Recruitment, Retention, and Retirement Plan Structure: Evidence from Teachers

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Abstract

In 2006, the State of Alaska transitioned from a defined benefit retirement system to a defined contribution system for all newly hired public education employees—a majority of which are teachers. For employees, these plans accrue approximately similar wealth at retirement. Using administrative records, we examine whether the reform altered labor market outcomes for new cohorts. At the threshold of policy implementation, there is no significant change in new hires for both quantity and observable characteristics such as age or previous experience. Further, there is no significant difference in retention up to 14 years post-policy implementation.

Keywords: retirement plan structure, teacher retention, teacher recruitment

JEL: H75, J45, J32

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1 Introduction

Retirement benefits represent a large portion of public education employees' compensation in the United States. Traditionally, public education employees are enrolled in defined benefit retirement plans. However in recent decades, defined benefit plans have faced an increasing financial burden due to increased life expectancy and demographic changes. This has pushed states to consider transitioning, not only employees in public education, but more broadly the public workforce to a defined contribution retirement plan. From an employer's perspective, a defined contribution plan (such as a 401(k)) offers several financial advantages—particularly by shifting longevity risk to the employee and sheltering the employer from demographic changes. However, switching from a defined benefit plan to a defined contribution plan may lead to changes in recruitment or retention for the public workforce—especially occupations where retirement benefits represent a significant portion of compensation such as public education employees. To understand this, we exploit a natural experiment where the State of Alaska transitioned its public workforce from a defined benefit to a defined contribution retirement plan. We utilize this setting to estimate changes in labor outcomes such as retention and recruitment due to the retirement benefit structure.

In this paper, we study the transition from a defined benefit to a defined contribution retirement plan on the recruitment and retention of public education employees in the State of Alaska. Relative to a defined benefit retirement plan, we estimate relatively small differences in retirement wealth between the two plans—at most 14.17 percentage points after 20 years of service and 1.57 percentage points after 30 years of service. Given these small differences in pension wealth outcomes, we suggest this setting provides opportunity to empirically isolate movement in form of retirement plan structure (i.e., defined benefit versus defined contribution), rather than changes to retirement benefit generosity. Using a "regression discontinuity in time"-style model to compare cohorts at the threshold of policy implementation, we find little to no change for recruitment outcomes. At most, the average age of new hires decreased from 37.8 years to 36.2 years (4.3 percent decrease; $p = 0.06$), and that previous experience increased

from 0.89 years to 0.91 years (2 percent; $p = 0.88$). For employee retention, we estimate differences across retirement benefit structure by comparing cohorts at the threshold of policy implementation. We estimate the difference in retention for intervals 1, 6, 9 and 14 years post policy. Across robustness specifications, we find no statistically significant change—this suggests that retirement plan structure has little impact on retention of public education employees. Collectively, we do not find evidence that defined contribution plans decrease retention or decrease the hiring quality of employees, relative to defined benefit plans. These findings suggest that the form of retirement plan has little impact across recruitment and retention.

There is a large body of literature on the implications of retirement plan structure on workforce retention. As defined contribution plans have increased over the past few decades, there has been a decrease in job stability.[1] While this correlation is suggestive that retirement plan structure may be at play, researchers have found mixed results on the effect of defined contribution plans on labor mobility. Early work from Mitchell (1982) suggests that portability of fringe benefits may have important implications for labor mobility. However, Gustman and Steinmeier (1993) finds that while backloading of pensions discourages mobility, the compensation premium is of more importance. Recent empirical evidence has found mixed findings. Friedberg and Owyang (2004) finds that defined contribution plans are associated with two or three less years of service compared to a defined benefit plan. Further, Haverstick, Munnell, Sanzenbacher, and Soto (2010) estimates that employees between 5 and 10 years of tenure at a firm are 23 percent more likely to quit if they have a defined contribution plan compared to a defined benefit plan. Similarly, Quinby (2020) studies the effect of transitioning from a defined benefit to a defined contribution retirement plan for the State of Michigan public workforce. In this setting, Quinby (2020) finds there is a decrease in retention following the change. On the contrary, Goldhaber, Grout, and Holden (2017) shows that for Washington teachers transitioning from a defined benefit to a hybrid defined benefit-defined contribution plan reduces turnover. Further, Ni and Podgursky (2016) develops a structural model to estimate the im-

[1] Related to this, a body of research has studied the implications of pension portability and labor market efficiency. For a review of the literature, please see Dorsey (1995).

pact of transitioning from a defined benefit to a defined contribution plan. Ni and Podgursky (2016) finds there is better retention under the defined contribution plan. While some research suggests that defined contribution plans encourage mobility, other research suggests that they reduce turnover. We contribute to this literature by exploiting a natural experiment in Alaska. Leveraging the change in benefit structure, we estimate changes in retention of public education employees finding that there is little to no difference in retention up to 14 years into employment. This finding suggests that defined benefit plans may not have a pronounced "job lock" effect.

While there is a large body of literature on retirement plans and retention, the literature on recruitment is still emerging. Stated preference experiments have previously estimated the value of retirement plan structure for employed teachers (DeArmond and Goldhaber, 2010; Fuchsman, McGee, and Zamarro, 2023; Johnston, 2025). Johnston (2025) finds that teachers' willingness-to-pay for a defined contribution plan relative to a defined benefit plan is approximately 900 dollars in a large school district setting. Similarly, Fuchsman et al. (2023) using a national survey of teachers estimates that the willingness-to-pay for a defined contribution plan equates to a 2.5 percent pay increase. Further, Fuchsman et al. (2023) finds that this valuation changes with experience suggesting that retirement plan structure may induce hiring of different types of employees. More direct evidence on the effect of retirement plan structure on recruitment is sparse. Prior research has evaluated the effect of overall retirement benefit generosity on recruitment, finding mixed results (Cole and Taska, 2023; Krueger, 1988; Wilson, 2023). We contribute to this literature by providing novel evidence on the changes in recruitment outcomes after the implementation of a defined contribution plan. We find little to no change in number of hires ($p = 0.73$), mean age ($p = 0.06$) and mean experience ($p = 0.88$) of new hires. These findings suggest that changes to retirement benefit structure do not significantly change hiring outcomes for public education employees.

The paper is structured as follows. The second section outlines the relevant policy background. The third section provides a conceptual framework for the relevant mechanisms when considering retirement benefit structure. The fourth section describes the data used in the

paper. The fifth section details our empirical approach. The sixth section discusses results on pension benefits, recruitment, and retention. The seventh section concludes.

2 Background

Teachers' Retirement System Tier II

Alaska is one of few states to have fully transitioned their public workforce from a defined benefit (DB) to a defined contribution (DC) retirement system. Between July 1996 to July 2006, all employees hired by a Teachers' Retirement System (TRS) employer were enrolled into a DB plan. Teachers' Retirement System employers represent those in public education, such as full- or part-time teachers in public schools or the University of Alaska, school nurses, or positions requiring teaching certificates, which fall into the TRS program. Eligible employees receive an annuity according to the following benefit formula:

$$Annuity_{DB} = \begin{cases} \sum_{t=1}^{SY} 0.02 \times HTAS, & SY \leq 20 \\ \sum_{t=1}^{20} 0.02 \times HTAS + \sum_{t=21}^{SY} 0.025 \times HTAS, & SY > 20. \end{cases} \tag{1}$$

where the $HTAS$ is the average of a worker's highest three annual salaries (or the high-three average salary) and SY is service years. Further, the generosity multiplier is a multiplier for each service year worked. For service years 1 through 20, the multiplier is 2 percent and for service years above 20, the multiplier is 2.5 percent. To finance this, employees contribute 8.65 percent of their salary annually. For the first eight years, employees are not vested and so they are not eligible for these benefits. However, once a worker has surpassed eight years of service, they are vested and eligible for a normal retirement conditional on certain age requirements.[2] Outside of this, the defined benefit retirement system also provides health insurance which we

[2] Employees must be age 55 for normal retirements. However after 30 years of service, a worker can retire at any age.

provide further details in Appendix F.

Teachers' Retirement System Tier III

Due to an actuarial error, the State of Alaska made insufficient contributions to the retirement system, leading to an increase in unfunded liabilities.[3] Through legislation, the State of Alaska implemented TRS Tier III. After July 1, 2006, all newly hired TRS employees were enrolled into TRS Tier III, a defined contribution plan.[4] For TRS Tier III, employees and employers both contribute to a retirement account that accrues interest. For employees, they contribute eight percent of their salary while employers contribute seven percent. Employees become vested under the following schedule: 0 percent after one year; 25 percent after two years, 50 percent after three years, 75 percent after four years; and 100 percent after five years.

Employees in this system are also eligible for a health retirement account and access to AlaskaCare Retiree Health Plan. While there is change in the health insurance portion of the retirement benefits across plan type, we calculate a back-of-the-envelope total cost between the two types and find it is a small amount relative to the overall retirement account—approximately -3.6 to 1.6 percent compared to the total retirement benefit. For further discussion on these differences, please see Appendix F.

While we have highlighted the policy variation between the two retirement plan systems, we also note public education employees in Alaska do not contribute to Social Security.[5] Figure 1 Panel (i) shows average Social Security income as a percent of total retirement income for retired teachers by state, from 2001 to 2023.[6] On average, Social Security accounts for 35 percent of total retirement income for retired teachers in Alaska—the lowest among all states.[7]

[3] Please see Appendix E for a history of how the policy came about. For additional reference, please see: NYT Link.

[4] Unvested employees between July 1, 2005 and July 1, 2006 had the option to change their pension from a defined benefit plan to a defined contribution plan. We quantify that at most 10 individuals switched from various cohorts. The approximate size of the 2007 cohort of educational staff is 631, which means this represents at most 1.6 percent of a cohort. We provide further information in Appendix C.

[5] Most public employees in Alaska do not contribute to Social Security in Alaska, after public employees voted to leave Social Security in 1978.

[6] Data comes from the American Community Survey and includes individuals older than 64, outside of the labor force, and list teacher as their last occupation.

[7] Note that: Alaskan public teachers may have a portion of their retirement income from Social Security

This feature underscores the reliance of public education employees in Alaska on the Teachers' Retirement System for their retirement income, suggesting that the consequences of the transition from a DB plan to a DC plan are larger in this context than in other settings where employees rely more heavily on Social Security.

3 Conceptual Framework

To provide additional clarity on differences in retirement benefits between the plans, we provide an example of what an average worker starting at age 25 would accrue in retirement wealth in Figure 2. For additional explanation of the calculations please see Appendix A. We highlight the retirement wealth (as a fraction of salary) accrued at retirement, between the defined benefit and defined contribution plan in the dashed and solid lines respectively.

Compared to the defined benefit plan, the defined contribution plan has larger variance in retirement wealth. This is due to the fact that the defined contribution plan is dependent on a portfolio of investments, thus creating uncertainty for retirement planning. In Figure 1 Panel (iii) we provide each of the returns on the TRS portfolio over the past 25 years. We note that from 1999 to 2024, the average annual return was 6.96 percent. To provide a sense of the variability we use a bootstrap procedure (detailed in Appendix A) to generate a distribution of possible returns after 25 years. With this we shade the area between the 10th and 90th percentile in returns observed, which are 3.61 percent and 10.31 percent respectively. When compared to the defined benefit plan, the defined contribution plan has similar wealth outcomes at retirement. Relative to the defined benefit plan, after 20 years of service the defined contribution plan provides 14.17 percent lower benefits. However after 30 years the difference between the two is negligible, with approximately a 1.57 percent difference between the two plans. Given these differences, we briefly discuss a few mechanisms for why the form of retirement plan may be differentially preferred for employees:

due to prior jobs that pay into the system.

Portability

Defined contribution plans are more portable than defined benefit plans. This is due to the fact that defined contribution plans are invested into an account that, once a worker is vested, do not bear any negative impacts from moving across jobs. Defined benefit plans, however, are less portable. This is because the annuity is, in general, directly tied to a worker's experience and salary. Once a worker leaves a job with a defined benefit plan, the accrual of their pension stops. This means that defined benefit plans will lose value over time naturally due to inflation once a worker leaves their employer. In comparison, defined contribution plans continue to accrue interest after a worker transitions to a new job and so do not lose their value.

Frontloading versus Backloading

Defined contribution plans are frontloaded in their compensation while defined benefit plans are backloaded. For defined contribution plans, they are invested into an account and left to accrue interest. Investments that compound over the longest period yield the largest returns. This implies that employees with a defined contribution plan are frontloaded in their compensation since their earliest investments will accrue the largest growth. Defined benefit plans are generally a multiplier of salary, service years, and a generosity multiplier. As employees continue with their respective employer, they increase in both salary and service years. This creates a multiplicative effect on a worker's pension, where each additional year has larger gains relative to the previous year. Thus for workers with a defined benefit plan, their retirement benefits are backloaded where late years have the largest impact on their pension.

Risk Preferences

Last, defined contribution plans are riskier due to the reliance on market returns. The performance of the defined contribution plan is dependent on how a worker is invested into a portfolio of investments. Comparatively, defined benefit plans provide an annuity based on a formula meaning there is less variability in retirement income.

Collectively, these mechanisms above suggest that the intended effect of implementing a defined contribution plan on recruitment and retention is not clear. While risk averse employees may prefer a defined benefit plan, employees who prefer portability would gain from a defined contribution plan. We leverage a natural experiment for the State of Alaska workforce to identify changes in labor outcomes when implementing a defined contribution plan.

4 Data

We use annual administrative data from the Alaska Department of Education and Early Development (DEED), which records each teacher and their assignments annually. For each teacher, we observe attributes such as school assignment, teaching assignments, certifications, full-time equivalent, salary, experience, and demographic characteristics. From the administrative data, we subset to all employees eligible to participate in TRS and start between the 1999 and 2019. Further, we group public education employees into cohorts by their first school year and track their exits from the workforce. We define each school year as July of a given year to the proceeding June of the following year. This design allows us to identify which retirement plan a worker is assigned to due to the fact that staff starting after July 1, 2006 were automatically enrolled into the DC plan.[8] For outcomes of interest related to recruitment, we aggregate our observations to the first June following hire.

5 Methodology

In Figure 1 Panel (iii) we provide the counts of new hires by each school year. For those new hires, we are able to observe characteristics such as age, salary, and previous experience. To

[8] Further, 74 percent of public education employees show their hire date in August of their first school year which means that public education employees are not hired at the June threshold for when the policy changed the retirement plan. For 13 percent of public education employees, we do not observe a hire date, which aligns with changes in the reporting of accounting data. For these observations we impute the hire date. We rely on the hire date to identify the when teachers begin teaching, except for cases where information is inconsistent due to changes in administrative accounting. Appendix B offers a thorough explanation of cohorts and dealing with cases of missing hire date.

test for significant changes in recruitment and retention after the implementation of a defined contribution plan, we use a "regression discontinuity in time"-style model.[9] Our specification is as follows:

$$Y_t = \alpha + \beta_0 DC + \beta_1(X - c) + \beta_2(X - c) \times DC + \epsilon_t \tag{2}$$

In this model, Y_t is the outcome of interest, DC is an indicator if the cohort is enrolled in the DC retirement plan, $X - c$ represents a time trend where we standardize the time variable to the year of policy implementation, and ϵ_t is an unobserved error term. The coefficient β_0 identifies any structural break related to the DC retirement plan, β_1 identifies a time trend across cohorts, while β_2 captures potential long run adjustments to the time trend related to the DC retirement plan.

Given the prior discussion of the differences between plans, we hypothesize that the effect of changing from DB plans to DC plans is most evident at the threshold of the policy implementation. Our variable of interest is β_0 which identifies if there are differences in outcomes between the 2006 and 2007 cohorts, where there is a discontinuous change to retirement plan structure. We estimate discontinuities between the 2006 and 2007 cohorts at the following times into their employment: 1 year, 6 years, 9 years and 14 years. We look at one year into employment to see if there are immediate changes in retention within one year of being hired. We, then, look at six years into employment since at this time, employees who are in the defined contribution plan are fully vested while those in the defined benefit plan are unvested. Further, we look at nine years into employment since both defined contribution and defined benefit plans are vested. Last, we see if there are large differences after 14 years since this is the longest time elapse we can observe.

For robustness of our results, we also consider alternative bandwidth specifications to test for sensitivity of our results. We consider bandwidths of 3 years and 5 years. Our main specification

[9] For further reference please see Hausman and Rapson (2018) which provides additional information on these models.

is using the full sample (i.e., all cohorts from 2000 to 2019), however we accompany these results with the alternate specifications listed above.

6 Results

6.1 Recruitment

We test if the change in retirement plan led to significant changes in the average teacher hired in observable characteristics. In particular, we estimate if there are significant differences in the number of hires, average age, average experience and average salary. These can be found in Figure 3. In each panel we find minimal evidence of a discontinuous change in recruitment outcomes across the policy threshold. For Panel (i) we observe a general downward trend in the count of hires across cohorts. Panels (ii) to (iv) we see stable trends in average experience, age, and salary. We first find no evidence of a significant change in the number of hires across the threshold ($p = 0.73$). This can be found in Table 1 Panel A. We, then, test if there are differences in the average age of those hired. We find that the average age of those hired does not significantly differ across the policy implementation threshold (-1.61 years or -4.24 percent; $p = 0.06$). Similarly, we do not find significant changes for experience (0.02 years or 1.66 percent; $p = 0.88$) or salary at hire (-3,157 dollars or -4.9 percent; $p = 0.13$). Largely, these results suggest that at the onset of policy, there were little impacts to the qualifications of new hires.

Previous research has documented that an individual's stage in their career may be an important factor for preferences over retirement benefits (Fuchsman et al., 2023). In Figure 9, found in Appendix D, we investigate if there are differences in the policy on hiring by age quartiles. To examine this, we estimate the same regression discontinuity at the 25th and 75th percentile on age of those hired. We find no change for the 25th percentile of age ($p = 0.09$) and for the 75th percentile of age ($p = 0.68$). These can be found in Table 2 in the appendix. Collectively, we find little to no change on recruitment of new public education employees after

the implementation of a defined contribution plan.

For public employees in Alaska, the majority of their retirement income is employer-provided. This suggests that retirement benefits may be a more salient fringe benefit when employees are searching for jobs. With this context, we do not find significant differences of those who are hired across the threshold. This may be for several reasons, we discuss a few below. It could be that employees have lower preferences for retirement benefits relative to other forms of compensation. Previous literature has estimated this using stated preferences Fuchsman et al. (2023); Johnston (2025). It might also be that employees are not aware of the retirement benefit structure when being hired. Gustman, Steinmeier, and Tabatabai (2007) suggests that there is a significant portion of employees who are not aware of type of their own employer-provided retirement plan. In this setting, we are unable to empirically differentiate these possible mechanisms however the State of Alaska implemented a large scale survey asking employees to rank order preferences for various retention incentive options.[10] For those under the DC plan, they ranked salary increases as a more preferable solution to increase retention compared to changing the retirement system. This is consistent with employees having lower preferences for retirement benefits compared to salary increases. Thus while the implementation of a defined contribution plan is considered favorable from previous literature, the evidence presented here suggests that it does not significantly change recruitment outcomes for public education employees.

6.2 Retention

Given there is no significant change to recruitment outcomes—both in quantity and observable characteristics—we further investigate if this policy had differential implications on retention across retirement plans. To do so, we look at each cohort after 1, 6, 9, and 14 years into employment which can be found in Figure 4. For one year into employment, we find a small significant increase in retention for the defined contribution plan (5.29 percentage points or 6.57 percent; $p < 0.01$), however when considering the sensitivity of the result using various bandwidths, we find it is no longer significant for both the five-year band ($p = 0.47$) and

[10] Please see: TRS Survey Results link

for the three-year band ($p = 0.8$). We further look at if there are large retention differences after six years of employment. At six years, employees in the defined contribution plan are fully vested while those in the defined benefit are not. This suggests that employees in the defined contribution plan may be more mobile once they are vested. However looking across the threshold, we find that the difference is approximately 0.81 percentage points ($p = 0.57$), or 1.51 percent. After nine years of employment, both the defined benefit and defined contribution plans are fully vested. In Panel (iii), we estimate to see if there are changes in retention and find no evidence (-1.09 percentage points or -2.34 percent; $p = 0.55$). Last, in Panel (iv), we do not see any difference at 14 years into employment (-3.21 percent or -8.92 percent; $p = 0.44$).[11] Largely, we do not find differences in retention across the retirement plan structure.

To test for heterogeneity, Appendix D explores the potential implications on retention for additional subsets of public education employees, given preferences may differ across age, experience and assignment. We look at STEM teachers, which may have a different outside option compared to non-STEM teachers. For each time lag, we find minimal evidence retention differs across retirement plans for STEM teachers. This can be seen in Appendix Figure 8. Further, preferences for retirement plans may evolve with experience (Fuchsman et al., 2023). We look at retention for public education employees starting with zero previous relevant experience, and find minimal evidence retention differs across retirement plans for each time lag. This can be seen in Appendix Figure 7. Collectively, we do not find significant changes for retention when looking across heterogenous types of employees.

In this context—where employees are quite reliant on TRS for their retirement income—we find that defined benefit plans and defined contribution plans have similar rates of retention up to 14 years into employment. While we are cautious in our interpretation, the evidence suggests that defined benefit plans may not have a pronounced "job lock" effect. From a labor market aspect, this suggests that public agencies may not benefit from offering a defined benefit plan in terms of retention. Further this relates to a broad strand of literature which has studied labor market efficiency and "job lock" which argues that parts of compensation—such as health-

[11] Due to data limitations, we cannot estimate retention differences at further times.

care and retirement benefits—may create barriers to mobility for employees potentially leading to reduced aggregate productivity (Dorsey, 1995). In our context, we do not see retirement plan structure meaningfully distorting labor mobility suggesting there are little implications to aggregate productivity.

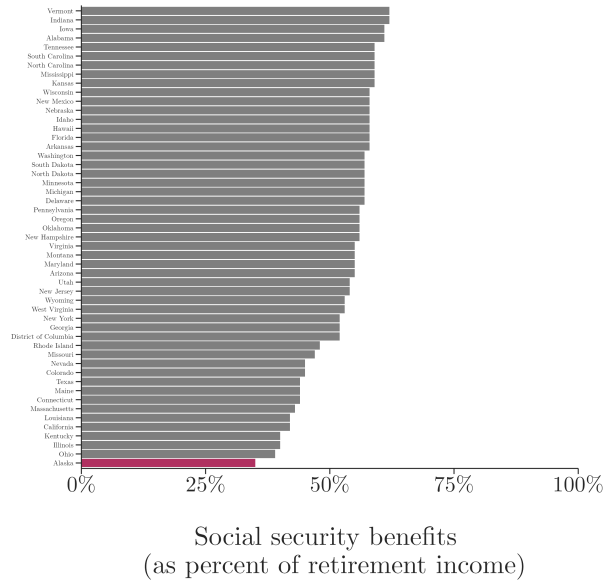
7 Conclusion

Several states are considering alternative retirement plans due to underfunding of their current retirement system. Understanding the implications of a new retirement benefit structure on worker retention and recruitment is crucial to weighing the costs and benefits of such a decision. In this paper, we leverage policy variation in retirement plan structure in the State of Alaska to estimate changes in the recruitment and retention of public education employees. We highlight there were small differences in the expected retirement wealth when comparing the plans. Given these small differences, we find little to no change in the characteristics of newly hired employees. Previous literature from Fuchsman et al. (2023) and Johnston (2025) suggests employed teachers place a relatively low value on the type of retirement plan, which is consistent with the results found in recruitment outcomes in this paper. Further for retention, we do not find significant differences across retirement plans for employees up to 14 years into employment. Altogether, these findings suggest that retirement benefit structure has limited impact on recruitment and retention.

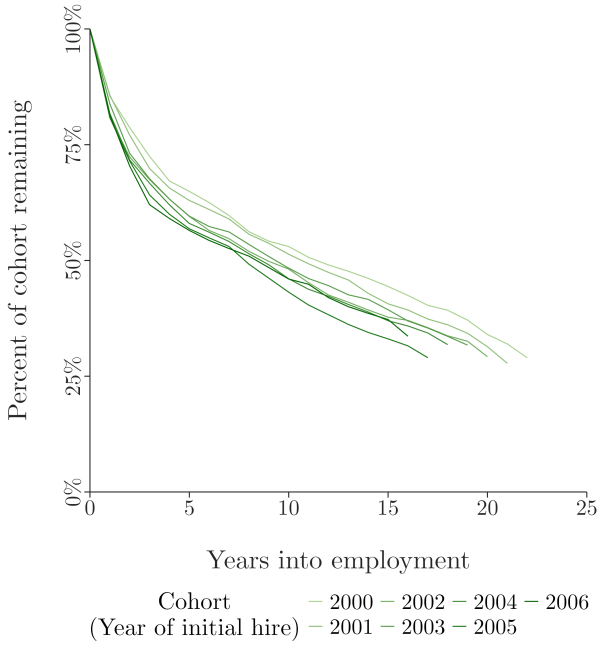
Figures

Figure 1: Descriptive statistics

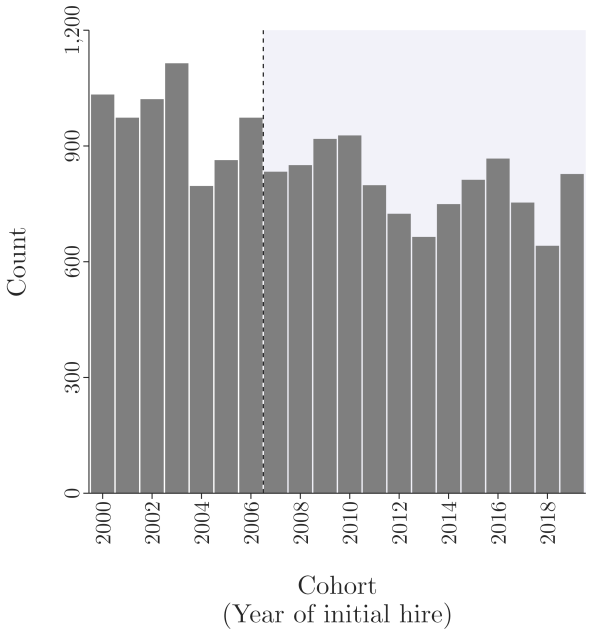
(i) Social security benefits for teachers



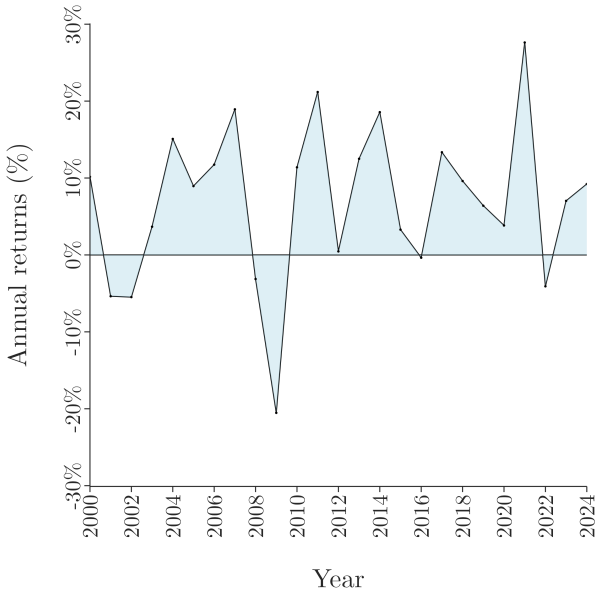
(ii) Survival rate of employees in TRS



(iii) Cohorts of new hires

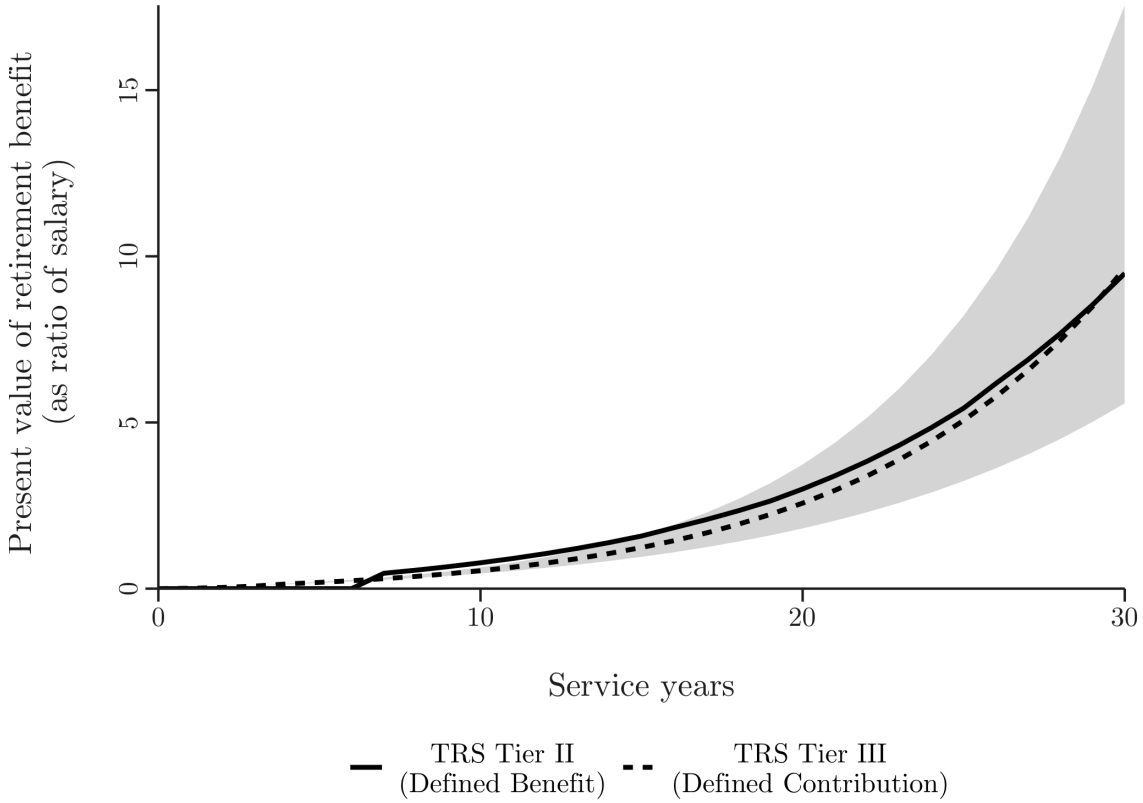


(iv) TRS annual portfolio returns



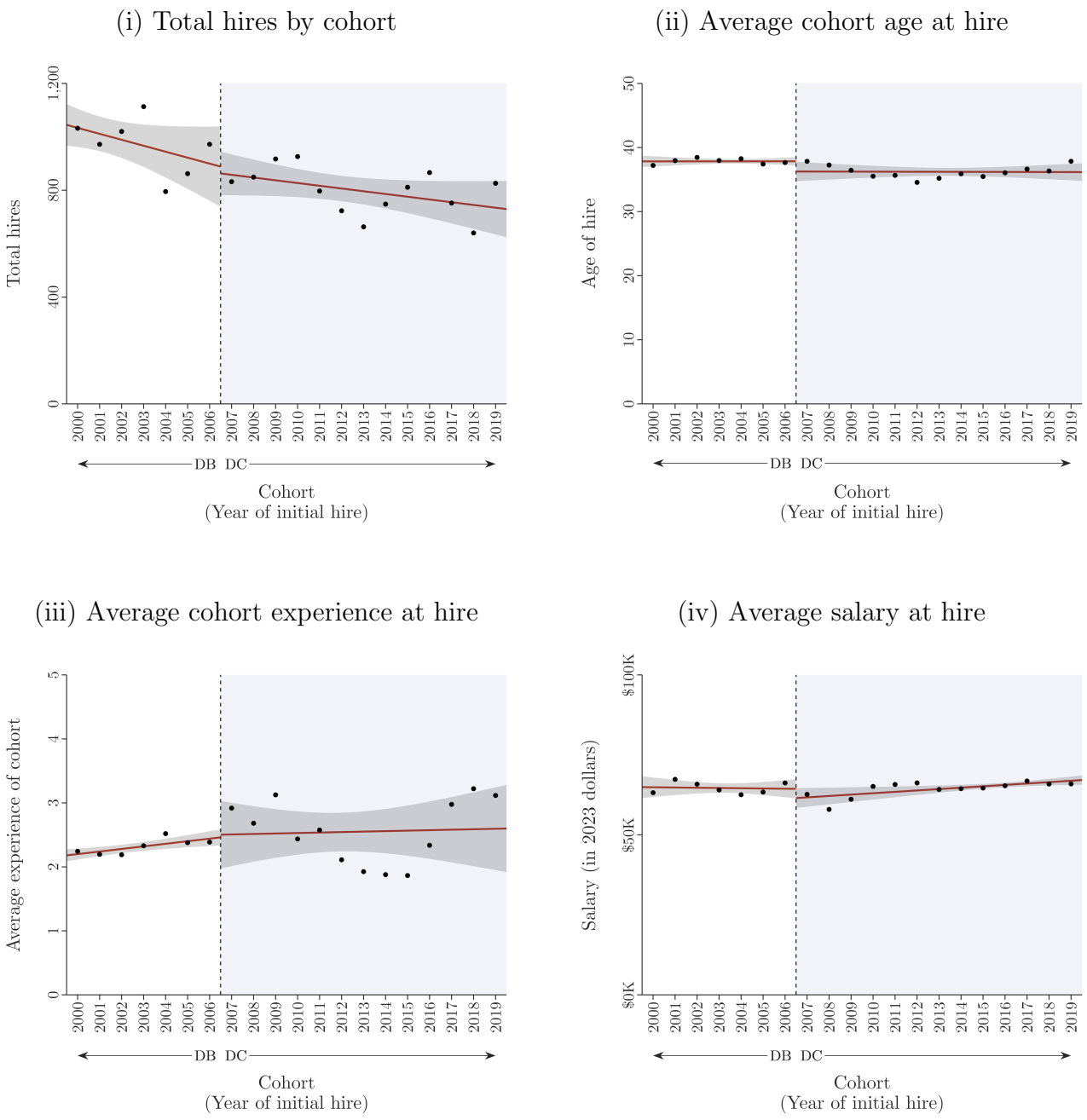
Notes: This figure provides descriptive statistics for TRS employees. Plot (i) graphs social security benefits as a percent of total retirement income for teachers by state. Alaska is highlighted in red, and shows the lowest social security benefits as a percent of total retirement income. Plot (ii) shows the retention rates for teacher cohorts on the DB plan, where the vertical axis represents the probability a teacher is still teaching and the horizontal axis shows years into employment. Plot (iii) displays cohort size for each teacher cohort from 2000 to 2019. The dashed vertical line identifies the policy switch from the DB to DC retirement plan. Public education employees hired before July 1, 2006 are enrolled in the DB plan while public education employees hired after are enrolled in the DC plan. Last, plot (iv) shows the annual returns of the TRS portfolio over time.

Figure 2: Retirement wealth accrued across benefit structure



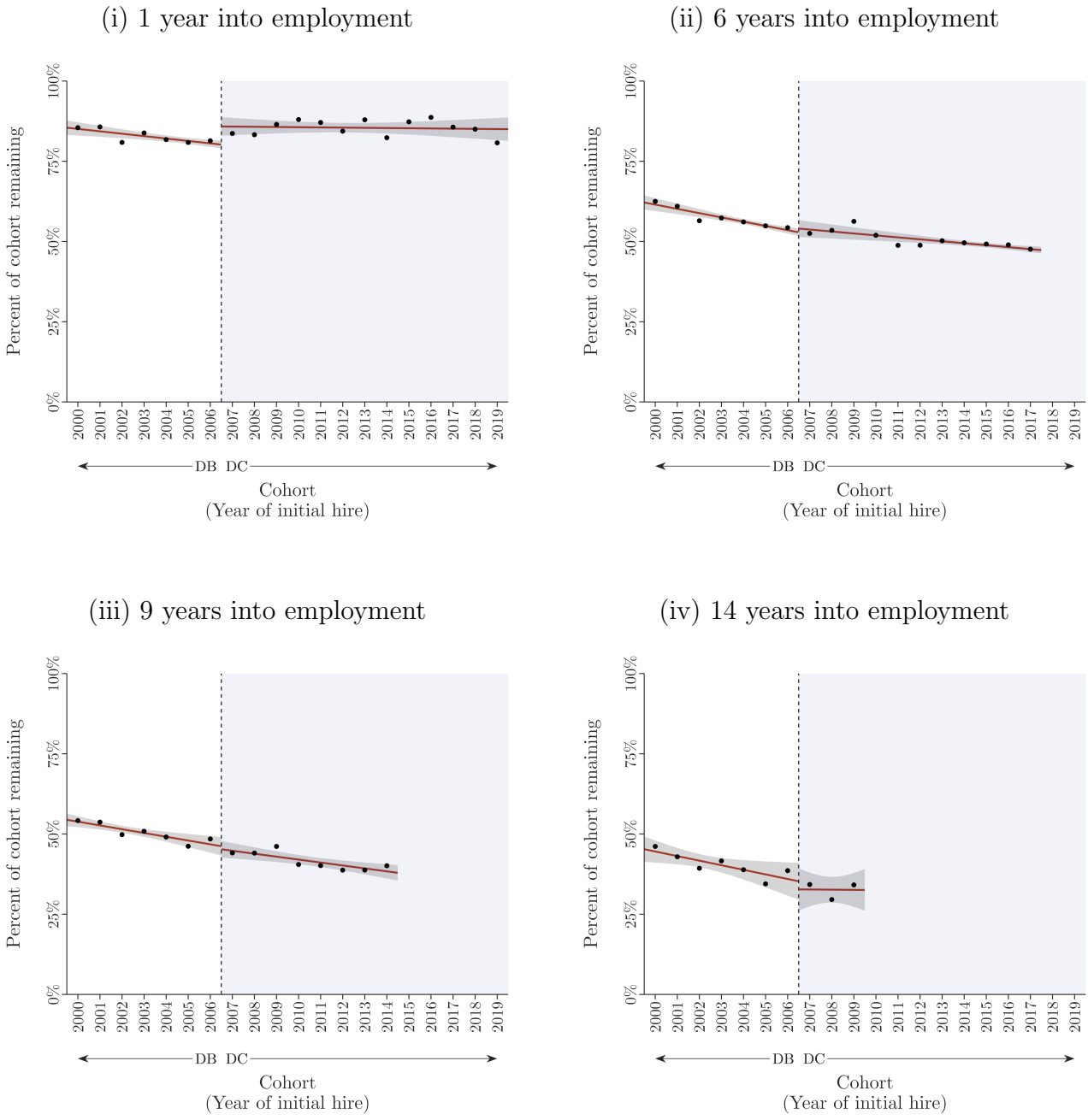
Notes: This figure illustrates a stylized worker's retirement wealth at different times in their career. The solid line represents if a worker were enrolled into TRS Tier II, a defined benefit plan, whereas the dashed line represents TRS Tier III, a defined contribution plan. For purposes, we consider the case where a teacher starts at age 25 and retires at age 55, estimating the present discounted value of retirement wealth as a fraction of their current salary. For details on the calculation of these variables please see Appendix A. For employees in the defined benefit plan, they are vested after eight years. Employees in the defined contribution plan become vested at the following schedule: 0 percent after one year; 25 percent after two years, 50 percent after three years, 75 percent after four years; and 100 percent after five years.

FIGURE 3: DID CHARACTERISTICS OF NEW HIRES DIFFER ACROSS RETIREMENT SYSTEMS?



Notes: This figure shows counts of public education employee hires, average age at hire, average experience at hire, and average salary at hire. Further, we plot the estimates from the regression discontinuity model at the policy threshold to identify if there are significant changes for number of total hires or quality of those hires. We provide these estimates in Table 1.

FIGURE 4: DOES COHORT RETENTION DIFFER ACROSS RETIREMENT SYSTEMS?



Notes: This figure shows the retention rate of each TRS cohort at intervals 1, 6, 9, and 14 years into employment. We aggregate each cohort to their respective start year and calculate the retention of public education employees after 1, 6, 9, and 14 years into employment. Further, we plot the estimates from the regression discontinuity model at the policy threshold to identify if there are significant changes for retention. We provide these estimates in Table 1.

TABLE 1: HOW DID LABOR OUTCOMES CHANGE AT THE POLICY THRESHOLD?

Panel A: Regression discontinuity model estimates on labor outcomes

Group:	I. Recruitment				II. Retention			
Dependent variable:	log(Hires)	log(Age)	log(Exp)	log(Salary)	Cohort retention (%)			
Years into employment:					1 Year	6 Years	9 Years	14 Years
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables								
Constant	6.8***	3.6***	0.89***	11.1***	0.81***	0.54***	0.47***	0.36***
	(0.07)	(0.007)	(0.02)	(0.02)	(0.005)	(0.005)	(0.01)	(0.02)
Year trend	-0.02*	6.9×10^{-5}	0.02***	-0.001	-0.007***	-0.01***	-0.01***	-0.01**
	(0.01)	(0.002)	(0.005)	(0.006)	(0.002)	(0.002)	(0.003)	(0.005)
1{DC}	-0.03	-0.04*	0.02	-0.05	0.05***	0.008	-0.01	-0.03
	(0.09)	(0.02)	(0.11)	(0.03)	(0.01)	(0.01)	(0.02)	(0.04)
Year trend × 1{DC}	0.01	-0.0003	-0.02	0.008	0.007**	0.007***	0.003	0.01
	(0.01)	(0.004)	(0.02)	(0.006)	(0.003)	(0.002)	(0.004)	(0.01)
Fit statistics								
Observations	20	20	20	20	20	18	15	10
R^2	0.54	0.48	0.07	0.38	0.36	0.90	0.92	0.82
Adjusted R^2	0.45	0.38	-0.11	0.26	0.25	0.87	0.90	0.73

Panel B: Bandwidth robustness of model estimates

Group:	I. Recruitment				II. Retention			
Dependent variable:	log(Hires)	log(Age)	log(Exp)	log(Salary)	Cohort retention (%)			
Years into employment:					1 Year	6 Years	9 Years	14 Years
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Full sample								
1{DC}	-0.03	-0.04*	0.02	-0.05	0.05***	0.008	-0.01	-0.03
	(0.09)	(0.02)	(0.11)	(0.03)	(0.01)	(0.01)	(0.02)	(0.04)
5yr Band								
1{DC}	-0.02	0.02**	0.21**	-0.10	0.009	0.008	-0.010	-0.04
	(0.11)	(0.008)	(0.06)	(0.06)	(0.01)	(0.02)	(0.02)	(0.04)
3yr Band								
1{DC}	-0.21**	0.03*	0.14	-0.06	0.005	-0.04**	-0.05	-0.04
	(0.03)	(0.009)	(0.11)	(0.06)	(0.02)	(0.009)	(0.02)	(0.05)

Notes: In this table each column reports the coefficients from an OLS regression with heteroskedastic-robust standard errors shown in parentheses. In Group I we show the results for the regression discontinuity models with recruitment outcomes—these are logged average age, logged average experience, logged salary, and logged cohort hires. For Group II we show results for retention rate at 1, 6, 9, and 14 years into employment. The variable of interest is $1\{DC\}$ which represents the discontinuous change in the outcome variable at the time of policy implementation. Panel B displays robustness checks to our variable of interest, $1\{DC\}$. For robustness, the distance from the policy threshold, or bandwidth, is adjusted. Estimates of $1\{DC\}$ are shown using the full sample and bandwidths for 5 and 3 years from the policy threshold.

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Appendix

A Calculation of Retirement Wealth

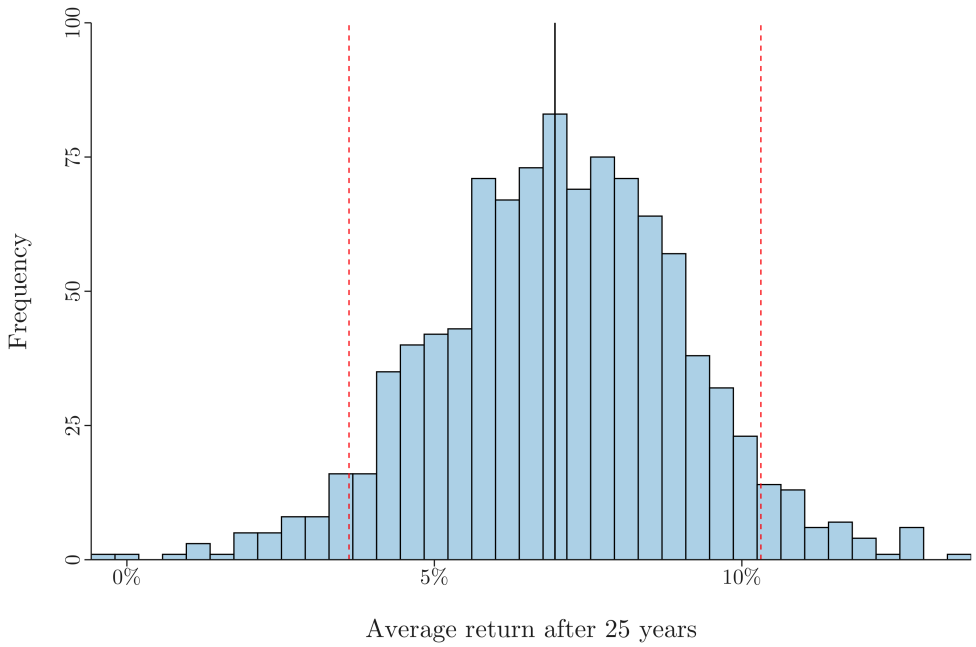
To calculate the present value of pension wealth at retirement age, consider a worker who receives a salary, S, with life expectancy T, SY service years, a starting age of a_0 and retirement age A. Further, r is a personal discount factor, R is the market return rate, and C_{DC} are the employee contributions to the DC account, and E_{DC} are the employer contributions to the DC account. Last, let a worker's salary increase over time so that $S_t = S_0 \times (1+g)^t$ where g is wage growth.

For estimation, we set T to match the CDC life expectancy tables which can be found in Arias, Xu, and Kochanek (2023). Further, we use age 55 as the retirement age since this is when an individual is first eligible to retire without a reduction in their benefits. For inflation, we use the Anchorage CPI and calculate an average annual rate of 2.38 percent from 1999 to 2020.[12] (Note: this is also the measure used for cost-of-living adjustments.) For g, we estimate a linear regression in starting wages across cohorts from 2000 to 2019 and find that wage increases are approximately 2.4 percent each year. To estimate possible market returns over a 25 year period, we bootstrap the annual returns observed in Figure 1 and take an average across 25 years. This preserves our observed average annual market return, R, which has been 6.96 percent from 2000 to 2024 however it allows us to plot a the distribution of possible average market returns. Below in Figure 5 is the histogram of the observed bootstrap distribution. For a low market return outcome, R_L, we use the 10th percentile which is 3.61 percent. For a high market return outcome, R_H we use the 90th percentile which is 10.31 percent. Last we let employees discount the future at the market return rate such that r is 6.96 percent, or that $1/(1+r)$ is 0.93.[13]

[12] This can be found at FRED: link

[13] This lies within previously documented values from Ericson and Laibson (2019) and Frederick, Loewenstein, and O'Donoghue (2002).

Figure 5: Histogram of bootstrapped average returns



Notes: This figure plots the histogram of bootstrapped average returns over a 25 year period. To do so, we sample with replacement from observed returns for the TRS annual returns from 2000 to 2024. Further, we take an average over 25 of these sampled returns and repeat this 1000 times. The black line represents the average return while the red lines represent the 10th and 90th percentile in returns.

Defined Benefit

For a worker under the defined benefit plan, they are eligible for an annuity at their time of retirement. This stream of payments continues for their remaining years. Calculating a present value for this is:

$$Wealth_{DB} = \sum_{t=A-(SY+a_0)}^{T-(SY+a_0)} \left(\frac{1}{1+r}\right)^t \times Annuity_{DB}, \tag{3}$$

where $Annuity_{DB}$ is calculated following the TRS annuity formula. This is as follows:

$$Annuity_{DB} = \begin{cases} \sum_{t=1}^{SY} 0.02 \times HTAS, & SY \leq 20 \\ \sum_{t=1}^{20} 0.02 \times HTAS + \sum_{t=21}^{SY} 0.025 \times HTAS, & SY > 20. \end{cases} \tag{4}$$

$HTAS$ is the average of the employee's highest three consecutive years of annual salary. Further, the annuity is adjusted for inflation by covering 50 percent of the cost-of-living increase as measured through the Anchorage CPI.[14]

Defined Contribution

For a worker under the defined contribution plan, they contribute a portion of their salary into an account alongside an employer's matching contribution. This account accrues interest until the worker's retirement where they earn interest on the account. Discounting this future account value to the year of separation is as follows:

$$Wealth_{DC} = \sum_{t=1}^{SY} \frac{(1+R)^{A-t-a_0}}{(1+r)^{A-SY-a_0}} \times S_t(E_{DC} + C_{DC}). \tag{5}$$

For high annual returns, we use R_H for R in the above formula and for low annual returns we replace R with R_L as previously reported.

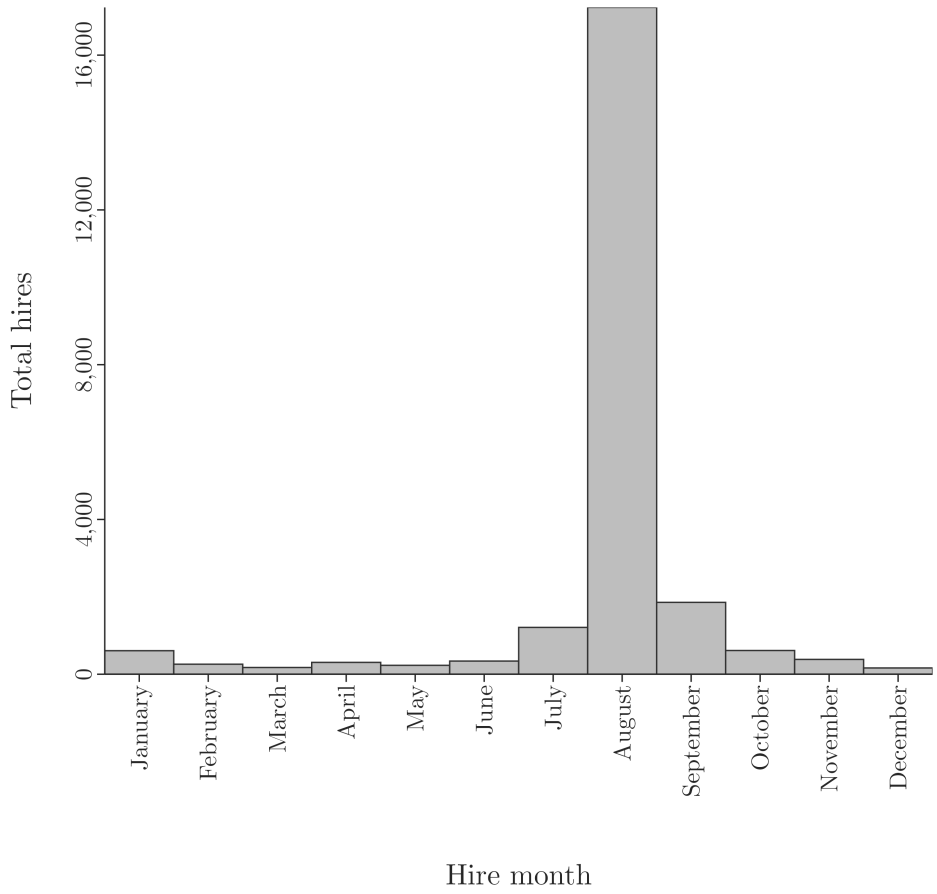
[14] This is conditional on one of the following being met: 1) recipient is at least age 60 on July 1 2) under age 60 if the recipient has been receiving PERS benefits for at least 5 years 3) has been receiving TRS benefits for at least 8 years as of July 1.

B Cohort Identification

We define teacher cohorts from the administrative data provided by the Alaska Department of Education. To select full-time teachers, we first drop all long-term substitute and part-time teachers. For 87 percent of teachers, we observe a reported hire date and divide teachers into cohorts by school year. We define a school year from July of year t to June of year $t+1$; labeled as school year $t+1$. This allows us to divide teachers by their retirement plan type, as teachers hired after June 30, 2006 were enrolled in the DC plan and teachers hired before June 30, 2006 were enrolled in the DB plan. As seen in Figure 6, 74 percent of teachers are hired in August of each school year with a small proportion of teachers hired around the months of the policy implementation. For some teachers, we observe multiple hire dates, which align with moves between schools or districts. We use the first hire date for this subset of teachers.

Teachers with a reported hire date before the 2000 school year or observed teaching in the 1999 school year are dropped. These two conditions allow us to subset to teachers starting between the 2000 and 2019 school years. Last, we deal with teachers that have a missing hire date. Due to the hiring column of the administrative data not being available, we are only able to observe the hire date after 2006. As discussed before we are able to observe the hire date for 87 percent of teachers. For 13 percent of teachers we do not observe a hire date. For these teachers, we impute their time of hire as the first school year they are observed in the administrative data.

Figure 6: Distribution of hires across each school year



Notes: This figure shows the distribution of hire months using a histogram for the population of teachers in this study. The horizontal axis lists the twelve months and the vertical axis reports the total number of hires for a given month. This figure represents all teachers hired between the 2000 and 2019 school year. In this study, we define the beginning of a school year as starting in July and ending in June of the following year. We observe most teachers have a hire month in August of each school year, which is typically when students begin classes.

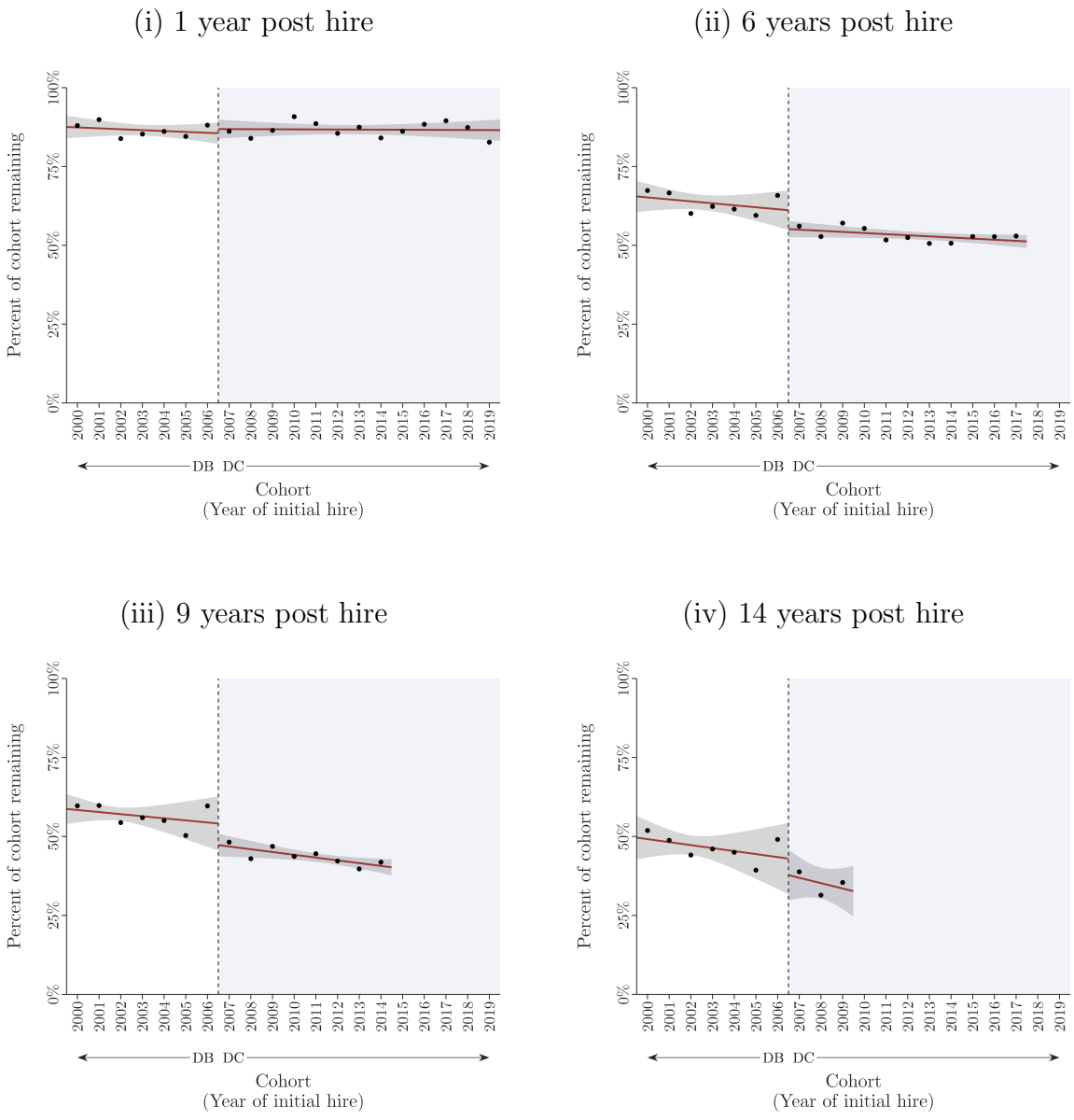
C Unvested Employees

After the defined contribution plan was implemented, unvested employees had one year to switch plans (going from a defined benefit plan to a defined contribution plan). When comparing State of Alaska Teachers' Retirement System Annual Financial Reports and the administrative data, we find few individuals switched. In the FY2007 retirement system report—the first year a report features the DC plan—we observe 641 active members under the DC plan. Of the 641 active members, 635 are unvested due to no years of experience. The additional six are between 25 to 75 percent vested which means they have worked for more than two years.[15] These six represent workers who switched from the DB to the DC plan between retirement plans—a relatively small amount of workers compared to the average cohort size.

[15]Under the DC plan, members with zero or one year of service are unvested, members with two years of service are 25 percent vested, and members reach 100 percent vested after five years.

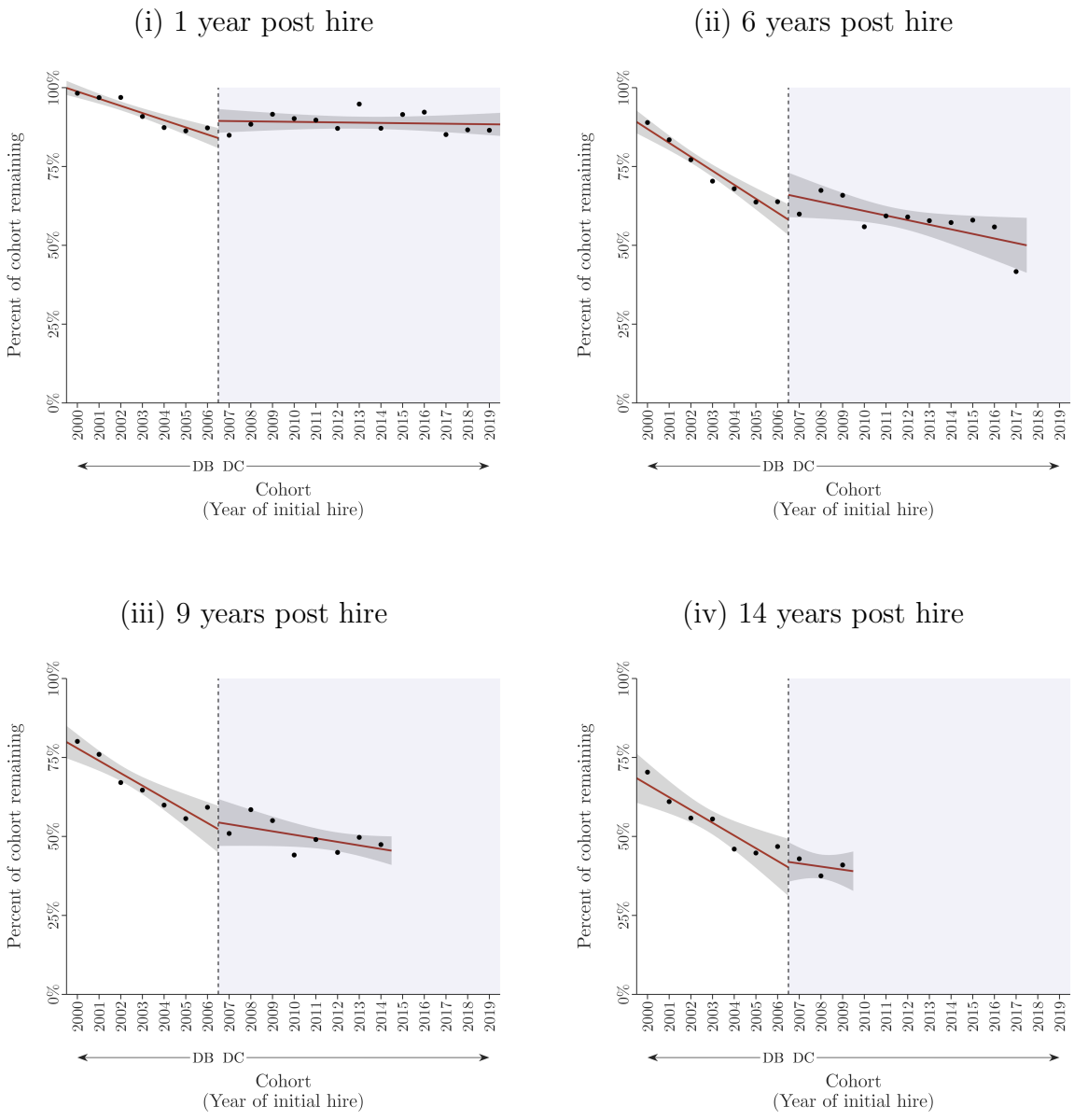
D Heterogeneity Analysis

Figure 7: Retention for teachers with zero experience



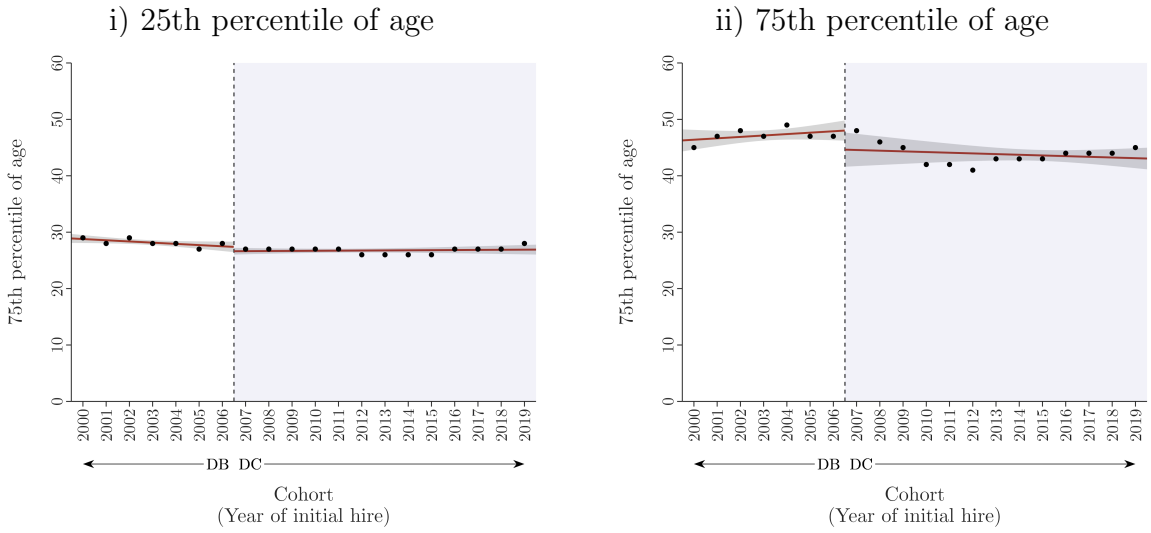
Notes: This figure shows the retention rate (percent) of each teacher cohort, for teachers starting with zero experience, at intervals 1, 6, 9, and 14 years post hire. The figure follows the same definitions of retention, cohort, and regression design as Figure 4. Table 2 displays the regression results, which do not find evidence that teacher retention differs significantly between the cohorts at the threshold of 2006/2007. This is consistent across all measured time lengths—1, 6, 9, and 14 years post hire.

Figure 8: Retention for STEM teachers



Notes: This figure shows the retention rate (percent) of each teacher cohort, for teachers with a STEM assignment, at intervals 1, 6, 9, and 14 years post hire. The figure follows the same defenitions of retention, cohort, and regression design as Figure 4. Table 2 displays the regression results, which do not find evidence that teacher retention differs significantly between the cohorts at the threshold of 2006/2007. This is consistent across all measured timelengths—1, 6, 9, and 14 years post hire.

FIGURE 9: DOES HIRING AGE DIFFER ACROSS RETIREMENT SYSTEMS?



Notes: This figure shows the 25th and 75th percentile of ages who were hired by a TRS employer. Further, we plot the estimates from the regression discontinuity model at the policy threshold to identify significant changes. We provide these estimates in Table 1.

Table 2: Heterogeneity analysis for labor outcomes

Panel A: Regression discontinuity model estimates on labor outcomes

Group:	I. Age distribution		II. STEM teachers				III. No experience teachers			
Dependent variable:	log(Age 25th percentile)	log(Age 75th percentile)	Cohort retention (%)							
Years into employment:			1 Year	6 Years	9 Years	14 Years	1 Year	6 Years	9 Years	14 Years
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Variables										
Constant	3.3***	3.9***	0.85***	0.60***	0.54***	0.42***	0.86***	0.61***	0.54***	0.43***
	(0.01)	(0.02)	(0.01)	(0.02)	(0.03)	(0.03)	(0.01)	(0.03)	(0.04)	(0.04)
Year trend	-0.008*	0.005	-0.02***	-0.04***	-0.04***	-0.04***	-0.003	-0.006	-0.007	-0.009
	(0.004)	(0.005)	(0.003)	(0.005)	(0.007)	(0.009)	(0.004)	(0.007)	(0.008)	(0.010)
1{DC}	-0.03*	-0.07*	0.04*	0.06	0.007	0.002	0.01	-0.06*	-0.07	-0.05
	(0.02)	(0.04)	(0.02)	(0.04)	(0.05)	(0.04)	(0.02)	(0.03)	(0.04)	(0.06)
Year trend × 1{DC}	0.008*	-0.008	0.02***	0.03***	0.03**	0.03	0.003	0.003	-0.002	-0.007
	(0.004)	(0.006)	(0.004)	(0.008)	(0.009)	(0.02)	(0.005)	(0.007)	(0.009)	(0.02)
Fit statistics										
Observations	20	20	20	18	15	10	20	18	15	10
R^2	0.62	0.53	0.59	0.89	0.90	0.91	0.03	0.85	0.88	0.75
Adjusted R^2	0.55	0.44	0.52	0.86	0.87	0.87	-0.16	0.82	0.85	0.62

Panel B: Bandwidth robustness of model estimates

Group:	I. Age distribution		II. STEM Teachers				III. No Experience Teachers			
Dependent variable:	log(Age 25th percentile)	log(Age 75th percentile)	Cohort retention (%)							
Years into employment:			1 Year	6 Years	9 Years	14 Years	1 Year	6 Years	9 Years	14 Years
Model:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Full sample										
1{DC}	-0.03*	-0.07*	0.04*	0.06	0.007	0.002	0.01	-0.06*	-0.07	-0.05
	(0.02)	(0.04)	(0.02)	(0.04)	(0.05)	(0.04)	(0.02)	(0.03)	(0.04)	(0.06)
5yr Band										
1{DC}	0.05***	-0.01	0.01	0.02	-0.0006	-0.02	-0.04	-0.07*	-0.09	-0.07
	(0.01)	(0.02)	(0.03)	(0.07)	(0.07)	(0.08)	(0.02)	(0.03)	(0.05)	(0.06)
3yr Band										
1{DC}	0.06*	-0.02	-0.01	-0.04	-0.05	-0.04	-0.02	-0.10	-0.10	-0.08
	(0.02)	(0.02)	(0.04)	(0.09)	(0.09)	(0.09)	(0.03)	(0.04)	(0.06)	(0.07)

Notes: This table reports the coefficients from an OLS regression with heteroskedastic-robust standard errors shown in parentheses, same as Table 1. In Group I we show regression discontinuity models with the outcomes logged 25th percentile of age and logged 75th percentile of age. For Group II we show results for retention of STEM teachers at 1, 6, 9, and 14 years from hire. Last, in Group III we show results for retention of teachers starting with no prior teaching experience at 1, 6, 9, and 14 years from hire. Following Table 1, the variable of interest is $1\{DC\}$ which represents the discontinuous change in the outcome variable at the time of policy implementation.

E History of Alaska Pension Policy

During a 2005 special session, the State of Alaska legislature feared the DB system faced financial insolvency. The state's DB fund actuary, Mercer, had recommended insufficient employer contributions to the fund from 2000 to 2005. Mercer made significant errors in their methodology, such as basic coding errors, incorrect actuarial assumptions, ignoring salary increases, and poorly estimating future healthcare costs. A consultant for the State of Alaska discovered the errors made by Mercer, which lead to the eventual policy change. The DC plan offered an opportunity for the State of Alaska to reduce future liabilities. In 2005, the bill to start new public employees on a DC pension plan narrowly passed the State House of Representatives. As of 2023, lawmakers have contemplated returning to a defined benefit plan for the public workforce.[16]

[16] Please see: Pew article link

F Retiree Health Plan

We note that the original intention of the policy was to offshore financial risk from longevity, rather than to decrease overall generosity of the system. This quote from Legislative Financial Division Informational Paper 21-2 summarizes this well: *"The change to a DC model reduced employers' contribution rates for new employees, but was primarily meant to arrest the growth of future pension obligations by eliminating the defined benefit for new hires."*[17] With the change in the retirement plan type, the legislation also changed the retiree health plan to offshore longevity risk. This change came from three places: 1) the cost of the two plans 2) a change in the deductible and out of pocket max and 3) the addition of a health savings account. We consider a back-of-the-envelope calculations to better contextualize these changes.

Cost of Plans: To do so, we compare the monthly health premiums between the plans. To simplify the math, we consider the case where a worker is single. As of January 1st, 2025, the monthly health plan premium for a retiree only that is Medicare age eligible is $320.79 and if not Medicare age eligible is $1094.46 for a worker under the DC plan. For the DB plan, the monthly health plan premiums for a retiree only without system-paid medical (such as Medicare) is $739 in monthly premiums and with system-paid medical it is $0. To simplify this, we consider the case where a worker is above Medicare age eligible. In this case, then the paid amount is $320.79 in monthly premiums for the DC plan and $0 for DB plan. This $320.79 monthly difference in the cost of medical benefits that a worker with the DC plan must pay translates to $3849.48 yearly.[18]

Health Reimbursement Arrangement: Here we consider two scenarios: A) an individual has worked 10 years B) an individual has worked 18 years.[19] If an individual worked 10 years, they would have an approximate $42,239 in their HRA account whereas if they worked 18 years they would have $64,616.

[17] This can be found at this link: LFD Paper 21-2.

[18] Note: If a worker is below Medicare age eligible, then the paid amount is $1094 for DC and $739 for DB. The difference is also approximately $300 in monthly premiums so this cost would be similar.

[19] We consider an upper bound of 18 years due to only 18 years of HRA contributions provided by the State of Alaska: link.

Deductible and Out-of-Pocket Max: Last, while the coinsurance largely did not change between the two plans, the annual deductible and out-of-pocket limit increased between the plans. This is shown below in Table 3. For the DB plan, the deductible is $150 while the DC plan is $300. For the DB plan, the out-of-pocket max is $800 while the DC plan is $1500.

Back of Envelope Calculation: If an individual were to live 15 years post retirement, they would be expected to pay approximately $57,742 to buy into the health insurance plan for the State of Alaska workforce under the DC plan. However, employees who have worked between 10 to 18 years could receive between $42,239 to $64,616 in their HRA at time of retirement. This would largely cover the cost of purchasing into the State of Alaska health plan.[20] Collectively, this suggests that the value of the health insurance across the types, while different, is not nearly as significant of change compared to the transition of the retirement plan from defined benefit to defined contribution. Overall, the difference ranges from -$15,503 to $6,874. In 2021, the average monthly benefit paid out was $3,596.[21] Assuming a worker lives for 10 to 15 years in retirement, this translates to a range of approximately $431,600 to $647,000. This suggests that the lower bound to upper bound for the difference in health insurance is between -3.6 to 1.6 percent.

[20] We do note that the health insurance has changed in terms of deductible and max out-of-pocket limits, however we are limited in being able to value this in the back-of-the-envelope calculation.

[21] Please see link.

Table 3: Basic coinsurance information comparison

Category	**DC Coinsurance Info**	**DB Coinsurance Info**
Deductible	$300	$150
Out-of-pocket max	$1500	$800
Most medical expenses	80 percent	80 percent
$100 penalty if seeking non-emergency care at an emergency room of a hospital	$100	-
Most medical expenses after out-of-pocket limit is satisfied	100 percent	100 percent
Facility services with a network provider	80 percent	80 percent
Facility services with an out-of-network provider	60 percent	60 percent
Transplant services at an Institute of Excellence (IOE) facility	80 percent	80 percent
Transplant services at a non-Institute of Excellence (IOE) facility or out-of-network provider	60 percent	60 percent
Preventive care with a network provider or when out-of-network provider is precertified	100 percent, deductible does not apply	100 percent, deductible does not apply
Preventive care with an out-of-network provider	80 percent	80 percent
Episode of Care received through Lantern benefits	100 percent	100 percent
Skilled nursing facility	100 percent	-
Preventive care provided to a non-Medicare age eligible dependent by a network provider or when use of out-of-network provider is precertified	100 percent, deductible does not apply	-
Inpatient mental disorder treatment with a network provider	-	80 percent
Inpatient mental disorder treatment with an out-of-network provider	-	60 percent
Inpatient substance abuse disorder treatment with a network provider	-	80 percent
Inpatient substance abuse disorder treatment with an out-of-network provider	-	60 percent