

Education and Decentralization. The case of Chilean Municipal Schools.

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ABSTRACT

Chile underwent a radical pro fiscal decentralization reform at the beginning of the 80s, which handed over the administration of public schools to municipal governments. By estimating a fiscal decentralization index at the municipal level, we test the hypothesis that more fiscally independent local governments tend to get better scores in both the so called "SIMCE" test, which is annually taken at the 4th primary level, and the PSU test, which is required to apply to most universities in Chile. In order to properly control by other environmental variables that potentially affect tests scores, a set of other explanatory variables are considered. A panel data set between 2001 and 2010 is used to estimate an empirical model. Results are clearly favorable to the hypothesis that, in the context of municipally administered public schools, FD does favor a better school performance.

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I. **Introduction.**

One interesting side effect of the pro State modernization wave that began in the late 80s among former socialist countries in Eastern Europe, was its stress on decentralization as one important dimension of such a general goal as to make State performance more efficient. The view of central government bureaucracy as an obstacle to improve the quality of public services alike rapidly spread up to other developing countries, becoming a hot policy issue in Latin America since the beginning of the 90s onward. Chile was a pioneer in this regard, as it underwent a radical process of fiscal decentralization by the beginning of the 1980, whereby the administration of primary health services and public schools were handed over to municipalities. Interestingly enough, an active national political debate is now being developed regarding the alleged unsatisfactory outcome of the existing municipal schools regime.

While the academic debate on decentralization has been running since long, a flourishing rather recent empirical and theoretical literature has made important contributions in trying to understand the implications of giving more political and fiscal leeway to sub national governments. Albeit many caveats should be made on the subject matter, most available evidence supports the view that decentralization enhances government's accountability, it drives policy making and public management closer to people's needs and improves the quality of public goods provision. In line with this evidence, we hypothesize that fiscal decentralization (FD) has been a welfare enhancing device in the case of Chilean public (municipal) schools. This shows up in the fact that more fiscally independent local governments achieve better municipal school scores in national specific knowledge tests than fiscally dependent ones. In order to control by relevant environmental variables, special consideration is made on the fact that in Chile, municipal schools compete with publicly funded private schools. Similarly to municipal ones, these are funded through a Friedman's type voucher per student paid by the Ministry of Education to the so called school "holders".

Upon the assumption that effective FD is not homogenously distributed across local governments, we measure the effective degree of FD at the municipal level, which is then used as a explanatory variable to explain public school scores in the so called “SIMCE” and “PSU” tests respectively. By using a municipal level data base that spans from 2001 to 2010, an empirical model is estimated, which provides supports to the hypothesis made above. Results are clearly favorable to the hypothesis that FD does favor a better school performance. Nevertheless, they appear to be stronger for the math part of the SIMCE test and the PSU test in general.

The remaining of this paper is organized as follows. Section II presents the current theoretical and empirical debate in the subject matter. Section III describes the Chilean case and section IV presents the empirical model and the econometric results.

II. The debate.

II.1 Theoretical framework.

The oldest and best known pro decentralization argument is the one according to which lower tiers of governments are in a better position to identify the particular needs of local jurisdictions. The advantages on information steaming from a “market type” of decentralization were first put forward by Von Hayek (1945) and they are certainly implicit in the so-called Fiscal Decentralization Theorem (Oates 1972). The formal justification of FD has followed different modelling strategies. One of them is the attempt to find similarities between the structure of a competitive market, and the way in which sub national governments supply a package of cost - efficient services to local residents. This is the line of reasoning behind the well known model by Tiebout (1956) and a myriad of related theoretical literature. It predicts that, as long as residents are freely movable across jurisdictions and no externalities exist across jurisdictions, local public goods delivery will be economically efficient. A renewed version of the same argument has been

made in the so called “new theory of the firm” (Tirole 1994). As opposed to the previous approach, this stresses the way in which FD provides a more efficient oriented structure of incentives to each “firm” (local government). More recently, a second generation of models is based on the “new political economy approach” (Lokwood 2006), which stresses the role of voters in a politically decentralised setting.

The combination of FD with a Friedman’s type of voucher per student as a way of financing publicly funded schools provides a sound, albeit controversial, mechanism to enhance quality and efficiency in the use of scarce resources. From a theoretical view point, vouchers are assumed to make parents responsible about their choice regarding the school being attended by children. By allowing them to freely moving from “bad” to “good” education providers, they are empowered to voting with their feet regarding the particular public school they are making a choice of. On top of the traditional inter jurisdictional competition space put forward by Tiebout (1956), a voucher based system extends this competition in two potentially welfare enhancing ways. First, it makes public schools compete with each other. Second, it exposes publicly run schools to lose students in favor of publicly funded private ones.

In the context of our research problem, some worth mentioning decentralization drawbacks include the danger of corruption and the lack of qualified local (municipal) personnel (Prud'homme 1995), the cost push effect resulting from a small scale operation in service delivering (Oates 2001), the potential for “elite captures” (Bardhan y Mookherjee 2006) and the possible segregation of poorer jurisdictions (Bonet 2006, Rodríguez-Pose y Ezcurra 2009). In addition to purely decentralization related arguments, the combination of FD with a voucher based school funding raises the question as to whether parents are properly informed to voting with their feet and /or they can really move across jurisdictions in search of cost efficient providers.

II.2 Existing empirical evidence.

Cross country studies appear to be generally favorable to the virtues of decentralization on the quality of education as well as about its potential effect regarding resources being allocated to this sector (Letelier 2010, Lindaman and Thurmaier 2002; Busemeyer 2008). While country specific research tends to confirm this general finding (e.i. Barankay y Lockhood 2007, Faguet y Sánchez 2007), some more qualitative studies cast some doubt on it (Kristiansen y Pratikno 2006). A relevant related issue is the extent to which decentralization produces a more heterogeneous outcome across jurisdictions and if true, what are the reasons that explain that. Some evidence suggests that decentralization deepens the gap between poor and wealthy jurisdictions. This appears to be the case of China (Zhao 2009) and El Salvador (Cuéllar-Marchelli 2003). Less clear is the result for Sweden provided by Ahlin y Mork (2008).

The question as to whether inter school competition is likely to produce more spending on education by school districts remains rather unattended. Among studies worth mentioning, the one by Hoxby (2000) on the USA metropolitan areas, concludes that, despite the degree of Tiebout type of choice rises school performance and reduces the students teacher ratio, it also lowers per pupil student spending at the district level. Hoxby interprets such a result as evidence that competition makes public schools to reallocate their resources away from non teaching activities. An interesting – and also radical-experience is the one of Sweden, which underwent a rapid education related decentralization process by the beginning of the 90s. Some evidence suggests that competition from private run publicly funded schools (*“independent” schools*) improves both the scores on mathematics national tests as well as the grades in public schools (Sandstrom and Bergstrom 2005).

III. The Chilean case.

Chile pioneered the adoption of a radical pro municipal based decentralization scheme by the beginning of the 80s. Ever since, public funding is given to municipal schools (MS) as well as to private “subsidized” schools (PSS) - generally called “school holders”- is allocated to them upon the number of students being attended. As opposed to the MS, PSS schools are allowed to charge in return to a proportional reduction of the student’s voucher value. Although MS can also charge a limited co-payment, this is supposed to be a volunteer parents’ contribution. A third category of fully private schools coexist with the two former ones. They are acknowledged to be generally better in most respects relative to MS and PSS alike.

Regarding the political justification behind delegation of MS onto municipal governments, it was then officially argued that excess bureaucracy at the central government level was a severe obstacle to improve efficiency in school administration. The voucher based funding model was assumed to boost competition across MS and between them and PSS. In theory, the voting with the feet mechanism would make local governments more accountable to their constituency as parents penalize badly performer school holders by choosing good performing ones. Nevertheless, it must be mentioned that when the existing institutional framework was launched in 1980, municipalities were made responsible of negotiating wages with local teachers. This was a major breakthrough with respect to former scheme and some argue it hides the “real” motivation behind public school decentralization. By weakening national teachers’ union, the central government managed to get rid of a potentially dangerous political threat.

A feature worth mentioning refers to the fact that MS may also get some funding from the municipality where they belong. This is made beyond the aforementioned voucher based share component of all money being spent on municipal education. Although such a source of funding is very unevenly distributed across municipalities, it represents about

10% of all resources being spent by the general government level as a whole. Two reasons may induce local governments to contribute. One is their actual fiscal leeway to decide upon the budget. Even if the local budget at stake were large in relative terms, large fixed administration costs may impede municipalities to make significant contributions. The second reason hinges upon mayor's political interest to prioritize school funding relative to other feasible items. As local governments do represent median voter's preferences on the subject matter, we may expect that more fiscally decentralized municipalities will be in a better position to freely decide the extent to which they want to strengthen MS.

Interestingly, the model described above was originally conceived to introduce private like administration practices at the municipal level. In line with this broad purpose, municipalities were empowered to choose between two administration structures. The first consisted of direct administration through administrative departments of education. The second consisted of leaving the administration of schools in the hands of the so called "corporations". These entities would be nonprofit private organizations headed by the local mayor. Other board members would be representatives of other local state organizations and the private sector. The advantage of corporations lies in them having a more flexible legal status, as it allows private companies to contribute to funding and co-running MS. Similarly, as labor norms in force are more employer friendly for private contractors, corporations' personnel hiring is farther facilitated. The corporation option was taken by only 53 municipalities before a constitutional court decided in 1981 that municipal function that had been carried out since 1980 could not be performed by private entities.

The Chilean MS administration and funding model is currently the subject of an active political debate. A key aspect of it relates to the allegedly low quality standard of MS as compared with PSS. This quality gap is even larger when the same comparison is made with respect to fully paid private schools. To this must be added that MS quality varies substantially across municipal governments. The pro "centralization" is now being

discussed, thereby MS would be given back to the central administration level. However unclear so far, the new institutional arrangement would move toward some sort of “deconcentrated” administration, in which municipal governments would have a rather limited role. We hypothesize that low quality MS performance is explained mainly – albeit not only- by the degree of municipal governments to decide on the amount of resources potentially diverted to education from their own budget. Since this is quite diverse across the country, it means that benefits from FD should be evaluated upon the specific municipality being observed. As long as this holds, some kind of selective – municipal case based- decentralization is in order.

IV. Empirical model.

Equation 1 (Ec1) bellow provides the basic structure of the empirical model. This is meant to explain the score of the “SIMCE” text, which is annually taken at the 4th basic degree at private and municipal schools alike, and the so called “PSU” text which is taken by students who conclude their secondary education and want to apply to the university. Among explanatory variables we may distinguish two broad sets. One is assumed to capture the relevant degree of FD for each specific municipality. The second set controls by all municipal specific environmental variables that affect above tests scores.

$$SCORE_{it} = \alpha + \beta_1 \times FD_{it} + \beta_2 \times CONTROL_{it} + \epsilon_{it} \quad EC_1$$

Regarding FD itself, our measurement follows the proposal being made by Barankay y Lockhood (2007) in trying to produce a municipal based index of it. This is done by assuming that the bulk of unavoidable municipal expenditures are the ones needed to funding staff wages (W). Two types of different kind of expenditures are to be distinguished in the Chilean context. One is meant to funding “permanent contract” type of personnel (W_p), and the other one pays “transitory contract” personnel (W_T). As

opposed to the first type, in which case jobs are protected by a set of rigid public sector regulations, transitory contract personnel can be easily fired on account of municipal unwillingness to keep them in the staff. However different in legal terms, both types of personnel enjoy a reasonable degree of labor stability, which makes W_p and W_T as relatively fixed expenditures items. In order to produce a sound measurement of FD, we will define “DF” as (Ec.2):

$$FD_j = \left[\frac{R - W_j}{R} \right] \quad Ec.2$$

While variable R stands for all municipal revenues, variable W_j may be proxied by W_T or W_p alternatively, leading to FD_p and FD_T as two feasible measurements of FD. As stated above, It should be expected that more fiscally independent municipalities (higher FD) will have more leeway to decide on the kind of education they want to provide, which makes FD more effective in getting benefits from decentralization to emerge.

Among control variables, an important one is the average municipal number of formal education years by above 18 years old residents. This is assumed to proxy the average parents’ formal education years. Since students from more educated families have a start off advantage, we expect this to affect SIMCE and PSU scores positively. Given the fact that separate information for math and language components of the SIMCE test is available, It will be hypothesized that parents’ education affects language skills more significantly than math skills, Similarly, we may expect that FD will affect math part of tests more strongly than language. Our second control variable is a dummy that captures the effect of municipal schools being run by a Corporations. Under the assumption that this municipal arrangement is more flexible and private like than a regular municipal structure, a positive effect on school performance may be expected. The likelihood of publicly funded private schools performance having a “competition driven” positive effect

on municipal ones is captured by the average score being achieved by municipally located PSS. As long as this type of schools get better tests scores, MS will be pressured to compete to avoid students' migration to private schools.

Separate mention deserve two additional explanatory variables that stand for the degree of heterogeneity of local residents. Its relevance hinges upon the extent to which "voice" being enforced by local residents does contribute to make local governments more accountable to their incumbents. Two related variables are included in this account. One is the number of municipal council members per local voter. A second one attempts to measure the degree of population homogeneity. We may expect that a more heterogeneous constituency will lead to less accountable governments. As voters' preferences become similar to one another, municipal governments will appear to be more clearly representative of the local median voter. We use the municipal GINI coefficient to capture this. More homogenous communities (lower GINI) are assumed to reflect similar local preferences across municipal voters, and then also more accountable local governments.

V. Econometric results.

Econometric estimations are made by using an annual panel data base that spans from 2001 to 2010. Data is taken from the Ministry on Interior Affair and Public Order data base (SINIM) and the National Electoral Service (SERVEL) web page. Since some of the variables are time invariant and/or are close to be (CORP, MC_VOTERS), the estimation of a random effect model is in order.

Regarding SIMCE test, results are presented in table 1. Columns 1 and 4 use the average of math and language scores among all municipal schools. Remaining columns are referred to either math or language scores in a separate fashion. It may be observed that DF affects scores positively regardless of the specific regression being considered. Nevertheless, coefficients – and even statistical significance- differ across cases in the table. First, DF coefficient is roughly three times higher for the math score than the corresponding language score coefficient when we use FD_p (regressions 2 and 3). Similarly, the

equivalent coefficient is only significant for SIMCE math score when FD_T is used (regressions 5 and 6). This conforms with the hypothesis that, should FD had an efficient enhancing effect on school performance, this would be more significant in math than in language skills.

When we look at control variables, we can see first that as expected, parents' average school rate (PAV.SCR) has a positive and significant coefficient in all reported cases from table 1. As expected though, this coefficient is higher for the language scores than for the math one. Regarding the corporation dummy (CORP), this appears to be statistically neutral. Interestingly, the competition effect from private schools, being this measured by the average score of municipally located PSS (PSS.SCORE) is clearly positive and significant. Expectedly, the number of students by teacher at MS (STUD_T) has a negative and significant effect. Albeit voice and accountability measurements (GINI and MC_VOTERS) do not appear to affect SIMCE scores significantly, they exhibit positive coefficients.

As far as the PSU score is concerned (table 2), estimations are made by taking the share of all students who got a score above 450 as dependent variable. In order to properly account for the truncated nature of this variable, a TOBIT model is estimated. Results confirm that FD coefficient is significant and correctly signed. Similarly to the case of SIMCE (table 1), control variables exhibit a consistent effect in the two reported regressions. Endogenous variable in this case is the average of math and language scores.

Table 1. Results SIMCE (all variables in natural log, except GINI coefficient)

	Simce (1) Municipal	Simce (2) math	Simce (3) language	Simce (4) Municipal	Simce (5) math	Simce (6) language
CONST.	5.241*** (61.05)	5.270*** (49.80)	5.183*** (63.87)	5.245*** (61.32)	5.265*** (49.80)	5.179*** (63.79)
FD _p	0.055** (2.49)	0.089*** (3.23)	0.026 (1.23)			
FD _T				0.043*** (2.56)	0.083*** (3.93)	0.009 (0.58)
PARENTS_SCORE	0.053*** (4.57)	0.034** (2.33)	0.075*** (6.76)	0.054*** (4.64)	0.035** (2.46)	0.076*** (6.82)
CORP	0.010 (1.47)	0.012 (1.54)	0.007 (1.16)	0.010 (1.47)	0.011 (1.54)	0.007 (1.18)
PSS_SCORE	0.053*** (3.48)	0.042** (2.24)	0.066*** (4.57)	0.052*** (3.45)	0.044** (2.33)	0.066*** (4.59)
STUD_T	-0.048*** (-8.95)	-0.042*** (-6.18)	-0.054*** (-10.50)	-0.048*** (-8.99)	-0.042*** (-6.29)	-0.053*** (-10.40)
GINI	0.011 (1.45)	0.014 (1.19)	0.012 (1.34)	0.009 (0.99)	0.014 (1.03)	0.012 (1.20)
MC_VOTERS	0.005 (1.61)	0.001 (0.18)	0.009*** (2.91)	0.005* (1.66)	0.001 (0.24)	0.009*** (2.98)
N	2,304	2,304	2,304	2,304	2,304	2,304
F (P-value)	0.00	0.00	0.00	0.00	0.00	0.00

Significant at 10% *, 5% **, 1% ***.

T statistic in parenthesis

Table 2. Results psu rate for score > 450 (all variables in natural log, except GINI coefficient)

	psu 1	psu 2
CONST	1.801*** (4.33)	1.777*** (4.28)
FD _p	0.589*** (2.62)	
FD _T		0.383** (2.20)
PARENTS_SCORE	0.851*** (6.60)	0.860*** (6.69)
CORP	0.018 (0.21)	0.017 (0.21)
PSS_SCORE	0.241*** (9.70)	0.240*** (9.65)
STUD_T	-0.111** (-1.96)	-0.116** (-2.04)
GINI	0.097 (1.17)	0.128 (1.41)
MC_VOTERS	0.082** (2.07)	0.083** (2.10)
N	1,787	1,787
F (P-value)	0.00	0.00

Significant at 10% *, 5% **, 1% ***.

T statistic in parenthesis

VI. Conclusions.

Empirical evidence from Chilean municipal schools sheds light on the fact that FD does improve education management as it improves students' scores in language and math knowledge tests. Nevertheless, national institutional arrangements on the subject matter suggest that indeed, the advantage of delegating public schools administration onto lower tiers of governments only becomes apparent for fiscally independent local governments. This confirms previous findings regarding the non homogenous impact that FD is likely to have when municipal governments differ in their leeway to run their budget. It follows that, despite FD having a positive effect on education, its impact is likely to be unevenly distributed across local governments. Our main conclusion is that some kind of "selected FD" will be a superior solution to an "all across the board" arrangement.

Our second main conclusion relates to the fact that FD effect differs for math and language tests when they are examined separately. In particular, FD seems to have a stronger effect on math scores than in language scores. Similarly, the coefficient that measures the impact of parents' education on MS performance shows this being stronger for language as opposed to math scores. Other things constant, the number of students per teacher as well as competition from PSS does affect MS positively. No impact of private run corporations was detected.

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