



How Will Rhode Island's New Hybrid Pension Plan Affect Teachers?

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The Employees' Retirement System of Rhode Island (ERSRI) offers teachers, municipal workers, state police, and other state employees traditional defined benefit (DB) pensions that pay retirees lifetime annuities based on final average salary and years of service. The system has trimmed those pensions several times since the mid-2000s to offset rising costs, boosting the age at which workers could claim benefits, increasing the number of earning years that enter the final average salary calculations, and reducing cost-of-living adjustments.

Faced with at least a \$7 billion gap in 2011 between promised benefits and funds set aside to finance them, state lawmakers implemented more sweeping pension changes with passage of the Rhode Island Retirement Security Act of 2011 (RIRSA).¹ In addition to cutting cost-of-living-adjustments (COLAs) paid to retirees, RIRSA transformed Rhode Island's public employee pension system from a pure DB plan to one that supplements a smaller DB pension with a defined contribution (DC) component that functions much like a 401(k) plan. Under the new component of the plan employees and employers both contribute to employees' retirement accounts, which are invested and earn returns. Employees may withdraw the accumulated balance when they leave state employment and may use the proceeds to purchase an annuity.

The new hybrid plan has been controversial.² Advocates contend that the recent reforms are necessary to make the system solvent and to protect taxpayers from future unsustainable costs by sharing the risk of uncertain investment returns with state employees (Raimondo 2011; Randazzo 2013). They also maintain that the new hybrid plan will enable most state employees to live comfortably in retirement. Some critics, however, claim that the reforms will weaken retirement income security, subject employees to unnecessary risk, and end up saving the state little if any money (Hiltonsmith 2013). To date, there has been virtually no rigorous analysis to help settle the dispute.

This report examines how the new hybrid plan will likely affect Rhode Island's public school teachers, the largest group of public employees in the state.³ It calculates the annual and lifetime retirement benefits that newly hired teachers will earn in the hybrid plan and the benefits they would have earned if they had instead been enrolled in the former stand-alone DB plan. The analysis compares benefits for teachers earning average salaries over their careers who are hired at particular ages and shows how their benefits grow in each plan with additional years of

service. It also examines outcomes for the entire population of newly hired teachers, assuming that they continue to separate from state teaching at the same rate observed by plan actuaries in the recent past under older plans, and shows how many would fare better or worse in the new hybrid plan.

The results show that most Rhode Island teachers will accumulate more retirement benefits in the new hybrid plan than they would have earned in the old stand-alone DB plan. Those spending less than a full career in state employment—the vast majority of Rhode Island’s public school teachers—will gain the most, primarily because the old plan did not serve them well. In fact, about half of all newly hired teachers would not have accumulated *any* employer-financed retirement benefits in the pure DB plan. Teachers retiring with 30 or more years of completed service, who would have earned very large pensions under the old plan, will lose substantial pension income because of the 2011 reforms, but their benefits will remain large enough in the new hybrid plan to ensure their financial security in retirement.

How Does the Hybrid Plan Differ from the Old DB Plan?

Until the 2011 reforms, newly hired Rhode Island public employees and those public employees who had not completed at least 10 years of service by June 30, 2005 participated in the state’s traditional final average salary DB pension plan under Schedule B. The plan requires public school teachers to contribute 9.75 percent of their salaries while working, and in exchange they receive annual retirement benefits equal to a set percentage of average salary paid during their five highest-earning years multiplied by completed years of service. That percentage ranges from 1.6 to 2.5 percent, depending on how long they work.⁴ Employees vest in the Schedule B plan after 10 years of service; those who separate from their employer with fewer service years cannot collect pension benefits and instead have their plan contributions refunded to them, without interest.

Full retirement benefits are available at age 65 for those with 10 or more service years and at age 62 to those with 29 or more service years. Employees with at least 20 years of service can also retire as early as 62, but their annual benefits are reduced 6 percentage points for each year they collect before age 65 if they have not completed the required 29 service years. Initial benefits are capped at 75 percent of final average salary. Retirees receive COLAs on the first \$35,000 of benefits equal to the percentage change in the consumer price index (CPI), but COLAs may not exceed 3 percent per year and are available only to retirees age 65 or older who are in at least their third year of retirement.⁵

New hires and most teachers not eligible to retire as of June 30, 2012 earn retirement benefits in Rhode Island's new hybrid plan, which combines a smaller traditional DB component with a DC component. The new DB pension equals 1 percent of final average salary multiplied by years of service, but vests after only five years of service. As in the old plan, teachers' contributions to the DB component of their plan are refunded to them if they separate before they vest, but they do not earn interest on those contributions. They cannot collect full retirement benefits from the hybrid plan until they reach Social Security's full retirement age, currently 66 for those born between 1943 and 1954, 66 and a few months for those born between 1955 and 1959, and 67 for those born later.⁶ Those who have completed 20 years of service may begin collecting early retirement benefits five years before the full retirement age, with benefits permanently reduced 9 percent for each year they collect before the full retirement age. COLAs are provided on the first \$25,000 of annual retirement benefits, with the base adjusted each year by the change in the CPI. The annual adjustment factor depends on investment performance, not the change in prices. It equals the plan's five-year average investment rate of return minus 5.5 percent but may never be less than zero or more than 4 percent. However, COLAs are suspended when the plan's funding level falls below 80 percent. In 2013, assets held by the state teachers' plan covered only 58 percent of projected liabilities (Gabriel Roeder Smith and Company 2013).

Teachers participating in the hybrid plan must contribute 8.75 percent of their pay each period—less than under the old Schedule B plan—with 5 percent of their pay directed into the DC account instead of the DB component. Employers also contribute 1 percent of employees' salaries to the DC account. Teachers not covered by Social Security and their employers must each contribute an additional 2 percent of salary to the DC account. Participants allocate their DC contributions and those made on their behalf by their employer among several mutual funds offered by TIAA-CREF Financial Services, allowing investments in equities, bonds, short-term money market instruments, real estate, and annuities. Teacher DC contributions vest immediately, while employer DC contributions vest after three years of service. Participants may withdraw their account balance when they separate, and may use all or part of the proceeds to purchase a partial or lifetime annuity from TIAA-CREF or other insurance companies.

Comparing Outcomes under the Two Plans

Our analysis compares retirement benefits that Rhode Island's newly hired public school teachers will receive under the new hybrid plan with the benefits they would have received

under the old stand-alone DB plan. We assume that teachers earn the average salary for their age and years of service for those hired in 2014 as reported by the plan actuaries (Gabriel Roeder Smith & Company 2013) and separate from state employment at the actuaries' computed rates. Our comparisons assume that retirement and separation rates do not change in response to the pension reforms. We also assume that retirees receive their DB pensions as single-life annuities, forgoing survivor benefits for any spouses, which they take-up at the age that maximizes the value of their lifetime benefits (given the age at which they leave state employment). Participants are assumed to convert their DC account balances into single-life annuities when they begin collecting their DB pension. The benefit calculations incorporate COLAs, under the assumption that the plan's funding status will improve and they will be reinstated by the time today's new hires begin collecting benefits. The analysis is restricted to teachers in school districts that provide Social Security coverage to their employees. We assume that plan participants discount future payments 5 percent per year and that prices increase 3 percent per year. All financial amounts are expressed in constant 2014 dollars.

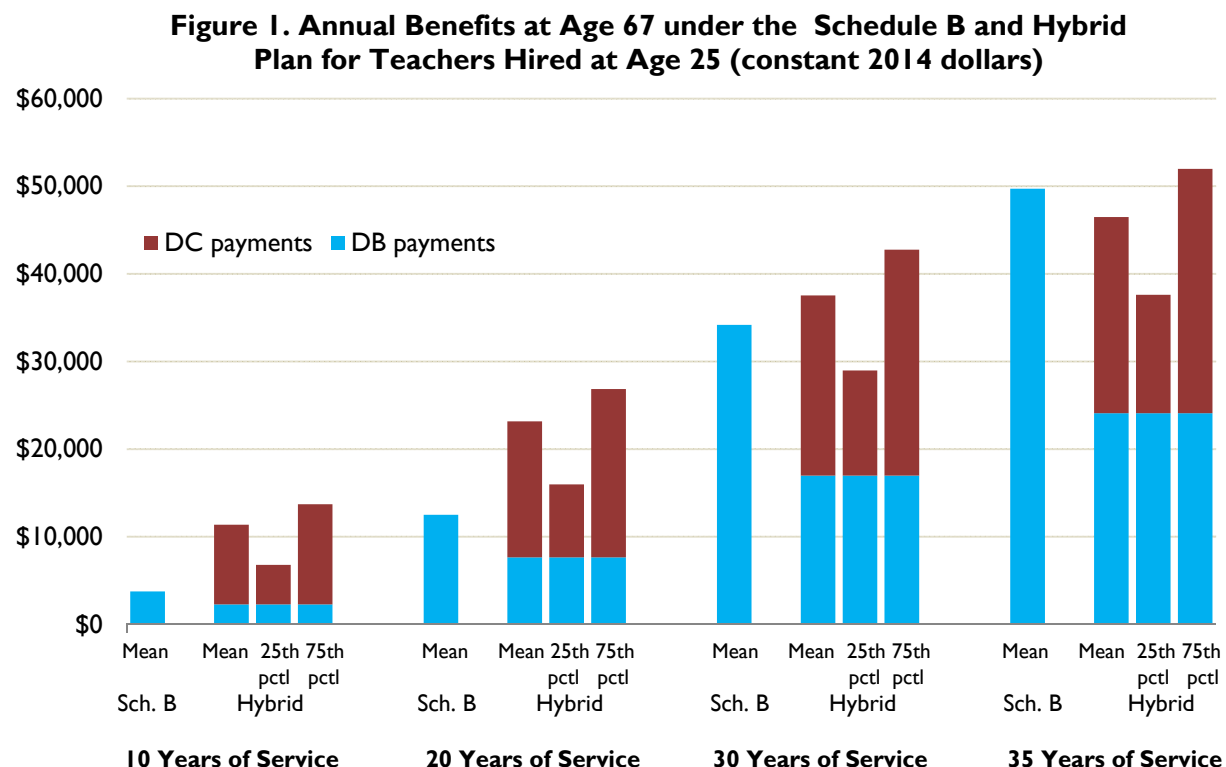
We assume that DC account balances earn average inflation-adjusted long-term returns of 4.38 percent, consistent with investors' historical experience. Between 1926 and 2013, the real average annual compound growth rate for a portfolio evenly split between stocks and bonds was 5.38 percent (Morningstar 2014). We subtract 1 percent to cover administrative fees. These returns are not guaranteed, of course. We account for this uncertainty by simulating the value of account balances under 1,000 different investment return scenarios and examining how outcomes vary under those alternative returns. The random investment return for each scenario is drawn from a normal distribution with a mean of 8.05 percent and standard deviation of 11.98 percent, which generates an expected long-term annual return of 7.38 percent—equivalent to a real annual return of 4.38 percent under our 3 percent inflation rate assumption. We report the mean value from the full distribution of account balance outcomes, which indicates how much employees can expect to receive from the hybrid plan. We also report values at the 25th and 75th percentiles of the distribution of benefit outcomes. There is a 25 percent chance that cash balance plan benefits will fall below the 25th percentile of the distribution and a 75 percent chance that they will fall below the 75th percentile. (Alternatively, there is a 75 percent chance that cash balance plan benefits will exceed the 25th percentile of the distribution and a 25 percent chance that they will exceed the 75th percentile.)

To estimate how much income retirees could receive from their DC accounts, we assume that they use their account balances to purchase a lifetime annuity sold by private insurance companies. Annuity payments are computed using a nominal interest rate of 4.7 percent.

Between 1926 and 2013, bonds averaged real annual returns of 2.7 percent (Morningstar 2014). We convert this real rate into a nominal rate by adding 3 percent to cover inflation, but subtract 1 percent to cover administrative fees. However, we assume that these annuities pay only 78 percent as much as actuarially fair annuities, because of adverse selection and private insurers' need to turn a profit.

How Much Income Will Retirees Receive?

Relative outcomes under the two plans depend partly on how long teachers remain on the job. Retirement benefits in the old Schedule B plan rise sharply with years of service, and short-tenured teachers receive little (figure 1). For example, those hired in 2014 at age 25 who quit after 10 years of service, earn average salaries, and keep their required contributions in the plan would receive only \$3,800 per year in pension benefits at age 67 (measured in 2014 constant dollars). Their pension would increase to \$12,500 per year if they stayed 20 years, to \$34,200 if they stayed 30 years, and to nearly \$49,700 if they stayed 35 years.



Source: Authors' calculations from plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 at age 25 who earn the average salary among plan participants for their age and years of service. The analysis assumes that hybrid plan participants annuitize the balances from the DC

The old DB plan backloads payments late in teachers' careers because the benefit formula directly ties payments to years of service and the formula multiplier increases as teachers work more (rising from 1.6 percent for those with up to 10 years of service to 2.5 percent for those with between 31 and 37 years of service). Final average salary also generally increases with tenure, so the earnings base partially replaced by the plan grows as teachers work longer. Future retirement benefits erode over time when teachers leave Rhode Island classrooms before they may begin receiving payments because the benefit is not adjusted for inflation or interest forgone while waiting to collect.

Teachers earn smaller guaranteed pensions in the hybrid plan than the Schedule B plan, but expected payments from the DC component more than make up the difference for nearly all teachers except those with the longest tenures. If DC accounts earn long-term average returns and hybrid plan participants convert their account balances into lifetime annuities at age 67, 25-year-old hires can expect to receive \$11,400 in retirement benefits at age 67 (measured in constant 2014 dollars), three times as much as they would receive in the old stand-alone DB plan. Expected benefits are 85 percent higher in the hybrid plan than old DB plan for those who leave after 20 years and 10 percent higher for those who leave after 30 years. However, the new hybrid plan generates lower expected benefits than the old plan for teachers with 35 years of service. The DC component of the hybrid plan accounts for 80 percent of benefits provided to teachers separating after 10 years of service, but that share declines the longer they work. After 30 years of service, for example, barely more than half of benefits provided by the hybrid plan comes from the DC component of the plan.

Unlike benefits provided by the DB plan, those provided by the DC component of the hybrid plan depend on uncertain investment returns. The mean hybrid plan values reported in figure 1 indicate how much participants would receive on average, but actual benefits would be higher if DC investments earned more than expected and lower if DC investments earned less. Assuming that investment returns follow historical patterns allows us to quantify this uncertainty. For example, there is a 25 percent chance that the annual payment from the hybrid plan would exceed the 75th percentile of the distribution of outcomes and a 25 percent chance that it would fall below the 25th percentile of the distribution; both these values are reported in figure 1.

Under nearly all investment return scenarios, teachers hired at age 25 who remain employed for as long as 20 years will receive substantially more benefits under the hybrid plan than the stand-alone DB plan. There is a 75 percent chance that annual hybrid plan payments for those separating after 20 years would reach at least \$16,000—a quarter more than their benefits

under the old Schedule B plan—and a 25 percent chance that they would reach nearly \$27,000—about twice as much as under the old plan. However, 25-year-old hires separating after 30 years stand only a 50-50 chance of receiving more retirement benefits at age 67 under the hybrid plan than the old plan, and there is only a 30 percent chance that those separating after 35 years will fare better in the new hybrid plan.

Overall, 78 percent of all Rhode Island public school teachers will earn more retirement benefits at age 67 under the new hybrid plan than the old stand-alone DB plan, including 73 percent of those who completed at least five years of service (table 1). Because participants in the old plan do not receive any benefits until they have completed 10 years of service while those in the new plan can immediately begin accumulating savings in their DC accounts from their own contributions, all teachers with less than 10 years of service will receive more benefits in the new plan. According to data from the Rhode Island plan actuaries (Gabriel Roeder Smith and Company 2013), these short-term teachers account for 36 percent of public school teachers hired in the state. Most teachers who separate after more than 10 years of service but fewer than 30 years will also receive more benefits in the hybrid plan, including 83 percent of those with 10 to 14 service years, 75 percent of those with 20 to 24 years, and 62 percent of those with 25 to 29 years. The gains are sizeable. For example, the median increase in annual benefits among those who receive more under the hybrid plan is \$5,000 (in 2014 dollars) after 10 to 14 years of service and \$7,800 after 25 to 29 years of service.

Most very long-tenured teachers will receive fewer retirement benefits in the hybrid plan than the stand-alone DB plan. The 2011 pension reforms will reduce annual retirement benefits for 64 percent of those who complete 30 to 34 years of service and 70 percent of those who complete 35 or more years. Half of those with at least 35 years of service who receive smaller pensions under the hybrid plan will lose more than \$11,500 a year (in 2014 dollars). However, only 15 percent of public school teachers hired in Rhode Island remain in the classroom for at least 30 years and only 7 percent remain for at least 35 years.

Fifteen percent of public school teachers hired in Rhode Island would receive pensions in the old plan worth less than \$10,000 per year (in 2014 dollars), 26 percent would receive pensions worth between \$10,000 and \$25,000 per year, and 23 percent would receive pensions worth more than \$25,000 per year, while the remaining 36 percent would not receive any pensions. Teachers with the fewest benefits under the old plan are most likely to do better in the new hybrid plan, while those with the most benefits under the old plan are most likely to do worse in the new plan. Ninety-four percent of teachers who would receive a pension worth less than

Table 1. Annual Benefits at Age 67 under the Teachers' Schedule B and Hybrid Plans, by Final Years of Service, Starting Age, and Benefits Received under the Schedule B Plan

	All teachers (%)	Median Annual Benefits at Age 67 (\$2014)		Percentage receiving more under the hybrid plan	Median Change in Age-67 Benefits (\$2014)	
		Old Schedule B plan	New hybrid plan		Those receiving more under the hybrid plan	Those receiving no more under the hybrid plan
All	100	9,900	15,300	78	4,700	-4,500
Final years of service						
At least 5 years	82	13,700	19,700	73	6,200	-4,500
0–4	18	0	1,000	100	1,000	NA
5–9	18	0	5,900	100	5,900	NA
10–14	15	6,800	12,100	83	5,000	-1,300
15–19	13	12,200	18,700	78	6,600	-2,200
20–24	11	18,100	24,400	75	7,200	-2,700
25–29	10	27,300	31,500	62	7,800	-4,300
30–34	8	42,700	39,500	36	8,100	-8,300
35 or more	7	58,900	51,600	30	10,000	-11,500
Starting age						
Younger than 25	21	10,600	20,500	81	6,500	-6,900
25–29	36	11,000	18,500	79	5,400	-6,700
30–34	17	10,800	16,100	77	4,300	-4,500
35–39	9	9,900	13,100	74	3,400	-3,200
40–49	12	7,200	9,000	69	2,600	-2,800
50 and older	4	0	4,900	80	2,100	-2,500
Age-67 benefits under the Schedule B plan (\$2014)						
Zero	36	0	3,200	100	3,200	NA
\$1–\$9,999	15	6,800	12,300	94	6,000	-700
\$10,000–\$25,000	26	15,800	20,900	75	6,600	-1,900
More than \$25,000	23	42,700	39,500	37	7,400	-7,500

Source: Authors' calculations based on plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 who earn the average salary among plan participants for their age and years of service. The analysis assumes that hybrid plan participants annuitize the balances from the DC component of their plan. Investment returns for the DC component are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

\$10,000 per year in the old plan will receive more in the hybrid plan, and the median gain among those who do better is \$6,000. However, 63 percent of those whose Schedule B pensions would exceed \$25,000 per year will receive less in the hybrid plan, with half of them losing more than \$7,500 a year.

Table 2 reports the percent change in annual pension benefits at age 67 when teachers with at least 10 years of service participate in the new hybrid plan instead of the old stand-alone DB plan. Half of teachers with at least 10 years of service will receive annual pension benefits that are at least 17 percent higher under the new plan than the old plan, with benefits increasing at least 50 percent for 31 percent of these teachers and at least doubling for 17 percent. Gains are especially large for teachers who separate before they complete 25 years of service. For example, annual benefits will at least double in the new plan, compared with the old Schedule B plan, for 35 percent of teachers with between 10 and 14 service years and for 23 percent of teachers with between 15 and 19 service years. Nonetheless, long-tenured teachers will experience significant pension losses. Annual benefits at age 67 will decline by at least 25 percent for a fifth of teachers with between 30 and 34 service years and for nearly a quarter of teachers with 35 or more service years.

Table 2. Percent Change in Annual Pension Benefits at Age 67 when Switching from the Schedule B Plan to the Hybrid Plan for Teachers with at Least 10 Years of Service

	Median Percent Change	Percentage Whose Benefits Would Increase			Percentage Whose Benefits Would Decrease		
		Any	50% or more	100% or more	Any	10% or more	25% or more
All	17	66	31	17	34	23	7
Final years of service							
10–14	58	83	54	35	17	10	1
15–19	37	78	42	23	22	14	2
20–24	25	75	33	15	25	15	2
25–29	9	62	20	7	38	24	6
30–34	-10	36	7	2	64	50	20
35 or more	-12	30	4	1	70	54	23
Age-67 benefits under the Schedule B plan (\$2014)							
\$1–\$9,999	85	94	67	44	6	3	0
\$10,000–\$25,000	26	75	33	15	25	14	2
More than \$25,000	-9	37	7	2	63	47	17

Source: Authors' calculations based on plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 who stay for at least 10 years and earn the average salary among plan participants for their age and years of service. The analysis assumes that hybrid plan participants annuitize the balances from the DC component of their plan. Investment returns for the DC component are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

The transition to the new hybrid plan will improve most teachers' retirement income security, and even those who lose substantial pension benefits from the transition to the new hybrid plan will remain financially secure in retirement. A common way of measuring income security in old age is to compute the share of pre-retirement earnings that are replaced by Social Security and pension benefits. We consider only pensions earned from the state teachers' plan, and ignore benefits that teachers might have earned from other employment. Social Security is based on retirees' highest 35 years of earnings. To estimate those benefits, we assume that teachers who begin teaching after age 25 work somewhere else in Social Security-covered employment beginning at that age, earning the same salary that they would have received as a public school teacher. Similarly, we assume that those who leave teaching before reaching Social Security's full retirement age work somewhere else until that age, again earning the same salary that they would have received if they had moved to a new teaching job (but earning no pension from that new position). We assume that teachers begin collecting Social Security at the full retirement age and their teacher pension at the age that maximizes the value of their lifetime benefits.

Comparing teacher pension and Social Security benefits to average earnings received during the five years preceding the full retirement age, we project that the median replacement rate for all teachers would be 47 percent under the new hybrid plan, slightly more than the 41 percent median replacement rate under the old Schedule B plan (table 3). These estimates, however, understate true retirement security because more than three-fifths of teachers participate in the state retirement system for less than 20 years, and many of those who spend less than a full career in the system likely accumulate retirement savings with other employers. Replacement rates are much higher for teachers with at least 30-year careers. For example, the median replacement rate is 72 percent under both plans for teachers with between 30 and 34 years of service, more than the 70-percent replacement rate commonly thought necessary to maintain pre-retirement living standards in old age (Scholz and Seshadri 2009). The median replacement rate falls 10 percentage points for teachers with 35 or more years of service following the shift to the new hybrid plan—more than for any other group—but half of those long-serving teachers are still able to replace at least 92 percent of their pre-retirement earnings. Similarly, replacement rates fall modestly for teachers who would have received annual pensions worth more than \$25,000 under the old plan, but their median replacement rate reaches 72 percent under the hybrid plan, generally high enough to finance a comfortable retirement.

Table 3. Median Percentage of Pre-Retirement Earnings Replaced by Social Security and Pension Benefits under the Teachers' Schedule B and Hybrid Plans

	Share replaced by Social Security (%)	Share Replaced by Pensions (%)		Share Replaced by Both Social Security and Pensions (%)	
		Old Schedule B plan	New hybrid plan	Old Schedule B plan	New hybrid plan
All	33	9	14	41	47
Final years of service					
At least 5 years	32	12	18	44	50
0–4	35	0	1	35	37
5–9	34	0	6	34	39
10–14	33	6	12	39	44
15–19	32	11	18	43	50
20–24	31	16	23	47	54
25–29	31	24	29	54	61
30–34	33	40	38	72	72
35 or more	37	64	54	102	92
Age-67 benefits under the Schedule B plan (\$2014)					
Zero	34	0	3	34	38
\$1–\$9,999	33	6	11	39	44
\$10,000–\$25,000	31	15	19	46	51
More than \$25,000	34	41	39	75	73

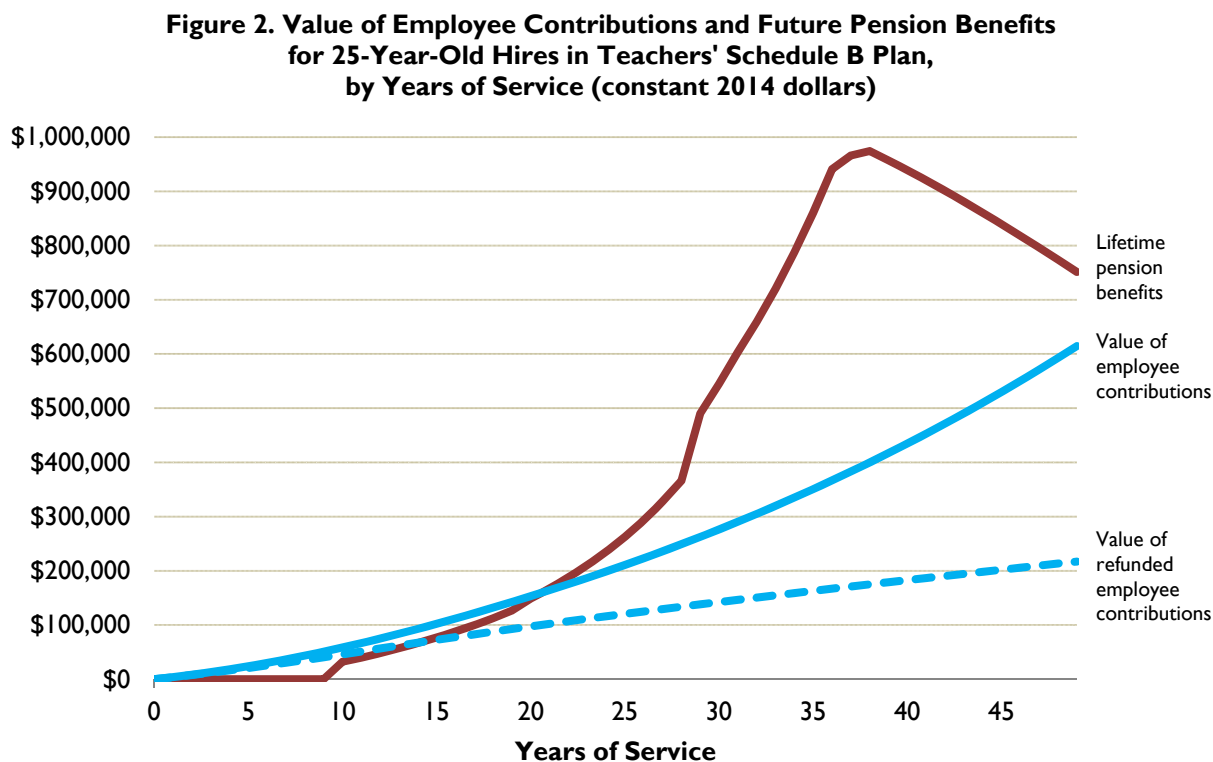
Source: Authors' calculations based on plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 who earn the average salary among plan participants for their age and years of service. Calculations assume that all teachers are covered by Social Security and do not include any pensions earned from other employers. We assume that teachers begin collecting Social Security at the system's full retirement age. Those who begin teaching in Rhode Island after age 25 are assumed to work elsewhere in Social Security-covered employment beginning at age 25, and those who stop teaching in Rhode Island before reaching Social Security's full retirement age are assumed to work elsewhere in Social Security-covered employment until then. Projections also assume that hybrid plan participants annuitize the balances from the DC component of the plan. Investment returns for the DC component are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

How Much Will Teachers Benefit from Their Plans over a Lifetime?

How much teachers benefit from each plan depends on how much retirement benefits they receive over their lifetimes, not in a single year, and how much they contribute to each plan. The old Schedule B plan allows retirees to collect full benefits at age 65, whereas they must wait until they reach Social Security's full retirement age—67 for those born in 1960 or later—under the hybrid plan. As a result, lifetime benefits might be higher under the old plan even if annual benefits are lower. However, the hybrid plan requires teachers to contribute a smaller share of their salaries, so comparing lifetime benefits alone does not provide a complete picture of how many taxpayer-financed benefits teachers collect under each plan.

Figure 2 shows how the expected value of lifetime pension benefits and employee contributions grow over a career under the old Schedule B plan for teachers hired at age 25 who receive average salaries. They are not entitled to any future pension benefits until they have completed 10 years of service, and even then their future pension is not worth much—a lifetime



Source: Authors' calculations from plan documents and actuarial reports.

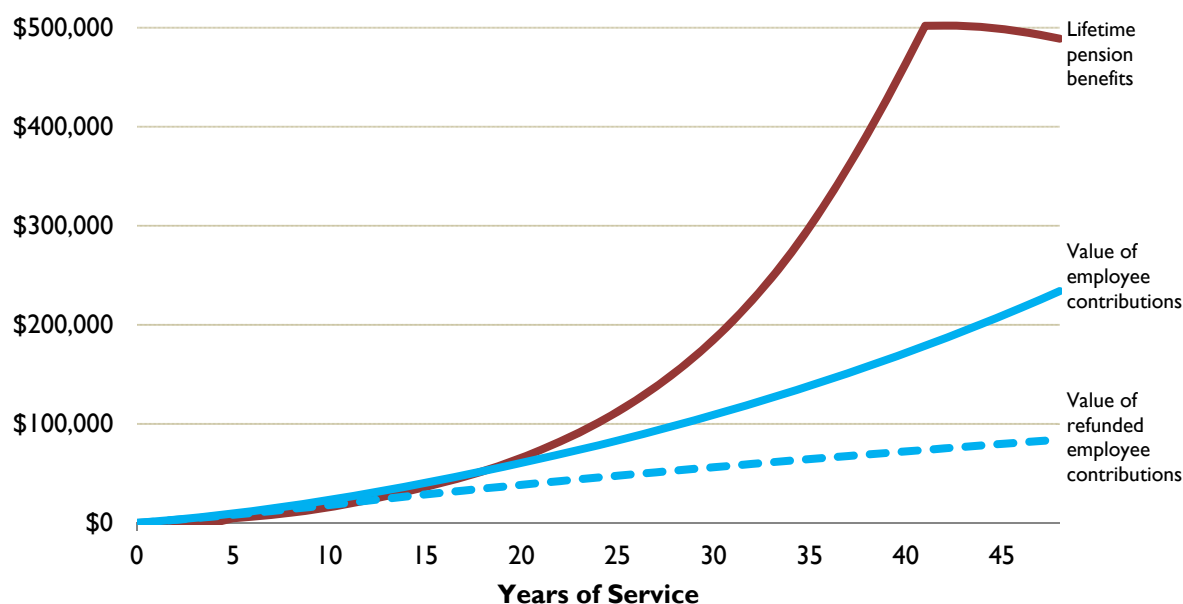
Note: Estimates are for teachers hired in 2014 at age 25 who earn the average salary among plan participants for their age and years of service. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent. Teachers who elect refunds do not receive interest on their contributions.

benefit stream that pays each year only 16 percent of the relatively low salaries received between ages 30 and 34 and does not begin for 30 years. Lifetime benefits then grow steadily with each service year beyond the tenth year, with a sharp jump at 29 years of service when teachers first qualify for full pension benefits at age 62 instead of having to wait until 65. The value of lifetime benefits peaks at nearly \$1 million (in 2014 dollars) for those with 38 years of service, when annual benefits equal 75 percent of final average salary, the plan's cap. However, the value of lifetime benefits drops sharply after 38 years of service, because teachers forfeit a year of benefits for each year they remain in the classroom beyond that point.

Teachers' required contributions to the old Schedule B plan are worth more than future pension benefits early in a career. The accumulated value of those contributions, equal to 9.75 percent of salary each period, depends on what they could have earned if invested elsewhere. Assuming an interest rate of 5 percent, we estimate that contributions made by a 25-year-old earning an average salary are worth about \$100,000 after 15 years of service, \$200,000 after 25 years, and \$500,000 after 44 years. Age-25 hires must teach for 21 years before their future pension benefits are worth more than the value of their accumulated contributions. The plan allows teachers to collect a refund on their contributions when they separate instead of receiving a pension. However, the plan does not pay any interest on refunded contributions, so teachers often suffer financial losses when they take a refund. Once they have completed 15 years of service age-25 hires earning average salaries are better off collecting a future pension than having their contributions refunded, even though they would have done better if they could have invested their retirement plan contributions outside of the plan.

Lifetime pension benefits and required employee contributions exhibit similar growth patterns in the DB component of the new hybrid plan (figure 3). As in the old plan, lifetime benefits are worth less than the value of employee contributions for teachers with short tenures, but worth much more for teachers with much longer tenures. The DB component of the hybrid plan vests after only five years of service, so teachers do not have to wait 10 years to qualify for a future pension. However, the DB pension is much smaller in the hybrid plan than the old plan, with the value of lifetime DB benefits in the hybrid plan maxing out at about \$500,000, about half the peak level in the old plan. Teachers in the hybrid plan do not reach that maximum until they have served for 42 years, four years longer than in the old plan. After serving 42 years, the value of lifetime DB benefits falls more slowly in the hybrid plan than the old plan, because additional service in the hybrid plan raises annual DB pension payments regardless of how long teachers have worked.⁷ Lifetime benefits fall slightly because the annual payment increase is not large enough to offset the benefit checks lost by delaying retirement.

Figure 3. Value of Employee Contributions and Future Pension Benefits from the DB Component of the Teachers' Hybrid Plan for 25-Year-Old Hires (constant 2014 dollars)



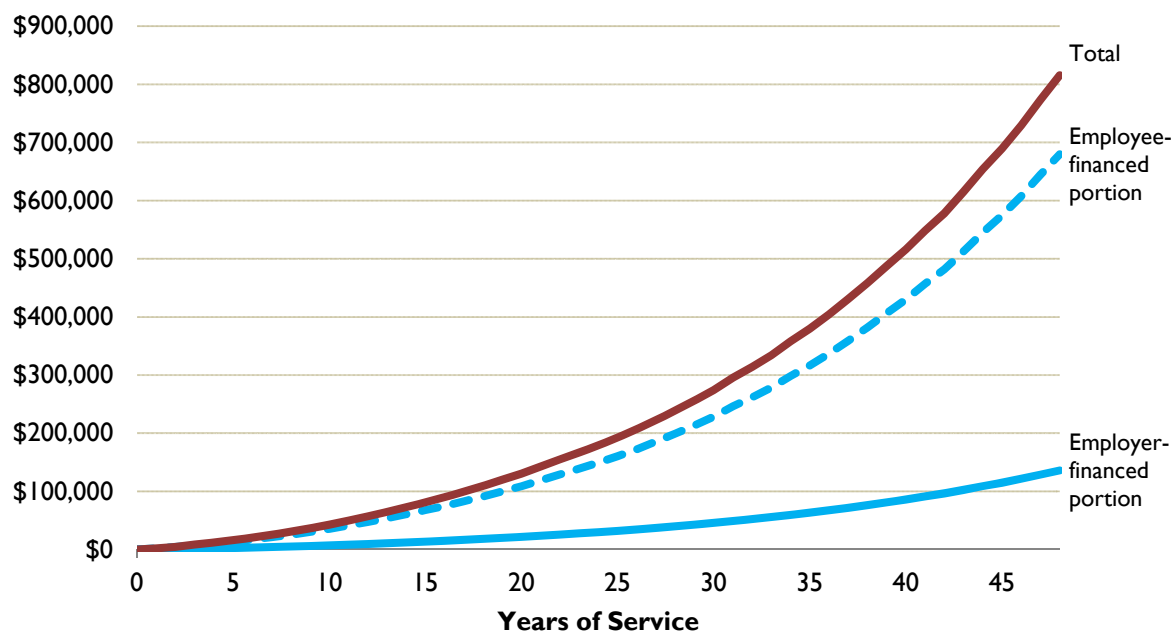
Source: Authors' calculations from plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 at age 25 who earn the average salary among plan participants for their age and years of service. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent. Teachers who elect refunds do not receive interest on their contributions.

Required employee contributions to the DB component of the hybrid plan are also smaller than the required contributions to the stand-alone DB plan. The value of those contributions do not top \$100,000 in the hybrid plan until teachers have completed 30 years of service or \$200,000 until they have completed 45 years. Nonetheless, teachers in the new plan must serve 18 years before their future lifetime pension benefits are worth more than the value of their required contributions, nearly as long as in the old Schedule B plan. However, they are better off taking their pension than a refund on their contributions once they have completed 12 years of service, because the hybrid plan, like the old plan, does not pay interest on refunded contributions.

Unlike the old Schedule B plan, the hybrid plan includes a DC component that also grows rapidly over a career. Assuming that DC contributions earn long-term annual returns of 7.38 percent, teachers can expect to accumulate \$50,000 in their DC accounts after about 13 years, \$100,000 after 19 years, and \$400,000 after 39 years (figure 4). Employer financing accounts for just one-sixth of the DC account. However, employer contributions to the DC account vest

Figure 4. Value of the DC Component of the Teachers' Hybrid Plan for 25-Year-Old Hires (constant 2014 dollars)



Source: Authors' calculations from plan documents and actuarial reports.

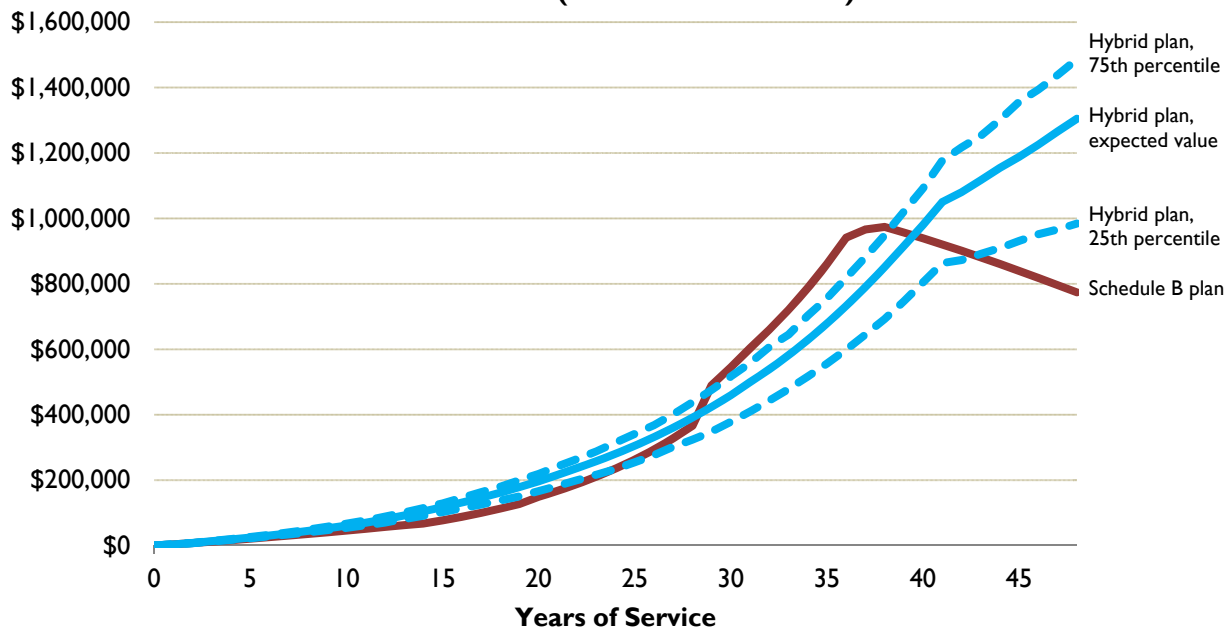
Note: Estimates are for teachers hired in 2014 at age 25 who earn the average salary among plan participants for their age and years of service. Investment returns for the defined contribution component of the hybrid plan are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

after only three years, and unlike the old plan and the DB portion of the hybrid plan the value of the DC component never falls below zero.

Figure 5 compares the total value of lifetime pension benefits under the two plans for teachers hired at age 25. The value of the hybrid plan includes the lifetime value of the stream of future DB pension payments plus the accumulated value of the DC account. Because the value of the DC account depends on uncertain investment returns, we report the expected value of total lifetime benefits earned under the hybrid plan as well as the 25th and 75th percentiles of the distribution of possible outcomes.

Under most investment return scenarios teachers hired at age 25 with as many as 20 years of service will accumulate more retirement benefits in the hybrid plan than the old stand-alone DB plan, even though they contribute less in the hybrid plan. For example, teachers can expect to earn about 50 percent more benefits in the hybrid plan than the old plan if they separate after 15 years of service and about 33 percent more benefits if they separate after 20 years. There is less than a 5 percent chance that their lifetime hybrid-plan benefits will fall below what teachers

Figure 5. Total Value of Expected Lifetime Pension Benefits in Teachers' Schedule B and Hybrid Plans for 25-Year-Old Hires (constant 2014 dollars)



Source: Authors' calculations from plan documents and actuarial reports.

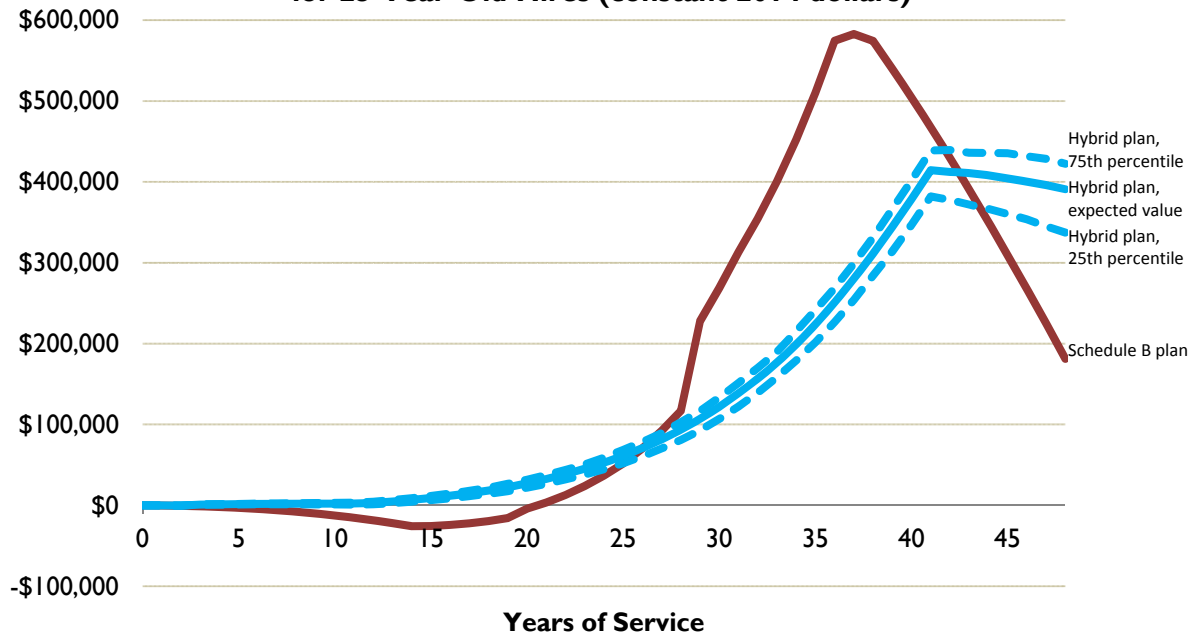
Note: Estimates are for teachers hired in 2014 at age 25 who earn the average salary among plan participants for their age and years of service. Investment returns for the defined contribution component of the hybrid plan are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

would have earned in the old plan after 15 years of service and less than a 10 percent chance that their hybrid-plan benefits will fall short after 20 years. However, teachers who spend between 29 and 39 years in the hybrid plan can expect to have done better in the old plan. After 35 years of service, for example, expected lifetime benefits are about a fifth less in the hybrid plan than the old Schedule B plan. However, teachers who remain in the classroom for 40 or more years fare better in the hybrid plan, because the old plan significantly penalizes very long careers by capping annual pensions at 75 percent of final average salary.

Much of the lifetime retirement benefits that teachers accumulate come from their own contributions. How much teachers gain from their retirement plan depends on benefits financed by the employer, since teachers could set aside their own contributions for retirement outside the employer's plan.

Figure 6 shows how the expected value of lifetime retirement benefits net of teachers' required contributions grows over a career in each plan for teachers hired at age 25 and earning average salaries. The value of employer-financed lifetime benefits differs much more between

Figure 6. Value of Employer-Financed Lifetime Pension Benefits from Teachers' Schedule B and Hybrid Plans for 25-Year-Old Hires (constant 2014 dollars)



Source: Authors' calculations from plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 at age 25 who earn the average salary among plan participants for their age and years of service. Investment returns for the defined contribution component of the hybrid plan are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

the two plans than the value of total lifetime benefits. Teachers hired at age 25 get more out of the old plan than the hybrid plan once they have completed between 26 and 42 years of service because they do exceptionally well in the old plan. For example, the old stand-alone plan provides more than 11 times as much employer-financed lifetime retirement benefits to those separating after 35 to 38 years of service than to those separating after 25 years. These teachers generally experience significant losses by enrolling in the hybrid plan. Those with 35 years of service, for example, lose nearly \$300,000 (in 2014 dollars) of lifetime benefits—42 percent—by switching to the hybrid plan.

The value of lifetime benefits net of employee contributions falls sharply when teachers hired at age 25 remain in the old plan for more than 38 years. Each year that they remain on the payroll beyond that point reduces the number of years that they collect benefits, while their annual benefit remains virtually unchanged—except for any boost in final average salary—because the plan caps annual payments at 75 percent of final average salary. Compounding the loss in net lifetime benefits, these long-serving teachers must continue to contribute 9.75 percent of their salary to the plan, even though they gain nothing from those additional

contributions. These pension losses penalize work at older ages, and many studies have shown that employees generally respond to such late-career pension losses by retiring (Samwick 1998; Stock and Wise 1990a, 1990b). Teachers who remain on the payroll for more than 42 years would fare worse in the old plan than the new hybrid plan.

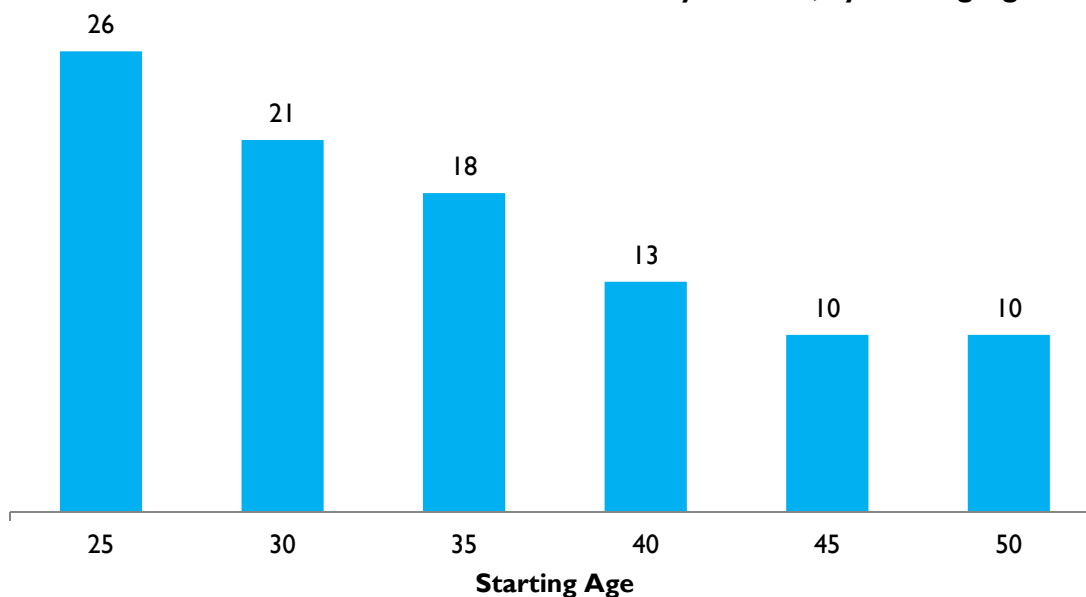
Teachers also lose money in the old plan if they separate after relatively few years of service. Those hired at age 25 not only get nothing out of the Schedule B plan if they participate for fewer than 21 years, they lose money because the value of their future pension falls short of the value of their own contributions. They can elect a refund of their contributions instead of a future pension when they separate, but they do not earn interest on their refunded contributions. The resulting financial losses are substantial. Age-25 hires earning average salaries who separate after 15 years lose about \$25,000 in forgone interest (measured in 2014 dollars). These shorter-tenured teachers effectively subsidize the very sizable DB pensions earned by long-tenured teachers. Teachers with fewer than 20 years of service fare much better in the hybrid plan, which provides them with at least some employer-financed retirement benefits.

Teachers hired at older ages accumulate retirement benefits in the old Schedule B plan more quickly than those who join earlier, because they do not have to wait as long to begin collecting their pension. As a result, they do not have to remain employed as long to fare better in the old plan than the new hybrid plan. For example, teachers hired at age 45 earn more lifetime benefits in the old plan than the hybrid plan after only 10 years of service, while those hired at age 35 must work at least 18 years before they fare better in the old plan and those hired at age 30 must work at least 21 years (figure 7). By comparison, age-25 hires need 26 years of service to fare better in the old stand-alone DB plan than the new hybrid plan.

Who Wins and Loses under the Hybrid Plan?

Overall, two-thirds of newly hired teachers will receive more employer-financed lifetime benefits in the new hybrid plan than the old stand-alone DB plan, including about three-fifths of teachers who complete at least five years of service (table 4). Teachers with fewer than 20 years of service are especially likely to do better in the new hybrid plan, with 9 out of 10 benefitting from the pension reform. About four-fifths of those with between 10 and 14 years of completed service and three-fourths of those with between 15 and 19 years of completed service will earn more lifetime benefits, net of their own contributions, in the new hybrid plan than the old plan, along with fully 100 percent of those with less than 10 years of completed service, who would not receive any pension benefits under the old plan. Half of teachers with between 15 and 19 years of

Figure 7. Minimum Number of Service Years Required for Teachers to Accumulate More Employer-Financed Benefits under the Schedule B Plan than the New Hybrid Plan, by Starting Age



Source: Authors' calculations from plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 who earn the average salary among plan participants for their age and years of service. Investment returns for the defined contribution component of the hybrid plan are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

completed service who will fare better under the hybrid plan will gain more than \$31,000 in employer-financed lifetime benefits.

Teachers with many years of service will lose substantial benefits under the new hybrid plan. We estimate that all teachers who separate with between 30 and 34 years of service would have accumulated more lifetime benefits net of their own contributions under the old plan than the new hybrid plan, as would 88 percent of those departing after 35 or more years of service. The losses are substantial, exceeding \$200,000 for more than half of those with 30 or more years of service who fare worse in the hybrid plan. However, these teachers account for only 15 percent of those ever employed by the state, and they will continue to amass substantial retirement wealth in the new plan. For example, median employer-financed lifetime benefits in the new hybrid plan will be \$180,300 (in 2014 dollars) for teachers separating after 30 to 34 years of service and \$309,000 for those separating after 35 or more years, much more than teachers with fewer years of service.

Table 4. Lifetime Value of Expected Pension Benefits when Switching from the Schedule B Plan to the Hybrid Plan, All Teachers

	All teachers (%)	Percentage earning more benefits under the hybrid plan	Median expected lifetime benefits in the hybrid plan, net of teacher contributions (\$2014)	Median Change in Expected Lifetime Benefits, Net of Teacher Contributions (\$2014)	
				Those doing better under the hybrid plan	Those doing no better under the hybrid plan
All	100	66	22,600	11,900	-101,700
Final years of service					
At least 5 years	100	59	40,900	18,600	-101,700
0–4	18	100	0	400	NA
5–9	18	100	2,500	10,100	NA
10–14	15	79	10,300	20,200	-21,100
15–19	13	73	28,600	31,400	-40,100
20–24	11	54	58,700	23,900	-48,100
25–29	10	19	107,000	14,700	-74,700
30–34	8	0	180,300	17,600	-208,500
35 or more	7	12	309,000	75,900	-242,200
Starting age					
Younger than 25	21	71	15,000	16,800	-182,400
25–29	36	68	19,800	13,500	-180,400
30–34	17	64	26,400	10,500	-87,900
35–39	9	58	30,300	7,000	-67,700
40–49	12	54	29,200	4,900	-47,900
50 and older	4	78	28,300	7,100	-37,300
Value of lifetime benefits net of employee contributions under the Schedule B plan					
Negative or zero	53	100	2,000	10,100	NA
\$1–\$50,000	11	92	37,600	17,100	-3,400
\$50,001–\$200,000	15	14	81,800	8,500	-29,200
More than \$200,000	21	4	207,200	63,400	-181,700

Source: Authors' calculations based on plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 who earn the average salary among plan participants for their age and years of service. The value of lifetime benefits excludes contributions from teachers. Investment returns for the DC component of the hybrid plan are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

Teachers who would have accumulated the fewest employer-financed lifetime benefits under the old stand-alone DB plan are most likely to gain under the new hybrid plan, whereas those accumulating the most benefits under the old plan are most likely to lose under the reforms. More than half of all newly hired teachers (53 percent) would get nothing out of the old plan,

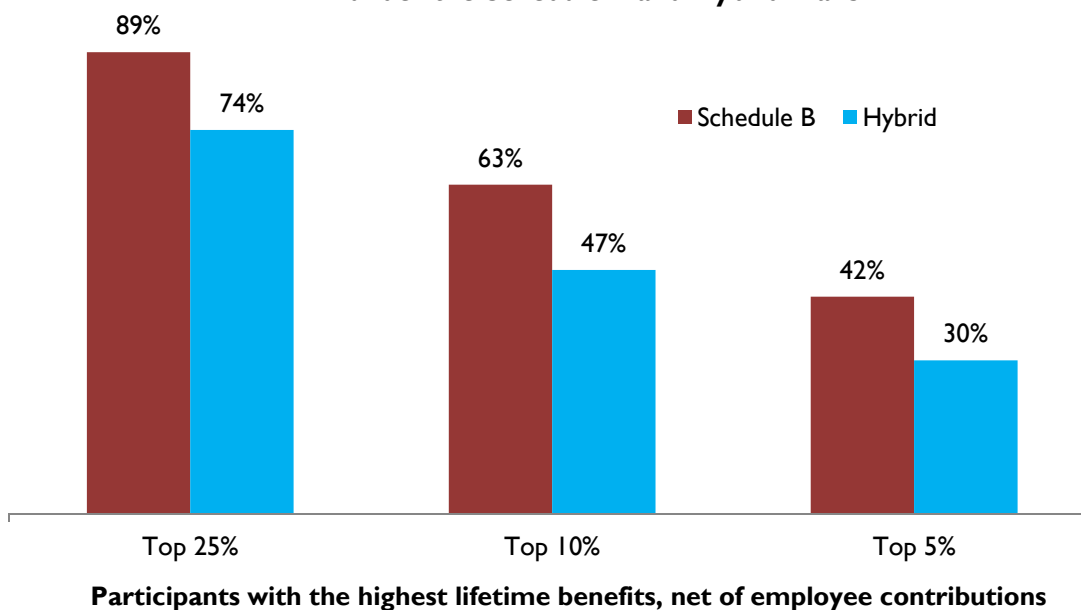
and more than half of this group would lose at least \$5,000 (in 2014 dollars) in the plan, because their future pensions or refunded contributions would be worth less than the value of their own contributions. Even among teachers who complete five years of service, 43 percent would contribute more to the old plan than they get back in future pensions or refunded contributions. All of these teachers will gain from the transition to the new hybrid plan. Additionally, 92 percent of those who would have accumulated some employer-financed benefits in the old plan but not more than \$50,000 will do better in the new plan. By contrast, nearly all of the roughly one in five teachers who would have accumulated more than \$200,000 of employer-financed lifetime benefits will do worse in the new hybrid plan. Their median losses would amount to \$181,700.

With teachers who would receive few benefits under the old plan doing especially well in the new hybrid plan, it is not surprising that the new hybrid plan distributes benefits more equally over the workforce than the old stand-alone DB plan. Under that Schedule B plan, 89 percent of all employer-financed retirement benefits would go to the 25 percent of teachers receiving the most benefits (figure 8). The remaining 75 percent of teachers would receive only 11 percent of all employer-financed benefits. The top 5 percent would receive 42 percent of all payments. Under the hybrid plan, the top 25 percent will receive only 74 percent of all benefits, and the top 5 percent will receive 30 percent. Although the hybrid plan will award a disproportionate share of benefits to teachers with the most years of service, the distribution will be less unequal than under the old stand-alone DB plan.

Conclusions

Although Rhode Island's recent decision to replace its stand-alone DB plan with a hybrid plan that combines a smaller DB component with a DC component has been very controversial, most teachers will earn more benefits under the new plan. Nearly four-fifths of newly hired teachers, including nearly three-fourths of those who remain employed for at least five years, will receive more retirement benefits at age 67 from the new plan than they would have received from the old plan. We find that slightly fewer teachers gain from the plan reform when we compare plan outcomes over teachers' lifetimes—instead of at a single age—because the new plan imposes a higher retirement age and provides less generous COLAs. Nonetheless, two-thirds of all newly hired teachers—and about three-fifths of those completing five or more years of service—will earn more lifetime retirement benefits, net of their own required contributions, under the new hybrid plan than they would have earned under the old plan.

Figure 8. Percentage of Employer-Financed Pension Benefits Going to those Teachers with the Highest Lifetime Benefits under the Schedule B and Hybrid Plans



Source: Authors' calculations from plan documents and actuarial reports.

Note: Estimates are for teachers hired in 2014 who earn the average salary among plan participants for their age and years of service. The value of lifetime benefits excludes contributions from teachers. Investment returns for the DC component of the hybrid plan are randomly drawn from a distribution that generates expected long-term annual returns of 7.38 percent. Future benefits are discounted at 5 percent a year. The annual inflation rate is assumed to be 3 percent.

The 2011 pension reforms will raise benefits for those who would have received no or very small pensions under the old plan and reduce benefits for those who would have received very generous pensions, distributing benefits more evenly across the workforce. Teachers who spend less than a full career in state employment will gain the most from the changes. Nine of 10 teachers who separate before completing 20 years of service—who account for 64 percent of teachers hired by the state—will earn more employer-financed benefits over their lifetime in the new hybrid plan than the old plan. The vast majority of these teachers will benefit from the change because the old plan did not serve them well. That plan required teachers to contribute nearly a tenth of their salary and serve 10 years before qualifying for any benefits. Because benefits were tied to final average salary without any inflation adjustment, the purchasing power of the initial pension payment eroded over time when teachers separated before they could begin collecting at age 62 or 65. Future pensions earned by many teachers employed for less than a full career were often worth less than the value of their own required contributions, meaning they got nothing out of the plan. Making matters worse, the plan did not pay interest on refunded contributions, so many teachers lost money by participating, effectively subsidizing

the generous benefits received by teachers with very long careers. In fact, about half of newly hired teachers would ultimately lose money by participating in the old stand-alone DB plan.

Teachers who remain in state employment for their entire career will fare worse under the new hybrid plan because they would have done so well under the old plan. For teachers hired at age 25, those separating after 35 to 38 years of service would receive more than 11 times as much employer-financed lifetime retirement benefits from the old plan than those separating after 25 years. Most of these long-tenured teachers will fare worse under the new hybrid plan, with many receiving more than 25 percent less than what they would have received under the old plan. Nonetheless, most will remain financially secure in retirement. We estimate, for example, that the typical Rhode Island public school teacher retiring after at least 35 years of service will receive enough pension and Social Security benefits to replace about 90 percent of her pre-retirement earnings.

DC plans—the dominant employer-sponsored retirement plan in the private sector—can play an important role in public-sector pension reform. In fact, Rhode Island’s new hybrid plan is similar to the Federal Employees Retirement System (FERS), which has been providing retirement benefits to federal government workers since 1987.⁸ Although relatively few participants in private-sector 401(k) plans have amassed much retirement savings (Munnell and Sunden 2004), their poor performance stems largely from low contribution rates. This is a much less serious problem in the public sector, because most public employers mandate employee contributions. DC account balances vary with investment returns, but prudent investment strategies can minimize that risk. Many public-sector employees would fare better in hybrid plans that include both DB and DC components than in a simple stand-alone DB plan.

Notes

1. As of June 30, 2010, only 48 percent of projected benefits to public school teachers and general state employees were fully funded. The teacher and state employee funds held assets worth \$6.4 billion to cover \$13.2 billion of actuarial accrued liability (Gabriel Roeder Smith & Company 2010). These estimates are based on the actuarial assumptions adopted by the plan, which include an annual interest rate of 7.5 percent. Estimates based on assumptions commonly used in the private sector indicate that the funding gap was close to \$9 billion (Raimondo 2011).
2. Unions sued to block many of the 2011 reforms. State and union leaders reached a settlement agreement in February 2014 that retains most of the changes included in the original legislation in exchange for some one-time COLA payments to retirees and additional protections for employees who had completed at least 10 years of service when the reforms were passed. The agreement had not yet been approved by state employees and retirees as of March 2014. Our analysis is based on the reforms specified in the original 2011 legislation.

3. In 2011, 26,417 teachers and 25,154 general state employees participated in ERSRI as active employees, retirees, or vested employees who had separated but were not yet collecting benefits (Employees' Retirement System of Rhode Island 2012). Municipal employees, state police, and members of the judiciary accounted for another 15,176 members.
4. The percentage factor is 1.6 percent for each of the first 10 years of service, 1.8 percent for years 11 to 20, 2 percent for years 21 to 25, 2.25 percent for years 26 to 30, 2.5 percent for years 31 to 37, and 2.25 percent for year 38. Plan B participants do not earn additional pension credits when working more than 38 years.
5. The maximum benefit base on which COLAs are computed increases over time with the change in the CPI.
6. Social Security's full retirement age is 66 and two months for those born in 1955 and rises two months for each successive birth cohort until it reaches 67 for those born in 1960.
7. Teachers in the hybrid plan would have to serve for 75 years before hitting the replacement rate cap of 75 percent.
8. See Issacs (2014) for more information about FERS.

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