

# Investment Risk and Risk Tolerance

## TMRS Board Retreat

April 29, 2021

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## Three Questions for Today

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***The Board's current investment strategy is to take a diversified approach to meet the 6.75% actuarial return assumption at the lowest possible level of risk. This approach limits downside risk but gives up some upside potential.***

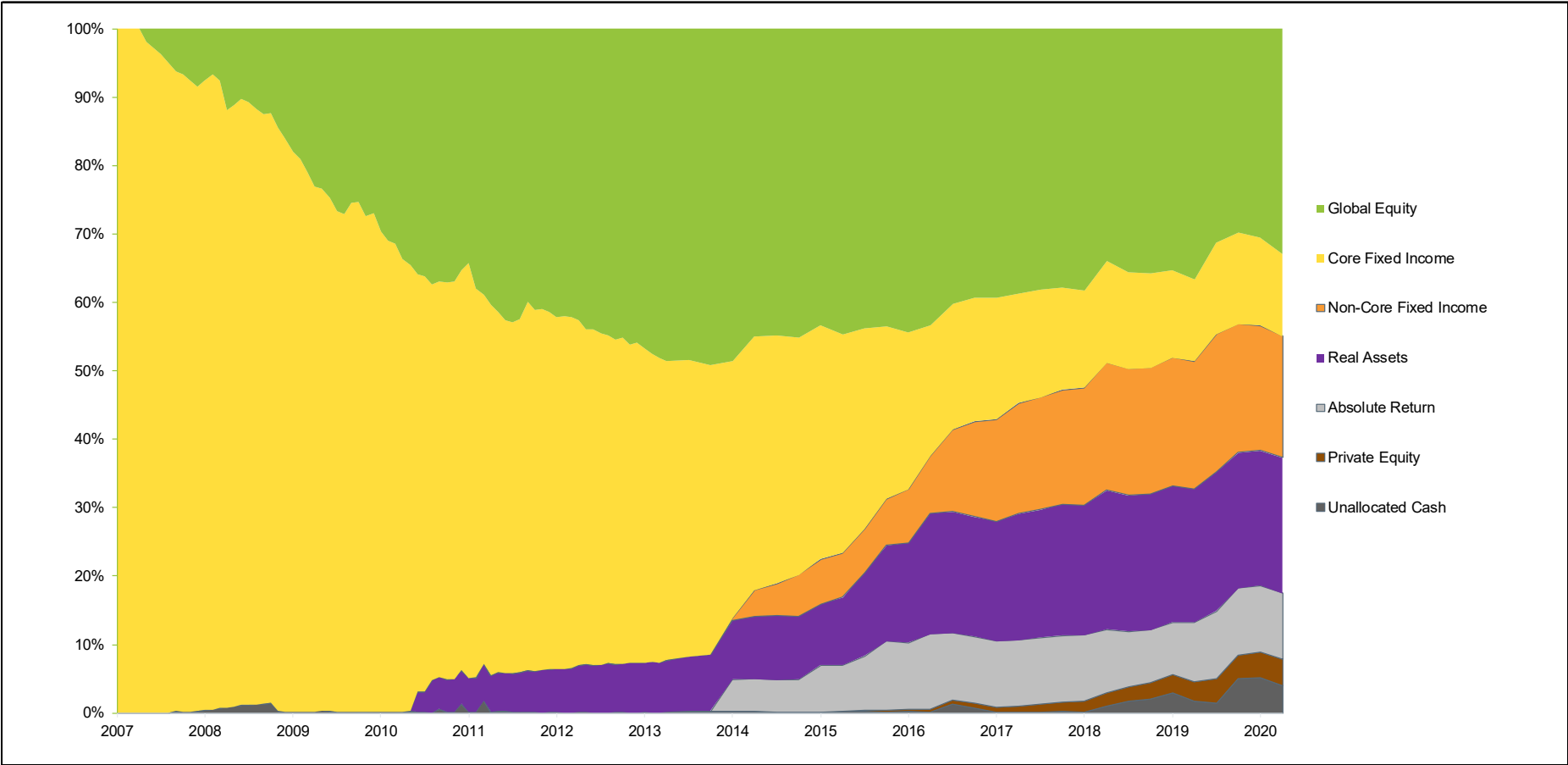
- 1. Does the Board still agree with this strategy?***
- 2. If not, what does a 6.75% portfolio with more risk look like?***
- 3. Does taking more investment risk impact funding risk?***

## Why are RVK and GRS Presenting This Topic?

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- **RVK is hired by and reports to the Board to provide advice on all investment-related matters.**
- **GRS is hired by and reports to the Board to evaluate investment risk in relation to funding risk.**

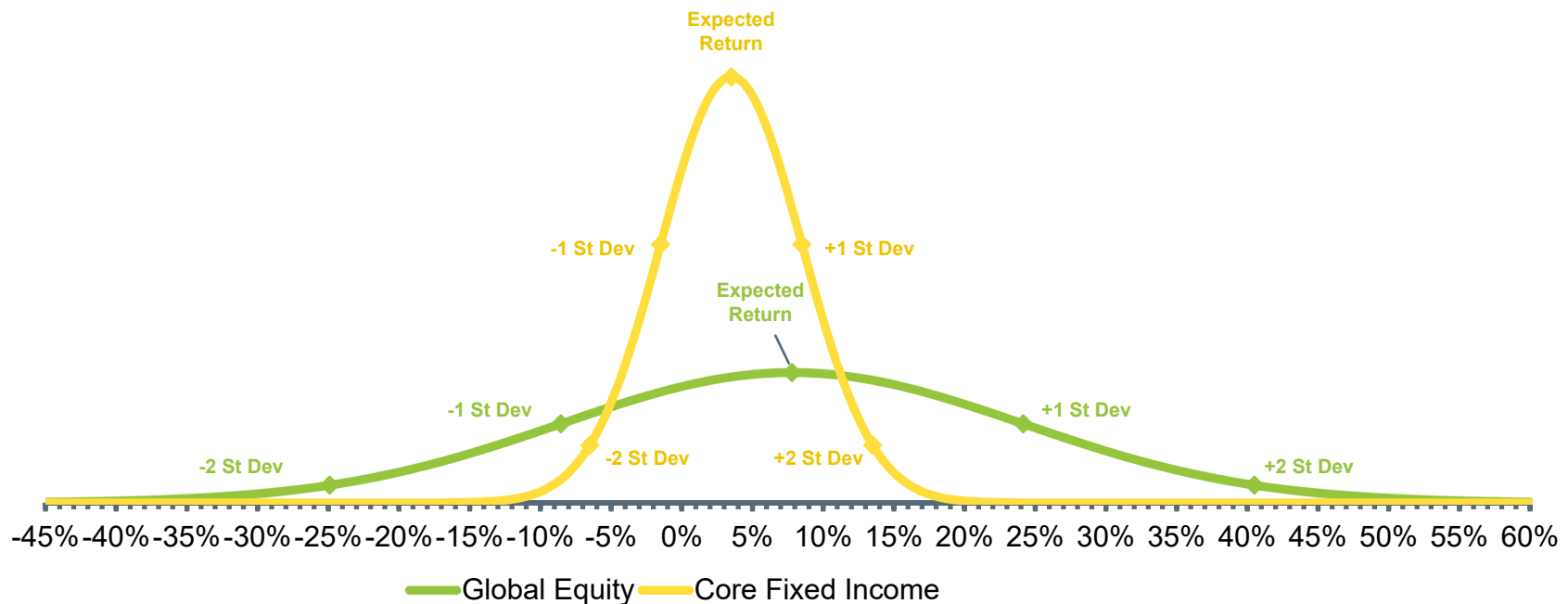
# How Did the TMRS Trust Fund Portfolio Get to Where it is Today?



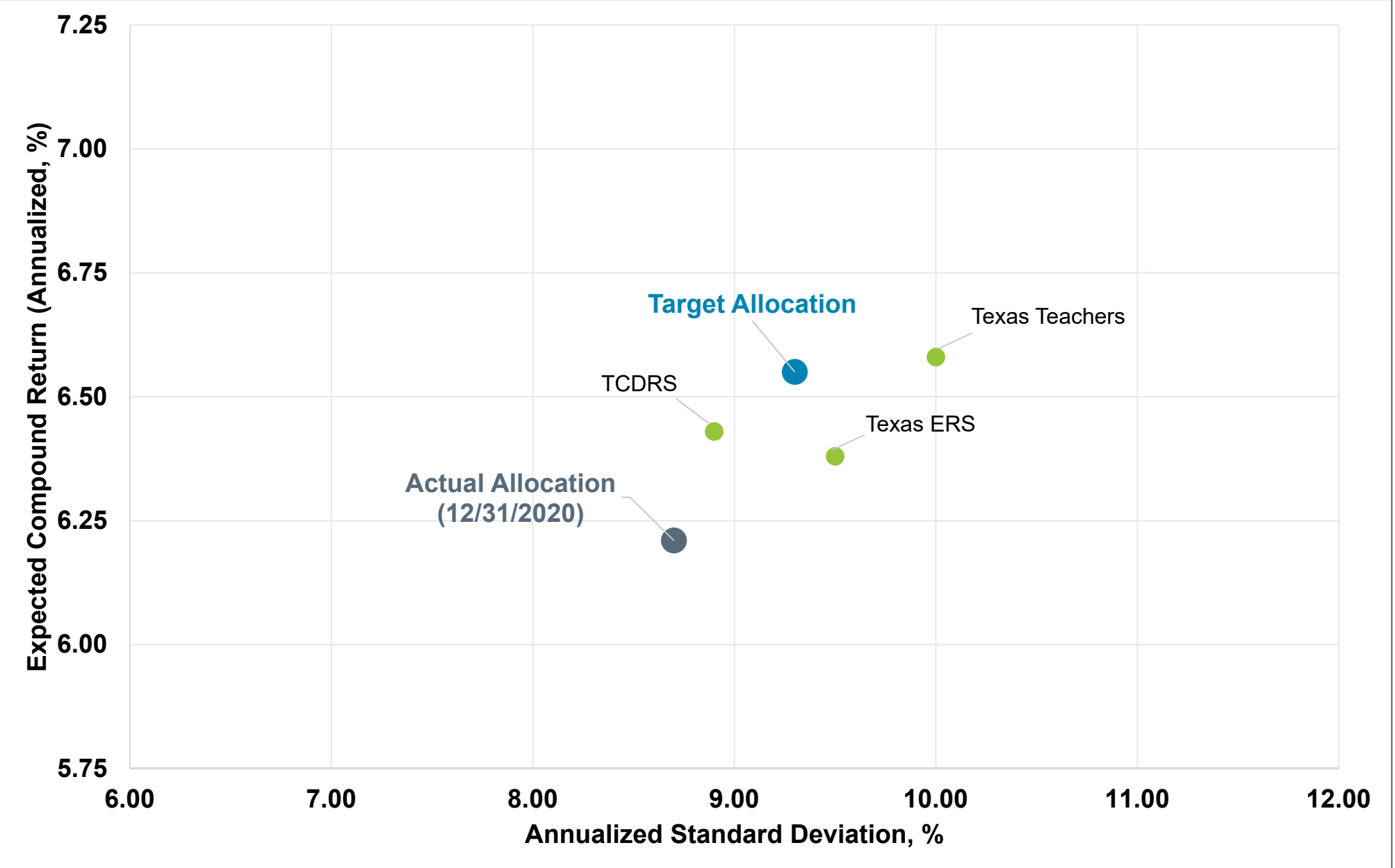
## Risk: How is it Measured?

**Standard Deviation** is a measure of risk that provides a statistical range of performance relative to average expectations:

- +/- 1 Standard Deviations accounts for approximately 68% of return outcomes
- +/- 2 Standard Deviations accounts for approximately 95% of return outcomes



# TMRS' Target Allocation Expected Risk & Return: The Board Has Already Decided to Take More Risk



## TMRS' Actual and Target Allocation Returns

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As of 12/31/2020	QTD	1 Yr	3 Yr	5 Yr	7 Yr	10 Yr	Since July 2009
Actual Performance	6.91	7.05	6.14	7.80	6.39	6.65	7.26
Target Allocation (Passive)	7.47	9.23	7.23	8.77	7.01	7.34	8.17
Difference	-0.56	-2.18	-1.09	-0.96	-0.61	-0.69	-0.91

Performance shown is net of fees.

## From 2020 TMRS Asset Allocation Study

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	<b>Actual Allocation (12/31/2020)</b>	<b>Target Allocation</b>	<b>Moderate Risk</b>	<b>Higher Risk</b>
Global Equity	33	30	36	64
Core Fixed Income	12	10	4	0
TMRS Non-Core Fixed Income	18	20	20	16
TMRS Real Return	11	10	10	0
TMRS Real Estate	9	10	10	10
TMRS Absolute Return Strategies	10	10	10	0
TMRS Private Equity	4	10	10	10
Cash Equivalents	4	0	0	0
Expected Standard Deviation, %	8.7	9.3	10.2	13.3
Expected Compound Return, %	6.21	6.55	6.71	6.92

***Additional return can only be achieved by undertaking additional risk.***

These are not recommendations.



# Additional Return Can Only Be Achieved by Undertaking Additional Risk

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Undergoing a Monte Carlo simulation provides insight into the performance of the asset allocation by examining many randomly sampled return outcomes.

Range of Return Outcomes	Actual Allocation (12/31/2020)	Target Allocation	Moderate Risk	Higher Risk
<b>1 Year</b>				
<b>Worst Case</b>	<b>-20.2</b>	<b>-22.1</b>	<b>-24.4</b>	<b>-33.8</b>
Median	6.7	7.2	7.4	7.6
Best Case	28.2	30.0	33.1	44.1
<b>10 Years</b>				
Worst Case	0.7	0.6	0.1	<b>-2.3</b>
<b>Median</b>	<b>6.3</b>	<b>6.7</b>	<b>6.9</b>	<b>6.9</b>
Best Case	10.8	11.5	12.2	14.5

Monte Carlo simulation shown using TMRS' 2020 Custom CMAs. Worst case in 1 year simulation is represented by 1<sup>st</sup> percentile outcome. Best case in 1 year simulation is represented by 99<sup>th</sup> percentile outcome. Worst case in 10 year simulation is represented by 5<sup>th</sup> percentile outcome. Best case in 10 year simulation is represented by 95<sup>th</sup> percentile outcome.

# More Risk for More Return – At What Cost?

Undergoing a Monte Carlo simulation provides insight into the performance of the asset allocation by examining many randomly sampled return outcomes.

<b>Probability of Achieving Return</b>	<b>Actual Allocation (12/31/2020)</b>	<b>Target Allocation</b>	<b>Moderate Risk</b>	<b>Higher Risk</b>
<b>1 Year</b>				
<b>Target 6.75%</b>	<b>50</b>	<b>52</b>	<b>52</b>	<b>53</b>
<b>10 Years</b>				
<b>Target 6.75%</b>	<b>44</b>	<b>49</b>	<b>51</b>	<b>51</b>

## Does Taking More Investment Risk Impact Funding Risk?

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**The step from the Target Allocation to the Moderate Risk Allocation increases the expected return but also increases the standard deviation from 9.3% to 10.2%, what does that mean for funding risk?**

# TMRS' Characteristics with Regard to Investment Risk

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- TMRS is a long-term investor with predictable cash flows
- Based on that, there is more flexibility to allow riskier investments more time to produce their returns or recover from drawdowns
- However, these riskier investments will have larger short-term fluctuations, so communications and expectations must anticipate those situations and prepare stakeholders for patience during those times
- TMRS typically focuses on a 15 to 25 year timeframe

## Why Would a Participating City Want TMRS to Take Investment Risk?

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- Benefits have been previously negotiated with certain expectations built in. In today's environment, investment risk has to be taken to meet those expectations without a significant increase in cost.
- To take advantage of the historical financial reward that has been received for taking investment risk, especially for institutional investors over longer periods of time.
- In a multiple employer situation like TMRS, the answer to the risk questions may not be the same for all cities.

# What Funding Risks are Impacted by Portfolios with More Investment Risk?

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- Portfolios with higher risk:
  - have the potential to create higher spikes in the contribution rates over the short term
  - have the potential to produce prolonged periods of a lower funded status
- Portfolios with higher risk metrics are also more uncertain, and thus the information based on them is less reliable
- However, a portfolio with too little investment risk can also increase funding risk if it fails to achieve the expected returns

## Every Additional Step of Risk Does Not Provide the Same Rewards

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- The step from the Actual to the Target decreases the contribution requirements and also decreases the funding risks
- The step from the Target to the Moderate decreases the contribution requirements and has no meaningful impact to the funding risks
- The step from the Moderate Risk to the High Risk barely decreases the contribution requirements but materially increases the funding risks

	Actual Allocation	Target Allocation	Moderate Risk	Higher Risk
Expected Compound Return	6.21%	6.55%	6.71%	6.92%
Expected Standard Deviation	8.7%	9.3%	10.2%	13.3%
Expected Contribution Rate	16.5%	15.0%	14.1%	13.8%
Probability Funded Ratio is Less than 80% at Any Time over Next 25 Years	29%	25%	25%	32%
Worst Case One Year Change in Contribution Rate	2.32%	2.58%	2.89%	4.17%

This is not a recommendation  
There are other risks to consider besides those shown above