

The Efficacy of Educational Vouchers*

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Glossary

Children Scholarship Fund – Scholarship program for students to attend private schools funded by the Walton Family Foundation.

Indirect effects – Effects on students not utilizing vouchers to attend private schools.

Means-tested – A criterion that uses the ability to pay as means of being eligible for a voucher.

PACES program – A Columbian program offered educational vouchers to over 144 000 low-income students throughout Colombia from 1992 to 1997.

Scholarships – While both vouchers and scholarships are entitlements to attend a private school, vouchers are publicly funded while scholarships are privately funded.

Sectarian schools – Schools affiliated with particular faith or religion.

Selection bias – Estimated effect of programs could be biased because participants have chosen to participate, which is not captured by the econometric model.

Self-selecting – Students choose to attend a private school.

Vouchers – A government-financed entitlement that students and their families could use to attend any school, including private schools.

Introduction

Advocates for vouchers argue that vouchers create incentives for schools to compete for students and that such competition can make all schools more effective and efficient. Milton Friedman originally proposed vouchers as a government-financed entitlement that students and their families could use to attend any school, including private schools (Friedman, 1955, 1962). Over time, support for voucher programs has come from diverse groups such as conservative pro-market advocates (including Friedman), Roman Catholic bishops hoping to reinvigorate parochial schools in urban cities, and minority advocacy groups.

*This review is an abbreviated version of our previous review (Zimmer and Bettinger, 2007).

Voucher opponents argue voucher programs cream skim the best students and that vouchers can increase inequities if selection into voucher programs falls along racial or economic divides. They claim that by reducing public school enrolments, vouchers intensify the fiscal strains already felt by public schools.

Debates over vouchers have increased in the last decade or so with the advent of publicly funded voucher programs in Milwaukee, Cleveland, and Florida. Additionally, the increase in the number of foundations and philanthropists providing private money for students to attend private schools has also increased the public awareness of voucher programs. Outside of the United States, voucher-like programs have also increased in popularity; and while the motivation for these voucher programs differs from those in the US, debates over these programs rage worldwide. In this article, we examine many of the claims and counterclaims of the debate by surveying the research literature on both domestic and international programs.

In reviewing the existing voucher literature, we focus exclusively on empirical evidence on vouchers and do not include a review of other forms of school choice including charter schools, home schooling, or the effectiveness of private schools generally. While some research has extended beyond academic and behavioral outcomes or the distributional effects of voucher programs and examined the effects of voucher programs on residential housing markets (Nechyba, 2000), cost effectiveness of voucher programs (Levin, 2002), on subsequent public support for vouchers, or lack thereof (Brunner and Imazeki, 2006), and on who wins and loses under voucher programs (Epple and Romano, 1998, 2003), we only discuss these broader effects to the extent that the studies shed light on the specific voucher programs that we review.

This is not the first review of vouchers programs (e.g., Zimmer and Bettinger, 2007; Gill *et al.*, 2001; Levin, 2002; McEwan, 2000, 2004). These reviews include the conceptualization of, and rationale for, voucher programs as well as evidence on the efficacy of vouchers. This article builds on these reviews, but focuses on the achievement and behavioral effects of vouchers on students and the effect these programs have on access and integration.

Structure of Voucher Plans

Voucher programs differ greatly in their specific design. Much of this variation is related to the differences in the

motivation for vouchers among the voucher advocates (Levin, 2007 *Handbook*). For example, many conservatives believe that flat-rate, modest vouchers can increase efficiency through increased competition (e.g., Friedman, 1955, 1962). Other proponents argue that means-tested vouchers can promote equity by providing better educational opportunities to low-income families in inner-city schools. Programs also differ in their advocacy of subsidies for transportation, degree of information availability, regulation of admission policies, and accountability mechanisms (Jencks, 1970; Levin, 2002). In practice, voucher programs differ substantially in their level of support, the target population, and admission of sectarian schools.

The various programmatic details change with reference to who participates in the voucher program and are likely to influence the generalizability of individual programs and studies. For instance, programs that restrict participation to low-income students are likely to have different distributional effects than a universal voucher program. Programs that allow students to attend sectarian schools are also likely to attract a particular set of students – specifically students seeking religious instruction opportunities. Finally, the scale of the programs may affect whether these programs will generate general equilibrium effects that may be even larger than the localized effects of voucher programs (e.g., Nechyba, 2000; Epple and Romano, 1998, 2003).

As the programmatic design can affect outcomes this article, as in our previous review, highlights the details of each voucher program and the associated outcomes individually. We synthesize the results in the final section and provide a summary of the programs and outcomes in Table 1.

Domestic Voucher Programs

Domestic voucher programs have been funded either by public taxes or private donations, primarily through philanthropists or foundations. While the scale and regulation of public and privately programs may differ, they are similar in that they both provide a subsidy for students to attend private schools.

Publicly Funded Programs

The Milwaukee voucher program

The most visible domestic voucher program began in Milwaukee in 1990. The program focused on low-income students. The program started small being capped at 1% of the school district's population. In examining the program, Witte (2000) compared the performance of voucher students to that of all other students in the Milwaukee school system finding no differences in test scores. Greene *et al.* (1997, 1998), found increases in reading and math test scores when they compared outcomes for

voucher recipients who had stayed in voucher schools for multiple years to outcomes for a comparison group of students who had wanted to use the voucher but could not because of a lack of space. These divergent results led to an often heated debate over the results and methodologies (e.g., Mitgang and Connell, 2003; McEwan, 2000). Rouse (1998) attempted to resolve the controversy. Rouse took advantage of the fact that oversubscribed schools used randomization to assign vouchers. (McEwan (2007) discusses how randomization is the gold standard in evaluative research). Rouse found slight positive, significant effects of the voucher program in math test scores, but none in reading.

Milwaukee's voucher experience also sheds light on the impact voucher programs can have on access and racial integration. African-Americans made up over 62% of the voucher population. Hispanics made up about 13% (WLAB, 2000). The program successfully targeted low-income families with the average family income for program participants being around US\$11 600 (Witte, 2000). Other studies showed that the voucher parents had slightly higher educational levels (Rouse, 1998; Witte, 1996; Witte and Thorn, 1996) than other parents in Milwaukee.

While the early Milwaukee program offered insights to policymakers, the small scale of the program limited the policy implications. In 1995, the state of Wisconsin greatly expanded the scholarship cap and the range of private schools that students could attend. These changes dramatically redefined the scope of the program. While only 341 students attended seven private schools in 1991, over 15 000 students attended dozens of sectarian and non-sectarian schools by the 2004–05 school year (Gill *et al.*, 2001). This expansion led some researchers to investigate whether Milwaukee's program resulted in changes in nearby public schools (e.g., Hoxby, 2005). Unfortunately, the expanded program did not require testing within the private schools, which resulted in no new studies of the program. A recently commissioned study (funded by the Bradley and Joyce Foundations among others) seeks to reevaluate the Milwaukee voucher program by having private schools voluntarily administer a standardized test.

The Cleveland voucher program

In 1995, the Cleveland Municipal School District began. The program was initially intended to allow vouchers to be used at sectarian schools; however, court decisions immediately blocked this provision. Not until many years later were students allowed to choose among both sectarian and nonsectarian schools. In 2007, Cleveland's program served over 6000 students.

Cleveland's voucher program has not yielded clear answers about the program's impact on academic achievement. As in the Milwaukee program, the problem with the evaluations was whether the researchers used an adequate comparison group. The most often cited evaluation

Table 1 Summary of international research on vouchers

Voucher site	Authors	Measures effects on	Identification strategy	Key results
Milwaukee WI	Witte (1990) Greene, Peterson, Jiangtao (1997, 1998)	Voucher users Voucher users	Regressions with controls Quasi-experimental design	No substantial effect Significant effects in both reading and math
Cleveland OH	Rouse (1998) Metcalf (2003) Belfield (2006)	Voucher users Voucher users Voucher users	Quasi-experimental design with covariate controls Observational with covariate controls Quasi-experimental design with covariate controls	Significant effects in math only and the effects grew over time No effect Little effect from the voucher program
Privately financed voucher programs (Children's Scholarship Fund)	Mayer <i>et al.</i> (2002), Howell and Peterson (2002) Kruger and Zhu (2004)	Voucher users Voucher users	Randomization of vouchers with baseline controls Randomization of Vouchers	Positive effects primarily among black students No effect for any set of students, including black students
Colombia	Bettinger and Slonim (2006) Angrist, Bettinger, Bloom, Kremer, and King (2002) Angrist, Bettinger, and Kremer (2006)	Voucher users Voucher users Voucher users	Randomization of vouchers Randomization of vouchers Randomization of vouchers	Little effects of the voucher program on student test scores; increased altruism among voucher recipients Positive effects on school years completed and tests Positive effects on high school graduation
Chile	Bettinger, Kremer, and Saavedra (2006) Gallego (2005) Mizala and Romaguera (1998) Sappelli and Vial (2002) Rounds (1996) Hsieh and Urquiola (2003) Bravo, Contreras, and Sanhueza (2000) McEwan (2001) McEwan and Carnoy (2000) Tokman (2001)	Voucher users at vocational schools Overall system Voucher users Voucher users Overall system Voucher users Voucher users Voucher users	Randomization of vouchers Instrumental variable for voucher presence Regressions with controls Heckman selection model Regressions with controls; aggregation Regressions with controls Regressions with controls Regressions with controls Regressions with controls	Positive effects on high school graduation System-wide increase in test scores No effects on users Positive effects No system-wide increase in test scores No effects on users; effects depend on controls No effects at most voucher schools Mixed effects but private schools more cost effective Mixed effects depending on student background

of the program (Metcalf *et al.*, 2003) compared the academic achievement of voucher users to two groups of students: (1) students offered vouchers who did not use the vouchers, and (2) a matched set of students who were not offered vouchers. Other researchers, including Gill *et al.* (2001), argued that the study failed to create an adequate control for students self-selecting into the program. Belfield (2006) used a different comparison group focusing on applicants who were rejected in their application to private schools. Overall, he finds little effect on academic achievement.

Another key motivation for establishing the voucher programs was to improve students' access to better schools. Kim Metcalf (1999) found that the program successfully targeted minorities and students from low-income families. The mean income level of students utilizing the vouchers was US\$18 750 and these students were more likely to be African-American students than a random sample of Cleveland students. As in Milwaukee, parents of voucher applicants had slightly higher levels of education (Metcalf, 1999; Peterson *et al.*, 1999).

Other publicly funded voucher programs

Voucher programs are also in place in Vermont, Maine, Florida, and Washington, DC. Of these programs, only DC's Opportunity Scholarship program has any publicly released results, which are only the first-year impacts. The Institute of Education Sciences-funded evaluation of Washington's program is using a randomized design to evaluate the effectiveness of the program. To date, the results suggests that parents are more satisfied with the program, but students utilizing the vouchers do not report higher levels of satisfaction or feeling safer. In addition, test scores for these students are on par with nonvoucher students (Wolf *et al.*, 2007). However, caution is warranted in interpreting these results as they are noted only after the first year of implementing the voucher program.

Domestic, Privately Funded Programs

Roman Catholic dioceses have provided scholarships to students to attend their schools for years. The use of philanthropists and foundation money for private school scholarships was first popularized by J. Patrick Rooney, who formed the Educational Choice Charitable Trust in 1991. This trust allocated private scholarships to low-income students to use at private schools in Indianapolis. Other programs in Milwaukee, Atlanta, Denver, Detroit, Oklahoma City, and Washington, DC, soon followed.

Some of the programs were established and financed by conservatives who wanted to either open up sectarian school options to more students or to create competition between private and public schools. Other programs (e.g., Oklahoma City) were funded by liberal voucher

proponents who wanted to provide additional schooling opportunities for inner-city students.

In 1994, the Walton Family Foundation helped create the Children's Educational Opportunity Foundation (CEO America) to support and create private scholarship programs. Shortly thereafter, the number of privately funded programs quickly expanded across the country. Of these programs, one of the most ambitious was a CEO America program in San Antonio funded at US\$5 million a year for at least 10 years. The program provided full scholarships to over 14 000 at-risk students making it the largest privately funded voucher program in existence at the time.

In 1998, the Walton Family Foundation helped create the Children's Scholarship Fund (CSF). CSF partnered with local funders to provide scholarships in cities across the nation. In April 1999, 1.25 million low-income students applied for 40 000 partial scholarships. Over the last decade, more and more of the programs developed, often receiving very little national attention, making it difficult to know exactly how many of the programs currently exist.

Of these programs, CSF has received the most national attention partially because of its relatively large scale and partially because CSF used randomization to assign scholarships. With randomization, researchers can compare students who participated in the lotteries to determine the effectiveness of these programs. (Zimmer and Bettinger (2007) discuss some of the challenges in these studies.) Other studies have been carried out in Charlotte, Dayton, New York, and Washington, DC among other locations. While Greene (2000) found a positive overall effect on test scores in Charlotte after 1 year, these studies have generally shown no effect. The one exception is among African-American students. Howell and Peterson (2002) and Myer *et al.* (2002) found that African-American students' test scores improved in New York's program. However, additional research by Krueger and Zhu (2002) showed that this research was sensitive to the definition of an African-American student. While the original analysis used the student's mother's identified race for the student's race, Krueger and Zhu define African-American students as those whose mother or father are identified as African-American. This more inclusive definition results in a scholarship effect size that is smaller than reported in the original study and is not statistically significant.

In a more recent study, Bettinger and Slonim (2006) focus on the effects of vouchers on nonacademic outcomes. Using surveys and new methods from experimental economics, they attempted to measure the effects of the vouchers on traditional outcomes such as test scores and on altruism. To test the effects of the voucher program on altruism, Bettinger and Slonim gave students US\$10 each and invited them to share some of their money with charities. In this context, they show that voucher recipients gave more to charities as a result of the voucher program.

Given that these programs were designed to target impoverished students, it is not surprising to find that participants have relatively low income. Peterson (1998), for example, found that the average income level of families of students participating in the New York scholarship program was only US\$10 000. The parents' education level of the participants, however, was slightly higher than the average level of the eligible population. Similarly, Howell and Peterson (2000) and Wolf *et al.* (2000) found that the families of participating students were low income. In terms of race, 100% of students participating in the Washington, DC scholarship program were minorities, while 95% of the students in New York were minority, mostly Hispanic students. In Dayton, the percentage of minorities was lower but was still 66%.

Finally, these private voucher programs typically serve a low percentage of special education students. For example, in New York, 9% of participating students have disabilities compared to the district-wide average of 14% of special education students (Myers *et al.*, 2000). In Charlotte, 4% of participating students had disabilities, while the district-wide average of special education students was 11% (Greene, 2000).

International Voucher Programs

There are a number of educational voucher or voucher-like programs across the world, including programs in Chile, Colombia, Sweden, Netherlands, Belize, Japan, Canada, and Poland. These voucher programs often differ significantly from the US programs either in terms of the motivating factors or the policy context. For example, many of the non-US programs are motivated by the goal of increasing school attendance among girls or low-income students. The relationship between church-sponsored private schools and public schools is also less defined in other countries where, in many cases, religious groups operate public schools.

We focus our attention on two programs that have figured most prominently in debates on the efficacy of vouchers – Colombia's *Programa de Ampliación de Cobertura de la Educación Secundaria* (PACES) voucher program and Chile's national voucher program.

Colombia PACES Program

The PACES offered educational vouchers to over 144 000 low-income students throughout Colombia from 1992 to 1997. The voucher program awarded full private school tuition to secondary school students who wished to transfer from public to private school at the start of their secondary school. Over time, the voucher's value did not keep up with the cost of inflation.

In contrast to the US programs, the motivation for Colombia's voucher program was to expand the capacity

of the public school system. In Colombia, most high school buildings host multiple high school sessions per day. Since most private schools were not overcrowded, Colombia established the voucher program to take advantage of excess capacity in the private system.

In cities where PACES was oversubscribed, cities held lotteries to award the vouchers. Angrist *et al.* (2002) use this randomization to measure the effects of the program. They find that within 3 years, voucher students had completed about 0.1 years of schools more than their peers and had test scores about 0.2 standard deviations higher than those who did not receive vouchers. They also find that the incidence of child labor and teenage marriage was lower as a result of the educational voucher. Based on follow-up research on students' high school careers, Angrist *et al.* (2006) find that voucher lottery winners were 20% more likely to graduate from high school than voucher lottery losers.

In Colombia, the evidence on the impacts of stratification is less developed and conclusive than the effects on achievement. Colombia's educational vouchers targeted low-income families living in the poorest neighborhoods, and Ribero and Tenjo (1997) report that the vouchers were largely effective in reaching this population. Voucher applicants generally came from families with higher educational levels than other families in the same neighborhoods (Angrist *et al.*, 2002).

Chile

In 1980, Chile embarked on an ambitious series of educational reforms designed to decentralize and privatize education. At the urging of Milton Friedman, who along with other prominent economists advised the Pinochet government at the time (Rounds, 1996), Chile established perhaps the world's largest ongoing voucher program. The program offered tuition subsidies to private schools. Before the reform, the budgets of public schools were insensitive to enrolment; however, after the reform, local public schools lost money when students transferred to voucher schools.

Unlike Colombia, where vouchers targeted poor students, the Chilean system was available to all students. Additionally, unlike other programs that do not allow selective admission, voucher schools in Chile could admit the students they most preferred. As a result of these policies, Rounds (1996) found that the poorest families were less likely to attend voucher schools.

Research on the efficacy of Chile's voucher program has been much more difficult to interpret than the Colombian research because of the nature of this admission policy. Some of the early evidence suggested that voucher schools modestly outperformed public schools. This finding was common in many papers (e.g., Bravo *et al.*, 1999; McEwan and Carnoy, 2000) but was sensitive

to the types of controls included in the empirical model, the specific municipalities included in the sample, and the statistical methods used. McEwan (2001), for example, found that Catholic voucher schools tended to be more effective and productive than other schools, but only for certain specifications of the model. McEwan and Carnoy (2000) show that academic achievement is slightly lower in nonreligious voucher schools, particularly when located outside the capital. Given that these voucher schools have less funding, however, McEwan and Carnoy suggest that they could still be more cost effective than public schools.

As research on the Chilean system continued, many researchers took note of the fact that the voucher program altered the composition of both public and private schools. For example, Hsieh and Urquiola (2003) showed that more affluent families took advantage of the vouchers. Similar to McEwan and Carnoy (2000) and Carnoy (2000), Hsieh and Urquiola suggest that this shift in student populations could account for the finding that private schools appear to be more effective than public schools. In the early 1990s, many voucher schools began charging tuition in addition to the voucher, and the difference in parents' incomes and education levels between these tuition-charging voucher schools and the other voucher schools was significant (Anand *et al.*, 2006).

How this increased sorting across voucher and non-voucher schools affects student achievement depends on the nature of peer effects. If improvements in peer quality lead to better educational outcomes for voucher users, then the sorting associated with the voucher program could improve their outcomes. At the same time, given the exit of high-quality students from the public schools, the students left in those schools may have systematically worse outcomes because of the deterioration of their peers. The aggregate effect of the voucher depends on the strength of these two effects.

Hsieh and Urquiola (2003) argue that the only way to identify the overall effects of the voucher program is to focus on aggregate outcomes because it is difficult, if not impossible, to remove the selection bias inherent in comparisons of different schools. The change in aggregate test scores reflects both the direct achievement effects for voucher recipients and the indirect effects for students who remain in public schools. When the authors look at changes in aggregate test scores throughout Chile, they find no evidence that the voucher program increased overall test scores.

Gallego (2005) provides other evidence on the Chilean voucher program. Gallego uses an instrumental variable approach to estimate the effects of the program. His findings suggest positive effects of the voucher program on the academic outcomes of students throughout municipalities where the voucher program had more penetration. While the result may be indicative of competitive

effects, it is driven in part by the effects of the program on voucher recipients. It echoes earlier research (McEwan, 2001; McEwan and Carnoy, 2000) which suggested that voucher schools affiliated with Catholicism had better outcomes than other voucher schools, public or private. As McEwan and Carnoy (2000) show, Catholic schools produced better students at a lower cost than other, public or private, voucher schools.

Summary and Conclusion

Table 1 summarizes the achievement findings from both domestic and international voucher programs. The table highlights the location, program, methods used in the analysis, and their key findings.

Research on domestic voucher programs has produced inconsistent results. While advocates have often pointed to positive effects for African-American students in the CSF program as proof that vouchers can work, the strength of these findings has been questioned – leaving many skeptical about the purported benefits of vouchers. International studies have also found mixed results. The evidence from Colombia indicates that voucher users have better academic and nonacademic outcomes than they would have in the absence of the voucher. In Chile, the estimated effects differ across studies, and a number of confounding factors make it difficult to ascertain the true effects. The research generally shows that students who take advantage of vouchers are disadvantaged students, especially in voucher programs that are means tested and specifically target such students.

To date, most of the voucher studies focus on programs that are typically small in scale. Hence, it is not clear whether the results generalize to large-scale programs. For a program with massive movements of students, an important policy consideration is not only who is participating in these programs, but what happens to the racial/ethnic and ability distribution of students in public schools.

In sum, researchers have failed to come to consensus on the efficacy of vouchers as a reform effort. This murkiness may be clarified as new studies emerge, including studies of the current Milwaukee program and the federally funded Washington DC vouchers.

Future research needs to peer inside the black box and to examine the mechanism in which outcomes differ among schools. Voucher researchers should take the opportunity to look at private schools that may be doing things differently and how the variation in the operation affects outcomes. Additionally, future research can shed additional light on the effects of vouchers on other critical outcomes such as individual behaviors, educational attainment as measured by college attendance, and wages.

It is also interesting to consider the value of vouchers programs relative to other forms of choice. When the idea of vouchers were first introduced, the only choices a family could make was sending their students to private schools without subsidies or choosing among various public schools based on residential location. However, over the last 50 years, a number of other alternatives have evolved including charter schools, magnet schools, and other inter- and intra-district choice programs. A relevant policy question has to do with the advantages and disadvantages of voucher programs relative to these other choice options, especially when many of these choice options are politically more feasible.

See also: Competition and Student Performance; Educational Privatization; The Economic Role of the State in Education; The Economics of Catholic Schools; The Economics of Parental Choice.

Bibliography

- Angrist, J., Bettinger, E., Bloom, E., Kremer, M., and King, E. (2002). The effects of school vouchers on students: Evidence from Colombia. *American Economic Review* 92(5), 1535–1558.
- Angrist, J., Bettinger, E., and Kremer, M. (2006). Long-term educational consequences of secondary school vouchers: Evidence from administrative records in Colombia. *American Economic Review* 96(3), 847–862.
- Belfield, C. R. (2006). The evidence on education vouchers: An application to the Cleveland scholarship and tutoring program. http://www.ncspe.org/publications_files/OP112.pdf (accessed June 2009).
- Bettinger, E. and Slonim, R. (2006). Using experimental economics to measure the effects of a natural educational experiment on altruism. *Journal of Public Economics* 90(8–9), 1625–1648.
- Bravo, D., Contreras, D., and Sanhueza, C. (1999). *Rendimiento escolar, desigualdad y brecha de desempeño privado/público: Chile 1982–1997. Documento de Trabajo, Departamento de Economía, U de Chile*, 1999.
- Brunner, E. J. and Imazeki, J. (2006). Tiebout choice and the voucher. *Working Paper*. University of Connecticut Economics Department.
- Chubb, J. E. and Moe, T. M. (1990). *Politics, Markets, and America's Schools*. Washington, DC: Brookings Institution.
- Coons, J. E. and Sugarman, S. D. (1978). *Education by Choice: The Case for Family Control*. Berkeley, CA: University of California Press.
- Epple, D. and Romano, R. (1998). Competition between private and public schools, vouchers and peer group effects. *American Economic Review* 88, 33–63.
- Epple, D. and Romano, R. (2003). Neighborhood schools, choice, and the distribution of educational benefits. In Hoxby, C. M. (ed.) *The Economics of School Choice*, pp 227–286. Chicago, IL: The University of Chicago Press.
- Friedman, M. (1955). The role of government in education. In Solo, R. A. (ed.) *Economics and the Public Interest*, pp 123–144. Piscataway, NJ: Rutgers University Press.
- Friedman, M. (1962). *Capitalism and Freedom*. Chicago, IL: University of Chicago Press.
- Gallego, F. A. (2005). Voucher-school competition, incentives, and outcomes. Evidence from Chile: MIT mimeo.
- Gill, B., Timpane, P. M., Ross, K. E., and Brewer, D. J. (2001). *Rhetoric versus Reality: What We Know and What We Need to Know about Vouchers and Charter Schools*. Santa Monica, CA: RAND Education.
- Greene, J. P. (2000). *The Effect of School Choice: An Evaluation of the Charlotte Children's Scholarship Fund*. New York: Center for Civic Innovation at the Manhattan Institute.
- Greene, J. P., Peterson, P. E., and Du, J. (1997). *Effectiveness of School Choice: The Milwaukee Experiment*. Cambridge, MA: Harvard University Program in Education Policy and Governance.
- Greene, J. P., Peterson, P. E., and Du, J. (1998). School choice in Milwaukee: A randomized experiment. In Peterson, P. E. and Hassel, B. C. (eds.) *Learning from School Choice*, pp 335–356. Washington, DC: Brookings Institution.
- Howell, W. G. and Peterson, P. E. (2000). *School Choice in Dayton, Ohio: An Evaluation after One Year*. Cambridge, MA: Program on Education Policy and Governance, Harvard University.
- Howell, W. G. and Peterson, P. E. (2002). *The Education Gap: Vouchers and Urban Schools*. Washington, DC: Brookings Institute.
- Hsieh, C. and Urquiola, M. (2003). When schools compete, how do they compete? An assessment of Chile's nationwide school voucher program. *NBER Working Papers 10008*.
- Jencks, C. (1970). Educational vouchers: A report on financing elementary education by grants to parents. *Report Prepared under Grant CG 8542 for the U.S. Office of Economic Opportunity*. Washington, DC: Centre for Policy Studies.
- Krueger, A. B. and Zhu, P. (2002). *Another Look at the New York City School Voucher Experiment, Working Paper 9418*. Cambridge, MA: National Bureau of Economic Research.
- Levin, H. (2002). A comprehensive framework for evaluating educational vouchers. *Educational Evaluation and Policy Analysis* 24(3), 159–174.
- Levin, H. (2007). Issues in educational privatization. In Ladd, H. and Fiske, E. (eds.) *Handbook of Research in Education Finance and Policy*, pp 447–466. New York: American Education Finance Association/Erlbaum.
- McEwan, P. J. (2000). The potential impact of large-scale voucher programs. *Review of Educational Research* 70(2), 103–149.
- McEwan, P. J. (2001). The effectiveness of public, Catholic, and non-religious private schools in Chile's voucher system. *Education Economics* 9(2), 103–128.
- McEwan, P. J. (2004). The potential impact of vouchers. *Peabody Journal of Education* 79(3), 57–80.
- McEwan, P. J. and Carnoy, M. (2000). The effectiveness and efficiency of private schools in Chile's voucher system. *Educational Evaluation and Policy Analysis* 22(3), 213–239.
- Metcalfe, K. K. (1999). *Evaluation of the Cleveland Scholarship and Tutoring Grant Program: 1996–1999*. Bloomington, IN: The Indiana Center for Evaluation.
- Metcalfe, K. K., West, S. D., Legan, N. A., Paul, K. M., and Boone, W. J. (2003). Evaluation of the Cleveland scholarship and tutoring program. *Summary Report 1998–2002*. Bloomington, IN: Indiana University School of Education.
- Mitgang, L. D. and Connell, C. V. (2003). Educational vouchers and the media. In Levin, H. M. (ed.) *Privatizing Education: Can the Marketplace Deliver Choice, Efficiency, Equity, and Social Cohesion?* pp 20–38. Boulder, CO: Westview.
- Myers, D., Peterson, P., Mayer, D., Chou, J., and Howell, W. G. (2000). *School Choice in New York City after Two Years: An Evaluation of the School Choice Scholarship Program*. Washington, DC: Mathematica Policy Research.
- Myers, D. P., Peterson, P. E., Myers, D. E., Tuttle, C. C., and Howell, W. G. (2002). School choice in New York City after three years. An evaluation of the school choice scholarships program. *Rep. No. 8404-045*. Princeton, NJ: Mathematica Policy Research.
- Nechyba, T. (2000). Mobility, targeting and private school vouchers. *American Economic Review* 90, 130–146.
- Peterson, P. E. (1998). *An Evaluation of the New York City School Choice Scholarships Program: The First Year*. Cambridge, MA: Program on Education Policy and Governance, Harvard University.
- Peterson, P. E., Howell, W. G., and Greene, J. P. (1999). *An Evaluation of the Cleveland Voucher Program after Two Years*. Cambridge, MA: Program on Education Policy and Governance, Harvard University.
- Ribero, R. and Tenjo, J. (1997). University de los Andes, Department of Economics Working Paper.
- Rounds, P. T. (1996). Will pursuit of higher quality sacrifice equal opportunity in education? An analysis of the educational voucher system in Santiago. *Social Science Quarterly* 77(4), 821–841.

- Rouse, C. E. (1998). Private school vouchers and student achievement: An evaluation of the Milwaukee parental choice program. *Quarterly Journal of Economics* 113, 553–602.
- Wisconsin Legislative Audit Bureau (WLAB) (2000). *Milwaukee Parental Choice Program: An Evaluation*. Madison, WI: Legislative Audit Bureau.
- Witte, J. F. (1996). Who benefits from the Milwaukee choice program? In Fuller, B., Elmore, R. F., and Orfield, G. (eds.) *Who Chooses, Who Loses? Culture, Institutions, and the Unequal Effects of School Choice*, pp 118–137. New York: Teachers College Press.
- Witte, J. F. (2000). *The Market Approach to Education*. Princeton, NJ: Princeton University Press.
- Witte, J. F. and Thorn, C. A. (1996). Who chooses? Voucher and interdistrict choice programs in Milwaukee. *American Journal of Education* 104, 187–217.
- Wolf, P., Gutmann, B., Puma, M., Rizzo, L., and Eissa, N. (2007). Evaluation of D.C. opportunity scholarship program: Impacts after one year. Institute of Education Science, U.S: Department of Education, NCEE 2007-4009.
- Wolf, P., Howell, W. G., and Peterson, P. E. (2000). *School Choice in Washington D.C.: An Evaluation after One Year*. Cambridge, MA: Program on Education Policy and Governance, Harvard University.
- Zimmer, R. and Bettinger, E. (2007). Beyond the rhetoric: Surveying the evidence of vouchers and tax credits. In Ladd, H. and Fiske, E. (eds.) *Handbook of Research in Education Finance and Policy*, pp 447–466. New York: American Education Finance Association/Erlbaum.
- Figlio, D. and Ludwig, J. (2000). Sex, drugs and Catholic schools: Private schooling and non-market adolescent behaviors. *NBER Working Paper No. 7990*, November 2000.
- Gill, B. and Booker, K. (2007). School competition and student outcomes. In Ladd, H. F. and Fiske, E. B. (eds.) *Handbook of Research in Education Finance and Policy*, pp 183–202. New York: American Education Finance Association/Erlbaum.
- Greene, J. P. and Hall, D. (2001). *The CEO Horizon Scholarship Program: A Case Study of School Vouchers in the Edgewood Independent School District, San Antonio*. Washington, DC: Mathematica Policy Research.
- Howell, W. G. (2004). Dynamic selection effects in mean-tested, urban school voucher programs. *Journal of Policy Analysis and Management* 23(2), 225–250.
- King, E., Rawlings, L., Gutierrez, M., Pardo, C., and Torres, C. (1997). Colombia's targeted education voucher program: Features, coverage and participation. *Working Paper No. 3*, Series on Impact Evaluation of Education Reforms, Development Economics Research Group, The World Bank.
- Ladd, H. F. and Hansen, J. S. (eds.) (1999). *Making Money Matter: Financing America's Schools*. Washington, DC: National Academy Press.
- Levin, H. (1998). Educational vouchers: Effectiveness, choice, and costs. *Journal of Policy Analysis and Management* 17(3), 373–392.
- Levin, H. (1999). The public-private nexus in education. *American Behavioral Scientist* 43(1), 124–137.
- Peterson, P. E., Campbell, D. E., and West, M. R. (2001). *An Evaluation of the Basic Fund Scholarship Program in the San Francisco Bay Area, California*. Cambridge, MA: Program on Education Policy and Governance.
- Toma, E. F. (1996). Public funding and private schooling across countries. *Journal of Law and Economics* 39, 121–148.

Further Reading

- Belfield, C. R. and Wooten, A. L. (2003). Educational tax credits for America's schools. *NCSPE Policy Briefing 3*. http://www.ncspe.org/publications_files/PB03.pdf (accessed June 2009).
- Bettinger, E., Kremer, M., and Saavedra, J. (2006). How educational vouchers affect students – the role of vocational high schools in Colombia. *Case Western Reserve* mimeo.
- Carnoy, M. (1998). National voucher plans in Chile and Sweden: Did privatization reforms make for better education? *Comparative Education Review* 42(3), 309–337.
- Coleman, J., Hoffer, T., and Kilgore, S. (1982). Cognitive outcomes in public and private schools. *Sociology of Education* 55, 65–76.
- Evans, W. N. and Schwab, R. (1995). Finishing high school and starting college: Do Catholic schools make a difference? *Quarterly Journal of Economics* 110(4), 941–974.

Relevant Websites

- <http://www.brookings.edu> – Brookings Institute.
- <http://www.edreform.com> – Center for Education Reform.
- <http://www.edweek.org> – Education Week.
- <http://www.friedmanfoundation.org> – Friedman Foundation for Educational Choice.
- <http://www.nea.org> – National Education Association.
- <http://www.ncspe.org> – National Center for the Study of Privatization in Education.
- <http://www.vanderbilt.edu> – Vanderbilt's National Center on School Choice.