

School Decentralization: Helping the Good Get Better, but Leaving the Poor Behind

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Abstract

The decentralization of public services from central to local control is a major feature of institutional innovation throughout the world. The main argument in support of decentralization is that it brings decisions closer to the people, alleviating information asymmetries, agency costs, and problems of collective decision. However, decentralization can also degrade service provision if local governments have weak technical capabilities or poor communities lack the ability to voice their preferences. Thus, decentralization may increase inequality if central provision guarantees a minimal provision level, whereas some regions and social groups are disadvantaged under decentralization. In this paper, we test the hypothesis that decentralization of secondary schools increased inequality of educational outcomes in Argentina. Our results show that decentralization had, on average, a positive and significant impact on student performance. Unfortunately, the effect seems negative for schools located in poor areas of provinces with weak technical capabilities.

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1. INTRODUCTION

Decentralization of public services is a major feature of institutional innovation throughout the world (Bird and Vaillancourt 1998, Burki et al 1999, Campbell 2001, World Bank 2004). The most often cited rationale is that decentralization brings decision-making closer to the people so their preferences can be better reflected in policy (e.g. Oates 1972, World Bank 1994 and 2004, Wallis and Oates 1998). The idea is that decentralization mitigates the problems of information asymmetries over heterogeneous preferences so that local public service provision can be better tailored to local tastes and needs. Some additionally argue that decentralization sidesteps problems of collective decision-making at the central level (Lockwood 2002, Besley and Coate 2003). Other hypothesize that decentralization might reduce central bureaucratic corruption (Bardhan and Mookherjee 2005a and 2005b), improve political accountability (Tommasi and Weinschelbaum 1999), and enhance incentives in the provision of public services (Besley and Ghatak 2003).

However, decentralization may also degrade the provision of public services under a number of circumstances. One important case is when local governments are less technically able to administrate public services than the central government (Smith 1985). Another possibility is that decentralization may facilitate the capture of resources by local elites that face reduced political competition. This could involve explicit corruption or allocation of the resources to public uses preferred by the local elites. Either way, groups that have less voice with local decision makers may be on the short end of the resource allocation (Bardhan and Mookherjee 2005a). Moreover, local governments might undersupply services in the presence of positive externalities and economies of scale in

production (Oates 1972).

One implication of the theoretical literature is that decentralization may lead to an increase in inequality. Since there is typically variation in the characteristics of local governments and populations along many dimensions, one would expect a heterogeneous response to decentralization. Specifically, in those areas that are well administrated with populations that have enough stature to voice and defend their preferences, decentralization should improve the provision and benefits from public services. Conversely, decentralization might not help and could actually harm public services in those areas that are poorly administrated with populations that lack the ability to voice their preferences. As a result, decentralization could help the good get better and make the already disadvantaged worse off. In this paper, we test the hypothesis that decentralization of secondary schools increased inequality of educational outcomes in Argentina.

Argentina provides an excellent opportunity to study the effect of decentralization on education outcomes. For over a century, two systems of secondary schools, one administered by the provinces and the other by the central government, existed side by side in the same communities. Between 1992 and 1994, the central government transferred all its secondary schools to provincial control and several provinces further transferred substantial decision-making power to local schools and communities. We use the exogenous variation in the jurisdiction of administration of secondary schools generated by this political experiment to identify the causal effect of school decentralization. Specifically, we estimate a difference in difference model that compares

the change in test scores of the national public schools transferred to the provinces and the change in test scores in the always-provincial schools.

We find that, on average, decentralization improved the performance of students on standardized Spanish and Mathematics tests. However, when we interact the effect of decentralization with measures of local administrative capabilities and population poverty, we find that decentralization only had a positive effect on schools located in non-poor municipalities in well-managed provinces. Decentralization had no impact on schools in non-poor municipalities in poorly managed provinces, nor on schools located in poor municipalities in well-managed provinces. But test scores actually fell in schools that were transferred in poor municipalities located in weakly managed provinces. These results suggest that decentralization not only increased inequality in education outcomes, but alarmingly reduced the outcomes of the most disadvantaged.

Despite its prominent place in school policy, there has been little rigorous evaluation of decentralization efforts on average educational outcomes let alone on the distribution of outcomes (Oates 1998, Hanushek 2002). A small empirical literature does suggest that there are advantages of having “policy closer to the people.” Faguet (2001) shows that after decentralization in Bolivia, local government had better knowledge of idiosyncratic educational preferences among others. Complementarities between household decisions and decentralization policies are presented in Behrman and King (2001). Using cross-sectional data, Eskeland and Filmer (2002) found a positive correlation between school autonomy and primary school performance in Argentina. In contrast, Paes de Barros and Mendonca (1998) found no relationship between school financial autonomy and local school boards with primary school performance in Brazil.

However, they did find positive effects of local director appointment power on primary school performance. Jimenez and Sawada (1999) and King and Ozler (2000) find that decentralization increased the participation of parents in school decision-making in El Salvador and Nicaragua, respectively. Finally, using data aggregated to the province level, Galiani and Schargrodsky (2002) find an improvement in school performance in Argentina associated with decentralization.

The organization of the paper is as follows. Section 2 describes the decentralization of secondary schools in Argentina. Sections 3 and 4 describe our data and empirical methods, respectively. Section 5 presents the average impact results. Inequality effects are analyzed in section 6. Finally, we summarize our conclusions and discuss the implications in section 7.

2. SCHOOL DECENTRALIZATION IN ARGENTINA

Prior to the unification of the independent provinces into the federal country of Argentina in 1853, provincial governments had operated public schools. After unification, the national government created an additional separate system of federal schools in order to foster national integration.¹ For more than a century provincial and central schools operated side by side in communities throughout the country. The process of decentralization began in 1978, when federal primary schools and pre-schools were transferred to provincial control. The process was completed in December of 1991, when the Argentine Congress ordered the transfer of all federal secondary schools to the provincial governments.

¹ See Tedesco (1986), Dussel (1995) and Llach et al (1999) for a historical description of the Argentine educational system.

The decentralization of secondary schools was part of an extensive program of structural reforms undertaken by the newly elected Menem government in the early 1990s. The reforms included financial and trade liberalization, a monetary currency board, the reform and privatization of the national pension system, the emancipation of the Central Bank, a general deregulation of economic activities, and a massive privatization program. The school decentralization was also part of a regional decentralization wave as a large number of Latin American countries implemented decentralization policies during this period (Bird and Vaillancourt 1998, Burki et al 1999, Willis et al 1999).

The actual transfer of central secondary schools to provincial control took place between 1992 and 1994. The transfer schedule was determined through bilateral negotiations between the federal government and each province (Rhoten 1999, Corrales 2003). Before decentralization federal secondary schools represented one third of total public secondary schools and provided service to more than one half of total public secondary students. For each province, Table 1 shows the decentralization year and the share of federal schools and federal students in the public school system prior to decentralization. Federal schools used to be larger than always-provincial schools.

The decentralization Law also guaranteed the provinces that they would not have to bear additional financial burden by taking on the operation of the transferred schools. This guarantee was implemented through the Federal Tax-Sharing Agreement (FTSA),² which is the formula by which Argentine provinces are allotted their share of federal tax revenues. Under the law, the federal government must cover any difference between the increase in FTSA transfers and the marginal increase in provincial school expenditures

² For a description of Argentine fiscal structure see Jones et al (2000).

due to the transfer of schools. Nicolini et al (2000) show that the increase in FTSA transfers has always been greater than the cost of operating the transferred schools over the period of analysis. This is because the FTSA transfers were increasing as a result of the economy growth over the period of analysis.

One of the major motivations for the decentralization was the belief that the transfer would increase efficiency by bringing school decision-making to the local level (Llach et al 1999). In fact, almost all of the important educational decisions³ were devolved to the provincial level as summarized in Table 2. Provincial governments took over budget, resource allocation, and personnel decisions in the formerly national schools. They now hire, assign, sanction and fire principals, teachers and staff, set wages, define the calendar year, supervise school operation, establish curriculum contents, and open and close schools and sections. The federal government remained in charge of establishing minimum curriculum contents, and providing technical assistance and supervision of teacher training programs. School themselves have always been able to choose textbooks, teaching methods, evaluation methods, and course content.

Many provinces took the transfer of authority seriously. In several cases the supervision of schools improved (Dussel and Thisted 1995, Macri 2001). For example, the Province and the City of Buenos Aires increased the frequency of supervision visits. A Buenos Aires provincial authority remarked, “Federal schools had their officials located in the National Ministry and schools never saw them. Schools now have a frequent contact with us” (Dussel and Thisted 1995, p. 63). Similarly, a Buenos Aires city official said, “I went to a school which had not been visited by a supervisor for seven years” (Macri 2001, p. 22).

³ Hanushek (1986, 1997) provides careful surveys of the educational production literature.

In many places, the Provinces further decentralized authority to the local level. In Mendoza, Rhoten (2000, pp. 614-5) writes "...the process of education decentralization has led to a system of "devolution" in which local government agencies and schools not only execute public policies but local society and market actors also possess the authority to make decisions regarding public policies and practices." She concludes that decentralization opened opportunities for local participation and educational advancement in Mendoza. The Provinces of Córdoba, Rio Negro, Santa Fe, and Buenos Aires and the City of Buenos Aires also actively encourage local participation in school decisions (Filmus 1997). In the Provinces of Córdoba, Misiones, and Santa Fe, and the City of Buenos Aires, schools now adapt curriculum contents to the local identity and assess performance (Rhoten 1999). The province of San Luis went even further by launching an innovative program of charter schools and instituting a selection process of school principals based on merit and open competition (Gorostiaga 2001, Corrales 2003).

Decentralization has also allowed for some budgetary autonomy at the school level. In Argentine schools, maintenance repairs, classroom materials, and dining room operation are usually paid by *cooperadoras* (school associations co-financed and managed by students' parents). Under national administration, *cooperadoras* did not receive funds from the federal government. Instead, the Province of Buenos Aires, the City of Buenos Aires and Mendoza decentralized these expenditures by directly transferring provincial funds to the *cooperadoras*, thus providing flexibility to address local needs (Dussel and Thisted 1995, Macri 2001, and Rhoten 1999).

How the decentralization worked in practice depended on local capabilities and political realities. For example, Rhoten (2000) contrasts the success in Mendoza with the

decentralization experience in Jujuy. In Jujuy, a poor province with low administrative and institutional capacities, decentralization is described as “political abandonment” by the national government. Attempts to establish school councils and implement local decision-making failed because the provincial government actively discouraged them, while local politicians abused the new resources under their control. One of the teachers interviewed by Rhoten (2000, p. 613) in Jujuy explains that “The obstacles to decentralization in this province are not economic, our problems are political problems, problems with power. Our politicians are façades. There is no real commitment to decentralization or to democratization in terms of sharing power and responsibility.”

Dussel and Thisted (1995) describe how the decentralization of expenditures through the *cooperadoras* in the Province of Buenos Aires depended on community participation. A school official remarked, “The school principal sometimes has a good *cooperadora*, but sometimes she/he is alone. But the money only comes earmarked to the *cooperadora*, so that the school needs an active *cooperadora*. Sometimes this system works very well, sometimes does not” (Dussel and Thisted 1995, p. 49). Within the same province, schools with weak *cooperadoras* received fewer funds. Gorostiaga (2001) points out “...many provincial administrations lacked the necessary technical expertise and resources to manage the new system,” while Rhoten concludes that “...some actors report not having the necessary financial resources or authority to undertake the new responsibilities.”

3. DATA

Our dataset contains information on 3,456 public schools, accounting for 99 percent of all public secondary schools, for 1994 through 1999.⁴ Of these, 2,360 were always provincial and 1,096 were transferred from the national government to the provincial government between 1992 and 1994. A school is defined as “Decentralized” if it was transferred from central to provincial administration. A school is defined as “Always Provincial” if it was under provincial control prior to 1991.

Our primary source of data is from the administrative records of the Argentine National Education Ministry. From them we obtained performance and enrollment information at the school level for fifth-year secondary students. The performance information is available for 1994 through 1999. The enrollment data cover the same period, except for 1995 when the Ministry did not collect them.

The National Education Ministry monitors fifth-year secondary school student performance through the administration of standardized Mathematics and Spanish tests. For each school, we have the school average test score and the number of students who took the tests. From 1994 to 1996, the tests were administered to a random sample of fifth-year students. Since 1997 every fifth-year student has taken the test.

The nationally administered standardized test scores are uniform and monotonic measures of school performance. However, we recognize that standardized test scores do not capture all of the dimensions of student achievement. One concern with our measure is that teachers could intentionally train students to maximize test scores instead of teaching general skills and knowledge. In this case, the test scores would not reflect school quality, but rather how well schools prepared students to take the test. However,

⁴ We excluded from the analysis 41 secondary schools that belong to national universities, military forces and police forces.

this is less likely in Argentina where there are no rewards or punishments for teachers or schools based on test outcomes.

While the Ministry began testing fifth-year students in 1994, the transfer of schools took place between 1992 and 1994. Hence, the first year of test score measurement coincides with the last year of school transference. However, we still have variation in the number of years students were exposed to decentralization. Since the exam is taken in the last (fifth) year of secondary school, students could be exposed from 1 to 5 years of studies in decentralized schools. Therefore, we will be investigating the effect of up to five years versus one year of exposure to decentralization.

There are two potential losses from this restriction. The first is that we are unable to evaluate the impact during the year of decentralization versus before decentralization, which should not be too much of a problem as it is likely that the changes introduced from decentralization were not fully implemented in the year in which the school was transferred. Moreover, the effect of these changes on student performance should depend on the years of exposure of the students. Second, since we do not have multiple periods of pre-intervention data we are not able to conduct the diagnostic tests recommended by Heckman and Hotz (1989) for assessing the validity of the underlying assumptions of the difference in difference estimator, i.e. whether pre-intervention trends are the same for treatment and control groups.

In addition to the analysis of the average impact of decentralization, we are also interested in studying distributional effects. In particular, we hypothesize that the advantages of decentralization may dilute for schools transferred to local governments that lack technical capabilities or for schools located in poor areas.

We use two alternative measures in order to proxy for the quality of provincial governments. The first is whether the Province ran a large long-term fiscal deficit prior to the decentralization. Provincial fiscal disorders in Argentina are frequent and typically associated with poor governance (Tommasi et al 2001). Moreover, poor provincial fiscal discipline can have a negative impact on the education sector. On several occasions, provincial fiscal deficits generated reductions and delays in teachers' wage payments that prompted long strikes.⁵ Our first dummy indicates that the school is located in a province with poor fiscal discipline if the Province ran a deficit larger (in absolute value) than the sample median (-1.35 percent of the provincial gross output) for the period 1990-1992, i.e. in the three years before decentralization.

Our second proxy uses an index of the quality of the Argentine provincial budgetary institutions developed by Jones et al. (2000). The index considers six characteristics of the provincial Constitutions: restrictions to the ability of the legislature to increase expenditures on the budget proposal submitted by the governor, limits to the provincial borrowing ability, limits to the municipal borrowing ability, strength of audit agencies, presence of within-province municipal tax share agreements, and limits to the use of promotional subsidies. We indicate that the school is located in a province with weak fiscal institutions if the Jones et al's provincial index of Fiscal Institutionalization is below the sample median.

⁵ For example, in 1995 and 1996 wages were reduced in Misiones, Entre Ríos, San Juan, Santa Fe, Río Negro, Corrientes, and Neuquén; while payment delays occurred in La Rioja, Entre Ríos, Jujuy, Tucumán, Salta, Córdoba, Misiones, Río Negro, Buenos Aires, Neuquén and the city of Buenos Aires. Out of 170 class-days in 1995, strikes lasted for 50 days in San Juan, 40 in La Rioja, 30 in Jujuy, 10 in Misiones, 120 in Río Negro, 20 in Salta and 70 in Córdoba (Senén González, 1997). Provincial fiscal crises provoked federal interventions in Santiago del Estero in 1993 and in Corrientes in 1999. In Santiago del Estero, a teachers' strike lasted for 50 days (La Nación, October 30, 1993), while there were basically no classes in Corrientes during all 1999 (Clarín, November 16, 1999).

The two measures of provincial government administrative ability are presented in Table 3. In the first column we report the provinces identified as having good fiscal discipline based on chronic budget deficits prior to 1992, while in the second column we use the Jones et al index to categorize the provinces that have proper budgetary institutions. Both proxies coincide for 18 out of the 24 provinces, indicating a strong correspondence between the two measures.

Finally, we will also interact decentralization with a poverty dummy to investigate whether poor localities have a differential gain from decentralization. We measure poverty at the municipality level using the fraction of households suffering Unmet Basic Needs (UBN) in the 1991 Census. The Government of Argentina defines a household as having Unmet Basic Needs if it suffers from at least one of the following: overcrowding as indicated by having an average of more than three people per room living in the house, no fecal evacuation system, poor housing conditions, or has 4 or more dependent household members per working member and the household-head has a low level of education (INDEC, 1984). The dummy variable defines a municipality as poor if the 30% or more of the households suffer from UBN. Based on this definition, 33% of the country's municipalities are classified as poor, and 15% of secondary schools are in poor communities.

Finally, we summarize the mean test scores and class size by provincial administrative ability and municipal poverty status in Table 4. Both for poor and non-poor municipalities, the test scores are higher in strong administrative provinces. Moreover, both for strong and weak administrative provinces, the students' performance

are worse in the schools located in poor municipalities. The average class size is larger in non-poor areas.

4. IDENTIFICATION

Our objective is to estimate the effect of school decentralization on educational quality measured by standardized test scores. In principle, we would like to compare test scores when schools are centrally administered compared to the counterfactual—i.e. test scores for the same schools under local administration at the same time. Since the counterfactual is never observed and we do not have a controlled randomized-trial, we are forced to turn to non-experimental methods that mimic the counterfactual under reasonable conditions.

We propose to use the always-provincial governments as control group for the decentralized schools. A major concern is that the schools that were centrally administered before decentralization could be different from the schools that have always been locally administered, and that these differences may be correlated with test scores. For example, provincial schools could be located in poorer urban areas while central schools could be in wealthier areas. In this case, the correlation between decentralization and test scores would be confounded with the wealth effect.

In principle, many of the types of (unobservable) characteristics that may confound identification are those that vary across schools, but are fixed over time. A common method of controlling for time invariant unobserved heterogeneity is to use panel data and estimate difference in differences models. We use this identification strategy, and hence, compare the change in outcomes in the treatment group, i.e. the

decentralized schools, to the change in outcomes in the control group, i.e. the always-provincial schools. By comparing changes, we control for observed and unobserved time-invariant school characteristics as well as time-varying factors common to both controls and treatments that might be correlated with decentralization as well as with test scores. The change in the control group is an estimate of the true counterfactual—i.e. what would have happened to the treatment group if there were no intervention. Another way to state this is that the change in outcomes in the treatment groups controls for fixed characteristics and the change in outcomes in the control groups controls for time varying factors that are common to both control and treatment schools.

Formally, the difference-in-differences model can be specified as a two-way fixed effect linear regression model:

$$y_{ijt} = \alpha dI_{it} + \beta \mathbf{x}_{jt} + \lambda_t + \mu_i + \varepsilon_{ijt} \quad (1)$$

where y_{ijt} is the test score in school i in province j and year t , dI_{ijt} is an indicator variable that takes on the value one if school i 's is administered locally in year t and 0 otherwise, \mathbf{x}_{jt} is a vector of control variables that vary both across provinces and time, λ_t is a time fixed effect common to all schools in period t –alternatively, it can be replaced by λ_{jt} , a province-year fixed-effect common to all schools in province j and period t -, and μ_i is a fixed-effect unique to school i . The \mathbf{x}_{jt} 's are time-varying province level controls such as income per capita, fiscal result, and unemployment. The year dummies capture all time-varying controls that are common to controls and treatments, and the school level dummies capture all school and community level factors that vary across schools but are fixed over time.

The model specified in equation (1) assumes that decentralization affects test

scores immediately and that the effect is constant over time. However, it may take time to implement policy changes suggesting that the impact of decentralization may be stronger later than earlier. Moreover, students take the test in their last year of secondary school, which introduces variation in the length of exposure to decentralization. For example, students who took the test one year after decentralization had four years of school under central administration and only one year (the last) under decentralized administration, whereas students who took the test five years after decentralization studied in a decentralized school for all five years. If the impact of decentralization on test scores is cumulative, then test scores should be correlated with the length of exposure to the treatment.

In order to capture length of exposure, we estimate instead a more flexible version of equation (1):

$$y_{ijt} = \sum_{s=0}^5 \alpha_s dI_{its} + \beta x_{jt} + \lambda_t + \mu_i + \varepsilon_{ijt} \quad (2)$$

where s indexes the number of years school i has been under local administration in year t , $s = 0$ is the year of decentralization, and all exposures greater than $s = 5$ are restricted to have the same impact as five years of exposure. However, we place no other restriction on the functional form of the estimated impact of length of exposure relative to the left out category, the always-provincial schools.

The error term ε_{ijt} is a zero mean variable assumed to be independent of the observed right side variables and the fixed effects. However, the error term is unlikely to be homoskedastic because the school level test scores are averages of the number of students who took the test. From 1994 to 1996, the tests were administered only to a random sample of fifth-year students, while since 1997 every fifth-year student takes the

test. To address this issue, we estimate the parameters of interest by means of a Feasible Generalized Least Squares which requires that each observation is divided by the corresponding standard error or the equation error term –i.e., each observation is multiplied by the square root of the number of students who took the test for that year and school. Another concern is that the equation error terms might be correlated across time and space. Therefore, we allow for an arbitrary covariance structure within provinces by computing our standard errors clustered at the province level, province-year level and municipality level.

5. AVERAGE IMPACT RESULTS

We present the results of our estimates of equation (2) in Table 5. Columns (1) and (2) report the results for Math and Spanish test scores of a fully-flexible model with school and common year fixed-effects, but no time-varying controls. We find that both Math and Spanish test scores in schools that were transferred increased significantly over the time since decentralization relative to test scores in the always provincial schools.

In columns (3) and (4) we add three provincial time-varying controls: the ratio of fiscal deficit to the gross domestic output (Fiscal Deficit Share), gross domestic product per capita (GDP per capita), and the unemployment rate (Unemployment). Once we introduce the controls, the estimated coefficients on the impact of decentralization fall. The results indicate that decentralized schools performance fell slightly in comparison to the always public schools in the first year of decentralization—between 0.8 and 1.5 points less in test scores. However, after 5 years of decentralization, decentralized schools

improved relative to the always provincial schools by 2.6 points (4.7 percent) in Math tests and 3.7 points (6.4 percent) in Spanish Tests.

In columns (5) and (6) we restrict the model specification by imposing the effect of decentralization on test scores to increase linearly on years since decentralization.⁶ The data accept this parsimonious model quite well. In order to provide a sense of the order of magnitude of the average impact of school decentralization on the transferred schools, we use the linear models to estimate the gain in test scores as a proportion of the baseline levels. We find an improvement of 3.8 % for Math and 5.9 % for Spanish after five years under decentralized administration.

All standard errors reported in Table 5 and the subsequent Tables are clustered at the province level, which is the level at which the intervention occurs. To check the robustness of our standard error estimates, we also estimated the standard errors clustered at the municipality level and then again at the province-year level. In the first case, standard errors are very similar to those obtained through clustering at the province level and the reported statistical significance never changes. In the second case, the standard errors are always lower than those reported in the tables.

5.1 Potential Bias from Omitted Time-Varying Factors

One of the major threats to the validity of our identification strategy is that there may be omitted non-common time-varying factors that are correlated with both decentralization and test scores. There are two ways in which this might happen. The first is the endogeneity of program placement. This would occur if government's choices of

⁶ In order to impose this restriction, years since decentralization are coded as being equal to 1 for the year of decentralization, equal to 2 for the year after decentralization, and similarly up to equal to 6 for the fifth year or more after decentralization. Always-Provincial schools are given a value of 0.

where and when to decentralize are based on test scores or on local shocks correlated with test scores such as income shocks. In other words, the government could have purposively based its decentralization decisions on location-specific time-varying information.

In our case, bias from endogeneity of program placement is not likely to be an issue. The decentralization of schools was a national policy that applied to all central schools and the control group is the set of schools that had historically been under provincial management. While schools were transferred over a three-year period, the transfer schedule depended on political negotiations between the national and provincial governments (Rhoten, 1999; Corrales, 2003) and not on test scores that in fact were not available at the time. Indeed, we cannot reject the independence of rank orders of the provinces by transfer dates and test scores using a Spearman rank coefficient test.

The second way in which omitted time-varying factors could confound the analysis is if there were other location-specific time-varying policies or environmental factors that affect treatment observations differently than control ones. Again, in our study, this is unlikely to be true for two reasons. First, after schools decentralized, both control and treatment schools were under the same administrative control and we know of no explicit within-province differentiation in policy towards the always provincial and the newly provincial schools. Second, the schools in the control group are located in the same municipalities, and in the same zip codes in many cases, as the treatment schools. Therefore, since both control and treatment schools are located in small geographic areas in the same governmental administrative regions, changes in policies and environmental factors that affected one group almost surely affected the other.

In addition, we address possible biases from omitted time-varying factors including province-year fixed-effects, which control for time-varying shocks, both environmental and other policy interventions, at the province level that may affect school performance. The estimated impacts of decentralization on test scores, which are reported in columns (7) and (8) of Table 5, increase slightly, but they are not significantly different from the baseline estimates reported in columns (5) and (6).

5. 2 Potential Bias From Differential Secular Trends

A second concern is that the secular time trend in the treatment schools is different from the secular trend in the control schools. If true, then the change in the test scores of the control communities would not be an unbiased estimate of the counterfactual—i.e. what would have happened to the decentralized schools if they had not been transferred. While we cannot directly test the identification assumption that the change in the control schools is an unbiased estimate of the change in the treatment schools if they were not treated, we can restrict the sample so that the treatment and control schools are similar in other characteristics. By restricting the sample to schools with similar characteristics we try to ensure that they are subject to the same external influences and have the same capabilities to react to them. Indeed, this is the basic idea of matched difference in difference estimators (Heckman, Ichimora and Todd, 1997).

We “match” the control and treatment samples along two dimensions: location and size. One might think of these as estimates on the common support along these two dimensions. We report the results of these analyses in Table 6 using the linear specification in columns (5) and (6) of Table 5, which utilized the whole sample. First, in

columns (1) and (2) of Table 6 we restrict the sample only to schools located in municipalities where there are at least one treated and one control school. This seeks to control for unobserved time-varying shocks at the municipality level that may affect school performance. The point estimates are not altered by this restriction relative to those in columns (5) and (6) of Table 5. In columns (3) and (4) of Table 6 we further restrict the sample only to schools located in zip code areas where there are at least one treated and one control school. Again, estimates remain unaltered.

Class sizes in federal schools were larger than those in the control groups (see Table 1). Our models control for size differences by conditioning on school fixed-effects but it may be the case that larger schools not only depart in average performance but also in its performance over time confounding treatment effect with unobserved heterogeneous trends. In order to control for this potential nuisance, we match schools by their class size in 1999, the last year in our sample. First, we restrict to schools whose class size is in the common support of the distribution of class size for treated and control schools. To implement this, we drop schools with a class size in 1999 lower than the one at the bottom 1% of the distribution of control schools and higher than the one at the upper 99% of distribution of treated schools. Once again, the estimates, reported in columns (5) and (6) of Table 6, are almost identical to those in the baseline specification.

However, even after trimming, schools in the treatment group are on average larger than those in the control group. Thus, in columns (7) and (8) of Table 6 we report the estimates obtained by trimming the samples at the upper 85% and bottom 15% of the treatment and control distribution of class size, respectively. This sample trimming discards more than 50% of the sample and ensures that the average school size is

approximately the same between treatment and control schools. Again, the estimates, reported in columns (7) and (8), are similar, and statistically equal to those in the baseline specification.

5.3. Potential Bias From Selective Migration

Finally, another important threat to the validity of our estimates is potential migration of students associated to decentralization. One explanation of our finding that test scores increase in decentralized schools relative to the always provincial schools is that weak students switch from the decentralized schools to the always provincial school or that strong students move from the always provincial to the decentralized schools. In either case, the change in test scores would be an artifact of the change in the relative composition of students as opposed to a true increase in quality.

Since the data are at the school level we cannot directly test for selective migration across school type or control for student ability by including student fixed effects in model (2). However, we can examine whether decentralization affects the distribution of students between decentralized and always provincial schools within a market—i.e. the municipality. We assume that if there are not changes in relative enrollment rates then there was no selective migration between schools and hence no selective migration bias in the estimated impacts of decentralization on tests scores. The one caveat to this interpretation is there could be movements of weak students from the decentralized schools that exactly offset the movement of strong students to the decentralized schools. Such perfectly equalizing movement would be, however, highly unlikely.

In order to test this, we estimate regression models of the following form:

$$\text{Share Always - Provincial}_{gjt} = \gamma dYDk_{jt} + \beta \mathbf{x}_{jt} + \lambda_t + \mu_g + \varepsilon_{gjt} \quad (3)$$

where $\text{Share Always-Provincial}_{gjt}$ is the share of fifth year student in Always-Provincial schools in municipality g of province j in year t , $dYDk_{jt}$ is a dummy that takes on the value of one if province j is k years or more after decentralization, and 0 otherwise. For example, if schools were decentralized in 1994, $dYD2_{jt}$ equals 1 for years 1996, 1997, 1998 and 1999, and 0 otherwise. Since enrollment data are only available since 1994, and are not available for 1995, we do not include regressions for $k = 0, 1$, but only for $k = 2, 3, 4$ and 5. As before, \mathbf{x}_{jt} is a vector of control variables that vary both across provinces and time, λ_t is a time fixed effect common to all municipalities in year t , and μ_g is a fixed effect unique to municipality g . The error term ε_{gjt} is a zero mean variable that is assumed to be independent of the observed right side variables and the fixed effects. However, it might be correlated across time and space. Therefore, we allow for an arbitrary covariance structure within municipality by computing our standard errors clustered at the municipality level.

We report the estimates of the impact of decentralization on the distribution of students between treated and control schools in the same municipality in Table 7. We do not find any relationship between the share of Always Provincial students and any of the treatment dummies $dYDk$ for $k = 2, 3, 4$ and 5. Indeed, in all regressions the coefficient γ is numerically equal to zero and statistically insignificant. Thus, there is no correlation between the proportion of students in fifth year in the Always Provincial schools and the progress of decentralization during the period studied. Accordingly, we do not find any evidence indicating that students that would have attended decentralized schools without

decentralization moved to the always provincial schools as a result of decentralization or vice versa, spuriously inducing the effect of school decentralization on test outcomes that we report in this section.⁷

6. INEQUALITY EFFECTS

Although “bringing decisions closer to the people” may be generally optimal, the advantages of decentralization may dilute when local governments lack technical capabilities and/or when, on average, the population does not have the ability to raise their voice. Indeed, our hypothesis is that decentralization increases inequality in outcomes along these dimensions.

In order to address this issue, we classify schools in four cells using a binary indicator of provincial government administrative capability to proxy for the quality of province governments, and a binary indicator of poverty at the municipality level to proxy for the population ability to raise their demands.⁸ Thus, each school is in one of the following four areas: 1) Strong Administrative Province and Non-Poor Municipality, 2) Strong Administrative Province and Poor Municipality, 3) Weak Administrative Province and Non-Poor Municipality, 4) Weak Administrative Province and Poor Municipality. As discussed in the data section above, we use two different measures of government administrative ability; fiscal discipline and the Jones et al index.

⁷ A further concern is that teachers could have differentially migrated between decentralized and always provincial schools as a result of decentralization. However, after schools decentralized, teachers in both treatment and control schools became under exactly the same labor conditions. The only additionally relevant rationale for migration could be location, i.e. teachers that were in the past working further away from their preferred area in order to enjoy better labor conditions, could prefer to change schools after decentralization. The regressions that restrict to schools in the same municipalities and zip code areas already addressed this issue.

⁸ Alternatively, the poverty dummy could be interpreted as capturing different population preferences for education in poor versus non-poor communities.

In Table 8 we report the results of the interaction of the linear treatment variable with a set of dummy variables that saturates the four areas defined above on test scores. We consistently find that only treated schools in Strong Administrative Provinces and in Non-Poor Municipalities increase their performance over time as a result of decentralization. All the gains disappear when the school is in a poor area or a badly administered province. Finally, schools in Weak Administrative Provinces and in Poor Municipalities deteriorated their performance after decentralization.

In Table 9 we summarize the effect of school decentralization on test scores for these four types of areas after 5 years of decentralization. Test scores improve about 7% in Math and 8% in Spanish in schools in well-administered provinces and non-poor localities; but diminished more than 14% in Math and more than 9% in Spanish in schools in badly administered provinces and non-poor municipalities. Thus, there is a trade-off between efficiency and equity associated to decentralization. Although “bringing decisions closer to the people” may be generally optimal, the advantages of decentralization dilute when provinces are weakly administered and people are extremely poor.

7. CONCLUSIONS

School decentralization has been advocated by public officers and international organizations throughout the world. The decentralization of public services and, in particular, of educational services has become a standard recommendation promoted by international organizations and followed by several countries. Unfortunately, this enthusiasm has run ahead of substantial evidence on the success of these policies. This

paper intended to fill that void by studying the average and distributional effects of a nation-wide school decentralization program on educational quality.

The Argentine decentralization program generated an exogenous variation in the jurisdiction of administration of secondary schools across time and space that provides an instrument to identify the causal effect of school decentralization on student test scores. Our identification strategy used the fact that, for historical reasons, a significant fraction of secondary schools was already under provincial administration, providing a natural control group for our experiment.

Our results suggest that decentralization had, on average, a positive and significant effect on student performance. In particular, schools located in non-poor localities and well-administered provinces improved substantially their performance. As predicted by Bardhan and Mookherjee (2005a), however, schools in poor areas and in provinces that are poorly administered did worse than under centralization. In turn, this growing educational inequality may later express in the labor market (Card and Krueger 1992 and 1996) further perpetuating inequality.

Thus, we find a trade-off between efficiency and equity. Although “bringing decisions closer to the people” may be generally optimal, decentralization can help the good get better, but make the already disadvantaged worse off. Policymakers should be aware of these potential harms to complement decentralization policies with targeted support interventions.

References

- Bardhan, Pranab and Dilip Mookherjee, 2005a, "Decentralizing Antipoverty Program Delivery in Developing Countries", forthcoming, *Journal of Public Economics*.
- Bardhan, Pranab and Dilip Mookherjee, 2005b, "Decentralization and Accountability in Infrastructure Delivery in Developing Countries", forthcoming, *Economic Journal*.
- Behrman, Jere and Elizabeth King, 2001, Household Schooling Behaviors and Decentralization, *Economics of Education Review* 20: 321-341.
- Besley, Timothy J. and Stephen Coate, 2003, "Centralized versus Decentralized Provision of Local Public Goods: A Political Economy Analysis", *Journal of Public Economics* 87(12): 2611-37.
- Besley, Timothy J. and Maitreesh Ghatak, 2003, "Incentives, Choice, and Accountability in the Provision of Public Services", *Oxford Review of Economic Policy* 19(2): 235-249.
- Bird, Richard M. and Vaillancourt, Francois (eds.), 1998, Fiscal Decentralization in Developing Countries, Cambridge, New York and Melbourne: Cambridge University Press.
- Burki, Shahid J., Guillermo E. Perry, and William R. Dillinger, 1999, Beyond the Center: Decentralizing the State, Washington, D.C., World Bank.
- Campbell, T., 2001, The Quiet Revolution: The Rise of Political Participation on Leading Cities with Decentralization in Latin America and the Caribbean, University of Pittsburgh Press, Pittsburgh.
- Card, David, and Alan Krueger, 1992, "Does School Quality Matter? Returns to Education and the Characteristics of Public Schools in the United States", *Journal of Political Economy* 100(1): 1-40.
- Card, David, and Alan Krueger, 1996, "The Labor Market Effects of School Quality: Theory and Evidence" in Dows Money Matter? The Link Between Schools, Student Achievement and Adult Success, G. Burtless (ed.), Brookings Institution, Washington, D.C.
- Corrales, Javier, 2003, "The Conflict between Technocracy and Participation in Education Reforms in Latin America", mimeo, Amherst College.
- Dussel, Inés, 1995, "La Situación del Sistema Educativo Argentino", mimeo, FLACSO.
- Dussel, Inés and Sofía Thisted, 1995, "La Descentralización Educativa: El Caso del Municipio de San Fernando, Provincia de Buenos Aires", Serie Documentos e Informes de Investigación N° 191, FLACSO.
- Eskeland, Gunnar S. and Deon Filmer, 2002, "Autonomy, Participation and Learning in Argentine Schools: Findings, and their Implications for Decentralization", World Bank, Policy Research Working Paper Series No. 2766.
- Faguet, Jean Paul G., 2001, "Does Decentralization Increase Government Responsiveness to Local Needs? Evidence from Bolivia", *Journal of Public Economics* 88: 867-893.
- Filmus, Daniel, 1997, "La Descentralización Educativa en Argentina: Elementos para el Análisis de un Proceso Abierto", Coloquio Regional sobre Descentralización de la Educación, San José de Costa Rica, Nov 3-5, 1997.
- Galiani, Sebastián and Ernesto Schargrotsky, 2002, "Evaluating the Impact of School Decentralization on Educational Quality", *Economía*, 2 (2), pp. 275-302.
- Gorostiaga Derqui, Jorge M., 2001, "Educational Decentralization Policies in Argentina and Brazil: Exploring the New Trends", *Journal of Education Policy*, 16 (6), pp. 561-583.
- Hanushek, Eric, 1986, "The Economics of Schooling: Production and Efficiency in Public Schools", *Journal of Economic Literature*, 24, pp. 1141-77.
- Hanushek, Eric, 1997, "Assessing the Effects of School Resources on Student Performance: An update", *Educational Evaluation and Policy Analysis*, 19, pp. 141-64.
- Hanushek, Eric, 2002, Comments on Galiani and Schargrotsky, "Evaluating the Impact of School Decentralization on Educational Quality", *Economía*, 2 (2), pp. 303-305.

- Heckman, J. and V. Hotz, 1989, "Choosing among Alternative Non-experimental Methods for Estimating the Impact of Social Programs: The Case of Manpower Training", *Journal of the American Statistical Association* 84 (408), pp. 862-74.
- Jimenez, Emmanuel and Yasuyuki Sawada, 1999, "Do Community-Managed Schools Work? An Evaluation of El Salvador's EDUCO Program." *World Bank Economic Review* 13, pp. 415-41.
- Jones, Mark, Pablo Sanguinetti and Mariano Tommasi, 2000, "Politics, Institutions, and Fiscal Performance in a Federal System: an Analysis of the Argentine Provinces." *Journal of Development Economics* 61, pp. 305-333.
- King, Elizabeth M. and Berk Ozler, 2000, "What's Decentralization Got To Do With Learning? Endogenous School Quality and Student Performance in Nicaragua" Development Research Group, World Bank, Washington, D.C.
- Llach, Juan José, Silvia Montoya and Flavia Roldán, 1999, Educación para Todos, IERAL, Córdoba.
- Lockwood, Ben, 2002, "Distributive Politics and the Cost of Centralization", *Review of Economic Studies* 69, 313-337.
- Macri, Mariela, 2001, "Anomia y Burocracia: La Descentralización Educativa en la Ciudad de Buenos Aires", Documentos de Trabajo N° 22, Instituto de Investigaciones Gino Germani, Facultad de Ciencias Sociales, Universidad de Buenos Aires.
- Nicolini, Juan Pablo, Pablo Sanguinetti and Juan Sanguinetti, 2000, "Análisis de Alternativas de Financiamiento de la Educación Básica en Argentina en el Marco de las Instituciones Fiscales Federales," mimeo, Universidad Torcuato Di Tella.
- Oates, Wallace, 1972, Fiscal Federalism, New York: Harcourt Brace Javanovich.
- Paes de Barros, Ricardo and Rosane Mendonca, 1998, "The Impact of Three Institutional Innovations in Brazilian Education.", in Organization Matters: Agency Problems in Health and Education in Latin America, William Savedoff (ed.), Inter-American Development Bank, Washington, D.C.
- Rhoten, Diana R., 1999, "Global-Local Conditions of Possibility: The Case of Education Decentralization in Argentina", Ph. D. dissertation, Stanford University.
- Rhoten, Diana R., 2000, "Education Decentralization in Argentina: a "Global-Local Conditions of Possibility" Approach to State, Market, and Society Change", *Journal of Education Policy*, 15(6), pp. 593-619.
- Senén González, Silvia N. de, 1997, "Ajuste y Reforma Educativa: Dos Lógicas en Pugna", mimeo, III Congreso Latinoamericano de Administración de la Educación, San Pablo.
- Smith, B.C., 1985, "Decentralization: The Territorial Dimension of the State", George Allen & Unwin, London.
- Tedesco, Juan C., 1986, Educación y Sociedad en la Argentina (1880-1945), Buenos Aires: Editorial Solar.
- Tommasi, Mariano, Sebastian Saiegh, and Pablo Sanguinetti, 2001, "Fiscal Federalism in Argentina: Policies, Politics, and Institutional Reform", *Economía* 1, pp. 157-211.
- Tommasi, Mariano and Federico Weinschelbaum, 1999, "A Principal-Agent Building Block for the Study of Decentralization and Integration", mimeo, Universidad de San Andres.
- Wallis, J.J., and W.E. Oates, 1988, "Decentralization in the Public Sector: An Empirical Study of State and Local Government", in Fiscal Federalism: Quantitative Studies, Rosen, H.S. (ed.), University of Chicago Press, Chicago.
- Willis, Elisa, Christopher Garman, and Stephan Haggard, 1999, "The Politics of Decentralization in Latin America", *Latin America Research Review*, 34(1).
- World Bank, 1994, World Development Report 1994: Infrastructure for Development, Oxford University Press, New York.
- World Bank, 2004, World Development Report 2004: Making Services Work For Poor People, Oxford University Press.

Table 1: Transfer of Schools From the Central to Provincial Governments

Province	Transfer Date	Percentage of public secondary school students attending federal schools	Percentage of public secondary schools under federal administration
Buenos Aires Province	1994	55.7	36.0
Buenos Aires City ^a	1992	93.5	84.6
Catamarca	1993	51.4	28.4
Chaco	1993	31.2	13.0
Chubut	1993	42.1	20.4
Córdoba	1993	29.1	17.6
Corrientes	1993	54.8	32.7
Entre Ríos	1993	69.5	37.0
Formosa	1993	40.8	17.0
Jujuy	1993	58.2	42.1
La Pampa	1993	46.6	42.2
La Rioja	1992	78.9	49.1
Mendoza	1992	55.1	36.1
Misiones	1992	34.7	22.9
Neuquén	1992	27.8	15.5
Río Negro ^b	1992	5.5	7.0
Salta	1993	45.4	24.8
San Juan	1992	80.5	54.0
San Luis	1992	67.3	26.8
Santa Cruz	1993	18.4	15.2
Santa Fe	1993	50.9	26.5
Santiago del Estero	1993	46.9	21.1
Tierra del Fuego ^c	1993	96.6	58.3
Tucumán	1992	81.1	51.9
National	1992-94	55.1	32.2

Source: Ministerio de Educación. Notes: ^a The City of Buenos Aires is not a province but a federal district. Their federal secondary schools were transferred to the city government. ^b In Río Negro, most secondary schools had been transferred to the province in 1971 (Dussel, 1995). ^c Tierra del Fuego, the latest Argentine provincial addition, was originally a national territory and only became a province in September of 1992.

Table 2: School Administration Responsibilities Before and After Decentralization

Function	Before decentralization	After decentralization
Financing of Operating and Capital Costs	National Ministry financed expenditures for national schools, while Provinces financed expenditures for provincial schools	Province finance costs of both decentralized and always provincial schools. The National government finances some special grants and compensatory programs through provinces.
Curriculum Design and Content	National Ministry established curriculum contents for national schools, while Provinces established contents for provincial schools.	National Ministry establishes minimum curriculum contents. Provinces approve these minimum contents and develop supplemental provincial curriculum framework.
Teacher Training	National Ministry and Provinces administered teacher training institutions.	Teacher training provided by Provinces. The National Ministry provides technical assistance and supervises teacher training programs.
Teacher (and Staff) Management	National Ministry and Provinces hired, paid, assigned, sanctioned and fired teachers in national and provincial schools, respectively.	Provinces hire, pay, assign, sanction and fire teachers in both decentralized and always provincial schools.
Program Supervision	National Ministry and Provinces supervised pedagogical activities of national and provincial schools, respectively.	Provinces supervise pedagogical activities of both decentralized and always provincial schools. National Ministry implements special compensatory programs.
Planning and Budget	National Ministry and Provinces planned budget and expenditures for national and provincial schools, respectively.	Provinces plan budget and expenditures for both decentralized and always provincial schools.
Student Evaluation and Grade Promotion	Grade promotion decided by schools. No uniform evaluation system.	Grade promotion decided by schools. Implementation of standardized tests administered by the National Ministry.
Textbooks and Educational Materials, Course Contents, and Classroom Methods	No approval function by National Ministry or Provinces. Decided by schools.	No approval function by National Ministry or Provinces. Decided by schools.

Source: Based on Appendixes 3.5 and 3.6 of Rhoten (1999), Table 4.2 of Burki et al (1999), and Table 9 of Llach et al (1999).

Table 3: Measures of Provincial Government Administrative Ability

Province	Fiscally Responsible (No Large Chronic Deficits Prior to Decentralization)	Good Budgetary Institutions (Jones et al 2000 Index of Fiscal Institutionalization)
Buenos Aires Province	Yes	Yes
Buenos Aires City	Yes	Yes
Catamarca	No	No
Chaco	No	Yes
Chubut	Yes	No
Córdoba	Yes	Yes
Corrientes	Yes	Yes
Entre Ríos	Yes	Yes
Formosa	No	No
Jujuy	No	Yes
La Pampa	Yes	Yes
La Rioja	No	No
Mendoza	Yes	Yes
Misiones	Yes	No
Neuquen	No	Yes
Río Negro	No	No
Salta	No	No
San Juan	No	No
San Luis	Yes	Yes
Santa Cruz	No	No
Santa Fe	Yes	Yes
Santiago del Estero	No	Yes
Tierra del Fuego	Yes	Yes
Tucumán	No	No

Table 4: Means and Standard Deviations of Test Scores and Class Size

Variable	All Schools	Strong Administrative Province		Weak Administrative Province	
		Non Poor Municipality	Poor Municipality	Non Poor Municipality	Poor Municipality
Math Test Scores	54.671 (14.411)	59.381 (12.980)	47.204 (12.800)	48.499 (12.892)	42.108 (11.821)
Spanish Test Scores	57.330 (11.920)	60.708 (10.954)	53.111 (10.886)	53.130 (11.059)	47.642 (10.420)
Class Size	51.866 (49.828)	54.768 (51.112)	28.098 (21.669)	55.307 (52.070)	34.267 (36.154)
Number of Schools					
Observations	12314	7942	444	2387	1541

Table 5: The Impact of School Decentralization on Test Scores

Independent Variables	Schools in all Municipalities							
	Math Test Scores (1)	Spanish Test Scores (2)	Math Test Scores (3)	Spanish Test Scores (4)	Math Test Scores (5)	Spanish Test Scores (6)	Math Test Scores (7)	Spanish Test Scores (8)
Year of Decentralization	1.665 (2.209)	1.428 (2.168)	-0.823 (2.268)	-1.538 (2.119)				
1 year after decentralization	3.683 (2.174)	4.163* (2.075)	1.784 (2.036)	1.609 (1.635)				
2 years after decentralization	4.085** (1.905)	4.719** (1.913)	2.924* (1.467)	3.027* (1.529)				
3 years after decentralization	3.028* (1.593)	4.025** (1.515)	2.017 (1.235)	2.648** (1.104)				
4 years after decentralization	3.843*** (1.306)	4.629*** (1.450)	3.096*** (1.076)	3.594*** (1.160)				
5 years or + after decentralization	3.649** (1.310)	5.095*** (1.481)	2.575** (1.162)	3.671*** (1.139)				
Years since decentralization					0.350** (0.140)	0.565*** (0.121)	0.472*** (0.092)	0.624*** (0.087)
Fiscal Deficit Share			0.355* (0.187)	0.339 (0.216)	0.336 (0.198)	0.326 (0.216)		
GDP per capita			0.0002 (0.0001)	0.0003** (0.0001)	0.0002 (0.0001)	0.0003** (0.0001)		
Unemployment			-0.103 (0.255)	-0.073 (0.232)	-0.084 (0.252)	-0.057 (0.230)		
School Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	No	No
Province-Year Fixed Effects	No	No	No	No	No	No	Yes	Yes
Number of schools	3350	3350	3273	3273	3273	3273	3350	3350
Number of observations	12314	12314	11987	11987	11987	11987	12314	12314

Note: The provincial unemployment rate is the May and October average for the cities surveyed by INDEC's Permanent Household Survey (EPH) located in each province (the population weighted average if data are available for more than one city in a province). None of Río Negro cities are surveyed by the EPH. The GDP per capita is the ratio of real province gross domestic product to the population (sources: Consejo Federal de Inversiones and INDEC). The province fiscal result is the fiscal deficit or surplus as a percentage of province GDP (source: DataFiel). Standard errors are clustered at the province level. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance. * Statistically different from zero at the 0.1 level of significance.

Table 6: Robustness of the Estimated Impacts to Location and Class Size

Independent Variables	Only Schools in Municipalities with Treatment and Control Observations		Only Schools in Zip Codes with Treatment and Control Observations		Only Schools in Municipalities with Treatment and Control Observations and on the Common Support on Class Size		Only Schools in Municipalities with Treatment and Control Observations and on a restricted Common Support on Class Size	
	Math Test Scores (1)	Spanish Test Scores (2)	Math Test Scores (3)	Spanish Test Scores (4)	Math Test Scores (5)	Spanish Test Scores (6)	Math Test Scores (7)	Spanish Test Scores (8)
Years since decentralization	0.329** (0.133)	0.525*** (0.105)	0.315** (0.127)	0.522*** (0.102)	0.367** (0.158)	0.482*** (0.125)	0.279 (0.241)	0.493** (0.204)
Control Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of schools	2920	2920	1952	1952	2587	2587	1316	1316
Number of observations	10688	10688	7341	7341	9606	9606	4930	4930

Note: Standard errors are clustered at the province level. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance.

Table 7: The Impact of School Decentralization on the Share of Students in Always Provincial Schools

Controls	Treatment Variables			
	2 years or + after decentralization	3 years or + after decentralization	4 years or + after decentralization	5 years or + after decentralization
	-0.001 (0.012)	0.006 (0.011)	0.009 (0.006)	0.000 (0.006)
Provincial controls	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	1235	1235	1235	1235

Note: The dependent variable is the share of fifth-year students attending always-provincial schools relative to total public school students by municipality. Standard errors are clustered at the municipality level. The enrollment data for the province of Corrientes is not available.

Table 8: The Impact of School Decentralization By Provincial Administrative Ability and Municipal Poverty Status

Independent Variables	Fiscal Discipline Measure of Provincial Admin Ability		Jones et al Measure of Provincial Admin Ability	
	Math Test Scores (1)	Spanish Test Scores (2)	Math Test Scores (3)	Spanish Test Scores (4)
Years Since Decentralization Interacted with				
Strong Administrative Province, Non-Poor Municipality	0.769*** (0.198)	0.887*** (0.189)	0.670*** (0.164)	0.783*** (0.145)
Strong Administrative Province, Poor Municipality	0.220 (0.452)	0.330 (0.390)	-0.329 (0.321)	-0.413 (0.365)
Weak Administrative Province, Non-Poor Municipality	-0.480 (0.347)	-0.118 (0.357)	-0.489 (0.400)	-0.029 (0.402)
Weak Administrative Province, Poor Municipality	-1.002** (0.437)	-0.761** (0.326)	-1.448*** (0.269)	-0.773** (0.287)
Control Variables	Yes	Yes	Yes	Yes
School Fixed Effects	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes
Number of schools	2920	2920	2920	2920
Number of observations	10688	10688	10688	10688

Note: All regressions are for municipalities where there are at least one treatment school and one control school. Standard errors are clustered at the province level. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance.

Table 9: Estimated Change in Test Scores After Five Years of Decentralization

	Non-Poor Municipality		Poor Municipality	
	Math Test Scores	Spanish Test Scores	Math Test Scores	Spanish Test Scores
Strong Administrative Province (Fiscal Deficit)	4.614*** (1.188) 7.7%	5.322*** (1.134) 8.7%	1.320 (2.712) 2.7%	1.980 (2.340) 3.7%
Weak Administrative Province (Fiscal Deficit)	-2.880 (2.082) -5.9%	-0.708 (2.142) -1.3%	-6.012** (2.622) -14.2%	-4.566** (1.956) -9.5%
Strong Administrative Province (Jones et al Index)	4.020*** (0.984) 6.7%	4.698*** (0.870) 7.7%	-1.974 (1.926) -4.1%	-2.478 (2.190) -4.6%
Weak Administrative Province (Jones et al Index)	-2.934 (2.400) -6.0%	-0.174 (2.412) -0.3%	-8.688*** (1.614) -20.6%	-4.638** (1.722) -9.7%

Note: Calculated from coefficients estimated in Table 7. Standard errors are clustered at the province level. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance.