



HAMPDEN COUNTY RETIREMENT BOARD

PRESENTED BY

Francesco Daniele, Director of Client Services

NOVEMBER 2, 2022

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
• PRIM's FUTURE Initiative	12
• Economic Backdrop	15
• PRIT Fund Asset Allocation Targets	18
• PRIT Fund Performance	22
• Appendix: PRIT Fund Asset Class Detail	32

A blue-tinted photograph of a city skyline, likely Boston, viewed from across a body of water. The skyline includes several tall skyscrapers and a mix of urban buildings. In the foreground, there is a paved walkway and some greenery on the left side.

PRIM BOARD & PRIT FUND OVERVIEW



AS OF JUNE 30, 2022

PRIT Fund Snapshot

As of June 30, 2022

PRIT FUND FACTS

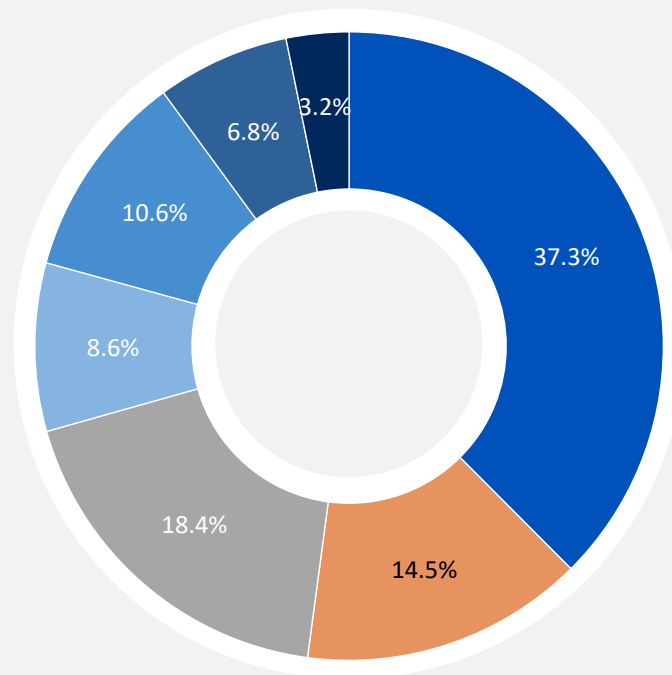
- \$92.4 billion AUM
- 56 public markets portfolios
- 16 real estate, timber and REIT portfolios
- 90+ private equity managers;
300+ partnerships
- 36 portfolio completion strategies managers

OVERSIGHT AND STAFFING

- 9 appointed and elected trustees
- 4 advisory committees, consisting of 35 industry professionals and Board members
- Staff of over 50 professionals
 - 1 PhD
 - 26 Masters
 - 15 CFAs
 - 6 CPAs
 - 3 CAIAs
 - 1 FRM
 - 1 CRE
 - 9 CFA Investment Foundations Program Certificate Holders

ASSET ALLOCATION

(as of 6/30/22)



TARGET RANGES

(approved 2/17/22)

- Global Equities 33% - 43%
- Core Fixed Income 12% - 18%
- Private Equity 12% - 18%
- Portfolio Completion Strategies 7% - 13%
- Real Estate 7% - 13%
- Value-Added Fixed Income 5% - 11%
- Timberland 1% - 7%

About PRIM



\$92.4 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 \$250 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. Perelmutter**, 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

Recent Recognition

PRIM's Private Equity Portfolio Ranked #3 by the American Investment Council

PRIM's Private Equity Portfolio was ranked #3 among 176 U.S. public pension funds based on 10-year performance by the American Investment Council's Public Pension Study. PRIM is the only fund that has been in the top five every year the study has been conducted, including #1 rankings in 2019, 2018, 2015, and 2013. (June 2022)

Institutional Investor's Partnership of the Year Award

PRIM's role with the Aggregate Confusion Project was awarded "Partnership of the Year" at the fifth annual Allocators' Choice Awards. PRIM is a founding partner with MIT Sloan School of Management in this project to "reduce the level of noise in ESG management" by improving data available to managers and allocators. Other participants include Qontigo, MFS Investment Management, AQR Capital Management, and Asset Management One. (September 2022)

Institutional Investor's Public Plan of the Year Award Finalist

PRIM's Portfolio Completions Strategies team was one of six finalists for "Public Plan of the Year" at their Hedge Funds Industry Awards for the 6th straight year. PRIM won the award in 2016 in recognition of our groundbreaking work in separately managed accounts, which is now becoming the industry standard. (April 2022)

Founding Signatory – CFA Institute's Diversity, Equity, and Inclusion Code

PRIM became a founding signatory to the CFA Institute's first-ever Diversity, Equity, and Inclusion Code for the Investment Profession. DEI Code signatories commit to six metrics-based Principles and to accelerate and amplify the impact of their commitment by making the economic, business, and moral case for diversity, equity, and inclusion. (March 2022)

PRIM Ranked #7 For Assets Managed by Diverse Managers by Pensions & Investments

PRIM was ranked seventh among the largest 200 funds in the U.S. for assets managed by diverse managers. This is an indication that PRIM's ongoing efforts over the years, combined with the new FUTURE initiative are putting PRIM at the top of the rankings in terms of progress. (February 2022)

Certificate of Achievement for Excellence in Financial Reporting – Government Finance Officer Association

PRIM was awarded the Government Finance Officer Association's Certificate of Achievement for Excellence in Financial Reporting for the 17th consecutive year. (June 2022)

GIPS Compliance

For the 5th consecutive year, PRIM has completed the CFA Institute's Global Investment Performance Standards of Integrity and transparency. PRIM is one of only a handful of large public pension plans to comply with the GIPS standards. Additionally, Matt Liposky, PRIM's Chief Investment Operations Officer, was selected to the CFA Institute's GIPS Standards Asset Owner Subcommittee. (August 2022)



PRIM'S FUTURE INITIATIVE



PRIM's FUTURE Initiative

PRIM believes that diversity of thought and investment equity is critical to the FUTURE success of PRIM and the asset management industry. To successfully implement and accomplish these goals, PRIM must plan for the FUTURE:

F U T U R E

Firmwide Commitment

Continuation of PRIM's firmwide commitment to diversity and inclusion and diversity of thought.

Unbiased

PRIM will remain unbiased when evaluating and selecting investment managers or other vendors.

Transparent

PRIM will be fully transparent as to the progress toward our goals, as well as our successes and challenges.

Utilize Technology

PRIM will utilize technology to successfully track and manage the amount of data this initiative requires.

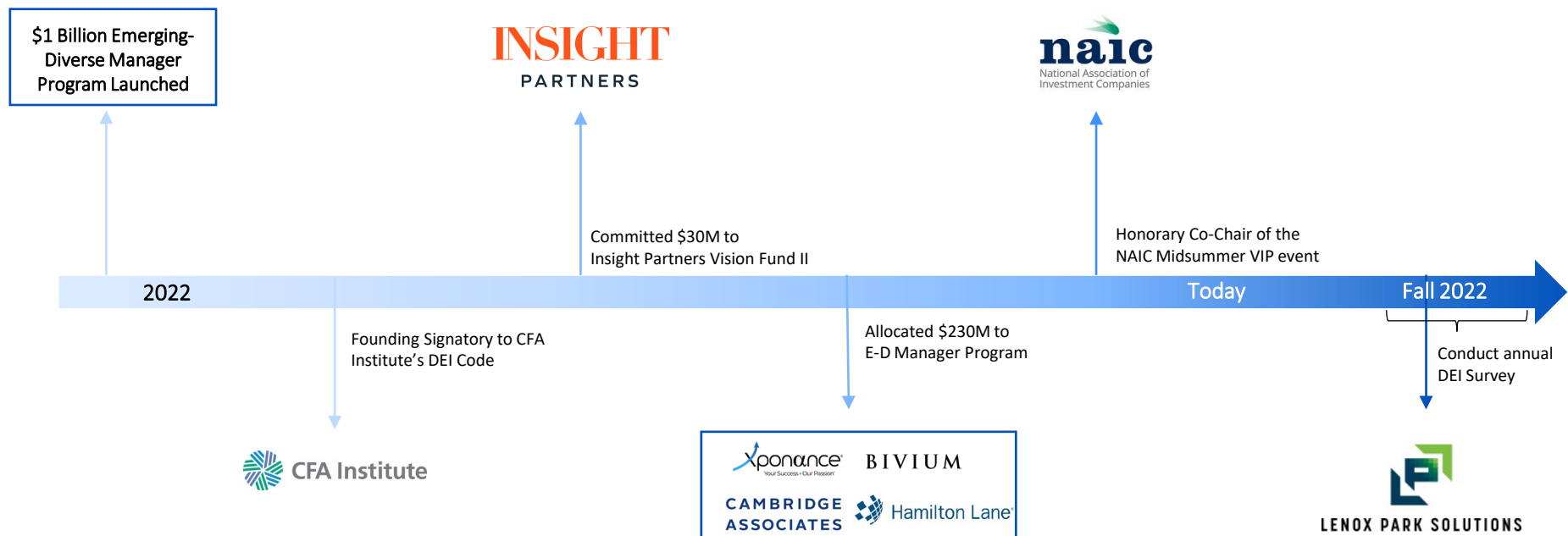
Resources

PRIM will employ additional internal and external resources as required to accomplish our goals.

Expand

PRIM will expand the conversation about diversity and inclusion in the asset management industry by being at the forefront of meaningful change.

FUTURE Initiative Update



PRIM continues to make progress on the keys to FUTURE Initiative:

- Reduce Barriers
- Enhance Diversity, Equity & Inclusion (DEI) Reporting
- Improve Sourcing
- Continue to Allocate Capital to Diverse Managers



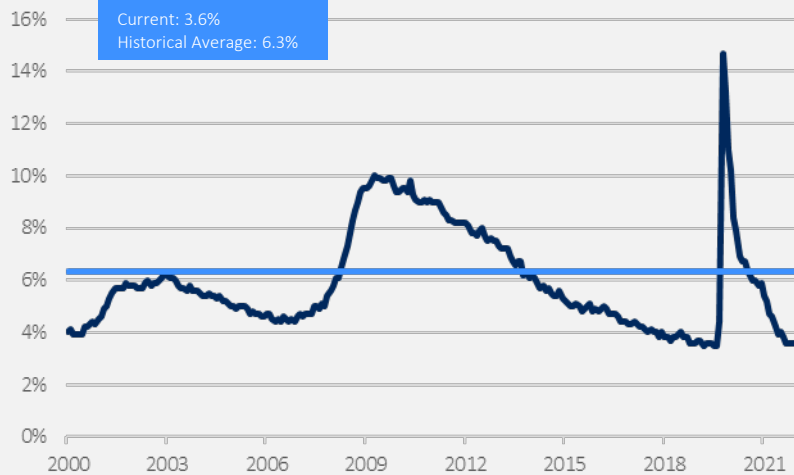
ECONOMIC BACKDROP

**Mass
PRIM**

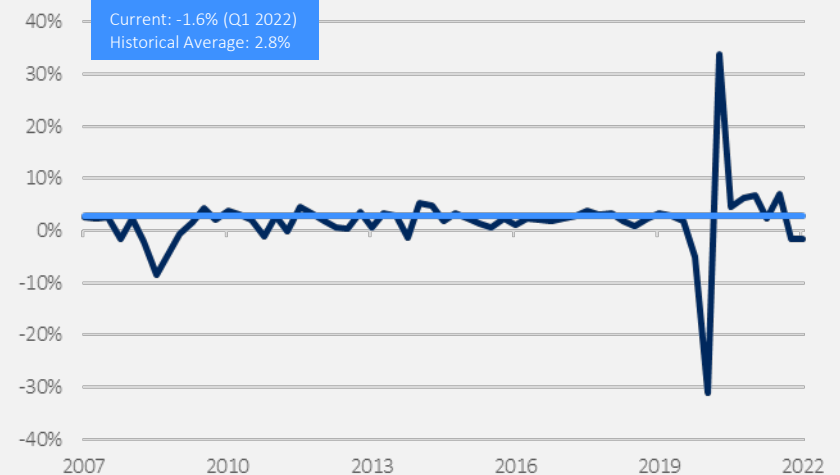
AS OF JUNE 30, 2022

U.S. Economic Data

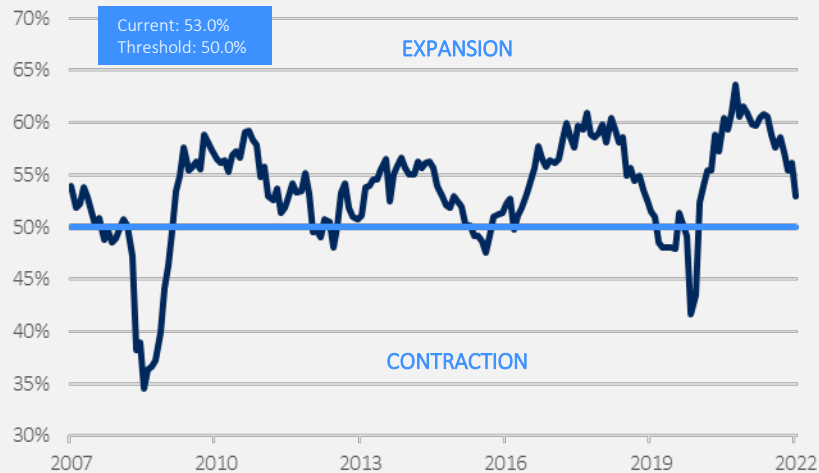
UNEMPLOYMENT RATE



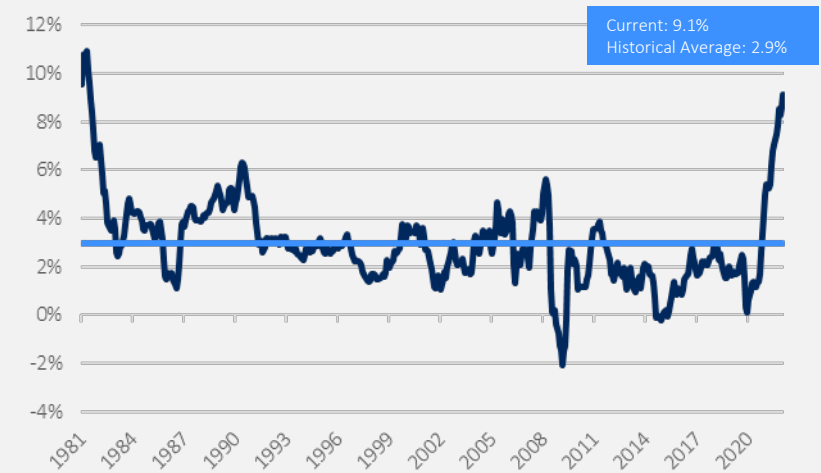
GDP GROWTH RATE



MANUFACTURING PMI

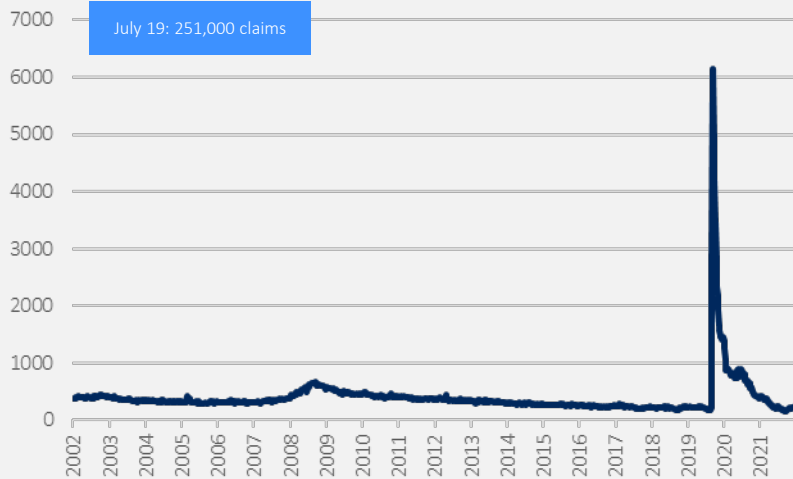


CONSUMER PRICE INDEX

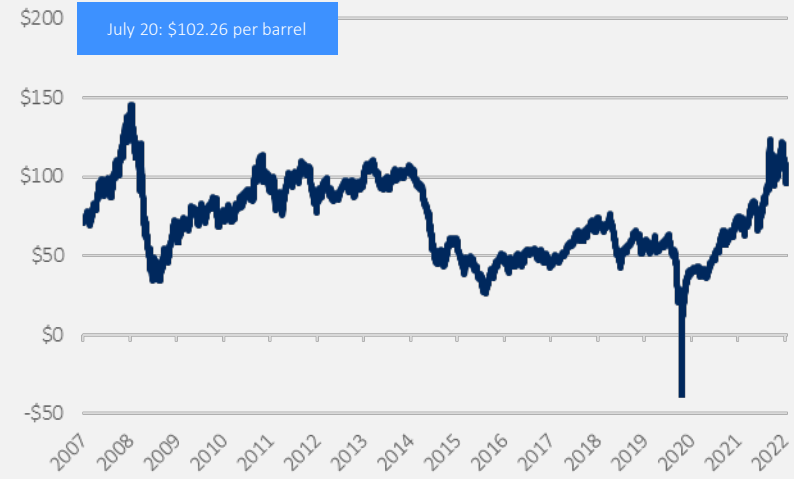


U.S. Economic Data

WEEKLY INITIAL JOBLESS CLAIMS (IN MILLIONS)



WTI CRUDE OIL (\$/BBL)



CBOE MARKET VOLATILITY INDEX (VIX)



The background of the slide is a photograph of a city skyline, likely Boston, featuring several tall skyscrapers and a prominent cable-stayed bridge. The image is overlaid with a semi-transparent blue filter. In the center, the text "PRIT FUND" and "ASSET ALLOCATION TARGETS" is displayed in large, white, sans-serif capital letters. In the lower center, the "Mass PRIM" logo is visible, consisting of the word "Mass" in a smaller font above the word "PRIM" in a larger, bold font, with a stylized graphic of three vertical bars to the left.

PRIT FUND ASSET ALLOCATION TARGETS

Mass
PRIM

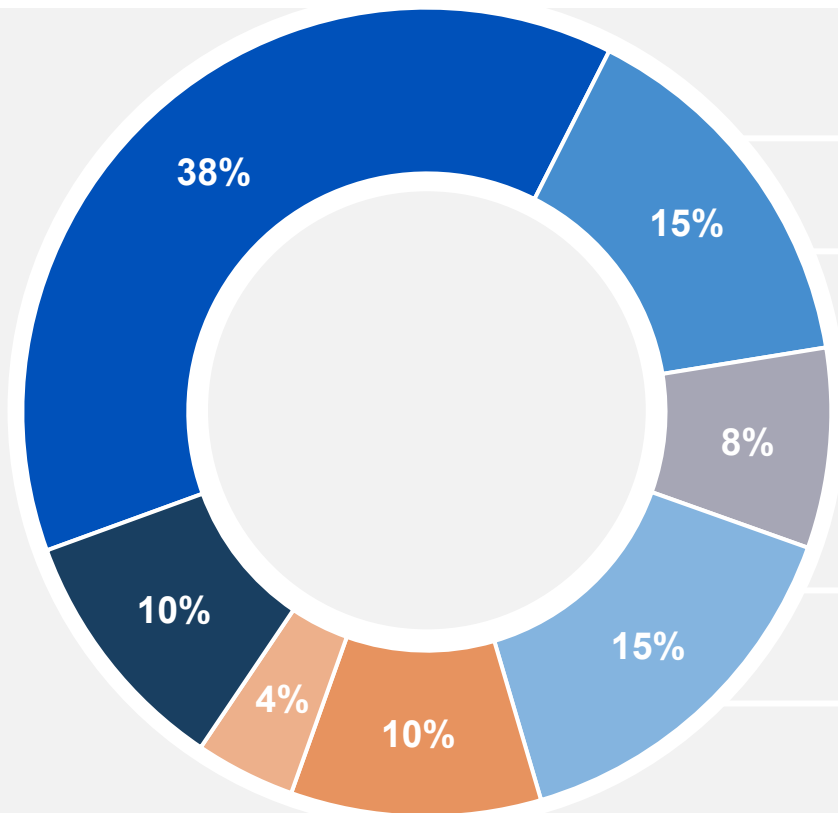
Changes to Target Ranges – PRIT Fund Asset Allocation

Approved February 17, 2022

Increase in Allocation Range	Same Allocation Range	Decrease in Allocation Range
Private Equity: Target Band moves up 1%	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 Portfolio Completion Strategies: Target Band stays the same	Global Equity: Target Band moves down 1%

PRIT Asset Allocation

Approved February 17, 2022



	AA 2021 Approved Range	AA 2022 Approved Range
Global Equity (including Hedged US Equity)	34% - 44%	33% - 43%
Core Fixed Income	12% - 18%	No Change
Value-Added Fixed Income	5% - 11%	No Change
Private Equity	11% - 17%	12% - 18%
Real Estate	7% - 13%	No Change
Timberland	1% - 7%	No Change
Portfolio Completion Strategies	7% - 13%	No Change

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.

PRIM 2022 Asset Allocation Recommendations

NEPC Capital Market Assumptions with PE and Global Equity Changes

		12/31/21 Asset Class Assumptions	
Asset Classes	Target Range	10 Yr. Expected Return	30 Yr. Expected Return
US Equity ¹		4.6%	6.3%
International Equities ²		5.4%	6.4%
Emerging International Equities ³		8.3%	8.7%
Hedged Equity ⁴		4.2%	5.7%
Global Equity	33% - 43%		
Core Bonds		2.0%	3.1%
Short-Term Fixed Income ⁵		1.4%	2.4%
20+ Yr. Treasury STRIPS		1.0%	2.1%
TIPS/ILBs		1.2%	2.3%
Core Fixed Income	12% - 18%		
Value-Added Fixed Income ⁶	5% - 11%	5.2%	6.4%
Private Equity	12% - 18%	9.1%	10.1%
Real Estate ⁷	7% - 13%	5.0%	6.0%
Timberland ⁸	1% - 7%	5.3%	6.6%
Portfolio Completion (PCS) ⁹	7% - 13%	4.2%	5.4%
Total Fund Expected Return¹⁰		5.7%	6.9%

1. Blended allocation to large-cap equity, small-cap equity, micro-cap equity

2. Blended allocation to large-cap equity and small-cap equity

3. Blended allocation to large-cap equity and small-cap equity

4. Modeled as US LIBOR, US large-cap equity, and US small-cap equity

5. Modeled as Short-Term Treasury

6. Blended allocation to high yield, bank loans, EMD, private debt

7. Blended allocation to Private Real Estate and REITs

8. Timberland is modeled as Private Real Assets Infrastructure/Land

9. Modeled as equal weighted blend of Hedge Fund Equity, Credit, and Macro

10. Asset classes modeled at the midpoint of the asset allocation range

A blue-tinted photograph of a city skyline at dusk or dawn, viewed from across a body of water. In the foreground, there is a paved walkway and some greenery on the left. The skyline features several tall buildings, some with lights on. The overall mood is serene and urban.

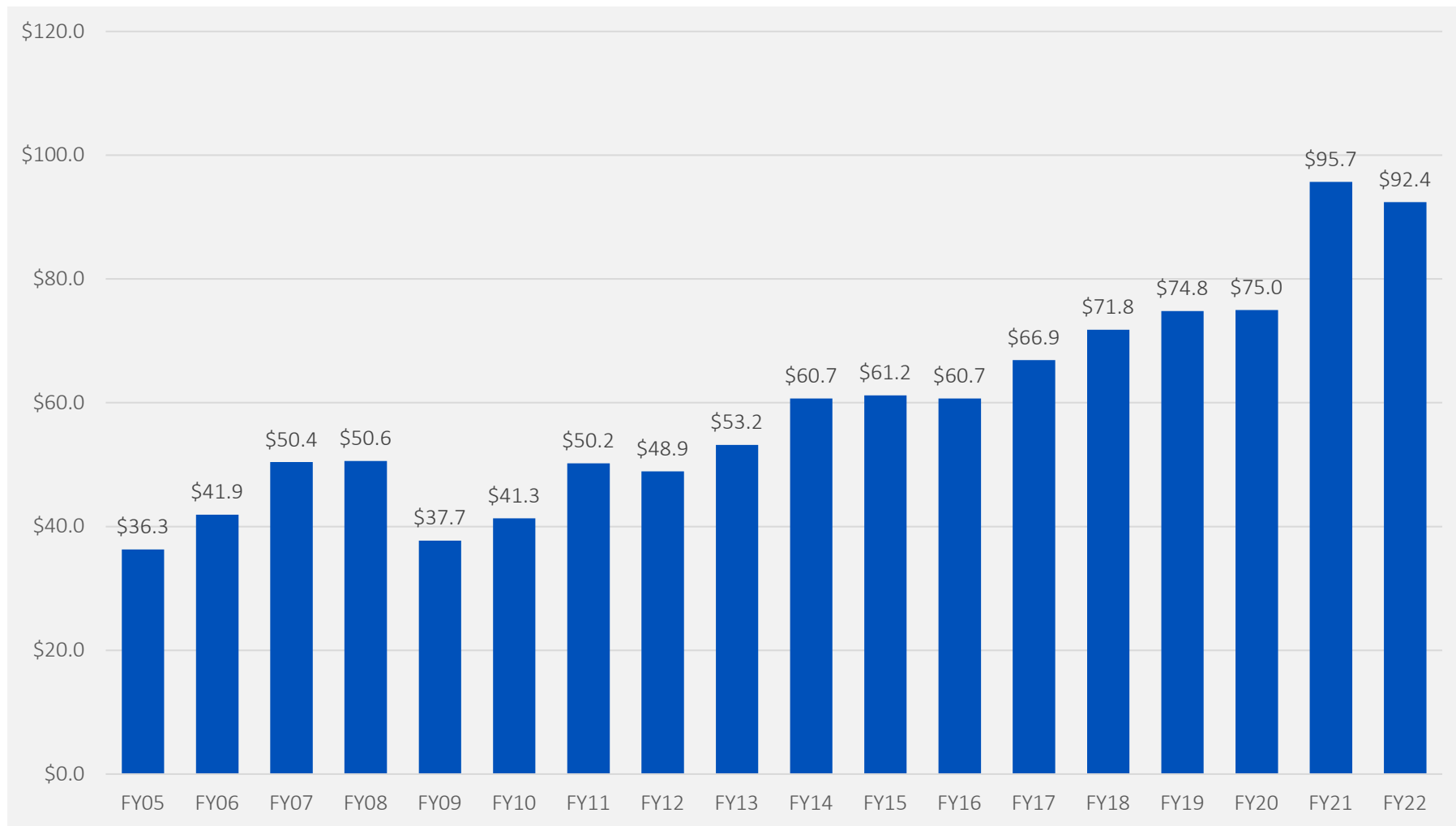
PRIT FUND PERFORMANCE

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 JUNE 30, 2022

Total PRIT Fund Fiscal Year Market Value

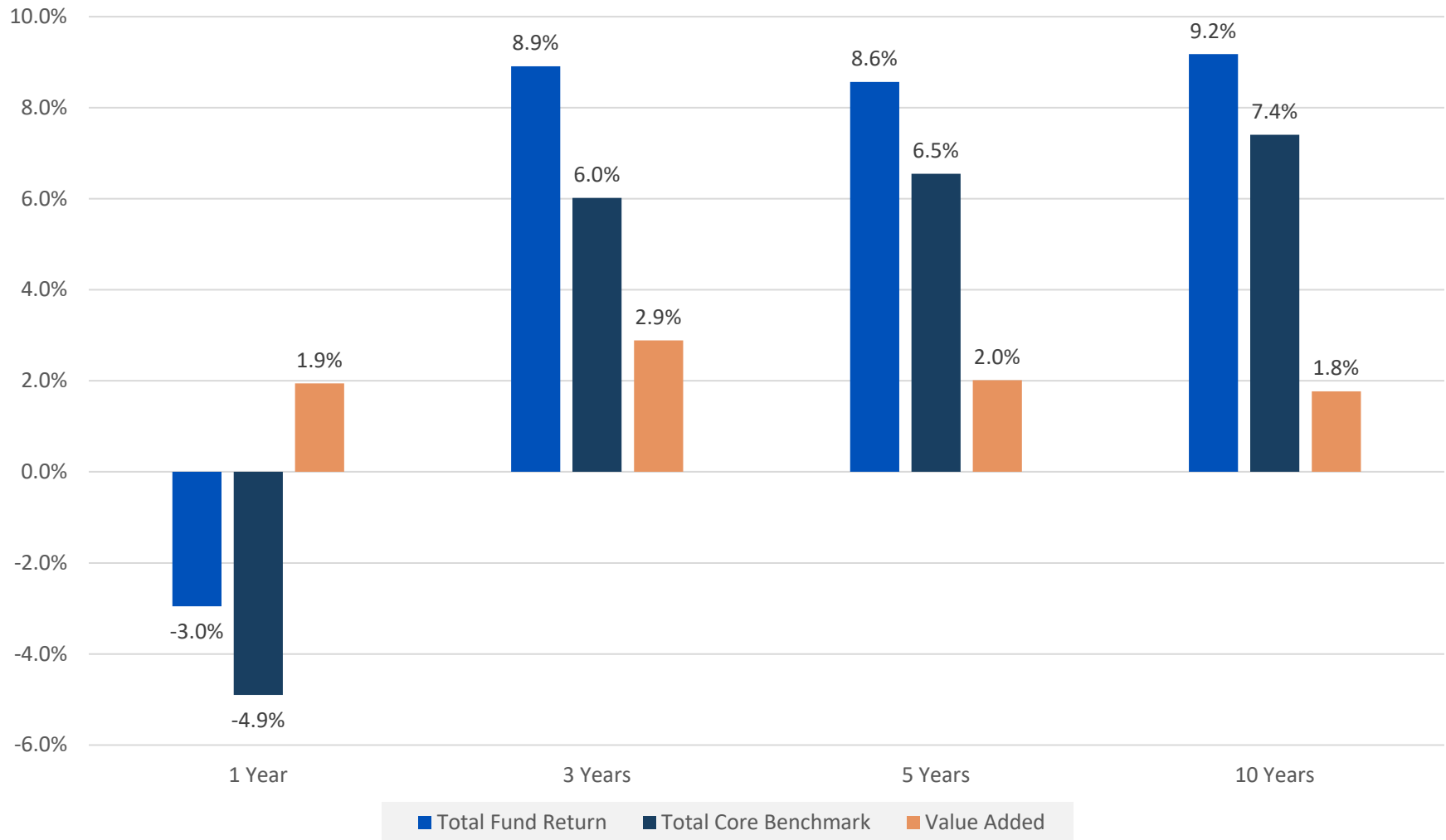
Value (\$Billions)



Source: BNY Mellon. As of June 30, 2022.

PRIT Fund Total Returns

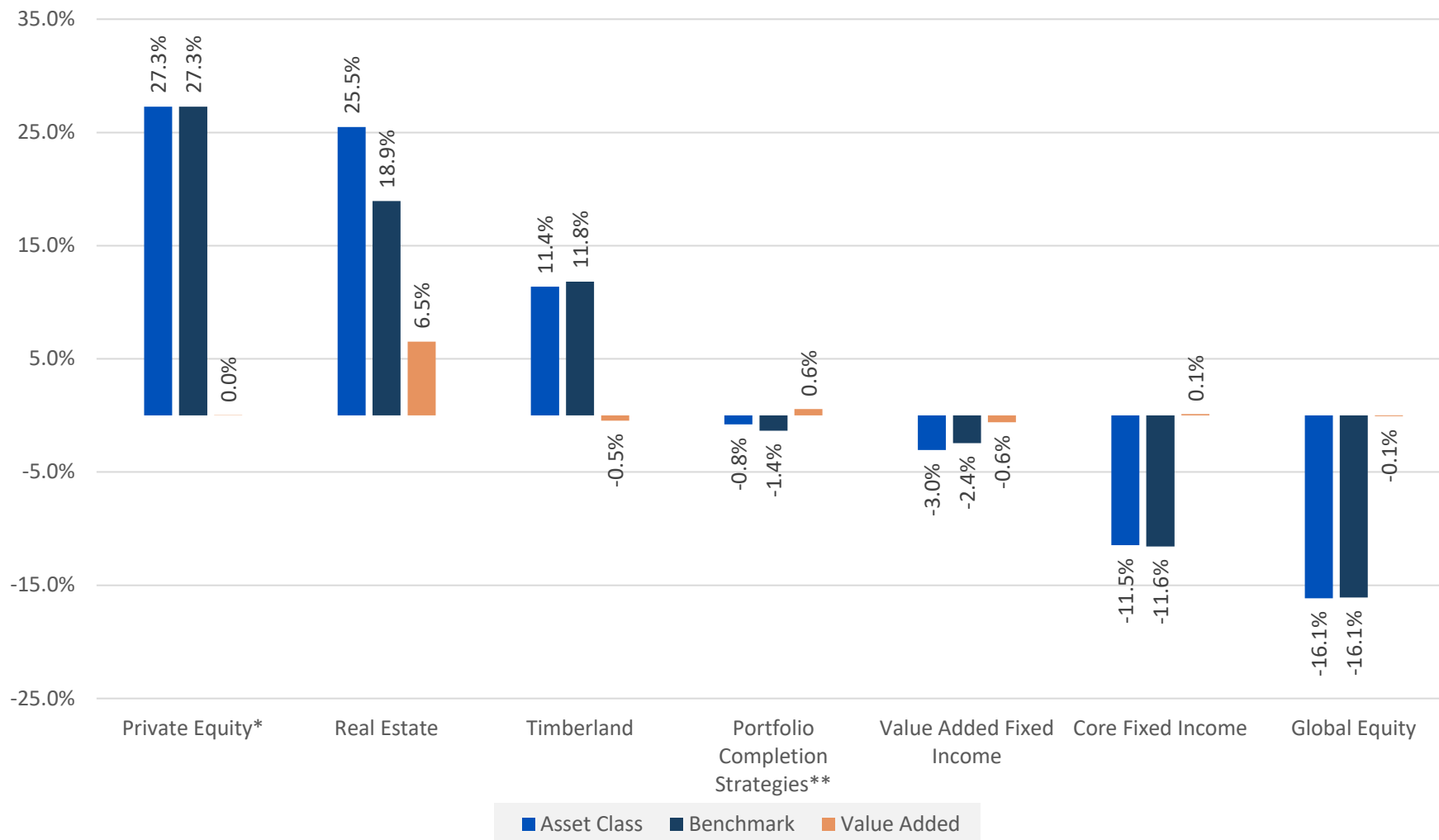
Annualized Returns as of June 30, 2022 (Gross of Fees)



Source: BNY Mellon. Totals may not add due to rounding. Total Core Benchmark includes private equity benchmark.

PRIT Asset Class Performance Summary

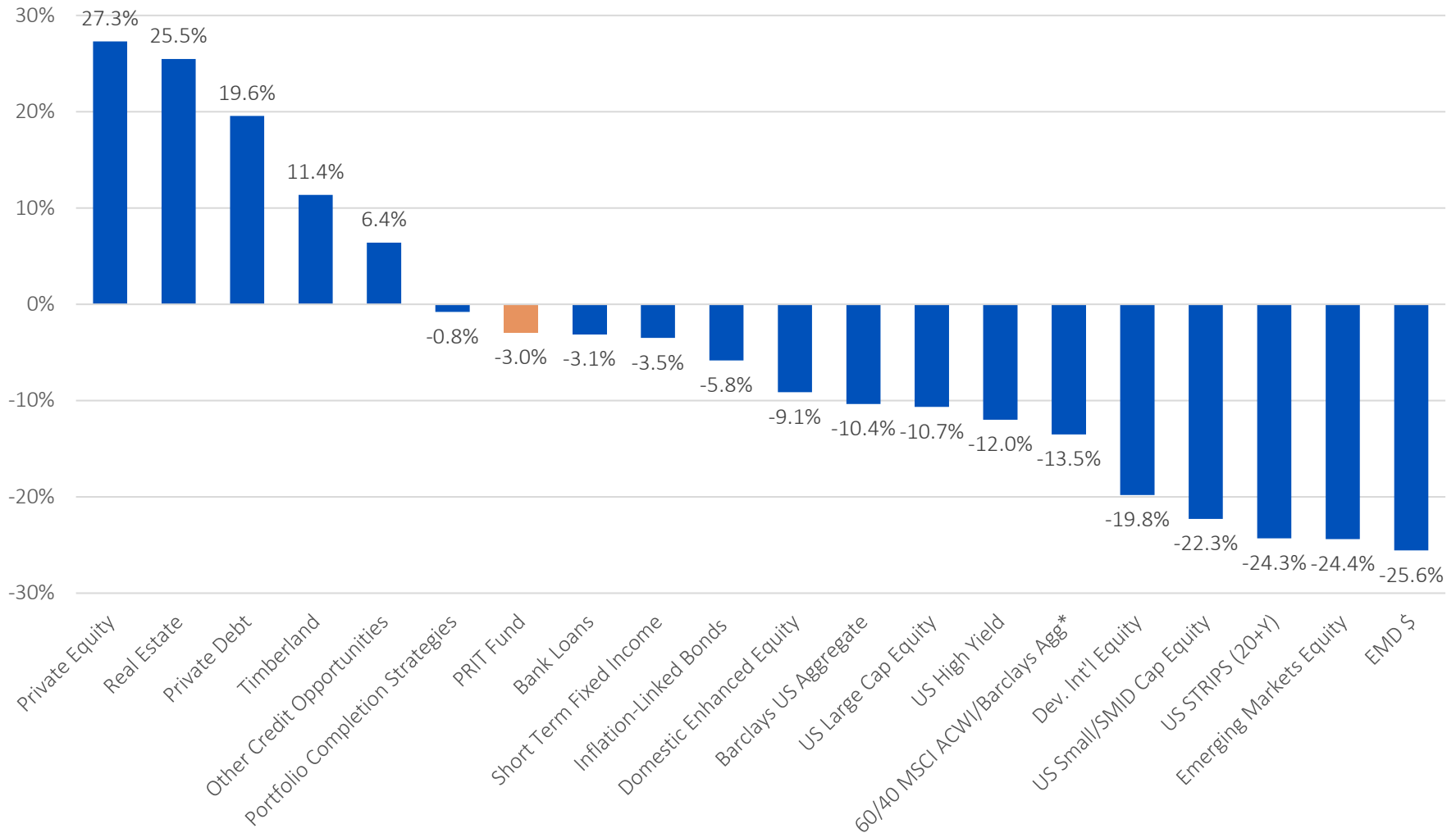
One-Year Ended June 30, 2022 (Gross of Fees)



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

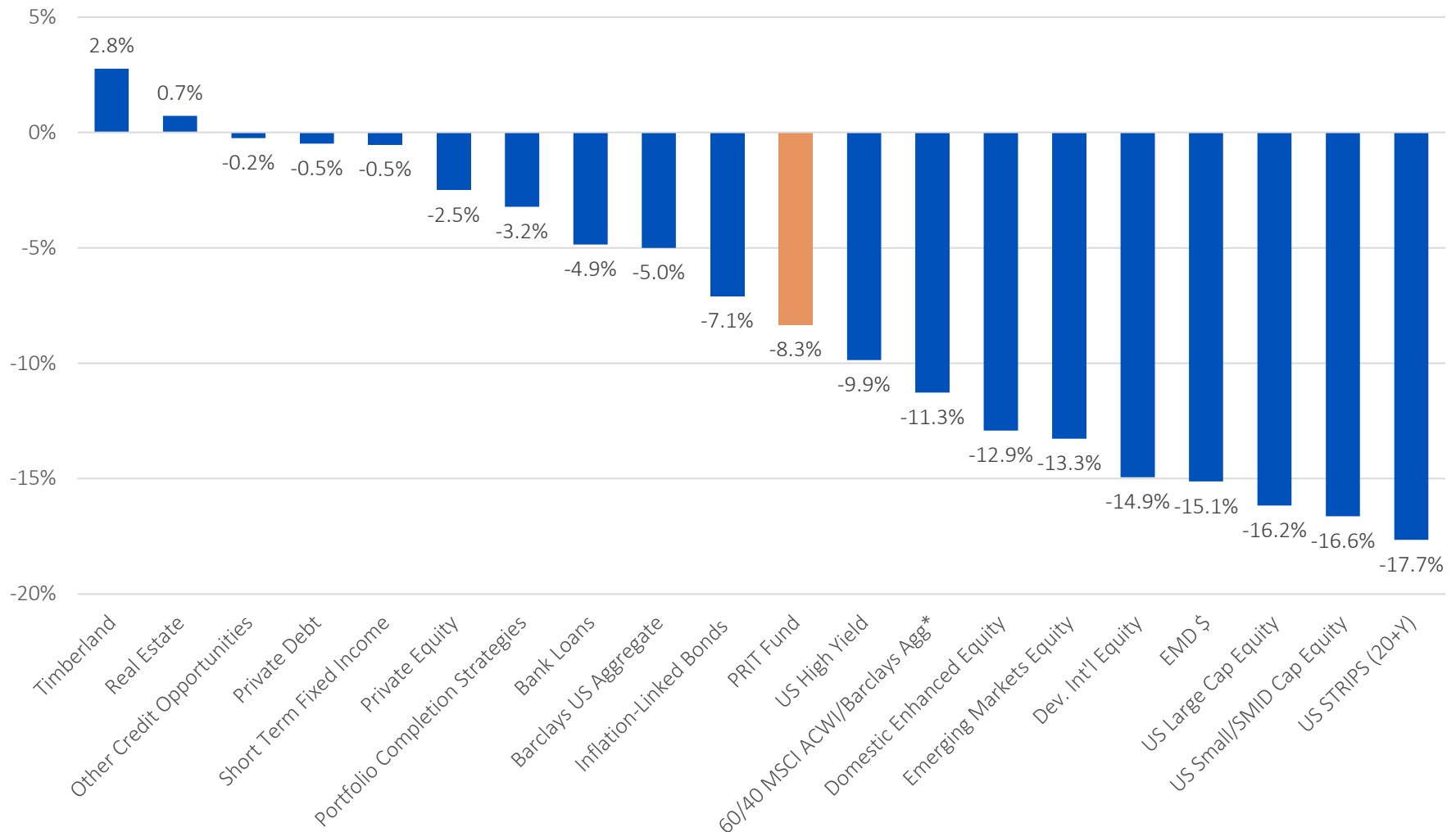
One-Year Ended June 30, 2022 (Gross of Fees)



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 – Second Quarter 2022

Quarter Ended June 30, 2022 (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 June 30, 2022 (Gross of Fees)

1 Year	3 Year	5 Year	10 Year
PRIVATE EQUITY 27.3%	PRIVATE EQUITY 31.9%	PRIVATE EQUITY 27.1%	PRIVATE EQUITY 22.4%
REAL ESTATE 25.5%	REAL ESTATE 14.1%	REAL ESTATE 11.5%	REAL ESTATE 11.5%
TIMBER 11.4%	GLOBAL EQUITY 6.3%	GLOBAL EQUITY 7.0%	GLOBAL EQUITY 9.1%
PORTFOLIO COMPLETION STRATEGIES (0.8%)	TIMBER 5.8%	TIMBER 5.4%	TIMBER 6.4%
VALUE-ADDED FIXED INCOME (3.0%)	VALUE-ADDED FIXED INCOME 3.6%	VALUE-ADDED FIXED INCOME 4.2%	VALUE-ADDED FIXED INCOME 4.7%
CORE FIXED INCOME (11.5%)	PORTFOLIO COMPLETION STRATEGIES 2.9%	PORTFOLIO COMPLETION STRATEGIES 3.5%	PORTFOLIO COMPLETION STRATEGIES 4.6%
GLOBAL EQUITY (16.1%)	CORE FIXED INCOME 0.0%	CORE FIXED INCOME 1.9%	CORE FIXED INCOME 2.9%

Source: BNY Mellon.

Hampden County Retirement System

Net of Fees Returns as of June 30, 2022

	MKT \$	%	Month	QTR	FY '22	Calendar YTD	1 Year	3 Year	5 Year	10 Year	Inception
HAMPDEN COUNTY RETIREMENT SYSTEM	457,352,704	100%	-3.94	-8.58	-3.75	-10.74	-3.75	8.31	8.02	8.68	9.00
CAPITAL FUND	457,352,704	100%	-3.94	-8.58	-3.75	-10.74	-3.75	8.31	8.03	8.68	
IMPLEMENTATION BENCHMARK (using short term private equity benchmark)			-3.52	-7.69	-3.47	-9.24	-3.47	8.29	8.16	8.50	
TOTAL CORE BENCHMARK (using long term private equity benchmark)			-3.20	-7.02	-4.90	-8.96	-4.90	6.02	6.55	7.41	

Inception date: November 1, 2004

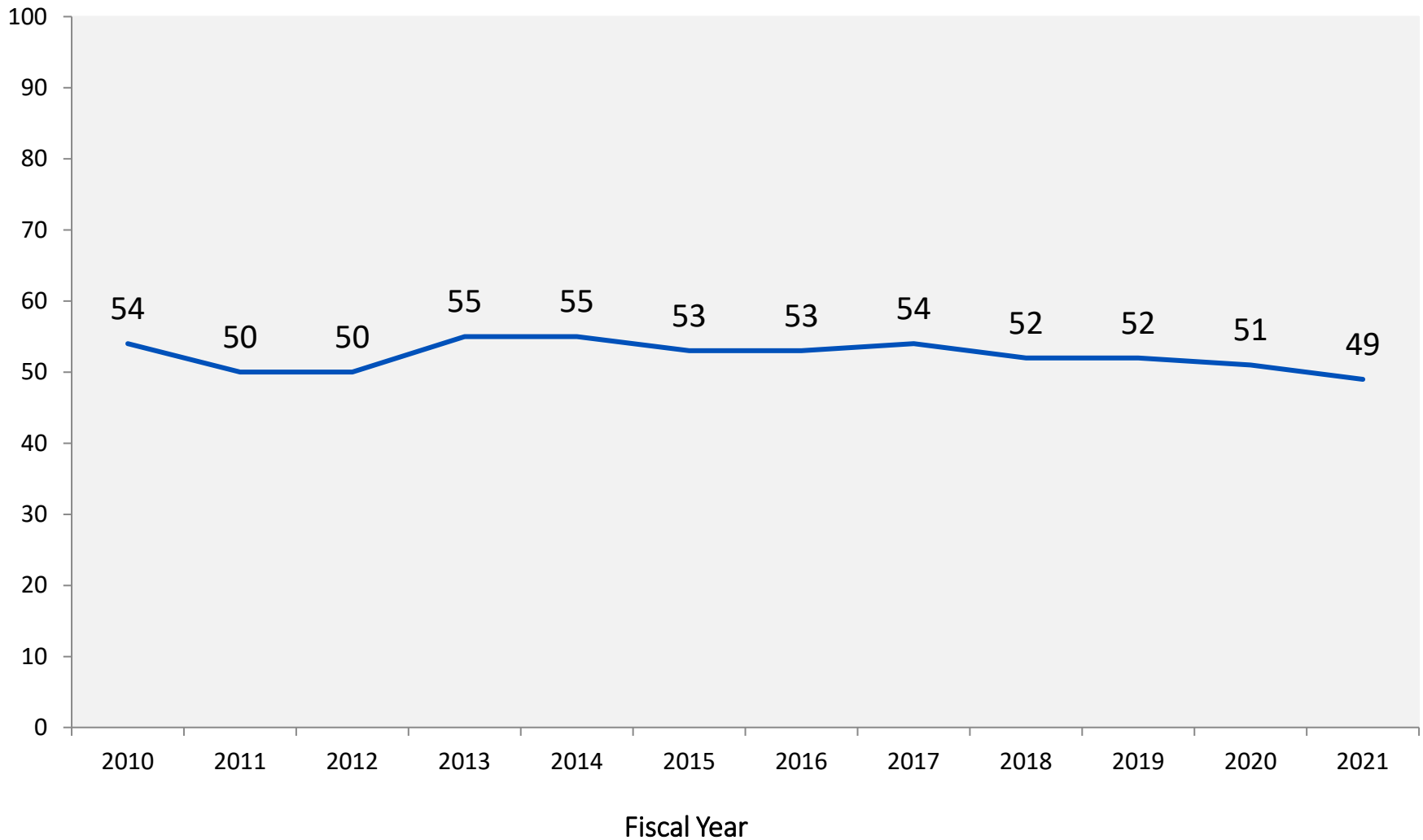
Hampden County Retirement System

Net of Fees Returns as of September 30, 2022

	MKT \$	%	Month	QTR	FY '23	Calendar YTD	1 Year	3 Year	5 Year	10 Year	Inception
HAMPDEN COUNTY RETIREMENT SYSTEM	461,845,105	100%	-5.11	-4.72	-4.72	-14.96	-10.37	6.12	6.16	7.70	8.58
CAPITAL FUND	461,845,105	100%	-5.11	-4.72	-4.72	-14.96	-10.37	6.13	6.17	7.70	
IMPLEMENTATION BENCHMARK (using short term private equity benchmark)			-5.48	-4.13	-4.13	-13.00	-9.00	6.28	6.46	7.58	
TOTAL CORE BENCHMARK (using long term private equity benchmark)			-4.43	-2.70	-2.70	-11.43	-7.87	4.61	5.25	6.65	

Inception date: November 1, 2004

Total PRIT Fund - Ratio of Expenses in Basis Points





APPENDIX PRIT FUND ASSET CLASS DETAIL

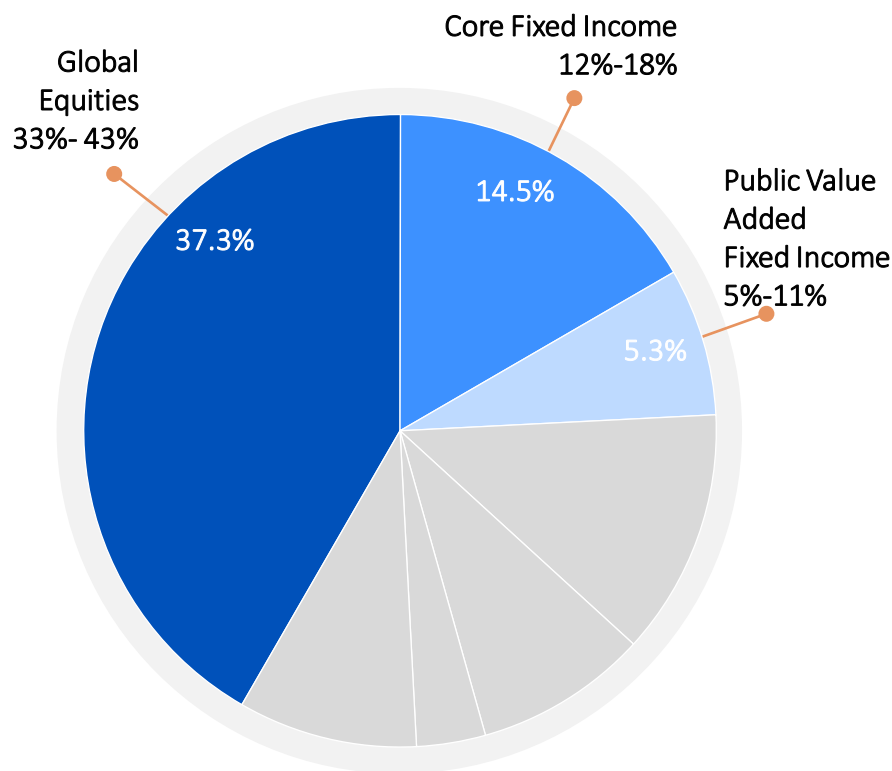
 Mass
PRIM

AS OF JUNE 30, 2022

Public Market Portfolios

PRIT FUND TARGET ASSET ALLOCATION

Actual Allocation as of June 30, 2022



Source: BNY Mellon and PRIM Staff.

*Excludes Private Debt allocation.

\$52.7 billion 57.1% of PRIT Fund

- Global Equities: \$34.5 billion, 37.3% of PRIT Fund
- Public Fixed Income: \$18.3 billion, 19.8% of PRIT Fund*

45% Active / 55% Passive

- Global Equities: 38% Active / 62% Passive
- Public Fixed Income: 57% Active / 43% Passive

56 Portfolios

- 30 Equity Portfolios
- 26 Fixed Income Portfolios

16 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
- Emerging-Diverse Managers

4 Team Members

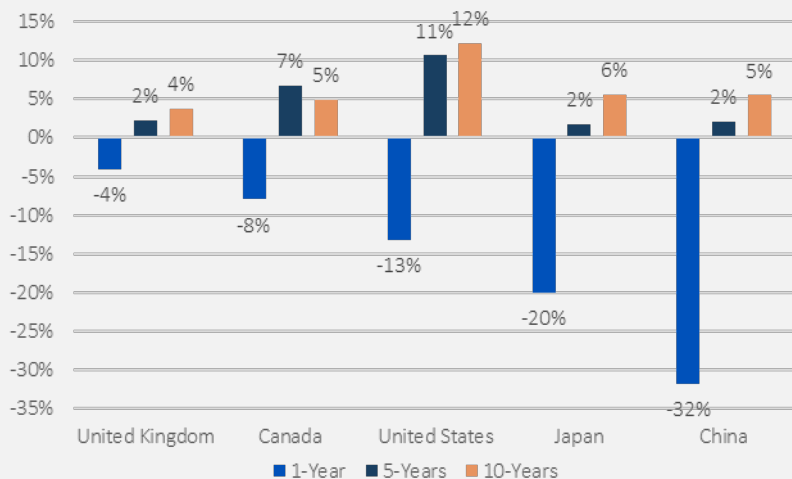


Public Markets – Key Initiatives

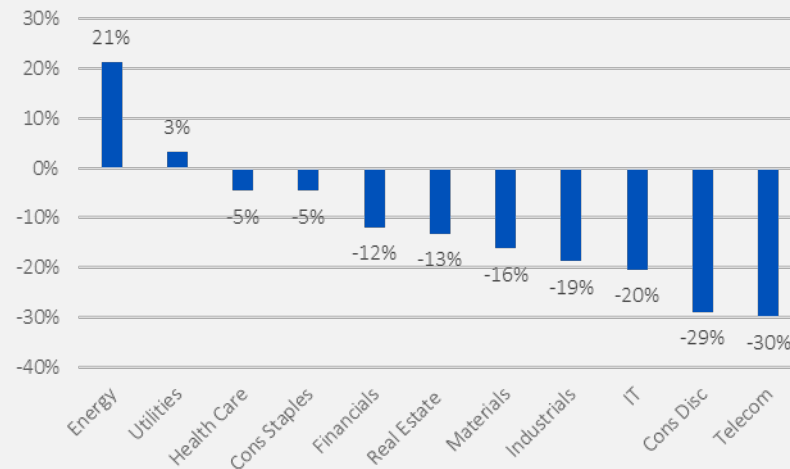
- Continue to source and allocate to diverse investment managers.
- Utilize approved managers of managers to implement PRIM's Emerging-Diverse Manager Program.
- Research and identify value managers in Developed International and Domestic Equity.
- Continue to identify Other Credit Opportunities investments, including co-investment opportunities.
- Work with PRIM Risk Team on implementation of fixed income portfolio analytics.
- Continue to upgrade analytical tools to improve investment research/analysis.
- Evaluate role of specialized equity managers within PRIT Fund structure.

Public Equity Review

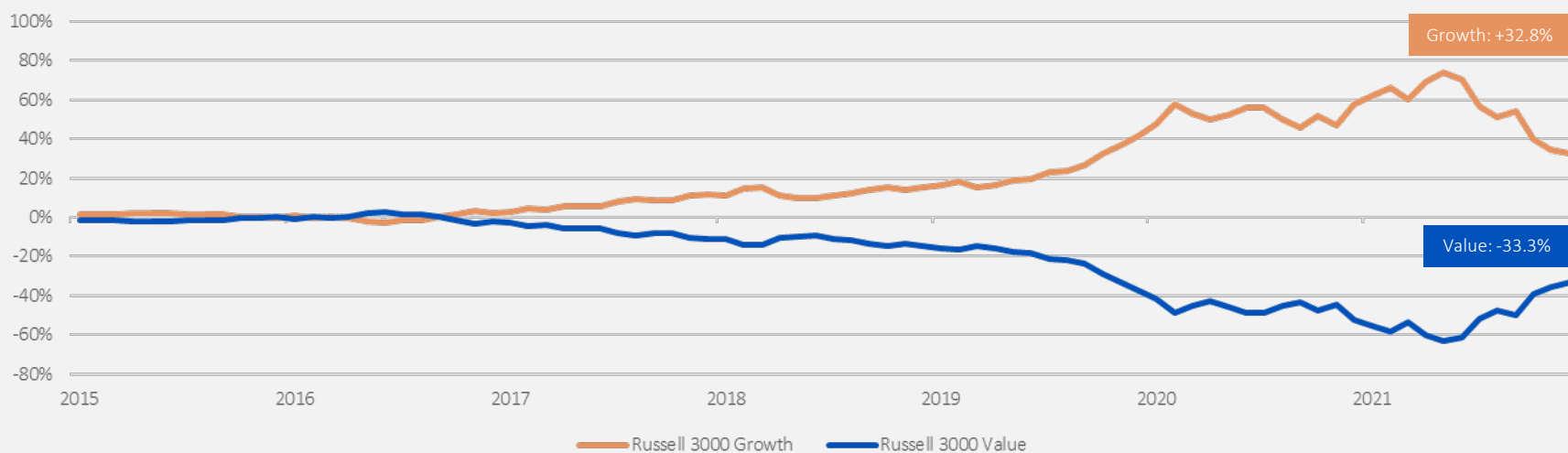
MAJOR COUNTRY RETURNS (MSCI ACWI)



GLOBAL ONE-YEAR RETURN BY SECTOR (MSCI ACWI)

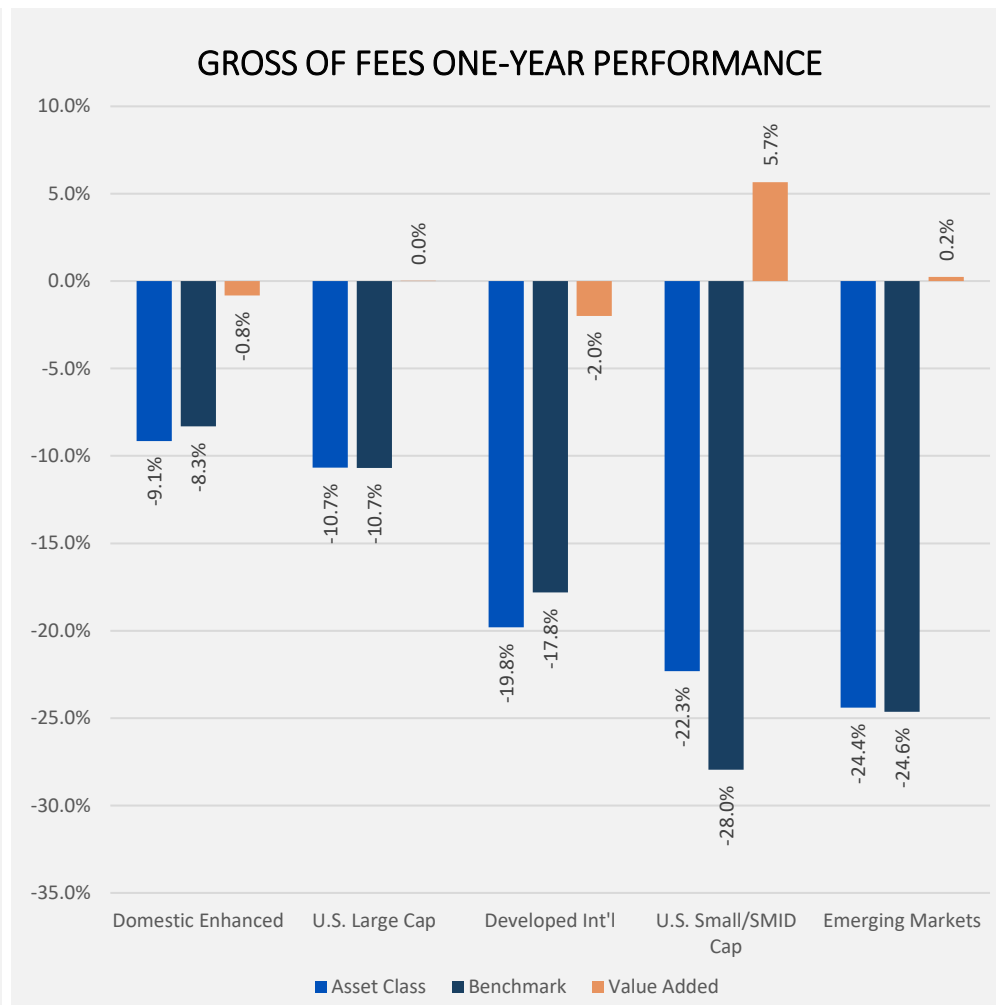
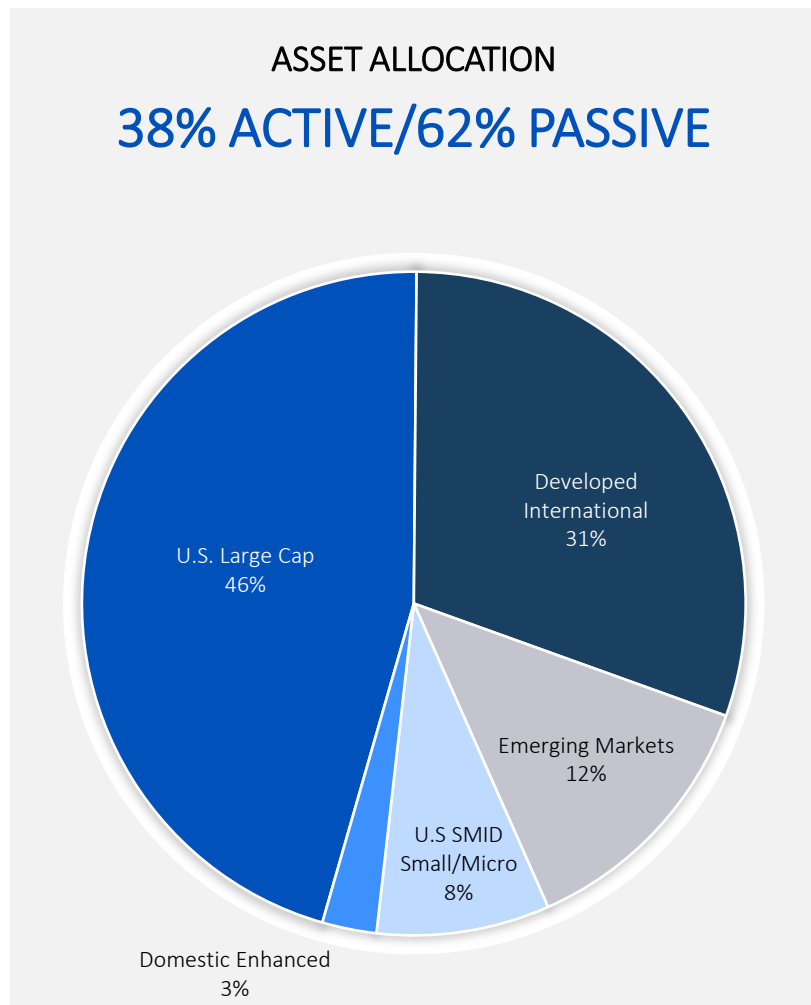


VALUE VS. GROWTH: RELATIVE RETURNS VS. RUSSELL 3000 (CUMULATIVE)



Global Equity

As of June 30, 2022, \$34.5 Billion – 37.3% of PRIT FUND (Target 33%-43%)

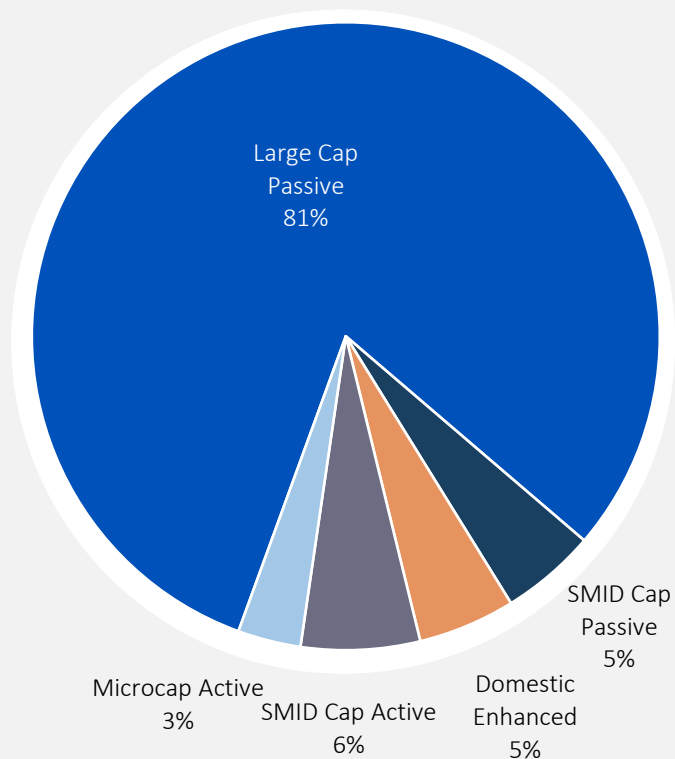


Source: BNY Mellon, PRIM Staff. As of June 30, 2022.

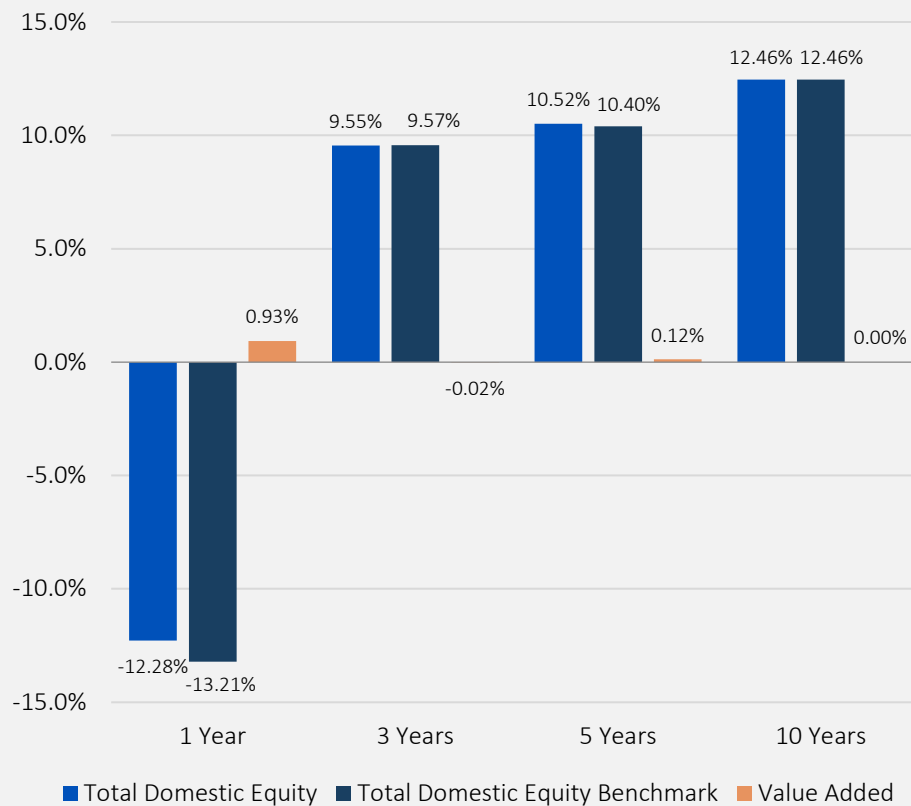
Domestic Equity

As of June 30, 2022, \$19.7 Billion – 21.3% of PRIT Fund

ASSET ALLOCATION 10% ACTIVE/90% PASSIVE



GROSS OF FEES PERFORMANCE

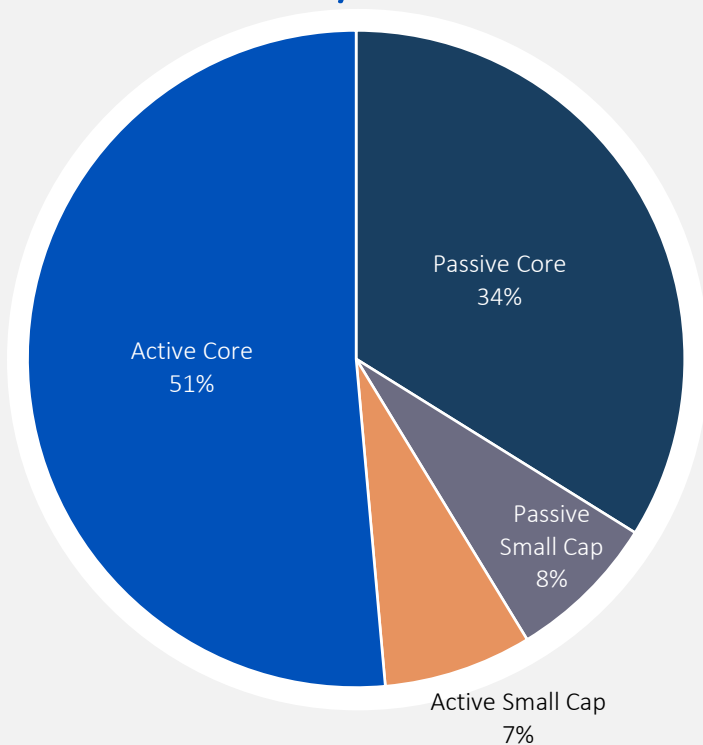


*Total Domestic Equity Benchmark: Currently the Total Domestic Equity benchmark is calculated by applying the investment performance of the sub asset class benchmarks to the sub asset class weights within the total domestic equity portfolio.

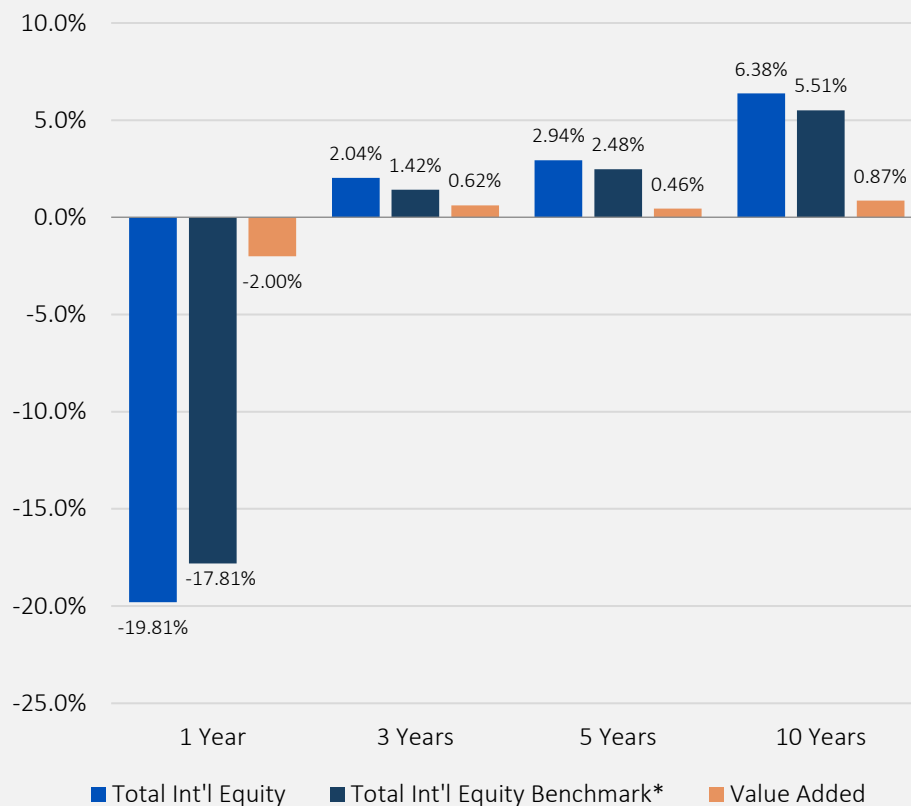
Developed International Equity

As of June 30, 2022, \$10.6 Billion – 11.5% of PRIT Fund

ASSET ALLOCATION 59% ACTIVE/41% PASSIVE



GROSS OF FEES PERFORMANCE

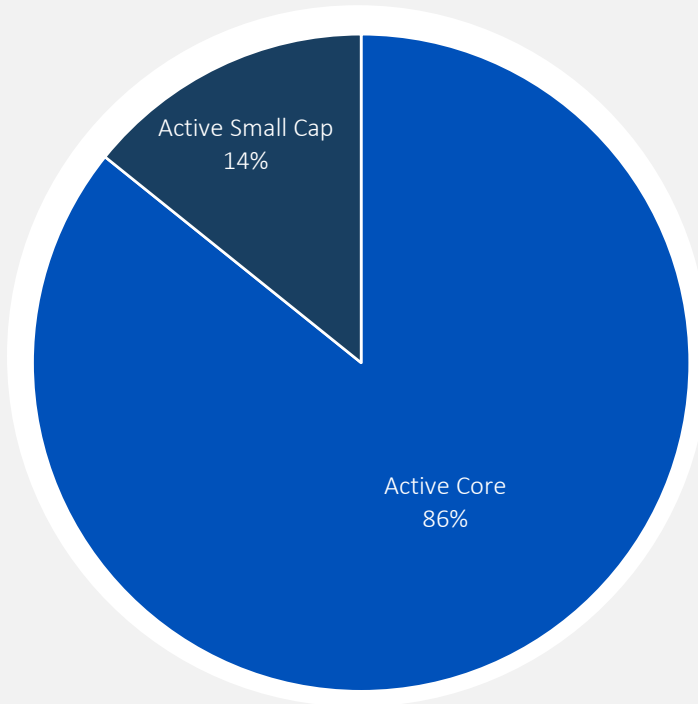


Emerging Markets Equity

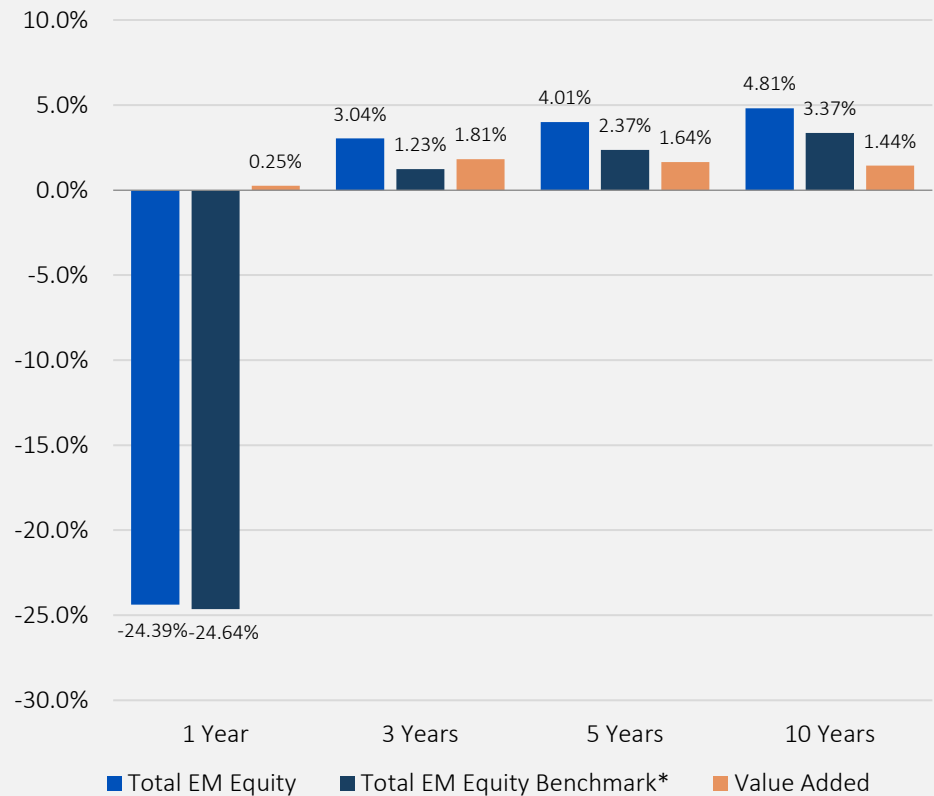
As of June 30, 2022, \$4.1 Billion – 4.4% of PRIT FUND

ASSET ALLOCATION

100% ACTIVE



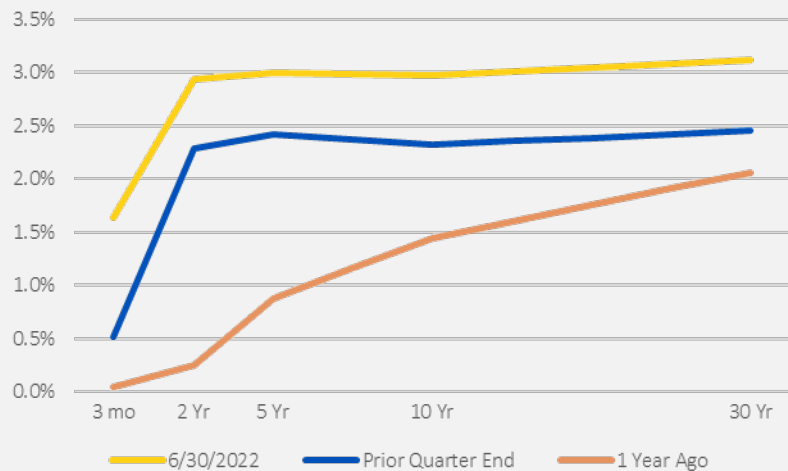
GROSS OF FEES PERFORMANCE



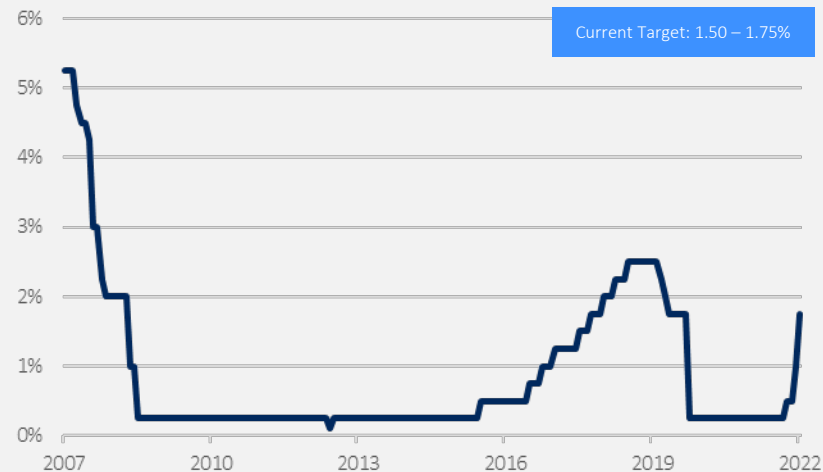
*Total Emerging Markets Equity Benchmark: currently Custom MSCI Emerging Markets IMI Net Divs, customized to exclude legislatively prohibited tobacco, Sudan and Iran securities (blend is maintained by MSCI).

Public Fixed Income Review

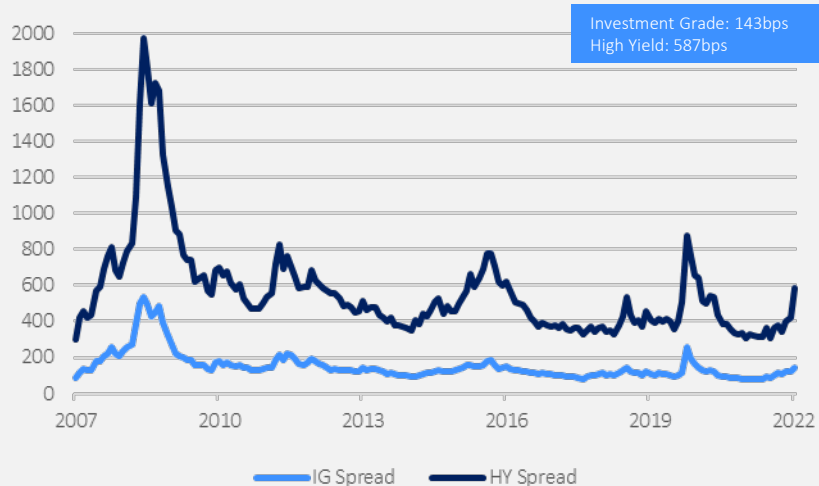
U.S. TREASURY YIELD CURVE



TARGET FED FUNDS RATE



U.S. CREDIT SPREADS

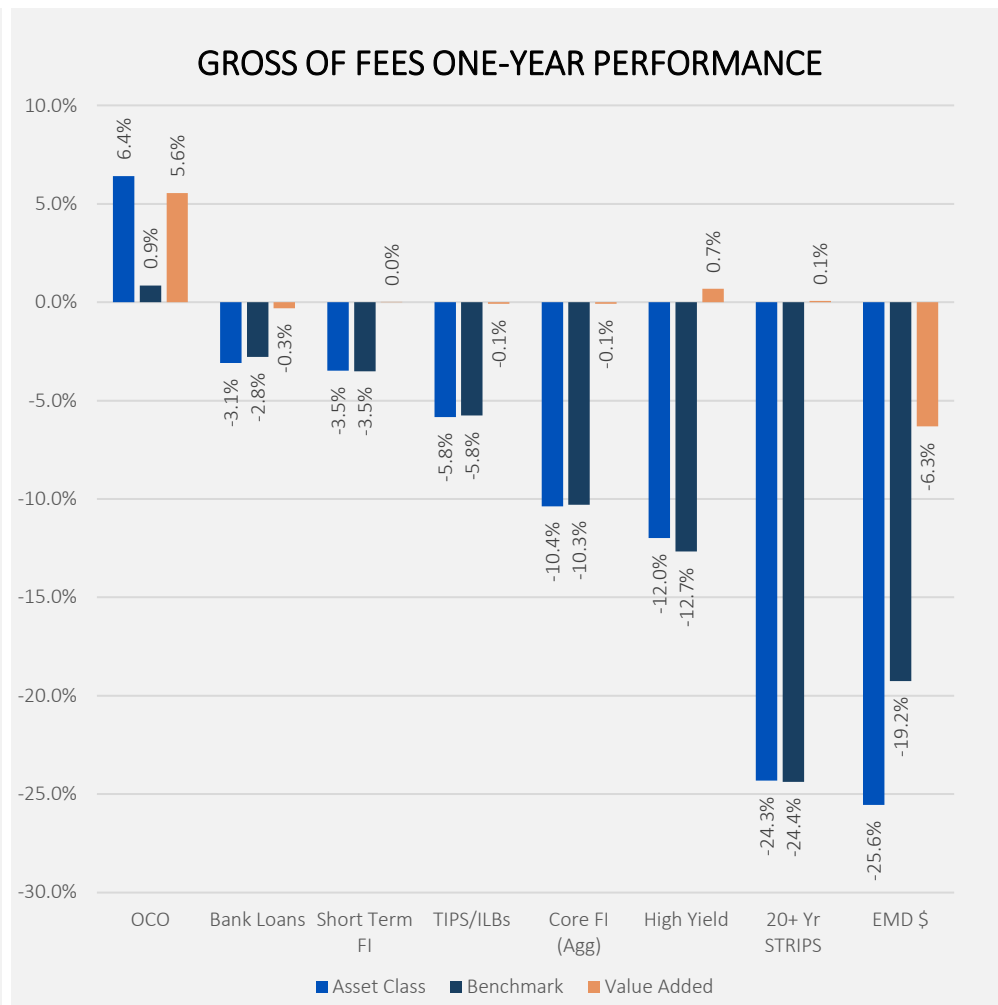
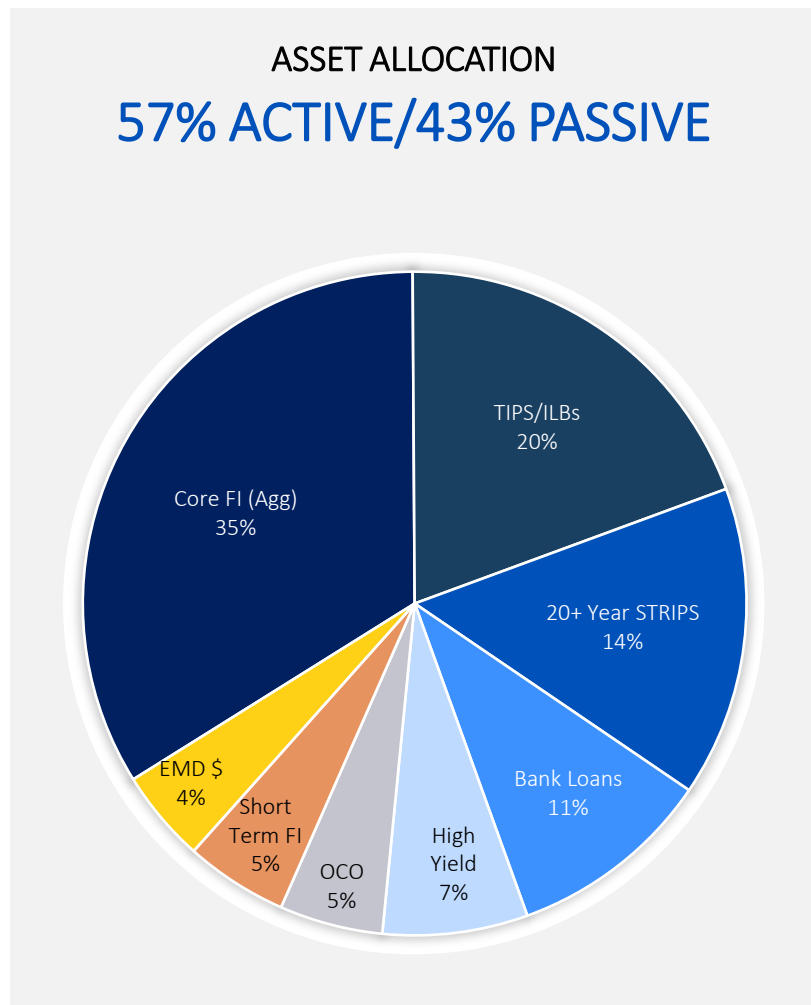


EMERGING MARKETS DEBT SPREAD



Core & Value-Added Fixed Income

As of June 30, 2022, \$18.3Billion – 19.8% of PRIT Fund* (Target 17%-29%)



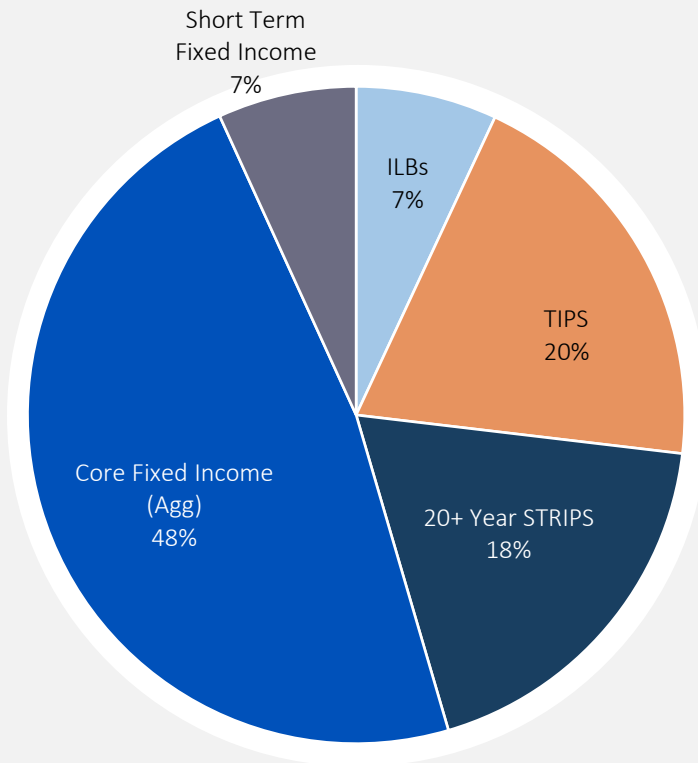
Source: BNY Mellon, PRIM Staff. As of June 30, 2022. *Excludes Private Debt allocation.

Domestic Investment Grade & Inflation-Linked Fixed Income

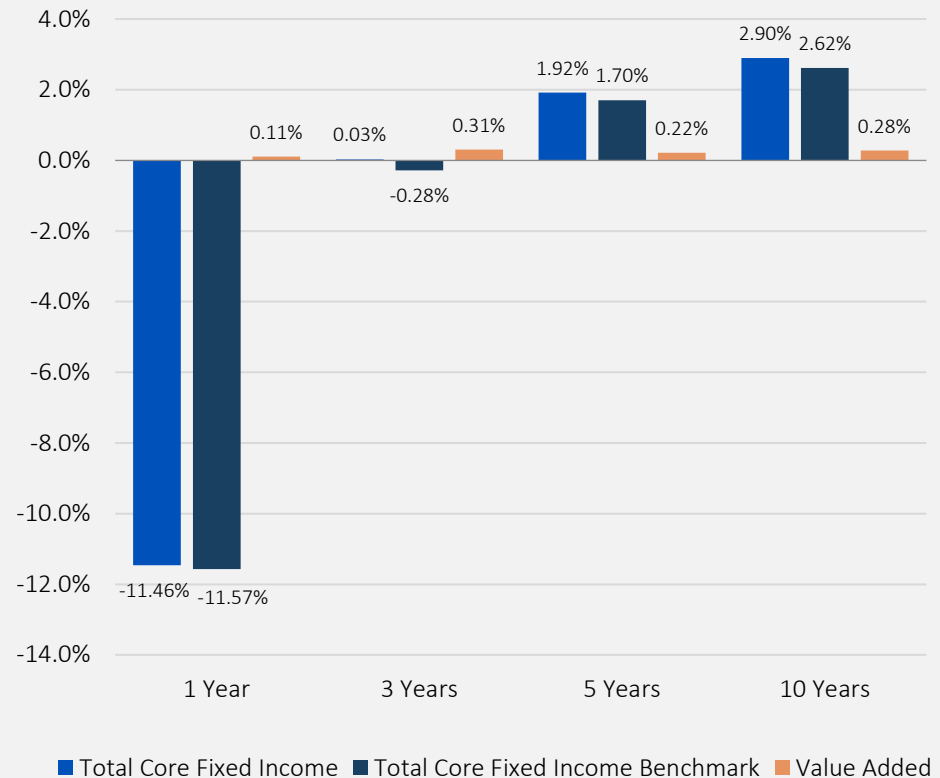
As of June 30, 2022, \$13.3 Billion – 14.5% of PRIT Fund (Target 12%-18%)

ASSET ALLOCATION

42% ACTIVE/58% PASSIVE



GROSS OF FEES PERFORMANCE



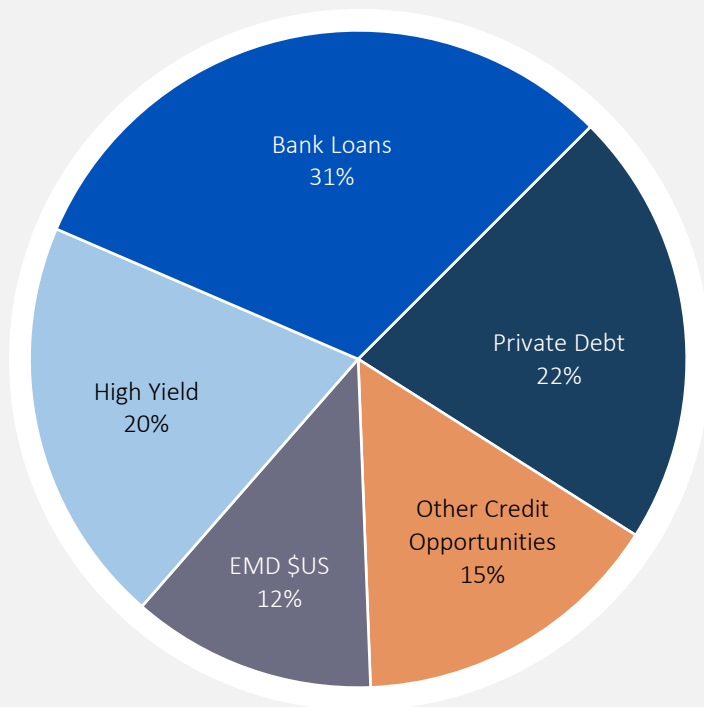
*Core Fixed Income Benchmark: Currently 46.6666% BC Aggregate/20% BC US TIPS/6.6667% BC ILB US\$ Hedged/20% BC STRIPS 20+/6.6667% Bloomberg Barclays US Treasury 1-3 Year Index.

Value-Added Fixed Income

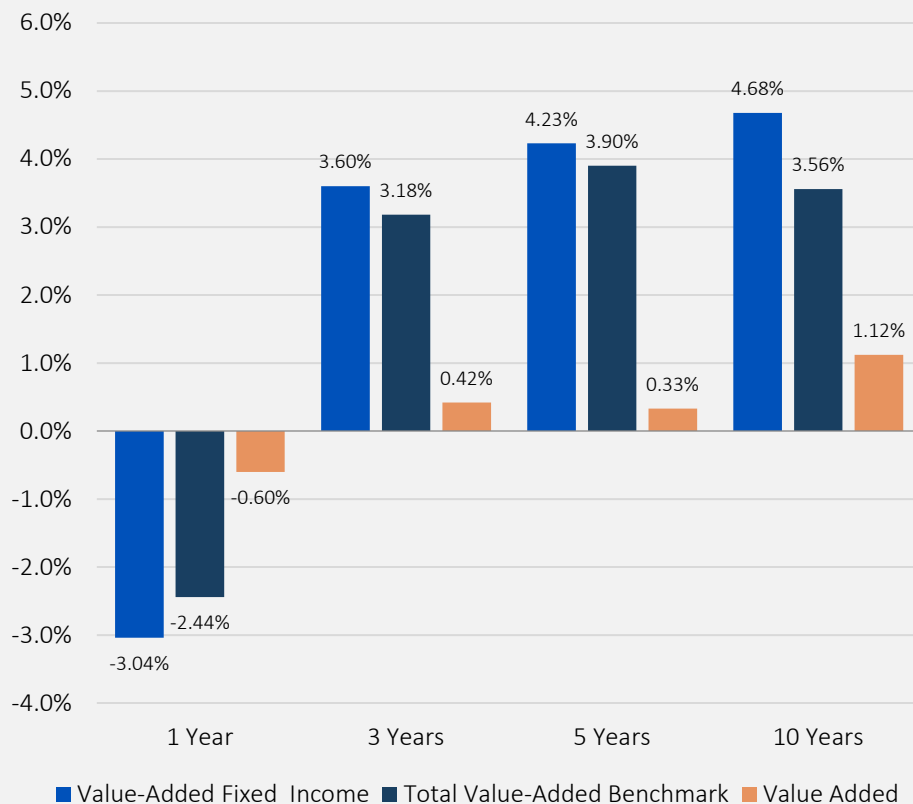
As of June 30, 2022, \$6.2 Billion – 6.8% of PRIT Fund (Target 5%-11%)

ASSET ALLOCATION

100% ACTIVE



GROSS OF FEES PERFORMANCE



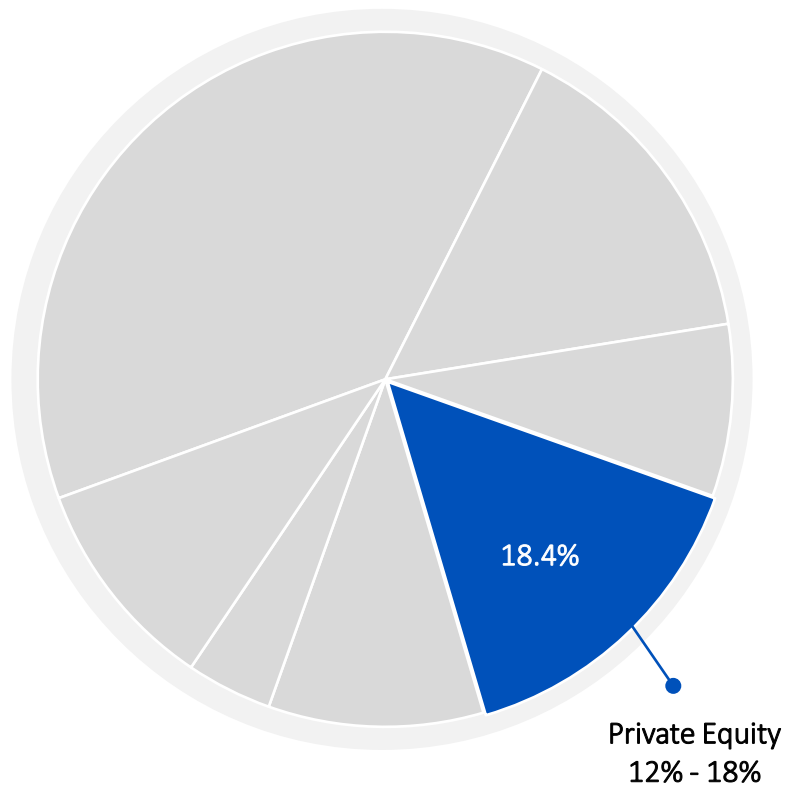
PRIVATE EQUITY PORTFOLIO



Private Equity Portfolio

PRIT FUND TARGET ASSET ALLOCATION

Actual Allocation as of June 30, 2022



Private Equity

\$16.9 billion, 18.4% of PRIT Fund

Private Debt

\$1.3 billion, 1.4% of PRIT Fund

95 GP Relationships

348 Partnerships

- 59 Co-Investment Partnerships

Emerging-Diverse 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

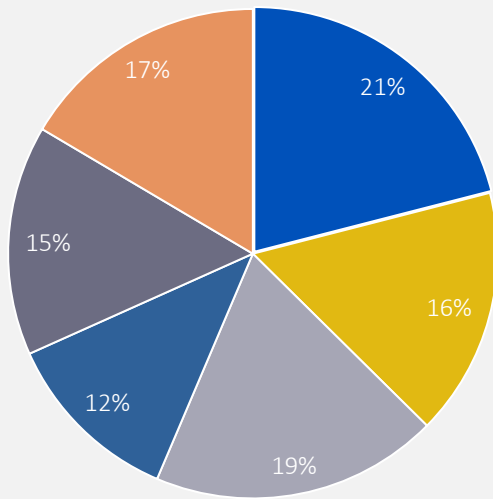


Private Equity Key Initiatives

- **Execute successful Private Equity Investment strategy.**
 - Increase Private Equity target allocation range to PRIT Fund to 12% to 18%.
 - Commitment goal of \$2.7 billion to \$3.3 billion to funds and co-investments.
 - Raise co-investment capacity to 40% of 2022 fund commitments.
 - Continue to scale and improve co-investment program
- **Continue to source and allocate to diverse investment managers.**
- **Utilize approved manager of managers to implement PRIM's Emerging-Diverse Manager Program**
- **Private Equity Research**
 - Further refine and accelerate venture capital strategy.
 - Improve governance terms to benefit limited partners.
 - Develop new analytical tools to enhance decision making.
- **Build the team's expertise and capacity.**
 - Recruit experienced team members with complementary skills to existing members.
 - Increase collaboration with other PRIM teams.

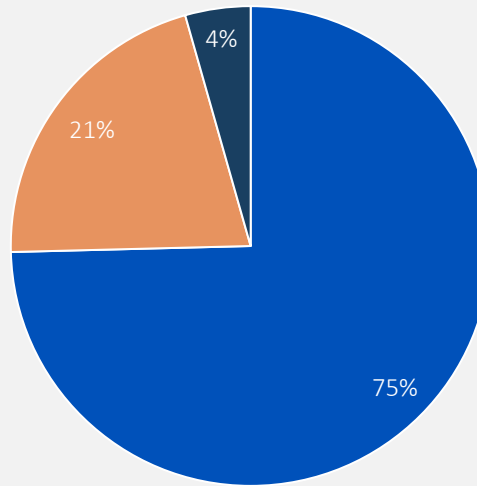
Private Equity Diversification

By Strategy



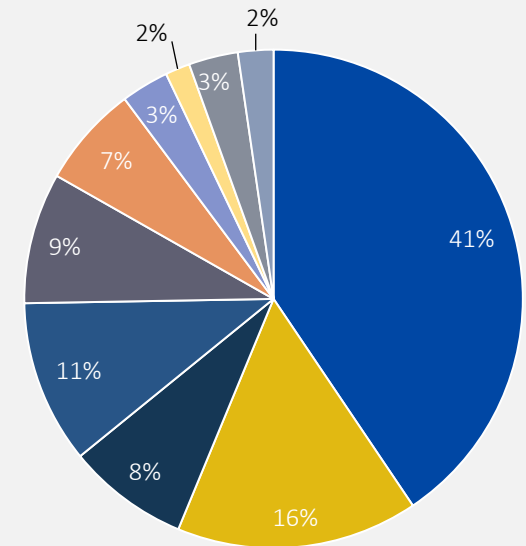
- Buyout - Mid
- Buyout - Large
- Buyout - Mega
- Buyout - Small
- Venture Capital
- Growth Equity

By Geography



- North America
- Western Europe
- Other

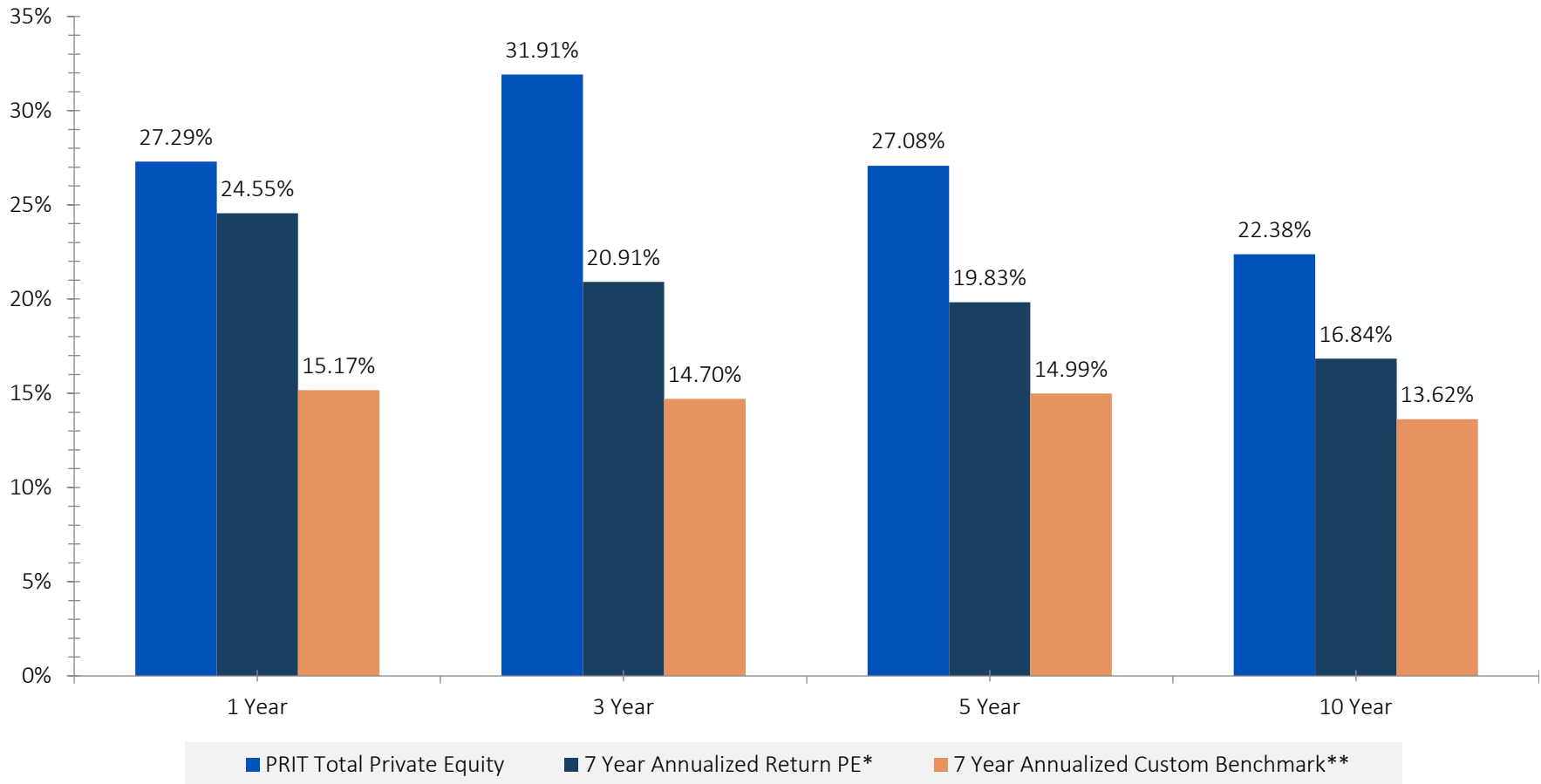
By Sector



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

Private Equity

Annualized Returns as of June 30, 2022 (Gross of Fees)



* 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 87.5% Russell 3000 + 3% / 12.5% MSCI Europe IMI + 3%.

Private Equity Performance by Vintage Year

Performance Summary By Vintage Year as of March 31, 2022

Private Equity Vintage Year	Capital Committed	Paid-In Capital	Percentage Contributed	Capital Distributed	Percentage Distributed	Reported Market Value	TVPI	Net IRR 03/31/2022	Cambridge Median IRR
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%	11.83%
1989	61,340,193	59,296,115	96.67%	126,898,769	214.01%	-	2.14x	20.38%	14.23%
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	251,102,917	215,034,991	85.64%	414,254,435	192.65%	\$1	1.93x	17.23%	16.66%
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%	812,641,641	147.67%	1,892,747	1.48x	7.76%	8.14%
1999	413,881,039	411,151,611	99.34%	373,455,602	90.83%	408,373	0.91x	(1.59%)	(0.36%)
2000	1,084,468,703	1,064,421,404	98.15%	1,801,404,736	169.24%	11,789,340	1.70x	12.66%	3.10%
2001	568,247,990	582,099,003	102.44%	1,217,495,749	209.16%	8,760,140	2.11x	26.09%	8.54%
2002	128,587,392	129,710,425	100.87%	231,245,933	178.28%	8,525,400	1.85x	12.19%	8.10%
2003	521,790,693	534,068,384	102.35%	982,628,531	183.99%	4,740,820	1.85x	17.54%	9.76%
2004	400,000,000	394,951,529	98.74%	929,438,584	235.33%	14,161,988	2.39x	23.32%	7.83%
2005	725,575,705	738,213,047	101.74%	1,174,482,753	159.10%	11,335,629	1.61x	9.53%	7.63%
2006	1,911,244,997	1,968,144,302	102.98%	3,105,036,912	157.76%	69,246,140	1.61x	8.57%	7.27%
2007	941,020,957	1,021,180,107	108.52%	1,657,880,228	162.35%	74,117,508	1.70x	11.68%	9.07%
2008	1,444,233,743	1,532,381,398	106.10%	2,759,912,731	180.11%	142,394,229	1.89x	14.55%	8.96%
2009	569,713,768	597,537,361	104.88%	1,104,403,337	184.83%	62,208,838	1.95x	18.95%	13.25%
2010	381,250,000	405,094,196	106.25%	988,581,663	244.04%	423,761,024	3.49x	22.97%	12.48%
2011	1,501,867,582	1,662,530,351	110.70%	2,902,449,920	174.58%	820,603,658	2.24x	18.51%	15.20%
2012	709,331,184	809,319,419	114.10%	1,414,800,195	174.81%	426,781,462	2.28x	22.27%	15.32%
2013	464,502,054	550,004,194	118.41%	709,243,220	128.95%	541,396,620	2.27x	19.12%	16.48%
2014	1,260,240,735	1,259,985,463	99.98%	1,613,090,853	128.02%	1,754,108,605	2.67x	25.50%	21.49%
2015	952,962,423	1,053,357,763	110.54%	1,023,300,272	97.15%	1,491,631,243	2.39x	26.13%	20.76%
2016	1,661,932,257	1,625,742,672	97.82%	1,303,740,917	80.19%	2,102,661,725	2.10x	25.29%	23.24%
2017	699,448,587	636,835,948	91.05%	252,103,185	39.59%	967,039,829	1.91x	26.54%	29.00%
2018	1,892,839,928	1,741,158,663	91.99%	634,523,824	36.44%	2,426,564,112	1.76x	31.58%	30.36%
2019	2,052,233,327	1,546,134,314	75.34%	394,716,657	25.53%	2,269,201,341	1.72x	46.68%	34.97%
2020	2,918,920,470	1,572,484,562	53.87%	58,093,325	3.69%	1,980,824,981	1.30x	32.64%	28.58%
2021	3,034,353,749	1,024,147,694	33.75%	399,461	0.04%	1,101,926,730	1.08x	15.11%	0.89%
2022	615,277,266	89,878,294	14.61%	-	0.00%	89,099,790	0.99x	(1.06%)	(4.75%)
Total Private Equity:	\$28,977,878,560	\$25,046,730,877	86.43%	\$30,565,473,559	122.03%	\$16,805,182,273	1.89x	14.47%	



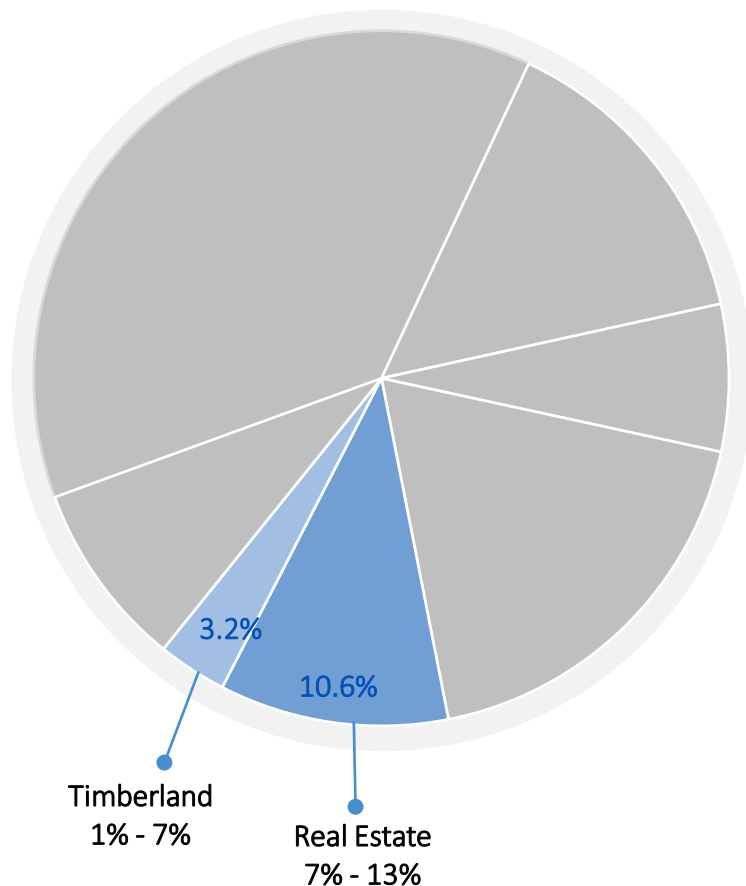
REAL ESTATE AND TIMBERLAND PORTFOLIO

**Mass
PRIM**

Real Estate and Timberland Portfolios

PRIT FUND TARGET ASSET ALLOCATION

Actual Allocation as of June 30, 2022



\$12.7 billion, 13.8% of PRIT Fund

- Real Estate: \$9.8 billion, 10.6% of PRIT Fund
- Timberland: \$2.9 billion, 3.2% of PRIT Fund

16 portfolios

- 6 core portfolios
- 5 non-core portfolios
- 2 global REIT portfolios
- 2 timberland portfolios
- 1 direct investment portfolio

Property Investments

- Real Estate – 106 properties
- Timberland – 23 properties

140 global real estate securities

Emerging-Diverse Managers

4 primary strategies

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

5 team members

Real Estate and Timberland Key Initiatives

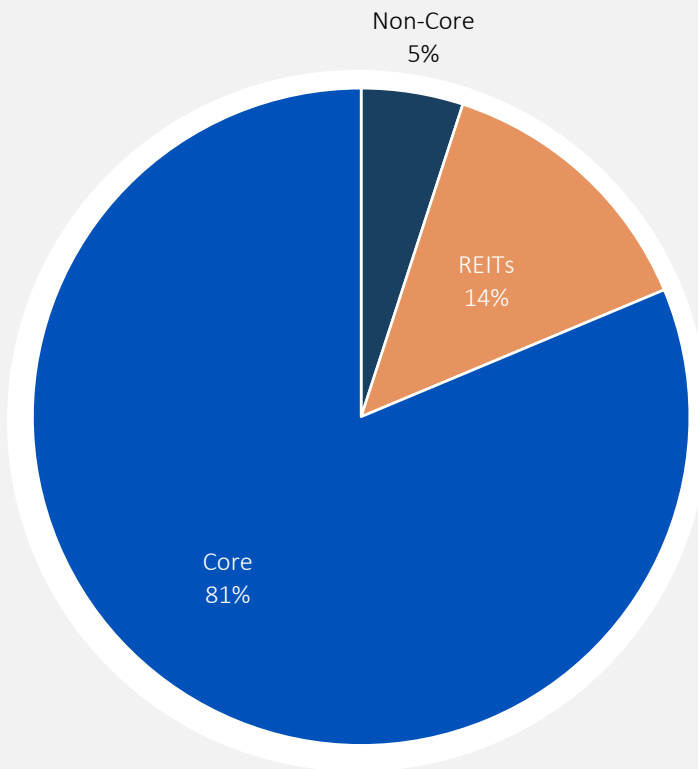


- Continue to source and allocate to diverse investment managers.
- Utilize approved manager of managers to implement PRIM's Emerging-Diverse Manager Program for Real Estate investments.
- Collaborate with PRIM's Research and Risk Teams on ESG and Climate Impact Research in Timberland.
- Form a Strategic Working Group to review the existing real estate portfolio and identify strategic investment opportunities.
- Continue to use REITs and PRIM's internal real estate financing facility as sources of capital to fund new acquisitions and maintain PRIM's current leverage structure.
- Complete Request for Proposal (RFP) process for Real Estate and Timberland Appraisal Services.
- Oversee the implementation of asset business plans and hold-sell recommendations in the real estate and timberland separate accounts.

Real Estate

As of June 30, 2022, \$9.8 Billion – 10.6% of PRIT Fund (Target 7%-13%)

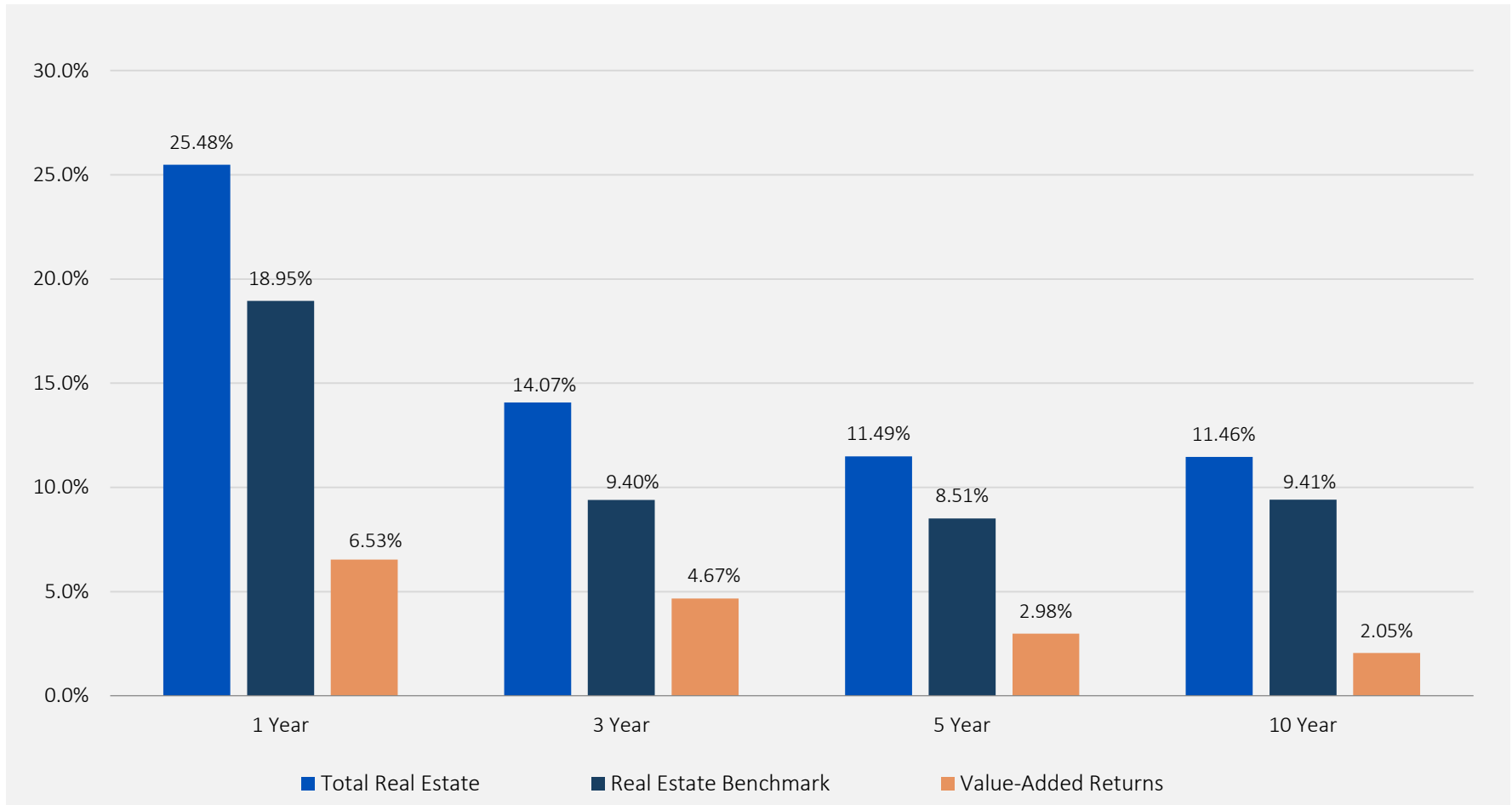
ASSET ALLOCATION



- Equity investments in both directly-owned properties and **REIT** securities
- Directly-owned **Core** properties make up the majority of the real estate portfolio
 - **Core** properties are typically well-leased, operating properties that provide regular cash flow from rents
- **Non-Core** investments make up approximately 5% of the real estate portfolio
 - **Non-Core** includes properties that are under development

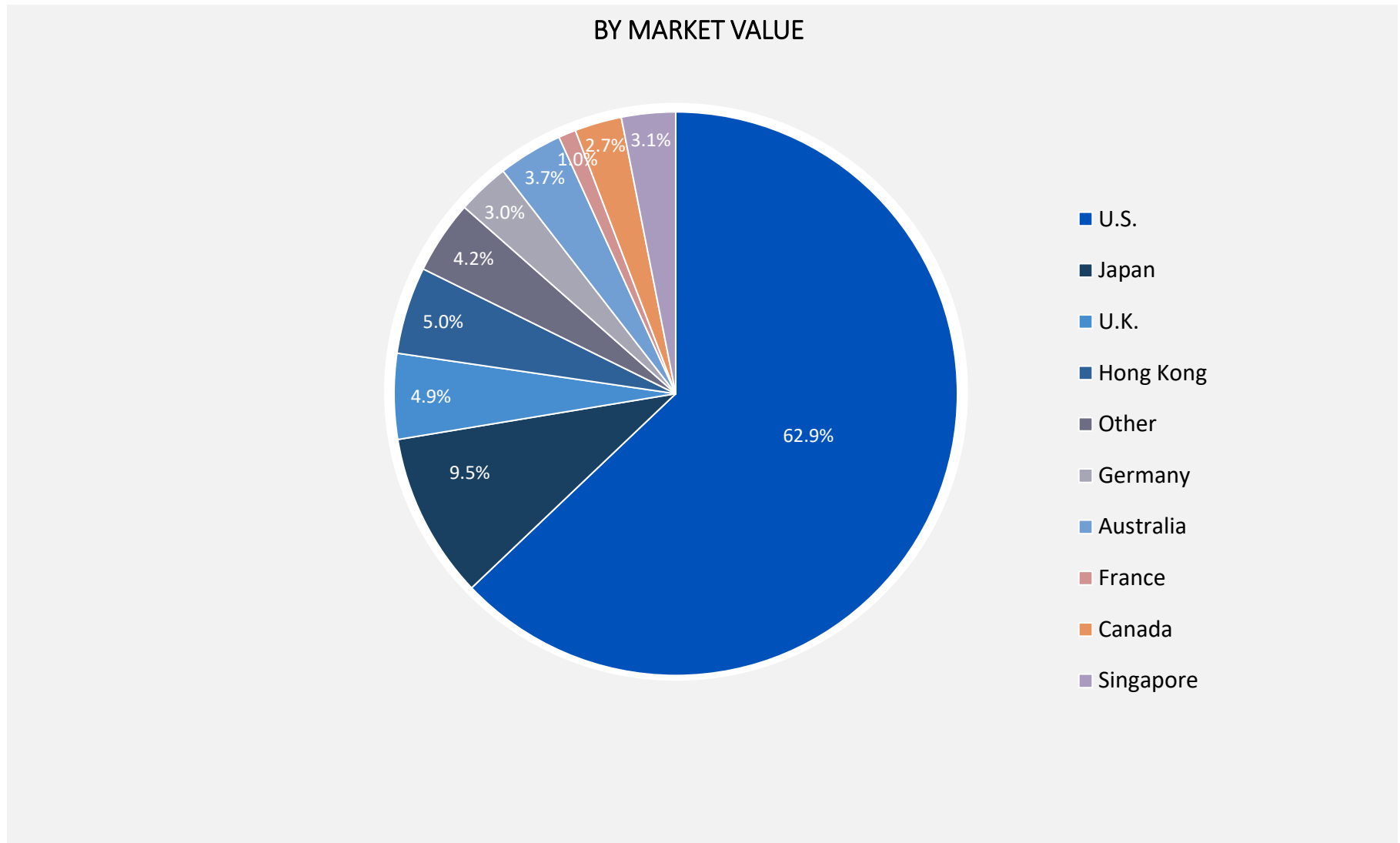
Total Real Estate Performance

Annualized Returns as of June 30, 2022 (Gross of Fees)

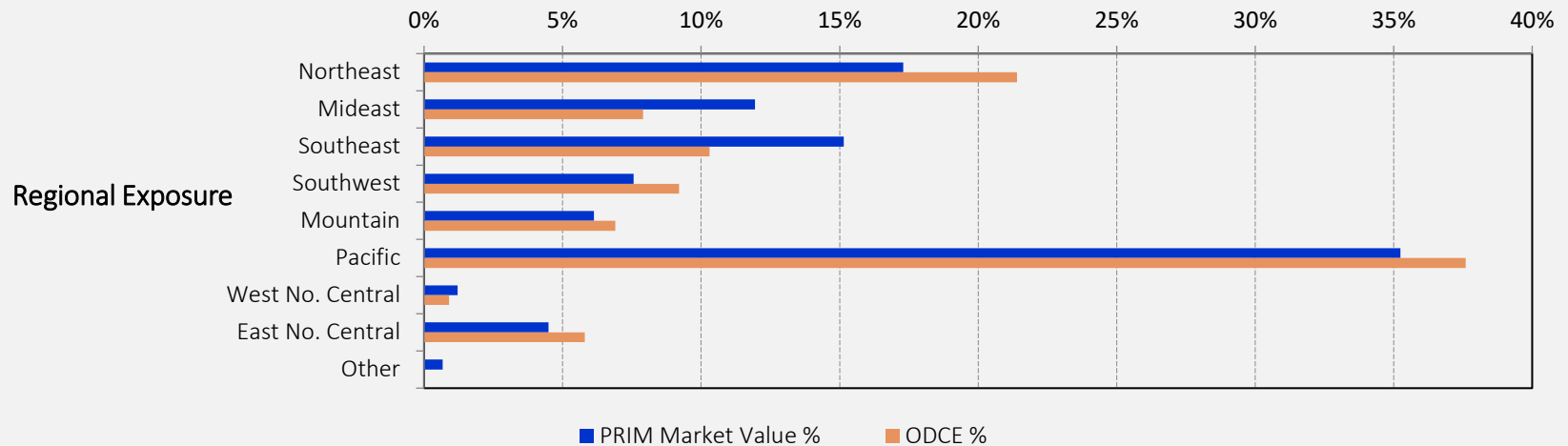
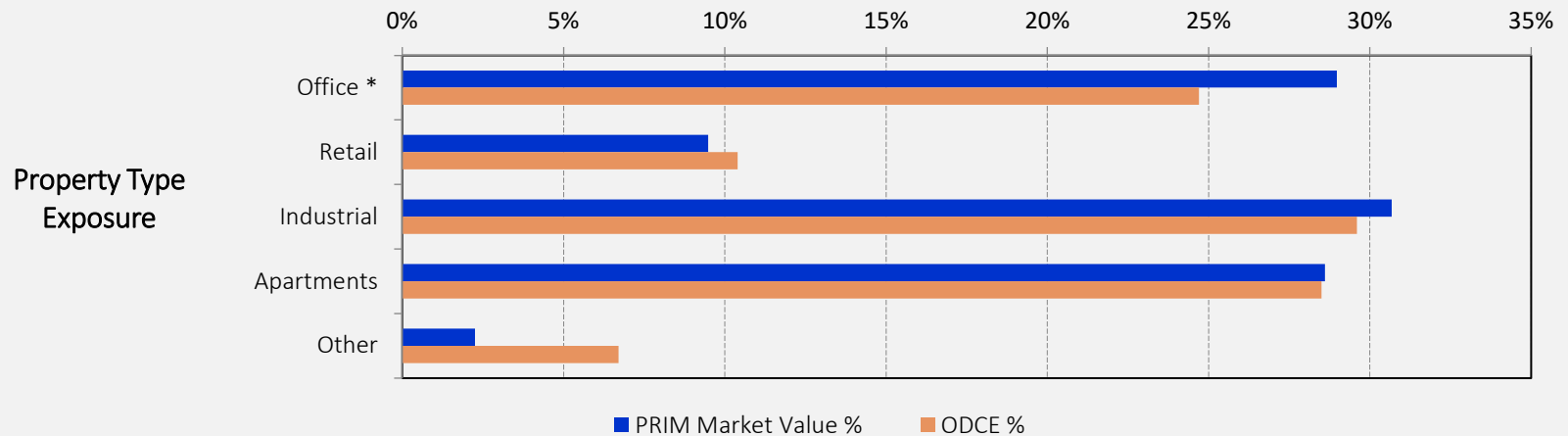


Benchmark: Currently benchmark is calculated by applying the investment performance of the sub asset class benchmarks to the sub asset class weights within the Total RE portfolio. These weights are based on the beginning adjusted monthly market value of each sub asset.

Public Real Estate (REITs) Exposure by Country

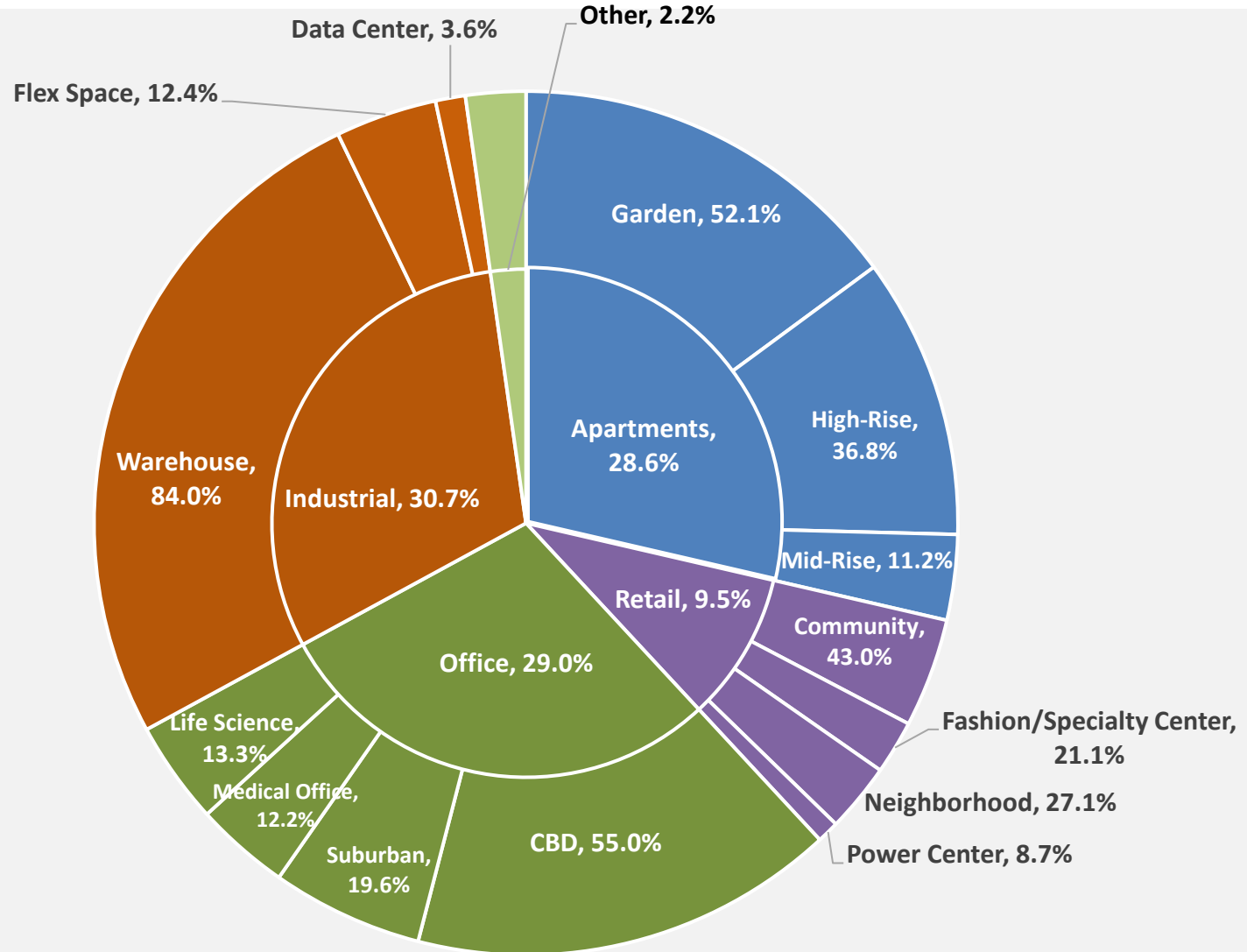


Private Real Estate Portfolio Exposure



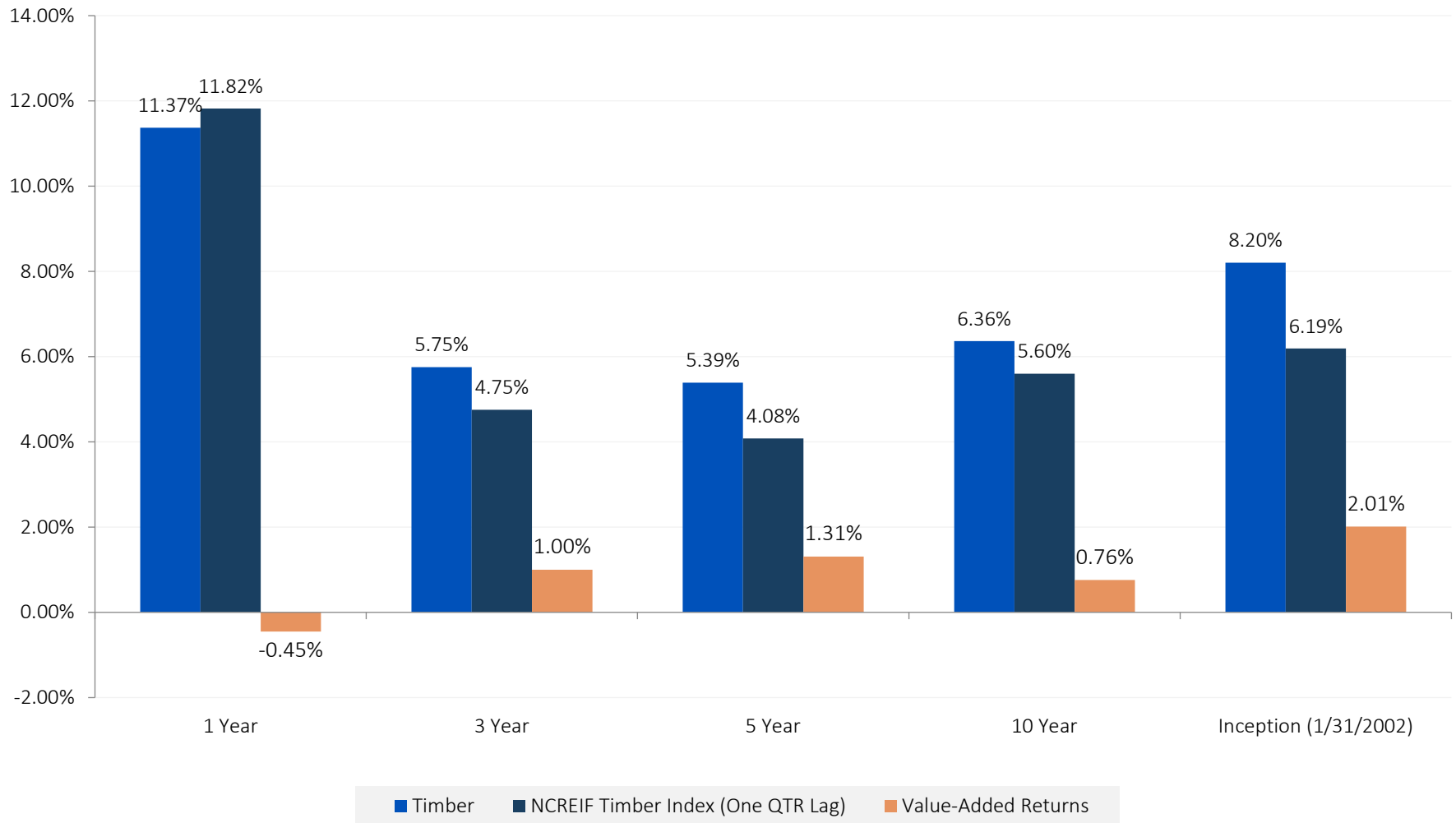
* Office includes life science assets

Property Subtype Breakdown



Timberland

Annualized Returns as of June 30, 2022 (Gross of Fees)

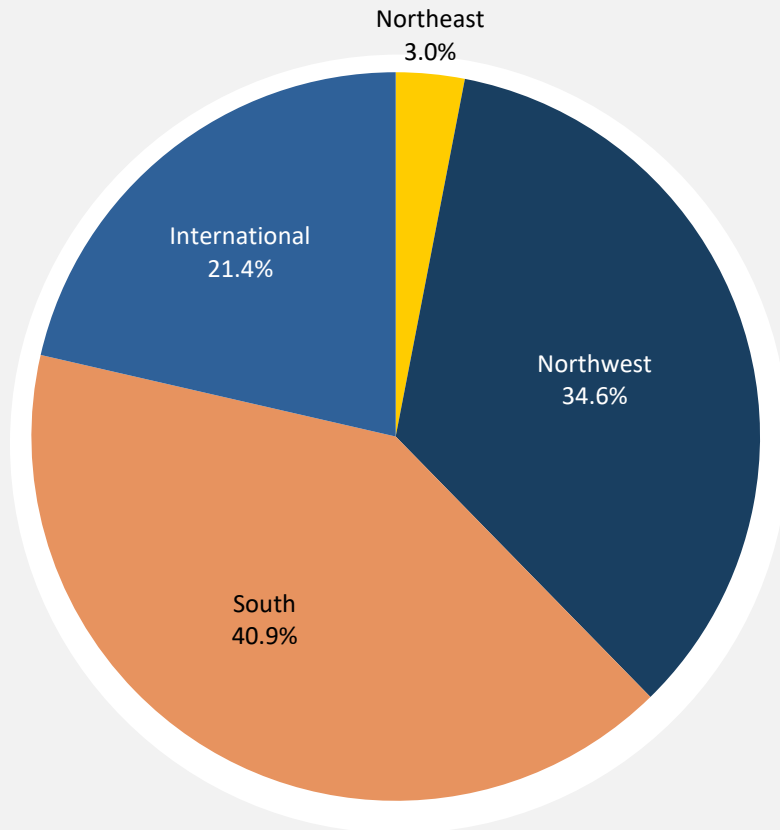


Benchmark: Currently NCREIF Timberland Index.

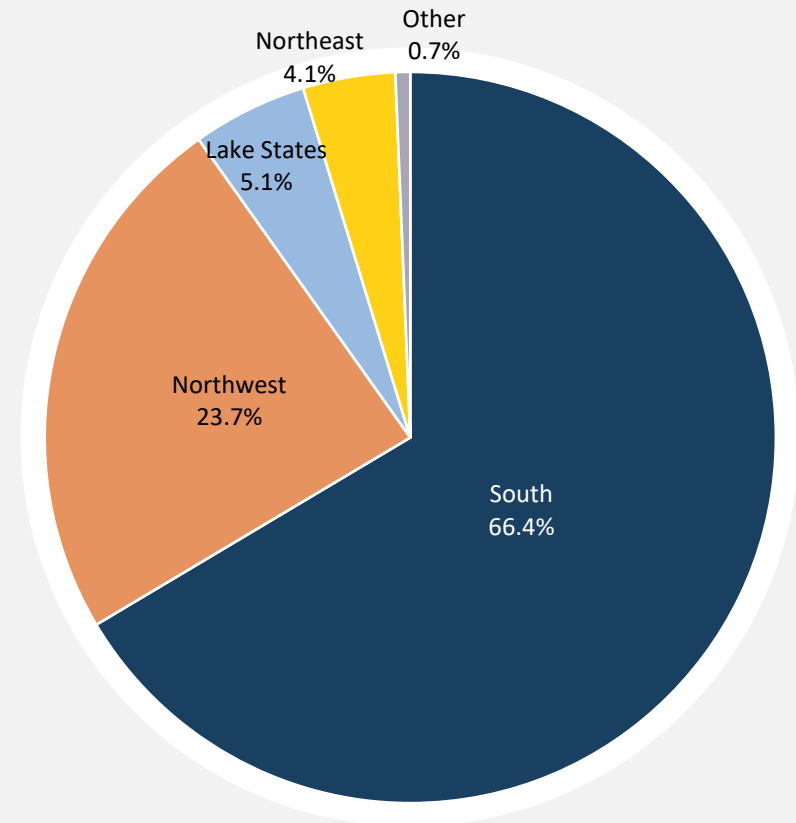
Timberland Exposure by Region vs. Benchmark

As of June 30, 2022, \$2.9 Billion – 3.2% of PRIT Fund (Target 1%-7%)

PRIM REGION EXPOSURE

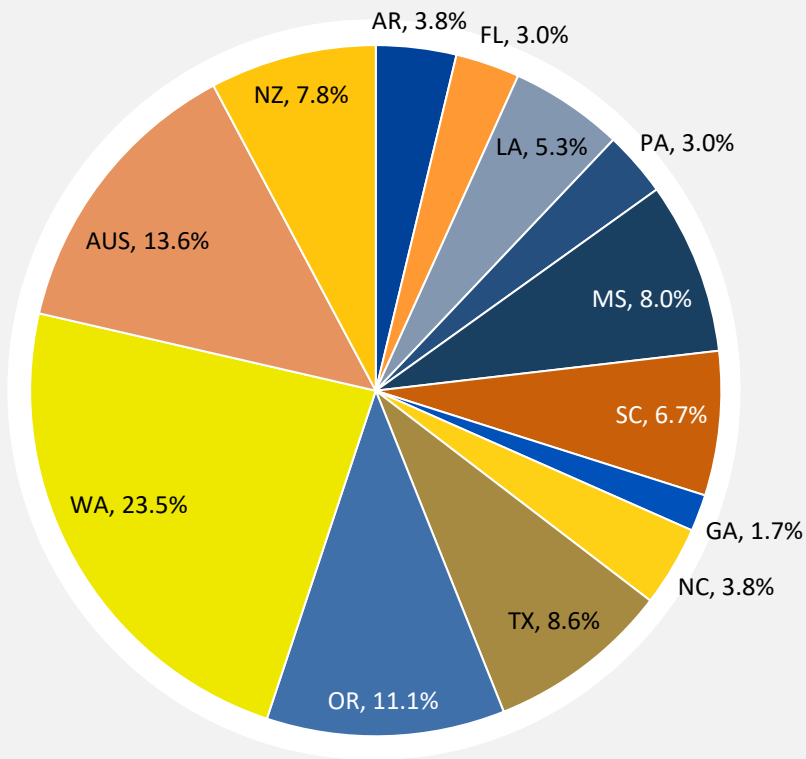


BENCHMARK



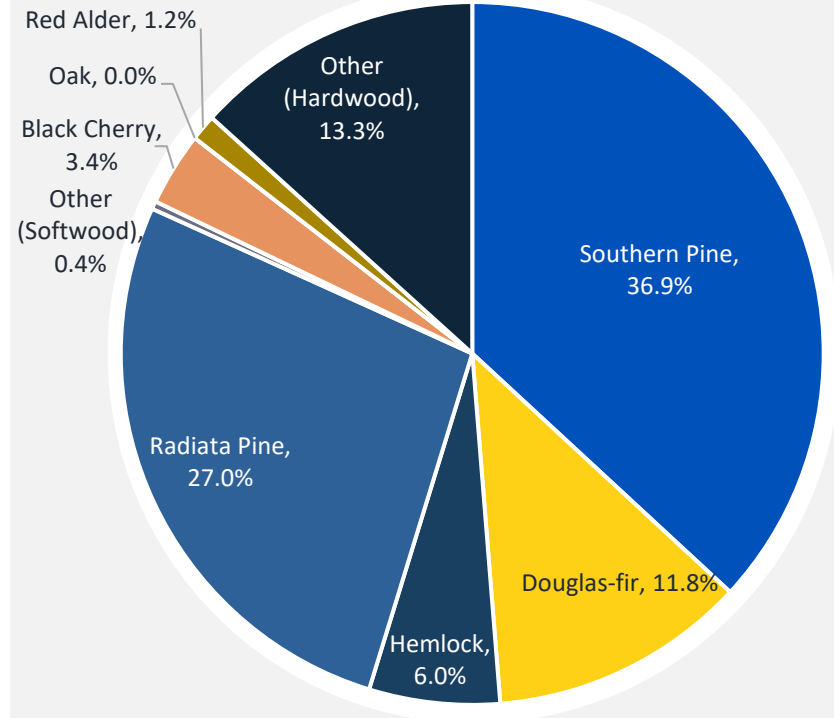
Timberland Exposure by State/Region

BY EQUITY VALUE



Timberland Exposure by Species

BY ACRES



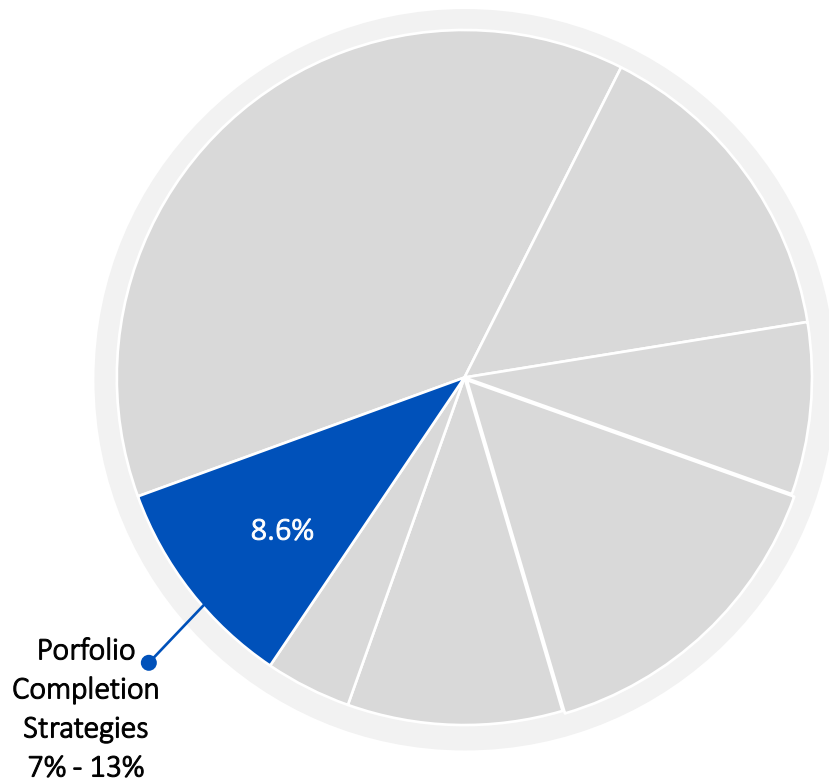
PORTFOLIO COMPLETION STRATEGIES



Portfolio Completion Strategies (PCS)

PRIT FUND TARGET ASSET ALLOCATION

Actual Allocation as of June 30, 2022



PCS \$7.9 billion, 8.6% of PRIT Fund

- Direct Hedge Funds: \$6.5 billion, 81% of PCS
- Hedge Fund of Funds: \$0.6 billion, 8% of PCS
- Real Assets: \$0.9 billion, 11% of PCS

29 Hedge Fund managers:

- 1 FoHF Manager
- 28 Direct Hedge Fund Managers

7 Real Assets Managers

Emerging-Diverse Managers

4 team members

Collaboration across all PRIM teams

Portfolio Completion Strategies

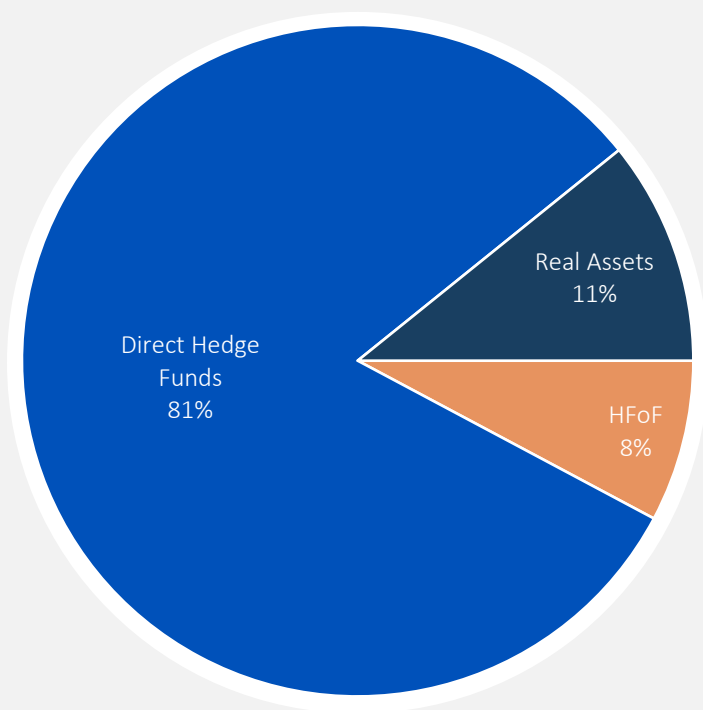
Key Initiatives

- Enhance reporting framework for Hedge Funds portfolio and Real Assets portfolio.
- Investments:
 - Research peer allocator's evolving practice of hedge funds investing; survey pension and endowments & foundations.
 - Directional Funds – continue building PRIM's knowledge of country/sector specialist funds.
 - Stable Value Funds – maintain manager level focus; re-evaluate specific mandate, as needed.
 - Complete hedge optimization for the Replication Program.
 - Complete ramping up the Emerging Manager Hedge Fund program and summarize preliminary experiences.
 - Real Assets – review PRIM's long-term investment thesis.
- Monitor implementation of PCS & Other Credit Opportunities Co-investments
- Continue to source and allocate to diverse investment managers.
- Continue collaboration with PRIM teams on investment and co-investments opportunities.
- Finish strategic study of PCS's organizational resources.

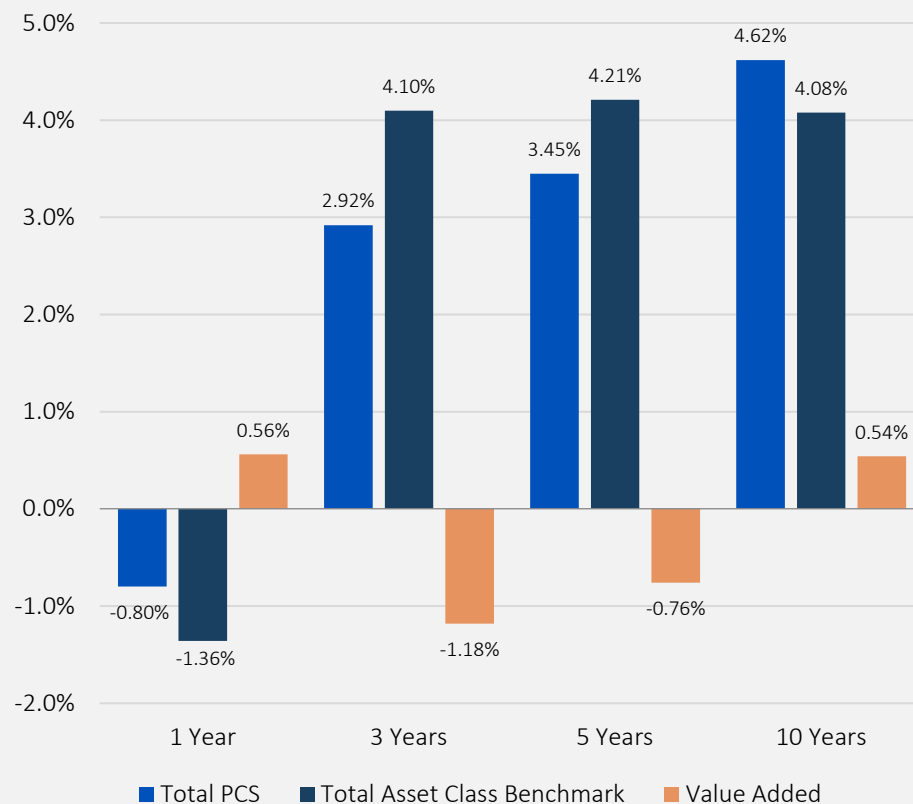
Portfolio Completion Strategies

As of June 30, 2022, \$7.9 Billion – 8.6% of PRIT Fund (Target 7%-13%)

ASSET ALLOCATION



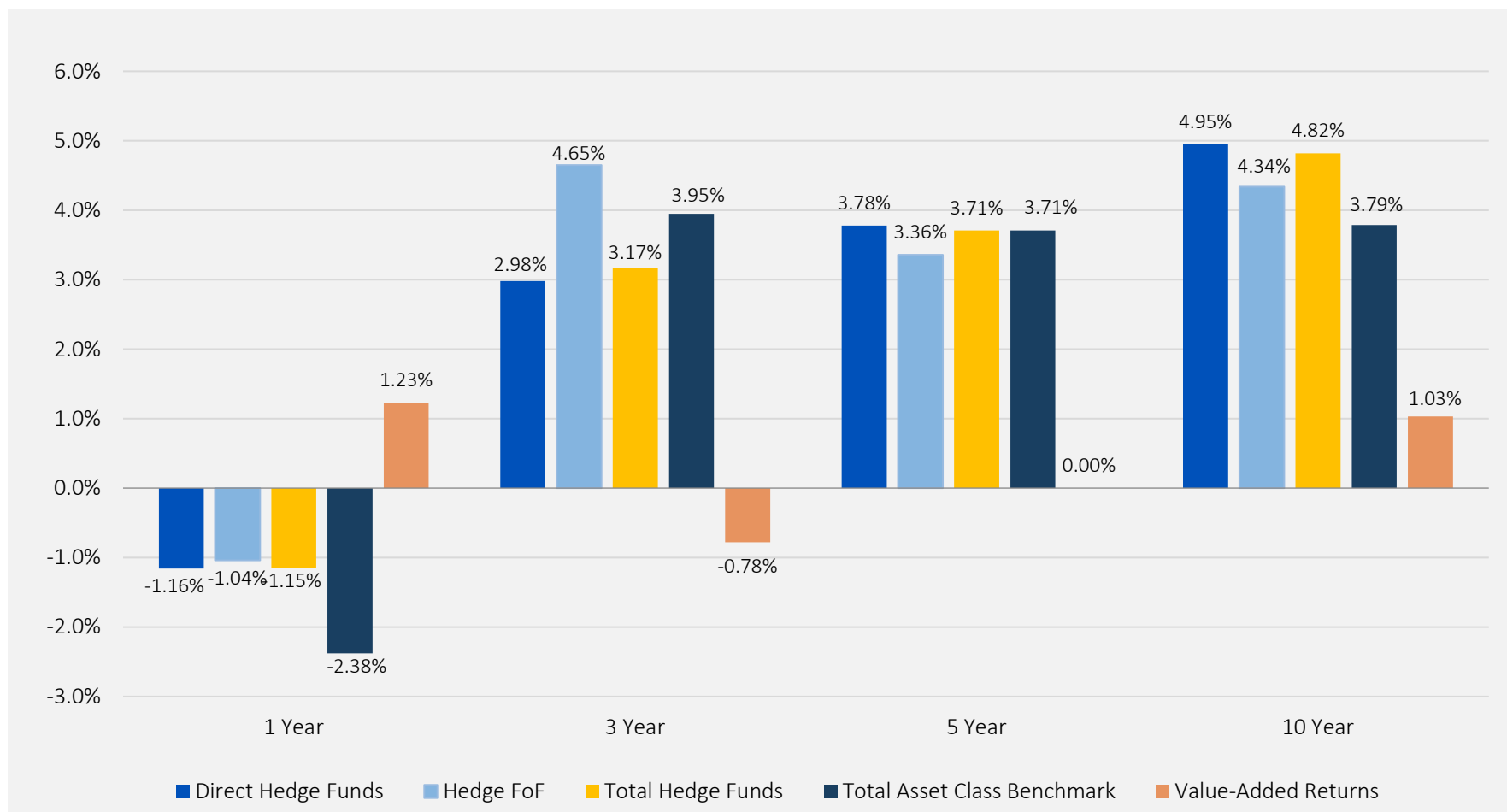
PERFORMANCE*



Benchmark: Total Portfolio Completions Composite Index was formed on April 1, 2017 by combining the prior Portfolio Completion Strategies with Total Hedge Funds. Total Portfolio Completion Strategies Composite Index is calculated by applying the underlying benchmark return for each sub asset class to the asset class's weight within the Total Portfolio Completion Strategies Composite. These weights are based on the beginning adjusted monthly market value of each sub asset. *Hedge Funds returns, 89% of the PCS Portfolio, are net of fees.

Hedge Funds Performance

Annualized Returns as of June 30, 2022 (Net of Fees)



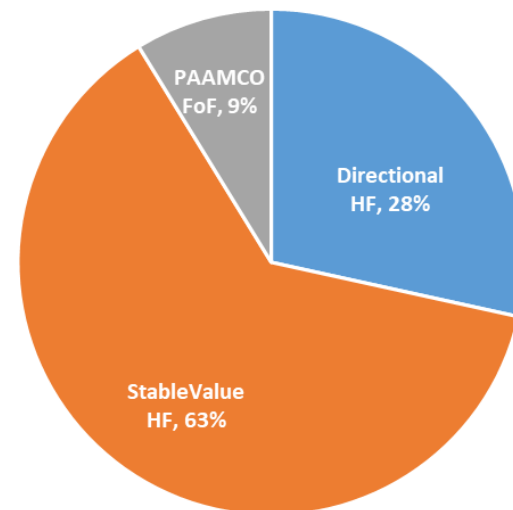
Benchmark: Currently using a composite of several HFRI sub-indices. (HFRI indices - Flash returns are used through 12/31/11. Current returns reflect most up to date performance and are subject to change.)

PRIM Hedge Funds Portfolio Snapshot

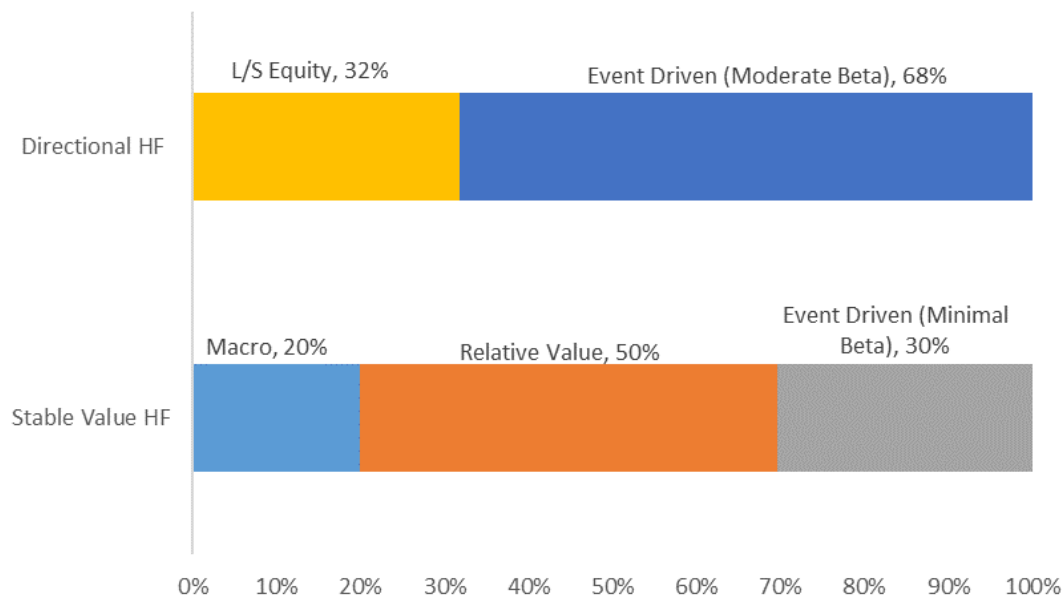
As of June 30, 2022, \$7.1 Billion – 7.7% of PRIT Fund

- Directional Hedge Funds: \$2.0 Billion
- Stable Value Hedge Funds: \$4.4 Billion
- Hedge Fund of Funds: \$0.6 Billion

Hedge Fund Portfolio Breakdown



Sub Strategy Breakdown



Sharpe Ratio and Market Beta Performance

As of June 30, 2022 (Net of Fees)

	Directional HF	StableValue HF	Total HF	Total PCS	PRIT Fund	MSCI ACWI	Barclays Agg	
1 Year	Return	-10.5%	3.6%	-1.3%	-1.0%	-3.4%	-15.8%	-10.3%
	Vol	7.0%	3.6%	3.6%	3.2%	8.2%	15.5%	5.1%
	Sharpe Ratio	(1.5)	1.0	(0.4)	(0.3)	(0.4)	(1.0)	(2.0)
	EQ Beta	0.4	0.1	0.2	0.2	0.5	1.0	0.2
	Bond Beta	0.7	(0.2)	0.1	0.1	0.9	1.7	1.0
	Correlation With PRIT Fund	0.9	0.5	0.8	0.8	1.0	0.9	0.5
3 Year	Return		3.0%	2.7%	8.4%	6.2%	-0.9%	
	Vol		6.2%	5.5%	9.0%	18.0%	4.6%	
	Sharpe Ratio		0.5	0.5	0.9	0.3	(0.2)	
	EQ Beta		0.2	0.2	0.5	1.0	0.1	
	Bond Beta		0.1	0.1	0.7	1.3	1.0	
	Correlation With PRIT Fund		0.7	0.7	1.0	0.9	0.3	
5 Year	Return		3.6%	3.3%	8.1%	7.0%	0.9%	
	Vol		5.3%	5.1%	8.1%	16.2%	4.0%	
	Sharpe Ratio		0.7	0.6	1.0	0.4	0.2	
	EQ Beta		0.2	0.2	0.5	1.0	0.1	
	Bond Beta		0.1	0.0	0.5	0.9	1.0	
	Correlation With PRIT Fund		0.8	0.8	1.0	1.0	0.3	

Note: All returns here are net of fees.

PRIM Hedge Funds and PCS Performance Breakdown

As of June 30, 2022 (Net of Fees)

- Within PRIT Hedge Funds, trailing 1 Year:
 - **Directional Hedge Funds** noticeably underperformed the benchmark
 - **Stable Value Hedge Funds** noticeably outperformed the benchmark
- As of February 2020, Stable Value Hedge Funds and Directional Hedge Funds are reported separately due to their different value propositions

	NAV	as of Total HF	as of Total	1 Month	1 Year
Directional HF	\$2.01 bn	28%	25%	-4.6%	-10.5%
Directional HF BM				-3.2%	-8.9%
StableValue HF	\$4.43 bn	63%	56%	-1.1%	3.6%
StableValue HF BM				-1.2%	1.5%
PAAMCO FoF	\$0.62 bn	9%	8%	0.5%	-1.0%
PAAMCO FoF BM				-2.0%	-5.9%
Real Assets	\$0.86 bn	N/A	11%	-0.1%	1.6%
Real Assets BM				1.4%	7.3%

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 U.S. investment-grade bond market. The index is comprised of government and corporate bonds.

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 (large cap), small and middle capitalization (small/mid cap), and micro capitalization (micro cap) strategies.

Emerging-Diverse Manager – Investment managers with less than \$2B of AUM, less than 3 yrs track record, that are minority-owned or women-owned.

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 ACWI Index – Captures large and mid cap representation across 23 Developed Markets and 25 Emerging Markets.

MSCI Emerging Markets Index – Captures large and mid cap representation across 25 Emerging Markets.

MSCI Europe Investable Market Index – Captures large, mid and small cap representation across 15 Developed Markets

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 3000 Index – A stock market index that measures the performance of the largest 3,000 U.S. companies representing approximately 97% of the investable U.S. equity 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.

Treasury Separate Trading of Registered Interest and Principal of Securities (STRIPS) – Bonds that are sold at a discount to their face value. The investor does not receive interest payments but is repaid the full-face value when the bonds mature. Also called "zero coupon" bonds.

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).



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