



The Value and Revenue Demands of Public Pension Promises

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A State and Local Fiscal Crisis in the US?

- Pensions represent large off-balance-sheet debts for state and local governments
- Government accounting standards board (GASB) procedures understate liabilities
 - Allowing circumvention of balanced budget requirements
- Threatens solvency of many state and local governmental entities

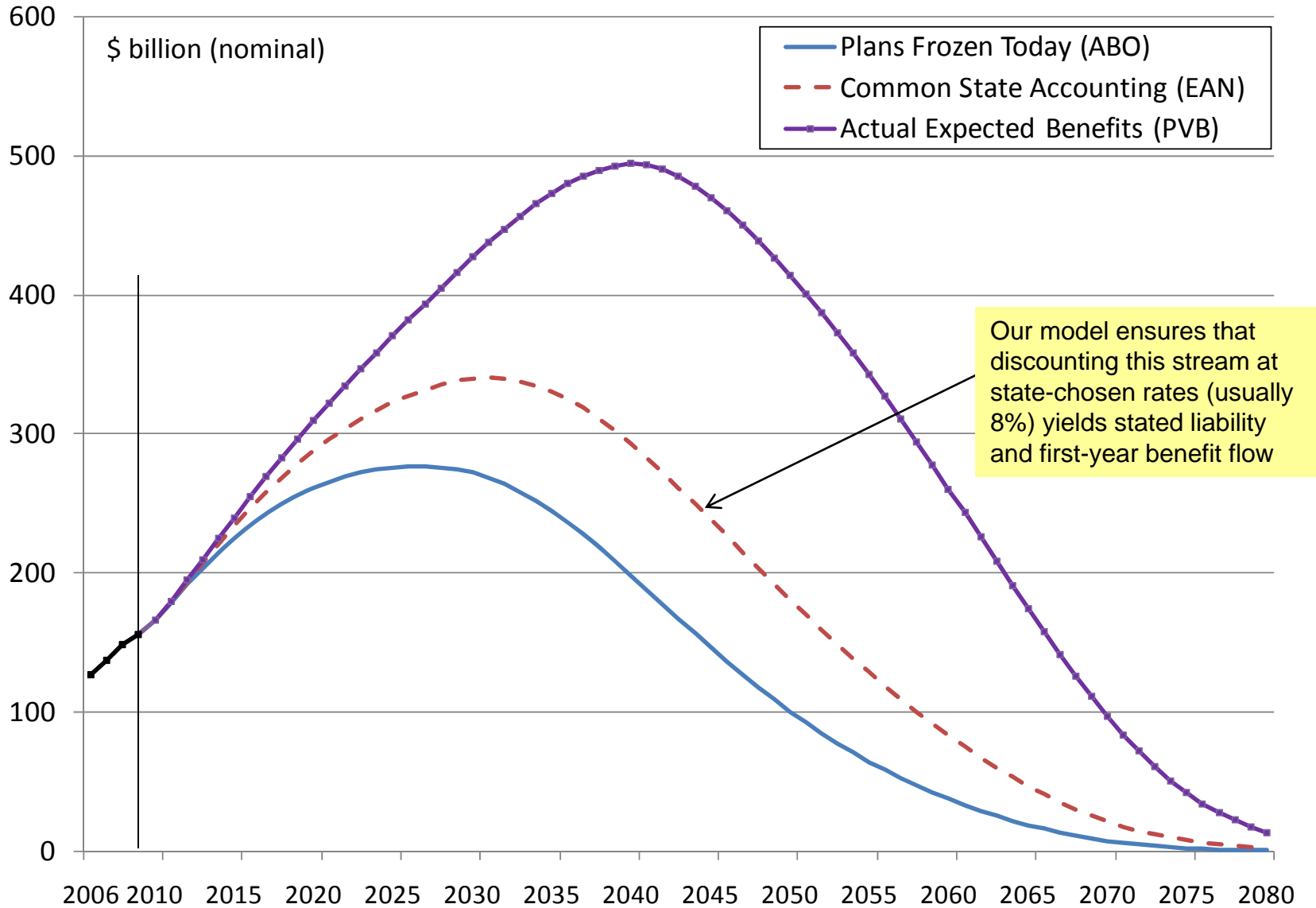
Outline of Questions

1. What are the cash flows that have been and are being promised?
2. What is the present value of these promises?
 - GASB accounting for liabilities: \$3.8 trillion
 - Assets are around \$2.7 trillion
 - Suggests ~\$1 trillion gap... is this right?
3. Extent of stress on state and local governments over next 30 years
4. Policy reforms

1. What are the Cash Flows?

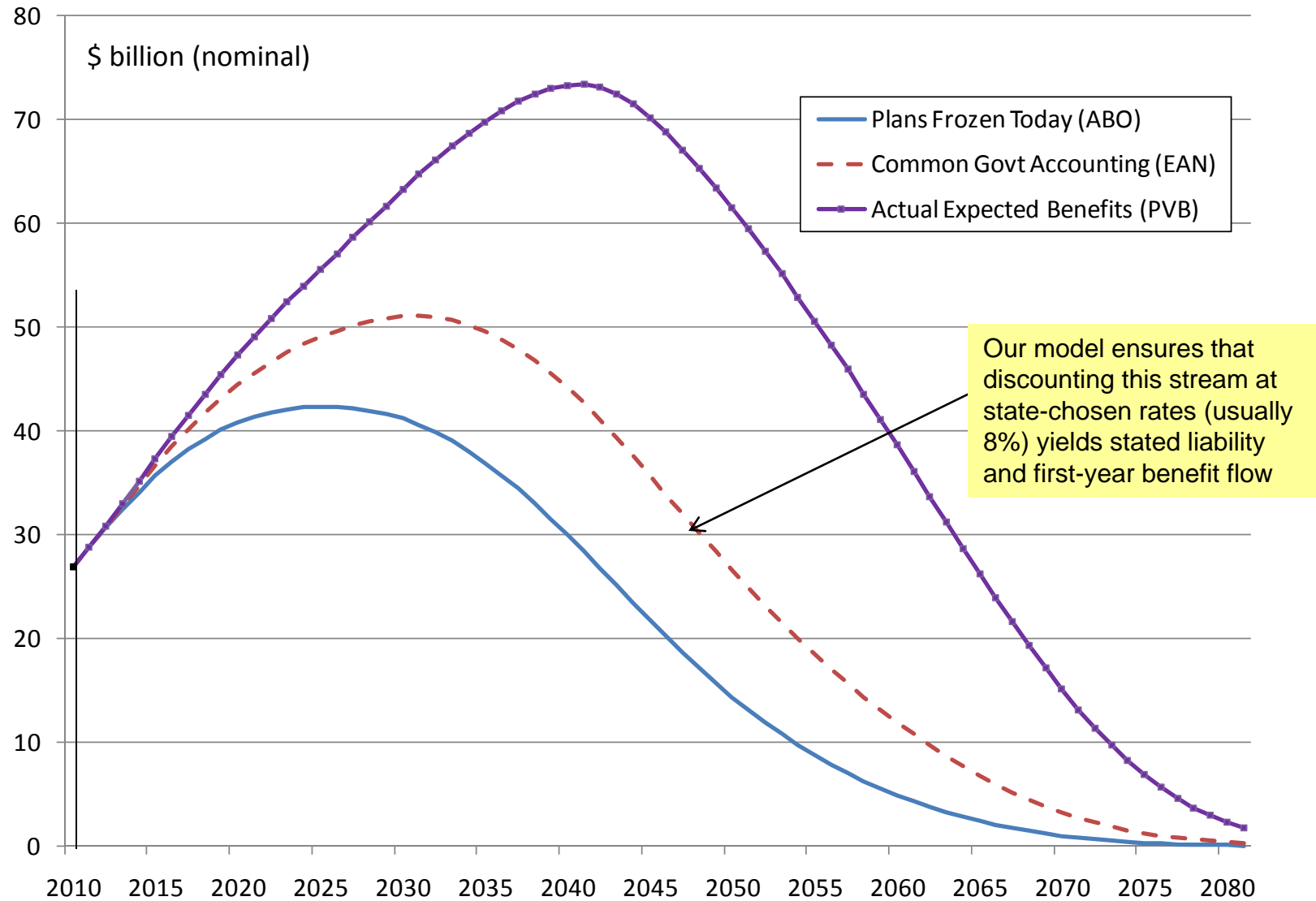
- For each entity, starting point should be annual cash benefit outflow
- Unfortunately not disclosed
 - Plans only disclose a (present value) liability and the discount rate they used
 - Actuarial reports contain demographic data and detailed description of plan rules
 - With much work, can approximately reverse engineer cash flows

Benefit Payments: 50 States



Source: Novy-Marx, Robert and Joshua Rauh, 2011, "Public Pension Liabilities: How Big Are They and What Are They Worth," *Journal of Finance*, forthcoming. http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1352608.

Benefit Payments: 77 Cities and Counties



Our model ensures that discounting this stream at state-chosen rates (usually 8%) yields stated liability and first-year benefit flow

Source: Novy-Marx, Robert and Joshua Rauh, 2011, "The Crisis in Local Government Pensions in the United States," in *Growing Old: Paying for Retirement and Institutional Money Management after the Financial Crisis*, Robert Litan and Richard Herring, eds., Brookings Institution. <http://www.kellogg.northwestern.edu/faculty/rauh/research/NMRLocal20101011.pdf>

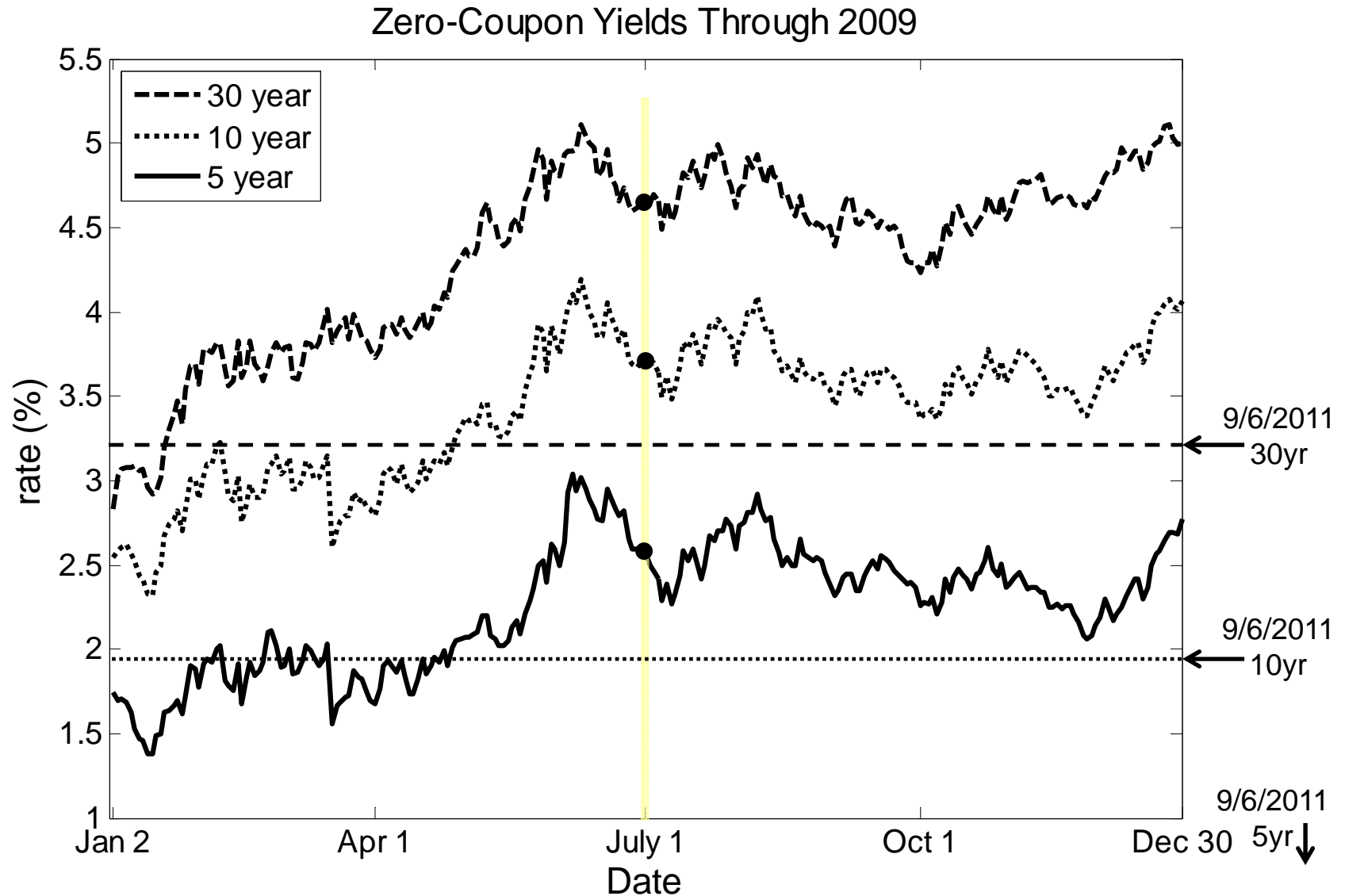
2. The Financial Value of Liabilities

- GASB discount rate for benefit cash flows is an expected return on plan assets, usually flat 8%
 - Contrary to all principles of financial economics
 - Financial valuation would use rates that reflect relative risk or safety of the payment promise
- Only justification for using discount rate higher than risk-free rate is to reflect the possibility of defaulting on pension promises
- Treasury yield curve approximates an appropriate default-free curve

ABO Liabilities in 2009 were ~\$3T

- Taking state accounting as given as of June 2009
 - \$1.0T unfunded at state level + \$0.3T unfunded local
= \$1.3T unfunded in total
- Using Treasury yield curve on ABO as of June 2009
 - \$2.5T unfunded at state level + \$0.6T unfunded local
= \$3.1T unfunded in total
- As of October 2011 it is even larger
 - Assets: up by around 15%, adds around \$0.4 trillion
 - Stated liabilities grew at 5.5% per year from 2007-2009... at that rate would fully offset asset growth
 - Some policy changes since then, but only a few have affected current employees or retirees
 - Yield curves lower → liabilities higher

Zero Coupon Treasury Yield Curves



Bottom line: Unfunded ABO liability as of 10 Oct 2011 over **\$4 trillion**.

3. Revenue Demands

- How much more revenue is needed?
- Potential sources
 - Tax increases
 - Spending cuts
 - Employee contribution increases
- Goal: Pay all pension promises going forward to existing employees, and pay off unfunded legacy liabilities over 30 years
- Analysis on a combined state and local basis within states

How Much More Revenue is Needed?

- Non-employee contributions to retirement benefits are 5.7% of own revenue (taxes, fees & charges)
- To pay benefit promises and be fully funded after 30 years, these contributions in aggregate must
 - More than double...
 - ...reaching 14.2% of total own-revenue in aggregate
 - Increase amounts to 24% of public employee payroll
- Increase would be \$1,398 / U.S. household per year
- Assumes each state grows at 10yr historical average, and no migration
- Much worse for some states than others

Largest Required Contribution Increases

	Gvt Contributions		Required Contribution Increase				
	Current (\$B)	Total Required (\$B)	% of Payroll	% of Tax Revenue	% of Own Revenue	% of GSP	per household
New Jersey ⁽¹⁾	\$3.6	\$11.9	30.9%	17.4%	12.7%	1.7%	\$2,475
New York	\$13.1	\$30.0	25.7%	12.3%	8.6%	1.5%	\$2,250
Oregon	\$1.3	\$4.4	36.1%	24.7%	13.2%	1.9%	\$2,140
Wyoming	\$0.2	\$0.6	23.7%	10.3%	6.5%	1.2%	\$2,080
Ohio	\$3.1	\$12.2	33.2%	21.3%	13.4%	1.9%	\$2,051
California	\$19.5	\$47.8	26.2%	17.7%	10.8%	1.5%	\$1,994
Minnesota ⁽²⁾	\$1.7	\$5.6	28.9%	16.9%	11.0%	1.5%	\$1,928
Illinois	\$6.0	\$15.5	32.3%	17.8%	12.3%	1.5%	\$1,907
New Mexico	\$0.9	\$2.3	29.1%	20.4%	11.4%	1.8%	\$1,756
Colorado ⁽²⁾	\$0.9	\$4.3	42.5%	19.0%	10.6%	1.3%	\$1,739
Rhode Island	\$0.6	\$1.3	27.0%	14.0%	9.4%	1.3%	\$1,576
Pennsylvania	\$2.8	\$10.3	34.9%	14.8%	9.7%	1.4%	\$1,550
Wisconsin	\$1.4	\$4.7	27.0%	14.2%	9.3%	1.4%	\$1,522
Connecticut	\$1.6	\$3.6	22.1%	9.6%	7.5%	0.9%	\$1,459
Michigan	\$3.0	\$8.3	31.7%	15.4%	9.3%	1.4%	\$1,386
Washington	\$2.5	\$6.0	20.8%	13.5%	7.4%	1.0%	\$1,371
Alaska	\$0.3	\$0.7	15.9%	6.4%	3.4%	0.8%	\$1,356
Hawaii	\$0.7	\$1.4	17.2%	10.4%	6.9%	1.0%	\$1,288
Texas	\$5.0	\$17.1	22.1%	15.4%	9.4%	1.1%	\$1,271
Missouri	\$1.8	\$4.7	26.9%	15.5%	9.7%	1.2%	\$1,264

(1) Does not reflect recent COLA suspensions

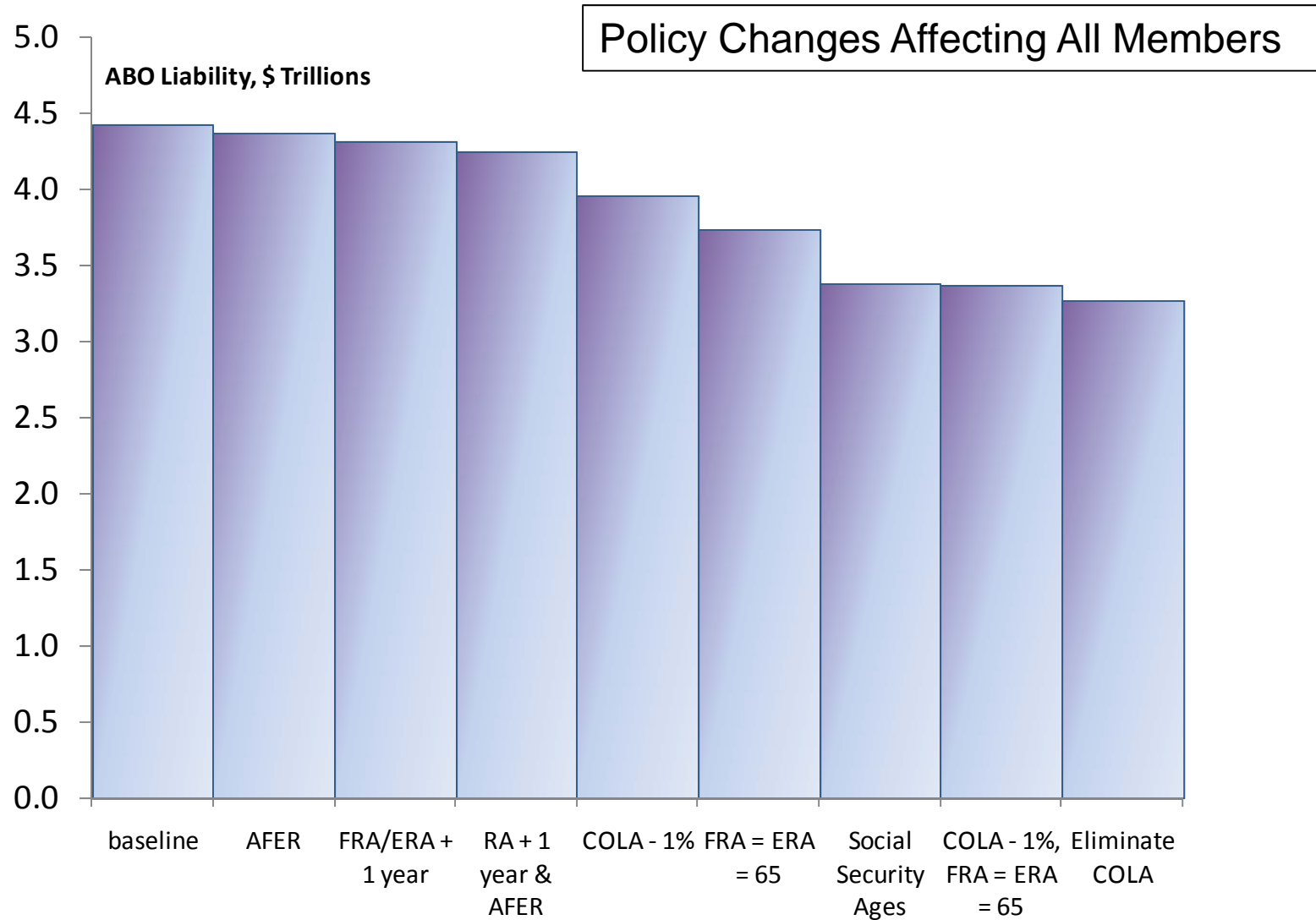
(2) Reflects recent COLA reductions

Source: Novy-Marx, Robert and Joshua Rauh, 2011, "The Revenue Demands of Public Employee Pension Promises," <http://kellogg.northwestern.edu/faculty/rauh/research/RDPEPP.pdf>

4. Policy

- Most policy changes that have been put in place have hardly dented the unfunded liabilities
- As long as GASB rules are in place, new liabilities will continue to be underfunded, debt grows
 - Even if extent of new benefit promises is less than it was before
- Two pieces of policy analysis we have done
 1. How COLA reductions and retirement age increases affect total unfunded liabilities
 2. How introduction of DC plans (soft and hard freezes) would affect the revenue demands
 - Key issue is Social Security for uncovered workers

Effects of Policy Changes on State Liabilities



Source: Novy-Marx, Robert and Joshua Rauh, 2011, "Policy Options for State Pension Systems and Their Impact on Plan Liabilities," *Journal of Pension Economics and Finance*, forthcoming.

Closing Plans to New Workers: Soft Freeze

- Soft freeze: employer pays for 10% DC + SS for new hires
- Still must increase by \$1,223 per household (7.4% of revenue), down from \$1,398
 - Saves costs for 42 of 50 states. Exceptions: states whose employees currently contribute a lot and are not in SS: Ohio, Colorado, Illinois, Massachusetts, Missouri, Louisiana and Maine
 - That analysis assumes state bears full cost of Social Security introduction for uncovered workers
- Ignores transparency benefit to DC plan

Halt Benefit Accruals: Hard Freeze

- Hard freeze: 10% DC + SS for all employees prospectively
- Required increase would be \$805 per household (by 4.9% of revenue), down from \$1,398
- Saves costs for all states, stops new pension borrowing
- Still would require revenue increases to pay down unfunded legacy liabilities
- Large transparency benefits

Conclusions

- Around \$4T in unfunded legacy liabilities, likely to keep growing
- Liquidity issues for some governments
- Conflicts of interest among beneficiaries, taxpayers, and municipal creditors
- Prediction: Taxpayers will bear lion's share, but not before municipal market forces the issue
 - Will states bail out cities?
 - Will federal government bail out states?



Additional Slides

Policy Responses that Affect Liabilities

- For states, we have modeled the following

Single Policy Measures

(1)	COLA – 1%	Cost of Living Adjustment (COLA) reduced by one percentage point relative to what each state system currently uses.
(2)	AFER	Implements Actuarially Fair Early Retirement (AFER). If an employee retires early, benefits are reduced so that the present value of benefits equals the present value if the employee were to delay collecting benefits until the normal retirement age.
(3)	FRA/ERA + 1 year	Raises the normal retirement age and the early retirement age by one year each.
(4)	Eliminate COLA	Cost of Living Adjustment (COLA) reduced to zero.

Multiple Policy Measures

(5)	AFER, FRA/ERA + 1 year	(2) and (3) combined
(6)	FRA = ERA = 65	Raises both Full Retirement Age (FRA) and Early Retirement Age (ERA) to 65 years
(7)	COLA – 1%, FRA = ERA = 65	(1) and (6) combined
(8)	Social Security Retirement Ages	FRA = 67, ERA = 62, early retirement buyouts similar to those used by Social Security

Precisely: We use a linear buyout schedule with a buyout rate equal to 6% + COLA. Social Security uses a non-linear buyout schedule that is roughly 6% per year but unlike the state plans has COLAs that are a.) tied to wage growth and b.) apply prior to the date one begins receiving benefits.

Issue: Liability Recognition

Accumulated Benefit Obligation (ABO)	Narrowest measure: Only recognize benefits earned based on service and salary up until today; includes COLAs
Projected Benefit Obligation (PBO)	Takes projected future salary increases into account in calculating today's liability, but not future years of service. Used in FASB accounting for corporations.
Entry Age Normal (EAN)	Reflects a portion of future salary and service by allowing new liabilities to accrue as a fixed percentage of a worker's salary throughout his career.
Present Value of Benefits (PVB)	Full projection of what current employees are expected to be owed if their salary grows and they work/retire according to actuarial assumptions.

States to Watch

Largest Unfunded Liabilities as Share of Annual Tax Revenues, at Treasury Rates

State	Unfunded Liability (\$B), Treasury Rates	Years of Revenue
Ohio	166.8	6.3
Colorado	57.4	6.0
Illinois	167.3	5.2
Oregon	37.8	5.2
South Carolina	43.2	5.1
Rhode Island	13.9	5.0
Alabama	40.4	4.5
Mississippi	28.7	4.2
New Mexico	23.9	4.2
Kentucky	42.3	4.2
New Jersey	124.0	4.0
Missouri	42.1	3.8
Wisconsin	56.2	3.7
Connecticut	49.0	3.7
New Hampshire	8.2	3.6

Fewest Years of Already-Promised Benefits Covered by Existing Assets (8% Returns)

State	Solvency Horizon	Average Benefit During 5 Years After (\$B)	Ratio to Projected Revenues (3% Revenue Growth)
Illinois	2018	13.6	32%
Connecticut	2019	4.9	27%
Indiana	2019	3.6	17%
New Jersey	2019	14.4	34%
Hawaii	2020	1.7	24%
Louisiana	2020	4.3	27%
Oklahoma	2020	3.7	30%
Colorado	2022	7.8	54%
Kansas	2022	2.5	23%
Kentucky	2022	5.3	35%
New Hampshire	2022	1	30%
Alabama	2023	5.5	39%
Michigan	2023	7.8	20%
Minnesota	2023	7.3	25%
Mississippi	2023	3.9	37%

Cities and Counties to Watch

Largest Unfunded Liabilities per Household, at Treasury Rates

City or County	Unfunded Liability	
	\$ billions	per household
Chicago	44.8	\$ 41,966
New York City	122.2	\$ 38,886
San Francisco City & County	10.7	\$ 34,940
Boston*	7.5	\$ 30,901
Detroit	6.4	\$ 18,643
Los Angeles	26.1	\$ 18,193
Philadelphia	9.7	\$ 16,690
Cincinnati	2.0	\$ 15,681
Baltimore	3.7	\$ 15,420
Milwaukee	3.4	\$ 14,853
Fairfax County	5.6	\$ 14,415
Hartford	0.7	\$ 14,333
St Paul Schools	1.4	\$ 13,686
Jacksonville	4.0	\$ 12,994
Dallas	6.3	\$ 12,856

Fewest Years of Already-Promised Benefits Covered by Existing Assets (8%)

City or County	Solvency Horizon	Average Benefit	Ratio to Projected
		During 5 Years After (\$M)	Revenues (3% Revenue Growth)
Philadelphia	2015	827	19%
Boston*	2019	695	27%
Chicago	2019	4,551	53%
Cincinnati	2020	219	24%
Jacksonville	2020	438	20%
St Paul Schools	2020	151	32%
New York City	2021	15,976	23%
Baltimore	2022	480	21%
DeKalb County	2022	215	18%
Fulton County	2022	169	12%
Kern County	2022	480	51%
Baltimore County	2023	309	11%
Detroit	2023	873	33%
Fort Worth	2023	290	27%
Sonoma County	2023	242	39%

* This is before Boston Teachers liabilities were transferred to state of Massachusetts in 2010

Major Policy Changes Enacted by States

- COLA Reductions for all members
 - Colorado: froze for 1 year, thereafter capped at 2%
 - Minnesota: 2.5% until plans reach 90% funding
 - South Dakota: based on funding status
 - New Jersey: has suspended COLAs (!)
- Some significant changes affecting new workers
 - Moving new workers to 401(k)-type plans
 - Utah (effective this year)
 - Alaska (since 2006)
 - Michigan (only one of several major plans, since 1997)
 - Georgia: new workers get a reduced DB plus a DC plan
- A number of states have increased employee contributions

Issues

- Ability and willingness of state and local governments to undertake reforms – or even recognize truth of the numbers
- Approach of ratings agencies
- Implicit federal backstops of both the pension and non-pension debt
- Possibility of federal regulation to limit exposure