

PRIM Board Quarterly Update

SECOND QUARTER 2018

Markets Overview and PRIT Fund Performance Summary

PRIM Executive Director and Chief Investor Officer Michael G. Trotsky, CFA provided the following information to the PRIM Board at its August 14, 2018, meeting:

MARKETS OVERVIEW

Fiscal year 2018 was another exceptionally strong year for PRIM. The PRIT Fund returned 10.0% gross, 9.5% net, for the fiscal year, 140 basis points above benchmark, net of fees, and we know of no other fund of our size or larger that outperformed us. Six of seven major asset classes outperformed their benchmarks net of fees. Private Equity returned 19.9% for the year, Global Equities returned 11.7%, Real Estate returned 8.9%, and Timberland returned 7.4%. Portfolio Completion Strategies (PCS), now 13.4% of the total PRIT Fund, returned 6.8% net of fees, 78 basis points above the benchmark while exhibiting low realized volatility of approximately 2.8%.

We evaluate the performance of the PRIT Fund on three equally important metrics: return, risk, and cost. As described above, the returns of each asset class and the entire PRIT Fund were very strong both relative to the benchmarks and in absolute terms, and importantly, expenses and risk remained tightly controlled. Even with the Board-approved, larger allocation in the fiscal year to high-performing, relatively higher fee, actively managed alternative asset classes such as Private Equity and PCS, we are pleased to report that the ratio of total expenses was 53 basis points in fiscal year 2018, compared with 54 basis points in fiscal year 2017. This decrease highlights our continuing efforts related to Project SAVE, as well as our focus on lower-fee separately managed accounts in our PCS portfolio, the success of our Private Equity co-investment program, and new direct Real Estate investments, among other things. Moreover, the 9.5% return of the PRIT Fund for the year was achieved with a realized volatility of 4.3%, producing a very high Sharpe ratio of approximately 1.8. We believe this Sharpe ratio, which measures the risk-adjusted return of the PRIT Fund, would be among the highest in the country, meaning our portfolio is higher returning relative to our peers even though it has comparatively lower risk, and low cost. PRIM's strong performance in both up markets such as fiscal year 2018 and calendar year 2017, combined with our strong outperformance in down markets like we had in fiscal year 2016 (nation-leading, positive performance), gives us confidence that our investment program is performing well and as designed.

Organizationally, fiscal 2018 was another outstanding year. One senior-level employee departed, the first such departure in several years, and consistent with the Board-approved hiring plans, we filled six staff vacancies with top talent. We are staffed with exceptional investment and finance professionals, and all our job postings attract literally hundreds of talented and well-qualified applicants. Our team continues to be recognized around the nation for the success and innovation of our investment program and for the transparency and completeness of our financial reporting. Our comparatively small staff researched and deployed approximately \$5.4 billion in new Board-approved investments in fiscal year 2018 – a new milestone for PRIM's productivity.

We have never been stronger or more productive, but retention of key employees remains my primary concern. The employment environment in the nation and in the region is strong – meaning there are numerous opportunities for our employees outside of PRIM - and we have spent considerable time and effort on retention strategies for PRIM employees. We continue to ensure that we provide a challenging and rewarding opportunity for all our employees, and that PRIM continues to maintain a positive culture and working environment that our employees enjoy and value. We owe a great deal of gratitude to our Board and committees for providing the support necessary to advance our investment program and to attract and retain the highly-qualified employees who have created one of the best performing public

pension plans in the nation.

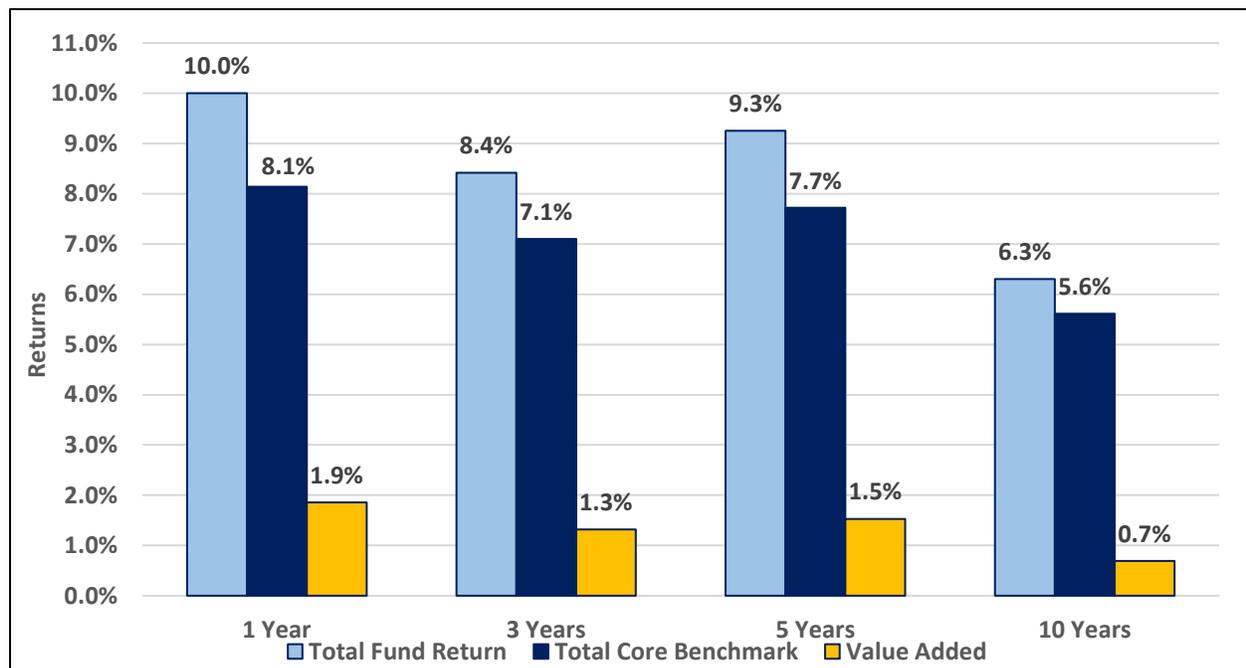
We are truly privileged to have volunteers of such high caliber and professional achievement on the PRIM committees and Board, and we recognize that our success is due in large part to the dedication, hard work, and expert oversight of our Board and its four committees.

PRIT FUND PERFORMANCE SUMMARY

As of June 30, 2018, the PRIT Fund net asset value stood at \$71.8 billion. For the one-year ended June 30, 2018, the PRIT Fund rose 10.0% gross (9.5% net), outperforming the total core benchmark of 8.1% by 186 basis points (140 bps net).

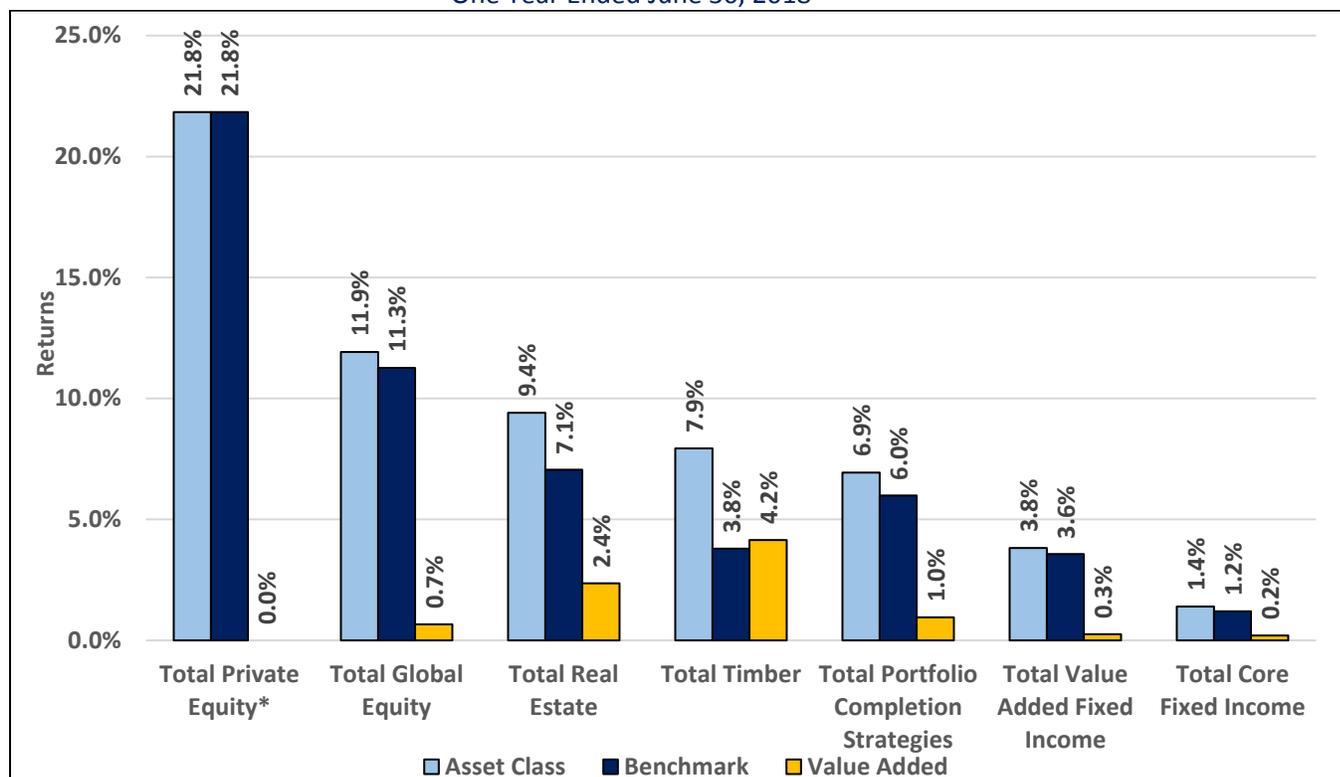
- This performance equates to an investment gain of \$6.4 billion, net of fees.
- This outperformance equates to \$935 million of value above the benchmark return, net of fees.
- Six of the seven major asset classes outperformed their respective benchmarks.
- Net total outflows to pay benefits for the one-year ended June 30, 2018, were approximately \$1.4 billion.

Total PRIT Fund Returns (Gross of Fees)
Annualized Returns as of June 30, 2018



PRIT Asset Class Performance (Gross of Fees)

One Year Ended June 30, 2018



PRIT Core Fund Performance Summary

Gross of Fees Performance

Trailing 1-Year Performance as of June 30, 2018

Trailing 1-Year Performance: June 30, 2018	Return	Benchmark Return	Over/(Under) Benchmark (bps)	\$Value (millions)	% of PRIT Fund
Total PRIT Fund	10.0%	8.1%	186	71,802	100%
Total Global Equity	11.9%	11.3%	66	30,064	41.9%
<i>Domestic Equity</i>	<i>15.6%</i>	<i>15.4%</i>	<i>25</i>	<i>13,696</i>	<i>19.1%</i>
<i>International Developed</i>	<i>8.7%</i>	<i>8.0%</i>	<i>69</i>	<i>11,831</i>	<i>16.5%</i>
<i>Emerging Markets</i>	<i>9.1%</i>	<i>7.8%</i>	<i>129</i>	<i>4,537</i>	<i>6.3%</i>
Private Equity	21.8%	21.8%	0	7,735	10.8%
Real Estate	9.4%	7.1%	236	6,455	9.0%
Total Timberland	7.9%	3.8%	415	2,434	3.4%
Total PCS	6.9%	6.0%	95	9,622	13.4%
Value Added Fixed Income	3.8%	3.6%	25	5,760	8.0%
Core Fixed Income	1.4%	1.2%	20	9,154	12.8%

PRIT Asset Class Performance (Gross of Fees)

Annualized Returns as of June 30, 2018

1 Year	3 Year	5 Year	10 Year
PRIVATE EQUITY 21.8%	PRIVATE EQUITY 18.3%	PRIVATE EQUITY 19.4%	PRIVATE EQUITY 13.6%
GLOBAL EQUITY 11.9%	REAL ESTATE 9.4%	REAL ESTATE 10.8%	REAL ESTATE 6.9%
REAL ESTATE 9.4%	GLOBAL EQUITY 9.1%	GLOBAL EQUITY 10.0%	VALUE-ADDED FIXED INCOME 6.8%
TIMBER 7.9%	TIMBER 5.5%	TIMBER 7.6%	GLOBAL EQUITY 6.6%
PORTFOLIO COMPLETION STRATEGIES 6.9%	VALUE-ADDED FIXED INCOME 5.0%	PORTFOLIO COMPLETION STRATEGIES 4.8%	TIMBER 4.6%
VALUE-ADDED FIXED INCOME 3.8%	CORE FIXED INCOME 3.6%	VALUE-ADDED FIXED INCOME 4.4%	CORE FIXED INCOME 4.0%
CORE FIXED INCOME 1.4%	PORTFOLIO COMPLETION STRATEGIES 3.3%	CORE FIXED INCOME 4.3%	PORTFOLIO COMPLETION STRATEGIES 3.2%

PRIM DEVELOPMENTS

Organizational Update

Recent Recognition

The *American Investment Council* ranked PRIM Private Equity #1 in private equity returns among 163 U.S. public pension funds based on 10-year performance. PRIM is the only fund that has been in the Top 5 of all private equity portfolios in every year the *American Investment Council* has performed the study – including #1 rankings in 2015 and 2013.

In May, and for the 13th consecutive year, PRIM was awarded the *Government Finance Officer Association's* Certificate of Achievement for Excellence in Financial Reporting for the completeness and timeliness of our Comprehensive Annual Financial Report.

Michael McGirr, Senior Investment Officer on the Private Equity team, was awarded the Treasurer's 2018 Citation for Outstanding Performance. Those selected for this honor have made notable contributions to the office of the Treasurer, its agencies and the citizens of MA.

Michael Trotsky, CFA, Executive Director and Chief Investment Officer, was elected Vice-Chair of *the CFA Society Boston* in late June. In the ordinary course of succession at the CFA, the Board's Vice-Chair is likely to serve as Chair of the Board in the following year. The *CFA Society Boston* serves more than 5,700

members in the greater Boston area. Last August, Michael's 3-year term as a Governor of the *CFA Institute* ended. The *CFA Institute* is the global parent of the *CFA Society Boston*, serving more than 150,000 members worldwide.

Andre Abouhala, Investment Analyst on the Public Markets Team, earned an MBA from Boston University in May.

New Hires

David Griswold joined in June as the Director of Information Technology. David has more than 20 years of information technology and communications experience and is joining us after 12 years at The Hancock Natural Resource Group (HNRG) and Forest Capital Partners. During his time at HNRG and Forest Capital, David was responsible for managing an international team of engineers and analysts, covering a variety of technology functions. David holds a bachelor's degree in Business Management with a concentration in Computer Science from Bentley College.

Sylvia Argiropoulos joined in June as an Administrative Assistant. She will support the Real Estate and Timberland and the Portfolio Completion Strategies teams. Sylvia brings 25 years of administrative experience to PRIM, most recently an Executive Assistant at Ernst & Young supporting its audit and consulting partners. Sylvia has her Associates Degree from Cape Cod Community College.

PRIM BOARD ACTIONS

At its August 14, 2018 meeting, the PRIM Board approved the following recommendations of the Investment Committee and PRIM Staff:

Other Credit Opportunities

The PRIM Board approved an initial allocation of up to \$100 million to the 400 Capital Asset Based Term Fund to be invested through a PRIM managed account. The 400 Capital Term Fund has been created to take advantage of high conviction themes which require more patient capital solutions. The strategy will, therefore, seek to capture illiquidity premiums associated with (i) regulated entities with mandates to reduce or sell existing/newly originated credit risk exposure, (ii) new or emerging asset classes or lending platforms requiring a pathway to scale, and (iii) market-driven liquidity events that allow patient capital to capture outsized premiums.

Portfolio Completion Strategies

The PRIM Board approved the implementation of the Emerging Manager Direct Hedge Fund Program. The selection of managers will follow a process and Investment Guidelines. The size of the program will be up to \$500 million. PRIM staff will regularly update the Investment Committee and the Board on the investment progress every meeting cycle. By way of background, the PRIM Board approved the Emerging Manager Direct Hedge Fund Advisory and Managed Account Platform Services at its February 15, 2018 meeting. The Board selected NewAlpha Asset Management (NewAlpha) to provide advisory services for the Emerging Manager Direct Hedge Fund program. The Board also selected Innocap to provide managed account platform services for the Emerging Manager Direct Hedge Fund program.

The PRIM Board approved a commitment of \$250 million in the to the Silver Creek Aggregates Reserves Fund I. The Fund will seek to assemble a diversified portfolio of aggregate reserves that span various markets throughout the United States. The Fund will acquire underlying aggregate reserves from construction materials operators as the operators aim to monetize some or all of their existing operating reserves. The targeted quarries are expected to have 35-50 years of remaining reserves. The implementation of the Fund will focus on sale/leasebacks and volumetric production payment (VPP) agreements with the operators as the Fund does not intend to operate the assets themselves. The Fund

will participate in both volume and price gains through the receipt of royalty or lease payments tied directly to the gross revenue from the aggregate production.

The PRIM Board approved an initial allocation of up to \$150 million to the Summit Partners Concentrated Growth L/S (Long/Short) Fund, to be invested through a PRIM managed account. Summit Partners is a global alternative investment firm headquartered in Boston. The strategy seeks to balance fundamental investing in growth companies and growth industries with a dynamic risk management overlay. Having managed growth equity hedge funds since 2005, the Summit team believes there needs to be an equal emphasis and competence in both stock selection and risk management in order to generate alpha.

PRIM Board approved an initial allocation of up to \$150 million to the Basswood Financial Fund, to be invested through a PRIM managed account. Basswood primarily invests in the financial sector through both long and short positions. Basswood believes that price momentum and daily fluctuations can obscure the true value of a business. The firm is focused on long-term wealth appreciation and capital preservation with minimal exposure to risk.

Private Equity

PRIM Board approved a commitment of up to \$300 million to Hellman & Friedman Capital Partners Fund IX L.P. ("Fund IX"). PRIM has invested in six prior Hellman & Friedman Capital Partners ("H&F") funds since 1995. H&F targets buyouts of large businesses in North America and Europe in the software, financial services, business & information services, healthcare, internet & media, energy & industrials, and retail & consumer sectors. All of Hellman & Friedman's funds are in the first or second quartiles in Private Equity industry peer performance rankings.

The PRIM Board approved a commitment of up to \$150 million to Technology Crossover Ventures X, L.P. ("TCV X" or "Fund X"). PRIM has invested in four prior Technology Crossover Ventures funds since 2006. Technology Crossover Ventures is an established growth equity investment firm with a strong and consistent track record. Nearly all of TCV's prior funds are in the first or second quartiles in Private Equity industry peer performance rankings. Fund X will target minority equity positions in both private and public technology companies.

The PRIM Board approved a commitment of up to \$150 million to Lovell Minnick Equity Partners V, L.P. ("Fund V"). PRIM has invested in one prior Lovell Minnick Partners Fund since 2015. Lovell Minnick Partners is a small, highly focused firm with an experienced and motivated team. Nearly all of LMP's are in the first or second quartiles in Private Equity industry peer performance rankings. Fund V will target control and non-control oriented private equity investments in middle market financial services companies.

Including the Private Equity deals approved at its August 14th meeting, the PRIM Board has approved up to \$1.437 Billion in commitments to the Private Equity Vintage Year Portfolio. The 2018 investment plan target is \$1.8 Billion.

The Client Services team -- Paul Todisco, Francesco Daniele and Sam Olivier -- will continue meeting the retirement boards of PRIM's member retirement systems throughout the year. To schedule a visit, please contact Paul at ptodisco@mapension.com, Francesco at fdaniele@mapension.com or Sam at solivier@mapension.com, or call 617-946-8401. We look forward to seeing you soon.