



September 14, 2021

To: Board of Trustees

**From: Dimitry Shishkoff, Director, Data, Performance & Risk
Melissa Jerkins, Manager, Data, Performance & Risk**

Dimitry Shishkoff
Melissa Jerkins

Re: Agenda Item 10: Data, Performance and Risk Report – Q2 2021

TMRS Investment staff provides the Board with a Data, Performance and Risk Report quarterly.

The Report is in your Board book.

ATTACHMENT:

1 – Q2 2021 Data, Performance and Risk Report



Q2 2021 Investment Risk Report

Data, Performance and Risk Team

Dimitry Shishkoff
Melissa Jerkins, Ph.D.
Ryan Conner

September 23, 2021

Summary

June 30, 2021

The Data, Performance and Risk Team monitors what investments TMRS owns, how risks from those investments aggregate to the Trust Fund, and how that compares to the risks in our Benchmark.

This monitoring uses the industry standard MSCI BarraOne Risk Model, which models each investment in the Trust Fund and the Benchmark based on recent market behavior.

The Trust Fund's risk measures for Q2 2021 are in line with the risk guidance provided by the Board in the Investment Policy Statement, Benchmarks, and Asset Allocation Study assumptions.

Trust Fund Standard Deviation Summary

June 30, 2021

The Trust Fund's standard deviation should be very similar to the Benchmark's, and it is.

The Trust Fund's standard deviation is larger than the assumption from the Asset Allocation Study, which is expected because markets have been turbulent recently.

The standard deviation of excess return is reasonable given Benchmarks as of June 30, 2021.

Standard Deviation Summary Table		
	Q2 2021	Q1 2021
Trust Fund Standard Deviation (Risk Model)	11.8%	12.4%
Benchmark Standard Deviation (Risk Model)	11.7%	12.5%
Asset Allocation Study Standard Deviation Assumption	9.3%	9.3%
Standard Deviation of Excess Return (Risk Model) Excess return is TMRS's Portfolio return minus the Benchmark return	1.2%	1.4%

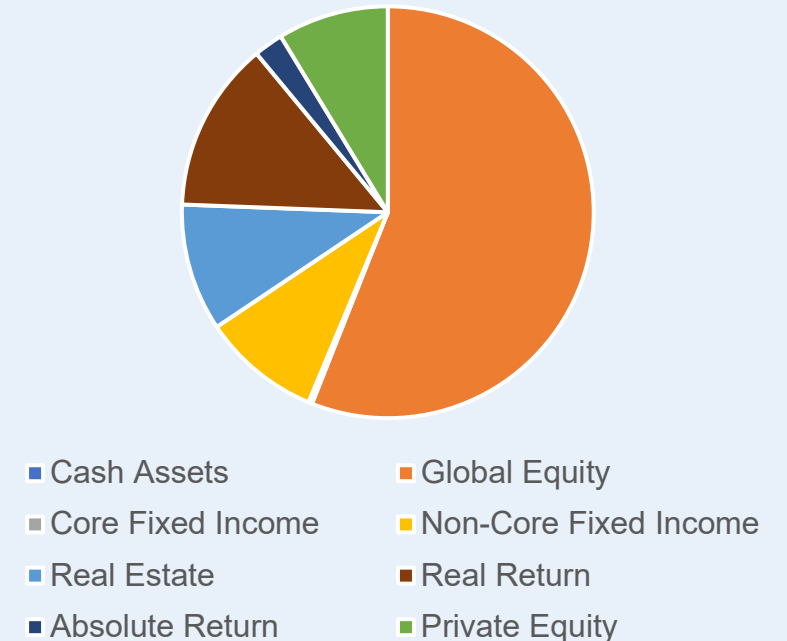
Contribution to Trust Fund Standard Deviation

June 30, 2021

Global plus Private Equity is 40% of the allocation but contributes 65% of the standard deviation.

	TMRS Trust Fund			Policy Benchmark		
	Allocation (%)	Standard Deviation	Contribution to Standard Deviation	Allocation (%)	Standard Deviation	Contribution to Standard Deviation
Total	100.0%	11.8	100.0%	100.0%	11.7	100.0%
Cash Assets	1.3%	0.0	0.0%	0.0%	0.0	0.0%
Global Equity	34.5%	19.0	56.0%	30.0%	18.7	46.2%
Core Fixed Income	10.5%	3.6	0.3%	10.0%	3.6	0.2%
Non-Core Fixed Income	18.5%	6.9	9.3%	20.0%	6.8	9.2%
Real Estate	9.0%	20.2	10.0%	10.0%	19.6	11.8%
Real Return	11.2%	14.7	13.4%	10.0%	13.0	10.4%
Absolute Return	9.7%	4.0	2.3%	10.0%	5.6	4.0%
Private Equity	5.3%	27.9	8.7%	10.0%	26.8	18.3%

TMRS Trust Fund
Contribution to Standard Deviation



Asset Class Allocation Ranges

June 30, 2021

TMRS maintains Asset Class Allocations within allowed ranges around Target Allocations.

We are maintaining an overweight to Global Equity while we move towards our target allocation to Private Equity; our overall equity exposure is in line with our Benchmark.

Asset Class	Policy Benchmark	Trust Fund Allocation (%)	Target Allocation (%)	Allocation Difference (%)	Allowed Range	Within Range?
Total		100.0%	100.0%	--	--	--
Cash Assets	30 Day T-Bill	1.3%	0.0%	1.3%	0-3%	✓ Yes
Global Equity	MSCI ACWI IMI	34.5%	30.0%	4.5%	25-45%	✓ Yes
Core Fixed Income	Barclays US Agg	10.5%	10.0%	0.5%	5-15%	✓ Yes
Non-Core Fixed Income	50% High Yield, 50% Levered Loan	18.5%	20.0%	-1.5%	15-25%	✓ Yes
Real Estate	NCREIF ODCE	9.0%	10.0%	-1.0%	5-15%	✓ Yes
Real Return	Manager Benchmark Rollup	11.2%	10.0%	1.2%	5-15%	✓ Yes
Absolute Return	HFRI FOF Diversified	9.7%	10.0%	-0.3%	0-10%	✓ Yes
Private Equity	Custom Risk Proxy	5.3%	10.0%	-4.7%	5-15%	✓ Yes

Excess Return Standard Deviations

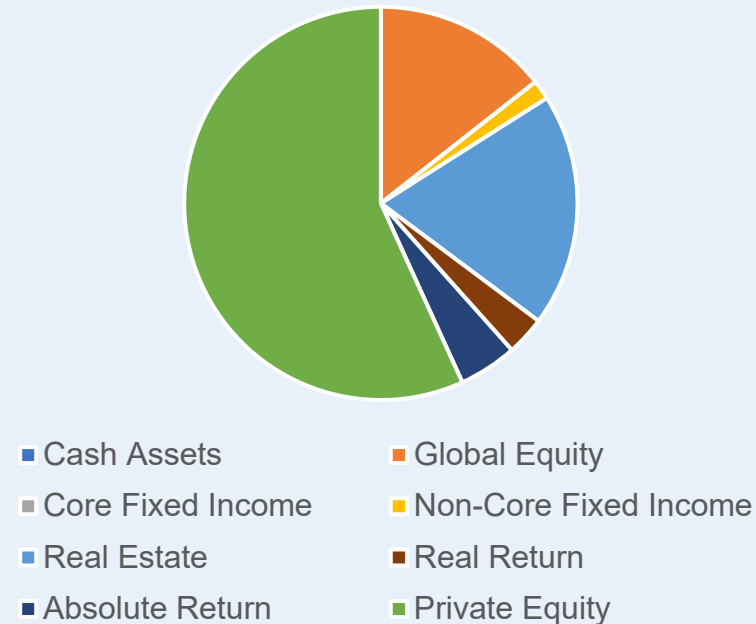
June 30, 2021

Excess return is TMRS's Trust Fund return minus the Benchmark return.

The standard deviation of excess return is 1.2%, and we expect it to be larger going forward because of increasing differences between the Trust Fund and Benchmark indices.

	Contribution to Standard Deviation of Excess Return (from Risk Model)
Total	1.2%
Cash Assets	0.00%
Global Equity	0.18%
Core Fixed Income	0.00%
Non-Core Fixed Income	-0.02%
Real Estate	0.24%
Real Return	0.04%
Absolute Return	0.06%
Private Equity	0.71%

Contribution to Standard Deviation of Excess Return



Historical Standard Deviation vs. Assumptions

June 30, 2021

We monitor the historical standard deviation of our Trust Fund and Benchmark returns. They have been very similar to each other but significantly lower than the Asset Allocation Study's long-term assumptions.

For Asset Classes that contain private market investments, historical standard deviations are lower than long-term assumptions due to appraisal-based valuations.

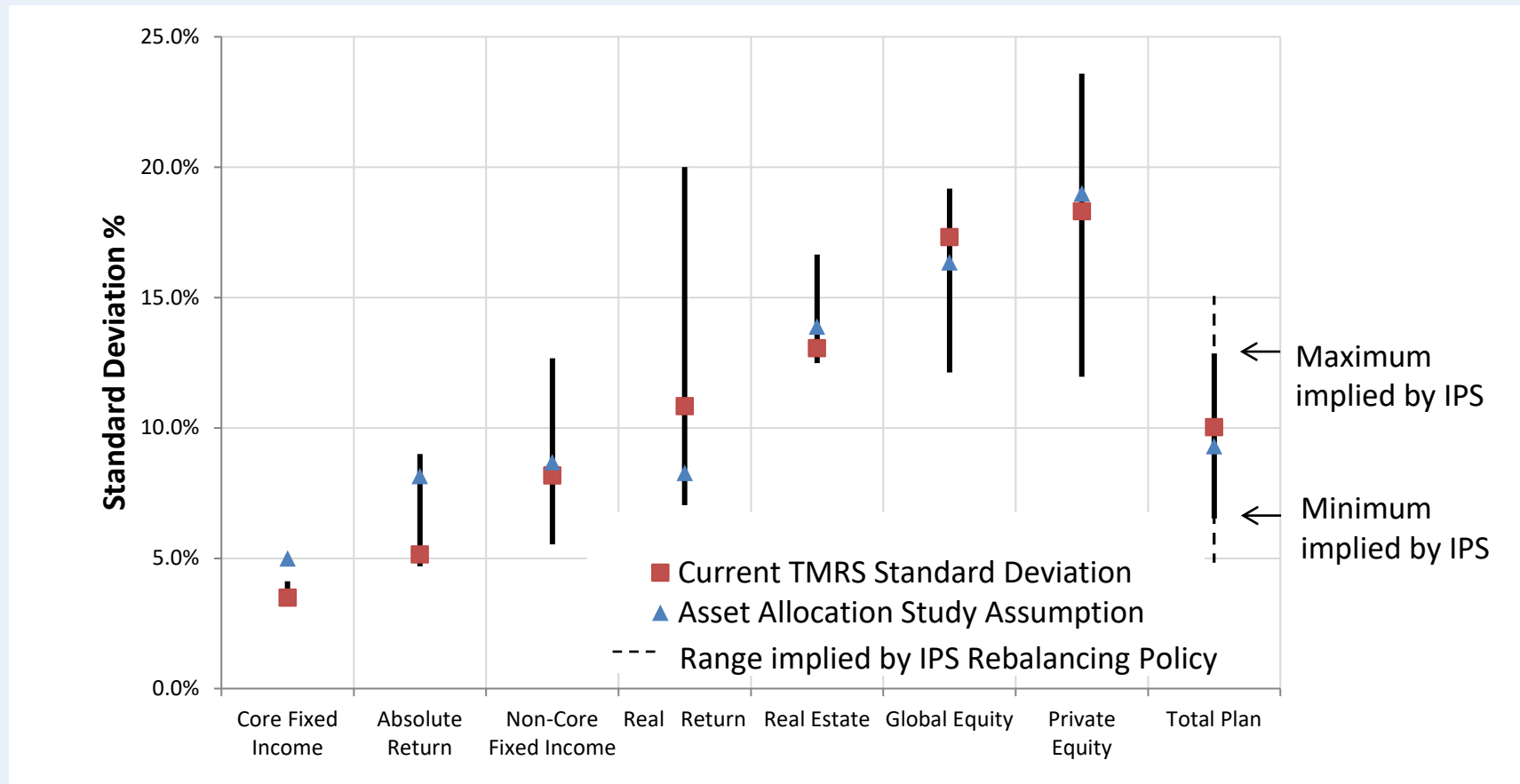
	Experienced 5-Year Standard Deviation of Returns		Asset Allocation Study Standard Deviation Assumption
	Portfolio	Benchmark	(from 2020 Asset Allocation Study)
Total	6.1%	6.1%	9.3
Cash Assets	0.4%	0.3%	2.0
Global Equity	16.5%	17.0%	16.4
Core Fixed Income	3.4%	3.3%	5.0
Non-Core Fixed Income	4.4%	4.0%	8.7
Real Estate	4.1%	3.2%	13.9
Real Return	6.2%	6.0%	8.3
Absolute Return	4.6%	5.7%	8.2
Private Equity	14.2%	14.2%	19.0

Allowed Asset Class Standard Deviation Ranges

June 30, 2021

The Investment Policy Statement (IPS) Asset Class Guidelines place limits on allocations Staff can make to sub-strategies within an Asset Class. We monitor how Staff's sub-strategy allocation decisions compare to the choices allowed by the IPS.

- ✓ All Asset Classes are within the standard deviation ranges implied by the IPS Guidelines.



Regional Exposures

June 30, 2021

We monitor how each Asset Class contributes to the Trust Fund regional exposures.

Asset Class	USA	Developed Europe	Developed Asia & Other	Emerging Americas	Emerging Europe	Emerging Asia & Pacific Rim	Emerging Middle East & Africa	Asset Class Allocation
Cash	1.3%	0.0%	0.0%	0.0%	0.0%	0.0%	0.0%	1.3%
Core Fixed Income	9.6%	0.5%	0.1%	0.1%	0.0%	0.1%	0.0%	10.5%
Non-Core Fixed Income	13.1%	2.0%	0.9%	0.7%	0.5%	0.9%	0.4%	18.5%
Global Equity	21.9%	4.4%	3.3%	0.4%	0.2%	4.0%	0.3%	34.5%
Real Return	7.6%	1.7%	1.5%	0.2%	0.0%	0.2%	0.0%	11.2%
Real Estate	8.6%	0.4%	0.0%	0.0%	0.0%	0.0%	0.0%	9.0%
Absolute Return	6.3%	1.1%	0.5%	0.2%	0.1%	1.5%	0.1%	9.7%
Private Equity	4.8%	0.4%	0.0%	0.1%	0.0%	0.0%	0.0%	5.3%
Grand Total	73.1%	10.5%	6.4%	1.7%	0.8%	6.6%	0.9%	

Risk Metrics Used by Data, Performance and Risk Team

June 30, 2021

The risk metric we use throughout this Report is standard deviation.

- **Standard Deviation:** A statistical measure of how observations of a random event (e.g., monthly returns or monthly rainfall) are distributed around their average; a low number indicates that observations are clustered close to the average, while a large number indicates that values are spread out over a wider range.

As recommended in the 2014 TMRS Risk Program Assessment conducted by State Street Associates, we use a variety of other metrics to analyze the distribution of returns, including:

- Value at Risk (VaR) in worst 5-10% of scenarios
- Expected Shortfall (CVaR) in worst 5-10% of scenarios (both within-period and end-of-period)
- Probability of loss at the end of various time horizons
- Probability of achieving the target return at the end of various time horizons
- Expected maximum drawdown over various time horizons

We also use the Ortec Finance Scenario model to explore more complex distributions of returns caused by widely observed market behaviors such as:

- Time-varying correlations and volatilities; correlations increasing during a crisis
- Non-normality of asset returns; skewed and fat-tailed return distributions
- Differences in volatilities and correlations implied by using monthly, annual, or triennial measurements
- Significance of current conditions in the market on 3-5 year return expectations
- Impact of illiquidity in both normal and stressed markets

DISCLOSURES

TMRS periodically discloses public information that is not excepted from disclosure under Section 552.0225(b) of the Texas Public Information Act. Information provided by a manager, a Managing General Partner (GP), any of its Associates or other data provider to TMRS or a TMRS service provider, and contained in these materials (i) may have been independently produced or modified by TMRS or the TMRS service provider; (ii) has not been reviewed or approved by the manager, Managing GP or any of its Associates; and (iii) may not reflect the historical performance or asset value reflected in the manager's, Managing GP's or any of its Associates' records and, therefore, should not be used for comparative purposes.

