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Public Service Delivery
in Basic Education:
Institutional Arrangements,
Governance and
School Results in
Chile and Uruguay

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ABSTRACT

This research is based on an international comparative study that sought to analyze the effects of educational governance on the quality of basic education in two Latin-American countries: Uruguay and Chile. Educational governance is operationalized using four factors: (i) decentralization, (ii) accountability, (iii) provision and financing, and (iv) incentives. The comparison between Chile and Uruguay is extremely relevant as the relative similarity between the two countries in terms of their educational achievements allows for comparisons beyond the specific national contexts while accounting for possible path dependency on national and historical factors. Through the use of a mixed-methods approach — using statistical techniques and approximately 60 semi-structured interviews with different key players in the education field — the study illuminates some very interesting mechanisms through which governance has influence on quality. The main findings are that, contrary to some assertions made by policymakers, institutional arrangements matter but a) they are not the main explanatory variable and b) when they matter, they do so in a multi-directional way. The study finds that the association between governance variables and results, as measured in PISA explains a very small portion of the differences in achievement results in the two countries. We estimated that greater autonomy in the allocation of resources and in publishing the results accounts significantly for the differences in mean scores. Additionally, the study finds that the relationship between the differences in governance and outcomes for these two countries is *mostly* mediated through an intermediate output variable: school progression. Thus, school progression in secondary education largely explains the differences in outcomes between Uruguay and Chile.

Keywords: Governance, basic education, accountability, decentralization, incentives, financing, Latin America

JEL Classification: I21; I22; I28

RESUMEN

El proyecto se basó en un estudio comparado internacional que tenía por objetivo analizar los efectos de la gobernanza educativa en la calidad de la educación básica en dos países latinoamericanos: Uruguay y Chile. La gobernanza educativa fue opeacionalizada en torno a cuatro factores, a saber: descentralización, rendición de cuentas, provisión y financiamiento e incentivos. El estudio no analiza estos factores estáticamente, sino que pone el foco en la interacción entre ellos y los diversos actores del campo educativo. La comparación entre ambos países es extremadamente relevante dadas las similitudes entre ambos en resultados educativos en un contexto de bifurcación por senderos diferentes en los últimos años. Combinando un análisis estadístico con la realización de aproximadamente sesenta entrevista semi-estructuradas a actores claves de la arena educativa, el estudio ilumina algunos mecanismos interesantes a través de los cuales los factores de gobernanza influyen en los resultados. Los hallazgos principales son que, contrariamente a lo que afirman muchos hacedores de políticas públicas, los arreglos institucionales importan pero a) no son la principal variable explicativa y b) no operan de forma unidireccional.. El estudio encuentra que mayor autonomía en la distribución de recursos y la publicación de resultados da cuenta de ciertas diferencias entre las medias de los dos países. Por otro lado, un hallazgo relevante es que la relación entre gobernanza y resultados educativos está básicamente mediada por una variable intermedia: el avance escolar. Es decir, el avance escolar en la educación media explica una parte importante de la diferencia en los resultados entere Uruguay y Chile. Por otro lado, la autonomía escolar en la distribución de recursos importa para determinar el grado de avance escolar.

Palabras claves: Gobernanza, educación básica, rendición de cuentas, descentralización incentivos, financiamiento, América Latina

Clasificación JEL: I21; I22; I28

INTRODUCTION

Even though Latin America has made significant progress in terms of improving access to basic education, there is considerable evidence to suggest that the region is still struggling with equity and quality issues. With the objective of overcoming this problem within the education systems, many countries in the region went through the processes of educational reforms during the 1990s. Consequently, educational governance came to be considered as an important ingredient for successful educational policy reforms (UNESCO 2009).

In general terms, educational governance is related to a group of formal and informal institutions through which different actors come to decide upon changes in the policy realm (Martinic and Elacqua, 2010; GDN 2010). Governance is by and large related to state´s ability to enforce laws but also to the capacity of several actors to hold the state accountable to their public (GDN 2009). Underpinning this analysis is an institutional perspective that understands institutions as "the rules of the game" that are many times explicitly stated but are oftentimes implicitly taken for granted in a society (North 1995). These rules condition the preferences and strategies of social actors who have a stake in them and who significantly affect the power relations and dynamics of a society as well as the efficiency of the public policies implemented.

This research seeks to improve the current understanding of the effects of institutional arrangements and governance on basic education through a cross-national comparative study between Uruguay and Chile. It seeks to test the hypothesis that differences in institutional setups of education systems affect the equity and quality of basic education delivery. The study will seek to provide empirical insights into:

- the overall explanatory power of institutional variables and school organizations on student achievement in Uruguay and Chile
- the individual effect of governance factors on educational quality and equity
- the factors that could be altered in order to improve average learning and reduce inequality in student achievement.

The research considers four main governance factors: (i) decentralization, (ii) accountability, (iii) provision and financing, and (iv) incentives.

All the governance factors prioritized in this study constitute fundamental rules of the educational system and as such, have far-reaching effects on its nature and characteristics. However, these factors are not immutable or static but rather dynamic and up for contestation by several actors who position themselves and interact around them. Contemplating the several actors who interact with these "rules of the game" and their interests allows us to account for the socially constructed nature of educational governance.

Adopting a mixed-methods approach and statistical techniques to estimate an Educational Production Function (EPF), using Ordinary Least Squares (OLS) and approximately 60 semi-structured interviews with different key players in the education field, the study illuminates some very interesting mechanisms through which governance mediates the education results.

The comparison between Chile and Uruguay is extremely relevant. Both have traditionally been considered "educationally advanced countries" in the Latin American context and, even though they had similar institutional setups in the past, they have followed divergent paths in terms of public service delivery in basic education since the 1980s.

The report begins by comparing the two countries under study in terms of their educational systems. It then presents the main theoretical framework of the research by exploring each of the factors in question and discussing their importance in structuring educational governance. The theoretical section also raises important controversies that have emerged regarding the effect of each governance factor on quality and equity in education. After a succinct presentation of the methodology employed for collecting data and analyzing the research questions, the paper presents the main research findings.

1. PRESENTATION OF THE NATIONAL CASE STUDIES

In this section we will briefly characterize each of the specific national cases under study, Chile and Uruguay, specifically in terms of their educational governance. We will do this in order to begin to assess — first theoretically and then empirically — how different "regimes" of education have provided different institutional arrangements that have impacted the way the education systems operate. Due to the complexity of each case at hand, the analysis mainly applies to the last three decades (since the transition to democracy), with emphasis on the processes of educational reforms that took place in the 1990s.

As in the rest of the Latin American region, Chile and Uruguay came out with intense educational reforms even as they adopted divergent institutional setups. This section presents a general categorization of both countries with regard to their educational institutions in order to provide a background of the main differences between them.

The focus of this research is on educational governance, which can be defined as the complex interplay between the existing institutions, norms, rules and values (GDN 2009) — some of the myriad factors that make up the institutional tissue that shapes the relations between the different actors (and their interests) in the process of defining the public agenda in education.

Chile established one of the most extensive decentralized systems among the Latin-American countries. The transformation took place in the 1980s under the military government and involved the transfer of responsibility of schools to the municipal districts. The main feature of this process was the transfer of administrative responsibility of public schools (initially 87 percent of them) to the municipalities (Gershberg and Meade, 2006; Aedo 2003). The assumption behind the educational reform was to allow "greater accountability for the educational clients" (Burki, Perry and Dillinger, 1999, cited in Meade and Gershberg, 2006).

The Ministry of Education (MINEDUC) is responsible for the financing of the service; the definition, approval and supervision of educational policies; the distribution of texts; and the evaluation of educational achievements. The municipalities are in charge of the administration of public schools. That is why Cox (2007) has referred to this structure as a "dichotomy set by law." This process of a thorough pro-market reshaping of the Chilean educational system represented a transition from a state matrix of service delivery (the classic "teaching state") to a decentralized model of subsidies to demand, becoming the paradigm of liberal transformation of education for both defenders and detractors (Rhoten 2004; García Huidobro and Cox, 1999). This major transformation of the educational system took power

away from certain actors (for example, the state) and gave it to newcomers engaged in the process of management and provision of education (such as the municipalities and the private system).

The Chilean experience is an example of an educational system based on subsidies to demand, where schools (private and public) receive subsidies depending on the number of matriculated students. This policy of shared funding supported the expansion of private providers (Bogliaccini and Filgueria, 2003). The main objective in this change of model was to increase — through competition between schools — parents' free-choice and, through this mechanism, improve the overall quality of the educational service (Mizala, Romaguera and Ostoic, 2005). This model has given great importance to the Assessment of Educational Quality (SIMCE) managed by the Ministry of Education, a system that has focused on guaranteeing the parents/consumers the right to choose from among educational units competing freely in the market, with minimum intervention of the central government.

Uruguay followed a divergent path to that of Chile. Since its democratic restoration in 1985, the several impulses to intensify decentralization have failed. The education system works in an extremely centralized and hierarchical way. All decisions — from administrative matters to curricular frameworks — are taken in the capital city of Montevideo and uniformly enforced throughout the country. This centralized model has been defined as the "de-localized" system, since all of the administrative, managerial and financial roles are confined to the jurisdiction of the national government. The *National Administration of Public Education* (ANEP) is the main regulator, provider and evaluator of the educational services in the country. Thus far, the national assessment system has supported the concentration of authority at the central level. Even though it regularly evaluates public and private schools, it has privileged the analysis of socioeconomic factors on student performance, over other variables such as school management or internal efficiency of the educational system.

In this country, most of the educational centers are public and state-run, versus a private sector that gathers around 15 percent of the enrolment in basic education. The debate over municipalization and subsidies to the private sector has not even figured in the public agenda. Private education does not receive any direct subsidies and its budget is basically regulated by supply and demand, without any restrictions on behalf of the state.

In summary, Chile and Uruguay had similar educational systems in the past but over the last decades the two countries have adopted divergent institutional arrangements. Chile handed over the administration of schools to municipalities and consolidated the subvention system. Uruguay has been faithful to its historically state-centralized educational matrix. The Chilean model gives great importance to management control through results while Uruguay has limited use of the student test scores for any control of schools. Ravela (2002) distinguished between national assessment systems with "strong" consequences that involve sanctions, such as in Chile, versus national assessment systems with "weak" consequences such as in Uruguay, where the results are only used for informational and formative proposes. In this second case, the test results are generally handled as aggregates. Therefore, they only affect the definition of educational policies at the macro level (Aristimuño and Kaztman, 2005). Table 1 summarizes the main characteristics of each of the countries when considering the educational factors under study.

Table 1. Governance factors in the educational sector in Chile and Uruguay

Factors	Chile	Uruguay
Decentralization	Decentralized model in which schools are administered by local governments ("municipios").	Extremely centralized and hierarchical model.
Provision and financing	Subsidies to demand	Classic "teaching state" model, no subsidies to demand.
Incentives	Teachers' incentive system based on students' results.	Implementation of very few incentives.
Accountability	Information on school quality disseminated to the community to promote parents' choice and competitiveness among schools.	Information on school quality used for decision making but rarely disseminated to the public.

Source: Elaborated by authors.

2. LITERATURE REVIEW AND CONCEPTUAL FRAMEWORK

2.1 DEFINING EDUCATIONAL GOVERNANCE

The concept of "educational governance" has evolved in tandem with the general concept of "governance". The emergence of the latter dates back to the 1990s; to be more precise, to the second half of the decade (Prats Caralá, 2005). The last 15 years have witnessed a proliferation of the different usages of the term "governance" to the point that today a myriad interpretations as to its forms, usefulness and implications coexist (Martinez 2005; Prats Caralá, 2005). The definition of the term becomes even more convoluted if one were to consider that it has both normative and analytic components.

Initially, the term governance was used to denote modes of governing that were hierarchical in nature (i.e. steering) but it has been amplifying its meaning to include broader definition of the public, thus moving from state-centric visions to those that look at "the social" angle from a networks perspective. This extension of the notion of governance has brought to the forefront a host of different actors (parents, unions, NGOs, corporations, international agencies) that are seen as key players — along with the state — in the process of policymaking (Prats Catalá, 2005: 165).

Educational governance can be thought of as synonymous with "educational regime" in the sense that it encompasses implicit and explicit norms that define the relevant actors in the educational field; the legitimate channels for them to express their demands; resources that they possess, the way they are supposed to interact with others and their respective responsibilities (O´Donnell 1996; Hyde 1992; Prats Catalá, 2005). It can thus be said that while educational governance has a structural dimension that constraints interaction, there is also plenty of leeway for social agency and improvization.

A reform in governance implies a change in the "rules of the game" or the norms that regulate the interactions and decision-making processes among the actors (Rodrik 2008).

Governance regimes not only define the relationship between state and the other relevant actors, such as parents and teachers unions, but also between their various parts, such as school centers, local governments and central authorities (UNESCO 2009).

2.2 FOUR GOVERNANCE FACTORS

In this section, we look at each of the four governance factors separately and present important theoretical contributions regarding their effects on educational equity and quality.

2.2.1 DECENTRALIZATION

Decentralization can be defined as the transfer of responsibility of planning, management, gathering and distribution of resources from the central government and its organs to local units of the government in the territory (Winkler and Gershberg, 2000). In general, decentralization of education systems has stemmed from political and professional motivation. Political reasons have usually been associated with the need to extend political legitimacy and public participation in public policy decisions, and this can be done by giving local government more power and political responsibility. Professional motivation has focused on the need to transfer the management of educational services to those with political and technical capability who know them best (McGinn and Welsh, 1999).

It is also useful to recognize the different dimensions of decentralization according to the types of decisions that are decentralized in education systems (Winkler 2004). First, it is necessary to observe how instruction is organized, and to understand how the school that each student attends is selected, the way the instruction time is structured and by whom, how text books are chosen, curricular content defined, and teaching methods determined. Second, one needs to analyze how personnel are administrated, examining the way in which school principals are hired and fired, how teachers are recruited, how their salaries are set and adjusted, the way the pedagogical responsibilities are assigned, and the provision of teacher development and in-service training is determined. Third, there is a dimension referring to how the education system is planned and structured. This involves decisions such as how schools are established and closed, the way the programs offered in schools are selected, how course content is defined and assessments for monitoring school functioning are done. Finally, there are decisions related to resources, for example, the way a plan for enhancing the resources is developed, the budget for the personnel is assigned, and the general budget and resources for in-service teachers' training are allocated. Morduchowicz (2010) shows that in Latin-American education reforms, decentralization has not been followed by patterns of allocation of resources that allow local units to assume their new educational responsibilities.

So far studies have not been able to prove any direct relation between decentralization and improvement in education with regard to quality, equity or efficiency (Hanson 1997; di Gropello, 2004). Among other factors that explain this shortcoming, we should mention that it is particularly difficult to isolate the effects of decentralization from other components of complex reform processes as the ones implemented in Latin America in the previous decades. For instance, in the case of Chile it has been difficult to evaluate if educational improvement in the 1990s was due to decentralization or whether it was a result of compensatory programs

(di Gropello, 2004). Furthermore, there are few clear guidelines for making decentralized systems more effective in improving the quality of education.

2.2.2 EDUCATIONAL PROVISION AND FINANCING

A first analytical distinction to make is between the concept of *funding*, on the one hand, and *provision of educational services,* on the other. While there is widely-held consensus that state should participate in education — due to the positive externalities generated by education, such as its ability to promote equality among citizens — there is greater divergence in terms of whether or not the state should provide the services.

Schematically, it is possible to divide supply-financing models of education into two basic types or schemes: a) a model in which both funding and provision are taken care of by the state, eventually sharing the responsibility with schools that provide a private service and that have private funding. In this case, the state funds the supply of education according to the personnel and infrastructure of schools; b) a model in which the provision of services is circumscribed to the private sphere and the state provides minimum funding. In this case, the state usually funds schools according to the number of students that attend a specific center, that is, according to the demand. This scheme often coexists with the system of fully public and private provision and funding.

In the case of the financing supply model, the central or regional authorities define the criteria and parameters for distributing resources to schools (such as the number of staff that a center can have, given a certain number of students). Contrarily, in the case of the financing demand, schools receive funds based on the number of students enrolled and the characteristics of the courses that they attend (for example, the school level and the grade). In this model, each school decides how to use the funds for their educational needs.

The debate around whether the type of provision-funding model has any effect on the academic achievement of students is still a very heated one within specialized literature on economic determinants of educational performance (Hanushek 2002; Hoxby 2003; Rouse and Barrow, 2009). The authors who claim that there is a positive relationship between the two state that the explanatory factors are the increased competition between schools and the greater capacity of parents to choose, both of which would increase school effectiveness. The relevant question is whether *ceteris paribus*, the academic performance of private schools, exceeds that of public schools. And this is not an easy question to answer, given that in practice, it is not easy to isolate the effects that unobserved characteristics of the different populations attending each type of center have on academic performance.

The implementation of one or the other model does not necessarily lead to greater efficiency and/or equity. The outcomes of these models are mediated by the characteristics of specific educational systems in which they are implemented. A variable that obviously matters is the amount of money provided by the state in the form of vouchers in the case of funding to demands or the amount of resources per student provided to each school in the case of funding to supply. However, as it has been widely documented, there is no mechanic relationship between the amount of resources and the educational results (see, for example, Hanushek 1986, 2003; GDN 2009; Balu, Patrinos and Vegas, 2009).

2.2.3 ACCOUNTABILITY

It is impossible to provide an operational definition of accountability unless one knows: "accountable" to whom and for what purpose (Campbell 2007; McMeekin 2008). In general, the concept refers to the need to make actors responsible for their actions and the results thereof (McMeekin 2002). To do this, it is necessary to have effective channels of communication in place, clear information regarding what is expected of each actor (PREAL 2003; McMeekin 2008) and the allocation of available resources (Corvalán 2006), as well as certain control mechanisms (Uhr 1993). The notion of "accountability" is thus intrinsically linked to the idea of responsibility (Corvalán 2006).

Within the educational field, the concept generally refers to the responsibility of schools with regard to student learning outcomes guaranteed through systematic dissemination of information on results to those concerned or involved. In countries that do not have systematic ways of collecting evidence on student learning, other measures of academic performance have been taken into account, such as rates of completion, repetition and dropout, the rate of continuation to higher levels, etc. (McMeekin 2008).

It is possible to identify three key players involved in the processes of accountability in public education services: *users* (including the direct beneficiaries such as students and their parents, and indirect beneficiaries such as the general public); *suppliers* (actors present in schools as well as the several supporting actors, such as supervisors and teacher trainers); and educational *policymakers* (government officials, unions, public intellectuals, and so on) (Winkler 2003; World Development Report, 2004; GDN 2009). The accountability relation can be direct (between users and suppliers) or indirect, including relationships between policymakers and citizens and service providers and policymakers (GDN 2009).

According to the specialized literature (Corvalán 2006; Poggi 2008), recent processes of accountability in Latin America have had a positive influence on certain educational developments in the region, such as increased school autonomy and importance of educational indicators. Concomitantly, some factors that account for poor accountability in education have also been identified, such as: a weak voice of actors, poor management, insufficient information, role confusion, and lack of pro-accountability initiative (Winkler 2003).

The main criticism that has been made to the application of the concept of accountability to education is not related to accountability per se, which — as we have seen — has been highlighted as a positive element for democratization (O'Donnell 1998), but rather to its frequent association with decentralization (Gershberg and Meade, 2006). Gershberg and Meade (2006) show that decentralization reforms — because they tend to be much more successful in less vulnerable communities — often times reproduce structural disadvantages of the education system. Finally, some authors have criticized the excessive emphasis that accountability policies have placed on evaluation, which can lead to the development of "as if" procedures within institutions (Darling-Hammond 2008).

2.2.4 INCENTIVES

The teaching profession is closely related to the salary and the incentive structure of a given country. The issue of incentives has made a lot of noise in recent years in Latin America but

its implications have often been taken for granted. Specialized literature (Morduchowicz 2009) points out that teacher compensation can be disaggregated into several components, among which the basic wage is the unifying factor among all teachers. Then several specifications are incorporated which determine the salary increase on the basis of different criteria such as experience. In some countries, basic salaries significantly increased periodically are considered additional incentives.

The literature identifies several types of incentives related to aspects such as knowledge and skills, student outcomes, teacher training, teaching in difficult contexts and teaching certain subjects (Vegas 2006; Morduchowicz 2009; Lozano 2010). However, Latin America has favored the first two forms of incentives over the rest.

As for non-material incentives, there is now considerable evidence to prove that individuals also weigh out other factors to form the equation, such as status and the social recognition associated with good performance (Andrews 2006).

The discussions around incentives have been embedded in broader debates on teaching and education and they have made clear the co-existence of very different perspectives on the matter, both on the part of the policymakers and union leaders. Morduchowicz (2010) notes that economics tend to assess human actions through the lens of incentives that have the apparent advantage of providing relatively simple solutions to highly complex problems. The author, however, points out that one should not forget that incentives are not ends in themselves but rather means for a given purpose that should be clearly defined. For any incentive to work, it needs to be grounded in well-defined objectives and clearly-stated rules.

The literature (OECD 2009; Lozano 2011) insists that the criteria for allocating incentives for teachers should be well designed and should seek a balance between indicators and the amounts granted. According to several authors (Morduchowicz 2010; Lozano 2011, OECD 2009) incentives constitute a very important instrumental aspect of educational policy design; however, they cannot be understood in abstract but rather in the context in which they are developed. The effectiveness of certain types of incentives depends, among other things, on certain contextual variables such as the existing teacher expertise and skills.

2.3 RELEVANT ACTORS AND INTEREST IN THE EDUCATIONAL "ARENA"

A political actor is defined as any individual or group of individuals who play a role (explicitly or implicitly) in any given system (in this case, in education). Social actors are the result of the intersection between several overlapping dimensions, among which one could highlight their distinctive "interests", "norms" and the "available resources" (Scharf 1997). Speaking of actors inevitably implies reference to power, as different actors are vested with different amounts of power over valuable resources in a given field (Hay 1997). An actor can be involved in more than a given field (e.g. education, politics, and economic) depending on the objectives sought (Touraine 1987).

It is not possible to speak of political interests *per se,* as they only acquire significance in relation to a given actor and in the specific socio-historical contexts in which they are defined. Furthermore, the definition of interests always acquires a relational dimension, as interests for one actor are usually obtained at the expense of the interests of others. Therefore,

the specific interests of the various educational actors interacting in the educational field cannot be understood in abstract, outside of the specific context in which they interact.

The literature points out that educational policy can be classified into two main types (Mizala 2007; Navarro 2006; IDB 2005), depending on the impact it has on social actors: those that can alter the correlation of forces in a given system and those that are non-conflicting.

In the context of the educational reforms that took place in Latin America in the 1990s, it is possible to identify specific actors who played a key role in the process as well as in the predominant trends, privileged mechanisms of expressing interests and dissent, repetitive power struggles between actors and the factors that have limited and enabled the expression of certain interests over others (Grindle 2004).

3. METHODOLOGY

3.1 MIXED-METHODS APPROACH

Complex problems demand complex solutions. The correlation of econometric analysis of PISA test results with different governance factors proves to be a privileged way of analyzing relationships across a broad range of cases in statistically significant ways. However, this form of quantitative explanation does not necessarily account for causality nor does it shed light on the mechanisms under which relationships take place. For this purpose, this project employs a mixed-methods approach to the research question at hand. Using multiple approaches can help capitalize on the strengths of the different approaches employed (and transcend their limitations) as well as help account for greater degrees of complexities and nuances to social issues and problems (Tashakkori and Teddlie, 2003).

Table 2 summarizes the different methodological approaches used in this study, the sources of information that they will use and the desired results sought by each one.

Table 2: Mixed-methods approach with quantitative and qualitative techniques.

Dimension	Methodology	Sources	Results
Governance settings	Historical analysis	Secondary references, literature review	Outline the main features of the reforms carried on in the 1980s and 1990s.
Equity and quality (DV)	Quantitative Qualitative	PISA 2009 Interviews Chile/Uruguay	Compare both countries in terms of quality and equity of education
Governance factors (IV)-	Quantitative Qualitative	PISA 2009 In-depth semi-structured interviews	Estimate the impact of divergent institutional factors and school organization on student performance. Understand the mechanisms through which the different factors operate.

Source: Elaborated by authors

3.2 QUANTITATIVE ANALYSIS

The main quantitative analysis is based on the Program for International Student Assessment (PISA) data source for Uruguay and Chile for the year 2009. PISA is an evaluation program of students at age 15, on a representative sample of the population attending secondary education, carried out in OECD countries (currently 30) and also other countries of the rest of the world (27 countries in 2006 and 35 in 2009). Both Chile and Uruguay participated in the 2006 and 2009 rounds. PISA presents a cross-section dataset on student achievement at age 15, student characteristics, family background and school and institutional characteristics.

PISA is an extremely rich source that provides comparable data among all participant countries about important aspects of educational arrangements and student learning outcomes.

One limitation of this dataset is that there is selection bias provoked by the fact that not all the 15-year-old cohort is attending school at the time of PISA evaluation. In addition, there are significant differences in terms of this aspect between Chile and Uruguay. While in Uruguay

20 percent of the 15-year-olds do not attend the educational system, in Chile the proportion of such children is less than 10 percent.

Our goal was to compare the performance of students in Uruguay and Chile across some institutional features (those that show enough within-country variation, as well as variation between the two countries), after controlling for the individual characteristics and school resources that clearly affect performance in education.

The quantitative approach consisted of estimations of an Educational Production Function (EPF) using Ordinary Least Squares (OLS) at the individual (student) level. In this way we could directly link a student's performance to their learning environment, and control for individual background influences on student performance, as well as the influence of school resources and teacher characteristics, and the possible influence of some relevant institutional features. However, many difficulties arise when trying to analyze the factors behind educational performance, especially the contamination of the simple OLS results by endogeneity and selection biases, mainly caused because there are important unobserved (omitted) variables. Estimated coefficients do not show a causal relationship but rather a global association between each governance factor (or group of variables that describe a governance factor) and performance. The purpose is not to establish causality, but rather to get a better description of the situation in both the countries.

In order to do this we ran several regressions of test scores on different samples: a full sample of Chile and Uruguay; separate regressions for each country; and separate regressions for public and private schools. Given the importance of school progression on performance, and the significant differences between Chile and Uruguay, we also estimated Probit models for school progression, on the full sample and by sub-samples, according to quartiles of school socioeconomic status.

The quantitative analysis was carried out in two sequential stages. First we undertook a descriptive analysis to characterize each type of school in both countries and identify sources of variation to be exploited. We also described performance in both countries across the different socioeconomic groups. Secondly, using the PISA 2009 pooled database of Chile and Uruguay we estimated separate regressions for each set of variables describing the governance factors, using the full sample, separate samples for public and private school and separate samples for the different socioeconomic groups, in all the cases with the necessary controls. This was followed by an analysis of the difference in academic achievement between the two countries (full regression and Oaxaca decomposition).[1]

This paper reports the most significant findings from the quantitative analysis described above. All of the tests, with their results and tables, are available in Appendix 4.

3.3 QUALITATIVE ANALYSIS

As rich as the PISA database may be, it does not by itself allow the apprehension of such complex phenomena as the ones that this project has sought to explore. Hence, this two-fold

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[1] For more information, please consult the quantitative methodological appendix.

research design is aimed at shedding light on the aspects that the statistical analysis was not able to account for.

In order to further "unpack" the effects of the governance factors listed above, approximately 60 semi-structured interviews were completed in Chile and Uruguay. Two types of interviews were carried out. While on the one hand, interviews were conducted with teachers and heads of selected schools, on the other, we interviewed key informants with great levels of expertise vis a vis our subject matter. Data was collected using a theoretical, purposeful non-random sample (Miles and Huberman, 1994).[2] The educational centers were selected following two main criteria: a) type of center provision, allowing us to grasp different institutional formats and assess their impact on provision, and b) educational outcomes (measures in achievement). In the case of Uruguay, where information is not readily and publicly available we relied on key informants.

Table 3: Interview sample across selection variables

Educational achievement	CHILE			URUGUAY		Total
	SCHOOLS (three interviews per center)					
	Municipal	Private	Particular subsidies	Public	Private	
Good results	Xx	Xx	X	x	xx	
Bad results	Xx		X	xx	x	
	4	2	2	3	3	42
	KEY INFORMANT					
N	9			6		15
TOTAL						57

Source: Elaborated by authors

4. RESULTS

The differences between Chile and Uruguay with regard to quality and equity of basic education (our dependent variable), are explained in section 4.1.

The four institutional factors considered in this study, and their effects on education quality and equity are presented in the section 4.2. The analysis goes from the most robust findings of the regressions to the qualitative evidence than can help explain some of the mechanisms at play in the governance of these two education systems.

The variable of provision and financing is integrated into the analysis of each of the institutional governance factors in question as it intervenes in the relationship between each of the factors and the educational outcomes. The distinction between private and public schools in the case of Uruguay, and that between public (municipal) schools, private subsidized and private non-subsidized schools in the case of Chile is vital to understanding how within-country variation takes place. The type of school provision was first used as a control variable for the full sample regression but then it was used to estimate separate regressions. Additionally, descriptive statistics presented in Appendix 4 show the differences

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[2] The interviews were first transcribed and then analyzed using the content analysis method and following Huberman and Miles´s (1994) specifications for qualitative matrix data analysis.

between private and public schools when considering institutional educational features in both the countries.

In the analysis of the effect of private/public provision on educational outcomes, we have to take into account that the omitted variables are a problem if there are features that are consistently related to <u>both</u> public/private choice <u>and</u> performance. Even if controlling for individual and school observable variables, there will probably be some unobservable characteristics of parents (or students) that are correlated both with private choice and outcome; or unobservable school characteristics (for example, resources, not well covered by PISA data) also correlated with private provision and outcome. Therefore, the estimated coefficients for private or public provision are not good measures of causal effects on educational performance. We estimate *associations*, after controlling for observable key individual characteristics, school inputs and governance factors. In general, after the usual controls, we do not find a repeat association of provision and performance in any of the evaluated areas. We do, however, find a positive association between private provision-financing and results in science, and a negative association between private provision/ public financing and results in mathematics. No significant association is found when assessing the reading scores.

For a more thorough look at the results please refer to Appendix 4 where descriptive statistics and regressions are presented in greater detail.

4.1 PERFORMANCE AND SCHOOL PROGRESSION IN URUGUAY AND CHILE

Average results of PISA 2009 scores show statistically significant better results for Chilean students in science and reading tests. Mean results in science are 26 points higher in Chile than in Uruguay (0.3 standard deviation), while the same difference in reading scores is 30 points (0.35 standard deviation). On the other hand, the results in mathematics do not differ significantly, on an average, between Chile and Uruguay. These results persist when comparing students of the same percentiles of individual socioeconomic status in both countries.[3] That is, at the same percentile of socioeconomic status Chilean students perform better than Uruguayan students in science and reading, while no significant differences are found in mathematics test scores (Table 4).

Table 4: PISA 2009 Test scores in Uruguay and Chile, by quartile of Index of Socioeconomic Status

PISA Index of Socioeconomic Status		Test scores					
		Uruguay			Chile		
		Science	Maths	Reading	Science	Maths	Reading
1st quartile	Mean	375	375	372	417	385	412
	Sd	78	72	82	68	63	71
2nd quartile	Mean	404	405	403	434	409	438
	Sd	78	73	84	67	64	68
3rd quartile	Mean	437	437	435	457	430	462

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[3] We ranked the students relative to the distribution of their own country.

	Sd	82	79	87	70	68	72
4th quartile	Mean	483	479	481	495	474	498
	Sd	87	84	93	78	78	78
Total	**Mean**	**425**	**424**	**423**	**451**	**425**	**453**
	Sd	91	87	96	77	76	79
Difference 4th-1st		108	105	109	78	89	86

Source: Elaborated by authors

Moreover, Uruguay shows greater variance in test scores. The difference in these scores between the lowest and the highest quartile of students, ranked by their socioeconomic status is much higher in Uruguay (107 points, on an average) than in Chile (84 points on an average).

In addition, Chile shows a degree of school progression at age 15 that is significantly higher than Uruguay. In Chile, 77 percent of students are enrolled in fourth grade or higher at the time they are tested by PISA, while the rate for Uruguay is only 61 percent. Moreover, differences in school progression by individual socioeconomic status are dramatically higher in Uruguay than in Chile. On the one hand, if we compare students from the highest quartile of socioeconomic status in both countries, we do not find significant differences in school progression, as the percentage of students in fourth grade or above is similar in Uruguay than in Chile (85 percent and 82 percent respectively). But if we look at students of the lowest quartile of socioeconomic status, we find dramatic differences in school progression between both countries. While 70 percent of Chilean students are enrolled in fourth grade or higher, this percentage among the Uruguayan students is only 39 (Table 5).

Also, nearly one-third of students of the lowest quartile of socioeconomic status show a lag of two grades or more (are in grade 2 or below at the time of the PISA test), while this proportion is only 6 percent for Chilean students. These features indicate much higher repetition rates between Uruguayan students across all levels of socioeconomic status, but are particularly dramatic in the lowest two quartiles (Table 5).

Table 5: Percentage of students in each grade by quartile of the Index of Socioeconomic Status in Chile and Uruguay. PISA 2009

PISA 2009		**Grade attended by student**							
		Uruguay				**Chile**			
PISA Index of Socioeconomic Status		**Grade 2 or below**	**Grade 3**	**Grade 4 or upper**	**Total**	**Grade 2 or below**	**Grade 3**	**Grade 4 or upper**	**Total**
1st quartile	Mean	32%	30%	39%	100%	6%	24%	70%	100%
2nd quartile	Mean	21%	29%	50%	100%	3%	20%	77%	100%
3rd quartile	Mean	12%	19%	69%	100%	3%	17%	80%	100%
4th quartile	Mean	5%	10%	85%	100%	1%	17%	82%	100%
Total	**Mean**	**17%**	**22%**	**61%**	**100%**	**3%**	**20%**	**77%**	**100%**
Difference 4th-1st		**-26**	**-19**	**46**		**-5**	**-7**	**12**	

Source: Elaborated by authors

This aspect is very important, since school progression is likely to have an impact on acquired cognitive skills. What follows is an attempt to determine the extent of the observed differences in test results (particularly in reading and science) between Chile and Uruguay as a result of students having completed one or more school grades, as well as due to other factors, including institutional features. But we have to note that the final interpretation of the results is not straightforward, as school progression is likely to be affected by the same features that affect the test scores. For example, if a type of institutional framework has a positive impact on school performance (test scores), it is also likely to influence students' school progression. Therefore, if we find an association between school progression and test results, it may reflect a direct impact of school progression on achievement (greater exposure to class time and educational resources should have an impact on cognitive skills) as well as an indirect impact (the effect of unobserved school or institutional factors affecting both school progression and learning).

How does Uruguay compare with Chile after controlling by individual characteristics, grade attended by student, and school inputs? Estimations indicate that the observed gross average difference in PISA 2009 science scores for Chile can be accounted for partly by the differences in the socioeconomic status of students in both these countries and partly by differences in students' school progression. On an average, student socioeconomic status is slightly higher in Chile than in Uruguay; school progression too is significantly better in Chile than in Uruguay. The estimations also show that the observed difference in reading scores (for Chile) can be accounted for partly by the differences in student socioeconomic status, partly by differences in school progression and partly due to differences in school characteristics. If we compare students with the same individual, grade and school characteristics, we observe that the performance of Uruguayan students is better in mathematics (Appendix 4).

Table 6 summarizes these findings. Individual controls include gender and the PISA Index of Socioeconomic Status. Grade is a set of dummies indicating the grade attended by the student (2 or below, 3, 4 or above). School controls include the PISA index of quality of school resources, school size, a set of dummies describing school admission policies, school socioeconomic status; a set of dummies indicating private /public provision and private/public financing. The second set of columns in Table 6 show the estimated coefficients for Uruguay after controlling for individual characteristics and grade attended by the student. Note that after controlling for these factors, no difference is seen between Uruguayan and Chilean students in science. Finally, the last three columns of the table report the estimated coefficients for Uruguay after controlling for individual characteristics, grade and school characteristics.

Table 6: Linear regression coefficients of test scores (Uruguay vs Chile). PISA 2009

Variables	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Uruguay	-15.94***	10.87***	-20.19***	-3.630	22.26***	-7.056**	-2.380	21.72***	-4.487
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private - Public	No	No	No	No	No	No	Yes	Yes	Yes

Source: Elaborated by authors

The *Oaxaca* decomposition of the mean difference in test scores between Chile and Uruguay indicates that nearly half of the difference in results can be accounted for by the greater internal efficiency (school progression at age 15) of Chile over Uruguay. In all cases, estimates indicate that if the ratio of students per grade in Uruguay resembled that of Chilean students, the difference in scores between the two countries would be reduced by between 12 to 13.5 points, according to the test. This represents between 45 to 50 percent of the differences in science and reading scores.

Another important factor accounting for differences in the mean scores is the socioeconomic status. The decomposition shows that about 7 to 10 point difference in average results can be accounted for by the differences in the socioeconomic status of students and of schools, which constitutes approximately 30 percent of the observed differences in science and reading.

Table 7: Decomposition of the mean difference in test scores between Chile and Uruguay

Group Variables	Science		Maths		Reading	
	Endowment effect	%	Endowment effect		Endowment effect	%
Male	0.53	2%	0.96		-0.57	-2%
Grade	12.94	50%	11.64		13.66	46%
Individual socioeconomic status	1.91	7%	1.82		2.02	7%
School socioeconomic status	5.84	22%	8.05		6.99	23%
Other school characteristics	3.15	12%	1.14		4.75	16%
Unexplained	1.62	6%	-22.61		3.16	11%
Total Difference in Scores (Ch-Ury)	**26**	**100%**	**1**		**30**	**100%**

Source: Elaborated by authors

In the case of mathematics, there is a significant unexplained difference in test scores, which corresponds to the difference in favor of Uruguay if Uruguay had Chilean values of socioeconomic status, school progression, school characteristics and assessed governance factors. However, this difference cannot be attributed to the variables that can be assessed using the PISA data.

In sum:

- Chile shows levels of internal efficiency higher than Uruguay.
- Average results of PISA 2009 scores show statistically significant better results for Chilean students in science and reading tests.
- Results in mathematics do not differ significantly, on an average, between Chilean and Uruguayan students. When controlling for student and school characteristics and grade, it is possible to observe the better performance of Uruguay.
- The difference in test scores between the lowest and highest quartile of students ranked by socioeconomic status is much higher in Uruguay (107 points on an average) than in Chile (84 points on an average).
- Chile shows a degree of school progression at age 15, which is significantly higher than Uruguay. In Chile, 77 percent of students are enrolled in fourth grade or higher at the time they are tested by PISA, while the rate for Uruguay is only 61 percent.

- Differences in school progression by individual socioeconomic status are dramatically higher in Uruguay than in Chile. While 70 percent of Chilean students in the lowest quartile of socioeconomic status are enrolled in fourth grade or above, among the Uruguayan students this figure stands at only 39 percent.

4.2 GOVERNANCE FACTORS: SOME CLUES FOR UNDERSTANDING THEIR EFFECTS

This section presents the main findings on the effects of several governance factors on PISA performance and school progression. Some relationships are significant for the full sample, others in specific types of institutions (private/public) and others are only significant in some quartiles of the socioeconomic status. These quantitative results are complemented by the main qualitative evidence gathered for each governance factor under study.

Decentralization

As described in the conceptual framework, school autonomy is an institutional feature that can have positive effects on student educational outcomes. We found a positive association between greater autonomy in resource allocation and performance in all PISA tests, both when analyzing the full sample and when separating public and private schools. We also found positive association between school autonomy in resource allocation and school progression, but it is only significant for the lowest quartile of the socioeconomic status.

Table 8: Relationship between test scores and grade of autonomy with respect to resource allocation/ curricular aspects for the full sample after controlling by individual characteristics and school inputs

	Full sample								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Autonomy in allocation of resources (PISA Index)	10.74***	10.38***	12.10***	8.209***	7.931***	9.424***	5.240**	4.043*	6.056***
Autonomy in Curriculum and Assessment (PISA Index)	-1.213	-3.284	-1.887	-1.716	-3.741	-2.429	-2.621	-4.598*	-3.692*
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Elaborated by authors.

When analyzing each country separately, the positive association between autonomy in resource allocation and test results holds in Chile, after controlling for individual characteristics, grade and school inputs. However, in Uruguay the positive association between this factor and outcomes is closely linked to the type of provision (public or private). This is due to the strong association between the degree of autonomy in resource allocation and the type of service provision in Uruguay: while private schools are fully autonomous in this regard, public schools have very little margins for this type of decisions. The lack of within-country variation makes it difficult to separate public-private provision with autonomy in resource allocation, if we only consider the Uruguayan sample.

Table 9: Relationship between test scores and grade of autonomy with respect to resource allocation/ curricular aspects disaggregated for Chile and Uruguay after controlling by individual characteristics and school inputs

	Chile								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Autonomy in allocation of resources (PISA Index)	10.57***	10.19***	11.95***	8.165***	7.842***	9.345***	5.429**	4.142*	6.300***
Autonomy in Curriculum and Assessment (PISA Index)	-1.380	-3.757	-2.276	-1.759	-4.107	-2.714	-2.456	-4.783*	-3.719
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	--	--	--	--	--	--	--	--	--
	Uruguay								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Autonomy in allocation of resources (PISA Index)	17.54***	15.64***	17.60***	13.22***	11.34***	13.25***	0.741	0.583	-1.131
Autonomy in Curriculum and Assessment (PISA Index)	5.342	13.40**	12.39**	0.704	8.351*	7.653**	-5.257	2.147	1.710
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	--	--	--	--	--	--	--	--	--

Source: Elaborated by authors.

Regarding the effect of a higher degree of autonomy in defining curriculum content and assessment, PISA 2009 does not show a strong association between this factor and educational outcomes. This result is robust when analyzing both the countries separately, under different types of controls.

When analyzing the relationship between decentralization and school progression, it is important to consider the student´s socioeconomic status. In order to analyze the possible effects of this institutional factor on school progress, we estimated separate regressions by quartile of school socioeconomic status. The dependent variable indicates a student attending fourth grade or above.

Practically no differences are observed between Chilean and Uruguayan students in the highest quartile, while dramatic differences appear when comparing school progress of students from the lowest quartile. Estimates indicate that school autonomy in personnel-management and process decisions such as hiring of teachers and deciding budget allocation is related to a greater probability of being in fourth grade or above by the time of PISA tests (i.e. not having repeated a grade or lagged behind), only for students attending schools of the lowest quartile of the socioeconomic status. On the other hand, we do not find significant association between this factor and school progress in the other quartiles of the distribution of students across school socioeconomic status.

Table 10: Probit estimations: Dependent variable – student being in fourth grade or above. Covariates – decentralization and control variables

	Full Sample		First quartile SES		Second quartile SES		Third quartile SES		Fourth quartile SES	
	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect
Autonomy in allocation of resources (PISA Index)	0.0515	0.0160	0.450**	0.1767	0.0398	0.0138	0.0846	0.0245	0.0488	0.0101
Autonomy in Curriculum and Assessment (PISA Index)	-0.0217	-0.0067	-0.186	-0.0730	-0.0291	-0.0101	0.0509	0.0147	0.0864	0.0179
Individual controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Grade	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
School controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private-Public	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private Subsidized	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Country FE	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Obs.	10,801	--	1,761	--	2,742	--	3,125	--	3,168	--
Pseudo R^2	0.0858	--	0.1538	--	0.127	--	0.0606	--	0.04	--

Source: Elaborated by authors.

The qualitative data collected is useful for illuminating some of the mechanisms underlying the relationships described in this factor.

In Chile, schools possess varied degrees of autonomy depending on the type of administration. In private centers all teachers and principals interviewed reported having autonomy in resource allocation (though not in curriculum), while private-subsidized schools and municipal schools reported having significantly less autonomy.

At the same time, it is important to point out that the level of autonomy that each municipal school exercises is dependent upon its academic results. Teachers in municipal schools with bad academic results said they had very limited autonomy (see quote 1), whereas those in municipal schools with good results stated that they were given certain amount of leeway, whilst the decision making was usually not in the hands of the principal but rather in the hands of the corporation[4] or municipality (quote 3). It can, therefore, be said that the model of decentralization that has been implemented in Chile has not necessarily allowed schools to exercise full autonomy to carry on with their education projects.

> *"Schools have very limited autonomy with regards to resources. The school, for carrying out any type of activity, depends on the resources sent by the corporation. The Ministry sends the resources to the corporations; they administer it and the money hardly ever reaches the schools. In fact, subventions for our school have increased and the truth is that we end up getting very little money. " (Chile/teacher/municipal/bad SIMCE/small school).*

> *"We have no supervision of how we do our work; in the subsidized school they are controlled every month, because they receive money from the state (…) and the municipal schools are subject to strong control as well (…).In October, there was a Latin American congress on education, for the municipal school 44 to allow their teachers attend the three-day conference, they had to request for permission one year in advance and compensate for the hours lost, a year before!"(Chile/principal/private/good SIMCE/big schools).*

As the testimonies illustrate, the lack of autonomy in some of the schools in Chile is related to an effect of the Chilean law of "Preferential School Subvention/SEP" that gives subvention to schools depending on the number of "priority" students enrolled and attending classes. The SEP classifies schools — both municipal and private subsidized, receiving the subvention —

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[4] Corporations are private entities that administer schools in some municipalities

into three types, depending on their achievement results measured in the SIMCE tests. Schools that have systematically achieved good educational results are awarded the category "autonomous education centers" while those that have not obtained good achievement levels are classified as "emergent" and those that have repeatedly obtained deficient results are categorized as "in recuperation". Centers that are classified as "autonomous" obtain the highest subvention and those "in recuperation" are provided support by the Ministry of Education that significantly limits their degree of autonomy. Schools in this category have a deadline of four years to achieve the set standards to become an "emergent school". Should they not achieve this level, the Ministry of Education reserves the right to revoke the official recognition of that center.

> In reference to the SEP a key informant explains: "*Schools can´t spend any money on things that really matter. That is the problem with the SEP law. If any intelligent person working in a small school of Santiago is asked, "what do you need to improve your school?" they will reply: teachers! (…) and in the law, what does it prohibit? The hiring of teachers!*". (Key informant)

While interviews confirmed that private schools in Chile possess absolute autonomy in terms of allocation of resources, they pointed out that curriculum decisions are limited to the parameters defined by the Ministry of Education. The quote below is an example of this:

> "*We abide to the ministerial decree on evaluation and we also have to obey the study plans dictated by the Ministry of Education.. We have to respect the school calendar provided by the ministry, etc. All of these formalities are not up for grabs, they are non-negotiable…. In terms of resource allocation, we have absolute autonomy; resources are ours*" (Chile/teacher/private religious school/ /good SIMCE/big).

In the case of Uruguay, the interviews confirmed the virtual lack of autonomy in schools in terms of resource allocation and decision-making with regard to curriculum. The central authority defines the curriculum, establishes the school formats, determines the school calendar, and orders the books to be used by students. All of these measures apply to private and public schools. In the case of the public schools, the state decides the allocation of human and material resources. All of this significantly limits the decision-making and planning capacity of the schools. As one of our interviewees from the private school points out:

> "*We are very respectful of the official system. We are always looking for approval from the state. I say we, but it´s mostly the heads of the school, they are always looking for approval from the state regarding how we do things…Both in primary and in secondary schools, there is a tendency to seek for approval to comply with official rules and norms*" (Uruguay/private/good results/big)

However, in the case of Uruguay, there seems to be a very interesting paradox: while there is strict control on the part of the state in terms of formalities and procedures, there seems to be lack of control where the substantive aspects of teaching and learning are concerned.

> "*In the public school, autonomy means that none really know what you are doing…if one obeys what is written in the norms, you won't have a problem. And the truth is that anonymity endows you with certain autonomy. I was visited once by my inspector several years ago, making sure things were in place, and that was it*". " (Uruguay/pubic/bad results/small)

Accountability

Among the accountability variables available in PISA, we found that after controlling for individual characteristics, grade, and school characteristics, there is a positive association between publishing the results and performance, in all evaluated areas.

Table 11: Relationship between test scores and accountability for the full sample, after controlling by individual characteristics and school inputs

	Full sample								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are posted publicly	9.724	11.31*	8.197	5.476	7.269	3.661	7.915*	10.33**	6.492*
Achievement data used in decisions about instructional resource allocation	-2.591	-0.483	2.642	-1.455	0.453	3.931	-5.003	-3.660	-0.705
Assessments are used to compare school to district/national performance	-8.492*	-11.48**	-10.77**	-9.757**	-12.78***	-12.07***	-6.288	-9.562**	-9.338**
Grade achievement data provided to parents compared to other schools	1.898	0.539	1.553	3.850	2.223	3.728	3.318	3.456	2.406
Parental achievement pressure	35.19***	40.32***	41.02***	30.17***	35.40***	35.73***	11.30**	12.83**	15.92***
Monitoring of teacher lessons by principal	-10.21*	-15.63***	-12.52**	-7.205	-12.75**	-9.329**	-9.395*	-13.97***	-11.04***
Monitoring of teacher lessons by external inspectors	-10.31*	-6.979	-12.55**	-6.022	-2.854	-7.986*	-7.322	-4.531	-8.316*
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Elaborated by authors.

Estimates indicate that the publication of results is significantly positively related to student school progress. This result is valid for the full sample and for the lowest quartile sub-sample. The estimated association is higher in the case of the lowest quartile, with a substantial estimated marginal effect (0.32, valuated at the means of the rest of the covariates). We also find a statistically significant positive relationship between the use of achievement data to compare the school to district or national performance and school progress. The effect is statistically significant at the mean of the full sample.

Table 12: Probit estimations: Dependent variable – student being in fourth grade or above. Covariates – accountability and control variables

	Full Sample		First quartile SES		Second quartile SES		Third quartile SES		Fourth quartile SES	
	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect
Achievement data are posted publicly	0.203**	0.061	0.887***	0.324	0.118	0.041	0.0552	0.016	0.130	0.026
Achievement data are used in decisions about instructional resource allocation to the school	-0.120	-0.037	0.0527	0.021	-0.215	-0.074	-0.197	-0.055	-0.299	-0.054
Assessments are used to compare the school to district or national performance	0.150**	0.046	0.151	0.059	0.298**	0.104	0.0426	0.012	-0.125	-0.026
Grade achievement data is provided to parents in comparison to same grade in other schools	-0.148*	-0.047	-0.0768	-0.030	-0.112	-0.040	-0.232	-0.070	-0.0222	-0.005
Parental achievement pressure	0.0631	0.019	0.174	0.067	0.500*	0.151	0.00978	0.003	0.397**	0.082
Monitoring of teacher lessons by principal	-0.226***	-0.068	-0.0822	-0.032	-0.364**	-0.122	-0.312**	-0.085	-0.130	-0.025
Monitoring of teacher lessons by external inspectors	-0.142*	-0.045	-0.395*	-0.156	-0.0716	-0.025	-0.113	-0.033	-0.267*	-0.056
Individual controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Grade	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
School controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private-Public	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private Subsidized	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Country FE	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Obs.	10,206	--	1,654	--	2,531	--	3,039	--	2,977	--
Pseudo R²	0.0983	--	0.1707	--	0.1465	--	0.0698	--	0.0528	--

Source: Elaborated by authors.

Interestingly, we found a positive association between the parents' influence over staffing and budgeting and school progress, significant in the full sample. In the rest of the accountability variables we did not find conclusive results, except that monitoring the teachers in class by the principal seems to be negatively associated with educational outcomes. This would contradict the existing literature on the issue but it should be relativized as it is difficult to know what type of monitoring is taking place in the schools.

This variable may reflect reverse causality, i.e. the principal monitors the less-qualified teachers.

Table 13: Probit estimations: Dependent variable – student being in fourth grade or above. Covariates – actor influence and control variables

	Full Sample		First quartile SES		Second quartile SES		Third quartile SES		Fourth quartile SES	
	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect
Parents influence in staffing and budgeting	0.148**	0.045	-0.229	-0.090	-0.0285	-0.010	0.0932	0.027	0.107	0.021
Parents influence in instructional content and assessment practices	0.190	0.056	-0.000704	0.000	-0.220	-0.079	0.280	0.073	-0.106	-0.023
Teachers influence in staffing and budgeting	0.0309	0.009	0.246	0.095	-0.180	-0.065	-0.108	-0.032	0.0357	0.007
Teachers influence in instructional content and assessment practices	-0.0610	-0.019	-0.0406	-0.016	0.291	0.104	-0.170*	-0.049	-0.286**	-0.055
Student influence in staffing and budgeting	-0.0867	-0.028	0.271	0.104	0.428**	0.135	-0.166	-0.051	-0.115	-0.025
Student influence in instructional content and assessment practices	-0.0313	-0.010	0.176	0.069	0.0256	0.009	0.0493	0.014	0.0252	0.005
Individual controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Grade	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
School controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private-Public	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private Subsidized	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Country FE	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Obs.	10,801	--	1,761	--	2,742	--	3,125	--	3,168	--
Pseudo R^2	0.088	--	0.147	--	0.1414	--	0.0651	--	0.0477	--

Source: Elaborated by authors.

The issue of school and teacher accountability was highly contentious in both the countries. While in Chile principals and teachers were acquainted with the notion of accountability and all the interviewees embraced it as a desirable aspect of any "healthy" education system, in Uruguay the concept was no part of the discourse with the actors interviewed; there was a tendency to associate it with the economic transparency in school and not with the responsibility of the stakeholders vis a vis educational achievements. While in Chile the criticism was centered around the ineffectiveness of the existing accountability mechanisms, in Uruguay there was limited discussion around accountability based on student achievement and teacher performance. This tendency would confirm the idea, expressed in the theoretical framework, that the accountability scheme in Chile is based on setting the responsibility of student results on teachers and schools, while the Uruguayan model reflects an idea of social accountability in which student results are explained through their linkage to social factors.

> "*Accountability? First of all, it is a concept that is unknown in Uruguay, on the part of teachers and even heads of schools. It is assumed that those that have to be accountable are the government authorities; in Uruguay we never hold the school center accountable*" (Uruguay/School head/public/big/good results).

In the case of Chile, when asked about SIMCE and its effects, teachers and principals were very critical of its limitations and its failure to acknowledge the fact that contextual variables intervene in the results. Some concern was expressed regarding the homogenizing parameters against which very different schools were measured. Paradoxically, the predominant discourse in private schools was on the SIMCE being a very limited measurement of student achievement and being considered as one of the several indicators to measure student success in education; there was emphasis on educating critical thinkers and principled students, and not so much on academic achievement. This could, of course, be due to the fact that private schools perform considerably better than the rest.

"The SIMCE is not the only indicator we use, obviously. In a sense, we are "guilty" of not preparing it like the other schools do; their educational project is preparing them for the test" (Chile/ head of school/private/good SIMCE/small).

SIMCE results occupied an important place in the school culture in public and private subsidized schools. Teachers expressed the pressure they felt from parents, schools and municipal authorities when achievement levels were reported; however, at the same time, they expressed their helplessness in actually improving the results through instruction. Additionally, some teachers were quite cynical about SIMCE as an end in itself, rather than a means for identifying areas that needed improvement. Some of the interviewees referred to the "prepare for the exam" culture that had been installed since the implementation of SIMCE:

"*Teachers teach for the SIMCE, they ask certain students to stay at home that day..."* *(Chile/teacher/private school/good results).*

An interview with a municipal school teacher shed light on yet another interesting aspect highlighted in the review of the literature: there are high levels of information differentials from one context to the other, which affect the reception of these types of exams on the part of parents. Interestingly; according to this teacher, it is precisely in the most vulnerable contexts that SIMCE appears to have the maximum amount of power. This is indeed a significant finding as it underlines the importance of countering "information imperfection" in terms of how achievement is accounted for.

"When you ask about the SIMCE you are forcing me to get into the issue of class and segregation of the system. It´s not the same thing to give this information to parents of students that come from the harshest deprivations than to give it to parents that have had access to certain educational levels themselves. In those contexts, that information, the data, the list, the phenomena have a complete different meaning than what it does here" (Chile/teacher/public/bad SIMCE/small).

The qualitative evidence showed that there is a completely different comprehension of the concept of teacher accountability with respect to results in both national cases. In Chile there is an overall consensus among actors that evaluation of the different stakeholders is not only desirable but also necessary. No one opposed the idea that teachers and principals should be held responsible for educational outcomes, but similar to the pattern found in the case of SIMCE, it was possible to sense a generalized discontent with the way teaching evaluation is carried out. This would not be applicable to the private system in which teachers are subject to a more complex system of evaluation. Additionally, there were several criticisms vis a vis the leeway given to teachers for manipulating the system of evaluation to their own advantage:

"I completely agree with the teacher evaluation. But I have to say, it has errors, for example, there are teachers that don´t do it; they hire other teacher to do it for them. So it´s not very effective... The class that you film is a small percentage of the evaluation, and since they know they will be observed, teachers prepare wonderful classes, they even rehearse them... So, it doesn´t really measure what it seeks to measure. What it does measure is that teachers are acquainted with theories of good teaching; that they are capable of teaching; but it doesn´t measure what teachers do daily, it doesn´t measure if they apply what they know in their everyday teaching..." (Chile/teacher/public/bad SIMCE/big).

The significant amount of evidence collected in Chile with regard to accountability contrasts with the virtual lack of reference to this issue in the case of Uruguay. This is partially due to the fact that there is no regular system of assessment of student achievements at the

secondary school level. The measurements that are used are those of PISA but at an aggregated level to avoid comparisons among schools. With regard to teacher evaluation, the predominant model does not link teacher performance to student results. This is the underlying premise of the social accountability described above.

> "*I think that the idea of being accountable is something that is difficult to accept, it's one of those concepts that has been rejected by teachers; concepts like management, accountability, etc., have always been seen an intromission of economists and business in education (…). In school we are always talking about evaluation and assessment; but it's difficult to accept for our work to be evaluated*" (Uruguay/principal/private/good result).

Incentives

Teacher accountability in Chile is strongly linked to incentives while in Uruguay there is no association between the two factors. According to an important part of the bibliography in Chile, most of the incentive policies are related to the national system of evaluation of teachers created after a long process of negotiations with the unions. We identified two types of incentives for teachers: those that result from student achievements and the one that results from the knowledge and abilities of teachers. In the case of Uruguay, teacher incentives associated with merit are non-existent.

It is important to point out here that we did not find robust evidence of association between educational performance and the incentives variables in PISA in any of the two countries (see Table 14 that reports the full sample; tables A.7 and A.8 in appendix report the detailed findings). In the case of Chile, this quantitative evidence is reinforced by interviewees who pointed out that incentives for teachers do not have any significant impact on student achievements. In the case of Uruguay, the qualitative evidence confirms the virtual non-existence of incentives that have any impact on educational quality, except for two incentives based on formal aspects: attendance and punctuality. Additionally, some teachers pointed to the existence of an incentive for working in vulnerable areas.

Table 14. Relationship between test scores and teacher incentives. Full Sample, after controlling by individual characteristics and school input

	Full sample								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are used in evaluation of the principal's performance	5.483	4.868	7.861	6.822	6.164	9.267	2.785	1.235	4.783
Achievement data are used in evaluation of teachers' performance	-5.463	0.150	-6.289	-5.909	-0.293	-6.760	-11.33*	-5.491	-14.00**
Proportion of full time teachers	1.366	-4.284	5.201	3.832	-2.357	7.704	2.687	-3.435	3.824
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Source: Elaborated by authors.

In Chile, the interviews reveal that there are many differences within the public schools that should be considered when it comes to incentives. Municipal schools located in privileged contexts can afford to give teachers more and better monetary incentives; thus they attract teachers with better qualifications in their teacher evaluations. Teachers working in

vulnerable contexts felt that the monetary bonuses given to them for working in difficult areas do not compensate for the effort required. Good teachers that take up the challenge are driven by other motivations, such as vocation or, in some cases, proximity to school.

> *"A: We don´t have any significant incentive, the most important thing is your vocation, it´s really difficult to work in these contexts. You get paid significantly less than in other schools, the salary is very low.*
> *Q: It´s not the same in all municipal schools?*
> *A: No. I mean, there is a basic salary that is national but the municipalities that have more resources, give teachers a manifold of incentives, such as incentives for assistance, for student assistance, for SIMCE results, for this and that…"* (Chile, teacher, public, bad SIMCE, big).

Another relative advantage of working for the public system — in comparison to the private subsidized sector — is job stability and protective labor laws that sometimes operate as non-material incentives (see quote that follows). This was also true in the case of Uruguay when teachers compared the relative advantages of working for the public system in relation to working in the private one (see second quote below).

> "*In private subsidized schools, the rules are different, you have a contract, if you did not do your work this year, you will not stay with us next year. You have the possibility of changing your staff and of training the one you have as you want, taking into account the vision and mission of the school"* (Chile/principal/public/bad SIMCE, small).

> *"In Uruguay teachers have a series of rights, specially effective teachers that have labor stability, and this is very important, they can never remove you from your job, unless you commit a dangerous offence"* (Uruguay/principal/public/bad results, medium).

However, because remunerations tend to be higher in the private schools, many good teachers decide to sacrifice job stability to take up better paying jobs. These material incentives affect the choices made by teachers at the time of entry into the system. These incentives are not measured by PISA but interviews would suggest that they matter.

Since in Chile most of the teacher incentives are dependent upon teacher evaluation (in the case of direct teacher incentives) and the SIMCE results (in the case of school incentives), many of the flaws underlying the incentives system are attributed to the problems existing in the accountability measures. A key informant from this country explains:

> *"I would say that many of the policies of incentives related to teacher evaluations have not given any results. The mechanisms of teacher evaluation for distributing incentives have weaknesses that have been clearly proven. It´s a great "Truman Show", where teachers prepare classes to be filmed and they receive plenty of help in their portfolios"* (Chile, key informant).

The case of Uruguay is significantly different because teachers do not get incentives for their educational achievements. This difference between the two countries became evident in the interviews with teachers, heads of schools and key informants who had difficulty talking about this issue that is practically non-existent in the Uruguayan educational public agenda. As one teacher states:

> *"A lot of the literature talks about incentives but here, it is all the same, no one really cares if you are any good or not"* (Uruguay/teacher/public/good/big school).

Both in Uruguay and in Chile, teachers emphasized the lack of symbolic incentives in the current scenario. According to the interviewees, the teaching profession does not have the

same prestige that it used to have and the system does not really differentiate between teachers seeking to make constant improvements and those that carry out their work as "educational bureaucrats." One of them explains:

> *"We have to recognize that there´s a lot in this that has to do with the administration, with colleagues, with parents, with anyone, recognizing your work. This is very important because we need to remember the human aspect of all this. I think that schools should give some type of recognition at the end of the year to teachers that try to self-train themselves, that work with projects, stimulating students (…). If the state would promote something like this, it would generate contagion" (Uruguay/teacher/public/good/big school).*

In Uruguay, the system of evaluation is related to principal and inspection report that is made to provide teachers with a score. The supervisor´s role was mostly associated with control, and interviewees emphasized their inability to provide any important meaningful formative feedback that would allow for improvement. Discipline inspectors have to carry out a great deal of administrative tasks and they are oftentimes overloaded with work, making systematic evaluation very difficult.

> *"In Uruguay, we are evaluated by the subject inspector, who shows up one day without warning and observes our class for 45 minutes (…). I´m not in favor of this type of evaluation because I think that the idea that you can evaluate what a teacher does an entire year with what they see in 45 minutes is deeply flawed. Maybe you had a bad day and that evaluation has an effect for an entire year, or until you have a new inspection. I have colleagues that haven´t been evaluated in over five years" (Uruguay/teacher/public school).*

> *"I was evaluated in 2004, that´s eight years ago. And then, after the evaluation visit, that´s it, you don´t have any incentive for the day to day, for improving your work daily. Yeah, I know, we are supposed to be naturally motivated because we are teachers, but how are we supposed to know if what we are doing is correct?" (Uruguay/teacher/public school).*

There is a widely-held consensus in the literature on educational policies that incentives matter, and they matter a lot. As we have seen, research has demonstrated that there is important place for material and symbolic incentives in educational results. However, interviewees have problematized the unidirectional views sometimes offered by economic studies (that associate incentives with better educational results). The cases illustrate that there are covert mechanisms at play that affect the relationship between incentives and results.

5. CONCLUSIONS

The quantitative research carried out enabled a thorough understanding of the relationship between some educational governance factors and results (understood as school progress and achievements). Additionally, the qualitative fieldwork was extremely useful to shed light on the intricate mechanisms that mediate this relationship in both countries.

In general, it is possible to say that the association between governance variables and results as measured in PISA explains a very small portion of the differences in achievement results in the two countries. We estimate that greater autonomy in the allocation of resources could be associated with between four and six points of the difference in results between Chile and Uruguay, depending on the area assessed. Furthermore, publishing results is another factor

that accounts significantly for differences in mean scores. The remaining variables do not explain more than three points of the differences in results, and are generally not significant.

The relationship between the differences in governance and outcomes for these two countries is *mostly* mediated through an intermediate output variable: school progression. In fact, the analysis showed the importance of school progression in secondary education in explaining the differences in outcomes between Uruguay and Chile.

For example, school autonomy over allocation of resources matters for school progression. School autonomy over curriculum and other aspects do not appear to matter in a significant way (though this result may be affected by low sample variance, as autonomy over curriculum is very limited in both countries). Accountability, mostly through the publication of results, matters for school progression, especially in the case of students from the lowest socioeconomic status. Since school progression is not only related to the quality of an educational system but also to its equity, these findings have important policy implications that are considered in the next section.

Results are inconclusive with regard to the importance of the mode of delivery (public vs private) and teachers´ incentives on educational outcomes. Further research should be carried out in order to further understand the relative impact of these governance factors on education.

The qualitative data helped to disentangle many of the findings from the regression analysis and to understand the meaning attributed by actors to the overall functioning of the education system. Actors' voices helped to shed light on many covert mechanisms and processes at play that, though unintended and many times invisible to policymakers, nonetheless have very real effects on the ways in which various governance factors operate.

6. POLICY IMPLICATIONS

An important finding of this research project is that any analysis of educational governance needs to assess the relationship between governance factors and the actors that intervene within their boundaries. Actors play a pivotal role in the way that educational governance policies emerge, evolve and shift. As the results of this study show, there are no "recipes" for success; at the most, there are important ingredients that play out differently in the specific contexts in which they are implemented.

Based on this underlying assumption that actors need to be included when defining and implementing educational policies, there are several recommendations that can be made.

Firstly, the relationship between governance factors and educational outcomes is not direct but rather mediated by school progression. This leads us to conclude that it is very important to be cautious when looking at direct associations between institutional inputs and outputs, institutional arrangement and results. Policymakers need to consider the possible social dynamics that underlie associations.

School progression appears as a variable that has a very important effect on school achievement. This is important for students from lower income quintiles, and hence is not just for overall quality, but for equity. Therefore, governments should pay special attention to

school progression and launch policies that fight against school dropouts and repetition, especially in the lower socioeconomic sectors. This obliges both the countries to design programs targeted at vulnerable students, and is particularly important in the case of Uruguay.

Neither of the two countries has developed high levels of school autonomy. The Chilean experience shows that decentralization policies are not only complex but also need to be assessed in the long run. The results imply that the increase in the degree of school autonomy, especially over resource allocation, can lead to an improvement in the educational outcomes. Nevertheless, it is clear that decentralization, and especially school autonomy, requires policies aimed at building capacities at the local levels.

Accountability mechanisms are important in terms of equity and quality of education. It is necessary to develop initiatives that strengthen accountability in order to empower teachers, parents and students. Accountability does not happen naturally. It is necessary to adequately prepare all the stakeholders involved. Findings imply diverse lines of action, such as improving the information systems, development of communication channels and clarification of the consequences of bad results. Furthermore, decision-makers should keep in mind that accountability is not only a technical matter but also a political and cultural issue.

The type of provision and financing did not prove to be an important explanatorily variable of academic results. On this basis, educational policies should strive to counterbalance the regressive effects of social stratification in education. Human and material resources available in the education system need to be distributed in a way that ensures stronger support to more vulnerable areas and thus bridge the gap between schools.

Qualitative research would suggest that there is the need to improve the design of these incentives and the elements on which they are based (test scores, etc.). Creating effective incentives for teachers is key to attracting and retaining them in vulnerable contexts. The research sheds light on the potential of teaching social prestige and of using non-material and symbolic incentives to promote good practices. Though the evidence of its effects is still incipient and limited, incentives emerge as an interesting and complementary tool to educational policies that seek to improve recruitment, retention, and ultimately the effectiveness of teachers' performance. Finally, incentives cannot be understood in dichotomist way. They need to be perceived as such by actors in a specific cultural matrix. This has to be considered when designing incentives for a particular education system.

Educational policies to promote quality and equity in basic education need to be articulated with development policies applied to promote health, nutrition, protection. Hence, changes in the institutional settings of the education system should be directed to promote coordination with other social sectors.

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Appendices

Content

Appendix 1- *PISA dataset in relation to governance factors*

The table presents the available information in PISA for each governance factor. Column 2 shows the variable name and column 3 the description or possible values. In addition to the raw variables, PISA constructs some indexes that intend to capture the influence of a global factor as a combination of some raw variables. As part of our work we analyzed the inclusion of PISA indexes and/or raw variables for some of these factors.

Table: Variables from PISA used

Governance Factors	Our Variables	Description / Variable values
Financing	Public and private stakeholders	Public/Private
	School funding sources	Government; Fees; Donors; Other sources
Incentives: Teacher	Teaching staff full or part	Full -part time
Accountability	Use of achievement data for information and benchmarking	Schools use achievement data to compare themselves with respect to a national or regional population
		Schools that use achievement data to compare themselves to other schools
		Schools that use achievement data to monitor their progress
	Use of achievement data for decision making	Schools that use achievement data to make changes in curriculum and instruction,
		Schools that use achievement data to allocate resources
	Parental achievement pressure	Parents expectations towards institution for high achievement of students
		Information to parents about achivement in comparison with other schools
		Head review
		Inspectors or other external review
	Use of achievement data for assessing	Information of student achievement is used to assess head's achievement
	Teacher or head achievement	Information of student achievement is used to assess teachers' achievement
Decentralization	School autonomy: responsibility for staffing and budgeting	Responsible for teacher selection (head, teachers, regional inspectors, national authorities)
		Responsible for teacher firing (head, teachers, regional inspectors, national authorities)
		Responsible for fixing initial salaries (head, teachers, regional inspectors, national authorities)
		Responsible for salaries increase (head, teachers, regional inspectors, national authorities)
		Responsible for elaborating institution budget (head, teachers, regional inspectors, national authorities)
		Responsible for allocating institution budget (head, teachers, regional inspectors, national authorities)
		Responsible for establishing student discipline practices (head, teachers, regional inspectors, national authorities)
		Responsible for student admission (head, teachers, regional inspectors, national authorities)
	School autonomy: responsibility for curriculum and assessment	Responsible for choosing text books (head, teachers, regional inspectors, national authorities)

		Responsible for establishing contents of courses (head, teachers, regional inspectors, national authorities)
		Responsible for establishing courses to be dictated (head, teachers, regional inspectors, national authorities)
		Responsible for establishing student evaluation practices (head, teachers, regional inspectors, national authorities)
	External influences on staffing	Influence of education authorities (in teacher assignment, budgeting, contents, evaluation practices)
Political and special interests	Budgeting, curriculum and assessment	Influence of directive council (in teacher assignment, budgeting, contents, evaluation practices)
		Influence of parents (in teacher assignment, budgeting, contents, evaluation practices)
		Influence of teachers (in teacher assignment, budgeting, contents, evaluation practices)
		Influence of students (in teacher assignment, budgeting, contents, evaluation practices)
		Influence of external evaluation units (in teacher assignment, budgeting, contents, evaluation practices)

Appendix 2- Quantitative Methodological appendix

1. **<u>Framework and potential problems</u>**

As a framework for this work, to determine the influence of institutions on students' educational performance we initially start from the education production function concept (EPF), of the form:

$$ti = \alpha Bi + \beta Ri + \gamma Ii + \varepsilon i$$

where *t i*s the test score of student i, *B* are the measures of the student's background, *R* are the measures of resource used and *I* are the measures of institutional features surrounding the student's learning. εi is an error term, and α, β, and γ are the parameters to be estimated. The γ parameters are our main parameters of interest.

Here we face two problems:

    a) Difficulties in Estimation, due to the type of data
    b) Sources of variation of institutional features

In what follows we address the two groups of difficulties and provide our work proposal in order to overcome their caveats.

a. *Difficulties in Estimation*

As documented in an early work of Hanushek (1979), estimation of the EPF has several particular characteristics that make the empirical analysis quite different from standard production function estimations. Not only there are endogeneity issues for the inputs (as in any production function) but there are also externalities in production (peer-group effects), sorting of inputs and input heterogeneity, which in part is unobservable. In particular, student and teacher ability are not observable, the distribution of ability among schools (and perhaps classes) may be not random, therefore selection bias problems can emerge when trying to factor decompose test results. These are the main difficulties in trying to analyze the factors behind education performance, the contamination of the simple OLS results by endogeneity and selection biases, mainly caused because there are important unobserved (omitted) variables.

Some of these problems may be overcome by using panel data. However,

    a. PISA is not a panel database, so we cannot follow individuals through time, therefore we cannot compute differences in outcomes over time at the individual level. We do not have comparable databases for the two countries that allow us to do this.
    b. We explored the possibility of following schools (not individuals) but that is also a problem, as PISA sampling methods assures sample is representative at national

and some subnational levels, but NOT schools, and not so many schools are selected in both 2006 and 2009 sample.

    c. So a panel data approach is actually not possible with the available data for the two countries

However, for the analysis of institutional features (governance factors), we have to take into account that omitted variables are a problem if there are features that are consistently related <u>both</u> to governance factors <u>and</u> performance. This is probably true for the choice of private vs. public provision. Even if controlling for individual and school observable variables, may be some unobservable characteristics of parents (or students) are correlated both with private choice and outcome; or unobservable school characteristics (for example, resources, not well covered by PISA data) are also correlated with private provision and outcome. But maybe this is not so clear with other governance factors. Quoting Fuchs and Woessman (2007) *"The institutional features of an education system may be reasonably assumed to be exogenous to individual students' performance. However, a caveat applies in that a country's institutions may be related to unobserved, e.g. cultural, factors which in turn may be related to student performance"[1]*. The last comment is mostly to be taken into account when comparing countries with very different cultural backgrounds, fact that is not likely the case in Uruguay and Chile.

So, regarding this aspect, we decided to:

    a. Make separate regressions for private and public schools
    b. Estimate regressions with full sample, including the private-public provision variable just as a control, but avoiding interpreting estimated coefficient.
    c. Take school averages for school inputs, to eliminate potential source of bias because of within school sorting (eg. teacher characteristics not class-specific, but averages for each school)
    a. For other institutional variables, we would assume, -as Fuchs and Woessmam (2007)- that after controlling for relevant individual and school input variables there are no systematic features that are consistently related to institutional factors and school performance.

Nevertheless, we honestly think that the *full* elimination of endogeneity problems with the data we have available for Chile and Uruguay is difficult to achieve, as controlling for the endogeneity of the school inputs (or even institutional features) with cross-sectional test scores is still a pending issue in the literature of the economics of education. So, estimated coefficients will not show a causal relationship but rather an association. Nevertheless, the purpose of this part of the work is NOT to establish causality, but rather to better describe the situation in both countries.[2]

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[1] In part 3.2 *Cross-sectional Data and Potential Resource Endogeneity*

[2]. Much work done with PISA data using cross country microdata analysis (Woessman 2003, Fuchs and Woessmann (2007), Hanuskek and Woessman (2010) does this type of analysis including a large set of variables, obviously being very careful with communication and interpretation of results.

b. *Sources of variation of institutional features*

Although student-level data are used, the conceptual unit of analysis is the State/System governance, which, in principle, does not vary by student but only between the two systems and over time. Moreover, institutional features may be highly collinear, so in practice it may be hard to disentangle effects of individual variables. These facts introduce two additional problems: the sources of variation of the data and multicollinearity.

The possible sources of variation are:

a. *Over time:* There is very little variation during the period where we have comparable data for both countries. The reforms were placed before or after the available data. Although we assessed conditional correlations using a pooled sample of 2006 and 2009, we think it does not add anything to using only cross sectional variation of only 2009: besides 2009 questionnaire is richer in accountability variables than 2006. SO, we decided to stick to 2009 data. This means we do not have over time variation.

b. *Within countries:* There is variation, as most governance factors are NOT country fixed effects. Depending on the factor, we can observe little to quite large within country variation. Governance factors do not vary by student *within* schools but do vary *between schools, within a country*.

c. *Between countries*: Large variation. But as we only have two countries, we have to exploit both between and within variation. If there are variables that are exactly collinear with country fixed effects, we could not assess the effect of that variable.

Regarding the multicollinearity issue between institutional factors, it is certainly a problem in our data. This happens because some institutional factors tend to be jointly implemented. For example, private provision is almost always associated with school autonomy regarding allocation of resources. More autonomous schools regarding allocation of resources tend to make more use of achievement data in decisions about instructional resource allocation. And so on.

If these features were exactly collinear, we could not disentagle the separate effect of each. But even if they are not collinear, a high collinearity makes it difficult to separate the individual effect of each variable. However, it should be noted that the effect on performance of an institutional factor may come not only directly by the factor itself (eg, introducing more school autonomy regarding resource allocation) but also by the indirect effect through other variables (for example, if more school autonomy comes along with more intensive use of achievement data for relevant decisions). In the latter case, if we introduce the two covariates (or, estimate conditional effects), this could introduce an endogeneity problem, since the last covariate could be affected by the first.

So, regarding this aspect, we decided to estimate separate regressions for each institutional (or group of) institutional factors, conditional on individual characteristics and school inputs.

Therefore, the estimated coefficients would capture not only the direct effect of the factor itself, but also the indirect effect (through its influence or association) with other governance factors. In other words, we are not estimating the effect on each governance factor conditional on other governance factors, but rather a *global* association between a governance factor and performance, conditional on observable individual characteristics and school inputs. Shedding more light on the mechanisms through which the estimated association between an institutional feature and performance take place will be the task of the qualitative research.

Appendix 3- Qualitative Methodological appendix

Interview protocol

<u>**Teachers and Heads of School**</u>

1. Se ha hablado mucho últimamente sobre el sistema educativo chileno. Remontándonos unos años atrás, ¿cuáles fueron algunos de los cambios educativos introducidos por el gobierno de Bachelet? ¿Cómo se posicionaron los diversos actores sociales frente a esos cambios?

2. ¿Qué entiende usted por la pablara rendición de cuentas o *accountability* en inglés? ¿Cómo se aplica la rendición de cuentas en Chile?

3. Se ha discutido mucho sobre el SIMCE, para usted. ¿Qué efecto tiene sobre la calidad educativa?

4. ¿Qué mecanismos existen actualmente para garantizar el buen desempeño de los docentes? ¿Cómo se realiza la supervisión de los docentes en cada centro educativo?

5. ¿Qué mecanismos existen actualmente para garantizar el buen desempeño de los directores?

6. ¿Cómo se informa a la comunidad y los padres sobre los resultados educativos de los alumnos de este centro? ¿Sabe usted dónde se ubica este centro escolar en relación a otros centros? Para usted, ¿Qué ventajas y qué desventajas tiene la difusión pública de los resultados educativos?

7. ¿Qué incidencia tienen los padres dentro del colegio? Además de los boletines, ¿cómo se les informa sobre el desempeño de sus hijos? Los padres de esta escuela, ¿qué factores priorizan a la hora de seleccionar este centro para sus hijos?

8. ¿Cómo se relaciona el centro educativo, el municipio y el Ministerio de Educación a la hora de tomar decisiones importantes? ¿Qué grado de autonomía considera que tiene el centro escolar respecto a estos otros dos actores?

9. ¿Considera que el grado de autonomía del colegio tiene algún impacto sobre los resultados y la calidad educativa?

10. ¿Qué incentivos tienen los docentes para trabajar en colegios de contextos vulnerables?

11. ¿Cómo incide el actual sistema de financiamiento sobre la equidad del sistema educativo?

<u>**Key Informants**</u>

1. Sin lugar a dudas, el tema de la educación en Chile ha estado en el tapete en todo el mundo a la luz de los acontecimientos que están teniendo lugar en los últimos meses. Desde una perspectiva más histórica, ¿cuáles han sido los actores más activos en procesos

de reforma de educación básica desde la transición democrática? (ej. sindicatos, iglesia, estudiantes, padres, partidos, organismos internacionales, universidad) ¿Qué posición han tomado? ¿Cómo han contribuido o no al cambio?

2. ¿Cuáles son los temas que ha llevado a los actores sociales a movilizarse por la educación?

3. ¿Cuáles fueron algunos de los cambios educativos introducidos por el gobierno de Bachelet? ¿Cómo se posicionaron los diversos actores sociales frente a esos cambios? ¿Cree usted que ha habido actores que se han beneficiado más que otros del proceso de reforma educativa durante ese período?

4. ¿Cómo incide el actual sistema de financiamiento sobre la equidad del sistema educativo? ¿Qué incentivos tienen los docentes para trabajar en colegios de contextos vulnerables?

5. Pensando en la evolución histórica del sistema educativo chileno, ¿cómo ha sido la relación entre centro educativo, municipio y Ministerio de Educación? ¿Considera que el grado de autonomía del colegio tiene algún impacto sobre los resultados y la calidad educativa?

Appendix 4- In-Depth Quantitative Results and Analysis

Descriptive statistics

Institutional features in Chile and Uruguay: What does PISA 2009 say?

A list of the variables used in this study and their **descriptive statistics** (means and standard deviations) is given in Table A.1. The sources of the variables are PISA 2009 student and school questionnaires. Descriptive statistics refer to student level data. To do so, student-specific data on achievement test scores and student characteristics has been merged with school-level data.

The relevant data on institutional features is mainly derived from the school questionnaire. For example, principals are asked who has "considerable responsibility" in hiring teachers, defining course content, choosing textbooks, etc, and they can select one or more options between school actors (principals, teachers, governing board) or national or regional authorities. Using this set of information, PISA constructs the index of autonomy in resource allocation and the index of autonomy in curriculum and assessment. The rest of the institutional variables are also derived from the principal's answers to a set of listed options.

Data is presented by type of institution regarding provision / financing and country, so there are descriptive statistics from private schools in Chile and Uruguay, public schools in both countries and private subsidized schools in Chile.

Table A.1. Descriptive statistics. Student level data, PISA 2009

	Chile						Uruguay			
	Private		Subsidized private		Public		Private		Public	
	Mean	Std D	Mean	Std D	Mean	Std D	Mean	Std D	Mean	Std D
PISA Index socioec status	1.18	0.78	0.07	0.87	-0.40	0.91	1.09	0.82	-0.23	0.87
Class size(student to teacher ratio)	16.67	6.33	27.58	7.65	22.98	8.48	17.08	10.86	16.25	5.48
Admission policy - Two factors are never considered	0.12	0.32	0.10	0.29	0.32	0.47	0.13	0.34	0.73	0.45
Admission policy - Sometimes one factor is considered but neither always	0.19	0.39	0.41	0.49	0.44	0.50	0.65	0.48	0.21	0.41
Admission policy - Always one factor is considered	0.69	0.46	0.50	0.50	0.24	0.43	0.21	0.41	0.07	0.25
Proportion of certified teachers	0.36	0.43	0.11	0.17	0.13	0.22	0.69	0.21	0.57	0.19
Proportion of qualified teachers	0.98	0.03	0.93	0.09	0.91	0.17	0.08	0.05	0.07	0.08
Total school enrolment	980.70	651.84	1167.01	819.67	1070.19	712.91	492.73	334.21	950.01	687.32
Quality of school educational resources	0.81	0.80	0.32	0.91	-0.39	0.91	0.86	0.77	-0.08	0.93
Ratio of computers and school size	0.60	0.34	0.33	0.23	0.26	0.30	0.50	0.33	0.18	0.16
School Responsibility for Resource Allocation	0.80	0.77	0.73	0.87	-0.82	0.20	1.91	1.46	-0.36	0.14
School Responsibility for Curriculum & Assessment	0.47	1.03	0.41	1.08	-0.36	0.83	1.09	1.38	-0.24	0.70
Hiring teachers-School autonomy	1.00	0.00	1.00	0.00	0.47	0.50	1.00	0.00	0.12	0.32
Hiring teachers-Regional autonomy	0.00	0.00	0.00	0.00	0.69	0.46	0.00	0.00	0.14	0.35
Hiring teachers-National autonomy	0.00	0.00	0.00	0.00	0.02	0.13	0.00	0.00	0.88	0.33
Hiring teachers-School autonomy(only)	1.00	0.00	1.00	0.00	0.28	0.45	1.00	0.00	0.05	0.21
Hiring teachers-Regional autonomy(only)	0.00	0.00	0.00	0.00	0.52	0.50	0.00	0.00	0.07	0.26
Hiring teachers-National autonomy(only)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.77	0.42
Establishing teachers' starting salaries-School autonomy	1.00	0.00	0.93	0.26	0.02	0.14	0.95	0.21	0.01	0.12
Establishing teachers' starting salaries-Regional autonomy	0.00	0.00	0.00	0.00	0.76	0.42	0.00	0.00	0.00	0.00
Establishing teachers' starting salaries-National autonomy	0.00	0.00	0.08	0.28	0.32	0.46	0.08	0.28	0.98	0.15
Establishing teachers' starting salaries-School autonomy(only)	1.00	0.00	0.91	0.28	0.02	0.14	0.91	0.29	0.01	0.12
Establishing teachers' starting salaries-Regional autonomy(only)	0.00	0.00	0.00	0.00	0.65	0.48	0.00	0.00	0.00	0.00
Establishing teachers' starting salaries-National autonomy(only)	0.00	0.00	0.07	0.26	0.18	0.39	0.05	0.21	0.99	0.12
Determining teachers' salary increases teachers-School autonomy	1.00	0.00	0.94	0.23	0.02	0.14	0.91	0.28	0.01	0.12
Determining teachers' salary increases-Regional autonomy	0.00	0.00	0.00	0.00	0.67	0.47	0.00	0.00	0.00	0.00
Determining teachers' salary increases-National autonomy	0.00	0.00	0.08	0.27	0.45	0.50	0.14	0.35	0.97	0.17
Determining teachers' salary increases-School autonomy(only)	1.00	0.00	0.92	0.28	0.02	0.13	0.85	0.36	0.01	0.12
Determining teachers' salary increases-Regional autonomy(only)	0.00	0.00	0.00	0.00	0.52	0.50	0.00	0.00	0.00	0.00
Determining teachers' salary increases-National autonomy(only)	0.00	0.00	0.06	0.23	0.29	0.45	0.09	0.28	0.99	0.12
Formulating school budget-School autonomy	1.00	0.00	1.00	0.00	0.40	0.49	1.00	0.00	0.22	0.42
Formulating school budget-Regional autonomy	0.00	0.00	0.00	0.00	0.72	0.45	0.00	0.00	0.02	0.14
Formulating school budget-National autonomy	0.00	0.00	0.02	0.14	0.05	0.23	0.00	0.00	0.88	0.32
Formulating school budget-School autonomy(only)	1.00	0.00	0.98	0.14	0.23	0.42	1.00	0.00	0.10	0.30
Formulating school budget-Regional autonomy(only)	0.00	0.00	0.00	0.00	0.55	0.50	0.00	0.00	0.01	0.08
Formulating school budget-National autonomy(only)	0.00	0.00	0.00	0.00	0.03	0.17	0.00	0.00	0.77	0.42

Table A.1. Descriptive statistics. Student level data, PISA 2009 (cont.)

| | Chile | | | | | | Uruguay | | | |
| | Private | | Subsidized private | | Public | | Private | | Public | |
	Mean	Std D	Mean	Std D	Mean	Std D	Mean	Std D	Mean	Std D
Choosing textbooks-School autonomy	0.97	0.18	0.92	0.27	0.92	0.28	0.94	0.23	0.59	0.49
Choosing textbooks-Regional autonomy	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.41	0.34	0.47
Choosing textbooks-National autonomy	0.03	0.18	0.26	0.44	0.31	0.46	0.29	0.46	0.62	0.49
Choosing textbooks-School autonomy(only)	0.97	0.18	0.73	0.44	0.68	0.47	0.65	0.48	0.21	0.41
Choosing textbooks-Regional autonomy(only)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07	0.26
Choosing textbooks-National autonomy(only)	0.03	0.18	0.08	0.27	0.08	0.28	0.04	0.19	0.29	0.45
Determining course content-School autonomy	0.86	0.35	0.74	0.44	0.60	0.49	0.66	0.47	0.23	0.42
Determining course content-Regional autonomy	0.00	0.00	0.02	0.12	0.00	0.00	0.37	0.48	0.31	0.46
Determining course content-National autonomy	0.38	0.49	0.43	0.50	0.63	0.48	0.84	0.36	0.83	0.38
Determining course content-School autonomy(only)	0.62	0.49	0.55	0.50	0.36	0.48	0.10	0.30	0.03	0.17
Determining course content-Regional autonomy(only)	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.10	0.30
Determining course content-National autonomy(only)	0.14	0.35	0.26	0.44	0.40	0.49	0.24	0.43	0.58	0.49
Achievement data are posted publicly (e.g. in the media)	0.32	0.47	0.33	0.47	0.40	0.49	0.00	0.00	0.07	0.26
Achievement data - Used to resource allocation to the school	0.81	0.39	0.86	0.35	0.65	0.48	0.62	0.49	0.41	0.49
Assessments are used to compare the school to district or national performance	0.35	0.48	0.50	0.50	0.50	0.50	0.04	0.18	0.21	0.41
Parental achievement pressure - Many parents	0.60	0.49	0.28	0.45	0.10	0.30	0.20	0.40	0.01	0.12
Grade achievement data is provided to parents in comparison to same grade in other schools	0.24	0.43	0.34	0.47	0.22	0.41	0.04	0.19	0.04	0.20
Monitoring of teacher lessons by principal	0.79	0.41	0.79	0.41	0.63	0.48	0.81	0.39	0.90	0.30
Monitoring of teacher lessons by external inspectors	0.31	0.46	0.22	0.42	0.19	0.39	0.61	0.49	0.84	0.36
Achievement data are used in evaluation of the principal's performance	0.50	0.50	0.42	0.49	0.30	0.46	0.07	0.26	0.18	0.38
Achievement data are used in evaluation of teachers' performance	0.64	0.48	0.70	0.46	0.35	0.48	0.42	0.49	0.37	0.48
Proportion of full time teachers	0.65	0.19	0.71	0.21	0.75	0.22	0.13	0.23	0.16	0.20
Teachers influence in staffing and budgeting	0.17	0.38	0.12	0.33	0.10	0.30	0.10	0.30	0.13	0.33
Teachers influence in instructional content and assessment practices	0.66	0.47	0.67	0.47	0.63	0.48	0.63	0.48	0.43	0.50
Parents influence in staffing and budgeting	0.08	0.27	0.27	0.44	0.50	0.50	0.17	0.38	0.14	0.35
Parents influence in instructional content and assessment practices	0.07	0.26	0.14	0.35	0.17	0.38	0.07	0.26	0.01	0.11
Student influence in staffing and budgeting	0.08	0.27	0.11	0.31	0.14	0.35	0.06	0.24	0.04	0.20
Student influence in instructional content and assessment practices	0.13	0.34	0.27	0.44	0.37	0.48	0.16	0.37	0.11	0.31

Table A.2. Descriptive Statistics of Components of PISA Index of Socioeconomic Status

	Full Sample		Chile		Uruguay	
	Mean	Std D	Mean	Std D	Mean	Std D
Father ocupation - white collar high skilled	0.27	0.44	0.28	0.45	0.26	0.44
Father ocupation - white collar low skilled	0.18	0.39	0.18	0.38	0.19	0.39
Father ocupation - blue collar high skilled	0.27	0.44	0.26	0.44	0.28	0.45
Father ocupation - blue collar low skilled	0.27	0.45	0.28	0.45	0.27	0.44
Mother ocupation - white collar high skilled	0.30	0.46	0.27	0.44	0.33	0.47
Mother ocupation - white collar low skilled	0.36	0.48	0.40	0.49	0.32	0.46
Mother ocupation - blue collar high skilled	0.07	0.25	0.06	0.24	0.08	0.27
Mother ocupation - blue collar low skilled	0.27	0.45	0.27	0.44	0.28	0.45
Highest parent - white collar high skilled	0.36	0.48	0.35	0.48	0.37	0.48
Highest parent - white collar low skilled	0.28	0.45	0.29	0.45	0.27	0.45
Highest parent - blue collar high skilled	0.17	0.38	0.18	0.38	0.17	0.38
Highest parent - blue collar low skilled	0.18	0.38	0.18	0.38	0.18	0.38
Highest parental occupational status (PISA Index)	43.75	17.35	43.74	16.56	43.76	18.08
Educational level of father - none	0.07	0.25	0.05	0.22	0.08	0.27
Educational level of father - isced 1	0.16	0.37	0.05	0.21	0.27	0.44
Educational level of father - isced 2	0.27	0.44	0.21	0.41	0.33	0.47
Educational level of father - isced 3b, c	0.01	0.11	0.00	0.00	0.03	0.16
Educational level of father - 3a, isced 4	0.26	0.44	0.41	0.49	0.11	0.31
Educational level of father - isced 5b	0.09	0.29	0.10	0.29	0.09	0.29
Educational level of father - isced 5a, 6	0.14	0.35	0.18	0.39	0.10	0.30
Educational level of mother - none	0.06	0.23	0.06	0.23	0.05	0.23
Educational level of mother - isced 1	0.17	0.37	0.05	0.22	0.28	0.45
Educational level of mother - isced 2	0.25	0.43	0.22	0.41	0.28	0.45
Educational level of mother - isced 3b, c	0.01	0.09	0.00	0.00	0.02	0.12
Educational level of mother - 3a, isced 4	0.28	0.45	0.42	0.49	0.15	0.36
Educational level of mother - isced 5b	0.11	0.31	0.11	0.31	0.10	0.31
Educational level of mother - isced 5a, 6	0.13	0.33	0.14	0.35	0.12	0.32
Highest educational level of parents - none	0.02	0.15	0.02	0.15	0.02	0.15
Highest educational level of parents - isced 1	0.11	0.32	0.03	0.16	0.20	0.40
Highest educational level of parents - isced 2	0.24	0.43	0.17	0.38	0.31	0.46
Highest educational level of parents - isced 3b, c	0.01	0.11	0.00	0.00	0.02	0.15
Highest educational level of parents - 3a, isced 4	0.28	0.45	0.42	0.49	0.15	0.36
Highest educational level of parents - isced 5b	0.13	0.34	0.13	0.34	0.14	0.34
Highest educational level of parents - isced 5a, 6	0.19	0.40	0.23	0.42	0.16	0.37
Highest parental education (in years) (PISA Index)	11.73	3.89	12.61	3.60	10.90	3.97

Table A.2. Descriptive Statistics of Components of PISA Index of Socioeconomic Status (cont.)

	Full Sample		Chile		Uruguay	
	Mean	Std D	Mean	Std D	Mean	Std D
Possessions own room	0.69	0.46	0.75	0.43	0.63	0.48
Possessions internet	0.58	0.49	0.57	0.49	0.59	0.49
Number of rooms with bath or shower	2.32	0.66	2.39	0.66	2.26	0.65
Possessions dishwasher	0.47	0.50	0.56	0.50	0.38	0.48
possessions dvd	0.90	0.29	0.92	0.27	0.89	0.32
Number of cellular phones	3.75	0.55	3.70	0.60	3.80	0.51
Number of televisions	3.29	0.76	3.41	0.72	3.18	0.78
Number of computers	2.12	0.87	2.16	0.89	2.08	0.84
Number of cars	1.69	0.79	1.73	0.82	1.65	0.76
Wealth (PISA Index)	-0.65	0.95	-0.63	0.98	-0.68	0.91
Possessions literature	0.48	0.50	0.47	0.50	0.49	0.50
Possessions poetry	0.60	0.49	0.62	0.48	0.59	0.49
Possessions art	0.52	0.50	0.59	0.49	0.45	0.50
Books at home - 0 to 10	0.25	0.43	0.20	0.40	0.30	0.46
Books at home - 11 to 25	0.26	0.44	0.27	0.44	0.25	0.43
Books at home - 26 to 100	0.29	0.46	0.33	0.47	0.26	0.44
Books at home - 101 to 200	0.11	0.31	0.12	0.32	0.10	0.30
Books at home - 201 to 500	0.05	0.23	0.05	0.23	0.05	0.23
Books at home - more than 500	0.03	0.17	0.03	0.16	0.03	0.17
Cultural Possessions (PISA Index)	-0.01	0.87	0.03	0.84	-0.05	0.90
Possessions desk	0.76	0.43	0.70	0.46	0.82	0.39
Possessions study place	0.84	0.36	0.81	0.39	0.88	0.33
Possessions computer	0.74	0.44	0.75	0.43	0.74	0.44
Possessions software	0.41	0.49	0.37	0.48	0.45	0.50
Possessions textbooks	0.92	0.28	0.93	0.25	0.90	0.30
Possessions technical reference	0.63	0.48	0.62	0.49	0.64	0.48
Possessions dictionary	0.98	0.13	0.98	0.13	0.98	0.13
Home educational resources (PISA Index)	0.14	1.05	-0.14	1.01	0.41	1.02
Home possessions (PISA Index)	-0.65	1.05	-0.65	1.07	-0.64	1.04

How do private and public schools differ regarding socioeconomic status of students, school inputs, quality of educational resources, admission policies, in Chile and Uruguay?

Student socioeconomic background is an important predictor of educational performance. Apart from including a measure of socioeconomic background as a control covariate, it can also be seen as having important interest itself, because its association with educational achievement provides an indication of the equality of opportunity of children with different backgrounds. Estimates of how strongly student achievement depends on family background can provide an indication of intergenerational mobility of a society.

The measure we included in our estimations is the PISA index of socioeconomic status.[3] Table 1 shows clear segmentation of students in public and private schools according to this Index. Private schools in both countries show the highest (positive) mean values of the index of socioeconomic status, while public schools show the lowest (negative).

Table A.1 also includes measures of school inputs, including class size, school size (total enrollment) proportion of certified / qualified teachers, the PISA index of quality of school educational resources, and the ratio of computers to school size.

There is no consensus on the sign of the association of class size with educational outcomes. Some studies find a positive effect of smaller student- teacher ratios but others do not find an association, or even find negative effects (see Woessmann, 2003; Fuchs and Woessmann, 2007). Subsidized private schools and public schools in Chile show the highest average student-teacher ratio (27 and 22 students per teacher, respectively). In turn, both private and public schools in Uruguay show lower student-teacher ratios (16 and 17, respectively), similar to the Chilean private schools ratio (17, on average).

There is also some variation in school size, measured by total school enrolment. Private Uruguayan schools are the smallest on average, with a total average enrolment of nearly 500 students per school. Public Uruguayan schools tend to be much large, and similar on average as private Chilean schools (950-980 students per school). Lastly, Chilean public and private subsidized school show the largest total enrollment per school (around 1100 on average).

Hanushek and Woessman (2010) report that in the student-level studies, measures of teacher education tend to show positive associations with student achievement, and even that class size effects are systematically associated with the education level of the teaching force.[4] Characteristics of initial teacher's education differ between Uruguay and Chile, as in Uruguay teachers get a non university specific teaching degree, while in Chile teachers have university qualification (ISCED 5A). Nevertheless, if we just consider each type of education as the "relevant", we can observe that the proportion of teachers with relevant qualifications is much

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[3] Table A.2 includes descriptive statistics of all the included factors in this Index.

[4] Estimated class-size effect tends to be larger in classes that are taught by teachers with lower education. So the results suggest that educated teachers do as well in large or small classes, but teachers with lower education do better in small classes. In any case, teacher education would be a strong predictor of educational achievement.

higher in Chile than in Uruguay. In Chile, the proportion of qualified teachers is above 90%, in private, private subsidized and public schools. In Uruguay the proportion of certified teachers is only 57% in public schools, and 69% in private schools.

Quality of educational resources is measured by a PISA constructed index. Again, quality of school resources is much higher in private than in public schools, in both countries. However, regarding this aspect, data shows a larger average difference between public and private schools in Chile than in Uruguay. While the index takes similar average values between private Uruguayan and Chilean schools, it reaches a much higher value in public Uruguayan schools than in Chilean public schools. So regarding quality of resources public Uruguayan schools seem to be better off than Chileans, while Chile shows a greater inequality in distribution of resources between public and public schools.

Regarding a specific resource as computers, PISA data show a higher ratio of computers to school size in private than in public schools, in both countries. In this case Chile is slightly better off than Uruguay both in the comparison of private and public schools between countries.

Admission policies also differ between both countries and between public and private schools. Regarding this aspect, PISA school questionnaire asks about factors considered when admitting students to the school and lists seven types (if the student lives in school area, student academic performance, recommendation of other schools, parents endorsement to religion or philosophy of the school, if the student requires a special program, if the student has family members at school, and others). The respondent has to choose for each item the options "never" "sometimes" or "always".

Chile shows a much higher percentage of students in schools that employ selective admission policies. 69% of students in the Chilean private system are in schools that have a special admission policy (the school always takes into account at least one factor in admitting a student). The same proportion in the Uruguayan private system is 21%. The same ratios in public schools are 24% and 7% respectively in Chile and Uruguay. As selection in admission may bias results, we included a set of dummies as covariates in estimated regressions.

To what extent are schools autonomous regarding allocation of resources / course content/ evaluation in both countries? Which decisions are mostly taken by national authorities? Which ones by regional authorities? Do these features vary across public and private schools?

As described in the conceptual framework, an institutional feature that is sometimes argued to have positive effects on student educational outcomes is school autonomy, basically because local decision makers tend to have better information about local the process. Nevertheless, local decision makers may also act opportunistically unless they are held accountable for the achievement of their students. In what follows we describe features characterizing school autonomy in both countries. Table 1 reports descriptive statistics of the two PISA indexes of autonomy (autonomy in resource allocation and autonomy in curriculum and assessment) and also of some of the items that compose those indexes.

School responsibility in resource allocation is clearly higher in private schools (including Chilean private subsidized) than in public schools, in both countries. Nevertheless, differences arise when comparing private and public schools between countries. Uruguayan private schools show a higher average value of this index than their Chilean counterparts, and the same can be said when comparing public schools. Moreover, differences arise when comparing each aspect of autonomy in resource allocation.

In terms of responsibility in hiring teachers, private schools (both in Uruguay and Chile) and subsidized private Chilean schools feel totally autonomous. In the case of the public system, 28% of Chilean students attend schools that assume total responsibility in hiring teachers, while 52% attend schools where this responsibility falls on regional authorities. In Uruguay, responsibility in hiring teachers in the public system relies mainly on national authorities.

Private schools in both countries show a high level of autonomy regarding the setting of teachers starting salaries and salary increases. More than 90% of students in the private system of both countries attend schools that have total responsibility on these aspects. In the case of Chilean public schools, responsibility regarding teacher salaries falls mainly in the regional authority. In turn, responsibility of teacher salaries in public Uruguayan schools relies solely on the national authority.

Regarding the formulation of the school budget we observe similar patterns. Every student attending the private system of both countries is at schools that have responsibility on budget formulation. In contrast, 40% of students in the Chilean public system attend schools who have at least shared responsibility in formulating the budget. Most of the responsibility regarding this aspect in the public Chilean system falls on regional authorities, although there seems to be significant shared responsibility between schools and regional authorities. In The Uruguayan public system, most of the responsibility in budget formulation falls on national authorities. Nevertheless 22% of students attend public schools that feel they have at least shared responsibility in this topic.

Private schools of both countries also show higher levels of autonomy in curriculum and assessment than public schools. Nevertheless the degree of autonomy of private schools regarding this aspect is lower than regarding resource allocation. In contrast, public schools show slightly higher average levels of autonomy regarding curricular aspects than regarding resource allocation, in both countries.

Regarding autonomy in choosing textbooks, more than 90% of students in the private and public Chilean system attend schools that have at least shared responsibility in choosing textbooks. Chilean private schools tend to assume all the responsibility in choosing textbooks. Meanwhile, a high percentage of students in the private subsidized and the public system attend schools that also assume total responsibility in this aspect (73% and 68%, respectively). In the cases with shared responsibility, the other responsible institution is the regional authority. In Uruguay, 65% of students in the private system attend schools that feel they have total responsibility in choosing textbooks, while 94% of them attend schools that at least consider to have shared responsibility regarding this aspect. The same percentages for public schools are 21% and 59%,

respectively. In this case, shared responsibility includes regional and national authorities, both in the private and public system.

In determining course content, Chilean schools show higher levels of autonomy than Uruguayan schools. 62% of students in the Chilean private system attend schools that have total responsibility regarding course content. The same percentages are 55% and 36% for private subsidized and public schools, respectively. In contrast, those percentages are only 10% and 3% in private and public Uruguayan schools, respectively. Regarding this aspect, in contrast to the others analyzed before, regional authorities have no responsibility in the Chilean system. Rather, the responsibility falls on national authorities, and more pronouncedly in the public system. In Uruguay, most of the responsibility falls on national authorities.

How do private and public schools differ regarding accountability in both countries? To what extent are school heads and teachers accountable in Uruguay and Chile? Are parents informed about education results? How do these aspects vary in both countries?

In Chile, between 30 and 40% of students attend schools that respond that achievement data are posted publicly. In Uruguay such policy is never put in practice in private schools, and only 7% of students in the public system attend schools that respond that publish their results.

The use of achievement data in decisions about instructional resource allocation is more frequent in Chile than in Uruguay, and, within each country it is more frequent in private than in public schools. About 80% of students in the private and private subsidized system in Chile attend schools that use achievement data in decisions about educational resource allocation This percentage drops to 65% in the case of Chilean public schools. In Uruguay, the same percentages are 62% and 41% for the private and public schools, respectively.

The practice of using assessment data to compare the school to district or national performance is also more frequent in Chile than in Uruguay, but in this case, the within country comparison shows that it more frequent in public than in private schools. In the Chilean case, private subsidized and public schools show similar mean values of this variable. In Uruguay, the private system practically does not practice this type of policy.

Parental achievement pressure seems to be much higher in Chile than in Uruguay, and also higher in private than in public schools. 60% of students in the Chilean private system attend schools whose principal responds that there is *constant* pressure from *many parents* to achieve very high academic standards. The same percentages for private subsidized and public schools in Chile are 28% and 10%, respectively. In Uruguay, these percentages are much lower, 21% in private schools and only 1% in public schools.

Providing parents of information about grade achievement data compared to same grades in other schools is a very rare practice in Uruguay, both in public and in private schools. In Chile it is a more frequent policy, although not very extended. Private subsidized schools show the highest mean value of this variable (34%).

On the other hand, monitoring teacher lessons by principals is an extended practice in both

countries. In this case, public Uruguayan schools show the highest value, with 90% of students attending schools that practice this policy. On the other end, the same percentage in Chilean public schools is 63%.

Monitoring teacher lessons by external inspectors is a more frequent practice in Uruguay than in Chile. Again, Uruguayan schools show the highest value, with 84% of students attending schools that are monitored by external inspectors. In contrast, only 19% of students in the Chilean public system attend schools that are subject to this type of monitoring. The comparison of private schools in both countries also shows that Uruguayan private schools are more frequently monitored by external inspectors than their Chilean counterparts.

How does teacher and principals' evaluation vary between Uruguay and Chile? Do the systems incentive full time teaching?

The use of achievement data to evaluate the principal´s performance is more frequent in Chile than in Uruguay. The difference between private institutions of both countries is very large: while 50% of students in the Chilean private system attend schools that practice this type of policy, the same percentage for private Uruguayan schools is only 7%. Figures for the public system are 30% and 18% respectively for Chile and Uruguay.

Regarding the evaluation of teacher performance, the use of achievement data is more frequent in private than in public schools, in both countries. Public schools of Chile and Uruguay show similar mean values of this variable (35% and 37%, respectively), while private Chilean schools show higher values than their Uruguayan counterparts (64%, 70% and 42% respectively for Chilean private, private subsidized and Uruguayan private).

Finally, the Chilean system clearly incentives full time teaching much more than the Uruguayan system. The proportion of full time teachers is 65% to 75% in Chile (depending on the type of school), while in Uruguay the percentage is much lower, between 13% and 16%.

How do teachers, parents and students participate in staffing, budgeting, course content and assessment in Uruguay and Chile? Is there a difference between public and private schools?

Both in Uruguay and Chile, the influence of teachers on staffing and budget is relatively low. Between 10% and 17% of students attend schools where principals respond that teachers have influence in these aspects. In contrast, the influence of teachers on course content and assessment practices is more frequent, the percentage being between 63% and 67% in Chile, and 63% and 43% private and public Uruguayan schools, respectively. In this aspect, teachers in the public Uruguayan system seem to have less influence on course content and evaluation than their counterparts in the private system.

Parental influence in staffing and budgeting is not very frequent in Uruguay, neither in private nor in public schools. In Chile, it seems to be relatively important in public and private subsidized schools (particularly in the first ones), while infrequent in private schools. Regarding curriculum and assessment, parents do not seem to have much influence neither in Chile nor in

Uruguay. Again, Chilean public and private subsidized schools show the highest mean values of this variable (17% and 14% respectively). A similar pattern can be seen for student influence, regarding both aspects.

Performance and school progress in Uruguay and Chile

Average results of PISA 2009 scores show statistically significant better results for Chilean students in science and reading tests. Mean results in science are 26 points higher in Chile than in Uruguay (0.3 standard deviations), while the same difference in reading scores is 30 points (0.35 standard deviations).   On the other hand, the results in mathematics do not significantly differ, on average, between Chilean and Uruguayan students. These results persist when comparing students of the same percentiles of individual socioeconomic status in both countries.[5] That is, at the same percentile of socioeconomic status Chilean students perform better than Uruguayan students in science and reading, while no significant differences are found in maths test scores (see Table 1).

Table 1. PISA 2009 Tests Scores in Uruguay and Chile, by quartile of Index of Socioeconomic Status

PISA 2009		Test scores					
		Uruguay			**Chile**		
PISA Index of Socioeconomic Status		Science	Maths	Reading	Science	Maths	Reading
1st quartile	Mean	375	375	372	417	385	412
	Sd	78	72	82	68	63	71
2nd quartile	Mean	404	405	403	434	409	438
	Sd	78	73	84	67	64	68
3rd quartile	Mean	437	437	435	457	430	462
	Sd	82	79	87	70	68	72
4th quartile	Mean	483	479	481	495	474	498
	Sd	87	84	93	78	78	78
Total	**Mean**	**425**	**424**	**423**	**451**	**425**	**453**
	Sd	91	87	96	77	76	79
Difference 4th-1st		108	105	109	78	89	86

Moreover, Uruguay shows greater variance in test scores. The difference in test scores between the lowest and highest quartile of students ranked by socioeconomic status is much higher in Uruguay (107 points, on average) than in Chile (84 points on average).

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[5] We rank the students relative to the distribution of their own country.

In addition, Chile shows a degree of school progress at age 15 significantly higher than Uruguay. In Chile, 77% of students are enrolled in fourth grade or higher at the time they are tested by PISA, while the same rate for Uruguay is only 61%. Moreover, differences in school progress by individual socioeconomic status are dramatically higher in Uruguay than in Chile. On the one hand, if we compare students from the highest quartile of socioeconomic status in both countries, we do not find significant differences in school progress, as the percentage of students in fourth grade or above is similar in Uruguay than in Chile (85% and 82% respectively). But if we look at students of the lowest quartile of socioeconomic status, we find dramatic differences in school progress between both countries. While 70% of Chilean students are enrolled in fourth grade or above, among the Uruguayan students this percentage is only 39% (see Table 2).

Also, nearly one third of students of the lowest quartile of socioeconomic status show a lag of two grades or more (are in grade 2 or below at the time of the PISA test), while that percentage is only 6% for Chilean students. These features indicate much higher repetition rates between Uruguayan students, across all levels of socioeconomic status, but particularly dramatic in the lowest two quartiles.

Table 2. Percentage of students in each grade, by quartile of the Index of Soicioeconomic Status, in Chile and Uruguay. PISA 2009

PISA 2009						Grade attended by student			
			Uruguay				Chile		
PISA Index of Socioeconomic Status		Grade 2 or below	Grade 3	Grade 4 o upper	Total	Grade 2 or below	Grade 3	Grade 4 o upper	Total
1st quartile	Mean	32%	30%	39%	100%	6%	24%	70%	100%
2nd quartile	Mean	21%	29%	50%	100%	3%	20%	77%	100%
3rd quartile	Mean	12%	19%	69%	100%	3%	17%	80%	100%
4th quartile	Mean	5%	10%	85%	100%	1%	17%	82%	100%
Total	**Mean**	**17%**	**22%**	**61%**	**100%**	**3%**	**20%**	**77%**	**100%**
Difference 4th-1st		**-26**	**-19**	**46**		**-5**	**-7**	**12**	

This aspect is very important, since school progress is likely to have an impact on acquired cognitive skills. In that sense, what follows attempts to discern how much of the observed differences in test results (particularly in reading and science) between Chile and Uruguay are due to students having completed one or more school grades, and how much to other factors, including institutional features. But we have to note that the final interpretation of the results is not straightforward, as school progress is likely to be affected by the same features affecting test scores. For example, if a type of institutional framework has a positive impact on school performance (test scores), it is also likely to influence student school progress. Therefore, if we find an association between school progress and test results, it may reflect both a direct impact of school progress on achievement (greater exposure to class time and educational resources should have an impact on cognitive skills) and an indirect effect (the effect of unobserved school or institutional factors affecting both school progress and learning). This is discussed later.

Performance, school progress and individual and school inputs

Using the PISA 2009 pooled database of Chile and Uruguay, we estimate <u>separate regressions</u> of test scores on each set of variables describing a governance factor, for the following samples:[6]

  a. Using the full sample, with controls for private-public provision[7]

  b. Using separate samples for each country, in order to analyze if estimated coefficients using full sample are valid in each country, separately. [8]

  c. Using separate samples for public and private schools.[9]

We first regressed test scores on a individual characteristics (gender, individual socioeconomic status), school progress (grade attended by student) and a set of school characteristics (PISA index of quality of school resources, school size, a set of dummies describing school admission policies, school socioeconomic status, a set of dummies indicating private /public provision and private/public financing). The type of question we want to answer before going on to institutional factors is, after controlling by individual characteristics, grade attended by student and school inputs, how does Uruguay compare to Chile? Results are reported on Table 3.

 The first set of columns show the coefficient associated to the dummy indicating a Uruguayan student, i.e., the difference in average test scores between Chile and Uruguay after controlling for gender and individual socioeconomic status. Estimations indicate that after controlling for these characteristics Uruguayan students still show a lower performance in science and reading. Nevertheless, the differences are shorter than those observed without controls. Estimations indicate that the difference in science and reading scores between both countries fall up to 16 and 20 points, respectively. On the other hand, after controlling for individual characteristics, Uruguayan students perform better than Chilean students in maths (the estimated difference is about 11 points). It follows that some of the differences in average results between both countries are explained by differences in individual characteristics of students in particular, differences in socioeconomic status. Recall from the previous section that Chile shows higher values of this index than Uruguay.

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[6] We also estimated a set of regressions using separate samples for quartiles of school socioeconomic status. In general, we did not find significant differences in estimated coefficients across subsamples. Estimations can be provided upon request.

[7] Note that pooling the database implies we are restricting the estimated coefficients (eg, the institutional effect on performance) to be the same in both countries.

[8] By estimating separate regressions for each country, we test the restriction that coefficients must be the same in both countries. However, results must be taken with care, since some features do not have enough within variation to identify an effect or association.

[9] Regressions should attempt to control for selectivity of students into public and private schools with a Heckman selection equation. We evaluated using the size of the community as the exclusion variable, but we are still working on these regressions. In this version we report private and public subsample regressions without the previous selection equation, so results regarding this aspect are definitely not final.

Table 3. Linear regression coefficients of test scores (Uruguay vs Chile)

Variables	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Uruguay	-15.94***	10.87***	-20.19***	-3.630	22.26***	-7.056**	-2.380	21.72***	-4.487
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private - Public	No	No	No	No	No	No	Yes	Yes	Yes

Individual controls include gender and the PISA Index of socioeconomic status. Grade is a set of dummies indicating the grade attended by the student (2 or below, 3, 4 or above). School controls include the PISA index of quality of school resources, school size, a set of dummies describing school admission policies, school socioeconomic status, a set of dummies indicating private /public provision and private/public financing.

The second set of columns in Table 3 show the estimated coefficients for Uruguay after controlling for individual characteristics and grade attended by the student. Note that after controlling for these factors, no difference persists between Uruguayan and Chilean students in science. This implies that the observed difference between average test scores in both countries can be fully associated to differences in socioeconomic status and to the fact that Chilean students have made on average more progress at school (have completed higher grades) than Uruguayan students. Nevertheless, as said before, if other school or institutional factors are associated with school progress, the associated coefficient of "grade" could be partly capturing these effects. We will turn to this aspect later.

Regarding reading scores, Uruguayan students still perform worse than Chilean students, after controlling for individual characteristics and grade, although the difference shortens up to 7 points. In order words, Uruguayan students with the same characteristics, attending the same grade as Chilean students get lower reading test scores, although the estimated difference is much less than the one we can observe without controls. Finally, after controlling for individual characteristics and grade, Uruguayan student perform significantly better in maths than Chilean students, with an estimated difference of 22 points in test scores. In this case, the lack of difference between gross average test scores between both countries mostly hides the fact that Uruguayan students have on average made less progress regarding completion rates.

Finally, the last three columns of table 3 report the estimated coefficients for Uruguay after controlling for individual characteristics, grade and school characteristics. These set of controls completely account for the persisting difference in reading for Chilean students.
On the other hand, after controlling for these factors we still observe a better performance of Uruguayan students in maths, with an estimated difference of nearly 22 points in test scores.

In sum, these first estimations indicate that: a) the observed gross average difference in PISA 2009 science scores for Chile can be accounted partly by differences in socioeconomic status of students in both countries and partly by differences in school progress of students. On average,

student socioeconomic status is slightly higher in Chile than in Uruguay, while school progress is significantly better in Chile than in Uruguay; b) the observed difference in reading scores (for Chile) can be accounted partly by differences in socioeconomic status, partly by differences in school progress and partly to differences in characteristics of schools; and c) If we compare students with the same individual characteristics, grade and school characteristics, we observe a better performance of Uruguayan students in maths.

Institutional factors and performance: Summary of main results

In general, analyzed institutional variables do not account for observed differences in test scores between both countries. Nevertheless there are some institutional features that appear more robustly related to results, either measured by test scores or by school progress at age 15. In what follows we summarize the main results.

In general, we find a positive association between greater **autonomy** in resource allocation and performance in all PISA tests, both when analyzing the full sample and when separating public and in private schools. We also find a positive association between school autonomy in resource allocation and school progress (see section VI), but it is only significant for the lowest quartile of socioeconomic status.

The positive association between autonomy in resource allocation and test results holds in Chile, after controlling for individual characteristics, grade and school inputs. However, in Uruguay the positive association between this factor and outcomes is closely linked to the type of provision (public or private). This is due to the strong association between the degree of autonomy in resource allocation and the type of service provision in Uruguay: while private schools are fully autonomous on this regard, public schools have very little margins for this type of decisions. The lack of within variation makes it difficult to separate public-private provision with autonomy in resource allocation, if we only consider the Uruguayan sample.

Regarding the effect of a higher degree of autonomy in defining curriculum content and assessment, there seems to be no strong association between this factor and educational outcomes. This result is robust when analyzing both countries separately, under different types of controls.

Table A.3. Relationship between test scores and grade of autonomy regarding resource allocation/ curricular aspects-Full Sample, Chile and Uruguay after controlling by individual characteristics and school inputs

	Full sample								
	Science	**Maths**	**Reading**	**Science**	**Maths**	**Reading**	**Science**	**Maths**	**Reading**
Autonomy in allocation of resources (PISA Index)	10.74***	10.38***	12.10***	8.209***	7.931***	9.424***	5.240**	4.043*	6.056***
Autonomy in Curriculum and Assessment (PISA Index)	-1.213	-3.284	-1.887	-1.716	-3.741	-2.429	-2.621	-4.598*	-3.692*
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Chile								
	Science	**Maths**	**Reading**	**Science**	**Maths**	**Reading**	**Science**	**Maths**	**Reading**
Autonomy in allocation of resources (PISA Index)	10.57***	10.19***	11.95***	8.165***	7.842***	9.345***	5.429**	4.142*	6.300***
Autonomy in Curriculum and Assessment (PISA Index)	-1.380	-3.757	-2.276	-1.759	-4.107	-2.714	-2.456	-4.783*	-3.719
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	--	--	--	--	--	--	--	--	--
	Uruguay								
	Science	**Maths**	**Reading**	**Science**	**Maths**	**Reading**	**Science**	**Maths**	**Reading**
Autonomy in allocation of resources (PISA Index)	17.54***	15.64***	17.60***	13.22***	11.34***	13.25***	0.741	0.583	-1.131
Autonomy in Curriculum and Assessment (PISA Index)	5.342	13.40**	12.39**	0.704	8.351*	7.653**	-5.257	2.147	1.710
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	--	--	--	--	--	--	--	--	--

Table A.4. Relationship between test scores and grade of autonomy regarding resource allocation/ curricular aspects-Full Sample, Public and Private Schools after controlling by individual characteristics and school inputs

	Full sample			Public Schools			Private schools		
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Autonomy in allocation of resources (PISA Index)	5.240**	4.043*	6.056***	28.43**	17.20	33.92***	6.178**	4.867*	6.373**
Autonomy in Curriculum and Assessment (PISA Index)	-2.621	-4.598*	-3.692*	-0.636	0.0412	-1.474	-2.308	-5.556**	-3.098
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Private-Public	Yes	Yes	Yes	No	No	No	No	No	No
Private Subsidized	--	--	--	--	--	--	-16.35*	-8.333	-6.372
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Among the **accountability factors**, we found that after controlling for individual characteristics, grade, and school characteristics, there is a positive association between publishing the results and performance, in all evaluated areas. Publication of results is also positively associated to school progress. This association is statistically significant for the full sample, and for the lowest and highest quartiles of school socioeconomic status.

We also found a positive association between a strong pressure from parents to achieve good results and performance in tests, after the usual controls. When analyzing both countries separately, this association persists only for Chile. It should be noted that this variable can be strongly endogenous, and therefore the association may reflect reverse causality (demanding parents send their children to better performing schools).

The use of use of achievement data to compare the school to district or national performance is positively related to school progress, although we did not find a direct association with achievement, measured by test scores. The effect on school progress is stronger in the second quartile subsample, although we also find an average effect on the full sample.

In the rest of the accountability variables we do not find conclusive results, except that monitoring teachers in class by the principal seems to be negatively associated to educational outcomes. Again, this variable may reflect reverse causality, i.e. the principal monitors more problematic or less qualified teachers.

Table A.5.Relationship between tests scores and accountability-Full Sample, Chile and Uruguay after controlling by individual characteristics and school inputs

	Full sample								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are posted publicly	9.724	11.31*	8.197	5.476	7.269	3.661	7.915*	10.33**	6.492*
Achievement data used in decisions about instructional resource allocation	-2.591	-0.483	2.642	-1.455	0.453	3.931	-5.003	-3.660	-0.705
Assessments are used to compare school to district/national performance	-8.492*	-11.48**	-10.77**	-9.757**	-12.78***	-12.07***	-6.288	-9.562**	-9.338**
Grade achievement data provided to parents compared to other schools	1.898	0.539	1.553	3.850	2.223	3.728	3.318	3.456	2.406
Parental achievement pressure	35.19***	40.32***	41.02***	30.17***	35.40***	35.73***	11.30**	12.83**	15.92***
Monitoring of teacher lessons by principal	-10.21*	-15.63***	-12.52**	-7.205	-12.75**	-9.329**	-9.395*	-13.97***	-11.04***
Monitoring of teacher lessons by external inspectors	-10.31*	-6.979	-12.55**	-6.022	-2.854	-7.986*	-7.322	-4.531	-8.316*
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Chile								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are posted publicly	10.23	11.54*	8.457	6.354	7.863	4.169	8.927*	11.08**	7.084**
Achievement data used in decisions about instructional resource allocation	-4.007	-0.963	3.412	-3.930	-0.996	3.715	-7.905	-5.543	-1.303
Assessments are used to compare school to district/national performance	-8.903*	-12.23**	-11.24**	-10.03**	-13.37***	-12.37***	-6.989	-10.48**	-10.11**
Grade achievement data provided to parents compared to other schools	2.861	1.492	2.861	4.269	2.737	4.611	3.341	3.280	2.909
Parental achievement pressure	37.56***	42.27***	43.27***	31.82***	36.73***	37.11***	12.93**	13.98**	17.44***
Monitoring of teacher lessons by principal	-10.45*	-17.03***	-12.94**	-7.774	-14.47***	-10.01**	-11.57**	-17.23***	-12.98***
Monitoring of teacher lessons by external inspectors	-12.71*	-8.930	-15.20***	-7.525	-3.967	-9.553*	-9.632	-5.757	-10.05**
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	--	--	--	--	--	--	--	--	--
	Uruguay								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are posted publicly	5.241	8.618	3.235	-2.354	-0.753	-4.700	-1.236	-2.815	-1.757
Achievement data used in decisions about instructional resource allocation	3.408	1.062	-0.211	10.51***	8.478**	6.983*	6.637**	4.060	1.988
Assessments are used to compare school to district/national performance	-7.902	-6.438	-8.359	-10.58**	-9.438**	-11.10**	-7.092	-6.341*	-7.134*
Grade achievement data provided to parents compared to other schools	-20.66	-13.68	-30.17**	-14.20	-7.054	-23.65	-5.742	4.677	-15.98
Parental achievement pressure	36.80***	31.40***	41.01***	22.09**	15.80	26.07**	4.786	-7.034	6.971
Monitoring of teacher lessons by principal	-4.418	1.861	-5.930	-1.684	5.378	-3.050	1.723	6.286	-0.741
Monitoring of teacher lessons by external inspectors	0.694	0.376	-1.225	-4.501	-5.085	-6.495	-5.505	-5.559	-5.605
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	--	--	--	--	--	--	--	--	--
Country FE	--	--	--	--	--	--	--	--	--

Table A.6. Relationship between tests scores and accountability- Full Sample, Public and Private Schools after controlling by individual characteristics and school inputs

	Full sample			Public Schools			Private schools		
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are posted publicly	7.915*	10.33**	6.492*	3.521	-0.264	-0.624	11.38*	16.89***	10.21**
Achievement data are used in decisions about instructional resource allocation to the school	-5.003	-3.660	-0.705	-5.443	-1.132	-3.619	-8.502	-8.313	1.358
Assessments are used to compare the school to district or national performance	-6.288	-9.562**	-9.338**	-5.840	-5.731	-6.280	-8.578*	-14.05**	-12.77***
Grade achievement data is provided to parents in comparison to same grade in other schools	3.318	3.456	2.406	1.990	8.839	5.266	3.477	-0.331	-2.310
Parental achievement pressure	11.30**	12.83**	15.92***	30.88***	28.80***	36.11***	1.324	1.365	3.337
Monitoring of teacher lessons by principal	-9.395*	-	-	1.947	-4.673	-0.498	-14.40*	-19.00**	-
Monitoring of teacher lessons by external inspectors	-7.322	-4.531	-8.316*	-7.601	-11.51	-15.50**	-4.543	1.451	2.171
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Private-Public	Yes	Yes	Yes	No	No	No	No	No	No
Private Subsidized	--	--	--	--	--	--	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

We did not find robust evidence of association between the variables indicating **incentives** and educational performance. We neither found evidence of robust association between the direct influence of different actors (parents, teachers and students) and achieved results.

Table A.7. Relationship between tests scores and teacher incentives-Full Sample, Chile and Uruguay after controlling by individual characteristics and school inputs

	Full sample								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are used in evaluation of the principal's performance	5.483	4.868	7.861	6.822	6.164	9.267	2.785	1.235	4.783
Achievement data are used in evaluation of teachers' performance	-5.463	0.150	-6.289	-5.909	-0.293	-6.760	-11.33*	-5.491	-14.00**
Proportion of full time teachers	1.366	-4.284	5.201	3.832	-2.357	7.704	2.687	-3.435	3.824
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
	Chile								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are used in evaluation of the principal's performance	6.465	5.248	9.117	7.653	6.367	10.39	1.956	0.0545	4.795
Achievement data are used in evaluation of teachers' performance	-3.600	2.129	-4.928	-4.879	0.937	-6.299	-11.18	-4.970	-14.76**
Proportion of full time teachers	0.226	-3.634	5.336	4.077	-0.249	9.524	2.170	-2.021	4.667
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	No	No	No	No	No	No	Yes	Yes	Yes
Country FE	--	--	--	--	--	--	--	--	--
	Uruguay								
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are used in evaluation of the principal's performance	-7.813	-3.097	-6.389	-3.921	1.447	-2.398	0.232	4.445	1.797
Achievement data are used in evaluation of teachers' performance	-13.22***	-10.06*	-12.50**	-11.33***	-8.814**	-10.68***	-12.09***	-12.30***	-12.75***
Proportion of full time teachers	8.268	-10.04	5.175	-3.125	-20.51**	-6.147	-2.999	-16.30**	-5.720
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	No	No	No	Yes	Yes	Yes	Yes	Yes	Yes
School controls	No	No	No	No	No	No	Yes	Yes	Yes
Private-Public	No	No	No	No	No	No	Yes	Yes	Yes
Private Subsidized	--	--	--	--	--	--	--	--	--
Country FE	--	--	--	--	--	--	--	--	--

Table A.8. Relationship between tests scores and teacher incentives- Full Sample, Public and Private Schools after controlling by individual characteristics and school inputs

	Full sample			Public Schools			Private schools		
	Science	Maths	Reading	Science	Maths	Reading	Science	Maths	Reading
Achievement data are used in evaluation of the principal's performance	2.785	1.235	4.783	9.372	-0.735	-3.677	7.317	9.595	17.40***
Achievement data are used in evaluation of teachers' performance	-11.33*	-5.491	-14.00**	-24.51***	-15.76**	-16.95**	1.927	8.650	-6.805
Proportion of full time teachers	2.687	-3.435	3.824	-14.04	-8.648	-7.415	24.72	4.210	21.62
Individual controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Grade	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Private-Public	Yes	Yes	Yes	No	No	No	No	No	No
Private Subsidized	--	--	--	--	--	--	Yes	Yes	Yes
Country FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Decomposition of average differences in results between Chile and Uruguay

Using the pooled data estimated achievement production function it is possible to decompose the difference in average academic between both countries as follows:

$$E(tu\text{-} tch/B, R \ I \ ) = a + \alpha(Bu\text{-} Bch) + \beta(Ru\text{-} Rch) + \gamma (Iu - Ich)$$

where term *a* represents the difference in academic achievement that cannot be explained by the difference in group endowments and the rest represents the difference in academic achievement that can be attributed to country endowments of individual characteristics, school inputs, and institutional factors, respectively. Following the sequence of analysis, the decomposition is performed for the four regressions alternately using the four sets of governance variables (decentralization, accountability, incentives and actors) together with individual controls, grade and school characteristics. The results are reported in Tables A.11 to A.13.

We use a variant of the Oaxaca Blinder decomposition, usually used to study differences in results according to groups (defined, for example, by gender, race, etc.) In our case, the compared groups are the two analyzed countries. We estimate an "endowment effect", which basically measures the expected change in mean scores of a group (Uruguay) if the group had equal average variable levels to the second group (Chile).

Recall that differences in gross outcomes between the two countries are significant only in the case of science and reading, in which Chile achieved results superior to Uruguay. For maths, the difference in mean outcomes is only one point, not statistically significant. The four groups of tables A.11 to A.13 illustrate the decomposition of test results by the endowment effect of each set of governance variables, as well as included control variables.

Table A.11. Decomposition of mean differences in results (Chile – Uruguay) by endowment effects of decentralization variables and control variables

Group Variables	Science Endowment effect	%	Maths Endowment effect	%	Reading Endowment effect	%
School Responsibility for Resource Allocation	5.18 *	20%	3.99 *		5.98 *	20%
School Responsibility for Curriculum & Assessment	-2.38	-9%	-4.18		-3.36	-11%
Male	0.53 **	2%	0.96 **		-0.58 **	-2%
Individual socioeconomic status	1.91 ***	7%	1.82 ***		2.02 ***	7%
Grade	12.83 ***	49%	11.56 ***		13.53 ***	45%
School socioeconomic status	6.00 ***	23%	8.23 ***		7.19 ***	24%
Other school characteristics	-0.13	0%	-0.95		1.07	4%
Unexplained	1.94	7%	-20.43		4.14	14%
Total Difference in Scores (Ch-Ury)	**26**	**100%**	**1**		**30**	**100%**

Table A.12. Decomposition of mean differences in results (Chile – Uruguay) by endowment effects of accountability variables and control variables

Group Variables	Science Endowment effect	%	Maths Endowment effect	%	Reading Endowment effect	%
Achievement data are posted publicly	2.35 *	9%	3.07 *		1.93	6%
Achievement data are used in decisions about instructional resource allocation to the school	-1.62	-6%	-1.18		-0.23	-1%
Assessments are used to compare the school to district or national performance	-1.80	-7%	-2.74		-2.68	-9%
Grade achievement data is provided to parents in comparison to same grade in other schools	0.78	3%	0.82		0.57	2%
Parental achievement pressure	2.14 *	8%	2.42		3.01	10%
Monitoring of teacher lessons by principal	1.67	6%	2.48		1.96	7%
Monitoring of teacher lessons by external inspectors	4.30	17%	2.66		4.88	16%
Male	0.54 **	2%	0.96 **		-0.54 **	-2%
Individual socioeconomic status	1.94 ***	7%	1.83 ***		2.05 ***	7%
Grade	12.49 ***	48%	11.21 ***		13.35 ***	44%
School socioeconomic status	5.25 ***	20%	7.11 ***		6.10 ***	20%
Other school characteristics	1.67	6%	0.30		2.06	7%
Unexplained	-3.72	-14%	-27.94		-2.46	-8%
Total Difference un Science Scores (Ch-Ury)	**26**	**100%**	**1**		**30**	**100%**

Table A.13. Decomposition of mean differences in results (Chile – Uruguay) by endowment effects of incentive variables and control variables

Group Variables	Science		Maths		Reading	
	Endowment effect	%	Endowment effect	%	Endowment effect	%
Achievement data are used in evaluation of the principal's performance	0.61	2%	0.27		1.05	4%
Achievement data are used in evaluation of teachers' performance	-1.96 *	-8%	-0.95		-2.42	-8%
Proportion of full time teachers	1.51	6%	-1.93		2.14	7%
Male	0.53 **	2%	0.98 **		-0.57	-2%
Individual socioeconomic status	1.78 ***	7%	1.70 ***		1.89	6%
Grade	13.53 ***	52%	12.03 ***		13.84	46%
School socioeconomic status	5.16 ***	20%	8.16 ***		6.46	22%
Other school characteristics	4.26	16%	1.47		7.13	24%
Unexplained	0.58	2%	-20.74		0.47	2%
Total Difference in Scores (Ch-Ury)	26	100%	1		30	100%

Table A.14. Decomposition of mean differences in results (Chile – Uruguay) by endowment effects of actors influence variables and control variables

Group Variables	Science		Maths		Reading	
	Endowment effect	%	Endowment effect	%	Endowment effect	%
Parents influence in staffing and budgeting	0.93	4%	1.21		0.49	2%
Parents influence in instructional content and assessment practices	0.23	1%	0.08		-0.01	0%
Teachers influence in staffing and budgeting	-0.05	0%	-0.07		-0.04	0%
Teachers influence in instructional content and assessment practices	-0.46	-2%	-0.28		0.04	0%
Student influence in staffing and budgeting	-1.04	-4%	-0.71		-0.86	-3%
Student influence in instructional content and assessment practices	-0.10	0%	-0.01		0.34	1%
Male	0.52 **	2%	0.95 **		-0.58	-2%
Individual socioeconomic status	1.91 ***	7%	1.82 ***		2.02	7%
Grade	13.02 ***	50%	11.75 ***		13.68	46%
School socioeconomic status	5.84 ***	22%	8.15 ***		7.02	23%
Other school characteristics	2.62	10%	0.63		4.09	14%
Unexplained	2.57	10%	-22.51		3.81	13%
Total Difference in Scores (Ch-Ury)	26	100%	1		30	100%

Most of the between country differences in all test results can be accounted by differences in the grade attended by students in both countries, i.e. the greater school progress of Chilean students. In the case of Sciences, approximately 13 points of the 26 of the gross difference is accounted by differences in the attended grade. In reading, the difference accounted by this factor would reach approximately 13.5 points (out of a gross difference of 30). Ultimately, between 45% and 50% of gross average differences in science and reading would be associated to this factor.

Another important factor that accounts for a significant part of the differences between both countries test scores is socioeconomic status. The decomposition shows that between 7 and 10

points of the mean difference in results are accounted by differences in socioeconomic status of students and schools, which represents about 30% of the differences in science and reading.

Regarding governance variables we estimate that greater autonomy in resource allocation could account for 4 and 6 points of the difference in results between Chile and Uruguay, depending on the assessed area. The remaining governance variables do not account for more than three points of the differences in results, and are generally not statistically significant.

Finally, we emphasize the high value of the "unexplained" part of the differences in maths test scores, that is, the difference that cannot be accounted by any of the variables included in the regression (between 21 and 28 points, according to the regression). In the case of Mathematics, this unexplained difference in negative, which corresponds to the difference in favor of Uruguay if Uruguay had the same values as Chile in terms of socioeconomic status, school progress, school characteristics and levels of several aspects of governance factors. However, this difference cannot be attributed to differences in institutional variables that can be assessed with the PISA data.

School progress and institutions

The above analysis points out the importance of school progress in secondary education in accounting for differences in outcomes between Uruguay and Chile. It could be argued that if analyzed institutional factors have a positive impact on school performance, they will also influence student school progress. Therefore, if we include the school progress as a covariate in the regression, it could partly capture the indirect effect of these institutional factors (which in turn would decrease the associated coefficient of the institutional factor itself). In order to analyze this hypothesis we performed two types of analysis.

First, we run all the above regressions without including "grade" as a covariate. The results showed no significant variations in the coefficients associated with institutional variables. [10] Second, we regressed school progress on each set of governance factors, individual characteristics and school inputs, through Probit models. Recall from section II that differences in school progress between both countries vary significantly with socioeconomic status. In particular, practically no differences are observed between Chilean and Uruguayan students of the highest quartile, while dramatic differences appear when comparing school progress of students from the lowest quartile. In order to analyze possible different effects of institutions and other factors, we estimated separate regressions by quartile of school socioeconomic status. The dependent variable indicates a student attending fourth grade or above. The results are reported in Tables A.15 to A.18.

Estimates indicate that school autonomy in personnel-management and process decisions such as hiring of teachers and deciding budget allocation is related to a greater probability of being in fourth grade or above by the time of PISA tests,(i.e. not having repeated or lagged behind), only for students attending schools of the lowest quartile of socioeconomic status. On the other hand,

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[10] These estimations are in Tables A.1, A.3, A.5 and A.7.

we do not find significant associations between this factor and school progress in the other quartiles of the distribution of students across school socioeconomic status. In the same way as the findings related to achievement, we do not find an association between autonomy in curricular aspects (as defining content, choosing textbooks) and school progress (Table A.15).

In terms of accountability, estimates indicate that publications of results are statistically significantly positively related to student school progress. This result is valid for the full sample and for the lowest quartile subsample. The estimated association is higher for the lowest quartile, with a substantial estimated marginal effect (0.32, valuated at the means of the rest of the covariates). We also find a statistically significant positive relationship between the use of achievement data to compare the school to district or national performance and school progress. The effect is statistically significant at the mean of the full sample, and in the second quartile subsample.[11]

Finally, no clear association was found between the variables indicating incentives and school progress. Regarding actors influence, there seems to be a negative association between teachers influence in curriculum and assessment and school progress, significant in the third and fourth quartile.

Table A.15. Probit estimations. Dependent variable: student being in fourth grade or above. Covariates: decentralization and control variables

	Full Sample		First quartile SES		Second quartile SES		Third quartile SES		Fourth quartile SES	
	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect
Autonomy in allocation of resources (PISA Index)	0.0515	0.0160	0.450**	0.1767	0.0398	0.0138	0.0846	0.0245	0.0488	0.0101
Autonomy in Curriculum and Assessment (PISA Index)	-0.0217	-0.0067	-0.186	-0.0730	-0.0291	-0.0101	0.0509	0.0147	0.0864	0.0179
Individual controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Grade	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
School controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private-Public	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private Subsidized	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Country FE	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Obs.	10,801	--	1,761	--	2,742	--	3,125	--	3,168	--
Pseudo R^2	0.0858	--	0.1538	--	0.127	--	0.0606	--	0.04	--

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[11] Regarding accountability factors, we also find an association between parental pressure to achieve high performance levels and school progress that is statistically significant in the second and fourth quartile of socioeconomic status. Also, a negative association between monitoring of teacher lessons by principals or external inspectors is found. Nevertheless, as said in previous sections these variables are more likely subject to endogeneity.

Table A.16. Probit estimations. Dependent variable: student being in fourth grade or above. Covariates: accountability and control variables

	Full Sample		First quartile SES		Second quartile SES		Third quartile SES		Fourth quartile SES	
	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect
Achievement data are posted publicly	0.203**	0.061	0.887***	0.324	0.118	0.041	0.0552	0.016	0.130	0.026
Achievement data are used in decisions about instructional resource allocation to the school	-0.120	-0.037	0.0527	0.021	-0.215	-0.074	-0.197	-0.055	-0.299	-0.054
Assessments are used to compare the school to district or national performance	0.150**	0.046	0.151	0.059	0.298**	0.104	0.0426	0.012	-0.125	-0.026
Grade achievement data is provided to parents in comparison to same grade in other schools	-0.148*	-0.047	-0.0768	-0.030	-0.112	-0.040	-0.232	-0.070	-0.0222	-0.005
Parental achievement pressure	0.0631	0.019	0.174	0.067	0.500*	0.151	0.00978	0.003	0.397**	0.082
Monitoring of teacher lessons by principal	-0.226***	-0.068	-0.0822	-0.032	-0.364**	-0.122	-0.312**	-0.085	-0.130	-0.025
Monitoring of teacher lessons by external inspectors	-0.142*	-0.045	-0.395*	-0.156	-0.0716	-0.025	-0.113	-0.033	-0.267*	-0.056
Individual controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Grade	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
School controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private-Public	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private Subsidized	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Country FE	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Obs.	10,206	--	1,654	--	2,531	--	3,039	--	2,977	--
Pseudo R^2	0.0983	--	0.1707	--	0.1465	--	0.0698	--	0.0528	--

Table A.17. Probit estimations. Dependent variable: student being in fourth grade or above. Covariates: incentives and control variables

	Full Sample		First quartile SES		Second quartile SES		Third quartile SES		Fourth quartile SES	
	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect
Achievement data are used in evaluation of the principal's performance	-0.0817	-0.026	-0.0545	-0.021	-0.0184	-0.006	-0.0936	-0.027	-0.138	-0.029
Achievement data are used in evaluation of teachers' performance	-0.125	-0.039	-0.244	-0.096	0.176	0.061	-0.00754	-0.002	-0.213	-0.042
Proportion of full time teachers	0.0144	0.005	0.435	0.170	-0.0207	-0.007	-0.583**	-0.169	0.0201	0.004
Individual controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Grade	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
School controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private-Public	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private Subsidized	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Country FE	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Obs.	8,220	--	1,381	--	2,260	--	2,454	--	2,116	--
Pseudo R^2	0.0812	--	0.1504	--	0.1261	--	0.0626	--	0.0565	--

Table A.18. Probit estimations. Dependent variable: student being in fourth grade or above. Covariates: actor influence and control variables

	Full Sample		First quartile SES		Second quartile SES		Third quartile SES		Fourth quartile SES	
	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect	Coef.	Marginal Effect
Parents influence in staffing and budgeting	0.148**	0.045	-0.229	-0.090	-0.0285	-0.010	0.0932	0.027	0.107	0.021
Parents influence in instructional content and assessment practices	0.190	0.056	-0.000704	0.000	-0.220	-0.079	0.280	0.073	-0.106	-0.023
Teachers influence in staffing and budgeting	0.0309	0.009	0.246	0.095	-0.180	-0.065	-0.108	-0.032	0.0357	0.007
Teachers influence in instructional content and assessment practices	-0.0610	-0.019	-0.0406	-0.016	0.291	0.104	-0.170*	-0.049	-0.286**	-0.055
Student influence in staffing and budgeting	-0.0867	-0.028	0.271	0.104	0.428**	0.135	-0.166	-0.051	-0.115	-0.025
Student influence in instructional content and assessment practices	-0.0313	-0.010	0.176	0.069	0.0256	0.009	0.0493	0.014	0.0252	0.005
Individual controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Grade	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
School controls	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private-Public	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Private Subsidized	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Country FE	Yes	--	Yes	--	Yes	--	Yes	--	Yes	--
Obs.	10,801	--	1,761	--	2,742	--	3,125	--	3,168	--
Pseudo R^2	0.088	--	0.147	--	0.1414	--	0.0651	--	0.0477	--

In sum:

PISA 2009 results show statistically better average performance in science and reading for Chilean students, while the results in mathematics are not significantly different between the two countries. These results persist when comparing performance between countries for the same percentiles of socioeconomic status. At the same percentile of socioeconomic status, Chilean students perform better than Uruguayans in science and reading, while no significant differences are observed in maths. Moreover, Chile shows levels of internal efficiency (measured by school progress at age 15) significantly higher than Uruguay. In turn, equality in outcomes, both measured in terms of educational achievement and school progress, is higher Chile than in Uruguay. What factors do explain the observed mean differences? How much of the gross differences can be accounted by differences in the systems internal efficiency, how much by the different institutional arrangements in both countries?

The above analysis shows that differences in results are mainly associated to the different degree of internal efficiency of both systems. In general, analyzed institutional variables do not account for observed differences in test scores between both countries. Nevertheless, there are some institutional features that appear more robustly related to results, either measured by test scores or by school progress at age 15.