MERS®
Municipal Employees' Retirement System

2019
Annual Retirement Conference

A Look Ahead at Defined Benefit Retirement Plans

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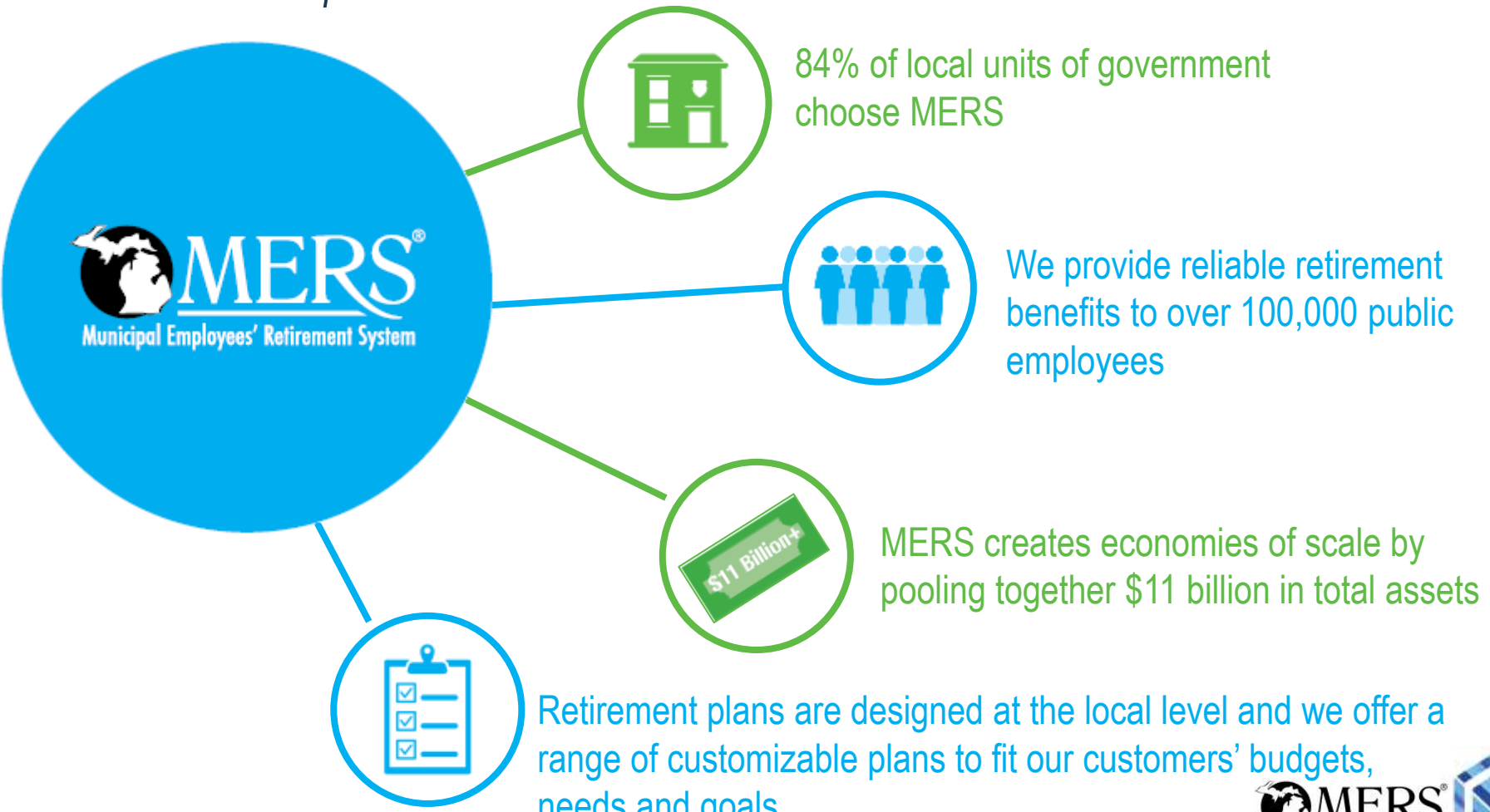
Agenda

- Responsible Funding Practices
- Deep Dive Into Actuarial Assumptions
- MERS Total Market Portfolio and Performance
- Looking Ahead

MERS of Michigan

MERS is an independent professional retirement services company that was created to administer the retirement plans for Michigan's local units of government on a not-for-profit basis



84% of local units of government choose MERS

We provide reliable retirement benefits to over 100,000 public employees

MERS creates economies of scale by pooling together $11 billion in total assets

Retirement plans are designed at the local level and we offer a range of customizable plans to fit our customers' budgets, needs and goals

An Independent Elected Board

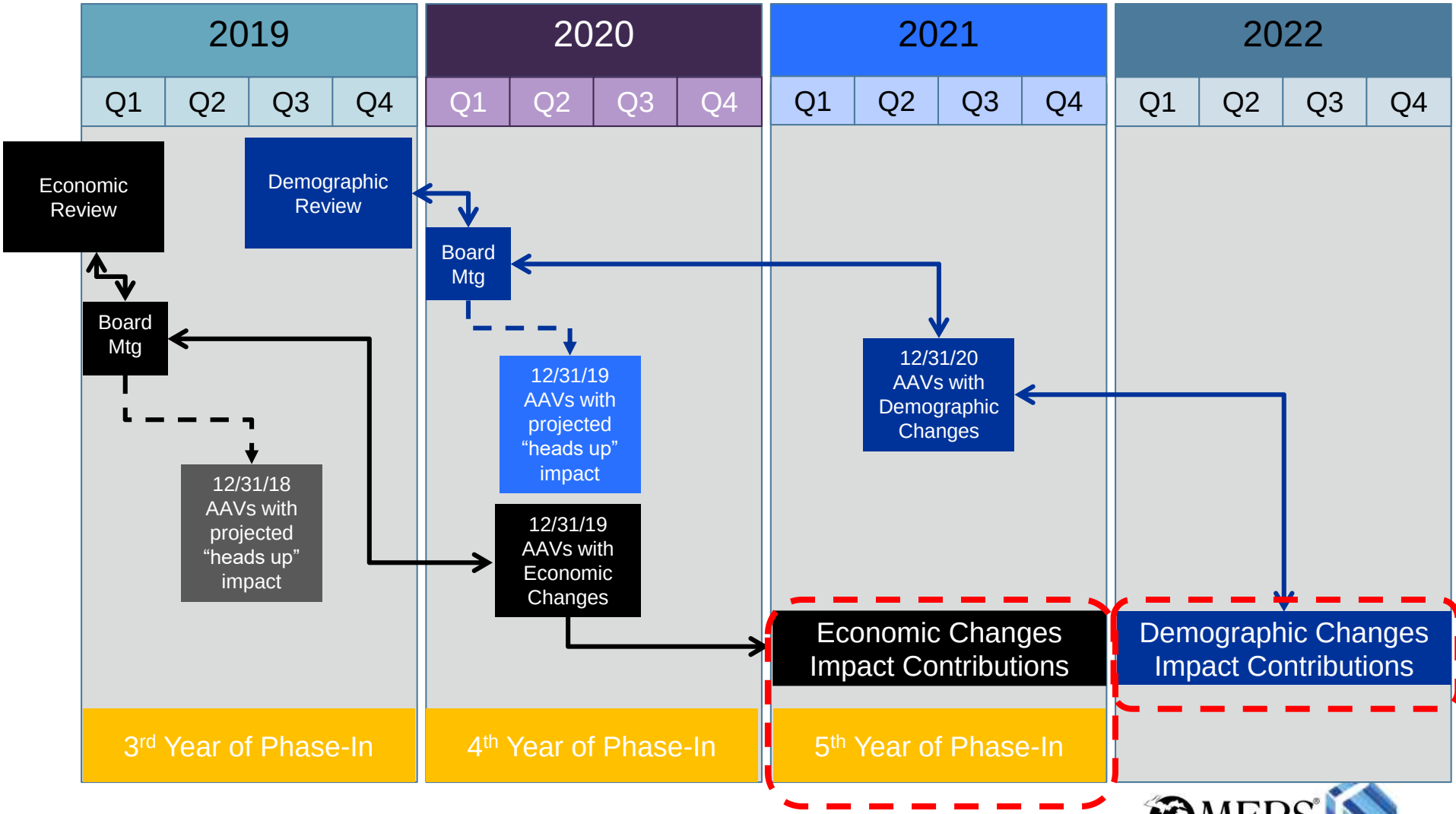
- MERS is governed by an elected board that operates without compensation
- Our board is committed to accountability and transparency, holding the line on costs, and watching out for the best interest of our members
- The ***MERS Retirement Board takes on the sole fiduciary responsibility***

Responsible Funding Practices

Responsible Funding Practices

- Required contributions are calculated by an **accredited actuary** using assumptions about future events
- Assumptions fall into two categories **— economic and demographic**
- **Each year** if actual experience is different from the assumptions, gains or losses are recognized on a fixed amortization period
- As part of our **fiduciary responsibility**, we check assumptions *at least* every five years
- In today's ever-changing world, there is a need to review economic assumptions more frequently so that plans can make **incremental changes**
- MERS has moved up the review of our economic assumptions to help ensure MERS plans are continuing to **adequately fund benefits**

Timeline


2019
2020
2021
2022
Q1
Q2
Q3
Q4
Economic Review
Demographic Review
Board Mtg
Board Mtg
12/31/18 AAVs with projected "heads up" impact
12/31/19 AAVs with projected "heads up" impact
12/31/19 AAVs with Economic Changes
12/31/20 AAVs with Demographic Changes
Economic Changes Impact Contributions
Demographic Changes Impact Contributions
3rd Year of Phase-In
4th Year of Phase-In
5th Year of Phase-In

Deep Dive into Actuarial Assumptions

Funding Policy Goals & Priorities

Adequacy

- Ensuring each plan's assets are sufficient to provide for the benefits that are expected to be paid and that each plan is making reasonable progress to achieve full funding

Intergenerational Equity & Transparency

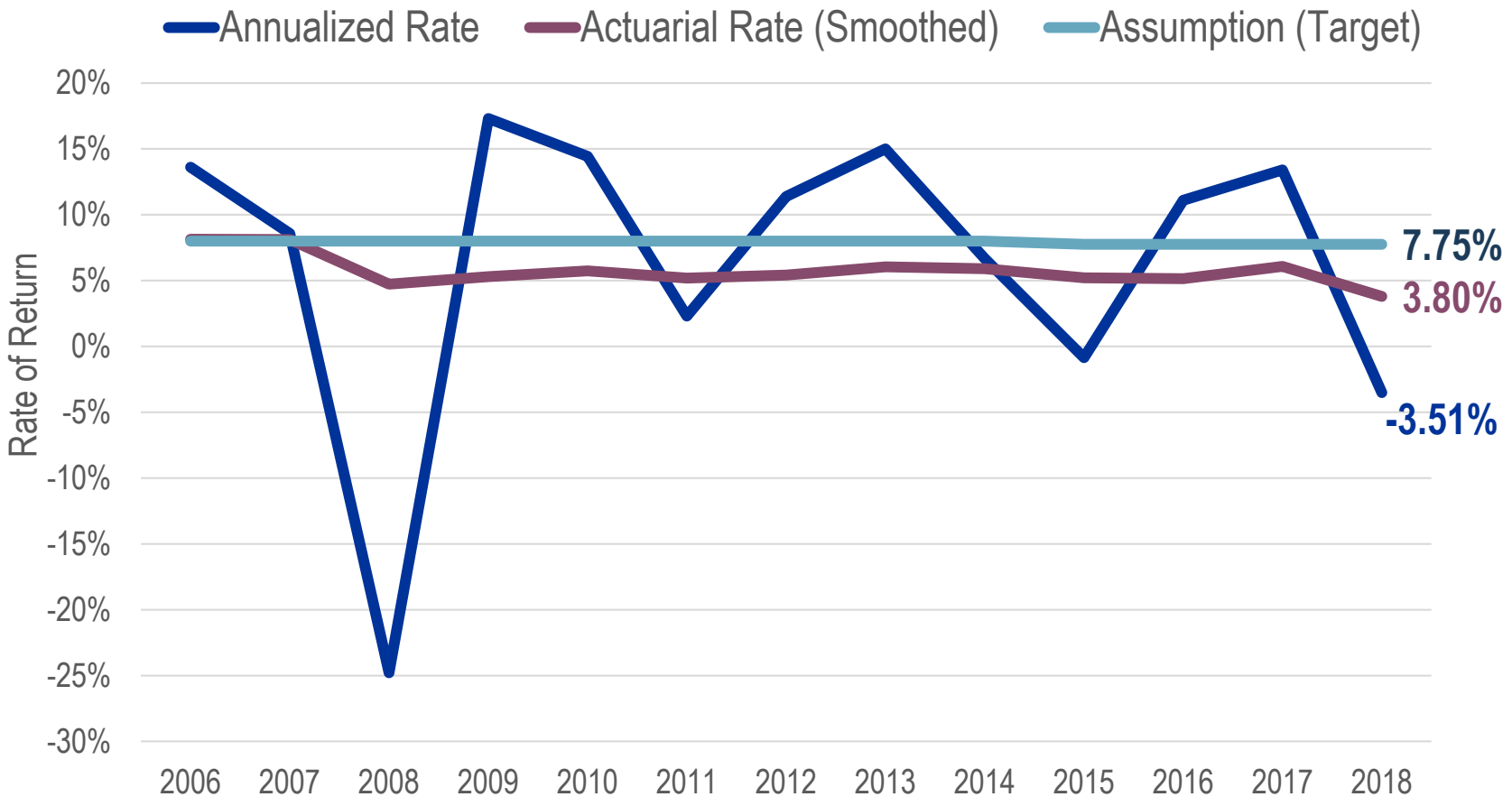
- Each generation should incur the cost of benefits for the employees who provide service in that generation, rather than deferring those costs to future employees
- The funding policy should be easily understood

Contribution Stability & Governance

- Contribution volatility should be balanced with the commitment to ensure plans are properly funded

Funding Policy – Asset Smoothing

Smoothing is a buffer against extreme fluctuations in the market



**Investment rate of return is gross of fees*

Understanding Various Rates of Return

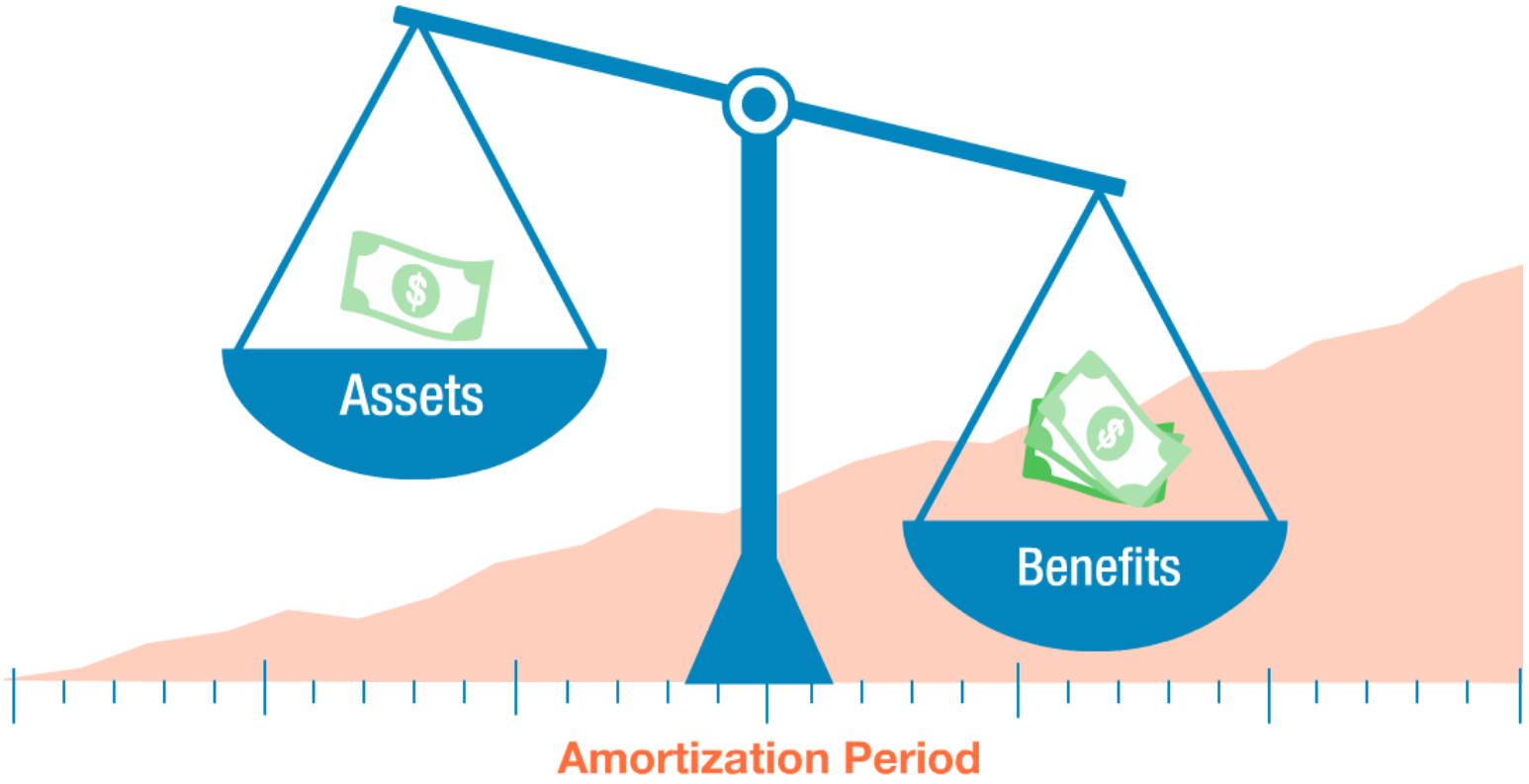
Rate of return calculations differ depending on their purpose

Actuarial

Actuarial Rate of Return (smoothed)	Market Rate of Return	Annualized Rate of Return
3.80%	**-4.12%**	**-3.51%**
• Net of expenses • Used in valuations • Uses smoothed rate of historical return	• Net of expenses • Simplified estimate • Assumes contributions and benefits are paid mid-year	• Gross • Published on MERS' website • Calculated by external banking custodian

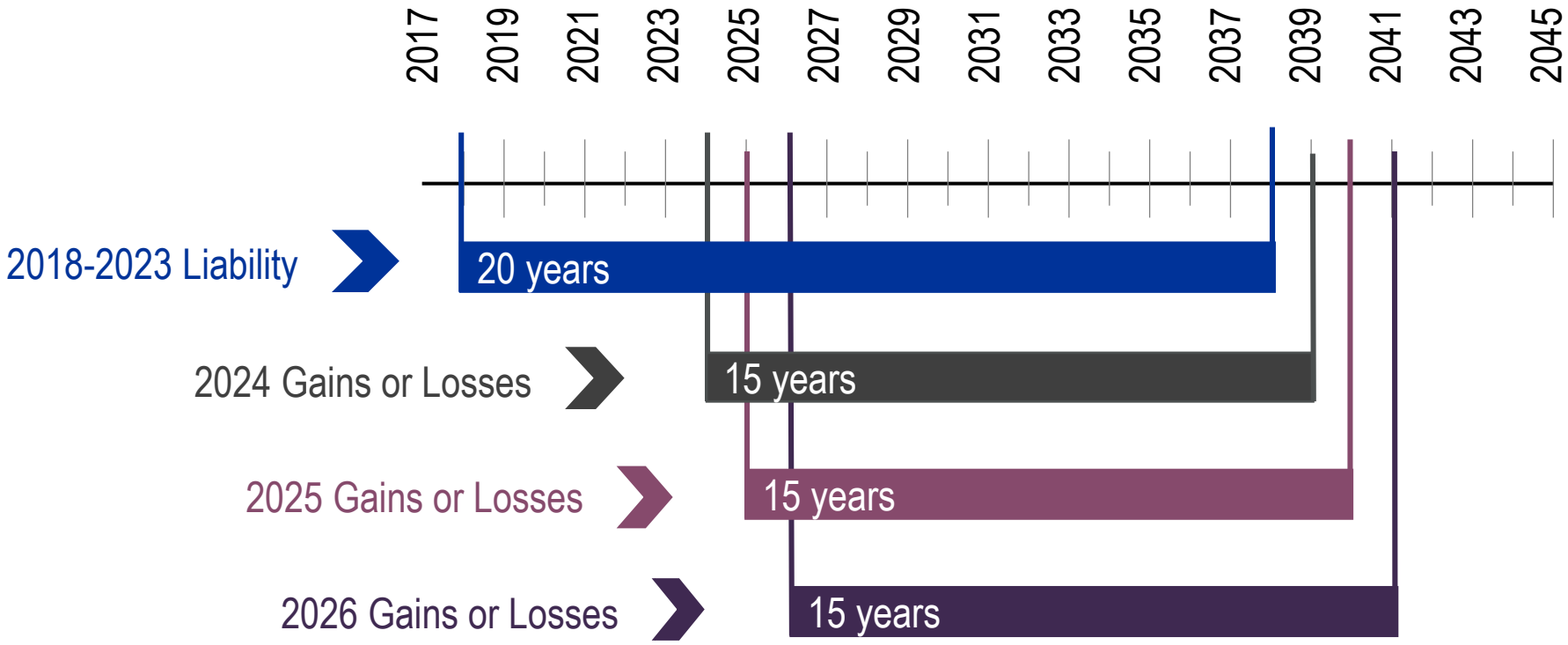
Various rates of return shown are for 2018

Amortization Policy



Unfunded liability is paid off over a fixed period of time known as the amortization period.

Layered Amortization Example



Economic Assumptions

- Economic assumptions are **forward** looking
- The actuary looks at estimates of future economic conditions inherent in current market data, expert opinions, investment consultant expectations, etc.
- Public retirement systems follow a process for establishing the investment return assumption that considers various financial, economic and market factors, and is based on a long-term view

Key Economic Assumptions

	Current Assumption	New Assumption Effective 12/31/2019
Price	2.50%	2.50%
Wage	3.75%	**3.00%**
Merit & Longevity	Based on an age scale	Based on an age scale
Investment Return	7.75%	**7.35%**

Investment Rate Review Process

- In mid-2018, GRS conducted an independent analysis of the investment rate assumption
- The Capital Market Assumption Modeler (CMAM) analysis uses capital market assumptions from 12 nationally recognized investment consultants and other sources*
- Adapted MERS' asset allocation policy to fit into the consultants' assumptions, adjusting for known differences
- GRS looked at 10, 20 and 30-year forecasts

** Consultants were: Aon Hewitt, JPMorgan, BNY Mellon, Callan, Mercer, Voya, Marquette Associates, NEPC, PCA, RVK, Summit Strategies, and Willshire*

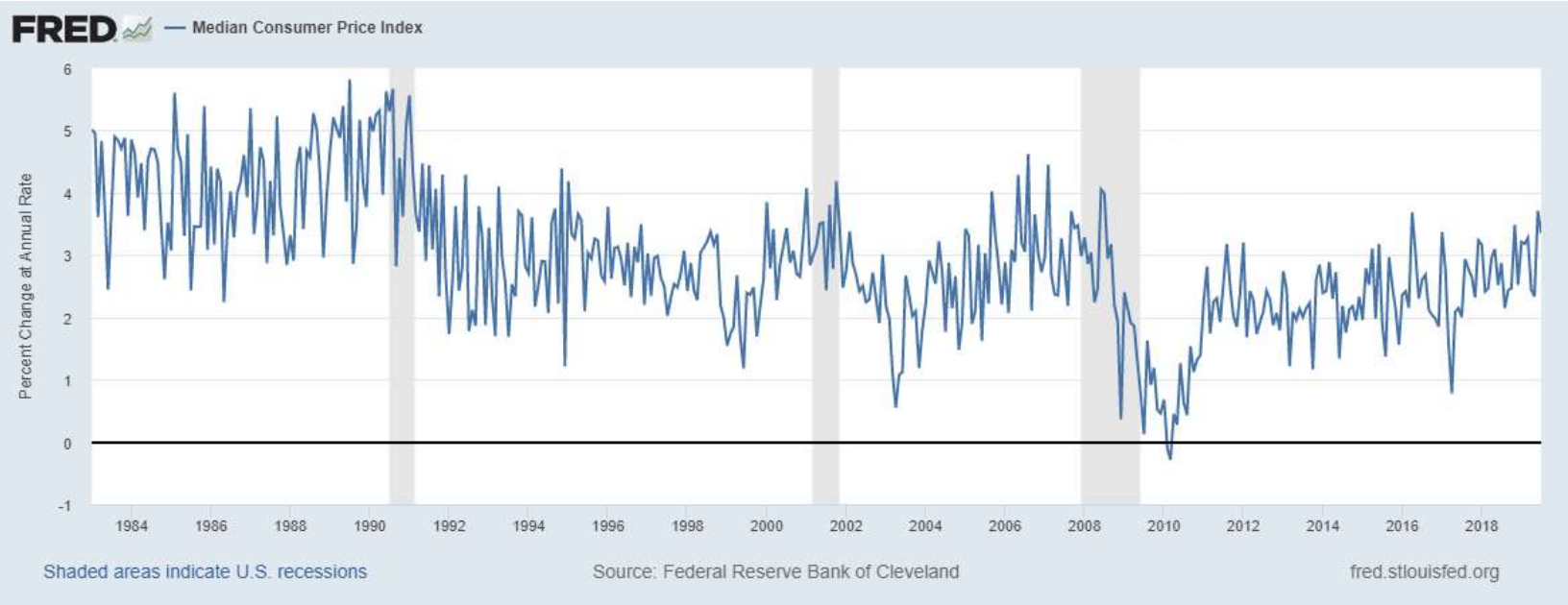
Investment Return Assumption

- Expected investment returns are likely to be materially **lower than the past** due to historically low interest rates and high equity market valuations
- Plans around the country have made reductions to their investment return assumption
- MERS **reduced the investment assumption** from 7.75% to 7.35% effective 12/31/19
- The impact of the economic assumption change was included in your recent evaluation, but it **won't affect contributions until FY 2021**

Wage Inflation

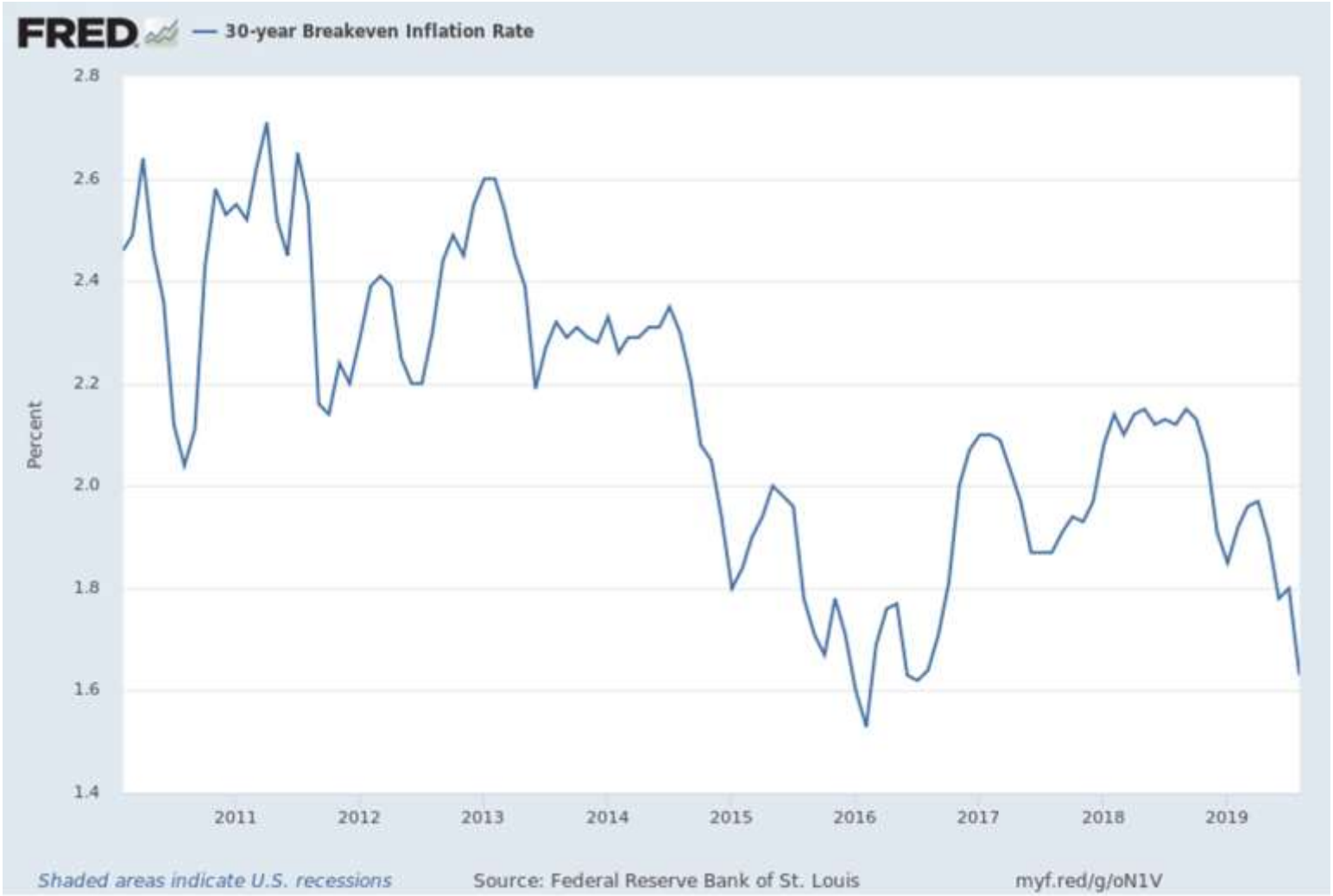
- Wage inflation is an assumption that considers large-scale or general economic factors which is used to project long-term increases of total payroll
- Two key factors of this assumption are:
  1) Price inflation
  2) Real wage growth
- **MERS reduced the wage inflation assumption from 3.75% to 3.00%, effective 12/31/19**

Price Inflation – Backward-Looking

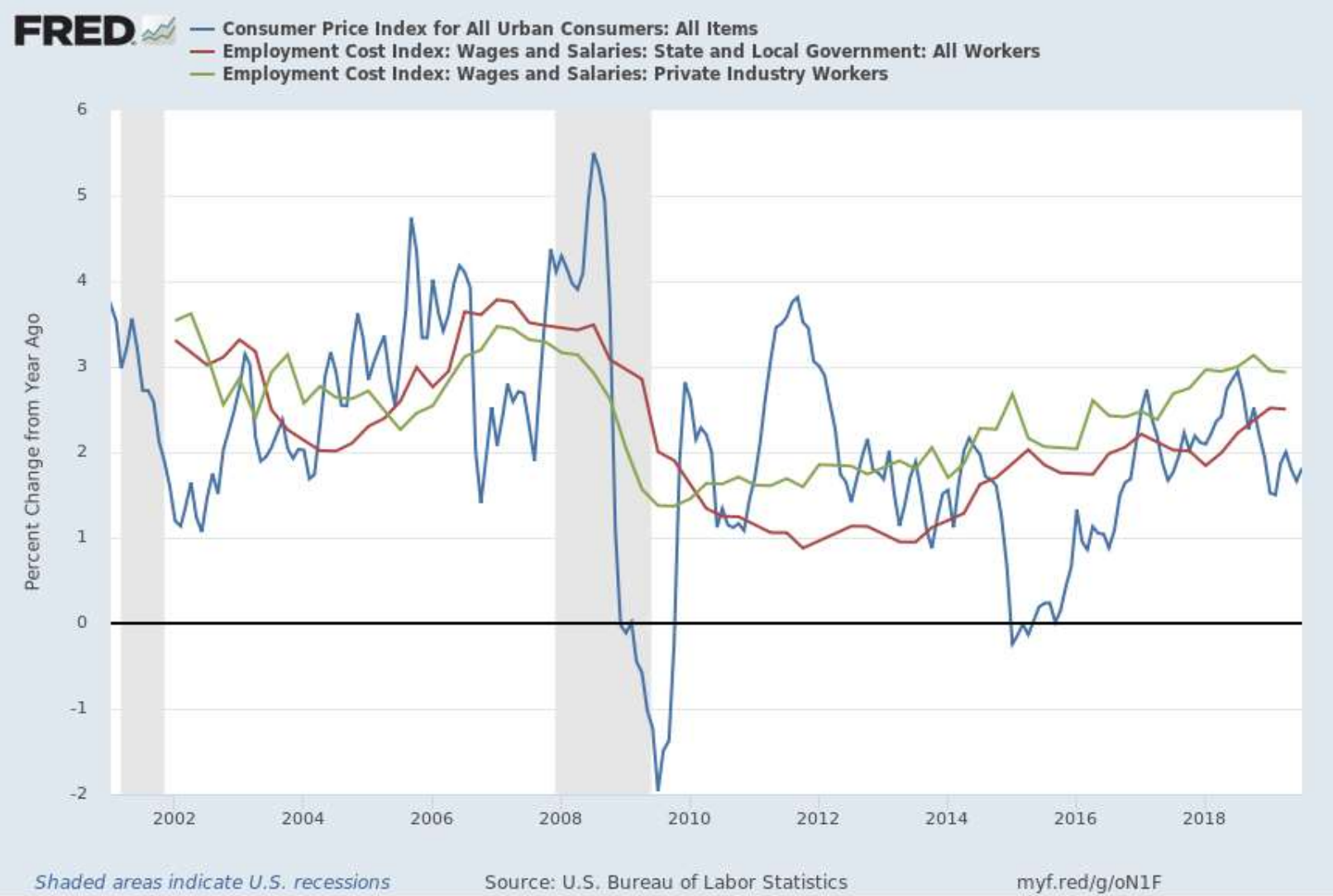


Federal Reserve Bank of Cleveland, Median Consumer Price Index [MEDCPIM158SFRBCLE], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/MEDCPIM158SFRBCLE, August 14, 2019.

Price Inflation – Forward-Looking



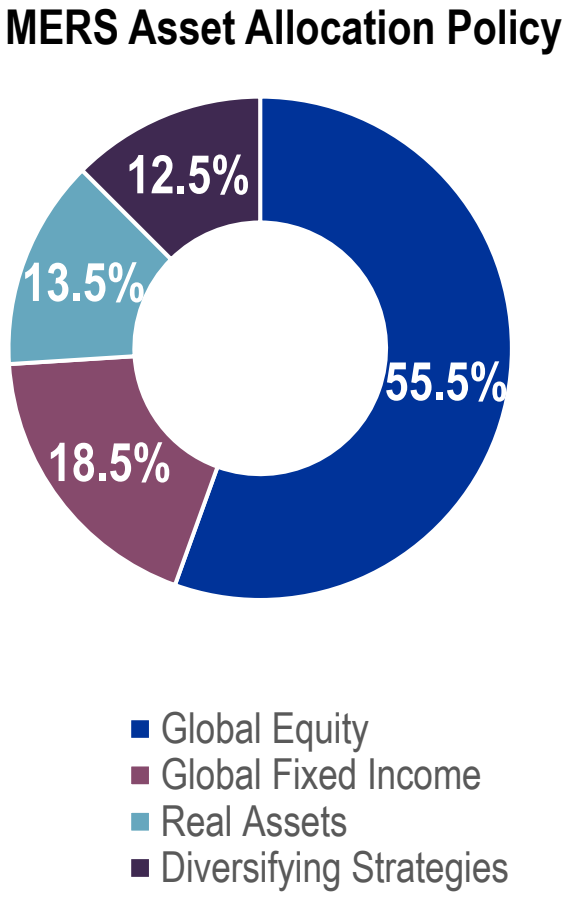
Rate of Wage Growth



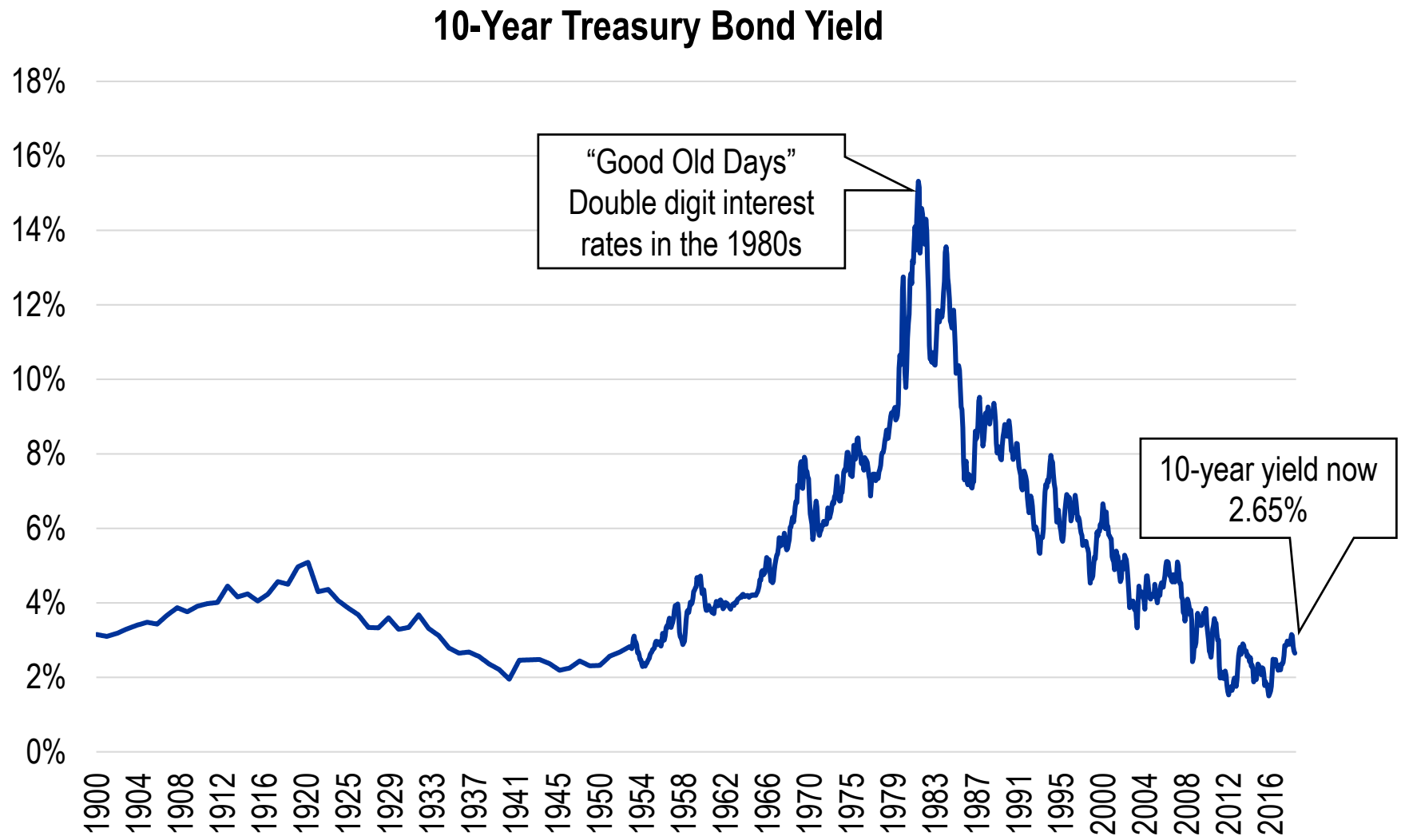
MERS Total Market Portfolio and Performance

Pension Plan Portfolio

- Mature pension plans must balance the need to pay pension benefits with ongoing growth
- Diversification reduces exposure to volatility through a variety of investments that are unlikely to all move in the same direction

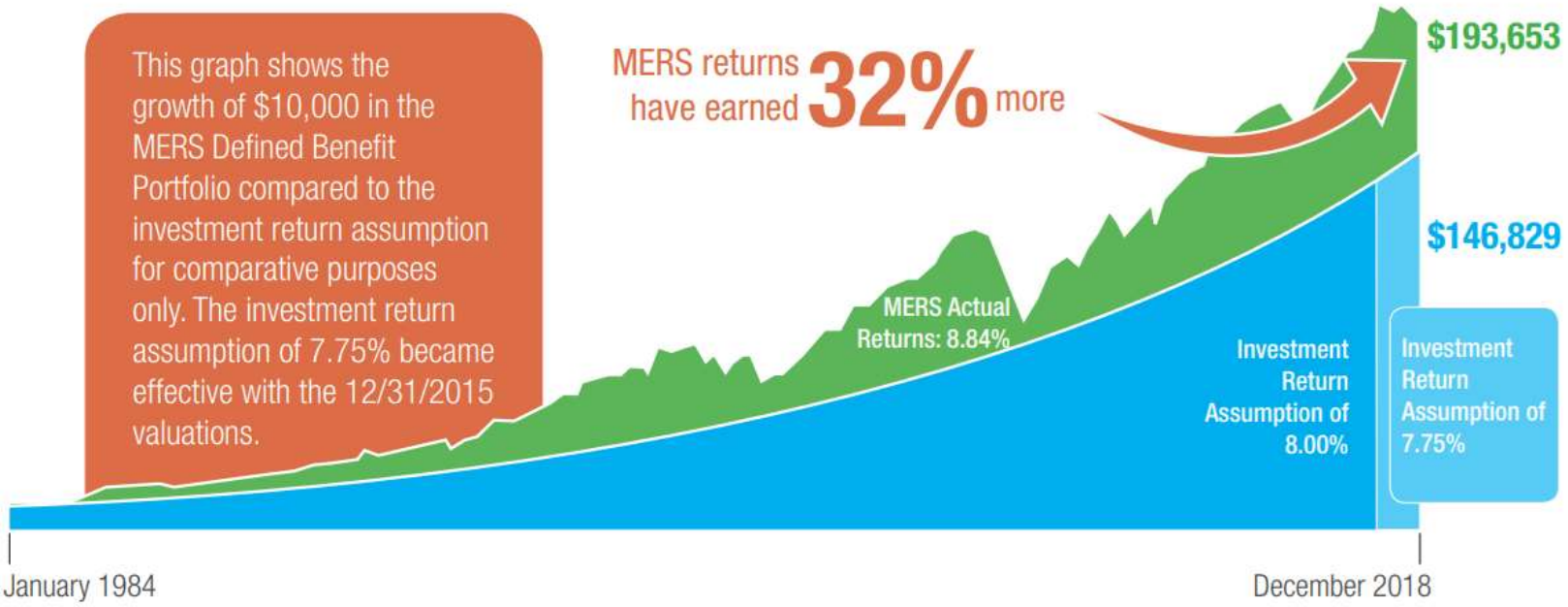


Interest Rates



Long-Term Investment Returns

Actual returns have outperformed the actuarial assumption



MERS Long-Term Investment Returns

As of December 31, 2018

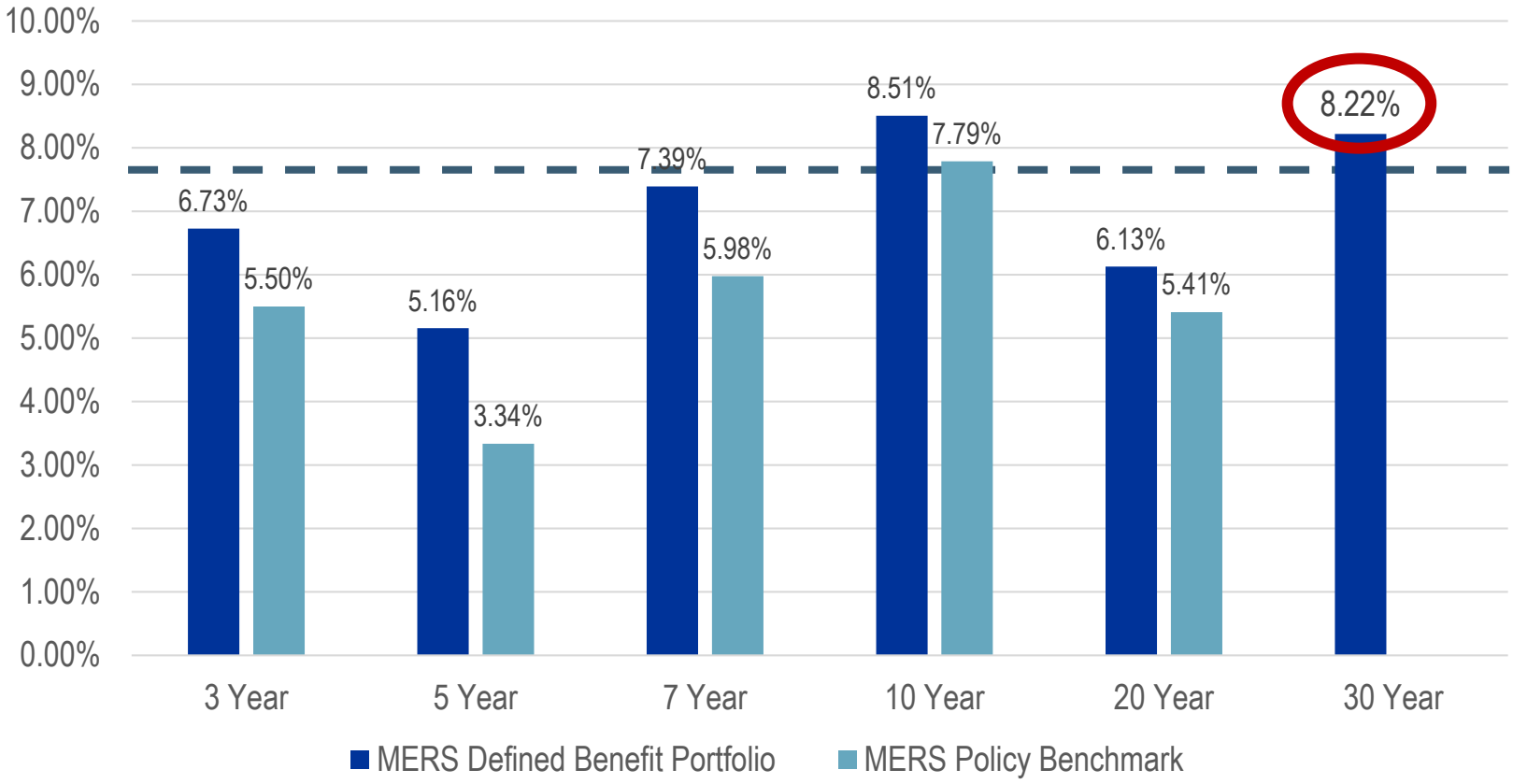
All rates are shown as gross of fees

Year-by-Year Returns (1977-2018)

Year	Rate of Return	Year	Rate of Return	Year	Rate of Return
2018	-3.51	2004	14.90%	1990	2.94%
2017	13.40%	2003	24.72%	1989	19.11%
2016	11.10%	2002	-8.34%	1988	11.19%
2015	-0.85%	2001	-1.91%	1987	5.50%
2014	6.68%	2000	-2.76%	1986	13.55%
2013	15.00%	1999	17.01%	1985	24.33%
2012	11.39%	1998	14.20%	1984	9.33%
2011	2.30%	1997	14.43%	1983	10.64%
2010	14.43%	1996	12.68%	1982	26.69%
2009	17.31%	1995	23.95	1981	3.65%
2008	-24.79%	1994	0.50%	1980	7.62%
2007	8.58%	1993	9.69%	1979	6.26%
2006	13.61%	1992	8.05%	1978	3.89%
2005	6.78%	1991	22.14%	1977	0.95%

Defined Benefit Portfolio Investment Performance

As retirement plans operate over long-term time horizons, it's important to focus on long-term rates rather than any single year

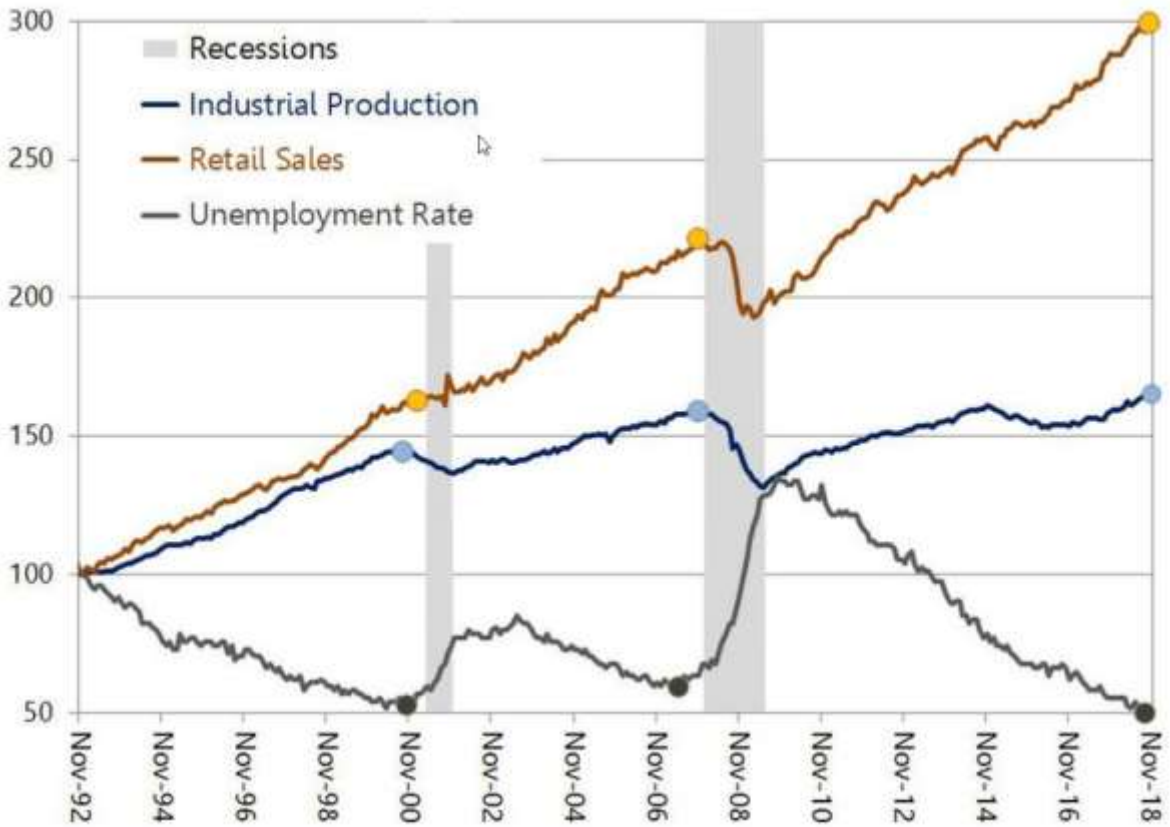


As of December 31, 2018

Looking Ahead

When is the Next Recession Coming?

Economic Indicators



Source: Forbes "Another Warning that a 2019 Recession is Coming" published 12/17/2018

The “New Norm”

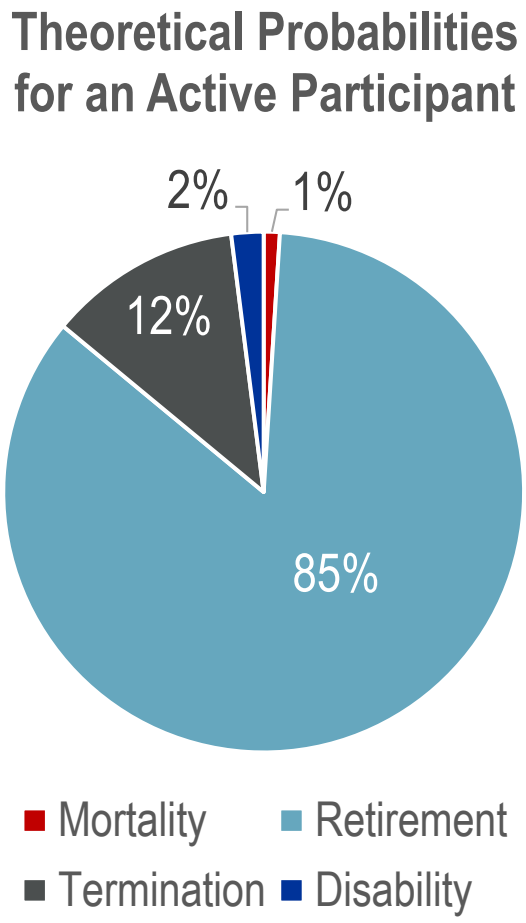
- Adjustments reflect **changes in trends**, rather than anomalies that would cause an overcorrection to plans
- In today’s ever-changing world, we expect **incremental changes** to ensure MERS plans are continuing to be adequately funded
- While adjustments typically mean higher contributions, it also means we are **adequately funding** the benefits that were promised

Demographic Assumptions

- Demographic assumptions not only **look back at the plan's actual experience**, but also look forward to future expectations
- Our external actuaries will begin to analyze plan data later this year as part of our Experience Study
- Based on industry trends, we are **forecasting continued increases** in participant longevity
- Any changes to **demographic assumptions will impact FY 2022 contributions**

Key Demographic Assumptions

- Mortality rates
  - How long people live determines how long pensions will be paid
  - Includes an assumption for future mortality improvement
- Retirement rates
  - When people retire affects when pensions will be paid
- Termination rates
- Disability rates



Trends in Demographic Assumptions

- Mortality trends
  - People are living longer, but mortality improvement has slowed down in recent years
  - The Society of Actuaries recently published new mortality tables based on public plan experience
    - Generally lower mortality rates
    - Translates into longer life expectancy
    - May result in increased cost for pensions
- The economy may affect demographic experience
  - Turnover may be higher/lower if the job market is good/bad
  - Retirements may be delayed in a bad economy

Defined Benefit Plan Costs

- As a multiple-employer plan, MERS creates economies of scale by pooling together assets for investment purposes, while maintaining separate accounts for each municipality
- In addition, strong cost control measures have helped MERS hold the line on administrative costs
  - In 2018, our administrative costs were equal to our expenses back in 2009
  - Since 2009, MERS has gained 272 members; an increase of more than 42%

Impact Relief and Other Funding Options

- Phase-In Contribution Increases
  - Upon request only; the default will be to pay full impact
  - Four-year phase-in of impacts on contributions (25% of impact will be reflected each year beginning with 12/31/2019 actuarial valuations)
  - Final contributions will be higher at the end of the phase-in because of lost interest on deferral of contributions during the phase-in period
- Amortization Extension Analysis
- Level Dollar Contributions

Alternative Scenarios

- AAVs contain “what if” projection scenarios, including the recently adopted 7.35% rate of return and 3.0% wage inflation assumptions
- MERS highly encourages you to review these scenarios and make additional contributions, if possible

Valuation Year Ending 12/31	Fiscal Year Beginning 1/1	Actuarial Accrued Liability	Valuation Assets[2]	Funded Percentage	Computed Annual Employer Contribution
7.75%[1]/3.75% NO 5-YEAR PHASE-IN					
2018	2020	$ 15,478,372	$ 10,380,846	67%	$ 775,680
2019	2021	$ 15,900,000	$ 10,500,000	66%	$ 804,000
2020	2022	$ 16,300,000	$ 10,900,000	67%	$ 837,000
2021	2023	$ 16,600,000	$ 11,200,000	67%	$ 877,000
2022	2024	$ 17,000,000	$ 11,500,000	68%	$ 718,000
2023	2025	$ 17,300,000	$ 12,000,000	69%	$ 745,000
7.35%[1]/3.00% NO 5-YEAR PHASE-IN					
2018	2020	$ 15,978,582	$ 10,380,846	65%	$ 828
2019	2021	$ 16,400,000	$ 10,400,000	63%	$ 854,000
2020	2022	$ 16,700,000	$ 10,800,000	65%	$ 883,000
2021	2023	$ 17,100,000	$ 11,200,000	65%	$ 919,000
2022	2024	$ 17,400,000	$ 11,500,000	66%	$ 762,000
2023	2025	$ 17,600,000	$ 12,000,000	68%	$ 786,000
5.75%[1]/3.75% NO 5-YEAR PHASE-IN					
2018	2020	$ 19,081,517	$ 10,380,846	54%	$ 1,124,028
2019	2021	$ 19,500,000	$ 10,300,000	53%	$ 1,170,000
2020	2022	$ 20,000,000	$ 10,800,000	54%	$ 1,210,000
2021	2023	$ 20,300,000	$ 11,400,000	56%	$ 1,260,000
2022	2024	$ 20,700,000	$ 11,800,000	57%	$ 1,120,000
2023	2025	$ 21,000,000	$ 12,500,000	60%	$ 1,150,000

12/31/2018 Valuation Results	Assumed Future Annual Smoothed Rate of Investment Return: Lower Future Annual Returns	Adopted 2019 Assumption	Valuation Assumptions
Investment Return Assumption	5.75%	7.35%	7.75%
Wage Increase Assumption	3.75%	3.00%	.75%
Accrued Liability	$ 19,081,5[illegible]7	$ 15,978,582	$ 15,478,372
Valuation Assets[1]	$ 10,380,[illegible]6	$ 10,380,846	$ 10,380,846
Unfunded Accrued Liability	$ 8,700,[illegible]71	$ 5,597,736	$ 5,097,526
Funded Ratio	[illegible]%	65%	67%
Monthly Normal Cost	$ 28,38[illegible]	$ 17,741	$ 17,857
Monthly Amortization Payment	$ 65,280	$ 51,309	$ 46,783
Total Employer Contribution[2]	$ 93,669	69,050	$ 64,640

Plan Maturity Metrics

- Your 2018 AAV includes new Plan Maturity Measures
- These measures are intended to give a gauge of risks faced by the plan
- Plans “mature” over time as active participants retire
- These measures will differ for each plan

PLAN MATURITY MEASURES

Risks facing a pension plan evolve over time. A young plan with virtually no investments and paying few benefits may experience little investment risk. An older plan with a large number of members in pay status and a significant trust may be much more exposed to investment risk. Generally accepted plan maturity measures include the following:

1. Ratio of the market value of assets to total payroll	3.1
2. Ratio of actuarial accrued liability to payroll	3.1
3. Ratio of actives to retirees and beneficiaries	2.9
4. Ratio of market value of assets to benefit payments	38.5
5. Ratio of net cash flow to market value of assets (boy)	6.6%

Ready to Learn More about Unfunded Liability?

- MERS works in partnership with our members to ensure that each municipality is making reasonable progress to achieve full funding
- We offer many options to help reduce UAL, with a variety of programs and provisions to fit each municipality's unique needs
- Contact your Regional Manager to discuss options for managing unfunded liability
- Attend *Defined Benefit Mechanics - Part 2: Managing Unfunded Accrued Liability*

Q&A

Contacting MERS of Michigan

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