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The Chilean Voucher System: Some New Results And Research Challenges

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1. INTRODUCTION

The discussion about voucher systems in general and the evaluation of the Chilean voucher system in particular has centered, among other things, on whether private schools are better than public schools, and on the importance of sorting and the peer effect.

In this spirit, this paper presents some results regarding both issues. Regarding the first issue I provide (based on published and ongoing work with Bernardita Vial) evidence that private schools are better than public schools, when they work with similar budgets. On the second issue, I discuss the evidence provided by papers such as McEwan and Carnoy (1998), and Hsieh and Urquiola (2002) (hereafter HU), and provide some new evidence regarding these issues. I conclude that probably the key lesson from the Chilean experience is the importance of the proper design of a voucher system.

The paper first discusses the characteristics of the Chilean voucher system, then examines the literature that has evaluated it, and ends with two topics that should be researched further: the regulation of the system by the Ministry of Education, and the peer effect. I provide new results to evaluate the importance of the latter.

2. IS CHILE A "TEXTBOOK" CASE?

Many of the papers in the literature describe the Chilean voucher system as the "textbook" voucher case[1]. But taking this route has prevented research from understanding how the particular design of the Chilean voucher system determines the results obtained in Chile.

In the "textbook" case schools with different internal incentive structures (public and private) operate under the same external rules and with the same budget (for which they compete). But in Chile external rules differ. Public schools have to abide by the Teachers Labor Statute while private voucher schools (at least formally), do not. Public schools work under "soft budget constraints", and are therefore not necessarily influenced by competition from private schools. No public schools have closed, because all the schools that lost students to private voucher schools received subsidies to pay the professors' salaries, when needed. Given this incentive structure, municipal schools facing competition from private voucher schools may prefer students to leave, since they keep their jobs, and teach smaller classes.

Some public schools are faced with the correct incentives. The existence of additional subsidies, quite large in rich municipalities, presents schools in these municipalities with the incentive to improve, receive more students, and receive more subsidies. Hence, incentives faced by municipal schools go both ways. A pattern of results compatible with the existence of these two conflicting incentive systems

is shown in Sapelli and Vial (2002), where the average treatment effect (ATE) is positive for private voucher schools with up to 25% less funds than public schools, and negative when public schools have funds that are more than 25% above those used by private schools[2].

So the incentives faced by municipal schools are different from what they are assumed to be in the "textbook" voucher system. Municipal schools do not face the choice of either supplying an adequate quality of education, or closing. The choice they face may even be as perverse as whether to teach larger or smaller classes.

Recognizing this perverse incentive, the Ministry of Education in Chile has built a parallel system of incentives. In particular several supply subsidies (to the school) are added in parallel to demand subsidies. This is a second deviation from the "textbook" case. Several programs fund schools in certain circumstances (for example, where poor students go). These funds operate as a tax to students that would want to move to another school, as they do not follow them (see Sapelli and Torche (2002) for an empirical estimate of how the design of the food program makes it operate as a tax on mobility between schools).

Finally, the Ministry of Education in Chile is moving towards a "standards based" evaluation of public schools. In sum, it is a patchwork system of incentives.

3. Is the "Textbook" Case the Appropiate Benchmark?

Another issue of importance, related to whether sorting is inevitable or not, is whether the textbook case is the appropriate benchmark. One key problem is who gets paid how much. If the cost of educating students to a certain level is a negative function of the initial human capital of the child (or family income, or parent education), then we should not have a flat subsidy (see Hoxby, 2001 or Aedo and Sapelli, 2001). If students receive a flat subsidy then private voucher schools will compete for those students with "rents" (those with higher initial human capital), dissipating these rents with higher quality education. They will not compete for those with low initial human capital, where there are no rents, or negative rents.

Summing up, the Chilean voucher system has, on the demand and supply side, at least two different sets of incentives: schools face different budgets and incentives, and students face different choice sets. Poor students have a lower net subsidy and are more prone to be captive of the public education system. Public schools do not face, in general, the incentives of competition, since they face soft budget constraints. Moreover, the extra budget channeled to poor students is given in the form of supply subsidies, a form that accentuates the dependence of poor students on public schools.

These rules do give way to sorting, but other rules would imply competition for all students. Sorting is not inevitable, but is a consequence of the design of the subsidy[3]. Different relative subsidies would be optimal. That requires the design of a system where relative prices are determined by supply and demand, not by a government agency. In sum, the "textbook" case is not the appropriate benchmark.

4. Evaluation of the Chilean Experience

The most recent literature provides evidence that private voucher schools are better than municipal schools (Gallego (2002); Sapelli and Vial (2002); Contreras (2001); Mizala and Romaguera (2001); Tokman (2001)). Most of the papers written in the last three years use individual data (not available before). Results changed with respect to those obtained with school averages.

Others have stated that this difference in results between types of schools is due to sorting and/ or the peer effect. Sorting is taken care of when the papers control for family characteristics. The key remaining issue is whether the peer effect is important. Regrettably, the literature contributes little to answer the question.

The key problem is the issue of causality. HU show higher enrollment in private schools coexists with lower test scores in public schools in the same municipality. This could be either proof of the peer effect, or not, since entry is endogenous and occurs first where municipal schools are doing a poor job (Hoxby 2001). However, HU do not perform a test that explicitly controls for endogeneity. Gallego (2002) finds that the issue is crucial: results with and without controlling for endogenous entry differ significantly. Gallego's results, when controlling for endogeneity, show that competition from private subsidized schools *increase* the test scores of municipal schools[4].

5. Which Schools are Better?

Evaluating schools is complicated since different schools could be best for different students. This requires estimating treatment effects for different subsets of the population. Sapelli and Vial (2002) estimate the treatment on the treated (TT) effects and average treatment effects (ATE), controlling for individual characteristics and school budget. If they do not control for differences in budgets, Sapelli and Vial find a substantially positive and significant TT effect, and a small and sometimes insignificant ATE.

If peer effects are key, the effect of going to a private school on an average student (i.e. the ATE), has to be positive and high since private schools have better peer groups. If the ATE is low, as found by Sapelli and Vial, the peer effect cannot be as important as claimed.

Sapelli and Vial then take into consideration heterogeneous budgets, and distribute municipal schools according to transfers received in addition to the subsidy. They find a larger positive TT when private schools are compared to low transfer municipal schools, but a negative TT when compared to municipal schools with substantially larger budgets. For schools that work with similar budgets, results are much better in private voucher schools. Similar results are found for the ATE.

6. Regulation of Private Schools

A detailed study of the regulation of private voucher schools, and how they may thwart the operation of a voucher system, is pending. An over-regulated private system will offer what regulators demand. According to Gauri (1998) "All told, the government monitors private schools more closely and frequently than at any other time in Chilean history, a surprisingly paradoxical outcome…". "The inspections and central government rules raise the costs of innovation for both municipal and private schools."

It may be a puzzle how, in this context, private voucher schools manage to obtain better test results. One hypothesis is that they specialize in an area where municipal schools are doing a bad job and where the government is less restrictive: discipline. They produced better academic results as a byproduct (i.e. there are economies of scope in the production of discipline and academic achievement).

7. The Peer Effect

Sometimes what is implied by "the peer effect" is that good students have a positive externality on bad students. Alternatively, it is assumed that the effect is symmetric, and dispersion is irrelevant. That, for example, is what Epple and Romano (1998) assume: achievement is a positive function of *mean* ability in the class. This implies that adding two persons with ability one or two standard deviations from the mean in opposite directions, is the same. But a class with brilliant and dumb students is different from one where all students are similar.

If mean peer ability may be productive, a low standard deviation (SD) of peer ability could also be productive. The issue is important, since we cannot change the mean by sorting (sorting is a zero sum game here), but we can lower the average of all schools SD by sorting (i.e. average class SD can be much lower than population SD). I find that a larger SD of ability in schools, implies lower test scores, *ceteris paribus*. The evidence is compatible with the existence of different production functions. Rural and municipal schools have a comparative advantage in classes with disperse peer ability; and urban and private schools have one in classes with relatively less disperse peer ability. Moreover, urban private schools have an absolute advantage over most of the relevant SD of ability range (see Figures 1 and 2, explained bellow).

FIGURE I
SIMCE SCORES AS A FUNCTION OF SCHOOL SD OF ABILITY, BY TYPE OF SCHOOL

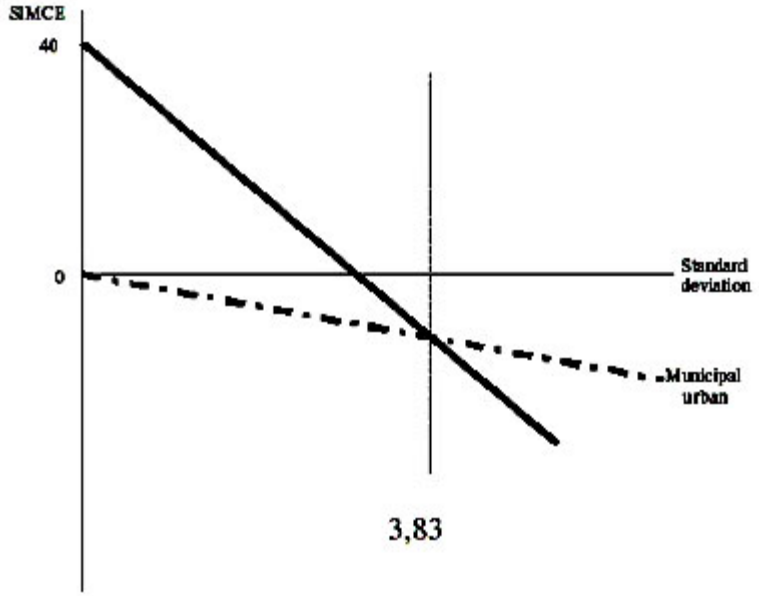
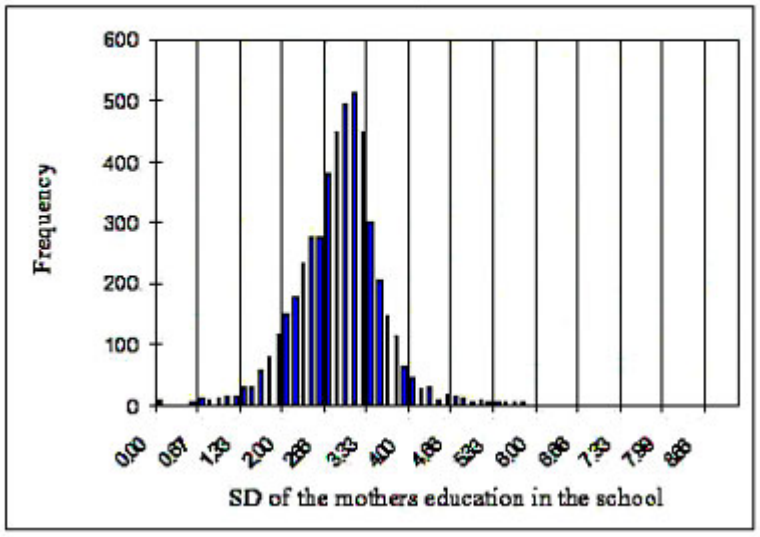


FIGURE 2
HISTOGRAM



The existence of different production functions can be due to the fact that ones ability is an input into the production function, and that public and private schools handle this input differently. In a public system the input is controlled by the state and used as if it where free, in a private system that input is controlled by private individuals and has a price. In the public system the input may be used inefficiently. For example, public schools teachers may appropriate the externality, using this free input in substitution for their own effort.

The evidence shows that *all* schools are benefited by a reduction in the SD of school ability, except for rural municipal schools. The reduction produces an increase in mean achievement that is more than twice as large for urban private than for urban municipal schools.

8. PEER EFFECT: RESULTS

I use data from the 1999 SIMCE results (4^{th} year primary school), joint with a survey on parents. From the latter I obtain the education of the mother, that I use as a proxy for student ability.

I start by describing the distribution of scores and ability within schools (see Table 1).

TABLE 1
THE SD OF SCORES AND ABILITY BY SCHOOL TYPE

Average of the coefficient of variation			
Language	Maths	Mother's education	Type of school
0,164	0,166	0,286	All Private Subsidized
0,173	0,176	0,309	All Urban
0,173	0,176	0,337	All
0,178	0,181	0,366	All Municipal
0,178	0,178	0,391	All Rural
0,146	0,157	0,256	Urban Private Subs.
0,192	0,180	0,330	Rural Private Subs.
0,182	0,184	0,347	Urban Municipal
0,175	0,178	0,386	Rural Municipal

The coefficient of variation (CV) of mother's education, with respect to urban private voucher schools, is 29% higher in rural private voucher schools, 36% higher in urban municipal schools, and 51% higher in rural municipal schools.

The CV of math scores, with respect to urban private voucher schools is, 15% higher for rural private voucher schools, 17% higher for urban municipal school, and 13% higher for rural municipal schools. Private voucher schools have a lower dispersion of abilities and results. Both rural and urban private voucher schools have a lower dispersion than average, while urban municipal schools have a higher dispersion.

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We regress average math score on the SD of mothers education by school, in interaction with area (urban/rural) and type of school (private/municipal). We also include a dummy for area and type of school and the log of the mean of the mothers education at the school. The results are (see Table 2):

Test results are always better when the SD of ability is lower (except for rural municipal schools). Urban private voucher schools are better than all others in schools with a dispersion of peer ability in the range from 0 SDs to 3,83 SDs (see Figure 1). Private voucher urban schools are better than municipal urban schools (see the histogram of SDs) for most of the SD range, since 3,83 is well out in the right hand tail of the distribution (see Figure 2). In Figure 1, one can observe that private voucher urban schools are 40 points better for a SD of zero, 20 points better for a SD of two, 10 points better for a SD of three, and about one point worse for a SD of four.

9. CONCLUSIONS

In sum, the literature on the importance of sorting and the peer effect may have the issues backwards: sorting is important only because of the inappropriate design of the system, and the peer effect is actually not as important and depends on technological choice. In sum, sorting is productive and schools are better if they teach more similar students.

The key lesson from the Chilean experience is that results depend on the design of the system; and the "textbook" case is not an optimal design for such a system.

REFERENCES

Aedo, C. and C. Sapelli (2001), "El sistema de vouchers en educación: Una revisión de la teoría y evidencia empírica para Chile", *Estudios Públicos*, Otoño 2001.

Beyer, H. (2001), "Falencias institucionales en educación: Reflexiones a propósito de los resultados del TIMSS", *Estudios Públicos*, Otoño 2001.

Contreras, D. (2001), "Evaluating a Voucher System in Chile. Individual, Family and School Characteristics", Documento de Trabajo N° 175, FACEA, Universidad de Chile.

Epple, D. and R. Romano (1998), "Competition between Private and Public Schools, Vouchers, and Peer Group Effects", *American Economic Review*, Vol. 88, 1, p. 33-62.

Gallego, F. (2002), "Competencia y Resultados Educativos: Teoría y Evidencia para Chile", *Cuadernos de Economía*, Año 39, no. 118, December.

Gauri, V. (1998), *School Choice in Chile*, U. of Pittsburgh Press.

Hanushek, E. (1986), "The economics of schooling: Production and efficiency in public schools". *Journal of Economic Literature*, 24, 1141-1177.

Hoxby, C. (2001), "School Choice and School Productivity (Or, Could School Choice be a Tide that Lifts All Boats?". "Conference on the Economics of School Choice", NBER, febrero.

Hoxby, C. (2002), "Ideal vouchers" Mimeo.

Hsieh, C. and M. Urquiola (2002), "When Schools Compete, How Do They Compete? An Assessment of Chile's Nationwide School Voucher Program" (found in www.worldbank.org/research/projects/service_delivery /paper_hsieh.pdf).

Mc Ewan, P. and M. Carnoy (1998), "Competition and Sorting in Chile's Voucher System", mimeo, Stanford University.

Mizala, A. and P. Romaguera (2000b), "Determinación de Factores Explicativos de los Resultados Escolares en Educación Media en Chile." Serie Economía N° 85, CEA, DII, Facultad de Ciencias Físicas y Matemáticas, Universidad de Chile, Agosto.

Sapelli, C. (2002), "Introduction to the Special Issue on the Economics of Education", *Cuadernos de Economía*, Año 39, N° 118, December.

Sapelli, C. and B. Vial (2002), "The Performance of Private and Public Schools in the Chilean Voucher System", *Cuadernos de Economía*, Año 39, N° 118, December 2002.

Sapelli, C. and Torche, A. (2002), "Subsidios al alumno o a la escuela: efectos sobre la elección de colegios", *Cuadernos de Economía*, año 39, N° 117, pp. 175-202.

Tokman, A. (2001), "Is Private Education Better? Evidence from Chile", mimeo, University of California, Berkeley, April.

Van de Ven and Ellis (2000), "Risk Adjustment in Competitive Health Plan Markets", in Handbook of Health Economics, Vol. 1A, Culyer y Newhouse, eds., N. Holland Elsevier.

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[1] For example, "Chile's government established a "textbook" voucher scheme" (HU, page 1).

[2] These results are obtained using 1998 data for 2nd grade secondary school. Preliminary work with 1999 4th year primary school data replicates the pattern: private subsidized schools that work with up to 25% less budget than municipal schools have a TT effect of 42, and an ATE not significantly different from zero. Similar to the results for primary, the TT becomes lower as transfers increase, turning negative for higher levels of transfer.

[3] This problem is very similar to the one created by community rates in health insurance. Community rates without risk rated subsidies (see van de Ven *et al.*(2000)) foster risk selection (an activity with negative social value). If risk rated subsidies are created, then the problem of risk selection disappears and you can have community rates paid by the insured and risk rated premiums received by the insurers. In some health economics texts you also find the confusion and the belief that sorting is the key behavior by which private insurance compete. However, the rules are not analyzed to determine whether this behavior is inevitable or is system dependent.

[4] Note that Gallego obtains the HU results when not controlling for endogenous entry.