

DOCUMENT(S) REVIEWED:	“Are Private High Schools Better Academically Than Public High Schools?” “Monopoly Versus Markets: The Empirical Evidence on Private Schools and School Choice”
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Summary of Review

Public versus private school achievement gaps in general and the effects of school choice on academic outcomes in particular remain controversial issues. I review two recent reports of empirical studies on this topic: one from the Milton & Rose D. Friedman Foundation (MFF) and the other from the Center on Education Policy (CEP). MFF presents its empirical analysis in the context of the larger policy question about the effect of school choice, whereas CEP simply attempts to answer a research question, with policy implications, about a possible public-private school achievement gap. Both studies contribute new evidence to the existing literature through secondary analyses of national high school student datasets — the Educational Longitudinal Study (ELS) and the National Education Longitudinal Study (NELS) databases. The two reports in tandem provide contrasting views and results regarding private school effects. MFF argues that private schooling is more successful at improving student test scores; CEP argues that public and private schools have relatively equal success. This review provides an independent cross-examination of the two data sources and shows that the public-private high school gaps in math achievement gain scores were almost null (in the NELS) or too small to be practically significant (in the ELS). Therefore, the seemingly divergent findings and conclusions at the first glance may have been largely due to their different interpretations rather than real differences in the results. Both studies could have given more useful guidelines for policy and practice if they had examined reasons for observed gaps (or the lack thereof) between public and private schools.

REVIEW

I. INTRODUCTION

School choice remains one of the most controversial issues in educational policy. The original idea of school vouchers was proposed in 1955 by Milton Friedman as a solution to the public schools' perceived monopoly control over schooling.¹ Debates over such vouchers often engage the question of whether private schools are more effective in educating students. It is within that context that two reports were recently issued by think tanks.

The first report, entitled, "Monopoly Versus Markets: The Empirical Evidence on Private Schools and School Choice,"² was issued by the Milton & Rose D. Friedman Foundation (MFF). This report was written by Greg Forster, a senior fellow of the foundation. The report covers two areas: it includes both a review of prior research on the effects of voucher programs and a new study presenting a public vs. private school comparison. My review here will focus only on the latter.³

The second report is "Are Private High Schools Better Academically than Public High Schools?"⁴ and was issued by the Center on Education Policy (CEP). It was authored by Harold Wenglinsky. Wenglinsky's report focuses on a narrower public-private comparison than does the MFF one: examining disadvantaged students in urban settings.

Both the CEP and the MFF studies attempt to add new empirical evidence to the existing literature of public-private gaps in academic outcomes. They share several commonalities: (1) comparing public and private schools in terms of students' learning outcomes as measured by standardized tests and (2) conducting secondary analysis of a na-

tionally representative sample of high school students. While the MFF study broadly compares public and private schools in the Educational Longitudinal Study (ELS) data, the CEP study capitalizes on more detailed information on school subtypes available in the National Education Longitudinal Study (NELS) data. Specifically, the CEP study differentiates three subtypes of public schools (comprehensive public schools, magnet schools, public schools of choice) and five subtypes of private schools (Catholic diocesan, Catholic holy order, Catholic parish, non-Catholic religious, independent private). This differentiation of school subtypes within each sector acknowledges their different missions and organizations, which are often obscured by conventional, monolithic comparisons of public versus private schools.

The CEP report examines, through its secondary analysis of the NELS data, academic outcomes such as high school academic achievement (reading, math, science, social studies), educational attainment, civic-mindedness, and students' job satisfaction eight years after high school. The MFF report, through its secondary analysis of the ELS data, begins with a literature review that discusses a broader set of outcomes, such as segregation, but the new MFF report limits its own study to two available measures—high school academic achievement (math only) and dropout rates. For other measures, it relies on its review of prior research.

Given the limitations of observational data and the two reports' uses of different data, this review takes the approach of cross-examining and cross-validating the research evidence in both studies.

II. FINDINGS AND CONCLUSIONS OF THE REPORTS

Despite their similar research problems and methods, the CEP report and the MFF report come to very different conclusions regarding the effects of public and private schools on academic outcomes. The CEP study finds that low-income students from urban public high schools generally did as well as their peers in private high schools on academic measures as well as on post-high school measures such as civic engagement and job satisfaction. Once key family background characteristics, such as socioeconomic status, and behaviors, such as parental involvement, were taken into account, CEP's findings were: (1) public high school students performed equally well on achievement tests as their counterparts in private schools; (2) the chances of attending college was not different between public and private school students; and (3) young adults who had attended public high schools displayed the same levels of job satisfaction and civic engagement as those who had attended any type of private high school. The study also notes two exceptions to these general findings: (1) independent (non-religious) private high school students obtained higher SAT scores than public school students and (2) Catholic schools run by holy orders such as the Jesuits had nominal positive academic effects. The CEP report concludes that, on average, students who attend private high schools receive neither immediate academic advantages nor longer-term advantages in attending college, finding satisfaction in the job market, or participating in civic life.

The MFF report, however, finds that private school students achieved more academic gains than public school students even after taking into account their different profiles of race, income, parental education and family composition. The study claims that the pri-

vate school effect is substantial in size. The report concludes that private schools in general, and school choice programs in particular, confer better academic and other benefits. But these conclusions about school choice are based primarily on the report's presentation and interpretation of prior research, not from the new analyses by MFF.

As discussed in the review of findings and conclusions below, the two reports' specific findings do not, as a practical matter, greatly differ. While it is true that the MFF study found a statistically significant benefit associated with private schooling and the CEP study did not, it is also true that the CEP study teased out some exceptions (for some independent schools and Catholic schools), while the benefit asserted in the MFF study is relatively small.

III. RATIONALES SUPPORTING FINDINGS AND CONCLUSIONS OF THE REPORTS

As both the CEP and the MFF reports claim, national longitudinal datasets (NELS and ELS data) are very useful in sorting out school effects because they track individual students' academic achievement over time.

The CEP study analysis of NELS data begins with a report of baseline-year differences in academic achievement between public and private school students in 8th grade. Private school students, particularly Catholic diocesan and independent private students, enter high school academically better prepared than their public school counterparts. Using national longitudinal data allows CEP to account for this difference in starting points and measure achievement gains made during high school. In contrast, and despite its use of baseline-year test scores for comparison, the MFF study does not report or explicitly account

for the public-private school achievement gap in 10th grade (note that the ELS database looks at public or private attendance in the 10th grade, not the 8th).

Even after considering the baseline difference, both studies still find that the initial achievement gap widened over time in some instances. CEP, for instance, finds that private school students, specifically independent private school groups, gained more than their public school counterparts through their four years of high school.⁵

Since these differences may be attributable to extraneous factors that are beyond the control of schools, such as family income and parents' expectations of their children, both studies attempt to capitalize on the readily available measures of student and family background variables in the national datasets. The CEP study notes significant differences between the two groups in terms of students' family socioeconomic status (SES), academic support and cultural capital, which could contribute to the widening of the preexisting achievement gap. After taking these differences into account through appropriate statistical procedures, the study finds that the private school advantages almost disappear. For example, the adjusted differences between independent private and comprehensive public schools in 12th grade achievement were too small to be statistically significant. What this means is that, while at first glance private schools appear to do better than public schools at educating students, most of the differences in scores can be accounted for by the fact that public and private schools have very different groups of students.

In contrast, the MFF study found that, even after taking into account selected student background factors, private schools continue to outperform public schools in math

achievement gains from 10th grade to 12th grade. However, while the difference in achievement gains MFF reports was statistically significant, the difference was very small in absolute terms and its practical significance is questionable.⁶

The MFF report nonetheless states that the "private school effect is substantial in size," pointing to purported gains for 12 years of schooling. That is, the report extrapolates from the gains it finds for the last two years of high school. This assumes that changes in achievement in other grade levels would be the same in size (and would, in fact, be gains rather than losses). Without additional research, these assumptions cannot be reasonably made.

One can identify several reasons why the two reports may have come to different conclusions. The two reports are based on different national datasets collected at different time periods during which other external factors may have influenced student achievement. The two studies also varied in their target population. The MFF study used the entire group of students included in the ELS data set. The author argues that this unrestricted selection can help gain some insight on the effect of school choice on students who are not especially disadvantaged. In contrast, the CEP study restricted its analytical sample to those who met two criteria: (1) attended urban high schools, and (2) had family income in the lowest quartile nationally of socioeconomic status. The CEP report justifies this decision regarding its more restrictive sample selection based on policy and methodological grounds (p. 26). With regard to policy relevance: "many policy discussions about private school choice, including voucher plans, are focused on creating alternatives for students in urban school systems." With regard to the elimination of confounding factors: "the compari-

son between public and private schools means something different in suburban areas, where suburban public schools have many of the advantages of private schools. Including suburban schools might bias models away from private school advantages.” Despite these reasonable rationales, more descriptive information about the other characteristics of the subgroup CEP analyzed in comparison with excluded ones was not provided but would have been very helpful to readers. Without this information, it was not clear what unique and unreported aspects of this choice may have influenced the findings. Both studies should have discussed the implications of their analytical choice with full information on the students who were included or excluded in their studies.

IV. THE REPORTS’ USE OF RESEARCH LITERATURE

New empirical research should generally be guided by a comprehensive and balanced review of prior research. The two reports differ considerably in their reviews of the literature. The MFF report focuses on experimental studies, particularly randomized trials of voucher programs, while the CEP report focuses on secondary analysis of large-scale national data studies related to public and private school achievement gaps. The MFF report highlights studies and findings that support its overall recommendations and dismisses evidence that does not fit its thesis. For example, the report colors the voucher-study findings by either inflating positive results or dismissing insignificant (neutral) results.⁷ The conclusions reached by the CEP review are less decisive about the possible achievement benefits of private school attendance.

In reviewing the range of educational outcomes that could differ between public and

private schools, the MFF report appears to be more comprehensive because of its broader touch on multiple educational outcomes. However, the MFF report is not balanced or thorough in synthesizing findings from prior research. First, it limits its review to studies that used random assignment for the evaluation of school voucher programs. It contends that random assignment is the gold standard for social science research, but nothing presented justifies the wholesale exclusion of other types of studies, specifically quasi-experimental and correlational studies. In fact, randomized field trials are not always warranted, feasible, or ethical. Moreover, these trials often lack external validity due to limited sample sizes. The selected studies were conducted in large cities (Charlotte, Milwaukee, New York, and Washington, DC), and the generalizability of the findings to the broader national or state contexts or to suburban or rural settings is questionable. Further, there is a disconnect between the very limited literature review on voucher programs and the new empirical research that the author then presents, which does not meet the self-defined gold standard.

The CEP report’s discussion of research focuses on earlier national high school longitudinal data, such as studies by Coleman and his colleagues and by Bryk and his colleagues.⁸ Both the CEP and the MFF studies claim that their use of longitudinal data allows them to cope with the limitations of some previous studies that used cross-sectional data, such those that analyzed NAEP data.⁹

What is missing in both sets of reviews is the distinction between school subtypes within the public and private sector and a discussion of what accounted for the effects in previous research. Such a discussion would be important to consider in under-

standing what a school effect means and where a private school effect, if any, exists.¹⁰

IV. REVIEW OF THE REPORTS' METHODOLOGIES

Basic pieces of both reports' methodologies were appropriate for the data and their investigations, but there are several limitations not fully acknowledged in either report. Both studies used data on student achievement at several points in time to measure the value added from schooling, and used similar, appropriate statistical techniques to control for other factors. The MFF study's choice of control variables is consistent with conventional practice, controlling for race/ethnicity, family structure, family income, and parental education. The CEP study similarly controlled for SES, parental discussion, parental involvement, and parental expectations. The CEP study not only included SES, like the MFF study, but also took an extra step to control other aspects of parental influences (what parents do as opposed to who they are). Although this choice is theoretically justifiable, its actual contribution to the model fit appears to be marginal.

Neither the MFF report nor the CEP report provided descriptive statistics. Such reporting would have rendered more information such as the percentages of students in each type of school and the central tendencies and spreads of the key variables for each type of school. This information would have helped readers better interpret the reports' findings. Neither examined selection mechanisms — how public and private schools differ in terms of the student profiles and how students and their parents self-select into different types.¹¹

The robustness of CEP report findings was

verified through a propensity score matching analysis, presented in a companion study funded by CEP and written by a different researcher.¹² This procedure gives some assurance that the matching of public and private school students through the report's statistical modeling was successful. The MFF report findings were not confirmed but would have benefited from doing so.

Both studies report that their findings meet certain levels of statistical significance. Knowing what these levels are is critical in gauging the likelihood that their sample results are not simply obtained by chance (and thus can be generalized to the national population). While both studies followed conventional standards of .05, .01 and .001 for significance levels, they did not acknowledge that even a very small effects difference may turn out to be statistically significant since they used large-scale national sample datasets.¹³ Despite the limitation of the statistical significance information, neither report fully interprets the *practical* significance of the public-private differences that they found. If an effect size is very small compared to the effects of other policies or factors, policy intervention may not be justified.

Furthermore, neither study examined whether certain groups of students seemed to benefit more by being at one school type rather than another. The CEP and MFF analyses both need further research in light of prior work such as Bryk and Lee's study of Catholic schools showing the stronger positive school effects for disadvantaged students,¹⁴ and Howell and Peterson's studies of randomized school voucher trials in New York City, Dayton, and Washington DC, which only revealed positive effects (at least in limited instances, and for certain model specifications) for black students.¹⁵

Both studies conducted a uni-level analysis,

using individual students as the unit of analysis. This approach cannot effectively differentiate school sector effects, if any, on within-school gaps vs. between-school gaps with regard to family background characteristics. In other words, questions remain as to whether private schools contribute to narrowing or widening the achievement gap for disadvantaged minority students. They may, for example, help narrow the gap within schools through curricular detracking, but widen the gap between schools through racial segregation. These school sector effects on academic equity could have been disentangled through multi-level analysis.

Finally, it is worth noting how each report measured achievement using test scores. The MFF study used T-scores, an approach that shows how well students do in comparison to each other. T-scores cannot, however, show how much student learning grows over time. A student may have learned a great deal over time, but it wouldn't be reflected in her T-score if everyone learned as much as she did. Her T-score would stay the same. If she or her peers learned nothing, her T-score would also stay the same over time. The CEP study used IRT scale scores, which have the benefit of showing absolute growth (how much a student has learned over time) and is not affected by how others do. The choice of test score metrics may or may not make a difference in the studies' findings on the relative advantages of public vs. private schools, but it makes a difference in our understanding of how much academic progress students make in each type of schools.

V. REVIEW OF THE VALIDITY OF THE FINDINGS AND CONCLUSIONS

These two studies challenge readers to draw a distinction between scientific research and political propaganda. The question is where these reports fall on the continuum between

the two. The MFF report's review of prior research and interpretations of the results from its own empirical study reveals strong bias in favor of private schools and school choice. The MFF report provides vigorous arguments for school choice (including private schools) based largely on the selective literature review. In contrast, the CEP study is more balanced in its interpretations of its results.¹⁶ An important difference in the studies is that MFF starts out trying to answer a policy question and that CEP is attempting to answer a research question with policy implications.

What are threats to internal and external validity of the two studies? Perhaps most importantly, researchers should not draw causal conclusions about whether public or private schools lead to better results for children based on observational studies. Causal conclusions are not warranted due to the many potential serious threats to internal validity. While both reports do not make strong causal arguments, they do not fully explain the limitations of doing so either. Indeed, there remain concerns with the validity of public and private school comparisons due to self-selection and creaming. The students in public and private schools may be different in fundamental ways. Private schools might have entrance criteria that public schools do not. Parents who are more engaged in their children's education might be more likely to use vouchers than parents who are not. Both reports' analyses may not have included important factors, which may have biased the results.

While the two new studies' use of large-scale national databases may contribute to their external validity, potential limitations still remain. Because they look at relatively short periods of time and only certain outcomes and subjects, the reports' findings cannot be generalized without concerns and

limitations.

The small but notable differences in major findings between the two studies, along with mixed results from prior research, raise questions about the robustness of findings on public-private school gaps in terms of value-added student achievement gains. Beyond the methodological concerns above, one possible explanation is that public schools, private schools, or both may have changed over the past three decades so that what held true in the 1980s no longer does. Moreover, any changes in the differences between the subtypes of public and private schools may have been obscured in the aggregate comparisons. It should be noted that the results would differ depending on which group was used as a reference group for comparison. The MFF study used all public schools as a reference group, whereas the CEP study used only comprehensive public schools.¹⁷

Given the various design factors (different groups studied, grades, subjects, test score metrics) that may account for the differences between the two studies, it might be informative to compare the descriptive statistics of public and private high school gains in student achievement by applying common parameters to the two national datasets that these studies use. Table 1 offers such a comparison of NELS and ELS results on the 10th to 12th grade math achievement gain scores in public and private schools in T-score and IRT-estimated number right metrics.

Although these direct comparisons did not make any adjustment for family background factors and the like, the patterns generally confirm what the two studies found: equivalent private school performance in the NELS data and higher performance of private schools in the ELS data.¹⁸ However, a closer

look at the effect sizes shows that the public-private high school gaps in math achievement gain scores were almost null (in the NELS) or too small to be practically significant (in the ELS). Therefore, the reports' seemingly divergent findings and conclusions at first glance may have been largely due to their different interpretations rather than real differences in the results.

Table 1. National Average Public and Private High School 10th to 12th Grade Math Achievement Gain Scores and the Private-Public School Gaps in NELS and ELS

Data	Outcome Metric	Public School	Private School	Gap (Effect Size)
NELS	T-score	-.28	.04	.32 (.03)
	IRT-estimate	4.31	5.08	.77* (.06)
ELS	T-score	-1.13	.00	1.13*** (.12)
	IRT-estimate	9.97	13.01	3.04*** (.26)

Note. * p < .05, *** p < .001

The effect size appears in parentheses, showing standardized group mean difference in gain scores between public and private schools. By one conventional standard, any effect size of .5 or larger is deemed practically significant.

How likely is it that the above unadjusted public-private gaps simply reflect the effects of extraneous factors that are beyond the control of schools — such as SES and who decides to go private rather than public schools? How much would the above results change with consideration of demographic differences (i.e., through statistical matching of students between the two sectors)? One may argue that leveling the playing field

between school types based on SES, family support and parental involvement would make public school students gain as much as their private school counterparts, which is what CEP reports for a limited subset of students and schools.

In contrast, one may make the counter argument that this statistical matching procedure may favor public schools and make the comparison unfair by taking away credit for any effective practices of school staff from affluent private schools that may better mobilize parental engagement and support for children's education. This dispute cannot be easily resolved through secondary analysis of observational data. And neither of these reports really helps resolve the dispute. Rather, their different choice of control variables used for public-private school comparison just reinforces the lack of consensus on this issue.

Once the private school results in Table 1 from NELS and ELS data are further broken down between Catholic and other private school types, the results show that there are significant differences between public and Catholic schools but not necessarily between public and non-Catholic private schools: NELS shows only a Catholic advantage whereas ELS shows both Catholic and independent private school advantages (statistically significant but very small gaps). Future studies need to take an in-depth look into differences between school subtypes within each sector as well as between public and private sectors.

VI. USEFULNESS OF THE REPORTS FOR GUIDANCE OF POLICY AND PRACTICE

Since the first modern-day school voucher law was passed by the state of Wisconsin in 1990 (targeting low-income families in

Milwaukee), school choice programs have sprung up in several states and the District of Columbia. In light of the controversies on the effects of school choice, both the MFF and the CEP reports are timely and policy-relevant. While both reports address the common question, "Is private school better academically than public school," this raises another question, "Better for whom, all students or specific subgroups, and for what purpose?"

There has been an evolution of school choice, including diversified goals and divergent forms.¹⁹ While Friedman's school voucher idea was originally intended to improve educational productivity in general, the contemporary argument for school choice appeals more to the goal of equalizing educational opportunities, especially for low-income, disadvantaged families in inner-cities. Therefore, student outcomes related to both "productivity" and "equity" goals deserve attention for the evaluation of current school choice policies and programs. The MFF and CEP studies tend to focus on productivity as measured by improving average test scores, while ignoring equity as measured by narrowing test score gaps among different racial and social groups of students.

Further, school choice programs and types of private and public schools differ in important respects, and research should do a better job of paying attention to these differences. The MFF study did not go the extra step and separate the issue of school choice within the public school sector from the issue of school choice across different sectors. The CEP study makes more of a contribution in this direction.

The two reports in tandem provide contrasting views and results on public versus private school effects, which will promote fur-

ther studies. The MFF study concludes that private schooling is more successful at increasing test scores, and it presents results that do show a small but statistically significant advantage for private schools in terms of increased test scores. The CEP study, however, reports relatively equal success in public and private schools. If private school students do have significantly greater gains than public schools students, the reason remains to be investigated and fully explained. Both studies examined here tend to take a purely outcome-driven approach, leaving the underlying student selection mechanism, school organization and schooling process hidden away in a black box. In this respect, the public vs. private school comparisons in both the CEP and the MFF reports do not give very useful guidelines for policy and practice, since these require nuance rather than global statements about performance.

In order to make their studies more accessible to lay people, the two reports focus a great deal on the substantive findings of their studies. In doing so, they minimize (or ignore) technical discussions and descriptions of statistical procedures and methodologies. The CEP report discussed methodological issues in the appendix and also explains some basic statistical terms (e.g., variable, correlation, and regression) for readers who do not have a background in statistical research. The MFF report does not include a technical appendix for explaining the data and methods in detail, which makes it harder to judge the quality of their work.

A major limitation of both studies is that their conclusions are based on the simple dichotomy of statistically significant or insignificant differences — whether there is in fact a difference — without considering if the difference is large enough to be meaningful to policy and practice. There is no one-size-fits-all criterion to evaluate the size

of an effect or to judge practical import of their findings about school effects. Nevertheless, both reports appear to avoid this discussion as well as contextual information that would help readers come to their own conclusions about the importance of these effects.

In spite of these limitations, both studies provide food for thought. What counts as school success and whose values matter in school choice? What kind of student outcomes and school effects matter for educational policymakers and parents? For those concerned with school accountability, value-added achievement gains are generally seen as preferable indicators of school effects. From this perspective, the findings of the CEP study indicate that public schools are doing an equally good job as private schools. The MFF study suggests slight private advantages, but the difference in value-added gains appears to be so small that public schools can compete well with private schools.

However, these two research reports may not give satisfactory answers to educational policymakers, practitioners, and parents who may have different questions in their own mind. The current measures of school performance that matter under No Child Left Behind (NCLB) — the straightforward percentage of students meeting or exceeding state standards — are quite different from the researchers' value-added outcome measures. Likewise, parents may be concerned about school make-up, climate and student performance at the time of their children's enrollment at school more than future value-added gains. These additional factors remain salient in the school choice discussion, particularly when information on academic progress is not readily available to parents and the current technology of educational research cannot accurately disentangle the

sources of contribution to academic progress.

Regardless of such divergent values and opinions of different stakeholders (including think tanks) involved in the school choice

policy debate, this synthetic review of the two reports suggests that students generally learn in public high schools about as well as in private high schools but that there are still many unanswered questions about potential differences in the finer details.

NOTES & REFERENCES

- ¹ See Friedman, M. (1955). The role of government in education. In Solo, R. (Ed.). *Economics and the Public Interest*. Rutgers University Press.
- ² Forster, G. (2007, Oct. 17). *Monopoly Versus Markets: The Empirical Evidence on Private Schools and School Choice*. Indianapolis, IN: Milton & Rose D. Friedman Foundation. Retrieved Dec. 9, 2007, from <http://www.friedmanfoundation.org/friedman/downloadFile.do?id=255>
- ³ For a think tank review of a recent Friedman Foundation report that included a similar research discussion (and for a critique of that research presentation), see Lubienski, C. (2007). *Review of "The ABC's of School Choice"*. Tempe, AZ & Boulder, CO: EPRU and EPIC. Retrieved November 24, 2007, from <http://epsl.asu.edu/epru/ttreviews/EPSSL-0709-241-EPRU.pdf>
- ⁴ Wenglinsky, H. (2007, Oct. 10). *Are Private High Schools Better Academically Than Public High Schools?* Washington, D.C.: Center for Education Policy. Retrieved Dec. 9, 2007, from <http://www.cepd.org/document/docWindow.cfm?fuseaction=document.viewDocument&documentid=226&documentFormatId=3665>
- ⁵ Specifically, the gap in standardized test gain scores between independent private (IP) and comprehensive public (CP) school groups was 14 points in reading (20 points for IP vs. 6 for CP), 12 points in math (23 points for IP vs. 11 for CP), 9 points in science (13 points for IP vs. 4 for CP) and 5 points in history (10 points for IP vs. 5 for CP).
- ⁶ The adjusted difference in math gain score was a one-point margin and was statistically significant at the .001 level. However, the difference amounts to only 0.1 in standard deviation units (T-score metric with mean of 50 and standard deviation of 10).
- ⁷ For example, in the result column of Table 2 (entitled "Top-quality research shows that vouchers improve academic outcomes"), the report provides annotated comments instead of simply describing the results. For its review of the study by Krueger and Zhu (2004), the report writes that "If legitimate methods are used, the positive results for vouchers becomes significant." The report also includes a prediction in reviewing the study of D.C. Opportunity Scholarship Program by Wolf et al.: "This study is ongoing and the positive results for vouchers may achieve statistical significance in future years, as has always happened in previous studies using legitimate methods."
- ⁸ See Bryk, A. S., Lee, V. E., & Holland, P. (1993). *Catholic Schools and the Common Good*. Cambridge, MA: Harvard University Press. See also Coleman, J. S., Hoffer, T., & Kilgore, S. (1982). *High School Achievement*. New York: Basic Books.
- ⁹ See Braun, H., Jenkins, F., & Grigg, W. (2006). *Comparing Private and Public Schools Using Hierarchical Linear Modeling*. Washington, DC: Government Printing Office. Lubienski, C., & Lubienski, T. (2006). *Charter, private, public schools and academic achievement: New evidence from the NAEP mathematics data*. New York: National Center for the Study of Privatization in Education.
- ¹⁰ See Chubb, J. E. and Moe, T. M. (1990). *Politics, Markets and America's Schools*. Washington, DC: Brookings Institution; Bryk, A. & Lee, V. E. (1992). Is politics the problem and markets the answer? An essay review of *Politics, Markets, and America's Schools*. *Economics of Education Review*, 11(4), 439-451. Chubb and Moe simply dichotomized public vs. private sectors for comparison and it was instrumental in igniting the old debate on school choice through new empirical analysis of nationally representative sample data. Bryk and Lee reviewed their study, criticizing it on the grounds that the positive outcomes described in the research comparing public and private schools are actually more typical of Catholic schools, but do not generalize to the private sector as a whole. Bryk and Lee pointed out that the private school advantages in student learning gains arise from the social values and organizational forms associated with Catholic schools (strongly shared academic mission in

communal and caring settings), rather than the general market-driven competition forces and entrepreneurial interests associated with independent private schools.

- ¹¹ A major problem with conventional control function approach is lack of selection models that specifies and tests a mechanism by which subjects self-select into different groups (public vs. private schools in this case). For discussion of the issues, see Winship, C., & Morgan, S. L. (1999). The estimation of causal effects from observational data. *Annual Review of Sociology*, 25, 659–706. Control function estimators, where a control function is entered into a regression equation in an attempt to eliminate the correlation between the treatment indicator variable and the error term. This approach is based on the assumption of ignorable treatment assignment that the probability of being assigned to the treatment condition is only a function of the observed variables (Rosenbaum & Rubin 1983). However, one problem with the regression approach is that it imposes a linearity constraint, and it is often difficult to know how the nonlinearity should be approximated. Matching solves this problem, although the average effect is not for the total population but only for that portion of the population where the treatment and control groups have common X values (Winship and Morgan, 1999).
- ¹² For detailed statistics, see Jeong, D. W. (2007). “Do School Types Matter in Student Achievement in Urban High Schools?” The CEP companion study also reports more information on the demographic composition of its analytical sample between school types. Retrieved Dec. 10, 2007, from <http://www.cep-dc.org/index.cfm?fuseaction=document.showDocumentByID&nodeID=1&DocumentID=226> (Sensitivity and Replication Report)
- ¹³ In comparison with the MFF study, the CEP study used a relatively smaller sample due to its selection of a subsample for urban disadvantaged students. While the insignificant results on public-private achievement gap in the CEP study are primarily due to truly small effect sizes, the results could have been influenced by other factors such as its smaller sample size and the adjustment of regression standard errors for design effect.
- ¹⁴ See Bryk, A. S., Lee, V. E., & Holland, P. (1993). *Catholic schools and the common good*. Cambridge, MA: Harvard University Press.
- ¹⁵ See Howell, W. G., and Peterson, P. E. (2002). *The Education Gap: Vouchers and Urban Schools*. Washington, DC: Brookings Institution Press. See also Lubienski, C. (2007). *Review of “The ABC’s of School Choice”*. Tempe, AZ & Boulder, CO: EPRU and EPIC. Retrieved November 24, 2007, from <http://epsl.asu.edu/epru/ttreviews/EPSSL-0709-241-EPRU.pdf>.
- ¹⁶ The CEP report points out that findings about voucher program effects have been disputed and it refers to Belfield and Levin (2005) for a fuller review of the research on private school effects: Belfield, C. R., & Levin, H. M. (2005). *Privatizing Educational Choice: Consequences for Parents, Schools and Public Policy*. Boulder, CO: Paradigm Publishers.
- ¹⁷ The CEP report possibly misled readers by stating that “a positive number for any given school would indicate a private school effect pertaining to that school” (p. 14). Any positive number for the other two types of public schools (i.e., magnet schools, public schools of choice) would indicate the effect of “choice” schools within the public sector rather than the effect of private schools.
- ¹⁸ The data analyses were conducted using the AM program with use of sampling weights and strata and cluster variables for accurate estimation. The national average scores are shown for typical students who did not experience retention or dropout during the time period and also did not change schools. The T-score gain is close to zero in private schools, whereas T-score gain is slightly negative in public schools. The private-public gap in average math gains in the T-score metric was negligible: .32 (.03 in SD unit) from NELS and 1.13 (.12 in SD unit) from ELS. The IRT-estimated number right gain score is positive in both public and private schools, which reflects absolute growth in math achievement. However, the gap

between public and private schools in the IRT-estimated number right metric was significant and it tends to be relatively larger than the T-score gap: .77 (.06 in SD unit) from NELS and 3.04 (.26 in SD unit) from ELS.

¹⁹ See Howell, W. G., and Peterson, P. E. (2002). *The Education Gap: Vouchers and Urban Schools*. Washington, DC: Brookings Institution Press.

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