



Teachers' willingness to pay for retirement benefits: A national stated preferences experiment

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ARTICLE INFO

JEL codes:

I20
J33

Keywords:

Teacher pensions
Stated preferences
Discrete choice experiment

ABSTRACT

Many states in the U.S. have recently made or are considering changes to their teacher retirement systems. However, little is known about how teachers value various elements of their retirement benefits versus other aspects of their jobs and compensation. To help alleviate this gap, we use a discrete choice stated preferences experiment embedded in a nationally representative survey of teachers to estimate their willingness-to-pay for various retirement plan characteristics and other non-salary job components. We find that, on average, early-career teachers are indifferent between a traditional pension and alternative retirement plan designs. In addition, we find that teachers have stronger preferences around their expected salary replacement in retirement and retirement age than plan type. We also find that teachers' willingness-to-pay for traditional pension plans is less than their willingness-to-pay for many other elements of their compensation, including salary growth, health insurance coverage, and Social Security enrollment.

1. Introduction

Retirement benefits are an important part of teachers' compensation packages and millions of retired teachers rely on government-sponsored pension plans for their livelihood. Unfortunately, states and school districts across the United States have not set enough money aside to fully cover the benefits teachers have already earned. Teachers' pensions in the United States are only 72% funded on average and have total unfunded liabilities exceeding \$600 billion, a sum that is likely to increase in the coming years as plans adopt more conservative assumptions and grapple with a challenging investment environment (McGee, 2019; Novy-Marx & Rauh, 2011; Public Plans Data, 2020).

Teachers' pension funding shortfalls have resulted in large cost increases and potentially reduced investment in other important areas. Annual per-pupil teacher retirement costs have nearly tripled since 2004, rising from \$599 to \$1763, and now account for 11.6% of the total per-pupil education expenditures (Costrell, 2022a). Soaring pension costs crowd out other expenditures, leaving less money to pay today's teachers, affecting both take-home salary and benefits (Aldeman, 2016; Anzia, 2020; Backes et al., 2016; Kim et al., 2020; McGee, 2016; Nation, 2018). Unfortunately, pension costs may increase further. Adequate

state and local government pension funding would require expenditures to roughly double (Rauh, 2017).

In recent years, many states have changed teachers' retirement benefits in response to rising costs. Most changes to teachers' retirement plans maintain the traditional final-average-salary defined benefit (FAS) design but alter parameters like retirement age, how much teachers earn for each year of work, and how much teachers contribute to the plan. Several states have considered, but relatively few have adopted (e.g., Kansas, Washington, etc.), alternative pension plan designs like defined contribution (DC), cash balance (CB), and hybrid plans that combine elements of two or more models.² Benefit changes have disproportionately affected new teachers, sometimes substantially reducing the value of retirement benefits for the next generation of educators.

These changes to teachers' retirement plans have the potential to substantially alter teacher labor markets (e.g., Brown, 2013; Costrell & McGee, 2010). Advocates for traditional FAS pensions contend that benefit reductions and/or plan design changes will harm states' ability to recruit and retain talented teachers (Boivie, 2011, 2017; Bond, 2017). They argue that teachers prefer FAS plans to alternative plans and that traditional pensions are effective workforce management tools that incentivize retention and orderly turnover at known retirement ages.

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² The various plan designs are described more fully in Section 3.

However, when offered alternative plans, a substantial percentage of teachers choose the alternatives, and the evidence on traditional pensions' effectiveness as a workforce management tool is limited and mixed at best (Chingos & West, 2015; Friedberg & Webb, 2005; Goldhaber et al., 2017; Ni et al., 2020b). Additionally, teachers must be aware of and value specific plan features for retirement plans to affect teacher labor markets, but evidence suggests that teachers exhibit limited retirement knowledge (Brown & Weisbenner, 2014; Chan & Stevens, 2008; DeArmond & Goldhaber, 2010; Fuchsman et al., 2021; Gustman & Steinmeier, 1999) and that they have a difficult time accurately valuing retirement benefits (Brown et al., 2017, 2021; Kim, 2020).

Of course, teachers care more broadly about their overall compensation package and job conditions. As a result, policymakers and school leaders must weigh important tradeoffs when making changes. Unfortunately, relatively little is known about how teachers value various features of their retirement plans versus other aspects of their jobs and compensation.

Over the coming years, pension reform will almost certainly continue to be a topic of conversation in state legislatures due to ongoing funding challenges. To inform the tradeoffs that policymakers are likely to face, we designed an experiment to quantify how teachers value various job attributes, including retirement plan design and characteristics. We administered a survey to a nationally representative sample of teachers from the RAND's American Teacher Panel. We embedded a discrete choice stated preferences experiment in this survey.

The design of our experiment closely follows work by Maestas et al. (2018) and Mas & Pallais (2017). We repeatedly asked respondents to choose between two jobs that are the same in every way except they have different randomly assigned salaries and vary on one non-salary characteristic (e.g., retirement plan type, retirement age, Social Security enrollment, etc.). We use respondents' choices to estimate their willingness-to-pay for specific job characteristics. We explore potential heterogeneity in preferences based on respondents' teaching experience, cognitive ability, conscientiousness, financial literacy, risk tolerance, and teachers' self-reported probability of leaving the profession within five years.³

Our results indicate that early-career teachers do not have a strong preference for a specific retirement plan type, but that teachers' willingness-to-pay for traditional pensions over alternative plans might increase with experience. However, we also find that, on average, teachers have stronger preferences around their expected salary replacement in retirement and retirement age than plan type. Respondents also valued participation in traditional pension plans less than many other elements of their compensation, including salary growth, health insurance coverage, and Social Security enrollment. Additionally, we find that teachers with higher cognitive ability, higher financial literacy, and lower levels of risk tolerance are willing to pay more for FAS plans.

These findings make three key contributions to the literature. First, our nationally representative stated preferences experiment allows us to quantify teachers' preferences for various job characteristics, including retirement plan design, in dollar terms. While others have asked teachers about their preferences around retirement plans (DeArmond & Goldhaber, 2010; Johnston, 2021), we are not aware of any prior research that estimates willingness to pay using a nationally representative sample. Second, we are the first to estimate teachers' preferences around CB plans, which several states have considered and Kansas recently adopted for new hires (Costrell, 2022b).

Finally, we estimate preferences for a variety of job conditions across several potential values. While others infer preferences for deferred versus current compensation given a real-world policy change (Biasi, 2019; Fitzpatrick, 2015; Goldhaber & Holden, 2020), their estimates are

limited by the specifics of the choice offered to workers, which constrains their utility for informing new retirement policy. Our design is more flexible, allowing us to compare a wider variety of retirement plan features and other job characteristics. We cannot, however, test if teachers' stated preferences from our experiment would match their revealed preferences.

The rest of this paper is organized into six sections. The next section provides background on teacher retirement plans and teachers' preferences around retirement benefits. Section 3 characterizes our survey and RAND's American Teacher Panel. In Section 4, we develop our stated preferences experiment. Section 5 describes our econometric approach to estimating teachers' willingness-to-pay for job conditions. The results of our stated preferences experiment are in Section 6. We conclude with policy implications in Section 7.

2. Background

Our experiment aims to compare teachers' relative valuation of different retirement plan types and features to their valuation of other aspects of their jobs and compensation. Given that the plan type choice features prominently both in our experiment and in public policy, this section discusses the common retirement plan types that teachers participate in and that we offer a choice between in our survey, highlighting the fundamental differences between designs. We then summarize the existing evidence on teachers' preferences around retirement.

2.1. Teacher retirement plan overview

Teachers participate in three common retirement plan types: FAS, DC, and CB.⁴ Each of these plan types can be designed to be cost equivalent and can incorporate many similar features (e.g., annuities, guarantees, risk sharing, withdrawal rules, etc.). The primary differences between plan types are (1) how investment risk is distributed and (2) how teachers earn benefits across their careers.⁵ We try to isolate these primary plan type differences in our experiment. The remainder of this section describes the fundamental features of each plan type in more detail.

The vast majority of teachers participate in FAS retirement plans that base benefits on years of service and end-of-career salary (U.S. Bureau of Labor Statistics, 2019).⁶ As noted above, these plans have proven challenging to manage in a fiscally sustainable way, leading to rising costs and multiple rounds of benefit changes for teachers. However, they may still be valuable if they offer positive labor market effects.

Under FAS systems, teachers are eligible to receive a set annual benefit for the remainder of their life once they reach the plan's retirement eligibility thresholds, which are generally defined in terms of age and years of service. A teacher's annual retirement benefit is determined by first multiplying their years of service in the system at retirement by the plan's benefit multiplier to get their *replacement rate* (i.e., the percentage of their pre-retirement salary that their benefit will replace). To calculate a teacher's annual benefit, their replacement rate is multiplied by their average salary over their last few years in the classroom.

Benefits under FAS plans are typically backloaded, meaning teachers

⁴ Some states offer choices between plan types and/or hybrids of these plan types.

⁵ These primary plan type differences are reflected in the definitions promulgated by the United States Internal Revenue Service and Department of Labor. For a more detailed discussion of cash balance plans see Elliott and Moore (2000) and Pew (2014). For an analysis of the only CB plan to be the primary state retirement plan for teachers see Costrell (2022b).

⁶ Teachers' end-of-career salaries, or final average salaries, are typically the teachers' average salary over the last 3 to 5 years of teachers' careers.

³ Both cognitive ability and conscientiousness serve as proxies for teacher quality (Cheng & Zamarro, 2018; Hanushek et al., 2018).

earn relatively meager benefits throughout much of their careers, and then the value of those benefits increases dramatically as they approach retirement eligibility. As a result of backloading, pension accruals make up a large share of highly-experienced teachers' total annual compensation (McGee & Winters, 2017). While FAS plans work well for teachers who spend a full career in a single retirement system (e.g. in a single state), because of their backloaded nature, they often leave teachers in a retirement insecure position for much of their careers (Aldeman & Johnson, 2015). FAS plans also create strong incentives to work until retirement eligibility and then to leave the classroom. These incentives are blunt and are not always aligned with schools' labor market needs or individual teachers' desire to leave before or work after retirement eligibility (Costrell & Podgursky, 2009).

DC and CB plans are often considered as alternatives to FAS plans. DC plans, such as private sector 401(k) plans, base benefits on how much money has accrued in individual accounts from employer and employee contributions and investment returns. CB plans are a type of defined benefit plan where benefits accrue like a DC plan but that offers a minimum guaranteed retirement benefit.

Both alternatives place more direct investment risk on participating teachers. DC plans generally place the most investment risk on employees, while CB plans often offer a middle ground by providing a minimum guarantee. FAS plans have similar investment risks, but their associated costs are only born by teachers indirectly through crowd-out effects on salary and job conditions and reduced retirement benefits for young and new teachers. The alternative plans, because they tie benefits more closely to investment returns, generally reduce government cost uncertainty even when they include a minimum investment return guarantee (Costrell, 2019; Costrell & Podgursky, 2009).

Both DC and CB plans offer more even benefit accrual across teachers' careers, albeit with somewhat lower maximum benefit levels for full-career teachers if the plans are cost-equivalent. The backloaded nature of FAS plans is risky for teachers because, if they do not work a full career under a single system, they are often left with meager savings, placing them in a retirement insecure position. Theoretical evidence suggests that teachers, especially early-career teachers, may prefer earning benefits more evenly across their careers to limit the risks associated with moving between systems or leaving the profession before reaching retirement age (McGee & Winters, 2019).

2.2. Preferences around retirement benefits

Although we are not the first to estimate retirement preferences using survey methodology (e.g., DeArmond & Goldhaber, 2010; Horng, 2009; Johnson et al., 2012; Johnston, 2021; Ladd, 2011; Viano et al., 2019), the literature on teachers' preferences around retirement benefits is more limited. Studies on the topic have investigated preferences around different retirement plan types, teachers' relative valuation of retirement benefits versus other aspects of their jobs and compensation, and teachers' valuation of deferred compensation versus current compensation.

Two studies evaluate teachers' revealed preferences when given a choice between retirement plan types in Florida and Washington (Chingos & West, 2015; Goldhaber & Grout, 2016). Florida offers teachers a choice between a FAS plan and a DC plan, while Washington offers a choice between a FAS plan and a hybrid FAS/DC plan. Both studies found that a substantial proportion of teachers chose the alternative plan designs, and they also provide evidence that choosing an alternative plan design is positively related to teacher effectiveness.

Two additional studies used surveys to investigate teachers' preferences around retirement plan design, finding that teachers, particularly younger teachers, may prefer DC plans to FAS plans. Using a survey in Washington, DeArmond & Goldhaber (2010) find that teachers would prefer to invest an extra 10% of their current pay into DC plans rather than FAS plans and that this preference was larger for teachers with more experience.

Johnston (2021) estimates teachers' willingness-to-pay in a single school district outside of Houston, TX, using a discrete choice experiment similar to the one employed in this paper. He finds that teachers are willing to pay more for DC plans, higher replacement rates, lower health insurance premiums, and smaller class sizes. Willingness-to-pay estimates for this Houston-area school district indicate that teachers would equate switching from a FAS plan to a DC plan with a \$900 raise. Johnston does not find that experience mediates this preference.

Recent research has also found that teachers, similar to other workers, value current pay more than deferred retirement compensation (Biasi, 2019; Fitzpatrick, 2015; Goldhaber & Holden, 2020; Ni et al., 2020a).⁷ That is, teachers do not value deferred retirement compensation on par with its present value. This raises the prospect that there could be misalignment between the compensation package offered to teachers and their preferences, which has implications for teacher quality. This line of research, however, is limited by the specifics of the real-world choices and policy changes used to estimate teacher preferences and does not speak to the broader tradeoffs policymakers face around other job characteristics (e.g., healthcare coverage, class size, etc.). Regardless, these findings motivate the structure of our experiment which allows us to estimate teachers' valuation of various job characteristics, including retirement plan design, in terms of current compensation via a willingness-to-pay measure.

3. Data

We developed an approximately 15 min survey focusing on teachers' knowledge of, preparation for, and preferences around retirement. We adapted questions from two of the 2018 Health and Retirement Study survey modules: The Retirement and Pension Plan module and the Retirement and Social Security module. The survey also included previously validated scales designed to measure financial literacy, personality, numeracy, and risk tolerance (Frederick, 2005; John et al., 1991; Kimball et al., 2008; Lipkus et al., 2001; Lusardi & Mitchell, 2011; Toplak et al., 2014). The next section will describe our stated preferences experiment in greater detail.

We collected data from RAND's nationally representative American Teacher Panel (ATP); survey administration was between February 10 and March 16, 2020 (RAND American Educator Panels, 2020). The ATP includes an estimated 29,000 active respondents teaching in public K-12 schools.⁸ For our study, we invited a total of 9904 teachers and obtained a response rate of 55%.⁹ Our data include both a nationally representative sample of teachers as well as samples representative of the following seven jurisdictions: Arkansas, California, Florida, Georgia, New York State, New York City, and Texas. The national sample was selected using probability sampling to facilitate the construction of a representative sample. The final sample included 5464 completed surveys. From these, we excluded respondents from our analytical sample if they reported extreme values for earnings, birth years, or age when entering the teaching workforce. Additionally, we exclude teachers with

⁷ How much teacher value current compensation over deferred retirement compensation remains a point of contention in the literature (see Ni et al., 2020a for a discussion).

⁸ Teachers are recruited to the ATP using probabilistic sampling methods. The ATP drew a random sample of schools and purchased schools' rosters of teachers from a vendor before randomly sampling teachers within those schools to invite to participate in the panel (Robbins et al., 2018; Robbins & Grant, 2020). The panel changes over time as members are replaced because they leave the profession or are otherwise unreachable.

⁹ Respondents were compensated for their time at a rate of \$1 per minute of the expected time to complete the survey for a total of \$15. The response rate for our survey did not vary substantially from other RAND surveys administered one year prior (e.g., W. R. Johnston et al., 2019; Prado Tuma et al., 2020). The response rate among current teachers is likely higher than 55 percent as many of the non-respondents may have previously left the profession.

Table 1
Sample descriptive statistics.

	Mean	Std. Dev.	Min.	Max.	NCES Mean ^a
Female	0.77				0.76
Hispanic	0.08				0.09
White	0.83				0.79
Black	0.08				0.07
Asian	0.03				0.02
Age	42.93	9.63	24	65	
Under 30	0.07				0.15
30 to 39	0.33				0.28
40 to 49	0.33				0.29
50 to 59	0.21				0.21
60 and over	0.06				0.03
Total Experience	14.69	7.46	2	43	
Less than 3	0.00				0.09
3 to 9	0.30				0.28
10 to 20	0.47				0.30
Over 20	0.22				0.30
Experience in State	13.71	7.15	0	30	
Salary	62,911	22,122	0	157,000	57,900
Elementary School	0.44				0.50
Secondary School	0.56				0.50
Numerical Ability Score	4.49	1.77	0	8	
Cognitive Reflection Test Score	1.76	1.53	0	5	
Conscientiousness	4.13	0.55	1.78	5	
Financial Literacy Questions Correct					
0	0.03				
1	0.14				
2	0.31				
3	0.52				
Risk Tolerance					
Potential Cut < 0.10	0.33				
0.10 < Potential Cut < 0.20	0.33				
0.20 < Potential Cut < 0.33	0.24				
0.33 < Potential Cut < 0.50	0.05				
0.50 < Potential Cut < 0.75	0.03				
Potential Cut > 0.75	0.02				
Self-Reported 5-Year Exit Probability	22.04	33.74	0	100	
P(Exit) = 0	0.54				
0 < P(Exit) < 0.5	0.20				
P(Exit) = 0.5	0.10				
0.5 < P(Exit) < 1	0.08				
P(Exit) = 1	0.08				

^a Source: Hussar et al., (2020). *The Condition of Education 2020* (NCES 2020-144). U.S. Department of Education. Washington, DC: National Center for Education Statistics.

greater than 30 years of in-state experience or who were older than age 65 since these teachers are likely already retirement eligible.¹⁰ With these restrictions in place and accounting for non-response to the

¹⁰ We excluded 0.35 percent of respondents for reporting earnings over \$200,000, 0.37 percent that had potential ages when entering the teaching workforce (age minus total experience) under age 20, 0.04 percent if they reported more experience within their current state of residence than they reported in total, 4.25 percent with in-state experience greater than 30, and 2.25 percent over age 65. Additionally, 4.63 percent of respondents were excluded for non-response to the in-state experience question, 5.31 percent were excluded for non-response to the birthyear question, and 0.02 percent were excluded for non-response to the total experience question. Given that many respondents met more than one exclusion criterion, we removed a total of 11.84 percent of the potential sample. Results that relax the age over 65 and in-state experience over 30 restriction, are not substantively different from the results presented in Section 6 and are available upon request.

discrete choice experiment questions, our analytic sample consisted of 4817 respondents.

While the ATP is representative of the current teaching population, it may not necessarily be representative of all those who have ever entered the teaching profession because of early- and mid-career attrition patterns. Some teachers leave teaching and fall out of the ATP because of factors related to their current job and compensation, and those remaining in teaching for longer likely have preferences that are tilted toward existing job conditions. Our willingness-to-pay estimates should be interpreted with this “survivorship” phenomenon in mind.¹¹ For this reason, we emphasize results for early-career teachers.

3.1. Mediator scales

Our survey includes several previously validated scales that we use to explore potential heterogeneity in respondents’ willingness-to-pay for different job characteristics. Those measures include cognitive ability, conscientiousness, financial literacy, and risk tolerance, which are all associated with retirement planning (Bajtelsmit & VanDerhei, 1997; Banks & Oldfield, 2007; Horneff et al., 2006; Letkiewicz & Fox, 2014; Lusardi & Mitchell, 2007; Zamarro, 2019). Based on this previous literature, we expect that the strength and direction of respondents’ preferences may vary based on their scores on these measures.

Both cognitive ability and conscientiousness serve as proxies for teacher quality (Cheng & Zamarro, 2018; Hanushek et al., 2018) and are also associated with retirement saving (e.g. Banks & Oldfield, 2007; Letkiewicz & Fox, 2014; Zamarro, 2019). We expect higher cognitive ability teachers to remain in teaching longer and more accurately predict their career paths (Goldhaber et al., 2011), allowing these teachers to better know what type of retirement plan would work well for them. Additionally, conscientiousness is associated with lower degrees of burnout (Kim et al., 2019), meaning that highly conscientious teachers could be less likely to exit at earlier ages when FAS plans are disadvantageous (Aldeman & Johnson, 2015).

Given that both cognitive ability and conscientiousness are related to the expected length of a teacher’s tenure, we ask respondents to report the probability that they would exit the teaching profession within the next five years. Respondents that know they will be exiting soon might have different preferences across retirement plan types depending on how long they have worked already.

To measure teachers’ cognitive ability, we include the 8-item Lipkus Numeracy Scale (Lipkus et al., 2001) and the 5-item Cognitive Reflection Test (Frederick, 2005; Toplak et al., 2014). Correct responses are counted to construct two measures of cognitive ability, which we combine using factor analysis with a varimax (orthogonal) rotation. We retain a single factor where both measures load equally.

Conscientiousness is measured using questions from the 44-item Big 5 inventory for personality traits (John et al., 1991).¹² Responses to the Big 5 questions are on a 5-point Likert scale. We average responses to the 9 questions that capture conscientiousness to generate a single measure. Larger values indicate higher levels of cognitive ability or conscientiousness.

We measure financial literacy using a 3-question battery from Lusardi & Mitchell (2011). The 3 questions are related to the financial concepts of compounding interest rates, inflation, and “risk diversification.” The questions are multiple-choice, and all include an option for “don’t know.” We consider “don’t know” to be an incorrect response and simply count the number of correct responses for each respondent to construct our financial literacy measure. Correctly responding to these

¹¹ We also acknowledge that changes to teachers’ compensation packages and/or job conditions may change the composition of the workforce by impacting both who is attracted to teaching and attrition patterns.

¹² The Big 5 inventory has been validated in a number of samples (e.g. John et al., 2008; John & Srivastava, 1999).

questions is associated with a higher likelihood of planning for retirement (Lusardi & Mitchell, 2007). Teachers with higher levels of financial literacy are likely to be able to identify which retirement plan type would work best for them.

We also construct a measure of risk tolerance following the work of Kimball et al. (2008). Respondents answer 2 or 3 questions with the same prompt. Respondents are first asked to pick between two jobs: the first job guarantees lifetime income for the family and the second job would have a 50% chance of doubling lifetime income and a 50% chance of cutting it by a *third*. Respondents picking the job with a guaranteed lifetime income are then asked if they would take the job guaranteeing lifetime income again or a job where the potential cut to lifetime income is 20%. Those that choose the guaranteed lifetime income a second time are asked to pick between the job with the guaranteed income and a job where the potential cut is 10%.

Conversely, respondents initially indicating that they would prefer the job with a potential income cut of one-third are offered the same guaranteed income as previously, but the second job could result in lifetime income cut by *half*. Those respondents still willing to take the job with a risky lifetime income are then asked to pick between guaranteed income and an uncertain income where the potential cut is 75%.

Based on their responses to this series of questions, respondents fall into one of six categories of risk tolerance. These categories correspond with the highest potential lifetime pay cut that they would risk having the chance of doubling lifetime income: less than 10%, 10%, 20%, 33%, 50%, and 75% or greater.

Given that expected tenure is a likely mediator of teachers' retirement plan preferences, we included a question asking respondents to report the probability that they would exit the teaching profession within the next five years. Respondents that know they will be exiting soon are likely to have different preferences across retirement plan types. For example, those in the early and middle portions of their careers who believe that they will leave within five years may value the additional flexibility provided by alternative plan types, while those who expect to stay longer may prefer the FAS plan.

3.2. Sample descriptive statistics

Table 1 contains descriptive statistics for our analytic sample compared to the overall teacher population.¹³ Over 77% of respondents are female. White teachers make up 83% of the sample, while black and Hispanic teachers each comprise 8% of the sample. The average age of our respondents is 43 with a standard deviation of 9.6 years. The age range of our sample is 24 to 65. On average, teachers had a total of 14.7 years of experience and 13.7 years of experience within their current state of residence. Using the average age and average total experience as benchmarks, the average teacher in our sample would have started teaching at age 28. Our sample includes only 11 teachers who report less than three years of experience. The average reported salary is approximately \$63,000 with a standard deviation of roughly \$22,000. We classify 44% of teachers as teaching in elementary schools and 56% in secondary schools.

Our sample is quite similar to the general teacher population when it comes to sex, race, and age. There are, however, some minor differences. Our sample includes more teachers than the general teacher population who self-identify as white. Young and inexperienced teachers are under-represented in our sample relative to the general population.¹⁴ Respondents report salaries approximately \$5000 greater than the average teacher salary, likely due to the absence of very early-career teachers. Our sample has a greater share of secondary school teachers than the

¹³ Data for general population statistics come from the National Center for Education Statistics (Hussar et al., 2020).

¹⁴ This difference is likely due to attrition from the profession and the challenges of attracting young and inexperienced teachers to the panel.

general teaching population. We use probability weights in our analyses to make up for these differences, thus ensuring that our sample remains nationally representative.

Our analytic sample scored in the middle of the cognitive ability measures, frequently reported high levels of conscientiousness, answered 2 or more of the financial literacy questions correctly, and appear relatively risk averse. On average, respondents answered 4.5 of the 8 Lipkus Numeracy questions correctly. Respondents fared worse on the Cognitive Reflections Test answering only 1.8 questions correctly out of 5 on average.

On the 1 to 5 conscientiousness scale, respondents rated themselves as quite conscientious with an average value of 4.13 with a standard deviation of 0.55. Over half of the sample correctly answered all three financial literacy questions, and another 31% of the sample answered only one question incorrectly. One-third of respondents were unwilling to risk even a 10% pay cut to double their lifetime income, while another third of the sample would risk a 10% but not a 20% pay cut. Only a combined 10% of the sample would be willing to risk having their lifetime income reduced by a third or higher.

Teachers in our sample appear quite confident that they will remain in teaching for the next five years. On average, teachers report a 22% chance that they will exit teaching within the next five years with a standard deviation of 33.7 percentage points. However, over half of respondents reported a zero chance that they will exit in the next five years. An additional 20% of respondents reported exit probabilities between 1% and 50%. Approximately 8% of respondents report a 100% chance that they will exit the profession within five years.¹⁵

4. Stated preferences experiment

We use a discrete choice stated preferences experiment following Maestas et al. (2018) and Mas & Pallais (2017) to understand teachers' preferences concerning various job conditions. Stated preferences experiments, also sometimes called conjoint analysis, originated in marketing but have spread to several other fields (Johnston, 2021). Part of the reason for their growing popularity is their success in predicting actual behavior (for example, see Hainmueller et al., 2015; Wiswall & Zafar, 2018; Wlömert & Eggers, 2016).

In our experiment, we repeatedly provide teachers with two hypothetical job offers and ask them to indicate which job they prefer. Each job has eight conditions that can vary: salary, type of retirement plan, the retirement plan's expected salary replacement rate¹⁶, retirement eligibility age, annual salary growth, class size, health insurance coverage, and Social Security participation¹⁷. For each hypothetical job offer pair, salary and one other characteristic varies. Respondents are instructed to assume all other job conditions, whether explicitly listed in the job offers or not, are the same.

For each job condition except salary, we chose a baseline value that is either the midpoint of the potential values or the most common real-world value. For example, the baseline value of retirement plan type is FAS, the most common teacher retirement plan type. We do this to ensure that jobs look somewhat similar to what teachers could expect if they were searching for a new job. One of the job offers presented to respondents is always comprised of the baseline values for each non-salary job condition. For the other job offer, we randomly select and vary one of the seven non-salary job conditions and set the remaining six

¹⁵ On average, respondents reporting 100 percent chance that they will exit within 5 years have 16.43 years of in-state experience.

¹⁶ As explained above, a retiree's replacement rate is the ratio of the retiree's benefit to salary. It is the proportion of salary that benefits "replace." If a retiree earned \$75,000 as a teacher, a 70 percent replacement rate would yield annual benefits of \$52,500 ($75,000 \times 0.70$).

¹⁷ Approximately 60 percent of teachers participate in Social Security (Kan & Aldeman, 2014).



Imagine you are offered two teaching jobs shown below. Except for the highlighted characteristic(s), please assume the jobs are the same in all other ways, including on characteristics not listed in the table.

Please review the jobs and indicate below whether you prefer Job A or Job B.

	Job A	Job B
Salary Growth	Salary grows by 5 percent annually.	Salary grows by 5 percent annually.
Type of Retirement Plan	The retirement plan bases benefits on a formula involving a person's age, years of service, and salary.	The retirement plan bases benefits on how much money has accumulated in a person's individual account from employee contributions, employer contributions, and investment returns.
Replacement Rate	A teacher who works a full career in the same retirement system earns retirement benefits that would provide a monthly check equivalent to 70 percent of their end-of-career salary.	A teacher who works a full career in the same retirement system earns retirement benefits that would provide a monthly check equivalent to 70 percent of their end-of-career salary.
Retirement Age	A teacher who works a full career in the same retirement system is eligible to receive benefits at age 60.	A teacher who works a full career in the same retirement system is eligible to receive benefits at age 60.
Class Size	Teachers have class sizes of approximately 27 students.	Teachers have class sizes of approximately 27 students.
Health Care	The health insurance plan would cover 80 percent of healthcare costs for the average person and provide catastrophic coverage.	The health insurance plan would cover 80 percent of healthcare costs for the average person and provide catastrophic coverage.
Social Security	Teachers contribute to and earn benefits in Social Security.	Teachers contribute to and earn benefits in Social Security.
Salary	\$59,736	\$71,111

Prefer Job A

Prefer Job B

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Fig. 1. Example of two job offers.

conditions equal to their baseline value. Salaries for both jobs are randomly generated deviations from the respondent's reported current salary. Fig. 1 provides an example of how the two hypothetical job offers would have appeared to respondents.

Each respondent was asked to choose between two randomly selected jobs eight times. To supply job offers for the survey, we created a database of 108,000 hypothetical job offer pairs.¹⁸ Job offers presented to respondents are randomly chosen from our database with replacement, which allows for offers to potentially be repeated in the sample. Individual respondents may be asked to choose among job pairs varying the same job condition more than once and may not see offers varying some of the conditions at all.

Offers are calibrated to prevent one job from strictly dominating the other. For example, a job that offers a 73% replacement rate and a \$70,000 annual salary would strictly dominate another job with a 70% replacement rate and a \$68,000 salary. We assume, other things held equal, that teachers would always choose a job with a higher salary if it also had a higher replacement rate, earlier retirement age, higher salary

¹⁸ We arrived at 108,000 hypothetical job comparisons by multiplying the 8 times a respondent would indicate a job preference times the 13,500 potential respondents. Since we sample from the database with replacement, we increased the number of potential respondents beyond the number of teachers we sent the survey to in order to reduce the incidence of repeated hypothetical job comparisons.

growth rate, smaller average class size, and additional health insurance. See Appendix A for additional information regarding hypothetical job comparison construction.

For each job condition, Table 2 contains the wording used to present it in the survey, its potential and baseline values, and information about how often it varied in the survey as well as how often each value was selected. Baseline values for each job condition are noted in the potential values column. The number of times that each job condition was randomly selected to be the one that varies in a job offer is provided in parentheses in the job condition column. Each job condition was selected to vary in a job offer between 5727 and 5980 times. The frequency that each job condition value is displayed is in the fourth column. Within each job condition, there is an approximately uniform distribution of display frequencies across condition values.

The final column of Table 2 shows the probability that respondents choose a job with a given job condition value. The most substantial threat to the validity of our experimental design is if certain job characteristics dominate (i.e., are always chosen). For example, if respondents always choose jobs with higher salaries, it will imply that the random deviations applied to reported salaries were too large, and we would get very little information from our experiment. However, we saw substantial variation in respondent choices across condition values, indicating that our survey values were well calibrated to yield useful information.

Respondents' patterns of choosing across various condition values

Table 2
Job conditions and values.

Job Condition	Condition Wording	Potential Values	Frequency Value Appears	Probability of Choosing Value
Retirement Plan Type (5727)	The retirement plan bases benefits on [value].	a formula involving a person's age, years of service, and salary	baseline	29%
		how much money has accumulated in a person's individual account from employee contributions, employer contributions, and investment returns	2857	72%
Replacement Rate (5817)	A teacher who works a full career in the same retirement system earns retirement benefits that would provide a monthly check equivalent to [X] percent of their end-of-career salary.	employee contributions, employer contributions, and investment returns with a minimum guarantee	2870	70%
		60	775	64%
		62	744	64%
		65	755	71%
		67	765	73%
		70	baseline	26%
		73	658	73%
		75	668	78%
Retirement Age (5743)	A teacher who works a full career in the same retirement system is eligible to receive benefits at age [X].	78	691	85%
		80	761	83%
		55	989	78%
		57	934	73%
		60	baseline	33%
		63	963	72%
Salary Growth (5809)	Salary grows by [X] percent annually.	65	1002	65%
		67	955	59%
		69	900	52%
		2	1458	62%
		3.5	1450	66%
Class Size (5917)	Teachers have class sizes of approximately [X] students.	5	baseline	26%
		6.5	1433	82%
		8	1467	85%
		-3	2912	65%
Health Insurance (5885)	The health insurance plan would cover [X] percent of healthcare costs for the average person and provide [Y].	0	baseline	28%
		+3	3005	78%
		X = 60, Y = catastrophic coverage	2947	62%
Social Security (5980)	Teachers [value] Social Security.	X = 80, Y = catastrophic coverage	baseline	28%
		X = 80, Y = catastrophic coverage, dental, and optical	2938	82%
		contribute to and earn benefits in do not	5980	62%
		contribute to or earn benefits in		

Notes: Bolded text in the condition wording column is also bolded in the survey to emphasize key elements.

also matched our expectations. For job conditions with ordered condition values, we expected respondents to be more likely to choose jobs with more favorable values, and that was the observed choosing pattern. For example, respondents chose higher annual salary growth more often as the values increased. Teachers chose job offers with a 2% annual salary growth 62% of the time and jobs with 8% annual salary growth 85% of the time.

4.1. Retirement plan choice

Given the complexity of retirement plans, it is useful to describe in more detail the plan type choice we present to respondents and provide justification for the presentation choices we made. As noted above, we selected baseline job characteristics to be the most commonly available to teachers. Eighty percent of teachers in the U.S. participate in DB plans, and the vast majority of those teachers are in FAS plans (U.S. Bureau of Labor Statistics, 2020). Therefore, in our experiment, the baseline retirement plan is a FAS plan.¹⁹

Our stated preferences experiment offered respondents a choice between the baseline FAS plan and one of two alternative plan designs, DC and CB. It is impossible to describe all potential differences in plan design in a survey, so we chose to focus on the two primary differences between the three plan types: (1) how investment risk is distributed and (2) how teachers earn benefits across their careers. We sought to make the survey language as clear as possible to isolate these primary plan type differences.

As a result, we chose to describe the three retirement plan types without using common labels (e.g., defined benefit or defined contribution). We made this choice for two reasons. First, we wanted to isolate teachers' preferences around how these retirement plans work without any bias due to perceptions attached to plan labels.²⁰

Second, teachers may not be familiar with customary plan labels, especially DC and CB, or their implications for retirement benefits because these are not commonly used in their state's plan literature and educational materials. Retirement systems often refer to FAS plans as "pensions" or "defined benefit" plans and systems use a variety of terms to refer to DC and CB plans including "investment plan" and "guaranteed return plan," respectively.²¹ The lack of consistency in plan type terminology could lead to respondent confusion and noisy results that do not necessarily reflect teachers' plan type preferences.

Instead, we described how retirement benefits are determined under each plan type as simply as possible to focus respondents on the key features of each design. Below are how the different retirement plan types were presented to respondents. We indicate the plan type in brackets, but this term was not shown to respondents.

"The retirement plan bases benefits on:

¹⁹ The present value of benefits varies with salary, which results in different levels of retirement benefits between offers even when the plan type, retirement age, and replacement rate are all the same. The baseline job offer should still be comparable across questions since we anchor salary offers to respondents' reported salaries.

²⁰ For example, messaging by advocacy organizations and trade groups like the National Public Pension Coalition and National Conference on Public Employee Retirement Systems has the potential to bias teachers for or against certain retirement plan labels.

²¹ For example, in Florida, teachers are given the choice between a FAS plan and a DC plan, but these plans are called "pension" and "investment" plans, respectively, in the accompanying materials. Kansas refers to its CB plan as "KPERS 3." The same is true in Washington state where TRS2 is a FAS plan and TRS3 is a hybrid plan that offers both a FAS and DC plan.

- [FAS] a formula involving a person’s age, years of service, and salary.
- [DC] how much money has accumulated in a person’s individual account from employee contributions, employer contributions, and investment returns.
- [CB] employee contributions, employer contributions, and investment returns with a minimum guarantee.”

As noted above, the baseline job offer included an expected replacement rate of 70% and a retirement age of 60, which is representative of the typical teachers’ retirement plan. When plan type varies across hypothetical job offers, the replacement rate and retirement age were held constant. The result is that respondents expect to be eligible to retire at the same age and at that point in their career, expect to have earned retirement benefits that replace the same amount of salary regardless of which plan type they choose.

By holding expected replacement rates and retirement ages constant across plan types, we eliminate potential contamination of our estimates from these features. Our goal is to isolate the primary differences in the way the retirement plans function, namely how benefits accrue and how they distribute risk (Aldeman & Johnson, 2015; Costrell & Podgursky, 2009).

Given that respondents are current teachers who have already accrued retirement benefits, it is useful to consider how they might interpret the choice between retirement plans. A long history of legal rulings makes it practically impossible to make changes to accrued benefits and, in some states, future benefit accruals for current teachers (Biggs et al., 2022; Monahan, 2010). It is, therefore, unlikely that respondents believe that they must give up their accrued benefits to switch to an alternative plan type. It is much more likely that they understand the choice of retirement plan type only applies to future benefit accruals.²² In this context, our willingness to pay estimates can be thought of as the raises that would be necessary to persuade teachers to opt into an alternative retirement plan.

5. Econometric approach

The raw proportions of respondents choosing specific job conditions, presented above, give us an overall idea of which job attributes teachers prefer, but it does not tell us how much teachers prefer those job attributes. Even though we force respondents to choose jobs at the expense of higher salaries, the simple proportions mask heterogeneity in the gap between the two salary offers. Following the approach of Maestas et al. (2018), we estimate teachers’ willingness-to-pay for the seven job conditions previously described.

We assume that teachers choose between a set of jobs based on a latent utility model where unobserved utility is a linear and additively separable function of the jobs’ non-salary conditions, the jobs’ corresponding salary, and individual characteristics:

$$U_{ijt} = \alpha + X'_{ijt}\beta + \delta \ln w_{ijt} + \lambda_i + \varepsilon_{ijt} \tag{1}$$

where U_{ijt} is individual i ’s latent utility for job choice j in the individual’s job choice from set t . While teachers may weigh several job offers in job choice set t , our experiment restricts the set to only two jobs. Within choice sets, only salary and one other job condition vary. Non-salary job conditions are X_{ijt} and w_{ijt} is the salary. We use the natural logarithm of salary to facilitate interpretation of our effects as percent changes and since the salary offers in our experiment are tied to teachers’ reported salaries and there is substantial heterogeneity in salaries across our

²² The magnitude of the willingness-to-pay estimates presented in Table 4 provides evidence for this interpretation. It is unlikely that late-career teachers would be willing to give up substantial accrued benefits, often equal to hundreds of thousands of dollars, for a 5.7 percent pay increase.

national sample and within states due to salary schedules. The vector λ_i contains an individual’s observable characteristics that impact the latent utility. We assume that ε_{ijt} is an Extreme Value Type I random variable.

We model the probability that an individual chooses job choice j over job choice k in choice set t as:

$$P(U_{ijt} > U_{ikt}) = \Lambda \left[\left(X'_{ijt} - X'_{ikt} \right) \beta + \delta (\ln w_{ijt} - \ln w_{ikt}) \right] \tag{2}$$

where $\Lambda[\cdot]$ denotes the cumulative logistic distribution.²³ In practice, the dependent variable takes value 1 if individual i selected job j in job choice set t (i.e., latent utility for job j is greater than latent utility for job k) and takes value 0 if otherwise. The independent variables in Eq. (2) represent the differences in job offers.²⁴ We identify β and δ in Eq. (2) since each non-salary job condition and salary is randomly selected.²⁵

Consistent estimation of β and δ requires that differences in job conditions and salaries across job pairs are unrelated to omitted variables. Despite our randomization, there could be other state-level unobserved differences that are associated with the jobs that our respondents select because retirement plans are not uniform across states. For example, most states use FAS plans, which may lead teachers to develop a preference for these plans owing to their familiarity with how these plans function. Additionally, replacement rates, retirement ages, and many other pension factors vary across states. For example, some states may allow teachers to retire at age 55 while other states may defer retirement to age 60. A teacher in the state with retirement eligibility at age 55 would likely value an increase in the retirement age from 60 to 63 differently than a teacher in the age 60 retirement eligibility age state. To ensure that state-level differences do not affect our estimates of β and δ , we include state fixed effects.

Preferences may also be dynamic based on how many job choices respondents have already made. It is possible that it took respondents a question or two before becoming comfortable with the module’s design and that attention waned toward the end of the module. Additionally, preferences may vary based on which characteristics have varied in previous job offers. For example, respondents may be willing to pay to retire at age 57, but the strength of that preference may differ if respondents have seen a previous job offer with a retirement age of 55. To address these types of potential bias, we also include question fixed effects.

Consider a non-salary job condition c and the marginal utilities for this job condition, β^c , and salary, δ , identified in Eq. (2). For individual i , job offer j in choice set t that included job condition c has expected utility $E(U_{ijt}) = \beta^c + \delta \ln w_{ijt}$ and job offer k in the same choice set that does not have the job condition has expected utility $E(U_{ikt}) = \delta \ln w_{ikt}$. An individual is indifferent between the two jobs when we fix the salary at w and subtract the individual’s willingness-to-pay for the job condition:

²³ We suppress individual characteristics in Eq. (2) since they do not vary across jobs within a job choice set. In practice, this means that the individual characteristics that would impact the latent utility for one job in the job choice set would also have to impact the latent utility for the other job in the choice set.

²⁴ Note that the explanatory variables are differences in job conditions and not the levels. As we explain when describing the stated preferences experiment, we chose job condition values to be in a realistic range if not the most common job conditions. The relevant variable for policy and our analysis is the difference in job conditions within the choice set. For example, it is irrelevant to us if a respondent chose a job offering a replacement rate of 75 percent instead of 70 percent or chose 70 percent over 65 percent: the relevant factor is that the respondent desired the additional 5 percentage points of replacement rate.

²⁵ Preferences are assumed to be linear in terms of job characteristics. Given the range of values for the job characteristics, we do not believe this is a very restrictive assumption. Moreover, the range of potential job offers for a potential job characteristic is smaller than the full range for each job characteristic.

Table 3
Mean willingness-to-pay for different retirement plan types.

	WTP (1)	WTP (2)	WTP (3)	WTP (4)
DC rather than FAS	-0.032*** (0.005)	-0.027*** (0.005)	-0.025*** (0.005)	-0.025*** (0.005)
CB rather than FAS	-0.026*** (0.005)	-0.020*** (0.005)	-0.019*** (0.005)	-0.019*** (0.005)
Question FE		X		X
State FE			X	X
N Teachers	4817	4817	4817	4817
N	38,531	38,531	38,531	38,531

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

$$\delta \ln w = \beta^c + \delta \ln(w - WTP^c) \tag{3}$$

where the WTP^c is the willingness-to-pay for job condition c . We solve for WTP^c in Eq. (3) to derive our willingness-to-pay measure:

$$WTP^c = w \left[1 - \exp\left(-\frac{\beta^c}{\delta}\right) \right]. \tag{4}$$

We report willingness-to-pay estimates as $1 - \exp\left(-\frac{\beta^c}{\delta}\right)$ and interpret these effects as $100 \left[1 - \exp\left(-\frac{\beta^c}{\delta}\right) \right]$ percent salary increases a respondent is willing to forgo to receive job attribute c . We use the delta method to calculate standard errors in Eq. (4).²⁶ We include probability weights to ensure our sample is nationally representative. Statistical inference tests the null hypothesis that the willingness-to-pay estimates are equal to zero; under this null hypothesis, respondents are indifferent to a change in the job condition.

As discussed in Section 4, we predefine the relationships between salary and several job conditions to avoid dominant offers. By construction, willingness-to-pay estimates for increasing replacement rate, increasing salary growth, and adding dental and optical coverage to health insurance plans will be positive. Likewise, estimates for increasing the retirement age, increasing class size, and reducing the share of costs covered by a healthcare plan will be negative. The magnitudes and statistical significance of the willingness-to-pay estimates for these job conditions are still policy relevant despite the predefined signs on estimates.

5.1. Preference heterogeneity

The mean willingness-to-pay estimates described above are informative for most job conditions, but teachers' preferences likely evolve both as they gain experience and over time as some teachers leave the workforce. To understand how preferences among the current teaching workforce change along this dimension, we examine heterogeneity based on respondents' years of experience in their current states. We do this by estimating Eq. (2) interacting the differences in job conditions for a choice set with experience quartiles. We use the middle two quartiles (i.e., second and third) as the comparison group.

Respondents in the first experience quartile (termed "early-career") have 7 or fewer years of experience, respondents in the second and third

²⁶ As described in the data section, several areas were oversampled in our survey. Oversampling those areas resulted in different probabilities that each teacher in the sample would have been surveyed. We clustered standard errors by the oversampled areas (there is one cluster per area and one cluster for all non-oversampled states) to account for differences in the probability that each teacher would have been sampled.

quartiles (termed "mid-career") have between 8 and 20 years of experience, and fourth quartile respondents (termed "late-career") have 21 or more years of experience. The interaction terms represent the difference in preferences for early- and late-career teachers relative to mid-career teachers.

To translate this differential into a willingness-to-pay estimate, we add the interaction terms to the mid-career teachers' preference in the numerator of the exponential in Eq. (4). For example, the willingness-to-pay for an early-career teacher, denoted by the superscript e , for job condition c is $WTP^{ce} = w \left[1 - \exp\left(-\frac{\beta^c + \beta^{ce}}{\delta}\right) \right]$ where β^{ce} is early-career teachers' differential preference for the job condition. We interpret this effect similarly to the overall effect.

In addition to experience, we also investigate heterogeneity in willingness-to-pay for job conditions based on respondents' cognitive ability, levels of conscientiousness, financial literacy, risk tolerance, and teachers' self-reported 5-year exit probabilities. Our approach is similar across each of these dimensions.

5.2. Equivalent valuations of retirement plan types and other job characteristics

Policymakers could also choose to compensate teachers for changes to one job condition with changes to another condition instead of salary. In an attempt to capture this policy option, we construct a measure of non-salary willingness-to-pay for the different retirement plan types included in our experiment.

Let WTP^{PT} represent the willingness-to-pay for either alternative plan design. A respondent is indifferent between taking a job with an alternative retirement plan if the job also includes a change to another job condition c , $WTP^{PT} + \gamma^c WTP^c = 0$, where γ^c represents how much the corresponding job condition changes. The change to another job condition required to make the offers equivalent is then:

$$\gamma^c = -\left(\frac{WTP^{PT}}{WTP^c}\right). \tag{5}$$

To compensate teachers for enrolling in non-FAS plans with changes in non-salary job attributes, willingness-to-pay estimates for non-salary job attributes are inversely related to how much the non-salary job attribute would have to change. In other words, the less respondents value a job characteristic, the more it would have to change to offset enrolling in an alternative retirement plan.²⁷

6. Results

We begin with the results from our stated preferences experiment that compare teachers' willingness-to-pay for different retirement plan types. Table 3 contains mean willingness-to-pay estimates for DC and CB plans relative to FAS plans. These values are calculated using the non-linear transformation in Eq. (4) based on the estimates from the logit model in Eq. (2).

The first column is our base specification while the second column includes question fixed effects to control for changes in willingness-to-pay as respondents answer more questions. In column 3, we include state fixed effects to control for any residual variation in preferences that

²⁷ Since we do not vary retirement plan type, salary, and other non-salary job components at the same time, we cannot be certain that teachers truly value changes in plan type and non-salary job components equivalently when compensated with γ^c . There may be some interaction effects between plan types and non-salary job components that are not captured by our experiment. Despite this limitation, we believe that presenting these tradeoffs is informative.

Table 4
Willingness-to-pay for different retirement plan types mediated by experience.

Panel A: Willingness-to-Pay Estimates			
	Early-Career (1)	Mid-Career (2)	Late-Career (3)
DC rather than FAS	-0.001 (0.010)	-0.021*** (0.006)	-0.057*** (0.010)
CB rather than FAS	0.017* (0.010)	-0.021*** (0.006)	-0.044*** (0.010)
Experience Range	Exp ≤ 6	6 < Exp < 20	Exp ≥ 20
Panel B: Differences in WTP Estimates			
	Mid – Early (4)	Late – Early (5)	Late – Mid (6)
DC rather than FAS	-0.020* (0.012)	-0.056*** (0.014)	-0.035*** (0.012)
CB rather than FAS	-0.037*** (0.012)	-0.061*** (0.014)	-0.024** (0.012)

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions and state and question fixed effects. *N Teachers* = 4,817; *N Job Offers* = 38,531. Experience range determined using experience in state quartiles: early-career respondents are in the first experience quartile, mid-career respondents are in the second or third experience quartiles, late-career respondents are in the fourth experience quartile. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

could be correlated with respondents' state of residence. Column 4 includes both state and question fixed effects.²⁸ We prefer the model in column 4 since we expect heterogeneity across states and questions.²⁹

Our results indicate that, on average, respondents would need to be compensated with a 2.5% pay increase to be indifferent between being enrolled in a plan matching the description of a DC plan versus a plan matching the description of a FAS plan (for brevity, we will say "DC plan" rather than "matching the description of a DC plan", etc.). Similarly, we estimate that respondents would be indifferent between a CB plan and a FAS plan if the CB plan were paired with a 1.9% salary increase. All estimates are statistically different from zero at the 99% confidence level.

Willingness-to-pay for FAS plans likely increases with experience because, as teachers gain experience, each additional year of work under a FAS plan is increasingly valuable (McGee & Winters, 2017) and because of the survivorship phenomenon discussed in Section 3. To better understand this relationship, we examine heterogeneity in willingness-to-pay for retirement plan types based on experience. Panel A of Table 4 presents willingness-to-pay estimates for enrolling in

²⁸ We also estimate a model that includes teachers characteristics as well as a model that includes teacher characteristics and information about teachers' levels of retirement planning. Our estimates of plan type willingness-to-pay are unaffected by the inclusion of either set of variables. This occurs since, as we explained in the econometric approach section, individual characteristics do not vary across the two job offers.

²⁹ As noted in the econometric approach section, we include state fixed effects in the event that preferences are related to what states actually offer teachers. We test for heterogeneity in retirement plan type offering by states in Appendix B. We compare states offering only FAS plans to states that offer any alternative plan and FAS only states to either states that offer FAS plans along with an alternative or states that only offer alternative plan designs. We do not find any significant evidence that plan type preferences differ.

alternative retirement plan types mediated by experience.³⁰ Panel B provides the differences in willingness-to-pay estimates between each group of teachers from Panel A. The model displayed in Table 4 includes state and question fixed effects.³¹

We find that teachers' willingness-to-pay for a FAS plan relative to either alternative retirement plan increases with experience. Respondents designated as early-career (low-experience) are indifferent between DC and FAS plans. Early-career teachers are willing to pay 1.7% of salary to enroll in a CB plan rather than a traditional FAS plan, but this result was only marginally significant. Mid-career respondents would need to be compensated with a 2.1% pay increase to be indifferent between enrolling in either alternative plan type instead of a FAS plan. Matching our expectation, late-career respondents had the strongest preference for FAS plans. Our results indicate that late-career teachers would equate enrolling in a DC plan with a 5.7% pay cut, while enrolling in a CB plan is equivalent to a 4.4% pay cut.

All differences in willingness-to-pay estimates between groups are statistically significant at the 99% confidence level except for the difference between mid- and early-career teachers for DC, which is significant at the 90% confidence level, and the difference between late- and mid-career teachers for CB, which is significant at the 95% confidence level.

This observed pattern of heterogeneity in willingness-to-pay coincides with the backloaded nature of FAS plans, which results in increasing returns to experience. Teachers often do not earn substantial benefits under a FAS plan until they approach retirement eligibility. Late-career respondents who have accrued the most benefits and for whom additional years of work under a FAS plan are the most valuable would have the strongest preferences for FAS plans. New and early-career teachers, who have not yet earned valuable pension benefits and who are not close to the steep part of the benefit accrual curve, are indifferent among the plan types.

Our experimental design sought to minimize bias or confusion related to common plan type labels as well as differences in plan generosity in two ways. First, we did not identify the retirement plan types by their common names (e.g., defined contribution). Instead, we described how teachers would earn benefits under each type of plan and asked them to choose based on the description.

Second, respondents were told that the plans were expected to deliver similar benefits at retirement. Specifically, they were instructed that, for both the FAS and alternative plans, retirement benefits would be expected to replace 70% of their end-of-career salary, that they would be eligible to retire with full benefits at age 60, and that they would be enrolled in Social Security. The only differences between retirement plan types were how respondents earn benefits and the investment and other risks respondents perceive were associated with each type of plan based solely on the plan's description, both of which are addressed in our plan descriptions.

In contrast to some of the previous literature (DeArmond & Goldhaber, 2010; Johnston, 2021), our results indicate that respondents place some value on, or have more comfort with, the way benefits accrue under a FAS plan and/or perceive alternative plans as being somewhat riskier. While we find that, on average, current teachers prefer FAS plans to alternative plan types, our results suggest that teachers may be open to plan design changes if paired with modest salary increases.

³⁰ Experience in the state would most closely resemble years of service in a pension system. We provide willingness-to-pay estimates mediated by age and total experience in Appendix C. Results when using experience in state as the mediator are similar to results when mediating with age or total experience.

³¹ Experience may be related to other unobserved teacher characteristics, leading to bias in willingness-to-pay estimates that allow for heterogeneity by experience. We also estimate a model that includes teacher characteristics and teachers' levels of retirement planning as control variables. The results are similar and are available upon request.

Table 5
Willingness-to-pay for job conditions and equivalent valuations with willingness-to-pay for retirement plan type.

	WTP (1)	DC Equivalent Valuation (2)	CB Equivalent Valuation (3)
Replacement Rate	0.016*** (0.000)	1.551*** (0.304)	1.173*** (0.307)
Retirement Age	-0.025*** (0.001)	-0.997*** (0.194)	-0.754*** (0.196)
Salary Growth	0.058*** (0.002)	0.427*** (0.084)	0.323*** (0.084)
Class Size	-0.005*** (0.001)	-5.204*** (1.499)	-3.935*** (1.326)
Health Insurance: 60% rather than 80%	-0.167*** (0.006)	-	-
Health Insurance: add in Dental & Optical	0.107*** (0.004)	-	-
Do not Enroll in Social Security	-0.107*** (0.005)	-	-

Notes: Willingness-to-pay estimates in Column 1 from Eq. (4) based on results from logistic regression of the model in Eq. (2). Model includes retirement plan type and question and state fixed effects. N Teachers = 4,817; N Job Offers = 38,531. Estimates of willingness-to-pay for retirement plan type are available in Column 4 of Table 3. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Equivalent valuation estimates in Columns 2 and 3 are based on Eq. (5).

Potentially even more relevant for public policy, we find that younger teachers are indifferent between plan designs, indicating that changes can be made for early-career and new teachers without providing additional compensation.

6.1. Willingness-to-pay for other job characteristics and equivalent valuations of retirement plan types

Policymakers face numerous tradeoffs when designing teachers' compensation packages, and no element exists in a vacuum. When weighing these various tradeoffs, it is important to understand teachers' relative preferences across job characteristics. This section provides willingness-to-pay estimates for the other 7 job attributes in our experiment and relates those preferences to our estimates for retirement plan type.

There are at least two reasons why the relative willingness-to-pay estimates provided in this section are important. First, our main results provide estimates for the required raises to compensate teachers for enrolling in alternative retirement plans instead of FAS plans. However, states or school districts could choose to compensate teachers via changes to other retirement plan features or job characteristics (e.g., the retirement age or class size).

Second, policymakers facing budget shortfalls may have to consider making changes to teacher compensation without giving anything to teachers in exchange. Proponents of FAS plans argue that policymakers should protect FAS plans and make budget cuts elsewhere. When faced with such decisions, comparing willingness-to-pay estimates for retirement plans versus other job characteristics gives policymakers helpful information about teachers' relative valuations of various elements of teachers' compensation packages.

Table 5 provides willingness-to-pay estimates for the other 7 job attributes from our experiment (column 1). The table also includes estimates for how much each job characteristic would need to change to make teachers indifferent between alternative plan types and a FAS plan (columns 2 and 3) using the equivalent valuation measure in Eq. (5). All estimates in this table come from our preferred model that includes state and question fixed effects.

Since states that may undertake retirement reform are likely to enroll all new hires and may enroll early-career teachers in an alternative plan design, we evaluate willingness-to-pay heterogeneity based on experience for the other job conditions in our experiment and report results in Table 6, which is analogous to Table 5. The panels correspond to the different job conditions from the experiment. Column 4 in Table 6 includes estimates of the differences in each coefficient for each job

condition.

In Table 5, we estimate that a one percentage point replacement rate increase is equivalent to a 1.6% salary increase. This estimate implies that respondents would be indifferent between enrolling in a DC plan if they are compensated with a replacement rate that is 1.6 percentage points higher than the replacement rate in a corresponding FAS plan. Within our experiment's context, the DC plan would replace 71.6% of salary whereas the FAS plan would replace 70%. The corresponding compensating differential for a CB plan would be a 1.2 percentage point replacement rate increase. Respondents' valuation of replacement rate increased with experience, though the differences in willingness-to-pay estimates are not large.

We estimate that teachers would be indifferent between lowering the retirement age by one year and a 2.5% salary increase. This estimate implies that teachers would be indifferent between enrolling in a DC or CB plan instead of a FAS plan if they were able to retire one year or 0.75 years earlier, respectively. In other words, teachers would be willing to enroll in an alternative plan if that plan reduces their expected retirement age by roughly one year relative to a FAS plan. Given our experiment's parameters, this means teachers enrolled in DC or CB plans would expect to retire at age 59 rather than our baseline FAS plan's retirement age of 60.³² More experienced respondents are willing to pay more to reduce their retirement ages than less experienced respondents.

To estimate the cost of increasing replacement rates or reducing retirement ages within the FAS context, we calculated the difference in the present value of pension wealth (i.e., the present discounted value of the future stream of pension benefits) using respondents' experimental job parameters and reported salaries.³³ At the median, it would cost \$1797 or 3.3% of salary to raise replacement rates by one percentage point and \$15,876 or 26.2% of salary to lower retirement age by one year. Comparing these cost estimates to our willingness-to-pay estimates

³² In practice, teachers would earn benefits more evenly under DC and CB plans compared to FAS plans, which ameliorates financial penalties for retiring earlier or later than a specified eligibility age. Prior literature has shown that in many cases FAS eligibility requirements have reduced retirement ages, and that moving to alternative plan designs would provide additional retirement age flexibility and potentially lengthen careers on average (Costrell & McGee, 2010; Friedberg & Webb, 2005; Ni et al., 2020b).

³³ To calculate present value, we use a four percent discount rate and the 2013 static mortality table based on the RP-2000 Mortality Tables Report adjusted for mortality improvement using Projection Scale AA. The mortality table can be found at <http://www.irs.gov/pub/irs-drop/n-08-85.pdf>.

Table 6
Willingness-to-pay for retirement job conditions mediated by experience.

	WTP (1)	DC Equivalent Valuation (2)	CB Equivalent Valuation (3)		WTP Difference (4)
<i>Panel A: Replacement Rate</i>					
Early-Career	0.014*** (0.001)	0.068 (0.742)	-1.226 (0.748)	Mid — Early	0.003*** (0.001)
Mid-Career	0.017*** (0.001)	1.289*** (0.375)	1.259*** (0.380)	Late — Early	0.003*** (0.001)
Late-Career	0.017*** (0.001)	3.354*** (0.636)	2.628*** (0.635)	Late — Mid	0.000 (0.001)
<i>Panel B: Retirement Age</i>					
Early-Career	-0.021*** (0.001)	-0.044 (0.477)	0.789 (0.482)	Mid — Early	-0.004** (0.002)
Mid-Career	-0.025*** (0.001)	-0.866*** (0.251)	-0.845*** (0.255)	Late — Early	-0.008*** (0.002)
Late-Career	-0.029*** (0.002)	-1.944*** (0.367)	-1.523*** (0.366)	Late — Mid	-0.005*** (0.002)
<i>Panel C: Salary Growth</i>					
Early-Career	0.062*** (0.003)	0.015 (0.163)	-0.269 (0.164)	Mid — Early	-0.003 (0.004)
Mid-Career	0.058*** (0.002)	0.365*** (0.106)	0.356*** (0.108)	Late — Early	-0.007* (0.004)
Late-Career	0.054*** (0.003)	1.044*** (0.198)	0.818*** (0.197)	Late — Mid	-0.004 (0.003)
<i>Panel D: Class Size</i>					
Early-Career	-0.007*** (0.002)	-0.137 (1.487)	2.458 (1.684)	Mid — Early	0.003 (0.002)
Mid-Career	-0.004*** (0.001)	-5.291** (2.304)	-5.166** (2.293)	Late — Early	0.002 (0.003)
Late-Career	-0.005*** (0.002)	-10.873** (4.609)	-8.519** (3.830)	Late — Mid	-0.001 (0.002)
	WTP (1)	DC Equivalent Valuation (2)	CB Equivalent Valuation (3)		WTP Difference (4)
<i>Panel E: Health Insurance – 60% rather than 80%</i>					
Early-Career	-0.127*** (0.012)	-	-	Mid — Early	-0.049*** (0.014)
Mid-Career	-0.176*** (0.008)	-	-	Late — Early	-0.055*** (0.016)
Late-Career	-0.182*** (0.012)	-	-	Late — Mid	-0.006 (0.014)
<i>Panel F: Health Insurance – add in Dental & Optical</i>					
Early-Career	0.112*** (0.009)	-	-	Mid — Early	-0.006 (0.010)
Mid-Career	0.106*** (0.005)	-	-	Late — Early	-0.010 (0.012)
Late-Career	0.102*** (0.008)	-	-	Late — Mid	-0.004 (0.009)
<i>Panel G: Do Not Enroll in Social Security</i>					
Early-Career	-0.102*** (0.009)	-	-	Mid — Early	-0.002 (0.010)
Mid-Career	-0.103*** (0.006)	-	-	Late — Early	-0.018 (0.012)
Late-Career	-0.120*** (0.008)	-	-	Late — Mid	-0.017* (0.009)

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job characteristics and question and state fixed effects. *N Teachers* = 4,817; *N Job Offers* = 38,531. Low experience teachers have 7 years or fewer; Medium experience teachers have between 8 and 20 years; High experience teachers have 20 years or more. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$. Equivalent valuation estimates in Columns 2 and 3 are based on Eq. (5).

above implies that, consistent with prior literature on deferred versus current compensation, teachers value these retirement benefits less than the cost to provide them (Biasi, 2019; Fitzpatrick, 2015).

Policy propositions to switch retirement plan types could also compensate teachers with higher rates of salary growth or with reduced class sizes, both of which teachers and teachers' unions commonly call on state and local policymakers to do (e.g., Weingarten, 2019a, 2019b). Our respondents are willing to pay 5.8% of salary for a one percentage

point increase in their annual salary growth rate and 0.5% of salary to decrease average class sizes by one student.

As shown in column 2, teachers would be indifferent between enrolling in a DC plan instead of a FAS plan if the DC plan was coupled with a 0.43 percentage point increase in their salary growth rate or a 5.2 student reduction in their average class size. The CB equivalent valuations are increasing the rate of salary growth by 0.3 percentage points or reducing class sizes by 3.9 students.

Table 7
Willingness-to-pay for different retirement plan types with mediators.

Panel A: Willingness-to-Pay Estimates	DC rather than FAS			CB rather than FAS		
	Low (1)	Medium (2)	High (3)	Low (4)	Medium (5)	High (6)
Cognitive Ability	-0.003 (0.010)	-0.027*** (0.006)	-0.041*** (0.009)	-0.016 (0.010)	-0.016** (0.006)	-0.029*** (0.009)
Conscientiousness	-0.017* (0.009)	-0.027*** (0.006)	-0.028*** (0.010)	-0.010 (0.009)	-0.023*** (0.007)	-0.021** (0.010)
Financial Literacy	-0.001 (0.011)	-0.022*** (0.008)	-0.035*** (0.007)	0.002 (0.011)	-0.008 (0.008)	-0.033*** (0.007)
Risk tolerance	-0.027*** (0.008)	-0.029*** (0.008)	-0.020*** (0.007)	-0.020** (0.009)	-0.026*** (0.008)	-0.011 (0.008)

Panel B: Differences in WTP Estimates	Med-Low (7)	High-Low (8)	High-Med (9)	Med-Low (10)	High-Low (11)	High-Med (12)
	Cognitive Ability	-0.025** (0.012)	-0.038*** (0.014)	-0.014 (0.011)	0.001 (0.012)	-0.012 (0.014)
Conscientiousness	-0.010 (0.011)	-0.011 (0.013)	-0.001 (0.012)	-0.013 (0.011)	-0.011 (0.014)	0.002 (0.012)
Financial Literacy	-0.021 (0.013)	-0.034*** (0.013)	-0.013 (0.010)	-0.011 (0.014)	-0.035*** (0.013)	-0.025** (0.010)
Risk tolerance	-0.003 (0.012)	0.007 (0.011)	0.010 (0.011)	-0.006 (0.012)	0.009 (0.012)	0.015 (0.011)

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions and state and question fixed effects. *N Teachers* = 4,817; *N Job Offers* = 38,531. Low-cognitive ability and conscientiousness teachers are in the first quartile; Medium-cognitive ability and conscientiousness teachers are in the second and third quartiles High-cognitive ability and conscientiousness teachers are in the fourth quartile. Low-financial literacy teachers answer 0 or 1 of 3 questions correctly; Medium-financial literacy teachers answer 2 of 3 questions correctly; High-financial literacy teachers answer all questions correctly. Low-risk tolerance teachers are unwilling to take the job when the potential pay cut is less than 10%; Medium-risk tolerance teachers are willing to take the job when the potential pay cut is between 10 and 20%; High-risk tolerance teachers are willing to take the job when the potential pay cut is greater than 20%. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Our estimates in panel C of Table 6 indicate that respondents' willingness-to-pay for salary growth decreases with experience but required compensating differentials in terms of salary growth continue to increase with experience. Mid-career respondents would be indifferent between enrolling in a FAS-alternative retirement plan if it was associated with between a 0.36 and 0.37 percentage point higher salary growth rate than the salary growth rate associated with a FAS plan. These compensating differentials rise to over 1 percentage point of salary growth for DC plans and 0.8 percentage points for CB plans for late-career respondents.

Estimates in Table 5 show that the teachers in our sample place a higher value on the proportion of expected healthcare costs covered by their insurance plan and whether they have optical and dental coverage than they place on the type of retirement plan in which they enroll. We estimate that teachers would require a 16.7% salary increase to offset a healthcare plan that covers 60% of expected costs instead of a plan that covers 80% of costs. Respondents are also indifferent between a 10.7% raise and enrolling in a plan with dental and optical coverage.³⁴

Table 6 presents heterogeneity in willingness-to-pay for health insurance. Respondents with more experience are willing to pay more for a health insurance plan that covers a larger share of health care costs, but early-career teachers are willing to pay the most for dental and optical coverage. Regardless of experience, willingness-to-pay estimates for health insurance are greater than 10% of salary.

³⁴ We do not report the DC and CB relative valuations in Tables 5 and 6 for health insurance and Social Security since these job attributes are not defined continuously in our experiment. The relative valuations would be the willingness-to-pay for retirement plan type as a proportion of willingness-to-pay for health insurance or Social Security, which is not all that informative of a measure.

We estimate that it would cost \$4031 or 6.8% of salary to provide a health insurance plan that covers 80% of total medical care costs versus 60% of total costs, which is significantly lower than our estimates of teachers' willingness to pay for those benefits.³⁵ Comparing these estimates to the replacement rate and retirement age estimates above, our results imply that teachers value healthcare coverage more than retirement benefits, at least across the parameter values tested in our experiment.

Finally, teachers in our sample place a larger value on enrolling in Social Security than they do on which type of other retirement plan they are enrolled in. Column 1 of Table 5 shows that respondents are willing to pay 10.7% of salary to be enrolled in Social Security. This willingness-to-pay estimate is especially noteworthy since it exceeds the employer contribution rate to Social Security of 6.2%. In other words, we estimate that teachers value Social Security by 4.5% of pay more than it costs employers to provide.

We estimated models that test for heterogeneity in the preference for

³⁵ To estimate the total cost of health insurance benefits, we use average monthly employee and employer premiums paid for medical care benefits for teachers with family coverage from the National Compensation Survey (NCS) (U.S. Bureau of Labor Statistics, 2020). We take the difference between 80 percent of the total and 60 percent of the total to estimate how much it would cost an employer to cover more of the total cost. We multiply the monthly figure by 12 to obtain the \$4,031 annual difference. Unfortunately, NCS does not collect data on dental and optical insurance costs or premiums, but we do not expect the premiums for these coverages to exceed the average premium for medical care. The percent of salary for medical care (6.8 percent) can therefore be viewed as an upper bound for the additional cost of dental and optical coverage.

Social Security and plan type based on whether teachers are enrolled in Social Security; results are available in Appendix E.³⁶ Teachers who participate in Social Security value it at 13.7% of salary, while those who do not participate value it at 5.4% of salary. The 8.3 percentage point gap in willingness-to-pay for Social Security is statistically significant. However, the willingness-to-pay estimate for teachers not participating in Social Security is not statistically different than the 6.2% employer contribution to Social Security.

6.2. Willingness-to-pay for different retirement plan types mediated by cognitive ability, conscientiousness, financial literacy, risk tolerance, and self-reported 5-year exit probability

We estimate the retirement plan type willingness-to-pay distributions for respondents with differing levels of cognitive ability, conscientiousness, financial literacy, and risk tolerance. These results are in Table 7. We report estimates from our preferred specification that include state and question fixed effects in Panel A and the differences in willingness-to-pay estimates in Panel B. Columns 1 and 4 show the estimates for respondents in the “low” category for each mediator. Columns 2 and 5 contain estimates for respondents in the “medium” category for each mediator. Columns 3 and 6 provide estimates of willingness-to-pay for respondents in the “high” category for each mediator.

Using cognitive ability to proxy for teacher quality, we find significant heterogeneity in willingness-to-pay for retirement plan type. We group respondents by cognitive ability based on respondents’ quartile in the cognitive ability distribution. As cognitive ability increases, teachers’ value FAS plans more. Teachers in the bottom cognitive ability quartile are indifferent between switching from FAS plans to either DC or CB plans, while teachers in the top quartile value these plans at a 4.1 and 2.9% pay cut, respectively. Even though willingness-to-pay estimates mediated by experience and cognitive ability appear similar in both magnitude and direction, there does not appear to be any relationship between these mediators in our sample – the correlation between experience and cognitive ability is negative 0.02.³⁷

Our second proxy for teacher quality, self-reported conscientiousness, does not account for much heterogeneity in plan type willingness-to-pay. Apart from low-conscientiousness respondents’ willingness-to-pay for CB plans, respondents value enrolling in DC and CB plans instead of FAS plans at between a 1.7 and 2.8% pay reduction.

We also group respondents based on the number of financial literacy questions they answer correctly. Low-financial literacy respondents answer 0 or 1 of the 3 financial literacy questions correctly. Medium-financial literacy respondents correctly answer 2 of the 3 financial literacy questions, and high-financial literacy respondents answer all 3 financial literacy questions correctly.³⁸

The most financially literate teachers in our sample are willing to pay more for traditional pension plans. Respondents answering all 3 financial literacy questions correctly are willing to pay 3.5% and 3.3% of salary for a FAS plan rather than switch to DC or CB plans, respectively. Teachers displaying the lowest levels of financial literacy are indifferent between retirement plans. Moderately financially literate teachers are indifferent between FAS and CB plans but are willing to pay 2.2% of

salary for FAS over DC plans.

We group respondents based on which potential lifetime pay cut they would be willing to accept from our risk tolerance questions. The questions making up our risk tolerance scale asked respondents if they would risk taking a job with a varying pay cut to lifetime income in exchange for the potential to double their lifetime income. Low-risk tolerance respondents are unwilling to accept the job if the potential cut to respondents’ lifetime income is less than 10%, while medium-risk tolerance respondents are willing to accept the job if the potential lifetime income cut is between 10 and 20%. High-risk tolerance respondents are willing to accept the job even if the potential cut to respondents’ lifetime income is greater than 20%.³⁹

We do not find evidence of heterogeneity based on risk tolerance in willingness-to-pay retirement plan types. Respondents with higher levels of risk tolerance are willing to pay less for traditional FAS plans than respondents with lower levels of risk tolerance, though the difference was not statistically significant. Medium risk tolerance respondents have the highest willingness-to-pay estimates for both alternative plan types.

Table 8 includes our willingness-to-pay estimates for retirement plan types when including respondent’s self-reported five-year exit probabilities as a mediating condition.⁴⁰ As shown in Column (1), respondents reporting that they will not exit the profession within 5 years value FAS plans over DC plans at 3.4% of salary. Respondents reporting exit probabilities between 0 and 50% value FAS plans over DC plans at 2.1% of salary. These results suggest that respondents who are either certain that they will stay or are leaning towards staying value FAS plans the most, but respondents who expect or are likely to leave are indifferent concerning DC plans.

Teachers who are certain they will stay in the profession value FAS plans more than CB plans, but all other teachers are indifferent. Respondents reporting 5-year exit probabilities of 0 value CB plans as a 2.4% pay cut relative to FAS plans.

Table 8 Willingness-to-pay estimates for different retirement plan types mediated by self-reported 5-year exit probability.

	DC rather than FAS (1)	CB rather than FAS (2)	N Teachers (3)	N (4)
P(Exit) = 0	-0.034*** (0.007)	-0.024*** (0.006)	2612	20,992
0 < P(Exit) < 0.5	-0.021** (0.010)	-0.017 (0.011)	978	7839
P(Exit) = 0.5	0.009 (0.014)	0.008 (0.014)	467	3758
0.5 < P(Exit) < 1	-0.019 (0.016)	-0.022 (0.017)	378	3040
P(Exit) = 1	-0.022 (0.016)	-0.021 (0.017)	382	3068

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions and state and question fixed effects. N Teachers = 4817; N Job Offers = 38,531; N in column (3) refers to the number of observations reporting 5-year exit probabilities within each rows range. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** p < 0.01, ** p < 0.05, * p < 0.1.

³⁶ Willingness-to-pay for retirement plan type was not related to Social Security participation.

³⁷ We also conduct Pearson’s chi-squared test of independence to assess if there is a relationship between experience and cognitive ability within our low, medium, and high groupings of experience and cognitive ability based on quartiles. The p-value from this test is 0.064.

³⁸ Per the descriptive statistics in Table 1, approximately 17 percent of respondents would fall in the low-financial literacy group, 31 percent would fall into the medium-financial literacy group, and the remaining 53 percent would be high-financial literacy.

³⁹ Based on the descriptive statistics in Table 1, we consider one third of respondents to have low-risk tolerance, another third to be medium risk-tolerance, and the remaining third to be high-risk tolerance.

⁴⁰ Differences in willingness-to-pay estimates mediated by self-reported 5-year exit probability are available in Appendix F.

7. Conclusion

Teacher pensions are underfunded by more than \$600 billion in the aggregate (McGee, 2019; Novy-Marx & Rauh, 2011). More resources than ever before are being devoted to paying down pension debt (Costrell, 2022a), squeezing state and local education budgets (McGee, 2016; Nation, 2018). What's more, there is mounting evidence that traditional pension plans do not work well for all teachers (Aldeman & Johnson, 2015; Backes et al., 2016; Costrell & Podgursky, 2009; McGee & Winters, 2019). As a result, policymakers are exploring alternative retirement plan designs. However, advocates for traditional pensions often stymie consideration of alternative plans citing teachers' strong preferences for final average salary pensions. Unfortunately, until now little was known about teachers' preferences around retirement or the strength of those preferences relative to other aspects of their jobs and compensation.

This paper addresses this knowledge gap by developing willingness-to-pay estimates based on a stated preferences experiment that models the tradeoffs policymakers are likely to face when redesigning teacher retirement plans. We find that early-career teachers are indifferent between traditional pensions and alternative plans, and that willingness-to-pay for FAS plans may increase with experience. This finding differs somewhat from two recent papers on teachers' retirement preferences that find teachers may prefer 401(k)-style plans (DeArmond & Goldhaber, 2010; Johnston, 2021). However, those studies only consider the more localized context of a single state or school district, and differences in teacher characteristics (e.g., experience, familiarity with alternative plans, etc.) between samples and survey design may explain any differences in estimated preferences for DC plans. Our finding that experience mediates retirement plan preferences corroborates both the previous literature and is consistent with increasing returns to experience under FAS plans.

Previous literature provides evidence that teachers are more responsive to changes in their salaries than they are to changes in their deferred retirement compensation (Biasi, 2019; Fitzpatrick, 2015; Goldhaber & Holden, 2020; Ni et al., 2020a). Our experiment provides some evidence to corroborate this finding. Teachers' willingness-to-pay for FAS plans relative to alternative retirement plan types were modest even for mid- and late-career teachers for whom an additional year of work under a FAS plan is most valuable. In addition, teachers were willing to pay significantly more for a one percentage point increase in salary growth than they were for a one percentage point increase in their replacement rate or to be able to retire one-year earlier. In future research, we will use the responses to the questions involving replacement rate and retirement age to estimate teachers' valuations of deferred retirement compensation versus current salary.

In addition, we show that teachers place sizable values on other job conditions. Teachers are willing to trade salary today if it means that their expected retirement benefits will be larger or if they can retire at a younger age. We found that teachers highly value their health care benefits, including supplementary coverages for optical and dental. They also place a substantial value on being enrolled in Social Security, valuing it more than its cost to employers. In fact, we estimate that teachers have stronger preferences around their expected retirement benefits, retirement age, health care, and Social Security enrollment than they do for various retirement plan types.⁴¹

⁴¹ Future research could explore these preferences more deeply by investigating the impact of information interventions on preferences, estimating preferences around a different or more detailed set of job conditions, performing stated preferences experiments with different populations (e.g., groups of pre-service teachers), and estimating the impact of real-world choices offered to teachers.

While our results have the potential to inform policy decisions, there are two key limitations. First, teachers' stated preferences on a 15 min survey may differ from their true or revealed preferences; the difference between hypothetical preferences and real preferences is sometimes called "hypothetical bias" (Cummings & Taylor, 1999). Furthermore, experiments to elicit willingness-to-pay for goods tend to over-value true willingness-to-pay (List & Gallet, 2001; Murphy et al., 2005). However, there is literature that finds that stated preferences experiments of the type that we execute tend to match revealed preferences (e.g., Hainmueller et al., 2015; Wiswall & Zafar, 2018; Wlömert & Eggers, 2016), but none of this previous literature specifically involves teachers or retirement plan types. Future research could provide validation for stated preferences for teachers specifically.

While responses to our survey are not directly tied to changes in teachers' compensation packages or job conditions, respondents may view their answers as having policy relevance because policy discussions around pension reform and teacher pay have been quite frequent in recent years, routinely making state and national headlines.⁴² Teachers were also compensated for their time answering the survey (see footnote 8), thus there were some incentives to provide their best answers.

A second important limitation of our experiment is that we only surveyed active teachers, and as discussed in Section 3, preferences are likely related to experience due to changing workforce composition over time (i.e., survivorship). In many cases, the drawbacks of FAS plans are more pronounced for teachers that have exited the profession, and it is well-documented that FAS plans disadvantage teachers that leave early in their careers (e.g., Aldeman & Johnson, 2015; Aldeman & Rotherham, 2014; Costrell & Podgursky, 2009). Inexperienced teachers, who demonstrate higher levels of attrition from the profession, are likely underrepresented in the panel. The effect is that more experienced teachers, who have the most career certainty and who benefit more from additional years of work under a FAS plan, likely disproportionately influence our willingness-to-pay estimates relative to the overall teacher population, making our average willingness-to-pay estimates conservative. We emphasize the results are mediated by in-state experience and focus on results for early-career teachers.

With these limitations in mind, our estimates provide some insights that may be valuable to policymakers as they grapple with current budgetary challenges. For example, states could reduce future budgetary risk by placing new teachers in alternative retirement plans and at the same time offer modest pay raises to mid- and late-career teachers to opt into the alternative plans.

In addition, changes to the retirement age, expected retirement benefits, and healthcare coverage are likely to result in larger negative labor market consequences than retirement plan design changes. Our results also indicate that states whose teachers are not currently covered by Social Security could reap significant benefits from enrolling them in the program because teachers appear to value those benefits more than their cost.

States and school districts that face challenging budget situations may have to make difficult decisions that affect teachers' job conditions, pay, and benefits. Understanding how teachers value various aspects of their jobs and compensation can help inform these policy decisions and minimize potential negative consequences.

⁴² For example, teachers in several states walked out of the classroom to advocate for higher pay as part of the Red for Ed movement, and Kentucky and Puerto Rico have recently seen strikes or protests against potential pension plan changes.

Data availability statement

The data used in this article can be obtained online from the RAND American Educator Panel Data Portal (<https://www.rand.org/education-and-labor/projects/aep/data-portal.html>).

CRedit authorship contribution statement

Dillon Fuchsman: Conceptualization, Methodology, Software, Formal analysis, Investigation, Data curation, Writing – review & editing, Visualization, Funding acquisition. **Josh B. McGee:** Conceptualization, Methodology, Software, Formal analysis, Investigation, Data curation, Writing – review & editing, Visualization, Funding acquisition. **Gema Zamarro:** Conceptualization, Methodology, Software, Formal analysis, Investigation, Data curation, Writing – review & editing, Visualization, Funding acquisition.

Disclosure statement

The survey used as the basis for this study was approved by the University of Arkansas IRB. The Walton Family Foundation and the Equable Institute provided financial support for the project. Josh McGee is a member of the Equable Institute board of directors. Dillon Fuchsman and Gema Zamarro have nothing to disclose.

Acknowledgments

We thank Heidi Erickson for her help on earlier versions of this work. We thank Robert Costrell, Andrew Camp, and participants at the 45th Annual AEFPP Conference, the 2020 APPAM Annual Conference, the 91st Annual SEA Meeting, the SCAER Research Workshop, and EDRE Brownbag Series for their comments.

Appendix A. Hypothetical job comparison construction

We use a four-step procedure to construct the hypothetical job offers presented to respondents by randomizing salary offers and one non-salary job conditions. We start by randomly generating two salary perturbations from a normal distribution with mean 1 and standard deviation 0.05. These perturbations are multiplied by the respondents' reported salaries to create the salary offers in our hypothetical job scenarios. Next, we randomly choose one of the seven possible non-salary job conditions where each job condition has the same likelihood of being selected. Then, we randomly pick one value corresponding with the selected job condition to vary from the job condition's baseline value. We then randomly pick whether the baseline job is offered as Job A or Job B and assign the relevant job condition values and salary perturbations. In the final step, salaries are assigned to teachers to prevent strictly dominating job offers. We assume that teachers would always select a job that corresponds with a higher salary and a larger replacement rate, earlier retirement, higher salary growth, smaller class sizes, or additional health insurance. For example, we would always expect respondents to choose the job that offers 8% annual salary growth and a \$50,000 salary instead of the job that offers 5% annual salary growth and a \$49,000 salary. Switching the salary offer forces a meaningful comparison about a respondent's willingness to pay for the extra 3 percentage points of salary growth. We have no prior expectation for one value for retirement plan type or for Social Security eligibility to strictly dominate in the same way that our other job condition values dominate.

Next, we create a table for the job offers and place the salaries in the corresponding job columns. Next, we fill in the baseline job offer column with the set of unvaried baseline job conditions. The randomly selected

job condition is filled in next with the randomly chosen condition value. The rows corresponding with the randomly selected job condition and salaries are shaded to increase visibility to respondents about how the job offers are different. Key differing text in the randomly selected job condition and the salary are bolded. The rest of the table is filled in with the baseline job offer. Fig. 1 is an example of two job offers where both jobs are exactly the same other than the retirement ages and salaries.

When teachers in the sample do not provide their salary information, we use their state average teacher salary rounded to the nearest \$10,000. State average teacher salaries are also used when respondents' reported salaries are under \$10,000. If respondents do not indicate which state they teach in, we use the national average teacher salary instead.

If class size is the job condition randomly selected, we either add or subtract 3 students from the state average school-level class size rounded to the nearest integer. We consider elementary teachers to be those who teach grades K-6 and secondary teachers to be those who teach grades 7–12. Again, the national average school-level class size is imputed if respondents do not indicate which state they teach in. Respondents leaving our question for the grades they teach blank or who indicate they teach elementary and secondary grades are assigned the average values corresponding to secondary schools. We obtain average teacher salaries and average class sizes information from the Digest of Education Statistics (Snyder et al., 2019).⁴³

Appendix B. Willingness-to-pay heterogeneity by state retirement plans

Table B1

Appendix Table B.1

Willingness-to-pay for different retirement plan types by state-offered retirement plan types.

	DC rather than FAS		CB rather than FAS	
	WTP	Alt. Plan – FAS Only	WTP	Alt. Plan – FAS Only
	(1)	(2)	(3)	(4)
<i>Panel A: FAS Only and Any Alternative Grouping</i>				
FAS Only	-0.028*** (0.006)		-0.020*** (0.006)	
Any Alternative Plan	-0.018* (0.009)	0.010 (0.011)	-0.016* (0.009)	0.004 (0.011)
<i>Panel B: FAS Only, FAS & Alternative, & Only Alternative Grouping</i>				
FAS Only	-0.027*** (0.006)		-0.020*** (0.006)	
FAS & Alternative Plan	-0.013 (0.010)	0.015 (0.012)	-0.009 (0.010)	0.011 (0.012)
Only Alternative Plan	-0.036* (0.021)	-0.009 (0.022)	-0.040* (0.022)	-0.020 (0.023)

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions. *N Teachers* = 4,817; *N Job Offers* = 38,531. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** *p* < 0.01, ** *p* < 0.05, * *p* < 0.1.

⁴³ State average class sizes for the District of Columbia, Florida, Hawaii, Maryland, and Rhode Island are not reported due to a failure of reporting standards to be met. See Table 209.30 of the Digest of Education Statistics for additional information (Snyder et al., 2019).

Appendix C. Willingness-to-pay heterogeneity by age and total experience

Table C1, Table C2

Appendix Table C.1

Willingness-to-pay for different retirement plan types mediated by age.

<i>Panel A: Willingness-to-Pay Estimates</i>			
	Young (1)	Mid-Age (2)	Oldest (3)
DC rather than FAS	-0.007 (0.009)	-0.029*** (0.006)	-0.035*** (0.010)
CB rather than FAS	-0.001 (0.010)	-0.014** (0.006)	-0.050*** (0.011)
Age Range	Age ≤ 34	34 < Age < 51	Age ≥ 51
<i>Panel B: Differences in WTP Estimates</i>			
	Mid – Young (4)	Old – Young (5)	Old – Mid (6)
DC rather than FAS	-0.023** (0.011)	-0.029** (0.013)	-0.006 (0.012)
CB rather than FAS	-0.013 (0.011)	-0.049*** (0.014)	-0.036*** (0.012)

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions and state and question fixed effects. *N Teachers* = 4817; *N Job Offers* = 38,531. Age range determined using age quartiles: young respondents are in the first experience quartile, mid-age respondents are in the second or third experience quartiles, oldest respondents are in the fourth experience quartile. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** *p* < 0.01, ** *p* < 0.05, * *p* < 0.1.

Appendix Table C.2

Willingness-to-pay for different retirement plan types mediated by total experience.

<i>Panel A: Willingness-to-Pay Estimates</i>			
	Early-Career (1)	Mid-Career (2)	Late-Career (3)
DC rather than FAS	-0.011 (0.010)	-0.021*** (0.006)	-0.049*** (0.011)
CB rather than FAS	0.011 (0.010)	-0.018*** (0.006)	-0.050*** (0.011)
Experience Range	Exp ≤ 7	7 < Exp < 21	Exp ≥ 21
<i>Panel B: Differences in WTP Estimates</i>			
	Mid – Early (4)	Late – Early (5)	Late – Mid (6)
DC rather than FAS	-0.010 (0.012)	-0.038*** (0.014)	-0.028** (0.012)
CB rather than FAS	-0.029** (0.011)	-0.060*** (0.015)	-0.031** (0.013)

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions and state and question fixed effects. *N Teachers* = 4817; *N Job Offers* = 38,531. Age range determined using age quartiles: young respondents are in the first experience quartile, mid-age respondents are in the second or third experience quartiles, oldest respondents are in the fourth experience quartile. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** *p* < 0.01, ** *p* < 0.05, * *p* < 0.1.

Appendix D. Willingness-to-pay heterogeneity by retirement planning

Table D1,

Appendix Table D.1

Willingness-to-pay for different retirement plans by ever having developed a retirement plan.

	No Planning (1)	Planning (2)	Difference (3)
DC rather than FAS	-0.024*** (0.007)	-0.026*** (0.007)	-0.001 (0.009)
CB rather than FAS	-0.006 (0.007)	-0.031*** (0.007)	-0.025*** (0.009)

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions. *N Teachers* = 4817; *N Job Offers* = 38,531. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** *p* < 0.01, ** *p* < 0.05, * *p* < 0.1.

Appendix E. Willingness-to-pay heterogeneity by social security enrollment

Table E1

Appendix Table E.1

Willingness-to-pay for different retirement plans and social security by social security enrollment.

<i>Panel A: Willingness-to-Pay Estimates</i>			
	Participates (1)	Does Not Participate (2)	Varies (3)
DC rather than FAS	-0.029*** (0.006)	-0.016** (0.008)	0.013 (0.044)
CB rather than FAS	-0.019*** (0.006)	-0.020** (0.008)	0.043 (0.050)
Social Security	-0.137*** (0.006)	-0.054*** (0.006)	-0.112*** (0.043)
<i>Panel B: Differences in WTP Estimates</i>			
	Participates – Does Not (4)	Participates – Varies (5)	Does Not – Varies (6)
DC rather than FAS	-0.013 (0.010)	-0.042 (0.045)	-0.029 (0.045)
CB rather than FAS	0.001 (0.010)	-0.062 (0.050)	-0.063 (0.050)
Social Security	-0.083*** (0.008)	-0.025 (0.044)	0.058 (0.044)

Notes: Willingness-to-pay estimates from Eq. (4) based on results from logistic regression of the model in Eq. (2). Models include all job conditions. *N Teachers* = 4817; *N Job Offers* = 38,531. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** *p* < 0.01, ** *p* < 0.05, * *p* < 0.1.

Appendix F. Willingness-to-pay differences by self-reported 5-year exit probability

Table F1

Appendix Table. F.1

Differences in willingness-to-pay estimates for different retirement plan types mediated by self-reported 5-year exit probability.

	0 < P(Exit) < 0.5 (1)	P(Exit) = 0.5 (2)	0.5 < P(Exit) < 1 (3)	P(Exit) = 1 (4)
Panel A: DC Rather than FAS				
P(Exit) = 0	-0.013 (0.012)			
0 < P(Exit) < 0.5	-0.043*** (0.016)	-0.030* (0.017)		
P(Exit) = 0.5	-0.015 (0.017)	-0.002 (0.019)	0.028 (0.022)	
0.5 < P(Exit) < 1	-0.013 (0.017)	0.001 (0.019)	0.030 (0.021)	0.002 (0.022)
Panel B: CB Rather than FAS				
P(Exit) = 0	-0.007 (0.012)			
0 < P(Exit) < 0.5	-0.032** (0.015)	-0.025 (0.017)		
P(Exit) = 0.5	-0.002 (0.018)	0.005 (0.020)	0.030 (0.022)	
0.5 < P(Exit) < 1	-0.003 (0.018)	0.005 (0.020)	0.029 (0.022)	-0.001 (0.024)

Notes: Differences based on willingness-to-pay estimates in Table 8. *N Teachers* = 4817; *N Job Offers* = 38,531. Each cell row's corresponding WTP estimate from Table 8 minus the column's corresponding WTP estimate from Table 8. Probability weights included. Standard errors calculated using delta method with clustering by sampling state in parenthesis; *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

References

Aldeman, C. (2016). *The pension pac-man: How pension debt eats away at teacher salaries*. Bellwether Education Partners [Policy Report] https://bellwethereducation.org/sites/default/files/Teacher%20Pension%20Pac-Man_Web.pdf.

Aldeman, C., & Johnson, R. W. (2015). *Negative returns: How state pensions shortchange teachers*. Bellwether Education Partners and Urban Institute [Policy Report] http://www.teacherpensions.org/sites/default/files/TeacherPensions_Negative%20Returns_Final.pdf.

Aldeman, C., & Rotherham, A. J. (2014). *Friends without benefits: How states systematically shortchange teachers' retirement and threaten their retirement security*. Bellwether Education Partners. https://bellwethereducation.org/sites/default/files/BW_PensionPaper_031314.pdf.

Anzia, S. F. (2020). Pension in the trenches: How pension spending is affecting U.S. local government. *Urban Affairs Review*. <https://doi.org/10.1177/1078087420964863>, 1078087420964863.

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. <https://doi.org/10.3102/0013189X16666812>

Bajtselmit, V. L., VanDerhei, J. L., Gordon, M. S., Mitchell, O. S., & Twinney, M. M. (1997). Risk aversion and pension investment choices. *Positioning pensions for the twenty-first century* (pp. 45–66). University of Pennsylvania Press.

Banks, J., & Oldfield, Z. (2007). Understanding pensions: Cognitive function, numerical ability and retirement saving*. *Fiscal Studies*, 28(2), 143–170. <https://doi.org/10.1111/j.1475-5890.2007.00052.x>

Biasi, B. (2019). *Higher salaries or higher pensions? Inferring preferences from teachers' retirement behavior*. <https://doi.org/10.2139/ssrn.3058384> [Working Paper].

Biggs, A., Boyd, D., McGee, J. B., & Monahan, A. B. (2022). *Addressing and avoiding severe fiscal stress in public pension plans (program on retirement policy)*. Urban Institute [Research Report] <https://www.urban.org/research/publication/addressing-and-avoiding-severe-fiscal-stress-public-pension-plans>.

Boivie, I. (2011). *The three Rs of teacher pension plans: Recruitment, retention, and retirement*. National Institute on Retirement Security [Issue Brief] <https://www.nirsonline.org/reports/the-three-rs-of-teacher-pension-plans-recruitment-retention-and-retirement/>.

Boivie, I. (2017). *Revisiting the three Rs of teacher retirement: Recruitment, retention and retirement*. National Institute on Retirement Security [Issue Brief] <https://www.nirsonline.org/reports/revisiting-the-three-rs-of-teacher-retirement-systems-recruitment-retention-and-retirement/>.

Bond, T. (2017). *Why pensions matter: The history of defined benefit pension plans in the United States of America*. National Public Pension Coalition. <https://protectpensions.org/wp-content/uploads/2017/03/NPPC-Why-Pensions-Matter-FINAL.pdf>.

Brown, J. R., Kapteyn, A., Luttmer, E. F. P., & Mitchell, O. S. (2017). Cognitive constraints on valuing annuities. *Journal of the European Economic Association*, 15(2), 429–462. <https://doi.org/10.1093/jeea/jvw009>

Brown, J. R., Kapteyn, A., Luttmer, E. F. P., Mitchell, O. S., & Samek, A. (2021). Behavioral impediments to valuing annuities: Complexity and choice bracketing. *The Review of Economics and Statistics*, 103(3), 533–546. https://doi.org/10.1162/rest_a_00892

Brown, J. R., & Weisbender, 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. <https://doi.org/10.1016/j.jpubeco.2013.05.004>

Brown, K. M. (2013). The link between pensions and retirement timing: Lessons from California teachers. *Journal of Public Economics*, 98, 1–14. <https://doi.org/10.1016/j.jpubeco.2012.10.007>

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. <https://doi.org/10.1162/rest.90.2.253>

Cheng, A., & Zamarro, G. (2018). Measuring teacher non-cognitive skills and its impact on students: Insight from the measures of effective teaching longitudinal database. *Economics of Education Review*, 64, 251–260. <https://doi.org/10.1016/j.econedurev.2018.03.001>

Chingos, M. M., & West, M. R. (2015). Which teachers choose a defined contribution pension plan? Evidence from the Florida retirement system. *Education Finance and Policy*, 10(2), 193–222. https://doi.org/10.1162/EDFP_a_00158

Costrell, R. M. (2019). Reforming teacher pension plans: The case of Kansas, the 1st teacher cash balance plan. *Ed WorkingPapers.com* (EdWorkingPaper No. 19–92). Annenberg Institute at Brown University. <https://www.edworkingpapers.com/ai19-92>.

Costrell, R.M. (2022a). Employer contributions per pupil for retirement benefits: U.S. public elementary and secondary schools, teachers & other employees, 2004–2022. https://edre.uark.edu/_resources/pdf/costrellemployercontributionsperpupil.pdf.

Costrell, R. M. (2022b). Reforming teacher pension plans: The case of Kansas, the first teacher cash balance plan. *Education Finance and Policy*, 1–25. https://doi.org/10.1162/edfp_a_00354

Costrell, R. M., & McGee, J. B. (2010). Teacher pension incentives, retirement behavior, and potential for reform in Arkansas. *Education Finance and Policy*, 5(4), 492–518. https://doi.org/10.1162/EDFP_a_00013

Costrell, R. M., & Podgursky, M. (2009). Peaks, cliffs, and valleys: The peculiar incentives in teacher retirement systems and their consequences for school staffing. *Education Finance and Policy*, 4(2), 175–211. <https://doi.org/10.1162/edfp.2009.4.2.175>

Cummings, R. G., & Taylor, L. O. (1999). Unbiased value estimates for environmental goods: A cheap talk design for the contingent valuation method. *American Economic Review*, 89(3), 649–665. <https://doi.org/10.1257/aer.89.3.649>

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. https://doi.org/10.1162/EDFP_a_00010

Elliott, K. R., & Moore, J. (2000). Cash balance pension plans: The new wave. *Compensation and Working Conditions*, 5(2), 3–12.

Fitzpatrick, M. D. (2015). How much are public school teachers willing to pay for their retirement benefits? *American Economic Journal: Economic Policy*, 7(4), 165–188. <https://doi.org/10.1257/pol.20140087>

Frederick, S. (2005). Cognitive reflection and decision making. *Journal of Economic Perspectives*, 19(4), 25–42. <https://doi.org/10.1257/089533005775196732>

Friedberg, L., & Webb, A. (2005). Retirement and the evolution of pension structure. *Journal of Human Resources*, XL(2), 281–308. <https://doi.org/10.3368/jhr.XL.2.281>

Fuchsman, D., McGee, J. B., & Zamarro, G. (2021). Teachers' knowledge about and preparedness for retirement: results from a nationally representative teacher survey. In *Ed WorkingPapers.com* (EdWorkingPaper No. 21–489). Annenberg Institute at Brown University <https://www.edworkingpapers.com/ai21-489>.

Goldhaber, D., Gross, B., & Player, D. (2011). Teacher career paths, teacher quality, and persistence in the classroom: Are public schools keeping their best? *Journal of Policy Analysis and Management*, 30(1), 57–87. <https://doi.org/10.1002/pam.20549>

Goldhaber, D., & Grout, C. (2016). Which plan to choose? The determinants of pension system choice for public school teachers*. *Journal of Pension Economics & Finance*, 15(1), 30–54. <https://doi.org/10.1017/S1474747214000353>

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. <https://doi.org/10.1177/0019793916678424>

Goldhaber, D., & Holden, K. (2020). How much do teachers value deferred compensation? Evidence from defined contribution rate choices (CALDER Working Paper No. 242–0920). <https://caldercenter.org/sites/default/files/WP%20242-0920%20FINAL.pdf>.

Gustman, A. L., & Steinmeier, T. L. (1999). *What people don't know about their pensions and social security: an analysis using linked data from the health and retirement study*. National Bureau of Economic Research. <https://doi.org/10.3386/w7368> (Working Paper No. 7368; Working Paper Series).

Hainmueller, J., Hangartner, D., & Yamamoto, T. (2015). Validating vignette and conjoint survey experiments against real-world behavior. *Proceedings of the National Academy of Sciences*, 112(8), 2395–2400. <https://doi.org/10.1073/pnas.1416587112>

Hanushek, E. A., Piopiunik, M., & Wiederhold, S. (2018). The value of smarter teachers: International evidence on teacher cognitive skills and student performance. *Journal of Human Resources*, 0317–8619R1. <https://doi.org/10.3368/jhr.55.1.0317.8619R1>

Horneff, W. J., Maurer, R., Mitchell, O. S., & Dus, I. (2006). Optimizing the retirement portfolio: Asset allocation, annuitization, and risk aversion (No. w12392). *National Bureau of Economic Research*. <https://doi.org/10.3386/w12392>

Hornig, E. L. (2009). Teacher tradeoffs: Disentangling teachers' preferences for working conditions and student demographics. *American Educational Research Journal*. <https://doi.org/10.3102/0002831208329599>

- Hussar, B., Zhang, J., Hein, S., Wang, K., Roberts, A., Cui, J., Smith, M., Mann, F. B., Barmer, A., & Dilig, R. (2020). *The condition of education 2020. (NCES 2020-144)*. National Center for Education Statistics, Institute for Education Sciences, U.S. Department of Education.. <https://nces.ed.gov/pubsearch/pubinfo.asp?pubid=2020144>
- John, O.P., Donahue, E.M., & Kentle, R.L. (1991). The big five inventory—Versions 4a and 54.
- John, O. P., Naumann, L. P., & Soto, C. J. (2008). Paradigm shift to the integrative big five trait taxonomy. *Handbook of Personality: Theory and Research*, 3(2), 114–158.
- John, O. P., & Srivastava, S. (1999). The big five trait taxonomy: History, measurement, and theoretical perspectives. *Handbook of Personality: Theory and Research*, 2(1999), 102–138.
- Johnson, S. M., Kraft, M. A., & Papay, J. P. (2012). How context matters in high-need schools: The effects of teachers' working conditions on their professional satisfaction and their students' achievement. *Teachers College Record*, 114(10), 1–39.
- Johnston, A. C. (2021). Teacher preferences, working conditions, and compensation structure. *EdWorkingPapers.com (EdWorkingPaper No. 20–202)*. Annenberg Institute at Brown University. <https://doi.org/10.26300/hr7y-1137>
- Johnston, W.R., Hamilton, L.S., Grant, D., Setodji, C.M., Doss, C.J., & Young, C.J. (2019). Learn together surveys: 2019 technical documentation and survey results. https://www.rand.org/pubs/research_reports/RR4332.html.
- Kan, L., & Aldeman, C. (2014). *Uncovered: Social security, retirement insecurity, and 1 million teachers*. Bellwether Education Partners [Policy Report].
- Kim, D. (2020). Worker retirement responses to pension incentives: Do they respond to pension wealth? *Journal of Economic Behavior & Organization*, 173, 365–385. <https://doi.org/10.1016/j.jebo.2019.10.016>
- Kim, D., Koedel, C., & Xiang, P. B. (2020). The trade-off between pension costs and salary expenditures in the public sector. *Journal of Pension Economics & Finance*, 1–18. <https://doi.org/10.1017/S1474747219000362>
- Kim, L. E., Jörg, V., & Klassen, R. M. (2019). A meta-analysis of the effects of teacher personality on teacher effectiveness and burnout. *Educational Psychology Review*, 31(1), 163–195. <https://doi.org/10.1007/s10648-018-9458-2>
- Kimball, M. S., Sahn, C. R., & Shapiro, M. D. (2008). Imputing risk tolerance from survey responses. *Journal of the American Statistical Association*, 103(483), 1028–1038. JSTOR.
- Ladd, H. F. (2011). Teachers' perceptions of their working conditions: How predictive of planned and actual teacher movement? *Educational Evaluation and Policy Analysis*, 33(2), 235–261. <https://doi.org/10.3102/0162373711398128>
- Letkiewicz, J. C., & Fox, J. J. (2014). Conscientiousness, financial literacy, and asset accumulation of young adults. *Journal of Consumer Affairs*, 48(2), 274–300. <https://doi.org/10.1111/joca.12040>
- Lipkus, I. M., Samsa, G., & Rimer, B. K. (2001). General performance on a numeracy scale among highly educated samples. *Medical Decision Making*, 21(1), 37–44.
- List, J. A., & Gallet, C. A. (2001). What experimental protocol influence disparities between actual and hypothetical stated values? *Environmental and Resource Economics*, 20(3), 241–254. <https://doi.org/10.1023/A:1012791822804>
- Lusardi, A., & Mitchell, O. S. (2007). *Financial literacy and retirement planning: New evidence from the Rand American life panel*. Center for Financial Studies (CFS) (CFS Working Paper Series No. 2007/33) <https://econpapers.repec.org/paper/zbwcfswop/200733.htm>.
- Lusardi, A., & Mitchell, O. S. (2011). Financial literacy around the world: An overview. *Journal of Pension Economics & Finance*, 10(4), 497–508. <https://doi.org/10.1017/S1474747211000448>
- Maestas, N., Mullen, K. J., Powell, D., von Wachter, T., & Wenger, J. B. (2018). *The value of working conditions in the United States and implications for the structure of wages*. National Bureau of Economic Research. <https://doi.org/10.3386/w25204> (Working Paper No. 25204).
- Mas, A., & Pallais, A. (2017). Valuing alternative work arrangements. *American Economic Review*, 107(12), 3722–3759. <https://doi.org/10.1257/aer.20161500>
- McGee, J. B. (2016). *Feeling the squeeze: Pension costs are crowding out education spending (No. 22)*. Manhattan Institute. <https://www.manhattan-institute.org/html/feeling-squeeze-pension-costs-are-crowding-out-education-spending-9368.html>.
- McGee, J. B. (2019). *How to avert a public-pension crisis (No. 40)*. National Affairs. <https://www.nationalaffairs.com/publications/detail/how-to-avert-a-public-pension-crisis>.
- McGee, J. B., & Winters, M. A. (2017). How pensions contribute to the premium paid to experienced public school teachers. *Educational Researcher*, 46(5), 250–258. <https://doi.org/10.3102/0013189X17721906>
- McGee, J. B., & Winters, M. A. (2019). Rethinking the structure of teacher retirement benefits: Analyzing the preferences of entering teachers. *Educational Evaluation and Policy Analysis*, 41(1), 63–78. <https://doi.org/10.3102/0162373718798488>
- Monahan, A. B. (2010). Public pension plan reform: The legal framework. *Education Finance and Policy*, 5(4), 617–646. https://doi.org/10.1162/EDFP_a_00014
- Murphy, J. J., Allen, P. G., Stevens, T. H., & Weatherhead, D. (2005). A meta-analysis of hypothetical bias in stated preference valuation. *Environmental and Resource Economics*, 30(3), 313–325. <https://doi.org/10.1007/s10640-004-3332-z>
- Nation, J. (2018). *Pension math: Public pension spending and service crowd out in California, 2003–2030*. Stanford Institute for Economic Policy Research (Working Paper No. 17–023) <https://siepr.stanford.edu/research/publications/pension-math-public-pension-spending-and-service-crowd-out-california-2003>.
- Ni, S., Podgursky, M., & Wang, F. (2020a). How teachers value pension wealth: A reexamination of the Illinois experience. In *Working Papers (No. 2007; Working Papers)*. Department of Economics, University of Missouri <https://ideas.repec.org/p/umc/wpaper/2007.html>.
- Ni, S., Podgursky, M., & Wang, X. (2020b). Teacher pension plan incentives, retirement decisions, and workforce quality. *Journal of Human Resources*, 1218. <https://doi.org/10.3368/jhr.57.1.1218-9912R2>
- 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. <https://doi.org/10.1111/j.1540-6261.2011.01664.x>
- Prado Tuma, A., Doan, S., Lawrence, R.A., Henry, D., Kaufman, J.H., Setodji, C.M., Grant, D., & Young, C.J. (2020). American instructional resources survey: 2019 technical documentation and survey results. https://www.rand.org/pubs/research_reports/RR4402.html.
- Public Plans Data. (2020). Center for retirement research at Boston college, center for state and local government excellence, and national association of state retirement administrators. <https://crr.bc.edu/data/public-plans-database/>.
- Pew. *Public Pension Cash Balance Plans: A Primer* [Issue Brief]. <https://www.pewtrusts.org/en/research-and-analysis/issue-briefs/2014/02/12/public-pension-cash-balance-plans>.
- American Educator Panels, RAND (2020). *ATP, 2020 ATP Survey on Finances, Retirement, and Job Preferences, UAR0120T*. Santa Monica, CA: RAND Corporation.
- Rauh, J. D. (2017). *Hidden debt, hidden deficits: 2017 edition*. Hoover Institution. <https://www.hoover.org/research/hidden-debt-hidden-deficits-2017-edition>.
- Robbins, M.W., & Grant, D. (2020). RAND American educator panels technical description. https://www.rand.org/pubs/research_reports/RR3104.html.
- Robbins, M. W., Grimm, G., Stecher, B., & Opfer, V. D. (2018). *A comparison of strategies for recruiting teachers into survey panels*. SAGE Open. <https://doi.org/10.1177/2158244018796412>
- Snyder, T., D, de Brey, C., & Dillow, S. A. (2019). *Digest of education statistics 2017 (NCES 2018-070)*. National Center for Education Statistics, Institute for Education Sciences, U.S. Department of Education.
- Toplak, M. E., West, R. F., & Stanovich, K. E. (2014). Assessing miserly information processing: An expansion of the cognitive reflection test. *Thinking & Reasoning*, 20(2), 147–168. <https://doi.org/10.1080/13546783.2013.844729>
- U.S. Bureau of Labor Statistics. (2019). *National compensation survey: Employee benefits in the United States, March 2019*. U.S. Bureau of Labor Statistics.
- U.S. Bureau of Labor Statistics. (2020). *National compensation survey: Employee benefits in the United States, March 2020*. U.S. Bureau of Labor Statistics. <https://www.bls.gov/ncebs/benefits/2020/home.htm>.
- Viano, S., Pham, L., Henry, G. T., Kho, A., & Zimmer, R. (2019). Push or pull: School-level factors that influence teacher mobility in turnaround schools. In *EdWorkingPapers.com (EdWorkingPaper No. 19–146)*. Annenberg Institute at Brown University. <https://doi.org/10.26300/aknp-g506>.
- Weingarten, R. (2019a, February 27). AFT president randi weingarten on federal legislation to reduce class sizes [Press Release]. <https://www.aft.org/press-release/aft-president-randi-weingarten-federal-legislation-reduce-class-sizes>.
- Weingarten, R. (2019b, May 6). AFT's weingarten responds to betsy DeVos on teacher salaries [Press Release]. <https://www.aft.org/press-release/afts-weingarten-responds-betsy-devos-teacher-salaries>.
- Wiswall, M., & Zafar, B. (2018). Preference for the workplace, investment in human capital, and gender. *The Quarterly Journal of Economics*, 133(1), 457–507. <https://doi.org/10.1093/qje/qjx035>
- Wlömert, N., & Eggers, F. (2016). Predicting new service adoption with conjoint analysis: External validity of BDM-based incentive-aligned and dual-response choice designs. *Marketing Letters*, 27(1), 195–210. <https://doi.org/10.1007/s11002-014-9326-x>
- Zamarro, G. (2019). Alternative measures of non-cognitive skills and their effect on retirement preparation and financial capability. *Journal of Pension Economics & Finance*, 1–15. <https://doi.org/10.1017/S1474747219000664>