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

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Abstract

The decentralization of public services is a major feature of institutional innovation. The main argument in support of decentralization is that it brings decisions closer to the people, thereby alleviating information asymmetries and improving accountability. However, decentralization can also degrade service provision in poor communities that lack the ability to voice and defend their preferences. In this paper, we analyze the average and distributional effects of school decentralization on educational quality in Argentina. We find that decentralization had an overall positive impact on student test scores. The decentralization gains, however, did not reach the poor. Thus, although “bringing decisions closer to the people” may help the good get better, the already disadvantaged may not receive these benefits.

JEL: H40, H52, H70, I20

Keywords: Decentralization, education, and inequality.

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1. INTRODUCTION

The decentralization of public services has become a major feature of institutional innovation throughout the world (World Bank 2004). The main rationale is that decentralization brings decision-making closer to the people so that their preferences can be better reflected in policy (Oates 1972). Specifically, decentralization can improve service provision by mitigating information asymmetries over heterogeneous preferences, by encouraging local participation, and by making service providers more accountable to their clients.¹ Decentralization, however, may not improve and even possibly degrade the provision of public services when local communities lack the ability to raise their voice, when local elites can capture public resources through the allocation of public resources to their preferred uses (Bardhan and Mookherjee 2005), or when local governments are less technically able than the central government to administer public services (Smith 1985).

The theoretical ambiguity on the advantages of decentralization for the provision of public services extends to its distributional effects. Since there is typically variation in the characteristics of local governments and populations, one would expect a heterogeneous response to decentralization. One conjecture is that decentralization improves service provision in wealthier areas where citizens have enough stature to voice and defend their preferences, but that the benefits of decentralization may not reach the poor. Alternatively, decentralization can make public provision more responsive to local needs, and this might be more crucial for the group who has fewer resources to buffer the

¹The recent literature on the effect of decentralization on service provision efficiency covers collective decision making (Lockwood 2002, Besley and Coate 2003), corruption (Bardhan and Mookherjee 2005, 2006a, and 2006b), accountability (Besley and Ghatak 2003, Reinikka and Svensson 2004), and competition (Urquiola 2005).

inadequacies of public provision. In this paper we analyze the average and distributional effects of decentralization on educational quality.

We perform this analysis in Argentina, where 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 for over a century. Between 1992 and 1994, the central government transferred all its secondary schools to provincial control. We use the exogenous variation in the jurisdiction of administration of secondary schools generated by this policy intervention to identify the causal effect of school decentralization on educational outcomes. Specifically, we identify the model by comparing changes in student outcomes at different lengths of exposure to decentralization to changes in outcomes of students in schools that were always under provincial control.

We find that decentralization had an overall positive effect on student test scores. Specifically, math test scores increased 3.5 percent and Spanish tests rose 5.4 percent on average after five years of decentralized administration. However, when we disaggregate by socio-economic status, we find that the gains from decentralization were exclusively in schools located in non-poor municipalities. In fact, decentralization did not improve at all test scores in schools located in poor municipalities. These results imply that decentralization increased inequality in education outcomes, which likely translates into increased inequality in the earnings of these cohorts.

There has been little rigorous evaluation of decentralization efforts on educational outcomes (Hanushek 2002). A small empirical literature does suggest that there are advantages of having “policy closer to the people.” Faguet (2004) shows that local governments had better knowledge of idiosyncratic educational preferences in Bolivia.

Behrman and King (2001) show complementarities between household decisions and decentralization policies. Using cross-sectional data, Eskeland and Filmer (2002) find a positive correlation between school autonomy and primary school performance in Argentina. Paes de Barros and Mendonca (1998) show no relationship between school financial autonomy and local school boards with primary school performance in Brazil. However, they do find positive effects of local director appointment power on primary school performance. Jimenez and Sawada (1999) observe that decentralization increased the participation of parents in school decision-making in El Salvador, while Gertler, Patrinos and Rubio (2006) provide evidence that strengthening parent-teacher associations improved school performance in Mexico. Finally, using data aggregated to the province level, Galiani and Schargrodsky (2002) find an improvement in overall school performance in Argentina associated with decentralization.

The organization of the paper is as follows. Section 2 presents a simple model to discuss the theoretical predictions on the average and distributional effects of decentralization. Section 3 explains the process of decentralization of secondary schools in Argentina. Sections 4 and 5 describe our data and empirical methods, respectively. Section 6 presents the average impact results. Inequality effects are analyzed in section 7. Finally, the implications of our findings are discussed in section 8.

2. CONCEPTUAL TRADE-OFFS IN SCHOOL DECENTRALIZATION

There is a significant theoretical literature that formally models the mechanisms and conditions under which the decentralization of the provision of public service would affect service delivery. This literature makes no firm predictions as to whether

decentralization will necessarily improve the overall provision of public goods. However, it does suggest that the effect of decentralization will be heterogeneous. There are some circumstances under which poorer communities would benefit more than non-poor communities and others under which they would benefit less.

The main argument in favor of decentralization is that it brings decisions closer to the people. Oates (1972) presents a model in which central governments produce a common level of public goods for all localities, while local governments can tailor public goods output to local tastes. Local provision overcomes the problem of information asymmetries over heterogeneous preferences. Oates finds that local provision is preferable when the gain from a better match between local government outputs and local preferences outweighs the economies of scale in central government provision.

Lockwood (2002) and Besley and Coate (2003) show that decentralization may also sidestep inefficiencies due to cost-sharing, strategic precommitment and lack of responsiveness to regional benefits in the choice of projects resulting from a centralized legislative process. Bardhan and Mookherjee (2005) argue that centralized delivery systems are prone to bureaucratic corruption due to problems in monitoring performance, whereas local decision-makers who are closer to the people may be more easily monitored.

However, the theoretical literature also puts forward a number of reasons why decentralization could degrade the provision of public services. Oates (1972) explains that decentralization forfeits economies of scale in central provision. Smith (1985) argues that decentralization may worsen outcomes when local governments are less technically able than the central government to administer the delivery of public services. Further,

Bardhan and Mookherjee (2005) examine the possibility of capture of public resources by local elites under decentralization through the allocation of public resources to their preferred uses. They argue that capture by locally strong interest groups is easier under decentralization. In this case, the non-elite have little voice in local decisions and their preferences and needs go unfulfilled. For example, if local elites do not use the local public schools, they would likely prefer that public resources were allocated elsewhere.

A simple model can illustrate the different effects discussed in the theoretical literature. Assume there are $i = 1, 2, \dots, M$ provinces, and within each one of them there are communities differentiated by their economic condition: poor and non-poor. We index them using subscript $j = \{p, n\}$. Each community ij has a representative school.

In order to produce education e_{ij} , the government makes a managerial effort b_{ij} in each community, incurring in a cost of b_{ij}^2 dollars. Each community also invests its own managerial effort a_{ij} in the production of education, for example, through participation in parent associations, teacher monitoring, and voicing of local preferences and demands. The social preferences of community ij are represented by a utility function $u(e_{ij}, a_{ij}) = e_{ij} - a_{ij}$. The production technology for education is:

$$e_{ij} = \left((\kappa_{ij} a_{ij})^\alpha + (\gamma_i b_{ij})^\alpha \right)^{\frac{1}{\alpha}}, \quad (1)$$

where $\kappa_{ij} a_{ij}$ denotes the effective managerial effort of community ij , and $\gamma_i b_{ij}$ is the effective managerial effort of the government. The parameter $0 < \alpha < 1$ captures the degree of complementarity between both efforts (decreasing in α). The parameter

$0 \leq \kappa_{ij} < 1$ represents the efficiency of community ij in delivering effort, and the parameter $\gamma_i > 0$ represents the efficiency of the government managerial effort.

For the sake of simplicity we will assume that if the system is centralized then $\gamma_i = 1 \forall i$ and $\kappa_{ij} = 0 \forall i \forall j$. Thus, $\gamma_i < 1$ would represent a central government more efficient than the local government as a result, for example, of the presence of economies of scale (Oates, 1972) or better management (Smith, 1985), whereas $\gamma_i > 1$ would represent a more efficient local government. Likewise, $\kappa_{ij} > 0$ symbolizes the efficiency of community participation under decentralization.²

The benevolent government maximizes the utility of each community, but using weights θ_{ij} that represent its preferences for education in each community. Under centralization, we assume $\theta_{ij} = 1 \forall i, j$. However, in the decentralized case, local governments may be under the influence of local elites who might bias the provision of public services against the poor (Bardhan and Mookherjee, 2005), leading to $\theta_{ip} < 1$ and $\theta_{in} > 1$.³ Alternatively, $\theta_{ip} < 1$ might represent a higher opportunity cost of education provision to the poor, who may have a preference for other public goods but could not transmit such a demand to the central government.

The timing of the model is as follows. The government first decides its managerial effort b_{ij} in each community. Communities then observe the government

² Of course, we could have $\kappa_{ij} > 0$ under centralization without affecting the conclusions of the model. We just expect κ_{ij} to be higher under decentralization.

³ The model also allows for local governments with pro-poor preferences: $\theta_{ip} > \theta_{in}$, and for central government biases.

contribution, and also choose their own managerial effort a_{ij} . We solve this two-stage model backwards, for the centralized and decentralized cases.

Under centralization, as $\kappa_{ij} = 0 \forall i \forall j$, every community will always choose $a_{ij}^c = 0$. Then, the government problem is simply:

$$\text{Max}_{\{b_{ij}\}} b_{ij} - b_{ij}^2,$$

which gives $b_{ij}^c = e_{ij}^c = 1/2 \forall i \forall j$.

In the decentralized case, given the government education effort b_{ij} , the problem for community ij is:

$$\text{Max}_{\{a_{ij}\}} \left((\kappa_{ij} a_{ij})^\alpha + (\gamma_i b_{ij})^\alpha \right)^{\frac{1}{\alpha}} - a_{ij},$$

and from the first order condition of this problem we obtain:

$$a_{ij}^d(b_{ij}) = b_{ij} \frac{\gamma_i}{\kappa_{ij}} \left(\kappa_{ij}^{\frac{\alpha}{\alpha-1}} - 1 \right)^{\frac{1}{\alpha}}.$$

The government problem in the first stage is:

$$\text{Max}_{\{b_{ij}\}} \theta_{ij} \left[\left((\kappa_{ij} a_{ij}^d(b_{ij}))^\alpha + (\gamma_i b_{ij})^\alpha \right)^{\frac{1}{\alpha}} - a_{ij}^d(b_{ij}) \right] - b_{ij}^2$$

which, after substituting for a_{ij}^d , can be written as:

$$\text{Max}_{\{b_{ij}\}} \theta_{ij} b_{ij} \gamma_i \left(1 - \kappa_{ij}^{\frac{\alpha}{1-\alpha}} \right)^{\frac{\alpha-1}{\alpha}} - b_{ij}^2.$$

From the first order condition of this problem we then obtain:

$$b_{ij}^d = \frac{\theta_{ij} \gamma_i}{2} \left(1 - \kappa_{ij}^{\frac{\alpha}{1-\alpha}} \right)^{\frac{\alpha-1}{\alpha}}.$$

Finally, evaluating $a_{ij}^d(b_{ij}^d)$ at b_{ij}^d :

$$a_{ij}^d = \frac{\theta_{ij}\gamma_i^2}{2} \left(1 - \kappa_{ij}^{\frac{\alpha}{1-\alpha}}\right)^{\frac{\alpha-2}{\alpha}} \kappa_{ij}^{\frac{\alpha}{1-\alpha}},$$

and evaluating $e_{ij}(a_{ij}, b_{ij})$ at b_{ij}^d and $a_{ij}^d(b_{ij}^d)$, gives:⁴

$$e_{ij}^d = \frac{\theta_{ij}\gamma_i^2}{2} \left(1 - \kappa_{ij}^{\frac{\alpha}{1-\alpha}}\right)^{\frac{\alpha-2}{\alpha}} = \frac{\theta_{ij}\gamma_i^2}{2} \lambda(\kappa_{ij}, \alpha) \quad (2)$$

We focus on equation (2) in order to analyze the effects of decentralization on educational outcomes e_{ij} .⁵ Relative to the centralized solution, the decentralized outcomes depend on four very intuitive factors. First, decentralization outcomes are higher (lower) when the efficiency of the local government γ_i is high (low) relative to that of the central government. Second, the education results are better in the areas where education is preferred by local governments (high θ_{ij}). Third, the decentralized outcomes depend positively on the efficiency of community participation κ_{ij} , as it can be shown that $\partial \lambda(\kappa_{ij}, \alpha) / \partial \kappa_{ij} > 0$. Finally, under decentralization the education results enjoy the augmenting channel given by the complementarity between government and community efforts ($\partial \lambda(\kappa_{ij}, \alpha) / \partial \alpha < 0$).

⁴ For $0 \leq \kappa_{ij} < 1$ and $0 < \alpha < 1$, it is immediate to see that $b_{ij}^d > 0$, $a_{ij}^d \geq 0$, and $e_{ij}^d > 0$. Moreover, all the second order conditions are satisfied under our assumptions.

⁵ Note that, as the expressions for e_{ij}^d , b_{ij}^d and a_{ij}^d are very similar, the same analysis could be focus on the other two variables.

The model allows us to compare the absolute outcome levels of the centralized and decentralized solutions. As $\lambda(\kappa_{ij}, \alpha) \geq 1$ for $\kappa_{ij} \geq 0$,⁶ from the comparison of $e_{ij}^c = 1/2$ and $e_{ij}^d = \lambda(\kappa_{ij}, \alpha) \gamma_i^2 \theta_{ij} / 2$, it is immediate that $\gamma_i^2 \theta_{ij} > 1$ is a sufficient condition for the superiority of decentralization. It is intuitive that a sufficient condition depends on just these two parameters, as the community effort (and the associated complementarity) can only improve the decentralized outcome. There are, of course, sets of parameter values for which the centralized solution is superior. Thus, the solution of the model is ambiguous regarding the overall superiority of one institutional arrangement over the other.

The model is also ambiguous with regards to the distributional outcomes. Each community invests in its own managerial effort for the production of education. As the efficiency κ_{ij} of this local effort is likely to vary across communities, and this heterogeneity might be augmented by the complementary government investment, the effects of decentralization will differ across communities. Moreover, local governments may have biases θ_{ij} affecting the provision of public services across communities, which might represent potential capture by local elites or, genuinely, different preferences by different groups. Communities with higher θ_{ij} and higher κ_{ij} will show better education

⁶ Note that $\lim_{\kappa_{ij} \rightarrow 0^+} \left(1 - \kappa_{ij}^{\frac{\alpha}{1-\alpha}}\right)^{\frac{\alpha-2}{\alpha}} = 1$ and $\partial \lambda(\kappa_{ij}, \alpha) / \partial \kappa_{ij} > 0$.

outcomes. Moreover, provincial governments with higher efficiency γ_i will show better results.⁷

Thus, the model predicts that the effects of decentralization will be heterogeneous across communities both between and within provinces. Specifically, in those areas that are well administered with populations that have enough stature to voice and defend their preferences, decentralization should improve the provision of public services.

Conversely, decentralization might not help and could actually harm public services in those areas that are poorly administered with populations that lack the ability to voice their preferences and to monitor service provision performance, and where local elites can capture the provision of public goods. Nevertheless, the gains from decentralized service provision responding to the locally but not centrally-observed heterogeneous conditions might be more important for the poor who have less home resources than the non-poor to counter any inadequacies in the school system. Hence, the theory of decentralization is also ambiguous about distributional effects. In the end, the average and distributional effects of decentralization must be settled empirically.

3. SCHOOL DECENTRALIZATION IN ARGENTINA

Prior to the unification of the independent provinces into the federal country of Argentina in 1853, provincial governments had operated all public schools. After unification, the national government created an additional separate system of federal schools in order to foster national integration. For more than a century provincial

⁷ Although we modeled the efficiency of local governments, γ_i , as a provincial characteristic, the efficiency of public officers can obviously also differ across communities in the same province for example, if poor communities are unable to attract the best teachers and directors.

and central schools operated side by side in communities throughout the country. In 1978, federal primary schools and pre-schools were transferred to provincial control. The process of decentralization was completed in December of 1991, when the Argentine Congress ordered the transfer of all federal secondary schools to the provincial governments.⁸

The decentralization of secondary schools was part of an extensive program of structural reforms undertaken 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

⁸ All the cohorts of students that were in primary school in 1978 had already finished secondary school by the time of the decentralization of secondary schools.

share of federal schools and federal students in the public school system prior to decentralization.⁹ Federal schools used to be larger than always-provincial schools.

The decentralization law did not change the distribution of resources among provinces. It also guaranteed that the Provinces 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),¹⁰ 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 to each province and the increase in the province school expenditures 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 strong economic growth at that time.

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, important educational decisions¹¹ were devolved from the federal 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 is only in charge of

⁹ For a historical description of the Argentine educational system and the transformation of federal territories into provinces that led to the variation in the proportion of federal schools across provinces see Tedesco (1986), Dussel (1995) and Llach et al (1999).

¹⁰ For a description of Argentine fiscal structure see Jones et al (2000).

¹¹ Hanushek (1986, 1997) provides careful surveys of the educational production literature.

establishing minimum curriculum contents, providing technical assistance and supervision of teacher training programs, and administering standardized tests. This process of decentralization from national to provincial control, however, did not directly imply a transfer of decisions to the school level. Both before and after decentralization, schools are in charge of the choice of textbooks, teaching methods, evaluation methods, and course content.

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. We now have frequent contact with the schools.” (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). The Secretary of Education at that time recognized that “There were [national] schools that for ten years had not had any supervision. They were managed by phone [from Buenos Aires] or by mail. The link was formal, epistolary, but not efficient” (quoted in Falletti 2005, p. 342).

In many places, decentralization increased community participation as presented in our model. Indeed, Filmus (1997) reports that the Provinces of Córdoba, Río Negro, Santa Fe, and Buenos Aires and the City of Buenos Aires actively encouraged local participation in school decisions. 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. 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), while the province of San Luis launched an innovative program of charter schools and instituted a selection process of school principals based on merit and open competition (Gorostiaga 2001, Corrales 2003).

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 relative to the federal government, decentralization is described as “political abandonment” by the national authorities. Attempts to establish school councils and implement local decision-making failed because the provincial government actively discouraged them, while local politicians biased the use of 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.” Several provincial governments have been blamed of clientelistic use of education resources (La Nación, January 30, 2004).

The availability of funds for the *cooperadoras* (school associations co-financed and managed by parents) illustrates the trade-offs of decentralization, and also provides a

good example of the complementarities between government and community efforts incorporated in our model. Under national administration, *cooperadoras* did not receive funds from the federal government, which decided expenditure priorities. Instead, decentralization has allowed for some budgetary autonomy at the school level. The Province of Buenos Aires, the City of Buenos Aires and Mendoza decentralized expenditures for maintenance repairs, classroom materials, and dining room operation by transferring provincial funds to the *cooperadoras*, thus providing flexibility to address local needs (Dussel and Thisted 1995, Macri 2001, and Rhoten 1999). The allocation of funds to the *cooperadoras* depended, however, on community participation. A school official in the Province of Buenos Aires remarked, “The 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, when parents lack the time, the aptitude or the interest to participate in the *cooperadora*, schools received fewer funds. In agreement with this case study evidence, Llach and Schumacher (2004) show that Argentine primary public schools located in poor areas receive less physical and human resources than those located in non-poor areas.

4. DATA

Our dataset contains information on 3,456 public schools, accounting for 99 percent of all public secondary schools, for 1994 through 1999.¹² Of these, 2,360 were always provincial and 1,096 were transferred from the national government to the

¹² We dropped 41 schools that belong to national universities, the military and the police.

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 (last) year secondary students. Expenditure data are not available at the secondary school level. 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 enrollment data cover the same period, except for 1995 when the Ministry did not collect them.

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

In addition to analyzing the average effect of decentralization, we study the distributional effects by poverty levels. 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). Our dummy variable defines a municipality as poor if the 30% or more of the households suffer from UBN. Based on this definition, 15% of secondary schools are in poor communities.¹³

Finally, we summarize the mean test scores and enrollment by municipal poverty status in Table 3. Student performance is worse in the schools located in poor municipalities. Schools are larger in non-poor areas.

5. 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.

¹³ Our results are robust to changes in the poverty cutoff. For example, they show no change if we move the cutoff down to 25 percent or increase it to 35 percent.

We propose to use the always-provincial schools 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 group controls for fixed characteristics and the change in outcomes in the control group controls for time-varying factors that are common to both control and treatment schools.

The standard difference in differences model imposes the assumption that decentralization affects test scores immediately and that the effect is constant over time.

However, policy changes take time to be implemented and the impact of educational policies is likely to be cumulative. Therefore, we expect the effect of decentralization to depend on the number of years that students attend schools under decentralized administration.

Since the exam is taken in the last (fifth) year of secondary school, students could be exposed from one to five years of studies in decentralized schools. We exploit this variation in the number of years students were exposed to decentralization to identify the model. There are two sources of variation in the years of exposure: cohorts within school over time and across schools as the schools were transferred over a two-year period. Since the first year of the test score data coincides with the last year of school transfer, we adopt the year the schools was transferred as the baseline for the analysis and investigate the effect of up to five years of exposure to decentralization.

Formally, we estimate the following model:

$$y_{ijt} = \delta + \sum_{s=1}^5 \beta_s dI_{its} + \phi x_{jt} + \nu_t + \mu_i + \varepsilon_{ijt}, \quad (3)$$

where:

- y_{ijt} is the test score in school i in province j and year t ,
- dI_{its} is an indicator variable that takes on the value one if school i in year t has been transferred to local administration s years since the year of transfer and 0 otherwise. The index s equals 0 for the year the school was transferred, and we set s equal to 5 for all lengths of exposure greater than or equal to 5.

- x_{jt} is a vector of control variables that vary both across provinces and time such as income per capita, unemployment, and fiscal result.¹⁴
- v_t is a year fixed effect common to all schools in period t –alternatively, it can be replaced by v_{jt} , a province-year fixed-effect common to all schools in province j and period t . These year dummies capture all time-varying factors that are common to controls and treatments.
- μ_i is a school fixed-effect that captures all school and community level factors that vary across schools but are fixed over time.
- ε_{ijt} is a zero mean variable assumed to be independent of the observed right side variables and the fixed effects.

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 the method of Generalized Least Squares which requires that each observation in equation (3) is divided by the corresponding standard error of 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 error terms might be correlated across time and space. We allow for such correlation by computing our standard errors clustered first at the province level, then at province-year level and then again at the municipality level. In the tables, we report standard errors clustered at the province level. This level typically yields

¹⁴ Provincial fiscal discipline can have a direct impact on the education sector. On several occasions, provincial fiscal deficits generated reductions and delays in teachers' wage payments that prompted long strikes.

the highest standard errors. More importantly, the statistical significance of our estimates does not change when assessed using the other two ways of clustering the standard errors.

6. OVERALL RESULTS

We present the results of our estimates of equation (3) in Table 4. Model (1) reports the results for Math and Spanish test scores of a fully-flexible model with school and common year fixed-effects, and three provincial time-varying controls: the ratio of fiscal deficit or surplus to the gross domestic output (Fiscal Result), gross domestic product per capita (GDP per capita), and the unemployment rate (Unemployment). We find that both Math and Spanish test scores in schools that were transferred increased significantly over time since decentralization relative to test scores in the always provincial schools. The results indicate that, after 5 years of decentralization, decentralized schools improved relative to the always-provincial schools by 2.68 points (4.9 percent relative to the mean test score reported in Table 3) in Math tests and 3.89 points (6.8 percent relative to the mean test score) in Spanish tests.

In model (2) we restrict the model specification by imposing the effect of decentralization on test scores to increase linearly on years since decentralization.¹⁵ The data support this parsimonious model. 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 gains in test scores as a proportion of the baseline levels. Multiplying the point estimates reported in Columns (3) and (4) by 5 and then dividing these figures by the respective average mean test scores in Table 3, we find an

¹⁵ In order to impose this restriction, years since decentralization are coded as being equal to 0 for the year of decentralization, equal to 1 for the year after decentralization, and similarly up to equal to 5 for the fifth year or more after decentralization. Always-Provincial schools are trivially given a value of 0.

improvement of 3.5 percent for Math and 5.4 percent for Spanish after five years under decentralized administration.¹⁶

6.1. 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 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 two-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.

¹⁶ The magnitude of these results can be compared to the effect of other interventions estimated in the education literature. For example, in the literature of class size, the size effect –i.e. the test score that would result from a given change in class size divided by the standard deviation of class mean scores– are about 0.32σ to 0.66σ in the case of the Tennessee STAR experiment (Finn and Achilles 1990), while our estimates imply an improvement from decentralization of 0.18σ to 0.32σ . As another example, Lavy (2002) evaluates a teacher incentive program in Israel and finds an increase in test scores of 2.4 percent to 4.1 percent of sample means after two years of implementation.

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 model (3) of Table 4, increase slightly, but they are not significantly different from the baseline estimates reported in model (2).

6.2. Differential Secular Trends

A second concern is that the secular time trend in the treatment schools could be 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, Ichimura and Todd, 1997).

We “match” the control and treatment samples along two dimensions: location and size. We report the results of these analyses in Table 5 using the linear specification in model (2) of Table 4, which we reproduce in the first row for ease of comparison. In the second row of Table 5 we restrict the sample only to schools located in municipalities where there are at least one treated and one control school. The point estimates are not altered by this restriction relative to those in the first row that uses the full sample. In the third row we further restrict the sample to schools located in zip code areas where there are at least one treated and one control school. Again, estimates remain unaltered.

Our models already controlled for size differences between decentralized and always-provincial schools (see Table 1) by conditioning on school fixed-effects. However, larger schools may depart from smaller schools in performance over time, hereby confounding the estimated treatment effect with unobserved heterogeneous time trends. In order to control for this potential nuisance, we match schools by their fifth-year enrollment in 1999, the last year in our sample. First, we restrict our sample to schools

whose size is on the common support of the size distribution for treated and control schools. To implement this, we drop schools with a fifth-year enrollment less than the first percentile of the size distribution of treated schools and greater than the 99th percentile of the size distribution of control schools. Once again, the estimates, reported in the fourth row of Table 5, 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 the last row of Table 5 we report the estimates obtained by trimming the samples at the upper 85th and bottom 15th percentiles of the control and treatment distribution of fifth-year enrollment, 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 are similar to those in the baseline specification, but no longer significant for Math.

Finally, all the estimates presented in Table 5 are robust to the inclusion of province-year fixed effects. Although in all cases the estimated coefficients are larger than the ones we report, and always statistically significant, they do not statistically differ from the ones actually reported.

6.3. Selective Migration

Another important threat to the validity of our estimates is that decentralization may have caused students to migrate from the decentralized to the centralized schools or vice versa. In this case, our finding that test scores increase in decentralized schools relative to the always provincial schools could be caused by weak students switching

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 test score 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. 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 no 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 that 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:

$$ShareAP_{gjt} = \delta + \beta dIk_{jt} + \phi x_{jt} + v_t + \mu_g + \varepsilon_{gjt} \quad (4)$$

where $ShareAP_{gjt}$ is the share of public school fifth year students in Always-Provincial schools in municipality g of province j in year t , and dIk_{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, $dI2_{jt}$ equals 1 for years 1996, 1997, 1998 and 1999, and 0 otherwise. We estimate a different regression for each value of k . As before, x_{jt} is a vector of control variables that vary both across provinces and time (GDP per capita, fiscal result, and unemployment), v_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_{git} 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 and therefore we compute our standard errors clustered at the municipality level.

We report the estimates of the impact of decentralization on the distribution of public school students between treated and control schools in the same municipality in Table 6a. We do not find any relationship between the share of Always-Provincial students and any of the treatment dummies dIk for $k = 1, 2, 3, 4$ and 5 . Indeed, in all regressions the coefficient β is numerically equal to zero and statistically insignificant.¹⁷ 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.

A similar identification threat is that decentralization could have caused students to migrate from the public school system to private schools or vice versa. Again, the change in test scores could be an artifact of the change in the relative composition of students as opposed to a true increase in quality. We use enrollment data to examine whether decentralization affects the distribution of students between public and private schools within a market—i.e. the municipality. In order to test this, we estimate regression models of the following form:

¹⁷ The same result is obtained if we interact dIk with the share of students in the Always-Provincial schools in 1994. For this exercise, we exclude the observations for 1994 since the variable of interest would be endogenous for that year.

$$SharePublic_{git} = \delta + \beta dIk_{jt} + \phi x_{jt} + \nu_t + \mu_g + \varepsilon_{git} \quad (5)$$

where $SharePublic_{git}$ is the share of all fifth year student in public schools in municipality g of province j in year t , and the rest of the variables are similar than before.

Table 6b shows that we do not find any relationship between the share of public school students in a municipality and any of the treatment dummies dIk for $k = 1, 2, 3, 4$ and 5. In all regressions the coefficient β is numerically equal to zero and statistically insignificant.¹⁸ Thus, there is no correlation between the proportion of students in fifth year in the public school system and the progress of decentralization during the period under study.

A related 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 came under exactly the same labor conditions. The only additionally relevant rationale for migration could be location, i.e. teachers that in the past could have been working further away from their preferred area in order to enjoy better labor conditions, might prefer to change schools after decentralization. The regressions that restrict to schools in the same municipalities and zip code areas also addressed this issue.

7. INEQUALITY EFFECTS

In this section we evaluate the distributional effects of school decentralization. In particular, we test the hypothesis that decentralization mostly benefited the already advantaged, but left the disadvantaged behind. We perform this analysis by examining

¹⁸ The same result is obtained if we interact dIk with the share of students in public schools in 1994. For this exercise, we exclude the observations for 1994 since the variable of interest would be endogenous for that year.

the impact of decentralization by the poverty status of the municipalities where the schools are located.

The results of this analysis are presented in Table 7. For comparison, the first two columns report the overall effects on Math and Spanish from row 2 of Table 5. The interaction of decentralization and poverty is presented in the second two columns of Table 7. We find that while test scores rose significantly in schools transferred in non-poor municipalities, they actually fell significantly in poor municipalities. This negative effect in poor municipalities, however, is not robust to the introduction of province-year fixed effects. When we control for province-year fixed effects, as reported in columns (5) and (6), we find that the effect of decentralization is large, positive and significant for non-poor municipalities, but insignificant in poor areas. Thus, the decentralization gains are exclusively concentrated in rich municipalities. These benefits disappear when schools are located in poor areas.

For these distributional results, we carry out the same robustness analyses performed for the overall effect. In Table 8, we match the control and treatment samples along location and size. For comparison, we first reproduce the results from the last two columns of Table 7. We then restrict the sample only to schools located in zip code areas where there are at least one treated and one control school, and the estimates remain unaltered. As larger schools could depart from smaller schools in performance over time, in the last rows of Table 8 we restrict the sample to schools whose size is on the common support of the size distribution of fifth-year enrollment for treated and control schools. As before, we first drop schools whose enrollment were smaller than the first percentile of the size distribution of treated schools and greater than the 99th percentile of the size

distribution of control schools, and we then trim the samples at the upper 85th percentile and bottom 15th percentile of the control and treatment distribution. In both cases, the estimates remain similar to those in the baseline specification.

Finally, Tables 9a and 9b follow equations (4) and (5) to show that the estimated distributional effects are not an artifact of changes in the school composition of students resulting from the presence of selective migration. We do not find changes in the share of Always-Provincial public school students in poor and non-poor municipalities as a result of decentralization. There is also no relationship between decentralization and the share of public school students in poor and non-poor areas.

8. DISCUSSION

The decentralization of public services and, in particular, of educational services has become a standard recommendation advocated by international organizations throughout the world (e.g. World Bank 2004) and has been implemented by many countries. Unfortunately, this enthusiasm has run ahead of theoretical ambiguity in the literature and of significant evidence on the success of these policies.

We study the average and distributional effects of decentralization on educational quality in Argentine secondary schools. Our results suggest that decentralization had a positive overall effect on students' performance. The benefits of "bringing decisions closer to the people", however, did not reach the poor. Our results are consistent with Bardhan and Mookherjee (2006c) who find that poorer communities benefited less from the decentralization of credit, agricultural, and employment programs in West Bengal.

While we do not have direct evidence as to why the benefits did not reach the poor, our model and the case studies highlight a number of possible pathways. First, while the allocation of funds from the central government to the provinces did not change under decentralization, the distribution across communities within provinces could have. In particular, in terms of the notation of our model, $\theta_{in} > \theta_{ip}$ could be an explanation for our empirical results. Non-poor communities that can exert more pressure to the provincial governments and have better representation in the local elites (or perhaps have a stronger preference for education provision relative to other public goods) could have captured more of the education resources.

Second, wealthier communities may have more stature to voice and defend their preferences, additional ability, time and resources to develop parent associations, and stronger authority and power for teacher monitoring. The higher efficiency of the community effort, $\kappa_{in} > \kappa_{ip}$ in terms of our model, described in some case-studies, could be an additional explanation for the regressive results.

Instead, differences in managerial bureaucratic ability at the province level (γ_i in our model) would not explain our empirical results, as the inequality effects survive to the introduction of province-year fixed effects. Still, the efficiency of public officers could also differ across communities within the same province, for example, if rich communities are able to attract more qualified school directors and teachers, and this more qualified school staff is better at using the greater decision-making authority allowed by decentralization.

Our results, however, should not prevent governments from considering decentralization as a valid policy to improve service delivery. Overall, we find that

service provision improved, although the non-poor were the only ones to benefit. Governments who want to extend the benefits of decentralization to poor communities will need to strengthen the ability of these communities to take advantage of decentralized authority. The specific policies depend on which of the factors discussed above prevented the poor communities from benefiting. More research into the pathways by which decentralization operates is critical to developing complementary policies that could extend the benefits of decentralization to the poor.

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

Province	Transfer Date	% of public secondary students attending federal schools	% 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	58.5	32.3
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
Total	1992-94	55.2	32.2

Source: Argentine National Education Ministry. 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 develop supplementary contents.
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: Means and Standard Deviations of Test Scores and School Size

Variable	All Schools	Schools in Non-Poor Municipalities	Schools in Poor Municipalities
Math Test Scores	54.67 (14.41)	56.86 (13.74)	43.24 (12.22)
Spanish Test Scores	57.33 (11.92)	58.95 (11.43)	48.86 (10.76)
Number of Observations	12314	10329	1985
Fifth-Year Enrollment	51.86 (49.82)	54.87 (51.28)	33.16 (34.07)
Number of Schools	3063	2639	424

Note: Standard deviations are in parentheses.

Table 4: The Impact of School Decentralization on Test Scores

Independent Variables	Model 1		Model 2		Model 3	
	Math (1)	Spanish (2)	Math (3)	Spanish (4)	Math (5)	Spanish (6)
1 year after decentralization	2.01 (1.67)	2.05 (1.24)				
2 years after decentralization	3.12** (1.32)	3.40** (1.22)				
3 years after decentralization	2.16* (1.17)	2.93*** (0.88)				
4 years after decentralization	3.22*** (0.96)	3.84*** (0.97)				
5 years or + after decentralization	2.68** (0.98)	3.89*** (0.93)				
Years since decentralization			0.38** (0.15)	0.62*** (0.13)	0.52*** (0.10)	0.69*** (0.09)
Fiscal Result	0.35* (0.18)	0.33 (0.21)	0.33 (0.19)	0.32 (0.21)		
GDP per capita	0.02 (0.01)	0.03** (0.01)	0.02 (0.01)	0.03** (0.01)		
Unemployment	-0.10 (0.25)	-0.06 (0.23)	-0.08 (0.25)	-0.05 (0.23)		
School Fixed Effect	Yes	Yes	Yes	Yes	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	No	No
Province-Year Fixed Effects	No	No	No	No	Yes	Yes
Number of schools	3273	3273	3273	3273	3350	3350
Number of observations	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 cities in the Province of Río Negro 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 clustered at the province level are in parentheses. *** 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 5: Robustness of the Estimated Impacts to Location and School Size

Sample	Coefficient on Years Since Decentralization		# of Schools
	Math	Spanish	
1. All Schools	0.38** (0.15)	0.62*** (0.13)	3273
2. Only Schools in Municipalities with both Treatment and Control Observations	0.36** (0.15)	0.58*** (0.11)	2920
3. Only Schools in Zip Codes with both Treatment and Control Observations	0.34** (0.14)	0.58*** (0.11)	1952
4. Only Schools in Municipalities with both Treatment and Control Observations and on the Common Support of 5 th Year Enrollment	0.40** (0.17)	0.53*** (0.13)	2587
5. Only Schools in Municipalities with both Treatment and Control Observations and on a restricted Common Support of 5 th Year Enrollment	0.30 (0.26)	0.54** (0.22)	1316

Note: Each cell reports the estimated coefficients and standard errors for the variable "Years Since Decentralization". All models include controls used in Table 4, school fixed effects, and year fixed effects. Standard errors clustered at the province level are in parentheses. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance

Table 6a: The Impact of School Decentralization on the Share of Public School Students in Always Provincial Schools

Controls	Treatment Variables				
	1 year or + after decentralization	2 years or + after decentralization	3 years or + after decentralization	4 years or + after decentralization	5 years or + after decentralization
Provincial controls	-0.0145 (0.0117)	-0.0007 (0.0120)	0.0066 (0.0111)	0.0097 (0.0064)	-0.0013 (0.0063)
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Number of observations	1256	1256	1256	1256	1256

Table 6b: The Impact of School Decentralization on the Share of All Students in Public Schools

Controls	Treatment Variables				
	1 year or + after decentralization	2 years or + after decentralization	3 years or + after decentralization	4 years or + after decentralization	5 years or + after decentralization
Provincial controls	-0.0027 (0.0068)	-0.0007 (0.0078)	0.0013 (0.0060)	-0.0003 (0.0042)	-0.0020 (0.0040)
Municipality fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Number of observations	1256	1256	1256	1256	1256

Note: The dependent variable in the first panel is the share of fifth-year students attending always-provincial schools relative to total public school students by municipality. The dependent variable in the second panel is the share of fifth-year students attending public schools relative to total students by municipality. All regressions are only for municipalities where there are at least one treatment school and one control school. Standard errors clustered at the municipality level are in parentheses.

Table 7: The Impact of School Decentralization By Municipal Poverty Status

Independent Variables	No Interactions		Interactions with Poverty			
	Math Test Scores (1)	Spanish Test Scores (2)	Math Test Scores (3)	Spanish Test Scores (4)	Math Test Scores (5)	Spanish Test Scores (6)
Years since Decentralization:						
Years since Decentralization Interacted with:						
Non-Poor Municipality	0.36** (0.15)	0.58*** (0.11)				
Poor Municipality			0.45** (0.17)	0.67*** (0.13)	0.58*** (0.11)	0.74*** (0.10)
Control Variables	Yes	Yes	-0.82** (0.39)	-0.60* (0.32)	-0.03 (0.27)	0.08 (0.25)
School Fixed Effects	Yes	Yes	Yes	Yes	No	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes
Province-Year Fixed Effects	No	No	No	No	Yes	Yes
Number of schools	2920	2920	2920	2920	2973	2973
Number of observations	10688	10688	10688	10688	10923	10923

Note: All regressions are for municipalities where there are at least one treatment school and one control school. Standard errors clustered at the province level are in parentheses. *** 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 8: Robustness to Location and School Size of the Estimated Impacts by Poverty Status

Sample	Coefficient on Years Since Decentralization		# of Schools
	Math	Spanish	
1. Only Schools in Municipalities with both Treatment and Control Observations			
Non-Poor Municipality	0.58*** (0.11)	0.74*** (0.10)	2973
Poor Municipality	-0.03 (0.27)	0.08 (0.25)	
2. Only Schools in Zip Codes with both Treatment and Control Observations			
Non-Poor Municipality	0.54*** (0.12)	0.69*** (0.10)	1972
Poor Municipality	-0.14 (0.38)	0.07 (0.29)	
3. Only Schools in Municipalities with both Treatment and Control Observations and on the Common Support of 5 th Year Enrollment			
Non-Poor Municipality	0.60*** (0.13)	0.63*** (0.11)	2639
Poor Municipality	-0.18 (0.30)	-0.06 (0.36)	
4. Only Schools in Municipalities with both Treatment and Control Observations and on a restricted Common Support of 5 th Year Enrollment			
Non-Poor Municipality	0.67** (0.25)	0.65** (0.29)	1349
Poor Municipality	-0.40 (0.36)	0.28 (0.27)	

Note: Each cell reports the estimated coefficients and standard errors for the variable "Years Since Decentralization". All models include school fixed effects, and province-year fixed effects. Standard errors clustered at the province level are in parentheses. *** Statistically different from zero at the 0.01 level of significance. ** Statistically different from zero at the 0.05 level of significance.

Table 9a: The Impact of School Decentralization on the Share of Public School 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
Non-Poor Municipality	-0.0047 (0.0124)	0.0062 (0.0112)	0.0081 (0.0063)	-0.0025 (0.0065)
Poor Municipality	0.0224 (0.0214)	0.0199 (0.0182)	0.0209 (0.0161)	0.0049 (0.0120)
Provincial controls	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	1256	1256	1256	1256

Table 9b: The Impact of School Decentralization on the Share of All Students in Public Schools

Controls	Treatment Variables			
	2 years or + after decentralization	3 years or + after decentralization	4 years or + after decentralization	5 years or + after decentralization
Non-Poor Municipality	-0.0008 (0.0079)	0.0014 (0.0061)	0.0010 (0.0043)	-0.0023 (0.0039)
Poor Municipality	0.0001 (0.0129)	-0.0017 (0.0106)	-0.0095 (0.0083)	-0.0007 (0.0115)
Provincial controls	Yes	Yes	Yes	Yes
Municipality fixed effects	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes
Number of observations	1256	1256	1256	1256

Note: The dependent variable in the first panel is the share of fifth-year students attending always-provincial schools relative to total public school students by municipality. The dependent variable in the second panel is the share of fifth-year students attending public schools relative to total students by municipality. All regressions are only for municipalities where there are at least one treatment school and one control school. There are no schools in the sample located in poor municipalities and in their first year after decentralization. Standard errors clustered at the municipality level are in parentheses.