



PAYING THE BEST TEACHERS MORE TO TEACH MORE STUDENTS

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On top of many policymakers' wish lists is increased teacher pay. Particular attention also has focused on mechanisms such as merit pay to target rewards to our most effective teachers and keep them in the classroom.² Yet resources are constrained. Raising pay for some or all teachers inevitably takes funds away from some other element of schooling. With little likelihood of surplus education funding in the foreseeable future, many pay overhauls have stalled or been scrapped entirely.³

But there is a way forward that would yield higher pay without fiscal sacrifice, new analysis shows: increasing the class sizes of only the most effective teachers. Targeted increases in class size would require fewer teachers overall and the savings from the reduced number of teachers could be repurposed as bonuses for the teachers taking on larger classes. It would also, importantly, improve net student learning as more students would be taught by the most effective teachers.

This fiscal analysis explores teacher cost and enrollment data in one district to quantify the amount of funds available for teacher bonuses associated with strategic class size increases of three students for the most effective teachers. The analysis then models the size of the teacher bonuses that would be available in each state if this policy were pursued under cost-neutral conditions. As it turns out, many districts already have uneven class sizes, often with small bonuses for those taking on extra students (typically \$1,000 per student). What isn't common, however, is the strategic and systematic placement of additional students in classrooms with the most effective teachers as a means to improve student outcomes. Nor is it common to pay those teachers the full savings associated with the larger class sizes, amounting to substantially larger bonuses than are currently on the books.

1 Suzanne Simburg contributed to the analysis for this project.

2 Research into the labor market value of the most effective teachers has found that they earn higher salaries than less effective teachers upon leaving the classroom. Matthew M. Chingos and Martin R. West, "Do More Effective Teachers Earn More Outside the Classroom?," *Education Finance and Policy*, Winter 2012, Vol. 7, No. 1, Pages 8-43. TNTP, in a survey of teachers, found that high-performing teachers were more than twice as likely as low performers to cite compensation as a reason for leaving the profession. "Shortchanged: The Hidden Costs of Lockstep Teacher Pay," TNTP, July 15, 2014, <http://tntp.org/publications/view/shortchanged-the-hidden-costs-of-lockstep-teacher-pay>.

3 John O'Connor, "Teachers Believe Income is Out of Their Hands," *State Impact*, August 22, 2011, <http://stateimpact.npr.org/florida/2011/08/22/teachers-say-income-is-out-of-their-hands/>

Teacher effectiveness matters more than class size

Calls for smaller classes are very common, and the mention of growing class sizes frequently sparks public concern over the implications for student learning.⁴ Research demonstrates a weak relationship between smaller class sizes and improved academic performance.⁵ The research also reveals that gains from smaller class sizes are dwarfed by gains from being taught by a more effective teacher.⁶ Recent research has modeled the effects on student performance of increasing the number of students in the classrooms of high performing teachers. In an important study, Michael Hansen found that assigning up to twelve more students than average to effective teachers can produce gains equivalent to adding two-and-a-half extra weeks of school on average for all 8th-grade students in the school—not just for those students moved into those teachers’ classes.⁷ Smaller, but still positive results were found for 5th-grade students.⁸ This research and others suggests that school districts would likely produce greater results for their students by selectively raising class sizes.

Of course, this isn’t always feasible. Parents love smaller classes. However, some evidence suggests that they value teacher effectiveness more. In a survey by Steve Farkas and Ann Duffett, when parents were asked if they would prefer their child to be placed into a class of 27 students “taught by one of the district’s best performing teachers” or into a class of 22 students “taught by a randomly chosen teacher,” 73 percent of parents opted for the larger class with a teacher proven to be effective.⁹

Teachers’ preference for smaller classes has its caveats too. Teachers like smaller classes and would likely have to be compensated extra to volunteer to take on more students. Some research suggests, however, that teachers value higher pay over smaller class sizes when the size of the bonus offered is high enough. In one survey, 83 percent of teachers responded that they would prefer an extra \$5,000 in salary to teaching two fewer students.¹⁰ Larger bonuses like these mean that districts would need to find savings elsewhere or come up with new monies.

⁴ See for example – Sam Dillon, “Tight Budgets Mean Squeeze in Classrooms,” *New York Times*, March 5, 2011, accessed July 30, 2014.

⁵ Research on class size is mixed but a positive impact of smaller class sizes has been found in lower elementary grades. The effect was largest for minority students and the impact faded after one year of small class size exposure. Steven G. Rivkin, Eric A. Hanusheck, and John F. Kain, “Teachers, Schools and Academic Achievement,” *Econometrica*, Vol. 73, No. 2 (March, 2005), 417-458.

⁶ Barbara Nye, Spyros Konstantopoulos and Larry V. Hedges, “How Large Are Teacher Effects,” *Educational Evaluation and Policy Analysis*, Fall 2004, Vol. 26, No. 3, pp 237-257.

⁷ Michael Hansen, “Right-sizing the Classroom: Making the Most of Great Teachers,” Thomas B. Fordham Institute, November 18, 2013, accessed July 30, 2014, < <http://edexcellence.net/publications/right-sizing-the-classroom-making-the-most-of-great-teachers>>.

⁸ *Ibid.*

⁹ Steve Farkas and Ann Duffett, “How Americans Would Slim Down Public Education,” Thomas B. Fordham Institute, August 2012, accessed July 30, 2014, <<http://edexcellence.net/publications/how-americans-would-slim-down-public-education.html>>.

¹⁰ Dan Goldhaber, Michael DeArmond and Scott Deburgomaster, “Teacher Attitudes About Compensation Reform: Implications for Reform Implementation,” National Center for Analysis of Longitudinal Data in Education Research, June 2010. Accessed April 2015, <http://www.urban.org/uploadedpdf/1001434-teacher-attitudes-reform.pdf>

Selective class size increases are more practical in growing districts

Hansen wrote that in addition to the financial questions of how to compensate teachers for the larger classes, there would be challenges associated with identifying effective teachers (especially among novices) and with assigning students. Some grades or subjects may not have any teachers identified as the most effective.¹¹ And some schools may not have enough students or classrooms to allow for meaningful reallocations that result in a leaner teacher workforce.

Each of the implementation challenges may at first be less of an issue for growing districts.¹² First, growing districts have a ready supply of new students who could be placed into classrooms with top-tier teachers, without shifting enrollment elsewhere in the district. Second, when enough new students are placed into existing classrooms, fewer new teachers need to be hired, and so the district has access to instant savings. Those savings can then be repurposed into bonuses that same year for those teachers taking on more students.

Cost-neutral teacher bonuses modeled in Cypress-Fairbanks ISD

For a growing district like Cypress-Fairbanks ISD outside Houston—which has 109,971¹³ students and anticipates 2 percent annual growth each year through 2022¹⁴—it may be simpler to assign more students to the top-performing teachers at the beginning of each school year, as this can largely be accomplished through the allocation of new students. Rather than allocate more students to some classrooms by assigning fewer to another, a district with increasing enrollment can simply raise total school enrollment in schools where there are more effective teachers willing to take on more students. Within a given school, some classes would get larger while others would stay the same. In raising total enrollment, the district can avert hiring some new teachers who would otherwise be needed to serve the new students. Those savings can then be reapplied as bonuses for the teachers taking on more students.

Note that this model differs from one where some classrooms get larger and some get smaller. In this model, some classes get larger and the rest stay the same.

¹¹ Research examining the distribution of teacher quality has found that between school differences in teacher quality are largely driven by a higher concentration of low-performing teachers in high-poverty schools while high-performing teachers can be found throughout schools (Tim R. Sass, Jane Hannaway, Zeyu Xu, David N. Figlio, Li Feng, “Value added of teachers in high-poverty schools and lower-poverty schools,” *Journal of Urban Economics*, Vol. 72, Issues 2-3, September-November 2012, 104-122. Other research has found that low-income students have less access to high-performing teachers and the difference is mainly driven by differences between schools (Isenberg et al, “Access to Effective Teaching for Disadvantaged Students,” National Center for Education Evaluation and Regional Assistance, November 2013, <http://ies.ed.gov/ncee/pubs/20144001/pdf/20144001.pdf>).

¹² Except for districts already hitting class-size limits where there is not flexibility to increase class-size.

¹³ Enrollment figure for 2012-2013. Profile 2012-2013: An Overview of Cypress-Fairbanks Independent School District, <http://www.cfsd.net/files/7014/1087/7053/12-13Profile.pdf>

¹⁴ Vision2020: Long-Range Planning Committee Cypress-Fairbanks ISD, January 9, 2014, http://www.cfsd.net/files/3813/9412/3949/06-03-2014_1639_170.pdf

Using a financial model with data from Cypress-Fairbanks ISD and the state of Texas from years 2012-13, this analysis computes the savings if every teacher in the top performance quartile took on three additional students, and thus fewer teachers were needed overall. We used the reported average salary of \$50,620¹⁵ and a benefits cost of \$11,136 per teacher.¹⁶ Currently, the district's average class sizes are 21.6 students at the elementary level and 22.3 students in middle and high school. In our model, we determined the number of total teachers needed if a quarter of the teachers taught three more students in each class taught, while the rest maintained the current average class size. We then computed the total savings in salaries and benefits from the reduced teacher rolls. Next we divided that amount by the number of teachers in the top quartile to determine a per-teacher bonus that would be available by reapplying these staffing costs.

Using this analysis, if the district had selectively added three extra students to all the classrooms of the top-quartile teachers in 2012-13, it could have hired 185 fewer teachers overall, at a total savings of over \$11 million in salary and benefits. Then as summarized in Table 1, if these funds had been reapplied as bonuses to those teaching the larger classes, the bonuses would amount to \$8,009 per classroom teacher at the elementary school, \$8,313 in middle school, and \$8,359 in high school.¹⁷ Given the existing average salaries, bonuses of this size would have meant a raise of between 16 percent and 17 percent of base salary.¹⁸

Figure 1: Larger classes could mean higher salaries paid for with corresponding savings

Cypress Fairbanks ISD	Elementary	Middle	High
Current class size	21.6	22.3	22.3
Average teacher salary*	\$50,620	\$50,620	\$50,620
Average benefits*	\$11,136	\$11,136	\$11,136
Bonus per teacher for taking 1 additional student (cost neutral)	\$2,670	\$2,771	\$2,786
Bonus per teacher for taking 3 additional students (cost neutral)	\$8,009	\$8,313	\$8,359
Percent bonus per additional 3 students (cost neutral)	16%	16%	17%

*Average salary and benefits includes all grades

¹⁵ Profile 2012-2013: An Overview of Cypress-Fairbanks Independent School District, <http://www.cfsd.net/files/7014/1087/7053/12-13Profile.pdf>

¹⁶ The benefits load per teacher includes both the district portion and the portion paid directly by the state.

¹⁷ The figures vary for middle and high school teachers as class sizes differ, as do the number of periods taught per teacher each day.

¹⁸ Author's calculations using class size data from the Texas Academic Performance Report 2012-13 District Profile and average teacher salary and projected enrollment growth as reported by Cypress Fairbanks ISD. Profile 2012-2013: An Overview of Cypress-Fairbanks Independent School District, <http://www.cfsd.net/files/7014/1087/7053/12-13 Profile.pdf> Vision2020: Long-Range Planning Committee Cypress-Fairbanks ISD, January 9, 2014, http://www.cfsd.net/files/3813/9412/3949/06-03-2014_1639_170.pdf 2012-13 Texas Academic Performance Report, <http://ritter.tea.state.tx.us/perfreport/tapr/2013/static/district/d101907.pdf>

This analysis conservatively considers only the savings associated with teacher salary and benefits. If the district were to selectively raise class sizes in this way, there would likely be additional savings over the long term not included here. With a reduced need for teachers, the district would save on administration and development costs, including teacher hiring and training. One study's estimates of the costs for hiring and training a new teacher ranges from \$5,000 to \$15,000¹⁹ depending on district type. And, over time, some districts might even need fewer or smaller buildings, since each building could serve more students.

Most importantly, such a plan should yield improved student outcomes. While the Hansen study examines the effects of both increasing the number of students in some classes and decreasing it in others, it was clear that the larger effect was that of more students having a better teacher – up to a point. That said, this fiscal model has some important differences from the Hansen analysis. Here, we consider raising classes for the top quartile teachers while keeping classes for all other teachers the same size. We cap the quantity of extra students at three, which should be low enough that the small expected loss of student learning for slightly larger classes is still less than the expected benefit of exposing more kids to the strongest teachers. Hence, net student learning should improve as a result.

Non-growing districts could free up funds for bonuses over time

Given the attractiveness of such a plan—higher salaries and better student outcomes at no additional cost to the district—it is worth considering the viability for districts that are not growing. There, implementation could take longer, especially if the teacher bonuses must come from savings associated with a reduction in total teachers needed. In the short run, most schools wouldn't simply be able to save on staffing by assigning more students to some classes, because they'd just be reducing the sizes of other classes. However, just as districts have managed their school enrollments to achieve class size targets, many districts over time could do the same to manage school enrollments toward a graduated class size plan where more effective teachers routinely receive more students.²⁰

A plan to routinely pay some teachers more to teach larger classes would also require deliberate enrollment planning, where the maximum student capacity might increase at certain schools. This kind of a change may take a few years, as neighborhoods are rezoned and choice plans altered to allow for increased caps at some schools. However, districts routinely do this kind of enrollment management already, and adjusting targets over time is something that already happens when state class size policies change, demographics shift, and so on.

¹⁹ Author's calculations based on data from Profile 2012-2013: An Overview of Cypress-Fairbanks Independent School District, <http://www.cfisd.net/files/7014/1087/7053/12-13Profile.pdf>

²⁰ Such a plan would be easier if the more effective teachers were evenly distributed across grades, subjects, and schools—something that is rarely addressed deliberately now. Perhaps the bonus associated with larger class size might be enough to entice the most effective teachers to shift teaching posts in order to enable a more even distribution.

Then, as teacher vacancies appear, districts would realize savings as they don't fill those vacancies and instead managed their enrollments around a new lower number of staff (where the most effective teachers teach larger classes). Over the longer term, this policy could lead to a decrease in the overall workforce and savings for the district.

An important caveat is that not all districts would be able to implement such a change with zero-cost bonuses. Very small districts or schools with very few classes per grade may not have the same flexibility, even over time, to make a tradeoff between staffing counts and salary. Similarly, districts or schools with very high teacher turnover may find it untenable to manage enrollments given the unknown mix of teachers and teacher effectiveness from one year to the next.

Bonuses for teachers depend on local cost structure and current class sizes

The savings associated with an increase in class size by three students differs from locale to locale depending on the district's cost structure and the prevailing average class sizes. In order to explore the size of the potential bonus across different state cost structures, we merged key data from different sources, and from different years. Data from National Center for Education Statistics (NCES) sources on class size and benefits load and from the National Education Association (NEA) on teacher pay were used to model the average bonus by state. Because of the data limitations, the analysis represents only a fiscal model, designed to provide an estimate of the relative size of bonuses given each state's cost factors. Table 2 demonstrates how much could be reallocated in each state to pay bonuses for teachers taking on three additional students, if that reallocation in each state resulted in a corresponding drop in total teacher staffing. While the average bonus for elementary teachers would amount to \$10,357 under these assumptions, that bonus would vary substantially across states. In Massachusetts, where class sizes are smaller and salaries are higher on average, selectively raising classes by three students could free up \$15,707 for each teacher with larger classes. In California, the bonus could be \$10,662 per participating teacher. On average, teachers opting in to such a plan could see their salaries rise by 19 percent.

Table 2: Savings from raising class sizes by three could pay sizable bonuses to teachers, depending on state cost factors

	Average elementary class size (SASS, 2011-12) ²¹	Average salary (NEA, 2012-13) ²²	NCES reported benefits load (NCES, 2010-11) ²⁴	Average bonus if savings applied as bonus	Potential bonus as a percent
USA (average)	21.6	\$55,489	34%	\$10,357	19%
Alabama	19.4	\$47,803	40%	\$10,312	22%
Alaska	21.1	\$62,918	60%	\$14,304	23%
Arizona	24.5	\$47,553	26%	\$7,312	15%
Arkansas	20.4	\$45,998	27%	\$8,610	19%
California	25.4	\$67,871	33%	\$10,662	16%
Colorado	23.3	\$49,228	24%	\$7,839	16%
Connecticut	20.1	\$69,165	39%	\$14,317	21%
Delaware	21.1	\$57,934	44%	\$11,838	20%
District of Columbia	‡	\$66,601	13%	‡	‡
Florida	‡	\$45,732	31%	‡	‡
Georgia	21.2	\$52,815	33%	\$9,917	19%
Hawaii	‡	\$55,063	40%	‡	‡
Idaho	25.1	\$47,416	33%	\$7,534	16%
Illinois	23.5	\$64,509	41%	\$11,596	18%
Indiana	21.7	\$50,801	45%	\$10,213	20%
Iowa	20.9	\$49,844	31%	\$9,343	19%
Kansas	20.7	\$46,598	26%	\$8,520	18%
Kentucky	23.7	\$48,908	33%	\$8,238	17%
Louisiana	19.4	\$49,006	35%	\$10,204	21%
Maine	17.8	\$47,249	41%	\$11,241	24%
Maryland	‡	\$63,960	40%	‡	‡
Massachusetts	20.1	\$70,340	50%	\$15,707	22%
Michigan	25.7	\$61,560	47%	\$10,581	17%
Minnesota	23.7	\$53,680	34%	\$9,109	17%
Mississippi	22.1	\$41,975	30%	\$7,418	18%
Missouri	20.7	\$45,321	27%	\$8,361	18%
Montana	20.5	\$47,132	29%	\$8,894	19%
Nebraska	19	\$47,368	34%	\$10,024	21%

²¹ Table 7: Average class size in public primary schools, middle schools, high schools, and schools with combined grades, by classroom type and state, 2011-12, http://nces.ed.gov/surveys/sass/tables/sass1112_2013314_t1s_007.asp.

²² C-9. Average Salaries of Public School Teachers, 2010-11 (Revised), Rankings & Estimates: Rankings of the States 2012 Estimates of School Statistics, NEA Research, December 2012, http://www.nea.org/assets/img/content/NEA_Rankings_And_Estimates-2013_%282%29.pdf.

²³ There are many concerns about the NCES reported benefits load, including worries that the figure is not comparable across states and may be incomplete in some places (including Texas where we found that the state reported load did not include a locally paid portion). While these data are concerning, they are the best available on a state-by-state basis.

²⁴ U.S. Department of Education, National Center for Education Statistics, Common Core of Data (CCD), "National Public Education Financial Survey (State Fiscal)", 2010-11 (FY 2011) v.1a; "State Nonfiscal Public Elementary/Secondary Education Survey", 2011-12 v.1a.locally paid portion). While these data are concerning, they are the best available on a state-by-state basis.

Nevada	26.1	\$53,023	36%	\$8,296	16%
New Hampshire	21.2	\$52,792	40%	\$10,489	20%
New Jersey	19	\$66,612	39%	\$14,575	22%
New Mexico	20.5	\$46,888	31%	\$8,977	19%
New York	21.5	\$72,708	42%	\$14,446	20%
North Carolina	19.8	\$46,700	26%	\$8,936	19%
North Dakota	19.3	\$44,807	30%	\$9,071	20%
Ohio	21.8	\$56,715	34%	\$10,444	18%
Oklahoma	21.1	\$44,343	30%	\$8,186	18%
Oregon	26.7	\$56,503	47%	\$9,305	16%
Pennsylvania	22.6	\$60,760	35%	\$10,888	18%
Rhode Island	‡	\$60,923	42%	‡	‡
South Carolina	19.4	\$47,050	30%	\$9,430	20%
South Dakota	21.7	\$39,850	28%	\$7,078	18%
Tennessee	17.8	\$45,891	30%	\$10,029	22%
Texas	18.6	\$48,638	‡	‡	‡
Utah	27.6	\$47,033	41%	\$7,222	15%
Vermont	16.7	\$50,141	35%	\$12,173	24%
Virginia	20.4	\$47,564	33%	\$9,276	20%
Washington	23.9	\$52,926	31%	\$8,713	16%
West Virginia	19.2	\$44,260	65%	\$11,381	26%
Wisconsin	20.8	\$54,207	50%	\$11,709	22%
Wyoming	17.4	\$56,100	36%	\$13,200	24%

‡ Missing class size data

These potential bonuses are substantially higher than those in many existing bonus programs—a national sample of public school performance pay found that the bonuses offered were, on average, only 2 percent of teacher pay.²⁵ For example, Douglas County, Colorado, offers between \$413 and \$2,500 for its performance bonus program.²⁶ And, importantly, whereas most merit programs depend on available funding and are often threatened by budget cuts, the concept of paying teachers bonuses for accepting more students can be a self-sustaining proposition, in that the bonuses come from corresponding savings.

It is also worth noting that teachers are generally more supportive of pay associated with additional duties or harder-to-staff work assignments than they are of merit or performance pay programs.²⁷ Many labor contracts already allow for extra compensation tied to additional duties including class size overages. While the contract terms may still need to be rewritten, the changes may be more palatable to teachers and their associations.

²⁵ Dan Goldhaber, “Teacher Pay Reforms: The Political Implications of Recent Research,” Center for American Progress, published online May 2009, accessed July 30, 2014, http://cdn.americanprogress.org/wp-content/uploads/issues/2006/12/pdf/teacher_pay_report.pdf.

²⁶ Ibid.

²⁷ Ibid.

The promise of substantial raises may justify tackling implementation hurdles

While the financial analysis here suggests great opportunity for increasing teacher pay while realizing greater student outcomes, the implementation challenges are significant. Districts that don't already have systems to quantifiably measure teacher effectiveness would need to develop them, and every participating district would need to make changes to its student and teacher assignment patterns.²⁸ Most importantly, the savings only materialize if a district does indeed reduce its teacher rolls over time. Enlarging some classes but leaving others under-enrolled won't produce corresponding savings to pay bonuses as modeled here.

One option for districts interested in moving in this direction is to start with the marginal or extra students who often prompt the hiring of an additional teacher. Or, when the sections of a high school course taught by a terrific teacher are at capacity with demand for more access, the district might offer more funds to raise class sizes in his or her course. Using the funds to raise that teacher's pay (instead of hiring more teachers) begins the process of tying pay to workload.

District and state leaders interested in workload-based pay schemes in the long run may need to clear some policy barriers, such as maximum class sizes and fixed overage payments that may be too low to induce teachers' voluntary participation. Most districts can structure the bonus pay using the district's stipend practices, but some may need to specify the option in their labor contracts.

Selectively raising class size and pay is sure to create some implementation hurdles. That said, most reforms carry a hefty price tag *and* implementation challenges. Rarely are districts presented with reform proposals that hold promise to increase outcomes at *no added cost*. Equally unusual is a way to increase teacher pay without new money or risking consequences elsewhere in the system. Paying teachers more while giving more kids access to the best teachers—this is one idea worth serious consideration.

²⁸ Although with the encouragement of the federal Race to the Top grant program, many states have already have or are in the process of creating teacher evaluation systems.



THIS SERIES OF RAPID RESPONSE BRIEFS IS DESIGNED TO BRING RELEVANT FISCAL ANALYSES TO POLICYMAKERS AND EDUCATION LEADERS AMIDST THE CURRENT ECONOMIC ENVIRONMENT.

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