CALDER Policymakers Council

Research Brief

TEACHER PENSIONS AND LABOR MARKET INCENTIVES

Kristian Holden

American Institutes for Research/CALDER

Suggested citation:

Holden, K. (2018). *Teacher pensions and labor market incentives* (CALDER Policy Brief No. 9-0918-1). Washington, DC: National Center for Analysis of Longitudinal Data in Education Research.

The crafting and dissemination of this research brief was supported by the National Center for the Analysis of Longitudinal Data in Education Research (CALDER), which is funded by a consortium of foundations. For more information about CALDER funders, see www.caldercenter.org/about-calder. Note that the views expressed are those of the authors and do not necessarily reflect those of funders or the institutions to which the authors are affiliated. The author would like to thank Dan Goldhaber for comments that improved this brief

Teacher Pensions and Labor Market Incentives

Kristian Holden

American Institutes for Research/CALDER

CALDER Policy Brief No. 9-0918-1

Highlights

- The great majority of teachers are covered by defined benefit (DB) retirement plans.
- DB pensions in most states face large, unfunded liabilities that will pressure policy makers in the future to make changes to policy.
- DB pension plans create cross-subsidization, where the costs of unfunded liabilities are not faced by those who benefit.
- DB pensions have little influence on early-career attrition but a strong influence on retirement timing.
- There is some evidence that DB pensions could explain low levels of cross-state mobility.
- Few studies consider the impact of DB pension systems on student achievement.
- Teacher pension structure has important implications for the desirability of the teaching profession.

Executive Summary

The majority of public school teachers are enrolled in defined benefit (DB) pensions, which provide benefits based on a function of teacher's age, experience, and end-of-career salary, and many state systems face large, unfunded liabilities. This brief considers the influence of DB pensions on the teacher labor market, including early-career retention, mobility, retirement timing, and teacher quality. In general, teachers do not appear to change their early-career retention decisions according the incentives created by DB pensions but do consider them when timing their retirement. Moreover, there is little evidence that DB pension incentives influence the quality of the teacher workforce. Lastly, there is some evidence that cross-state mobility could be impeded by these plans, with negative consequences for student achievement.

What Is the Issue?

The majority of public school teachers are enrolled in defined benefit (DB) pension plans, where retirement compensation is determined by age, experience, and end-of-career salary (National Education Association, 2011). These benefits are paid as a guaranteed annuity for the duration of retirement. Because a sizable portion of a teacher's total compensation is awarded in the form of retirement benefits (e.g., Backes et al., 2016), it is important to consider the role DB pensions play in the teacher labor market.

A growing body of research has noted that state DB pension plans have large, unfunded liabilities. This means that states do not have enough funding to cover the expected costs of promised retirement benefits for their workers. This is particularly concerning because, by some estimates, these unfunded liabilities are greater than $1 trillion across state pension systems, which suggests that policy makers will be under pressure to address this shortfall.[1] In contrast, other types of retirement plans do not face problems with unfunded liabilities. For instance, private employees tend to have defined contribution (DC) plans, such as 401(k) plans, where benefits are not determined based on a formula but on employee and employer contributions as well as investment returns. A few state pension systems have introduced hybrid plans that combine DB and DC plans to provide a lower guaranteed return as well as tying part of the retirement benefit to contributions. Lastly, cash balance plans provide an investment account with guaranteed minimum rate of return but with retirement benefits still determined by the size of the account.

DB pension plans and unfunded liabilities also create problems of inequity because those who receive the benefits do not necessarily pay the corresponding costs. While this could be beneficial in theory (for example, through risk-sharing across generations [see Cui, de Jong, & Ponds, 2011; Gollier, 2008]), it has been found in practice to cause substantial inequity across teachers. For example, Backes et al. (2016) find that new cohorts of teachers are covering part of the cost of pervious cohorts.[2] Additionally, some researchers have raised concerns that differences in salary schedules across districts could lead to inequity across districts (see Shuls, 2017) or inequity within the pension system across different jobs such as school leadership or superintendent positions (Koedel, Ni, & Podgursky, 2013).[3]

So why provide DB pensions instead of another type of plan? One reason is that they create unique incentives that could potentially affect the composition of the teacher workforce. For example, work by Costrell and Podgursky (2010) highlights the large differences in expected DB pension benefits depending on when teachers exit employment. In short, teachers who exit before they reach retirement eligibility have expected retirement benefits that are hundreds of thousands of dollars lower than those who reach eligibility. This implies that any early

[1] For more information on the underfunding of DB pension systems, see Biggs, 2011; Biggs and Richwine, 2011; and Novy-Marx and Rauh, 2009, 2011, 2014.
[2] Another issue raised by these authors is that these liabilities are also associated with changes in the allocation of school funding, with a significant reduction in real operating spending per student.
[3] Research has also noted that the use of end-of-career salary can lead to manipulation to increase DB pension benefits (Fitzpatrick, 2017; Goldhaber, Grout, & Holden, 2017).

separation, either by crossing state lines or exiting the teacher workforce, can lead to substantially lower expected retirement benefits. Similarly, delaying retirement is expensive, as teachers will receive fewer payments over the course of their lives. The discussion below features the research evidence on how DB pensions affect early-career attrition; retirement timing; mobility across state lines and pension boundaries; and, ultimately, the implications for teacher quality and student outcomes.

What Is Known?

Early-Career Retention

Researchers have noted that DB pensions create backloaded compensation that incentivizes employees to stay rather than quit (e.g., Salop & Salop, 1976; Ippolito, 1987, 2002). That said, there is little empirical evidence on whether DB pensions affect early-career retention for teachers. Koedel and Xiang (2017) find that a pension enhancement for public school teachers in St. Louis did not result in additional retention among teachers who are not yet eligible to retire. Research by Goldhaber, Grout, and Holden (2015) examines two pension plans in Washington state: a traditional DB plan and a hybrid plan with less penalty for early-career separation. Their results suggest that this difference in pension structure is not associated with differences in early-career retention. This research is concerning because retention tends to be lowest for early-career teachers, implying that DB pensions have little influence on attrition overall (for example, see Ingersoll, 2001, and Marvel et al., 2007).

Mobility Across State Lines or Pension Systems

In addition to disincentivizing exiting the profession, DB pension plans incentives discourage teachers from exiting pension systems for teaching positions in other states, or covered by different DB pension systems. For example, a teacher who moves across state lines midway through a 30-year career will receive two very small pensions based on 15 years of experience each. Empirically, it is challenging to separate the effects of pension systems from other state-level differences (such as independent licensure systems), but it is clear that teachers are relatively unlikely to move from teaching in a public school in one state to another. For instance, Goldhaber et al. (2015) find very little cross-state mobility of teachers between Oregon and Washington, which is consistent with the idea that pension systems create barriers at state lines.[4] Similarly, Podgursky et al. (2016) find that less than 0.1% of the teacher workforce crosses state lines between Iowa, Minnesota, and Wisconsin. Lastly, Kim et al. (2017) find that schools near state borders are disproportionately affected by differences in state-specific licensing and pension plans and tend to have lower student achievement relative to non-border schools.

An interesting study of the principal labor market by Koedel et al. (2012) helps establish that pension systems can inhibit mobility, independent of licensure requirements. This study considers frictions in the principal labor market caused by three separate pension systems in Missouri (which has a common licensure system across the state): the state's Public Service

[4] Notably, the lack of cross-state mobility may also reflect differences in state-specific licensure regulation and seniority rules, which the authors do not separate.

Retirement System and district-specific pension plans in Kansas City and St. Louis, respectively. The authors find large impacts on cross-plan mobility and estimate that removing pension borders could increase mobility by 97% to 163%.

Retirement Timing

Similar to early-career incentives, researchers have also noted that DB pensions create sharp push-and-pull incentives that reward retirement shortly after eligibility (e.g., Costrell & Podgursky, 2010). Retirement timing has been the focus of many teacher pension studies, and in general, retirement timing seems to correspond to DB pension incentives.[5] Costrell and Podgursky (2010) show that Arkansas teachers tend to retire as soon as they meet retirement eligibility cutoffs. Closely related work by Costrell and McGee (2010) considers the pattern of wealth accrual of Arkansas teachers to simulate teacher responses to changing eligibility cutoffs for retirement. Two papers add to the empirical credibility of these findings by using changes in retirement policies to estimate the effects of DB pensions on retirement. Ni and Podgursky (2016) consider a different, "option-value" approach to modeling retirement decisions and show that this model can provide an accurate picture of the retirement behavior of teachers, even when pension rules change. Alternatively, Brown (2013) considers nonlinearities in California pension rules as well as pension reforms, which suggest that teachers' retirements respond to policy changes.

In addition to the rules for retirement eligibility, research has also explored how other features of this peak influence retirement timing. For example, Furgeson, Strauss, and Vogt (2006) find that a $1,000-increase in pension wealth increases the probability of retirement among female teachers by .02 to .08 percentage points and find less responsiveness among male teachers. In contrast, they find that changes in salary appear to have little effect on retirement behavior.

Teacher Quality

One of the most important questions is not only whether pensions affect early-career attrition, mobility, or retirement timing, but also whether these plans differentially affect *high-quality* teachers. Relatively few papers have considered this question, which is particularly important given that DB pensions are likely intended to "push out" late-career teachers via retirement timing.[6] One important paper by Koedel, Podgursky, and Shi (2013) considers whether the pension incentives for retention are associated with teacher quality, as measured by teacher value added. They find no significant relationship between these DB pension incentives and teacher quality, which could suggest that "pushing out" late-career teachers is not a valuable practice for improving student achievement.

[5] Many older studies have also considered DB pensions and retirement timing for the private sector before the shift to DC plans. For example, see Stock and Wise (1990), Samwick (1998), and Friedberg and Webb (2005).
[6] This is related to research by Fitzpatrick and Lovenheim (2014), who study the effects of an early retirement incentive on teacher attrition and student achievement. They find that the program did not reduce test scores and may have increased them.

What Is Not Known?

A great deal of research has focused on the financial aspects of DB pension plans, but there is still much that is not known about how DB teacher pensions influence the teacher labor market; in particular, only a handful of studies have examined early-career attrition. This is an important missing piece of the research on pensions because much of the attrition from the teacher workforce occurs in the first few years of teaching (see Ingersoll, 2001, and Marvel et al., 2007). Similarly, it is not clear to what degree DB pensions reduce the mobility of teachers across state lines, though research strongly suggests that cross-state mobility is extremely limited. It is not clear that making it difficult for teachers to cross state lines is advantageous for the teacher workforce, and research by Kim et al. (2017) suggests these borders have important negative consequences for student achievement.

We know substantially more about the effects of DB pensions on retirement timing, even within the teaching profession. That said, most of this research is concentrated in a few states, such as Arkansas, California, and Missouri. More research could be performed to understand the impact of DB pension incentives across other states, which is important because Costrell and Podgursky (2010) show that pension wealth accrues differently across five states, and state-specific estimates could be useful for policy.

Inconsistencies between early-career attrition and retirement timing suggest reasons to be concerned about the value that teachers place on retirement benefits and, subsequently, the ability of teacher pensions to attract high quality candidates into the profession. Unfortunately, there is little direct evidence on teacher preferences for these benefits. As such, related research in other areas suggests two possible explanations. First, it could be that early-career teachers are not well informed about their pension plans and, thus, do not respond to these incentives. This idea is consistent with work by Chan and Stevens (2008) suggesting that individuals who are well informed about their pension plans are more responsive to pension incentives, and it could be the case that younger workers don't respond to retention incentives because they are not well informed.[7] Second, it could be that early-career teachers may simply not value DB compensation very much. These benefits are realized far in the future, and teachers may heavily discount this compensation. This may also reveal time-inconsistent preferences for retirement, as research by Laibson (1997) and Laibson et al. (1998) suggests that there are discrepancies between how much individuals feel they should save for retirement and how much they actually save. Lastly, it is also possible that teachers value different types of retirement structures. While many emphasize the "guaranteed" annuity associated with DB pensions, teachers may value the increased options provided by DC compensation in terms of different rates of saving and control over the chosen investments. It is also possible that teachers prefer some combination of DB and DC benefits via a hybrid plan (e.g., Goldhaber, Grout, & Holden, 2017).

[7] There is a great deal of additional research suggesting that employees do not know much about their pension benefits. Research by DeArmond and Goldhaber (2010) suggests that only 46% to 74% of Washington State teachers can correctly identify their plan type. Similarly, work by Gustman and Steinmeier (2005) and Brown and Weisbenner (2014) suggests that employees have very little knowledge of plan characteristics.

Lastly, retention and mobility are particularly important where they influence the effectiveness of teachers. For instance, policies that push out effective teachers and retain ineffective teachers are actually detrimental for improving outcomes for students. As mentioned above, very few studies relate DB pension incentives to student outcomes (Koedel et al., 2013; Kim et al., 2017).

Policy Levers and Policy-Making Challenges

Concerns about large, unfunded liabilities will place great pressure on policy makers for change. These liabilities have received a great deal of attention, both in the research community and media, and for good reason. Experts may not agree about the exact size of the shortfall (e.g., how many billions or trillions of dollars), but generally, most agree that the problem is pronounced, especially in states such as Illinois and New Jersey. Unfortunately, there are no clever solutions to these problems, only obvious and painful choices. Policy makers can cut benefits, which many states have already done by reducing the generosity of pension plans for newly hired teachers, while creating greater inequity across generations. Policymakers can raise taxes, such as in New Jersey, or decrease spending in other areas, either within education or in other areas of state budgets. All told, the policy levers discussed here do not address *existing* shortfalls but, perhaps most importantly, may prevent *future* shortfalls.

When policymakers consider the different characteristics of pension plans, they should consider the potential advantages and disadvantages of each. This brief suggests that the research on many of the labor market incentives for DB pensions in terms of early-career retention, mobility, retirement timing, and teacher quality does not strongly support the notion that DB pensions are a useful tool for creating incentives for teachers. In contrast, relatively little research has considered the implications of teacher pensions for the desirability of teaching as a profession. For example, if teacher pensions provide benefits that high-quality teacher applicants don't value, then this would have important implications for the quality of the teacher workforce. Given the lack of evidence, it is not clear what these individuals prefer.

To this end, there are several policy levers that policy makers can use. First, they can change the allocation of total compensation between teacher salary and teacher retirement plans. Interestingly, plan structures with DC components allow individuals to pick their level of savings, which has important implications if savings preferences differ across teachers. Second, policy makers could change the structure of teacher pensions. Several states have introduced new types of pension plans. These include DC plans, like the Florida Retirement System "Investment" plan, which provides teachers with a benefit based on their contributions and returns on investment like a 401(k). Other states have introduced hybrid plans that combine DB and DC retirement accounts, such as TRS3 in Washington State, which provide advantages of each type of plan. Lastly, Kansas has introduced cash balance plans, which provide retirement accounts with guaranteed minimum annual investment return and an annuity based on the value of the account at retirement. Given the lack of evidence on teacher preferences, it is not clear which of these plan structures teachers themselves would prefer. Third, and lastly, policy makers would be well served to make teacher pensions well understood by the teacher workforce so that individuals understand the consequences for early-career separation and mobility.

References

Backes, B., Goldhaber, D., Grout, C., Koedel, C., Ni, S., Podgursky, M., Xiang, P. B., & Xu, Z. (2016). Benefit or burden? On the intergenerational inequity of teacher pension plans. *Educational Researcher*, *45*(6), 367–377.

Biggs, A., & Richwine, J. (2011). *Comparing federal and private sector compensation* (AEI Economic Policy Working Paper Series). Washington, DC: American Enterprise Institute.

Biggs, A. G. (2011). An options pricing method for calculating the market price of public sector pension liabilities. *Public Budgeting & Finance*, *31*(3), 94–118.

Brown, J. R., & Weisbenner, S. J. (2014). Why do individuals choose defined contribution plans? Evidence from participants in a large public plan. *Journal of Public Economics*, *116*, 35–46.

Brown, K. M. (2013). The link between pensions and retirement timing: Lessons from California teachers. *Journal of Public Economics*, *98*, 1–14.

Chan, S., & Stevens, A. H. (2008). What you don't know can't help you: Pension knowledge and retirement decision-making. *The Review of Economics and Statistics*, *90*(2), 253–266.

Costrell, R.M. and McGee, J.B., 2010. Teacher pension incentives, retirement behavior, and potential for reform in Arkansas. *Education Finance and Policy*, *5*(4), pp.492-518.

Costrell, R. M., & Podgursky, M. (2010). Distribution of benefits in teacher retirement systems and their implications for mobility. *Education Finance and Policy*, *5*(4), 519-557.

Cui, J., De Jong, F., & Ponds, E. (2011). Intergenerational risk sharing within funded pension schemes. *Journal of Pension Economics & Finance*, *10*(1), 1–29.

DeArmond, M., & Goldhaber, D. (2010). Scrambling the nest egg: How well do teachers understand their pensions, and what do they think about alternative pension structures? *Education Finance and Policy*, *5*(4), 558–586.

Fitzpatrick, M. D., & Lovenheim, M. F. (2014). Early retirement incentives and student achievement. *American Economic Journal: Economic Policy*, *6*(3), 120–54.

Fitzpatrick, M. D. (2017). Pension-spiking, free-riding, and the effects of pension reform on teachers' earnings. *Journal of Public Economics*, *148*, 57–74.

Friedberg, L., & Webb, A. (2005). Retirement and the evolution of pension structure. *Journal of Human Resources*, *40*(2), 281–308.

Furgeson, J., Strauss, R. P., & Vogt, W. B. (2006). The effects of defined benefit pension incentives and working conditions on teacher retirement decisions. *Education Finance and Policy*, *1*(3), 316–348.

Goldhaber, D., Grout, C., & Holden, K. L. (2017). Pension structure and employee turnover: Evidence from a large public pension system. *ILR Review*, *70*(4), 976–1007.

Goldhaber, D., Grout, C., Holden, K. L., & Brown, N. (2015). Crossing the border? Exploring the cross-state mobility of the teacher workforce. *Educational Researcher*, *44*(8), 421–431.

Gollier, C. (2008). Intergenerational risk-sharing and risk-taking of a pension fund. *Journal of Public Economics*, *92*(5–6), 1463–1485.

Gustman, A. L., & Steinmeier, T. L. (2005). Imperfect knowledge of social security and pensions. *Industrial Relations: A Journal of Economy and Society*, *44*(2), 373–397.

Ingersoll, R. M. (2001). Teacher turnover and teacher shortages: An organizational analysis. *American Educational Research Journal*, *38*(3), 499–534.

Ippolito, R. A. (1987). Why federal workers don't quit. *Journal of Human Resources, 22*(2), 281–299.

Ippolito, R. A. (2002). Stayers as "workers" and "savers": Toward reconciling the pension-quit literature. *Journal of Human Resources, 37*(2), 275–308.

Kim, D., Koedel, C., Ni, S., & Podgursky, M. (2017). Labor market frictions and production efficiency in public schools. *Economics of Education Review*, *60*, 54–67.

Koedel, C., & Xiang, P. B. (2017). Pension enhancements and the retention of public employees. *ILR Review*, *70*(2), 519–551.

Koedel, C., Podgursky, M., & Shi, S. (2013). Teacher pension systems, the composition of the teaching workforce, and teacher quality. *Journal of Policy Analysis and Management*, *32*(3), 574–596.

Koedel, C. R., Grissom, J. A., Ni, S., & Podgursky, M. (2012). Pension-induced rigidities in the labor market for school leaders (CALDER Working Paper No. 67. Washington, DC: National Center for Analysis of Longitudinal Data in Education Research.

Koedel, C., Ni, S. and Podgursky, M., 2013. The school administrator payoff from teacher pensions. *Education Next*, *13*(4).

Laibson, D. (1997). Golden eggs and hyperbolic discounting. *The Quarterly Journal of Economics*, *112*(2), 443–478.

Laibson, D. I., Repetto, A., Tobacman, J., Hall, R. E., Gale, W. G., & Akerlof, G. A. (1998). Self-control and saving for retirement. *The Brookings Papers on Economic Activity*, *1998*(1), 91–196.

Marvel, J., Lyter, D. M., Peltola, P., Strizek, G. A., Morton, B. A., & Rowland, R. (2007). *Teacher attrition and mobility: Results from the 2004-05 Teacher Follow-up Survey.* (NCES 2007-307). Washington, DC: National Center for Education Statistics, Institute of Education Sciences, U.S. Department of Education.

National Education Association. (2011, May 5). Statement of the NEA on public pensions. Retrieved from http://www.nea.org/home/43840.htm

Ni, S., & Podgursky, M. (2016). How teachers respond to pension system incentives: New estimates and policy applications. *Journal of Labor Economics*, *34*(4), 1075–1104.

Novy-Marx, R., & Rauh, J. D. (2009). The liabilities and risks of state-sponsored pension plans. *Journal of Economic Perspectives*, *23*(4), 191–210.

Novy-Marx, R., & Rauh, J. (2011). Public pension promises: How big are they and what are they worth? *The Journal of Finance*, *66*(4), 1211–1249.

Novy-Marx, R., & Rauh, J. (2014). The revenue demands of public employee pension promises. *American Economic Journal: Economic Policy*, *6*(1), 193–229.

Podgursky, M., Ehlert, M., Lindsay, J., & Wan, Y. (2016). *An examination of the movement of educators within and across three Midwest region states* (REL 2017-185). Washington, DC: Regional Educational Laboratory Midwest, Institute of Education Sciences, U.S. Department of Education.

Salop, J., & Salop, S. (1976). Self-selection and turnover in the labor market. *The Quarterly Journal of Economics*, 619–627.

Samwick, A. A. (1998). New evidence on pensions, social security, and the timing of retirement. *Journal of Public Economics*, *70*(2), 207–236.

Shuls, J.V., 2017. Examining Inequities in Teacher Pension Benefits. *Journal of Education Finance*, *42*(4), pp.435-447.

Stock, J. H., & Wise, D. A. (1990). Pensions, the option value of work, and retirement. *Econometrica (1986-1998)*, *58*(5), 1151.