June 24, 2021

Texas Municipal Retirement System

Asset Allocation Study

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Why Does the Board Review the Trust Fund's Asset Allocation?

Section XI. A. of the Board's Investment Policy Statement States:

The Board recognizes that the most important determinant of long-term return and risk is the asset allocation decision.

The Strategic Target Allocation must deliver:

1. *A representation of the Board's long-term return objective with its implied risk tolerance*

2. *Sufficient confidence for the Board to "stay the course" given extreme market moves; and*

3. *A benchmark against which to measure performance.*

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Current Asset Classes and Target Asset Allocation

Asset Class	Target Allocation	Underlying Exposures	Purpose
Global Equity	30%	Public US and International Common and Preferred Stock	Capital Appreciation
Core Fixed Income	10%	Treasurys, Mortgage Backed Securities, and Investment Grade Credit, etc.	Diversification Capital Preservation
Non-Core Fixed Income	20%	EMD, High Yield, Bank Loans, Opportunistic Fixed Income, and Direct Lending, etc.	Diversification Income Capital Appreciation
Real Return	10%	GTAA, Inflation Linked Securities, Commodities, Infrastructure, Specialty Finance, and Natural Resources, etc.	Enhance Total Return Diversification Inflation Protection
Real Estate	10%	Private Investments in Office, Retail, Apartments/Residential, Industrial, and Hotels/Hospitality, etc.	Enhance Total Return Diversification
Absolute Return	10%	Private partnerships that apply focused, skill-based Equity, Event Driven, Credit, Relative Value, Multi Strat, and Global Macro strategies	Provide Favorable Standalone Risk-Adjusted Returns Diversification
Private Equity	10%	Privately held businesses that do not trade on an exchange, are illiquid, and have a long time horizon. Primary strategy types include Buy Out, Venture/Growth, and Special Situations	Enhance Total Return
Cash Equivalents	0%	Cash, Commercial Paper, T-bills, and Short-Term Gov't Bonds	Safeguard Principal, Maintain Adequate Liquidity to Meet Anticipated Needs, and Earn Incremental Yield

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Recommended Asset Class Changes

2020

2021

Real Return
Global Linkers
Agriculture
MLPs
Energy
Timber

→ Name & Structure Change

Other Public & Private Markets
Infrastructure
Specialty Finance
Natural Resources

Absolute Return

→ Name Change

Hedge Funds

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RVK's Asset Allocation Modeling and Inputs

Capital Market Assumptions (CMAs) are the basis of any meaningful Asset Allocation Study

CMAs - risk, return and correlation – are widely accepted as the most powerful drivers of total fund return over the long run.

Forward looking estimated inputs include:

1. **Expected Risk** (Standard Deviation)

2. **Expected Returns** (Geometric)

3. **Expected Correlation** (The relationship of asset class returns with all other asset classes)

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Asset Class Capital Market Assumptions
2020 Compared to 2021

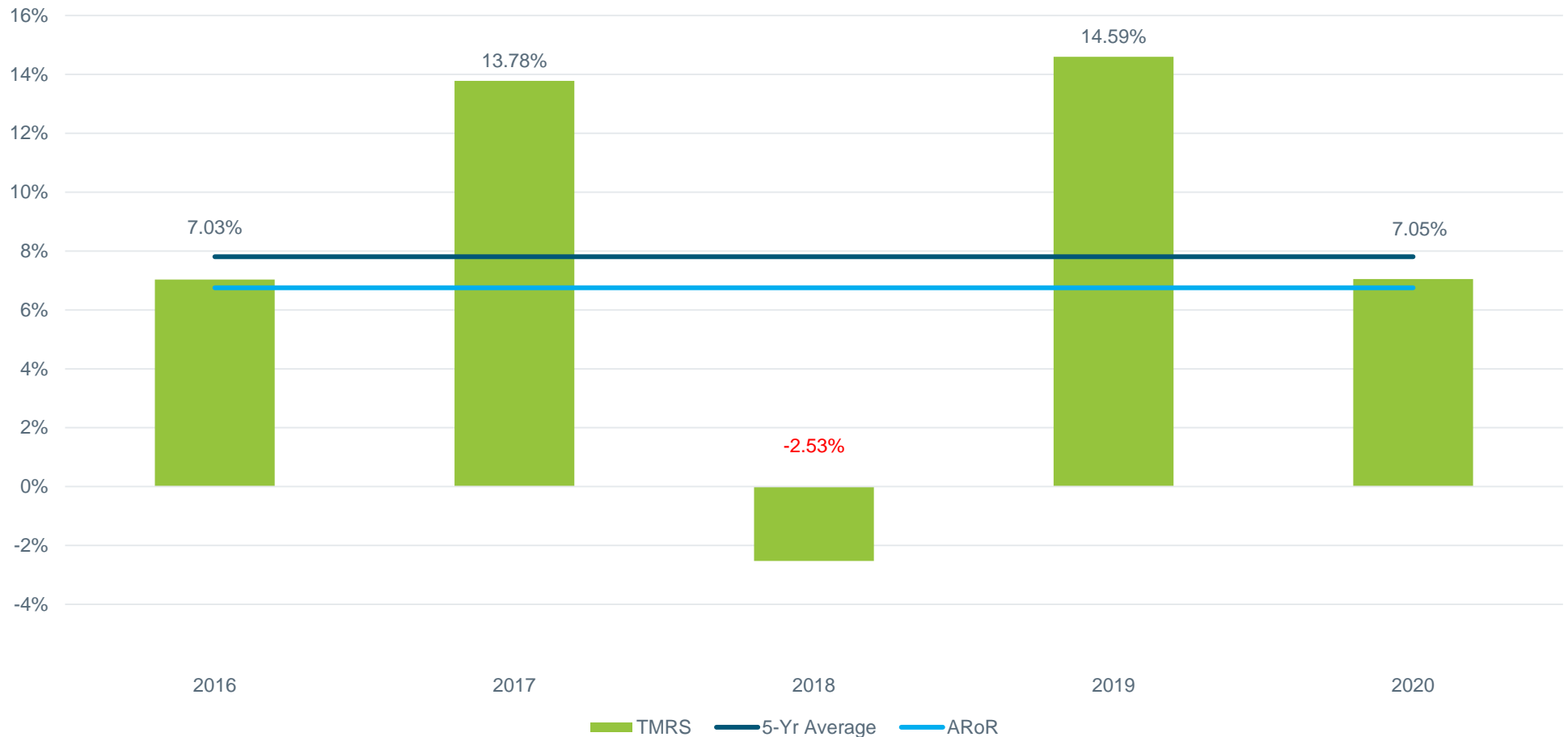| Asset Class	2020 Assumptions		2021 Assumptions		Change (2020-2021)	
	Expected Geometric Return	Expected Standard Deviation	Expected Geometric Return	Expected Standard Deviation	Expected Geometric Return	Expected Standard Deviation
Global Equity	6.58	16.35	6.29	16.60	-0.29	+0.25
Core Fixed Income	3.63	5.00	1.88	5.00	-1.75	--
Non-Core Fixed Income	6.29	8.69	5.26	9.49	-1.03	+0.80
Other Public & Private Markets	6.03	8.28	6.37	13.62	+0.34	+5.34
Real Estate	5.61	13.89	5.73	15.57	+0.12	+1.68
Hedge Funds	5.67	8.15	5.01	8.53	-0.66	+0.38
Private Equity	8.65	19.00	8.39	19.00	-0.26	--
Cash Equivalents	2.98	2.00	1.48	2.00	-1.50	--
TMRS's Target Allocation	*6.55*	*9.29*	*5.99*	*10.85*	*-0.56*	*+1.56*

Asset class risk and return assumptions have been customized for the TMRS portfolio and were created to be specific to TMRS' asset class structures. Return assumptions are generally index-based and assume no investment manager excess return.

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Returns in Context

What does the Expected Return Represent?

- It represents the geometric average annual total fund return expected over 10+ years, **NOT** the annual return in any given year

Calendar Year Returns vs. Assumed Rate & TMRS' Trailing 5-Yr Return

Legend: TMRS (green bar), 5-Yr Average (dark blue line), ARoR (light blue line)

Data labels shown: 7.03% (2016), 13.78% (2017), -2.53% (2018), 14.59% (2019), 7.05% (2020)

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Asset Allocation – Modeled Portfolios

	Constraints		Current Allocation	Target Allocation	Portfolio A	Portfolio B	Portfolio C
	Min	Max					
Global Equity	30	50	34	30	35	35	40
Core Fixed Income	5	10	11	10	9	5	5
Non-Core Fixed Income	0	20	18	20	20	20	20
Other Public & Private Markets	0	12	11	10	10	12	12
Real Estate	0	12	9	10	10	12	12
Hedge Funds	0	10	10	10	5	5	0
Private Equity	0	10	4	10	10	10	10
Cash Equivalents	1	1	3	0	1	1	1
Expected Geometric Return, %			5.71	5.99	6.06	6.22	6.28
Expected Standard Deviation, %			10.42	10.85	11.27	11.66	12.09
***5 Yr Probability of Achieving 6.75%**			45	48	48	50	50

Return assumptions are generally passive-based and assume no investment manager excess return.

*5 Yr probability numbers are from a Monte Carlo Simulation. Undergoing a Monte Carlo simulation provides insight into the expected performance of the asset allocation mixes by examining thousands of randomly sampled outcomes. Current Allocation as of 3/31/2021.

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Monte Carlo Analysis

Undergoing a Monte Carlo simulation provides insight into the expected performance of the asset allocation mixes by examining thousands of randomly sampled outcomes.

Probability of Achieving Return

	Current Allocation	Target Allocation	Portfolio A	Portfolio B	Portfolio C
1 Year					
Target 6.75%	51	52	52	53	53
5 Years					
Target 6.75%	45	48	48	50	50
10 Years					
Target 6.75%	41	44	45	47	48

Monte Carlo simulation shown using TMRS' 2021 CMAs.

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Monte Carlo Analysis

Undergoing a Monte Carlo simulation provides insight into the expected performance of the asset allocation mixes by examining thousands of randomly sampled outcomes.

Expected Range of Return Outcomes

	Current Allocation	Target Allocation	Portfolio A	Portfolio B	Portfolio C
1 Year					
Worst Case	-35.26	-36.08	-36.63	-38.50	-39.31
Median	6.89	7.27	7.30	7.59	7.62
Best Case	31.69	32.79	34.32	35.14	36.83
5 Years					
Worst Case	-4.77	-4.78	-5.08	-5.45	-5.68
Median	6.19	6.50	6.53	6.74	6.77
Best Case	13.95	14.51	14.98	15.38	15.81
10 Years					
Worst Case	-2.19	-2.33	-2.45	-2.73	-2.93
Median	5.93	6.24	6.28	6.47	6.50
Best Case	11.62	12.07	12.39	12.76	13.05

Monte Carlo simulation shown using TMRS' 2021 CMAs. Worst case in 1 year simulation is represented by 1st percentile outcome. Best case in 1 year simulation is represented by 99th percentile outcome. Worst case in 5 & 10 year simulation is represented by 5th percentile outcome. Best case in 5 & 10 year simulation is represented by 95th percentile outcome.

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Board Direction on Next Steps

Guidance on Implementation

➢ **Staff and RVK recommend:**

- **The Asset Allocation changes should be effective July 1, 2021.**

- **The underweight to Private Equity should be invested in Global Equity while waiting for capital to be called.**

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