

Issue Brief

Revisiting The Three Rs of Teacher Retirement Systems: Recruitment, Retention, and Retirement

By Ilana Boivie

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ABOUT THE AUTHOR

Ilana Boivie is the Senior Policy Analyst with the DC Fiscal Policy Institute, where her work focuses on strengthening job training and adult education, and on improving working conditions for people employed in the District of Columbia. She conducts original research and analysis on these issues, and frequently testifies before policymakers. Previously, she worked as a Research Economist for the Communications Workers of America, where she served as the subject matter expert on retirement policy and provided bargaining and policy support on health care issues. Prior to that, she served as Director of Programs for the National Institute on Retirement Security, where she conducted original research and analysis of national retirement issues, and frequently spoke on retirement and economic matters. Ilana holds an M.A. in Economics from New Mexico State University and a B.A. in English from Binghamton University, where she graduated Magna Cum Laude.

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ABOUT NIRS

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EXECUTIVE SUMMARY

As early as the turn of the 20th century, American legislators seemed to understand the importance of teacher quality to students' education. A 1917 report on public education noted that "a school-teacher's work is personal, direct, and positive. It works for the good or the ill of each pupil."¹

Defined benefit (DB) pension plans were first introduced for teachers in the United States to help with the recruitment of high quality educators, and as an incentive to keep those educators in the teaching profession. By 1916, some form of retirement plan was made available to public schoolteachers in 33 states. It was thought that such a retirement system might serve two purposes: 1) bringing more diverse, and highly qualified teachers into the profession; and 2) creating a more productive workforce that actually saves public employers money, as one dollar in pension benefits was seen as worth more than a dollar in salary.²

Today, the vast majority of public school teachers in the United States participate in a traditional DB pension plan.

This report analyzes the effectiveness of pensions on teacher retention and overall teacher productivity, and draws policy conclusions about the ideal design of teacher retirement systems. It finds that:

- Teacher effectiveness increases with experience. Education policy literature finds that teacher productivity increases sharply within the first few years of teaching. Thus, the more retention that we see among midcareer teachers, the more that the average teacher productivity within a school will increase.

- The cost of teacher turnover is quite high, both in terms of financial cost and loss of productivity to the school district. Additionally, public school teachers turn over less than private school teachers, largely due to their compensation, including pension benefits.
- Defined benefit pension plans help to recruit high quality teachers, and to retain highly productive teachers longer, as compared with defined contribution (DC) accounts.
- In 2009, DB pensions helped to retain an additional 30,000 teachers nationwide. Because longer tenured teachers are more effective teachers, the increased retention that DB pensions bring increases the overall quality of public education.
- Because the cost of teacher turnover is substantial, the retention effects of DB pension plans also save school districts money. In 2009, DB pensions saved school districts between \$130.7 million and \$284.4 million nationally in teacher turnover costs.

DB pensions remain a cost-effective way to increase retention of highly effective teachers in our public schools. Because DB pensions play an important role in the retention of highly productive teachers, pensions have the dual benefit of both increasing the overall quality of our public education system while also reducing the costs to taxpayers. These findings are particularly important considerations for policymakers given the economic challenges facing states and localities as they attempt to keep taxpayer costs low while improving education for American children.

I. TEACHER EFFECTIVENESS INCREASES WITH EXPERIENCE

To effectively design a retirement system that retains good quality teachers, teacher quality itself must first be assessed. That is, to know whether the policy in place is keeping the “right” employees, it must first be understood which employees are the highest quality. Only then can it be assessed whether or not those employees are being effectively retained.

On the question of teacher productivity, the education policy literature is quite clear: teachers become more effective as they gain experience. This is especially evident when looking at student test scores. A paper from the National Bureau of Economic Research studied fifth grade mathematics and reading teachers, and found “significant returns to teacher experience.”³ One study found that, after controlling for student poverty, the two highest predictors of test scores were teacher experience and teacher preparation.⁴ Furthermore, in a meta-analysis of teacher experience and productivity, Glass found that 85 percent of the statistically significant regression coefficients of these studies were positive, indicating to the author that “students of more experienced teachers achieve at higher levels.” The study further found regularly licensed teachers to be more effective than emergency-certified teachers.⁵

Education policy literature also finds that teacher productivity increases sharply within the first three to five years of teaching.⁶

Henry, Fornter, and Bastian find that science teachers with five or more years of experience were far more effective than more novice teachers.⁷ Harris and Sass find that teachers become more and more productive within the first few years, when experience can enhance teacher effectiveness in both reading and mathematics, especially among elementary and middle school teachers. The authors find that most of the productivity increases occur within the first year of teaching. After a few years, however, subsequent experience yields “diminishing increases in teacher productivity,” meaning that productivity gains begin to level off after a certain point.⁸

Milankowski and Odden specifically quantify the gains to students of increased teacher effectiveness. They found that students achieved between 0.07 and 0.10 standard deviations higher in both reading and mathematics when taught by an experienced teacher, as opposed to an inexperienced teacher.⁹

Overall, the research is clear that teacher turnover has a negative effect on student achievement.¹⁰ Therefore, each time a mid-career teacher, who tends to be highly effective, leaves and is replaced by an inexperienced teacher, who tends to be less effective, the school as a whole sees a drop in average productivity. An obvious human resource goal should then be retaining mid-career teachers—because this is when all teachers are at their most effective.

II. THE FINANCIAL COST OF TEACHER TURNOVER IS HIGH

With teacher productivity increasing sharply in the first five years of teaching and then reaching a plateau with increased experience, it makes sense to implement public policy in which teachers are especially encouraged to stay once they have achieved this level of effectiveness. In other words, once teachers have about five years' experience, they are most productive; therefore, retention policies should be built around retaining those teachers with at least five years' experience. This can even have additional positive effects on the overall effectiveness of the teaching workforce as a whole, for example, when there are sufficient veteran teachers in a school to support the mentoring of younger teachers.¹¹

In fact, teacher turnover patterns seem to fit the human resource objectives of retaining highly qualified teachers quite nicely. Harris and Adams find that the overall rate of teacher turnover is relatively low as compared to several similar professions. Further, they find that the highest rates of turnover were among the youngest teachers, and the older, retiring workers.¹² Similarly, a study by the National Commission on Teaching and America's Future finds that in both urban and rural schools, the youngest and oldest teachers left at the highest rates, while middle-aged teachers were most

likely to remain teachers. In large urban schools especially, teachers with less than five years' experience left at the highest rates. In fact, in a regression analysis of teacher turnover, the only statistically significant variable was teacher experience, where teachers with zero to one years' experience were most likely to leave.¹³

Further, ample research has been conducted on the prevalence of teacher turnover overall, and finds that rates of teacher turnover do not seem significantly high for any teachers, at any ages. Harris and Adams find that an average of only 2.6 percent of teachers leave each year due to switching to a new profession.¹⁴ Further, researchers at the National Center for Education Statistics found that schoolteachers were just as likely to continue working in the same occupation three years after beginning the job, as compared with other white collar jobs such as those in the sciences, business and finance, and information technology.¹⁵

The Alliance for Excellent Education has calculated the total number of teachers who left the profession in 2009. Their findings are reprinted in **Table 1**. Nationally, the average rate of teachers leaving the profession was 6.8 percent.

Table 1: U.S. Teacher Turnover Rates

Total Number of Teachers	Teachers Leaving the Profession	Percentage of Teachers Leaving
3,404,518	230,123	6.8%
Number of teachings leaving the profession does not include leaving due to retirement. Leave rate is a weighted average of state-by-state attrition rates.		

Source: Authors calculations based on Alliance for Excellent Education. 2014. "On the Path to Equity: Improving the Effectiveness of Beginning Teachers." Washington, DC.

When a mid-career teacher leaves education, the productivity losses are great, as noted earlier. Yet for every teacher who turns over, there is an even greater loss to the school beyond that of just lost productivity; there is also a large financial cost to turnover. Whenever a teacher leaves, a new teacher must be hired, and the school must engage in activities such as recruitment, hiring, administrative processing, and training, to name a few.¹⁶

Several studies attempt to put an actual monetary value on the cost of turnover. Though these estimates can vary depending on the data collected and methodology used, each of them seem to conclude that the cost of turnover is quite high.¹⁷

The Alliance for Excellent Education also calculates the financial cost of teacher turnover for the United States as a whole, and on a state-by-state basis. It finds that over 230,000 teachers left the profession in 2009; the total cost of this turnover was between \$1 billion and \$2.2 billion. See **Table 2**. It should be noted that these costs take into account the cost of turnover only—in terms of recruitment, hiring, orientation, and other associated costs—but not the salary differentials between the teacher leaving and the newly hired replacement. Nor does it take into account the productivity losses associated with teacher turnover. **Figure 1** presents state-by-state attrition rates, and **Figure 2** presents the state-by-state costs of teacher turnover.

Table 2: National Teacher Turnover Costs

Total Turnover Cost of Teachers Who Leave the Profession (Low Estimate)	\$1,001,052,722
Total Turnover Cost of Teachers Who Leave the Profession (High Estimate)	\$2,178,923,695

Source: Authors calculations based on Alliance for Excellent Education. 2014. "On the Path to Equity: Improving the Effectiveness of Beginning Teachers." Washington, DC.

Figure 1: Teacher Attrition Rates, by State

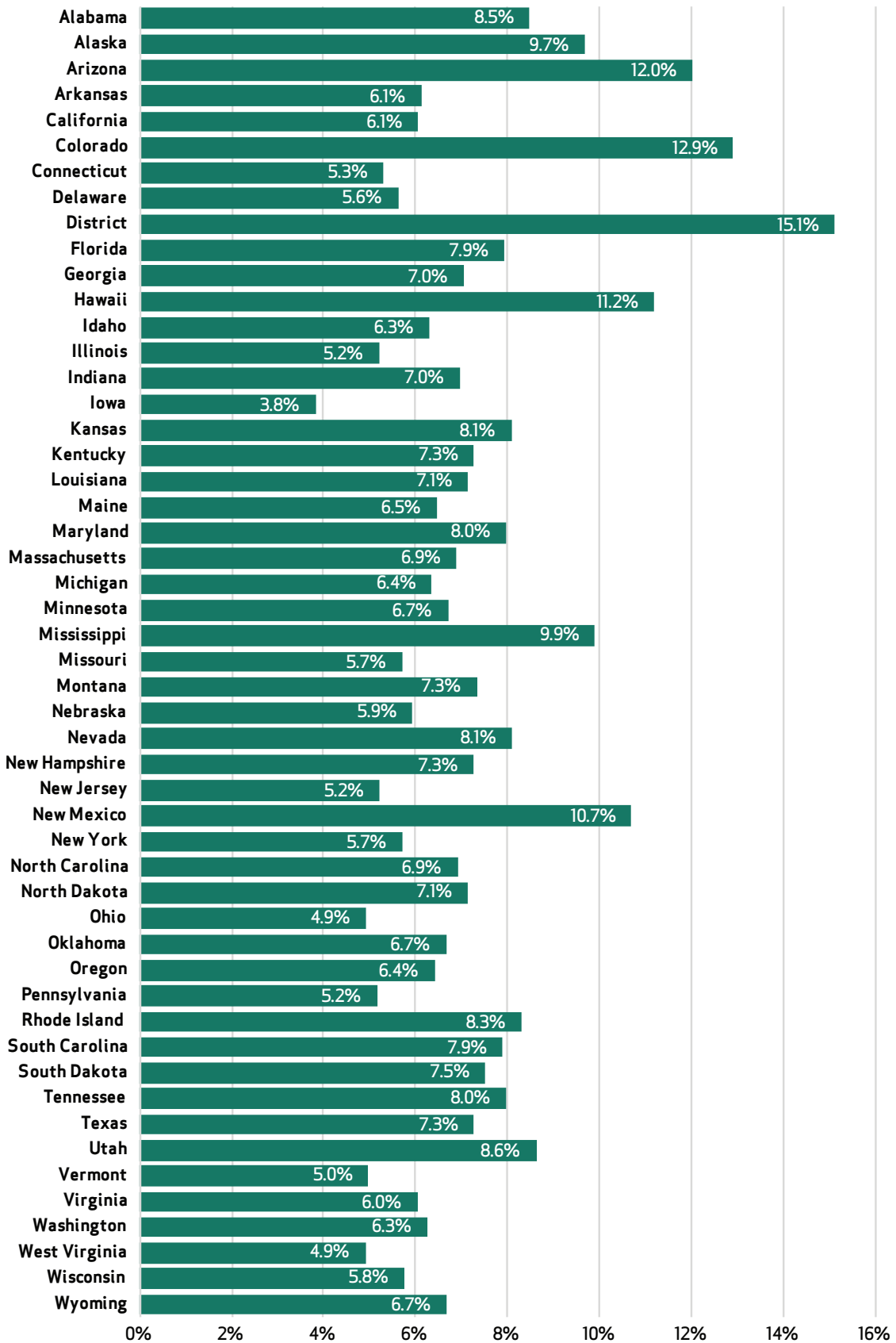
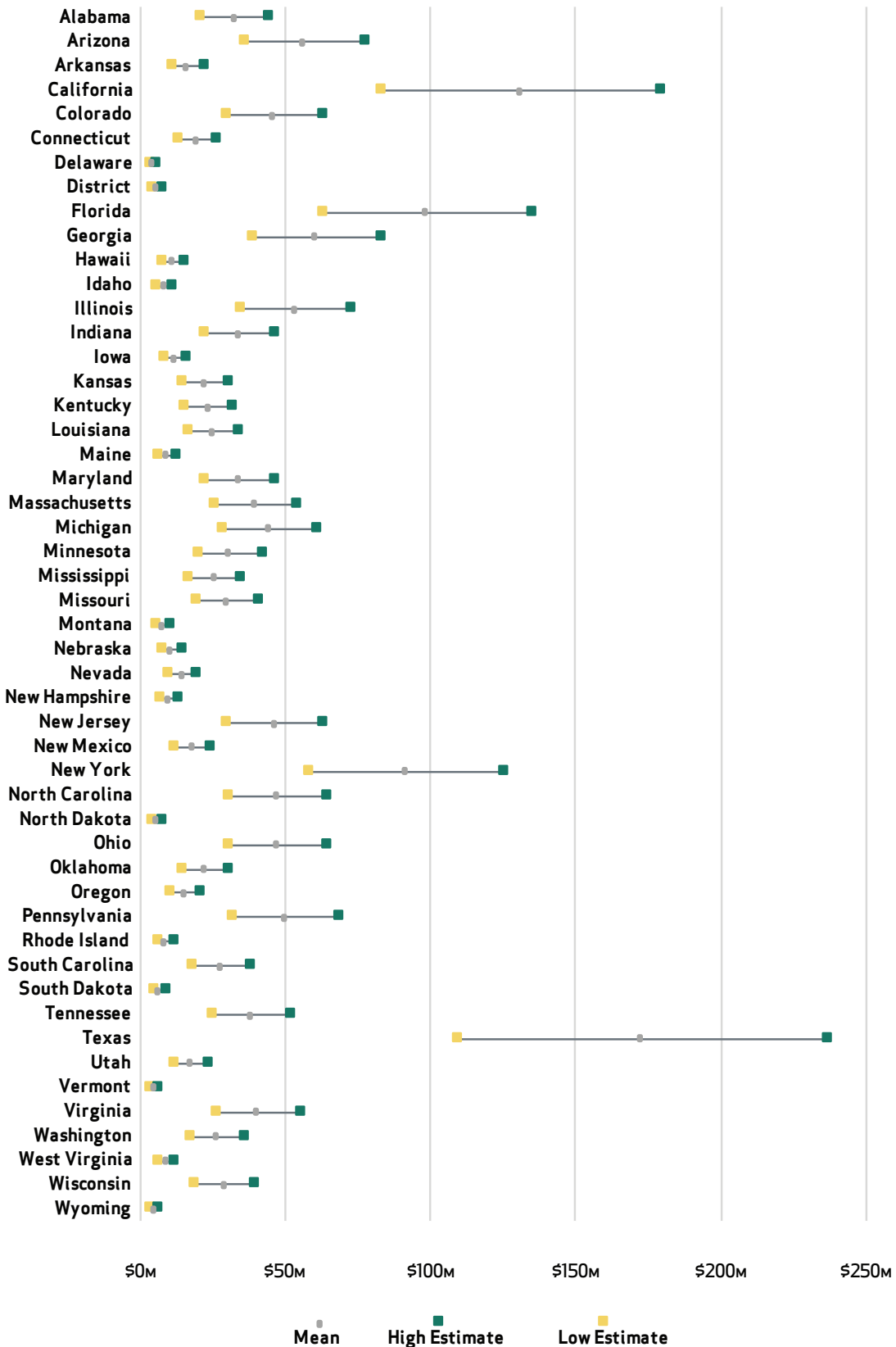


Figure 2: Total Turnover Cost of Teachers who Leave the Profession, by State



Data for Alaska is not applicable, as teachers were offered only a DC plan in 2009.

IV. DB PENSION PLANS INCREASE RECRUITMENT AND RETENTION OF EFFECTIVE TEACHERS

As mentioned earlier, DB plans were initially implemented in school districts to recruit and retain highly qualified teachers. In fact, for decades public and private sector employers have used DB pension plans as a recruitment and retention tool to reduce attrition of qualified workers. Especially within the public sector, DB plans may be all the more highly valued, as these employees tend to receive less total compensation than their private sector counterparts.¹⁸ In addition, 27 percent of all state and local employees,¹⁹ and 40 percent of all public school teachers,²⁰ are not covered under Social Security. For those employees, their DB pension benefit may be all the more important, as it is likely the only source of guaranteed income that they will receive in retirement. Across industries and sectors, research shows that employees still place a high value on their DB pension benefits.

Attraction and Recruitment

DB plans are an important recruitment tool, as employees seem to value these benefits quite highly. A 2014 study by Towers Watson found that employees of firms with DB plans place a much greater importance on both attraction than workers at firms with DC plans; 45 percent of employees of DB firms say the plan is an important reason they decided to join the firm, as compared to just 25 percent of employees at DC firms.²¹ Among employers, a 2004 survey found that 84 percent of DB plan sponsors believe that their pension plan has some impact on employee retention, with 31 percent stating that this impact is major.²² Finally, Ippolito finds that workers seem to value pensions so highly that they willingly forego higher wages in order to be ensured guaranteed retirement income.²³

Also, employers with DB pensions may be able to better attract desirable skilled employees due to a self-selection effect. This means that employees who are more likely to stick with a job also tend to be more apt to accept employment that offers a DB pension in the first place.²⁴ Boston College researchers find that, because DB pensions tend to favor long-term service, public employees' relatively longer tenure than private sector counterparts led to an employee preference for DB pensions over DC plans.²⁵ Similarly, other research has found that longer-term employees tended to prefer DB pensions to DC

and cash balance plans. This could be because employees who are looking for a career instead of a short-term job seek out employers who offer DB pensions.²⁶ Ippolito focuses on the attraction effect of DB pensions and considers how employers use retirement plans to select employees interested in making a long-term commitment to their employers. Employees who delay gratification and are less focused on immediate rewards are more attractive employees for these employers. DB pensions, which offer larger compensation to employees with greater tenure, are more attractive to these employees than to those who are more focused on current rewards.²⁷ Employers with DB pensions may thus use retirement benefits to select employees who best fit their needs. In the same vein, Nyce finds that DB pensions had a much larger retention effect than DC plans and that DB pension plans raised employees' commitment to their employer, while no such effect existed for DC plans. These results were strongest among younger employees, suggesting that DB pensions can play a crucial role in retaining employees who are willing to make a long-term contribution to their employer's success.²⁸

Regarding public sector employees and teachers specifically, more and more research has been finding links between retirement benefits and teacher retention.²⁹ A 2016 study of the Chicago teachers' pension plan found that teachers are more likely to leave the profession sooner when their benefits were reduced.³⁰

In addition, there is strong evidence that teachers and other public employees have a strong preference for DB pension plans. First, public employees overall view pensions very favorably at a significantly greater rate than private sector employees—55 percent versus just 36 percent. Research finds that when given the choice between a primary DB or DC plan, public sector employees overwhelmingly choose the DB pension plan. Among the eight state retirement systems that offer a choice between DB, DC, and combined DB/DC plans, the uptake rate for options for the DB benefits ranges from 98 to 75 percent.³¹ This suggests that public employees value their DB pension benefits highly. Additionally, research shows that women—who make up the majority of public school teachers—face a “double whammy” in retirement, in that they have lower wages and lower savings levels in individual

retirement accounts, while at the same time living longer than men.³² For this reason, it seems that women place a greater value on DB pension benefits than men. For example, in a recent public opinion poll, 73 percent of women said that retirement plan was an extremely or very important job feature in job considerations, as compared with 60 percent of men. Additionally, 83 percent of women, and just 70 percent of men, feel that the disappearance of traditional pensions has made it harder for workers to achieve the American Dream.³³

Perhaps most telling is the unique case of West Virginia.³⁴ After 1991, West Virginia enrolled new teachers in a DC plan, as the state had closed the Teachers Retirement System (TRS), a DB plan. Over time, teachers failed to accumulate sufficient savings for retirement in the DC plan. Thus, in 2005, the state reopened TRS to all newly hired teachers.

Then came the question of what to do about the teachers hired between 1991 and 2005 who had been enrolled in the DC plan. The state determined that these teachers could make individual elections whether to remain in the DC plan or transfer to the DB plan. As a result, a full 78 percent of those teachers chose to switch in June of 2008, including 76 percent of young teachers (under 40 years old). This result was a surprise, since it is often assumed (incorrectly, as it turns out) that younger workers prefer DC plans over DB plans.

Retention

Perhaps as a result of their strong popularity, DB pension plans consistently reduce employee turnover. As early as 1993, Allen and colleagues found evidence that DB pensions keep workers at jobs longer.³⁵ Even and MacPherson similarly found that firms with pension coverage saw lower turnover rates, with the effect being greater at large firms than at smaller firms. Additionally, the authors found that firms with DB plans consistently showed smaller turnover rates than firms with DC plans, despite firm size.³⁶ According to Towers Watson, a full 68 percent of employees with DB plans say their retirement plan is an important reason that they stay with their employer, as compared with just 39 percent of employees with DC plans. In addition, workers with DB pensions are much more likely to say they plan to continue working for their current employer until they retire than workers with DC plans.³⁷

Researchers at Boston College have attempted to quantify the reduced attrition that pensions bring, and found significant effects. First, they find evidence that the move from DB plans

into DC plans beginning in the 1990s caused employees to turn over at higher rates—as opposed to the other way around, as is sometimes assumed.

They further find that DB pension coverage increases tenure with an employer by four years, as compared to having no retirement system in place. DB coverage increases tenure with an employer by 1.3 years as compared with DC coverage. Having a DB and DC plan showed the greatest retention effects, as the two plans together increase tenure by a full 3.1 years, as compared with a DC-only plan.³⁸

Within the teaching profession specifically, public school teachers have been found to turn over less often than private school teachers, largely due to their compensation, including pension benefits. In a comprehensive review of recent literature on teacher recruitment and retention, Guarino and colleagues find a large consensus in the literature that public school teachers turn over less than their private school counterparts.³⁹ Ingersoll finds that private school teachers turn over at a much higher rate than public school teachers.⁴⁰ The National Center for Education Statistics verifies this in a study finding that 11.9 percent of private school teachers turn over each year as compared with just 6.6 percent of public school teachers. Additionally, private school teachers were much likely to leave the profession for another career, while public school teachers more commonly left due to child rearing or retirement.⁴¹

In a simulation analysis of the retention effects of changing retirement benefits, Christian Weller finds that moving public school teachers from DB pension plans to alternative retirement plans such as cash balance or DC plans would increase teacher turnover.⁴² Finally, Harris and Adams again find that turnover for public school teachers is substantially lower than that of private school teachers, a point they find unsurprising, as public school teachers are more likely to have pensions, which “seem to reduce turnover.”⁴³

Efficient Retirement

Additionally, employees’ decisions on when to actually retire offer additional productivity benefits to employers with DB pensions. DB pensions can encourage “efficient retirement,” such that employees withdraw from the labor force when their productivity decreases. Lazear argues that DB pensions can function similar to severance pay in encouraging efficient retirement as employees age and their productivity starts to level off or even to decrease.⁴⁴

Nalebluff and Zeckhauser study the effect that DB pensions have on individuals' retirement decisions, and find that the features of most U.S. DB pensions can be designed to facilitate appropriate and optimal retirement decisions among employees.⁴⁵ Luchak, Pohler and Gellattly find that employees with a DB pension were more likely to retire later when they experienced higher levels of affective commitment to their employer. Employees with high affective commitment planned to retire, on average, about two years later than employees with low levels of affective commitment.⁴⁶ Hence, when setting an early retirement age, DB benefits often target an average age when employee productivity starts to soften.⁴⁷

Recent research finds that women who worked in education services had the highest level of average household income in 2013. During their working careers, teachers earn less than 80 percent of the weekly wages earned by other women college graduates employed in the private sector,⁴⁸ but women 65 and older in the education sector had the highest average household income—\$66,038—when compared to other occupational fields. The two largest sources of income for these educators were Social Security (38 percent of income) and income from a defined benefit pension (37 percent of income), which together account for three-fourths of household income.

Women who worked as professionals, scientists or managers had the second highest average household income for this age group, at \$57,576. About half of this income was from Social Security, and about one-quarter came from wages.⁴⁹ Wages supply a much lower percent of household income for teachers than for other women, suggesting that they are in a better financial position to retire.

Regarding teacher pensions specifically, a 2013 study found that pensions can provide a tool to allow teachers to retire when they feel ready, which can have a positive effect on student achievement.⁵⁰

Thus, the literature is quite clear that public employers implement DB pension plans to attract and retain qualified workers. In turn, these employees—including teachers—value their pensions quite highly, and will work for employers with DB pension coverage substantially longer than for employers that offer only DC plans.

V. DB PENSIONS CAN INCREASE TEACHER PRODUCTIVITY

Even as they retain employees longer, there is evidence that DB pension plans actually increase worker productivity.

Towers Watson finds that “effective retirement plans are clearly related to employees’ emotional connection to their employer,” and that employees with DB plans are much more engaged with their work than those with DC plans.⁵¹

Dorsey finds “various indirect evidence” that certain productivity gains are attributable to DB pensions.⁵² More recently, in his analysis of productivity changes when a company moves from a DB to a DC retirement plan, Hall finds that those firms that moved from a DB to a DC plan between 1995 and 2000 experienced productivity losses, especially as compared with those firms who retained their DB plans. He hypothesizes that this loss of productivity may be due to the fact that—as noted above—workers turn over more quickly with the DC switch, and thus leave the firm before they had acquired all of the job-specific skills necessary to achieve higher productivity.⁵³

Although the author concludes that more work needs to be done in order to prove such a correlation between increased tenure and increased productivity, the relationship does seem intuitively likely, especially in relation to the teacher productivity literature reviewed above.

In addition, Towers Watson finds that, with the switch to “do-it-yourself” DC plans, “financial worries can distract workers from their jobs and enact a toll on their well-being and ultimately their job performance.”⁵⁴

Within the teaching profession specifically, the teacher effectiveness literature clearly shows that as teachers gain experience they become more effective. Since DB pensions are serving to retain teachers longer, it would follow that such increased retention would naturally lead to further productivity gains. That is, the DB pension plan is serving to retain the most qualified teachers; this, in turn, increases overall teacher quality at each school. Indeed, in a simulation analysis of teacher effectiveness and retirement benefits, Weller finds the counterfactual to be true—that average teacher effectiveness could fall by at least 4.3 percent and 1.2 percent, respectively, should DB pensions be replaced by DC plans or cash balance plans for teachers.⁵⁵

The bottom line is that better recruitment of targeted employees, increased retention of skilled employees, and greater commitment to the employer translate into higher productivity with DB pensions. Further, these findings seem to hold especially true for schoolteachers and their employers.

VI. IN REDUCING TURNOVER, THE DB SYSTEM SAVES SCHOOLS MONEY

As effective as DB pensions are at reducing turnover and thus increasing overall teacher quality, they have the added benefit of reducing the financial costs associated with teacher turnover. Since DB pensions reduce turnover, as compared with DC plans, such reduced turnover saves the school district money in terms of those same turnover costs discussed previously: recruitment, hiring, administrative processing, training, etc.

Table 3, Figure 3 and **Appendix Table 4** shows the increase in tenure attributable to the fact that schools in each state offer a primary DB plan rather than a DC plan. We calculate the additional teachers retained under the DB plan, as well as the additional turnover costs that would be associated with a switch to a DC plan. The DB plan is associated with substantially less teacher turnover, and thus large cost savings. Nationally, nearly 30,000 teachers are more likely to stay in the profession as a result of a DB plan, and such reduced attrition yields between \$130 million and \$284 million in cost savings nationwide. See **Table 3**. (For state-by-state data, see **Figure 3**.)

It should be noted that these costs take into account the cost of turnover only—in terms of recruitment, hiring, orientation, and other associated costs—but not the salary differentials between the teacher leaving and the newly hired replacement. For example, if a mid-career teacher is replaced by a young teacher, the school will generally pay the younger, inexperienced teacher a lower salary than the older teacher being replaced.

Such salary differentials are not included, as the analysis was meant to isolate the cost of turnover itself. Some studies, such as that of Milankowski and Odden, attempt to include salary differentials as well as the loss of productivity in turnover cost calculations. Interestingly, these authors find that, when losing a mid-career teacher, the productivity loss is so substantial that it outweighs any cost savings in terms of a reduced salary for the new teacher.⁵⁶ In a cost-benefit analysis of a California teacher mentoring program, Villar and Strong found that the highest cost savings were achieved with increases in teacher effectiveness. After five years, every dollar invested in a teacher “produces a positive return...and the state almost recovers its expenses,” as increases in teacher productivity positively affect the teachers, their students, the school district, and the broader society.⁵⁷

Such results may not be surprising, considering the near consensus in the literature on the massive gains in productivity that more experienced teachers bring, as discussed previously.

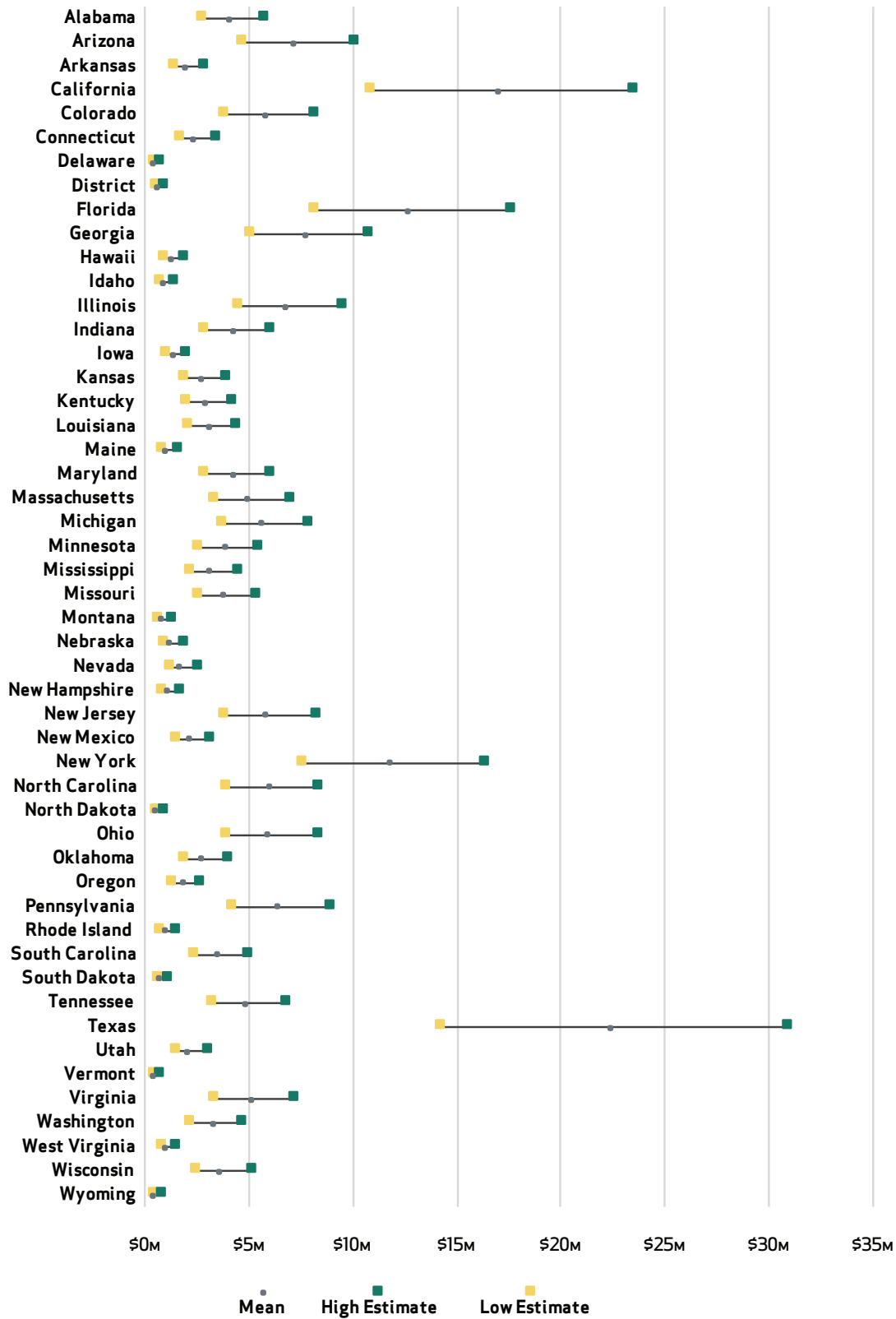
Finally, these costs also do not take into account the transition costs of switching out of the DB pension system. Weller finds that the transition costs associated with moving from a DB pension to an alternative retirement plan can be substantial. The transition costs of a switch to a cash balance design would cost on average 0.7 percent of payroll, and a DC transition would cost 0.3 percent of payroll, over 40 years.⁵⁸

Table 3: National Teacher Turnover Cost Savings Associated with DB Plans

Projected Leave Rate Under DC Plan	7.6%
Additional Teachers Retained Under DB Plan	29,934
Turnover Cost Savings of DB Plan (Low Estimate)	\$130,659,492
Turnover Cost Savings of DB Plan (High Estimate)	\$284,397,671

Estimated from Munnell, Alicia H., Kelly Haverstick, and Geoffrey T. Sanzenbacher. 2006. “Job Tenure and Pension Coverage.” Working Paper 2006-18. Chestnut Hill, MA: Center for Retirement Research at Boston College. And Alliance for Excellent Education. 2014. “On the Path to Equity: Improving the Effectiveness of Beginning Teachers.” Washington, DC.

Figure 3: Teacher Turnover Cost Savings Associated with DB Plans, by State



Data for Alaska is not applicable, as teachers were offered only a DC plan in 2009. For a description of the low and high estimate calculations, see the Technical Appendix.

VII. CONCLUSION

Education policy literature shows that teachers become more effective with more experience. The DB pension system was originally designed to recruit and retain high quality educators, while also offering economic security in retirement to those public employees who teach America's children. This report analyzes the effectiveness of pensions on teacher retention and overall teacher productivity. It finds that:

- DB pensions help to retain highly productive teachers longer.
- 6.8 percent of public school teachers left the profession for another occupation in 2009; the cost of turnover nationally is between \$1 billion and \$2.2 billion per year.
- DB pensions helped to retain an additional 30,000 teachers nationwide in 2009, which in turn saved between \$131 million and \$284 million in teacher turnover costs across the nation's school districts.

Because DB pension plans are so highly regarded by the employees who have them—especially teachers—they play a critical role in recruiting and retaining highly productive teachers. This increases each school's average level of effectiveness, and thereby benefits students as well. Additionally, the DB plan brings the added benefit of saving school districts—and taxpayers—money in terms of expensive turnover costs. In other words, DB pensions provide the dual benefit of increasing the quality of the U.S. public education system while at the same time reducing the cost of teacher turnover to taxpayers.

TECHNICAL APPENDIX

To estimate the percentage increase in job tenure when switching from a DC to a DB plan (Table 2 below), we first utilized data from Munnell and colleagues' 2006 paper "Job Tenure and Pension Coverage." The mean tenure reported in the paper for workers with no employer-sponsored retirement plan was 7.26 years in 2003. The paper also reports that, from this baseline of no retirement plan, switching to a DC and DB retirement plan at work respectively increases tenure by 2.7 and 4.0 years. The average tenure under a DC plan was 10.0 years, and a switch from a DC plan to a DB plan increases tenure by 1.3 years, for a total average tenure of 11.3 years.

Assuming a 35-year career, we then calculate the total number of jobs that employees under each type of plan will hold throughout their careers: 3.5 jobs under a DC plan, and 3.1 jobs under a DB plan. Thus, the probability of each employee turning over in any given year is the total number of jobs worked divided by the number of years worked, or 0.1 and 0.09, respectively. Thus, the probability of turning over in a single year is 12.7 percent higher in a DC plan versus a DB plan.

We then multiply this probability by Alliance for Excellent Education's reported turnover rates to determine what the turnover rates would have been under the alternative retirement systems. The difference in turnover rates is multiplied by the total number of teachers in order to calculate the number of teachers who would have turned over under the alternate retirement system. This number is multiplied by the per teacher cost of turnover in order to calculate the cost savings resulting from the corresponding retirement plan.

The Alliance for Excellent Education calculates a "low estimate" and a "high estimate" for the per teacher cost of turnover. The cost estimates are drawn from a study of teacher turnover conducted by the National Commission on Teaching and America's Future. The lower estimate--\$4,365—was gathered from a not-poor, small, rural school district. The higher estimate--\$9,501—was gathered from a low-income, large, urban school district.

For the national average of turnover rates, we use a weighted average of the turnover rates among all 50 states, based on the total number of teachers in that state.

Table 4: Teacher Turnover Cost Savings Associated with DB Plans, by State

	Projected Leave Rate Under DC Plan	Additional Teachers Retained under DB Plan	Turnover Cost Savings of DB Plan (Low Estimate)	Turnover Cost Savings of DB Plan (High Estimate)
Alabama	9.6%	590	\$2,575,716	\$5,606,386
Alaska	N/A	N/A	N/A	N/A
Arizona	13.6%	1043	\$4,553,799	\$9,911,945
Arkansas	6.9%	286	\$1,248,594	\$2,717,729
California	6.8%	2451	\$10,697,596	\$23,284,734
Colorado	14.6%	844	\$3,684,989	\$8,020,866
Connecticut	6.0%	347	\$1,514,713	\$3,296,973
Delaware	6.3%	61	\$265,089	\$577,002
District	17.1%	87	\$378,349	\$823,526
Florida	9.0%	1836	\$8,013,099	\$17,441,570
Georgia	8.0%	1121	\$4,892,661	\$10,649,525
Hawaii	12.6%	186	\$813,672	\$1,771,065
Idaho	7.1%	133	\$582,260	\$1,267,366

	Projected Leave Rate Under DC Plan	Additional Teachers Retained under DB Plan	Turnover Cost Savings of DB Plan (Low Estimate)	Turnover Cost Savings of DB Plan (High Estimate)
Illinois	5.9%	985	\$4,300,573	\$9,360,766
Indiana	7.9%	622	\$2,715,888	\$5,911,489
Iowa	4.3%	197	\$861,815	\$1,875,853
Kansas	9.1%	397	\$1,733,727	\$3,773,687
Kentucky	8.2%	422	\$1,842,601	\$4,010,664
Louisiana	8.1%	449	\$1,958,289	\$4,262,475
Maine	7.3%	150	\$655,073	\$1,425,853
Maryland	9.0%	624	\$2,721,644	\$5,924,019
Massachusetts	7.8%	723	\$3,157,929	\$6,873,649
Michigan	7.2%	816	\$3,562,711	\$7,754,713
Minnesota	7.6%	559	\$2,441,657	\$5,314,589
Mississippi	11.2%	459	\$2,003,956	\$4,361,876
Missouri	6.4%	545	\$2,379,065	\$5,178,350
Montana	8.3%	122	\$530,636	\$1,154,999
Nebraska	6.7%	180	\$784,232	\$1,706,985
Nevada	9.2%	250	\$1,090,762	\$2,374,188
New Hampshire	8.2%	165	\$721,923	\$1,571,362
New Jersey	5.9%	849	\$3,704,052	\$8,062,359
New Mexico	12.1%	317	\$1,383,417	\$3,011,189
New York	6.5%	1700	\$7,420,257	\$16,151,171
North Carolina	7.8%	866	\$3,779,333	\$8,226,219
North Dakota	8.1%	83	\$362,709	\$789,485
Ohio	5.6%	862	\$3,763,263	\$8,191,241
Oklahoma	7.5%	404	\$1,762,559	\$3,836,442
Oregon	7.2%	265	\$1,157,224	\$2,518,851
Pennsylvania	5.8%	921	\$4,020,501	\$8,751,152
Rhode Island	9.4%	143	\$626,225	\$1,363,061
South Carolina	8.9%	505	\$2,205,957	\$4,801,557
South Dakota	8.5%	104	\$454,162	\$988,543
Tennessee	9.0%	698	\$3,047,532	\$6,633,357
Texas	8.2%	3235	\$14,119,343	\$30,732,618
Utah	9.7%	306	\$1,337,002	\$2,910,163
Vermont	5.6%	67	\$290,317	\$631,913
Virginia	6.8%	741	\$3,233,763	\$7,038,714
Washington	7.1%	474	\$2,070,550	\$4,506,825
West Virginia	5.5%	147	\$639,981	\$1,393,004
Wisconsin	6.5%	526	\$2,296,089	\$4,997,741
Wyoming	7.5%	69	\$302,239	\$657,862

Data for Alaska is not applicable, as teachers were offered only a DC plan in 2009.

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