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REVIEW OF *THE SCHOOL STAFFING SURGE*

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Summary of Review

The School Staffing Surge finds that between 1992 and 2009, the number of full-time equivalent school employees grew 2.3 times faster than the increase in students over the same period. The report claims that despite these staffing and related spending increases, there has been no progress on test scores or drop-out reductions. The solution, therefore, is school choice. However, the report fails to adequately address the fact that achievement scores and drop-out rates have actually improved. If the report had explored the causes and consequences of the faster employment growth, it could have made an important contribution. However, it does not do so. Unless we know the duties and responsibilities of the new employees, any assertion about the effects of hiring them is merely speculative. Further, the report's recommendations are problematic in its uncritical presentation of school choice as a solution to financial and staffing increases. The report presents no evidence that school choice - whose record on improving educational outcomes and efficacy is mixed - will resolve this "problem." The report's advocacy of private school vouchers and school choice seem even odder given that private schools have smaller class sizes and charter schools appear to allocate a substantially greater portion of their spending on administrative costs—two of the main policies attacked in the report.

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Review of *The School Staffing Surge: Decades of Employment Growth in America's Public Schools*

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I. Introduction

A new report, *The School Staffing Surge: Decades of Employment Growth in America's Public Schools*,[1] authored by Benjamin Scafidi and published by The Friedman Foundation for Educational Choice, analyzes the growth in public school personnel relative to the increase in students since 1992. It disaggregates personnel into teaching and non-teaching personnel and finds that between 1992 and 2009, the number of full-time equivalent school employees grew 2.3 times faster than the increase in students over the same period. Among school personnel, the growth in the number of administrators and other staff was higher than that of teachers. The report also argues that the unequal rate of growth (teachers versus other staff) cannot be attributed to the federal No Child Left Behind (NCLB) law.

In an era of competing demands upon state and local coffers, understanding spending on K-12 education is invaluable. We should identify and highlight best practices, with an eye to improving overall performance and closing achievement gaps. This requires a careful analysis of school spending disaggregated by nature and type, so as to eliminate potential inefficiencies.

In this context, a report of this type could have been of great import. In particular, the report would have been helpful had it explored the causes and consequences of faster growth of teachers, staff and administrators, examining the variation across states and over time. However, the report's approach is instead to document employment growth, label the growth as problematic, and then recommend certain favored policies (i.e., vouchers and school choice). It does not analyze the determinants of such growth, which limits its contribution to a meaningful discussion of growth of K-12 spending. Further, the report's recommendations section is problematic in its uncritical presentation of as-yet-untested hypotheses and advocacy of policies with mixed records. In doing so, the report prescribes policies whose economic and educational efficacy is unproven and speculative.

II. Findings and Conclusions of the Report

The report finds that between 1992 and 2009, the number of K-12 public school students grew 17% nationwide while the number of full-time equivalent school employees increased 39%—2.3 times greater than the increase in students over that same period. Among school personnel, the report finds that teaching staff grew by 32% while administrators and other staff experienced a higher growth rate (46%). The rate of growth was higher during the pre-NCLB years (1992-2001) compared with post-NCLB years (2002-2009)—during the

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latter period, teachers and administrators both increased at about the same rate (7%). The patterns of increase were different in different states, though the overwhelming majority of states increased school personnel—both teachers and non-teaching personnel—at a faster rate than the increase in their students. Furthermore, the report claims there were no increases in achievement scores that would justify these added costs.

The report also conducts two thought experiments:

- What if states had changed their non-teaching personnel commensurate with their change in student populations (17% instead of 46%)?
- What if the increase in teachers had been "only" 1.5 times as large as the increase in students?

Under specific assumptions about average compensation and employment costs of non-teaching personnel, the report finds that in the first case public schools in the country would have had an additional $24.3 billion—enough to give each teacher in the country a $7,500 raise. In the second case, American public schools would have had an additional $12.9 billion to spend, which it calculates as enough to give each teacher a $4,200 raise.

III. The Report's Rationale for Its Findings and Conclusions

The report relies on data from the U.S. Department of Education—in particular, the 2008 and 2010 issues of the *Digest of Education Statistics* published by the National Center for Education Statistics. (It is important to note that the latest version of the *Digest* (2012) shows a much slower increase in the rate of hiring of public school teachers going forward from 2009, including a significant *actual* decline between 2009 and 2010. However, the numbers from 2011 onwards are estimated projections.[2])

These data are supplemented by data from the 2010 issue of *Education at a Glance* published by the Organization for Economic Co-operation and Development (OECD). The report uses the NCES data to show that the rate of increase in either teaching staff or non-teaching staff over the last two decades (1992 to 2009) in the U.S. far exceeded the increase in student enrollment. The OECD data is used to show that OECD nations' publicly funded schools spend an average of 14.9% of their operating budgets on non-teaching staff, compared with 25.7% spent on administrators, support staff, clerical staff, etc. in the U.S.[3]

The unstated rationale behind the report is that instructional expenditures are more effective in terms of raising student achievement and the trend of higher growth in non-teaching personnel over the last two decades is indicative of bureaucratization and "non-productive" spending. As discussed below, this maintained hypothesis of spending on teachers being *always* more effective is unlikely to hold irrespective of context. That is, it is likely true in some contexts but untrue in others. And it does not necessarily follow from the data and analyses presented.

The report also draws some speculative conclusions without considering other potentially relevant causes. The fact that teaching and non-teaching personnel both grew at a faster rate during the pre-NCLB period compared with the post-NCLB period does not necessarily imply that NCLB did not cause any significant growth of school employees, as argued in section V of the report. NCLB may have caused employee growth in some areas while growth in other areas was stifled by other factors. Shifting of duties of existing employees may also have occurred. This is all speculative; the data and analyses presented can give us no answers.

IV. The Report's Use of Research Literature

The report's use of research literature fails to provide an adequate and comprehensive view in several instances.

Claimed lack of progress in student achievement

Contrary to the report's claim, there has been significant progress in educational attainment in the U.S. over the last few decades, including a considerable narrowing of achievement gaps. Dismissing this prior progress risks drawing the wrong policy conclusions.

Tables 1 and 2 document the trends in student achievement in the United States over the last four decades. The gains look particularly impressive when disaggregated by race/ethnicity: Whites, Blacks and Hispanics each have made significant strides in the last 40 years. The disaggregated picture also makes it clear that part of the reason behind the slower average increase is the fact that minorities, who have had lower average scores throughout this entire period of time, now make up a much larger share of the student

Table 1: Average Reading Scale Scores in NAEP tests: Selected years, 1971-2008

		1971	1980	1990	1999	2008
9-year olds	*All Students*	208	215	209	212	220
	White	214	221	217	221	228
	Black	170	189	182	186	204
	Hispanic	--	190	189	193	207
13-year olds	*All Students*	255	258	257	259	260
	White	261	264	262	267	268
	Black	222	233	241	238	247
	Hispanic	--	237	238	244	242
17-year olds	*All Students*	285	285	290	288	286
	White	291	293	297	295	295
	Black	239	243	267	264	266
	Hispanic	--	261	275	271	269

Source: National Center for Education Statistics (2009, May). *Digest of Education Statistics*, Table 124. U.S. Department of Education. Retrieved November 28, 2012, from http://nces.ed.gov/programs/digest/d10/tables/dt10_124.asp.

Table 2: Average Mathematics Scale Scores in NAEP tests: Selected years, 1973-2008

		1973	1982	1990	1999	2008
9-year olds	*All Students*	219	219	230	232	243
	White	225	224	235	239	250
	Black	190	195	208	211	224
	Hispanic	202	204	214	213	234
13-year olds	*All Students*	266	269	270	276	281
	White	274	274	276	283	290
	Black	228	240	249	251	262
	Hispanic	239	252	255	259	268
17-year olds	*All Students*	304	298	305	308	306
	White	310	04	309	315	314
	Black	270	272	289	283	287
	Hispanic	277	277	284	293	293

Source: National Center for Education Statistics (2009, May).*Digest of Education Statistics,* Table 140. U.S. Department of Education. Retrieved November 28, 2012, from http://nces.ed.gov/programs/digest/d10/tables/dt10_140.asp.

population. This is a trend that is likely to continue—in fact, as the Census Bureau reported earlier this year, minorities now constitute a majority of U.S. births[4]—and these disaggregated trends should be taken into account while interpreting the aggregate picture.

Claimed lack of progress in graduation rates

The report relies on recent work by economists James Heckman and Paul LaFontaine to argue that public high school graduation rates in the U.S. peaked around 1970 and have remained more or less at that level since then. However, because graduation requirements have been significantly strengthened over time and states differ significantly in the stringency of such requirements, the results in Heckman and LaFontaine are unlikely to depict the true picture.[5] Even then, student-level longitudinal data from surveys show significant gains in graduation rates, and there have been corresponding gains in terms of earning more credits and completing higher curriculum levels.[6] College enrollment is at an all-time high in the U.S., and enrollment rates have been continuously rising over the last 50 years. More than 70% of the members of the high school graduating class of 2009 were enrolled in college in October 2010—a number significantly higher than the 45.1% who were enrolled in college in 1959, the first year for which records are available, according to the U.S. Department of Labor's Bureau of Labor Statistics.[7]

Importance of instructional spending vis-à-vis other forms of spending

One cannot evaluate the consequences of a higher growth in teaching personnel compared with non-teaching personnel without a careful accounting of exactly where the additional money is going. For example, while class size reduction efforts likely account for some of the increase in personnel, a significant portion of K-12 school spending on personnel also goes to aides for special education, mainstreaming of special education populations, Title IX sports, remediation, bus aides, etc.—often as a result of a large number of state and federal laws—the effect of which, although of great value along several dimensions, may not show up in test score gains. Anecdotal evidence suggests that much of the increase in school spending in recent years has been to increase access to health and safety for students and to enforce curriculum assessment and accountability mandates.[8]

As yet there is no consensus in the research literature as to the proper balance between instructional expenditures and administrative expenditures. A recent and comprehensive literature review concludes that the best empirical research on this topic tends not to show *either* negative effects of administrative expense, or positive effects of instructional expense on student outcomes when addressed as internal shares of total budgets.[9] Interesting evidence also comes from a recent study of resource allocation patterns in *charter schools*. A recent study finds that in Michigan, where charter and traditional public schools receive approximately the same operational funding, charters spend on average nearly $800 more per pupil per year on administration and $1,100 less on instruction (holding constant other determinants of resource allocation).[10] Thus, the

Table 3. Average class size in primary education, by type of institution (2009)

	Public institutions	Private institutions	Total: Public and private institutions
	(1)	(2)	(5)
Australia	23.2	24.8	23.7
Czech Republic	20.0	15.9	19.9
Denmark	20.0	16.3	19.4
Finland	19.8	18.4	19.8
France	22.6	23.0	22.7
Germany	21.7	22.0	21.7
Hungary	20.8	19.2	20.7
Italy	18.7	20.2	18.8
Japan	28.0	32.1	28.0
Korea	28.6	30.5	28.6
Poland	19.0	11.9	18.7
Portugal	20.2	20.8	20.2
Spain	19.8	24.5	21.1
United Kingdom	25.7	13.0	24.5
United States	23.8	19.3	23.3
OECD average	***21.4***	***20.5***	***21.4***
EU21 average	***20.0***	***19.0***	***19.8***

Source: Organization for Economic Cooperation and Development (OECD) (2011, September 13). *Education at a Glance*, Table D2.1. Retrieved November 28, 2012, from http://www.oecd.org/edu/eag2011.

report's disparagement of administrative expenses while advocating for a policy that could increase these same expenses is contradictory.

Class sizes across developed nations

Contrary to the impression one might get after reading the report, class sizes in the United States are actually larger, not smaller, by international (particularly, OECD) standards. For example, as the following table shows, an average of 23.8 students fills the typical

American public primary school classroom, which is above the O.E.C.D. average of both 21.4 students for all schools and only public schools.

Private schools in the United States have lower average class sizes than public schools. In the United States, the typical public primary school classroom has 23.8 students, more than four more students than the average private primary school classroom (19.3 students).[11] Among the arguments presented in the report is the contention that small class sizes have no benefit after the earliest years of schools (and that benefits are small even in those early grades). Such contentions are not consistent with the research base.[12] Further, if class sizes did not really matter, why do tuition-charging private schools—which presumably compete in the marketplace with other schools for students—have significantly smaller classes than their counterparts in the public sector? It is interesting that in a paper arguing greater efficiency through staff reductions and against class-size reduction policies, the author argues for more private school vouchers and hence for more students in schools with small class sizes and more teachers.

Efficacy of alternate ways to promote student achievement

The report puts significant faith on school reform efforts that are either unproven or have not sufficiently demonstrated their potential to raise student achievement. Among these reform efforts are school choice and private school vouchers. However, the empirical literature suggests that these policies have not generated consistent and substantial benefits.[13]

V. Review of the Report's Methods

The report disaggregates the growth in non-teaching personnel across the 50 states between 1992 and 2009; however, it does not go beyond comparing this growth to the corresponding growth in student enrollment. As such, the report provides no insights into the causes of this increase. More so, while there is substantial variation between the states there does not seem to be any obvious patterns in the trends—whether geographically, or in terms of low-income and high-income states, or in terms of states with varying political orientation, or in terms of states with collective bargaining and states without collective bargaining. For instance, while Arizona and Colorado both had large increases in total staff (61% and 64%, respectively), Arizona had a much larger increase in student enrollment than did Colorado (66% and 38%, respectively). Simply averaging such numbers, pointing to overall trends, and then advocating for school choice does not illuminate the causes and likely results and is a disservice to the report's readers. A comprehensive study would try to relate each state's growth of teachers, non-teaching personnel, and spending with that state's changes in educational, economic, demographic, political and policy circumstances. It might then become a useful guide for policy.

The report asserts that most of the disproportionate growth in school employees, particularly of non-teaching staff, stems from the pre-NCLB period. This fails to take account of a number of important and potentially relevant factors. For example, it is possible that the growth in employment during the 1990s was the result of earlier pent-up, unfulfilled demand. The economy was in somewhat better shape in the years preceding NCLB than in the years after it, and it was in substantially better shape in the years

> *The report's methodology is completely inadequate for the purpose, and its significant biases and omissions undermine the potential for valid findings.*

following 1992 than in the years preceding it. State budgets during the 1990s were in the best position to allow for the reported growth. Further, the hiring that took place during the 1990s would have reduced the need for additional hiring in the following decade, which happened to coincide with the post-NCLB years. There is considerable anecdotal evidence that NCLB led to the hiring of different types of non-classroom teachers such as mentor teachers, data coaches, and other kinds of coaches. There was also significant growth of special education para-educators during the time-frame examined in the report; and Goals 2000, the first federal push for test-based accountability, came in 1994.Without accounting for additional factors—including rates of economic growth and incomes, prior hiring patterns, accountability mandates, etc.—which the report repeatedly fails to do, we cannot ascertain the true effect of NCLB on school staffing.

VI. Review of the Validity of the Findings and Conclusions

The main thrust of the report is that expansion of payrolls at American public schools has been a waste of money. Increases in the number of administrators leads only to more bureaucracy and inefficiency, we are told—and increases in the number of teachers did not produce any tangible gains in student achievement over the past few decades.

Yet public schools in the U.S. have *larger* class sizes, not smaller ones, whether the basis of comparison is other OECD countries or U.S. private schools. Moreover, the assertion that falling class sizes in the few decades after World War II have not been instrumental in spurring academic progress is not supported by the facts. The most careful studies of class-size reduction find significant positive benefits of attending smaller classes.[14] In fact, a recent study argues that attending smaller classes in kindergarten yields significant benefits later in life in the form of higher earnings and employment prospects in the labor market.[15] Taken together, the evidence is in favor of lower class sizes, though of course the benefits are likely to be higher in some situations compared with others.[16] The finding that the U.S. has been adding teachers at a greater rate than the increase in student enrollment tells us very little about either efficiency or achievement.

It is true, almost by definition, that public schools would have saved significant amounts of money if actual personnel increases were lower. But this simple statement does not inform us as to the effect of this growth on student achievement or other valuable broader educational outcomes—for example, effects on bullying of special education students, or effects on sports participation due to Title IX. Would student performance and other outcomes that matter have increased if schools had invested more in teaching staff compared with non-teaching staff? Would all or most of these outcomes have not suffered if hiring of teachers and administrators were significantly lower than they really were? Instead of answering these more relevant questions, the study undertakes thought experiments regarding how much money could have been "saved" and either reimbursed to taxpayers as property tax relief or given to teachers as higher salaries.[17] Unless we know who the employees are, their duties and responsibilities and how crucial (or not) they are, any assertion about the benefits of hiring or not hiring them is merely speculation. It is simply the author's selection of a favored interpretation without any proof that this interpretation is any more valid than any other rationale. Thus, blanket assertions like "the massive taxpayer investment for increased public school staffing could have been spent in a more effective manner within the public school system" (page 20) are simply unfounded.

Interestingly, the author does hint at the importance of going beyond simple comparisons of spending and personnel growth, as the report lists the following two questions as important for consideration: "Are adding teachers and non-teaching staff at rates higher than increases in students a wise investment?" and "Is there an inherent trade-off between the number of public school staff and overall public school staff quality?" (page 19). However, there is no concerted effort to address these questions in a rigorous way; instead the reader is provided assertions extolling the virtues of school vouchers and cautioning against government intervention in education.

VII. Usefulness of the Report for Guidance of Policy and Practice

It is true that over the last two decades staff employment has increased faster than student enrollment, and non-teaching personnel have increased at a higher rate than teaching personnel. Understanding the causes and consequences of these changes on student achievement and school efficiency would be very worthwhile, since the trends do raise essential questions. Unfortunately, the report, while highlighting the importance of growth in such spending, does not provide useful insights.

Instead, the rhetoric of the report contends that such staff growth is inefficient and that such growth did not and would not result in a commensurate increase in student achievement. However, the report's methodology is completely inadequate for the purpose, and the report's significant biases and omissions undermine the potential for valid findings. The report does not further our understanding of the issue at hand and is of little, if any, help in guiding policymakers, educators or the public.

Notes and References

1 Scafidi, B. (2012). *The School Staffing Surge: Decades of Employment Growth in America's PublicSchools*, The Friedman Foundation for Educational Choice, October 2012. Retrieved November 11, 2012, from http://www.edchoice.org/Research/Reports/The-School-Staffing-Surge--Decades-of-Employment-Growth-in-Americas-Public-Schools.aspx.

2 See National Center for Education Statistics (2012). *Digest of Education Statistics, 2012*, Table 69. Washington, DC: National Center for Education Statistics, U.S. Department of Education. Retrieved November 25, 2012, from http://nces.ed.gov/programs/digest/d12/tables/dt12_069.asp.

3 Note that it is likely that at least part of the gap is accounted for by differences in definitions across countries.

4 See Cauchon, D. & Overberg, P. (2012). Census data shows minorities now a majority of U.S. births. *USA TODAY*, 17 May, 2012. Retrieved on November 12, 2012, from http://usatoday30.usatoday.com/news/nation/story/2012-05-17/minority-births-census/55029100/1.

5 See

Roy, J. & Mishel, L. (2008). Using administrative data to estimate graduation rates: Challenges, Proposed solutions and their pitfalls. *Education Policy Analysis Archives, 16*.. Retrieved on November 12, 2012, from http://epaa.asu.edu/ojs/article/view/36.

6 See Nord, C., Roey, S., Perkins, R., Lyons, M., Lemanski, N., Brown, J., & Schuknecht, J. (2011). *The Nation's Report Card: America's High School Graduates* (NCES 2011-462). U.S. Department of Education, National Center for Education Statistics. Washington, DC: U.S. Government Printing Office.

7 See Bureau of Labor Statistics (2010,April 28). College enrollment up among 2009 high school grads..*TED: The Editor's Desk*, April 28, 2010. Retrieved November 12, 2012, from http://www.bls.gov/opub/ted/2010/ted_20100428.htm.

As Mishel (2007) points out, contrary to conventional wisdom, college graduates are, in fact, *not* in short supply. He refers to the Sum et al. (2006) report which contends that "fewer young college graduates have been able to obtain college labor market jobs, and their real wages and annual earnings have declined accordingly due to rising mal-employment." In other words, many college graduates are now forced to take jobs requiring only high school educations. See

Mishel, L. (2007, September 24). Schools as scapegoats. *The American Prospect*. Retrieved November 16, 2012, from http://prospect.org/article/schools-scapegoats.

See also Sum, A., Barnicle, T., Khatowada, I., McLaughlin, J., & Palma, S. (2006, January). *Educational and Labor Market Outcomes for the Nation's Teens and Youth Since the Publication of America's Choice: A Critical Assessment*. Washington, DC: The New Commission on the Skills of the American Workforce. Retrieved November 16, 2012, from http://www.skillscommission.org/wp-content/uploads/2010/05/Education-LaborMarketOutcomes.pdf .

8 Personal email communication of Bruce Hunter, AASA, with William Mathis, NEPC, October 25, 2012.

9 See Baker, B.D. & Elmer, D.R. (2009) The politics of off-the-shelf school finance reform. *Educational Policy* 23 (1), 66-105.

An example of an earlier study that does not find a consistent relationship between administrative inputs and educational output (in the form of standardized test scores) is Brewer (1996), who studies resource allocation in New York State, using a panel of school districts during the period 1978-87. See

Brewer, D. (1996, April). Does more school district administration lower educational productivity? Some evidence on the "Administrative Blob" in New York public schools. *Economics of Education Review*, *15* (2), 111–124.

10 See Arsen, D. & Ni, Y. (2012, March). *Is Administration Leaner in Charter Schools? Resource Allocation in Charter and Traditional Public Schools*, Occasional Paper No. 201. New York: National Center for the Study of Privatization in Education. Teachers' College, Columbia University. Retrieved November 12, 2012, from http://www.ncspe.org/publications_files/OP201.pdf.

11 Across the O.E.C.D. the public-private class size gap is narrower, at 21.4 students per public primary school class and 20.5 students per private primary school class. See

Rampell, C. (2009, September 11). Class size around the world (Economix blog). *The New York Times*. Retrieved November 12, 2012, from
http://economix.blogs.nytimes.com/2009/09/11/class-size-around-the-world/.

12 Finn, J.D. (2002). Class size reduction in grades k-3. In *School Reform Proposals: The Research Evidence*. Tempe, AZ: Education Policy Research Unit, Arizona State University. Retrieved November 27, 2012, from http://nepc.colorado.edu/files/Chapter02-Finn-Final.pdf.

13 See Miron, G., Welner, K. G., Hinchey, P., & Mathis, W. (Eds.) (2012). *Exploring the School Choice Universe: Evidence and Recommendations*. Charlotte, NC: Information Age Publishing.

See also:
Belfield, C. R. & Levin, H. M. (2001). *The Effects of Competition on Educational Outcomes: A Review of the U.S. Evidence,* Occasional Paper no. 35. New York: National Center for the Study of Privatization in Education, Teachers' College, Columbia University.

Rouse, C. E. (1998, May). Private school vouchers and student achievement: An evaluation of the Milwaukee parental choice program. *The Quarterly Journal of Economics*, *113* (2), 553-602.

Rouse, C.E. (1998, March). Schools and student achievement: More evidence from the Milwaukee parental choice program. *Economic Policy Review*, 61-76. *4*, (1).

Wolf, P., Gutmann, B., Puma, M., Kisida, B., Rizzo, L., Eissa, N., & Carr, M. (2010, June). *Evaluation of the DC Opportunity Scholarship Program: Final Report* (NCEE 2010-4018). Washington, DC: National Center for Education Evaluation and Regional Assistance, Institute of Education Sciences, U.S. Department of Education. Retrieved November 12, 2012, from http://ies.ed.gov/ncee/pubs/20104018/pdf/20104018.pdf.

Note that Wolf *et al* (2010) did find that the program significantly improved students' chances of graduating from high school, according to parent reports. Note also that Rouse (1998, May) found that Milwaukee school voucher program might have had a positive effect on the math achievement of those who attended a private school; but no benefits for reading scores. Rouse (1998, March) suggests that the achievement advantage of private schools participating in the Milwaukee program could stem from their smaller class sizes, compared with traditional public schools.

Studies by Sarah Lubienski and Christopher Lubienski have also shown that private schools do not necessarily perform better than their counterparts in the traditional public sector. See

Lubienski, S.T. & Lubienski, C. (2006, Winter). School sector and academic achievement: A multilevel analysis of NAEP mathematics data. *American Educational Research Journal*, *43* (4), 651-698.

Lubienski, C., Crane, C., & Lubienski, S.T. (2008, May). What do we know about school effectiveness? Academic gains in public and private schools. *Phi Delta Kappan*, *89*, (9), 689-695.

14 The classic studies on effects of class size are Krueger (1999) and Angrist and Lavy (1999).

Krueger, A.(1999, May). Experimental estimates of education production functions. *The Quarterly Journal of Economics*, *114* (2), 497-532.

Angrist, J.D. & Lavy, V. (1999, May). Using Maimonides' rule to estimate the effect of class size on scholastic achievement. *The Quarterly Journal of Economics, 114* (2), 533-575.

For a comprehensive review of the research literature on the effects of class size, see

Schanzenbach, D.W. (2011). *Review of "Class Size: What Research Says And What It Means For State Policy."* Boulder, CO: National Education Policy Center. Retrieved November 19, 2012, from http://nepc.colorado.edu/thinktank/review-class-size-what-research-says-and-what-it-means.

15 See

Chetty, R., Friedman, J.N., Hilger, N., Saez, W., Schanzenbach, D.W., & Yaga, D. (2011, November). How does your kindergarten classroom affect your earnings? Evidence from Project STAR. *Quarterly Journal of Economics, 126* (4), 1593-1660. November, 2011.

16 Jepsen and Rivkin (2009) provide a cautionary note: they show that while smaller classes in the aftermath of California's class-size reduction initiative raised mathematics and reading achievement, the increase in the share of teachers with neither prior experience nor full certification dampened the benefits of smaller classes, particularly in schools with high shares of economically disadvantaged, minority students. See

Jepsen, C. & Rivkin, S. (2009, Winter). Class size reduction and student achievement: The potential tradeoff between teacher quality and class size. *Journal of Human Resources*, *44* (1), 223-250.

The California policy has also be criticized for other failings, including the lack of available classroom space and the incentive created for experienced teachers to move from grade levels that didn't have reduced class size (e.g., grade 4) to those that did (e.g., grade 3). See

Stecher, B.M. & Bohrnstedt, G. (2000*). Class Size Reduction in California: Summary of the 1998-99 Evaluation Findings*. Santa Monica, CA: The RAND Corporation. Retrieved November 27, 2012, from http://www.rand.org/pubs/reprints/RP903z1.html.

See also

Bohrnstedt, G.W. & Stecher, B.M. (Eds.) (2002). *What We Have Learned about Class Size Reduction in California*. Sacramento, CA: California Department of Education. Retrieved November 27, 2012, from http://www.classize.org/techreport/CSRYear4_final.pdf.

17 An increase in teacher salaries is probably overdue, more so since over time there has been erosion in relative salaries to of teachers relative to comparable workers. See

Mishel, L., Allegretto, S.A., & Corcoran, S.P. (2008). *The Teaching Penalty: Teacher Pay Losing Ground*. Washington, DC: Economic Policy Institute. Retrieved November 27, 2012, from http://www.epi.org/publication/book_teaching_penalty/.

A recent analysis by Adamson and Darling-Hammond (2008) also suggests that higher salaries would reduce the inequitable distribution of teachers. See

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