



PENSION RESERVES
INVESTMENT
MANAGEMENT BOARD

Presentation to the State Retiree Benefits Trust Fund Board

***PRIM Board Organizational Update
PRIT Fund and SRBT Fund Performance Review
Municipal Outreach Update***

Thursday, April 4, 2019

By

***Paul W. Todisco, Senior Client Services Officer, PRIM Board
Francesco Daniele, Senior Client Services Officer, PRIM Board
Samuel Olivier, Client Service Analyst, PRIM Board***

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



Mission

- ❑ **PRIM is a \$69.3 billion investment fund that invests public employee pension benefits.**
 - PRIM does not administer benefits.
 - PRIM has a highly talented, experienced and focused investment staff.
- ❑ **PRIM's Mission is to relieve the pension funding burden on the taxpayer.**
 - PRIM is a self-funded agency which generates asset returns for Massachusetts.
 - In the past five years, PRIM's returns have contributed over \$19.9 billion to pension funding (\$3.6 billion over benchmark).
 - The Project SAVE initiative realized over \$150 million in value for the fund annually.
- ❑ **PRIM is independent and governed by a nine-member Board of Trustees.**
 - The Massachusetts State Treasurer is the Chair of the PRIM Board.
 - A robust committee structure lends advice regarding investments and operations.



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. Timely asset allocation decisions
6. Project SAVE
7. Re-engineered Hedge Fund program – Portfolio Completion Strategies
 - a. Direct hedge funds
 - b. Hedge fund replication
 - c. Alternative risk premia harvesting strategies
 - d. Equity risk mitigation
8. Enhanced manager search and selection process
9. Private Equity co-investment
10. Direct Real Estate



PRIT Fund Overview

❑ Oversight and staffing:

- 9 appointed and elected trustees
- 4 advisory committees, consisting of 37 industry professionals and Board members
- Staff of 45 professionals
 - 2 Ph.D's
 - 10 CFA's
 - 6 CPA's
 - 2 CAIA's
 - 19 CFA Investment Foundations Program Certificate Holders

❑ Core Fund Facts

- \$69.3 billion AUM as of 12/31/2018
- 46 public markets portfolios
- 14 real estate, timber and REIT managers
- 100+ private equity managers; 200+ partnerships
- 39 portfolio completion strategies managers





PRIM Board Organizational Update



PRIM Board Membership



PRIM Advisory Committees Membership

Investment Committee (12 Members)

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.

1. Deborah B. Goldberg, Chair, Ex Officio Board Member
2. Paul E. Shanley, Board Member
3. Ruth Ellen Fitch, Board Member
4. Joseph C. Bonfiglio, Massachusetts & Northern New England Laborers' District Council
5. C. LaRoy Brantley, Investment Consultant
6. Michael Even, CFA, President and CEO, Numeric Investors
7. Constance M. Everson, CFA, Managing Director, Capital Markets Outlook Group
8. James B. G. Hearty, Partner, Clough Capital
9. Peter Monaco, Managing Director, Raptor Group
10. Philip Rotner, Chief Investment Officer, Boston Children's Hospital
11. Glenn P. Strehle, CFA, Treasurer Emeritus, MIT
12. Timothy L. Vaill, Special Advisor

Real Estate Committee (10 Members)

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

1. Deborah B. Goldberg, Ex Officio Board Member
2. Lydia Chesnick, Esq., Partner, Bernkopf Goodman LLP
3. Robert Gifford, Robert Gifford Advisory
4. Jill S. Hatton, Chair, CRE, Real Estate Investment Professional
5. Anthony E. Hubbard, Esq., CVS Corporation
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, Public Safety Union Member



PRIM Advisory Committees Membership

Administration and Audit Committee

(10 Members)

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.

1. Deborah B. Goldberg, Ex Officio Board Member
2. Robert L. Brousseau, Chair, Board Member
3. Theresa T. McGoldrick, Esq., Board Member
4. Patrick E. Brock, Chairman of the Hampshire County Retirement Board
5. Joseph A. Connolly, Senior Managing Director Strategic Development, TerraCap
6. Karen E. Gershman, CPA, Chief Operating Officer, Health Advances
7. Eileen Glovsky, Treasurer Appointee
8. James B. G. Hearty, Partner, Clough Capital
9. Dennis J. Naughton, Board Member
10. Michele A. Whitham, Esq., Founder & Principal, Whitham Law LLC

Compensation Committee

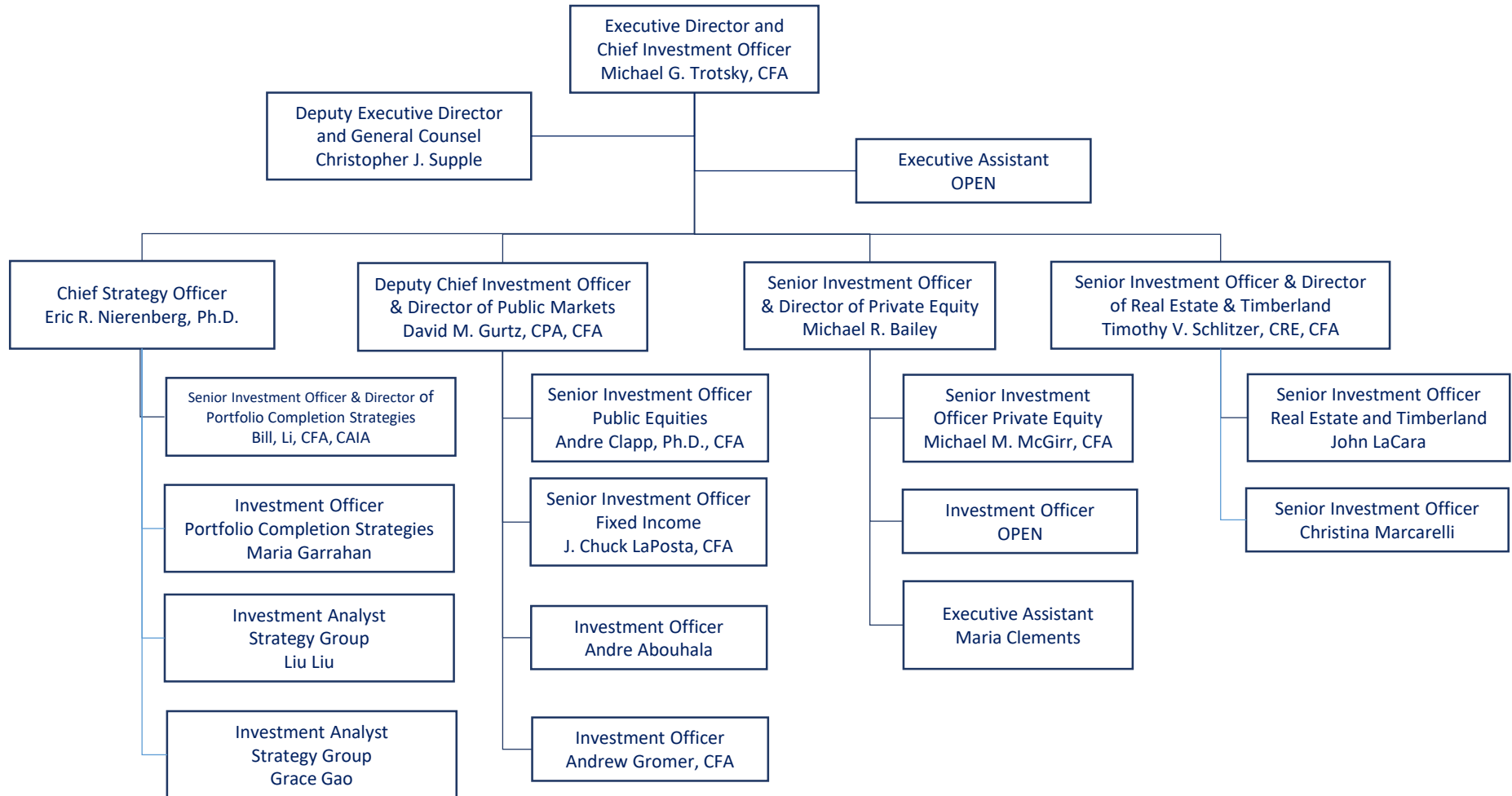
(5 Members)

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.

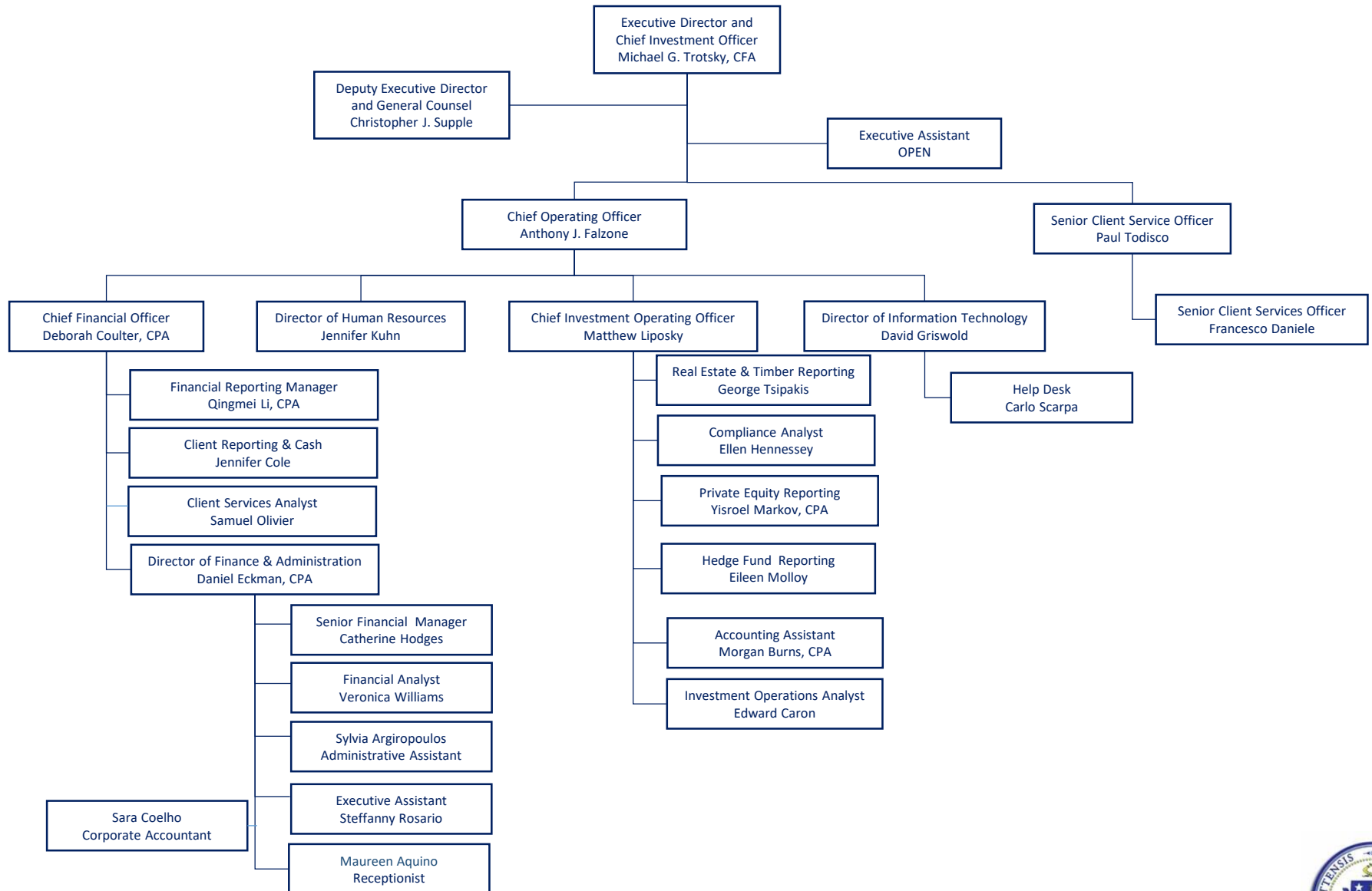
1. Deborah B. Goldberg, Ex Officio Board Member
2. Robert L. Brousseau, Board Member
3. Patrick E. Brock, Chairman, Hampshire County Retirement Board
4. Joseph A. Connolly, Senior Managing Director Strategic Development, TerraCap
5. Michele A. Whitham, Esq., Founder & Principal, Whitham Law LLC



PRIM Investment Organizational Chart



PRIM Finance and Operations Organizational Chart



External Advisors

Fund Advisors:

- **NEPC** - Asset Allocation
- **Callan Associates** - Public Markets
- **Aberdeen/Arden** - Hedge Fund Investments
- **Hamilton Lane** - Private Equity
- **The Townsend Group**- Real Estate & Timber
- **The International Woodland Company** - Timber

Independent Auditors:

- **KPMG, LLP** - PRIM Board and PRIT Fund, Real Estate, Timber, and SASE 16 Reviews
- **Deloitte & Touche, LLP** – PRIM Board tax Consultant

Custodian:

- **BNY Mellon Corporation**



Summary of Recent National Recognition

- ❑ PRIM was nominated as a finalist for 2018 **U.S. Institutional Risk Premia Manager of the Year**, by EQDerivatives. (December 2018)
- ❑ Bill Li, CFA, CAIA, Director of Portfolio Completion Strategies, was inducted into the **Volatility and Risk Premia Hall of Fame's 2019 class** by EQDerivatives. (December 2018)
- ❑ CFA Society Boston has elected Michael Trotsky, CFA, Executive Director and Chief Investment Officer to serve as Vice Chair of the Board of Directors. (June 2018)
- ❑ PRIM's Private Equity Portfolio has been ranked #1 among 163 U.S. public pension funds based on 10 year annualized returns as of June 30 2017 by the American Investment Council's 2018 Public Pension Study
- ❑ Alyssa Fiore, CFA, Analyst on the Private Equity Team, and Andrew Gromer, Analyst on the Public Markets Team, both received their **Chartered Financial Analyst (CFA)** designations, having passed all three tests and completed the work requirements.
- ❑ Chris Supple, Deputy Executive Director and General Counsel, was reappointed to a 2nd term as Chair of the Securities Litigation Committee at the National Association of Public Pension Attorneys (NAPPA)
- ❑ PRIM was nominated again for Institutional Investor Magazine's 15th annual **Large Public Fund of the Year Hedge Fund Industry award**. The award recognizes excellence in innovation and thought leadership in the Hedge Fund space. (May 2017)
- ❑ Bill Li, Investment Officer, earned the **Chartered Alternative Investments Analyst (CAIA)** designation after passing the required two-part exam. The CAIA curriculum is designed to provide a broad knowledge in alternative investments including hedge funds, private equity, real assets and structured products. (May 2017)
- ❑ PRIM was awarded the **Government Finance Officer Association's Certificate of Achievement for Excellence in Financial Reporting** for the 12th consecutive year. (May 2017)
- ❑ Tim Schlitzer, Senior Investment Officer and Director of Real Estate and Timberland, and Bill Lee, Investment Officer on the Hedge Fund team, received their **Chartered Financial Analyst (CFA)** designations, having passed all three tests and completed the work requirements. (November 2016)
- ❑ David Gurtz, CFA, CPA, CFO and COO, and Paul Todisco, PRIM Senior Client Services Officer, received the **Commonwealth's Citation for Outstanding Performance** at a State House ceremony with Treasurer Deborah Goldberg, Chair of the PRIM Board. (September 2016)
- ❑ Eric Nierenberg, Ph.D., Director of Hedge Funds & Low Volatility Strategies, was awarded Institutional Investor magazine's **Large Public Fund of the Year Award**. The award recognizes performance innovation, achievements and contributions to the industry in the past year. (June 2016).

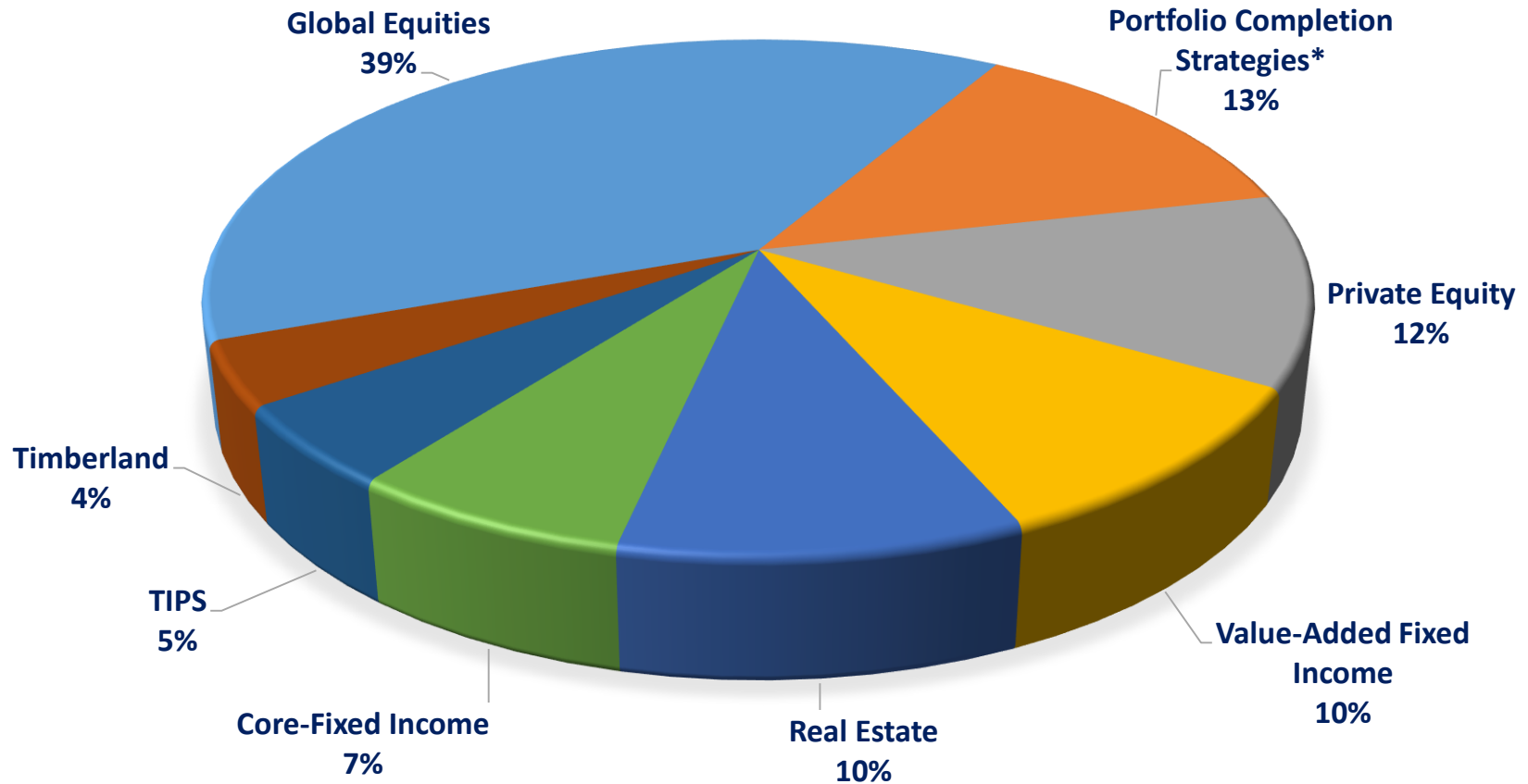




Asset Allocation Review



PRIT Fund Overview – Current Asset Allocation Targets



*PCS Includes 9% allocation to Hedge Funds.



Detailed Summary: Target Range Proposal

Increase in Allocation Range

Core Fixed Income: Target Band moves up 3%

- ❑ The net increase will be funded across the US Treasury curve.



US Short Term Fixed Income

- ❑ Within Core Fixed Income, there will be an increase across the US Treasury curve which will be funded through a reduction in Global Inflation-Linked Bonds.

Portfolio Completion Strategies: Target Band moves up 1%

Private Equity: Target Band moves up by 1%

Decrease in Allocation Range

Global Equity: Target Band moves down 3%

- ❑ The decrease will be sourced from Developed International and Emerging Markets Equities.
- ❑ Within Global Equities, the increase in the Hedged Equity program will be funded by US and International Equities.

Value Fixed Income: Target Band moves down by 2%

Same Allocation Range

Real Estate: Target Band remains the same

- ❑ As Private Real Estate deals are sourced, the team may fund from REITS.

Timber: Target Band remains the same



PRIM Asset Allocation Mid-Point Target

Asset Class Allocations	Current AA Target Range	2019 AA Target Range	2019 AA Target Mid-Point	Mid-Point AA Change From 2018
Global Equity	37% - 47%	34% - 44%	39%	<u>-3.0%</u>
US Equity			13%	-4.5%
Int'l Developed Equities			13%	-2.5%
Emerging Int'l Equities			5%	-1.0%
Hedged Equity			8%	5.0%
Core Fixed Income	9% - 15%	12% - 18%	15%	<u>3.0%</u>
Core Bonds			6%	1.0%
Short-Term Fixed Income			2%	2.0%
Long Duration Treasury			3%	1.0%
Inflation-Linked Bonds			4%	-1.0%
Value-Add Fixed Income	7% - 13%	5% - 11%	8%	<u>-2.0%</u>
Private Equity	9% - 15%	10% - 16%	13%	<u>1.0%</u>
Real Estate	7% - 13%	7% - 13%	10%	-
Private Real Estate			9%	1.0%
Public REITs			1%	-1.0%
Timberland	1% - 7%	1% - 7%	4%	-
PCS	7% - 13%	8% - 14%	11%	<u>1.0%</u>



PRIM Asset Allocation

Asset Class Allocations	Current AA Target Range	2019 AA Target Range	2019 AA Target Mid-Point	Mid-Point AA Change From 2018
Global Equity	37% - 47%	34% - 44%	39%	<u>-3.0%</u>
Core Fixed Income	9% - 15%	12% - 18%	15%	<u>3.0%</u>
Value-Add Fixed Income	7% - 13%	5% - 11%	8%	<u>-2.0%</u>
Private Equity	9% - 15%	10% - 16%	13%	<u>1.0%</u>
Real Estate	7% - 13%	7% - 13%	10%	-
Timberland	1% - 7%	1% - 7%	4%	-
PCS	7% - 13%	8% - 14%	11%	<u>1.0%</u>

Capital Market Assumptions ¹	2018 Assumptions Current Target Range	2019 Assumptions 2019 Target Range
5-7 Yr. Returns	6.6%	6.8%
30 Yr. Returns	7.7%	7.9%
Volatility	12.6%	12.1%
Sharpe Ratio 30 Yr.	0.39	0.41

1. Asset classes modeled at the midpoint of the target range

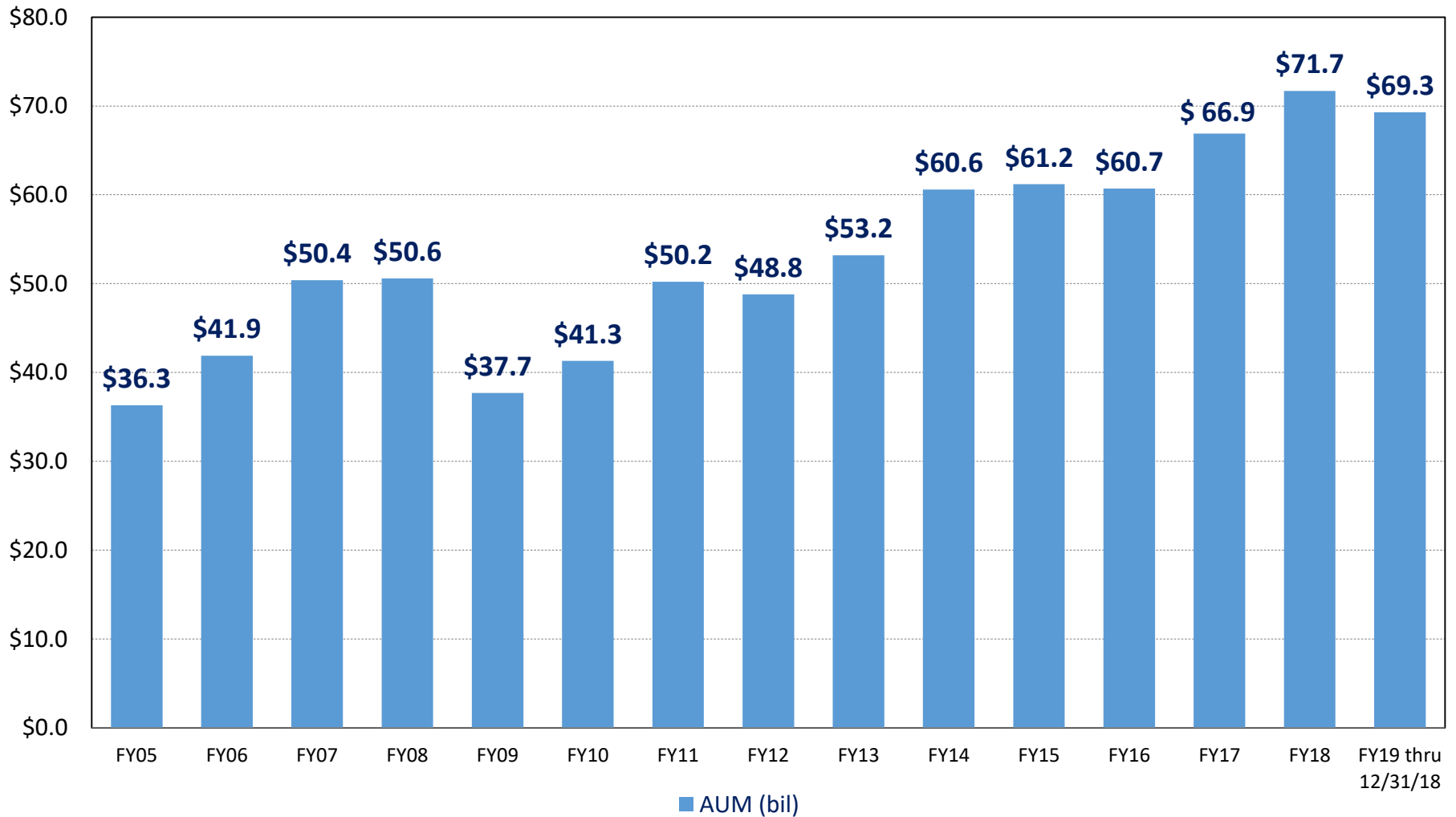




PRIT Fund Performance As of December 31, 2018

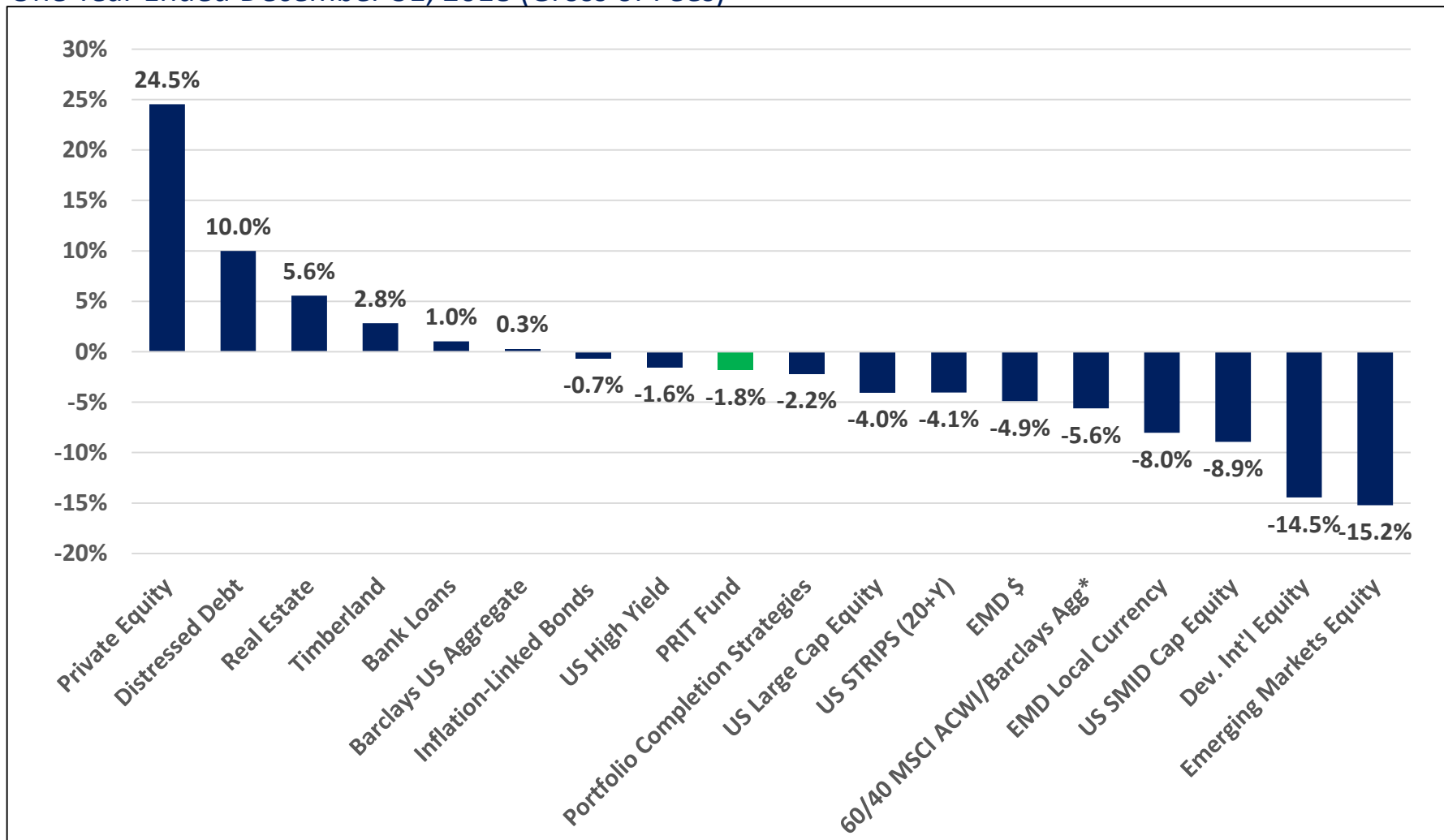


Total PRIT Fund Fiscal Year Market Value (\$Billions)



Asset Class Performance Summary

One Year Ended December 31, 2018 (Gross of Fees)



Source: BNY Mellon, FactSet.

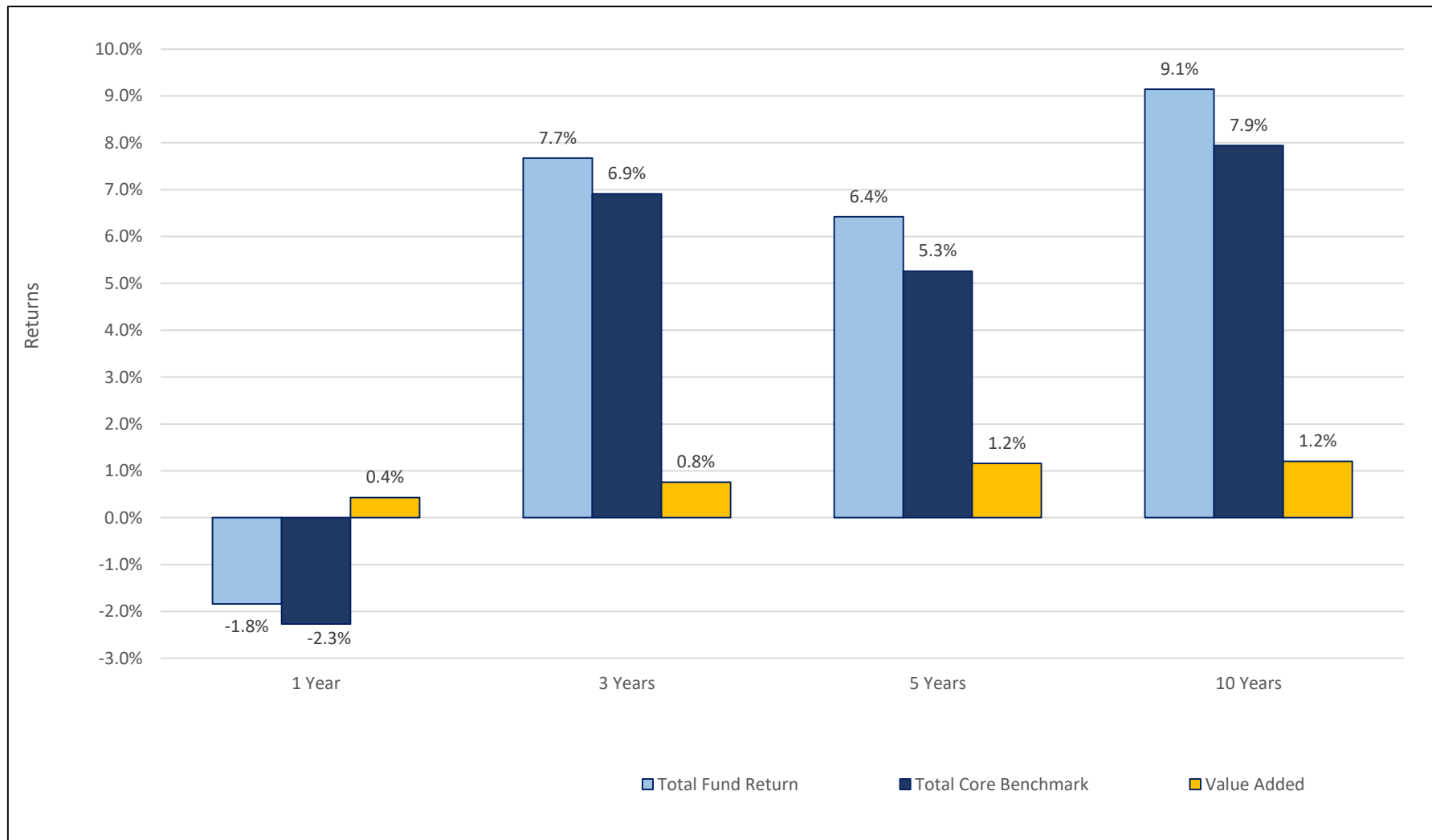
All performance figures reflected are PRIT Fund Asset Class returns.

*MSCI ACWI/Barclays Aggregate is derived from a 60/40 combination of index returns.



Total PRIT Fund Returns

Annualized Returns as of December 31, 2018 (Gross of Fees)



Source: BNY Mellon.

Total Core Benchmark includes private equity benchmark.



PRIT Asset Class Performance

One Year Ended December 31, 2018 (Gross of Fees)

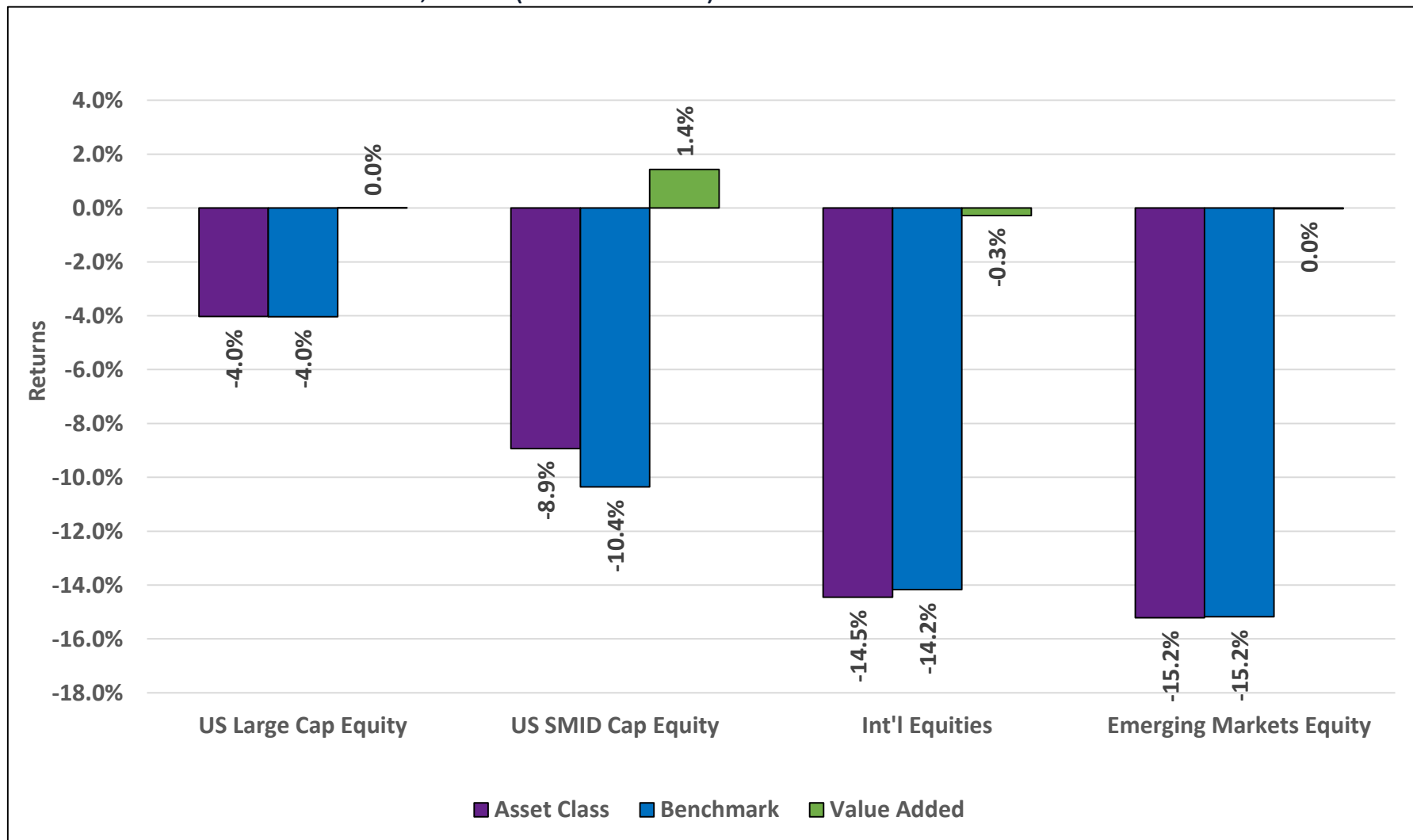


Source: BNY Mellon.
 Totals may not add due to rounding.
 *Benchmark is actual performance.



Public Markets Performance – Equities

One Year Ended December 31, 2018 (Gross of Fees)

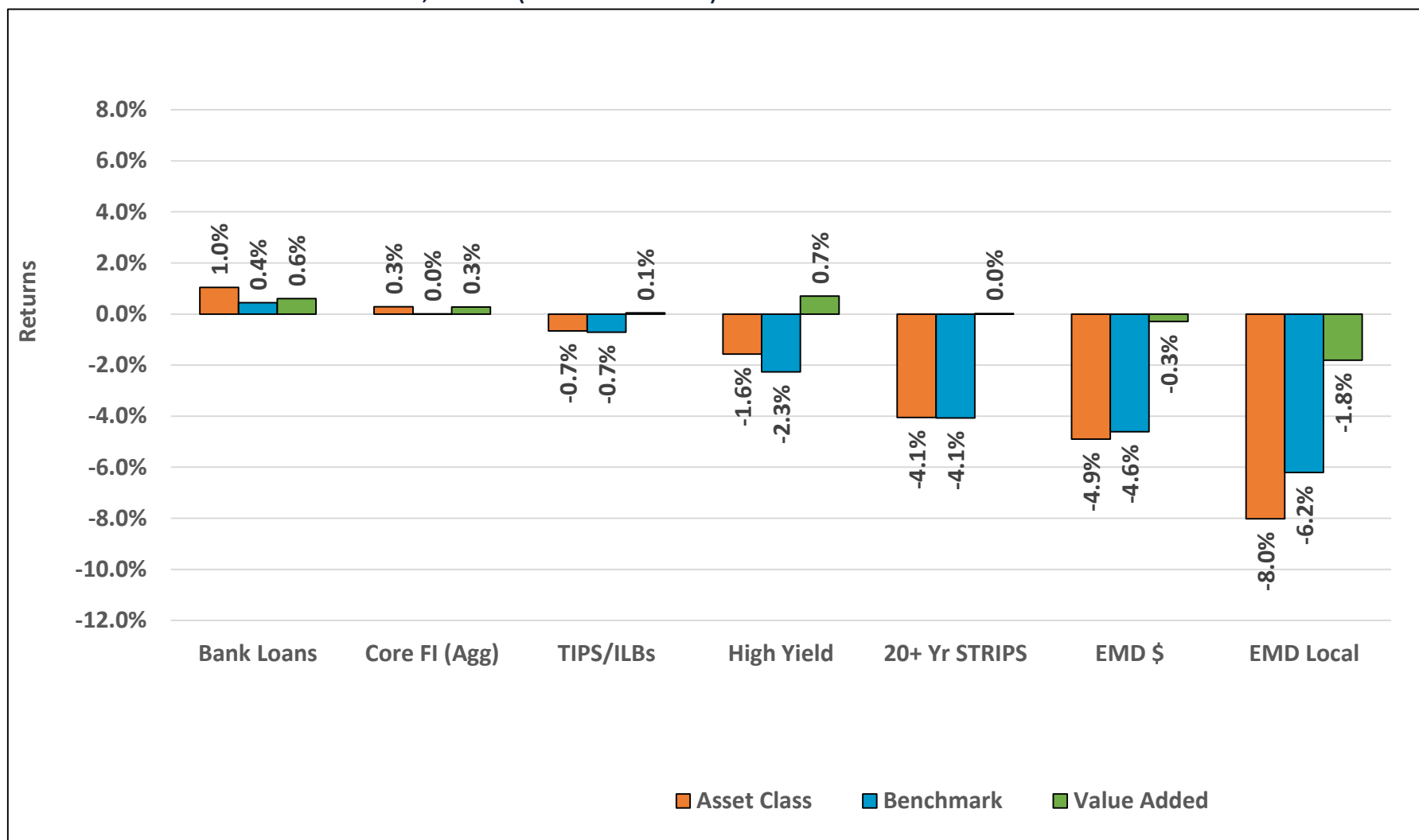


Source: BNY Mellon.
 Totals may not add due to rounding.



Public Markets Performance – Fixed Income

One Year Ended December 31, 2018 (Gross of Fees)



Source: BNY Mellon.
Totals may not add due to rounding.



PRIT Asset Class Performance

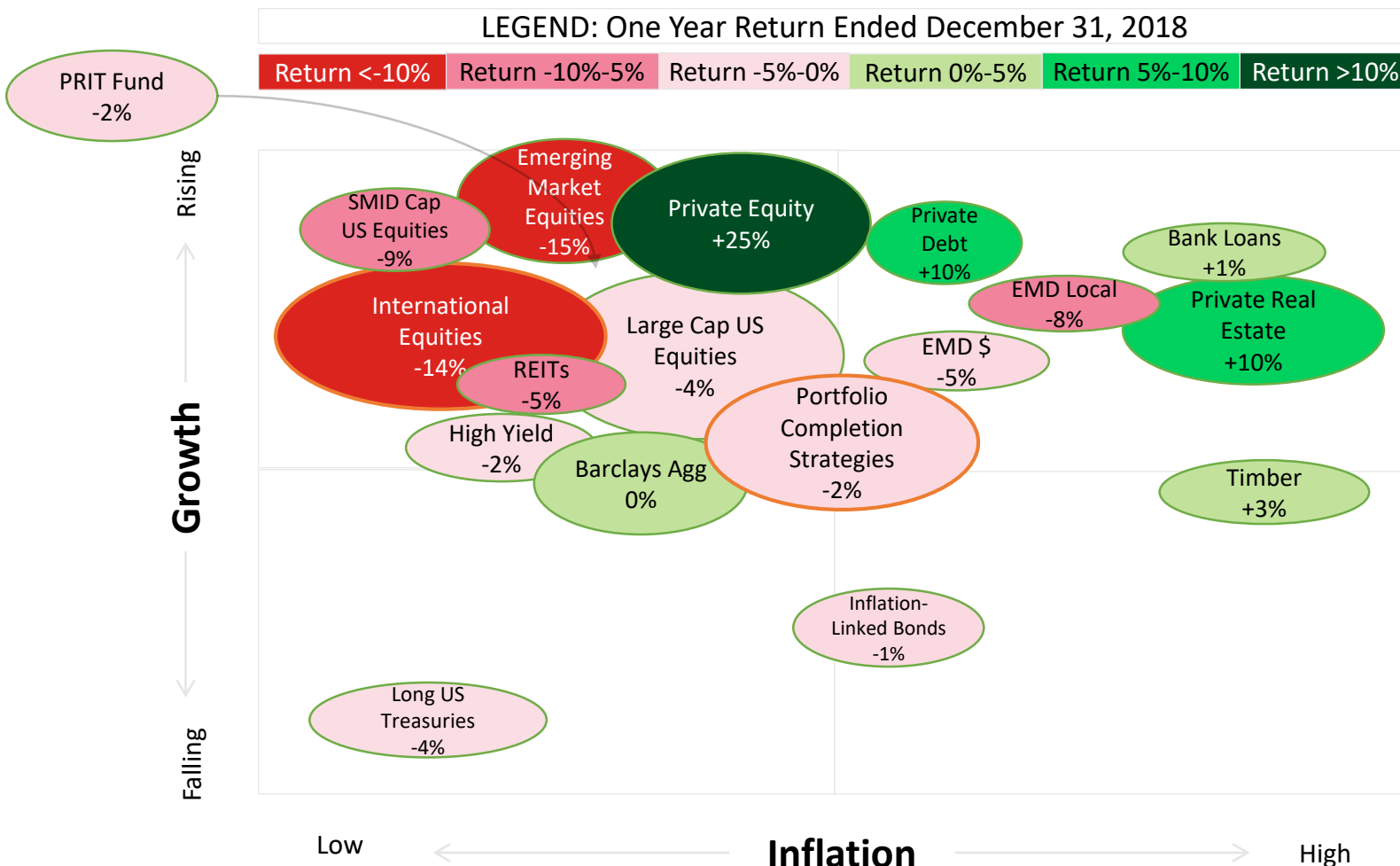
Annualized Returns as of December 31, 2018 (Gross of Fees)

1 Year	3 Year	5 Year	10 Year
PRIVATE EQUITY 24.5%	PRIVATE EQUITY 20.8%	PRIVATE EQUITY 19.8%	PRIVATE EQUITY 15.9%
REAL ESTATE 5.6%	REAL ESTATE 7.4%	REAL ESTATE 9.7%	GLOBAL EQUITY 10.2%
TIMBER 2.8%	GLOBAL EQUITY 7.0%	TIMBER 5.6%	VALUE-ADDED FIXED INCOME 9.1%
VALUE-ADDED FIXED INCOME 0.5%	VALUE-ADDED FIXED INCOME 6.8%	GLOBAL EQUITY 4.5%	REAL ESTATE 9.0%
CORE FIXED INCOME (0.8%)	TIMBER 5.9%	CORE FIXED INCOME 4.2%	CORE FIXED INCOME 5.2%
TOTAL PCS (2.2%)	TOTAL PCS 3.3%	VALUE-ADDED FIXED INCOME 3.8%	TOTAL PCS 5.0%
GLOBAL EQUITY (10.4%)	CORE FIXED INCOME 2.9%	TOTAL PCS 2.8%	TIMBER 3.0%



Asset Classes & Regimes – One Year Ended December 31, 2018

- GDP Growth: +3%.
- Core CPI: +2.2%.
- 30yr yields: +28bps.



Asset class returns represent PRIM's actual returns, gross of management fees (with the exception of hedge funds, which are net of fees).



Sharpe Ratios As of Dec 2018

Market Indices

PRIT Sleeves

1 year	PRIT Fund	MSCI ACWI	Barclays Agg	Global Equity	Core Fixed Inc	Val Fixed Inc	Private Equity	Real Estate	Timber	Total HF
Ann. Return	-2.2%	-8.9%	0.0%	-10.6%	-0.9%	-0.2%	22.6%	5.0%	2.3%	-1.6%
Ann. Volatility	6.7%	13.5%	3.1%	13.5%	4.5%	3.0%	10.6%	4.1%	3.4%	3.3%
Sharpe Ratio	(0.63)	(0.81)	(0.65)	(0.93)	(0.65)	(0.73)	1.94	0.73	0.09	(1.07)

3 year	PRIT Fund	MSCI ACWI	Barclays Agg	Global Equity	Core Fixed Inc	Val Fixed Inc	Private Equity	Real Estate	Timber	Total HF
Ann. Return	7.2%	7.2%	2.1%	6.8%	2.8%	6.0%	18.8%	6.9%	5.4%	3.6%
Ann. Volatility	5.6%	10.6%	2.9%	10.9%	6.1%	3.8%	8.6%	3.3%	3.4%	2.9%
Sharpe Ratio	1.07	0.57	0.33	0.52	0.27	1.26	2.06	1.72	1.25	0.82

5 year	PRIT Fund	MSCI ACWI	Barclays Agg	Global Equity	Core Fixed Inc	Val Fixed Inc	Private Equity	Real Estate	Timber	Total HF
Ann. Return	6.0%	4.8%	2.5%	4.3%	4.1%	3.0%	17.9%	9.1%	5.2%	2.9%
Ann. Volatility	5.5%	10.9%	2.8%	11.0%	7.4%	4.3%	8.8%	3.4%	3.9%	3.4%
Sharpe Ratio	0.95	0.38	0.65	0.33	0.46	0.54	1.95	2.43	1.14	0.63

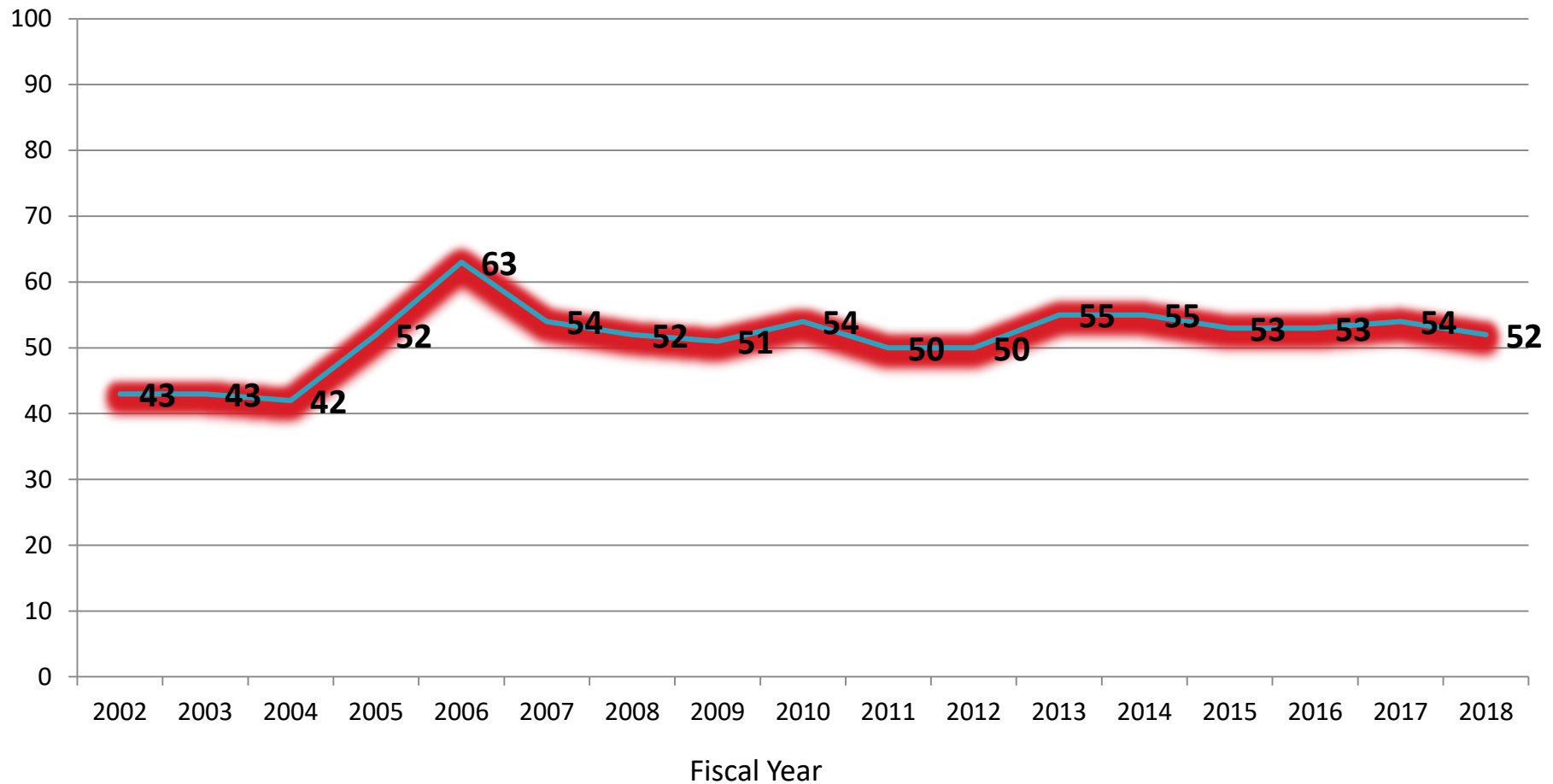


Project SAVE Update

PROJECT SAVE as of 12/31/2018	Annualized Value Target	Annualized Value Realized	% of Target Achieved
<u>INITIAL PROGRAMS</u>			
Hedge Fund-of-Funds Unwind	\$40 mm	\$38.2 mm	96%
Cash Overlay Program	\$20 mm	\$28.2 mm	141%
Public Markets Fee Negotiations	\$1.5 mm	\$8.2 mm	546%
Private Equity Co-Investment	\$25 mm	\$13.2 mm	53%
Hedge Fund Fee Negotiations	\$7 mm	\$57.0 mm	824%
Hedge Fund Replication	\$7 mm	\$14.8 mm	211%
Securities Litigation	\$0.7mm	\$0.6 mm	82%
<u>INITIAL PROGRAMS TOTALS</u>	<u>\$101.2 mm</u>	<u>\$160.9 mm</u>	<u>159%</u>
<u>FOLLOW-ON PROGRAMS</u>			
Real Estate direct- or co-investment	\$2 mm	\$1.6 mm	
Securities Lending	\$15 mm	\$10.5 mm	
Private Equity Stock Distribution	\$0.3mm	\$0.1 mm	
<u>TOTAL PROJECT SAVE PROGRAMS</u>		<u>\$173.1 mm</u>	



PRIT Fund Ratio of Expenses in Basis Points





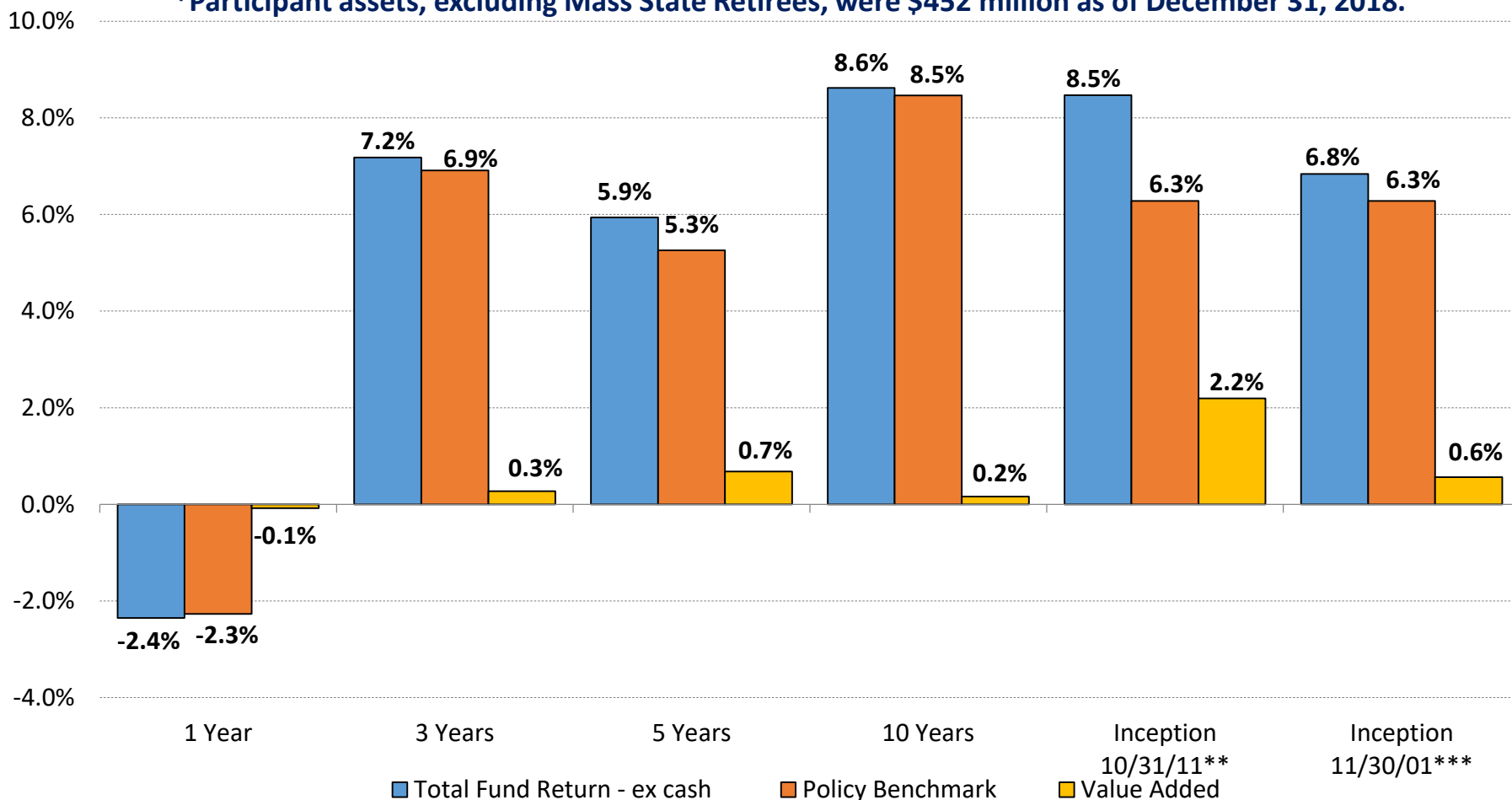
SRBT Fund Performance As of December 31, 2018



Total SRBT Fund Returns (Net of Fees) - \$1.595 Billion*

Annualized Returns as of December 31, 2018

*Participant assets, excluding Mass State Retirees, were \$452 million as of December 31, 2018.



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. **The ITD return of 10.1% 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.





SRBT Fund Performance

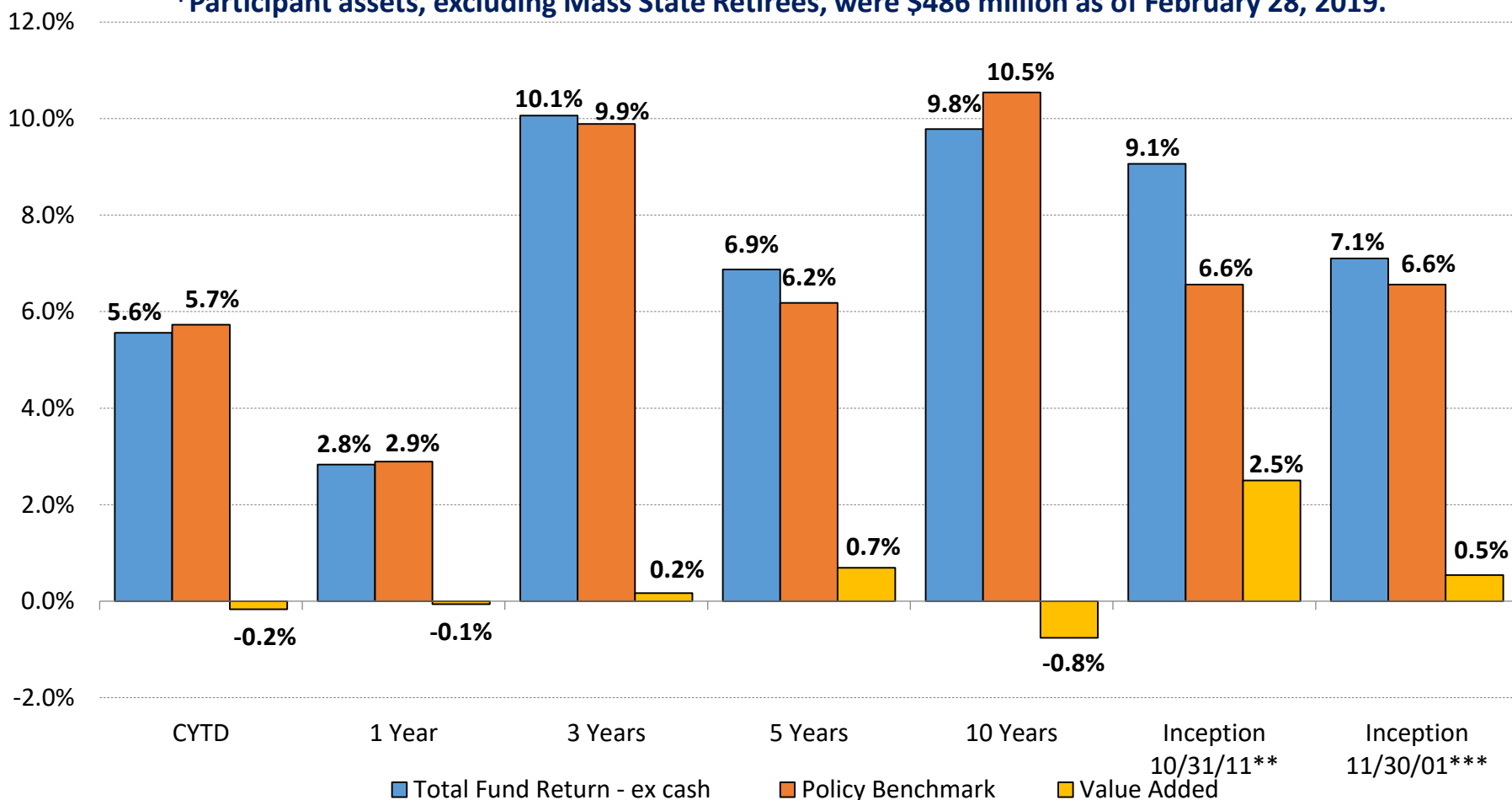
As of February 28, 2019



Total SRBT Fund Returns (Net of Fees) - \$1.693 Billion*

Annualized Returns as of February 28, 2019

*Participant assets, excluding Mass State Retirees, were \$486 million as of February 28, 2019.



The inception date for the SRBT'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. **The ITD return of 10.1% 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 SRBT assets including legacy separate account investments as well as the PRIT GA investments.





Municipal Outreach



Municipal Outreach

1. Acton-Boxborough Regional School District
2. Amherst-Pelham Regional School District (OPEB committee considering investment options)
3. Andover
4. Ayer Shirley Regional School District
5. Belmont
6. Bernardston
7. Bridgewater
8. Byfield Water District
9. Cape Cod Regional Transit Authority
10. Chelmsford Water District
11. Dartmouth
12. Dracut
13. Freetown
14. Foxboro
15. Greater Lawrence Sanitary District
16. Greater Lowell Technical Regional High School (Renewed interest in October)
17. Greenfield
18. Groton
19. Halifax
20. Haverhill
21. Hull
22. Longmeadow
23. Lynn
24. Massachusetts Association of Regional Planning Agencies (MARPA)
25. Massachusetts Housing Finance Authority
26. Medway
27. Melrose
28. Mohawk/Hawlemont Regional School District (Buckland)
29. Nauset Regional High School
30. Newbury
31. Pepperell
32. Somerset
33. South Hadley Fire District (Scheduling a meeting date)
34. Springfield
35. Sudbury
36. Tri-County Educational Collaborative (Franklin, MA)
37. Truro
38. Waltham
39. West Boylston Municipal Light Department
40. Westford*
41. West Newbury
42. Woburn

*New listing



Governmental Entities Participating in the SRBTF

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

