



PRESENTATION TO THE
TOWN OF FRANKLIN
OPEB BOARD OF TRUSTEES

PRESENTED BY

Francesco Daniele, Director of Client Services
Laura Strickland, Senior Client Services Officer
Emily Green, Senior Client Services Analyst

JUNE 7, 2021

Deborah B. Goldberg, Treasurer and Receiver General, Chair
Michael G. Trotsky, CFA, Executive Director and Chief Investment Officer

Table of Contents

• PRIM Board & PRIT Fund Overview	3
• Economic Update	13
• PRIT Fund Asset Allocation Targets	18
• PRIT Fund Performance	22
• State Retiree Benefits Trust Fund	30
• Appendix: PRIT Fund Asset Class Detail	35



PRIM BOARD & PRIT FUND OVERVIEW

 Mass
PRIM

AS OF MARCH 31, 2021

PRIT Fund Snapshot

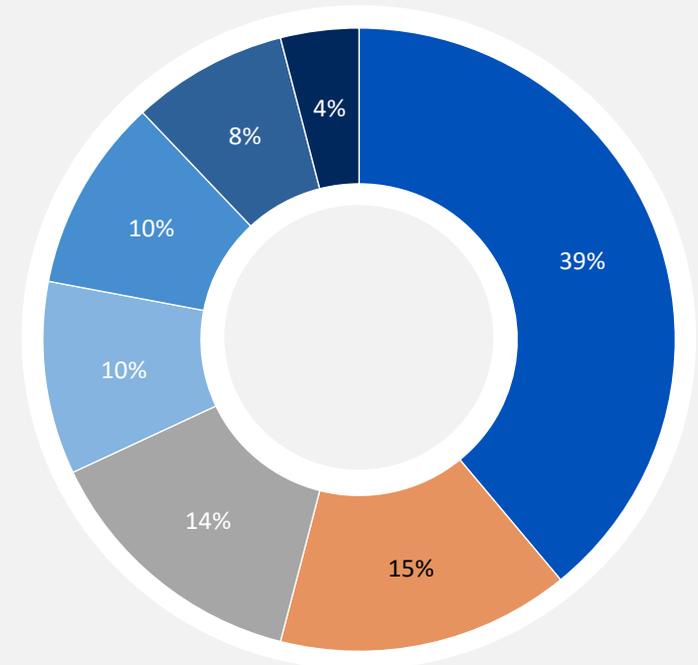
PRIT FUND FACTS

- \$90.1 billion AUM
- 50 public markets portfolios
- 16 real estate, timber and REIT portfolios
- 100+ private equity managers;
200+ partnerships
- 32 portfolio completion strategies managers

OVERSIGHT AND STAFFING

- 9 appointed and elected trustees
- 4 advisory committees, consisting of 34 industry professionals and Board members
- Staff of 50 professionals
 - 2 PhDs
 - 27 MASTERS
 - 11 CFAs
 - 6 CPAs
 - 2 CAIAs
 - 1 FRM
 - 1 CRE
- 19 CFA Investment Foundations Program Certificate Holders

ASSET ALLOCATION



TARGET ASSET ALLOCATION

(as of 2/24/21)

- Global Equities 34% - 44%
- Core Fixed Income 12% - 18%
- Private Equity 11% - 17%
- Portfolio Completion Strategies 7% - 13%
- Real Estate 7% - 13%
- Value-Added Fixed Income 5% - 11%
- Timberland 1% - 7%

About PRIM



\$90.1 billion investment fund that invests public employee pension benefits

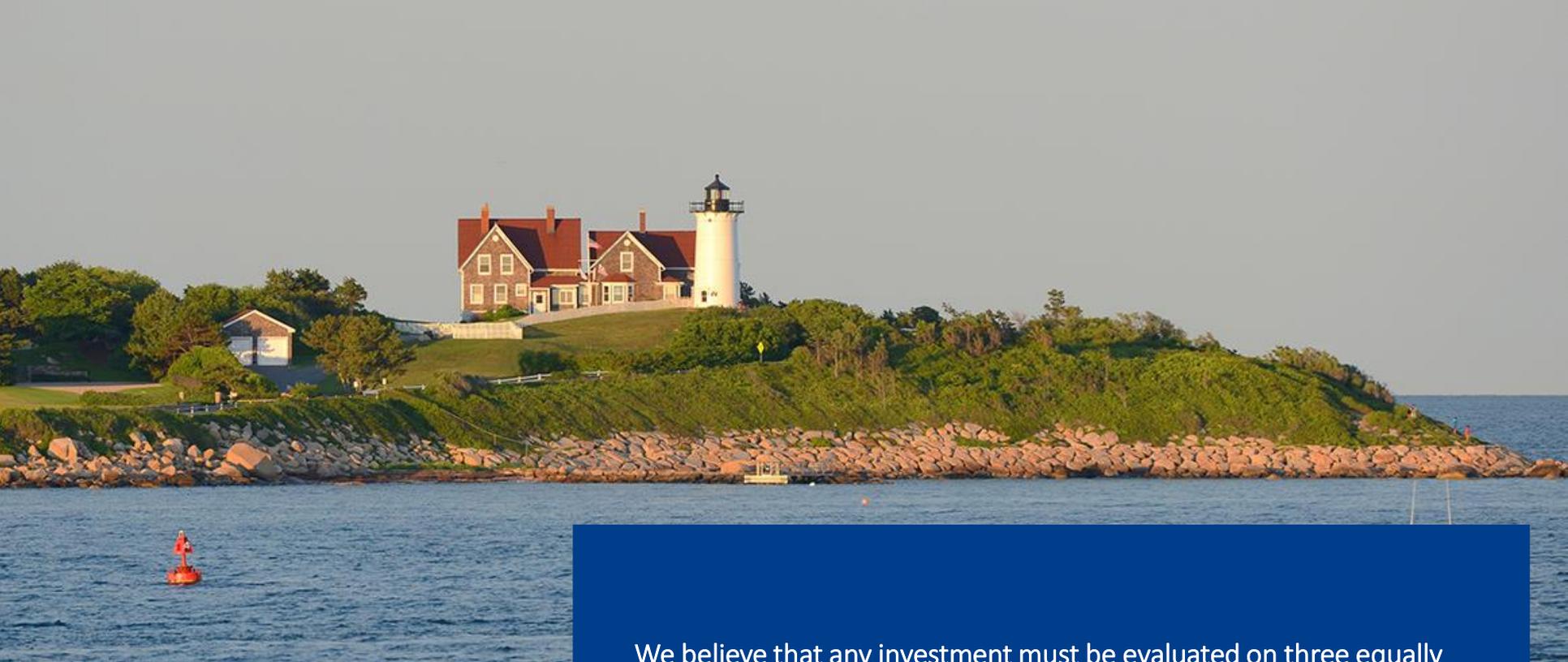
- PRIM has a professional, experienced and focused investment staff.
- PRIM does not administer benefits.

PRIM's mission is to relieve the pension funding burden on the taxpayer

- Self-funded agency which generates asset returns for the Massachusetts pension system.
- PRIM's Project SAVE initiative is achieving over \$200 million annualized value enhancing activities for the fund annually.

PRIM is independent and governed by a nine-member Board of Trustees

- Massachusetts State Treasurer is the Chair of the PRIM Board.
- A robust committee structure lends investment and operational expertise to the decision-making process.



PRIM Core Beliefs

We believe that any investment must be evaluated on three equally important parameters: return, risk and cost.

We don't make tactical asset allocation decisions or investment decisions based on market or economic predictions. Instead, we engineer a strategic, long-term asset allocation strategy that we hope will stand the test of a long-time horizon.

We value a basis point of cost reduction more than a basis point of return. Because we can count on cost savings every year, but nobody ever really knows what the markets will deliver.

PRIM Top 10 Accomplishments

1

Stable organization: Exceptional staff with low turnover supported by a strong, stable Board and Committee structure

2

National recognition for PRIM and its staff

3

Strong relative and absolute investment performance

4

Sophisticated risk management platform and framework

5

Methodical asset allocation decisions

6

Project SAVE

7

Re-engineered Hedge Fund program – Portfolio Completion Strategies

- Direct hedge funds
- Hedge fund replication
- Emerging manager direct hedge fund
- Hedge fund and other credit fund co-investment

8

Enhanced manager search and selection process

9

Private Equity co-investment

10

Direct Real Estate Program

PRIM Board



Chair
DEBORAH B. GOLDBERG
State Treasurer and
Receiver-General,
Commonwealth of Massachusetts



**Ruth Ellen
Fitch**

Appointee of
the State
Treasurer



**James B.G.
Hearty**

Designee
of the
Governor,
Ex Officio
Member



**Peter
Monaco**

Appointee
of the
Governor,
Non-State
Employee or
Official



Carly Rose

Appointee
of the
Governor,
Public Safety



**Theresa F.
McGoldrick,
Esquire**

State
Retirement
Board
Member
(SRB)



**Dennis J.
Naughton**

Teachers'
Retirement
Board
Member
(TRB)



**Robert L.
Brousseau**

Elected
Representative
State Teachers'
Retirement
System



**Paul E.
Shanley,
Esquire**

Elected
Representative
State
Employees
Retirement
System



PRIM Advisory Committees

Investment Committee

The Committee advises the Board with respect to the asset allocation policy of PRIM and related investment policies and assist the Board in overseeing the investment program. The mandate of the Investment Committee does not include real estate and timber. Members include:

1. **Deborah B. Goldberg**, Chair, Treasurer and Receiver General of Massachusetts, PRIM Board Chair (Ex Officio)
2. **Joseph C. Bonfiglio**, Massachusetts & Northern New England Laborers' District Council
3. **C. LaRoy Brantley**, Investment Consultant
4. **Michael Even**, Former President and CEO, Numeric Investors
5. **Constance M. Everson**, CFA, Managing Director, Capital Markets Outlook Group
6. **Ruth Ellen Fitch**, Esq., Board Member, Former President and CEO, the Dimock Center
7. **James B. G. Hearty**, Board Member, Former Partner, Clough Capital (Ex Officio)
8. **Peter Monaco**, Board Member, Managing Director, Raptor Group
9. **Phillip H. Perelmuter**, Former Managing Partner, Wellington Management
10. **Philip Rotner**, Chief Investment Officer, Boston Children's Hospital
11. **Paul E. Shanley**, Esq., Board Member, Director of Professional Liability, Amity Insurance
12. **Glenn P. Strehle**, CFA, Treasurer Emeritus, MIT
13. **Timothy L. Vaill**, Former Chairman and CEO, Boston Private Holdings

Real Estate Committee

The Committee advises the Board in setting investment policy within the real estate and timber portfolios and assist the Board in overseeing these portfolios. Members include:

1. **Jill S. Hatton**, CRE, Chair, Real Estate Investment Professional
2. **Deborah B. Goldberg**, Treasurer and Receiver General of Massachusetts, PRIM Board Chair (Ex Officio)
3. **Lydia Chesnick**, Esq., Partner, Bernkopf Goodman LLP
4. **Robert Gifford**, RGA Corp.
5. **Anthony E. Hubbard**, Esq., CVS Health
6. **Jack Lutz**, PhD., Forest Research Group
7. **William F. (Bill) McCall, Jr.**, CRE, McCall & Almy, Inc.
8. **Garlan Morse, Jr.**, CRE, Morris and Morse Company, Inc.
9. **Peter F. O'Connell**, Marina Bay Company
10. **Carly Rose**, Board Member, Public Safety Union Member



PRIM Advisory Committees

Administration and Audit Committee

The Committee assists the Board in overseeing all issues related to the governance, administration, and audit functions of PRIM, and to provide recommendations for the Board's consideration. Members include:

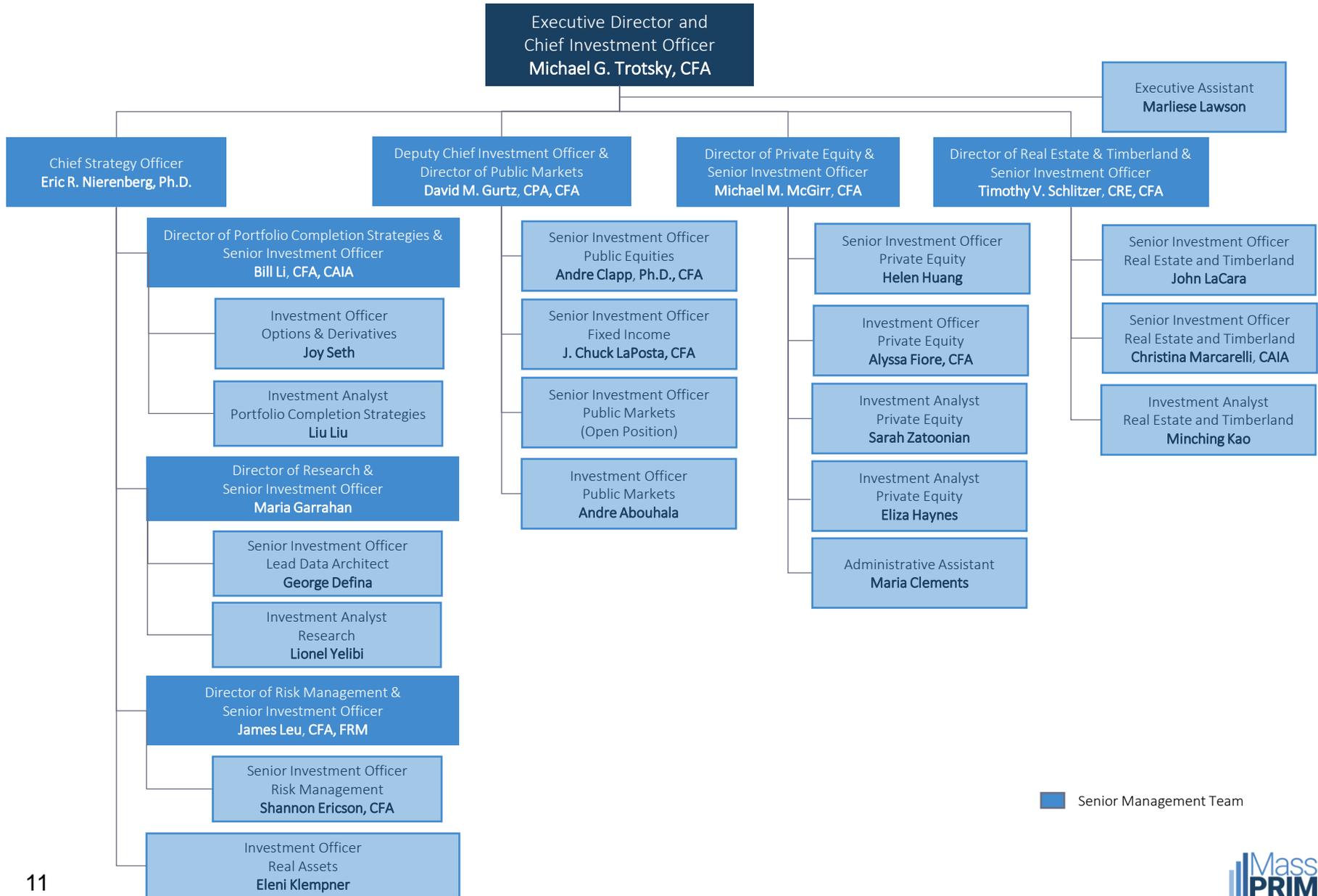
1. **Robert L. Brousseau**, Chair, Board Member, Retired Teacher, Town of Wareham School System
2. **Deborah B. Goldberg**, Treasurer and Receiver General of Massachusetts, PRIM Board Chair (Ex Officio)
3. **Patrick E. Brock**, Chairman, Hampshire County Retirement Board
4. **Karen E. Gershman**, CPA, Former Partner and Chief Operating Officer, Health Advances
5. **James B. G. Hearty**, Board Member, Former Partner, Clough Capital (Ex Officio)
6. **Theresa F. McGoldrick**, Esq., Board Member, National Executive Vice President, National Association of Government Employees (NAGE)
7. **Dennis J. Naughton**, Board Member, Retired Educator, Millis Public Schools
8. **Michele A. Whitham**, Esq., Founder & Principal, Whitham Law LLC

Compensation Committee

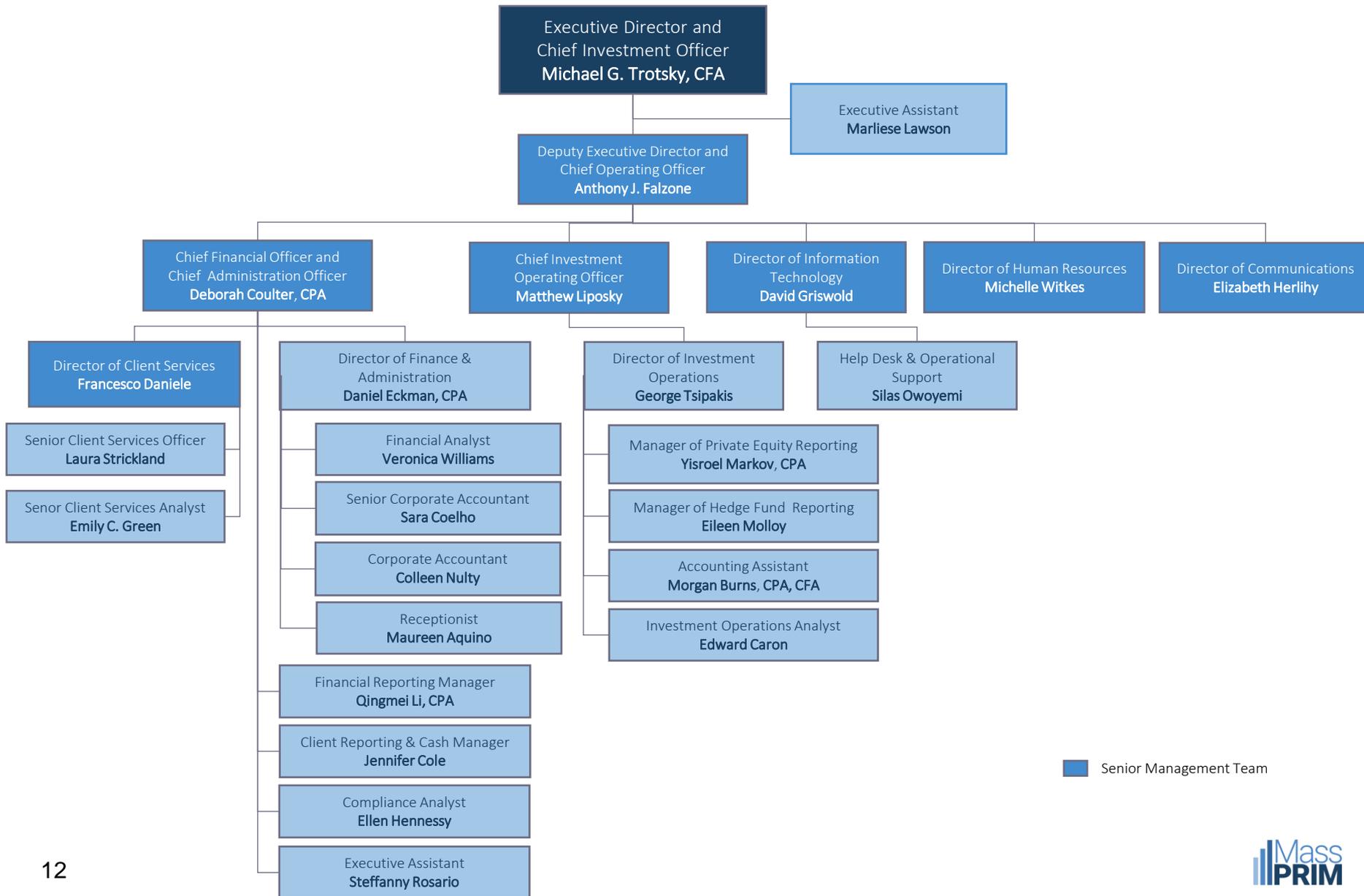
The Committee assists the Board in overseeing staff compensation and benefit policies. The Administration and Audit Committee is responsible for assisting the Board on other human resource matters. Members include:

1. **Michele A. Whitham**, Esq., Chair, Founder & Principal, Whitham Law LLC
2. **Deborah B. Goldberg**, Treasurer and Receiver General of Massachusetts, PRIM Board Chair (Ex Officio)
3. **Robert L. Brousseau**, Board Member, Retired Teacher, Town of Wareham School System
4. **Patrick E. Brock**, Chairman, Hampshire County Retirement Board

PRIM Investment Team



PRIM Finance and Operations Team



A photograph of a city skyline at dusk, with buildings illuminated and reflected in the water. The scene is overlaid with a blue tint. In the foreground, there is a cobblestone walkway and a low stone wall.

ECONOMIC UPDATE

The logo for Mass PRIM, featuring the word "Mass" in a serif font above the word "PRIM" in a bold, sans-serif font. To the left of the text are three vertical bars of increasing height, resembling a bar chart.

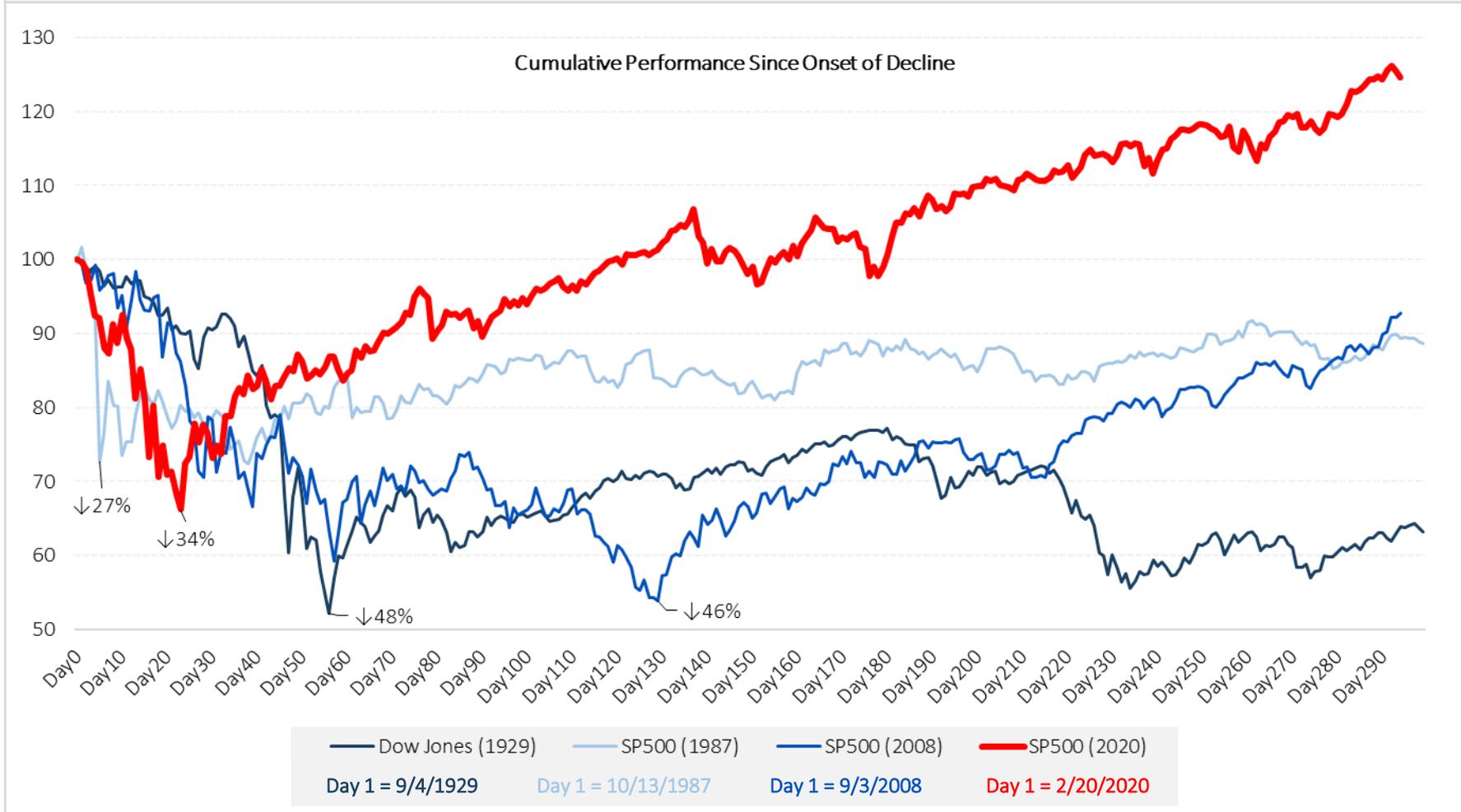
Mass
PRIM

AS OF MARCH 31, 2021

Unprecedented Sharp Decline and Recovery

As of April 20, 2021

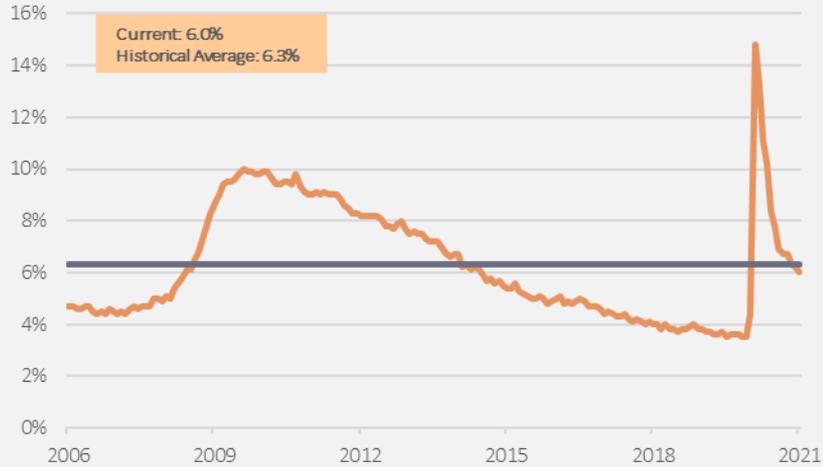
- Velocity of COVID-19 sell-off surpassed that of GFC.
- Rebound velocity also surpassed that of previous sell-offs.
- S&P 500 reached new high in April 2021.



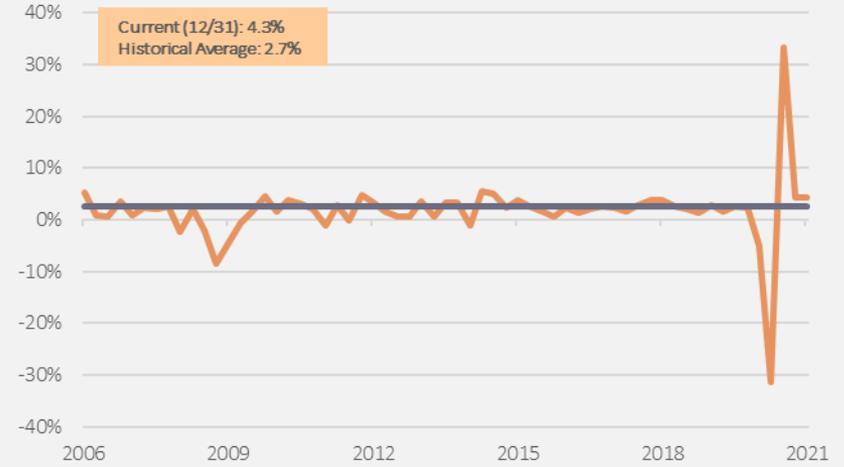
Source: FactSet, PRIM Staff.

U.S. Economic Data

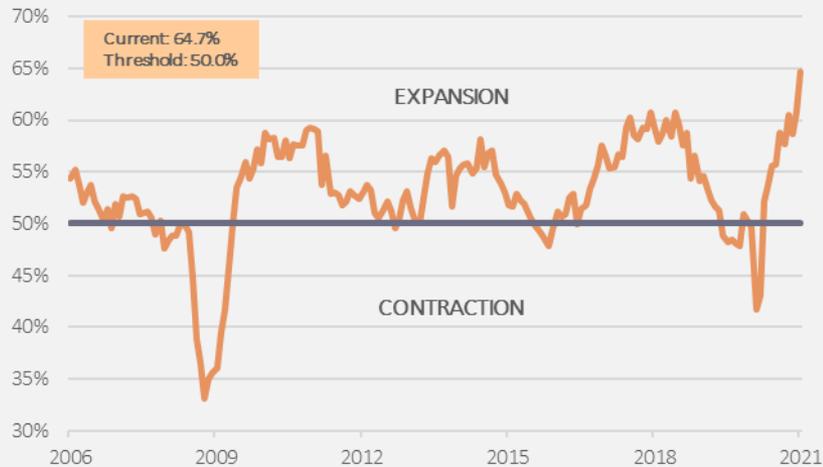
UNEMPLOYMENT RATE



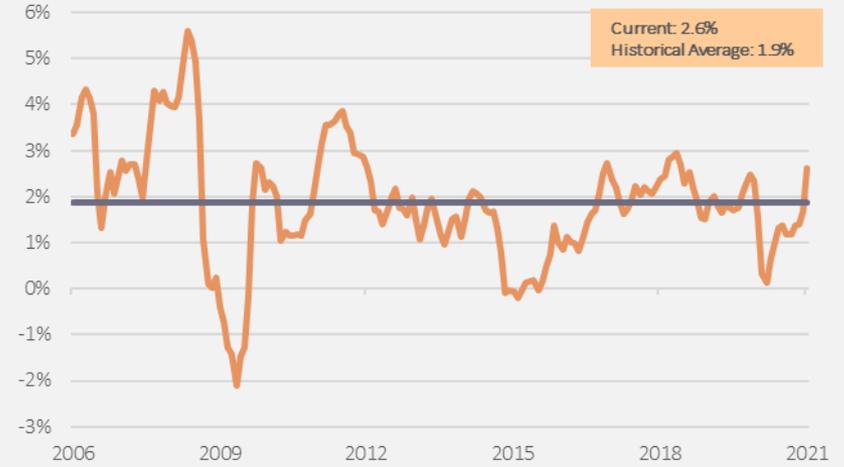
GDP GROWTH RATE



MANUFACTURING PMI

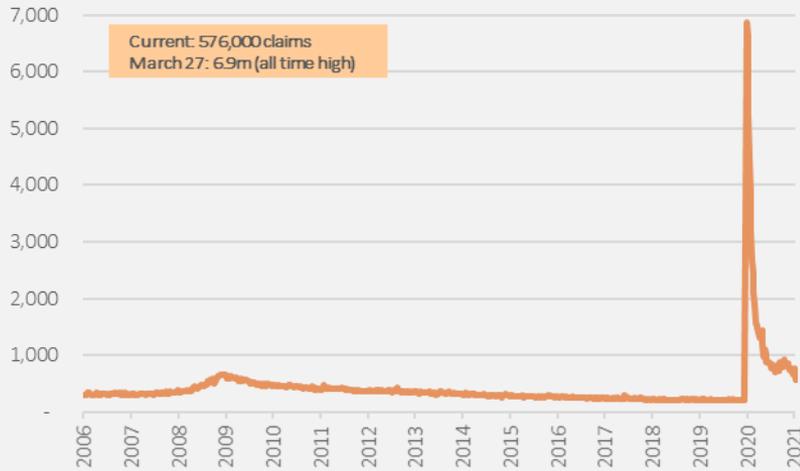


CONSUMER PRICE INDEX



U.S. Economic Data

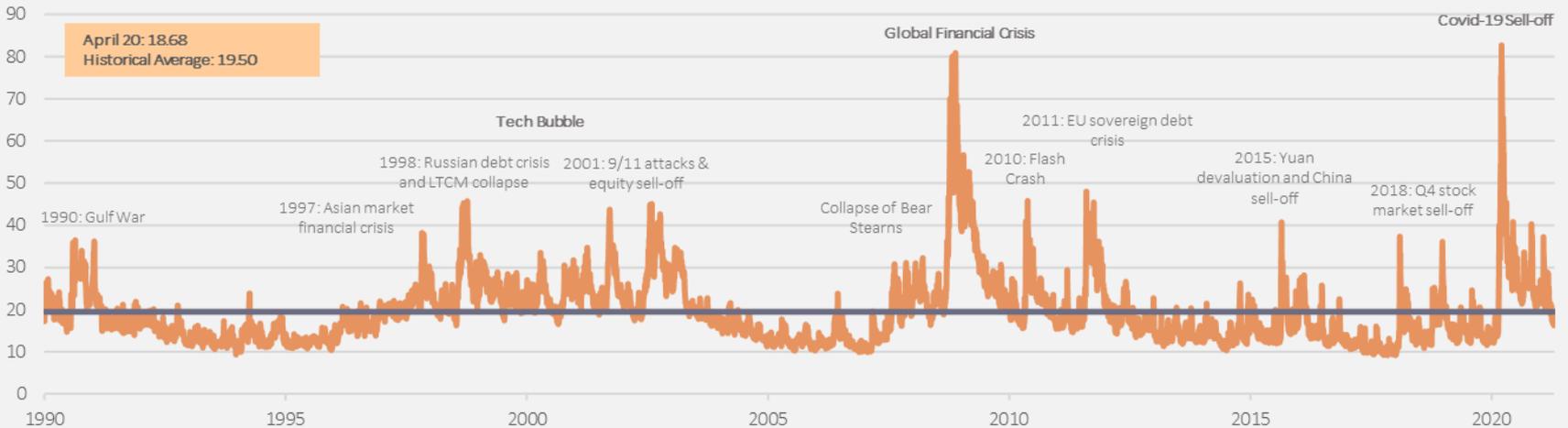
WEEKLY INITIAL JOBLESS CLAIMS (IN MILLIONS)



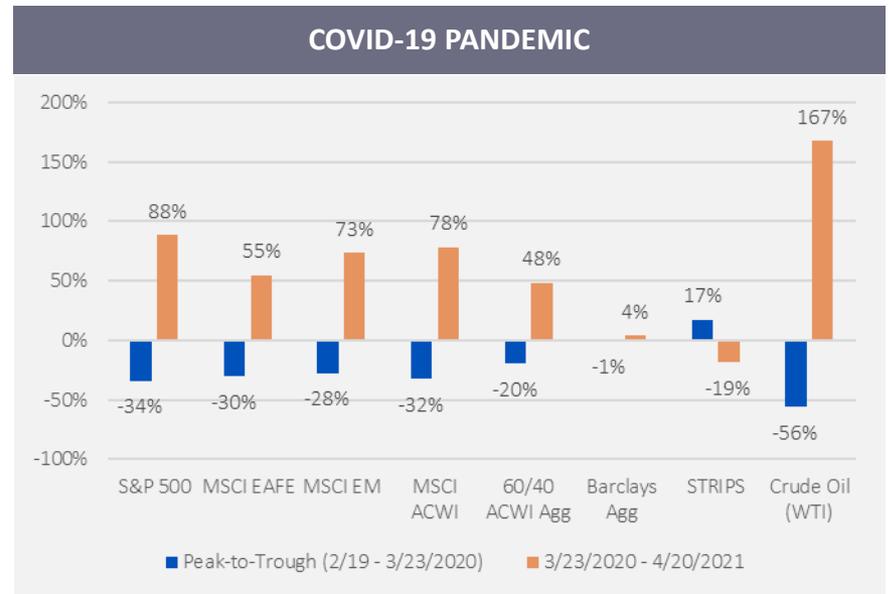
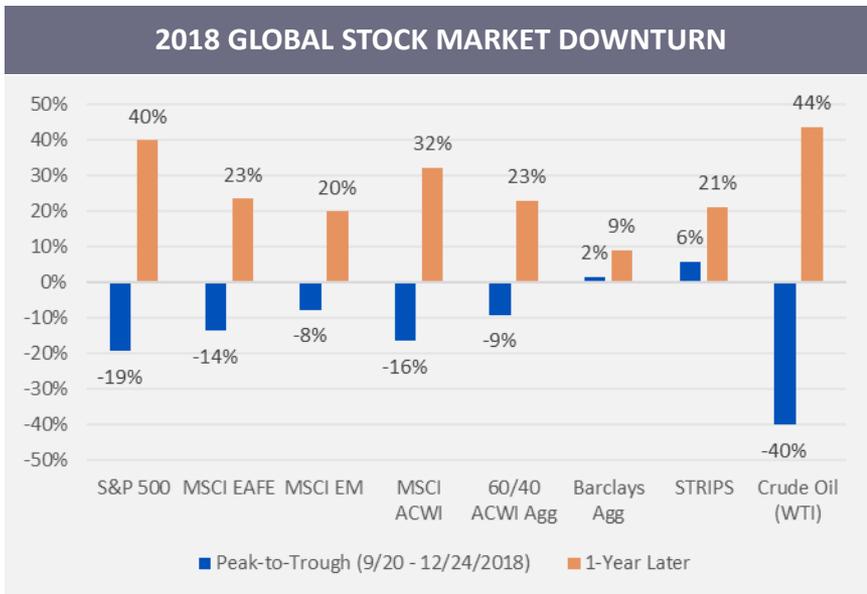
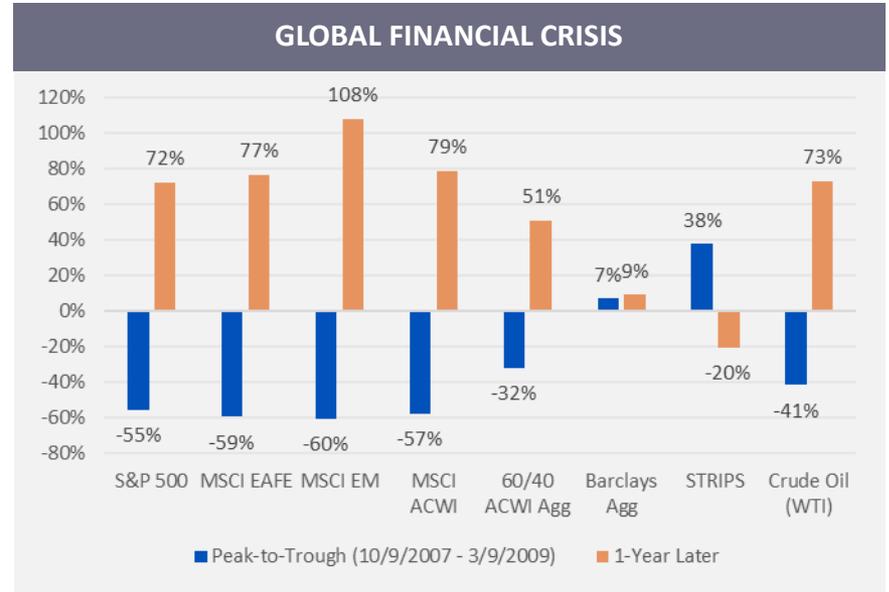
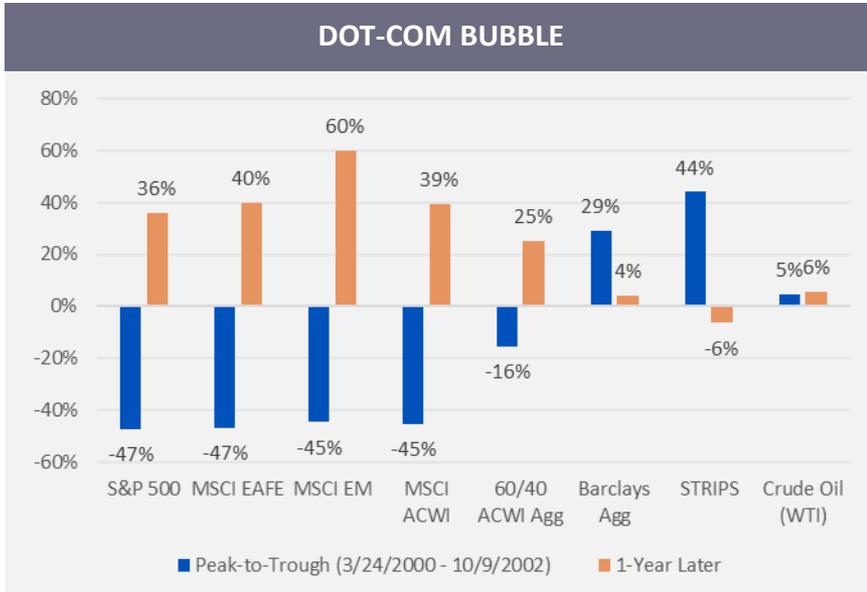
WTI CRUDE OIL (\$/BBL)



CBOE MARKET VOLATILITY INDEX (VIX)



Historical Market Sell-Off Performance



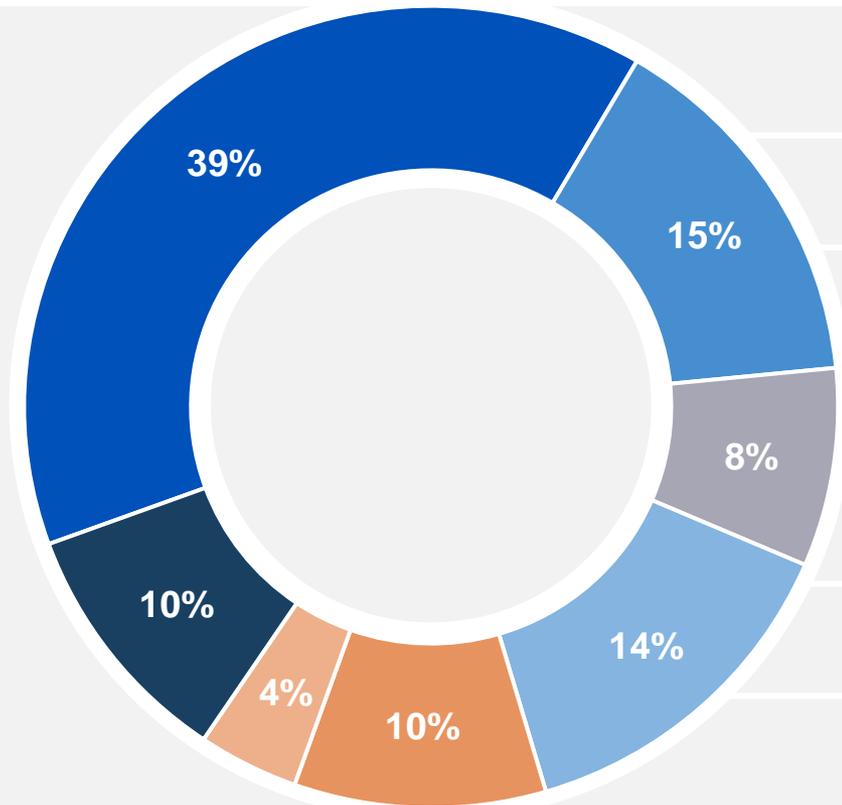


PRIT FUND ASSET ALLOCATION TARGETS

Mass
PRIM

PRIT Asset Allocation

Approved February 24, 2021



	AA 2020 Approved Range	AA 2021 Approved Range	Within Range
Global Equity (including Hedged US Equity)	34% - 44%	No Change	Yes
Core Fixed Income	12% - 18%	No Change	Yes
Value-Added Fixed Income	5% - 11%	No Change	Yes
Private Equity	10% - 16%	11% - 17%	Yes
Real Estate	7% - 13%	No Change	Yes
Timberland	1% - 7%	No Change	Yes
Portfolio Completion Strategies	8% - 14%	7% - 13%	Yes

The ranges in the PRIM asset allocation reflect the long-standing use of bands around a midpoint. Managing the asset allocation to a particular midpoint in the range is not always possible, practical or advisable.

Changes to Target Ranges – PRIT Fund Asset Allocation

Approved February 24, 2021

Increase in Allocation Range

Private Equity:
Target Band moves up 1%

Same Allocation Range

Global Equity:
Target Band stays the same

Core Fixed Income:
Target Band stays the same

Value-Added Fixed Income:
Target Band stays the same

Real Estate:
Target Band stays the same

Timberland:
Target Band stays the same

Decrease in Allocation Range

Portfolio Completion Strategies:
Target Band moves down 1%

PRIM 2021 Asset Allocation Recommendations

NEPC Capital Market Assumptions with PE and PCS Changes

Asset Classes			12/31/20 Asset Class Assumptions	
	Proposed Asset Allocation Range		10 Yr. Expected Return	30 Yr. Expected Return
US Equity ¹	21.2%		5.5%	6.4%
International Equities ²	11.8%		5.9%	6.6%
Emerging International Equities ²	5.0%		7.6%	8.4%
Hedged Equity ³	1.0%		4.8%	5.7%
Global Equity	34% - 44%			
Core Bonds	7.0%		1.4%	2.7%
Short-Term Fixed Income ⁴	1.0%		1.0%	2.0%
20+ Yr. Treasury STRIPS	3.0%		0.4%	1.7%
TIPS/ILBs	4.0%		1.0%	2.1%
Core Fixed Income	12% - 18%			
Value-Added Fixed Income ⁵		5% - 11%	4.8%	6.2%
Private Equity		11% - 17%	9.6%	10.2%
Real Estate ⁶		7% - 13%	4.8%	6.0%
Timberland ⁷		1% - 7%	5.4%	6.6%
Portfolio Completion (PCS) ⁸		7% - 13%	4.0%	5.2%
Total Fund Expected Return⁹			5.8%	6.8%

1. Blended allocation to large-cap equity (85%) and small-cap equity (15%)
2. Blended allocation to large-cap equity (90%) and small-cap equity (10%)
3. Modeled as US LIBOR, US large-cap equity, and US small-cap equity
4. Modeled as short-term Treasury
5. Modeled as 50% High Yield and 50% Private Debt

6. Real Estate is modeled as 80% Private Real Estate and 20% REITs
7. Timberland is modeled as Private Real Assets Infrastructure/Land
8. Modeled as equal weighed blend of Hedge Fund Equity, Credit and Macro
9. Asset classes modeled as the midpoint of the asset allocation range

A blue-tinted photograph of a city skyline at dusk, viewed from a waterfront promenade. The sky is a deep blue, and the city lights are beginning to glow. In the foreground, there is a paved walkway with a low stone wall and some greenery on the left. The water of the harbor is visible on the right, with several wooden pilings extending into it.

PRIT FUND PERFORMANCE

The logo for Mass PRIM, featuring the word "Mass" in a sans-serif font above the word "PRIM" in a larger, bold, sans-serif font. To the left of the text are three vertical bars of increasing height, resembling a bar chart.

AS OF MARCH 31, 2021

Total PRIT Fund Fiscal Year Market Value

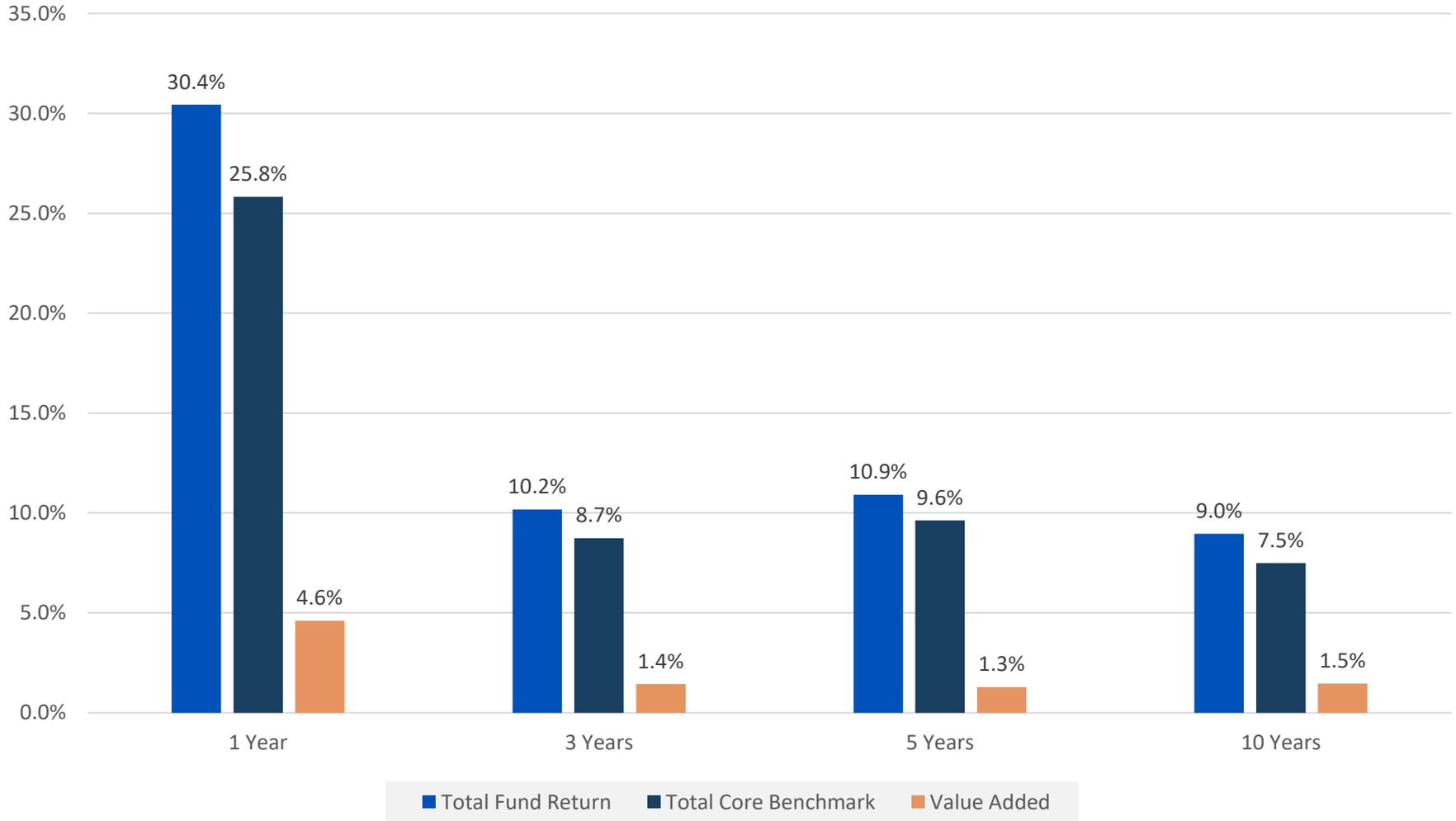
Value (\$Billions)



Source: BNY Mellon. As of March 31, 2021.

PRIT Fund Total Returns

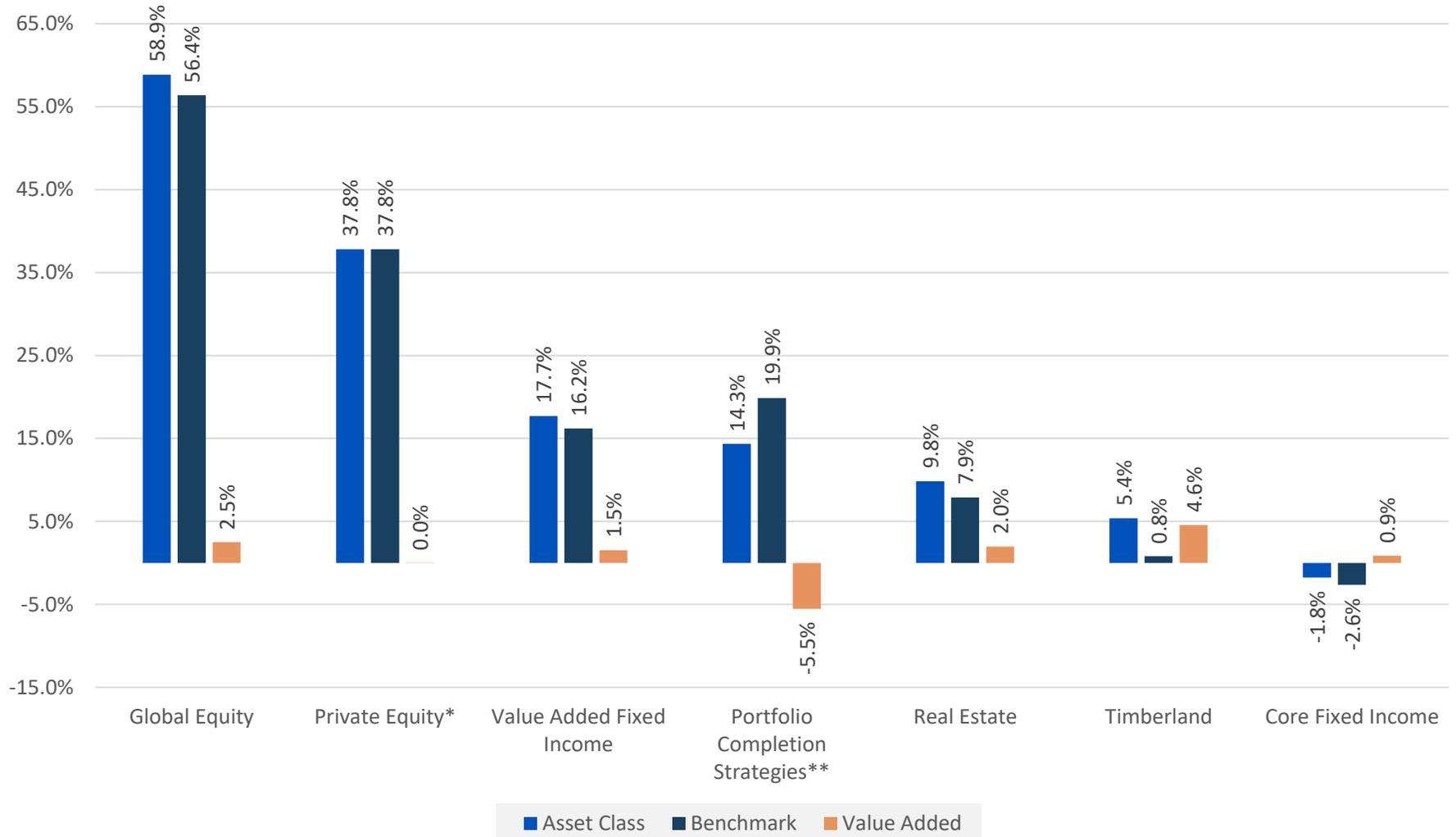
Annualized Returns as of March 31, 2021 (Gross of Fees)



Source: BNY Mellon. Total Core Benchmark includes private equity benchmark.

PRIT Asset Class Performance Summary

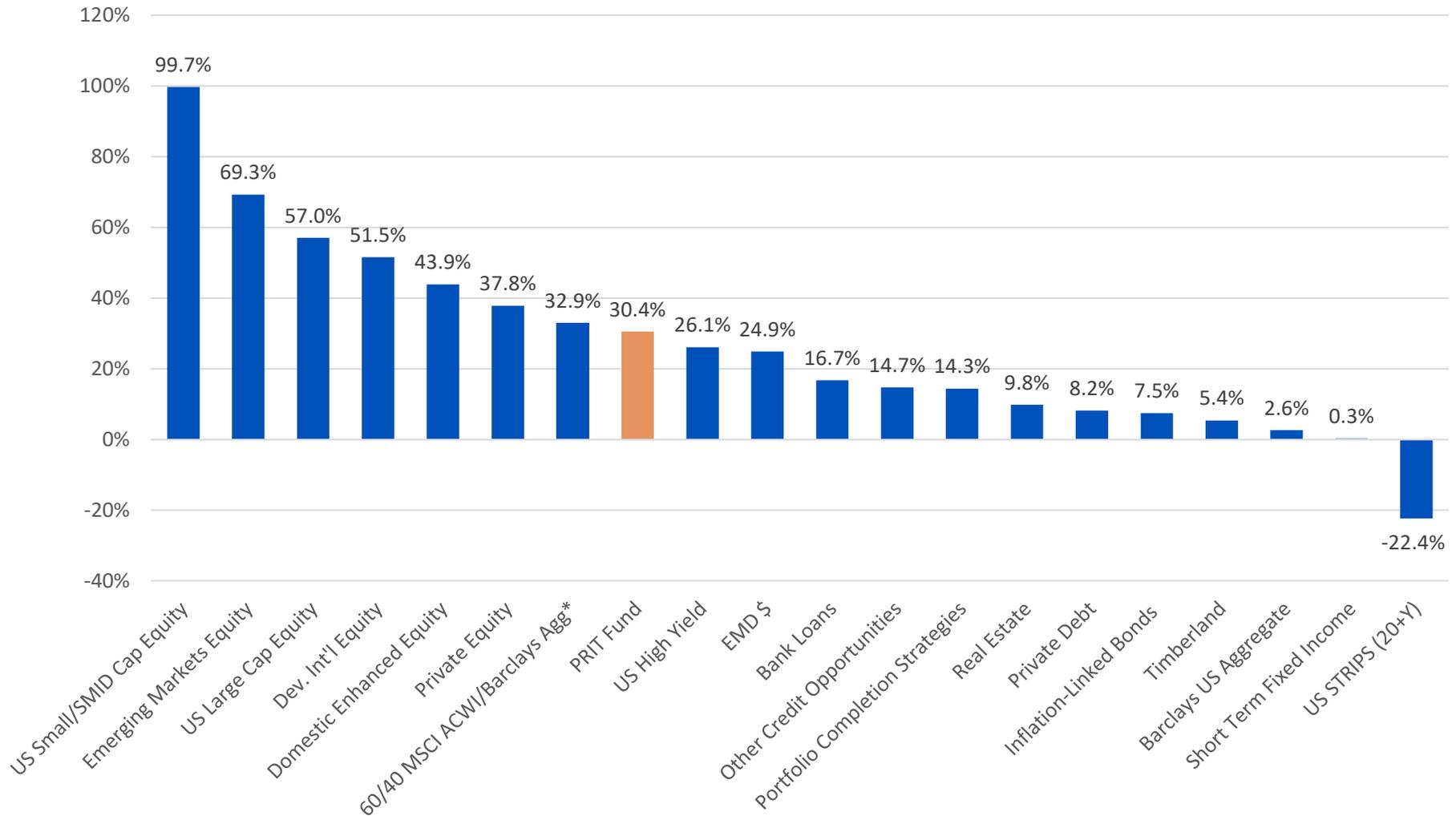
One-Year Ended March 31, 2021 (Gross of Fees)



Source: BNY Mellon. Totals may not add due to rounding. *Benchmark is actual performance. **Hedge Fund returns are net of fees.

PRIT Performance By Strategy – One-Year

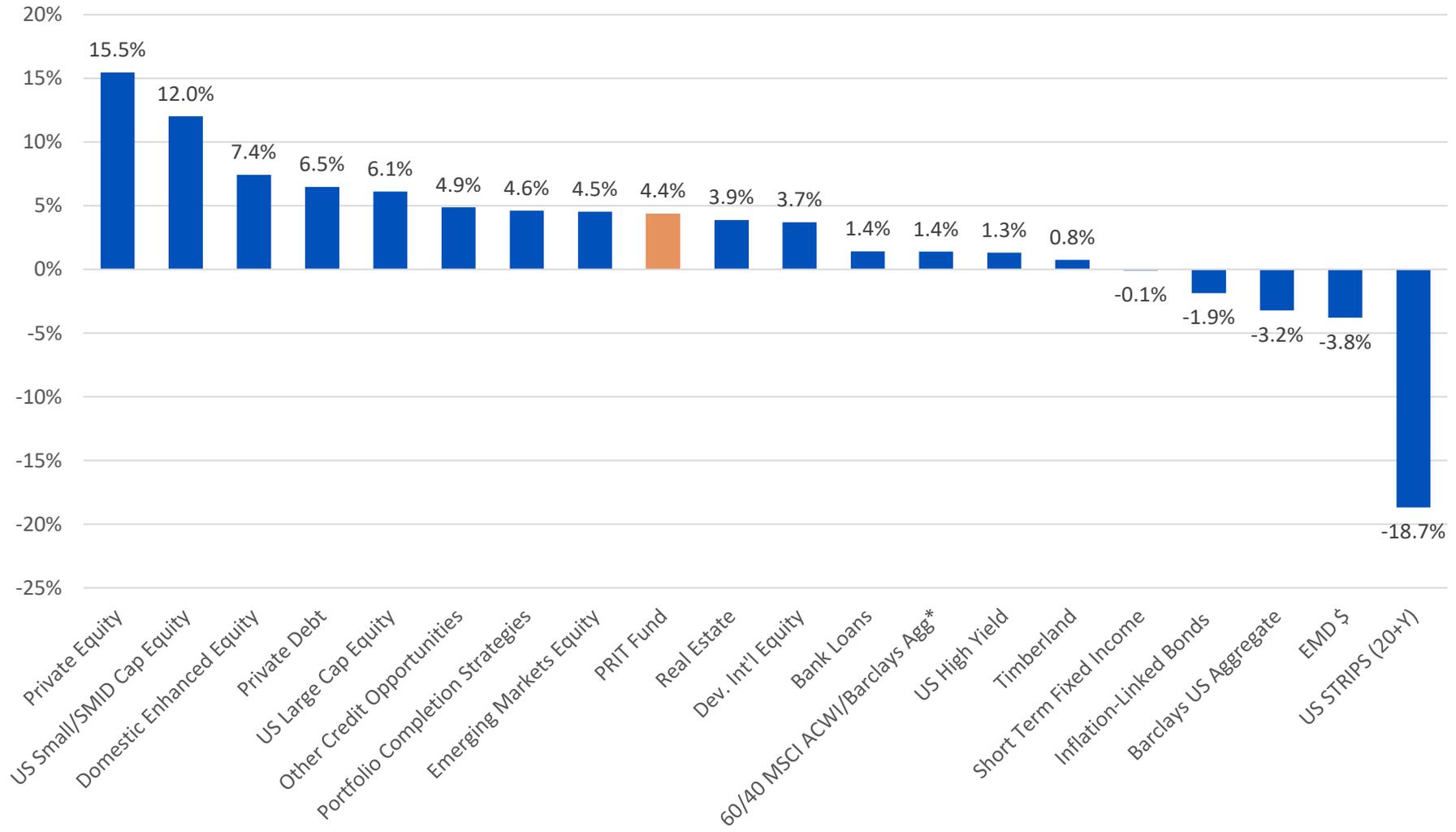
One-Year Ended March 31, 2021 (Gross of Fees)



Source: BNY Mellon, FactSet. All performance figures reflected are PRIT Fund Asset Class returns. *MSCI ACWI/Barclays Aggregate is derived from a 60/40 combination of index returns.

PRIT Performance By Strategy – First Quarter 2021

Quarter Ended March 31, 2021 (Gross of Fees)



Source: BNY Mellon, FactSet. All performance figures reflected are PRIT Fund Asset Class returns. *MSCI ACWI/Barclays Aggregate is derived from a 60/40 combination of index returns.

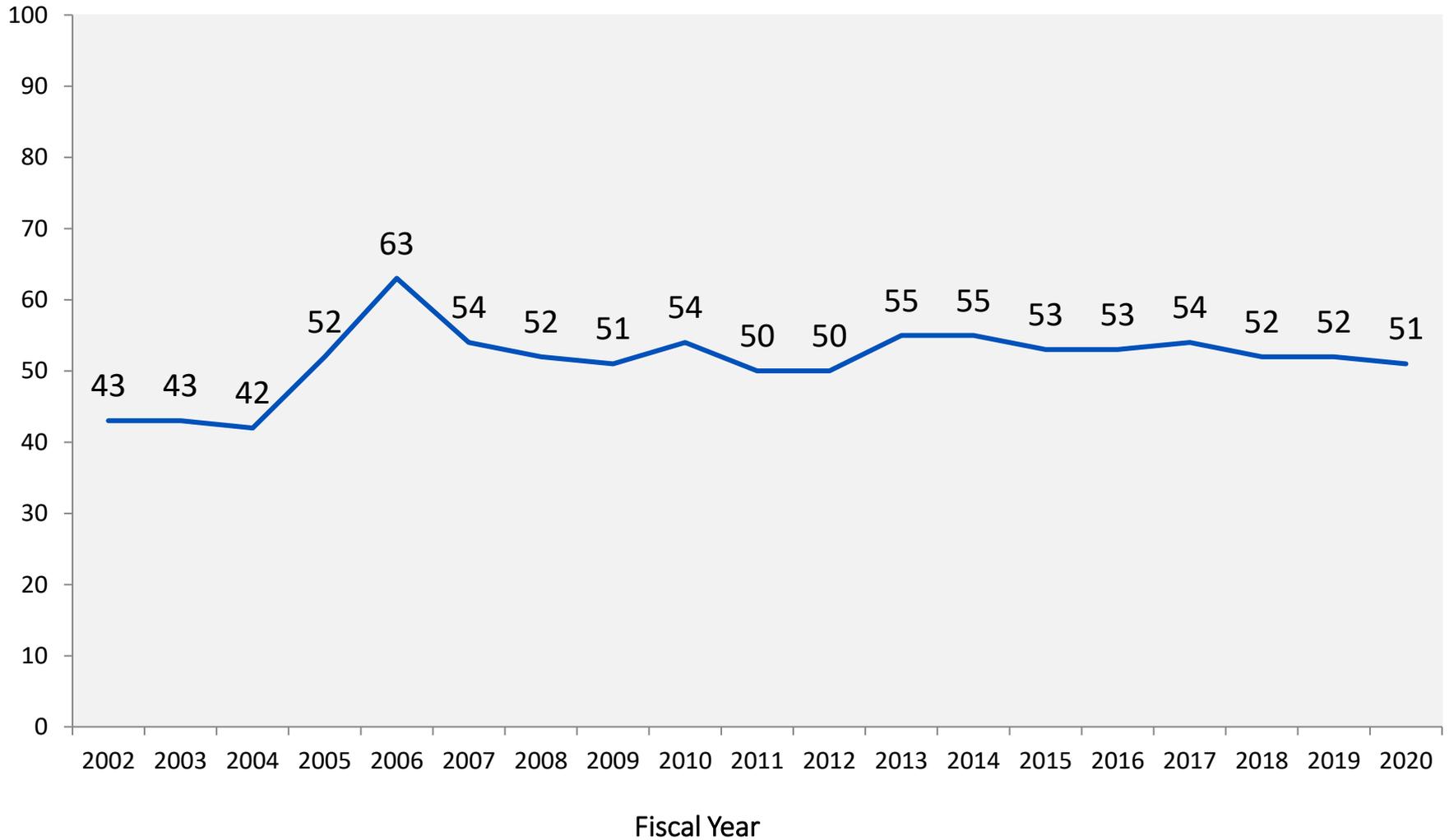
PRIT Fund Annualized Returns By Asset Class

As of March 31, 2021 (Gross of Fees)

1 Year	3 Year	5 Year	10 Year
GLOBAL EQUITY 58.9%	PRIVATE EQUITY 24.5%	PRIVATE EQUITY 22.6%	PRIVATE EQUITY 19.8%
PRIVATE EQUITY 37.8%	GLOBAL EQUITY 11.9%	GLOBAL EQUITY 13.7%	GLOBAL EQUITY 9.7%
VALUE-ADDED FIXED INCOME 17.7%	REAL ESTATE 6.8%	REAL ESTATE 7.1%	REAL ESTATE 9.6%
PORTFOLIO COMPLETION STRATEGIES 14.3%	CORE FIXED INCOME 5.8%	VALUE-ADDED FIXED INCOME 6.7%	VALUE-ADDED FIXED INCOME 5.4%
REAL ESTATE 9.8%	VALUE-ADDED FIXED INCOME 5.0%	PORTFOLIO COMPLETION STRATEGIES 5.0%	CORE FIXED INCOME 4.8%
TIMBER 5.4%	PORTFOLIO COMPLETION STRATEGIES 3.6%	TIMBER 4.3%	TIMBER 4.7%
CORE FIXED INCOME (1.8%)	TIMBER 2.4%	CORE FIXED INCOME 3.8%	PORTFOLIO COMPLETION STRATEGIES 4.2%

Source: BNY Mellon.

Total PRIT Fund - Ratio of Expenses in Basis Points



A blue-tinted photograph of a city skyline at dusk, with a waterfront promenade in the foreground. The skyline includes several tall buildings, some with lights on. The promenade has a cobblestone path and a low stone wall.

STATE RETIREE BENEFITS TRUST FUND

The logo for Mass PRIM, featuring the word "Mass" in a serif font above the word "PRIM" in a bold, sans-serif font. To the left of the text are three vertical bars of increasing height, resembling a bar chart.

Mass
PRIM

AS OF MARCH 31, 2021

Composition of the SRBTF Board of Trustees

Secretary of Administration & Finance or designee

Michael Heffernan

Frank Gervasio serves as Secretary Heffernan's Designee

State Treasurer & Receiver-General or designee

Deborah B. Goldberg

Nicola Favorito serves as Treasurer Goldberg's Designee and is SRBTF Board Chair

State Comptroller or designee

William McNamara

Executive Director, Group Insurance Commission or designee

Matthew Veno

James Rust serves as Mr. Veno's designee

Executive Director, Public Employee Retirement Administration Commission or designee

John W. Parsons

Treasurer's Appointee

Michael C. Tow, CFP

President & Founder, New Boston Financial

Governor's Appointee

Theresa Flynn

Principal, Strategic Benefit Advisors

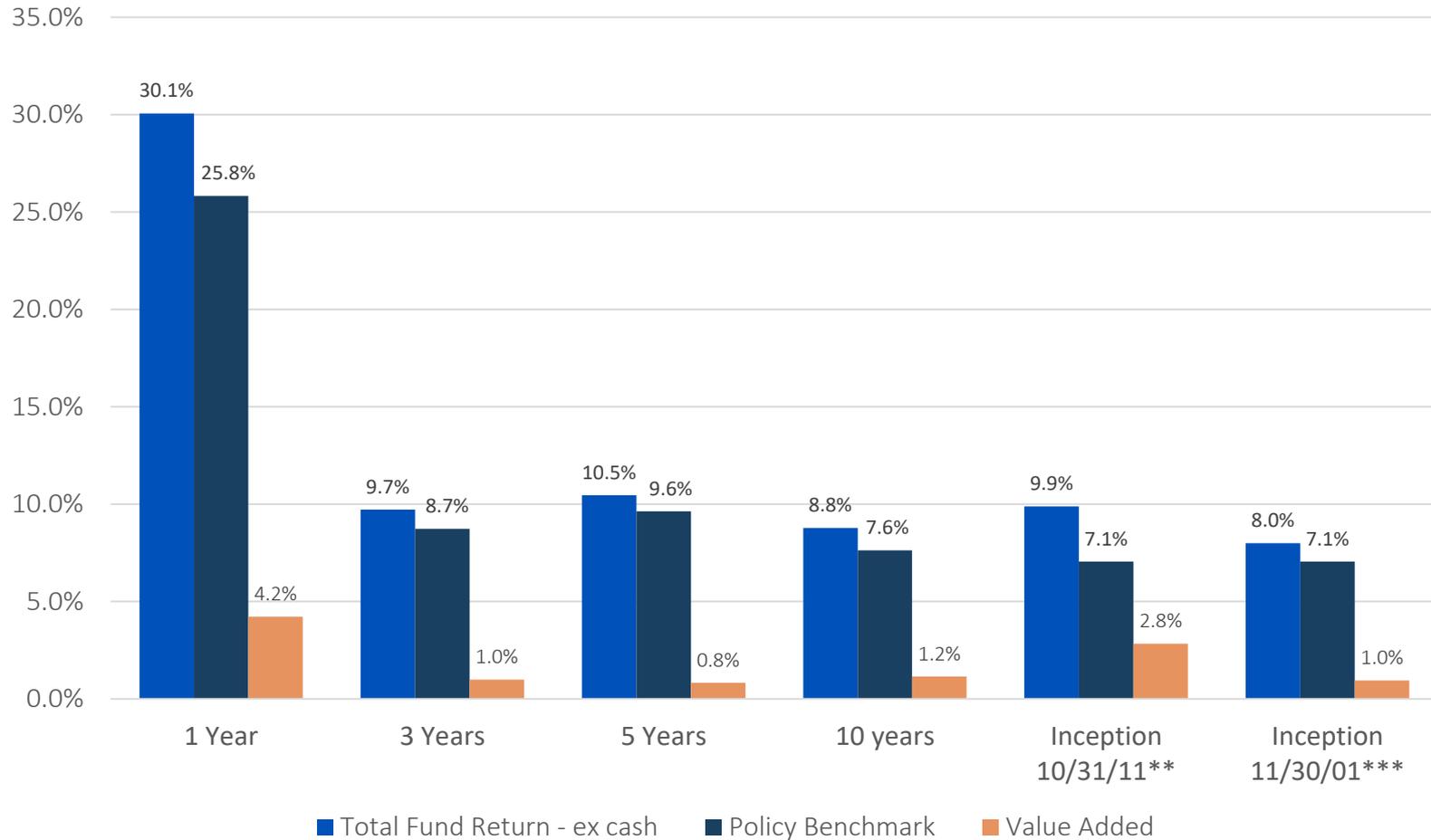
Five of the seven Trustees are Ex Officio Members. The two appointed Trustees serve five-year terms.

Governmental Entities Participating in the SRBTF

1. Town of Acton
2. Town of Amherst
3. Town of Ayer
4. Town of Bedford
5. Town of Bellingham
6. City of Beverly
7. BiCounty Educational Collaborative, Franklin, MA
8. Town of Blackstone
9. Boston Redevelopment Authority
10. Town of Boxford
11. Town of Braintree
12. Town of Brewster
13. Town of Brookline
14. Town of Burlington
15. Byfield Water District
16. Town of Chelmsford
17. Concord Area Special Education (CASE) Collaborative
18. Town of Cohasset
19. Town of Dalton
20. Town of Dracut
21. Town of Dedham
22. Town of East Bridgewater
23. Fall River Housing Authority
24. City of Fitchburg
25. Town of Franklin
26. Franklin Regional Council of Governments
27. Greater Lowell Regional Technical School
28. Town of Harvard
29. Town of Hingham
30. Town of Holliston
31. Town of Ipswich
32. Town of Lancaster
33. Lawrence Housing Authority
34. Town of Lenox
35. City of Leominster
36. Town of Lincoln
37. Lincoln-Sudbury Regional School District
38. Town of Longmeadow
39. Lowell Regional Transit Authority (LRTA)
40. Lower Pioneer Valley Educational Collaborative
41. Town of Manchester-By-The-Sea
42. Manchester Essex Regional School District
43. Town of Marblehead
44. Marblehead Municipal Light Department
45. Massachusetts School Building Authority
46. Mass State Retirees (SRBTF)
47. Mass Water Resources Authority
48. Town of Medfield
49. Town of Middleton
50. Town of Milton
51. Town of Montague
52. Nashoba Regional School District
53. Town of Needham
54. City of New Bedford
55. City of Newburyport
56. City of Newton
57. Town of North Andover
58. Town of Northborough
59. Town of Northfield
60. Old Rochester Regional School District
61. Town of Orleans
62. Pilgrim Area Collaborative (PAC), Pembroke, MA
63. Town of Provincetown
64. Quabbin Health District
65. Town of Reading
66. Shawsheen Valley Technical High School, Billerica, MA
67. Town of Sherborn
68. South Hadley Fire District
69. Town of Stockbridge
70. Town of Tewksbury
71. Town of Wakefield
72. Wakefield Municipal Gas & Light Department
73. Town of Wayland
74. Town of Wellesley
75. Town of Westwood
76. Town of Wilmington
77. City of Worcester

Total SRBT Fund Returns

\$2.48 Billion* One Year Ended March 31, 2021 (Net of Fees)



*Participant assets, excluding Mass State Retirees, were \$770.6 million as of March 31, 2021

** The inception date for the SRBTF's investment in the PRIT Fund General Allocation Account (PRIT GA) was 10/31/2011, when 82% of the fund was transitioned from separate accounts to PRIT GA. The remaining 18% of separate account assets were transitioned over the following 14 months with 100% of assets invested in PRIT GA by 12/31/2012. **This ITD value of 9.9% reflects the inception-to-date return for PRIT GA assets only.**

*** The inception date for the TOTAL FUND was 11/30/2001. This ITD value reflects the true inception-to-date return for all SRBTF assets including legacy separate account investments as well as the PRIT GA investments.

Town of Franklin OPEB Assets in SRBTF

Net of Fees Returns as of March 31, 2021

	MKT \$ (000)	%	Month	QTR	FY '21	Calendar				
						YTD	1 Year	3 Year	5 Year	10 Year Inception
TOWN OF FRANKLIN	8,926	100%	3.11	4.17	21.22	4.17	29.93	9.67	10.39	9.73
SRBTF OPEB MASTER TRUST	8,926	100%	3.11	4.25	21.30	4.25	30.02	9.69	10.43	
<i>POLICY BENCHMARK</i>			<i>1.17</i>	<i>2.42</i>	<i>15.21</i>	<i>2.42</i>	<i>25.82</i>	<i>8.73</i>	<i>9.63</i>	

TRANSACTION DATE	TRANSACTION TYPE	AMOUNT
2/8/2021	Purchase	\$672,000
2/21/2020	Purchase	\$970,000
4/4/2019	Purchase	\$572,000
3/13/2019	Purchase	\$370,000
2/27/2018	Purchase	\$280,000
7/26/2017	Purchase	\$522,000
5/26/2017	Purchase	\$360,000
12/28/2016	Purchase	\$472,000
6/27/2016	Purchase	\$200,000
8/28/2015	Purchase	\$1,877,693

A nighttime photograph of the Boston waterfront, showing a cobblestone promenade in the foreground, a body of water, and a city skyline with illuminated buildings in the background under a dark blue sky.

APPENDIX PRIT FUND ASSET CLASS DETAIL

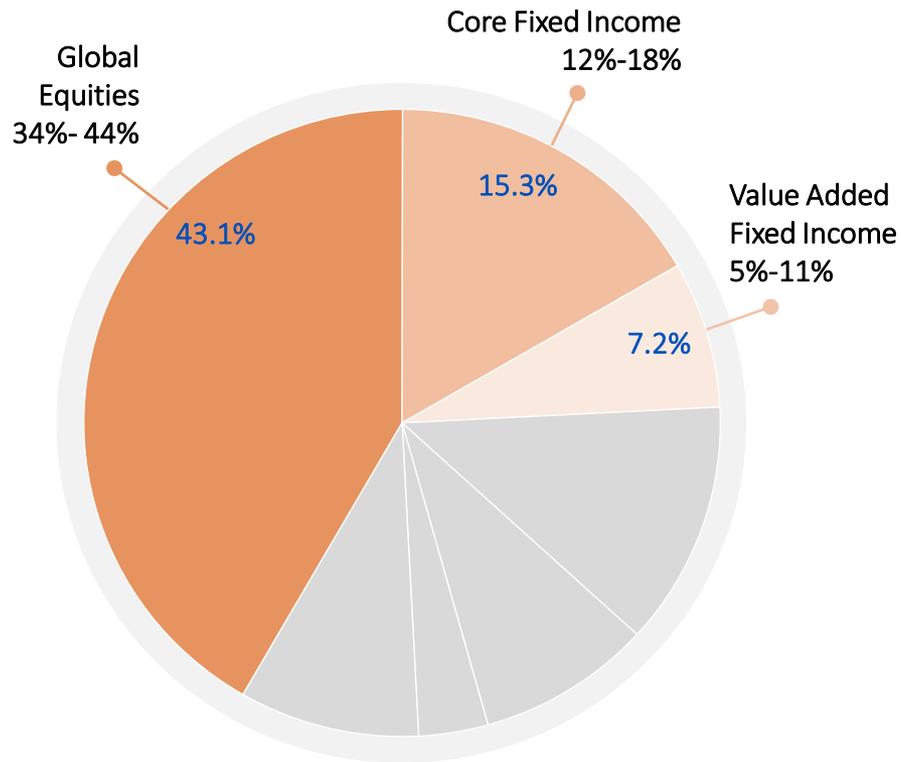
The logo for Mass PRIM, featuring the word "Mass" in a serif font above the word "PRIM" in a bold, sans-serif font. To the left of the text are three vertical bars of increasing height, resembling a bar chart.

AS OF MARCH 31, 2021

Public Market Portfolios

PRIT FUND TARGET ASSET ALLOCATION

Actual Allocation as of March 31, 2021



\$57.6 billion 64.0% of PRIT Fund

- Global Equities: \$38.8 billion, 43.1% of PRIT Fund
- Public Fixed Income: \$18.8 billion, 20.9% of PRIT Fund*

46% Active / 54% Passive

- Global Equities: 41% Active / 59% Passive
- Public Fixed Income: 55% Active / 45% Passive

50 Portfolios

- 25 equity portfolios
- 25 fixed income portfolios

15 Asset Classes

- U.S. Large Cap Equity
- U.S. Small/SMID Cap Equity
- Developed International Equity
- Developed International Small Cap Equity
- Emerging Markets Equity
- Emerging Markets Small Cap Equity
- Core Bonds
- 20+ Year STRIPS
- Short Term Fixed Income
- U.S. TIPS
- Global Inflation-Linked Bonds
- High Yield Bonds
- Bank Loans
- EMD \$
- Other Credit Opportunities

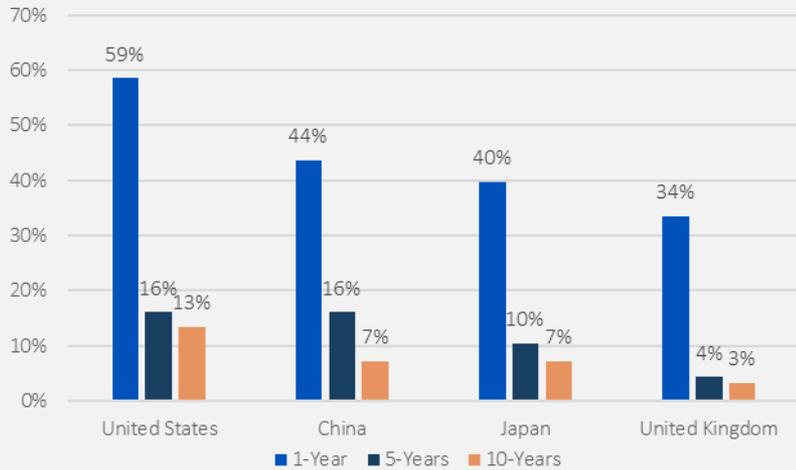


Public Markets – Key Initiatives

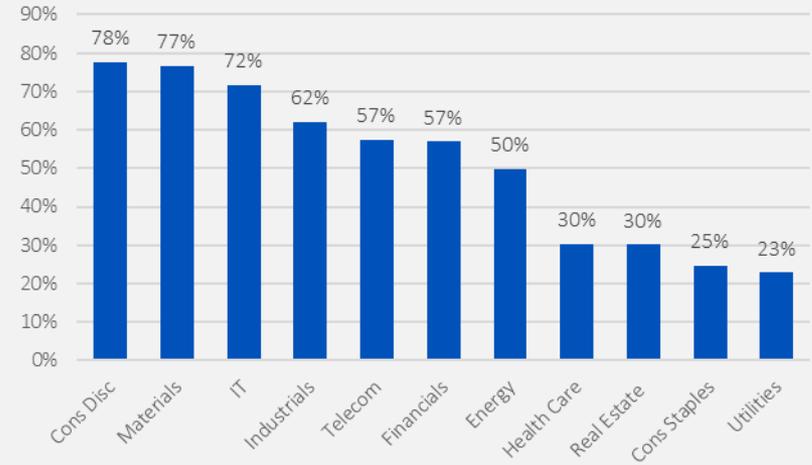
- Continue to source and allocate to diverse investment managers.
- Review Public Markets Benchmarks with Verus.
- Continue to identify Other Credit Opportunities investments, including co-investment opportunities.
- Conduct routine review and update of the Investment Policy Statement.
- Collaborate with Real Estate team to review and implement an improved Real Estate Debt program.
- Continue to upgrade analytical tools to improve investment research/analysis.

Public Equity Review

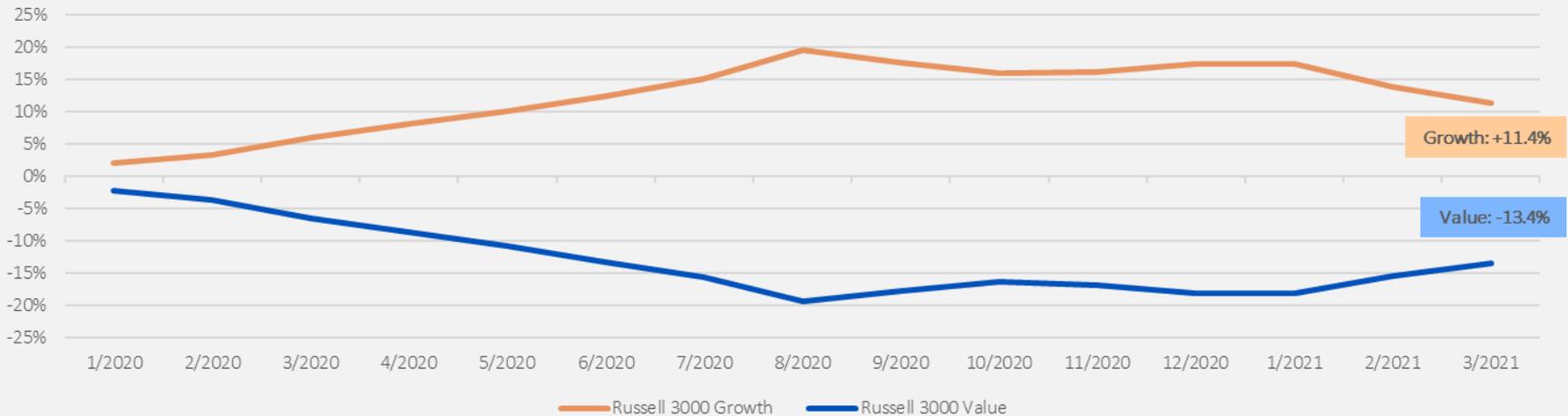
MAJOR COUNTRY RETURNS (MSCI ACWI)



GLOBAL ONE-YEAR RETURN BY SECTOR (MSCI ACWI)

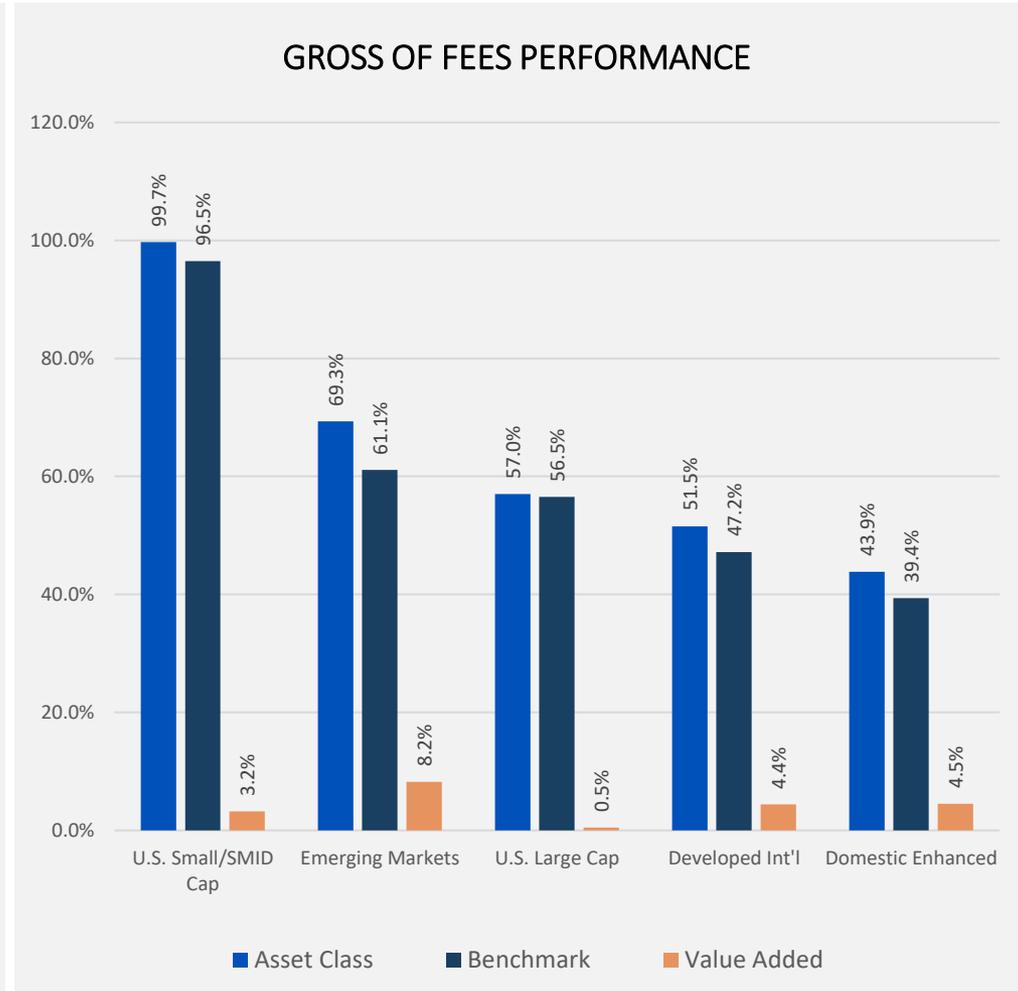
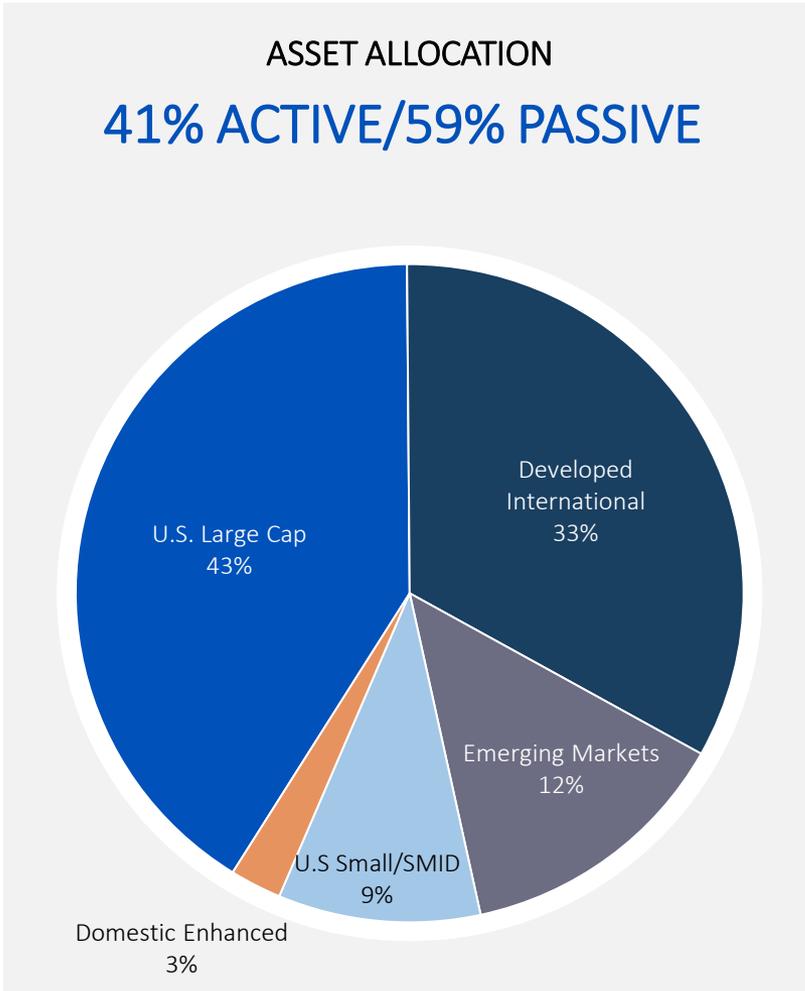


VALUE VS. GROWTH: RELATIVE RETURNS VS. RUSSELL 3000 (CUMULATIVE)



Global Equity

\$38.8 Billion – 43.1% of PRIT FUND (Target 34%-44%)



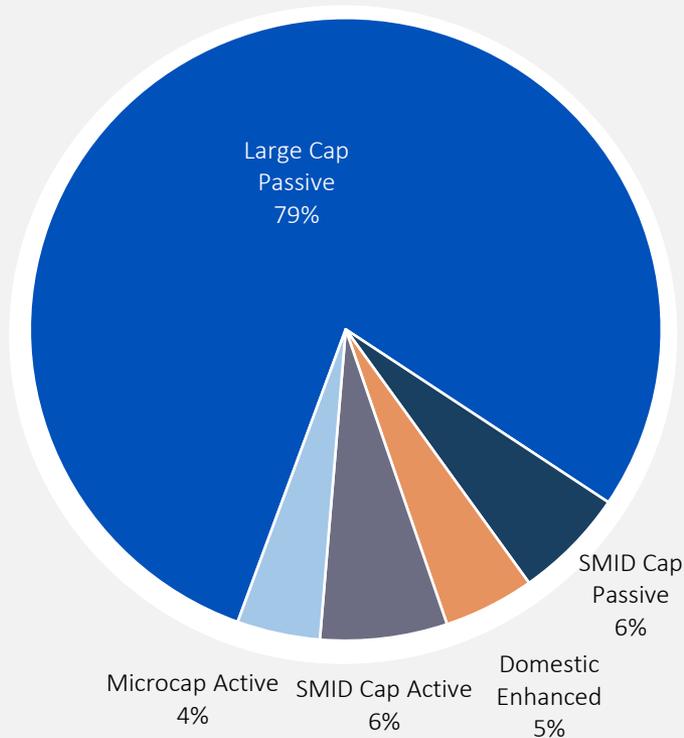
Source: BNY Mellon, PRIM Staff. As of March 31, 2021.

Domestic Equity

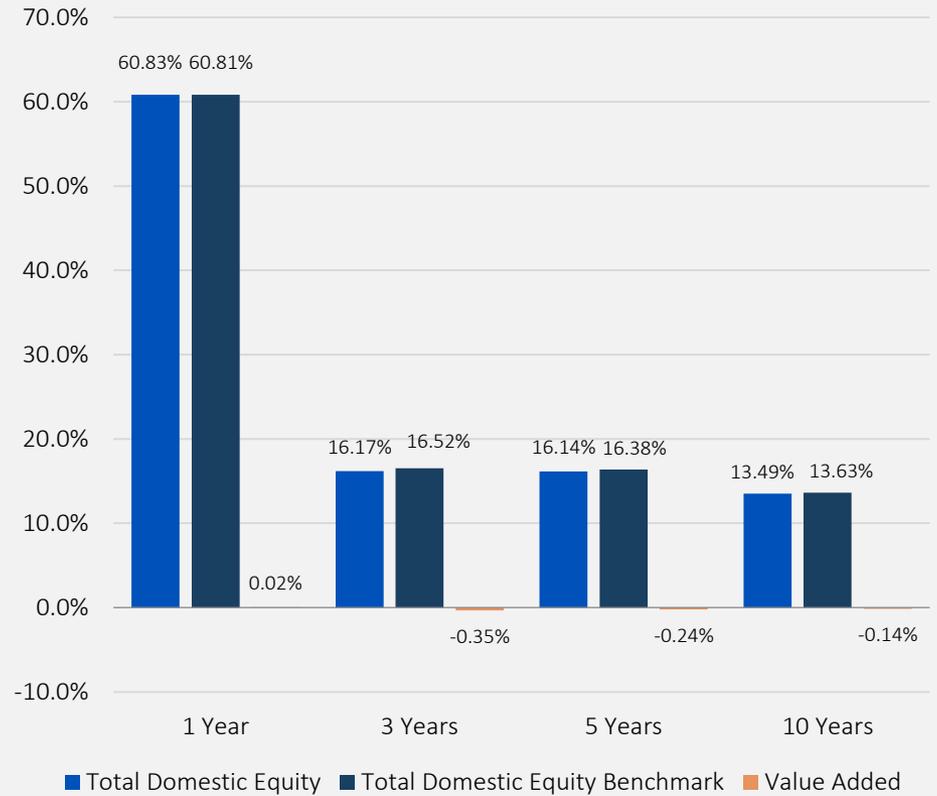
\$21.2 Billion

ASSET ALLOCATION

11% ACTIVE/89% PASSIVE



GROSS OF FEES PERFORMANCE



As of March 31, 2021

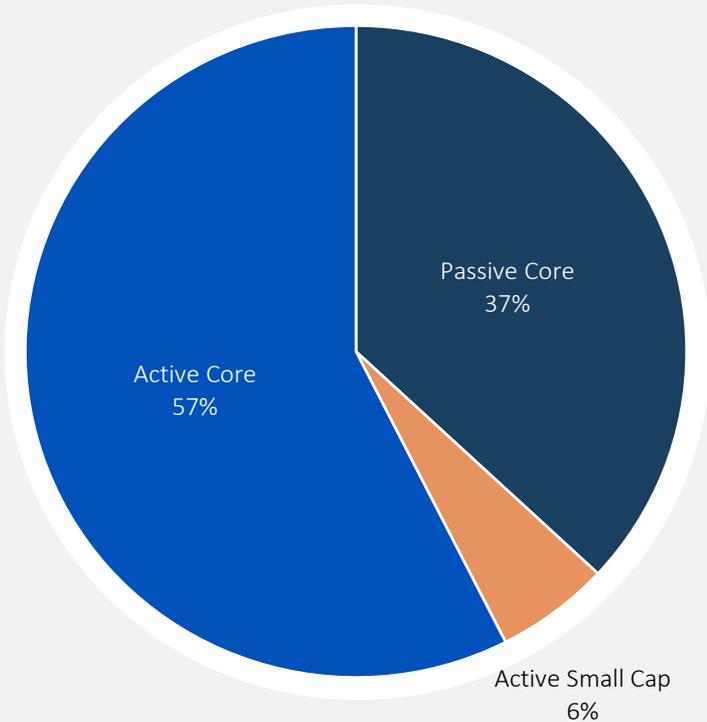
*Total Domestic Equity Benchmark: Currently the Total Domestic Equity benchmark is calculated by applying the investment performance of the sub asset class benchmarks to the sub asset class weights within the total domestic equity portfolio.

Developed International Equity

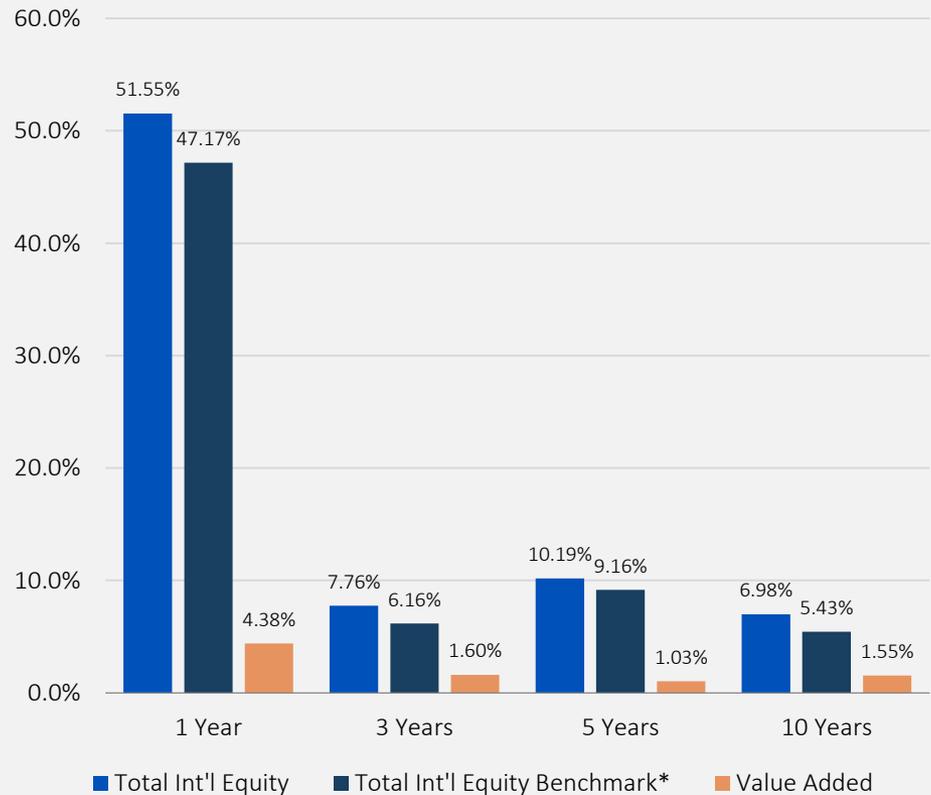
\$12.8 Billion

ASSET ALLOCATION

63% ACTIVE/37% PASSIVE



GROSS OF FEES PERFORMANCE



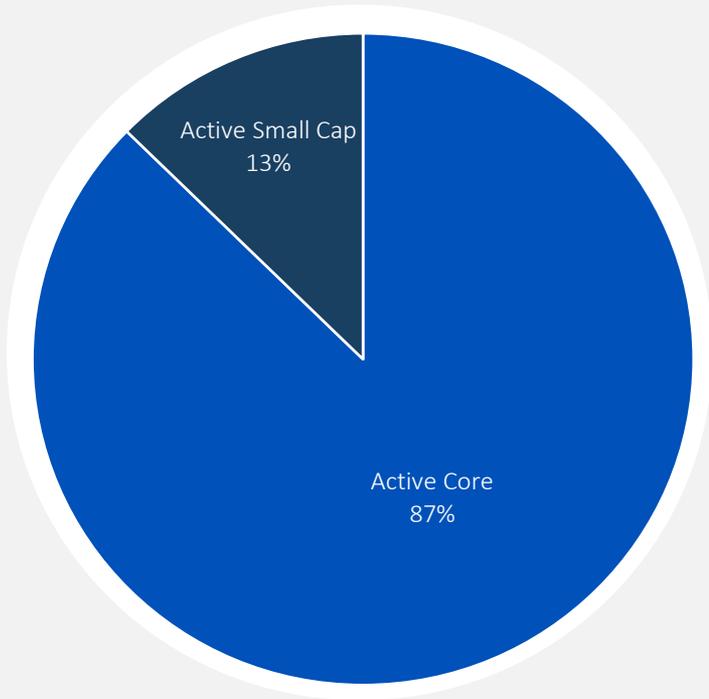
As of March 31, 2021

*Total International Equity Benchmark: Currently 40% custom MSCI World Ex-US IMI Net Dividends, 55% Custom MSCI EAFE Standard Index Net Dividends, 5% Custom MSCI EAFE Small Cap Index Net Divs, customized to exclude legislatively prohibited tobacco, Sudan and Iran securities (blend is maintained by MSCI).

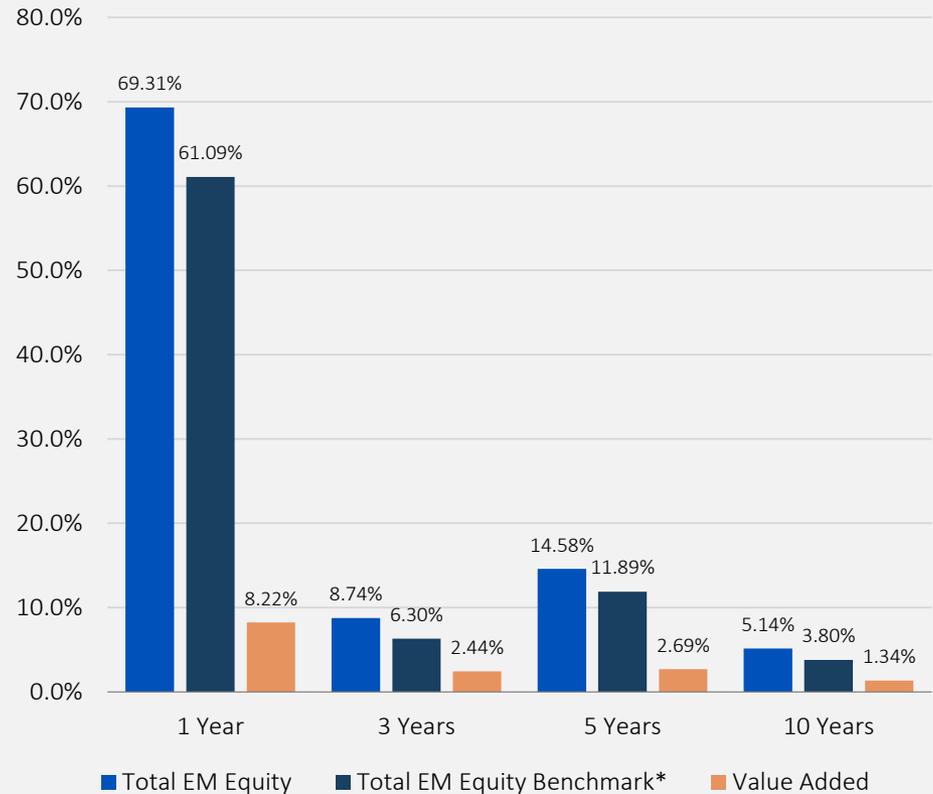
Emerging Markets Equity

\$4.7 Billion

ASSET ALLOCATION 100% ACTIVE



GROSS OF FEES PERFORMANCE

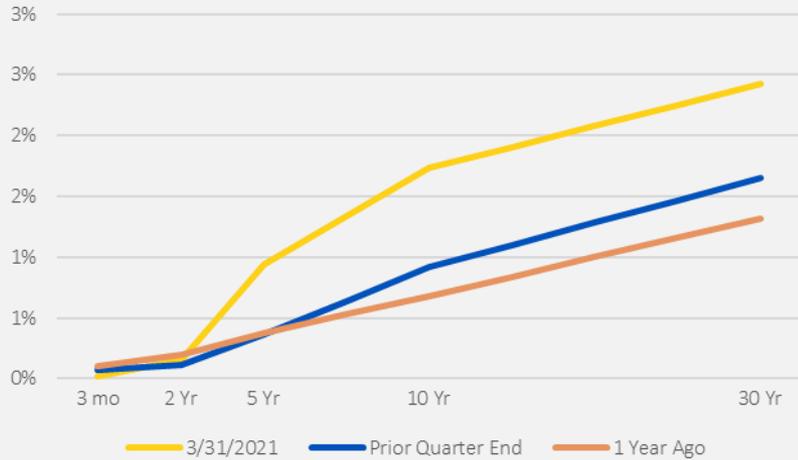


As of March 31, 2021

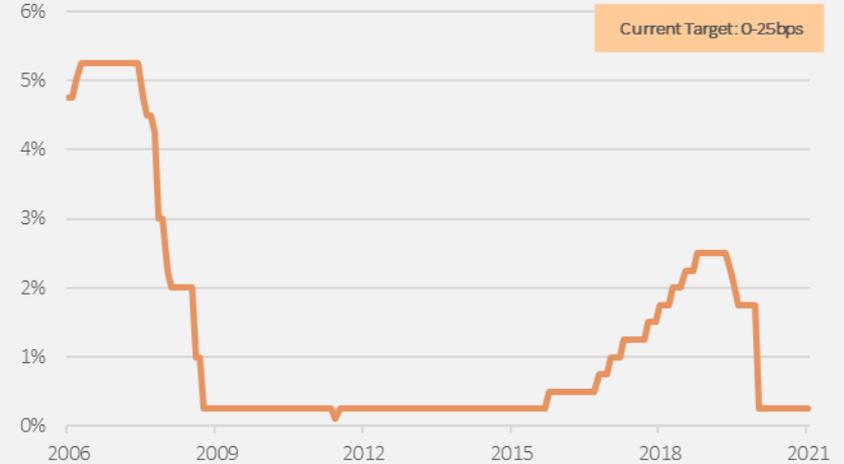
*Total Emerging Markets Equity Benchmark: currently 90% MSCI EM Standard Net Divs, 10% Custom MSCI EM Small Cap Net Divs (blend is maintained by MSCI).

Public Fixed Income Review

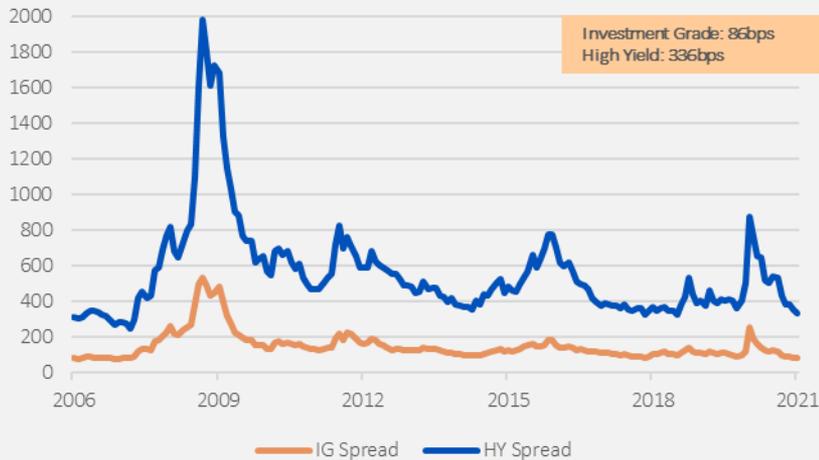
U.S. TREASURY YIELD CURVE



TARGET FED FUNDS RATE



U.S. CREDIT SPREADS

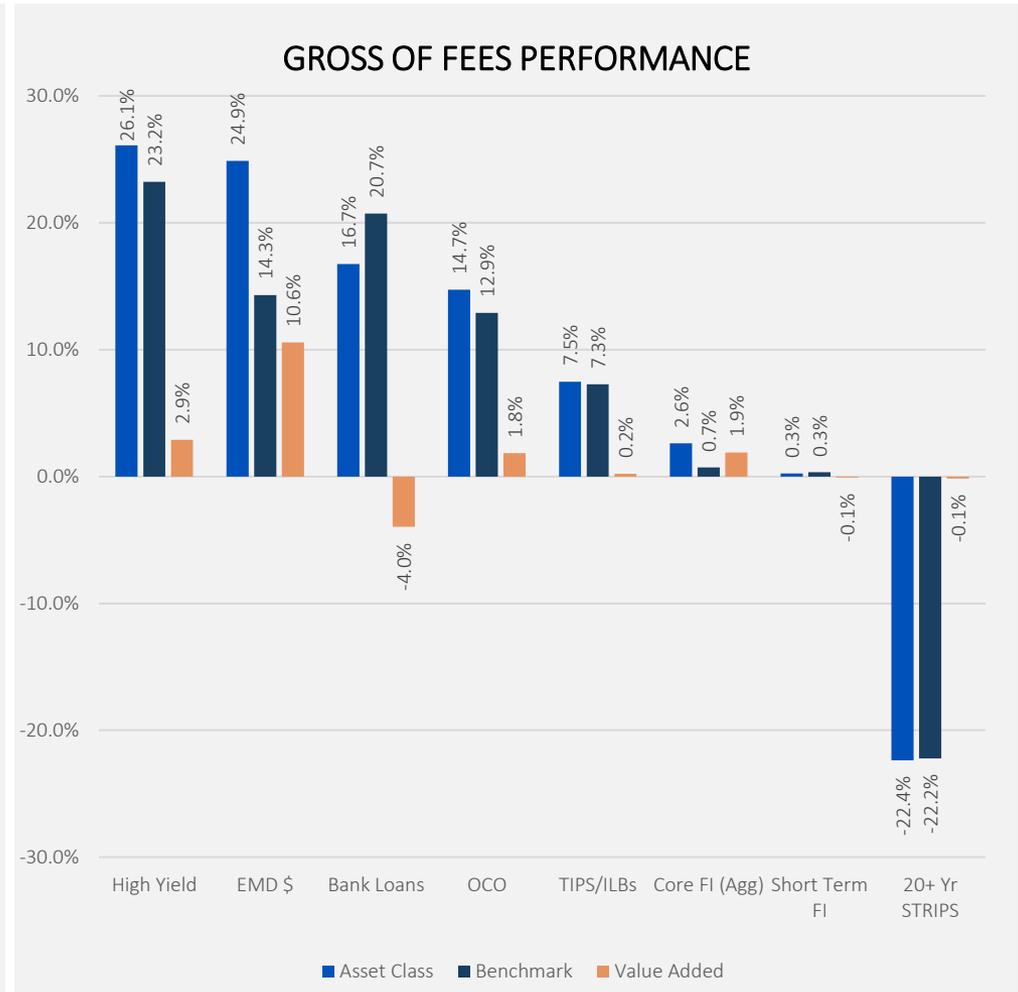
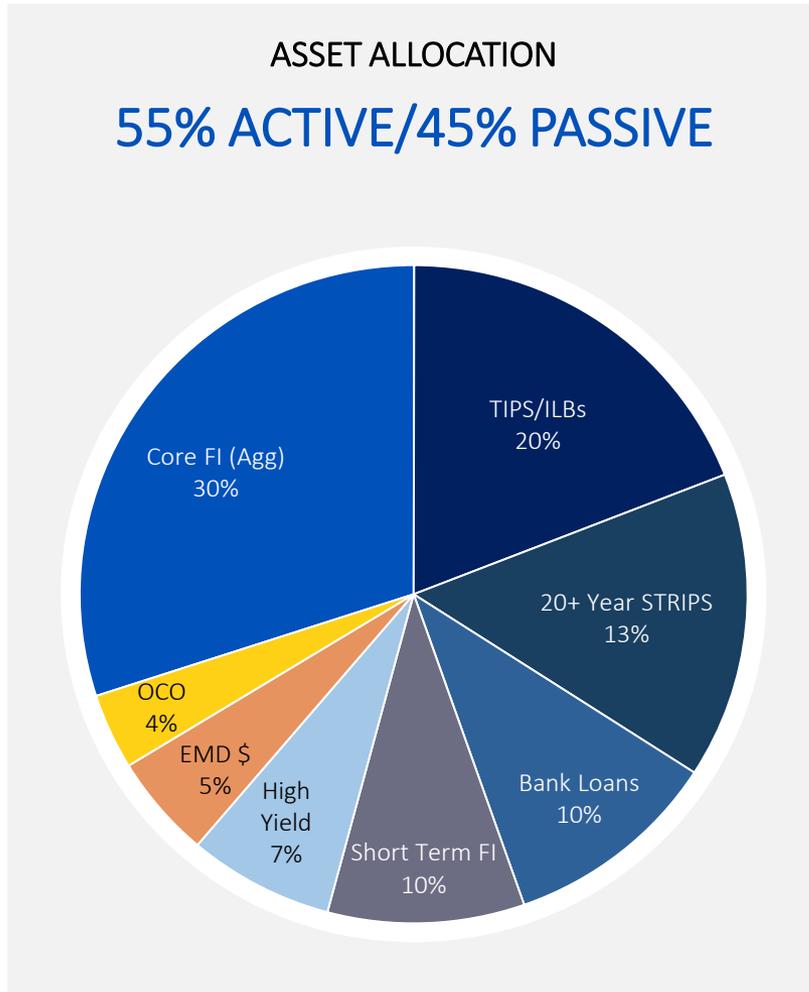


EMERGING MARKETS DEBT SPREAD



Core & Value-Added Fixed Income

\$18.8 Billion – 20.9% of PRIT Fund* (Target 17%-29%)



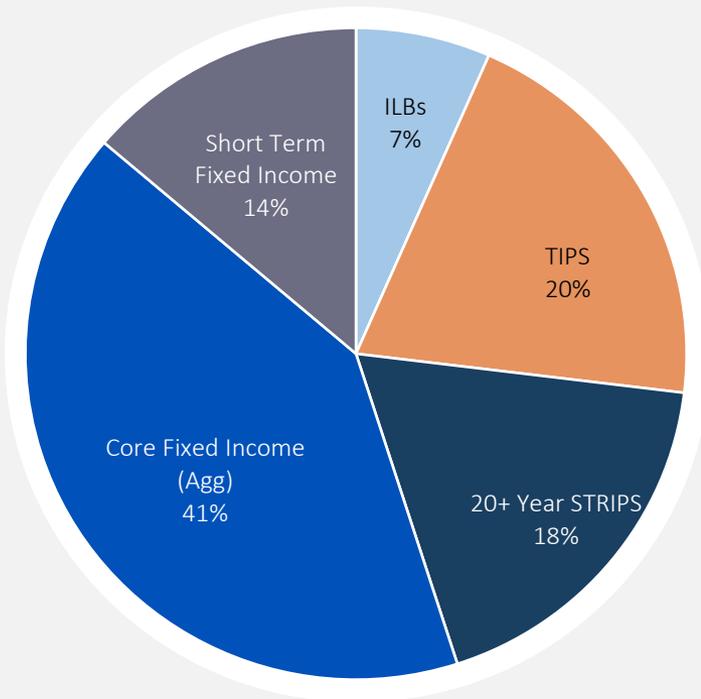
Source: BNY Mellon, PRIM Staff. As of March 31, 2021. *Excludes Private Debt allocation.

Domestic Investment Grade & Inflation-Linked Fixed Income

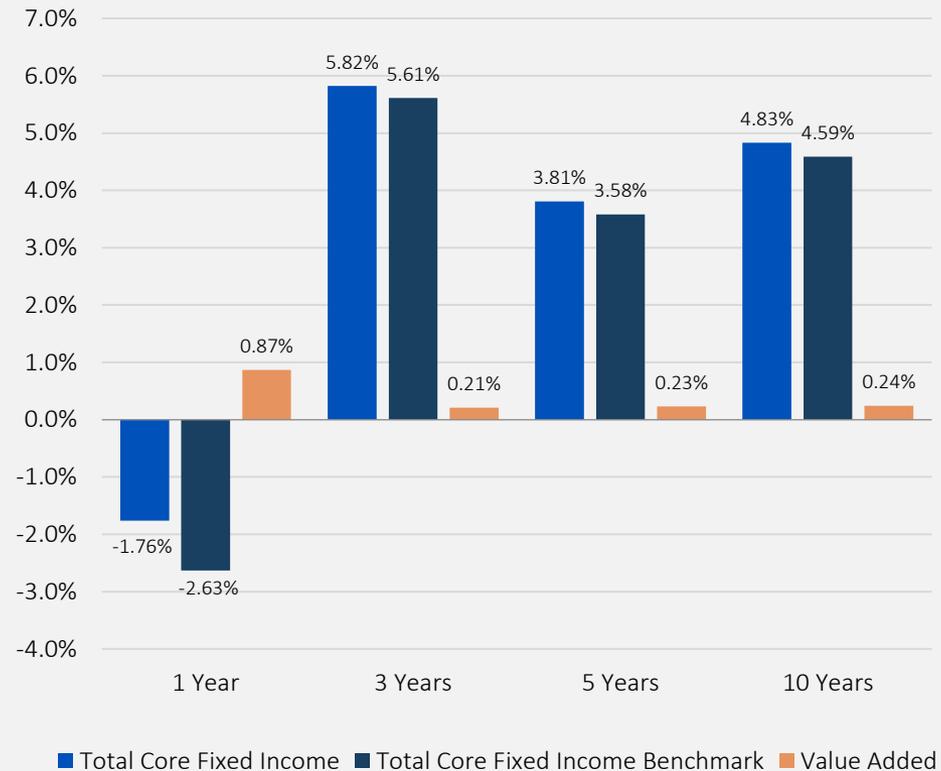
\$13.8 Billion – 15.3% of PRIT Fund (Target 12%-18%)

ASSET ALLOCATION

38% ACTIVE/62% PASSIVE

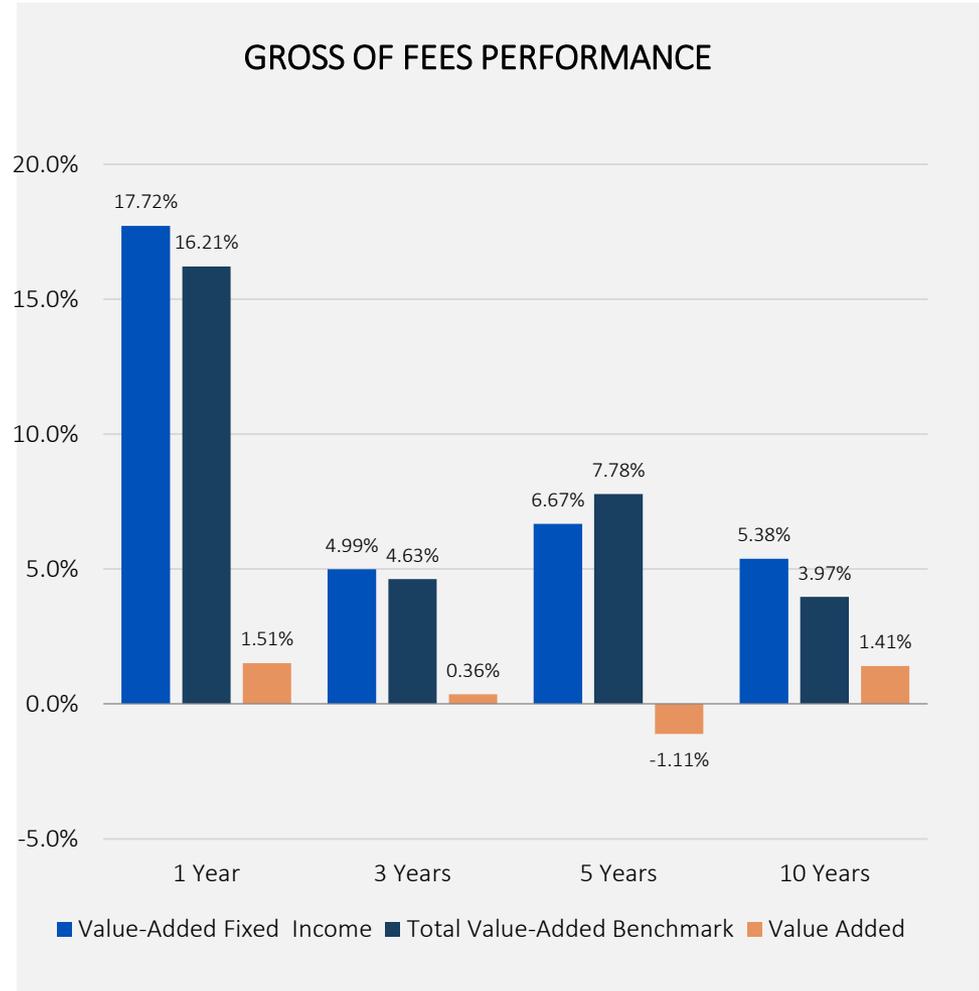
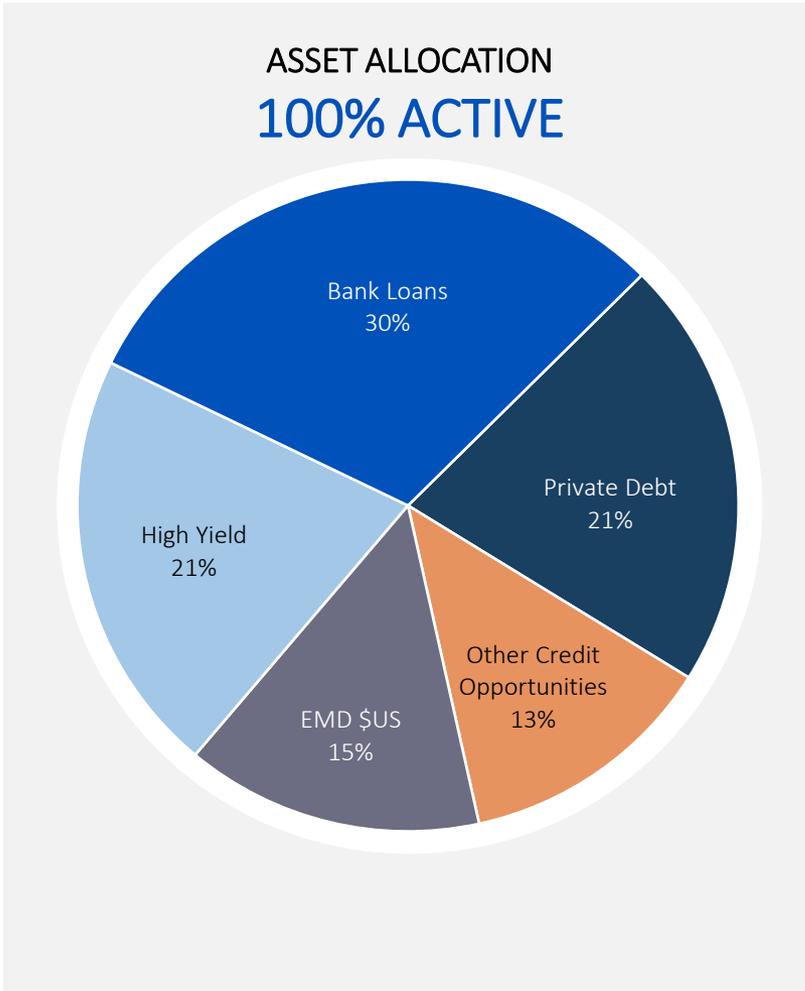


GROSS OF FEES PERFORMANCE



Value-Added Fixed Income

\$6.5 Billion – 7.2% of PRIT Fund (Target 5%-11%)



As of March 31, 2021

*The Value-Added benchmark is calculated by applying the investment performance of the sub asset class benchmarks to the sub asset class weights within the value-added fixed income portfolio, Private Debt component is using actual Private Debt Returns. These weightings will be automatically adjusted on a monthly basis.

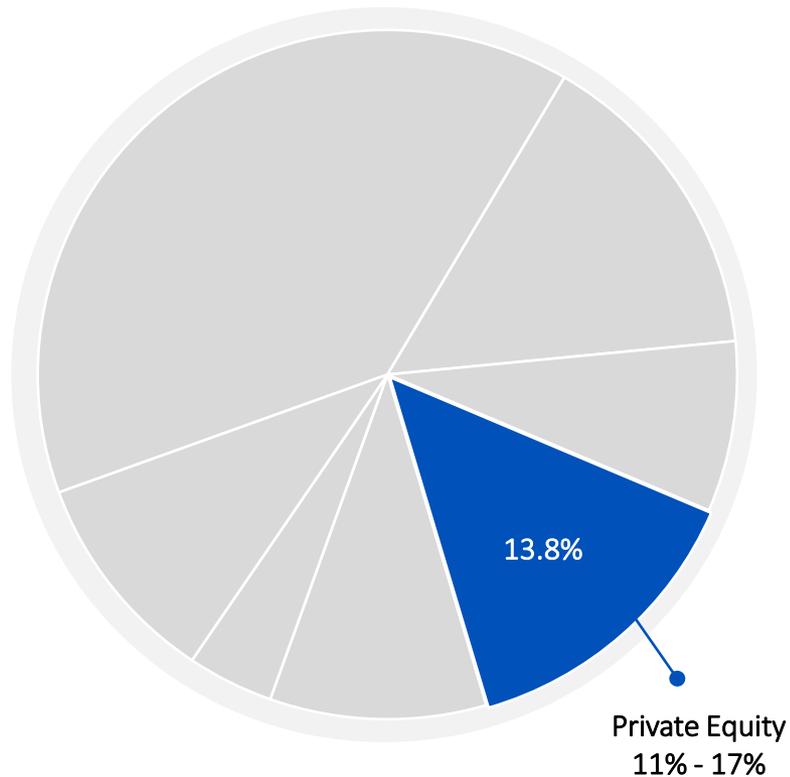
PRIVATE EQUITY PORTFOLIO



Private Equity Portfolio

PRIT FUND TARGET ASSET ALLOCATION

Actual Allocation as of March 31, 2021



Private Equity

\$12.4 billion, 13.8% of PRIT Fund

Private Debt

\$1.3 billion, 1.6% of PRIT Fund

114 investment managers

6 team members

~ 30 investment decisions/year

5 core investment strategies:

- Large buyouts
- Small and mid cap buyouts
- Growth equity
- Venture capital
- Distressed debt

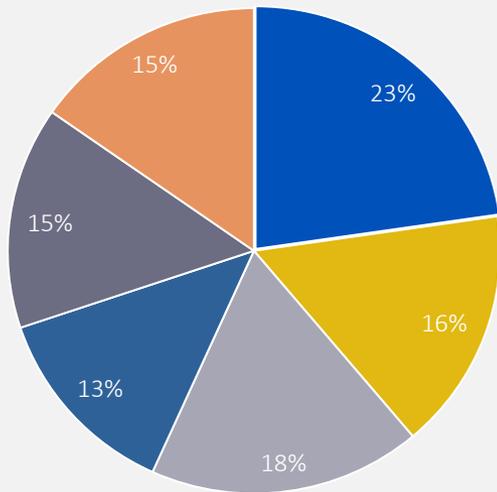


Private Equity Key Initiatives

- **Execute successful Private Equity Investment strategy.**
 - Increase Private Equity target allocation range to PRIT Fund to 11% to 17%.
 - Commitment goal of \$2.1 billion to \$2.7 billion to funds.
 - Raise co-investment capacity to \$480 million, 20% of 2021 commitments.
- **Continue to source and allocate to diverse investment managers.**
- **Research new Private Equity Strategies.**
 - Private Equity replication.
 - Scale co-investments.
 - Improve governance terms to benefit limited partners.
 - Improve LP/GP relationship balance with selected investment managers.
- **Build the team's expertise and capacity.**
 - Increase collaboration with other PRIM teams.

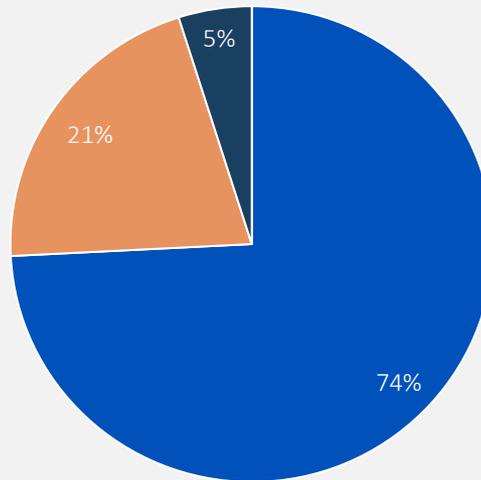
Private Equity Diversification

By Strategy



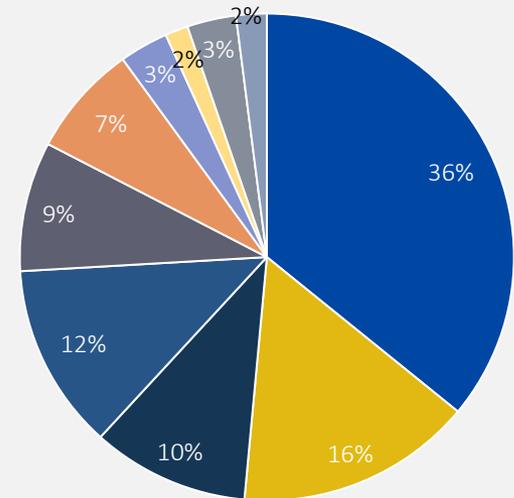
- Buyout - Mid
- Buyout - Mega
- Venture Capital
- Buyout - Large
- Buyout - Small
- Growth Equity

By Geography



- North America
- Western Europe
- Other

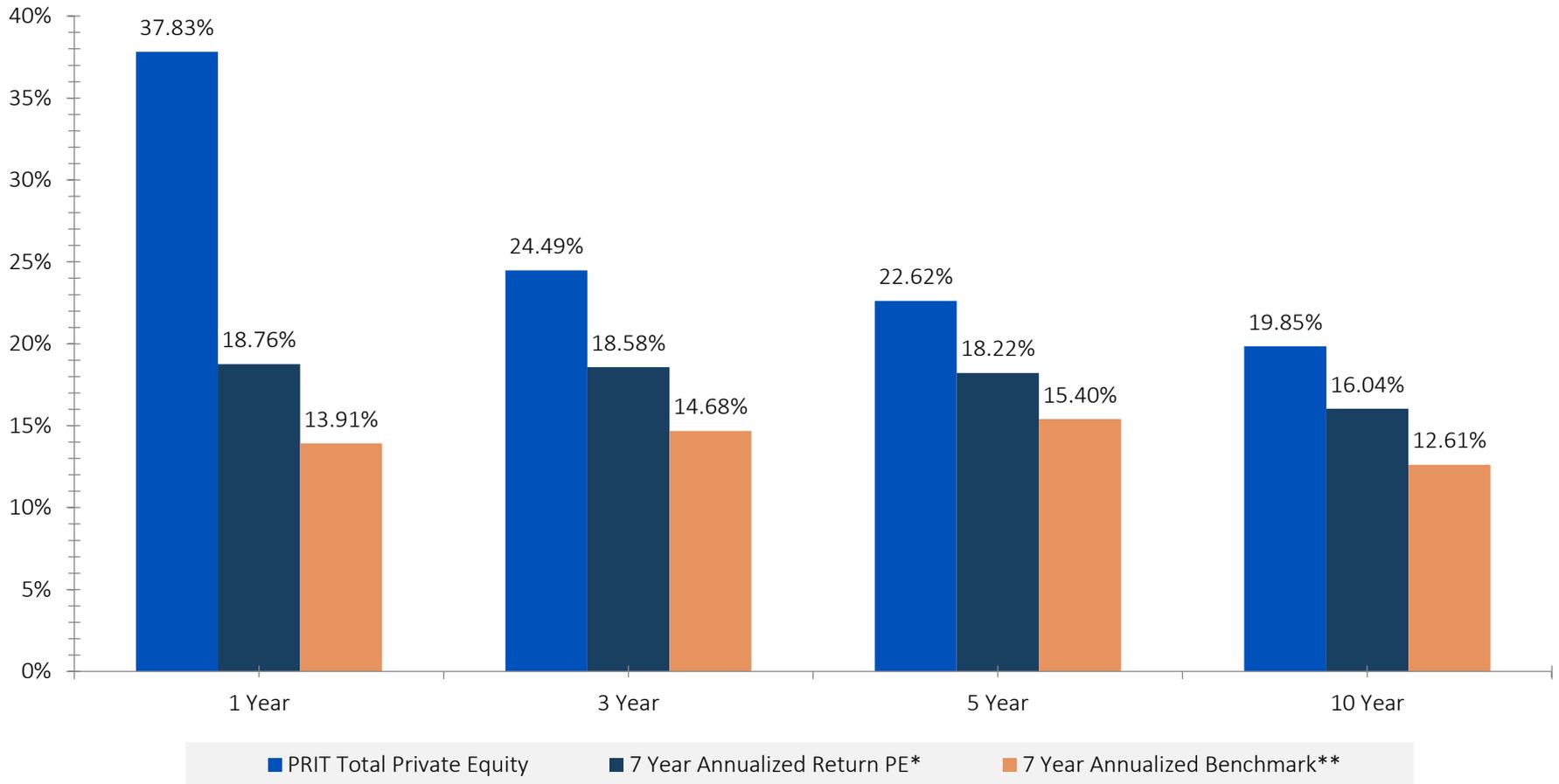
By Sector



- Information Technology
- Health Care
- Consumer Discretionary
- Industrials
- Financials
- Communication Services
- Energy & Utilities
- Materials
- Consumer Staples
- Other

Private Equity

\$12.4 Billion – 13.8% of PRIT Fund Gross of Fees Performance



* The 7 Year Annualized performance is used in the Policy Return and Policy Benchmark.

**The 7 Year Annualized Benchmark: Currently 7-year annualized return of a blend of the 85.9% Russell 3000 + 3% / 14.1% MSCI Europe IMI + 3%.

Private Equity Performance by Vintage Year

Performance Summary By Vintage Year as of December 31, 2020

Private Equity	Capital Committed	Paid-In Capital	Percentage Contributed	Capital Distributed	Percentage Distributed	Reported Market Value	TVPI	Net IRR 12/31/2020	Cambridge Median IRR
PE Vintage Year									
1986	\$ 77,680,426	\$ 79,264,625	102.04%	\$ 238,804,549	301.28%	-	3.01x	15.58%	9.47%
1987	216,385,228	215,372,662	99.53%	420,456,645	195.22%	-	1.95x	11.34%	15.15%
1988	93,451,860	89,954,995	96.26%	184,708,592	205.33%	-	2.05x	14.99%	11.77%
1989	61,340,193	59,296,115	96.67%	126,898,769	214.01%	-	2.14x	20.38%	13.55%
1990	218,931,380	225,129,257	102.83%	516,114,811	229.25%	-	2.29x	13.51%	20.16%
1991	1,000,000	1,000,000	100.00%	796,310	79.63%	-	0.80x	(4.22%)	20.26%
1992	28,010,702	27,694,264	98.87%	51,950,840	187.59%	-	1.88x	23.29%	18.47%
1993	151,028,336	150,975,841	99.97%	282,602,309	187.18%	-	1.87x	18.20%	19.17%
1994	15,000,000	15,024,279	100.16%	28,813,938	191.78%	-	1.92x	19.98%	18.46%
1995	251,103,008	215,034,991	85.64%	414,254,435	192.65%	88,011	1.93x	17.23%	16.16%
1996	64,257,593	67,485,450	105.02%	110,478,819	163.71%	-	1.64x	12.65%	10.33%
1997	380,791,347	399,674,317	104.96%	744,523,311	186.28%	-	1.86x	17.37%	11.08%
1998	564,974,028	550,291,977	97.40%	812,234,939	147.60%	2,800,194	1.48x	7.76%	8.15%
1999	413,881,039	411,160,285	99.34%	372,943,959	90.71%	812,375	0.91x	(1.60%)	(0.54%)
2000	1,084,468,703	1,064,412,630	98.15%	1,792,181,206	168.37%	17,849,532	1.70x	12.65%	3.10%
2001	592,256,629	582,099,003	98.28%	1,217,183,755	209.10%	8,641,822	2.11x	26.09%	8.57%
2002	128,587,392	129,710,425	100.87%	225,818,987	174.09%	10,597,156	1.82x	12.14%	8.10%
2003	521,790,693	534,062,460	102.35%	978,315,598	183.18%	5,689,850	1.84x	17.53%	9.78%
2004	400,000,000	394,708,529	98.68%	928,639,122	235.27%	15,434,179	2.39x	23.34%	7.74%
2005	726,730,465	738,064,442	101.56%	1,164,994,011	157.84%	17,935,466	1.60x	9.52%	7.99%
2006	1,911,198,129	1,968,242,925	102.98%	3,063,617,701	155.65%	98,886,817	1.61x	8.56%	7.04%
2007	941,930,296	1,021,057,209	108.40%	1,571,903,716	153.95%	137,136,469	1.67x	11.62%	9.02%
2008	1,457,485,550	1,528,550,834	104.88%	2,663,385,932	174.24%	179,481,495	1.86x	14.43%	9.18%
2009	572,500,621	597,091,827	104.30%	1,014,724,306	169.94%	120,713,259	1.90x	18.84%	13.99%
2010	381,250,000	403,777,678	105.91%	681,221,644	168.71%	526,529,099	2.99x	22.08%	12.21%
2011	1,504,804,696	1,635,616,966	108.69%	2,240,360,757	136.97%	914,769,943	1.93x	16.67%	14.52%
2012	710,350,486	791,508,571	111.43%	1,119,279,933	141.41%	556,218,640	2.12x	22.07%	15.06%
2013	527,411,015	537,649,737	101.94%	523,624,677	97.39%	540,704,982	1.98x	17.94%	14.77%
2014	1,235,821,590	1,237,348,866	100.12%	1,098,115,238	88.75%	1,697,664,035	2.26x	25.00%	19.74%
2015	954,987,342	981,949,699	102.82%	561,054,502	57.14%	1,457,521,337	2.06x	26.02%	17.06%
2016	1,664,085,582	1,562,218,104	93.88%	474,633,640	30.38%	2,193,802,494	1.71x	24.43%	19.14%
2017	702,164,422	507,037,034	72.21%	77,355,818	15.26%	672,546,304	1.48x	20.60%	22.46%
2018	1,889,106,657	1,277,006,388	67.60%	231,714,436	18.15%	1,561,234,211	1.40x	27.29%	20.45%
2019	2,052,233,327	861,727,661	41.99%	93,993,540	10.91%	1,007,175,670	1.28x	35.91%	17.16%
2020	2,997,015,476	489,803,311	16.34%	1,273,390	0.26%	529,571,937	1.08x	25.58%	(4.96%)
Total Private Equity:	\$ 25,494,014,211	\$ 21,351,003,354	83.75%	\$ 26,028,974,135	121.91%	\$ 12,273,805,276	1.79x	14.02%	



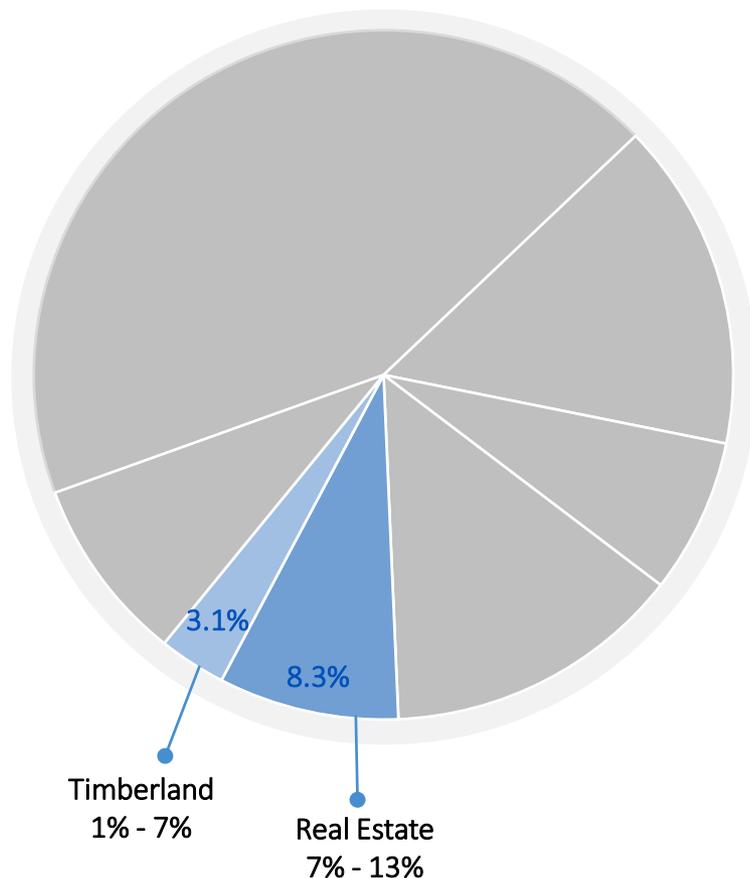
**REAL ESTATE AND TIMBERLAND
PORTFOLIO**

**Mass
PRIM**

Real Estate and Timberland Portfolios

PRIT FUND TARGET ASSET ALLOCATION

Actual Allocation as of March 31, 2021



\$10.3 billion, 11.4% of PRIT Fund

- Real Estate: \$7.5 billion, 8.3% of PRIT Fund
- Timberland: \$2.8 billion, 3.1% of PRIT Fund

16 portfolios

- 6 core portfolios (including 3 new in 2019)
- 5 non-core portfolios
- 2 global REIT portfolios
- 2 timberland portfolios
- 1 direct investment portfolio

Property investments

- Real estate – 93 properties
- Timberland – 24 properties

140 global real estate securities

4 primary strategies

- Core U.S. private real estate
- Non-core U.S. private real estate
- Global real estate securities
- Global timberland

4 team members

Real Estate and Timber Key Initiatives

Real Estate

- **Investments**
 - Continue to source and allocate to diverse investment managers.
 - Emphasize non-core and direct investment sourcing.
 - Office and retail assets: Maintain an asset level focus. Re-evaluate manager assignments as needed.
 - Implement project consulting model.
 - Continue to increase PRIM's knowledge of non-traditional Real Estate sectors.
 - Continue to use REITs as liquidity for acquisitions.
 - Evaluate new technology for customized asset management solutions.
- **Real Estate portfolio debt**
 - Refinance \$500 million maturity.
 - Re-evaluate PRIM's capital structure.

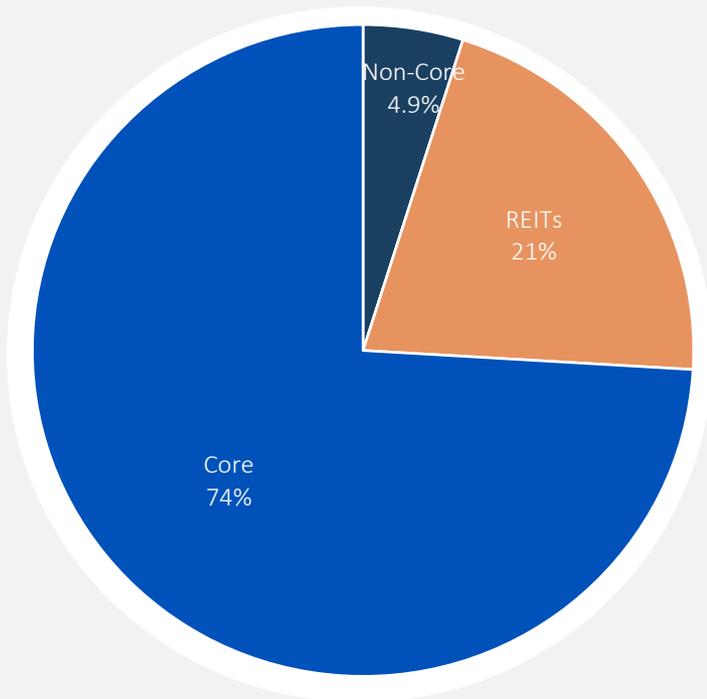
Timber

- Review PRIM's long-term investment thesis.
- Monitor implementation of Real Estate and Timberland operating and disposition plans.
- **Collaboration with other PRIM teams.**
 - Review asset class with Research team.
 - Review benchmark with Risk team.

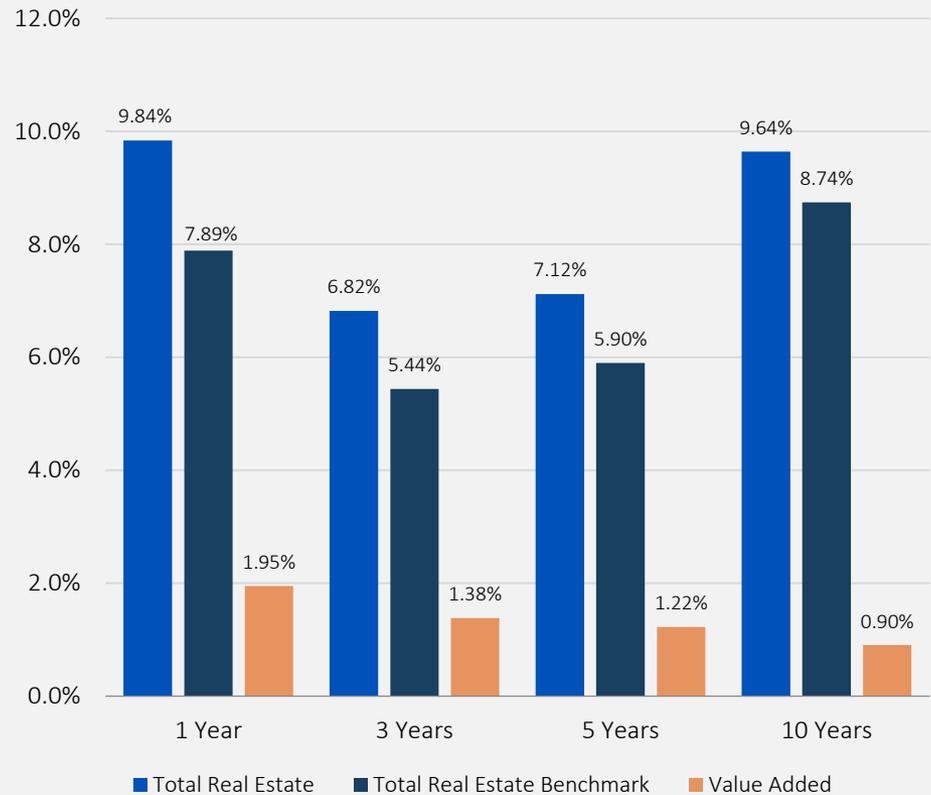
Real Estate

\$7.5 Billion – 8.3% of PRIT Fund (Target 7%-13%)

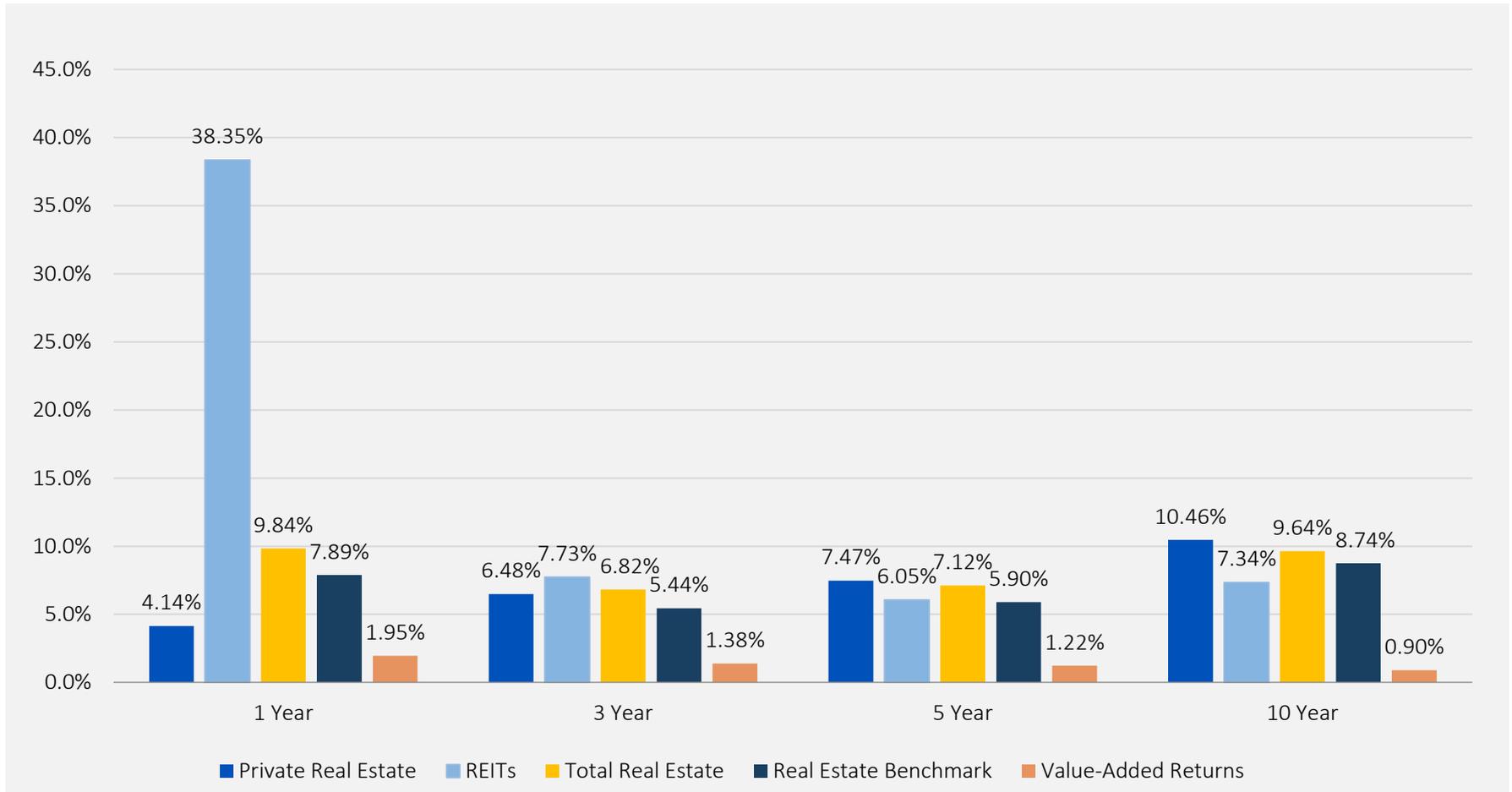
ASSET ALLOCATION



GROSS OF FEES PERFORMANCE

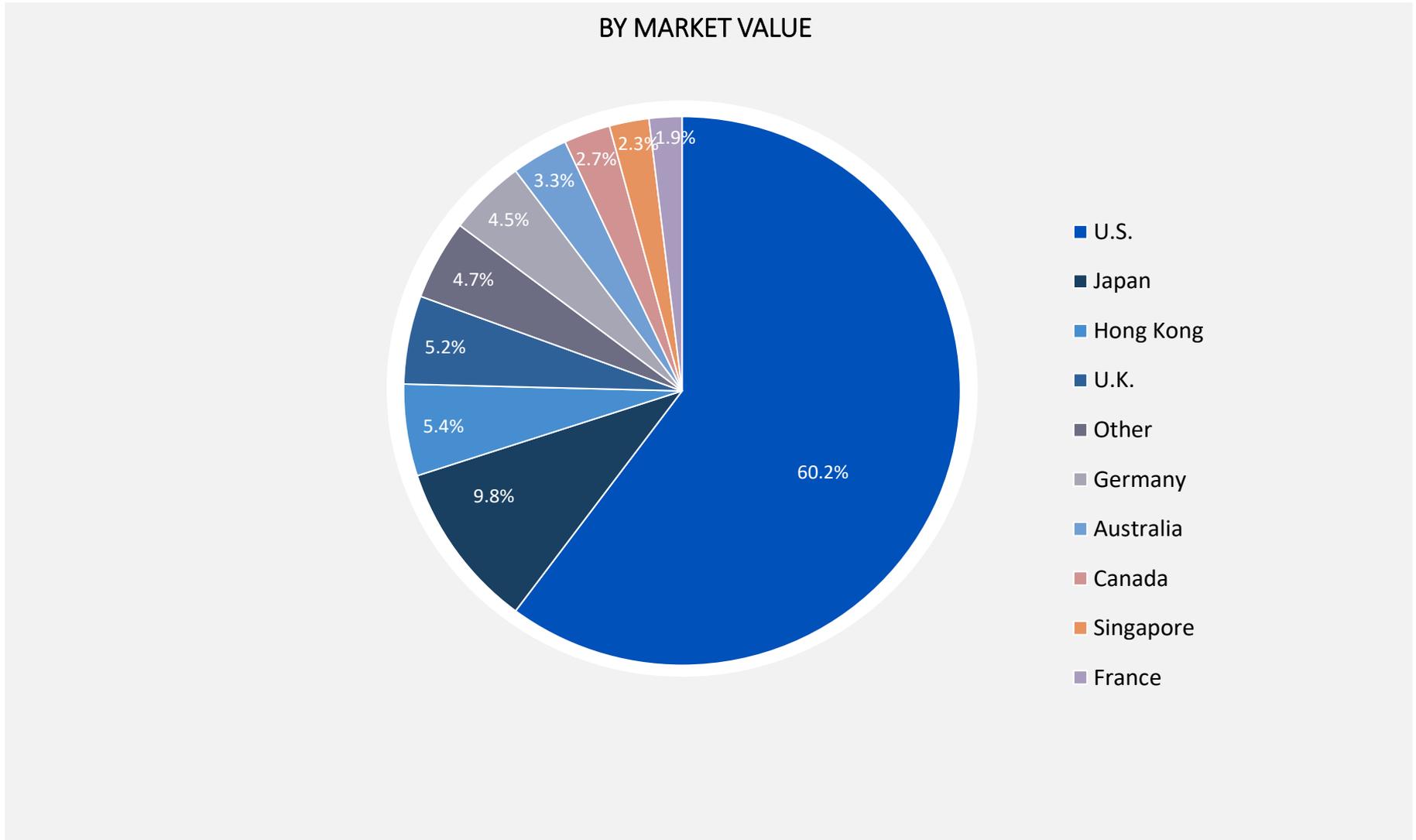


Total Real Estate Performance

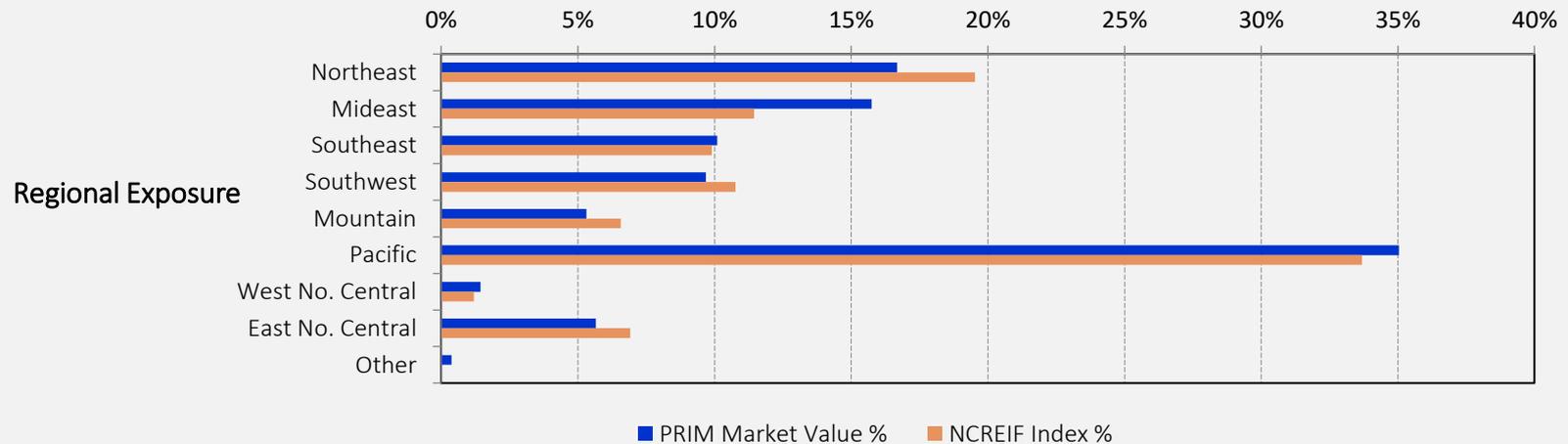
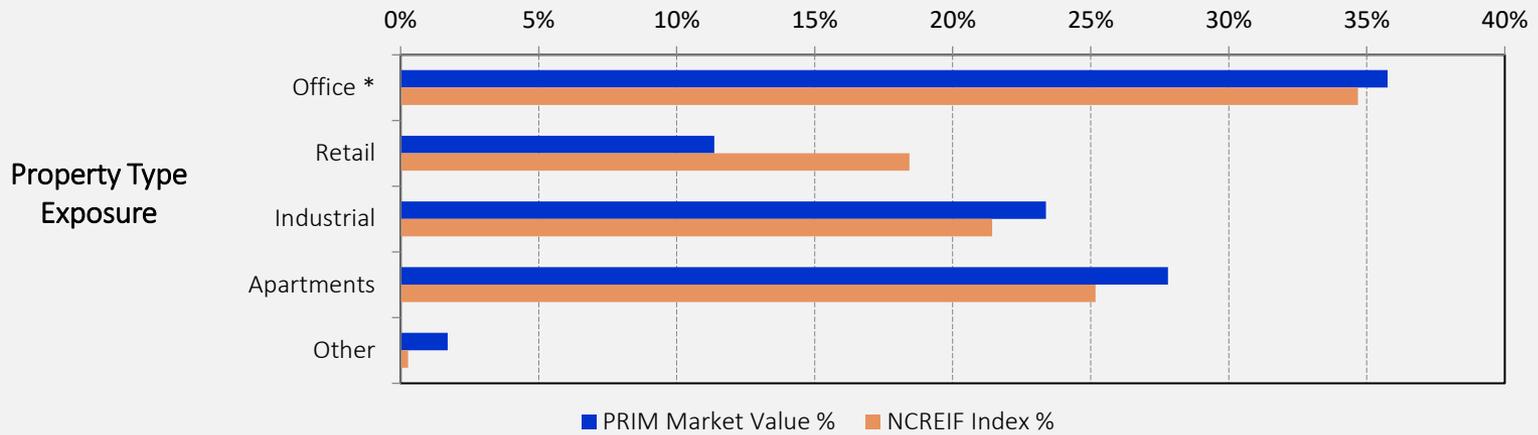


Benchmark: Currently 80% NCREIF PROPERTY ONE QTR LAG/20% FTSE EPRA NAREIT Developed Net Total Return.

Public Real Estate (REITs) Exposure by Country

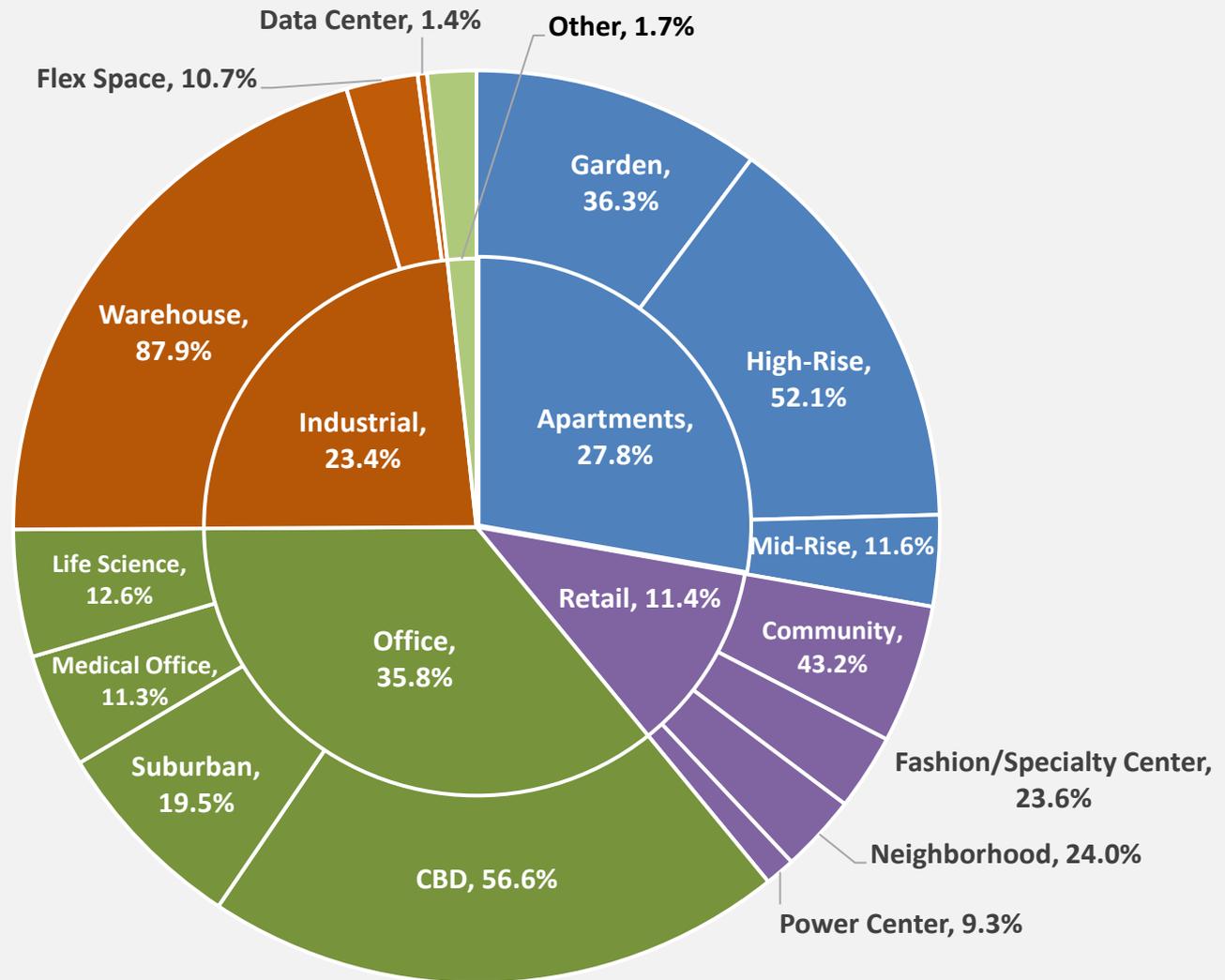


Private Real Estate Portfolio Exposure



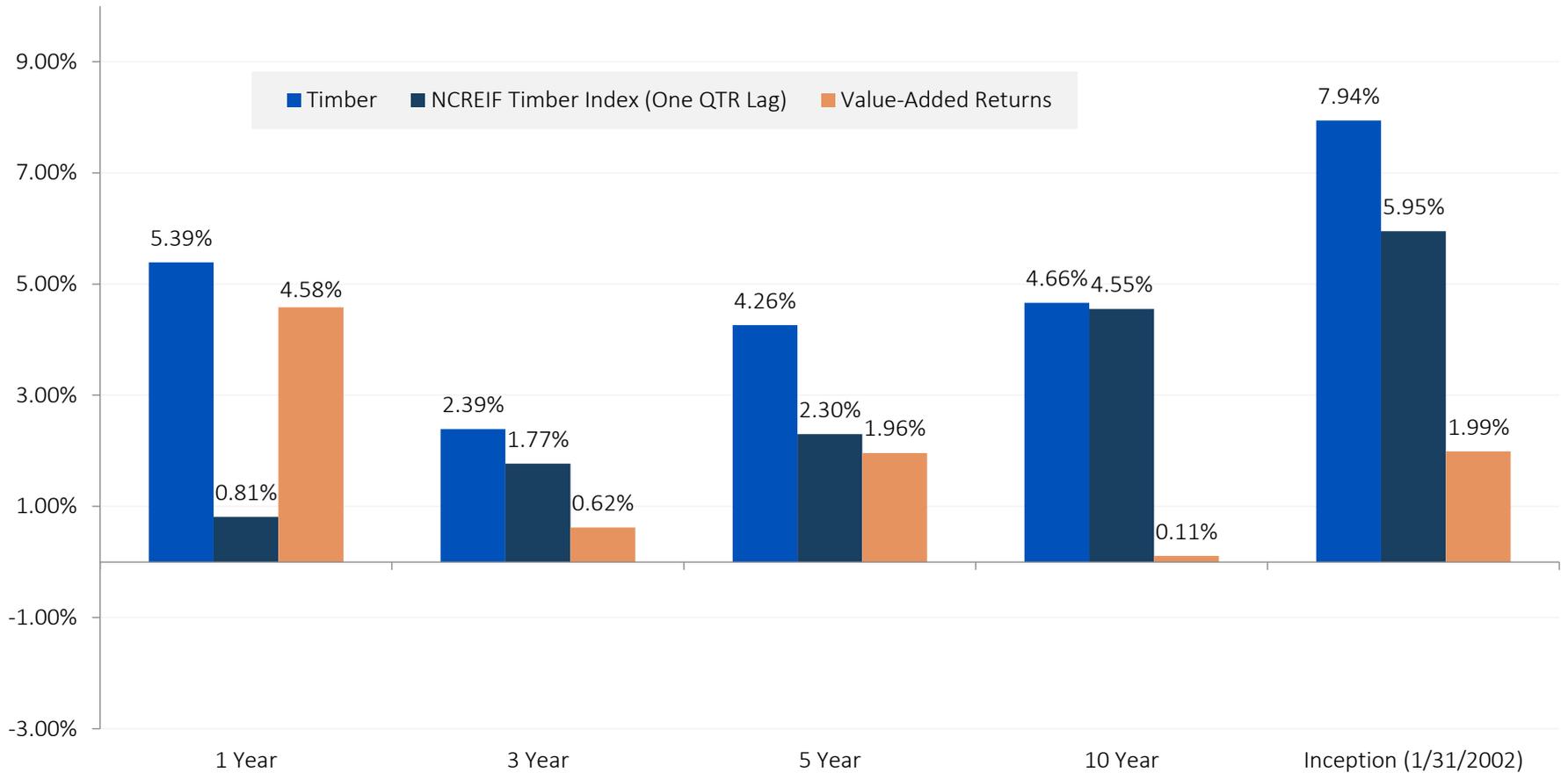
* Office includes life science assets

Property Subtype Breakdown



Timberland Performance

Gross of Fees

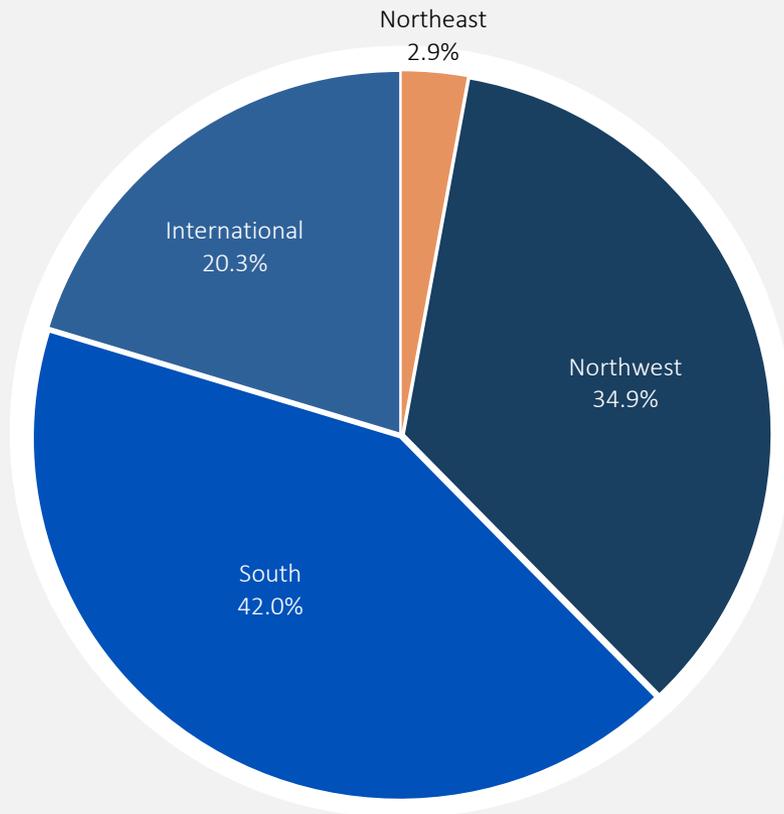


Benchmark: Currently NCREIF Timberland Index.

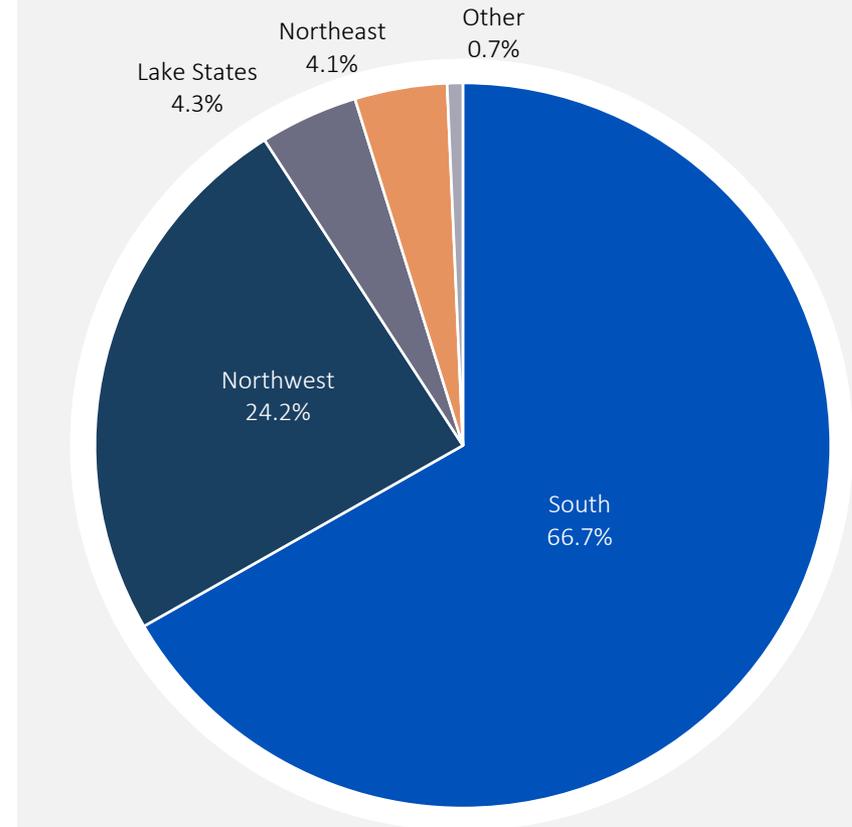
Timberland Exposure by Region vs. Benchmark

Equity Value

PRIM REGION EXPOSURE



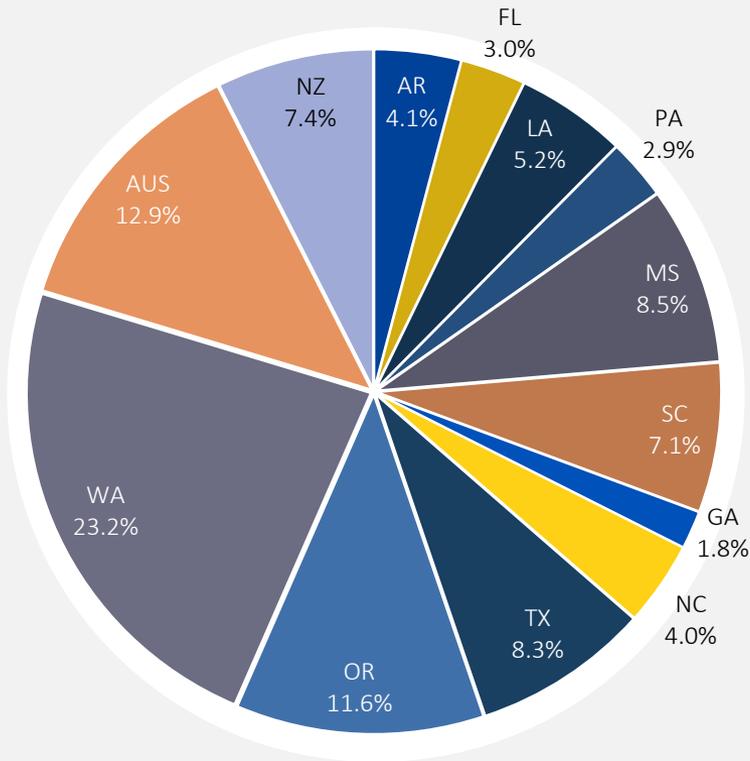
BENCHMARK



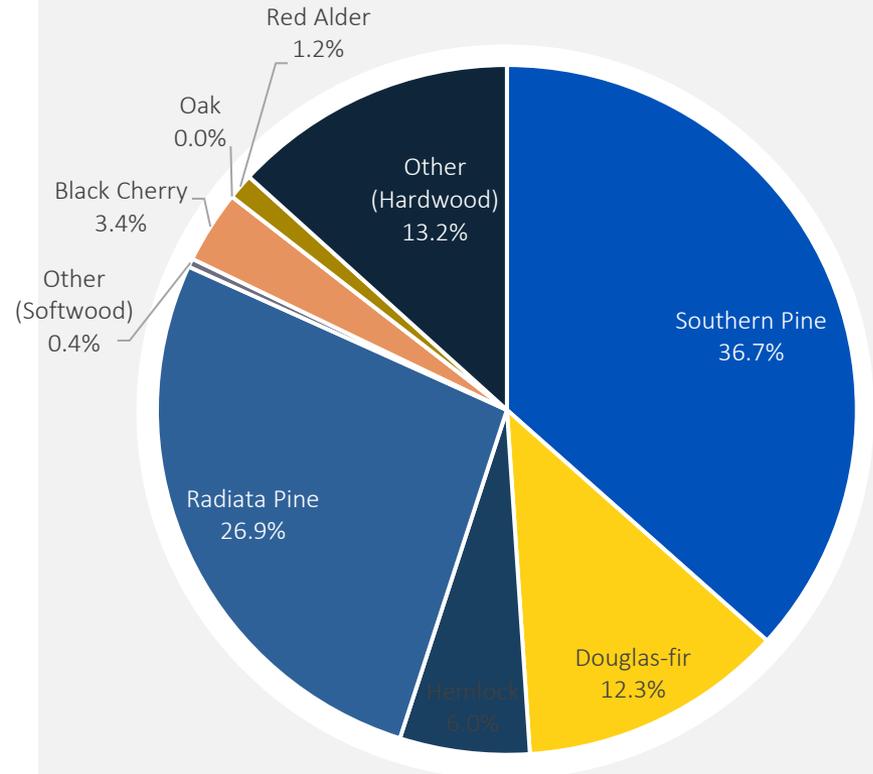
Timberland Exposure by State/Region

Timberland Exposure by Species

BY EQUITY VALUE



BY ACRES



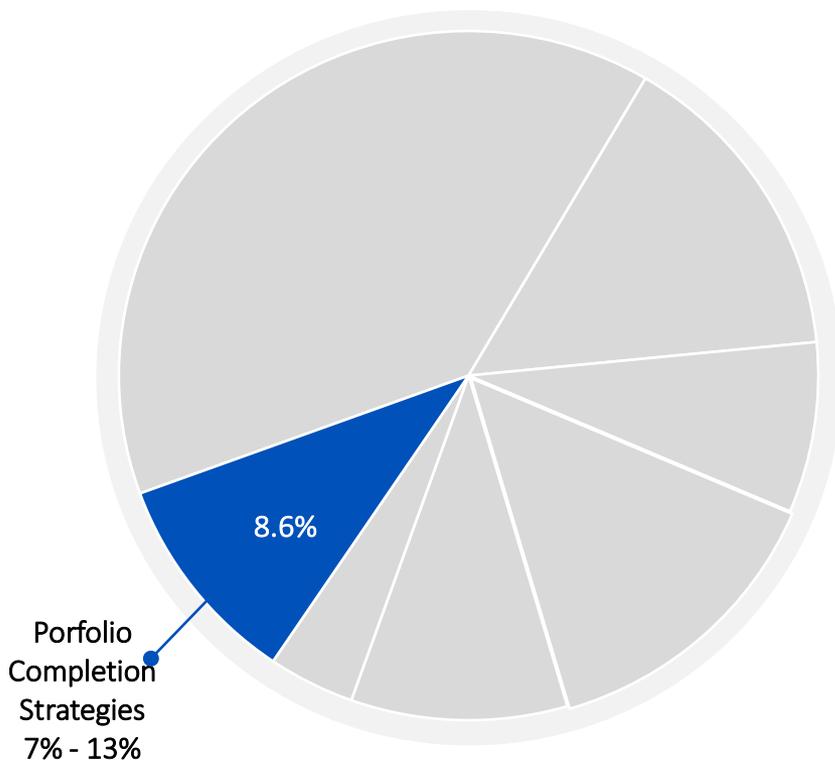
PORTFOLIO COMPLETION STRATEGIES



Portfolio Completion Strategies (PCS)

PRIT FUND TARGET ASSET ALLOCATION

Actual Allocation as of March 31, 2021



PCS \$7.8 billion, 8.6% of PRIT Fund

- Direct Hedge Funds: \$6.3 billion, 81% of PCS
- Hedge Fund of Funds: \$0.6 billion, 8% of PCS
- Real Assets: \$0.8 billion, 11% of PCS

26 Hedge Fund managers:

- 1 FoHF Manager
- 25 direct hedge fund managers

10 team members

6 PCS managers

Collaboration across all PRIM teams

Portfolio Completion Strategies

Key Initiatives

Portfolio Completion Strategies

- Continue to source and allocate to diverse investment managers.
- Continue implementing carveout of Hedge Fund portfolio into “Stable Value” and “Directional” components.
- Continue collaboration with PRIM teams on investment and co-investments opportunities.
- Finalize analytic infrastructure to better research and monitor derivative-based strategies.

Risk

- Conduct comprehensive benchmark review in 2021.
- Develop risk management “best practices”- procedures, policies, and measures from a risk perspective related to the stages of investment due diligence and ongoing manager monitoring.
- Evaluate risk management platform and internal vendors.
- Identify and implement lower cost borrowing alternative for the Real estate sleeve.

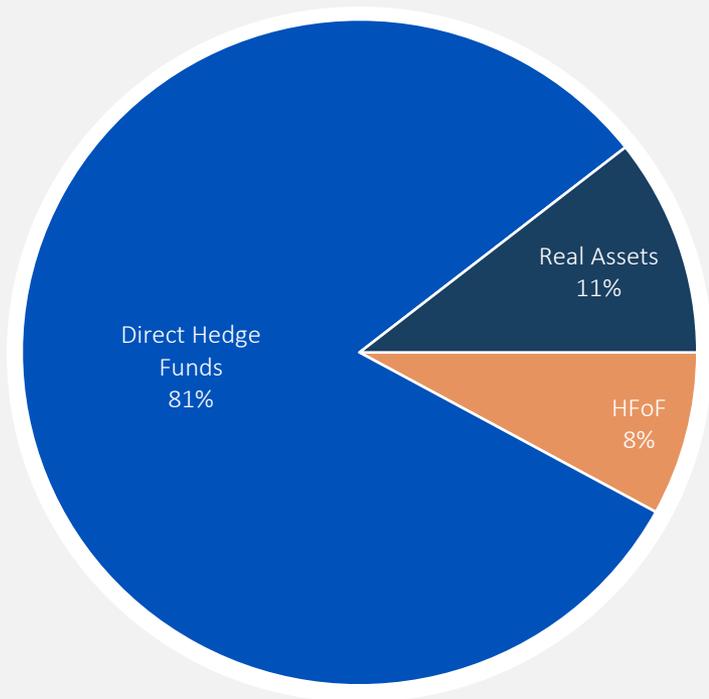
Research

- Build out supplemental asset allocation research to refine optimal asset class ranges and further increase model robustness.
- Conduct Private Equity replication research.
- Collaborate with MIT and other prospective members of the Aggregate Confusion Project: An ESG Research consortium.
- Further refine the Diverse-owned Investment Management firm database.

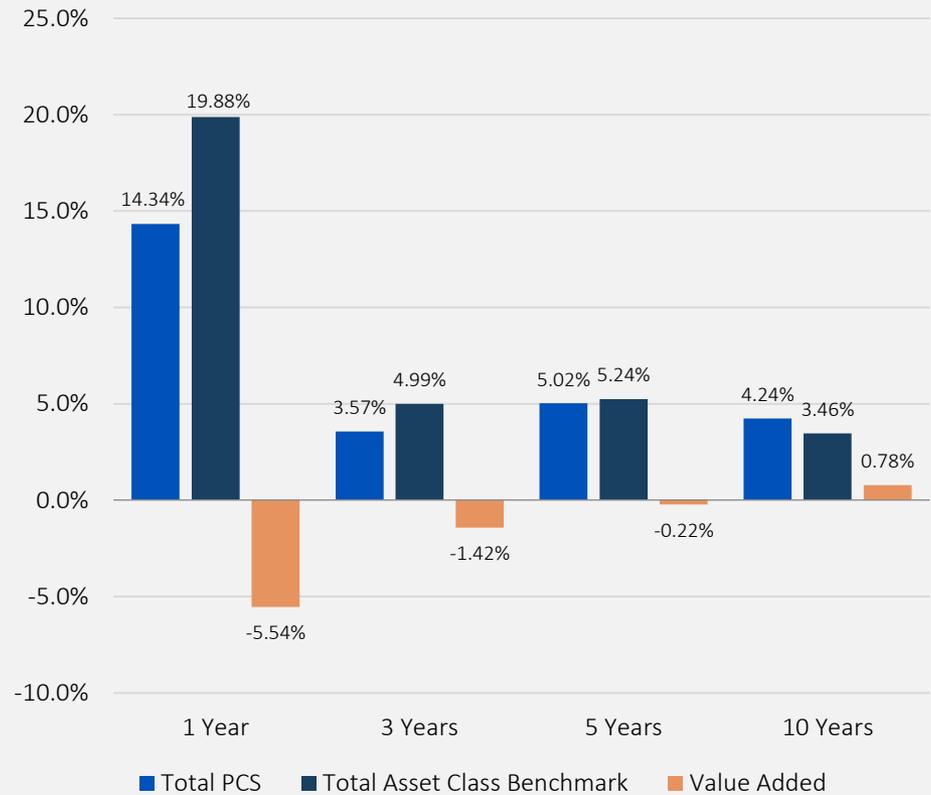
Portfolio Completion Strategies

\$7.8 Billion – 8.6% of PRIT Fund (Target 7%-13%)

ASSET ALLOCATION

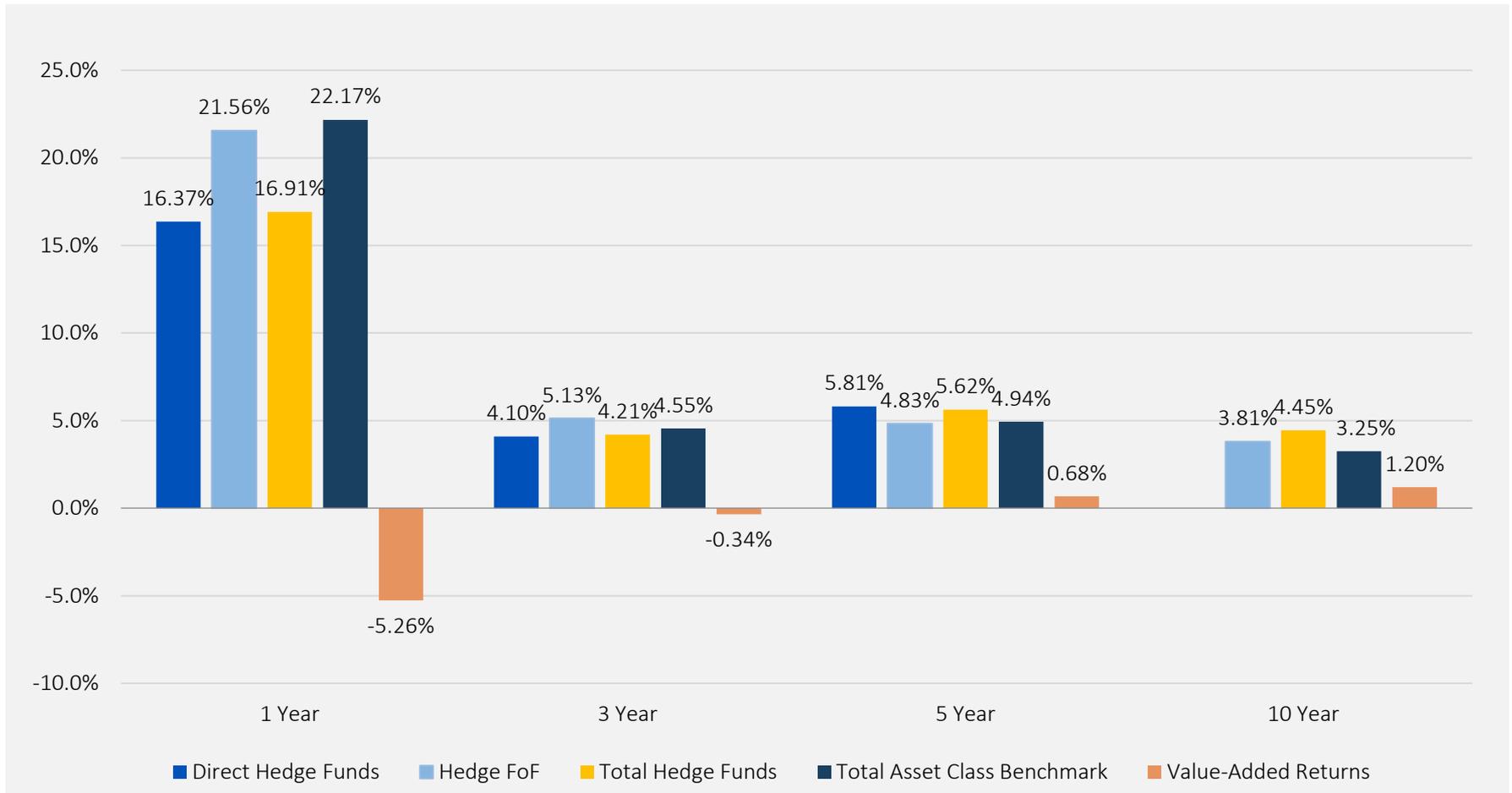


PERFORMANCE*



Hedge Funds Performance

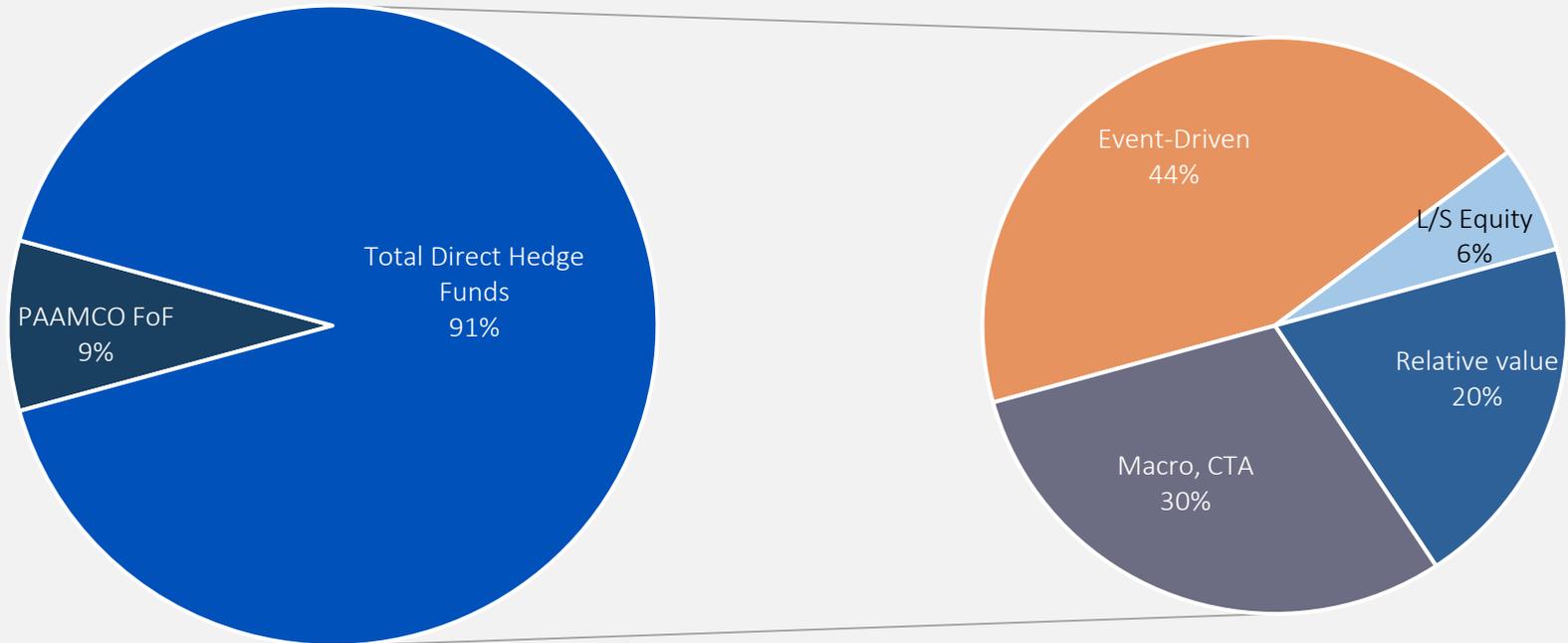
\$6.9 Billion Net of Fees Performance



Benchmark: Currently using a composite of several HFRI sub-indices. (HFRI indices - Flash returns are used through 12/31/11. Current returns reflect most up to date performance and are subject to change.)

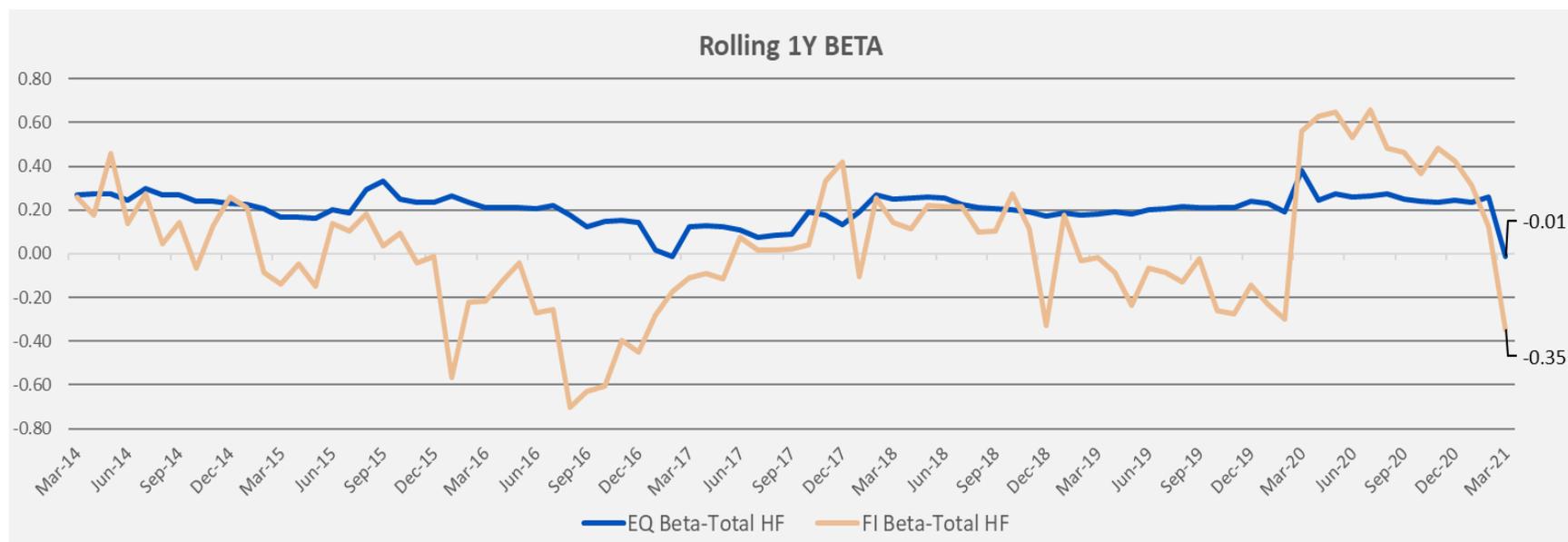
PRIM Hedge Fund Portfolio Snapshot

\$6.9 Billion



Sharpe Ratio and Market Beta Performance

		Total Fund	Total HF	Direct HF	HFRI FOF	SP500	Barclays Agg
1 Year	Return	29.8%	16.8%	16.2%	23.8%	56.4%	0.7%
	Vol	7.2%	3.9%	4.0%	5.6%	17.3%	3.6%
	Sharpe Ratio	4.10	4.30	4.01	4.22	3.25	0.17
3 Year	Return	9.7%	4.1%	4.0%	5.4%	16.8%	4.7%
	Vol	8.7%	6.2%	6.3%	7.2%	18.4%	3.6%
	Sharpe Ratio	0.95	0.44	0.41	0.56	0.84	0.95
5 year	Return	10.4%	5.5%	5.7%	5.6%	16.3%	3.1%
	Vol	7.2%	5.0%	5.1%	5.8%	14.9%	3.3%
	Sharpe Ratio	1.29	0.86	0.88	0.77	1.02	0.61



PRIM Hedge Fund and PCS Performance Breakdown

	1 Year		2 Year		3 Year	
	Avg. Weight	Performance	Avg. Weight	Performance	Avg. Weight	Performance
Managed Account	63%	20.5%	60%	8.0%	51%	6.1%
Legacy (incl High Conviction)	15%	11.8%	14%	9.0%	13%	7.2%
Run Off	2%	6.2%	5%	-2.7%	8%	-1.6%
PAAMCO	8%	21.5%	9%	7.1%	9%	5.1%
Real Assets	11%	-4.5%	12%	-1.4%	10%	-5.8%

Glossary of PRIT Fund Investment Terms

Active Management – Refers to a portfolio management strategy where the manager makes specific investments with the goal of outperforming an investment benchmark index.

Barclays Capital Aggregate Bond Index – An index that replicates the investment grade bond market. The index is comprised of corporate, government, and mortgage-backed securities.

Core Fixed Income Portfolio – Investments in investment grade bonds (see definition of Barclays Capital Aggregate Bond Index).

Domestic Equity Portfolio - Investments in shares of publicly-traded U.S. companies utilizing a large capitalization strategy (large cap) and small and middle capitalization equity strategies (small/smld cap).

Emerging Markets Equity Portfolio - The primary strategy for this portfolio is investing in companies in developing countries, including, but not limited to, China, Brazil, Russia, South Korea, Taiwan, India and Turkey. These countries typically have less efficient securities markets, and thus there is opportunity for substantial returns.

Hedge Fund Research, Inc. (HFRI) - An organization that specializes in the areas of indexation and analysis of hedge funds.

International Equity Portfolio - The primary strategy for this portfolio is investing in companies in developed markets, industrialized nations outside of the United States, including, but not limited to, Japan, Germany, the United Kingdom, France, Italy, Switzerland, Hong Kong, Canada, and Australia.

MSCI EAFE Index - A stock market index that is designed to measure the equity market performance of developed markets outside of the U.S. & Canada.

MSCI Emerging Markets Index - Captures large and mid cap representation across 24 Emerging Markets (EM) countries

Passive Management - An investing strategy that tracks a market-weighted index or portfolio. The most popular method is to mimic the performance of an externally specified index by buying an index fund.

Portfolio Completion Strategies (PCS) – The objective of the PCS portfolio is to provide the PRIT Fund access to broader investment opportunities. Investments selected for the PCS portfolio should enhance the risk/return profile of the PRIT Fund. Investments may include long-term strategic investments or short-term opportunistic investments. Some of these strategies include hedge funds and real assets..

Private Equity Portfolio - Two components comprise the PRIT Fund's Private Equity portfolio: venture capital (early-stage and multi-stage) and special equity partnerships (buyout and growth equity). Unlike public markets, where the investor has the ability to “cash out” of positions at any time, these private market investments are illiquid.

Real Estate Portfolio – Equity investments in both directly-owned properties and REIT securities. Directly-owned core properties make up most of the portfolio. Core properties are typically well-leased, operating properties that provide regular cash flow from rents. Non-core investments include properties that are under development.

REIT – A company that owns, and in most cases operates, income-producing real estate. REITs often trade on major exchanges like other securities and provide investors with a liquid stake in real estate.

Russell 2500 Index - Combines a portion of midcap U.S. stocks with small cap U.S. stocks – forming a “SMID” (small/mid) cap segment of stocks from the Russell 3000® Index, which is a capitalization-weighted U.S. stock market index that seeks to be a benchmark of the entire U.S stock market

Standard & Poor's (S&P) 500 Index – A U.S stock market index based on the market capitalizations of 500 large companies having common stock listed on the NYSE or NASDAQ.

Timberland Portfolio – Direct investments in timberland: in the United States timberland markets are divided into three regions, each with distinct economic characteristics: the Pacific Northwest, the Northeast and the Southeast. The Pacific Northwest is a high value softwood market, in which the growing cycle to produce a mature tree is forty to fifty years; in Australia, there is approximately 2 million hectares (4.9 million acres) of plantation timberlands that are almost evenly split between hardwood and softwood species.

Treasury Inflation-Protected Securities (TIPS) - Investment grade fixed income investments designed to provide a hedge against rising inflation. The principal of a TIPS increases with inflation and decreases with deflation, as measured by the Consumer Price Index. When a TIPS matures, the investor is paid the adjusted principal or original principal, whichever is greater.

Value Added Fixed Income – A fixed income portfolio consisting of the following strategies: high yield bonds (non-investment grade corporate debt); bank loans (senior secured corporate debt); emerging markets debt (debt issued within the emerging, or developing countries, marketplace, and private debt (investments in private partnerships that invest directly in companies under financial distress).



Massachusetts Pension Reserves
Investment Management Board
84 State Street, Suite 250
Boston, MA 02109
617-946-8401
www.mapension.com

THANK YOU

CONTACTS

Francesco Daniele
Director of Client Services
Office 617-946-8416
E-mail: fdaniele@mapension.com

Laura Strickland
Senior Client Services Officer
Office 617-946-8490
E-mail: lstrickland@mapension.com

Emily Green
Senior Client Services Analyst
Office 617-946-8486
E-mail: egreen@mapension.com