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Equality of Educational Opportunities at Public Primary Schools in Argentina

Cecilia Adrogue
UdeSA-CONICET
Argentina

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Abstract This paper assesses the degree of equality of educational opportunities across Argentina's public primary schools. The main finding is that there are inequalities between jurisdictions, but even greater inequalities within them, suggesting the existence of serious problems in the distribution of resources at the sub-national level. Following the recommendations of the specialized literature, estimates of school quality and measures of disparity in educational opportunity were calculated. While school differences were found across provinces, even greater discrepancies were found among public schools located within provinces, which are responsible for the provision of primary education. Most importantly, inequality among public schools is found to be associated with factors that are considered socially unacceptable, such as the student's socio-economic status even among schools financed by the same governmental unit.
Keywords*:* Public education; inequality; equality of opportunity; Argentina.

Igualdad de oportunidades educativas en las escuelas primarias públicas en Argentina

Resumen: El presente trabajo analiza el grado de igualdad de oportunidades educativas en las escuelas primarias púbicas en Argentina y se encuentra que fallas a nivel sub-nacional pueden ser las culpables de su falta. Siguiendo la literatura, se estimaron medidas de calidad de las escuelas y se calculó la disparidad de las oportunidades educativas. Mientras que se encontraron diferencias entre provincias, todavía mayores diferencias se encontraron entre escuelas públicas localizadas en la misma provincia, que son las responsables de proveer la educación básica. Más importante aún, la desigualdad entre escuelas públicas se

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encuentra asociada a factores que se consideran socialmente inaceptables, como la situación socio-económica del estudiante, incluso entre escuelas financiadas por la misma unidad gubernamental.
Palabras-clave: educación pública; desigualdad; igualdad de oportunidades; Argentina.

Igualdade de oportunidades educacionais nas escolas primárias públicas em Argentina
Resumo: Este trabalho avalia o grau de igualdade de oportunidades educacionais entre as escolas primárias públicas da Argentina e descobre que falhas ao nível sub-nacional pode ser o culpado por sua falta. Seguindo a literatura, são calculadas as estimativas de qualidade da escola e as medidas de disparidade de oportunidades educacionais. Embora as diferenças escolares fossem encontradas entre as províncias, ainda maiores discrepâncias foram encontradas entre as escolas públicas localizadas em províncias, que são responsáveis pela oferta de educação primária. Mais importante ainda, a desigualdade entre escolas públicas é encontrado para ser associada a fatores que são considerados socialmente inaceitáveis, como a situação sócio-econômica do aluno, mesmo entre escolas financiadas pela mesma unidade governamental.
Palavras-chave: educação pública, desigualdade, igualdade de oportunidades; Argentina.

Introduction

One of the main objectives of Argentina's Federal Education Law of 1993, as stated in section 8, was to provide equality of educational opportunities. In the economic jargon, and borrowing Roemer's words, "to level the playing field."[1] In a world of perfectly equal opportunities differences in outcomes would arise from differences in efforts. Disparities derived from different amounts of effort would not be considered discriminatory or unfair.

The main purpose of this paper is to determine the extent to which the objective of equality of educational opportunities is being fulfilled and point to where the main failings lie. Though some studies have shown that there is great disparity in quality among public schools in Argentina (Llach and Schumacher, 2005 and Llach and Gigaglia, 2003), they are inconclusive as to the extent of inequalities as well as their specific sources.

In order to evaluate equality of educational opportunities, the quality of schools is estimated using three different indexes proposed by the literature. These capture the physical, human and social dimensions of schools. The distribution of these factors among public schools was found to be very unequal. Great disparities were found between provinces, governmental units that support primary education since 1970, but even bigger ones between schools financed by the same governmental unit, where, a priori, we would not have expected to find any. Moreover, these inequalities were found to be positively linked with socially unacceptable conditions, such as family income.

The following section reviews the literature on school quality, the measurement of schooling inequalities, and situations considered socially unacceptable. Section three provides a description of the data as well as an outline of the way the different indexes of school quality and socioeconomic status (SES) were constructed. Section four presents the methodology and estimation strategy, section five the results and the conclusion is section six.

[1] Roemer (2005) p.1.

Empirical approaches to measuring educational quality, inequalities and finding unfair situations

Formal schooling is an important determinant of the skills of an individual and plays a decisive role in determining his/her standard of living as adults (Glewwe, 2002). While other factors also contribute, including parents', friends' and individual abilities, schools have a special role since they are the ones most directly affected by public policies. A variety of motivations lead societies to provide strong support to schooling, including economic considerations, political participation, a sense of social justice, and a desire for general development of society. Almost all governments in the world assume a substantial role in providing education for their citizens (Hanushek, 2004).

An equal opportunity policy, as Roemer (2005) defines it,

> [I]s an intervention (e.g., the provision of resources by state agency) that makes it the case that all those who expend the same degree of effort end up with the same outcome, regardless of their circumstances. Thus, the equal opportunity policy 'levels the playing field', in the sense of compensating persons for their deficits in circumstances, so that, finally, only effort counts with regard outcome achievement.[2]

On school quality

Most empirical studies of human capital have concentrated on the quantity of schooling attained by individuals, ignoring the quality differences, in most cases, due to lack of information regarding quality.[3] This focus, questioned among others by Hanushek (2004), contrasts sharply with public policy considerations that consider almost exclusively school quality issues. One public policy exception is The Education for All initiative, a global commitment in which 164 governments pledged at the World Education Forum in Dakar, 2000, to increase years of schooling by 2015 and provide quality basic education for all children, youths and adults. Yet, much of this policy making tended to downplay the issues of quality (Hanushek and Woessmann, 2007).

In line with the experience of other developing countries, the years of schooling of the argentine population rose considerably after 1974. The proportion of people without instruction or with incomplete elementary instruction was 37% of the total population in 1974 and dropped to only 9% in 2002. The percentage of the population that had completed only primary school fell from 37% to 28%, and as a consequence, secondary schooling and post-secondary education rose considerably. People with secondary incomplete studies rose from 11% to 18%, secondary graduates from 9% to 19%, incomplete post-secondary studies from 3% to 10% and college graduates from 3% to 16%. This large increase of the number of years of schooling was a great first step, the goal of universal primary education was also achieved because net enrolment rate has been over 99% for primary school children (SEDLAC, 2012) for the lasts decades. The next one is to improve quality.

There are several ways to measure school quality. In fact, Hanushek and Woessmann (2007) state that one of the challenges to understanding the impact of quality differences in human capital has been simply knowing how to measure quality. Adams (1993) identifies approximately fifty ways to measuring school quality while the OECD (2005) comes up with six. In the present study we will evaluate the availability of school

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[2] Roemer 2005, pp.3-4.

[3] One of the first studies to focus on quality as well as quantity was Barro and Lee (1996), who worked on data from individual governments as compiled by UNESCO and other sources. The Program for International Student Assessment (PISA) carried out the first assessment in 2000, and regarding Argentina, the first ONEE took place in 1993.

resources, their quality and their distribution among the public primary schools in the country, in this sense, we will use Krueger's (1999) "education production function" which defines school quality by the quality of inputs to the education system. Following Llach and Schumacher (2005) three indexes of school quality were constructed. They capture the physical, human and social dimensions of school quality. The details of the indexes used can be found in section 3.2.

On the measurement of schooling inequalities

In addition to evaluating the quality of the schools, its distribution among schools is also very relevant. Berne and Stiefel (1984)[4] analyze alternative measures of what they call horizontal equity, also known as equal treatment of equals. In this sense, perfect horizontal equity would exist when every school in the distribution receives the same school quality. Horizontal equity measures basically capture the spread or dispersion in a distribution and assess how far the distribution is from perfect equality. Although no list of horizontal equity measures is exhaustive, they provide a comprehensive list: range, restricted range, federal range ratio, relative mean deviation, McLoone index, variance, coefficient of variation, standard deviation of logarithms, Gini coefficient, Theil's measure and Atkinson's index (Berne and Stiefel, 1984, pp. 19-21). A great number of studies use the coefficient of variation as the measure to evaluate horizontal equity. These include Berne and Stiefel (1994), Iatarola and Stiefel (2003), and Roza et al. (2007) among others. Murray et al. (1998) construct four measures of the within-state distribution of education expenditures –the Theil index, the Gini coefficient, the natural logarithm of the ratio of spending at the 95th percentile to spending at the 5th percentile, and the coefficient of variation. Studies interested in decomposing inequality mainly use the Theil inequality index. Ram (1995) studies inequalities in access to education using the population weighted Theil index to measure the amount of inter-country and intra-country inequality of school enrolments, and Murray et al. (1998) use also the Theil index to show the disparity in student spending between and within states.

In the case of Argentina, it is relevant to disentangle whether the source of educational inequality is found in differences among provinces (the governmental units responsible for the provision of basic education), or differences within each province. This would shed light on the relative importance of each of the causes of the inequality, and help determine whether the main problem is one of provincial administration of educational resources or an incomplete compensatory policy from the National Government. For this reason, it is convenient to develop a summary measure of school quality that can be disaggregated into its constituent components. This is achieved by applying the inequality decomposition analysis to population subgroups (Cowell and Jenkins, 1995). As Bourguignon (1979) states, the decomposability of an inequality measure implies a sort of additivity, so as to express it as the sum of inequality existing between subgroups of a population and a kind of "weighted average" of the inequality within those groups, although the "weights" used in this averaging do not necessarily sum up to one. In this sense, an inequality measure is said to be additively decomposable if it can be expressed as the sum of a "within group" inequality term and a "between groups" inequality term (Shorrocks, 1980).

In the present case, decomposability is a much desired property, though not any decomposable measure is a satisfactory index. For example, the variance is not neutral with respect to a scale change of the whole distribution, which would be a desirable property of

[4] Define three principles of educational equity: horizontal equity, vertical equity and equality of opportunity. In the present study vertical equity or, as it is also called "unequal treatment of unequals", will not be analyzed due to lack of information.

an inequality measure. Another property that might be expected from an inequality measure is that it decreases with any transfer from rich to less rich schools (Pigou-Dalton condition or strong principle of transfers). Bourguignon (1979) investigated all inequality measures that are decomposable while satisfying a set of basic requirements: they are continuous and differentiable (the Gini coefficient, widely used to measure inequality, is not differentiable, therefore, is not an appropriate measure to decompose (Cowell, 2000)), symmetric, mean independent (also called income-homogeneous), satisfy the symmetry axiom for population and satisfy the Pigou-Dalton condition. The continuity requirement means that an infinitesimal change in the value of a school quality may be expected to produce only an infinitesimal change in the inequality measure. The differentiability condition leads to the elimination of a wide family of measures in which school qualities enter with their rank in the whole distribution and which are not differentiable everywhere (Gini coefficient, interquantiles mean incomes ratios, etc.). These measures are generally not decomposable. The symmetry requirement is also called the anonymity rule. The mean independence property implies that the measure is invariant when all school quality indexes are multiplied by the same scalar, and in the same way, the symmetry axiom for population, which requires that the inequality of a distribution be the same to that of the distribution obtained by replicating any number of times each school quality, a kind of population-zero-homogeneity.

Decomposable inequality measures will differ by the weighting systems. The two most obvious candidates are "income-weighted" and "population-weighted" decomposable measures. Interestingly, Bourguignon found only one inequality measure consistent with each concept of decomposability and satisfying the list of convenient properties: the Theil Entropy coefficient (T) and the average logarithm of relative incomes (L), which as he pointed out, is the same as Henri Theil's (1967, pp. 126-127) population-weighted index of inequality. Going one step further, Shorrocks (1980) points out that "when inequality measures are used to assess the contribution of one particular factor to total inequality, another problem arises in the different interpretations that can be given to statements like 'X percent of inequality is due to Y'."[5] Only when the decomposition coefficients do not depend on the subgroup means will the ambiguities disappear. For this reason, the most satisfactory decomposable measure, allowing total inequality to be unambiguously split into the contribution due to differences between subgroups is the population-weighted index of inequality, in which the decomposition coefficients are precisely the population shares (n_g/n). "[It allows] total inequality to be unambiguously split into the contribution due to differences between subgroups and the contribution due to inequality within each subgroup g=1,…,G, in such a way that total inequality is the sum of these G+1 contributions."[6]

On situations socially considered unacceptable or unfair

There is a great consensus in considering an individual's educational level and basic health status important factors in determining her set of opportunities (Gasparini, 2002). In Argentina, the National Education Law (2006) states that knowledge and education are public goods and personal and social rights guaranteed by the Government. And as a way to guarantee equity for all the inhabitants of the Nation, they should be free, of good quality, and available to everyone.

In order to assert that the existing inequality is inequitable, it should be corroborated that its main source is socially unacceptable (Gasparini, 2002). For example, disparity in educational opportunities among private schools may not be considered

[5] Shorrocks 1980, p. 624.
[6] Shorrocks 1980, p. 625.

inequitable if it stems from a disparity in fees charged. The same inequality among public schools may be unacceptable, because the governmental unit that finances education should assign the resources in such a way as to compensate for existing disparities and provide equal treatment of equals[7].

In order to measure equality of educational opportunities, relationship measures (Berne and Stiefel, 1984) are generally used to quantify the degree of association between characteristics that are considered illegitimate or unacceptable (Gasparini, 2002). And though there are a great number of available measures, regression based measures are the most common. They are popular not only because they are based on certain statistical principles, but also because there are several possible equal opportunity measures that can be derived from regression analysis. Berne and Stiefel (1984, pp. 27-32) present eleven regression-based relationship measures, of four types: correlation, slopes, elasticities and adjusted relationship measures. Several studies use the regression based analysis to search for educational inequities; among others we can find Berne and Stiefel (1994), Iatarola and Stiefel (2003), Llach and Schumacher (2005) and Rubenstein et al. (2007).

According to Iatarola and Stiefel (2003), equality of opportunity can be conceptualized in two ways. A neutral formulation posits that equal opportunity exists if there is a *lack* of association between per student resources and characteristics associated with historically disadvantaged groups (Berne and Stiefel, 1984), while an affirmative action formulation posits that equal opportunity is achieved if there is a *positive* association in the relationship (Roemer, 2005).

Regarding empirical studies about the state of education around the world, a very complete report is UNESCO (2012). It states that many young people around the world - especially the disadvantaged- are leaving school without the skills they need to thrive in society and find decent jobs. As well as upsetting young people's hopes, these education failures are jeopardizing equitable economic growth and social cohesion. A valuable book edited by Fernando Reimers (2000), offers a complete contribution referred to Latin America, and the inequality of schools along the social ladder, and López (2005) also analyses the situation for some Latin American countries. Among the works referred to Argentina those of Braslavsky (1985) and Bravslavsky and Filmus (1987) can be mentioned. Based on a small, non-random sample, Braslavsky and Filmus confirmed not only the inequality of schools but also the existence of differential educational trucks, depending on students' SES levels, demonstrating that disparities in schools and social segregation were not only present at elementary level but also extended to intermediate level. Veleda (2009) analyses four factors that determine education segregation, one exogenous (spatial segregation) and three endogenous (state regulation, competition among schools, family decision process to choose school) and tries to find policy recommendations to reduce school segregation.

In the case under study we evaluate the extent in which school quality, defined in terms of inputs, is related to the level of income of the students. A priori, a strong correlation between socioeconomic status of the students and opportunities would be considered inequitable. Though it should be analysed thoroughly since the existence of cooperative associations could be enhancing this correlation, and their influence should not be considered unacceptable. These associations are generally managed by parents of students of the school, and collect funds from students to invest them in improving the quality of the service provided by the school. Therefore, the inequalities derived from the existence of these associations resemble those related to the fees private schools charge, and not a direct consequence of public policy or the administration of the schools.

[7] In Argentina some private schools not only charge fees but also receive state support.

In the following section a description of the database can be found. Next we will proceed by constructing measures of the schools' quality, subsequently by measuring the discrepancies that can be found, and once this data is obtained, we will evaluate how unfair the situations are.

Data

Description of the data base

Our primary source of information on schools, teachers and student characteristics is the *Operativo Nacional de Evaluación Educativa* (National Educational Assessment) or ONEE for the year 2000 which is the only census of schools elaborated by the Argentine National Ministry of Education, therefore the only source of micro data for all the schools in the country. In addition, the National Household Expenditure Survey (Encuesta Nacional de Gastos de Hogares or ENGH for the years 1996-1997) was selected to provide income and consumption patterns in order to calculate the SES of the children in the sample, needed to detect unfair situations, in which school quality is positively associated to the level of income of the household.

An original database was constructed as a way to integrate the outcomes of the survey of GBE sixth-grade students with those obtained from the surveys of directors and teachers for the same year. The three data bases were integrated using the section or classroom as the unit of measurement. Therefore, each entry in the database represents a school section, and shows the characteristics and opinions of the director of the school, the teachers' features and judgments and the average of the students' outcomes and characteristics.

Argentina is a federal country organized in 24 autonomous political jurisdictions (23 provinces and the Autonomous City of Buenos Aires). Responsibility for pre-primary and primary education has been decentralized at the provincial level since 1970; when the National Government, by Law 17.878 and Law 18.586, transferred the elementary schools to the provinces and the Municipality of the City of Buenos Aires. This process was completed in 1978. Though schools were transferred to the provinces, educational equity remained the responsibility of the National Government. As such, compensatory federal funds were mandated in order to guarantee educational equity. Both free public schools and private institutions that charge fees to students supply education (Berlinski and Galiani, 2005). Unfortunately, one of the provinces (Neuquén) did not participate of the census, and therefore, we will work with 23 units. And, as our concern is the unacceptable sources of educational inequality, we will focus the study on the public schools, due to the fact that the private ones may differ in quality because of the different fees they charge.

Construction of the school quality indexes

School quality will be measured through three indexes measuring, respectively, physical, human and social capital of each school. This means that school quality will be defined by its inputs. The indexes were constructed using a methodology that has been applied in other studies in the field (Llach and Schumacher, 2005 and Llach and Gigaglia, 2003). The physical capital index is divided in two sub indexes, corresponding to the construction and functional characteristics of the buildings, which includes the quality, functionality and state of repair of the building, electricity, classrooms, furniture, library, courtyards and bathrooms; and the quality and availability of teaching materials. The human capital index measures the quality of the directors and teachers of the schools and is constructed on three main issues: professional and school experience, qualifications and

training and aptitude for the job. Experience quantifies the seniority in a particular school, the number of years in teaching, the contractual status (full time, replacement, etc.), and the mode of access to the position. Qualification and training refers to the qualifications acquired via formal training and education, and access was constructed on the analysis of the working methodology. Finally, social capital refers to the social networks that exist in the schools. It is divided in three sub indexes, interaction with the community, interaction with the students' parents, and the internal organization, which include school autonomy, the relationship among the teaching staff, and the relationship of the director and teachers with the students. Although the three measures were constructed on the basis of the ONEE, the different dimensions measured clearly have different degrees of subjectivity. While physical capital, years of experience and qualifications are quantifiable and verifiable, measures of aptitude for the job and relationships within schools have a significantly subjective component. This is an element to bear in mind when analysing the results.

The Socio Economic Status Index (SES)

A measure of the students' SES is required in order to identify situations that are considered socially unacceptable, as discussed in section 1.3 above. But the SES cannot be determined directly since the ONEE data base does not measure income or consumption, i.e., the most widely used measures to quantify welfare status. In order to overcome this matter, we have followed Schumacher (2003) and Elbers et al. (2003) and used an alternative data set that contains income, and used as explanatory variables a list of determinants also found in the ONEE. Once this model has been estimated, it is used to predict income using the information contained in the ONEE database. With the purpose of estimating the spending pattern of the households, the purchasing habits regarding durable goods and public services corresponding to the households of different SES were studied as well as how the level of education of the head of household affected it. The chosen survey was the National Household Expenditure Survey because it has similar questions to the ones corresponding to the ONEE as well as information regarding households' income and consumption for the different regions in Argentina. It also has the advantage of representing the whole population of the country, where many surveys only include urban populations.

The regression equation was as follows:

$$\ln(ingpcf) = a_0 + a_1(edup) + a_2(edusi) + a_3(edus) + a_4(eduui) + a_5(eduu) + a_6(car) + +a_7(electricity) + a_8(telephone) + a_9(stove) + a_{10}(gas) + a_{11}(air\ conditioning) + a_{12}(hot\ water) + a_{13}(toilet) + a_{14}(water) + a_{15}(2\ members) + a_{16}(3\ members) + +a_{17}(4\ members) + a_{18}(5\ members) + a_{19}(6\ members) + a_{20}(7\ members\ or\ more)$$

The first five explanatory variables are intended to represent, using dummy variables, the maximum educational level attained by the head of the family: completed primary (edup), incomplete secondary (edusi), completed secondary (edus), incomplete tertiary (eduui) and completed tertiary (eduu). The subsequent nine variables represent the possession of durable goods and utilities. Finally, the last six variables represent the size of each household, only one of the last six variables is assigned the value "1" with the remaining valued at "0", depending on the number of members in the household.

Estimations of the households' expenditure patterns for each of the regions in the country (GBA, NEA, NOA, Cuyo, Pampeana and Patagonia) were obtained, which means, that a specific value was assigned to each of the coefficients for each of the regions. Later, with the estimated coefficients, the explanatory variables were replaced by the different vectors provided by the ONEE database for each of the regions, and in this way, a prediction of the logarithm of per capita household income of each student surveyed was obtained, taking into account the expenditure pattern usual of his place of origin. Finally,

the values were rescaled without altering the relative positions in order to assign zero value to the minimum and one hundred to the maximum. This was done by subtracting the minimum value from each prediction, dividing by the difference between the maximum and the minimum values and multiplying by one hundred. It is worth mentioning that the *SES* has an economic dimension; it is the prediction of the logarithm of the household per capita income, and also a cultural dimension, captured by the level of education of the household head and the number of members in the family. It is expected that a higher *SES* would represent both greater financial capacity of the household to invest in the student's education and a culture within the household that is more conducive to studying.

Methodology and estimation strategy

To assess the relevance of the various factors discussed in the previous section on educational equity, we adapt the decomposition methodology and the regression analysis to our case.

Decomposition methodology

The basic intuition of the decomposition methodology, is that given a specific partition Π (the provinces in this case) and a suitable inequality measure, overall inequality, I, can be written as some function of within-group inequality for the partition $I_W(\Pi)$, and between-group inequality $I_B(\Pi)$; the former refers to inequalities within each province and reflects the assignment of resources by the provincial government; the latter reflects an inefficient or incomplete compensatory policy by the National Government, thus

$$I = f\left[I_W(\Pi), I_B(\Pi)\right] \tag{1}$$

In principle, this functional breakdown would specify the proportion of inequality 'accounted for' by between-group inequality with reference to a particular population partition Π, and thus, the inequality 'explained' by the population partition Π (Cowell and Jenkins, 1995). In the present case, it would refer to differences across provinces.

In order to implement such indexes, a suitable inequality measure is needed. Such measure should at least guarantee that the decomposition is consistent for all logically possible partitions Π. If we also require that the measure be continuous and differentiable, symmetric, mean independent (also called income-homogeneous), satisfy the symmetry axiom for population and the strong principle of transfers, the only relevant measure is the generalised entropy index (Cowell, 2000).

$$\begin{aligned} I_c(y) &= \frac{1}{n}\frac{1}{c(c-1)}\left\{\sum_{i=1}^{n}\left[\frac{y_i}{\mu}\right]^c - 1\right\}, c \neq 0,1, \\ I_0(y) &= \frac{1}{n}\sum_{i=1}^{n}\log\frac{\mu}{y_i}, c = 0, \\ I_1(y) &= \frac{1}{n}\sum_{i=1}^{n}\frac{y_i}{\mu}\log\frac{y_i}{\mu}, c = 1 \end{aligned} \tag{2}$$

Expression (2) specifies a family of inequality contour maps with given mean and population. The parameter c indexes the members of the family and can be assigned any real value, specifying a high positive value of c yields a 'top sensitive' index that is particularly sensitive to changes in the upper tail of the distribution (Cowell, 2000). In

particular, when c=2 the index corresponds to the square of the coefficient of variation. I_1 is the Theil index and I_0 is the population weighted entropy index, also proposed by Theil (Shorrocks, 1980). I_0 and I_1 are particular family members for which the within-group component weights sum to one, being I_0 the most satisfactory decomposable measure, allowing total inequality to be unambiguously split into the contribution due to differences between and within subgroups (Shorrocks, 1980).

We may in principle assign overall inequality to between group and within-group components, but there are two logically separate and unavoidable difficulties that have to be confronted when doing this; the cardinalisation issue and the definition of between group inequality (Cowell and Jenkins, 1995). Regarding the first one, it is worth mentioning that although inequality within a given group is a purely ordinal concept, the decomposition by component subgroups is contingent upon the specific cardinalisation of the inequality measure. And regarding the latter, it is important to bear in mind that since an inequality measure is defined on the sets of arbitrary dimensions, the concept of inequality within any subgroup is straightforward; selecting a measure for the whole population also provides a measure for any group in Π. However the method of aggregation of these intra-group inequalities into a single number representing the within-group inequality component for Π is not self-evident. Two different meanings have been given to this concept: the between-group component can be interpreted as inequality of the group means, or inequality of the group representative values (Cowell and Jenkins, 1995).

The equation used for the decomposition is:

$$T = \sum_{g=1}^{G}\left(\frac{\mu_g N_g}{\mu N}\ln\left(\frac{\mu_g}{\mu}\right)\right) + \sum_{g=1}^{G}\left[\frac{\mu_g N_g}{\mu N}\sum_{i\in g}\left(\frac{w_i y_i}{\mu_g N_g}\ln\left(\frac{y_i}{\mu_g}\right)\right)\right] \quad (3)$$

The first term is the between groups (g) inequality and the second term is the within groups component. *G* specifies the group, *i* the observation (in the present case, the school section), *y* the variable under study, *w* the weight, μ refers to the mean of *y* and *N* to the number of observations of the population or group. This decomposition technique outlined was applied to the SES index and to the three schools' capitals indexes and the results are presented in section four.

Regression analysis

The quality of education plays a particular role in determining a person's future opportunity set and its distribution concerns policy makers and society in general. Though an equal distribution of education is a desirable outcome, inequality in its provision is not necessarily unfair. Only those differences in outcomes that are due to differences in unacceptable variables would be considered unfair (Gasparini, 2002).

In order to evaluate the equality of educational opportunities, multiple regression analysis was used to measure the extent to which characteristics of students or schools explain the variation in the schools' resources. As the neutral formulation of the equal opportunity principle states, perfect equity would be defined as the absence of a relationship between the object of study, school quality (SQ), and a certain characteristic considered illegitimate. The most common illegitimate characteristic used is a measure of the students' wealth, in our case it would be the *SES*, though other characteristics may also be considered illegitimate, such as being an immigrant (*Inm*) or a native student (*NS*). The variables corresponding to the presence of immigrants and of native students are dummy variables which were constructed on the response given by the directors of the schools. *Inm* has a value of 1 if there are recent immigrants at the school, zero if there are not; *NS* has a value or 1 if there are indigenous students, 0 if there are not, and both present missing

value if the director did not answer the question. The following regression for each jurisdiction (*j*) will be evaluated, being *i* the section of the school and φ a constant for each jurisdiction.

$$SQ_{ij} = \alpha_j SES_{ij} + \beta_j Inm_{ij} + \delta_j NS_{ij} + \varphi_j \quad (4)$$

Particular attention should be given to two different ways of measuring the relationship between the variables. The degree to which the variables move together can be analyzed through their correlation, or through the goodness of fit of the whole model (the coefficient of determination, which is also the square of the simple correlation, and indicates how much of the variability of the dependant variable is explained by the model). The magnitude of the relationship between the variables can be assessed with the slope or the elasticity.

The results obtained with the multiple regression technique for both of these measures are presented in the section 4.3. In particular, the coefficient of determination of the model and the slopes of the variables considered illegitimate are shown.

Results

This section reports the different measures of school quality and the distribution of educational opportunities. It begins by presenting the mean and coefficients of variation for the SES and the school capital; next, the decomposition of the inequality found is presented, and finally, the equality of educational opportunities is offered.

1.1 Schooling Inequalities

As a first approach to estimating schooling inequality, the coefficients of variation for the three measures of school capital and for the SES can be seen in Table 1. The coefficient of variation is defined as: $c_v = \frac{\sigma}{\mu}$, where σ is the standard deviation and μ is the mean.

As can be observed in Table 1, there is a great disparity in the number of sections in the jurisdictions, Buenos Aires (3,188), Córdoba (1,030), Tierra del Fuego (71), Santa Cruz (100) and Catamarca (106). Nonetheless the highest coefficients of variation of the measures of school capital are not only in the larger jurisdictions like Buenos Aires province or Cordoba, but also in the smallest ones like Catamarca, La Rioja, Jujuy and San Luis. Disparity appears not to be related to size.[8]

Also, it is quite noticeable that the capital most unequally distributed is the physical capital, despite the fact that it is the easiest to measure and to modify via a redistribution of resources.

[8] Provinces differ not only in size, but also in their population, climate and productive and managerial capacity.

Table 1:
Means and Coefficients of Variation corresponding to the school capital and to the SES index[1]

	Obs.	*SES*		Physical Capital		Human Capital		Social Capital	
		μ	c_v	μ	c_v	μ	c_v	μ	c_v
All Jurisdictions	11237	41.82	0.20	2.66	0.24	3.73	0.13	2.85	0.16
City of Bs.As.	525	59.37	0.07	3.34	0.17	3.86	0.11	2.88	0.16
Bs.As	3188	43.46	0.13	2.49	0.26	3.68	0.13	2.88	0.17
Catamarca	106	40.87	0.13	2.39	0.22	3.41	0.11	2.64	0.18
Córdoba	1030	43.87	0.13	2.89	0.21	3.92	0.10	2.96	0.13
Corrientes	384	37.29	0.22	2.46	0.24	3.54	0.13	2.65	0.18
Chaco	506	36.21	0.26	2.42	0.24	3.63	0.13	2.77	0.16
Chubut	180	49.75	0.14	3.04	0.17	3.81	0.11	2.76	0.16
Entre Ríos	440	41.22	0.16	2.59	0.23	3.43	0.14	2.71	0.17
Formosa	245	33.72	0.26	2.25	0.24	3.54	0.12	2.67	0.15
Jujuy	168	37.01	0.18	2.41	0.21	3.56	0.12	2.62	0.19
La Pampa	208	46.71	0.11	3.33	0.17	3.65	0.12	2.91	0.13
La Rioja	113	43.22	0.11	2.49	0.24	3.61	0.13	2.55	0.20
Mendoza	586	40.39	0.16	2.89	0.21	3.86	0.13	2.98	0.15
Misiones	563	36.25	0.23	2.46	0.20	3.64	0.13	2.86	0.15
Río Negro	219	42.61	0.18	2.71	0.18	3.58	0.13	2.79	0.15
Salta	469	37.38	0.20	2.59	0.21	3.86	0.12	2.83	0.16
San Juan	276	38.74	0.16	2.66	0.18	3.90	0.11	3.01	0.12
San Luis	156	40.22	0.15	2.78	0.22	3.94	0.10	2.95	0.14
Santa Cruz	100	53.31	0.07	3.09	0.14	3.70	0.11	2.58	0.19
Santa Fé	804	39.78	0.20	2.82	0.22	3.91	0.11	2.92	0.15
Sgo.del Estero	361	33.15	0.25	2.34	0.23	3.60	0.16	2.76	0.16
Tucumán	539	38.53	0.16	2.61	0.19	3.88	0.12	2.90	0.15
Tierra del Fuego	71	54.92	0.07	3.35	0.10	3.54	0.11	2.39	0.22

Source: Own estimation based on ONE 2000.
[1] μ: mean, c_v: coefficient of variation.

The coefficients of variation for the indicators of school quality range between 12.9% (corresponding to human capital) and 24% (corresponding to physical capital) considering all jurisdictions. Therefore, the presence of inequalities is not just a feeling but a fact.

The jurisdictions with the highest mean of physical capital tend to have it more equally distributed; this is the case for Tierra del Fuego, the City of Buenos Aires, Santa Cruz, Chubut and La Pampa. On the contrary, the ones with the lowest physical capital have greater disparities (Buenos Aires Province, Santiago del Estero, Chaco and Corrientes among others). Regarding the human capital, Santiago del Estero is the jurisdiction that presents the highest inequality (0.16) while San Luis and Cordoba the lowest (0.10). In what respects the social capital, the highest inequalities are found in Tierra del Fuego, La Rioja, Jujuy and Santa Cruz (with coefficients over 19%). Finally, the coefficients of variation for the SES of the students range from 6.8% (Santa Cruz) to 26.4% (Formosa), with, the poorer jurisdictions, in general, being the most unequally distributed.

It is worth mentioning that with the exception of the poorest jurisdictions, Chaco, Misiones, Formosa and Santiago del Estero, at least one measure of school capital is more poorly distributed than the SES. This indicates that the schooling inequalities are even worse than the socioeconomic inequalities in most jurisdictions.

Inequality decomposition

After having a first approach to the problem, the following step is to study whether it is caused by poor provincial administration or by inefficient compensatory policy by the

national government. The decomposition of the inequalities between and within jurisdictions is presented in table 2 for the SES and the school capital.

Table 2:
Theil decomposition between and within jurisdictions

SES			**Physical Capital**		
Total Theil	0.021	**100.0%**	Total Theil	0.030	**100.0%**
Between groups Theil	0.008	**37.0%**	Between groups Theil	0.005	**15.8%**
Within group Theil	0.013	**63.0%**	Within group Theil	0.025	**84.2%**
Human Capital			**Social Capital**		
Total Theil	0.009	**100.0%**	Total Theil	0.014	**100.0%**
Between groups Theil	0.001	**8.5%**	Between groups Theil	0.001	**5.0%**
Within group Theil	0.008	**91.5%**	Within group Theil	0.013	**95.0%**

Source: Own estimation based on ONE 2000.

The decomposition of the Theil index showed that the majority of the schooling inequalities are explained by differences within the jurisdictions, more than 84% corresponds to it. In a word, a poor quality school does not necessarily belong to a poor province.

As can be observed in table 2, the physical capital is the most unequally distributed (0.03), even worse than the SES (0.021). But, as can be seen, the inequality between jurisdictions is worse in the case of the SES (0.008), than that of the physical capital (0.005) and human and social capitals (0.001). This could suggest a certain effect of the compensatory policy from the National Government regarding educational quality between jurisdictions. In other words, there are greater economic disparities than educational quality disparities between jurisdictions; this suggests there is some mechanism providing more educational resources to the poorer ones.

At the same time, it should be noted that the largest inequalities are within each of the provinces, which would suggest that it is the provincial administration that is failing. A priori, we would not have expected to find inequalities between schools financed by the same governmental unit. In the case of the physical capital, 84.2% of the inequality found is explained by differences within the provinces, while for the human and social capitals, more than 90% corresponds to differences inside the provinces. Therefore, improving the distribution of the school quality within each jurisdiction is essential to getting closer to the objective of horizontal educational equity.

Then, we focused the study in the evaluation of the particular situation of each jurisdiction. We studied the horizontal equity with the coefficient of variation and the Theil index. The ones that present the worst scenario are Buenos Aires province, Corrientes, Chaco, Entre Rios and La Rioja. All these are the worst ranked in the distribution of the three measures of school quality, either by the coefficient of variation as by the Theil index (see table 3). The best ones in this respect are Córdoba, Chubut, La Pampa, San Juan, San Luis and Tucumán. It is worth mentioning that the size of the jurisdictions is quite different, but that large and small jurisdictions are in both groups. Buenos Aires province is the largest one while Córdoba is the second largest one. And La Rioja and San Luis are among the smallest jurisdictions.

A special case is Tierra del Fuego, which presents a very high value of *SES* and quite equally distributed resources, the highest value for physical capital and the most equally distributed, but the lowest and worst distributed social capital. A similar situation can be seen in Santa Cruz. Though, as it has been mentioned, this capital is to a certain

extent affected by personal opinions. At the same time, Tierra del Fuego is the youngest jurisdiction, and both provinces have the fewer amount of schools and sections. An opposite situation can be seen in the case of San Juan and San Luis, which present much better results for the human and social capitals than for the physical capital and the SES. Except for Chaco, Formosa, Misiones and Santiago del Estero, the physical capital is the worst distributed, even worse than the SES, as was already seen with the c_v.

Table 3:
Rankings for the Theil index and the amount of school capital in each jurisdiction

Jurisdiction	Theil *SES*	*SES*	Theil Physical Capital	Physical Capital	Theil Human Capital	Human Capital	Theil Social Capital	Social Capital
City of Bs.As.	23	23	21	22	15	16	9	16
Bs.As.	18	17	1	9	5	13	5	15
Catamarca	17	13	13	3	18	1	7	5
Córdoba	16	18	14	18	21	22	21	21
Corrientes	5	6	3	6	7	3	6	6
Chaco	2	3	4	5	4	10	14	11
Chubut	15	20	19	19	19	15	12	9
Entre Ríos	12	14	6	11	2	2	8	8
Formosa	1	2	5	1	12	5	16	7
Jujuy	8	5	12	4	10	6	2	4
La Pampa	19	19	20	21	14	12	22	18
La Rioja	20	16	2	8	6	9	3	2
Mendoza	11	12	9	17	3	17	11	22
Misiones	4	4	15	7	8	11	17	14
Río Negro	9	15	17	14	9	7	19	12
Salta	6	7	10	10	11	18	10	13
San Juan	10	9	18	13	17	20	23	23
San Luis	14	11	11	15	23	23	20	20
Santa Cruz	22	21	22	20	20	14	4	3
Santa Fé	7	10	8	16	16	21	15	19
Sgo.del Estero	3	1	7	2	1	8	13	10
Tucumán	13	8	16	12	13	19	18	17
Tierra del Fuego	21	22	23	23	22	4	1	1

Ranking Theil: 1: Most unequal 23: Most equal. Ranking capitals and *SES*: 1: Lowest value 23: Highest value. Source: Own estimation based on ONE 2000 and ENGH.

Table 4:
Absolute values for the Theil index and the amount of school capital in each jurisdiction

Jurisdiction	Theil *SES*	Mean *SES*	Theil Physical Capital	Mean Physical Capital	Theil Human Capital	Mean Human Capital	Theil Social Capital	Mean Social Capital
City of Bs.As.	0.002	59.37	0.015	3.34	0.007	3.86	0.014	2.88
Bs.As.	0.008	43.46	0.034	2.49	0.009	3.68	0.016	2.88
Catamarca	0.009	40.87	0.023	2.39	0.006	3.41	0.016	2.64
Córdoba	0.009	43.87	0.023	2.89	0.006	3.92	0.009	2.96
Corrientes	0.025	37.29	0.030	2.46	0.009	3.54	0.016	2.65
Chaco	0.035	36.21	0.030	2.42	0.009	3.63	0.012	2.76
Chubut	0.009	49.75	0.015	3.04	0.006	3.81	0.013	2.76
Entre Ríos	0.013	41.22	0.027	2.60	0.010	3.43	0.015	2.71
Formosa	0.037	33.72	0.029	2.25	0.007	3.54	0.012	2.66
Jujuy	0.017	37.01	0.023	2.41	0.008	3.56	0.020	2.62
La Pampa	0.006	46.71	0.015	3.33	0.007	3.65	0.009	2.91
La Rioja	0.006	43.22	0.031	2.49	0.009	3.61	0.020	2.55
Mendoza	0.013	40.39	0.024	2.89	0.009	3.86	0.013	2.98
Misiones	0.026	36.25	0.021	2.46	0.009	3.64	0.012	2.86
Río Negro	0.017	42.61	0.017	2.71	0.008	3.58	0.011	2.79
Salta	0.022	37.38	0.023	2.59	0.007	3.86	0.013	2.83
San Juan	0.014	38.74	0.017	2.66	0.007	3.90	0.008	3.01
San Luis	0.011	40.22	0.023	2.78	0.005	3.94	0.011	2.95
Santa Cruz	0.002	53.31	0.010	3.09	0.006	3.70	0.018	2.58
Santa Fé	0.020	39.78	0.024	2.82	0.007	3.91	0.012	2.92
Sgo.del Estero	0.032	33.15	0.026	2.34	0.014	3.60	0.013	2.76
Tucumán	0.012	38.53	0.018	2.61	0.007	3.88	0.011	2.90
Tierra del Fuego	0.003	54.92	0.005	3.35	0.005	3.54	0.024	2.39

Source: Own estimation based on ONE 2000 and ENGH.

Equality of educational opportunities

As stated in section 1.3, in order to assert that the existing inequality is inequitable, it should be corroborated that its main source is socially unacceptable (Gasparini, 2002). Inequality among public schools may be unacceptable, because the governmental unit that finances education should assign the resources in such a way as to compensate for existing disparities and provide equal treatment of equals. Moreover, the National Government should compensate the poorer jurisdictions in order to allow them provide good quality education.

Following the methodology described in section 3.2 we evaluate its degree of association with the factors considered unacceptable in order to determine unfair situations. That is to say, we relate the amount of school capital to the *SES*, the presence of immigrants and native students (variables considered illegitimate as determinants of school quality).

The coefficients of determination corresponding to the multiple regressions for the school capital and the three variables considered unacceptable: SES, immigrants and native students can be found in table 5. They indicate how much of the variability in the school capital is explained by characteristics considered unfair. In some jurisdictions, like the City of Buenos Aires, Buenos Aires Province, Cordoba, Corrientes, Chaco, Chubut, Entre Rios, Formosa, Mendoza, San Juan, San Luis, Santa Fe and Tucuman, the regressions corresponding to the physical capital are the ones with the highest coefficient of determination. This would suggest that in these jurisdictions there is less equality of physical capital than there is of social or human capital. This could be related to the way

provincial expenditure in education is distributed, as Paz and Jimenez (2011) mention, in many provinces more than 90% of expenditure in education corresponds to teachers, directors and other school staff salaries.[9] Catamarca, Jujuy, La Pampa, La Rioja, Tierra del Fuego, Santa Cruz and Rio Negro present the highest fit in the regression corresponding to the social capital, while Misiones, Salta and Santiago del Estero show the highest fit in the human capital regression. Corrientes and La Rioja present all the coefficients of determination under 0.05, which would indicate that in all of them, there is not a strong association between the variables considered unacceptable and the school capital.

Table 5 presents the outputs of the regressions regarding the Equality of Educational Opportunities.

[9] In addition, this difference could be due to the fact that in some schools, cooperative associations raise funds in order to maintain the physical capital.

Table 5:
Equality of Educational Opportunities

Dependant variable		(i) Physical capital					(ii) Human capital					(iii) Social capital				
	No.obs.	Pupils' SES	Immigrants	Native students	Intercept	R2	Pupils' SES	Immigrants	Native students	Intercept	R2	Pupils' SES	Immigrants	Native students	Intercept	R2
All Juris.	9198	0.031***	-0.085***	-0.038	1.415	0.171	0.009***	-0.033***	0.006	3.378	0.028	0.008***	-0.031***	-0.040**	2.530	0.028
Cap. Fed	453	0.044***	-0.017	-0.080	0.816	0.117	0.000	0.071*	0.070	3.829	0.013	0.011**	-0.031	-0.029	2.242	0.016
Bs.As	2643	0.039***	-0.051**	-0.052	0.849	0.131	0.012***	0.016	-0.013	3.175	0.022	0.020***	0.002	-0.029	2.038	0.063
Catamarca	83	0.027***	0.471	0.090	1.247	0.131	-0.009	0.301	-0.504	3.754	0.022	-0.027***	1.121**	-1.760***	3.733	0.144
Córdoba	884	0.039***	-0.056	0.220	1.212	0.139	0.012***	-0.029	0.083	3.421	0.027	0.015***	-0.013	0.109	2.315	0.047
Corrientes	279	0.013***	-0.246	0.361	1.981	0.041	0.005	0.042	0.023	3.389	0.009	0.003	-0.010	0.072	2.572	0.004
Chaco	411	0.017***	0.147	-0.164**	1.842	0.112	0.012***	-0.259**	0.099*	3.211	0.063	0.005**	-0.044	0.019	2.634	0.010
Chubut	144	0.002	-0.160	-0.235**	3.049	0.094	-0.003	0.101	-0.078	3.969	0.012	0.007	0.037	-0.088	2.444	0.033
Entre Ríos	371	0.022***	-0.170	-0.049	1.718	0.069	0.002	0.230*	-0.365	3.391	0.011	0.012***	0.019	-0.519**	2.238	0.054
Formosa	201	0.025***	-0.017	0.039	1.401	0.174	0.013***	-0.156*	0.195**	3.069	0.104	0.015***	-0.062	0.067	2.146	0.107
Jujuy	107	0.002	0.245**	0.021	2.264	0.045	0.009	-0.208**	-0.020	3.343	0.062	0.023***	-0.182*	-0.036	1.899	0.151
La Pampa	170	0.029***	0.197	0.195	1.990	0.070	0.028***	0.425***	-0.081	2.354	0.142	0.028***	0.243*	0.002	1.609	0.148
La Rioja	82	0.014	-0.071	(dropped)	1.920	0.017	0.009	-0.117	(dropped)	3.289	0.014	0.008	-0.336	(dropped)	2.291	0.036
Mendoza	477	0.019***	-0.125*	0.213*	2.149	0.056	0.010***	-0.057	0.002	3.494	0.020	0.013***	0.053	0.209**	2.464	0.055
Misiones	472	0.010***	-0.112	-0.125	2.106	0.034	0.016***	-0.058	-0.043	3.089	0.078	0.009***	-0.018	0.024	2.538	0.036
Río Negro	181	0.003	0.134	-0.016	2.574	0.015	0.006	-0.019	0.180**	3.293	0.045	0.009**	0.164**	0.060	2.392	0.073
Salta	343	0.016***	0.196***	-0.082	1.965	0.076	0.016***	-0.058	-0.062	3.309	0.083	0.011***	-0.055	0.045	2.419	0.030
San Juan	221	0.015***	0.147	(dropped)	2.055	0.071	0.012***	0.119	(dropped)	3.440	0.058	0.011***	-0.018	(dropped)	2.598	0.055
San Luis	124	0.025**	0.231	(dropped)	1.762	0.072	-0.003	0.054	(dropped)	4.055	0.004	0.003	0.090	(dropped)	2.786	0.007
Santa Cruz	72	0.008	0.061	-0.008	2.675	0.009	0.013	0.153	0.933**	3.002	0.080	0.040***	0.202	0.662	0.395	0.111
Santa Fé	674	0.023***	0.091	-0.153*	1.937	0.109	0.005**	0.002	-0.031	3.744	0.009	0.012***	-0.066	0.110***	2.486	0.048
Sgo.del Est.	294	0.021***	0.630***	0.023	1.585	0.169	0.032***	0.117	0.680*	2.582	0.204	0.009***	0.378**	-0.211	2.461	0.057
Tucumán	448	0.032***	-0.192**	0.334*	1.389	0.158	0.012***	-0.184**	0.133	3.435	0.034	0.014***	0.054	0.041	2.380	0.042
T. del Fuego	64	0.014	-0.179**	(dropped)	2.682	0.095	0.001	-0.187**	(dropped)	3.585	0.066	0.033**	-0.307**	(dropped)	0.660	0.140

*** Significant at 1%, ** significant at 5% and * significant at 10%. ǂThe cases when the variable is dropped correspond to those in which none of the directors of the schools answered that there are native students. Source: Own estimation based on ONEE 2000 and ENGH.

In column/model (i), the provinces that present the highest coefficients of determination are Formosa, Santiago del Estero, Tucuman, Cordoba, Buenos Aires, Catamarca, Chaco, Santa Fe and the City of Buenos Aires. The highest slopes values of the *SES* and significantly different from zero are those corresponding to Formosa, Tucuman, Cordoba, Buenos Aires Province, Catamarca, the City of Buenos Aires and La Pampa. The *SES* has a significant and positive effect on the level of physical capital in many jurisdictions with the exception of Chubut, Santa Cruz, Tierra del Fuego, Rio Negro, Jujuy and La Rioja. This confirms that in most of the provinces there is not equality of educational opportunities, because there is a significant relationship between the level of physical capital and the wealth of the students, measured through the *SES*. The exceptions are Jujuy, La Rioja, Rio Negro and Santa Cruz where we cannot reject that all the coefficients corresponding to the independent variables are equal to zero (F-Statistic), indicating that the present inequalities cannot be attributed to unacceptable reasons. In these cases, though there is inequality, we cannot conclude that it is unfair. Regarding the other two variables that would also be considered unacceptable as determinants of the schools' capitals, the presence of immigrants and native students; the outcomes presented in the table suggest that their presence is significant in very few provinces and that their effect on the physical capital goes in both directions, either positive or negative. Therefore, in most of the cases we cannot conclude that the inequality found is unfair to immigrants or native students.

In the case of the human capital (column/model (ii)) approximately half of the jurisdictions present a coefficient of the *SES* positive and significantly different from zero. The presence of native students is significant on the determination of the amount of human capital in very few provinces. In all of them, the effect is positive, not negative, which would have been considered unacceptable. On the contrary, the presence of immigrants, when it is significantly different from zero, is sometimes positive, as in the case of the City of Buenos Aires, Entre Rios and La Pampa, and negative in the cases of Tucuman, Tierra del Fuego, Chubut, Jujuy, Formosa and all the jurisdictions considered as a whole. We cannot reject the equality of opportunity regarding the human capital in the following jurisdictions: City of Buenos Aires, Catamarca, Corrientes, Chubut, Entre Rios, La Rioja, San Luis, Santa Cruz and Santa Fe (The F-Statistic is not significantly different from zero). Therefore, we cannot conclude that the inequality found in the human capital of these jurisdictions is unfair.

In the case of the social capital (column/model (iii)), the absence of equality of educational opportunities can be confirmed in most of the jurisdictions. Catamarca is a special case, in which there appears to be a negative association between the level of *SES* and of capital, suggesting the existence of a pro-poor distribution. The presence of native students is significant in very few provinces, and its impact on the social capital is sometimes positive (Santa Fe and Mendoza), and sometimes negative (Entre Rios, Catamarca and all the jurisdictions considered as a whole). A similar situation is observed in the case of immigrants, in Catamarca, Santiago del Estero and Rio Negro their presence has a positive and significant impact on the social capital, while in Tierra del Fuego, on the contrary, the effect is negative.

Tierra del Fuego is the only province in which the presence of immigrants has a negative and significant effect on the three types of capitals of the schools, and Santiago del Estero and La Pampa are the only ones in which this variable has a positive effect on the three capitals (though in the case of the human capital it is not significantly different from zero for Santiago del Estero and in the case of the physical capital for La Pampa).

As was already mentioned, public schools quite often have cooperative associations which are generally managed by parents of students of the school and recollect funds from

the students to invest them in improving the quality of the service provided by the school. Their action could affect the amount of physical capital the school can buy or afford to repair, or provide funds to hire more acknowledged teachers (human capital). Regarding the social capital, as it is constructed taking into account the relationship between schools and parents; it also takes into account if these cooperative associations are constituted in the school. Therefore, it cannot be used to test if it is a determinant of the social capital, because we already know it is.

Incorporating the presence of these cooperative associations in order to check their impact on the physical and human capitals of the schools in most cases did not alter significantly the results previously found. Three variables considered unacceptable (*SES*, immigrants and native students) were tested as determinants of the school capital, and one considered acceptable (the presence of cooperative associations). These results are presented in table 6. The presence of a cooperative association is a significant determinant of the physical capital in Río Negro, Formosa, Mendoza, Misiones and Santa Cruz, though in the latter case, it has a negative impact. In the case of Río Negro, it is the only element that presents a coefficient significantly different from zero indicating that all the disparity in the distribution of this capital would be due to acceptable sources. In fact, the model which was not significant without incorporating this variable, now it is. In Mendoza and Misiones, though the coefficients regarding the unacceptable factors are still significant, some are slightly smaller than when these cooperative associations are not included, but in Formosa, the coefficient regarding the *SES*, is even bigger than in the previous analysis. As regards the human capital, the cooperative associations have a significant impact for the cases of Buenos Aires province, Formosa, San Juan, San Luis, Tucumán and Chubut, though in the latter case presents a negative effect. In the case of San Luis, it is the only determinant with a coefficient significantly different from zero, indicating that the inequality in the human capital would be explained by acceptable factors, and again, the model that was not significant now is. In the rest of the provinces, the results regarding the other coefficients are mixed; in the case of Buenos Aires province, the coefficients corresponding to unacceptable sources remained the same, on the contrary, in Formosa and San Juan the coefficients were increased, and in the case of Tucumán, the one corresponding to the *SES* was reduced, but the corresponding to the presence of immigrants was increased.

Table 6:

Equality of Educational Opportunities, including cooperative associations

Dependant variable		(i) Physical capital						(ii) Human capital					
	No.obs.	Pupils' SES	Immigrants	Native students	Cooperative Associations	Intercept	R2	Pupils' SES	Immigrants	Native students	Cooperative Associations	Intercept	R2
All Jurisdictions	9157	0.031***	-0.086***	-0.030	0.042	1.377	0.171	0.009***	-0.035***	0.012	0.130***	3.250	0.032
Cap. Fed	449	0.045***	-0.025	-0.081	0.641	0.124	0.124	0.003	0.037	0.073	0.195	3.500	0.008
Bs.As	2636	0.039***	-0.048**	-0.036	0.169	0.689	0.131	0.012***	0.019	0.002	0.246***	2.946	0.025
Catamarca	81	0.027***	0.432	0.248	0.150	1.112	0.149	-0.007	0.265	-0.431	0.042	3.662	0.020
Córdoba	884	0.039***	-0.056	0.217	0.104	1.117	0.140	0.012***	-0.029	0.084	-0.020	3.440	0.027
Corrientes	277	0.011***	-0.248	0.345	0.175	1.864	0.046	0.005	0.043	0.019	0.049	3.348	0.010
Chaco	410	0.018***	0.201	-0.174***	0.262	1.570	0.117	0.013***	-0.211*	0.092*	0.227	2.971	0.068
Chubut	144	0.001	-0.149	-0.248**	-0.199	3.261	0.102	-0.003	0.116	-0.096	-0.276*	4.264	0.035
Entre Ríos	370	0.022***	-0.173	-0.049	-0.022	1.746	0.069	0.001	0.224*	-0.362	0.160	3.265	0.015
Formosa	201	0.028***	-0.051	0.082	0.499**	0.822	0.200	0.016***	-0.181**	0.228***	0.375**	2.634	0.127
Jujuy	107	0.001	0.246**	0.022	0.029	2.245	0.046	0.008	-0.205**	-0.014	0.174	3.228	0.077
La Pampa	164	0.024***	0.141	0.146	0.029	2.233	0.062	0.024***	0.373***	-0.096	0.209	2.375	0.147
La Rioja	82	0.012	-0.039	(dropped)	0.253	1.803	0.043	0.008	-0.098	(dropped)	0.155	3.218	0.030
Mendoza	477	0.018***	-0.143**	0.206*	0.269***	1.972	0.078	0.010***	-0.057	0.002	0.006	3.490	0.020
Misiones	468	0.010***	-0.103	-0.137	0.334**	1.793	0.047	0.016***	-0.044	-0.023	0.052	3.032	0.080
Río Negro	177	0.000	0.087	0.065	0.219***	2.540	0.061	0.005	-0.025	0.183**	0.092	3.298	0.047
Salta	339	0.016***	0.199***	-0.077	0.153	1.814	0.077	0.016***	-0.057	-0.064	-0.105	3.413	0.082
San Juan	221	0.016***	0.149	(dropped)	-0.020	2.070	0.071	0.012***	0.132	(dropped)	-0.150*	3.556	0.072
San Luis	124	0.026***	0.217	(dropped)	0.224	1.511	0.079	-0.001	0.030	(dropped)	0.391**	3.617	0.056
Santa Cruz	72	0.016	0.077	0.100	-0.333***	2.515	0.108	0.009	0.147	0.887**	0.142	3.070	0.095
Santa Fé	674	0.023***	0.091	-0.153*	(dropped)	1.937	0.109	0.005**	0.002	-0.031	(dropped)	3.744	0.009
Sgo.del Est.	291	0.021***	0.648***	0.027	-0.616	2.222	0.168	0.032***	0.109	0.679*	0.048	2.519	0.207
Tucumán	445	0.032***	-0.194**	0.341*	0.066	1.342	0.160	0.010***	-0.188**	0.154	0.239***	3.283	0.050
T. del Fuego	64	0.010	-0.167**	(dropped)	0.119	2.804	0.124	-0.002	-0.173*	(dropped)	0.127	3.716	0.095

*** Significant at 1%, ** significant at 5% and * significant at 10%. †The cases when the variable is dropped correspond to those in which none of the directors of the schools answered that there are native students. Source: Own estimation based on ONEE 2000 and ENGH.

In other words, the regression analysis showed that in most cases there is a positive association which indicates the lack of equality of educational opportunities. With the exception of Santiago del Estero, the coefficient of determination is never higher than 20%, and in most of the cases is fewer than 10%. Formosa and Santiago del Estero not only have the poorest students, but also horizontal inequality and a lack of equality of educational opportunities. Two cases that are distinctive are La Rioja and La Pampa, the first one has bad marks regarding horizontal inequality, while we cannot reject the hypothesis of equality of educational opportunities. This means that we could not find evidence that the distribution of the school quality is related to unacceptable factors. On the contrary, La Pampa has good indicators about horizontal equality, while the regression analysis shows that almost 15% of the distribution of the schools capitals can be explained by unacceptable factors.

Conclusions

The need for empirical work on the measurement of equality of educational opportunities in the Argentine public system has often been stressed. This paper takes a step in that direction by presenting three measures of school quality, their distribution, the decomposition of the inequality in between and within jurisdictions, and the degree of association between the school quality and a set of variables considered unacceptable.

The coefficients of variation for the indicators of school quality range between 12.9% (corresponding to human capital) and 24% (corresponding to physical capital) considering all jurisdictions. Therefore, the presence of inequalities is not just a feeling but a fact. After having a first approach to the problem, the following step was to try to unravel where the main problem was. In that sense, we studied whether it was one of provincial administration or of inefficient compensatory policy by the national government. The decomposition of the Theil index showed that the majority of the schooling inequalities are explained by differences within the jurisdictions, more than 84% corresponds to it. In a word, a poor quality school does not necessarily belong to a poor province.[10] Had the municipalities (smaller governmental units) been responsible to finance education, disparities between schools in the same province would have been expected, but this was not the case, since schools with great disparities in inputs are financed by the same governmental unit.

Then, we focused the study in the evaluation of the particular situation of each jurisdiction. We studied the horizontal equity with the coefficient of variation and the Theil index. The ones that present the worst scenario are Buenos Aires province, Corrientes, Chaco, Entre Rios and La Rioja. All these are the worst ranked in the distribution of the three measures of school quality, either by the coefficient of variation as by the Theil index. The best ones in this respect are Córdoba, Chubut, La Pampa, San Juan, San Luis and Tucuman. It is worth mentioning that the size of the jurisdictions is quite different, but that large and small jurisdictions are in both groups. Buenos Aires province is the largest one while Córdoba is the second largest one. And La Rioja and San Luis are among the smallest jurisdictions.

Next, the degree of association between the quality of the schools and those variables considered unacceptable was studied to determine the degree of equality of educational

[10] Other studies also find intradistrict inequalities; Roza et al. (2007) find great disparities in spending among the public schools financed by the same district, and Iatarola and Stiefel, (2003) also find inequalities in the provision of resources as well as a lack of equitable distribution of performance; in particular, they analyze the district of New York City.

opportunities. In this sense, the regression analysis showed that in most cases there is a positive association which indicates the lack of equality of educational opportunities. With the exception of Santiago del Estero, the coefficient of determination is never higher than 20%, and in most of the cases is fewer than 10%. Formosa and Santiago del Estero present a worrisome situation. Not only they have the poorest students, but also they have horizontal inequality and a lack of equality of educational opportunities. Two cases that are distinctive are La Rioja and La Pampa, the first one has bad marks regarding horizontal inequality, while we cannot reject the hypothesis of equality of educational opportunities. This means that we could not find evidence that the distribution of the school quality is related to unacceptable factors. On the contrary, La Pampa has good indicators about horizontal equality, while the regression analysis shows that almost 15% of the distribution of the schools capitals can be explained by unacceptable factors.

Finally, it is worth mentioning that though we could corroborate the lack of horizontal equity and of equality of educational opportunities, even among the public schools financed by the same jurisdiction, the inequality of the school capital between jurisdictions is less than the inequality of the SES between jurisdiction, this could mean that there is a certain equalizing policy regarding educational quality to compensate to the poorer jurisdictions. Nonetheless, the school capital within jurisdictions is more unequally distributed than the SES.

As further research, it would be interesting to analyze the situation within each province in order to have a better understanding of the results found. Exploring the diversities that coexist in each province, their traditions, their productive matrix and the possibilities they have to access public resources will be helpful to better understand the problem and provide policy recommendations.

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About the Author

Cecilia Adrogué
Universidad de San Andrés – Universidad Austral - CONICET
cadrogue@conicet.gov.ar or cadrogue@gmail.com

Dr. Adrogué is a postdoctoral scholar at CONICET-Universidad de San Andrés and Assistant professor at Austral University in Argentina. Her research interests include equality of opportunities, educational quality and the impact of education on multidimensional poverty measures.

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