

Equities, Real Estate, Farmland & Infrastructure

Arizona State Retirement System

September 28, 2018

Outline

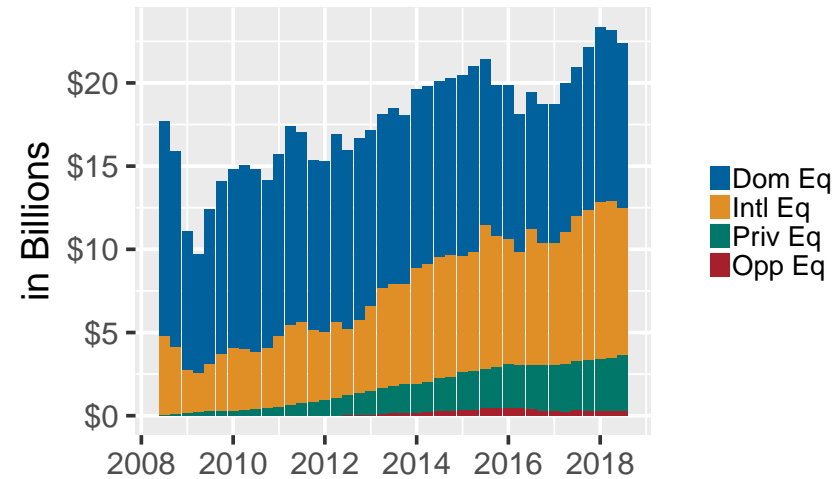
- 1 Equities
 - Public Equity
 - Allocation
 - Performance
 - Private Equity
 - Performance
- 2 Real Estate
- 3 Farmland, Infrastructure and Timber

Total Equities

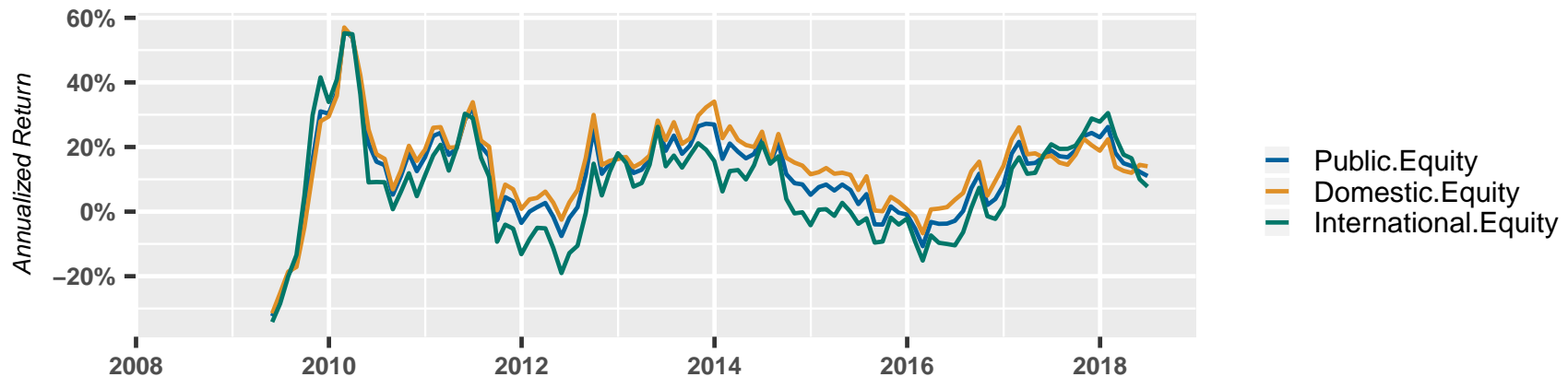
Annualized Returns

Composite	One Year	Three Year	Five Year	Ten Year
Public Equity	11.03%	8.65%	10.1%	7.82%
Benchmark	11.49%	8.99%	10.45%	7.78%
Excess	-0.46%	-0.33%	-0.34%	0.04%
Domestic Equity	14.03%	11.53%	13.05%	10.58%
Benchmark	15.02%	12.08%	13.54%	10.58%
Excess	-0.99%	-0.55%	-0.49%	0%
International Equity	7.72%	5.24%	6.36%	3.14%
Benchmark	7.62%	5.55%	6.58%	3.23%
Excess	0.1%	-0.3%	-0.23%	-0.09%
Private Equity	14.57%	12.18%	12.64%	12.13%
Benchmark	10.43%	8.1%	11.28%	12.47%
Excess	4.14%	4.07%	1.36%	-0.34%
Private Opportunistic Equity	3.26%	9.52%	19.26%	20.76%
Benchmark	10.12%	3.51%	8.25%	10.15%
Excess	-6.86%	6.01%	11.01%	10.62%

Market Values



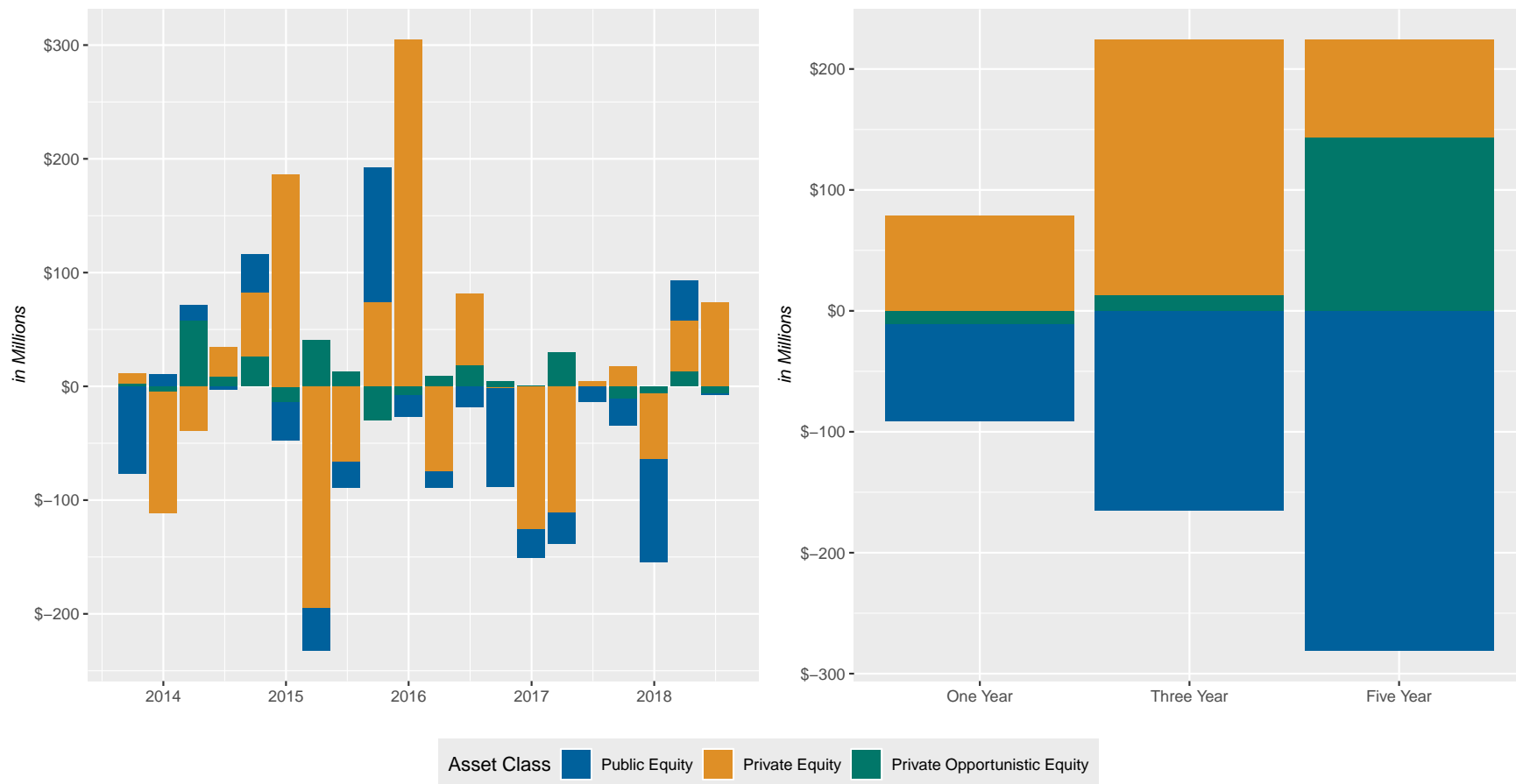
Public Equity Rolling 1 Year Returns



¹ Private Equity and Private Opportunistic Equity 10 year returns are Inception to Date

Total Equity Dollar Value Added

**Total Equity Dollar Value Added
Relative to Sub-Asset Class Benchmarks**



Total Equity Allocation

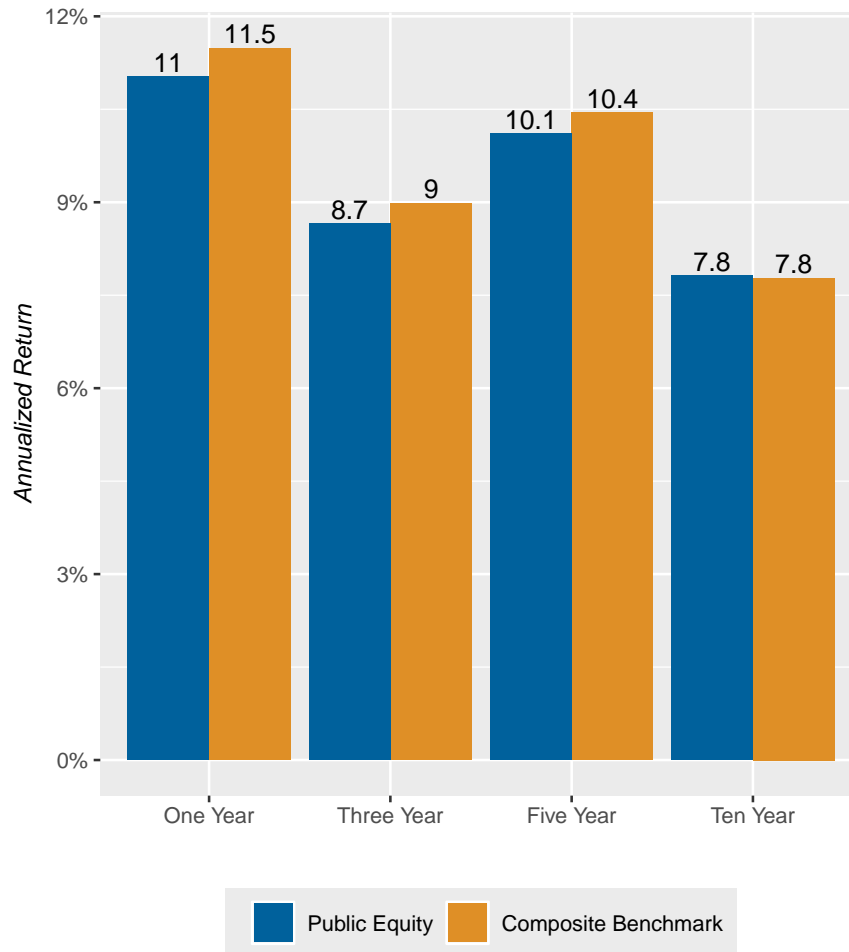
Asset Class	Total Fund Exposure	Interim	Interim	Actual - Interim	
		Target (%)	Target (\$MM)	Δ (%)	Δ (\$MM)
Large Cap	19.9%	20.4%	8,224	-0.4%	-\$176
Mid Cap	3.2%	3.4%	1,391	-0.2%	-\$93
Small Cap	3.1%	3.5%	1,424	-0.4%	-\$173
US Equity	26.3%	27.4%	11,038	-1.1%	-\$442
Developed Large Cap	14.5%	14.5%	5,859	0.0%	\$5
Developed Small Cap	2.1%	2.6%	1,031	-0.5%	-\$194
Emerging Markets	4.8%	5.3%	2,132	-0.5%	-\$190
Non-US Equity	21.4%	22.4%	9,022	-0.9%	-\$379
Total Public Equity	47.7%	49.7%	20,060	-2.0%	-\$820
Private Equity - US Exposure	7.7%	5.3%	2,149	2.4%	\$975
Private Equity - Non US Exposure	1.9%	4.4%	1,756	-2.4%	-\$975
Total Equity	57.4%	59.4%	23,964	-2.0%	-\$820

**As of September 17, 2018*

Public Equities Returns & DVA

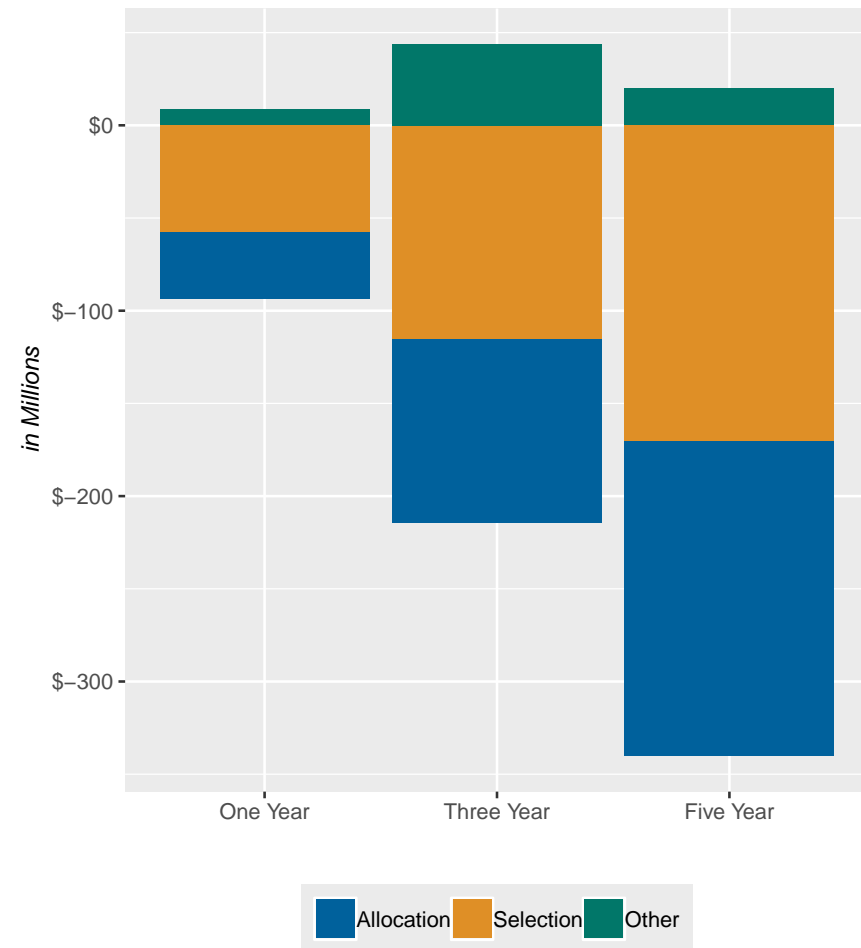
Public Equity and Composite Benchmark

Trailing Period Returns



Public Equity Dollar Value Add

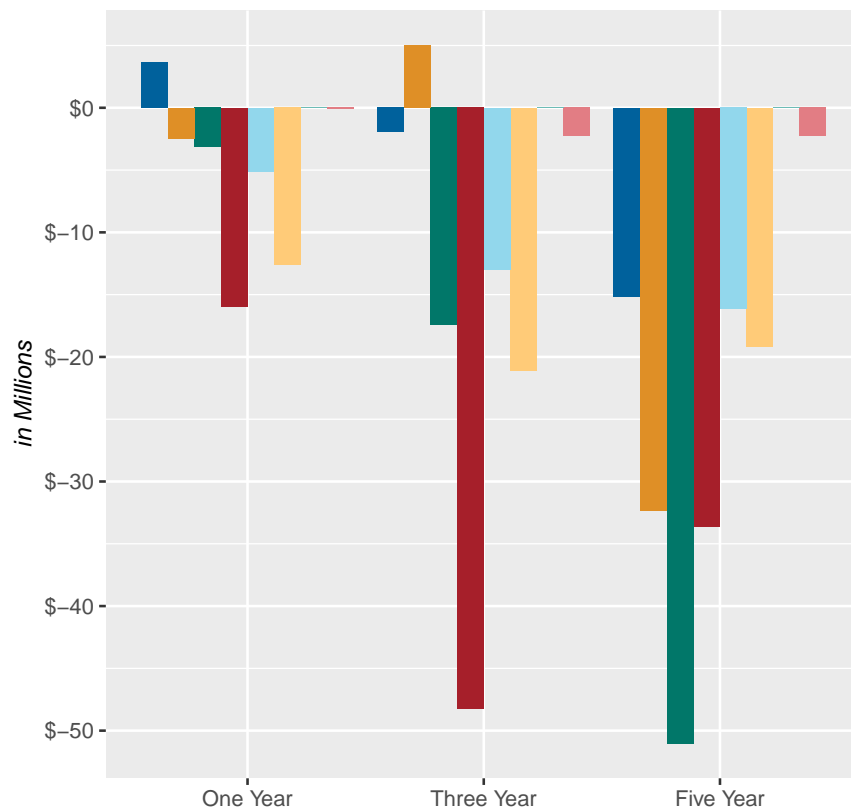
Relative to Composite Benchmark



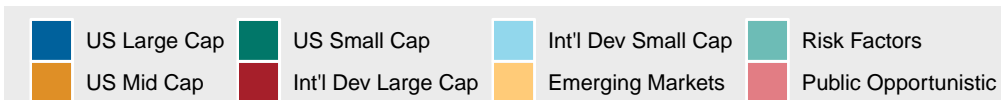
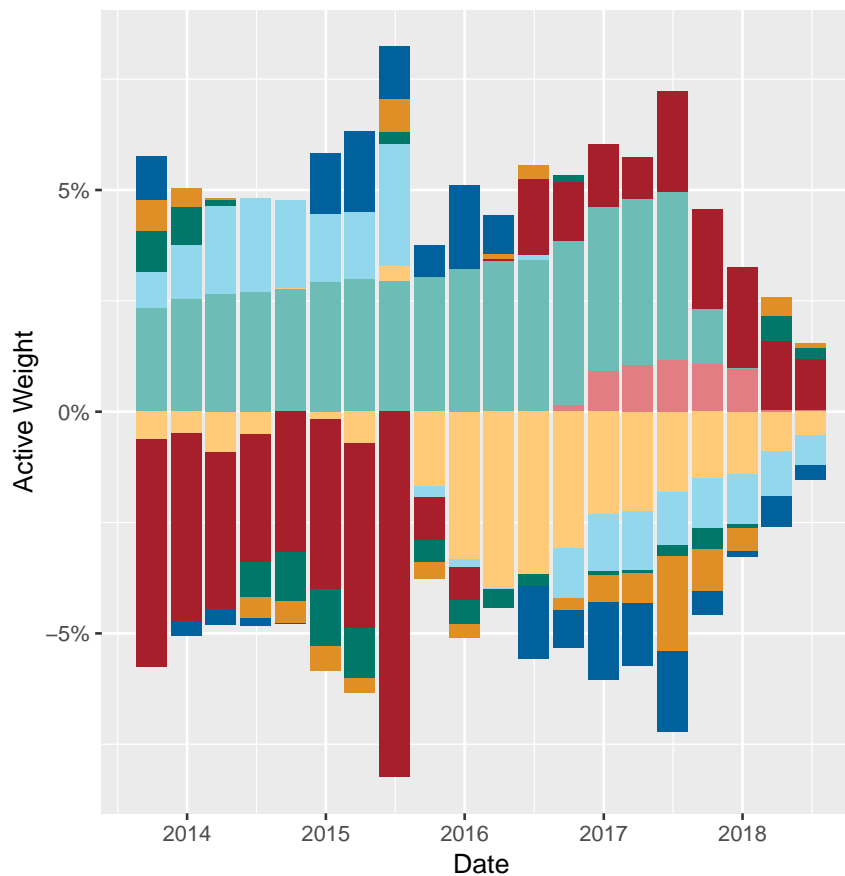
Allocation Effect

Public Equity Allocation Effect by Sub Asset Class

Relative to Composite Benchmark



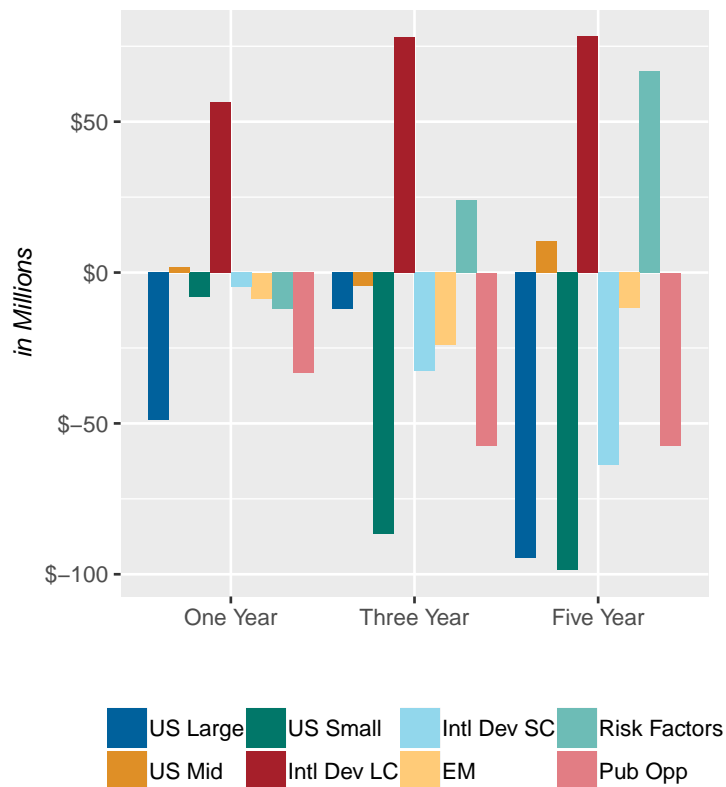
Average Quarterly Active Weight



Selection Effect

Public Equity Selection Effect

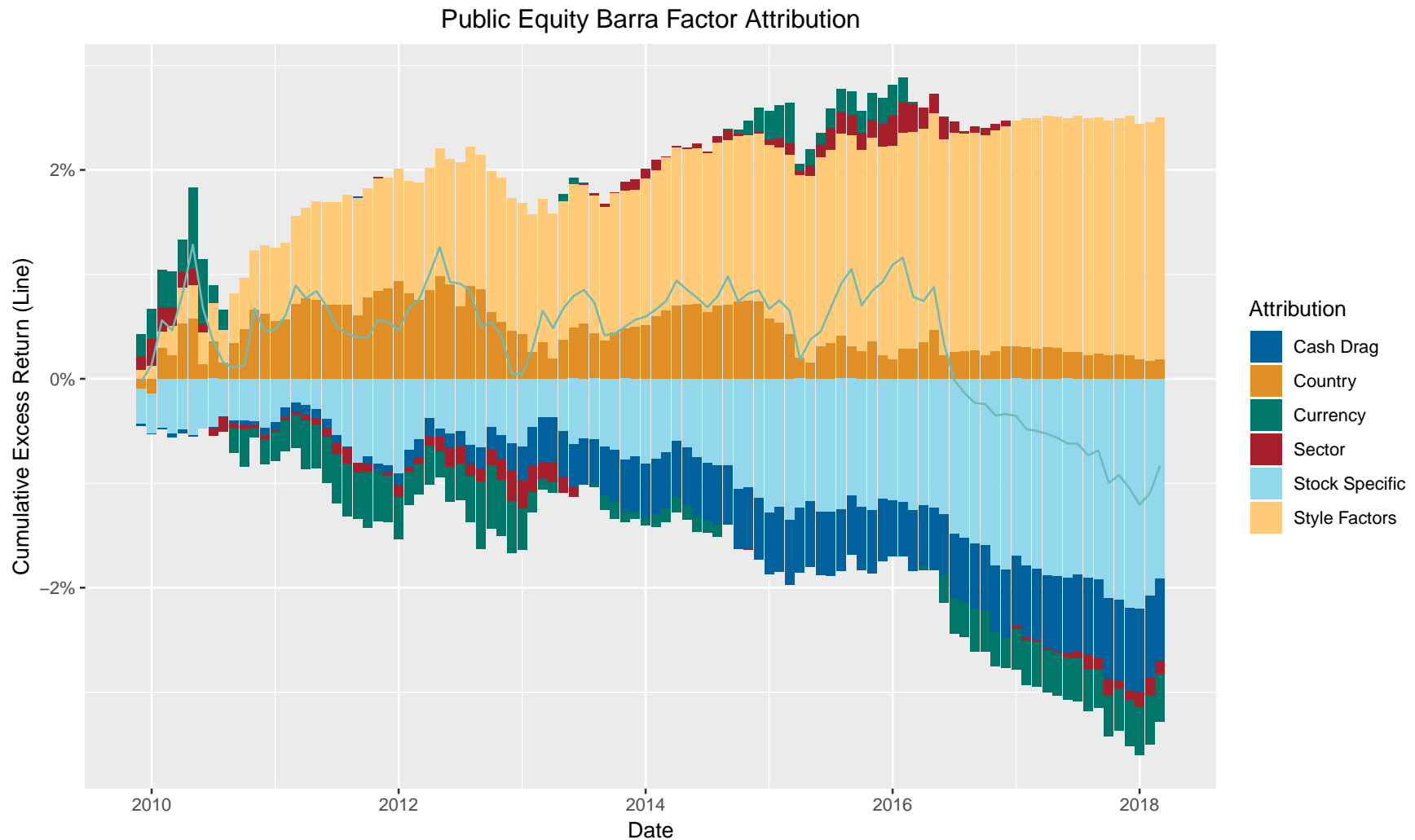
Relative to Composite Benchmark



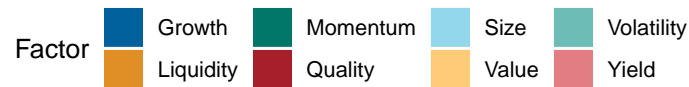
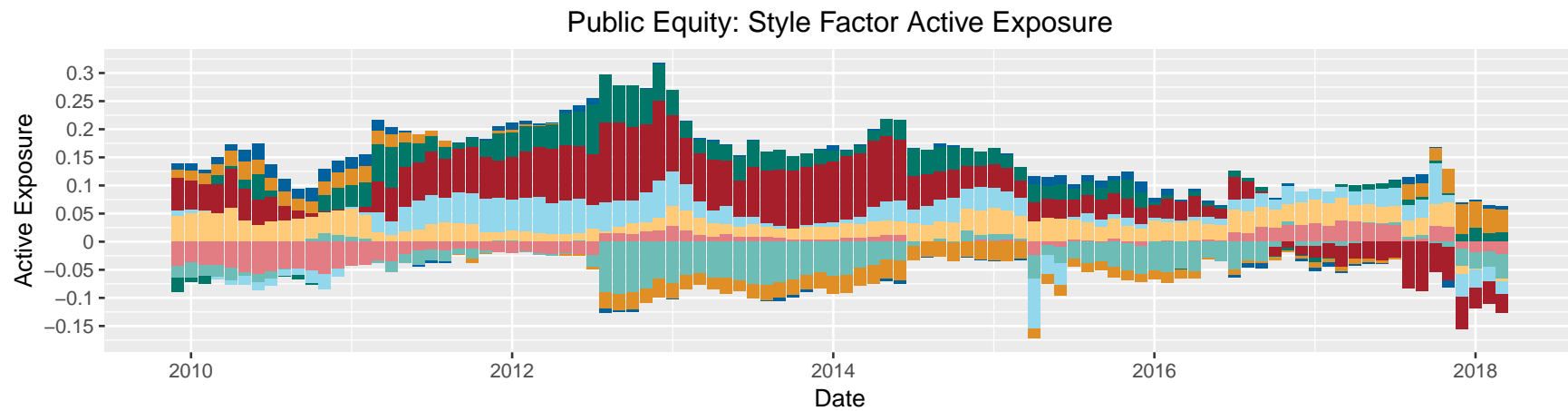
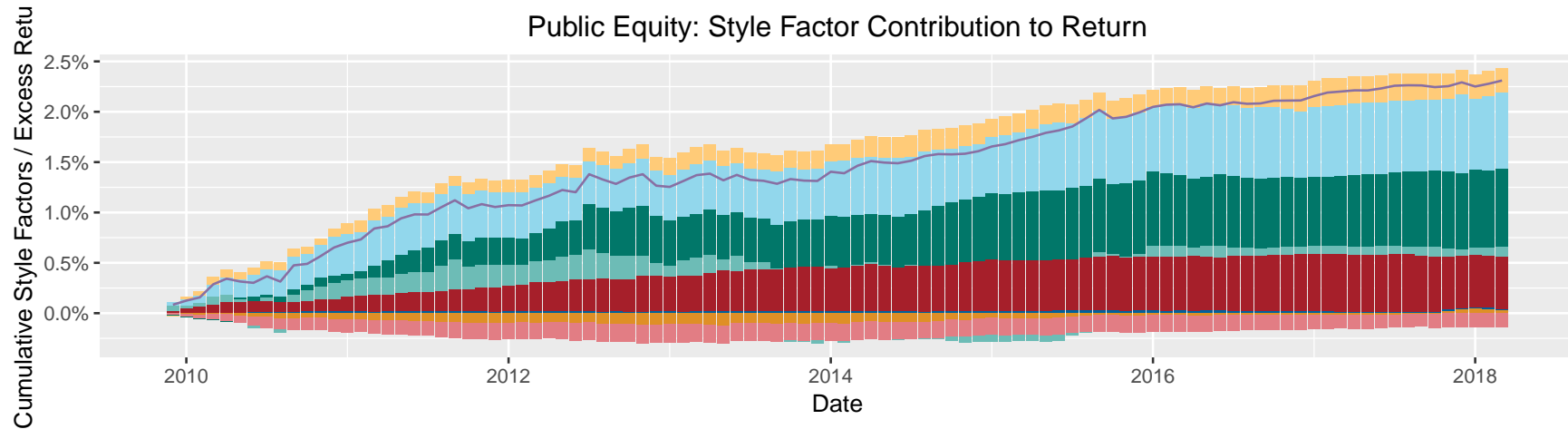
Annualized Returns

Composite	One Year	Three Year	Five Year	Ten Year
US Large Cap	13.67%	11.86%	13.19%	10.18%
Benchmark	14.37%	11.93%	13.42%	10.17%
Excess	-0.7%	-0.07%	-0.23%	0.01%
US Mid Cap	13.69%	10.8%	12.79%	10.76%
Benchmark	13.5%	10.89%	12.69%	10.78%
Excess	0.18%	-0.09%	0.1%	-0.02%
US Small Cap	19.62%	11.09%	12.84%	11.77%
Benchmark	20.5%	13.84%	14.6%	12.25%
Excess	-0.88%	-2.74%	-1.76%	-0.48%
Int'l Dev Large Cap	7.67%	5.28%	6.65%	NA%
Benchmark	6.84%	4.9%	6.46%	NA%
Excess	0.83%	0.38%	0.19%	NA%
Int'l Dev Small Cap	11.5%	8.74%	10.09%	NA%
Benchmark	12.45%	10.09%	11.33%	NA%
Excess	-0.95%	-1.35%	-1.25%	NA%
Emerging Markets	7.75%	5.07%	4.83%	NA%
Benchmark	8.2%	5.6%	5.05%	NA%
Excess	-0.46%	-0.53%	-0.21%	NA%
Public Opportunistic	-7.15%	NA%	NA%	NA%
Benchmark	15.02%	NA%	NA%	NA%
Excess	-22.17%	NA%	NA%	NA%

Public Equity: Barra Attribution



Public Equity: Style Factors

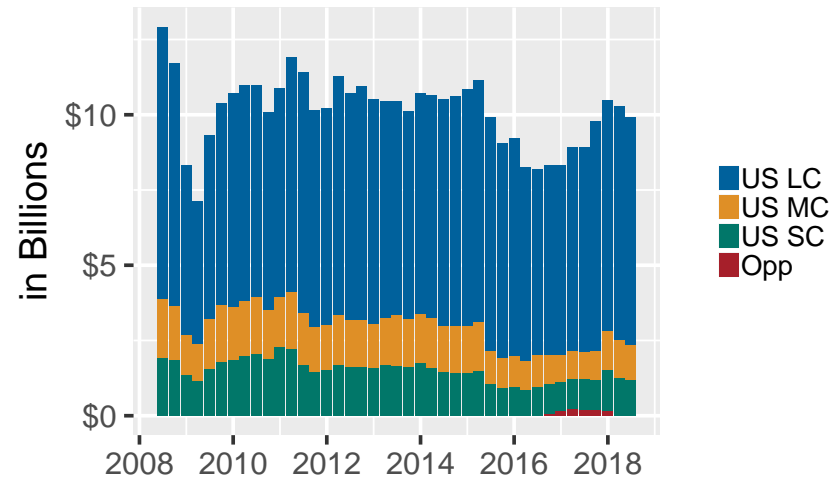


Domestic Equity

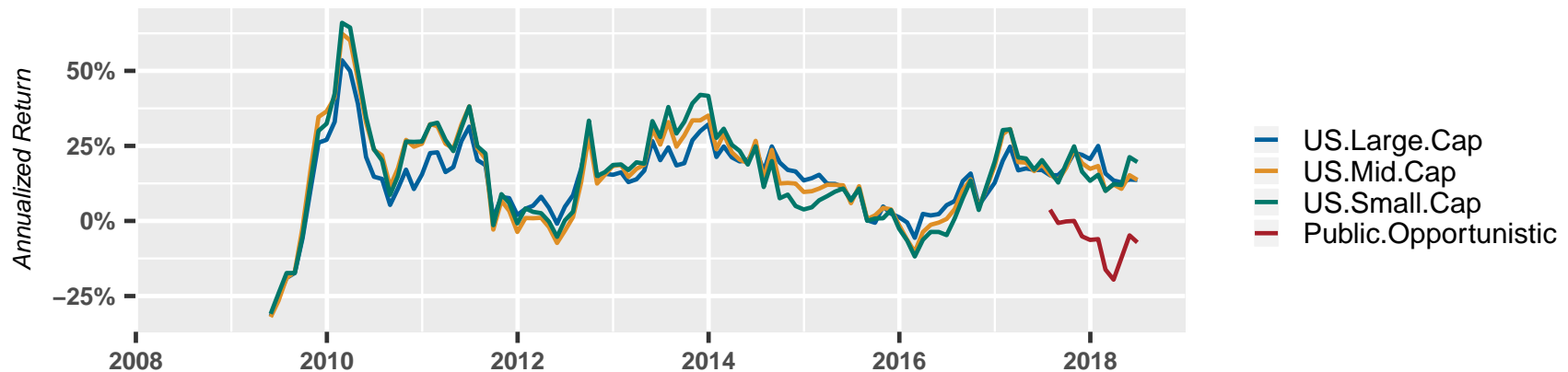
Annualized Returns - TWRs

Composite	One Year	Three Year	Five Year	Ten Year
US Large Cap	13.67%	11.86%	13.19%	10.18%
Blended Benchmark	14.37%	11.93%	13.42%	10.17%
Excess	-0.7%	-0.07%	-0.23%	0.01%
US Mid Cap	13.69%	10.8%	12.79%	10.76%
Blended Benchmark	13.5%	10.89%	12.69%	10.78%
Excess	0.18%	-0.09%	0.1%	-0.02%
US Small Cap	19.62%	11.09%	12.84%	11.77%
Blended Benchmark	20.5%	13.84%	14.6%	12.25%
Excess	-0.88%	-2.74%	-1.76%	-0.48%
Public Opportunistic	-7.15%	NA%	NA%	NA%
Blended Benchmark	15.02%	NA%	NA%	NA%
Excess	-22.17%	NA%	NA%	NA%

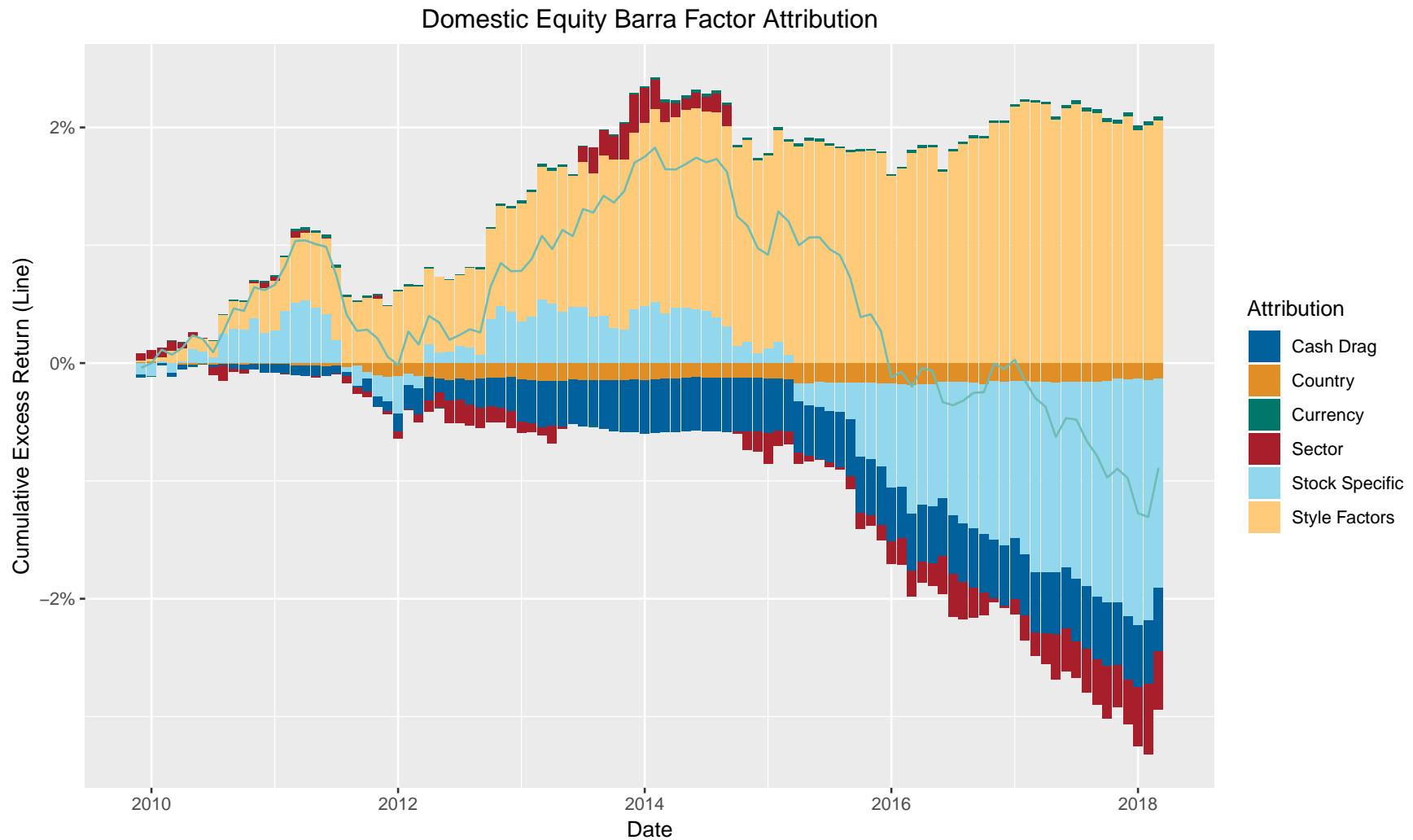
Market Values



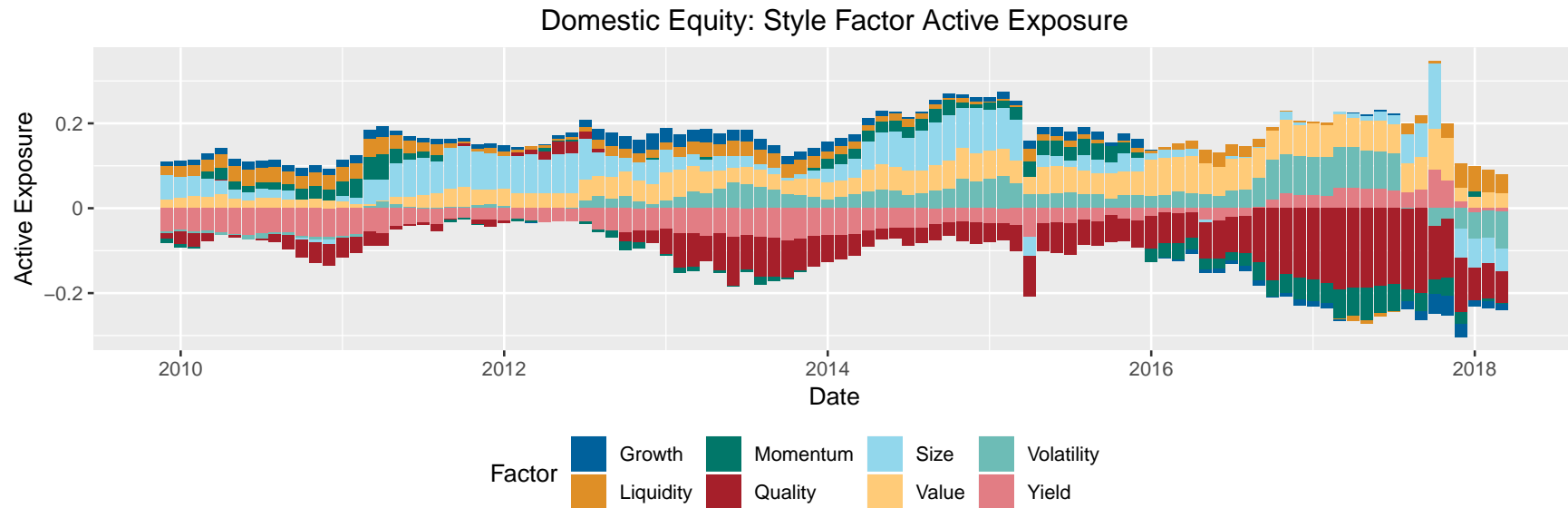
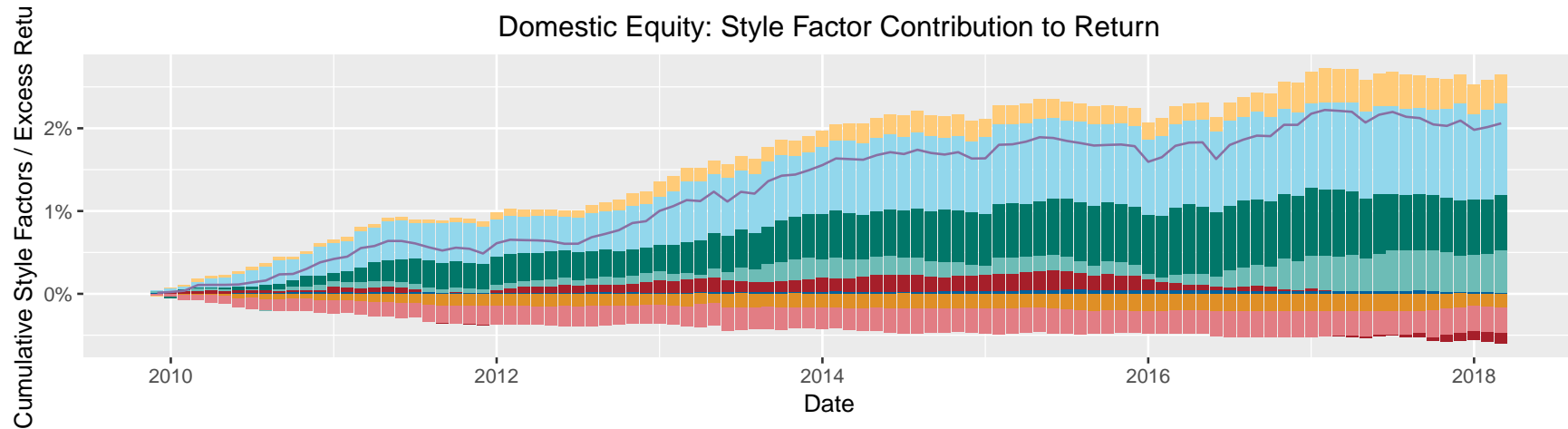
Domestic Equity Rolling 1 Year Returns



Domestic Equity: Barra Attribution



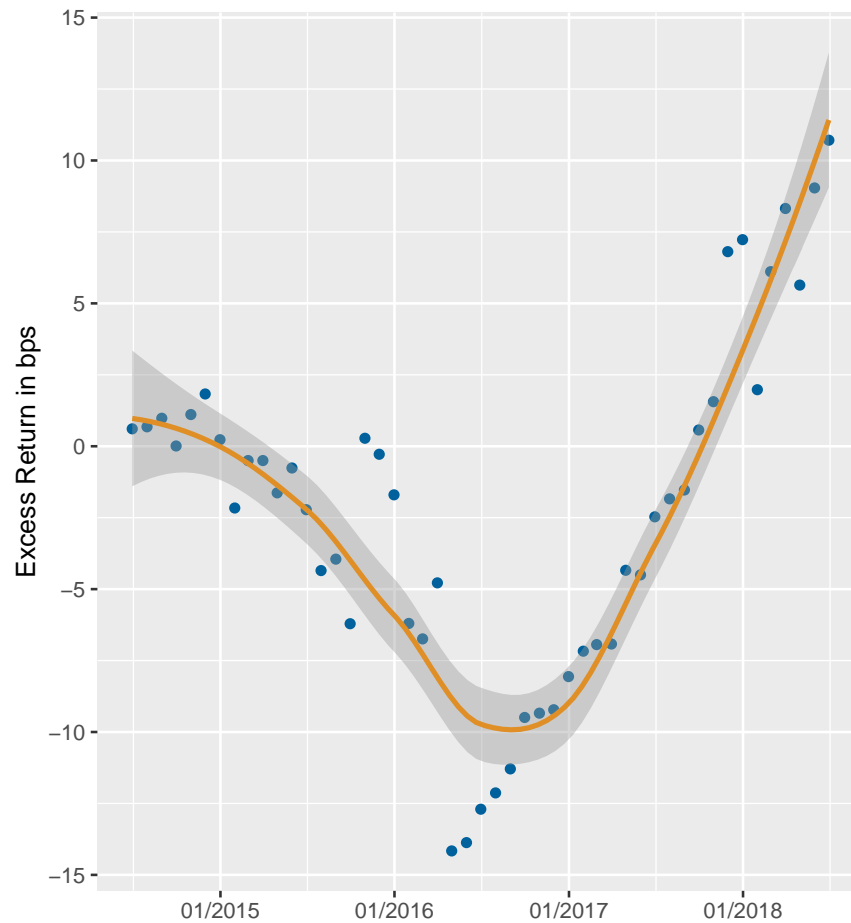
Domestic Equity: Style Factors



E-Portfolios Performance

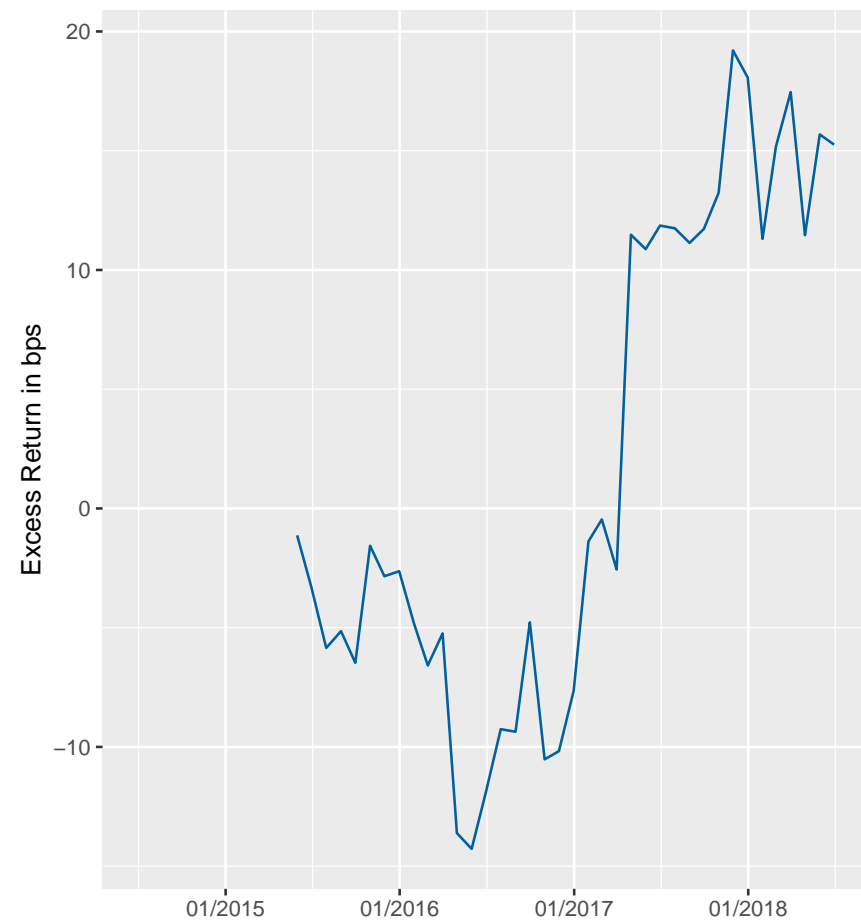
E Portfolios Composite

Monthly Cumulative Excess Performance



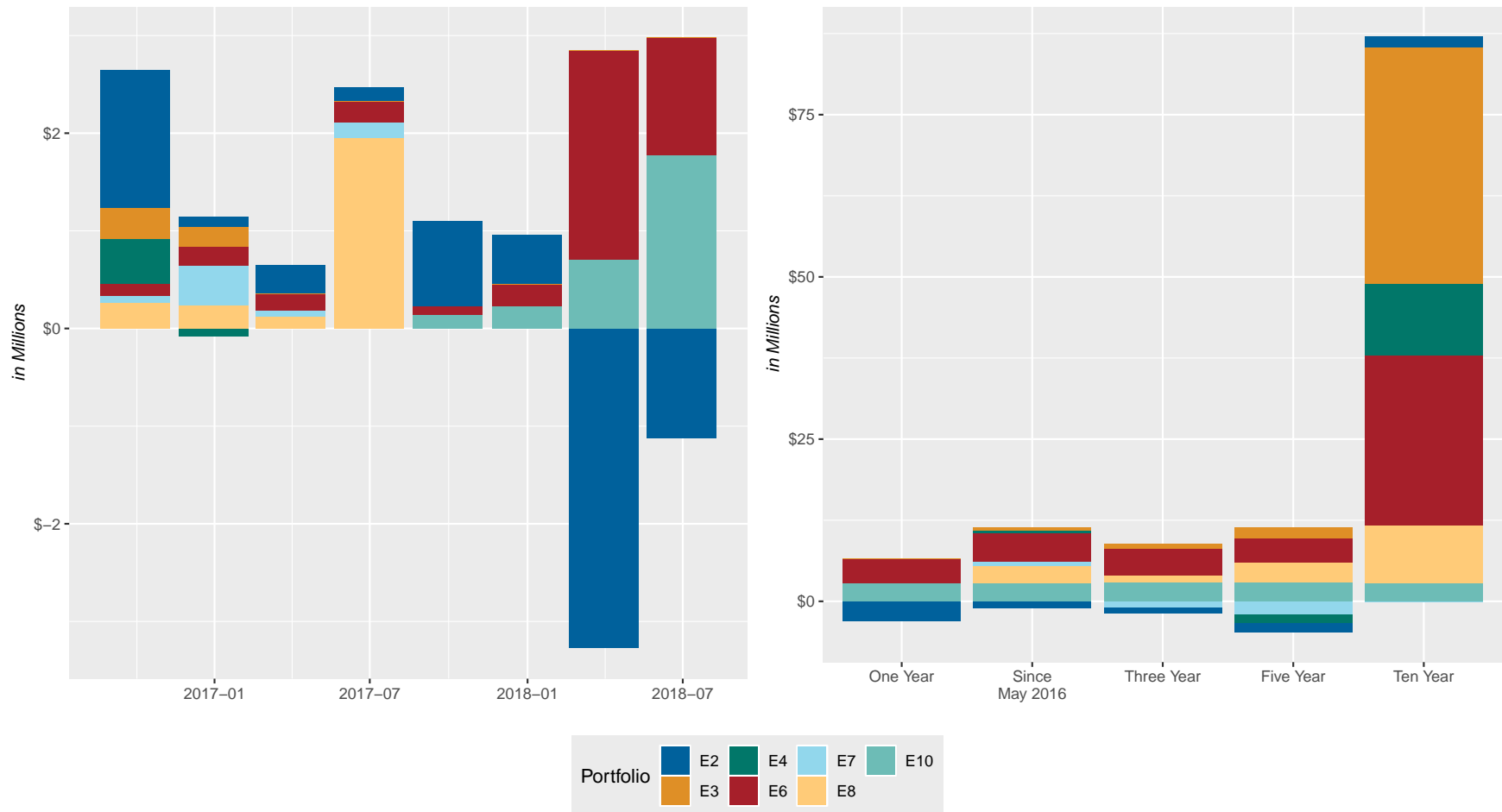
E Portfolios

Rolling 1 Year Excess Performance



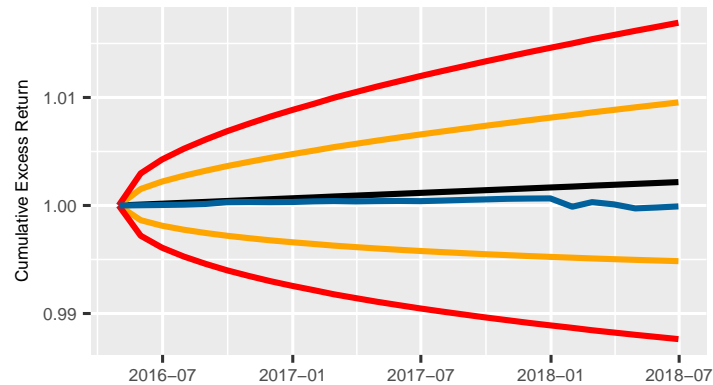
E-Portfolios Dollar Value Added

E-Portfolio Dollar Value Added

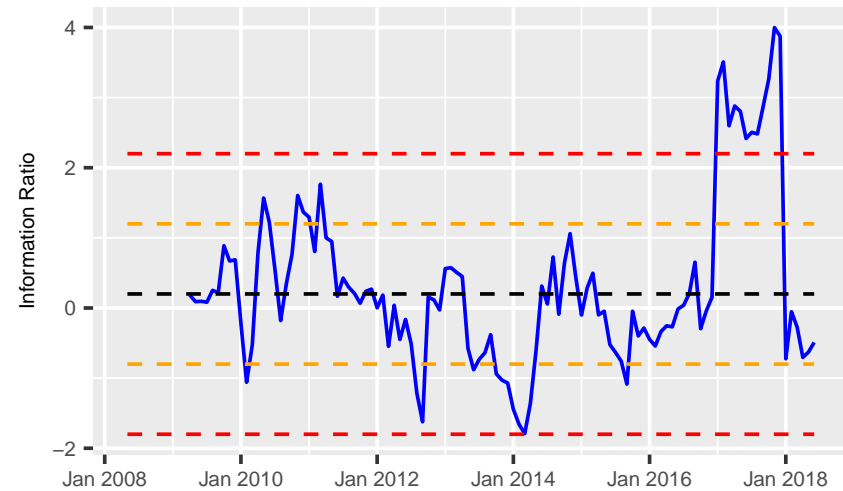


E2: Performance & Risk Summary

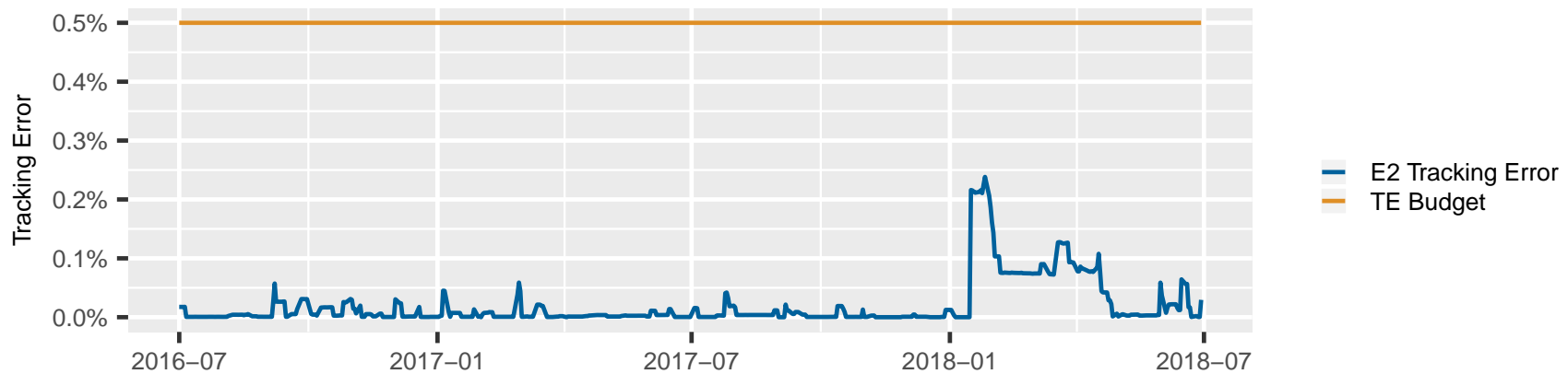
Actual vs. Expected Excess Return
+/- 1 & 2 Std Dev



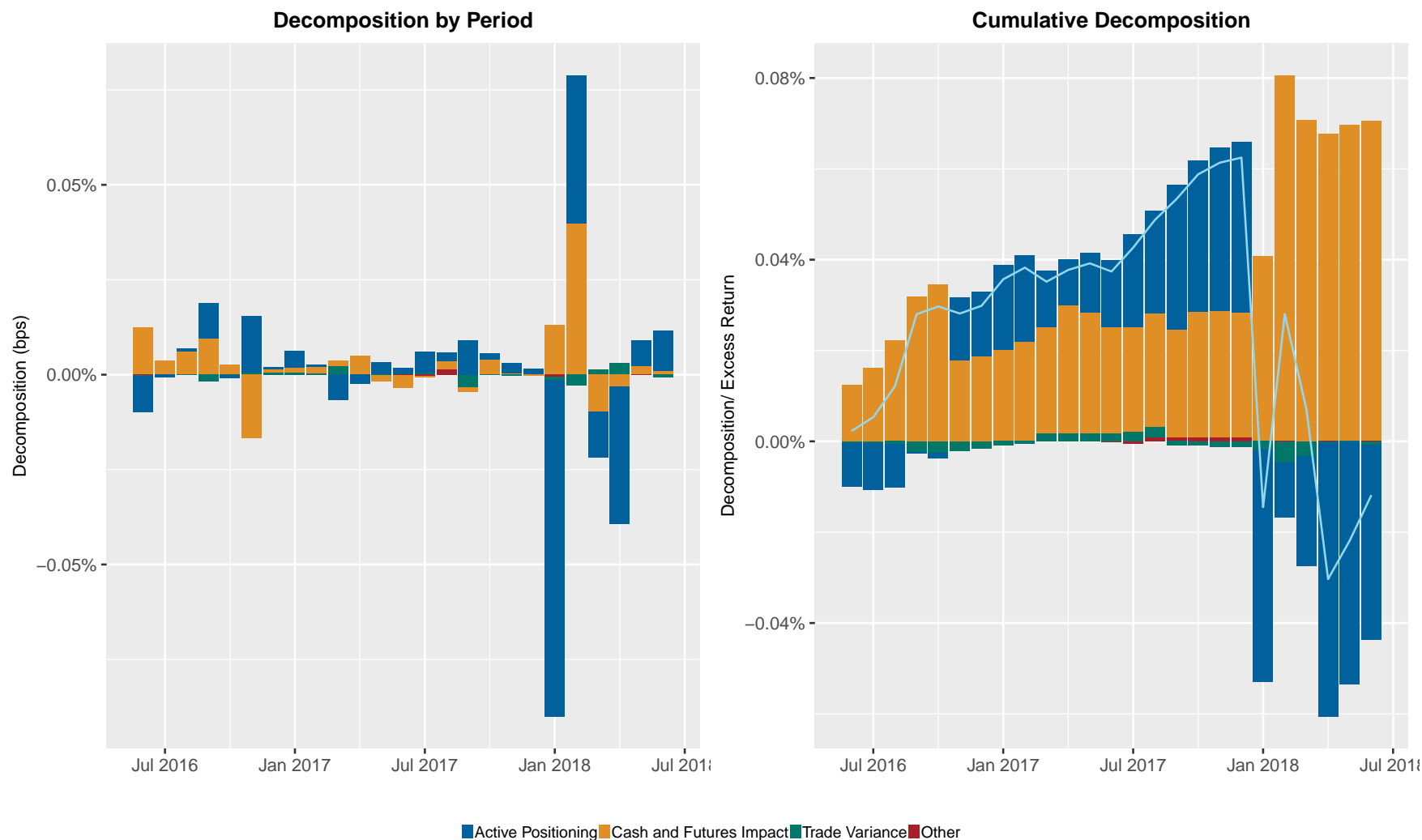
Rolling 12-Month Information Ratio



Tracking Error

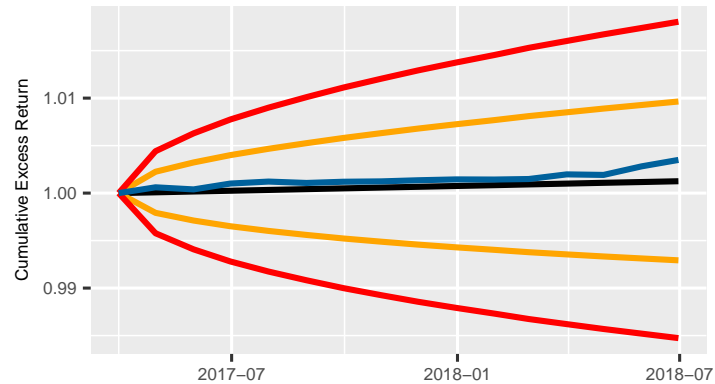


E2: NAV Decomposition

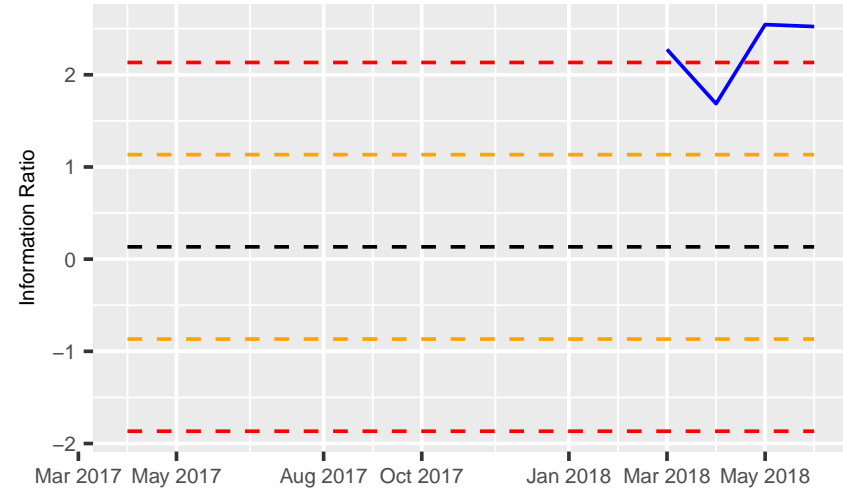


E10: Performance & Risk Summary

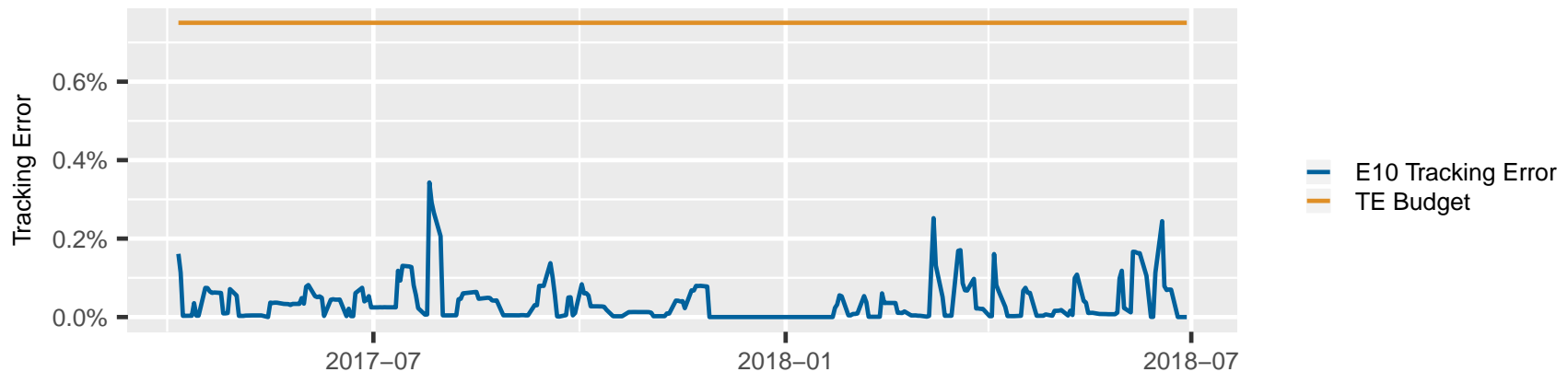
Actual vs. Expected Excess Return
+/- 1 & 2 Std Dev



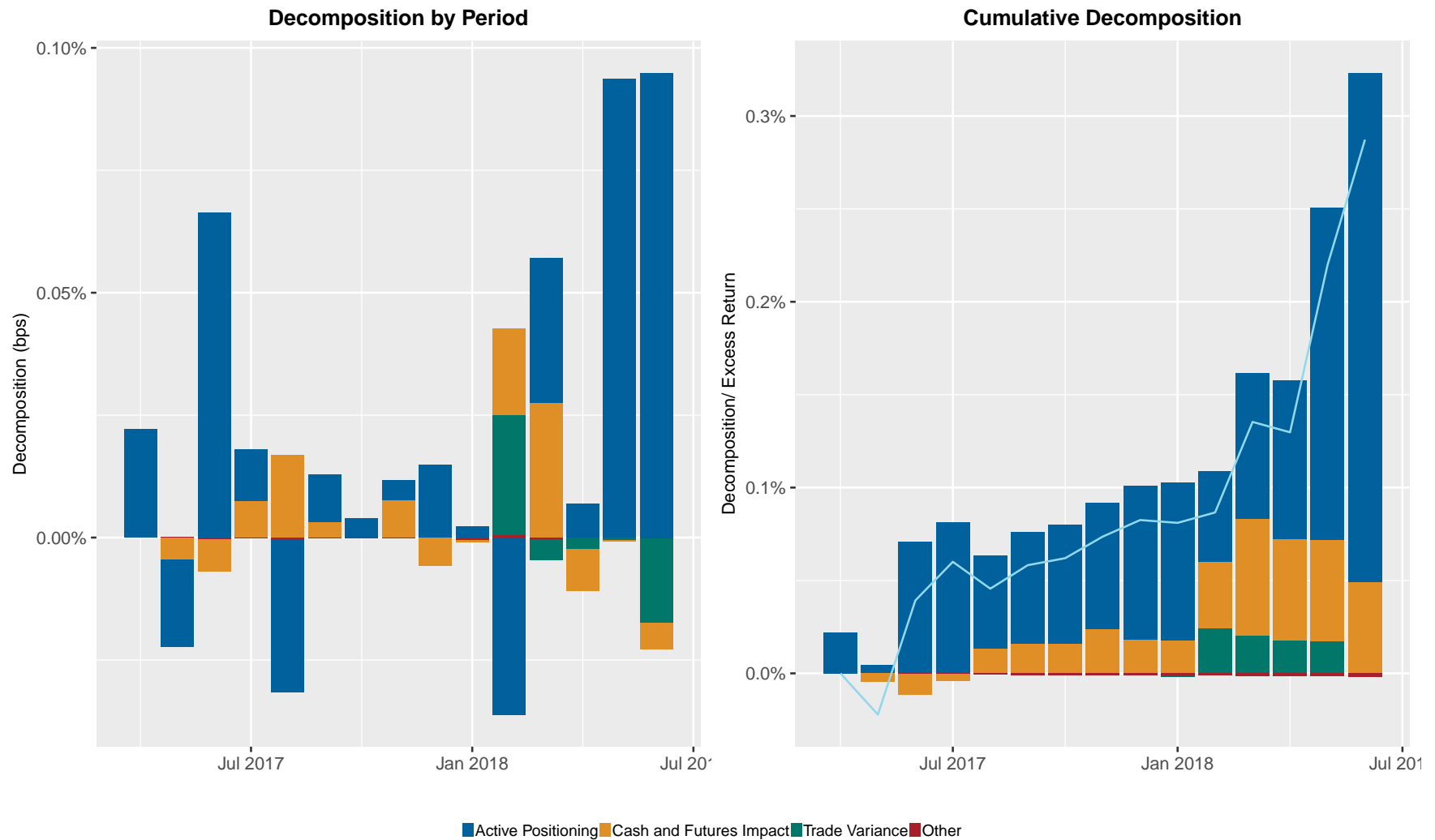
Rolling 12-Month Information Ratio



Tracking Error

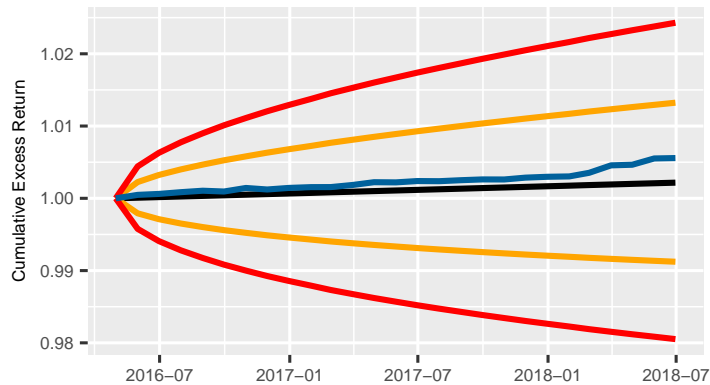


E10: NAV Decomposition

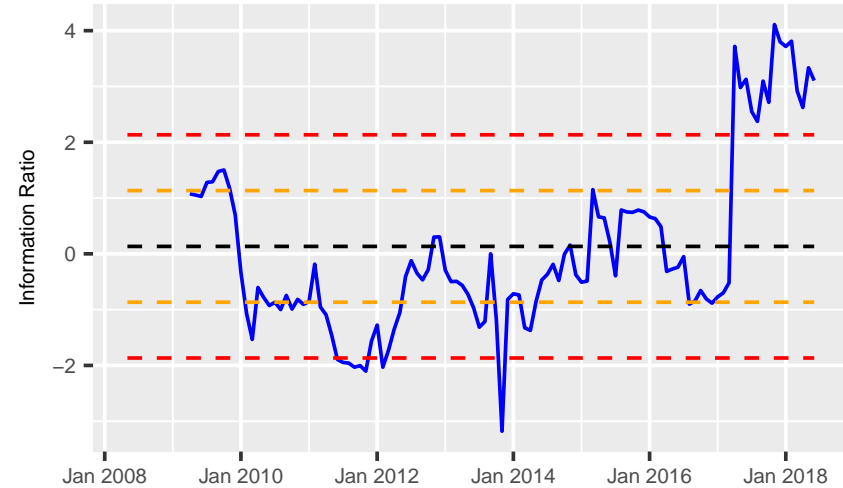


E6: Performance & Risk Summary

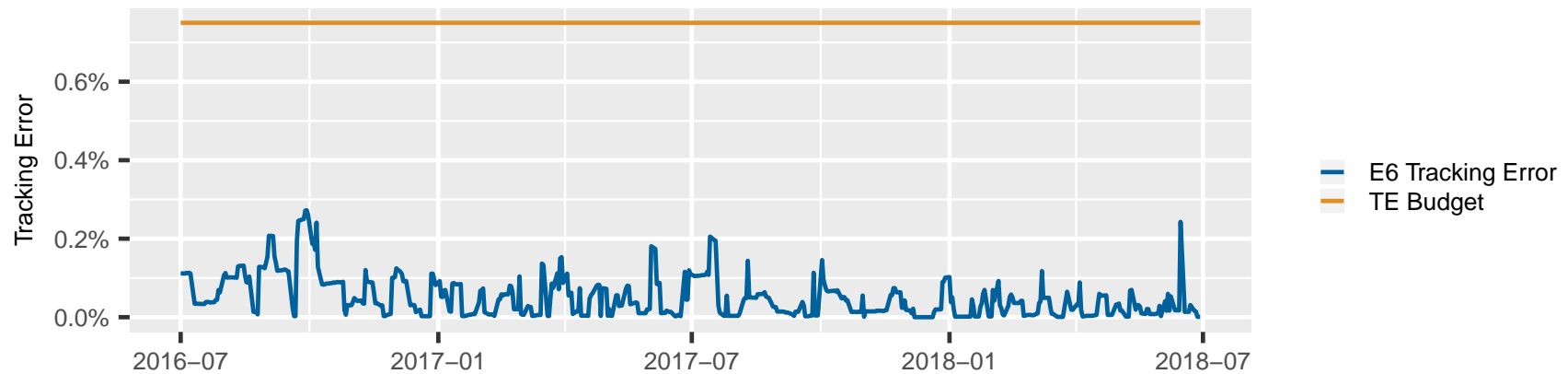
Actual vs. Expected Excess Return
+/- 1 & 2 Std Dev



Rolling 12-Month Information Ratio

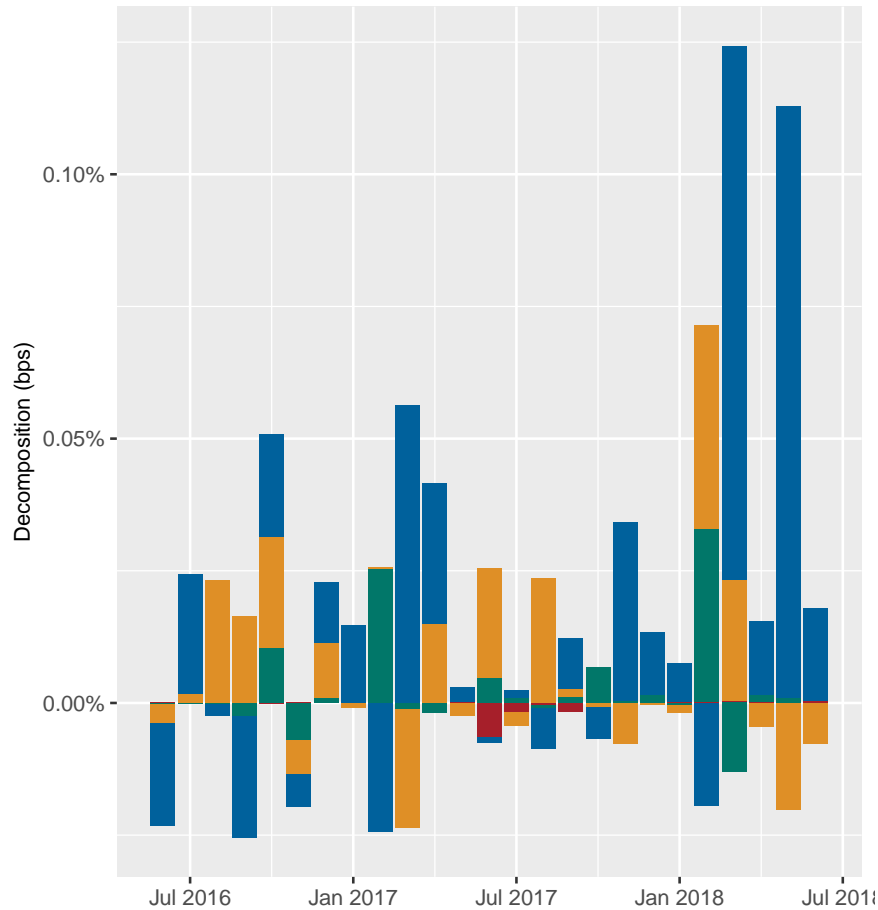


Tracking Error

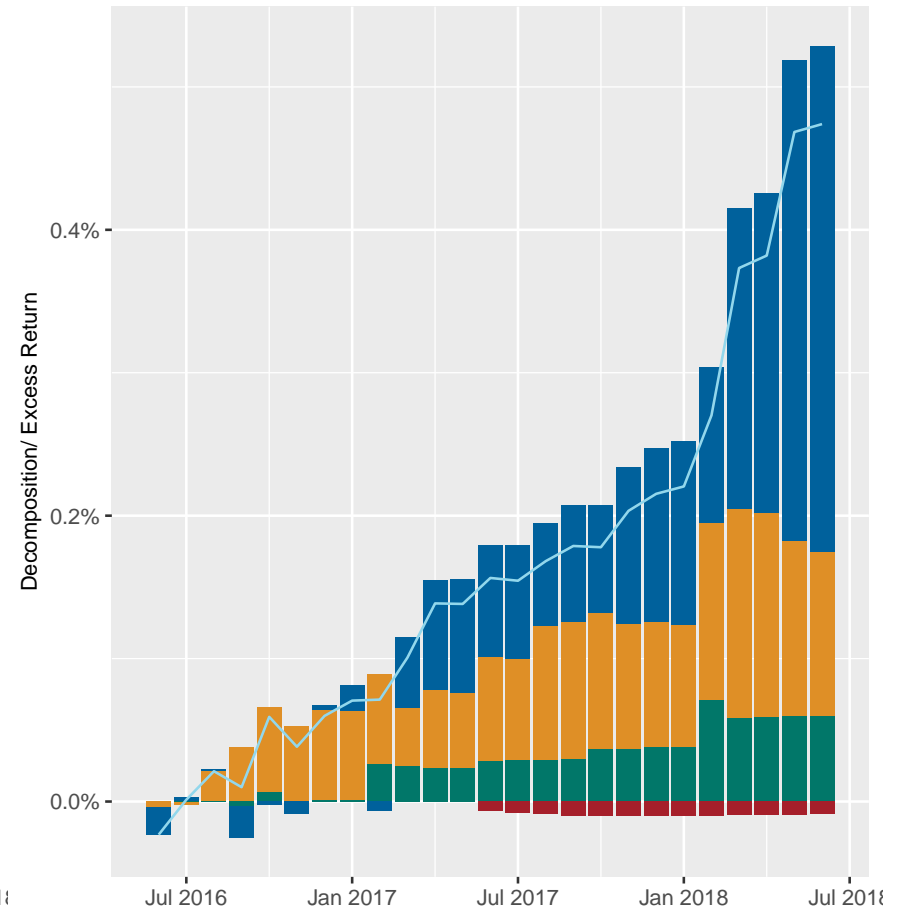


E6: NAV Decomposition

Decomposition by Period



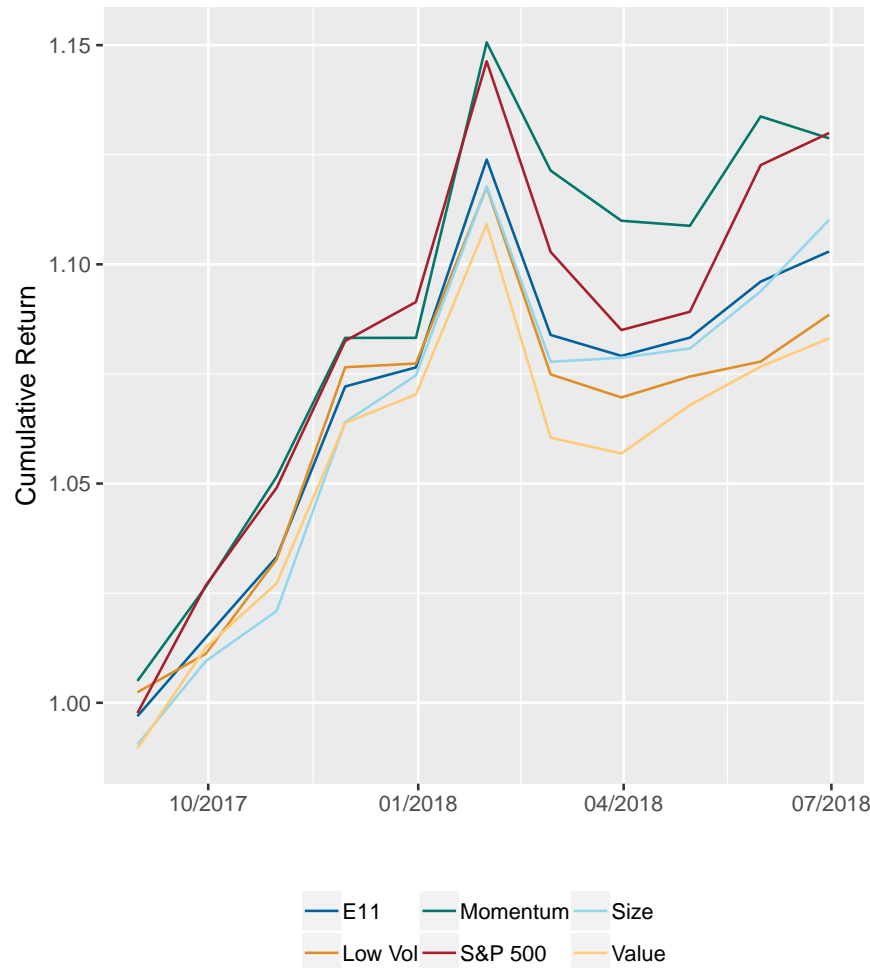
Cumulative Decomposition



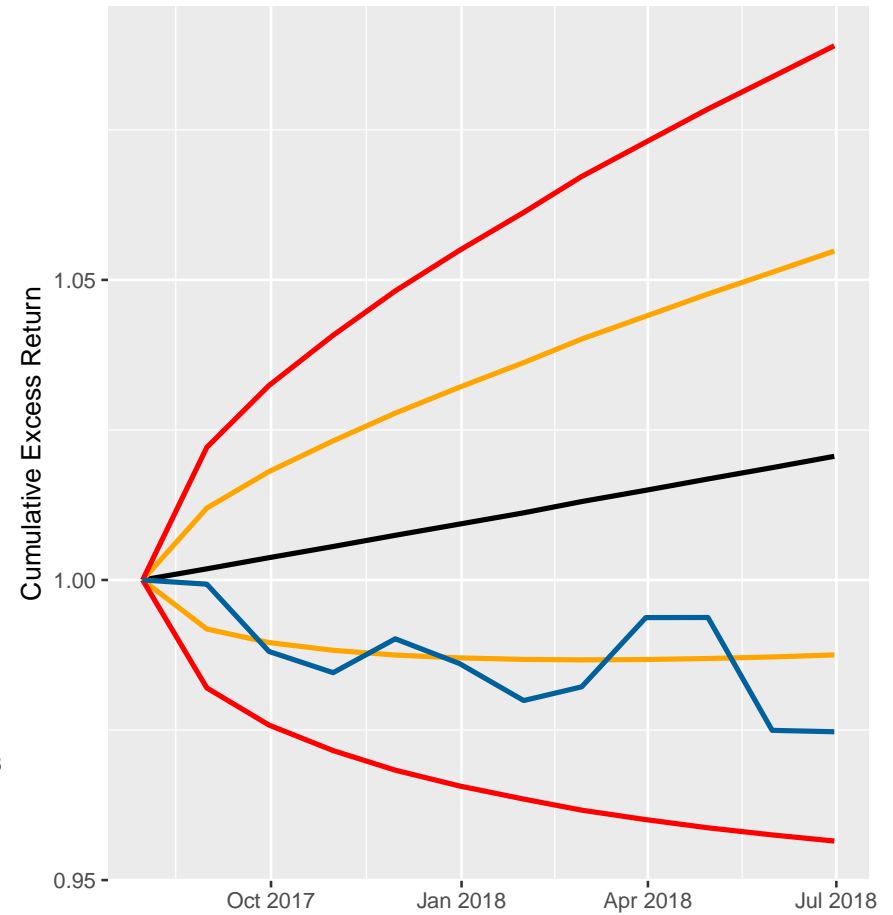
Active Positioning Cash and Futures Impact Trade Variance Other

E11 Performance Summary

E 11 Performance



Actual Excess vs Expected Excess ± 1 & 2 Std Dev
(Relative to S&P 500)

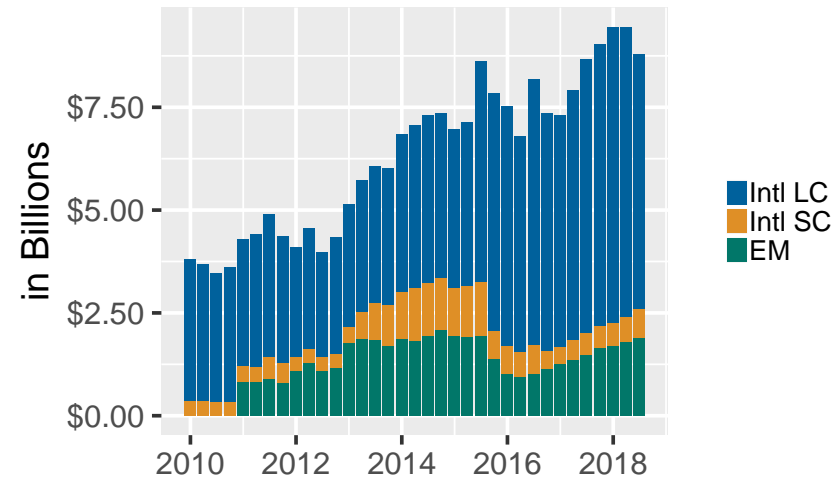


International Equity

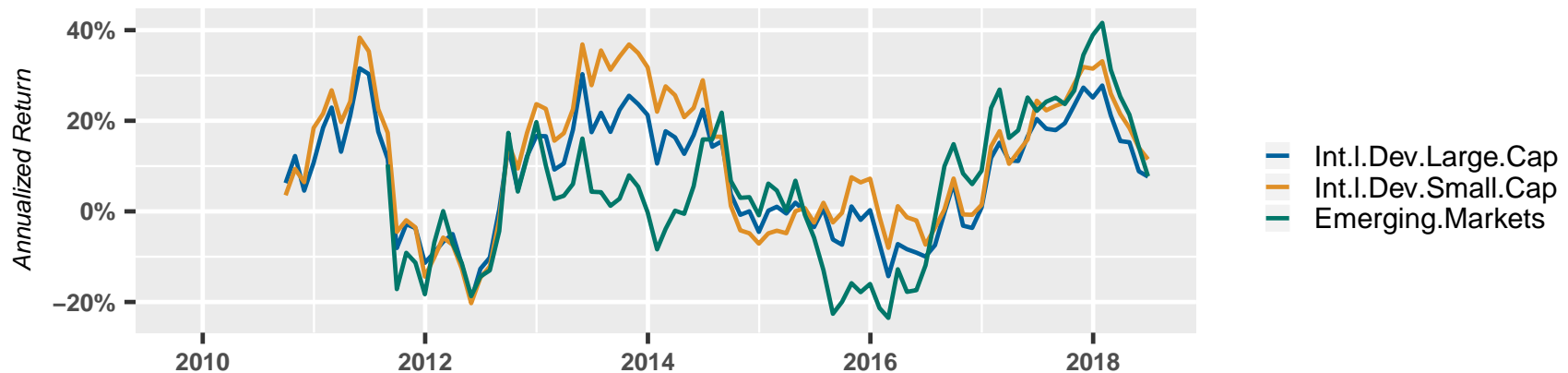
Annualized Returns - TWRs

Composite	One Year	Three Year	Five Year
Int'l Dev Large Cap	7.67%	5.28%	6.65%
Blended Benchmark	6.84%	4.9%	6.46%
Excess	0.83%	0.38%	0.19%
Int'l Dev Small Cap	11.5%	8.74%	10.09%
Blended Benchmark	12.45%	10.09%	11.33%
Excess	-0.95%	-1.35%	-1.25%
Emerging Markets	7.75%	5.07%	4.83%
Blended Benchmark	8.2%	5.6%	5.05%
Excess	-0.46%	-0.53%	-0.21%

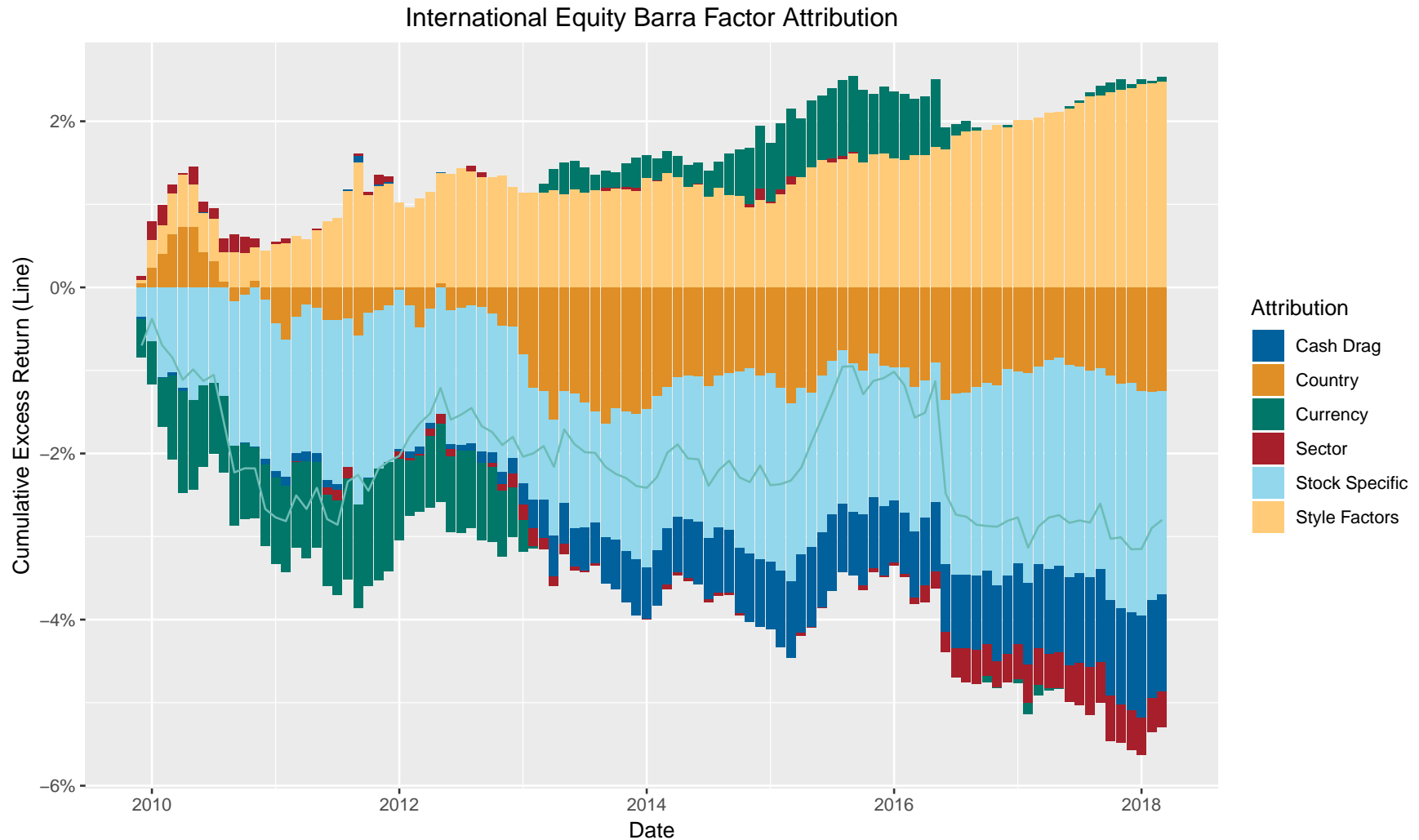
Market Values



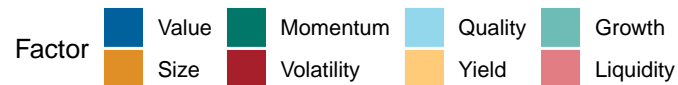
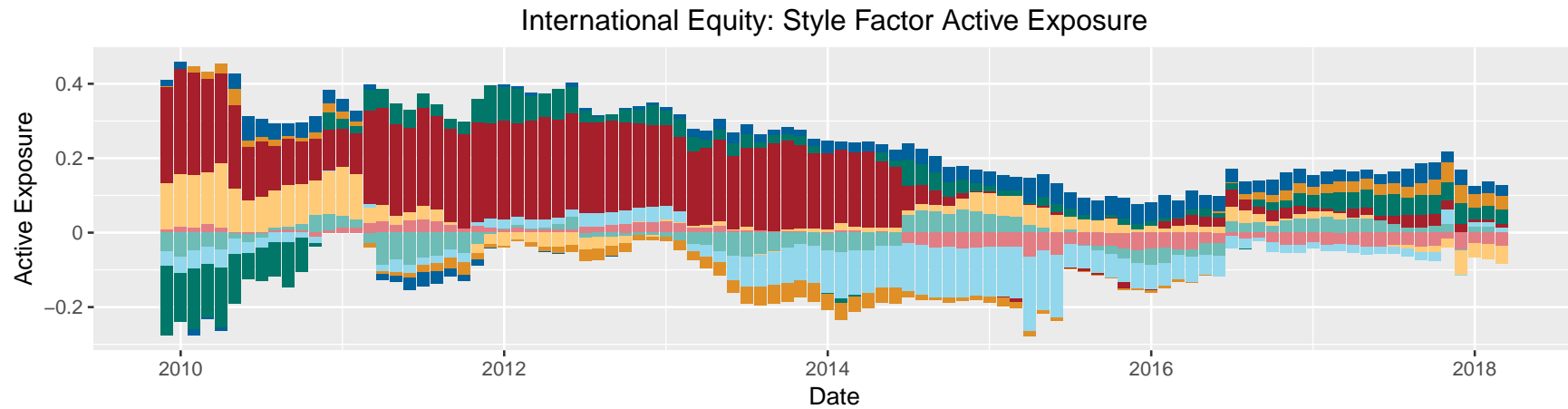
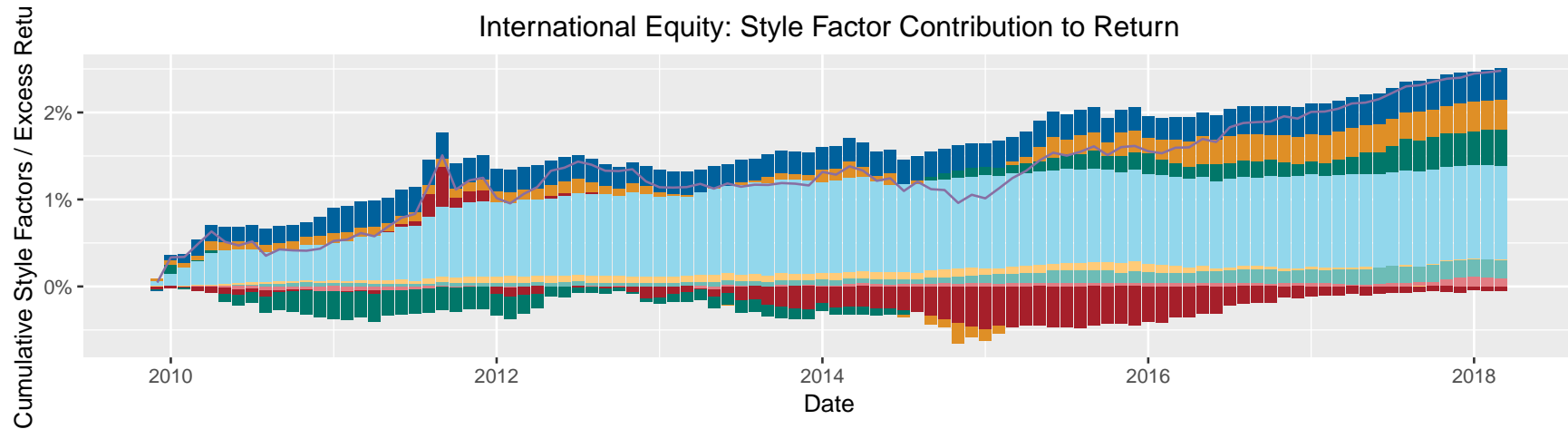
Domestic Equity Rolling 1 Year Returns



International Equity: Barra Attribution



International Equity: Style Factors

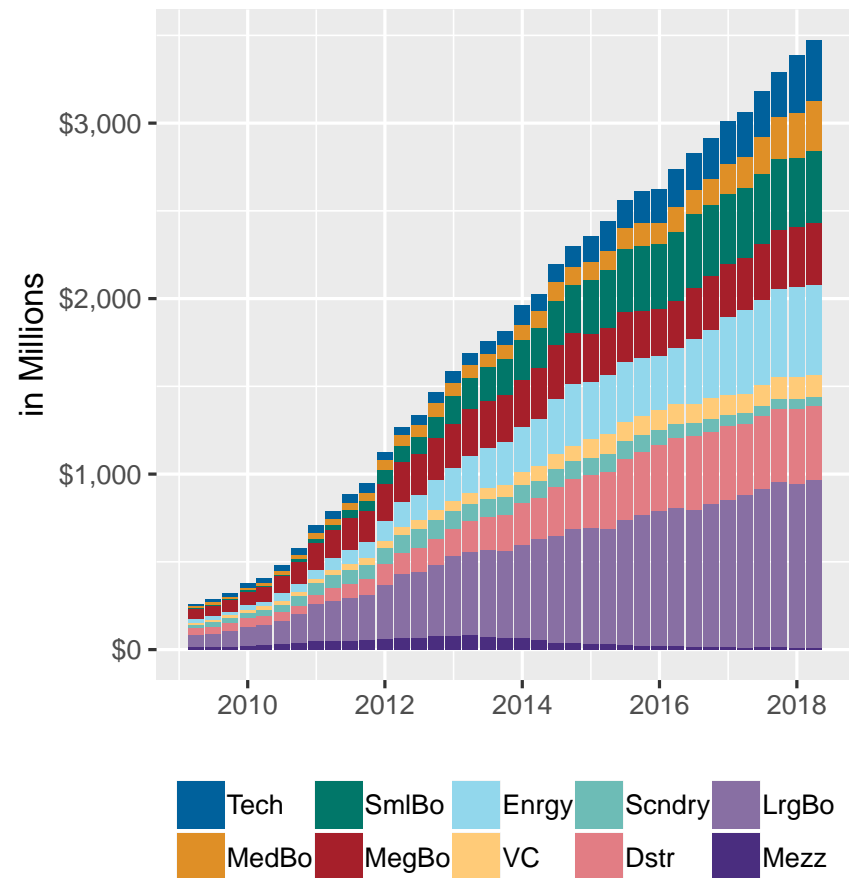


Performance Overview & Allocation

Private Equity IRRs

Category	Qtr	1 Year	3 Year	5 Year	ITD
Private Equity	2.05%	14.6%	12.2%	12.6%	12.1%
Russell 2000	-1.77%	10.4%	8.1%	11.3%	12.5%
Excess	3.82%	4.1%	4.1%	1.4%	-0.3%
Tech	6.16%	23.9%	18.3%	20.2%	17.9%
MedBo	4.15%	21.1%	18.8%	20.4%	15.6%
SmlBo	4.67%	13.7%	18.5%	17.2%	13.9%
MegBo	1.62%	19.9%	16.9%	16%	12.8%
Enrgy	-1.5%	3.7%	5.1%	5.7%	7.3%
VC	3.88%	21.5%	9.5%	14.5%	11%
Scndry	2.83%	16.3%	6.3%	9.1%	9.6%
Dstr	-0.42%	6.7%	3.9%	5.6%	8%
LrgBo	1.87%	17.6%	13.7%	13.4%	13.6%
Mezz	0.53%	12.3%	7.2%	8%	9.5%

NAV by Strategy

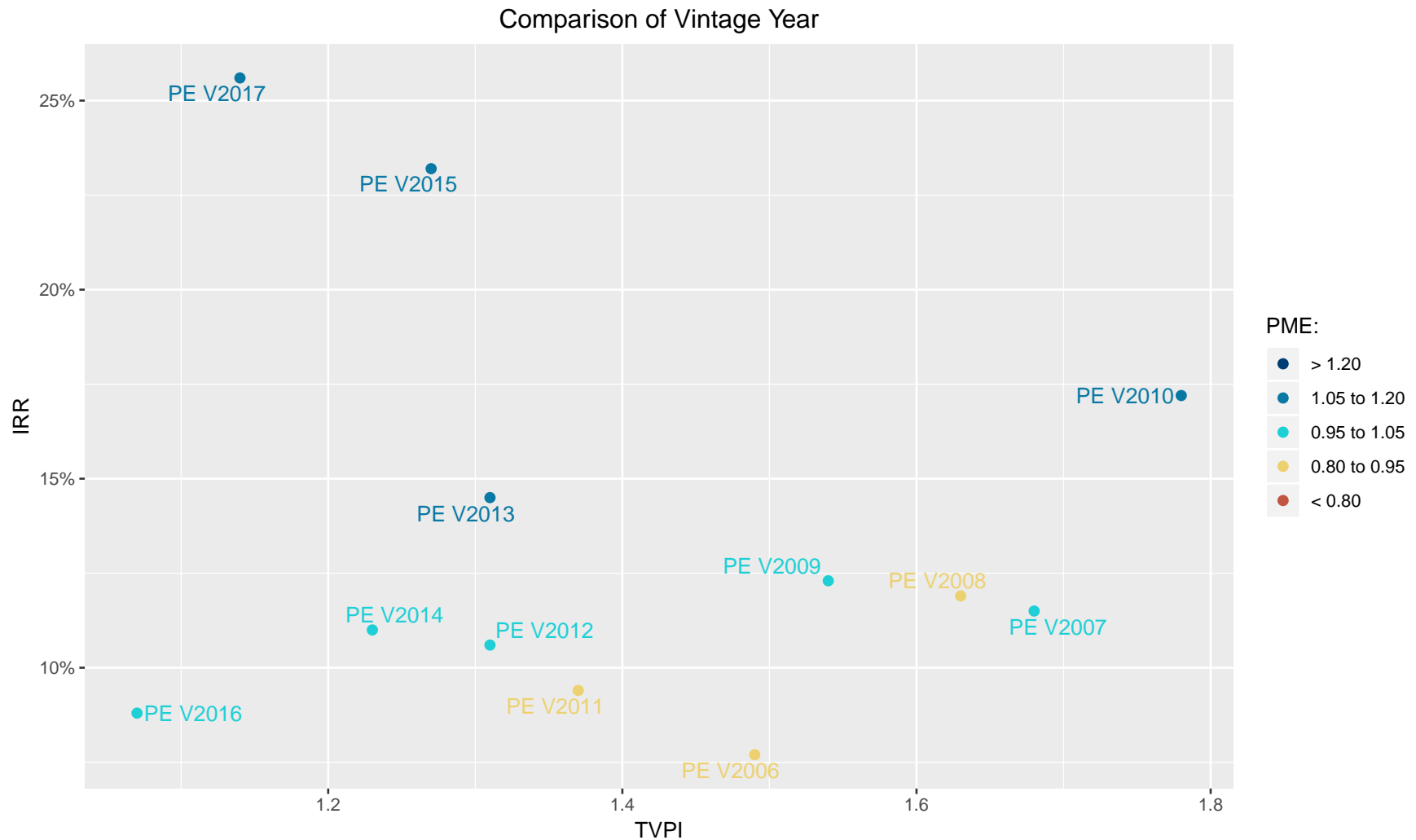


Performance by Total

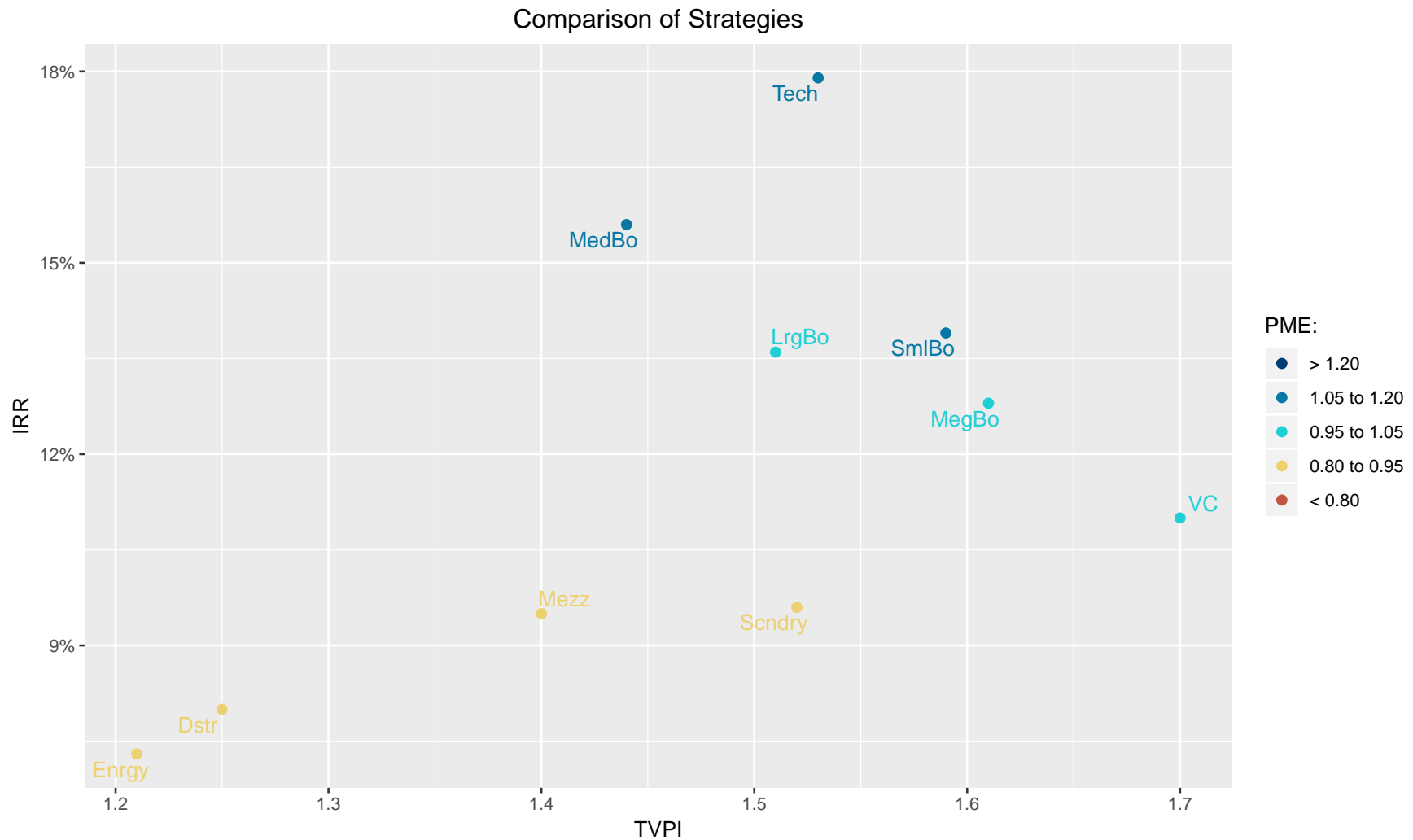
Comparison of Total, Current, and Legacy Portfolios



Performance by Vintage



Performance by Category

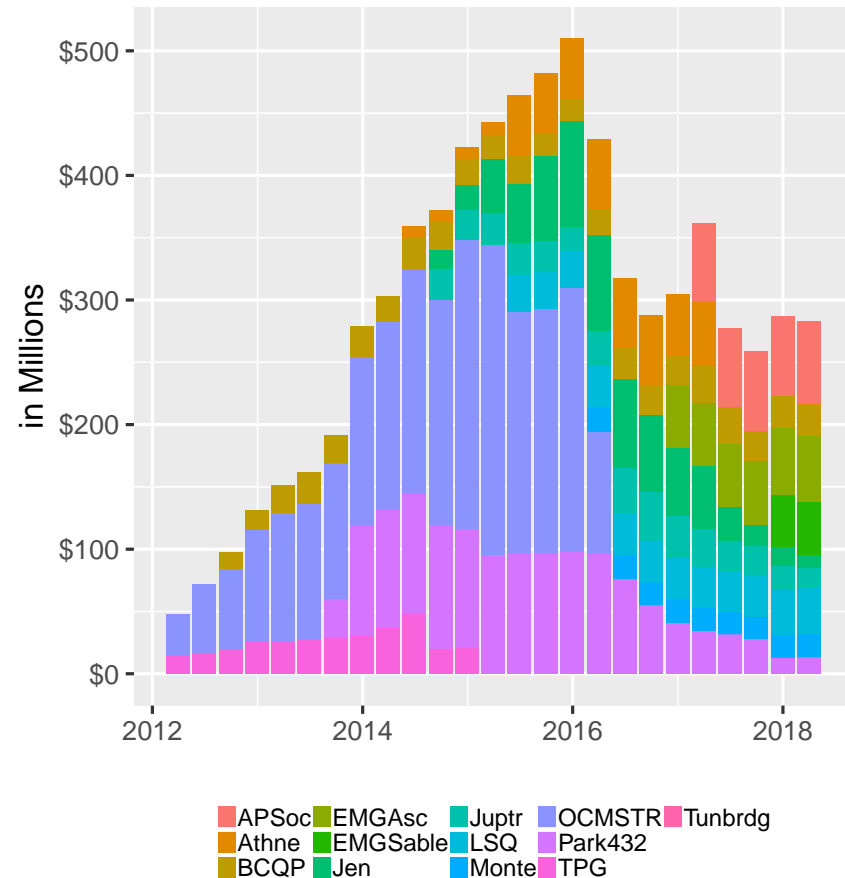


Private Opportunistic Equity

Private Opportunistic Equity IRRs

Category	Qtr	1 Year	3 Year	5 Year	ITD
Private Opportunistic Equity	-0.3%	3.3%	9.5%	19.3%	20.8%
Absolute 8%	1.9%	8%	8%	8%	8%
Excess	-2.2%	-4.7%	1.5%	11.3%	12.8%
OCMSTR	0%	0%	5.8%	21.7%	22.7%
Tunbrdg	0%	NA%	NA%	NA%	NA%
Park432	1.6%	8.1%	2.2%	31.1%	31.1%
Juptr	-25.7%	-53%	-21.1%	-17.4%	-17.4%
APSoc	3.9%	5.4%	4.5%	4.5%	4.5%
Athne	0%	-50.4%	30.7%	27.4%	27.4%
BCQP	-2.1%	-7.5%	12.6%	13.8%	37.1%
EMGAsc	0.3%	3.3%	31.3%	31.3%	31.3%
EMGSable	0%	40.9%	40.9%	40.9%	40.9%
LSQ	0.5%	13.8%	4.8%	4.8%	4.8%
Monte	3.2%	4.5%	-0.4%	-0.4%	-0.4%
Jen	6.2%	26%	17.9%	17.7%	17.7%
TPG	0%	0%	420.8%	22.2%	16.6%

Private Opportunistic Equity Funds



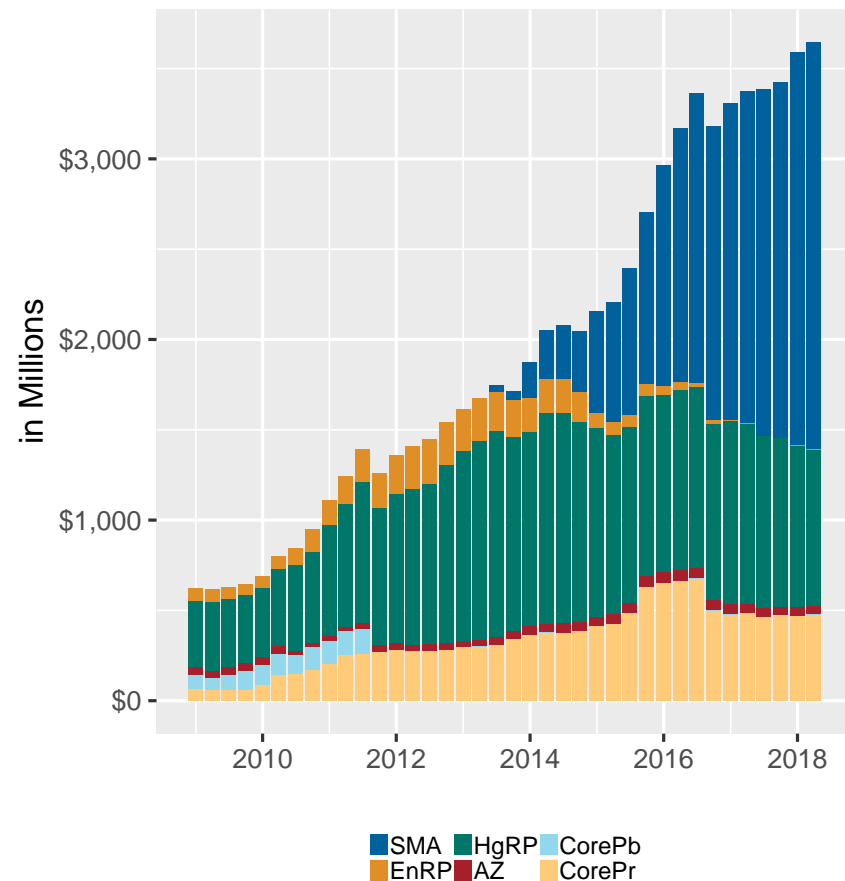
- While we customarily compare opportunistic investments to an absolute return benchmark
 - The inception to date dollar matched IRR for an investment in Russell 2000 would have been 10.15%

Performance Overview & Allocation

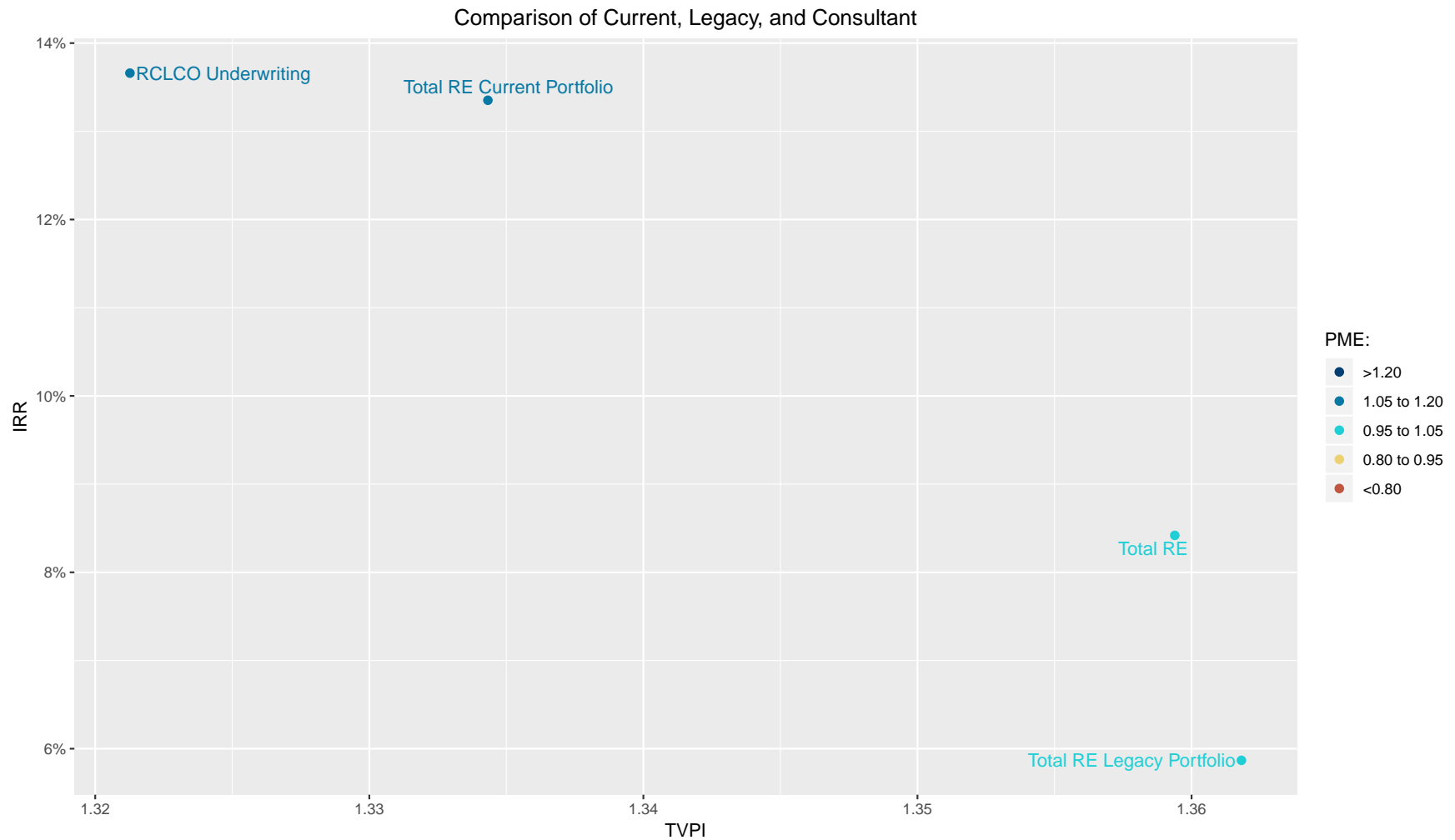
Real Estate IRRs

Category	Qtr	1 Year	3 Year	5 Year	ITD
Real Estate	2%	7.6%	10.9%	11.9%	8.4%
ODCE Net	1.8%	6.7%	9.4%	10.5%	7.2%
Excess	0.1%	1%	1.5%	1.4%	1.2%
EnRP	-0.2%	4.9%	18.9%	15.7%	5.7%
HgRP	0.6%	5.4%	7.9%	10.8%	7.4%
CorePb	0%	0%	NA%	NA%	0.1%
CorePr	1.9%	7%	9.1%	9.6%	9.4%
AZ	-14.4%	-9.7%	-9.8%	3.8%	7.6%
Strat	3%	9.2%	14.1%	14.2%	14.2%

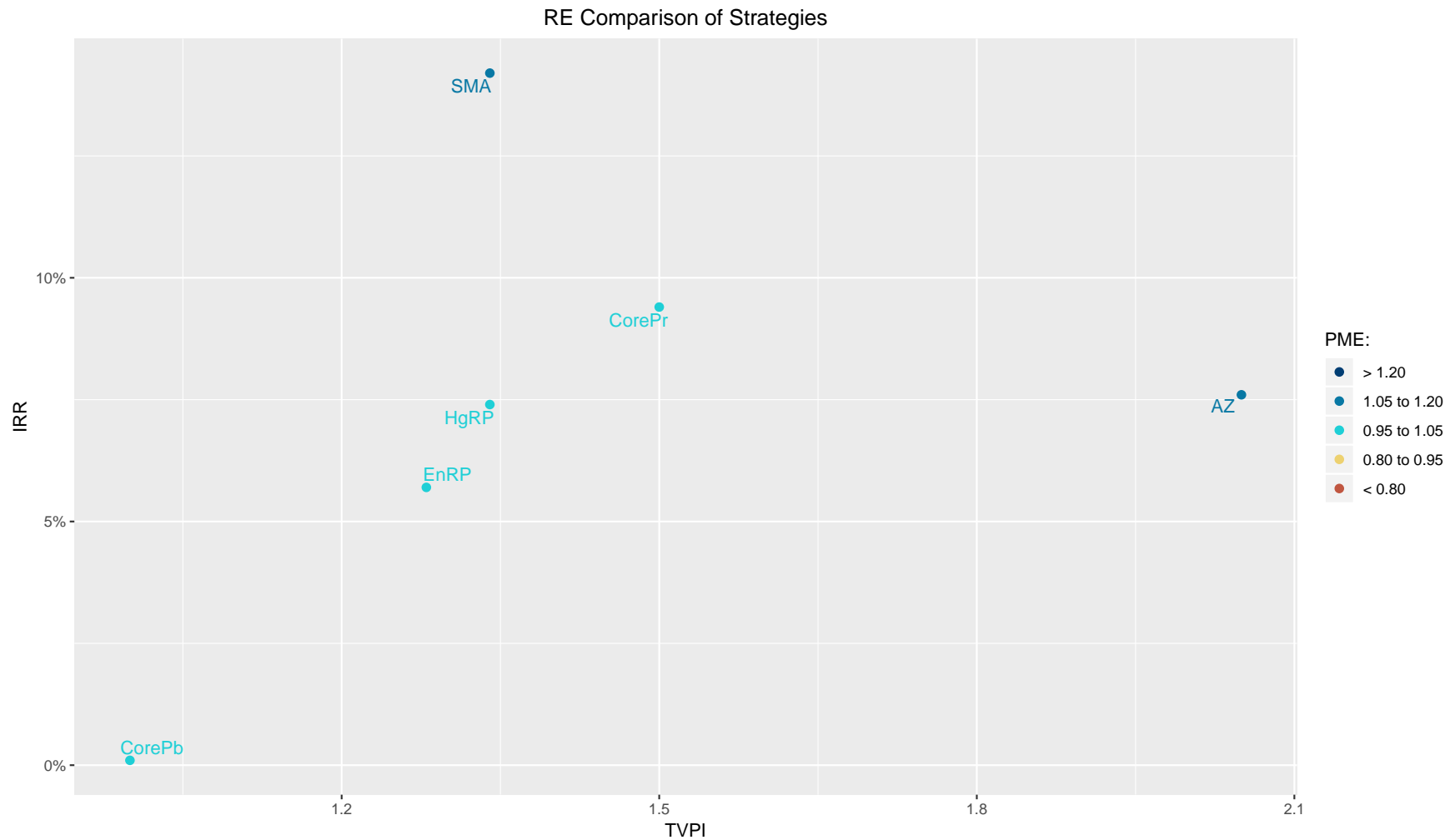
NAV by Strategy



Total Performance



Performance by Strategy

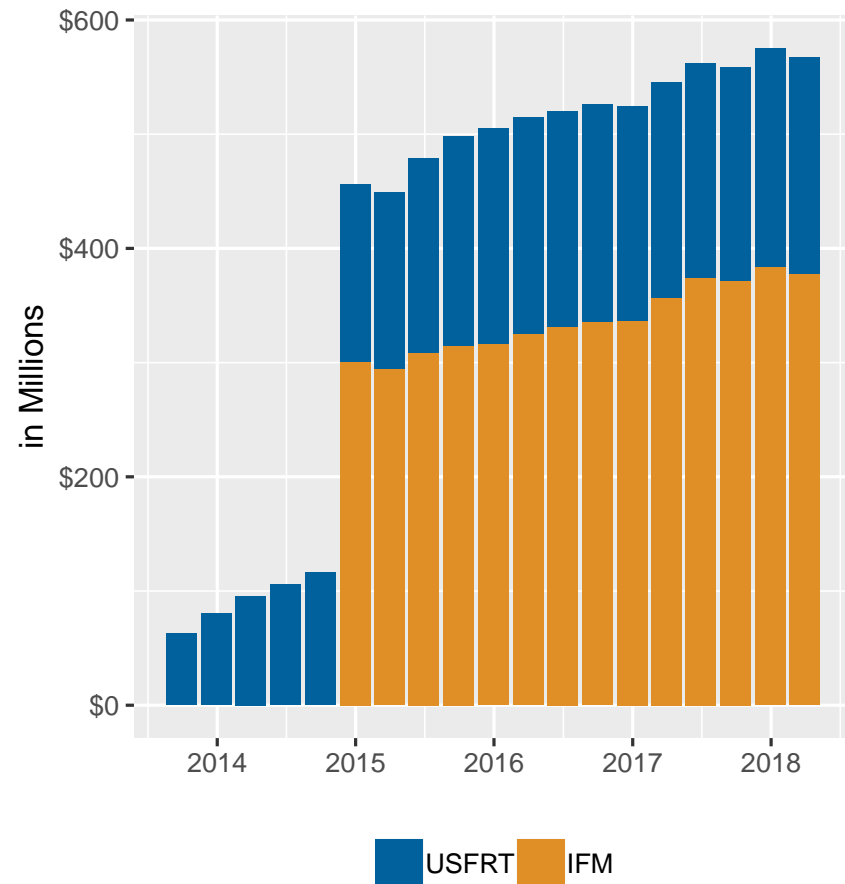


Performance Overview & Allocation

Farmland & Infrastructure IRRs

Category	Qtr	1 Year	3 Year	5 Year	ITD
Farmland	5.5%	15%	9.7%	8.2%	8.2%
Core CPI + 350 Bps	1.6%	5.7%	5.7%	5.6%	5.6%
Excess	3.9%	9.3%	4.1%	2.6%	2.6%
IFM	8.5%	21.9%	13.7%	11.7%	11.7%
USFRT	-0.1%	2.2%	2.6%	2.9%	2.9%

NAV by Strategy



Total Performance

