

Comments

Reynaldo Fernandes: Chile has undergone considerable reform of the educational system in the last twenty-five years. In the early 1980s, the government implemented a nationwide voucher system, in which the management of public schools was transferred from the Ministry of Education to the municipalities. Under this system, municipal schools receive a per-student subsidy and are not allowed to charge tuition or turn away students unless over-enrolled. Subsidized private schools receive the same per-student subsidy as municipal schools, but they have wide latitude regarding student selection and are allowed to charge fees (after 1994). Since the end of Augusto Pinochet's military government in the early 1990s, Chile has been governed by the same political coalition, which has given continuity to the effort of improving education in the country. This has led to substantial increases in the per-pupil expenditure, the dissemination of information on school performance, and other policy measures.

In 2000, Chile participated in the Program for International Student Assessment (PISA), with the expectation that the results would reflect the effects of years of investment in the sector. The PISA results were disappointing, however. Chilean students' performance was much lower than European and Asian students and similar to that of students in other Latin American countries, such as Brazil and Mexico. While there is thus no evidence that the Chilean education reform has improved students' average test score, there is evidence that the voucher system has contributed to increased stratification, in the sense that students with better socioeconomic status have transferred from public schools to private ones.

McEwan, Urquiola, and Vegas address these issues, contributing to the literature in two distinct aspects: they present new evidences that Chilean education reform has increased stratification and has had little effect on students' average achievement; and they explore factors that may explain why the evo-

lution of school quality in Chile has been disappointing. In this comment, I focus on the second contribution.

The market mechanism assumes that efficient firms can be expanded or replicated, which pushes inefficient firms out of the market. If Chilean students' low performance on the PISA test is due to inefficient schools, then the market mechanism is not working in the voucher system implemented in the country. However, the relation between low performance and schools' inefficiency is not evident. Students' performance on standardized tests depends both on school quality and on external factors such as students' socioeconomic status. School quality, in turn, depends on the schools' efficiency in managing their resources and on the total amount of available resources. Thus, low performance cannot automatically be identified with school inefficiency. Given that Chile expanded the freedom of school choice and increased per-pupil expenditures, one could expect an improvement on test scores. McEwan, Urquiola, and Vegas show that this is not the case. Their evidence suggests that the Chilean voucher system did not contribute to increasing schools' efficiency. The question is, why not?

To address this question, several factors need to be explored, but the authors focus on just one: "the difficulties researchers have encountered in generating useful information on school performance." While the measurement problem is a serious one for establishing an accountability program (with rewards and punishments) and for assessing the program's effectiveness, its importance for orienting parents in school choice is not very clear. The response to the failure of education reform in Chile must be obtained elsewhere.

Imperfection of the Quality Measure and School Accountability Programs

The practice of evaluating schools according to their students' performance on standardized tests is becoming more frequent worldwide. It is also common to allocate rewards, sanctions, and assistance based on these results. Since it is important to show teachers and parents the reasons why their schools are being rewarded or punished, simple indicators are desirable. This may explain why students' mean test scores are among the most widely used performance measures by school accountability programs. Other measures used are mean test score variations between two periods of time (a measure of progress) and mean test score variation for students' cohorts in different grades (a measure of value added).

The literature on school accountability emphasizes two potential problems in using scores on standardized tests: distortion of incentives and gaming. In the case of the former, the problem lies in the fact that schools have multiple goals, whereas the measures used focus on only a few. Schools are therefore motivated to concentrate their efforts on those aspects required by the programs. In the case of gaming, schools might adopt strategies to change test scores without improving teaching quality. Strategies might include training and motivating students to participate in the tests or excluding low-proficiency students from the tests or from the school.

McEwan, Urquiola, and Vegas suggest that scores on standardized tests are imperfect measures of the restricted goals that they are intended to evaluate, even when no gaming is present. A math test is an imperfect tool for assessing a school's capacity to provide good learning to its students because it reflects not only school effort, but also the influence of family and friends, the students' inherent abilities, and random error. The authors highlight that test scores are measures with a lot of noise since the variance of error is very large, especially among small schools.

McEwan, Urquiola, and Vegas suggest there is a trade-off in the extent to which rankings generated using test score measures are either very similar to rankings based purely on students' socioeconomic status or very volatile from year to year. This is indeed a serious problem for school accountability programs, since rewarding or punishing schools based on the socioeconomic status of their students or based on a lottery would have undesirable consequences for the incentive structure of the schools' accountability programs. For example, schools that perform poorly on achievement tests because they receive low-income students may be discouraged from improving teaching quality, since school ranking does not reflect all the effort made. Similarly, programs that focus on rewarding the "best" schools or punishing the "worst" do not motivate larger schools. Smaller schools are more likely to be among the top or bottom schools, since error variance decreases as the number of students rises.¹

Error variance also creates some difficulties for evaluating programs' effectiveness using standard procedures such as difference-in-differences analysis. In any given year, the schools with the lowest performances tend to be overrepresented among the schools achieving a low value of error. Thus,

1. Kane and Staiger (2002).

the mean reversion process would tend to increase the mean performance of the schools with the lowest performances, disregarding any change in schools quality.

Imperfection of the Quality Measure and School Choice Process

Suppose that three measures of students' performance on standardized tests are available for each school: mean test score, value added, and mean test score variation between two subsequent years. Further suppose that the variance of error is very small and that it may not be taken into account. If policymakers have to choose one of these measures to implement a school accountability program, the majority would probably go with value added. Some might opt for mean test score variation, but very few would choose mean test scores, since punishing schools because they have low-income students simply is not reasonable. Mean test scores might not be a bad choice, however, for parents deciding on a school for their children. Value added measures do not represent what most people consider a good school. A school that has low-performing students and produces good value added could be a bad choice for a student with high learning capacity.

Students' mean test scores may be a good guide for orienting school choice. First, top schools tend to combine good students and good quality, while bottom schools tend to have both bad students and bad quality. Students who want to transfer from a low-performing school to a high-performing school are probably doing the right thing. Second, the family's options do not include all schools, but rather are generally restricted to the few that are closest to home. In this case, the separation of school effects and student effects is not the main issue, because socioeconomic status tends to be very similar for families living in the same neighborhood. If that is not the case, it may be relatively easy for the families to separate the two effects. The families probably have more information on schools than the econometrician, who lives far from their reality.

If schools want to attract more and better students, they need to raise their students' mean test score. Better quality schools will probably have an advantage in this process. While the market mechanism may cause stratification, one could expect that it would raise students' mean performance substantially. If this mechanism does not work in Chile, it is probably not because the families lack information on the quality of schools.

Francisco A. Gallego: This interesting and ambitious paper addresses a variety of topics related to the school system in Chile. The paper presents a literature review on the Chilean voucher system and its effects on school quality and stratification; new evidence on the correlation between school entry and outcomes using a regression-discontinuity design in a Chilean region with relatively low school entry and a relatively large share of rural population; a detailed discussion on the degree of informativeness of most available measures of school outcomes in Chile; and a policy discussion on the present and the future of the Chilean voucher system, with implications for other countries. The paper highlights the key findings that the school system in Chile has not fulfilled its implicit promise of increasing quality and that the reforms have accentuated stratification. I agree with these two stylized facts. The new evidence using regression-discontinuity design supports these facts, but neither the interpretation of the results nor its policy implications are obvious. In turn, the section on information is really interesting and shows that simply providing information may not produce big impacts on school quality. I do not have major comments on this section, so I concentrate on the other parts of the paper. Finally, I agree with most of the policy implications presented, although I would shift the emphasis somewhat.

I organize my comments in two sections. First, my comments on the actual implementation of the quasi-voucher system in Chile stress a couple of missing pieces in the analysis. Second, I discuss briefly the policy implications presented in the paper.

The Quasi-Voucher System in Chile

I agree with the propositions that school quality in Chile could be better and that the actual implementation of the voucher system has been an important cause of the high degree of stratification in schools.¹ However, I would stress two additional points not present in the paper. First, the Chilean experience of choice is not the only way of implementing school choice and is certainly subject to many improvements. In this sense, the Chilean voucher system is not really a textbook version of the Friedman-style voucher system (which is why I call it just a quasi-voucher system).² Second, I disagree somewhat with the

1. Many of the ideas presented in this section are based on Gallego and Sapelli (2007a, 2007b).

2. Moreover, some key features of the system changed from 1981 to 2007; see Gallego (2006).

authors' reading of the available literature.³ Very little causal evidence is available to answer many questions, and given the nature of what is available, it is really hard to learn much more with the methodologies used so far.⁴ In addition, evidence is still lacking on the cost effectiveness of the Chilean voucher system. Even if quality did not rise relative to the prevoucher system, enrollment seems to have improved (although there is no evidence on this), and little is known about costs in counterfactual scenarios. The rest of this section explores three key issues for understanding the actual evolution of the voucher system and its impacts on quality and stratification.

The Actual Value of the Voucher

From a conceptual point of view, publicly financed education in Chile is provided through a quasi-market for a heterogeneous product. There is fundamental heterogeneity because production costs vary with students' socio-economic status. As we economists well know, the key incentive mechanism in a voucher system should be the value of the per-student voucher. In the simplest model, p is the value of the per-student voucher, $c(q)$ is the unit cost of providing quality q , and $c(\cdot)$ is increasing in q . If there is free entry in the market, $p = c(q)$, and the value of the voucher pins down quality. A higher value of the voucher thus implies higher quality. Then, a low value of the voucher may well explain the low quality observed in Chile—as in the case of an ε voucher in which the value of the voucher is close to zero.

Table 6 presents the annual value of the per-student voucher in Chile. It is currently about U.S.\$1,200 (in constant 2005 PPP-adjusted dollars), which is equivalent to about 11.3 percent of per capita GDP. The value dropped in the late 1980s to about \$600 (about 15 percent of per capita GDP). To provide a benchmark, the table also lists the value of selected U.S. voucher programs. The median for a group of programs is U.S.\$2,400 (about 28 percent of per capita GDP). The value of the Chilean voucher is thus quite low by international standards. Moreover, there is a consensus in Chile that the value of the voucher is not enough to provide a minimum acceptable school quality.⁵

3. Larrañaga (2004) and Sapelli (2003) provide alternative recent surveys of the Chilean voucher system. Additional references on the effectiveness of vouchers and public schools include Sapelli and Vial (2002, 2003, 2005, 2006).

4. As the authors argue, the key weakness of many papers in this literature is “that private entry into school markets is endogenous.” One must therefore be extremely careful in deriving causal interpretations of some empirical regularities found in this and other papers.

5. Gallego and Sapelli (2007b).

TABLE 6. Voucher Value in Several Programs

<i>Program</i>	<i>Percent of per capita GDP</i>	<i>Value of voucher^a</i>
Chile		
1982	53.19	1,019
1985	32.55	686
1990	14.12	606
1995	11.21	733
2000	12.06	1,010
2005	11.32	1,265
Selected U.S. programs		
Charlotte, North Carolina	9.01	1,669
Cleveland, Ohio	24.01	2,455
Dayton, Ohio	10.90	1,178
Florida	34.43	3,927
Milwaukee, Wisconsin 1990	31.00	2,402
Milwaukee, Wisconsin 1998	37.27	4,611
Average	24.44	2,707
Median	27.5	2,429

Source: Author's calculations.

a. In constant 2005 PPP-adjusted U.S. dollars (purchasing power parity).

As previously discussed, the value of the voucher does not depend on students' socioeconomic status. So if the per-student voucher is low on average, it should be even lower for poor students. In equilibrium, these students are probably segregated in low-quality public schools, because both public and voucher schools with excess demand will select "cheap" students.

All in all, both the observed low quality and the stratification may be consequences of the established prices (which are too low, particularly for poor students) and not of school choice per se. Interestingly, current policies that will increase the voucher disproportionately for poor students may provide good experiments for studying the relevance of my story to explain the outcomes of the Chilean quasi-voucher system.

The Role of Self-Selection and Self-Stratification vis-à-vis Selection from the Supply Side

Many arguments and policy proposals relate the stratification we observe in Chile to selection from the supply side, because regulations allow over-enrolled public and voucher schools to freely select students—that is, private schools are able to cream skim students. As previously discussed, these overenrolled schools have incentives for selecting according to student costs.

Moreover, voucher and secondary public schools may charge a top-up fee above the voucher.

The question is how big cream skimming from the supply side is. I am not sure it is as extensive as the arguments in the paper imply. First, the school-entry cohort is significantly smaller today than during the peak in the mid-1990s: the school-entry cohort in 2001–05 was 11 percent smaller than in 1996–2000, and it will be 15 percent smaller in fifteen years. Many schools—especially middle-class schools—have excess supply. Second, survey evidence suggests that 93 percent of parents say they send their kids to the school they wanted.⁶ This figure is probably biased upward, but the order of magnitude is suggestive. Finally, a group of researchers and I recently carried out a survey of parents in three regions in Chile. The results reveal that 89 percent of parents apply to just one school (the average number of schools to which parents apply is 1.16), and only about 7.5 percent of parents applied to a school and were not accepted.⁷ Moreover, of the students that applied to a school and were not accepted, about 40 percent ended up in voucher schools.⁸

This evidence as a whole suggests that selection from the supply side is not as extensive as commonly thought. An alternative explanation is that there is self-selection: studies show that parents like to be with peers who are similar to them.⁹ Moreover, equilibrium self-selection is relevant in both selective and nonselective schools.¹⁰

The policy implications of self-selection are different from the policy implications of school selection. Prohibiting school selection will not decrease stratification significantly if self-selection is what matters the most.

6. Centro de Estudios Públicos (2006).

7. The numbers increase to 1.26 school applications per student and 12 percent of students who applied to a school and were not accepted in the Santiago Metropolitan Area, which has the highest penetration of voucher schools. Similarly, the percentage of students who applied to a school and were rejected and then ended up in voucher schools is 41 percent.

8. The low number of applications may be a consequence of selection from the supply side. In equilibrium, parents might not apply to schools that they expect are going to reject their kids. However, if this argument is of first-order importance, it would imply that these sophisticated parents must be really rational when they choose schools, which contradicts one of the most important arguments against school choice, and that currently used measures of school selectivity may be severely biased.

9. Elacqua, Schneider, and Buckley (2006); Gallego and Hernando (2007). For the theoretical rationale for this class of preferences, see Rayo and Becker (2007). Luttmer (2005) presents experimental evidence, and Chakrabarti (2005) includes related evidence for the voucher program in Milwaukee, Wisconsin.

10. Gallego and Hernando (2007).

The Impact of Nonvoucher Public Programs

Arguments outlining the potential benefits of a voucher system are based on the assumption that schools have hard budget constraints. In reality, public schools in Chile tend to receive explicit transfers from other programs and implicit transfers to finance school deficits.¹¹ At least some public schools, therefore, have soft budget constraints. This should have an impact on the incentives created by the voucher. This theoretical argument seems to be supported by the data. Public schools that operate under relatively soft budget constraints do not react to interschool competition, whereas schools that operate under hard budget constraints react strongly.¹² In contrast, Gallego and Hernando similarly find that only voucher schools with low market power (in the quality dimension) offer high quality, while public schools do not react to this incentive.¹³

Policy Implications

The value of the voucher needs to be increased, but with different values for different socioeconomic groups.¹⁴ This could increase average quality, decrease stratification, and improve the set of schools available to poor students. However, the necessary differentiation in the additional increase for poor students seems to be greater than current policy proposals. Simulations suggest that the value of the voucher should at least be doubled for poor students and should not increase for about 20 percent of students.¹⁵ Thus, it may not be realistic to expect that small increases in the value of the voucher will generate big impacts on quality for poor students, because the increase in the voucher value may not be sufficient to foster acceptable levels of quality.

A second issue that emerges from the previous discussion is that parents strongly value both distance and quality when choosing schools.¹⁶ Moreover, quality seems to be a superior attribute and distance an inferior attribute. This

11. See Serrano and Berner (2002), for instance.

12. Gallego (2006). In that paper, I extensively discuss some valid concerns about the identification strategy (that is, that “priests are unlikely to have ever been randomly allocated”). I present evidence against those concerns and thus in support of the strategy.

13. Gallego and Hernando (2007).

14. Aedo and Sapelli (2001) were the first authors to argue in favor of this proposal.

15. Gallego and Sapelli (2007b). The simulations use the following target: move all students to at least 0.50 standard deviation above current average test scores.

16. Gallego and Hernando (2007).

implies that low-quality schools may survive by being close to students, and this will be especially true for poor students. Thus, the education system needs to incorporate an exit mechanism, through a Superintendence or other institutional arrangement, for schools below some minimum quality level.

Finally, regulations that protect bad public schools from competition should be eliminated. In the current context, the increase in the voucher could easily be used just to finance deficits, without a clear impact on school quality.

Conclusion

McEwan, Urquiola, and Vegas raise a number of issues on the effects of a voucher system and information on school quality and stratification. The Chilean case provides an interesting experience that includes elements of a voucher system as well as some key distortions to this system. How these elements and distortions affect average quality and stratification is the key research question from an academic and policy perspective. Moreover, there is room for new research using more theoretically motivated semistructural empirical studies.¹⁷ I look forward to seeing more research on this and other topics from the authors.

17. Urquiola and Verhoogen (forthcoming) is an excellent example.

References

- Aedo, Cristian, and Osvaldo Larrañaga. 1994. "Sistemas de entrega de los servicios sociales: la experiencia chilena." In *Sistemas de entrega de los servicios sociales*, edited by Cristian Aedo and Osvaldo Larrañaga, pp. 33–74. Washington: Inter-American Development Bank.
- Aedo, Cristian, and Claudio Sapelli. 2001. "El sistema de vouchers en educación: una revisión de la teoría y evidencia empírica para Chile." *Estudios Públicos* 82 (otoño): 35–82.
- Anand, Priyanka, Alejandra Mizala, and Andrea Repetto. 2006. "Using School Scholarships to Estimate the Effect of Government Subsidized Private Education on Academic Achievement in Chile." Working Paper 220. Santiago: University of Chile.
- Angrist, Joshua, and Victor Lavy. 1999. "Using Maimonides' Rule to Estimate the Effect of Class Size on Scholastic Achievement." *Quarterly Journal of Economics* 114(2): 533–75.
- Angrist, Joshua, and others. 2002. "Vouchers for Private Schooling in Colombia: Evidence from a Randomized Natural Experiment." *American Economic Review* 92(5): 1535–558.
- Auguste, Sebastian, and Juan Pablo Valenzuela. 2006. "Is It Just Cream Skimming? School Vouchers in Chile." Buenos Aires: Fundación de Investigaciones Económicas Latinoamericanas.
- Bellei, Cristian. 2007. "The Private-Public School Controversy: The Case of Chile." PEPG Working Paper 05-13. Harvard University, Program on Education Policy and Governance.
- Bravo, David, Dante Contreras, and Claudia Sanhueza. 1999. "Rendimiento educacional, desigualdad y brecha de desempeño privado público: Chile 1982–1997." Working Paper 163. Santiago: University of Chile, Department of Economics.
- Bresnahan, Timothy F., and Peter C. Reiss. 1987. "Do Entry Conditions Vary across Markets?" *Brookings Papers on Economic Activity* (special issue): 833–71.
- . 1991. "Entry and Competition in Concentrated Markets." *Journal of Political Economy* 99(5): 977–1009.
- Centro de Estudios Públicos. 2006. "Estudio nacional de opinión pública, junio–julio 2006. Tema especial: educación." Santiago.
- Chakrabarti, Rajashri. 2005. "Do Vouchers Lead to Sorting under Random Private School Selection? Evidence from the Milwaukee Voucher Program." Harvard University.
- Chay, Kenneth, Patrick J. McEwan, and Miguel Urquiola. 2005. "The Central Role of Noise in Evaluating Interventions That Use Test Scores to Rank Schools." *American Economic Review* 95(4): 1237–258.
- Chubb, John, and Terry M. Moe. 1990. *Politics, Markets, and America's Schools*. Brookings.

- Coleman, James S., and others. 1966. *Equality of Educational Opportunity*. U.S. Department of Health, Education, and Welfare, Office of Education.
- Contreras, Dante. 2002. "Vouchers, School Choice, and the Access to Higher Education." Working Paper 845. Yale University, Economic Growth Center.
- Elacqua, Gregory. 2006. "Enrollment Practices in Response to Vouchers: Evidence from Chile." Occasional Paper 125. Columbia University, Teachers College, National Center for Study of Privatization in Education (www.ncspe.org/publications_files/OP125.pdf [31 August 2007]).
- Elacqua, Gregory, Mark Schneider, and Jack Buckley. 2006. "School Choice in Chile: Is It Class or the Classroom?" *Journal of Policy Analysis and Management* 25(3): 577–601.
- Engel, Eduardo, and Patricio Navia. 2006. *Que gane el "más mejor."* Santiago: Random House Mondadori.
- Epple, Dennis, and Richard E. Romano. 1998. "Competition between Private and Public Schools, Vouchers, and Peer-Group Effects." *American Economic Review* 88(1): 33–62.
- . 2002. "Educational Vouchers and Cream Skimming." Working Paper 9354. Cambridge, Mass.: National Bureau of Economic Research.
- Friedman, Milton. 1955. "The Role of Government in Education." In *Economics and the Public Interest*, edited by Robert A. Solo. Rutgers University Press.
- Gallego, Francisco A. 2006. "Voucher-School Competition, Incentives, and Outcomes: Evidence from Chile." Pontificia Universidad Católica de Chile, Instituto de Economía.
- Gallego, Francisco A., and Andrés Hernando. 2007. "School Choice in Chile: Looking at the Demand Side." Pontificia Universidad Católica de Chile, Instituto de Economía, and Harvard University.
- Gallego, Francisco A., and Claudio Sapelli. 2007a. "El esquema de financiamiento de la educación en Chile: una evaluación." *Revista de Pensamiento Educativo* 40(1): 263–84.
- . 2007b. "Financiamiento y selección en educación: algunas reflexiones y propuestas." *Puntos de Referencia* 286 (septiembre): 1–12. Santiago: Centro de Estudios Públicos.
- García-Huidobro, Juan Eduardo. 1994. "Positive Discrimination in Education: Its Justification and a Chilean Example." *International Review of Education* 40(3–5): 209–21.
- . 2000. "Educational Policies and Equity in Chile." In *Unequal Schools, Unequal Chances: The Challenges to Equal Opportunity in the Americas*, edited by Fernando Reimers, pp. 160–78. Harvard University Press.
- Gauri, Varun. 1998. *School Choice in Chile*. University of Pittsburgh Press.
- Hanushek, Eric A., John F. Kain, and Steven G. Rivkin. 2004. "Disruption versus Tiebout Improvement: The Costs and Benefits of Switching Schools." *Journal of Public Economics* 88(9–10): 1721–746.

- Hanushek, Eric A., and Margaret E. Raymond. 2003. "Lessons about the Design of State Accountability Systems." In *No Child Left Behind? The Politics and Practice of Accountability*, edited by Paul Peterson and Martin West, pp. 127–51. Brookings.
- . 2005. "Does School Accountability Lead to Improved Student Performance?" *Journal of Policy Analysis and Management* 24(2): 297–327.
- Hanushek, Eric A., and Ludger Woessmann. 2007. "The Role of School Improvement in Economic Development." Working Paper 12832. Cambridge, Mass.: National Bureau of Economic Research.
- Howell, William G., and Paul E. Peterson. 2002. *The Education Gap: Vouchers and Urban Schools*. Brookings.
- Hoxby, Caroline M. 2000. "Does Competition among Public Schools Benefit Students and Taxpayers?" *American Economic Review* 90(5): 1209–238.
- Hsieh, Chang-Tai, and Miguel Urquiola. 2003. "When Schools Compete, How Do They Compete? An Assessment of Chile's Nationwide School Voucher Program." Working Paper 10008. Cambridge, Mass.: National Bureau of Economic Research.
- . 2006. "The Effects of Generalized School Choice on Achievement and Stratification: Evidence from Chile's Voucher Program." *Journal of Public Economics* 90(8–9): 1477–503.
- Kane, Thomas J., and Douglas O. Staiger. 2001. "Improving School Accountability Measures." Working Paper 8156. Cambridge, Mass.: National Bureau of Economic Research.
- . 2002. "The Promise and Pitfalls of Using Imprecise School Accountability Measures." *Journal of Economic Perspectives* 16(4): 91–114.
- Krueger, Alan B., and Pei Zhu. 2004. "Another Look at the New York City School Voucher Experiment." *American Behavioral Scientist* 47(5): 658–98.
- Larrañaga, Osvaldo. 2004. "Competencia y participación privada: la experiencia chilena en educación." *Estudios Públicos* 96 (primavera): 107–44.
- Luttmer, Erzo F. P. 2005. "Neighbors as Negatives: Relative Earnings and Well-Being." *Quarterly Journal of Economics* 120(3): 963–1002.
- McEwan, Patrick J. 2000a. *The Impact of Vouchers on School Efficiency: Empirical Evidence from Chile*. Ph.D. dissertation, Stanford University.
- . 2000b. "The Potential Impact of Large-Scale Voucher Programs." *Review of Educational Research* 70(2): 103–49.
- . 2001. "The Effectiveness of Public, Catholic, and Non-Religious Private Schools in Chile's Voucher System." *Education Economics* 9(2): 103–28.
- McEwan, Patrick J., and Martin Carnoy. 2000. "The Effectiveness and Efficiency of Private Schools in Chile's Voucher System." *Educational Evaluation and Policy Analysis* 22(3): 213–39.
- McEwan, Patrick J., and Robert Olsen. 2007. "Admissions Lotteries in Charter Schools." Wellesley College and the Urban Institute.
- McEwan, Patrick J., and Joseph S. Shapiro. 2008. "The Benefits of Delayed Primary School Enrollment: Discontinuity Estimates Using Exact Birth Dates." *Journal of Human Resources* 43(1): 1–29.

- Mizala, Alejandra, and Pilar Romaguera. 2000. "School Performance and Choice: The Chilean Experience." *Journal of Human Resources* 35(2): 392–417.
- Mizala, Alejandra, Pilar Romaguera, and Miguel Urquiola. 2007. "Socioeconomic Status or Noise? Tradeoffs in the Generation of School Quality Information." *Journal of Development Economics* 84: 71–75.
- Mizala, Alejandra, and Miguel Urquiola. 2008. "Parental Choice and School Markets: The Impact of Information Approximating School Effectiveness." Columbia University.
- OECD (Organization for Economic Cooperation and Development). 2000. Programme for International Student Assessment (PISA) Database. Paris (www.pisa.oecd.org).
- . 2003. Programme for International Student Assessment (PISA) Database. Paris (www.pisa.oecd.org).
- Rayo, Luis, and Gary S. Becker. 2007. "Evolutionary Efficiency and Happiness." *Journal of Political Economy* 115(2): 302–37.
- Rothstein, Jesse. 2006. "Good Principals or Good Peers? Parental Valuations of School Characteristics, Tiebout Equilibrium, and the Incentive Effects of Competition among Jurisdictions." *American Economic Review* 96(4): 1333–350.
- Rouse, Cecilia Elena. 1998. "Private School Vouchers and Student Achievement: An Evaluation of the Milwaukee Parental Choice Program." *Quarterly Journal of Economics* 113(2): 553–602.
- Sapelli, Claudio. 2003. "The Chilean Voucher System: Some New Results and Research Challenges." *Cuadernos de Economía* 40(121): 530–38.
- Sapelli, Claudio, and Bernardita Vial. 2002. "The Performance of Private and Public Schools in the Chilean Voucher System." *Cuadernos de Economía* 39(118): 423–54.
- . 2003. "Peer Effects and Relative Performance of Voucher Schools in Chile." Working Paper 256. Pontificia Universidad Católica de Chile, Instituto de Economía.
- . 2005. "Private vs. Public Voucher Schools in Chile: New Evidence on Efficiency and Peer Effects." Working Paper 289. Pontificia Universidad Católica de Chile, Instituto de Economía.
- . 2006. "Performance of Voucher Schools in Chile: Efficiency, Resources or Sorting?" Pontificia Universidad Católica de Chile, Instituto de Economía.
- Serrano, Claudia, and Heidi Berner. 2002. "Chile: un caso poco frecuente de indisciplina fiscal (bailout) y endeudamiento encubierto de la educación municipal." Working Paper R-446. Washington: Inter-American Development Bank.
- Shadish, William R., Thomas D. Cook, and Donald T. Campbell. 2002. *Experimental and Quasi-Experimental Designs for Generalized Causal Inference*. Boston: Houghton Mifflin.
- Urquiola, Miguel. 2005. "Does School Choice Lead to Sorting? Evidence from Tiebout Variation." *American Economic Review* 95(4): 1310–326.
- . 2006. "Identifying Class Size Effects in Developing Countries: Evidence from Rural Bolivia." *Review of Economics and Statistics* 88(1): 171–77.

- Urquiola, Miguel, and Valentina Calderón. 2006. "Apples and Oranges: Educational Enrollment and Attainment across Countries in Latin America and the Caribbean." *International Journal of Educational Development* 26(6): 572–90.
- Urquiola, Miguel, and Eric Verhoogen. Forthcoming. "Class Size and Sorting in Market Equilibrium: Theory and Evidence." *American Economic Review*.
- Van der Klaauw, Wilbert. 2002. "Estimating the Effect of Financial Aid Offers on College Enrollment: A Regression-Discontinuity Approach." *International Economic Review* 43(4): 1249–286.
- Vegas, Emiliana, and Jenny Petrow. 2007. *Raising Student Learning in Latin America*. Washington: World Bank.