unions might raise expectations and demand levels, widening the gap between expectations and actual work conditions.

⁴⁸ Perhaps a better control would be how happy the person is overall, or outside of work. Regrettably, this information is not available. People who join organizations such as ecological or human rights groups, however, may also be more prone to express discontent, and this could provide a good control to explore the validity of the third hypothesis.

Table 16. Job Satisfaction and Participation in Ecological or Human Rights Groups

	Are you satisfied with your job?	
	YES (JS=1)	NO (JS=0)
Participates	2.1 %	1.4 %
Does NOT participate	97.9 %	98.6 %

Source: EDS

A very low rate of participation in these organizations is found, with a slightly higher rate among satisfied teachers. Thus, the third hypothesis might not be an appropriate explanation for the negative relation found between satisfaction and union participation.

Since it is not possible to solve the endogeneity problem between “participation” and JS, the partial correlation between teacher’s job satisfaction (JS) and union participation is examined, “controlling” for age, gender, the teacher’s education, income and participation in ecological or human rights groups.

Table 17. Partial Correlation Coefficients of Job Satisfaction

Variables	Column 1		Column 2	
	Correlation	Significance	Correlation	Significance
Union Participation	-0.05	0.04	-0.05	0.03
Participation in ecological or human rights groups			0.02	0.54
Age	0.07	0.01	0.07	0.01
Gender (female=0)	-0.02	0.54	-0.02	0.53
Teacher’s Education	0.01	0.95	0.01	0.97
Teacher’s Income	0.07	0.00	0.07	0.00
Nº Observ.	1,517		1517	

There is a negative and significant relation between job satisfaction and union participation. It is also observed that the negative relation found in column 1 does not disappear after controlling for participation on ecological or human rights groups (column 2). This result is interpreted as evidence against the third hypothesis. Therefore, as a very first approximation it is concluded that the “voice” hypothesis presented by Freeman is possibly the best argument to explain the negative relation found between job satisfaction and union membership.

6. Conclusion

This paper constitutes a first look at the effects of trade unions on the education sector in Argentina, providing new information and preliminary results on some of the channels of union influence on the performance of this crucial sector.⁴⁹ The next few paragraphs highlight some of these main channels.

First, union characteristics have an important effect on days of class lost to strikes. Days lost are also related to fiscal problems and delayed payment of wages by provincial authorities. Furthermore, the nature of the political relationship between unions and provincial authorities is a factor influencing strike activity. As days of class one of the stronger explanatory variables for student learning, there is a reason to criticize unions in this regard. However, union leaders argue that strikes are an instrument for improving teachers' working conditions, increasing education budgets and consequently improving education outcomes. While the present results do not confirm or refute this claim, they show that the *means* unions use to obtain their demands have strong and negative effects on student learning.

It is also found that unions report an important concern on tenuring teachers, as student learning improves when the teacher in front of the class is a tenured one. But since tenuring also seems to increase absenteeism, it might reduce the actual number of tenured teachers in front of the class, with an uncertain net effect on student learning. Regarding public expenditure on education and teachers' salaries, there is not a strong union effect, except that they increase the share of salaries in the education budget. Budgets and salaries are mainly determined by fiscal variables. Finally, there is evidence that union strength is positively correlated with lower student/teacher ratios, and that union participation and job satisfaction are negatively correlated.

In summary, the impact of unions on students' performance depends on the channel and kind of political market where unions operate, but not on the existence of unions by itself. There are, however, some limitations to this analysis. Only the effect of cross-provincial union characteristics on education outcomes has been considered, and this may understate the total effects of teachers' unions, since much of their activity operates at the national level, by influencing national legislation, overall budgets, etc. Also, there is an "intercept" of union influence in the weakest-union province, which is not estimated; only the marginal effect of

⁴⁹ It is worth noting at this point that there appear to be broader "political" factors not considered in this analysis which might have a bigger impact than union activity on the quality of education in Argentina.

additional union strength in cross-provincial comparisons is considered. This “lower bound” in turn is also related to national level factors. For example, legislation such as the *Estatutos Docentes* (which is uniformly supported by teacher unions throughout the country) has its historical origin in national legislation and is believed to have strong negative incentive effects. The exploration of these issues is left for future work.

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Appendix 1.

The SINEC survey provides information for 23952 students, 1761 teachers and 991 principals.

The next table provides a description of the variables we use and their basic statistics:

Table 18. EPF Basic Statistics

<i>Variable Name</i>	Description	Values	1997 mean	1999 mean
<i>Gender</i>	Student's sex	1 female 0 male	0.50	0.51
<i>Kindergarten</i>	If the student has attended kindergarten	0 no 1 yes	0.87	0.86
<i>Family Size</i>	Density of people living at home	0 to 11	1.50	1.59
<i>Father Education</i>	Father's education	1 Incomplete Elementary school 2 Completed Elementary school 3 Incomplete High School 4 Completed High school 5 Incomplete University formation 6 Completed University formation	3.09	3.01
<i>Mother Education</i>	Mother's education	1 Incomplete Elementary school 2 Completed Elementary school 3 Incomplete High School 4 Completed High school 5 Incomplete University formation 6 Completed University formation	3.17	3.11
<i>Repeated grade</i>	Has the student repeated a course?	1 yes 0 no	0.29	0.25
<i>Family Wealth</i>	Wealth measured in pesos	0 to 17000	8276.47	8910.97
<i>Class Size</i>	Number of classmates		25.18	25.82
<i>Teacher Experience</i>	Teacher's experience	1 if TE is less than 1 year 2 if TE is between 1 and 5 years 3 if TE is between 6 and 10 years 4 if TE is between 11 and 15 years 5 if TE is between 16 and 20 years 6 if TE is between 21 and 25 years 7 if TE is between 26 to 30 years 8 if TE is more than 30 years	3.62	3.71
<i>Dedication</i>	Teacher's dedication at school	1 full- time 0 part-time	0.72	0.64
<i>Teacher Education</i>	Teacher's education	1 Maestro normal 2 prof. enseñanza primaria no univers. 3 prof. enseñanza primaria universti. 4 profesor no universitario 5 profesor universitario 6 profesional universitario	1.98	2.22
<i>Teacher Tenure</i>	If the teacher is tenured	1 yes 0 no	0.61	0.53

Table 18., continued

<i>Variable Name</i>	<i>Description</i>	<i>Values</i>	<i>1997 mean</i>	<i>1999 mean</i>
<i>Class Days</i>	How many schools days she had during the year?	115 if its less than 121 days 125 if it's between 121 and 130 days 135 if it's between 131 and 140 days 143 if it's between 141 and 145 days 148 if it's between 146 and 150 days 153 if it's between 151 and 155 days 158 if it's between 156 and 160 days 163 if its more than 161 days	156.83	120.48
<i>Job Satisfaction</i>	Teacher's Job Satisfaction index	1 Very Low 2 Low 3 High 4 Very High	3.20	2.70
<i>Principal tenure</i>	If principal is tenured	1 yes 0 no	0.38	0.33
<i>Principal Experience</i>	Principal's experience as principal	1 if PE is between 1 and 5 years 2 if PE is between 6 and 10 years 3 if PE is between 11 and 15 years 5 if PE is between 16 and 20 years 6 if PE is more than 20 year	1.80	1.88

When the dependent variable for each case is characterized, language test scores are on average higher than math scores, presenting different means for each year.

Year	Math		Language	
	Mean	median	mean	Median
1997	50.31	47.37	56.03	55.81
1999	49.76	50.00	54.80	53.00

Ciudad de Buenos Aires has the best test results on average for all the tests and years that were analyzed. The other top five provinces are Santa Fe (every test), Mendoza, Buenos Aires and La Pampa (3 out of 4 tests). In the bottom five are Tucuman and Chubut (3 out of 4 tests).

In contrast to the Coleman Report, the present findings include strong evidence that several school and classroom factors affect students' performance. The next table summarizes the findings obtained using the EPF for the 1997 and 1999 math and language evaluations.

Table 19. Regression Result for 1997 Language Test and 1999 Math and Language test
OLS clustered by school
(t values in parenthesis)

Dependent Variable:		log(language'97)	log(math'99)	log(language'99)
Student and Family Factors	Gender (female=1)	0.086 (10.431)	0.005 (0.397)	0.129 (10.547)
	Father's Education	0.001 (0.215)	-0.003 (0.637)	-0.001 (0.355)
	Mother's Education	0.010 (3.391)	0.011 (2.376)	0.002 (1.505)
	Kindergarten	0.048 (3.752)	0.034 (1.610)	0.030 (1.638)
	Family size	-0.015 (3.914)	-0.022 (3.802)	-0.023 (3.977)
	Repeated grade	-0.150 (14.323)	-0.128 (7.101)	-0.145 (9.253)
	Wealth	0.00001 (1.709)	0.00002 (2.172)	0.00001 (1.707)
Classroom Factors	Students/ teacher	0.002 (1.750)	-0.003 (1.874)	-0.002 (1.921)
	Classroom Structure	0.011 (3.063)	0.013 (1.975)	0.012 (1.527)
	Job Satisfaction	0.021 (1.787)	0.031 (1.930)	0.027 (1.847)
	Teacher Tenure	0.002 (0.106)	0.037 (1.261)	0.041 (1.626)
	Teacher's Dedication	0.007 (0.430)	0.001 (0.058)	-0.019 (0.863)
	Teacher Experience	0.009 (1.430)	0.028 (3.133)	0.010 (1.177)
	Teacher Education	0.014 (1.563)	-0.016 (1.476)	-0.017 (1.468)
School Factors	Class Days	0.002 (2.876)	0.003 (1.974)	0.0001 (1.205)
	Principal Tenure	0.037 (1.895)	-0.048 (1.673)	-0.007 (0.308)
	Principal's experience	-0.005 (0.557)	-0.008 (0.769)	-0.008 (0.838)
Observations		11263	9312	8959
R – squared		0.14	0.11	0.14

Appendix 2.

Table 20. Teacher Unionism Across Provinces
(Means for the period 1997-1999)

Province	Participation	Fragmentation	Fragmentation II	Recognition	Political Alignment
Buenos Aires	2.3	4	9.5	1	0.33
Catamarca	3.8	1	7.9	0	0.33
Chaco	3.3	1	6.5	1	1
Chubut	0,1	1	2.4	1	0.33
Ciudad BsAs	4.5	3	3.8	1	1
Cordoba	4.3	1	1.8	1	0.33
Corrientes	3.5	3	4.4	1	0.66
Entre Rios	4.1	1	0.6	1	0.33
Formosa	11.8	2	34.9	0	0.33
Jujuy	1.9	1	2.9	1	0
La Pampa	6.3	1	3.6	0	0.33
La Rioja	0.6	1	2.7	0	0
Mendoza	3.9	1	0.8	1	0.33
Misiones	10.1	1	1.6	1	0.33
Neuquen	13.5	1	1.3	1	0
Rio Negro	12.3	1	1.2	1	0.33
Salta	0.4	2	2.0	1	0.66
San Juan	1.9	1	1.8	1	0
San Luis	7.5	1	6.6	0	0.66
Santa Cruz	7.0	1	2.8	1	0
Santa Fe	0.8	1	0.3	1	0.33
Santiago Estero	2.0	2	8.6	1	1
Tierra Fuego	0.1	1	12.7	0	0
Tucuman	4.7	1	1.1	1	0

Source: CEDI.

Variables

1. Strikes

Description

Variable	Description	Source
STRIKES	Number of class days lost due to teachers' unions strikes.	Authors' calculations based on Ministry of Labor, CTI, and newspapers
Delay	Number of provincial civil service strikes. We consider is a good proxy for payment delays in the public sector.	Ministry of Labor and CTI
Attendance bonus	Attendance bonus as a percentage of wages.	Ministry of Education

Note: The province is the unit of analysis.

Basic Statistics

Variable	N° Obs	Mean	Std. Dev	Min	Max
STRIKES	72	6.13	10.88	0	76
Participation	72	4.60	3.90	0.1	13.5
Fragmentation	72	1.42	0.82	1	4
Recognition	72	0.75	0.44	0	1
Political Alignment	72	0.36	0.33	0	1
Delay	72	3.36	10.85	0	81
Attendance bonus	72	6.08	7.63	0	26

Source: CEDI.

2. Tenure

Table 21. Tenured Teachers across Provinces (1994)

Province	Percentage of Tenured Teachers	Province	Percentage of Tenured Teachers
BUENOS AIRES	59%	MENDOZA	67%
CATAMARCA	32%	MISIONES	58%
CHACO	49%	NEUQUEN	46%
CHUBUT	56%	RIO NEGRO	43%
CORDOBA	65%	SALTA	67%
CORRIENTES	64%	SAN JUAN	63%
Ciudad BS.AS.	57%	SAN LUIS	65%
ENTRE RIOS	56%	SANTA CRUZ	47%
FORMOSA	41%	SANTA FE	59%
JUJUY	65%	SANT. DEL ESTERO	43%
LA PAMPA	48%	TIERRA DEL FUEGO	38%
LA RIOJA	50%	TUCUMAN	61%

Source: Censo Nacional Docente (1994).

3. Class Size

Description and basic statistics

Description	Mean	Source
Number of teachers in primary and public schools	9,999	Ministry Education
Number of students attending primary and public schools	17,248	Ministry Education
Student/Teacher Ratio	9	
Provincial GDP per capita	16.34	
	6538	Ministry of the Economy
Total public expenditure per capita	0.0014	Ministry of the Economy

4. Job Satisfaction

Variables Description

Variable	Description	Source
Job satisfaction	1 if the teacher is satisfied with her job, 0 otherwise	EDS
Participation on ecological or human rights groups	1 if the teacher participates in ecological or human rights associations	EDS
Age	In years	EDS
Gender	1 if male, 0 if female.	EDS
Teacher's education	Number of years of schooling	EDS
Income	Wage, in pesos	EDS

Note: Teachers are the unit of analysis.

Basic Statistics

Variable	If the teacher IS satisfied (JS=1)			If the teacher is NOT satisfied (JS=0)		
	Obs.	Mean	Std.Dev.	Obs.	Mean	Std.Dev.
Union Participation	1,463	0.076	0.265	71	0.127	0.335
Part. ecological or human rights	1,462	0.021	0.144	71	0.014	0.119
Age	1,463	36.419	9.853	71	32.155	8.309
Gender	1,463	0.159	0.365	71	0.183	0.390
Teacher's education	1,448	14.432	1.871	70	14.314	2.137
Income	1,463	501.99	397.18	71	334.80	309.01