

CIO Board Report

Arizona State Retirement System

November 15, 2019

Fiscal Year to Date

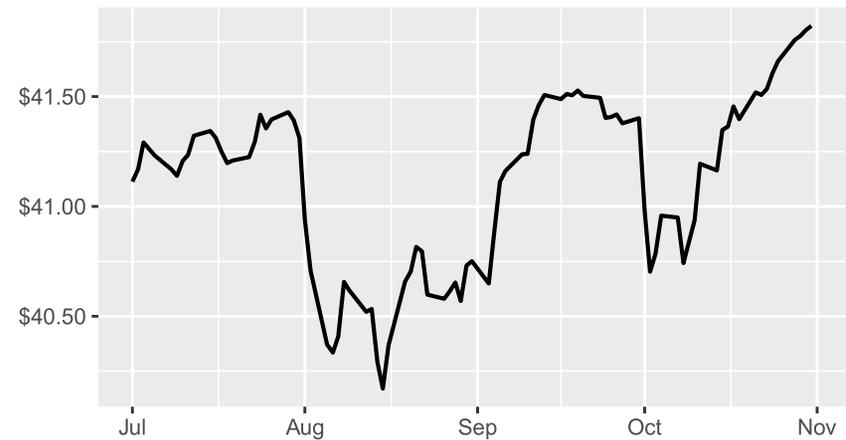
Summary

Total Fund Fiscal Year to Date through 10/30/2019

Return Fiscal Year to Date

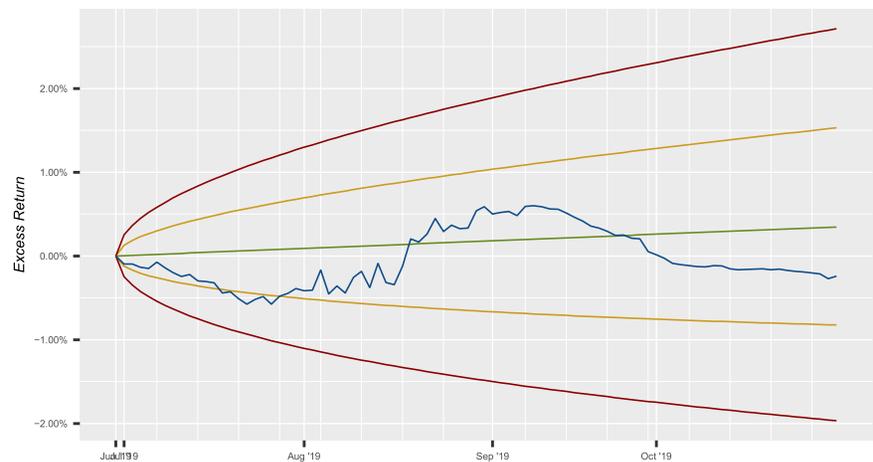


Total Fund Market Value (Billions)



Total Fund Performance versus Expectations

100 Basis Points Expected Excess Return with 200 Basis Points Tracking Error



Total Fund Current Positioning through 10/30/2019

Total Fund Positioning

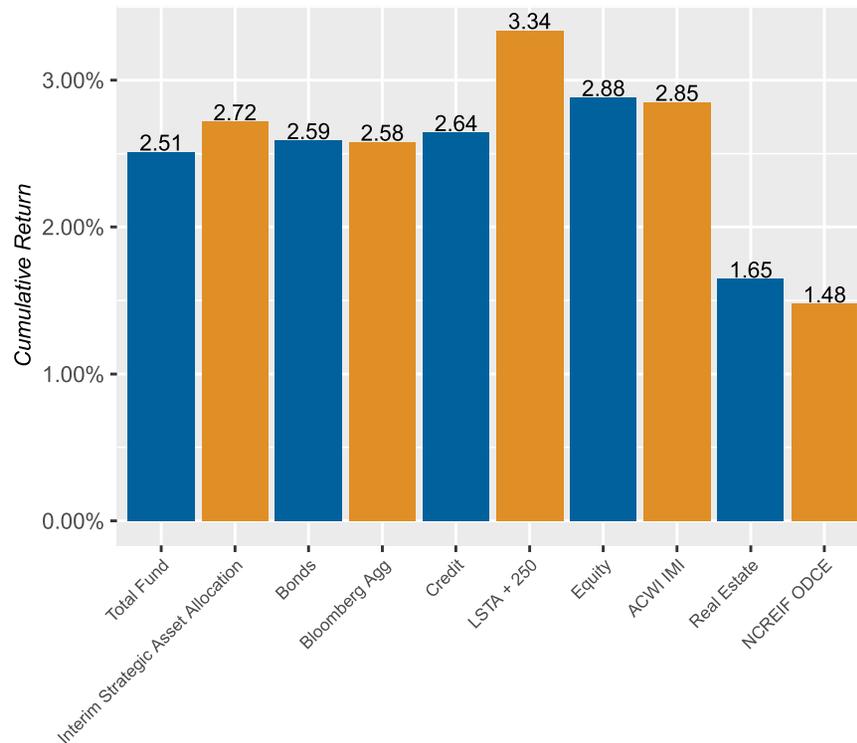
	NAV w/ Notional (\$ mm)	NAV Exposure (%)	Target (%)	Active Weight (%)	Active Weight (\$ mm)
Cash	870.6	2.1	0.0	2.1	870.6
Bonds	4265.6	10.2	10.8	-0.6	-251.2
Credit	8135.5	19.5	19.6	-0.1	-61.5
Equity	22224.7	53.1	54.3	-1.2	-484.4
Real Estate	6345.9	15.2	15.3	-0.1	-52.8
Other	0.4	0.0	0.0	0.0	0.4
Total Fund	41821.6	100.0	100.0	0.0	0.0

Total Fund Attribution

Fiscal Year to Date Total Fund Returns & Dollar Value Add through 10/30/2019

Asset Class and Benchmark

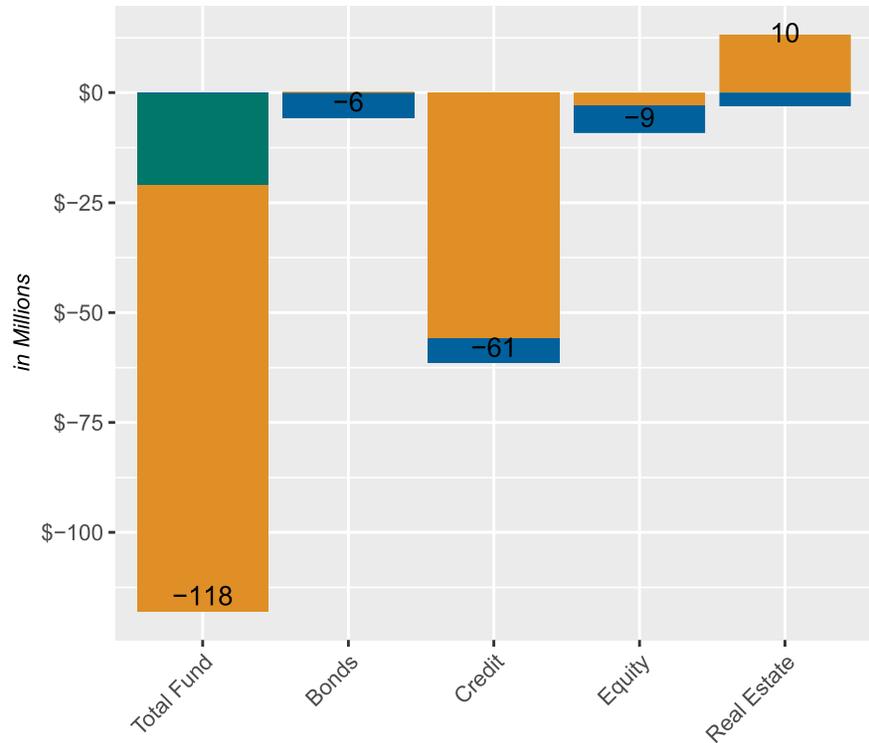
Fiscal Year to Date



Asset Class Benchmark

Dollar Value Add

Fiscal Year to Date Dollar Value Add

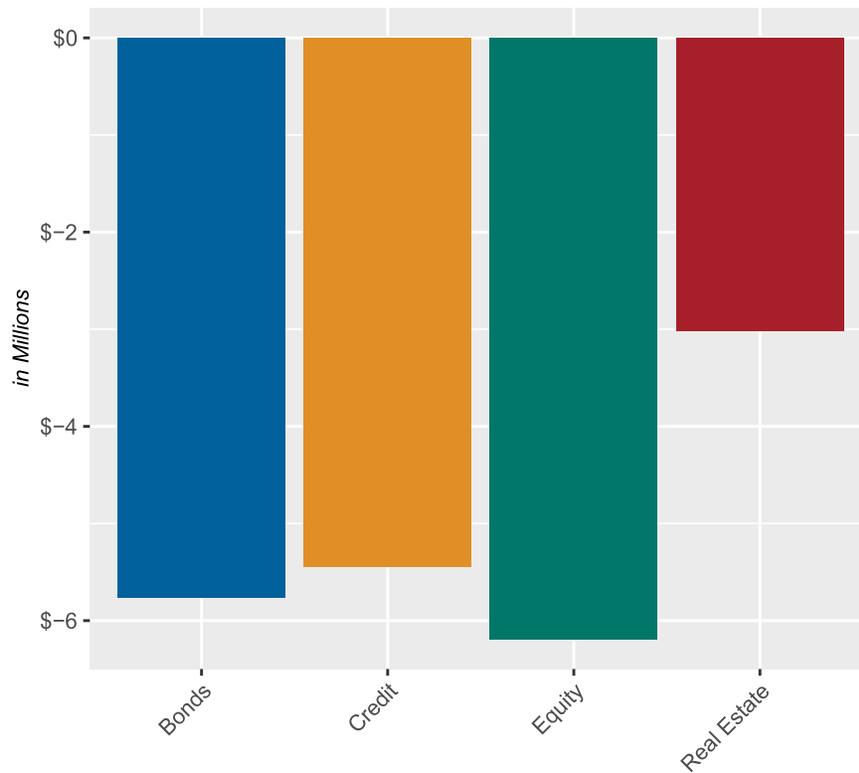


Allocation Excess Return Residual

Fiscal Year to Date Allocation Effect and Excess Return by Asset Class through 10/30/2019

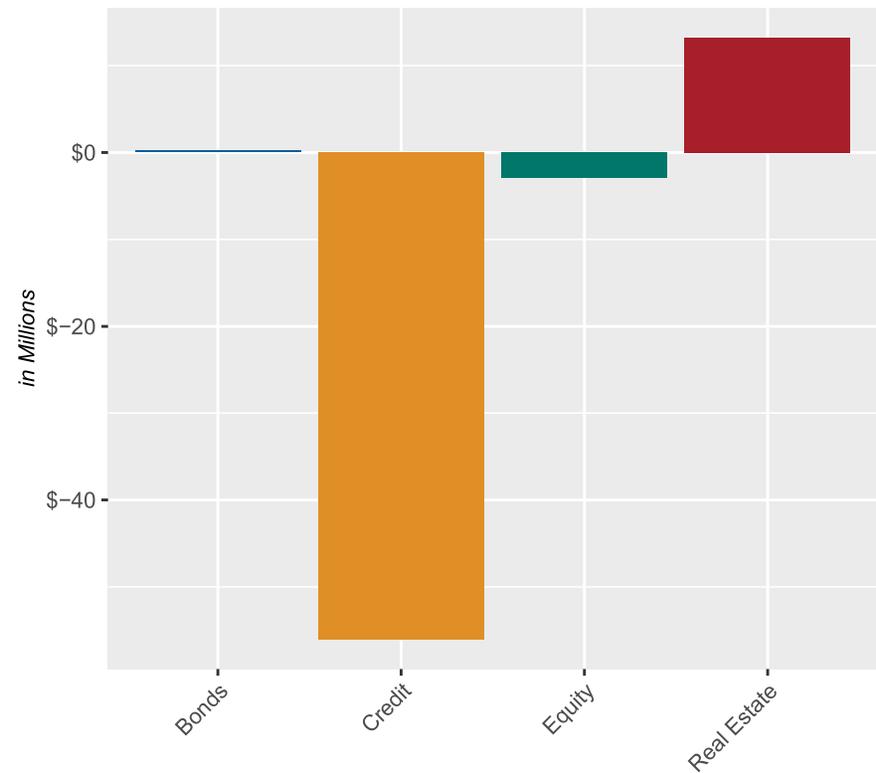
Allocation Effect by Asset Class

Relative to Strategic Asset Allocation Benchmark



Excess Return by Asset Class

Relative to Benchmark



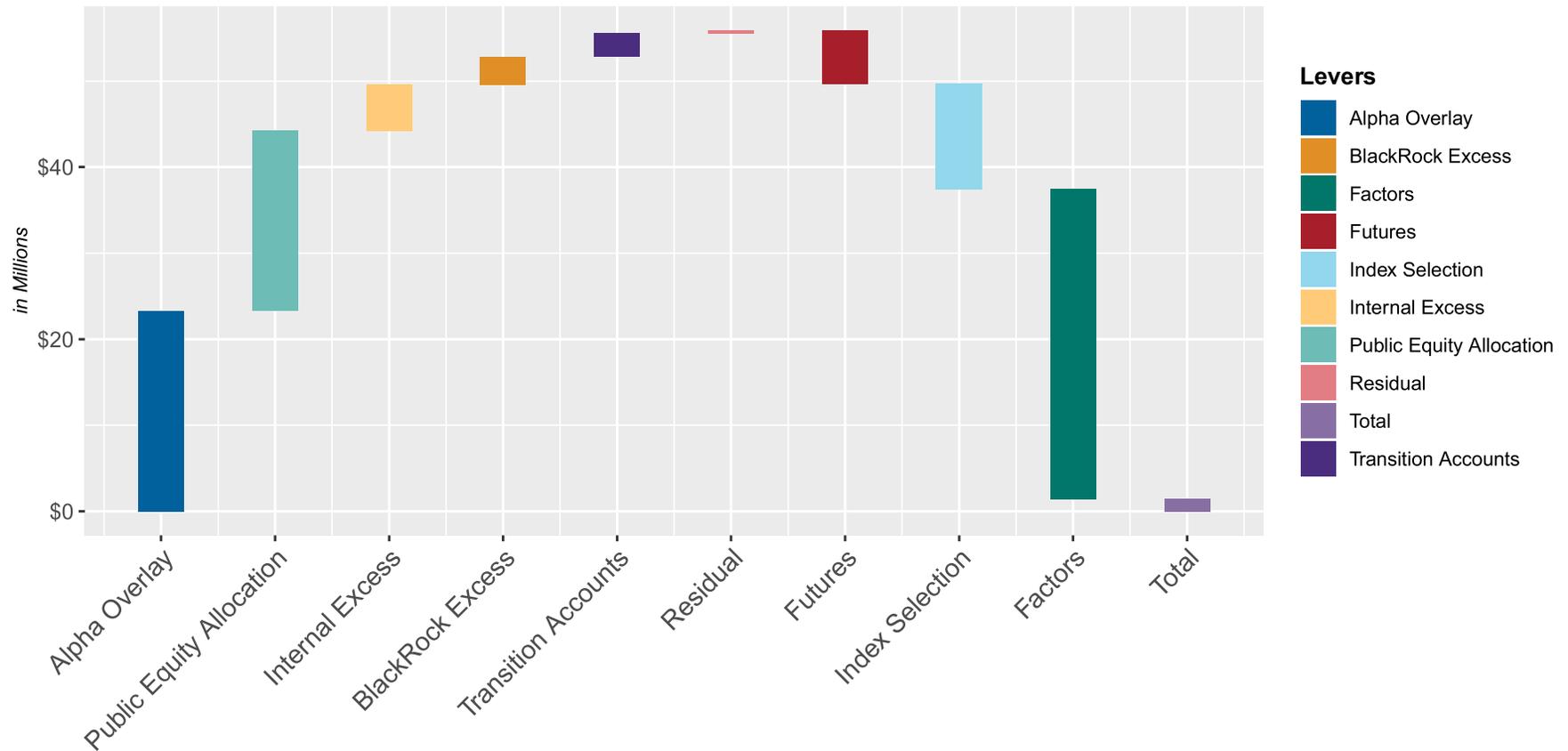
■ Bonds
 ■ Credit
 ■ Equity
 ■ Real Estate

Decomposition of Equity Excess Return

Public Equity Levers through 10/30/2019

Public Equity Dollar Value Add

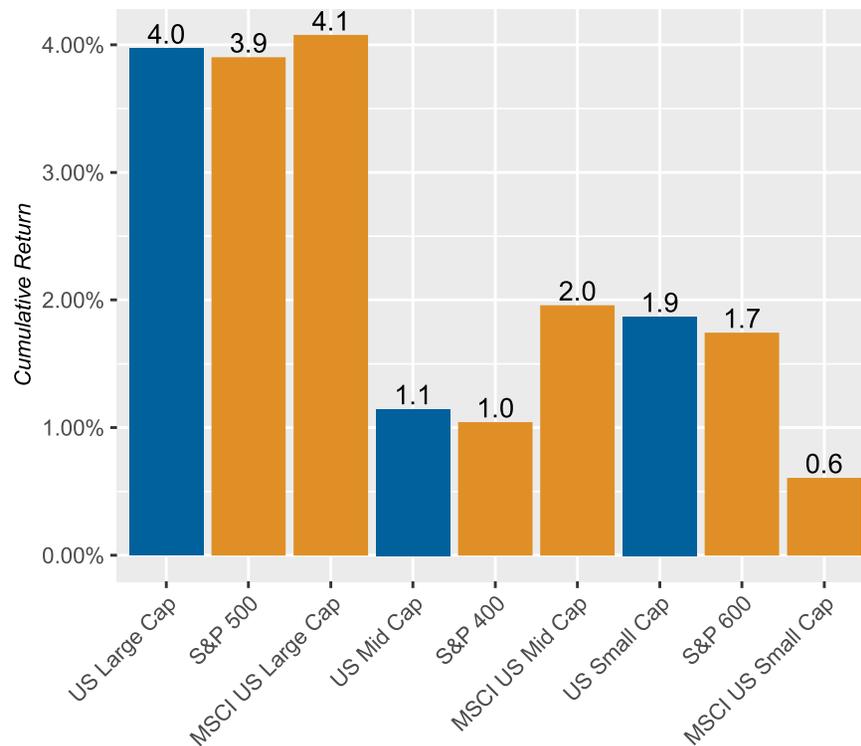
Fiscal Year to Date Dollar Value Add



Internally Managed Portfolios through 10/30/2019

Internal Portfolios and Benchmarks

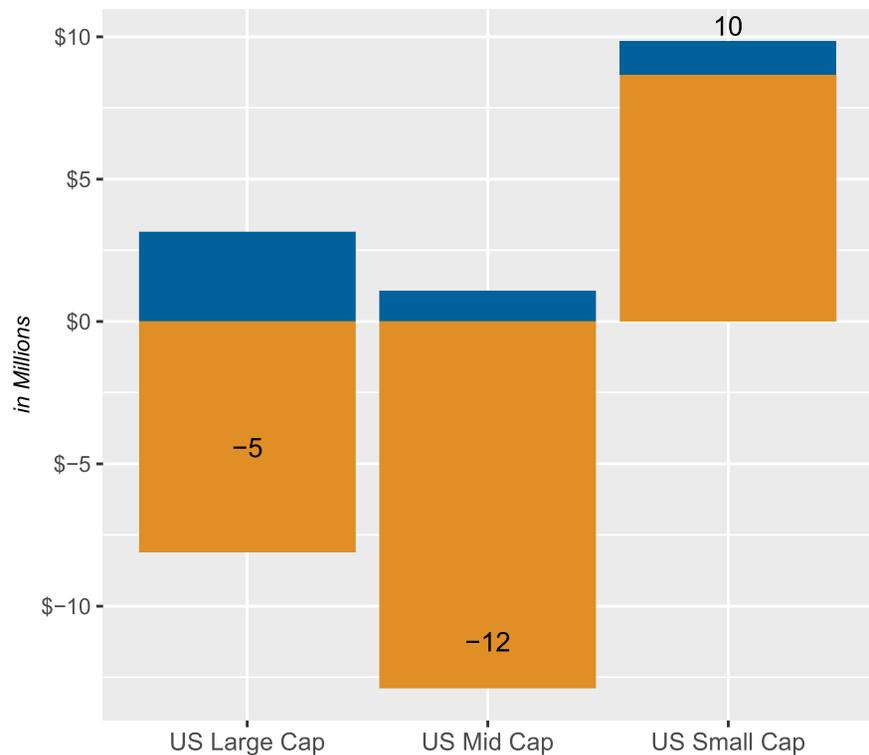
Fiscal Year to Date Returns



Portfolio Benchmark

Internal Portfolio Dollar Value Add

Fiscal Year to Date Dollar Value Add

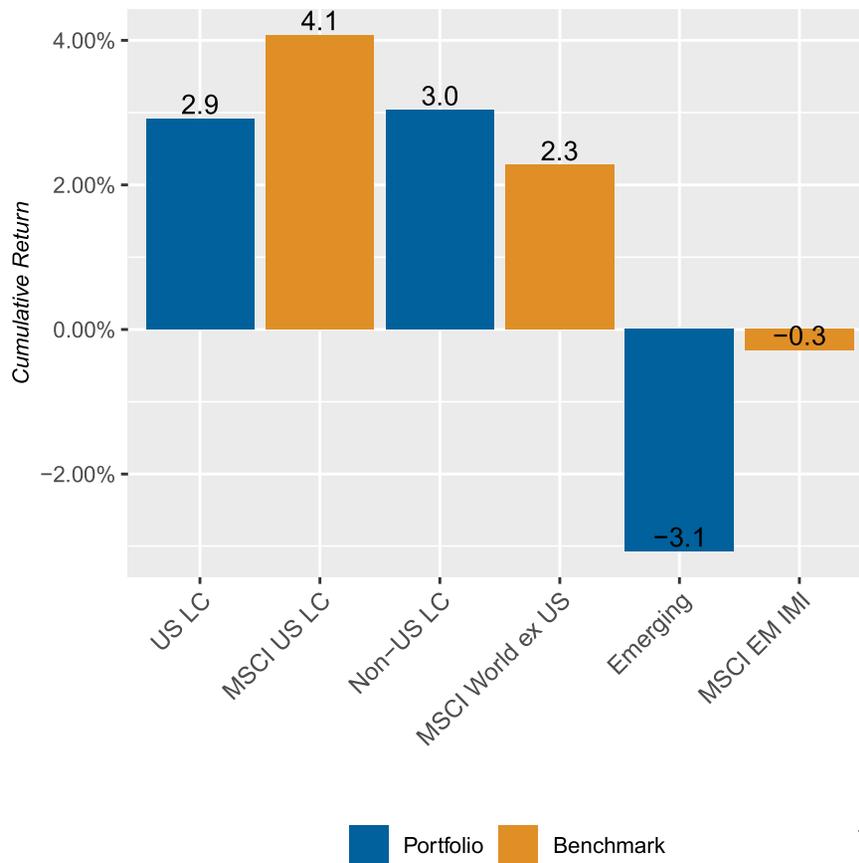


Excess Index Selection

Factor Portfolios through 10/30/2019

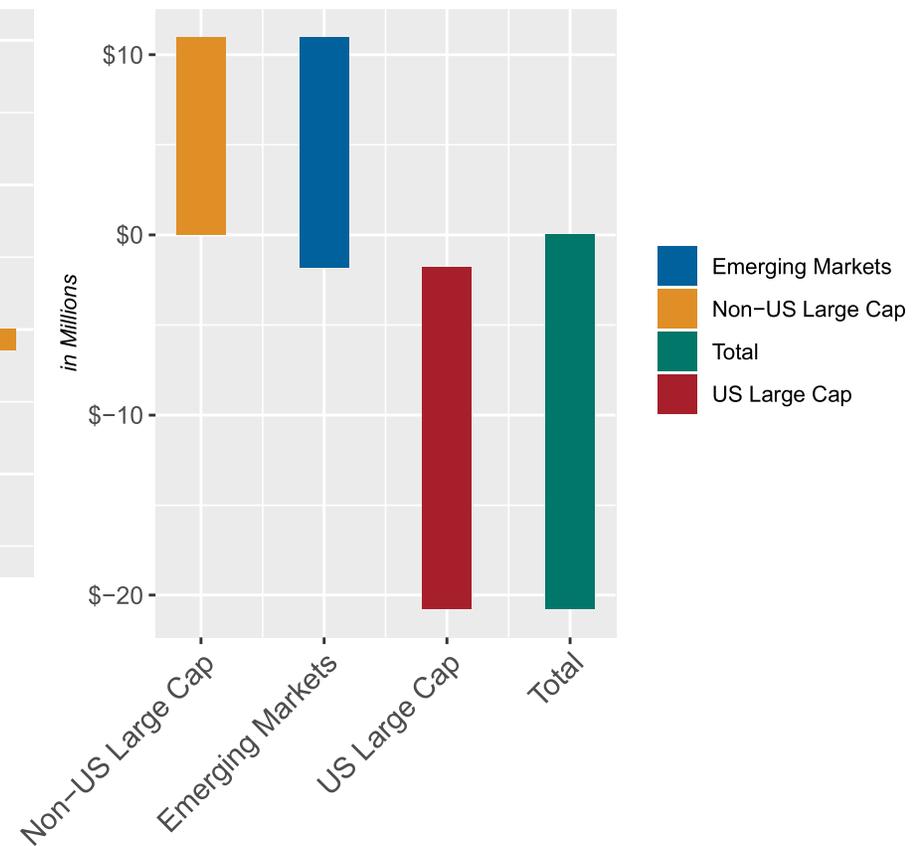
Factor Portfolios and Benchmark

Fiscal Year to Date



Factor Portfolio Dollar Value Add

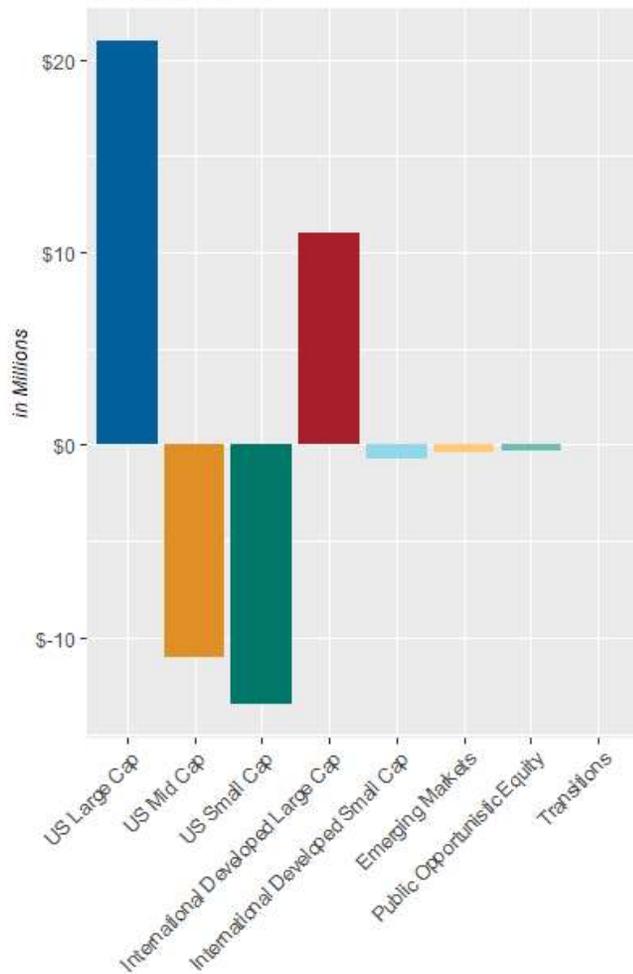
Fiscal Year to Date Dollar Value Add



Public Equity Allocation through 10/30/2019

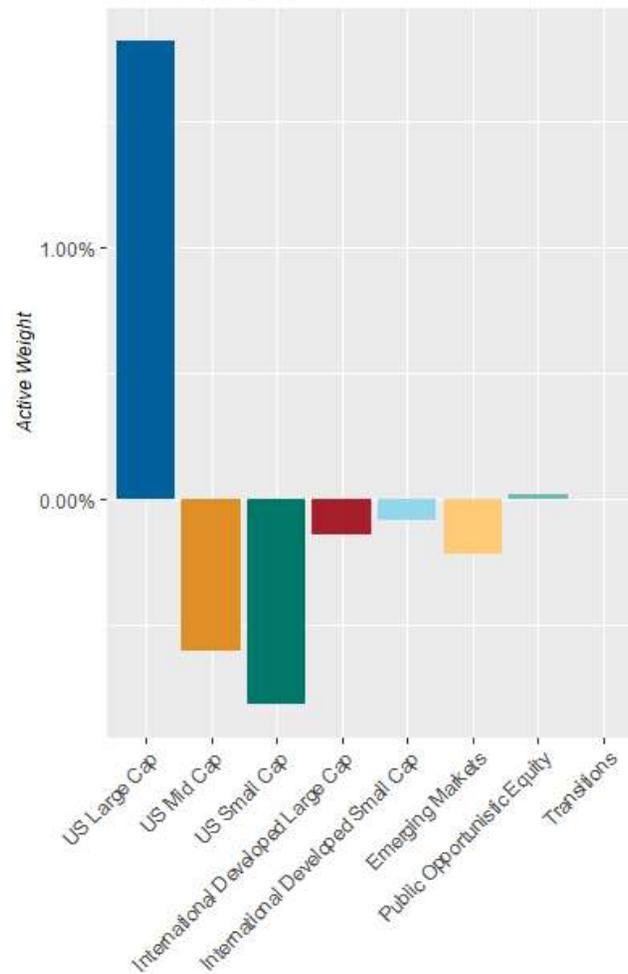
Allocation Effect by ACWI Subcomponents

Relative to ACWI IMI



Composite Average Active Weights

Relative to ACWI IMI



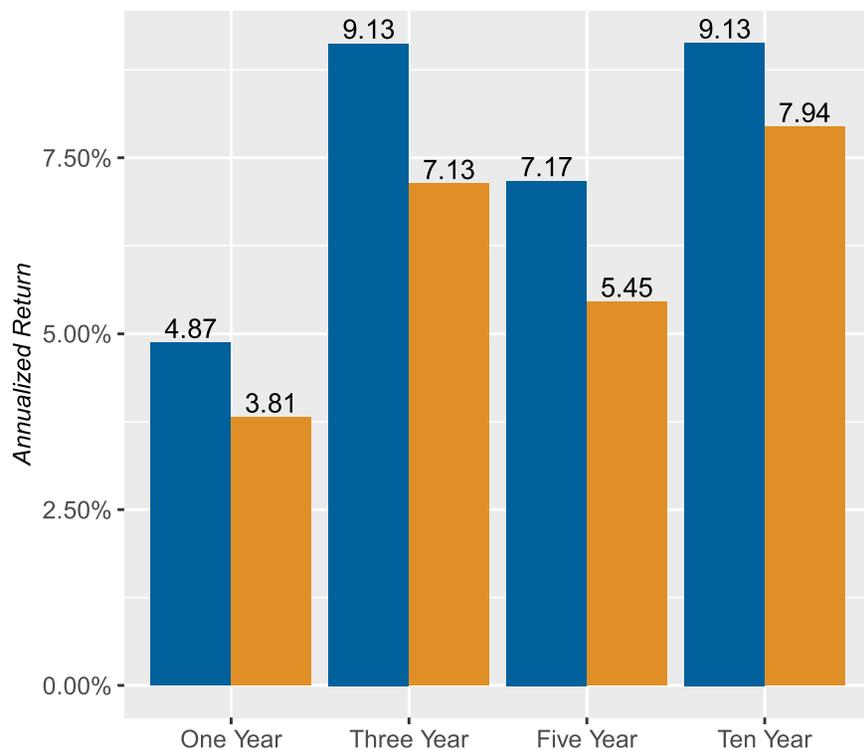
Quarterly Performance

Total Fund

Trailing Returns & Dollar Value Add for the period ended 9/30/2019 - Preliminary

Total Fund and Strategic Asset Allocation Benchmark

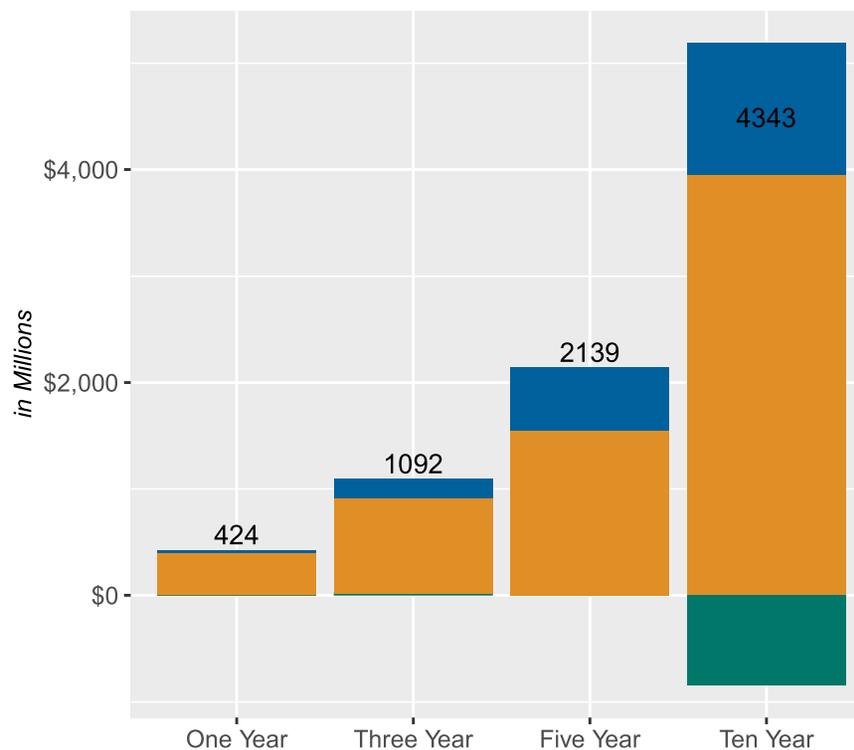
Trailing Period Returns



■ Total Fund ■ Strategic Asset Allocation Benchmark

Total Fund Dollar Value Add

Relative to Strategic Asset Allocation Benchmark

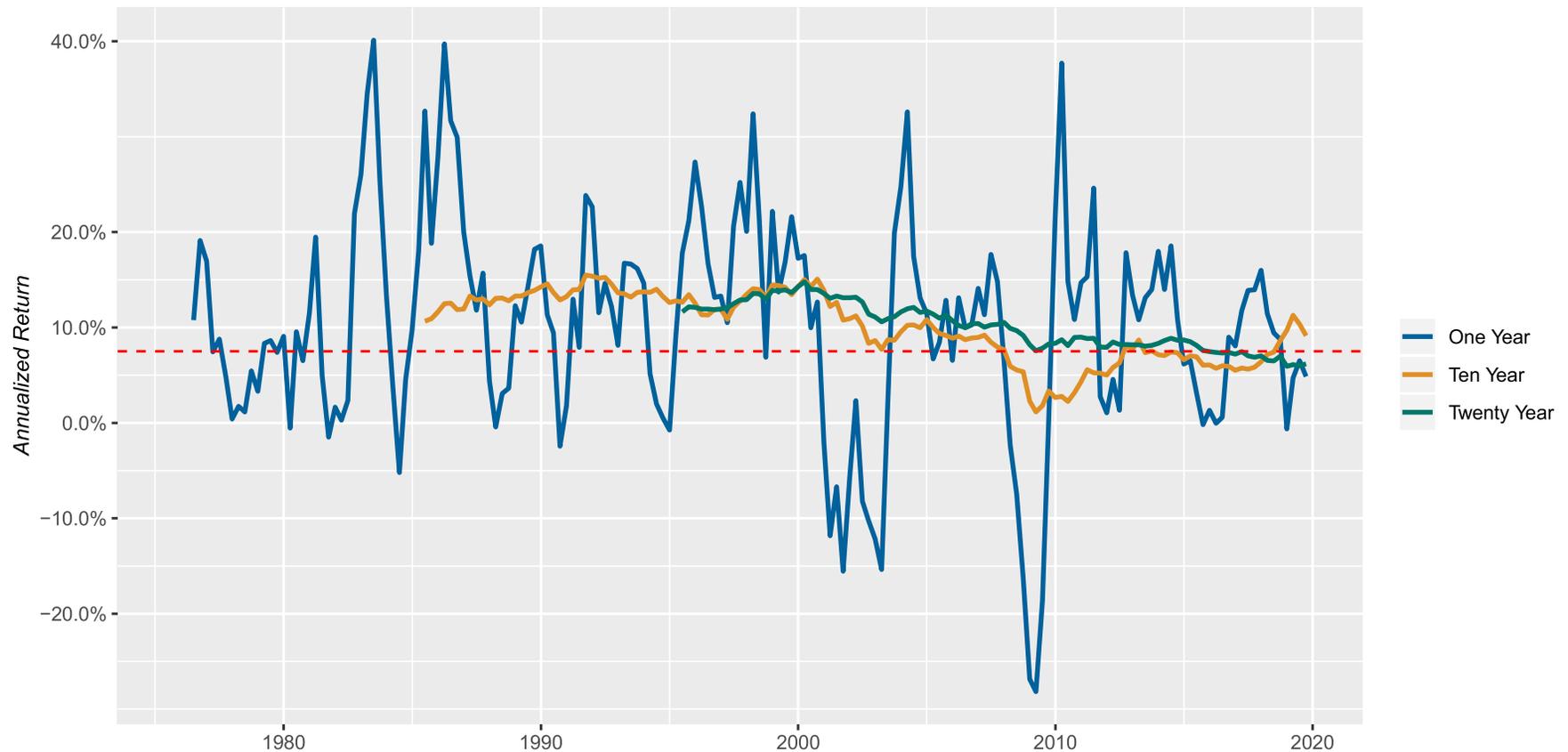


■ Allocation ■ Excess Return ■ Residual

Total Fund Returns for the period ended 9/30/2019 - Preliminary

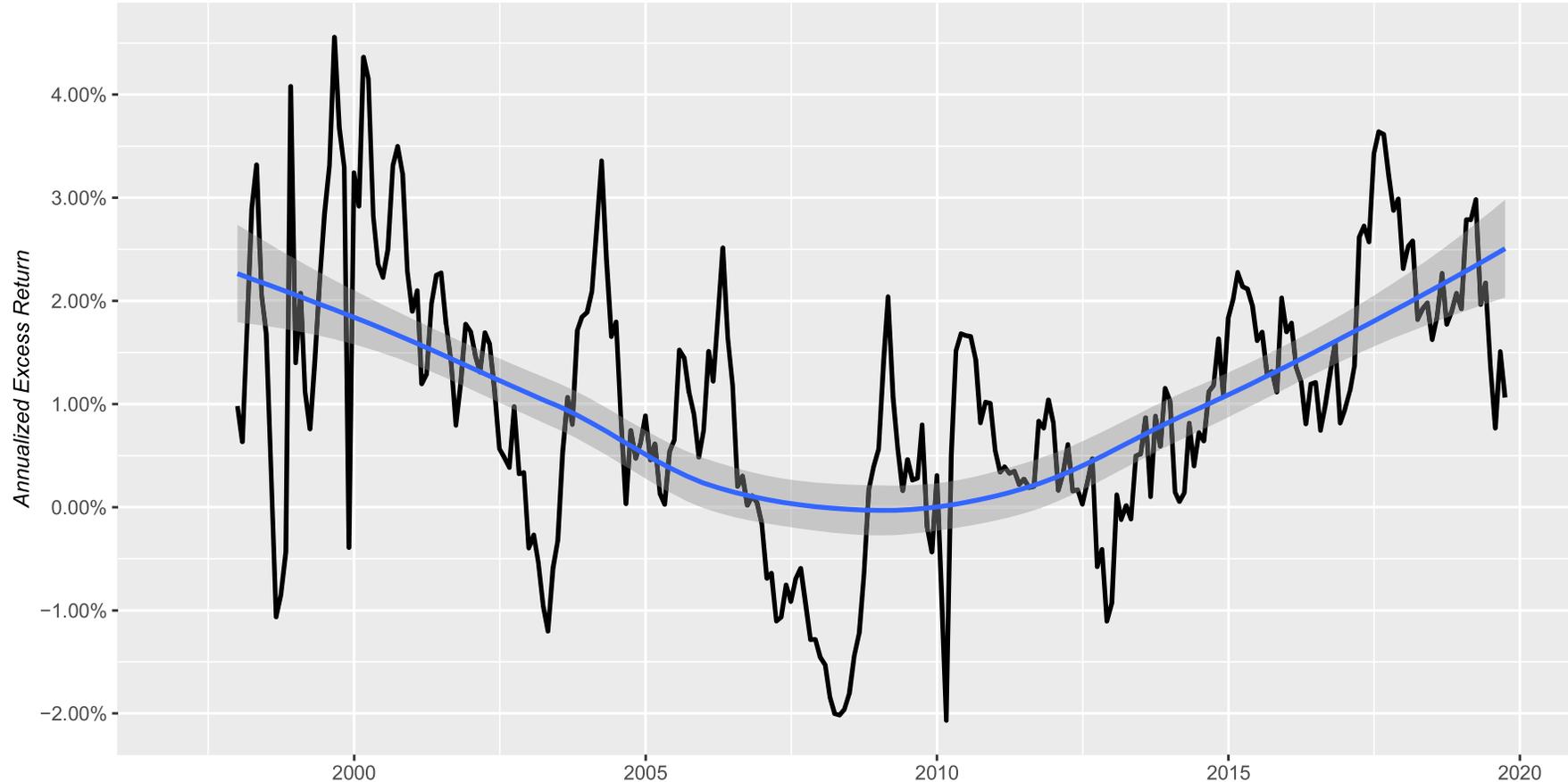
Total Fund Rolling Returns

Trailing Period Returns



Total Fund Rolling 1 Year Excess Return for the period ended 9/30/2019 - Preliminary

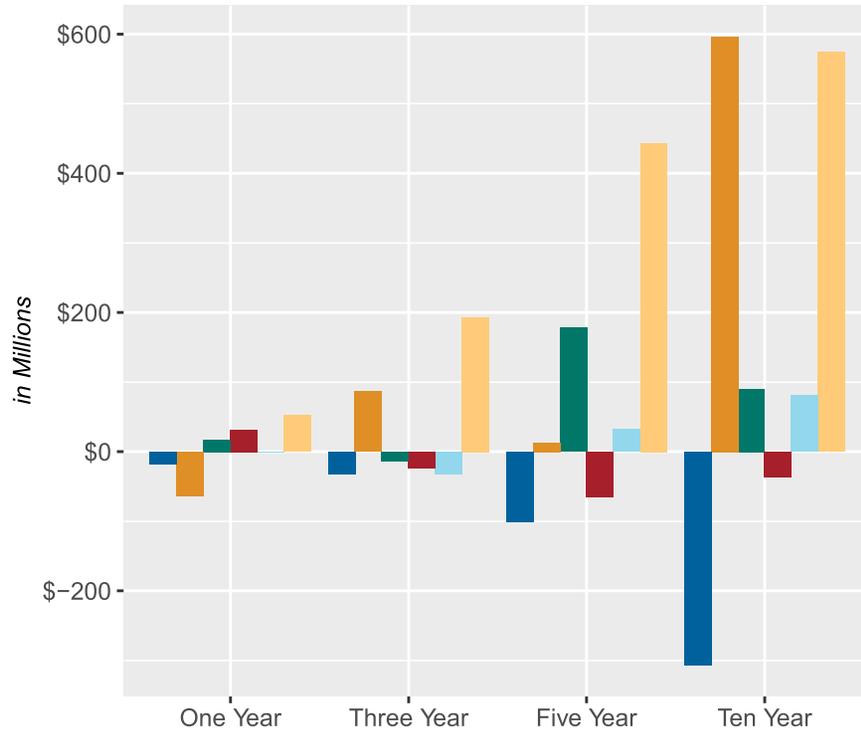
Total Fund Rolling 1 Year Excess



Allocation Effect for the period ended 9/30/2019 - Preliminary

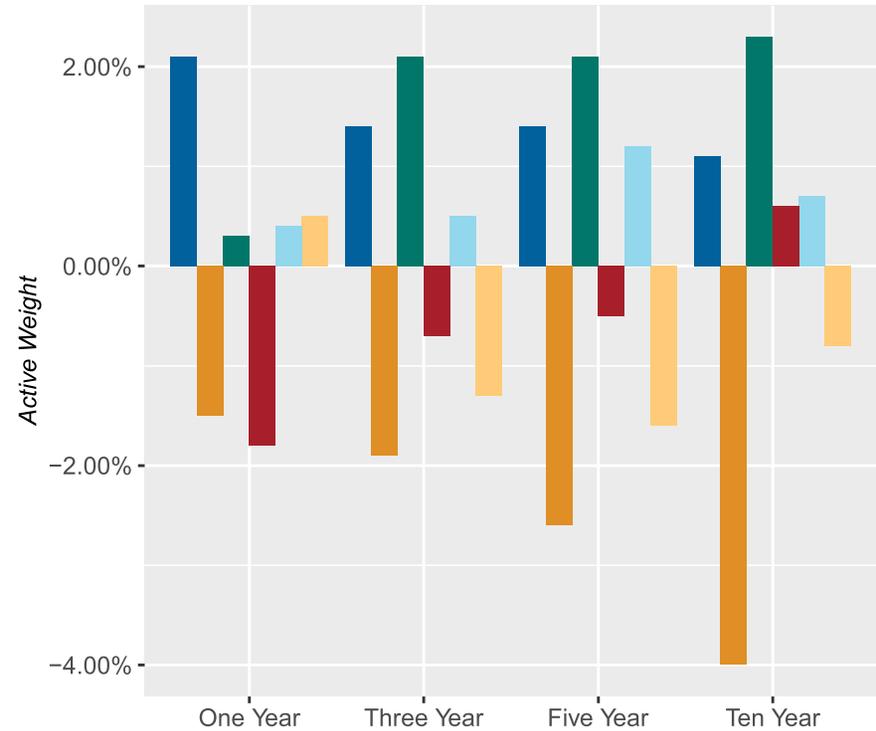
Allocation Effect by Asset Class

Relative to Strategic Asset Allocation Benchmark



Asset Class Average Active Weights

Relative to Strategic Asset Allocation Policy

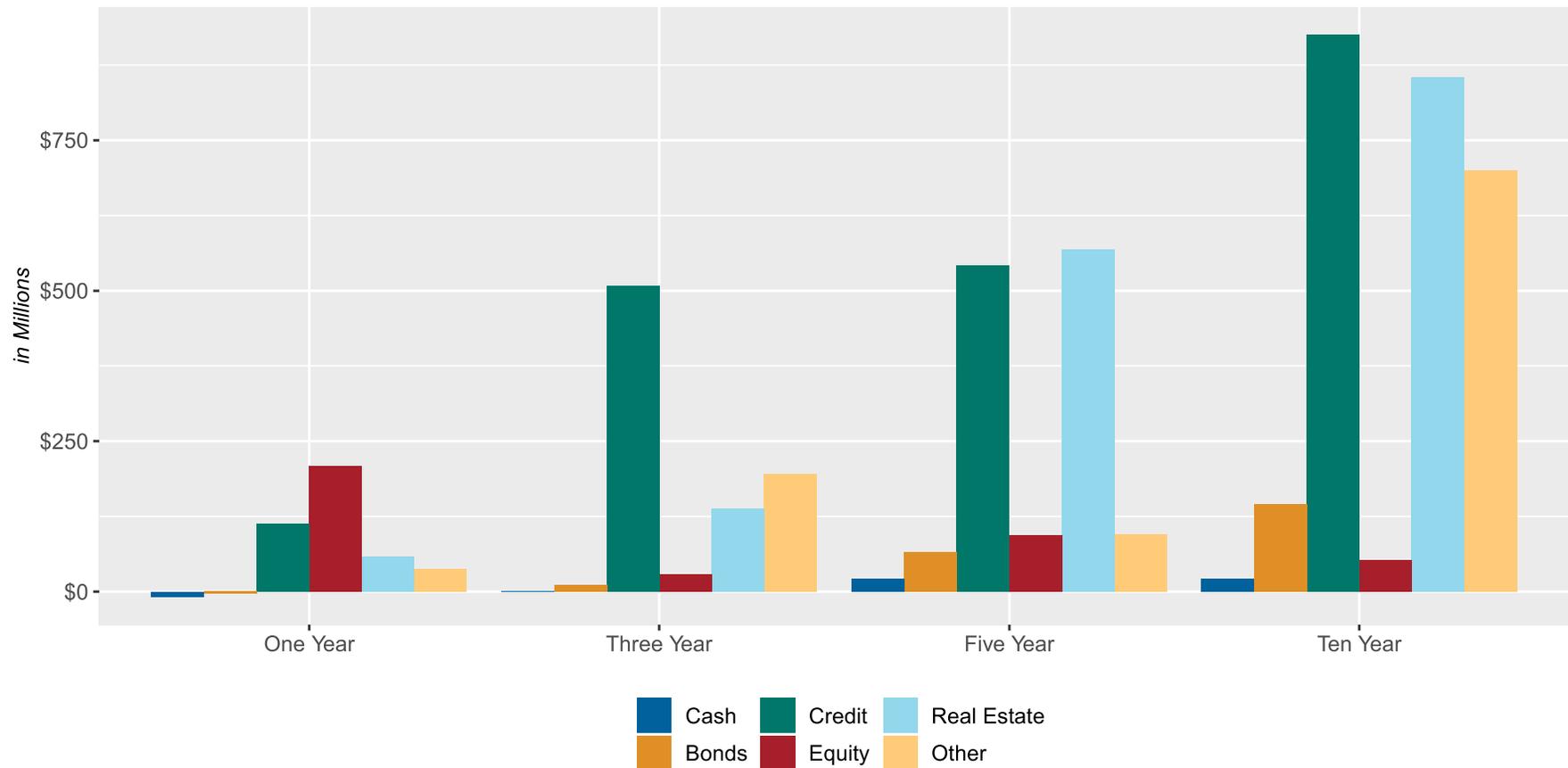


■ Cash ■ Credit ■ Real Estate
■ Bonds ■ Equity ■ Other

Excess Return by Asset Class for the period ended 9/30/2019 - Preliminary

Excess Return by Asset Class

Relative to Strategic Asset Allocation Benchmark



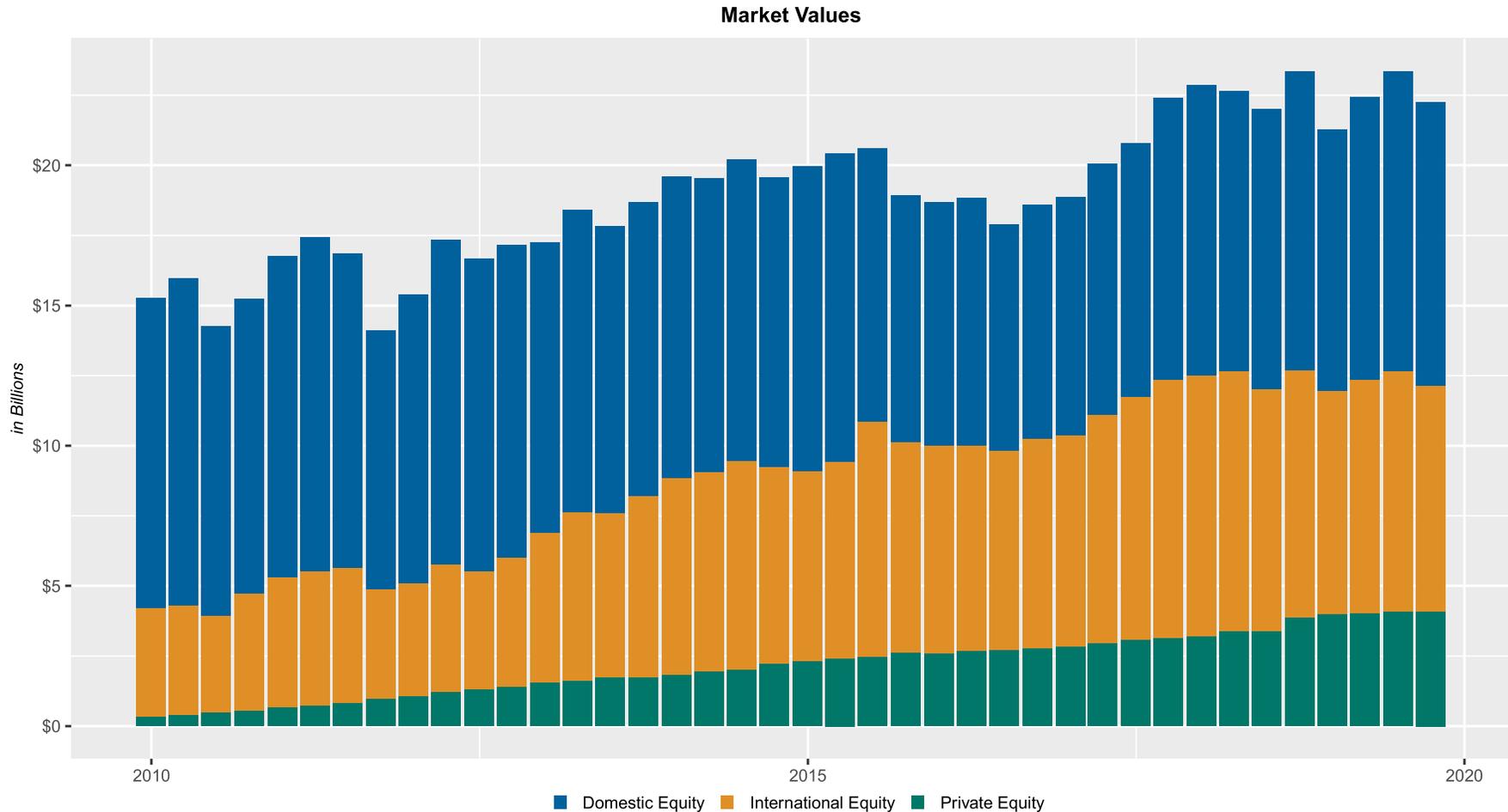
Equity

Total Equities for the period ended 9/30/2019 - Preliminary

Returns for the period ended 9/30/2019

Composite	Quarter	One Year	Three Year	Five Year
Equity	0.58%	2.28%	10.2%	7.65%
Benchmark	0.52%	1.37%	10.33%	7.57%
Excess	0.06%	0.9%	-0.13%	0.08%
Public Equity	0.03%	0.16%	9.24%	6.93%
Benchmark	-0.1%	0.8%	9.88%	7.44%
Excess	0.12%	-0.64%	-0.64%	-0.51%
US Equity	1.45%	2.26%	11.95%	10.15%
Benchmark	1.23%	3.01%	12.99%	10.94%
Excess	0.22%	-0.75%	-1.05%	-0.79%
International Equity	-1.71%	-2.28%	6.25%	3.17%
Benchmark	-1.72%	-1.85%	6.27%	3.29%
Excess	0.01%	-0.43%	-0.02%	-0.12%
Private Equity	3.28%	12.85%	14.82%	11.6%
Benchmark	3.12%	5.27%	12.43%	7.4%
Excess	0.16%	7.58%	2.38%	4.2%

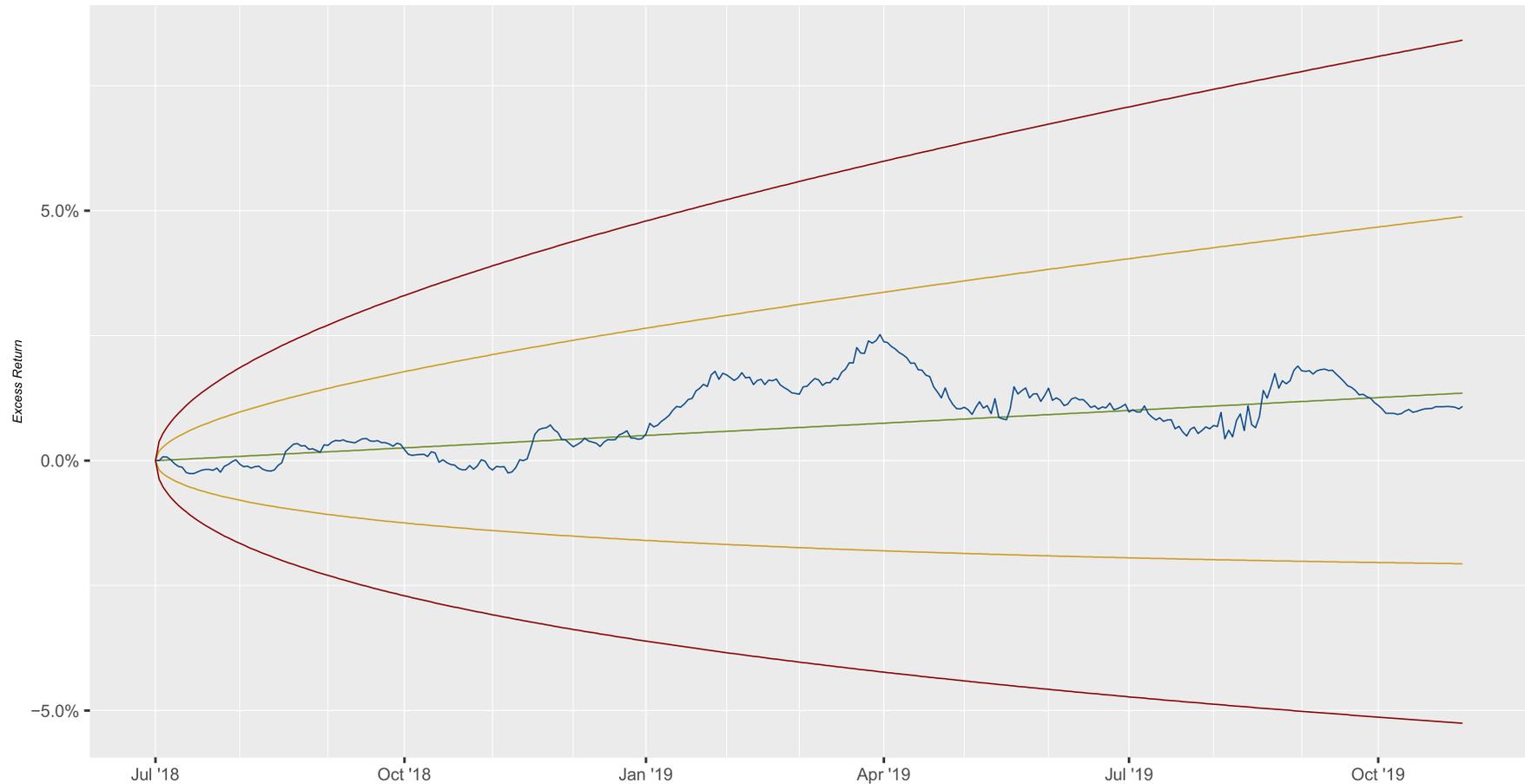
Total Equity Market Values for the period ended 9/30/2019 - Preliminary



Total Equity Performance for the period ended 9/30/2019 - Preliminary

Total Equity Portfolio Performance versus Expectations

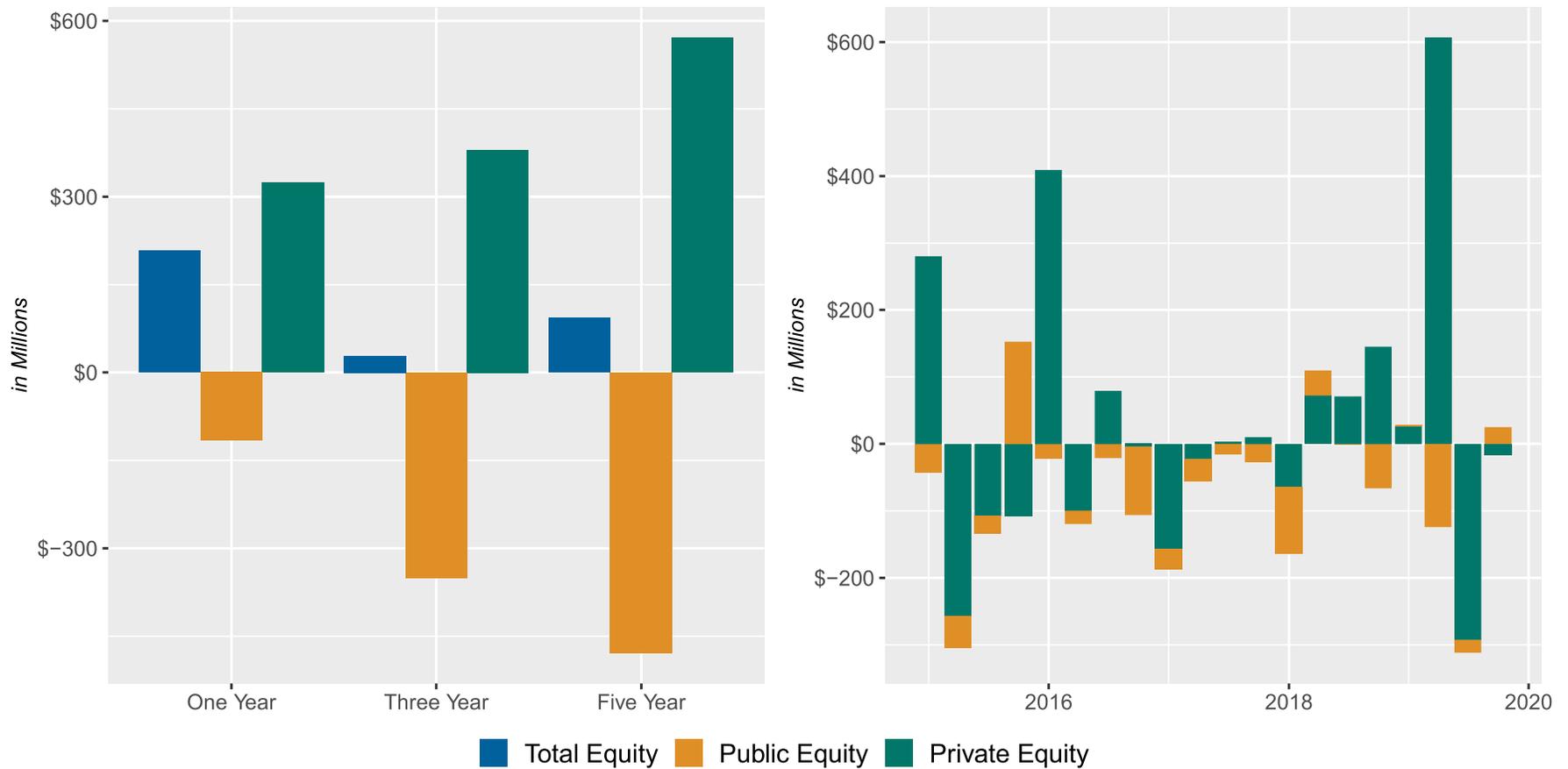
100 Basis Points Expected Excess Return with 300 Basis Points Tracking Error



Public Equity

Total Equity Returns and Dollar Value Add for the period ended 9/30/2019 - Preliminary

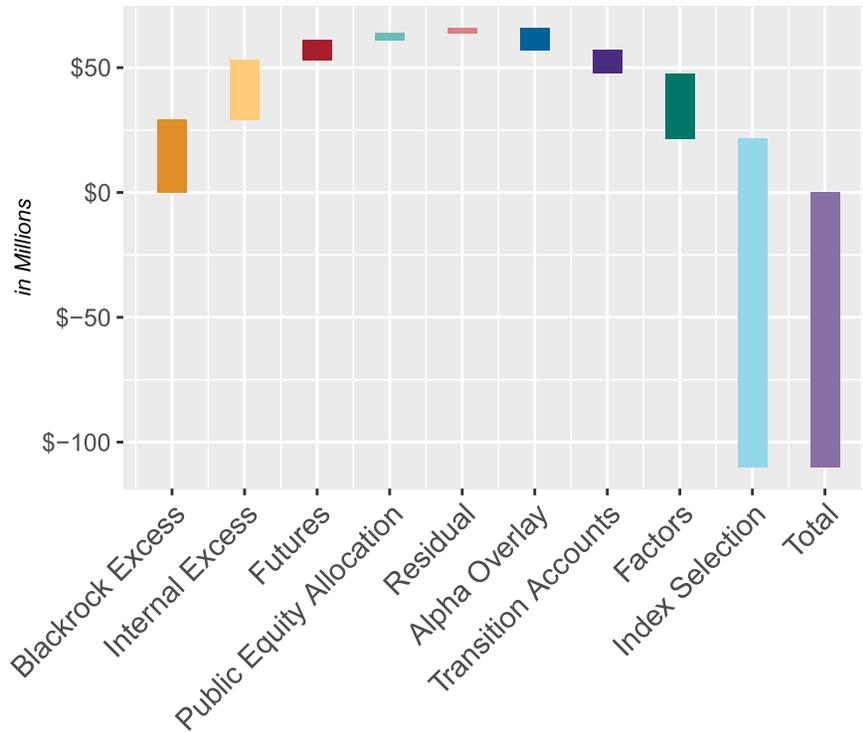
Total Equity Dollar Value Added



Public Equity “Levers” for the period ended 9/30/2019 - Preliminary

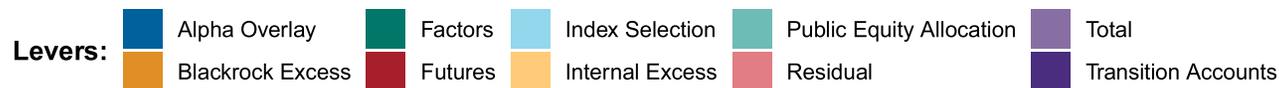
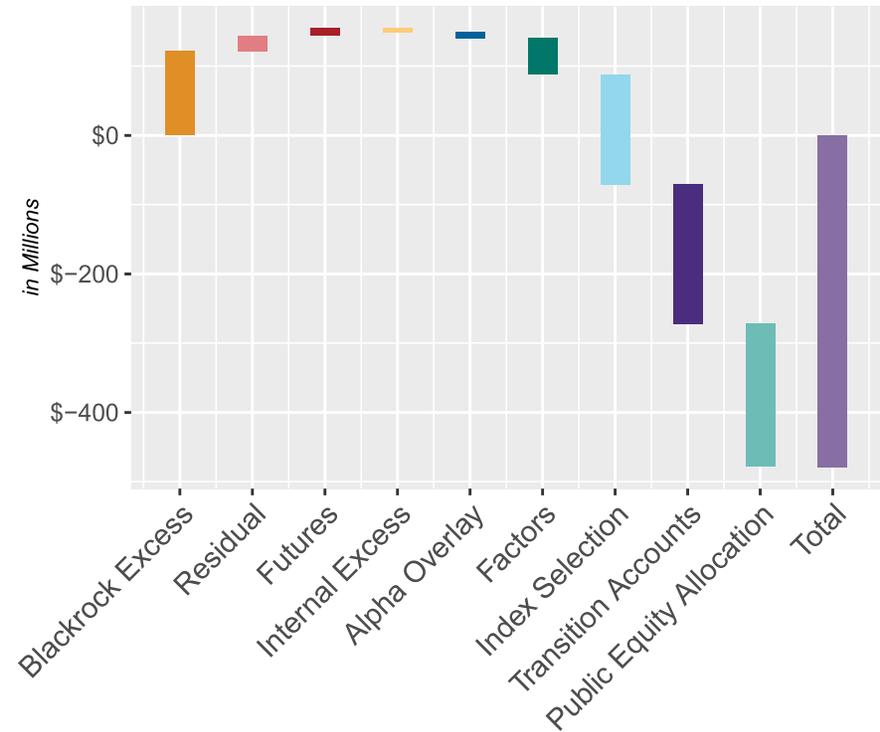
Public Equity Dollar Value Add

One Year



Public Equity Dollar Value Add

Trailing 5 Years



Private Equity

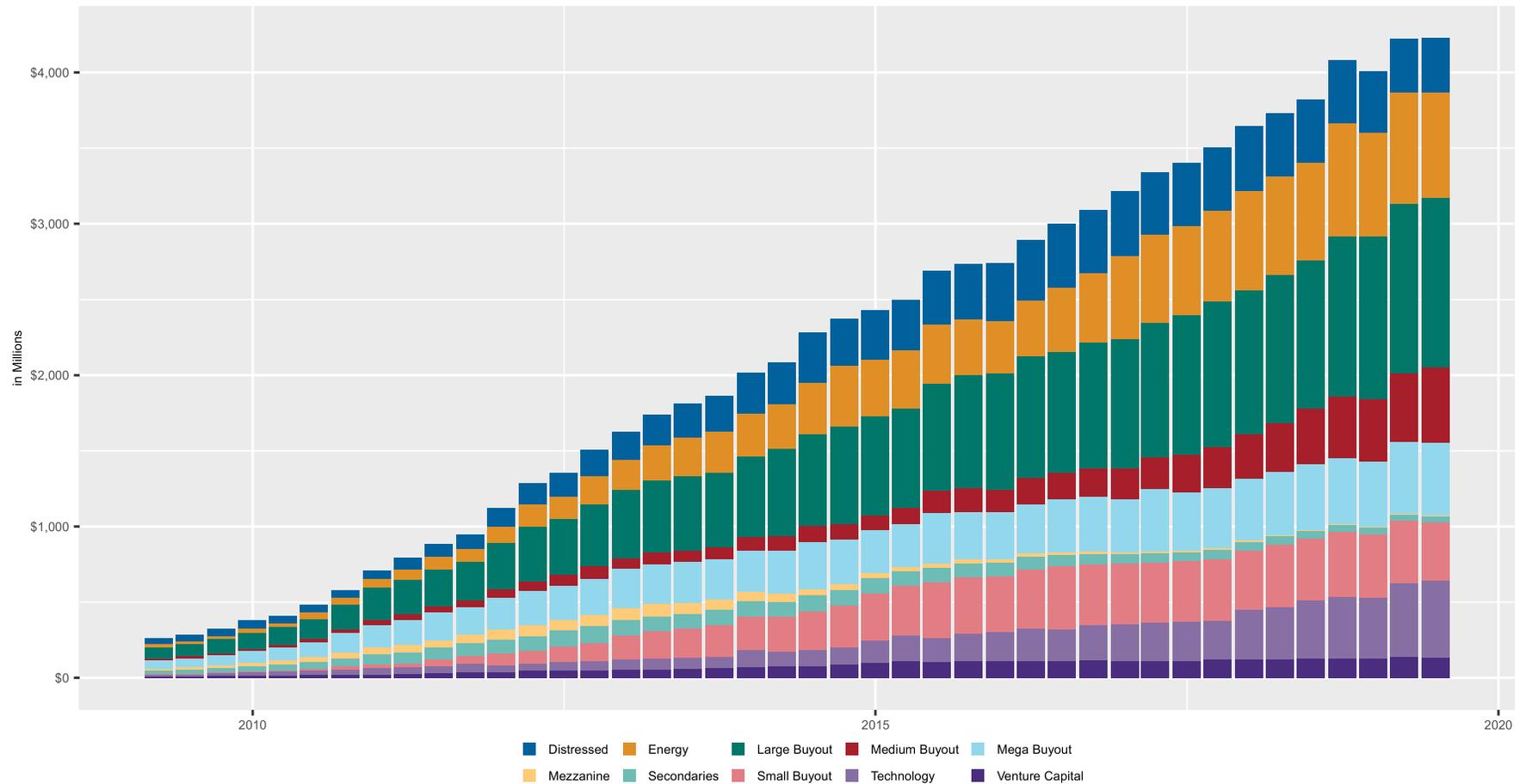
Private Equity Performance Overview & Allocation for the period ended 6/30/2019 - Preliminary

Private Equity Internal Rate of Return

Category	Quarter	1 Year	3 Year	5 Year	Inception
Private Equity	3.3%	12.8%	14.8%	11.6%	12.5%
Benchmark	3.1%	5.3%	12.4%	7.4%	11.2%
Excess	0.2%	7.6%	2.4%	4.2%	1.2%
Distressed	2.5%	-5.4%	3.2%	1.5%	6.6%
Energy	-3.6%	1.4%	8.4%	2.8%	7.1%
Large Buyout	6%	15.6%	16.2%	12.7%	13.8%
Medium Buyout	3%	16%	16.3%	18.5%	15.1%
Mega Buyout	3.2%	11.5%	18.6%	14%	13.4%
Mezzanine	3.2%	-11.8%	5.9%	8.4%	9.3%
Secondaries	-4%	-0.3%	6.9%	4%	9.1%
Small Buyout	5.4%	26.5%	21.6%	20.3%	15.7%
Technology	6.9%	31.4%	24.5%	22.7%	20.2%
Venture Capital	5.2%	17%	15.5%	15.1%	11.9%

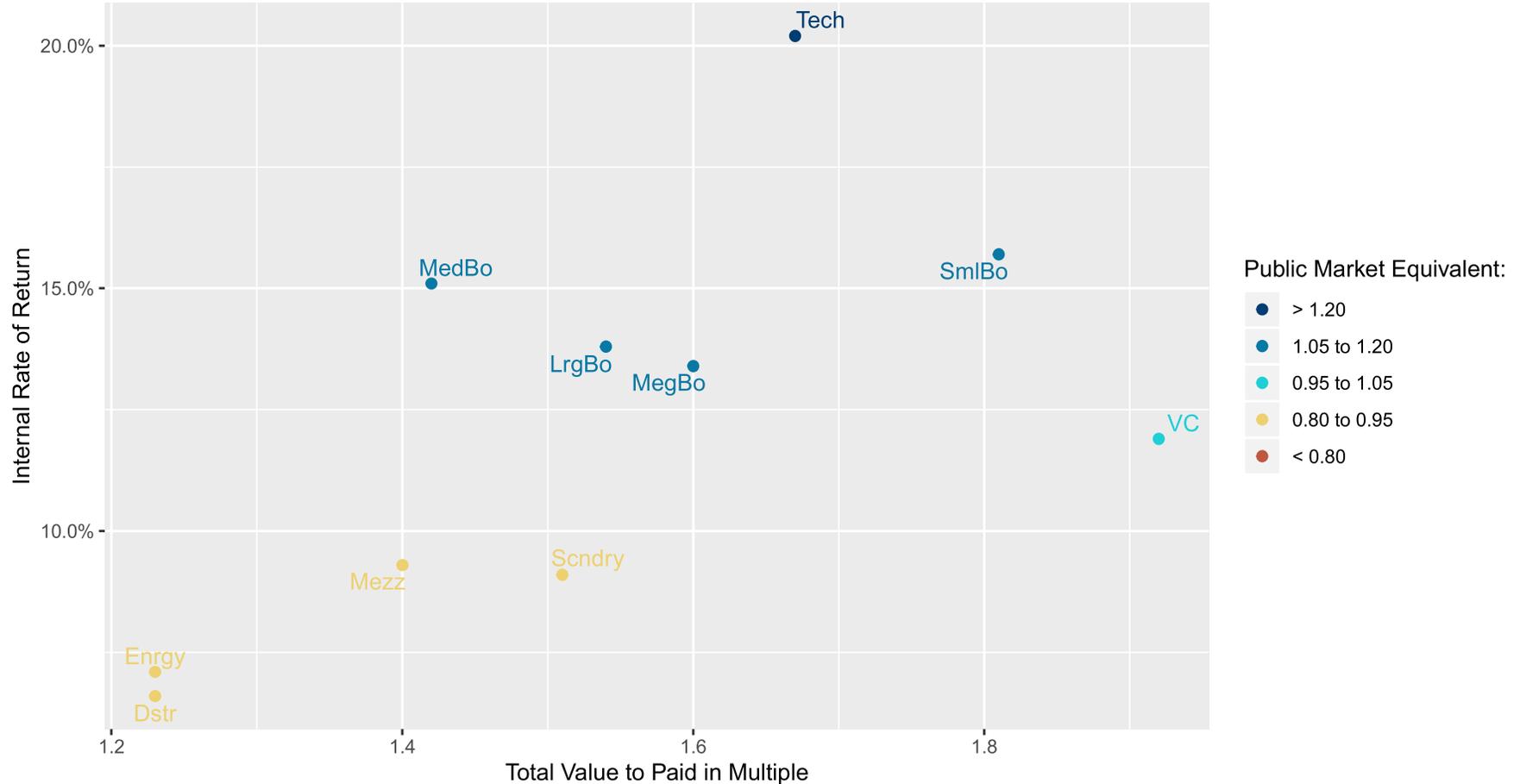
Private Equity Decomposition for the period ended 6/30/2019 - Preliminary

Net Asset Value by Strategy



Private Equity Performance by Category for the period ended 6/30/2019 - Preliminary

Comparison of Strategies



Real Estate

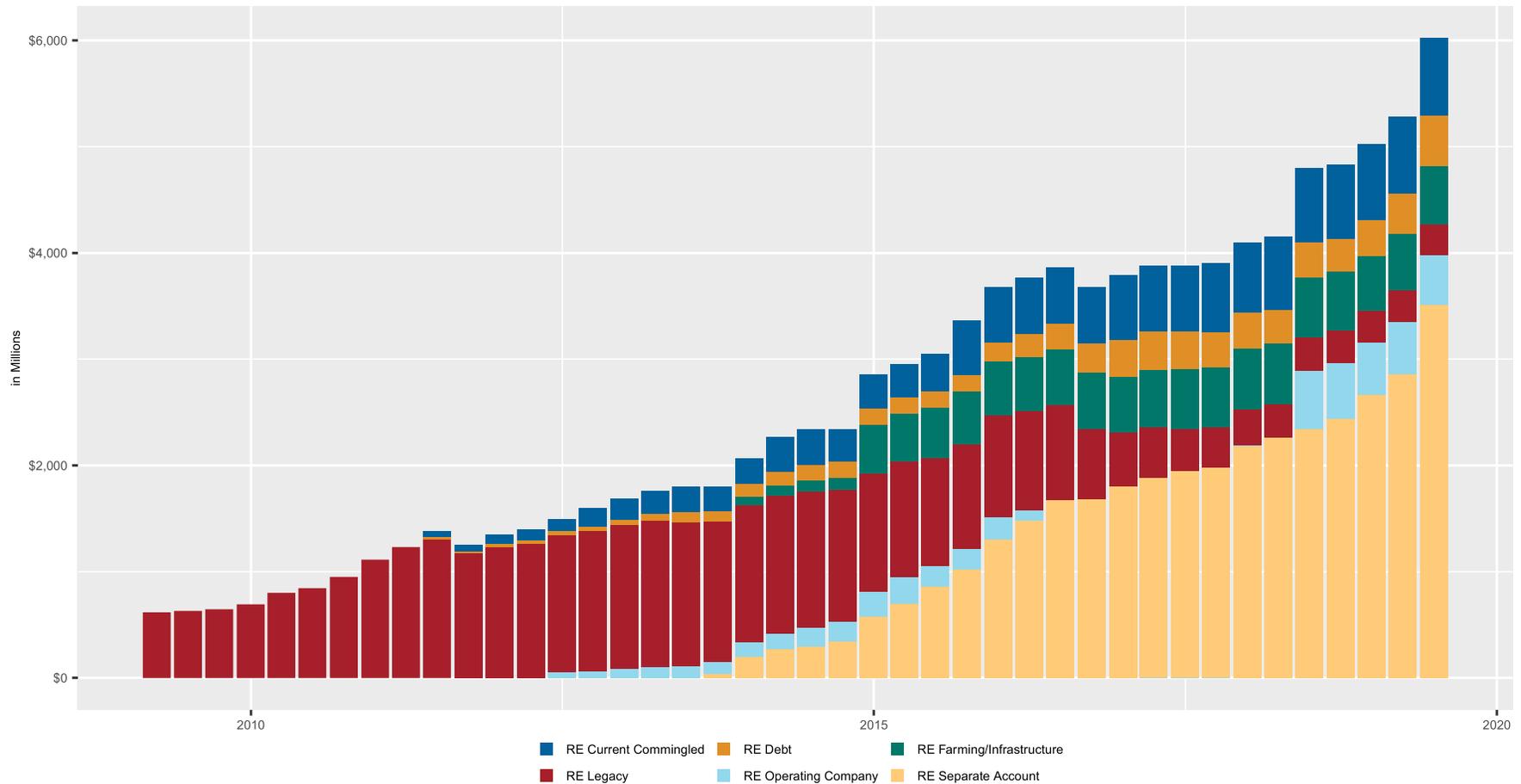
Real Estate Performance Overview & Allocation for the period ended 6/30/2019 - Preliminary

Real Estate Internal Rate of Return

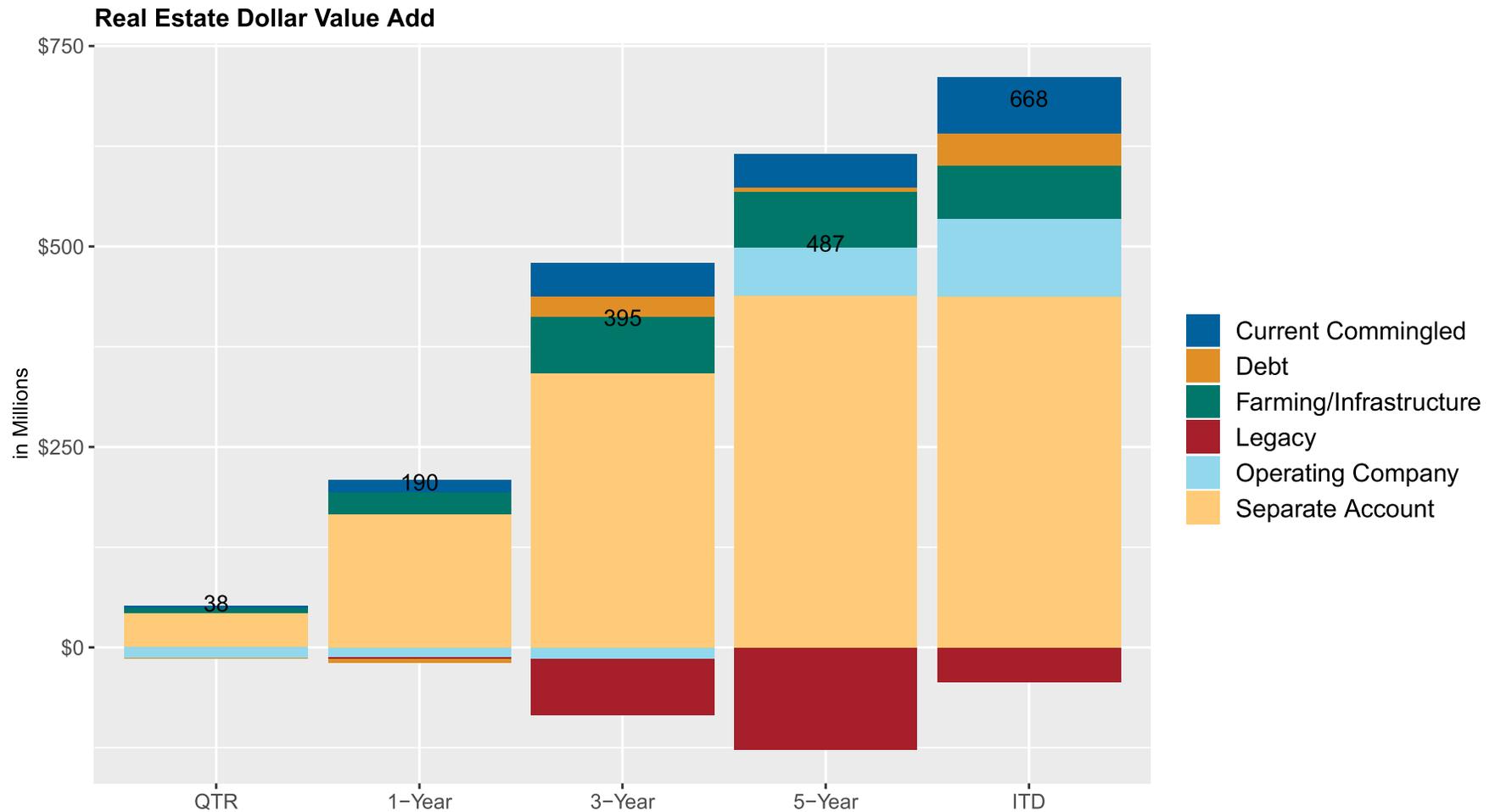
ID	Quarter	1-Year	3-Year	5-Year	Inception to Date
Real Estate	1.80	8.10	8.77	10.16	8.73
Benchmark	1.20	4.44	6.13	8.12	6.84
Excess	0.61	3.66	2.65	2.05	1.89
RE Current Commingled	1.52	6.58	8.39	9.87	11.00
RE Debt	1.17	3.22	8.87	8.60	11.28
RE Farming/Infrastructure	2.38	9.92	9.69	8.12	7.91
RE Legacy	1.48	3.64	1.45	7.53	5.82
RE Operating Company	-1.59	1.84	2.68	13.20	15.20
RE Separate Account	2.59	10.95	11.42	12.89	12.84

Real Estate Net Asset Value by Strategy for the period ended 6/30/2019 - Preliminary

Net Asset Value by Strategy

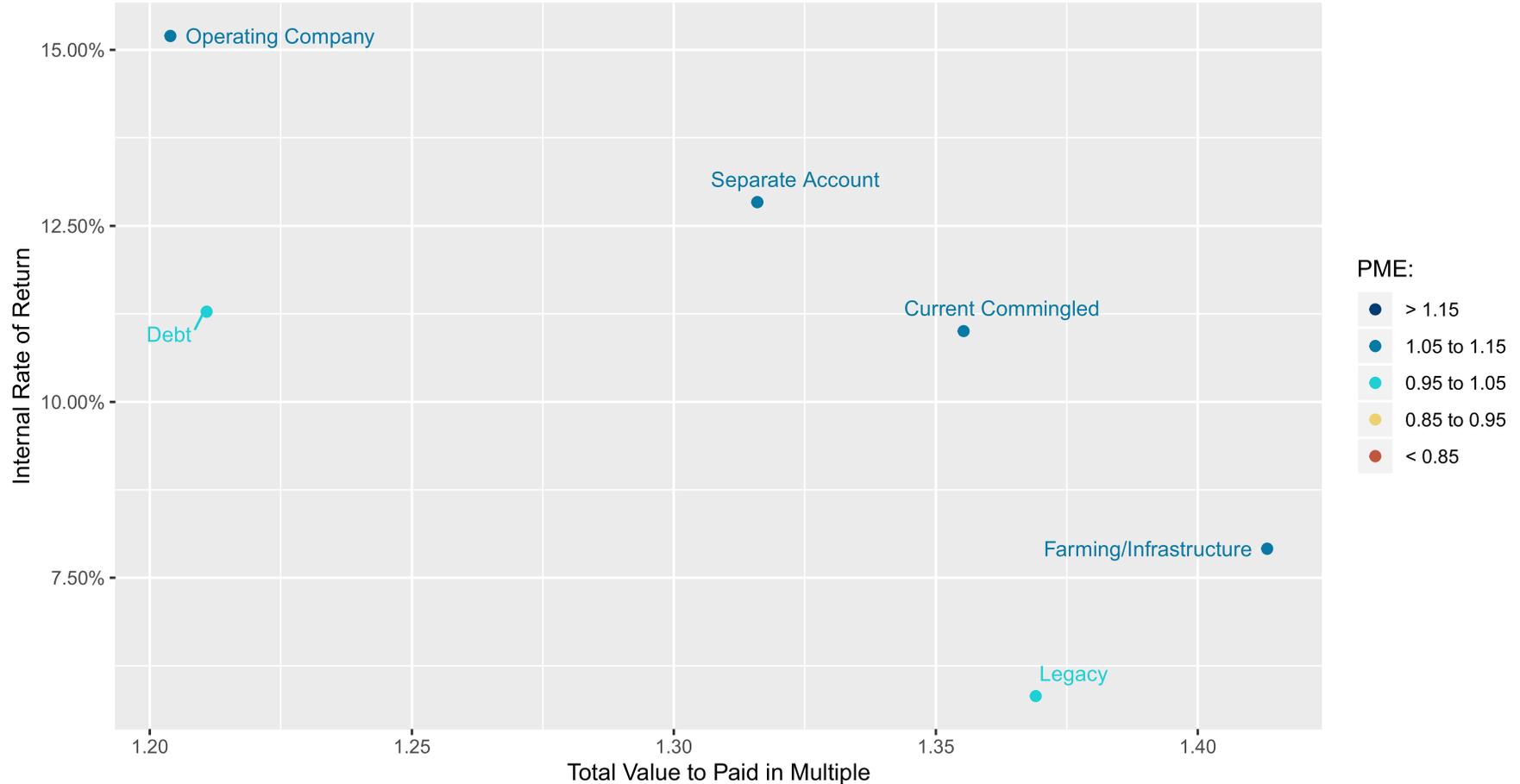


Real Estate Dollar Value Add for the period ended 6/30/2019 - Preliminary



Real Estate Performance Summary for the period ended 6/30/2019 - Preliminary

Comparison of Real Estate Strategies



Credit

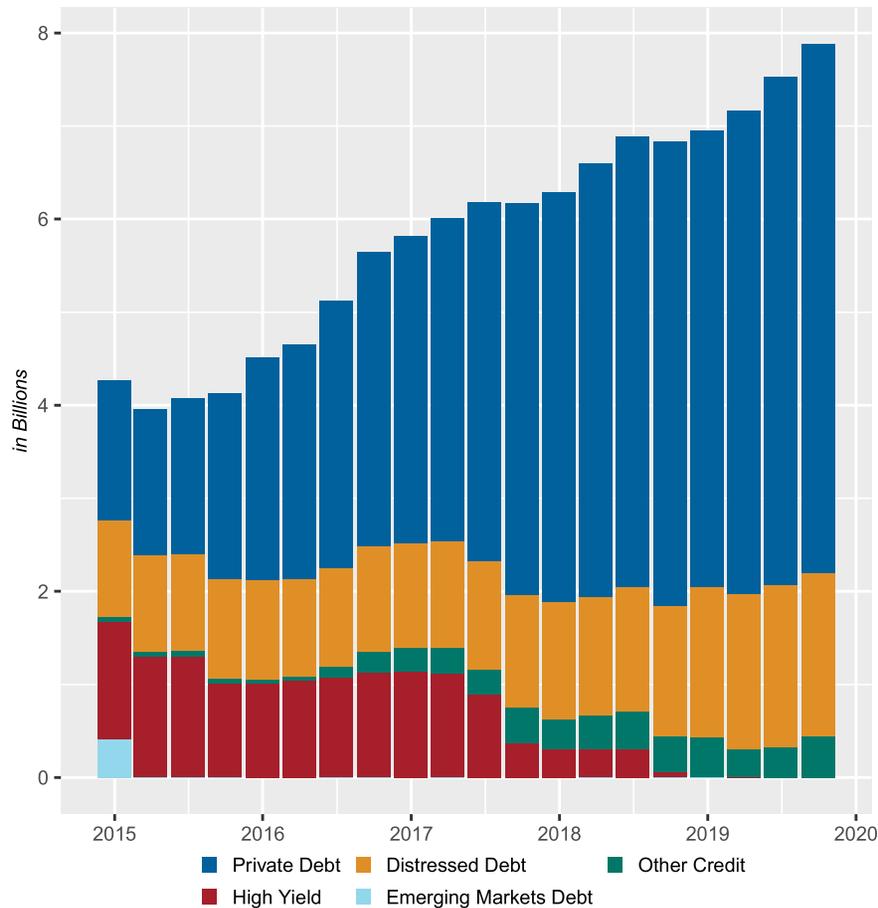
Total Credit for the period ended 9/30/2019 - Preliminary

Credit Annualized Returns

	Quarter	One Year	Three Year	Five Year
Total Credit (TWR)	2.44	8.87	10.66	9.11
Blended Benchmark	2.30	6.57	7.56	7.09
Total Credit Excess	0.14	2.30	3.10	2.02
Private Debt (IRR)	2.39	9.26	10.79	10.31
S&P/LSTA Leveraged Loan + 250 Basis Points	2.30	6.58	7.68	6.87
Private Debt Excess	0.09	2.68	3.11	3.44
Distressed Debt (IRR)	2.76	8.26	10.87	6.36
Fixed 8% Return/LSTA Blend	2.28	6.50	7.24	7.53
Distressed Debt Excess	0.48	1.76	3.63	-1.17
Other Credit (IRR)	1.40	6.19	8.10	7.69
Fixed 8% Return/LSTA Blend	2.32	6.71	7.27	7.37
Other Credit Excess	-0.92	-0.52	0.83	0.32

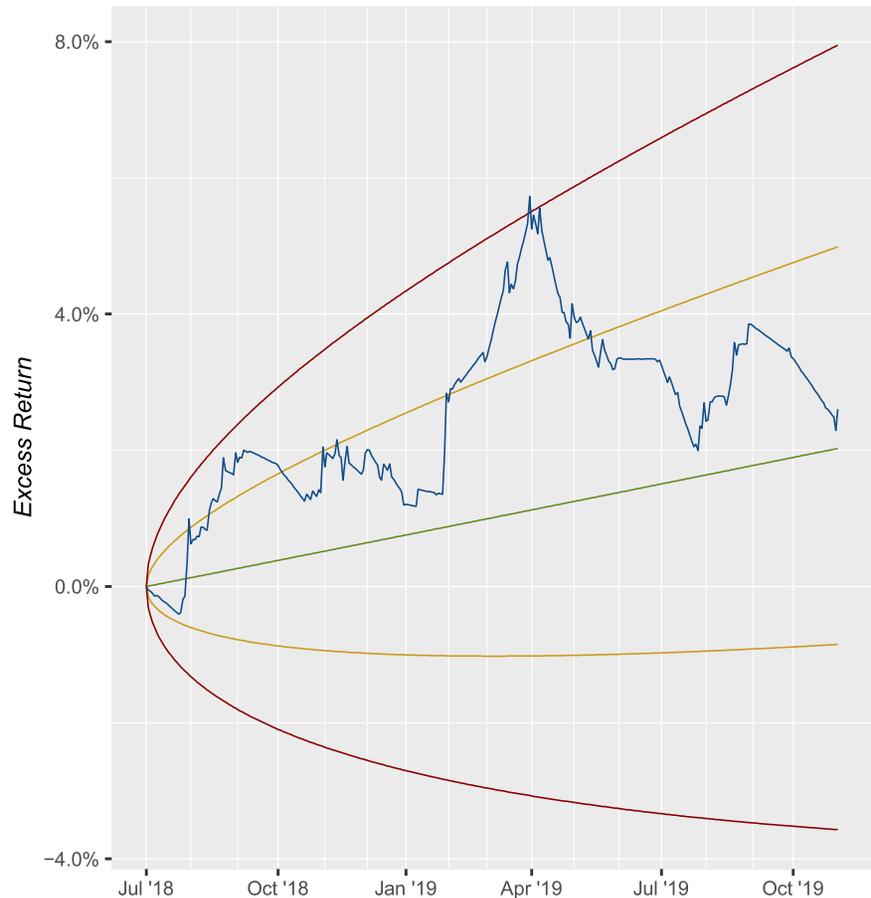
Credit Market Values and Performance for the period ended 9/30/2019 - Preliminary

Total Credit Market Values



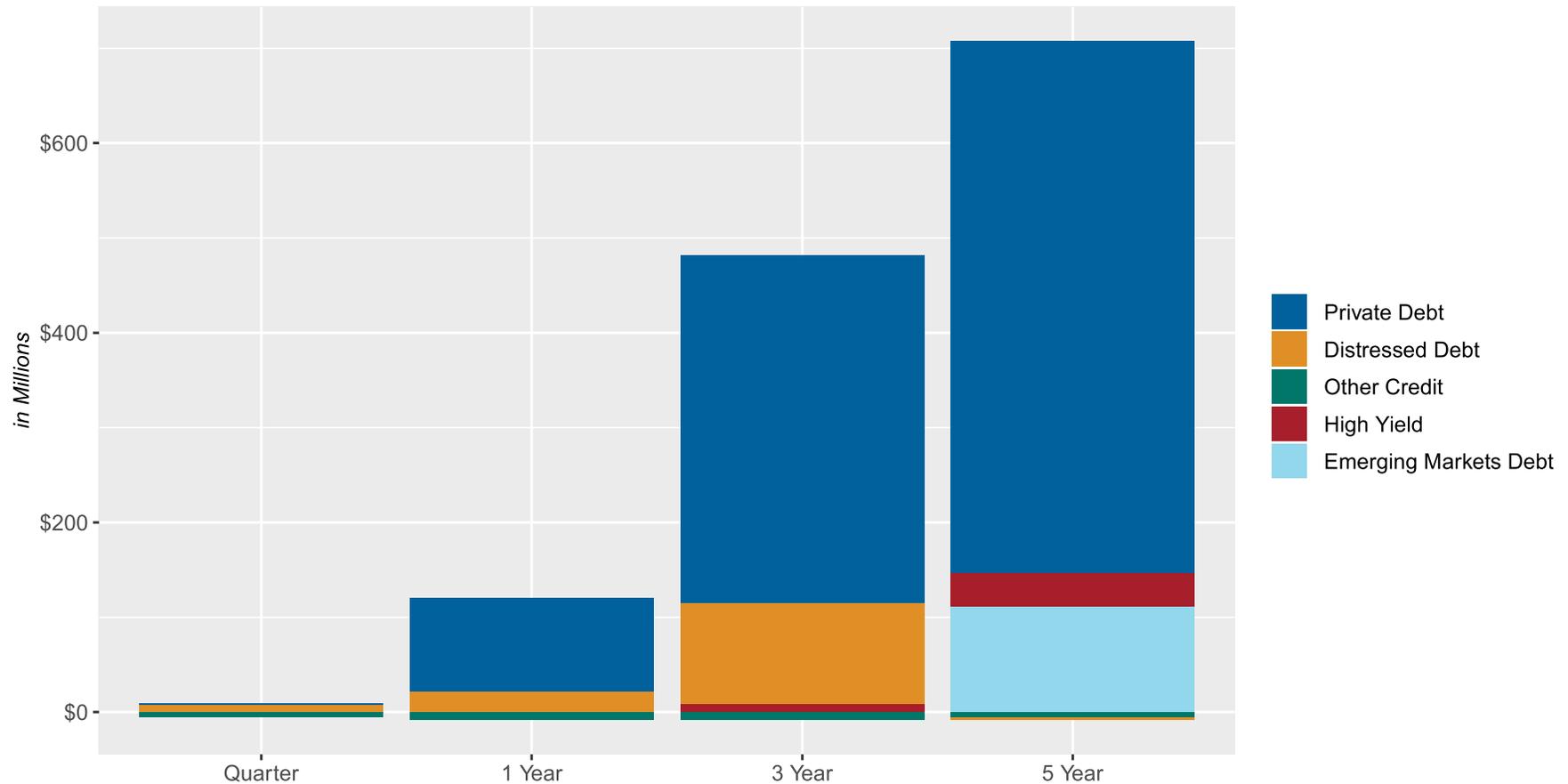
Total Credit Portfolio Performance versus Expectations

150 Basis Points Expected Excess Return with 250 Basis Points Tracking Error



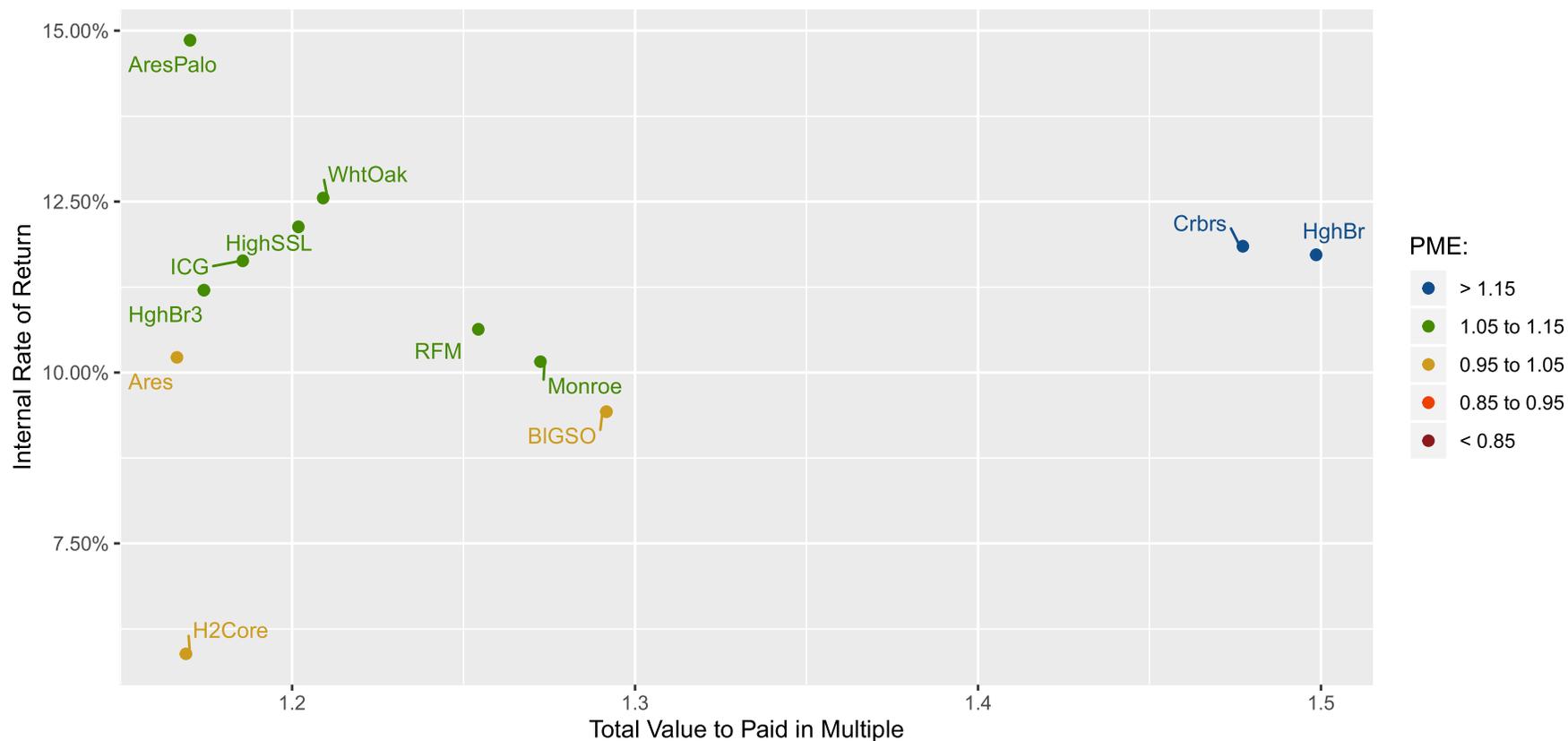
Credit Dollar Value Add for the period ended 6/30/2019 - Preliminary

Credit Dollar Value Add versus Benchmark



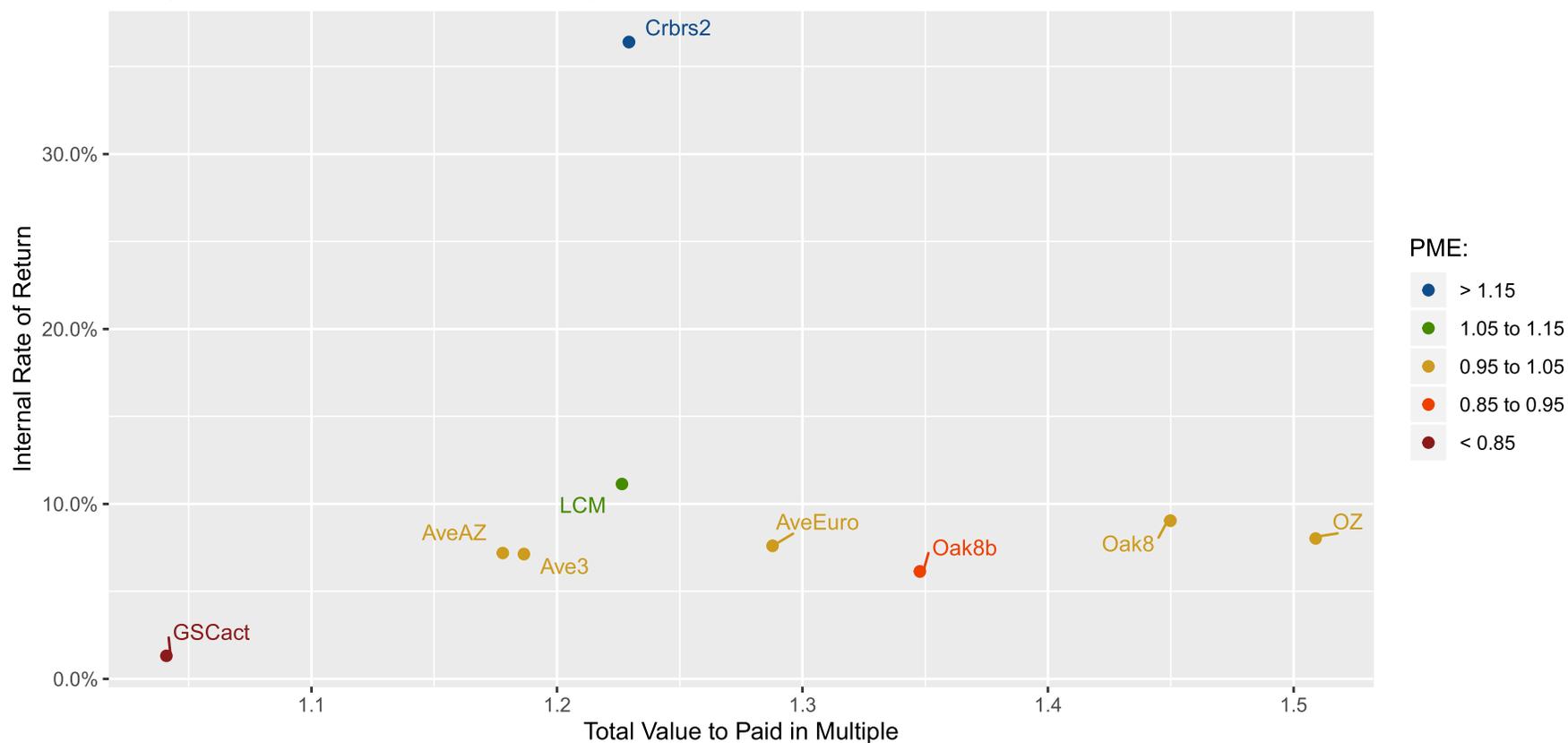
Private Debt: Total Value to Paid in Multiple & Public Market Equivalent for the period ended 6/30/2019 - Preliminary

Comparison of Private Debt Strategies



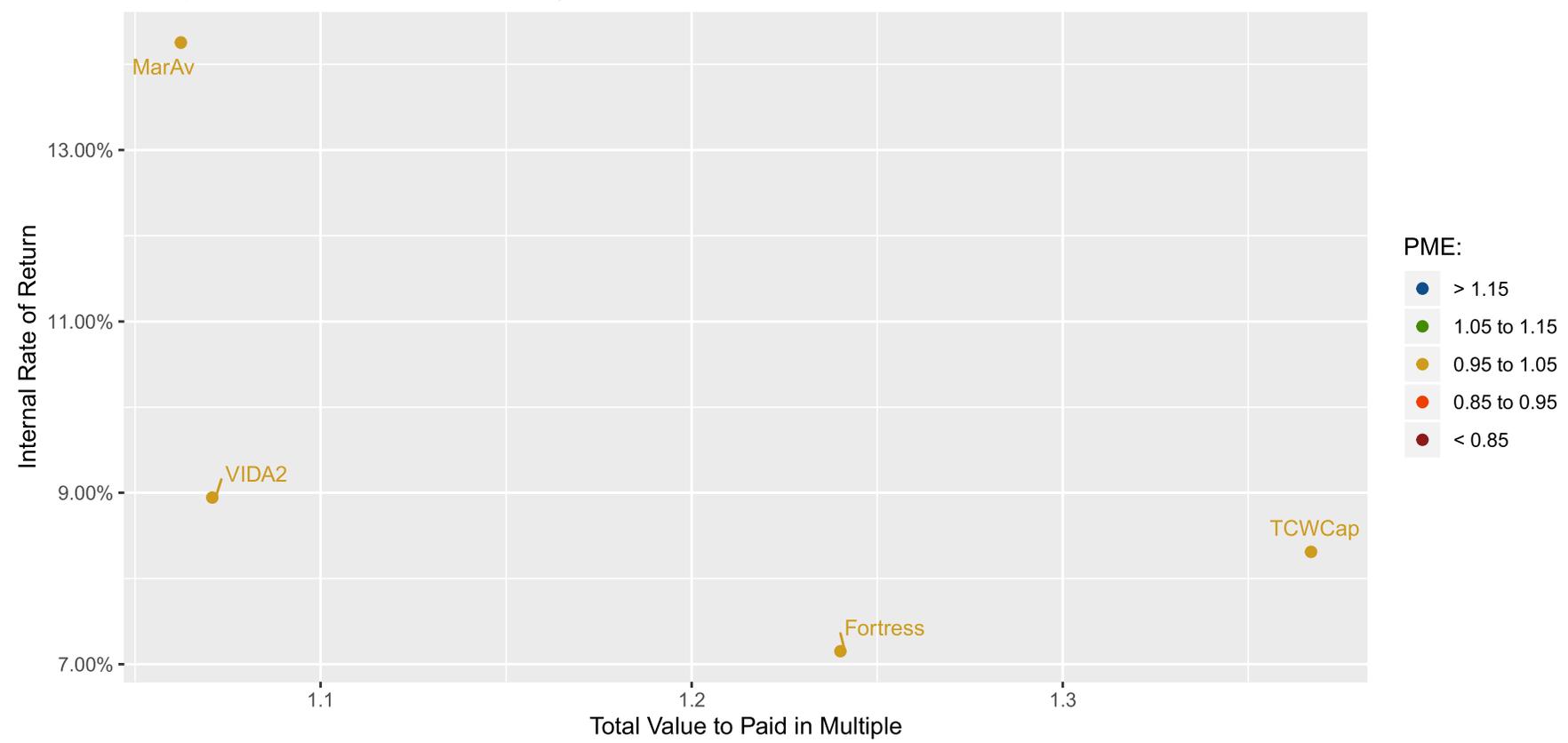
Distressed Debt: Total Value to Paid in Multiple & Public Market Equivalent for the period ended 6/30/2019 - Preliminary

Comparison of Distressed Debt Strategies



Other Credit: Total Value to Paid in Multiple & Public Market Equivalent for the period ended 6/30/2019 - Preliminary

Comparison of Other Credit Strategies



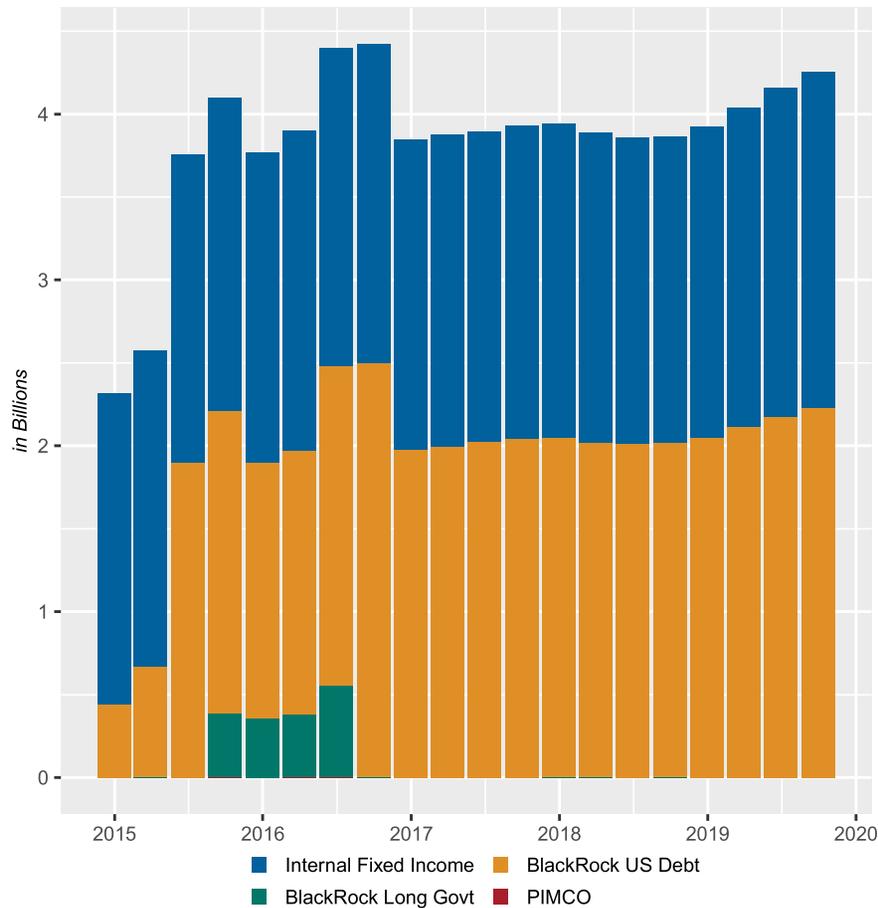
Core Fixed Income for the period ended 9/30/2019 - Preliminary

Annualized Time-Weighted Returns

	FYTD	1 Year	3 Year	5 Year
Core Bond Composite	10.27	10.21	3.00	3.66
Barclay's Aggregate	10.32	10.30	2.92	3.38
Core Composite Excess	-0.04	-0.09	0.08	0.28
Internal Fixed Income	10.12	10.05	3.01	3.51
Barclay's Aggregate	10.32	10.30	2.92	3.38
Internal Fixed Income Excess	-0.20	-0.24	0.08	0.14
BlackRock US Debt Fund	10.41	10.35	3.01	3.47
Barclay's Aggregate	10.32	10.30	2.92	3.38
BlackRock Excess	0.10	0.06	0.08	0.09

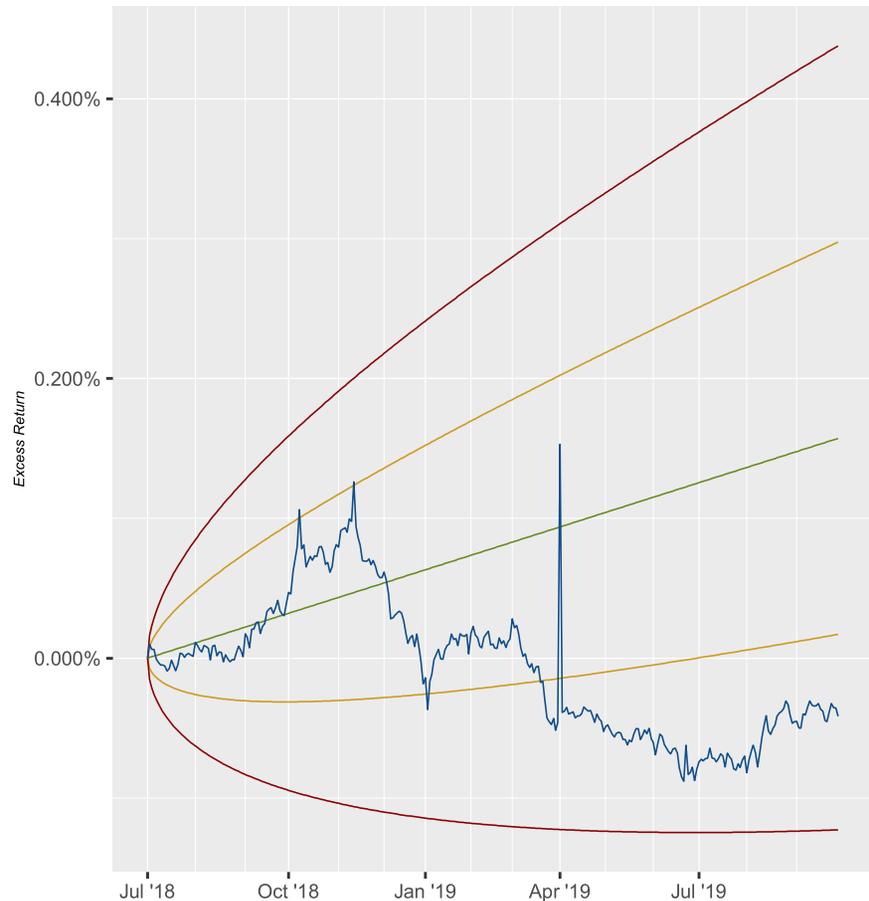
Core Fixed Income Decomposition for the period ended 9/30/2019 - Preliminary

Core Bonds Market Values



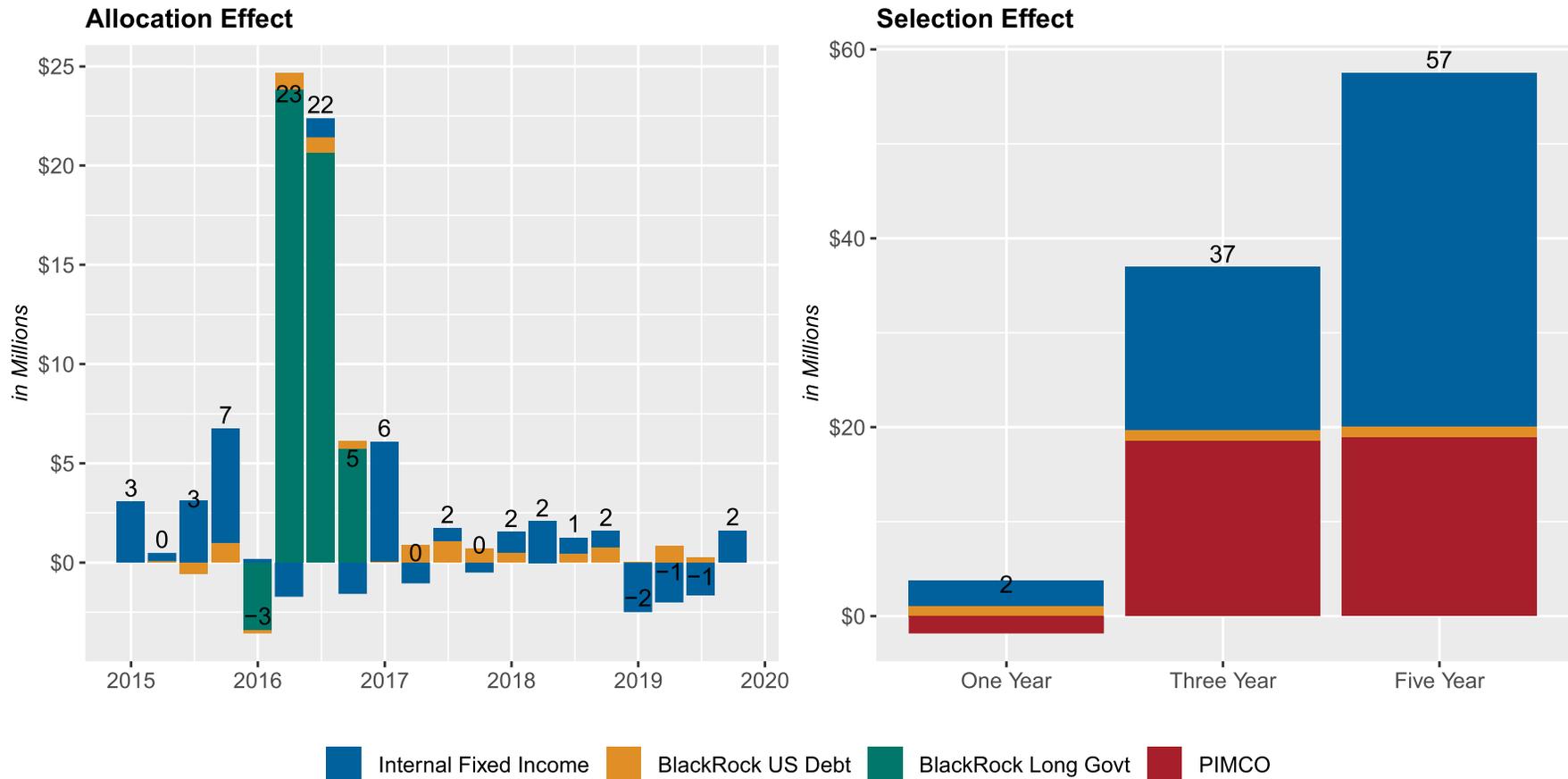
Core Bond Portfolio Performance versus Expectations

12.5 Basis Points Expected Excess Return with 12.5 Basis Points Tracking Error



Core Fixed Income Dollar Value Added for the period ended 9/30/2019 - Preliminary

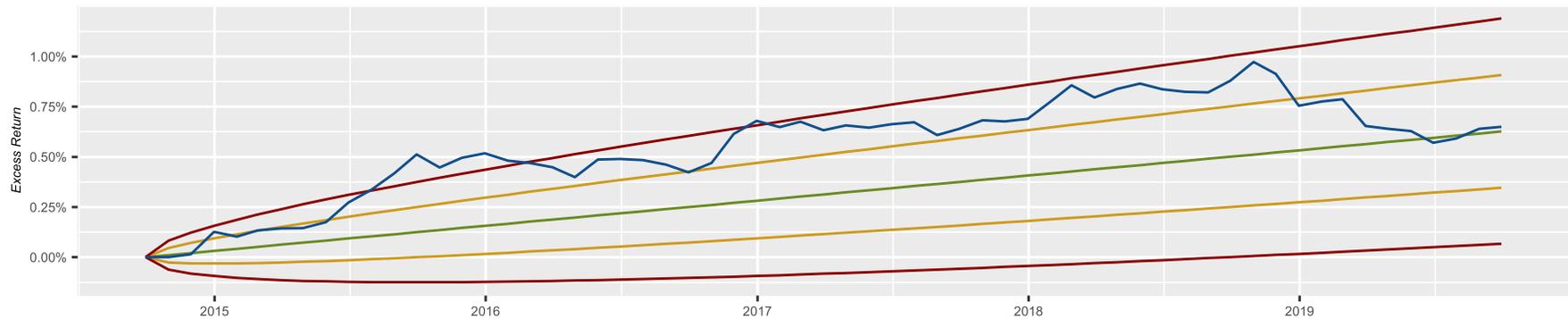
**Core Fixed Income Dollar Value Added
 Relative to Barclay's Aggregate Benchmark**



Core Fixed Income Performance for the period ended 9/30/2019 - Preliminary

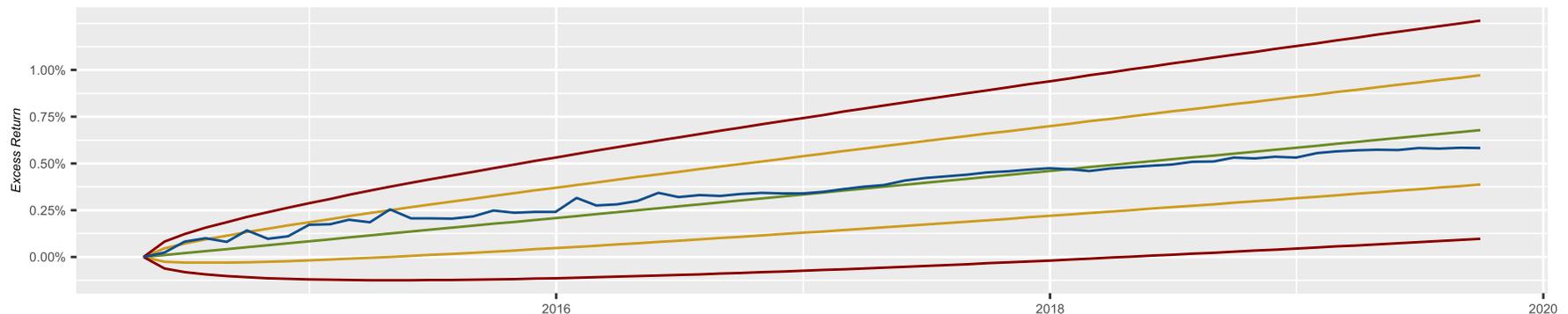
Internal Fixed Income Portfolio Performance versus Expectations

12.5 Basis Points Expected Excess Return with 12.5 Basis Points Expected Tracking Error



Blackrock US Debt Portfolio Performance versus Expectations

12.5 Basis Points Expected Excess Return with 12.5 Basis Points Expected Tracking Error



MSCI Risk Report

Total Portfolio Value-at-Risk at 8/31/2019

TOTAL PORTFOLIO VALUE-AT-RISK (VAR)

As of August 31st, 2019 Total VaR for ASRS Portfolio was 13.99%, indicating that there is a 5% chance that portfolio could lose ~\$5.56B in a given year. Note that a 5% event is expected to occur every 20 years

