

# The Sustainability of State and Local Government Pensions: A Public Finance Approach

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The Pension Crisis: State and Local Pension Challenges

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# Disclaimers

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# Introduction

- Topic: Fiscal sustainability of state and local gov. pensions
- Questions:
  - Are state and local pensions fiscally sustainable under current benefit and funding levels?
  - If not, what is required to make them sustainable?

# Introduction (cont.)

- Past work has approached question from finance perspective
  - Establish size of liabilities
  - PDV of promised benefits using current financial market prices (e.g. Novy-Marx and Rauh 2011)
- We adopt a methodology more rooted in public finance
  - PAYGO pension stability
  - Sustainability of public debt

# Preview of Conclusions

- In aggregate, pensions can be stabilized with moderate fiscal adjustments under low and moderate asset return assumptions
- Only moderate returns to stabilizing immediately versus in the future (e.g. 10 years in future)
- Lots of heterogeneity and some plans are far from stable

# Background: Concern over Sustainability

- Calculating liabilities requires a discount rate
- Pensions have typically used a high discount rate
- Strong legal protections -> low discount rate
- Large unfunded S&L pension liabilities
  - Unfunded liabilities  $\approx$  \$4 trillion (Rauh 2017 & FA)
  - 50% funding ratio
- Unfunded liabilities  $\rightarrow$  widespread sustainability concerns
  - Academics, press, rating agencies, policymakers

# Fiscal Sustainability

- Prefunding not required for fiscal sustainability
- Fully unfunded pay-as-you-go (paygo) pension systems can be sustainable
  - e.g. Samuleson (1958)
- PAYGO sustainable if internal rate of return does not exceed the growth rate of the wage base (labor force growth + productivity growth)

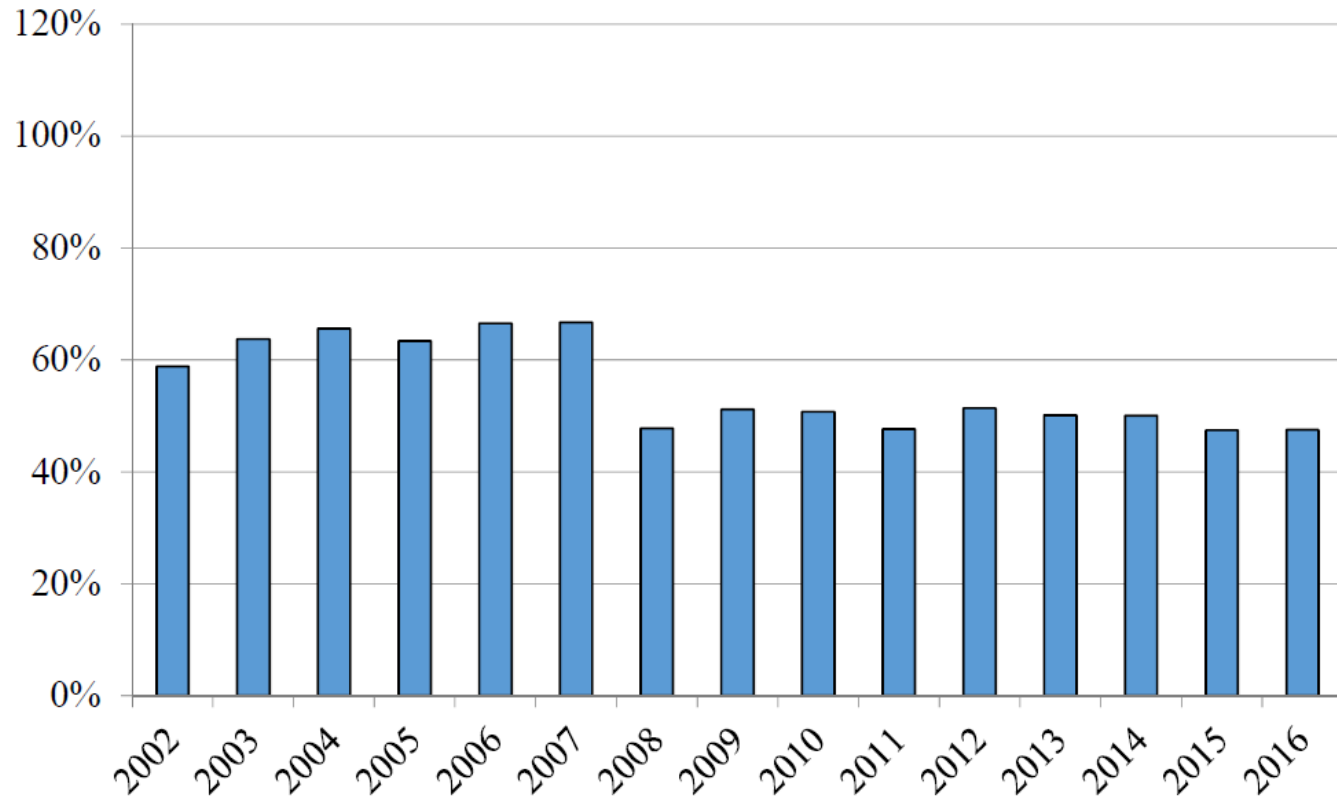
# Sustainability of PAYGO

- Stable PAYGO can become unsustainable if
  1. Demographic or economics changes increase outlay growth and/or lower revenue growth
  2. Policymakers increase benefits
- Hybrid system – partially PAYGO and partially prefunded – can be stable in face of these shocks
- Most S&L pensions have effectively long been hybrid systems
- We analyze these pension as hybrid systems
  - Most past work has focused on a full prefunding benchmark



# How Funded are State and Local Pension Plans?

Panel B: State and Local Government Pension Funding Ratios Under AAA Corporate-Bond Interest Rate



Source: Financial Accounts of the United States

- Looking back to 1978:
  - 1 in 6 plans had no prefunding
  - Only 25% of plans were contributing sufficiently to prevent liability growth
  - 1 in 4 local plans did not even conduct actuarial valuations

# Public Debt Sustainability

- Unfunded pension liabilities = implicit public debt
- Public debt can be sustainable with no fiscal costs
  - Roll over debt indefinitely with no tax or expenditure changes
- Requires  $r = g \rightarrow$  debt-to-GDP ratio stable with balanced primary budget
  - $r$  = interest rate
  - $g$  = GDP growth
- Current historically low interest rates  $\rightarrow$  public debt sustainable (Blanchard 2019; Furman and Summers 2019; Elmendorf and Sheiner 2017)
- Implicit pension debt – i.e. unfunded liabilities as a share of GDP – can be stable with no additional fiscal costs

# Caution Required!

- Pension debt can be sustainable in principal, but may not be in practice
- Our findings suggest pension debt not currently sustainable

# Data

- Public Plans Database (PPD) from BC Retirement Center
- 2017 Actuarial Valuations (AVs) and Comprehensive Annual Financial Reports (CAFRs)
- Sample of 40 plans
  - Small sample reflects extremely labor intensive nature of methodology
  - Sample observationally similar to universe of S&L pensions

# Estimation Sample of State and Local Pension Plans

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	Estimation Sample	Public Plans Database National Sample
Assets / Liabilities	0.71 (0.16)	0.71 (0.17)
Unfunded Liabilities / Payroll	2.04 (1.60)	2.07 (1.63)
Total Pension Contributions / Payroll	0.24 (0.11)	0.24 (0.11)
Active Members / Retired Members	1.37 (0.36)	1.34 (0.37)
Projected Percent Active Member Growth	0.41 (0.57)	0.44 (0.60)
Observations	40	180

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# Methodology

- Analyzing sustainability requires benefit cash flows
- Actuarial reports provide the pension liability and actuarial assumptions
- Reverse engineer cash flows
  - Method pioneered by Novy-Marx and Rauh (2011, 2014)
  - Used in Lutz and Sheiner (2014)

# Reverse Engineering Cash Flows

- Collect:
  - For current employees: age, years of service, withdrawal and retirement probabilities, pension benefit calculations, wage growth
  - For current retirees: ages, average benefit
  - For all: mortality probability, COLAs, discount rate
- Construct statistical machinery to "age" workers and retirees and calculate benefits
  - Each year: apply quit, disability, death, and retirement probabilities
  - Surviving workers gain a year of age & service, receive wage increases
  - Each year calculate benefits for retirees

# Reverse Engineering Cash Flows (cont.)

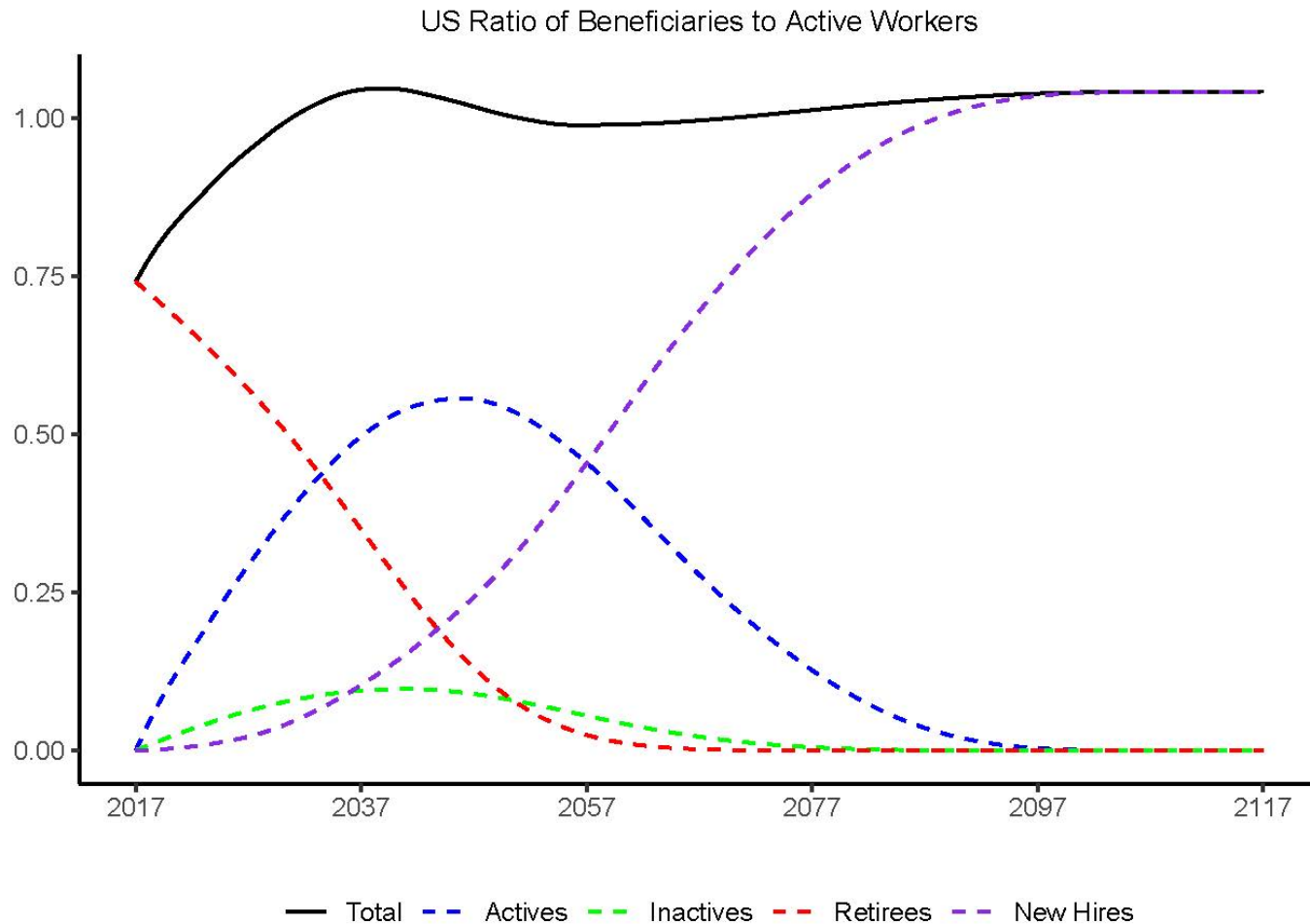
- Simple conceptually, but very challenging in practice
- Calculate PDV of liabilities and compare to reports
  - Errors are about zero on average but larger for some plans and for current workers



# Final Steps

- Harmonize assumptions: use same discount rate, inflation rate, wage growth, asset returns for all plans
- Project population and GDP on state or locality specific basis
- Add new hires each year based on state population

# US Ratio of Beneficiaries to Workforce

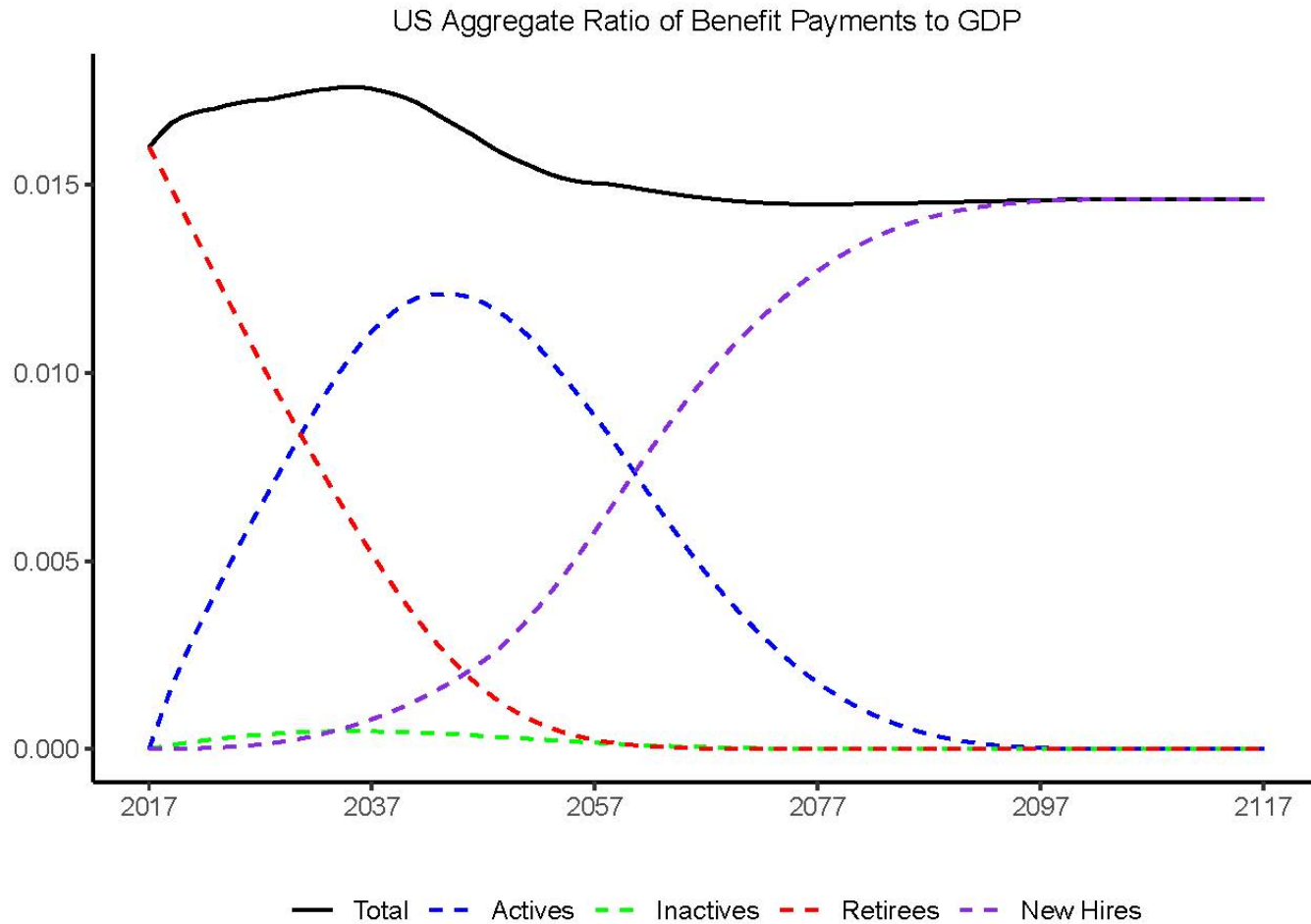


Demographic transition increasing ratio of retirees to workforce

Ratio increases nearly 40 percent over next two decades

Rise is almost the same as projected for Social Security

# US Ratio of Benefit Payments to GDP



Benefits rise much less than # retirees – about 9% over next two decades

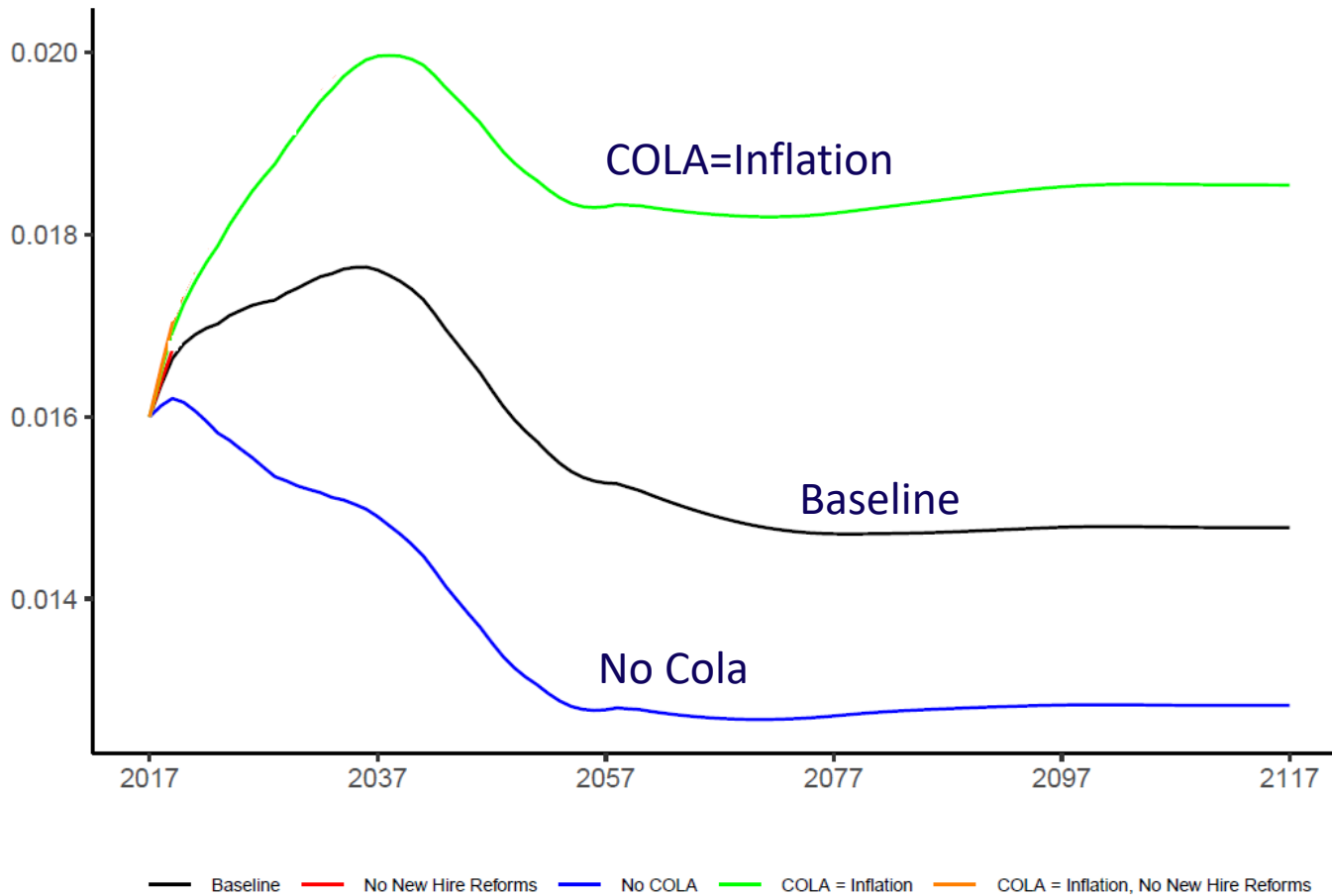
Then benefits decline as a share of GDP – not at all like Social Security

Plans get eventual fiscal relief

Governments may wish to smooth through period of peak benefits

# Why Don't Benefits Rise More?

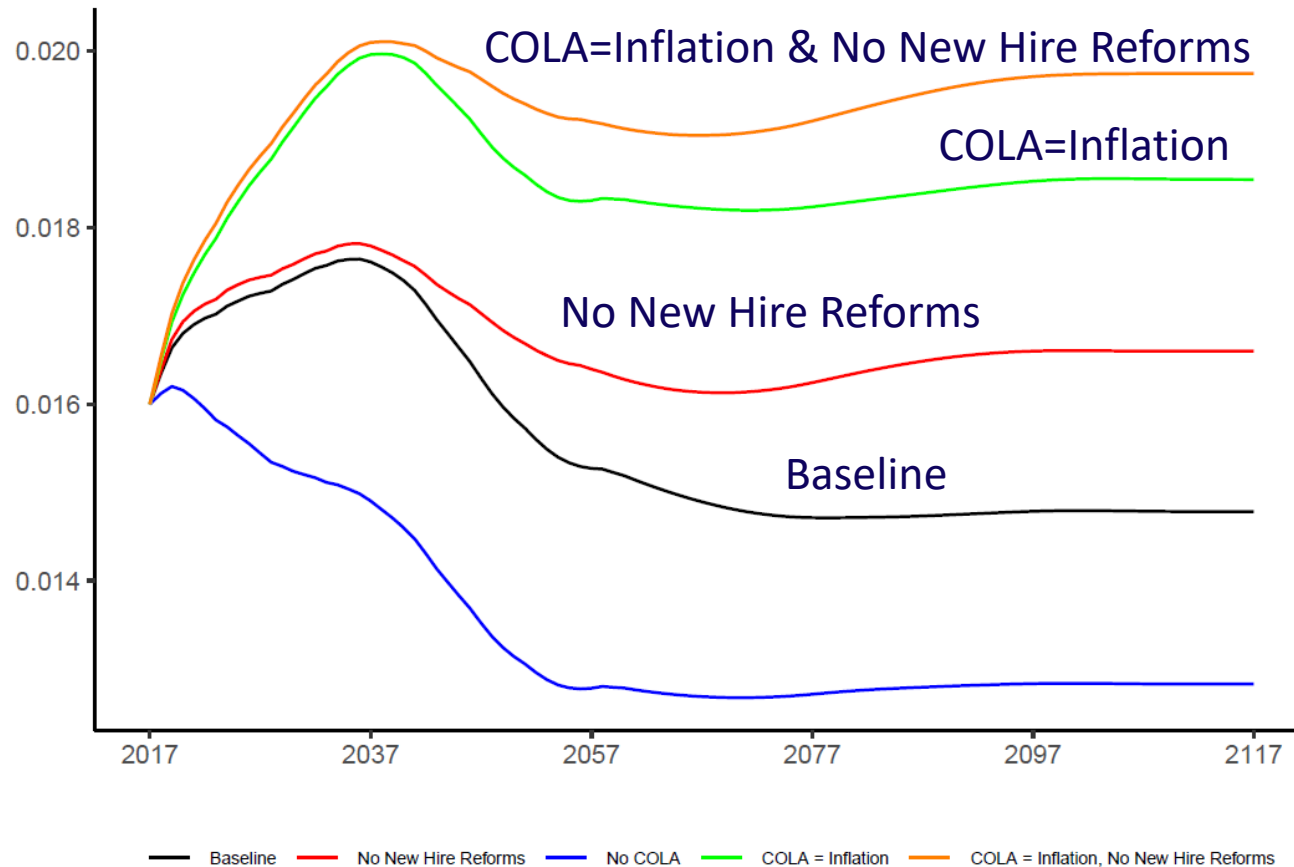
US Aggregate Ratio of Benefit Payments to GDP



- 17 out of 40 plans have lowered COLAs since 2007
  - If COLAs equaled inflation, benefits would rise about 25% over next two decades.
  - If plans eliminated COLAs (many could do so legally), benefits would eventually fall an additional 9%.

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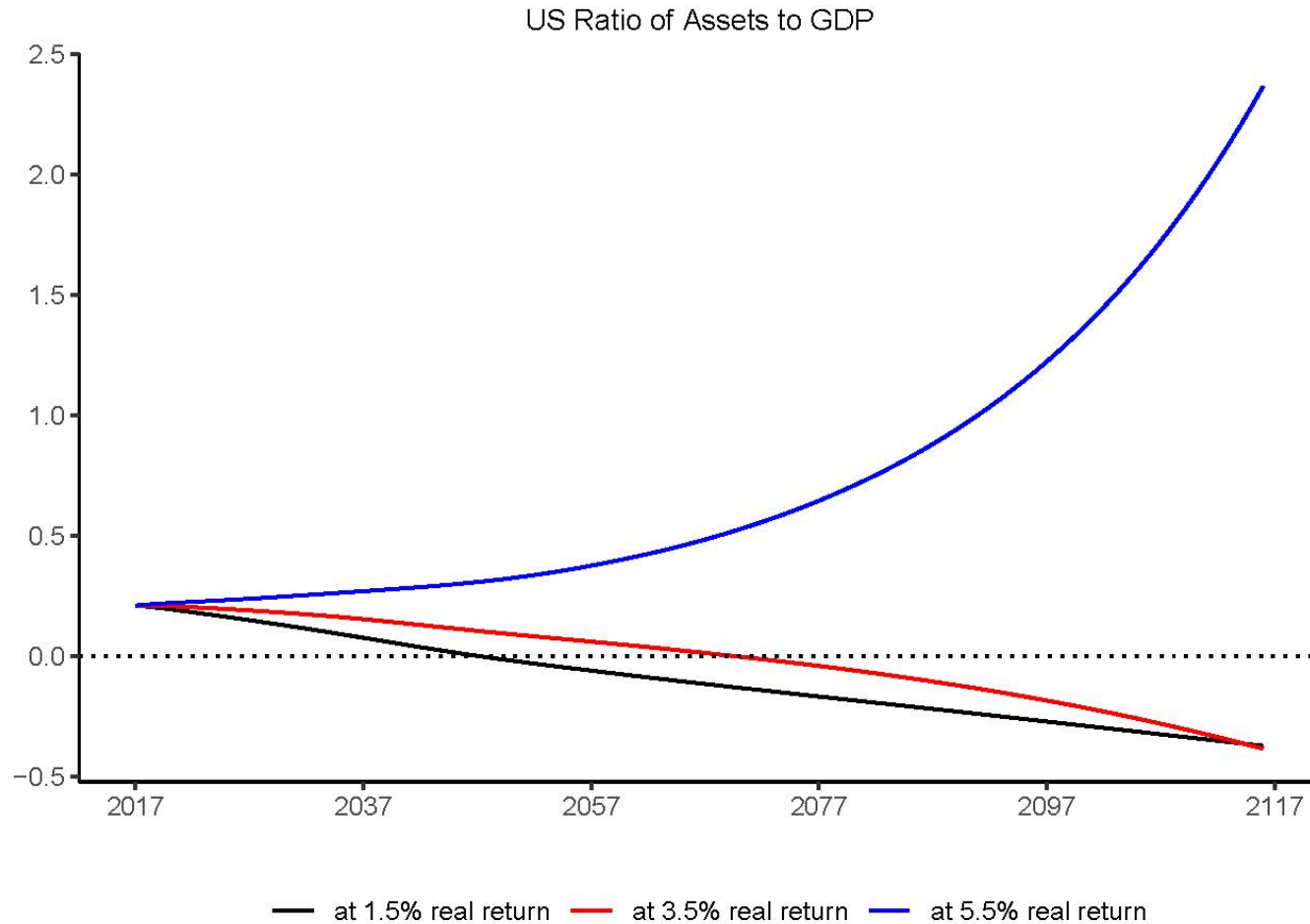
Plans have made plans less generous for new hires (adjusting retirement ages, benefit factors, vesting, etc.)

- If reforms for new hires eliminated, benefits would be about 12% higher in long run

# Sustainability Analysis

- Assume plans maintain current contribution as share of payroll to pensions in the baseline.
- Discount the value of the liabilities at a risk-free rate.
- Consider 3 deterministic rates of return on pension assets
  - 1.5% real return = risk-free rate
  - 5.5% real return = expected rate
    - About what plans have realized since 2000
  - 3.5% real return = middle ground.

# Exhaustion Dates: One way of assessing sustainability



In aggregate

- plans exhaust (hit zero assets) in 30 years under a 1.5% rate of return
- Around 50 years under 3.5%

# Making Pensions Sustainable

## 2 Stabilization Exercises

Choose one-time permanent change in contributions to:

1. **Long-run:** Debt as share of GDP is constant in long run (without regard to the level)
2. **30-year Medium-run:** Return to today's debt-to-GDP ratio by the end of 30 years



# Contribution to Stabilize Implicit Debt in Long-Run

Real rate of return	Increase in contribution rate required if changes are made (percent of payroll):			
	Start Today	Start In 10 years	Start In 20 years	Start In 30 years
1.5%	12.7%	12.89%	13.06%	13.2%
3.5%	4.28%	5.46%	6.82%	8.41%
5.5%	-5.2%	-7.55%	-10.97%	-15.87%

At 3.5% return, contribution increase about 4% of payroll today. Rises to 8% if delay 30 years.

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5.5%	-5.2%	-7.55%	-10.97%	-15.87%

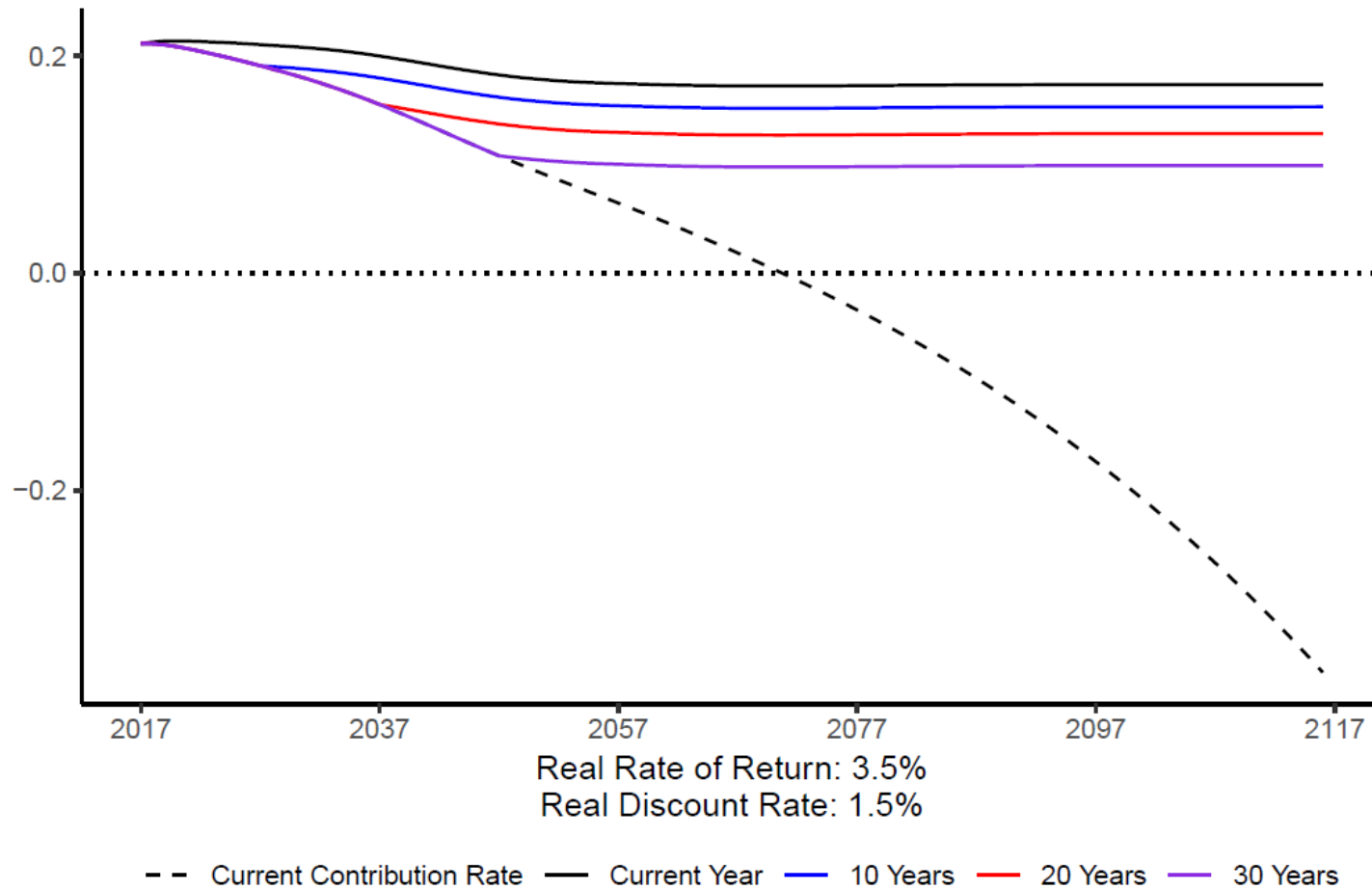
At 3.5% return, contribution increase about 4% of payroll today. Rises to 8% if delay 30 years.

At 1.5% return, contribution increase about 13% of payroll, regardless of when you start.  
Why? 1.5% return is only sufficient to hold assets-to-GDP ratio fixed.

The lower the rate of return, the larger the required increase, but the less urgency to act.

# Assets Under Long-Run Stabilization

US Pension Assets Under Pension Debt Stabilization  
(Stabilization Started at Different Time Horizons)



# Implicit Debt to GDP Returns to Today's Level in Year 30

Implicit debt gets back to today's level in 30 years

Real rate of return	Start Today	Start In 10 years	Start In 20 years
1.5%	13.97%	18.32%	22.81%
3.5%	4.19%	6.25%	9.05%
5.5%	-5.74%	-9.61%	-14.84%

- At 3.5% return, contribution increase about 4% of payroll today. Rises to 9% if delay 20 years.
- Delay causes contribution to increase, because have to not just stabilize but pay down debt

# Implicit Debt to GDP Returns to Today's Level in Year 30

Implicit debt gets back to today's level in 30 years

Real rate of return	Start Today	Start In 10 years	Start In 20 years
1.5%	13.97%	18.32%	22.81%
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5.5%	-5.74%	-9.61%	-14.84%

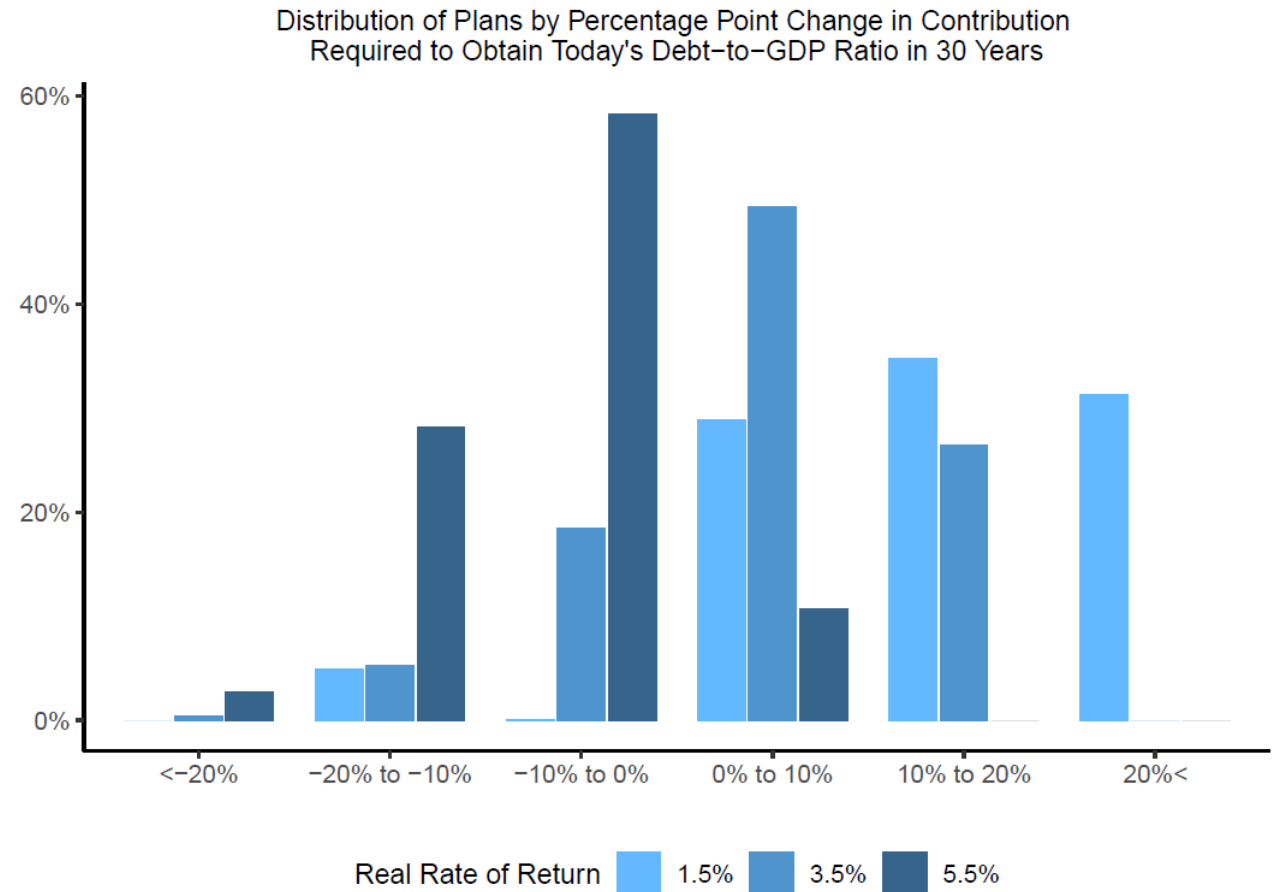
- At 1.5% return, contribution increase about 14% of payroll today. Rises to 23% if delay 20 years.
- Delay causes contribution to increase, because have to not just stabilize but pay down debt

# Full Funding Requires Much Larger Adjustments

<u>Rate of Return</u>	Fully Funded in 30 Years			Implicit Debt Gets Back to Today's Level in 30 Years		
	Start Today	Start In 10 years	Start In 20 years	Start Today	Start In 10 years	Start In 20 years
1.5%	35.52%	55.76%	120.01%	13.95%	18.30%	22.72%
3.5%	20.34%	35.62%	84.90%	4.16%	6.20%	8.89%
5.5%	6.15%	12.29%	32.72%	-5.76%	-9.67%	-15.07%

# Lots of Heterogeneity Across Plans

- All of this for the aggregate state and local pension sector
- Some plans in much better shape, some in much worse



# Conclusions

- In aggregate, plans can become sustainable with modest changes in funding assuming moderate asset returns.
- At risk free rates of return, changes are larger, but less urgency in acting sooner rather than later
- Significant heterogeneity
- Next step: Place pension stabilization within the broader context of state and local budgets



# Thank you!

Comments welcome:

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# Future Work

## Sensitivity Analysis:

Demographics

Productivity Growth

Mortality

No Colas

Broaden context to overall state and local fiscal outlook

State and local governments have debt as well as pension assets. Lower interest rates mean lower rates of return on pension assets, but also lower interest costs on debt. Net effect should be smaller than calculated here.

How does fiscal stress from pensions compare to stress from Medicaid over long run?