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CAN STATE AND LOCAL PENSIONS MUDDLE THROUGH?

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Introduction

The finances of state and local pension plans are headline news almost daily.[1] Indeed, although these plans were moving toward prefunding their promised benefits, two financial crises in 10 years have thrown them seriously off course. Measured by the standards of the Government Accounting Standards Board, between 2008 and 2009 the ratio of assets to liabilities for our sample of 126 plans dropped from 84 percent to 79 percent. But this decline is only the beginning of the bad news that will emerge as the losses are spread over the next several years. Furthermore, the funded levels are closer to 50 percent if liabilities are discounted by a riskless rate, as recommended by economists and financial experts.[2] What do these numbers imply for the future of these plans?

Here's what's happening. States and localities have increased contributions and extended retirement ages for new employees, but these changes will take a long time to have any substantial effect. In most states, constitutional protections and court rulings have prohibited public employers from cutting benefits for existing employees.[3] Thus, the only option for a quick fix would be an infusion of tax revenues. But the recession has decimated tax revenues and increased the demand for state and local services. Thus, the question is whether these plans have enough assets to muddle along until the economy and the stock market recover. Or do they face a liquidity crisis? That is the subject of this *brief*.

The discussion is as follows. The first section looks at the simple ratio of assets to benefits over time and across plans in 2009. The second section moves to a more dynamic approach and investigates two concepts for estimating when plans would run out of money. Under a "termination" concept, where benefits earned to date and plan assets are put in an "old" plan and normal cost payments cover all future accruals, most plans have enough assets to last for at least 15 years. Under a more realistic "ongoing" framework, where normal costs are used to cover benefit payments, most plans have enough for at least 30 years.

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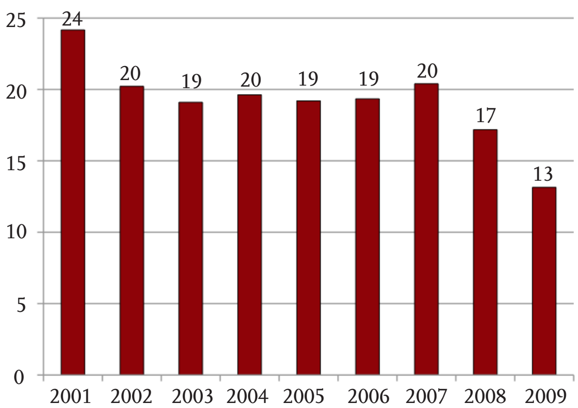
Assets to Benefits

The simplest place to start investigating the liquidity issue is to look at the ratio of plan assets to benefits. This ratio shows for how many years plans could – with no further investment returns, no additional contributions, and no growth in benefits – continue to pay benefits. Figure 1 reveals that, in 2001, assets were 24 times annual benefit payments, suggesting that – with money on hand – state and local plans in the aggregate could continue to pay benefits for 24 years. In the wake of the bursting of the dot.com bubble, this ratio dropped to 19-20 years and stabilized at this level for several years. It was likely poised to rebound when the financial crisis of 2008 hit. The ratio now stands at 13 (see Figure 1).

Figure 1. Market Assets of Public Plans over Annual Benefit Payments, 2001-2009

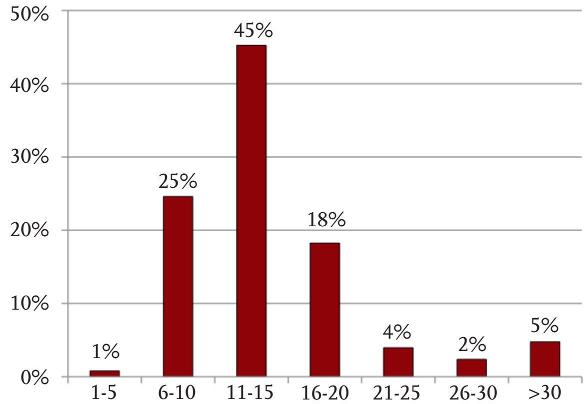


Source: Authors' calculations from *Public Plans Database* (PPD), 2001-2009.

As one would expect, plans are distributed around that average ratio. One plan – Kentucky ERS – has a ratio of five, and 31 plans – including several large plans – have ratios between six and 10 (see Figure 2).

While the simple ratio is useful for describing trends over time, in fact plan sponsors will continue to make contributions, plans will earn returns on their assets, and benefit payments will grow as the baby boom retires. Therefore, given realistic assumptions, how long before plans run out of money?

Figure 2. Distribution of Plans by Market Assets over Annual Benefit Payments, 2009



Source: Authors' calculations from 2009 PPD.

Estimating Exhaustion Dates

The answer to this question depends on how the exercise is structured. One approach is to adopt a "termination" framework.[4] This framework involves putting benefits earned to date and existing assets in an "old" plan and creating a "new" plan in which all accruing benefits are covered by future normal-cost contributions.[5] The new plan will be fine because it has no hangover liability and contributions will be set aside to cover accruing costs. The old plan, however, is underfunded and, without additional contributions, will ultimately run out of money. The question is when? The answer clearly depends on investment returns. Calculating accrued benefits based on the methodology described in Appendix A, we find that the exhaustion date for the state-local sector as a whole is 2023 with returns of 6 percent and 2033 with returns of 8 percent (see Table 1 on the next page).[6] These are similar to widely publicized numbers presented in a series of recent papers.[7]

The alternative approach is to treat the plans as ongoing entities. This approach requires a projection of actual benefit payments for current and future employees (see Appendix A) and the assumption that plan sponsors can use future normal-cost contributions to cover benefit payments. Under the ongoing scenario, the exhaustion dates are 2025 with returns of 6 percent and 2041 with returns of 8 percent.[8] Of course, using normal costs to cover benefits rather than accumulating payments in anticipation of future payments will worsen the funded status of plans.

But if the issue is strictly one of plans running out of money, then using normal costs to cover future benefits must be considered.

Under either the termination approach or the ongoing approach, the exhaustion dates for individual plans are widely distributed around the aggregate exhaustion dates. Figure 3 shows estimated exhaustion dates under each scenario for each of the 126 plans in our sample, assuming the 8-percent return (see Appendix B for individual plan data). As expected, the ongoing scenario shows far fewer plans exhausting their assets in the next 15 years, suggesting that plans have more breathing room than the termination approach suggests. Even in the ongoing framework, however, several large plans run out of assets in the next 15 years. These plans include Connecticut SERS, Illinois SERS, Illinois Universities, Kentucky ERS, Louisiana Teachers, New York City Teachers, and Rhode Island ERS.[9] Benefits will be paid because they are contractual obligations of the employer, but the money will have to come from general revenues rather than the pension fund.

Table 1. Exhaustion Dates for State and Local Pensions under a "Termination" and an "Ongoing" Framework by Rate of Return

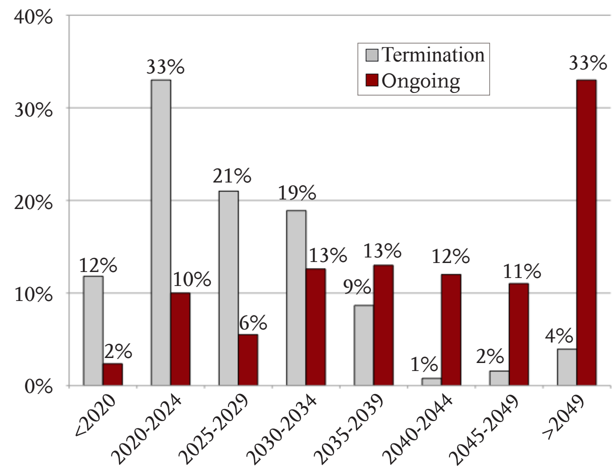
Rate of return	Framework	
	Termination	Ongoing
6 percent	2023	2025
8 percent	2033	2041

Note: "Ongoing" assumes that plans pay the normal cost in future years and these monies are available to cover benefit payments for current and future employees. "Termination" assumes that assets and benefits earned to date are put into an "old" plan and normal cost payments cover all new accruals.
Source: Authors' estimates from 2009 PPD.

Conclusion

Most state and local plans had made great strides in improving their funding discipline and management in recent decades, so they had a relatively solid foundation in place before the two financial crises hit. For that reason, even after the worst market crash in decades, state and local plans do not face an immediate liquidity crisis.

Figure 3. Percent of State and Local Plans Exhausted by Year under a "Termination" and an "Ongoing" Framework



Note: Assumes an 8-percent return.
Source: Authors' estimates from 2009 PPD.

Using a stringent "termination" framework, in which assets and benefits earned to date are put into an "old" plan and normal cost payments cover all new accruals, most plans will be able to cover benefit payments for the next 15 years, although some notable exceptions exist.

Using a more realistic "ongoing" framework, in which normal costs are used to cover benefit payments, most plans have enough for at least 30 years. And these estimates are conservative. They are based on 2009 data and therefore do not reflect the run-up in the stock market in the last year. They also do not incorporate recent efforts to increase employee contributions and reduce benefits for new employees. And they assume that states pay only the normal cost when many make the full annual required contribution.

In short, most public plans appear to have time to muddle through, although notable exceptions include Connecticut SERS, Illinois SERS, Illinois Universities, Kentucky ERS, Louisiana Teachers, New York City Teachers, and Rhode Island ERS.

In the end, however, the future outlook of public pensions, just as with private investors, is closely tied to the recovery of the economy and the stock market.

APPENDICES

Appendix A – Methodology

The model estimates the dates when the 126 plans in our sample may exhaust their assets by projecting future pension payments under two scenarios. In the first scenario, it predicts how long assets on hand today could fund future pension payments under a "termination" framework, which involves putting benefits earned to date and the existing assets in an "old" plan and creating a "new" plan in which all accruing benefits are covered by future normal cost contributions. In the second scenario, it predicts the solvency of the system in an ongoing scenario that allows for new entrants into the plan, continued benefit accruals for active employees, and contributions made to fund the system. Determining exhaustion dates also requires projecting annual asset levels and normal costs for these same plans.

Project Annual Benefit Payments

To determine the annual benefit payments, the model must:

1) Project the age and annual benefit payment at the time of retirement for each active participant.
2) Calculate the benefit payment received by current retirees.
3) Estimate the life expectancy of current and future retirees.

To this end, the model requires detailed information in three categories: demographics, actuarial assumptions, and plan design. The demographic data include the number of active members and current retirees in each plan, the average salaries and tenure of active members of different ages, and the average benefit received by retirees of different ages. Assumptions pertain to rate of return, turnover, vesting, mortality, and salary growth. The plan design data include the employee contribution rate, benefit formula, and COLA provisions. We apply the actual plan-specific assumptions for the 14 largest plans. We assign smaller plans one of the 14 sets of assumptions by comparing calculated liabilities under each of the 14 assumption sets to the plan's own reported liability.

In each year, an active member of a plan will either continue working, separate, retire, or die. At time t, the number of individuals, by birth cohort i, remaining in the plan is

$$pop_{i,t} = pop_{i,t-1} * (1 - mort_{i,t-1}) * (1 - sep_{i,t-1}) * (1 - ret_{i,t-1})$$

the number of individuals who separate is equal to

$$separates_{i,t} = pop_{i,t-1} * (1 - mort_{i,t-1}) * (sep_{i,t-1})$$

and the number of individuals who retire is equal to

$$retirees_{i,t} = pop_{i,t-1} * (1 - mort_{i,t-1}) * (ret_{i,t-1})$$

where $pop_{i,t}$, $sep_{i,t}$, and $ret_{i,t}$ are the number of members, mortality, separation, and retirement probabilities, respectively, for cohort i at time t.

When an individual separates, his accrued tenure, salary history, and separation date are stored. Those who separate are also assigned a survival probability from their date of separation until retirement age. The starting pension benefit, S, for person n of birth cohort i who separates from the plan at time t is given by

$$S_{i,n} = a * tenure_{i,n,t} * W_{i,n,t} * P(t) * 1(tenure_{i,n} \geq vesting\ period)$$

where a is the plan's accrual rate, $tenure_{i,n,t}$ is the accrued years of service at the time of separation, $W_{i,n,t}$ is the plan-specific average of the highest annual wages received at separation, and $P(t)$ is the probability of living from time t until retirement. The vesting period is a plan-specific input and 1(.) is an indicator function that takes the value of 0 if false and 1 if true.

Benefits for individuals who work until retirement age are computed in a similar manner. The starting benefit for an individual, m, of birth cohort i, who retires from the plan at time t is

$$R_{i,m,t} = a * tenure_{i,m,t} * W_{i,m,t}$$

where a is the plan's accrual rate and $tenure_{i,m,t}$ is the accrued years of service at the time of retirement.

To calculate the benefit in the termination scenario, $W_{i,t}$ is the plan-specific average of the highest annual wages received by person n or m in 2009; $tenure_{i,t}$ is the accrued years of service as of 2009. To calculate the benefit in the ongoing scenario, $W_{i,t}$ is the plan-specific average of the highest annual wages to be received by a person *at the age of separation*.

In the ongoing scenario, new hires replace employees who separate, retire, or die. The total workforce grows over time according to $growth_{t-1}$ (U.S. Census Bureau).

$$pop_{i,t} = \Big(pop_{i,t-1} * (1 - mort_{i,t-1}) * (1 - sep_{i,t-1}) * (1 - ret_{i,t-1}) + (pop_{i,t-1} - (* \ pop_{i,t-1} * (1 - mort_{i,t-1}) * (1 - sep_{i,t-1}) * (1 - ret_{i,t-1}))) \Big) * growth_{t-1}$$

The age distribution of new hires reflects those reported in the Actuarial Valuations of the 14 largest plans.

In total, the benefit paid to birth cohort i reaching retirement at time t are equal to

$$Benefit_{i,t} = \sum_{n=1}^{N} S_{i,n} + \sum_{m=1}^{M} R_{i,m}$$

In each subsequent year, the expected value of the cohort's total benefit is equal to the previous year's payment multiplied by the plan-specific cost-of-living adjustment and the survival probability of living to the next year.

$$Benefit_{i,t} = Benefit_{i,t-1} * (1 + COLA) * (1 - mort_{i,t-1})$$

Total future payments to active workers made by the pension plan in a given year are then equal to

$$B_t = \sum_i Benefit_{i,t} * 1\,(i \geq minimum\ retirement\ age\ at\ time\ t)$$

where 1(.) is the indicator function that takes the value of 0 if false and 1 if true.

Current retirees are treated similarly to active employees. The PPD records the total benefits paid to retired employees in 2009 and the proportion of those benefits paid to retirees of different ages. The model assumes that, in each subsequent year, the expected value of each retiree birth cohort's total benefit is equal to the previous year's payment multiplied by the plan-specific cost-of-living adjustment and the survival probability of living to the next year.

Project Annual Asset Levels

Each year, a plan's assets increase with new contributions and income earned. Its assets decrease with the benefits it pays. The model assumes that plans receive contributions and pay benefits at two points during the year. Accordingly,

$$Assets_t = (Assets_{t-1} * (1 + r)) + \left(\frac{C_t - B_t}{2} * \frac{r}{2}\right) + \left(\frac{C_t - B_t}{2}\right)$$

where r is the assumed rate of return on plan assets, C_t is the normal cost contribution in a given year *t*, and B_t is the annual benefit paid in a given year.

Appendix B – Year of Exhaustion, by Plan

Plan name	Termination		Ongoing	
	6%	8%	6%	8%
Alabama ERS	2021	2022	2028	2031
Alabama Teachers	2021	2022	2029	2035
Alaska PERS † *	2021	2023	2021	2023
Alaska Teachers † *	2022	2025	2022	2025
Arizona Public Safety Personnel	2021	2022	2038	2047
Arizona SRS †	2023	2025	2055	> 2100
Arkansas PERS	2024	2026	2040	2061
Arkansas Teachers	2026	2030	2038	2054
California PERF †	2026	2029	2036	2064
California Teachers †	2025	2029	2071	> 2100
Chicago Teachers	2021	2023	2046	2066
City of Austin ERS	2021	2023	2029	2036
Colorado Municipal	2025	2027	2029	2032
Colorado School	2022	2025	2029	2036
Colorado State	2022	2023	2027	2031
Connecticut SERS	2017	2017	2021	2023
Connecticut Teachers	2019	2020	2030	2038
Contra Costa County	2027	2031	> 2100	> 2100
DC Police & Fire	2027	2030	2063	> 2100
DC Teachers	2037	> 2100	2042	2056
Delaware State Employees	2026	2030	2033	2042
Denver Employees	2026	2029	2035	2046
Denver Schools	2027	2033	2038	2063
Duluth Teachers	2021	2023	2029	2035
Fairfax County Schools	2022	2024	2047	2070
Florida RS †	2030	2040	> 2100	> 2100
Georgia ERS †	2021	2024	2025	2028
Georgia Teachers	2027	2033	2037	2053
Hawaii ERS	2020	2022	2028	2031
Houston Firefighters	2029	2035	2042	2076
Idaho PERS	2027	2032	2075	> 2100
Illinois Municipal	2030	2037	2039	2056
Illinois SERS	2016	2017	2021	2022
Illinois Teachers †	2019	2019	2029	2035
Illinois Universities †	2018	2019	2020	2021
Indiana PERF	2026	2030	2037	2048
Indiana Teachers	2018	2018	2023	2026
Iowa PERS	2026	2030	2032	2038

Plan name	Termination		Ongoing	
	6%	8%	6%	8%
Kansas PERS	2021	2022	2030	2034
Kentucky County	2020	2021	2027	2031
Kentucky ERS	2015	2015	2016	2017
Kentucky Teachers †	2020	2021	2027	2032
LA County ERS	2025	2028	2033	2042
Louisiana SERS	2019	2020	2028	2033
Louisiana Teachers	2018	2018	2021	2022
Maine Local	2030	2038	2039	2061
Maine State and Teacher	2021	2023	2029	2034
Maryland PERS	2024	2026	2033	2041
Maryland Teachers	2022	2024	2035	2044
Massachusetts SERS	2021	2023	2028	2033
Massachusetts Teachers	2019	2020	2025	2028
Michigan Municipal	2022	2025	2034	2046
Michigan Public Schools	2021	2023	2029	2036
Michigan SERS*	2021	2023	2021	2023
Minneapolis ERF*	2017	2018	2017	2018
Minnesota PERF	2022	2024	2027	2030
Minnesota State Employees †	2026	2030	2032	2037
Minnesota Teachers	2021	2023	2026	2030
Mississippi PERS	2018	2019	2022	2023
Missouri DOT and Highway Patrol	2016	2017	2019	2020
Missouri Local	2026	2029	2035	2050
Missouri PEERS	2028	2031	2051	2065
Missouri State Employees	2024	2026	2033	2041
Missouri Teachers	2023	2025	2051	> 2100
Montana PERS	2024	2026	2031	2038
Montana Teachers	2021	2023	2026	2029
Nebraska Schools	2027	2032	2035	2046
Nevada Police Officer and Firefighter †	2028	2032	2069	> 2100
Nevada Regular Employees †	2024	2027	2047	2065
New Hampshire Retirement System	2020	2021	2034	2042
New Jersey PERS †	2021	2022	2029	2034
New Jersey Police & Fire	2022	2025	2030	2037
New Jersey Teachers	2019	2020	2029	2036
New Mexico PERF	2023	2025	2037	2046
New Mexico Teachers	2020	2022	2026	2030
New York City ERS	2022	2024	2030	2035
New York City Teachers	2017	2017	2019	2021

Plan name	Termination		Ongoing	
	6%	8%	6%	8%
New York State Teachers	2029	2038	2036	2049
North Carolina Local Government ‡	2035	2049	2062	> 2100
North Carolina Teachers & State Employees † ‡	2028	2034	2055	> 2100
North Dakota PERS	2028	2032	2036	2043
North Dakota Teachers	2022	2024	2032	2039
NY State & Local ERS †	2041	> 2100	2057	> 2100
NY State & Local Police & Fire †	2036	2053	2044	2065
Ohio PERS †	2025	2029	2034	2047
Ohio Police & Fire	2026	2030	2038	2049
Ohio School Employees †	2023	2026	2035	2047
Ohio Teachers †	2021	2023	2026	2029
Oklahoma PERS	2023	2025	2040	2062
Oklahoma Teachers	2018	2019	2027	2031
Oregon PERS	2026	2031	2030	2035
Pennsylvania School Employees †	2020	2021	2034	2049
Pennsylvania State ERS	2022	2024	2031	2044
Phoenix ERS	2021	2023	2038	2048
Rhode Island ERS	2019	2020	2022	2023
Rhode Island Municipal	2024	2027	2041	2054
San Diego County	2025	2028	2036	2048
San Francisco City & County	2025	2029	2034	2043
South Carolina Police	2019	2020	2026	2030
South Carolina RS	2020	2021	2037	2053
South Dakota PERS	2030	2036	2040	2056
St. Louis School Employees	2025	2031	2031	2045
St. Paul Teachers	2020	2021	2024	2026
Texas County & District	2029	2035	2035	2043
Texas ERS	2026	2031	2043	2058
Texas LECOS †	2018	2017	2020	2021
Texas Municipal	2029	2037	2049	> 2100
Texas Teachers †	2029	2035	2042	2084
TN Political Subdivisions	2026	2029	2036	2044
TN State and Teachers	2028	2034	2035	2044
University of California	2029	2034	2041	2059
Utah Noncontributory	2028	2032	2037	2047
Vermont State Employees	2023	2026	2035	2043
Vermont Teachers	2021	2022	2044	2065
Virginia Retirement System	2025	2028	2033	2040
Washington LEOFF Plan 1*	2031	2094	2031	2094
Washington LEOFF Plan 2	2030	2037	2045	2095

Plan name	Termination		Ongoing	
	6%	8%	6%	8%
Washington PERS 1*	2018	2019	2018	2019
Washington PERS 2/3	2035	2045	2046	2059
Washington School Employees Plan 2/3	2030	2036	2047	2102
Washington Teachers Plan 1*	2019	2020	2019	2020
Washington Teachers Plan 2/3	2031	2035	2056	> 2100
West Virginia PERS	2025	2028	2035	2044
West Virginia Teachers	2017	2018	2021	2022
Wisconsin Retirement System †	2034	2063	2036	> 2100
Wyoming Public Employees	2026	2030	2043	2066
Total	2023	2033	2025	2041

† Uses actual data.
* Denotes closed plan.
‡ For analysis of both North Carolina plans, assets are at market level as of 12/31/2009. Estimates for North Carolina Teachers and State Employees (TSERS) are based on the results for North Carolina Local Government System (LGERS), which has a similar funded level and normal cost to that of the TSERS.
Source: Authors' estimates from 2009 Actuarial Valuation Reports.

Endnotes

1 For example, see Perez-Pena (2010); Walsh (2010a, 2010b); Neumann and Corkery (2011); and Varghese (2011).

2 Munnell, Aubry, and Quinby (2010).

3 Colorado, Minnesota, and South Dakota are widely-publicized exceptions. Each of these states has reduced the cost-of-living adjustment for current retirees. These actions are being challenged in the courts.

4 See Rauh (2009, 2010).

5 The normal cost equals the annual contribution required to cover benefits accrued in that year.

6 Benefit payments as calculated under an Accumulated Benefit Obligation (ABO) concept are paid solely out of existing assets and returns on those assets.

7 See Rauh (2010). The numbers presented in this *brief* differ from Rauh's because of underlying assumptions. While Rauh applies the same set of actuarial assumptions – generalized from the 10 largest plans – to every plan in his sample, we apply the actual plan-specific assumptions to the 14 largest plans: Arizona SRS, California PERF, California Teachers, Florida RS, Illinois Teachers, New Jersey PERS, NY State & Local ERS, NY State & Local Police & Fire, North Carolina Teachers and State Employees, Ohio PERS, Ohio Teachers, Pennsylvania School Employees, Texas Teachers, and Wisconsin Retirement System. We assign smaller plans one of the 14 sets of assumptions by comparing calculated liabilities under each of the 14 assumption sets to the plan's own reported liability. See Appendix A for more details.

8 This analysis uses actuarial assumptions and plan designs reported in 2009 Actuarial Valuations and Comprehensive Annual Financial Reports. We assume that plans retain their 2009 plan designs going forward.

9 The other plans in this category include closed plans – Minneapolis ERF, Washington PERS 1, Washington Teachers Plan 1 – and smaller plans – Missouri DOT and Highway Patrol, Mississippi PERS, Texas LECOS, and West Virginia Teachers.

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