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CONFLICT AND POWER: THE TEACHERS' UNION AND EDUCATION QUALITY IN MEXICO*

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Abstract

The teachers' union in Mexico, or Sindicato Nacional de Trabajadores de la Educación (SNTE) represents over 1 million members and is the largest in Latin America. This study uses data from the national student tests administered by the Instituto Nacional para la Evaluación de la Educación (INEE), along with data from the Mexican Ministry of Education and other sources, to investigate the relationship between different measures of union influence and primary student test scores in Mexico. It found that union membership is not merely a function of state student enrollments, but of political and other factors. For example, the number of teaching positions ("plazas") appears to increase with each election period, which might suggest an important avenue of political exchanges that might affect SNTE's influence on education. In addition, the study suggests SNTE is far from a uniform block. Conflict and fragmentation inside the organization are significantly and negatively associated with student test scores. A single dissident section or multiple sections with opposing political inclinations in a state, are associated with lower average student test scores. The influence of the union over educational quality is a complex problem. This paper is presented only as an approximation with the intent of formalizing some of the potential channels through which this relationship becomes evident.

— Key words: teachers' union, education quality, Mexico.
Classification JEL: I20, J51.

Introduction

It is commonly believed that teachers' unions exert great influence over education and that this influence is not always positive (Hoxby, 1996; Moe 2001; Eberts and Stone, 1987). Often, teachers'

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unions are seen as rent-seeking organizations whose top priority is to increase their power and influence, and obtain benefits for their members (Moe, 2001). In countries with only one union or where one union represents a vast proportion of teachers, they can use their monopolistic position over labor relations between the State and the education sector, to benefit their agenda, one that is not always congruent with the goals of efficiency and improved educational quality.

In Mexico, there is some support for the idea of union's as rent-seeking organizations. Even though teachers' salaries rose in real terms over 1996-2004 in virtually all of the OECD countries, some of the largest increases were seen in Mexico (OECD, 2005). These raises were undertaken at a time where educational performance was not seen as improving and despite repeated calls to strike a better balance between wage and non-wage expenditures¹ and to "resist unjustified raises in teachers' real wage" (OECD, 2005). The recent announcement that the Mexican government will budget close to 4 billion dollars annually² to improve teachers' salaries even more was perceived by some as a concession to the teachers' union in exchange for political support during the 2006 elections.³

The *Sindicato Nacional de Trabajadores de la Educación* (SNTE), the national teachers' union in Mexico, represents over 1 million members, and is the largest union in Latin America.⁴ In a recent meeting in Mexico City with academics and the media, representatives from the OECD declared that SNTE was one of the reasons why Mexico placed so low in international educational evaluations (La Jornada, 10/28/06). The majority of Mexican teachers view the union with either distrust or indifference and do not think it contributes to increasing school quality, as a recent opinion survey showed (Ipsos-Bimsa 2006, quoted in Reforma, 12/21/06).

A recent study commissioned by the Ministry of Education, found that the union's large power and the powers granted to it by Mexican Education Legislation, prevent the Ministry of Education of being able to effectively govern the education sector according to its own agenda. (Iaies et al., 2006). In fact, Iaies et al. argue that the fact that SNTE has virtual veto power over education policy and reform, SEP has limited governance over the education system in Mexico.

In 2007, the new government led by President Calderon, named Fernando Gonzalez, son-in-law of SNTE's President Elba Esther Gordillo, as the new Undersecretary for Basic Education, one of the highest ranking positions in the Ministry of Education. Gonzalez' militancy in SNTE as well as his close connection to Gordillo, underscored an imminent conflict of interest. Lastly, even though teachers and other school personnel are government employees as well as Union members, it is the union aspect which seems to dictate their responsibilities and range of action. School administrators and supervisors, for example, have recognized that they respond more to Union

¹ By some estimates, wage expenditures take up more than 90% of the budget in Mexico (OECD, 2004).

² The budget increase will take place gradually, until it reaches the agreed 4 billion dollar annual increase in 6-7 years time.

³ Among those voicing these opinions were prominent op/ed writers such as Miguel Angel Granados Chapa (Reforma, Oct-18-2006), and academics like Carlos Ornelas (cited in <http://www.foros.gob.mx/read.php?3,261508>).

⁴ SNTE's membership figures (as well as most SEP teacher statistics) usually refer to "plazas" or teaching positions. Because teachers and other education workers can hold two or more teaching positions (for example a teacher in a morning shift school, and a school principal in an afternoon shift school), membership numbers overestimate the actual count of individuals belonging to the Union.

than to SEP officials, and that their job descriptions include coordinating and serving as liaisons between the Union and SEP (Iaies et al., 2006).

Although it is generally accepted that the union holds large power over the education sector and to a large degree co-governs it with the Ministry of Education, its influence on education quality is far from being empirically established. Some authors studying education in Latin America argue that unions per se do not have a detrimental effect on quality, but that its impact depends on the channels and political context in which they operate (Murillo et al., 2002; Alvarez, et al., 2006. There have been instances in which the unions and state cooperate to implement and gain consensus for progressive reforms that could be labeled anti-union, but nevertheless need union support to be implemented (OECD, 2005).⁵

In this paper, we use the case of SNTE in Mexico to explore the role of the Union on student achievement. First, we provide a description of SNTE in Mexico, its numerous sections, their political affiliations and the factors that could drive membership and cohesion. Second, using data from national standardized student exams we study the relationship between various measures of union influence (such as union strength and political inclination) and education quality.

We make no claims about being able to precisely model union influence over education quality. The quantitative nature of this analysis requires data. The analysis is limited by data which, on the matter of union influence, are hard to come by, and is only able to provide an approximation to the complex and multidimensional problem of union influence over education quality. Rather, the purpose is to help further our understanding of the complex interaction between union factors and educational quality. By formalizing some of the potential channels through which this relationship becomes evident and providing some empirical observations, we hope to contribute to the literature on teachers unions and education quality in Latin America.

This paper is organized as follows. Section 1 gives a brief background of SNTE in Mexico and describes how it is constituted, its various sections, political inclinations and the factors that help drive membership and union cohesion. Section 2 describes the data and methods used in the analysis of union relationship to educational quality. Section 3 presents our main results and Section 4 concludes.

1. SNTE: Membership and Cohesion

The *Sindicato Nacional de Trabajadores de la Educación* (SNTE) represents over 1 million teachers, school administrators, education bureaucrats, janitors, cafeteria workers, and school aides in Mexico. The majority of its membership is made up of primary and secondary teachers. Because of various legal arrangements (included in the Federal Education Law) SNTE holds a virtual monopoly over labor relations between the education sector and the State. The mandatory fees it collects from members (around 1% of base salary) and the minimal accountability it must

⁵ One example is the implementation in 1992 of the National Modernization Agreement which decentralized education to the states and also instituted the teacher incentive program *Carrera Magisterial*. It has been acknowledged that without the Union's support, this agreement could not have been implemented. The question remains, however, as to whether union influence over these reforms alters them in such a fundamental way that in the long term they come to be regarded as Union wins.

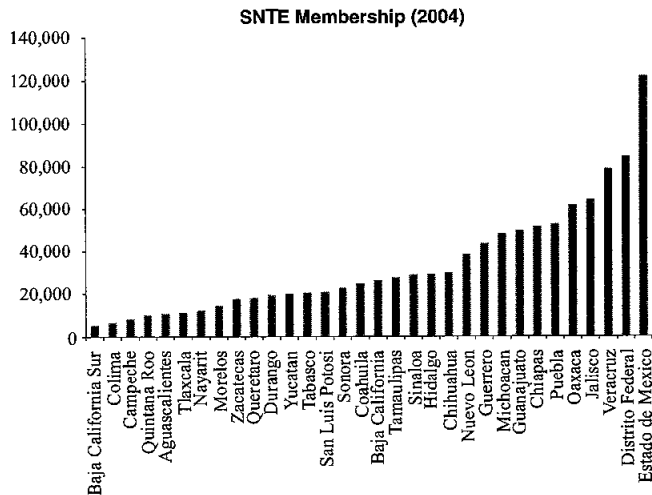
give to its members or the public over the use of these funds, give its leadership enormous financial power. SNTE is governed by one Executive Committee (that is composed of the national leadership) and 55 sections distributed across the country.⁶ Thirty-one of these are federal sections, 19 are state-sections and 5 are “single” sections. One of these sections represents teachers in private schools.

As a starting point, assume that union strength is a function of membership and cohesion. A union that concentrates large numbers of teachers and education workers in a State will be more powerful than one that does not. In addition, a cohesive Union that behaves as a compact unit might be able to exert more influence over government than one that is fragmented and pulled in different directions.

As previously discussed, in terms of members SNTE is a powerful organization. Because all basic education public school teachers must be a part of SNTE, its membership is almost equivalent to the number of basic education teachers in the country.⁷ This number is mainly determined by student enrollments (a function of school age population) and desired class size ratios. Because all teachers have to be members of SNTE, the number of teachers in the country is a fairly accurate approximation of SNTE’s total membership.

Figure 1 shows SNTE membership by state. States such as Veracruz, Estado de Mexico, Puebla, and Jalisco have the largest SNTE memberships.

Figure 1
SNTE Membership by State



Source: Number of Teachers, SEP (2004).

⁶ In December of 2006, a new section was created in the state of Oaxaca, bringing the total up to 56 sections.

⁷ The union, however, also includes as members school administrators (many of whom are also teachers), teacher aides, and other school personnel (e.g. janitors, administrative assistants, etc.).

Figure 2 shows the relationship between growth in student enrollments and growth in the number of teachers at the national level.

Figure 2 suggests that the number of teachers has always outgrown the number of students in the country. This is not entirely unexpected if Mexico had consistently adopted a policy of lower class sizes (fewer students per teachers). This has been the case as shown in Figure 3.

Figure 2
Growth in Basic Education Teachers vs. Growth in Enrollments (1990-2006)

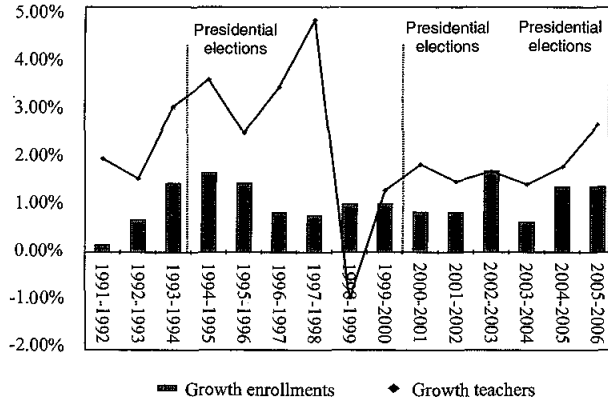
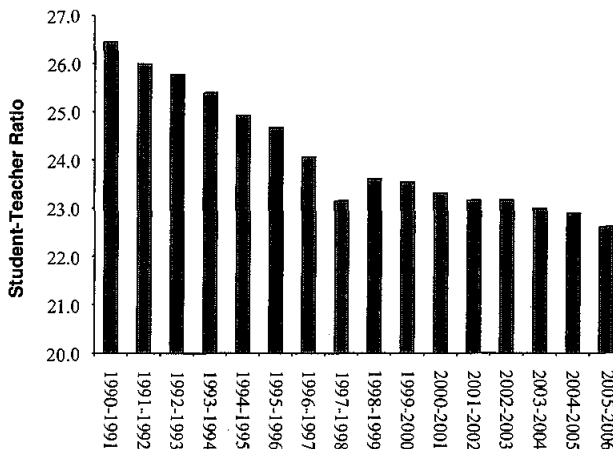


Figure 3
Basic Education Student-Teacher Ratios (1990-2006)



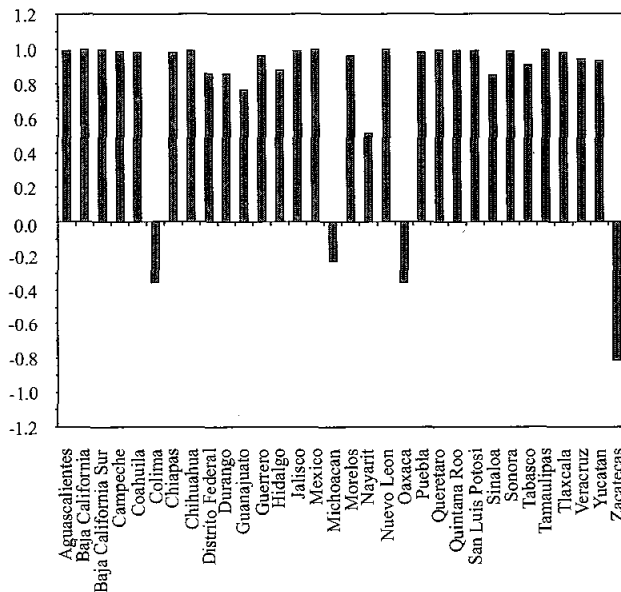
However, the pattern of lower class sizes is not uniform across years. Neither is the pattern of growth in enrollments and teachers. There are years of continuous growth followed by years of continuous decline. Because we don't expect to see any sudden shifts in population growth patterns (at least not from year to year), we explored other factors behind these changes. One is that electoral years could influence the number of teachers that are hired. To explore this possibility we added a marker for election years to Figure 2. In fact, Figure 2 suggests that the two years prior to all federal elections in Mexico since 1990 were characterized by accelerated growth in the number of teachers. The same was true for the year post elections in 1994 and 2000.

Furthermore, if enrollments were the only factor driving numbers of teachers or teacher growth, we would not expect to see large differences by state during this same time period. There are, however, such differences. As Figure 4 shows, the correlation between enrollments and teachers in the period between 1990 and 2006 differed greatly across states, with some states exhibiting high positive correlations and others high negative correlations.

These numbers suggest that while enrollment is one of the primary drivers of the number of teachers in the country, there are other factors driving the number and growth of teachers in the country, and some of them appear to be politically related.

Union strength could be a function of the collective influence or "voice" teachers can exert in each state. Teachers in states where public school teaching is an attractive job, compared to

Figure 4
Correlation between Numbers of Basic Education Enrollments and Teachers by State (1990-2006)



other jobs in the public sector or the formal private sector, could constitute a kind of “elite” (defined as a group of better paid, more educated workers with respect to the state population average). States where teachers are an “elite” group could be characterized by having more politically active sections, with greater influence and strength often used to promote a pro-jobs, pro-benefits agenda. On the other hand, this group of teachers could also act independently to exert their own influence over educational matters, but not through union channels or mechanisms.

Table 1 shows various education and wage differentials for teachers and non-teachers. It suggests that states in which teachers constitute a kind of “elite” (e.g. have higher wages relative to other workers and constitute a larger share of people in the state with higher education, and people in the state working as professionals or technicians), are in fact states that have multiple sections (except for Oaxaca) and are very politically active (particularly the cases of Chiapas, Oaxaca, and Guerrero).

Table 1
Wage and Education Differentials between Teachers and Non Teachers by State

| State | Teachers as a Proportion of People with Higher Education ¹ | Hourly Income Gap among Teachers and Formal Sector Workers ² |
|---------------------|---|---|
| Aguascalientes | 0.10 | 3.35 |
| Baja California | 0.10 | 2.99 |
| Baja California Sur | 0.10 | 3.12 |
| Campeche | 0.12 | 2.71 |
| Coahuila | 0.09 | 3.22 |
| Colima | 0.11 | 3.50 |
| Chiapas | 0.25 | 4.31 |
| Chihuahua | 0.11 | 3.26 |
| Distrito Federal | 0.06 | 2.17 |
| Durango | 0.16 | 4.26 |
| Guanajuato | 0.17 | 3.59 |
| Guerrero | 0.21 | 3.74 |
| Hidalgo | 0.18 | 3.60 |
| Jalisco | 0.10 | 3.19 |
| Estado de Mexico | 0.10 | 2.87 |
| Michoacan | 0.19 | 3.54 |
| Morelos | 0.10 | 3.08 |
| Nayarit | 0.14 | 4.04 |
| Nuevo Leon | 0.07 | 2.63 |
| Oaxaca | 0.33 | 3.79 |
| Puebla | 0.13 | 3.24 |
| Queretaro | 0.12 | 2.68 |

Table 1 (continued)

| State | Teachers as a Proportion of People with Higher Education ¹ | Hourly Income Gap among Teachers and Formal Sector Workers ² |
|-----------------|---|---|
| Quintana Roo | 0.12 | 3.69 |
| San Luis Potosi | 0.11 | 3.44 |
| Sinaloa | 0.10 | 4.03 |
| Sonora | 0.09 | 3.71 |
| Tabasco | 0.12 | 3.60 |
| Tamaulipas | 0.08 | 3.18 |
| Tlaxcala | 0.13 | 3.55 |
| Veracruz | 0.14 | 3.56 |
| Yucatan | 0.14 | 4.16 |
| Zacatecas | 0.19 | 4.12 |

/1 It is defined as people between 25 and 64 years old who finished higher education. Own estimations based on INEE data (2006).

/2 Teachers are elementary school teachers with salaries corresponding to LEVEL A IN CM (majority of teachers are in this level). The income per hour is calculated assuming 10 weeks of paid vacations.

Source: Tabulador SEP (Expenditure Budget, 2004).

The Mexican Institute of Social Insurance (IMSS) is the source of salaries corresponding to the formal sector workers. The income per hour includes labor benefits.

Politically and ideologically speaking, SNTE is far from a uniform block. Even though the union served for decades as a virtual political arm of the *Partido Revolucionario Institucional* (PRI) (Arnaut, 1996; Bayardo, 1993), nowadays many sections within SNTE and even its leadership support other parties and ideologies.⁸ Among the various political or fractions within SNTE, two can be clearly distinguished: the “institutional” faction which is aligned with SNTE’s national leadership (the National Executive Committee), and the “dissident” faction grouped under the *Coordinadora Nacional de Trabajadores de la Educación* (CNTE) and representing more radical, left-leaning ideologies. In states with two or more sections, often both ideologies coexist in the same section. However, even though individual members or groups might identify with moderately or even radical faction, the section’s leadership’s political alignment (either institutional or dissident) determines the section’s official alignment.⁹

Most sections are institutional, but particularly in the central and southern parts of Mexico dissident factions have become very powerful, such as in the states of Michoacan, Guerrero, and Oaxaca. States where the left-leaning *Partido de la Revolución Democrática* (PRD) is the main political force tend to have strong dissident union sections.

Table 2 shows the number of sections in each state as well as section political inclinations.

⁸ The animosity between SNTE’s President Elba Esther Gordillo and Roberto Madrazo, the PRI’s presidential candidate in the 2006 elections was widely known. It is generally believed that just as she had helped Vicente Fox to the presidency in 2000, she also politically maneuvered to defeat Madrazo in favor of Felipe Calderon. Calderon won the election and became Mexico’s President in December of 2006.

⁹ Interview with former section leader, April 2007.

Table 2
Union Characteristics by State

| State | Estimated SNTE Membership | Sections | Political Alignment | Party in Power (2004) |
|---------------------|---------------------------|---------------|--------------------------|-----------------------|
| Aguascalientes | 10,409 | 1 | Institutional | PAN |
| Baja California | 25,993 | 2, 37 | Institutional | PAN |
| Baja California Sur | 4,994 | 3 | Institutional | PRD |
| Campeche | 8,010 | 4 | Institutional | PRI |
| Coahuila | 24,627 | 5, 35, 38 | Institutional | PRI |
| Colima | 6,318 | 6, 39 | Institutional | PRI |
| Chiapas | 51,156 | 7, 40 | Institutional, Dissident | PRD-PAN |
| Chihuahua | 29,546 | 8, 42 | Institutional | PRI |
| Distrito Federal | 84,121 | 9, 10, 11, 36 | Dissident, Institutional | PRD |
| Durango | 19,113 | 12, 44 | Institutional | PRI |
| Guanajuato | 49,122 | 13, 45 | Institutional | PAN |
| Guerrero | 43,219 | 14 | Institutional | PRI |
| Hidalgo | 28,738 | 15 | Institutional | PRI |
| Jalisco | 64,130 | 16, 47 | Institutional | PAN |
| Estado de Mexico | 121,505 | 17 | Institutional | PRI |
| Michoacan | 47,857 | 18 | Dissident | PRD |
| Morelos | 14,203 | 19 | Institutional | PAN |
| Nayarit | 11,843 | 20, 49 | Institutional | PRD-PAN |
| Nuevo Leon | 38,145 | 21, 50 | Institutional | PRI |
| Oaxaca | 61,522 | 22 | Dissident | PRI |
| Puebla | 52,453 | 23, 51 | Institutional | PRI |
| Queretaro | 17,578 | 24 | Institutional | PAN |
| Quintana Roo | 9,884 | 25 | Institutional | PRI |
| San Luis Potosi | 20,501 | 26, 52 | Institutional | PAN |
| Sinaloa | 28,648 | 27, 53 | Institutional | PRI |
| Sonora | 22,562 | 28, 54 | Institutional | PRI |
| Tabasco | 20,262 | 29 | Institutional | PRI |
| Tamaulipas | 27,269 | 30 | Institutional | PRI |
| Tlaxcala | 10,981 | 31, 55 | Institutional | PRD |
| Veracruz | 78,463 | 32, 56 | Institutional | PRI |
| Yucatan | 19,691 | 33, 57 | Institutional | PAN |
| Zacatecas | 17,252 | 34, 58 | Institutional | PRD |

Source for membership: SEP, basic education teachers by state.

Source for section numbers: SNTE webpage.

Source for political alignment: Interviews with union leaders and members and literature review.

In terms of union cohesion (or fragmentation), thirteen states have one section, seventeen states have two sections, one state has three (Coahuila), and Distrito Federal has four.¹⁰ In most states (all except D.F. and Oaxaca), having more than one section is related to states having two parallel teacher systems: federal and state. Federal teachers (“federalizados”) are paid and hired centrally, while state teachers (“estatales”) are hired and paid by the state education system. Federal teachers work in schools that are officially property of the federation, and state teachers work in state schools. These parallel systems are the result of a decentralization reform that never quite decentralized education to all states.

2. Methods and Data Description

The analysis focuses on trying to answer the following research question: what is the relationship between union force (determined by strength and cohesion) and student achievement?

To answer this we will first estimate a base model of the form:

$$Y_{its} = \alpha + \beta_1 U_e + \beta_2 STU_i + \beta_3 FAM_i + \beta_4 T_{ts} + \beta_5 SCH_s + \beta_6 MUN_m + \varepsilon_{its} \quad (1)$$

Where:

Y= Achievement (in primary) of student *i*, taught by teacher *t*, at school *s*

U= Union relevant variables (at the *e* or state level)

STU = Control variables at the individual student level *i*

FAM = Control variables at the family level for student *i*

T = Control variables at the teacher level for teacher *t* at school *s*

SCH = Control variables at the school level for school *s*

MUN = Control variables at the municipal level for *municipio m*

The model is estimated cross-sectionally using individual-student level data for 2004. Due to survey design, results are representative at the state level. The variables of interest are those related to the Union. A second model will be estimated adding controls for public education accountability.

One common methodological concern with cross-sectional models attempting to capture the relationship between student achievement and a set of explanatory variables is that by not including potentially relevant variables some of the relevant coefficients in the model might be biased. Bias of the kind arises when there is an omitted variable that is correlated both with the outcome of interest and one or more independent variables.

¹⁰ Recently, the state of Oaxaca has a new section with institutional leanings. It was created by SNTE’s national executive committee after the massive teacher strikes of 2006. Its purpose is to counteract Section 22’s dissident positions.

This could happen, for example, when there is sorting of teachers in schools or classrooms with higher ability students, or sorting of high ability students into certain kinds of schools. If this were the case, coefficients on the variables trying to measure teacher or school quality would likely be biased since certain kinds of teachers (not necessarily the more competent ones) are more likely to sort into higher-ability classrooms, and certain kinds of schools (not necessarily the ones with higher quality) are likely to receive disproportionate shares of high performing kids. When this is the case, omission of relevant variables such as individual student ability or family and teacher preferences is often the main cause for the bias.

These concerns are usually alleviated either by using more data to generate proxies of those variables or using fixed effects with longitudinal data. These kinds of data, unfortunately, are not available for this study. There are some reasons to believe, however, that this kind of bias possesses less of a threat to the validity of the results in the case of this analysis.

First, the Estandares data set is rich in individual, family, teacher and school level variables. It includes measures of students' motivations and expectations, as well as teachers' education, socio-economic status, and satisfaction. Although these variables might not be able to fully or even adequately capture the full range of influences over student achievement, they can help diminish omitted variable bias. Second, in this analysis the variables of interest are aggregated at the state level. Therefore, it is reasonable to assume little or no sorting of more or less able students at this higher level of aggregation, since States are expected to have more or less similar student ability distributions. Variations in school and teacher factors can be controlled by including state-level measures that could influence these variations such as state income, development indices, level of urbanicity, etc. Provided relevant factors such as income, SES and other relevant variables at both the individual and state level can be controlled for, the bias is likely to be reduced.

To address some of the limitations of the cross-sectional model and also to look at other outcomes besides test scores (quantity outcomes, for example), we also estimate a short panel model using data on state-level absorption rates from 2000-2006. Independent union and state variables include most of the variables used in the previous model.

Variables and Data Sources

The full list of variables that will be used in this analysis as well as sources of data and dates available can be found in Table 3.

Table 3
Variables and Data Sources

| Conceptual Category | Variable | Data Source | Variable Description |
|---------------------|---|-------------|--|
| Education Quality | Student achievement in Spanish and Math | INEE | Average test scores of 6 th graders in Spanish and Math in Estandares (2004). Scores are at the school level. |
| Union Membership | SNTE Membership per capita | SEP | Number of teachers by state over total adult (ages 18-64) population (2005) |

Table 3 (continued)

| Conceptual Category | Variable | Data Source | Variable Description |
|--|--|--|--|
| Union cohesion | Sections | SNTE's webpage | Number of SNTE sections in each state (2005) |
| | Political alignment | Literature, interviews with experts and SNTE Members | Political inclination of each SNTE section. Categorized as mainstream (aligned with the executive committee of SNTE), dissident (CNTE), moderate dissident, moderate mainstream, no clear alignment. |
| Teacher influence (as a group) | Salary gap | IMSS and SEP (Tabulador) | Average teacher salaries as a proportion formal employee salaries in the state (includes benefits and it is adjusted for vacation) |
| | Teachers as proportion of people with higher education | SEP, INEE and CONAPO | Teachers as a proportion of population with higher education |
| | Teachers as proportion of professionals and technicians | SEP and PNUD | Teachers as a proportion of population employed as professionals or technicians in the state |
| Civil Society demands | Competitive entry into teaching | SEP | Whether state has a competitive exam for obtaining a teaching position (2005) |
| Student Controls | Gender, age, mothers' education, expectations | INEE | Context questionnaires of Estandares (2004) |
| Teacher Controls (averaged at the school level) | Teacher highest degree earned, seniority, SES, etc. | INEE | Context questionnaires of Estandares (2004) and averaged at the school level. |
| | Teacher satisfaction, adm. support, and working conditions | INEE | Context questionnaires of Estandares (2004) averaged at the school level. Indexes constructed using factor analysis. |
| School Controls | School resources | INEE | Context questionnaires of Estandares (2004) averaged at the school level. Indexes constructed using factor analysis. |

To measure student achievement (a proxy for educational quality) student results in *Estandares Nacionales* (2003-2004), the national standardized test designed by the *Instituto Nacional de Evaluación Educativa* (INEE) and administered to a nationally representative sample of primary and secondary students in Mexico are used. Data from this test are available for the 2004 application. The test is given to students in 6th grade (primary) and 3rd grade (secondary) in Spanish and Math. We focus only on primary students.

As part of *Estandares*, students and teachers fill out a context questionnaire containing questions about family factors (socio-economic status, learning environments and opportunities), teacher quality (education, professional development, school administrative support), and school factors (school facilities and resources, etc.). Answers from these questionnaires are used as control variables for students, families, teachers, and schools.

Union strength is measured using SNTE membership per capita in each state (total number of basic education teachers in the state over total adult population). To measure fragmentation (or cohesion) the number of SNTE sections in each state is included. Several variables such as the number of teachers as a proportion of the people in the state with higher education as well as the salary gap between teachers and formal sector employees in the state are included.

To control for other potentially important influences on student test scores, we include the municipal human development index (as a measure of socio-economic status of the community), the average educational attainment of the population aged 15 and over, and whether the state has instituted competitive exams for entry into the teaching profession. Nineteen out of the 32 states in Mexico have implemented a system of competitive entry into teaching. Most of these systems have been around for a few years, and are found in states as different as Chiapas and Colima.

3. Results

Descriptive statistics for the variables used in these analyses can be found in Table 4. Table 5 shows the coefficients of interest of estimating Equation (1). The first column shows estimation for the model that includes the union variables of interest in a model with student, school, teacher, family, and state controls. Column Two shows results from a similar model that adds a reform variable measuring whether the state has instituted competitive entry into teaching.¹¹ Column Three estimates this same model excluding Mexico City.

The results suggest that SNTE membership (per capita) in the state is not significantly correlated with achievement in any of the models. Having more than one union section in the state, however, seems to be positively associated with student achievement. The effect size is

¹¹ We decided against using a measure of state evaluation system, (using rankings given by state education authorities) because of the endogeneity in this variable with student achievement. This state evaluation system was constructed by us with the purpose of including it in our analysis. But, we found, for example, that states with developed evaluation systems could include relatively well-off states such as Aguascalientes and Colima, as well as states that normally don't do well in student achievement such as Chiapas and Coahuila. This could suggest that evaluation systems affect achievement, but that achievement also determines which states put more effort into developing their evaluation systems. Second, upon further investigation (mainly through additional interviews) we became concerned that the rankings suffered from great measurement error, as some of the rankings were not robust to other peoples' opinions of their state's evaluation system.

Table 4
Descriptive Statistics of Variables Used in the Analysis

| Variable | Mean | Std. Dev. | Min |
|--|-------------|------------------|------------|
| Student test scores | 43.073 | 14.401 | 7.000 |
| Student's age | 11.883 | 0.873 | 10.000 |
| Student speaks Spanish (1-Yes, 0-No) | 0.906 | 0.291 | 0.000 |
| Student's mother is literate (1-Yes, 0-No) | 0.902 | 0.297 | 0.000 |
| Family lives in house with electricity (1-Yes, 0-No) | 0.926 | 0.262 | 0.000 |
| Hours worked by teacher | 8.610 | 8.420 | 1.000 |
| Teacher's mother has primary or less (1-Yes, 0-No) | 0.804 | 0.397 | 0.000 |
| Teacher is female (1-Yes, 0-No) | 0.478 | 0.500 | 0.000 |
| Teacher speaks Spanish (1-Yes, 0-No) | 0.864 | 0.343 | 0.000 |
| Teacher lives close to school (1-Yes, 0-No) | 0.817 | 0.387 | 0.000 |
| Teacher seniority | 18.217 | 8.914 | 0.000 |
| Teacher took professional development (1-Yes, 0-No) | 0.765 | 0.424 | 0.000 |
| Teacher has Normal Basica (1-Yes, 0-No) | 0.059 | 0.235 | 0.000 |
| Teacher has Normal Basica four-year plan (1-Yes, 0-No) | 0.245 | 0.430 | 0.000 |
| Teacher has Normal Superior (1-Yes, 0-No) | 0.163 | 0.369 | 0.000 |
| Teacher has University degree in education (1-Yes, 0-No) | 0.199 | 0.400 | 0.000 |
| Teacher has University degree in other (1-Yes, 0-No) | 0.036 | 0.187 | 0.000 |
| Teacher has Masters degree (1-Yes, 0-No) | 0.047 | 0.211 | 0.000 |
| Teacher has PhD (1-Yes, 0-No) | 0.000 | 0.021 | 0.000 |
| School stratum | 2.461 | 0.831 | 1.000 |
| School shift | 1.207 | 0.542 | 1.000 |
| IDH Index (Municipal Level) | 0.776 | 0.068 | 0.414 |
| Number of SNTE sections in state | 1.709 | 0.528 | 1.000 |
| SNTE membership per capita in state | 0.026 | 0.005 | 0.020 |
| Single section dissident (vs. single section insitucional) | 0.058 | 0.234 | 0.000 |
| Multiple sections institutional (vs. single section institutional) | 0.648 | 0.478 | 0.000 |
| Multiple sections mixed (vs. single section insitucional) | 0.025 | 0.156 | 0.000 |
| Wage differential between teachers and non-teachers | 3.453 | 0.447 | 2.627 |
| Teachers as a proportion of population with higher education | 13.203 | 4.977 | 7.123 |
| State has competitive entry into teaching (2005) | 0.608 | 0.488 | 0.000 |
| Average years of schooling of population aged 15+ | 7.907 | 0.777 | 5.960 |
| N | 40,469 | | |

Table 5
Results

| | Model 1 | Model 2 | Model 3 (without Mexico City) |
|--|-------------------|-------------------|--|
| Number of SNTE sections in state | 1.81 (0.41)** | 1.48 (0.39)** | 2.07 (0.47)** |
| SNTE membership in state | 83.57 (-58.44) | 83.77 (-58.41) | 98.17 (-59.27) |
| Single section dissident (vs. single section institutional) | -3.87 (0.49)** | -4.15 (0.50)** | -4.18 (0.50)** |
| Multiple sections institutional (vs. single section institutional) | -1.13 (0.48)* | -0.92 (-0.47) | -1.56 (0.55)** |
| Multiple sections mixed (vs. single section institutional) | -3.16 (0.97)** | -3.05 (0.96)** | -3.30 (0.94)** |
| Wage differential teachers and non-teachers | 0.97 (0.27)** | 0.85 (0.26)** | 0.61 (0.26)* |
| Proportion teachers of population with higher education | 0.32 (0.07)** | 0.33 (0.07)** | 0.31 (0.08)** |
| State has competitive entry into teaching (2005) | | -0.58 (0.25)* | -0.71 (0.25)** |
| Observations | 42169 | 42169 | 41228 |
| R-Squared | 0.92 | 0.92 | 0.92 |

Notes: Standard errors in parentheses. * significant at 5%; ** significant at 1%. Effect sizes are interpreted as the magnitude of the change in terms of standard deviations in the dependent variable, for a change in one standard deviation in the independent variable. Dependent variable in all models: Total student-level score in Estandares test, for 6th grade students (2003-04). Control variables for Models 1 and 2: student age, native language, mother's education, house has electricity, teacher hours worked, teacher's education and seniority, professional development, teacher's mother's education, teacher speaks Spanish, teacher lives near school, school SES stratum, school shift, pupil-teacher ratio, municipal human development index, and average education attainment of 15 year olds in state.

close to 0.07 of a standard deviation in student test scores. This result is consistent with the hypothesis that authorities facing more fragmented union groups in their states could find it easier to advance their quality agendas. It could also be driven, however, by other factors. Recall from Section 1 that states with two sections are those in which federal and state education systems were kept parallel after the decentralization reforms of 1992. States with only one union section are usually states that received full control of all schools and personnel after decentralization. These states do not have federal school systems.

In states that have both, the two systems could be having differential effects on achievement. For example, the federal system might be better paid, is able to recruit better teachers, or could have

better school resources than the state system. Unfortunately we cannot test this hypothesis because we do not have the data that would allow us to say whether a section was state or federal, and, more importantly, to assign students to each of these sections so their average student test scores could be known.

This last result appears to be washed out once we include the political alignment of the state section(s). The coefficient for the interaction between number of sections and political inclination, suggest a negative correlation with test scores any time the state does not have a single institutional section. The largest effect is found for a single dissident union section (vs. a single institutional section). Having multiple sections is also related to negative student test scores if these sections are all institutional (vs. a single institutional section), or worse if the multiple sections have contrasting inclinations (one dissident, one institutional, for example). These coefficients are statistically significant in all models. It is possible that states with co-existing opposing sections (or a single, but dissident section) have more conflict and this results in lower student achievement, all else equal.

We posited that teachers would constitute an “elite” in the state if they had high relative wages (compared to other professionals) and represented a high proportion of people in the state with higher education. We argue that results shown in Table 5 suggest that when teachers represent a higher proportion of people in the state with higher education, this is positively related to student test scores (effect size around 11% of a standard deviation). Even though we argued in Section 1 that if teachers constituted more of an “elite” group in the state this could give the union more force in those states, this result is far from straight forward.

By running simple correlations we found a negative correlation between teachers representing higher proportions of people with higher education in the state and most socio-economic indicators (average educational attainment, human development index, etc.). In fact, states where teachers constitute an “elite” are among the poorest ones: Chiapas, Oaxaca, Guerrero, and Zacatecas (see Table 1) And, the simple correlation between this variable and student test scores is negative. Once the full regression model with all controls is run, however, the relationship is positive.

Second, there is a positive correlation between teachers representing higher proportion of people with higher education in the state and union membership, and a negative correlation with union fragmentation (total number of sections). These results would suggest that the union is stronger and more cohesive in states where teachers constitute an “elite.” (defined in this way).¹² In these states, teachers as a group, could have more “voice” to obtain more resources (for their schools, students, and themselves), which could result in higher learning.

A simpler explanation would suggest that these states have higher teacher quality, because depressed formal sector wages and uniform teacher salaries allow the education sector to recruit more qualified people (relative to other states).

¹² This could help explain why these states also show higher relative wages for teachers. It might be the case that in these states teachers have more “voice” and are able to organize more effectively to obtain their demands (e.g. higher wages). The high wage differential, however, could be more a function of depressed formal sector salaries (the denominator) than high teacher salaries (the numerator), since teacher wages depend on a highly uniform wage schedule. In addition, in the teacher labor market wages might not be a sign of productivity, because of greater market rigidities and imperfections (much more so than in other labor markets).

To disentangle the quality effect from the potential “voice” effect, one could control for teacher characteristics related to quality. The model includes control variables for teacher education, seniority, professional development, and socio-economic status. These are not perfect markers of teacher quality, but they control some of the variation.

Assuming these controls remove some of the influence of teacher quality over test scores, the positive relationship between “teachers as an elite” and student test scores might suggest that something related to teachers’ collective influence over education in the state might be at work. Read this way, the model would predict that holding all variables at their mean values (average student socio-economic status, average teacher characteristics, average urbanicity, single institutional section, average membership per capita, etc.), a more influential teacher group could in fact be related to higher student achievement.

One key problem, however, is that this analysis does not allow us to observe whether this influence is manifested through union activities or through teachers’ independent actions to improve scores. For example, teachers in states where they represent a higher proportion of people with higher education could hold more status with parents or communities. This higher status might lead to teachers having more influence over them in educational matters such as parental involvement in student learning, community participation in education, etc. To the extent that their influence derives in activities that could improve student learning, this could help explain part of the positive relationship between this variable and student test scores. Unfortunately, we do not have data that would allow us to qualify how this variable affects achievement, whether it is through union influence or independent activities. Furthermore, we are not certain our teacher characteristic controls are able to fully remove the influence of teacher quality this over achievement (particularly in this cross-sectional setting). We do believe, however, that this result is worthy of further exploration.

Lastly, Model 2 includes a variable measuring whether states had competitive entry into teaching. This variable is negatively related to student test scores, suggesting that states that implement competitive entry reforms have lower student achievement. We do not want to read too much into this result, because of possible endogeneity concerns. It could be argued that those states who instituted competitive entry into teaching reforms were compelled to do so precisely because of quality concerns. That is, achievement is not a function of the reform. On the contrary, reform is a function of achievement. Moreover, the effect of competitive entry into teaching might be more a sign of the state reform vision than an actual teacher effect. These competitive exams apply only to new entrants into the profession, which constitute the vast minority of the teacher workforce. It might be years before the effects of these reforms are actually observed on teacher quality (and then on student learning).

Although this concern is valid, we include the result because states that have implemented these reforms are a mixed bag in terms of achievement. They include Chiapas, Guerrero, Michoacán and Nayarit (among the lowest performers), and Nuevo León, Colima, Tamaulipas and Jalisco (among the better performing states). This suggests that states implement these reforms for many other reasons beyond student test scores.

4. Concluding Remarks

Several findings emerge from the descriptive section of this paper that justify future research. The fact that the number of teachers increase with every election period is likely related to the Union's influence over elections and the concessions it is able to obtain from the government in exchange for increasing its membership. In addition, the fact that the correlations between numbers of teachers and student enrollments vary so much across states probably warrants some more attention to try to understand the factors driving the size of the teacher workforce in each state. The results presented in this section appear to suggest that union membership (measured by number of teachers) is not only a function of student enrollments, but that political and other factors might also play an important role.

The paper showed that SNTE was far from a uniform block, and that it was in fact composed of many sections with varying political leanings. Fragmentation and conflict among union sections are more strongly (and negatively) related to student test scores than only union membership per se. In particular, having dissident sections or having two or more politically opposed union sections in a state, is a significant predictor of negative student results.

The results from this paper contradict the view of SNTE as a monolithic entity. In a context where SNTE's strong influence over the education sector is a reality not likely to change any time soon, a state is better off having a single union section that is aligned with SNTE's national executive committee (the institutional faction), than multiple sections or (even worse) dissident sections. The channels through which fragmentation affects test scores are not evident. We can only speculate that fragmentation or dissidence might brew more local conflict which in turn negatively affects students. This could be due to more teacher strikes, or more intense political activity which might distract teachers from their day-to-day teaching duties. Or, it is possible that whatever gains SNTE makes from exercising its muscle in political and other battles, states that are aligned with it are more likely to be rewarded.

Attempting to measure the direct effect of SNTE (or teachers unions in general) over student test scores is a challenging task. Attempt to capture complex political, economic and even cultural relations embedded in the interplay between the union and education quality with a simple model utilizing cross-sectional data might seem futile. Our attempt in this paper is not to provide a definitive answer to the question of how unions affect student achievement, but to try to structure the debate of union influence over education quality in by decomposing the various channels through which unions might derive their power and influence and ultimately, through their actions, affect student learning. Much more research is needed to better understand the important topic of Union effects on education quality in Latin America.

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