COMMON INVESTMENT MEETING
Public Session

THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER

September 19, 2019

MARKET RETURNS

Market Returns: Q2-2019

Asset Class	Index	Q2-2019	Fiscal YTD	3 Year	5 Year	Expected*
Equities - U.S.	Russell 3000	4.10%	8.98%	14.02%	10.19%	7.80%
Equities - Developed Intl	MSCI World ex USA IMI Net	3.50%	0.16%	8.92%	2.22%	8.90%
Equities - Emerging Intl	MSCI EMERGING MARKETS	0.61%	1.21%	10.66%	2.49%	11.00%
Debt - US Govt Long Duration	FTSE Treasury 10+	6.04%	12.24%	1.27%	5.78%	
Debt - US Government	NYC Treas/Agency +5	4.56%	10.38%	1.41%	3.99%	2.80%
Debt - Investment Grade	NYC IG Credit	4.07%	10.13%	3.67%	3.84%	3.40%

*Average of consultant long-term arithmetic expected market returns, as of 2016

Source: State Street

What changed in Q2?

1) Global growth concerns

- Global growth slowing; China and US slowing, recessions likely in Germany, France and UK
- Trade war intensifying, Trump tweet on May 5th announcing additional tariffs

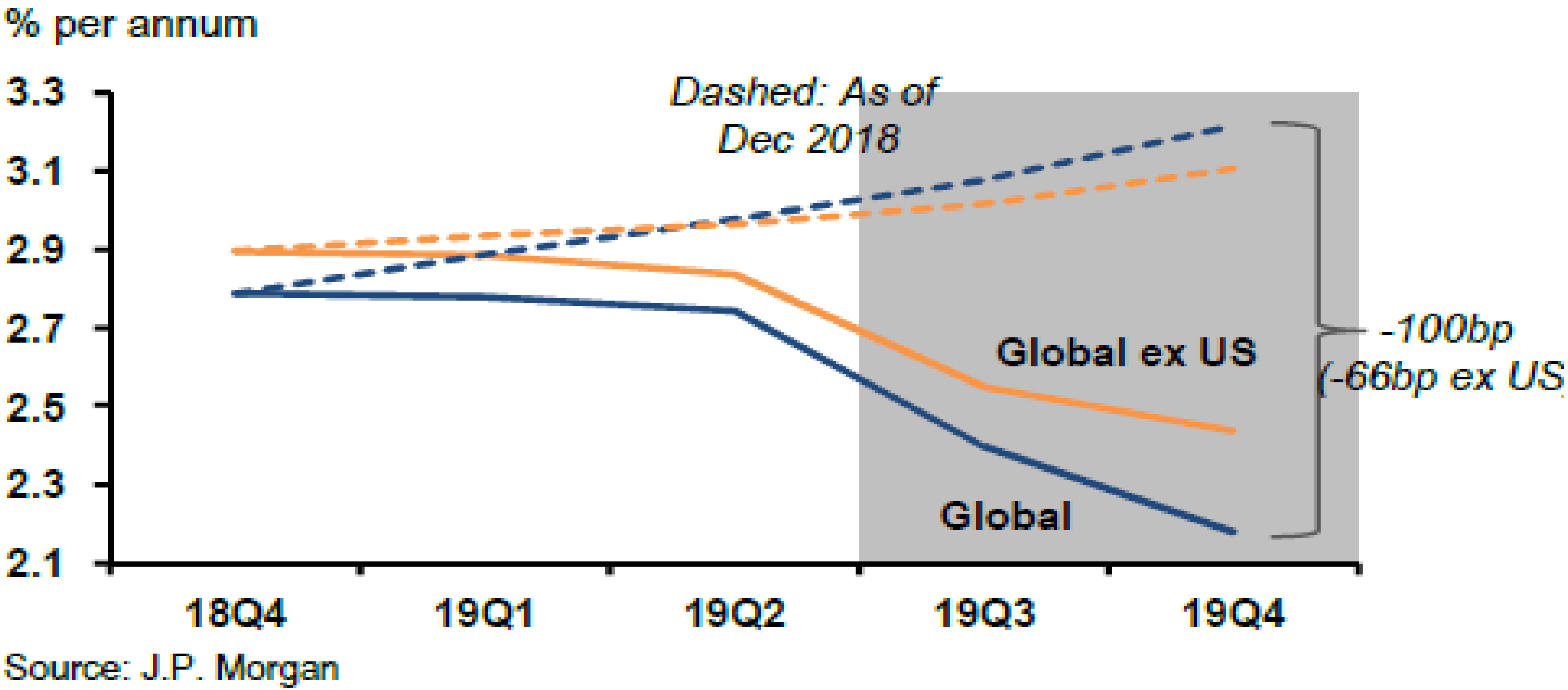
Market Returns Q2 – 2019

What changed in Q2?
2) Lower Interest rates globally

- **Federal Reserve:**
  - FOMC meeting, May 1st – “patient on future interest rate adjustments”
  - Powell speech, June 4th at Chicago Fed Conference – emphasized undershoot of inflation and downside risks to global growth
  - FOMC meeting, June 19th – “uncertainties about economic outlook have increased”; “closely monitor economic outlook and act as appropriate to sustain the expansion”
  - US economic data – Q2 GDP decelerated from 3.1% to 2%, inflation lower than expected, business spending slowed, employment and consumer spending remain strong
- **ECB:**
  - ECB chair Draghi speech, June 18th at ECB forum in Sintra, Portugal – reassured markets of ECB’s willingness to act if necessary and that all monetary policy options available
  - European economic data – widespread weakness, particularly in exports, low inflation continued.

Market Returns Q2 – 2019

- Change in expected global policy rates



Global Interest Rates

Country	10yr yield (as of 6/30/19)	Q2 change in 10-yr yield
US	2.00	-50bp
Canada	1.47	-17bp
Mexico	3.60	-47bp
Germany	-0.32	-25bp
Italy	2.10	-32bp
UK	0.83	-17bp
Switzerland	-0.55	-15bp
Japan	-0.16	-6bp
China	3.23	-12bp
Australia	1.38	-41bp
South Africa	8.85	-17bp

- **Key takeaway – level of yields low, large drop in yields in Q2**

Q2 – Current Asset Allocation Review

Portfolio Update – Q2'19

1) Rebalancing activity

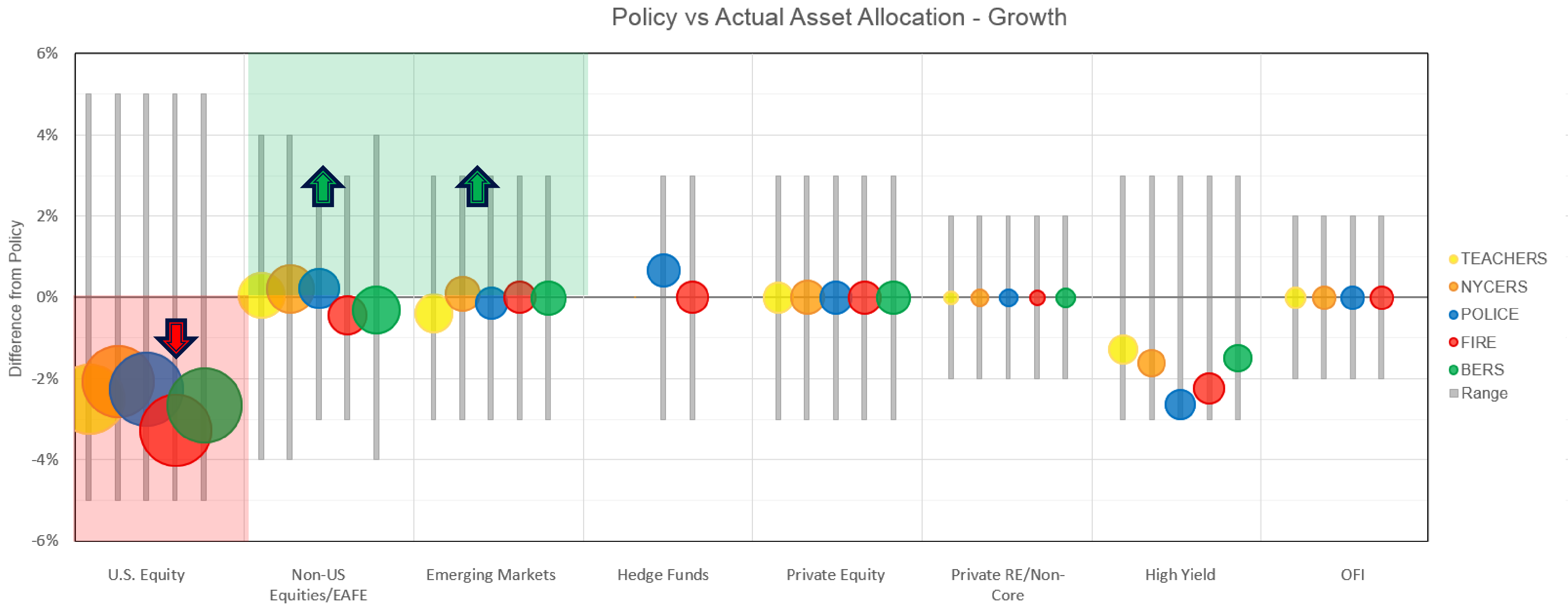
- Small amount of duration extension in US Treasury portfolio

2) Portfolio concerns

- Slowing global growth
- Geopolitical risks
- Central banks easing cycle

Q2 – Current Asset Allocation Review - Growth

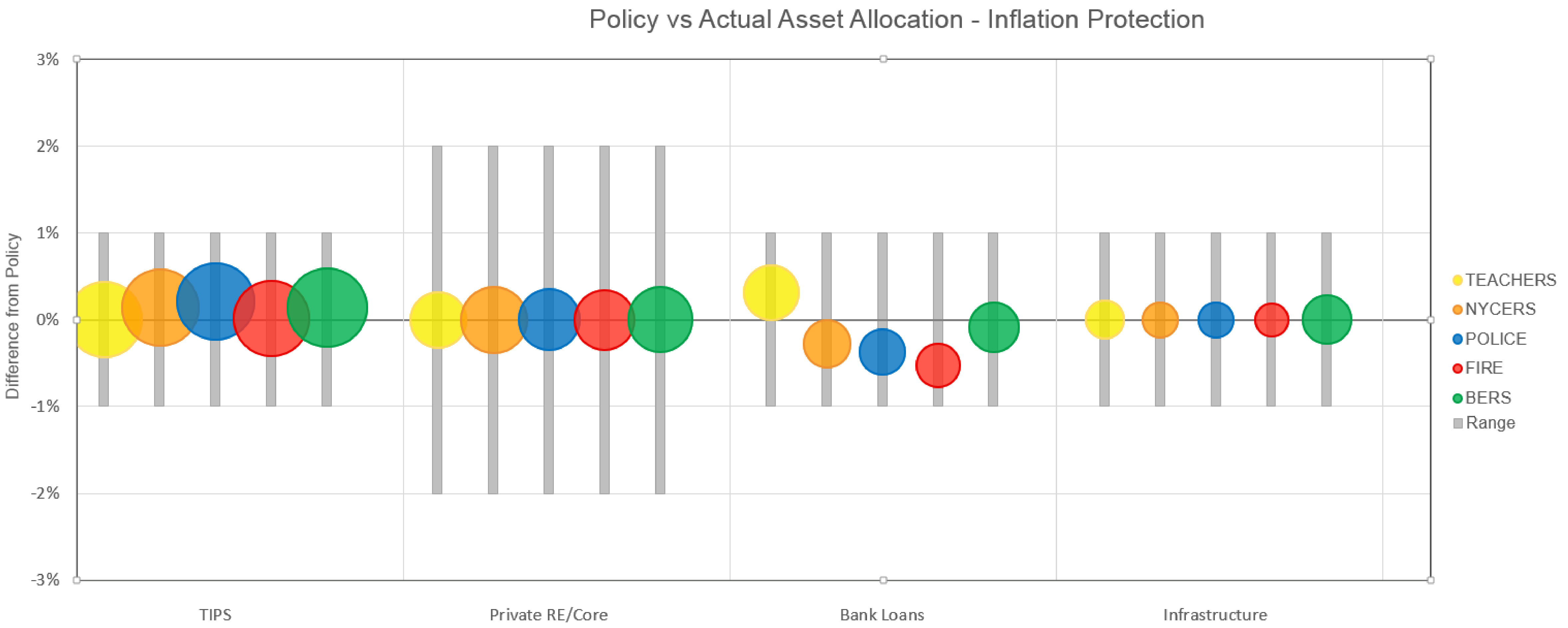
Relative Mix to Adjusted New Policy Weights



Source: State Street

Q2 – Current Asset Allocation Review – Inflation Protection

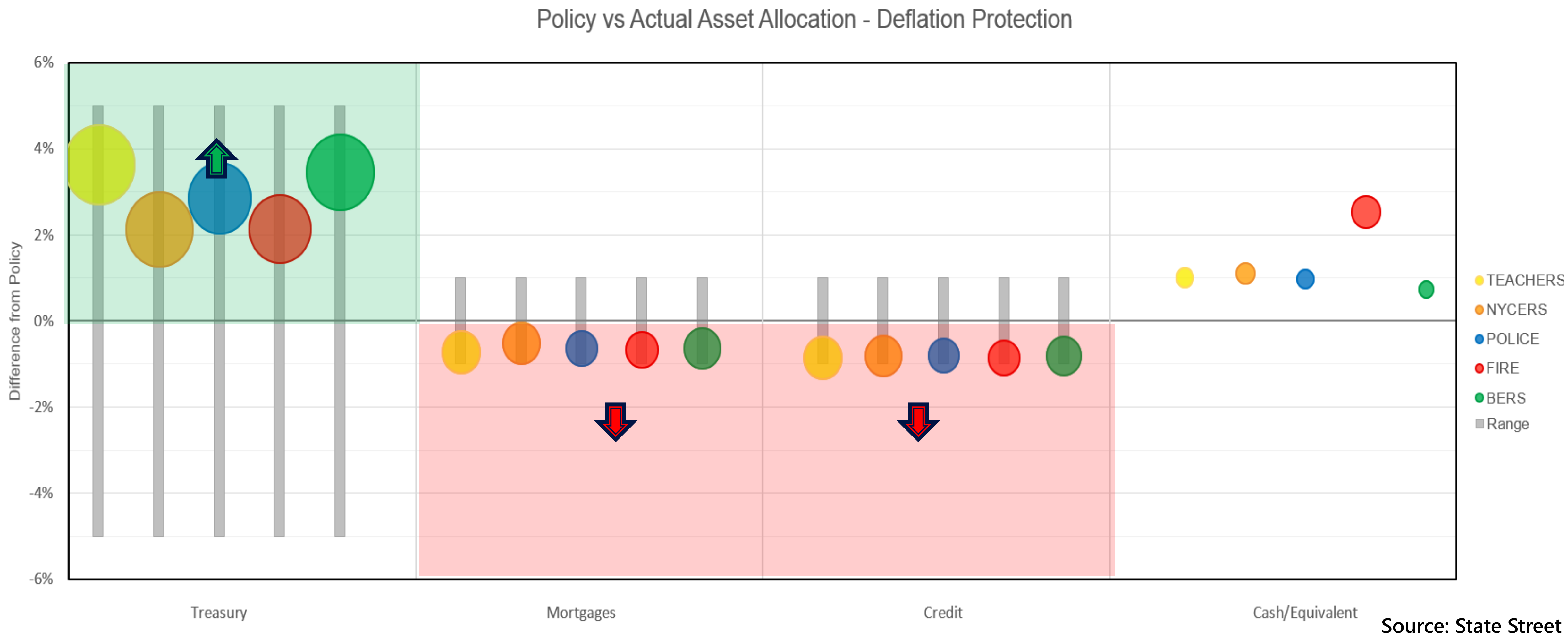
Relative Mix to Adjusted New Policy Weights



Source: State Street

Q2 – Current Asset Allocation Review - Deflation Protection

Relative Mix to Adjusted New Policy Weights



Source: State Street

Current Asset Allocation Review

- **Core Bond Portfolio Duration, Actual Vs. Target (as of 06/30/2019)**

	TRS	NYCERS	Police	Fire	BERS
Original Duration	6.19	6.34	6.51	6.39	6.25
New Duration Target	11.90	8.67	12.24	12.17	8.69
Duration as of 03/31/19	10.12 (69%)	8.10 (76%)	10.43 (70%)	10.38 (69%)	7.96 (73%)
Duration as of 06/30/19	10.24 (71%)	8.27 (83%)	10.74 (74%)	10.63 (73%)	8.21 (80%)

Source: State Street

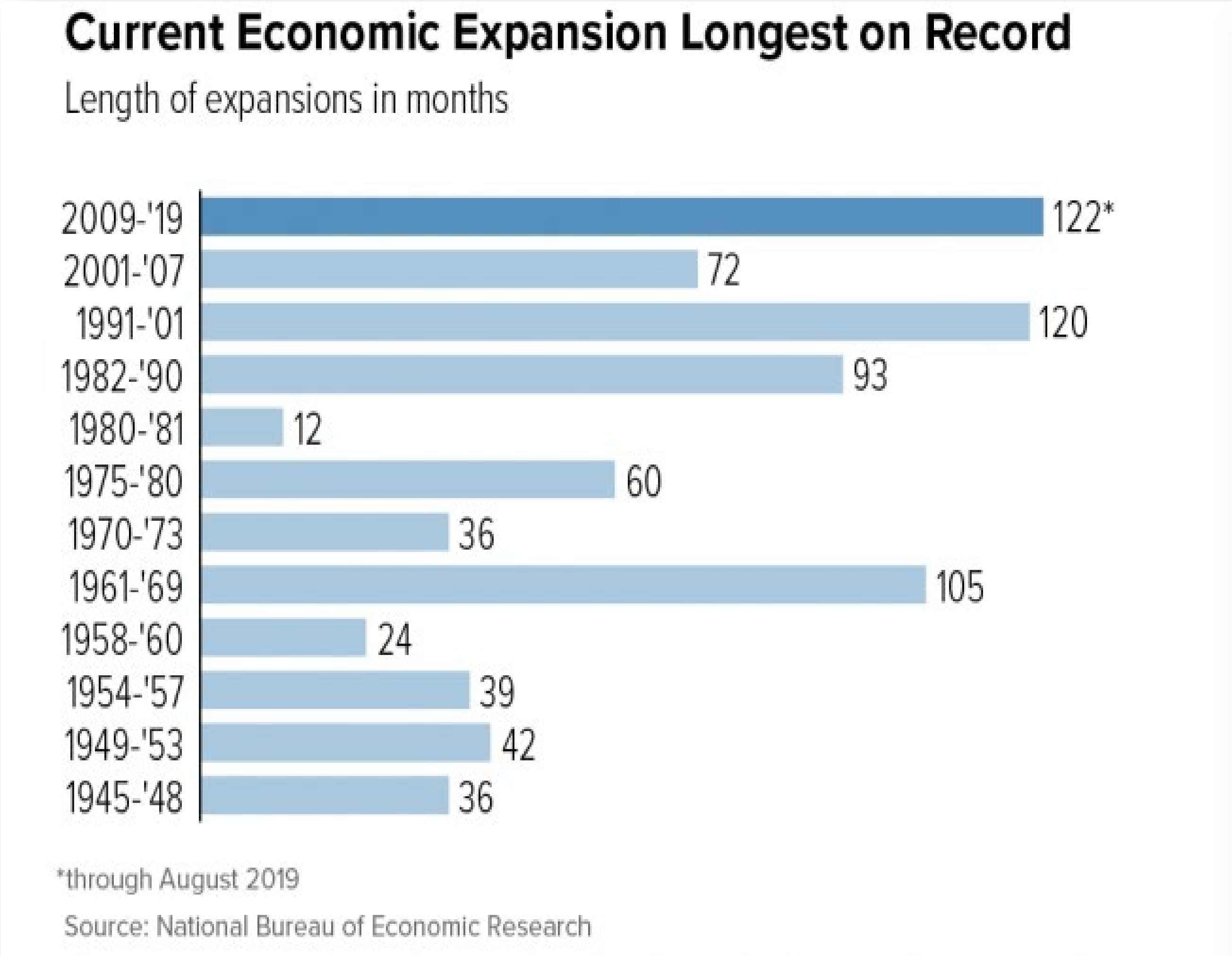
New Strategic Asset Allocation

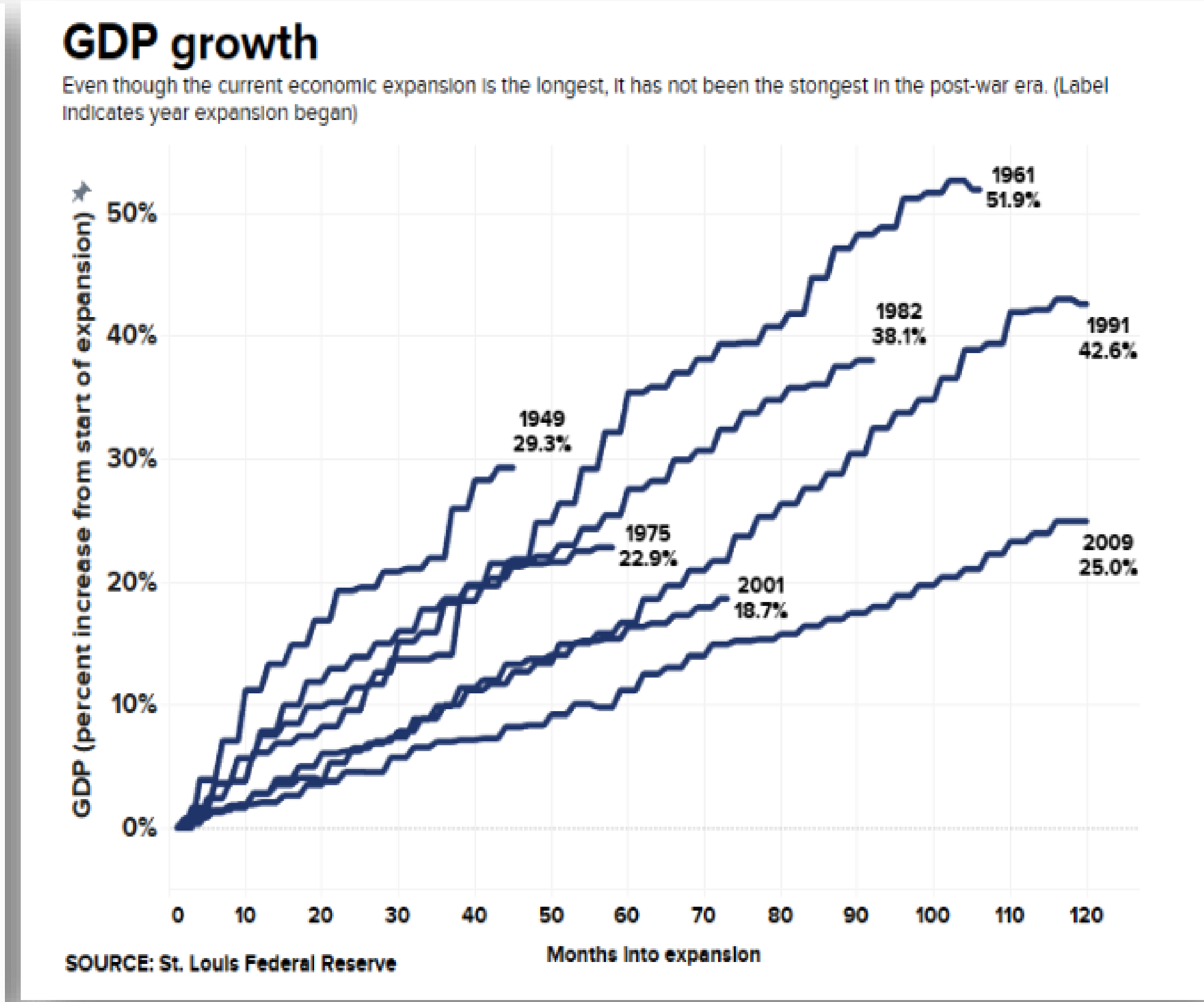
- Update on Strategic Asset Allocation process
- Overview
- Public and Private Market Valuations
- Realized returns and changes in consultants capital market assumptions

Overview

- **Backdrop**
  - Longest economic expansion ever
  - Historically high asset returns over last 10-years, as compared to both expectations and economic growth
  - Record low interest rates
- **Challenges**
- **Observations**

Challenges of Strategic Asset Allocation





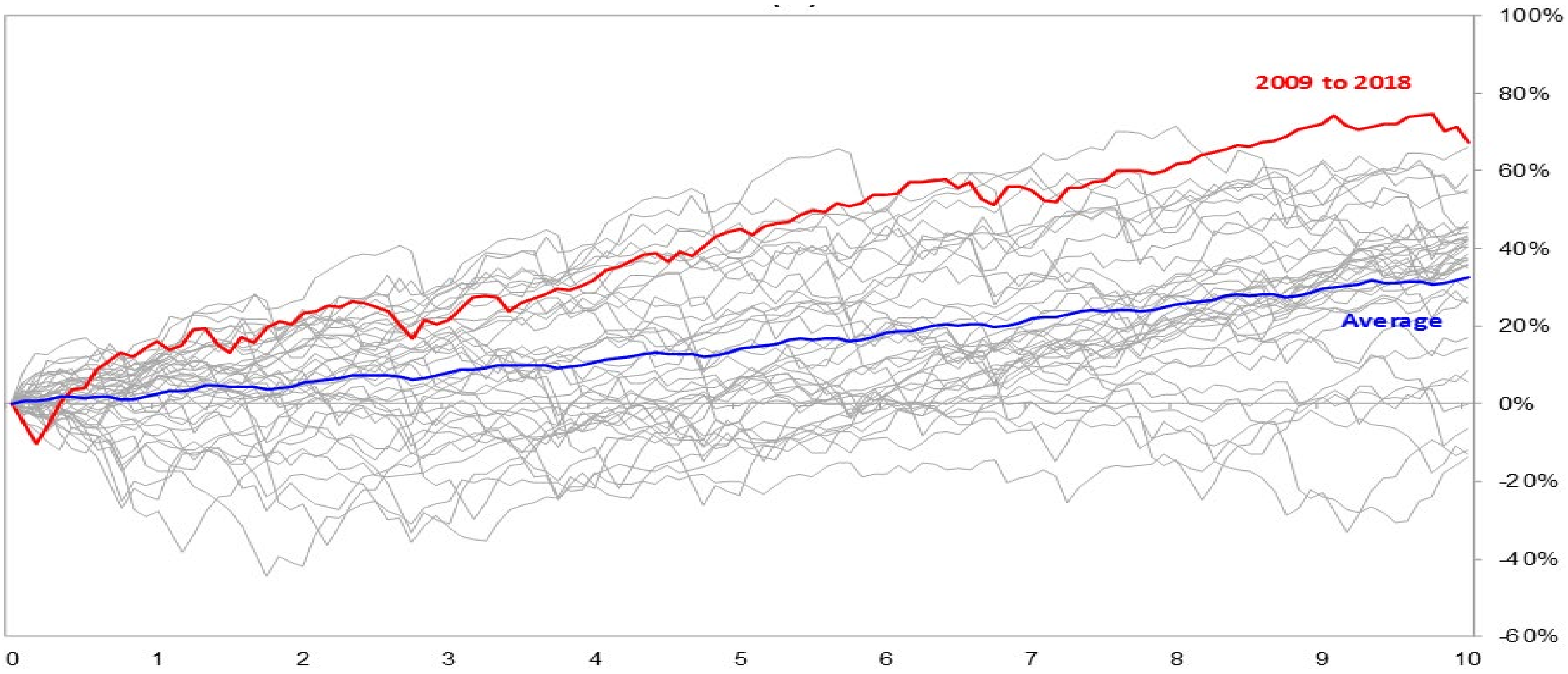
Challenges of Strategic Asset Allocation

- **Actual asset returns as compared to consultants expected returns (from June'16)**

Asset Class	Actual Return		'16 Consultants Return expectations
	3-YR	5 -Yr	
US Eq	13.91%	9.89%	7.80%
EAFE Eq	11.06%	4.08%	8.90%
EM Eq	9.90%	1.50%	11.00%
Core FI	2.79%	3.34%	3.13%
High Yield	6.83%	4.05%	6.15%
Private Real Estate	9.91%	11.44%	8.24%
Private Equity	15.84%	12.76%	11.13%
OFI	7.93%	4.83%	8.12%
Infrastructure	13.59%	11.91%	7.18%
Hedge Funds	6.56%	3.91%	6.35%

Challenges of Strategic Asset Allocation

Global 60% equities/40% fixed income hypothetical portfolio returns over all 10-year periods since 1970

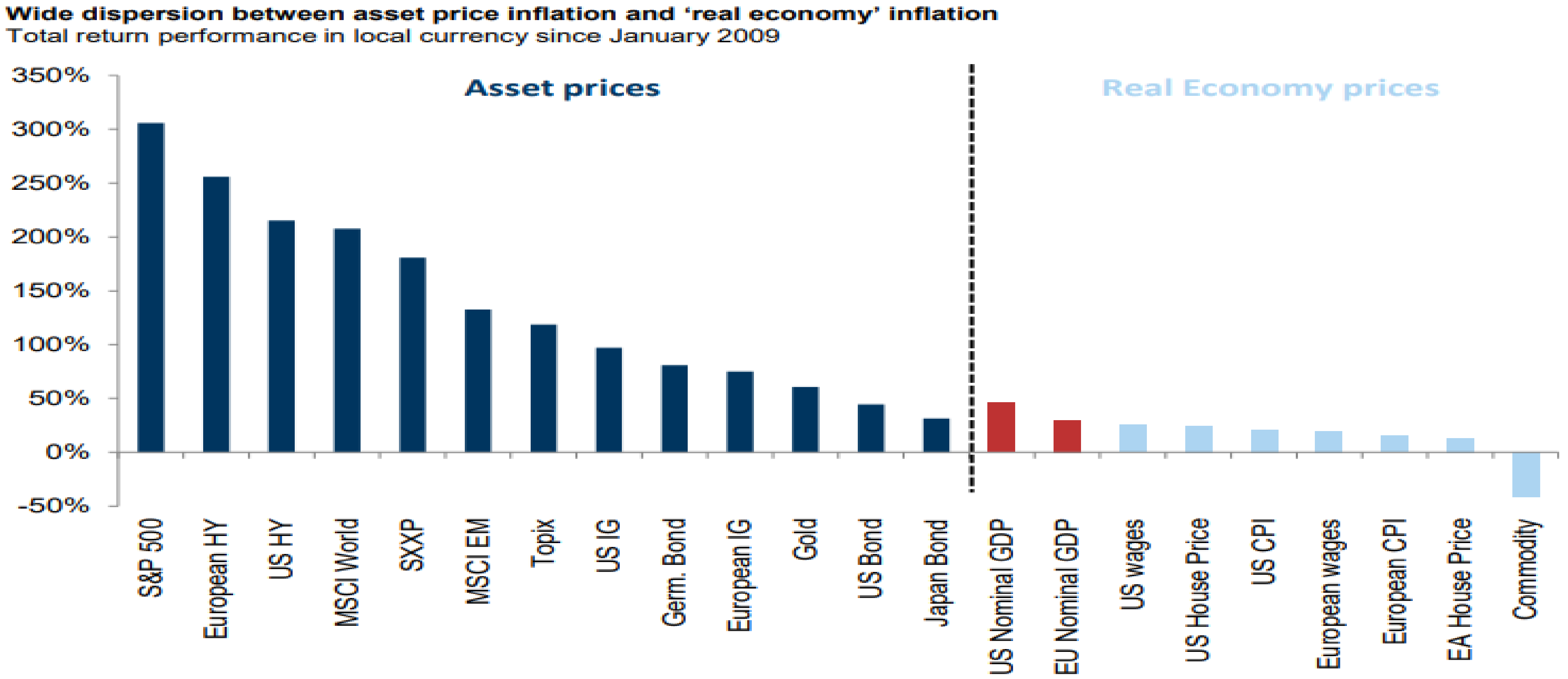


Global 60/40 portfolio consists of 60% global equities (currency-hedged) and 40% developed world nominal government bonds. Please review the "Important Disclosures and Other Information" located at the end of this presentation.

BRIDGEWATER

Challenges of Strategic Asset Allocation

- **Financial and Real Economy Prices Total Return**



Public and Private Market Valuations

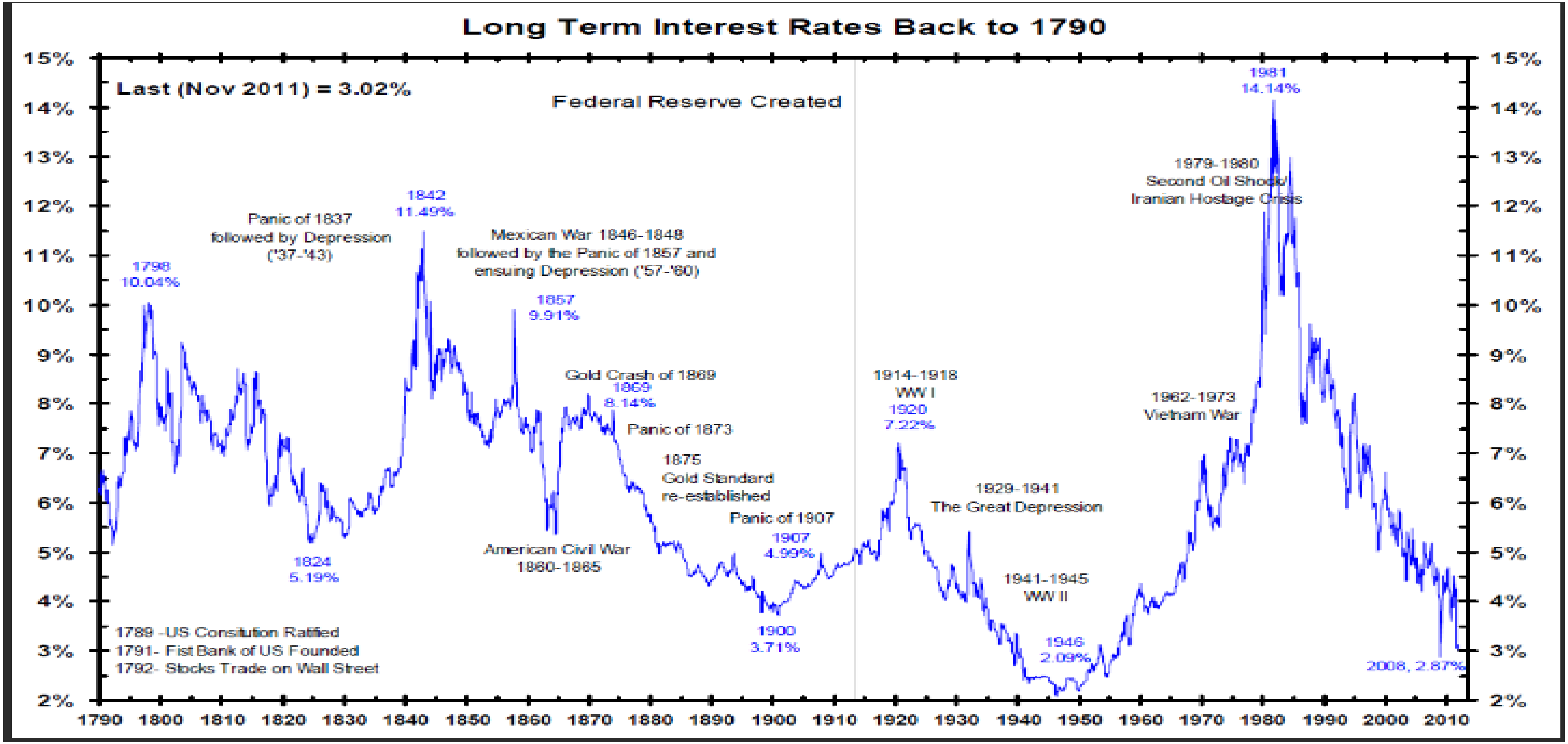
Fixed Income:

- Lowest 30- Year yields in history

2009-2019

Source: Bloomberg

Challenges of Strategic Asset Allocation



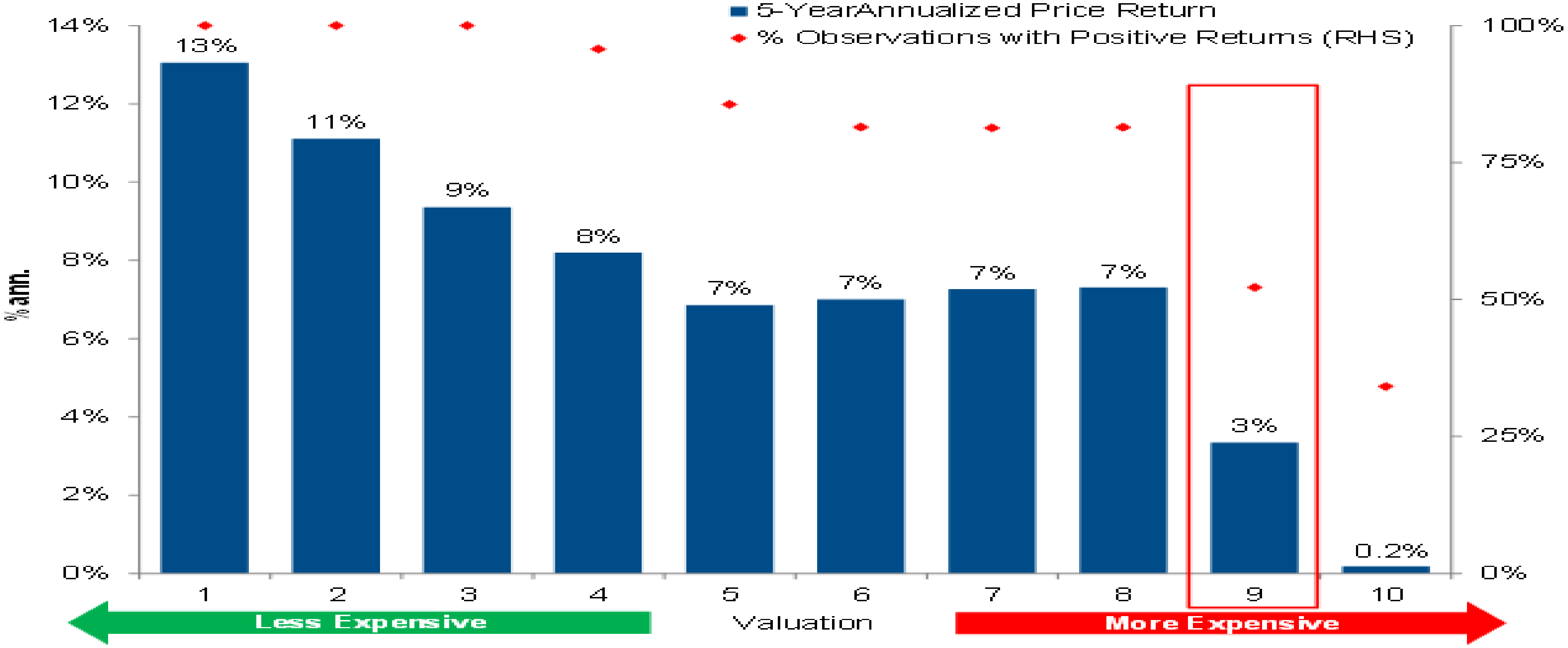
Implications:

- Expected returns for long duration US Treasury bonds have decreased
- Discount rate for valuing long term assets is low, supportive of current rich valuations in most asset classes
- Increased uncertainty over stock vs. bond correlation, particularly with low interest rates

Challenges of Strategic Asset Allocation

US Equities:

- Historically expensive valuations

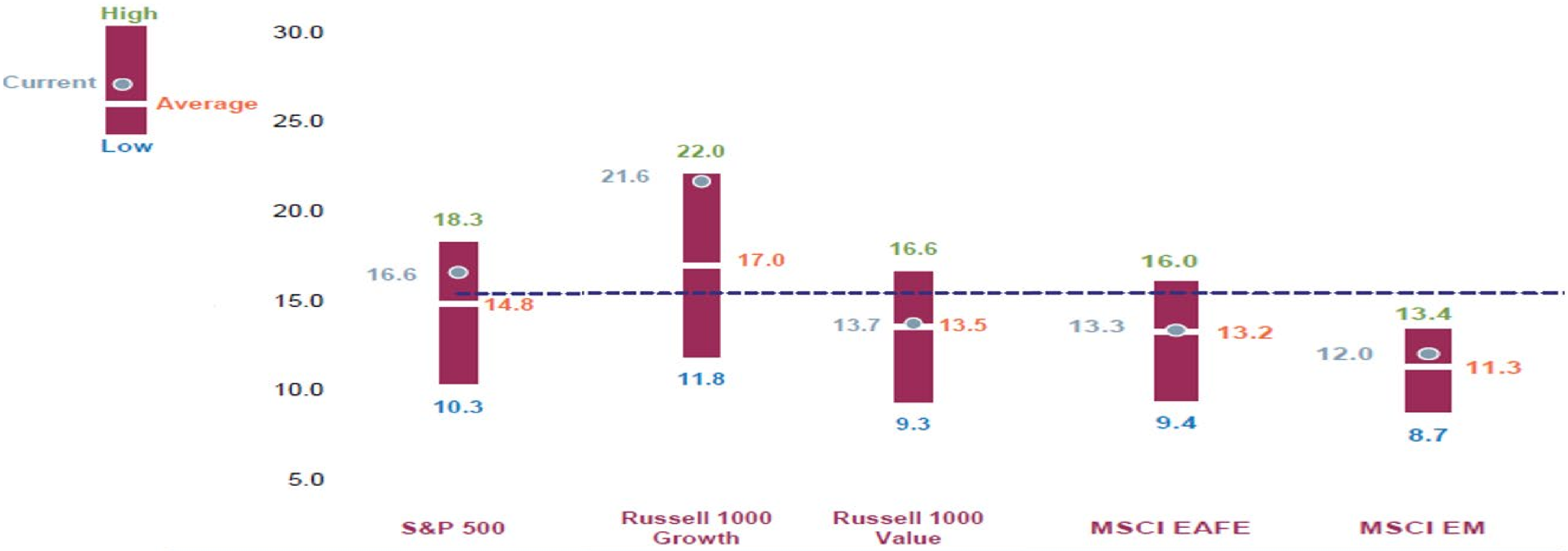


Source: GSAM

Challenges of Strategic Asset Allocation

- **Valuations across styles and regions**

Regions/Styles: Current NTM P/E vs. 10-Year High, Low, Average



	S&P 500	Russell 1000 Growth	Russell 1000 Value	MSCI EAFE	MSCI EM
High Date	11/17	7/19	2/17	5/15	9/09
Low Date	9/11	9/11	9/11	9/11	9/11

Source: Eaton Vance

Challenges of Strategic Asset Allocation

Implications:

- Expected returns in US equities, given valuations, have decreased
- Large cap growth at historically rich valuations, small cap and value more reasonably valued
- EAFE and EM equities more reasonably valued
- How will valuations change in lower or higher interest rates?

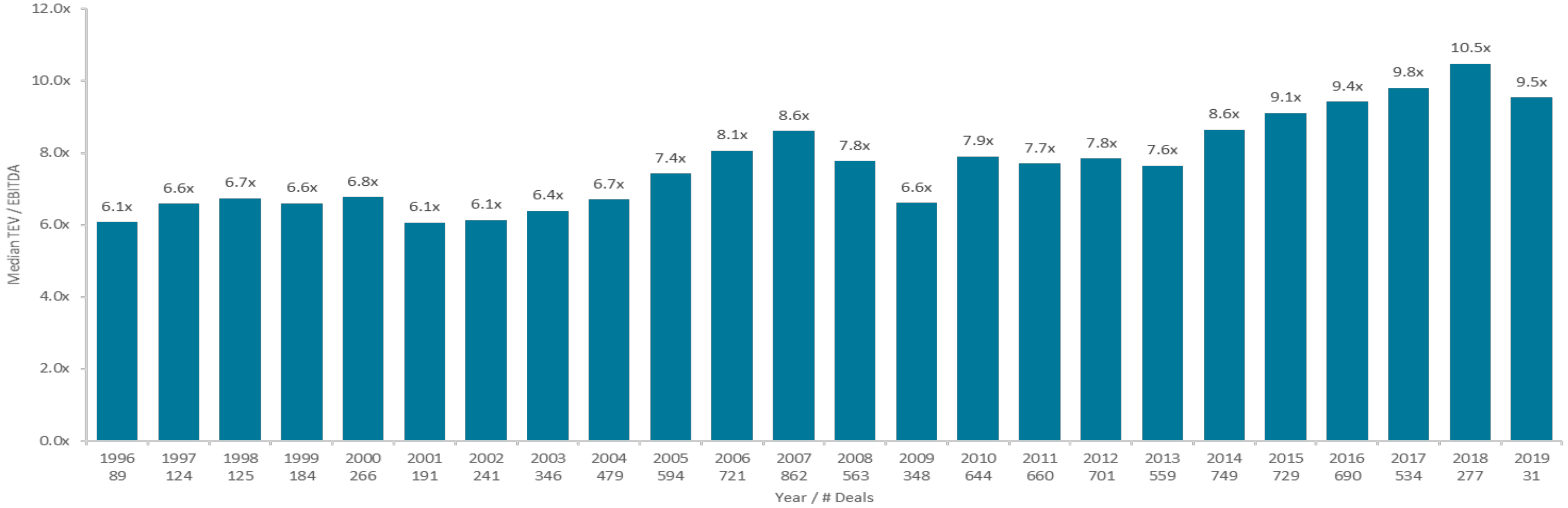
Challenges of Strategic Asset Allocation

Private Equity:

- Historically high purchase multiples, as measured by EBITDA multiples

PURCHASE PRICE MULTIPLES – ALL BUYOUTS

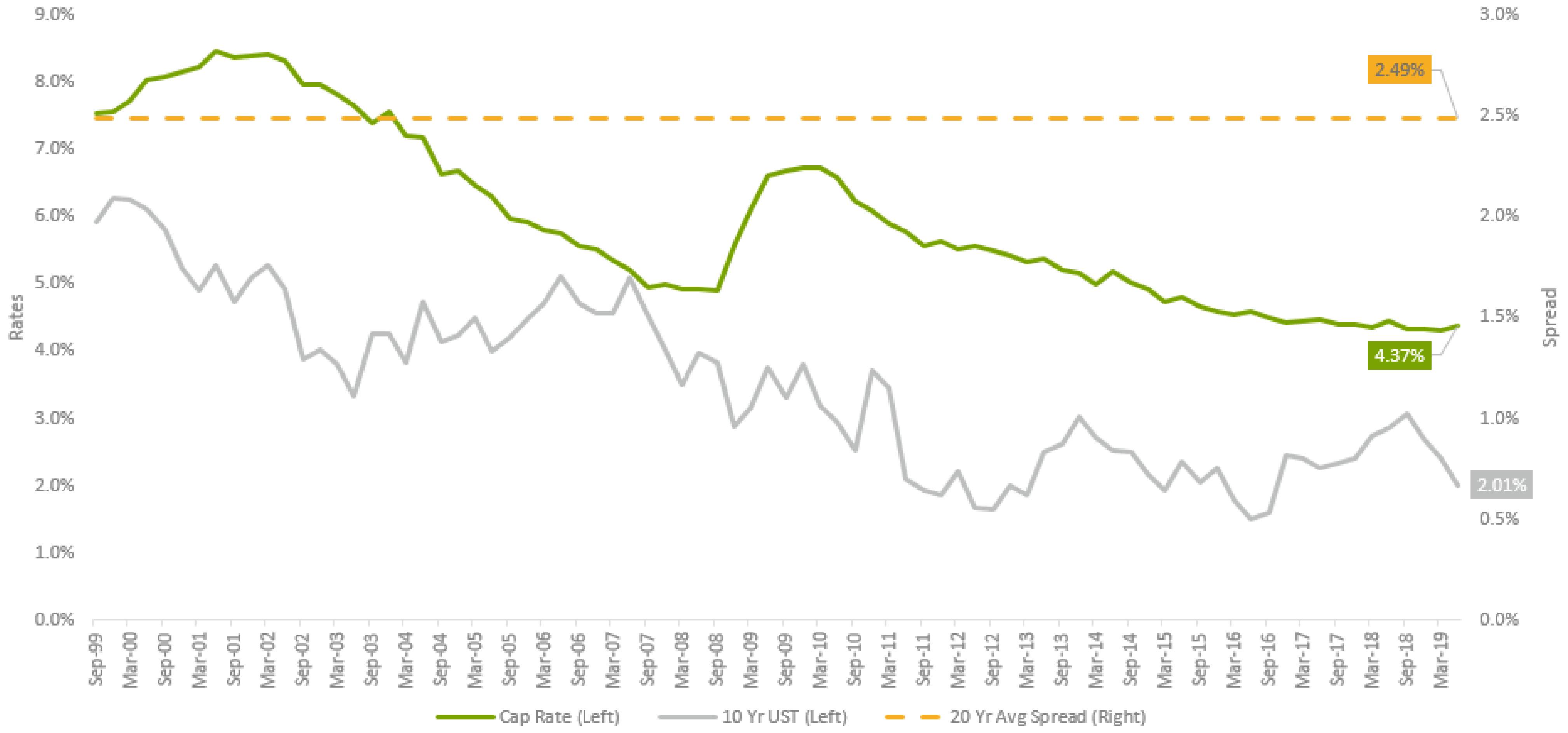
Median



Source: StepStone Private Markets Intelligence (SPI), as of March 31, 2019. Includes 10,707 Buyout investments made between 1996 and 2019. StepStone acquires proprietary operating metrics through investment due diligence and portfolio monitoring.

Challenges of Strategic Asset Allocation

- **Cap rates vs. UST 10-yr yield**



Source: BAM and State Street

Challenges of Strategic Asset Allocation

- **Asset class return expectations**

Asset Class	Actual Return		'16 Consultants Return expectations	'19 Consultants Return expectations
	3-YR	**5 -Yr**		
US Eq	13.91%	9.89%	7.80%	5.80% ↓
EAFE Eq	11.06%	4.08%	8.90%	6.80% ↓
EM Eq	9.90%	1.50%	11.00%	8.30% ↓
Core FI	2.79%	3.34%	3.13%	3.20% ↑
High Yield	6.83%	4.05%	6.15%	4.80% ↓
Private Real Estate	9.91%	11.44%	8.24%	6.30% ↓
Private Equity	15.84%	12.76%	11.13%	8.70% ↓
OFI	7.93%	4.83%	8.12%	7.70% ↓
Infrastructure	13.59%	11.91%	7.18%	6.90% ↓
Hedge Funds	6.56%	3.91%	6.35%	5.60% ↓

Challenges of Strategic Asset Allocation

Overview

- **Backdrop**
- **Challenge**

What is appropriate strategic asset allocation given:

- Late economic cycle dynamics
- Historically expensive public and private asset classes
- Limit portfolio volatility
- Basket clause constraint
- Reduce portfolio drawdown risk
- Achieve actuarial 7 % return over long time horizon

- **Observations**

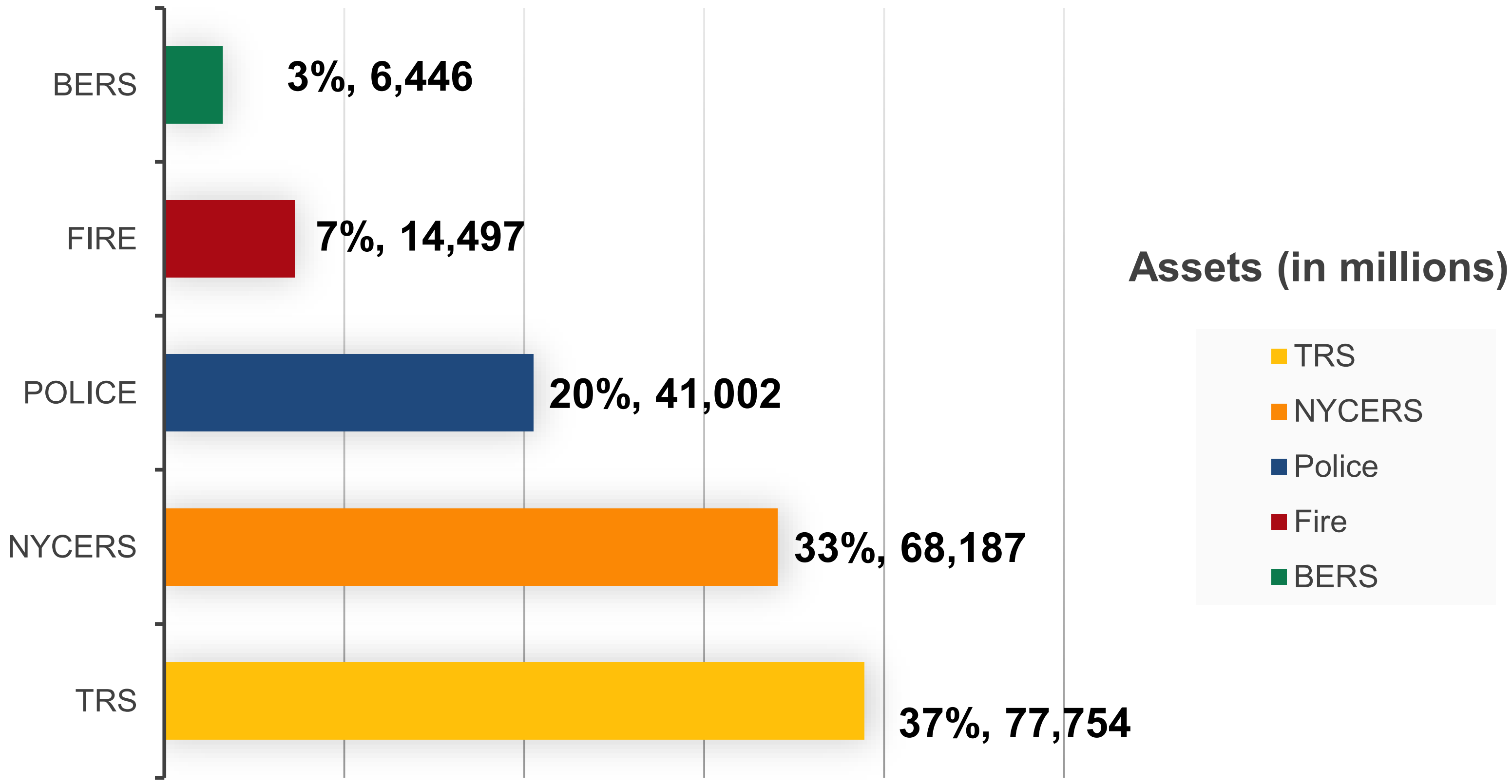
- Lower expected returns for most asset classes, as compared to actual return for over last several years
- Basket clause constraint
- Additional geopolitical uncertainties including de-globalization, Brexit, populism, US President election, increase downside risks to most asset classes
- Therefore, increased probability of lower than 7% portfolio returns going forward.

QUESTIONS?

PERFORMANCE REPORTING
2nd Quarter 2019

NYC Retirement Systems AUM (% , in millions)

$207,887m Total AUM for all 5 Systems as of June 30, 2019



Source: State Street

Total NYC Pension Fund Net Performance as of 06/30/2019

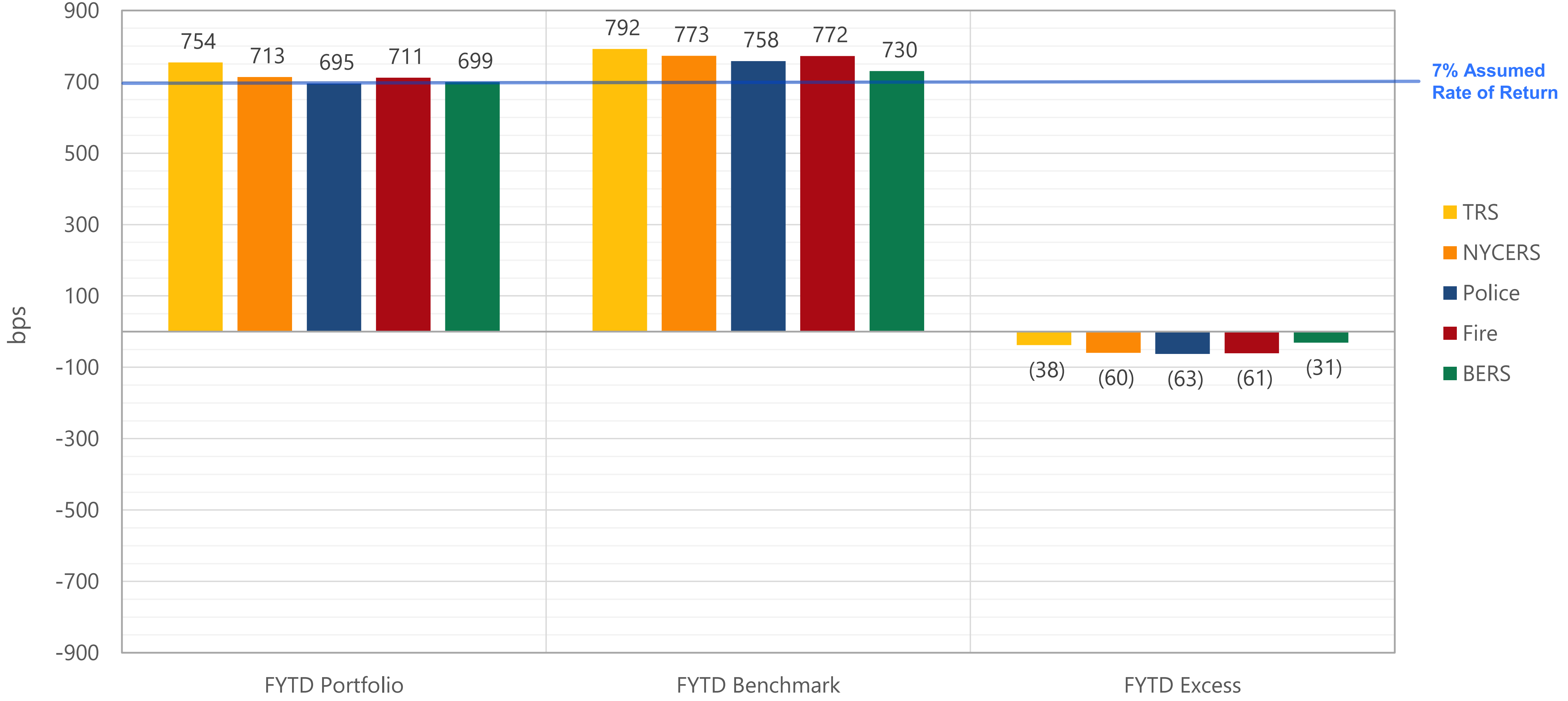
NYC Pension System	Portfolio Std Dev - 1 yr.	3 Month	Fiscal YTD	One Year Trailing	Three Year Trailing
BERS	10.08	3.36%	6.99%	6.99%	10.84%
TRS	9.01	3.57%	7.54%	7.54%	9.41%
FIRE	8.84	3.39%	7.11%	7.11%	9.72%
NYCERS	8.83	3.41%	7.13%	7.13%	9.53%
POLICE	8.81	3.32%	6.95%	6.95%	9.82%
Public Mkt Equiv 65/35		**3.77%**	**7.25%**	**7.25%**	**8.95%**
Median Fund - TUCS		**3.37%**	**6.73%**	**6.73%**	**9.43%**

Net of fees in public asset classes are recorded on an accrual basis.
Private markets data is reported on a lagged basis

Source: State Street

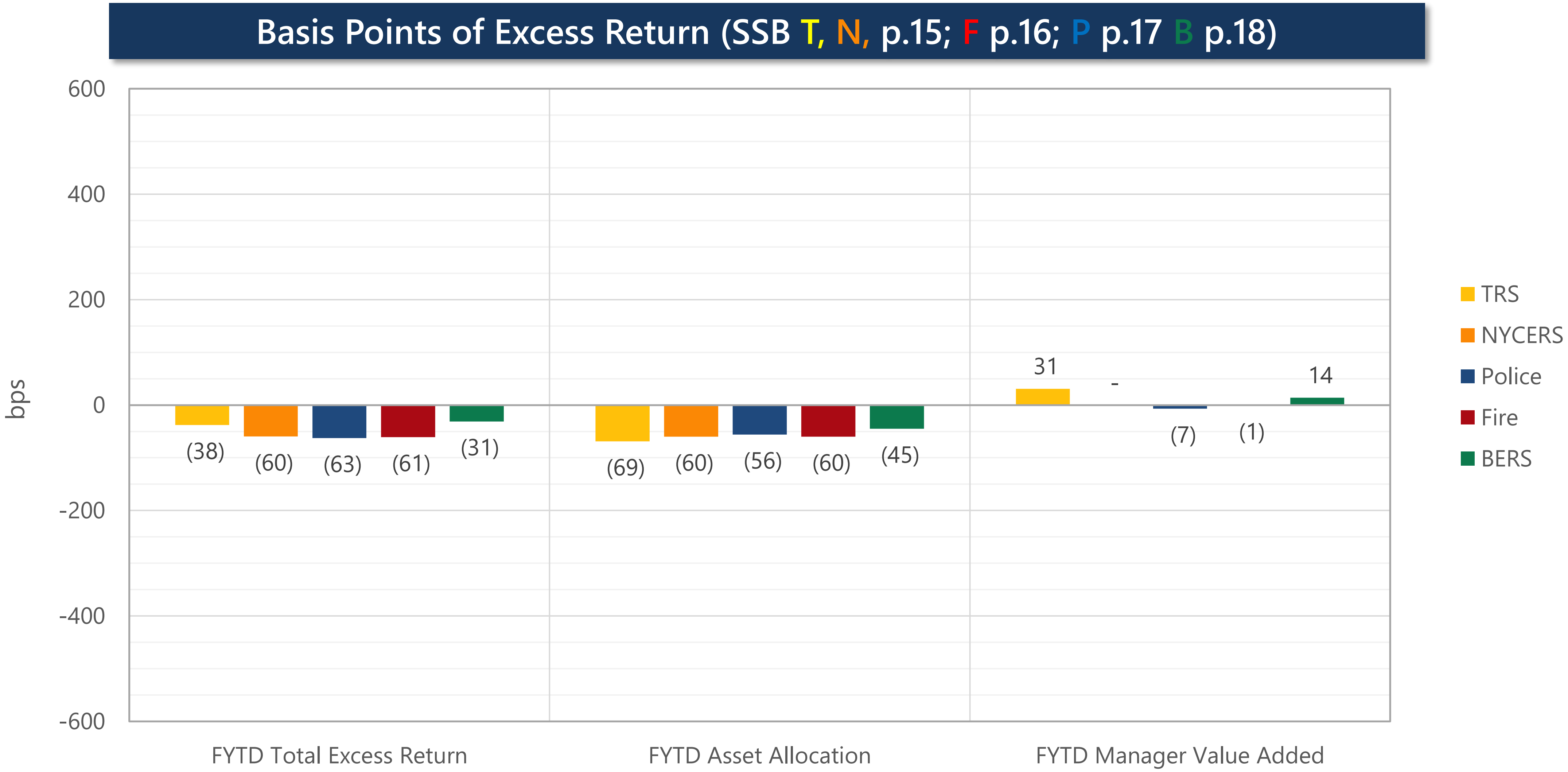
Fiscal Year to Date Return as of 06/30/2019 – Total Portfolio

Basis Points of Excess Return (SSB T, N, p.15; F p.16; P p.17 B p.18)



Source: State Street

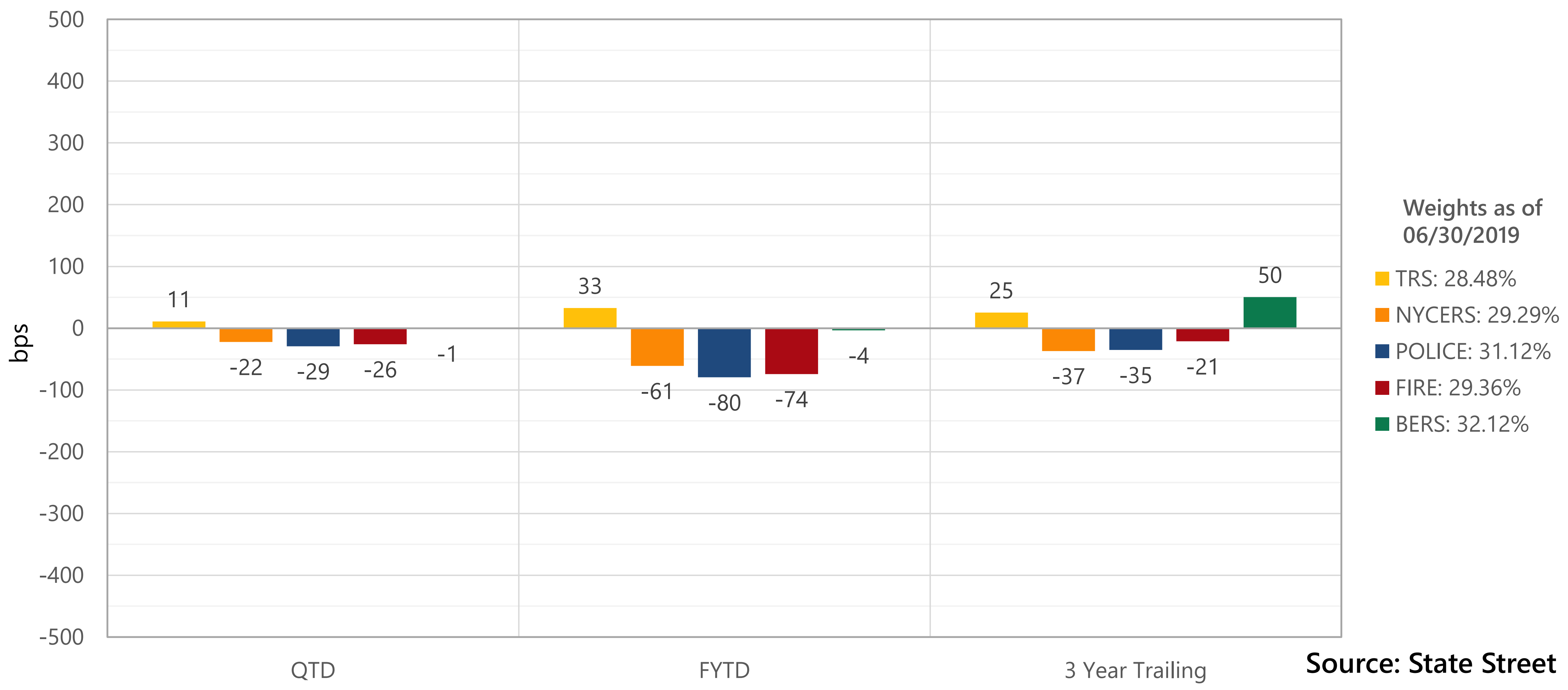
Fiscal Year to Date as of 06/30/2019 Excess Return – Total Portfolio



Source: State Street

Value Added – Total Domestic Equity

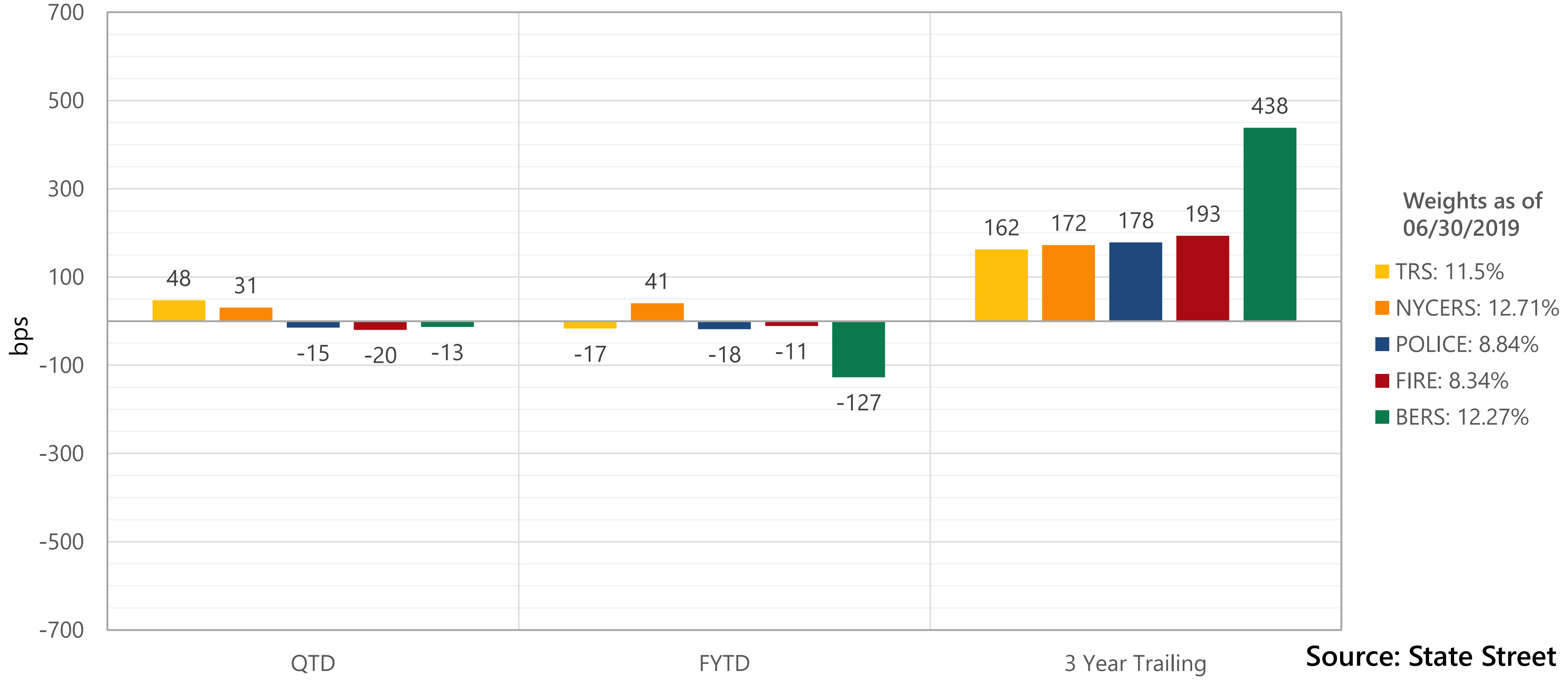
Basis Points of Excess Return (SSB T p.29; N p.30; F p.31; P p.32; B p.33)



Source: State Street

Value Added – Total World Ex-USA

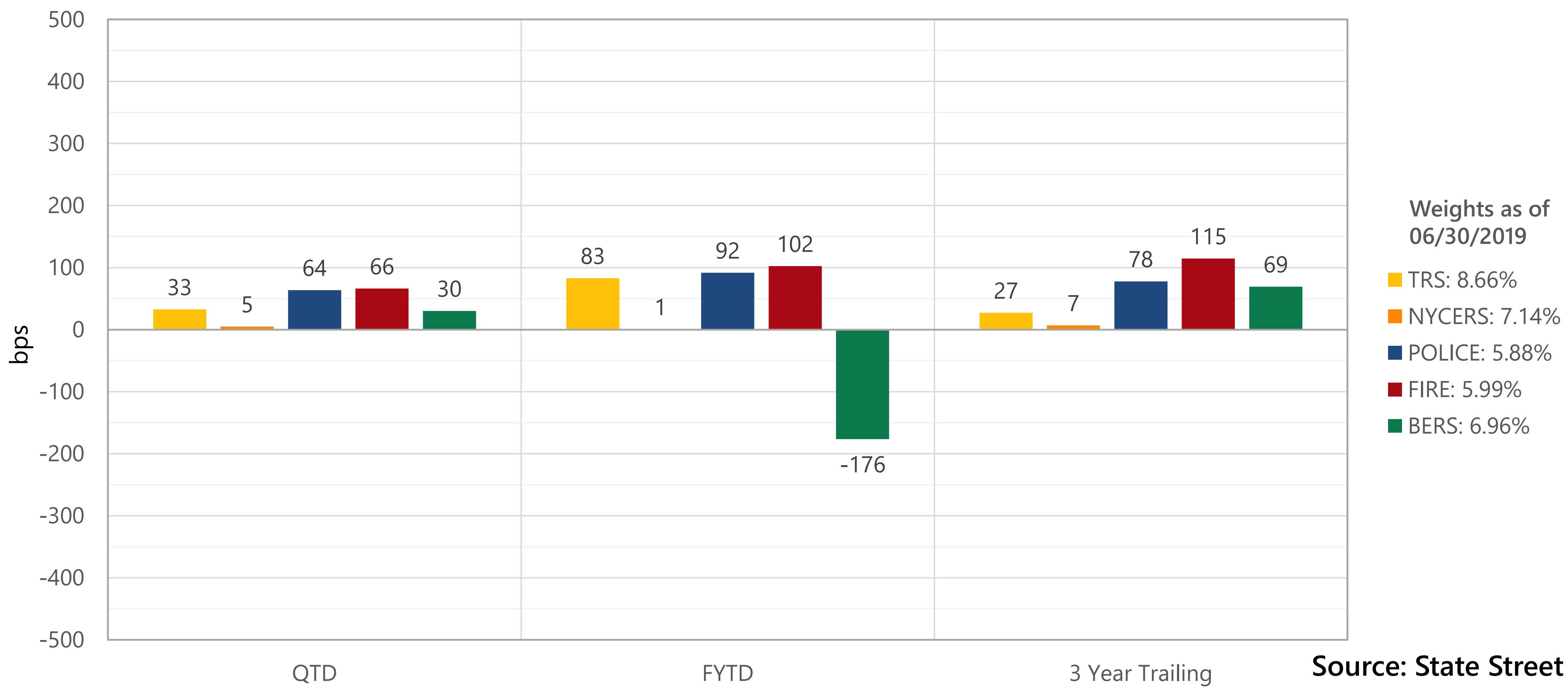
Basis Points of Excess Return (SSB T p.30; N p.31; F p.33; P, B p.34)



Source: State Street

Value Added – Total Emerging Markets

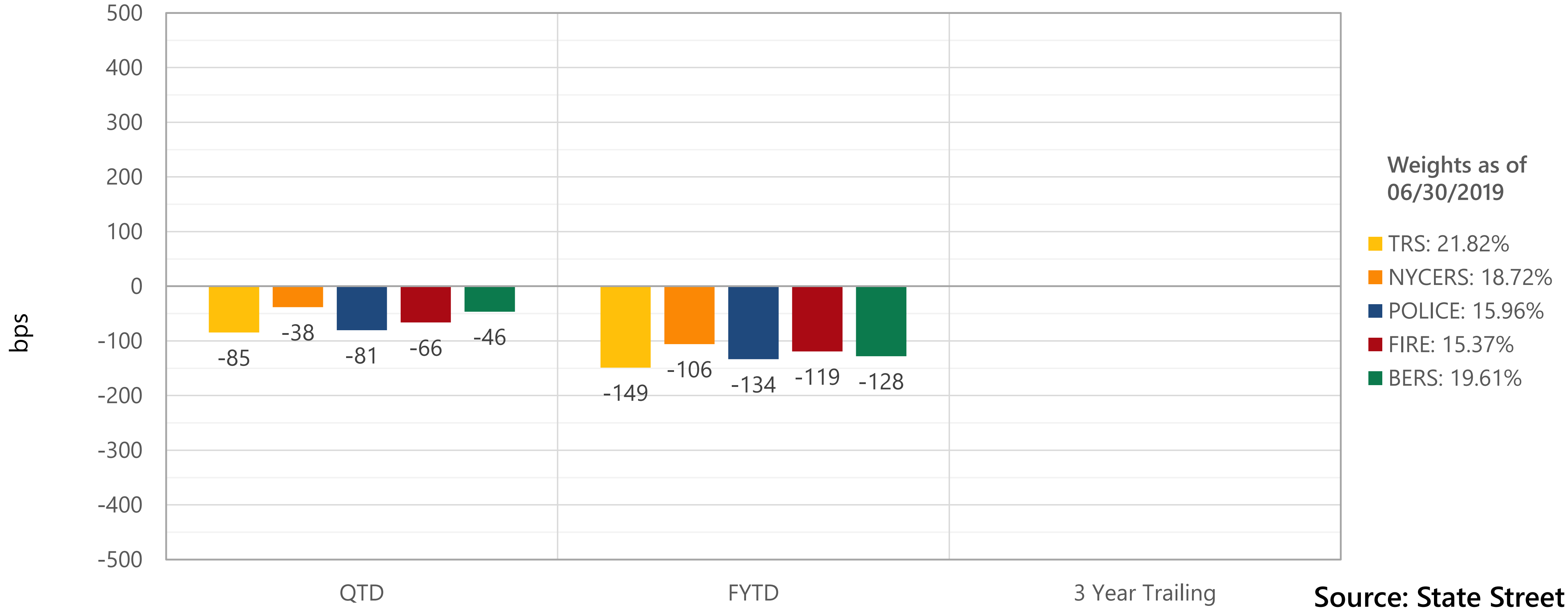
Basis Points of Excess Return



Source: State Street

Value Added – Total Structured Fixed Income

Basis Points of Excess Return (SSB; T p.33; N p.35; B p.36; F p.37; P p.38)

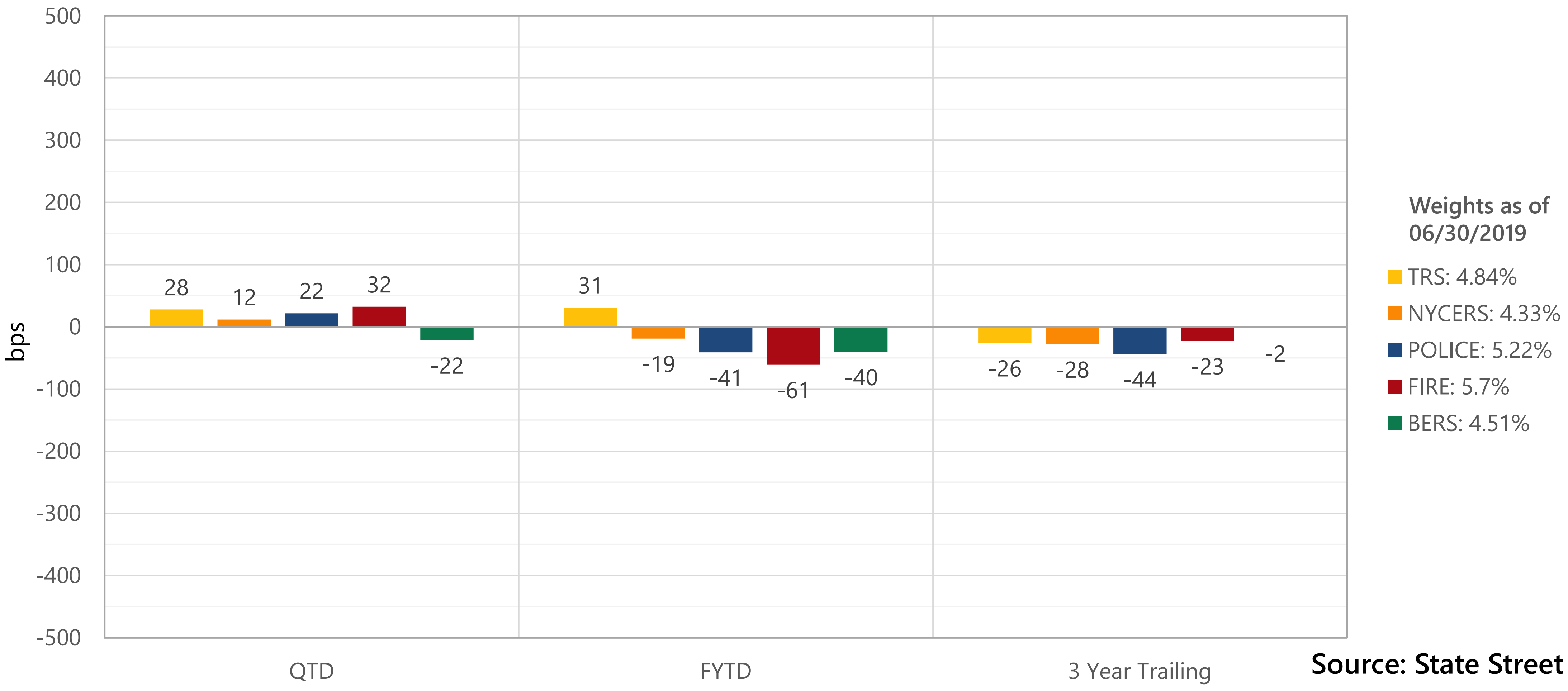


Source: State Street

Note: The blended benchmark reflects the current asset allocation. No Data for the Trailing 3yr.

Value Added – High Yield

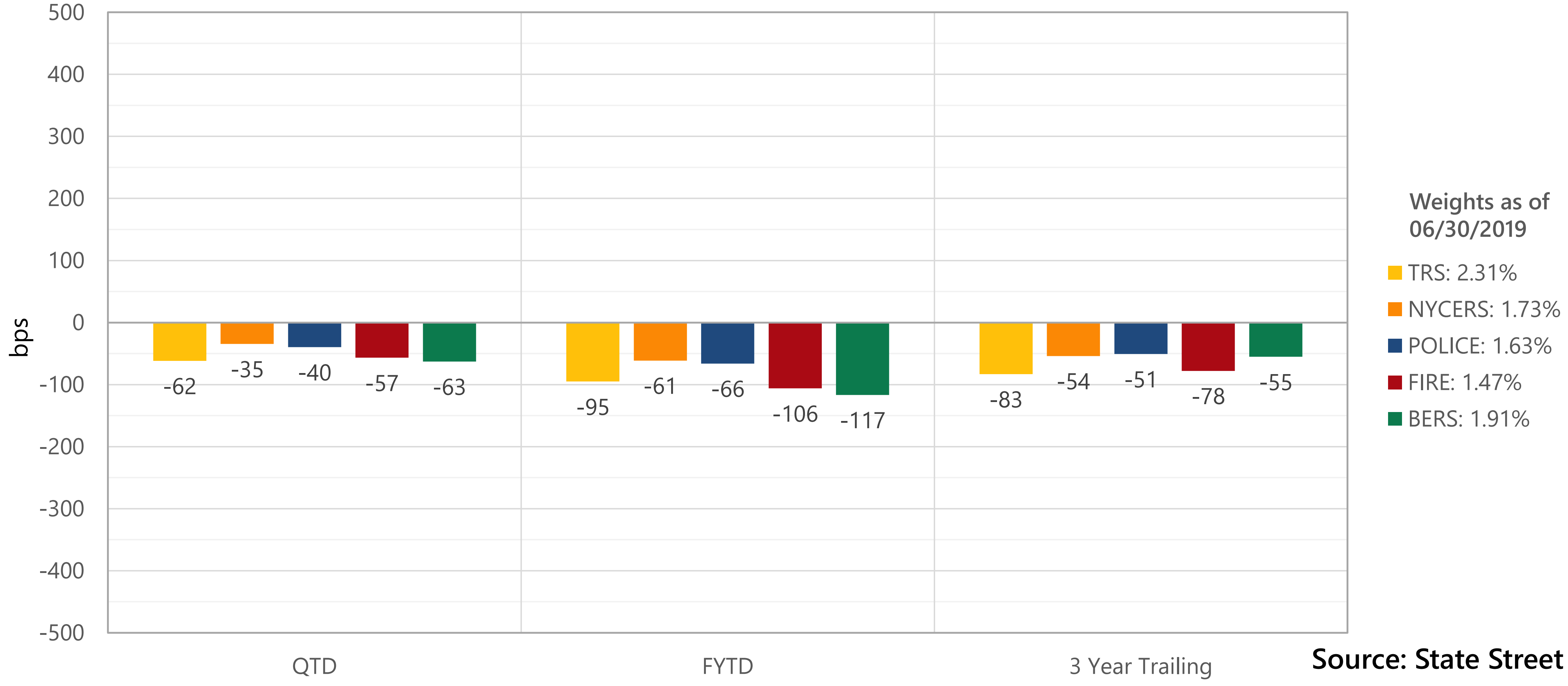
Basis Points of Excess Return (SSB; T p.33; N p.35; B p.36; F p.37; P p.38)



Source: State Street

Value Added – Bank Loans

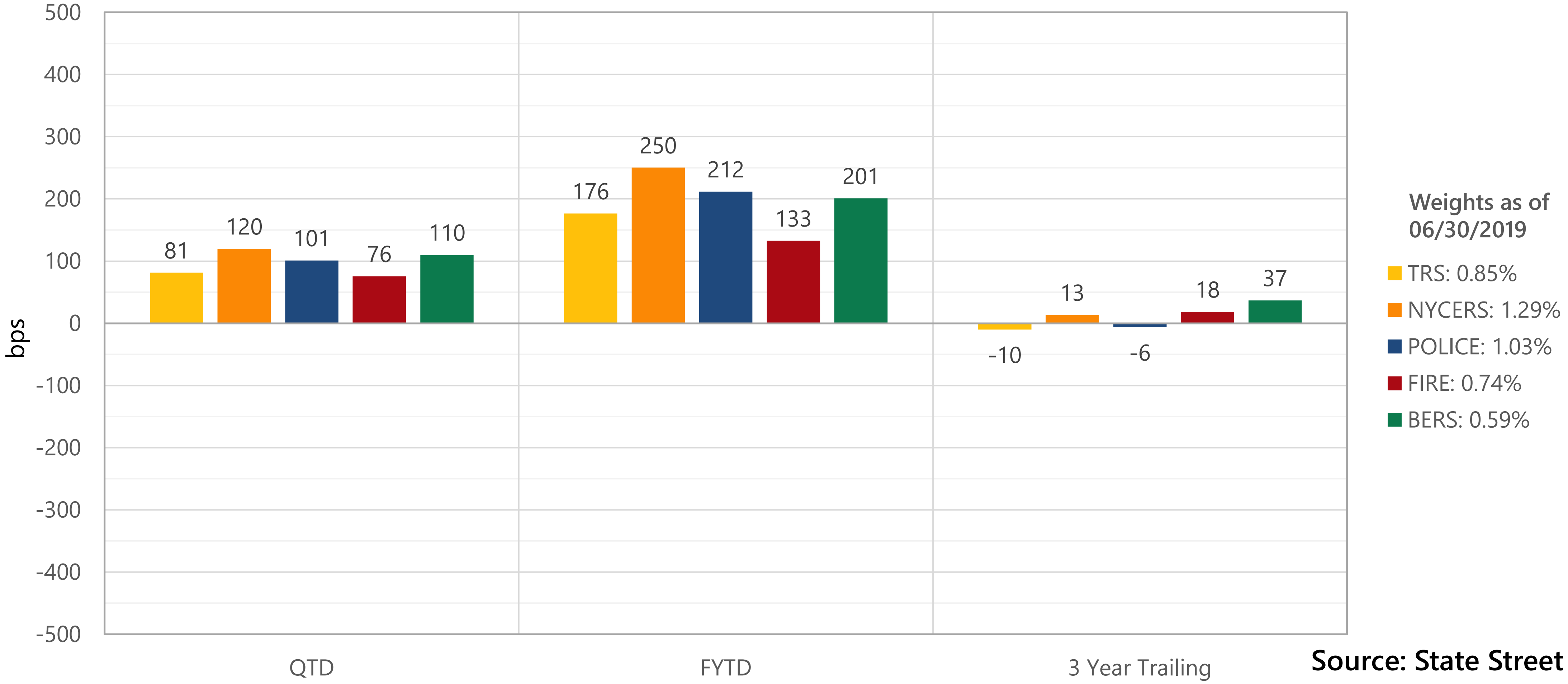
Basis Points of Excess Return (SSB; T p.33; N p.35; B p.36; F p.37; P p.39)



Source: State Street

Value Added – Economically Targeted Investments

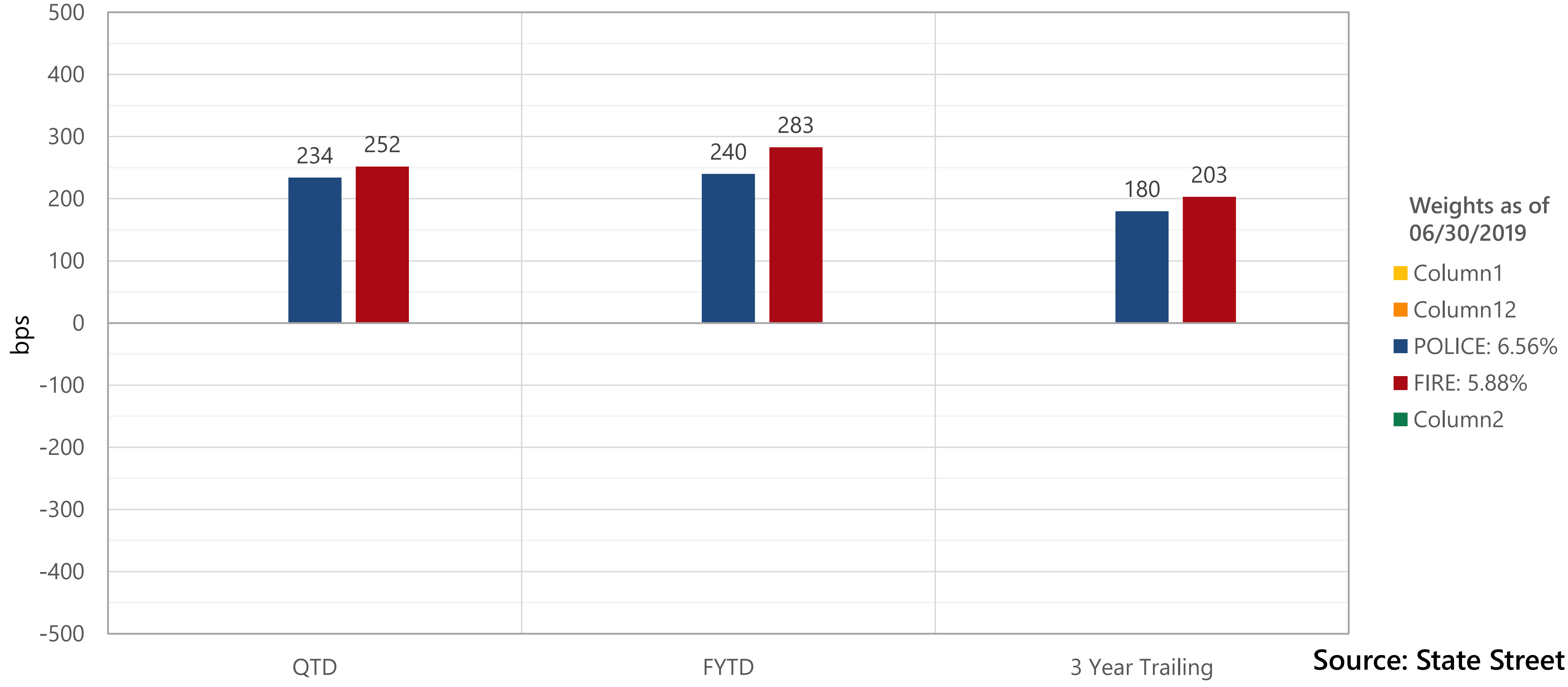
Basis Points of Excess Return (SSB; T p.34; N, B p.36; F p.38; P p.39)



Source: State Street

Value Added - Hedge Funds

Basis Points of Excess Return (SSB F p.35; P p.36)



Source: State Street

Hedge Fund Performance Less Tactical Trade

	Q2 2019	FYTD	3 Year
FIRE	4.0%	5.8%	7.5%
POLICE	3.8%	5.2%	7.2%
HFRI+100	1.8%	2.2%	5.3%

Source: Aksia

Tactical Trade Performance

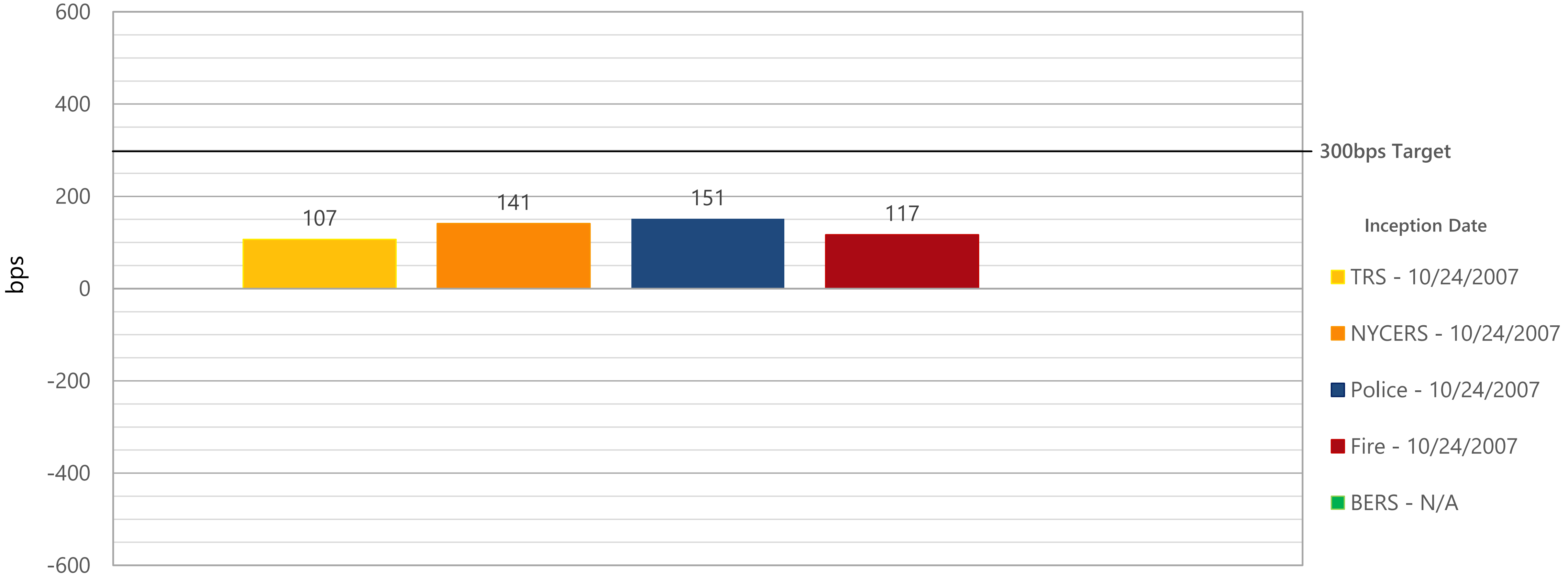
	Q2 2019 POLICE & FIRE	FYE
Tactical Hedge Fund Trade	5.8%	-1.0%
RUSSELL 3000	4.1%	9.0%
Outperformance	1.7%	-10.0%

Source: Aksia

PRIVATE MARKET DATA

Value Added - Opportunistic Fixed Income (OFI)

Basis Points of Cumulative IRR above Public Market Equivalent



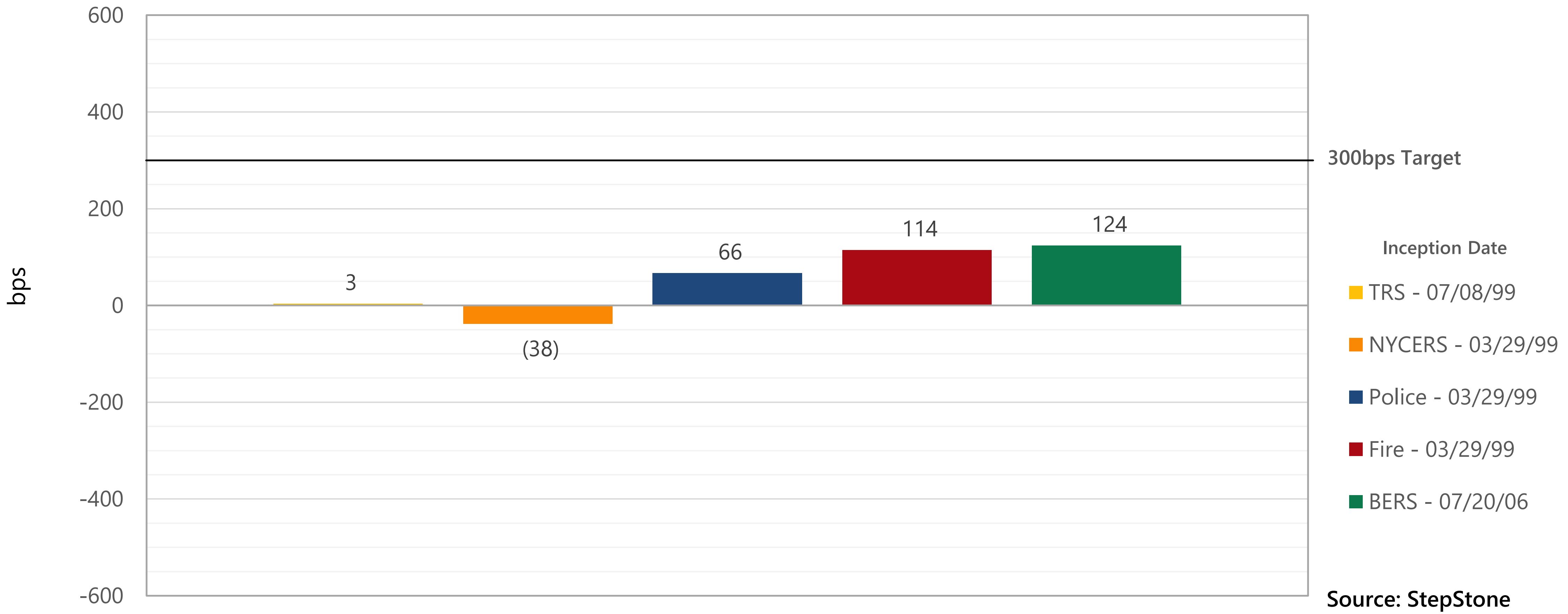
Excess Return Since Inception; PME Benchmark: 50% JP Morgan Global High Yield 50% CS Leveraged Loans as of 6/30/19

Source: State Street

The PME Spread is the difference between the IRR and the PME.

Value Added - Private Equity

Basis Points of Cumulative IRR above Public Market Equivalent

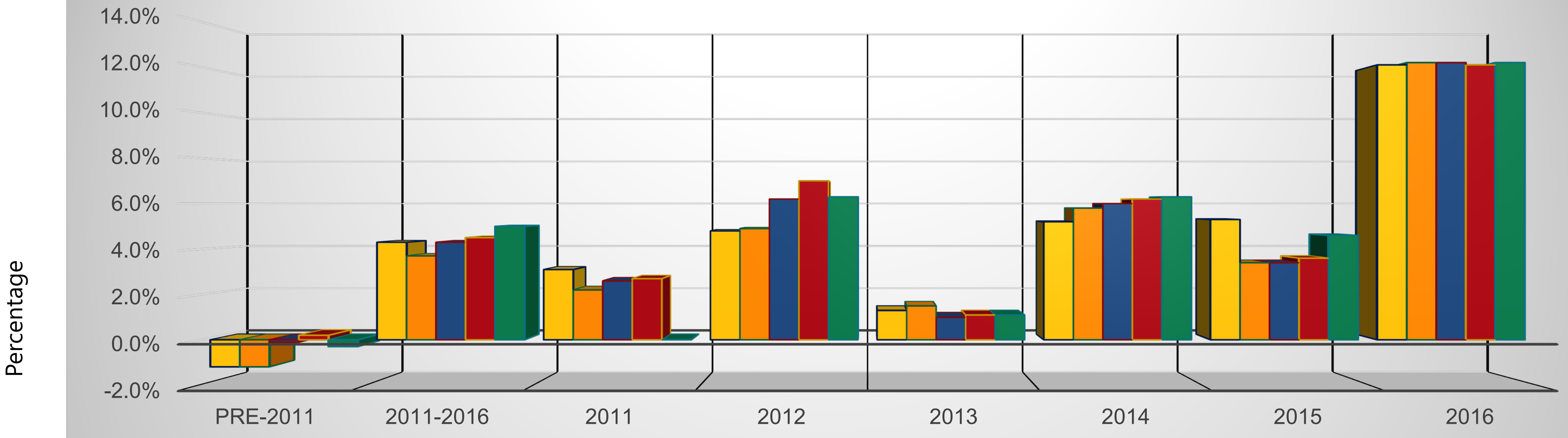


Source: StepStone Group & Hamilton Lane

Excess Return Since Inception; The PE Benchmark is the Russell 3000 + 300 bps as of 3/31/19

The PME Spread is the difference between the IRR and the PME.

Private Equity Value Added – PME Spread By Vintage Year as of 03/31/19



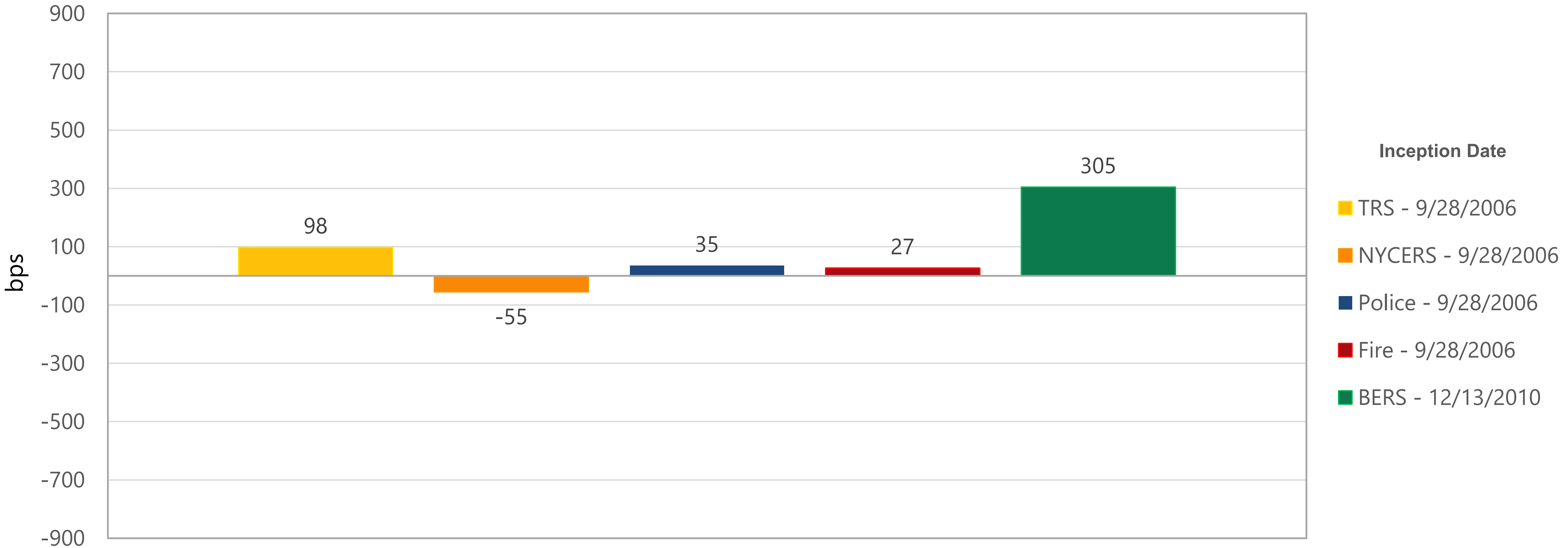
	Pre-2011	2011-2016	2011	2012	2013	2014	2015	2016
TRS - PME Spread	-1.2%	4.3%	3.1%	4.8%	1.3%	5.2%	5.3%	12.1%
NYCERS - PME Spread	-1.2%	3.7%	2.2%	4.9%	1.5%	5.8%	3.4%	12.2%
Police - PME Spread	-0.1%	4.3%	2.6%	6.2%	1.0%	6.0%	3.4%	12.2%
Fire - PME Spread	0.2%	4.5%	2.7%	7.0%	1.1%	6.2%	3.6%	12.1%
BERS - PME Spread	-0.3%	5.0%	N/A	6.3%	1.1%	6.3%	4.6%	12.2%

TRS - PME Spread   NYCERS - PME Spread   Police - PME Spread   Fire - PME Spread   BERS - PME Spread

Source: BAM, StepStone Group, & Hamilton Lane

Value Added - Private Real Estate - Core

Basis Points of Cumulative IRR above Public Market Equivalent



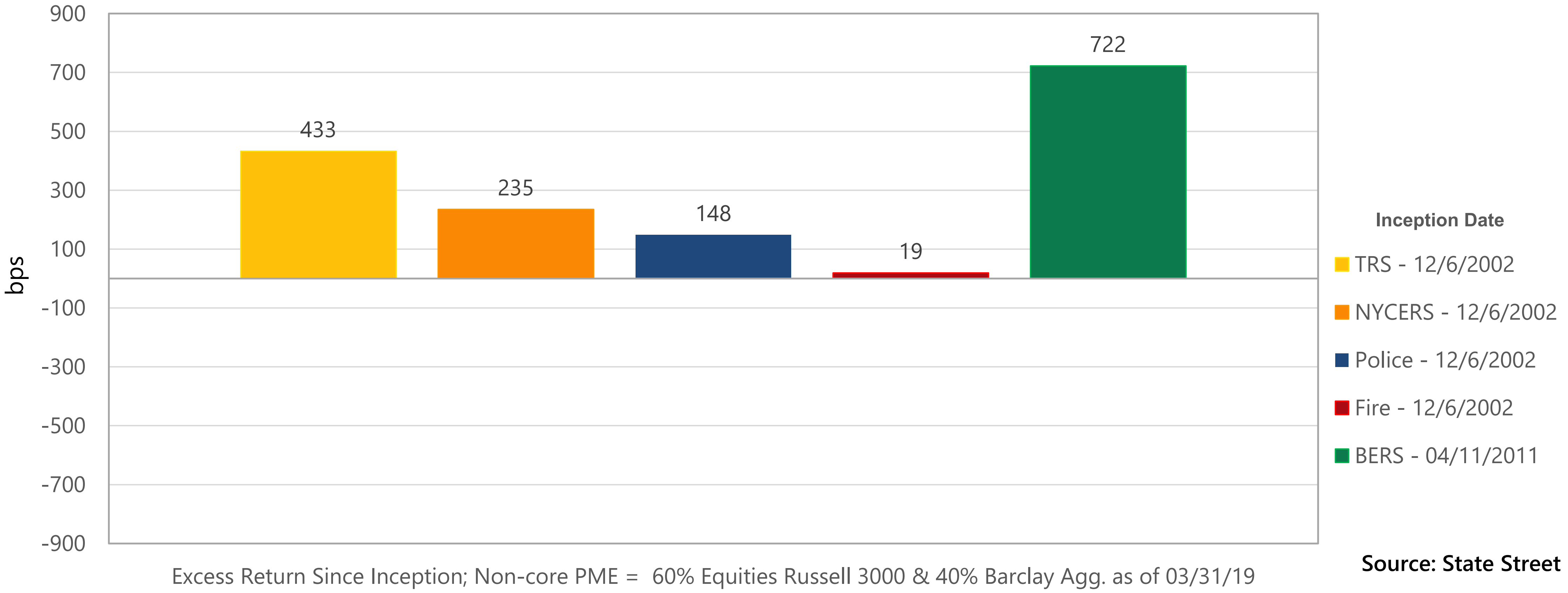
Excess Return Since Inception; Core PME = 40% Equities Russell 3000 & 60% Barclay Agg. as of 03/31/19

Source: State Street

The PME Spread is the difference between the IRR and the Core PME Return.

Value Added - Private Real Estate – Non-Core

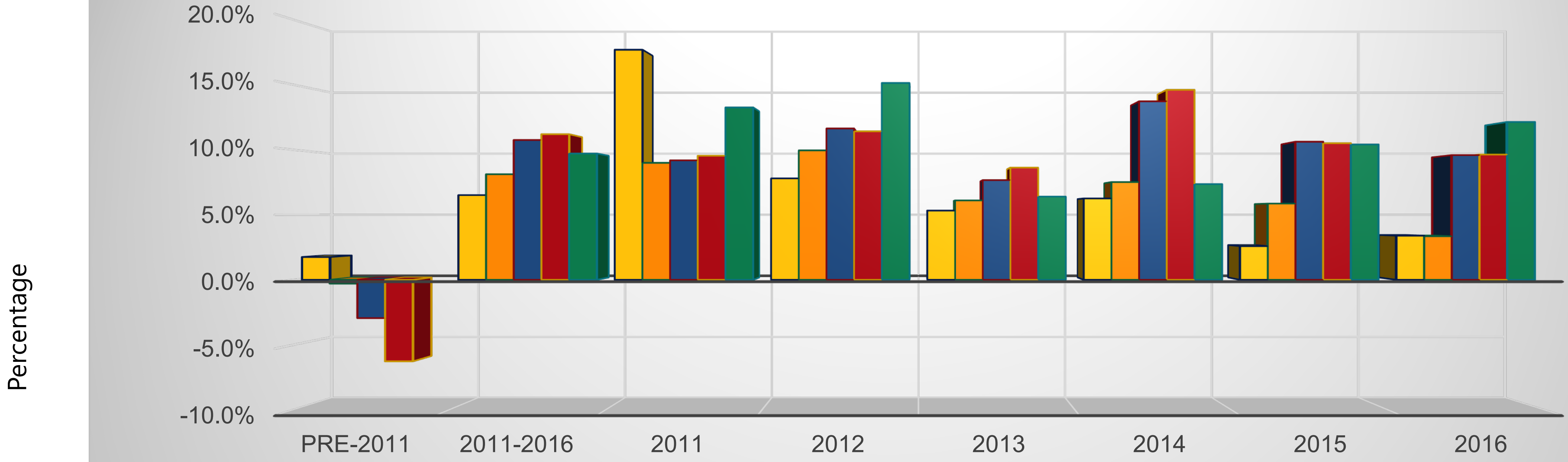
Basis Points of Cumulative IRR above Public Market Equivalent



Source: State Street

The PME Spread is the difference between the IRR and the Non-core PME Return.

Private Real Estate (Non-Core) Value Added - PME Spread By Vintage Year as of 03/31/19



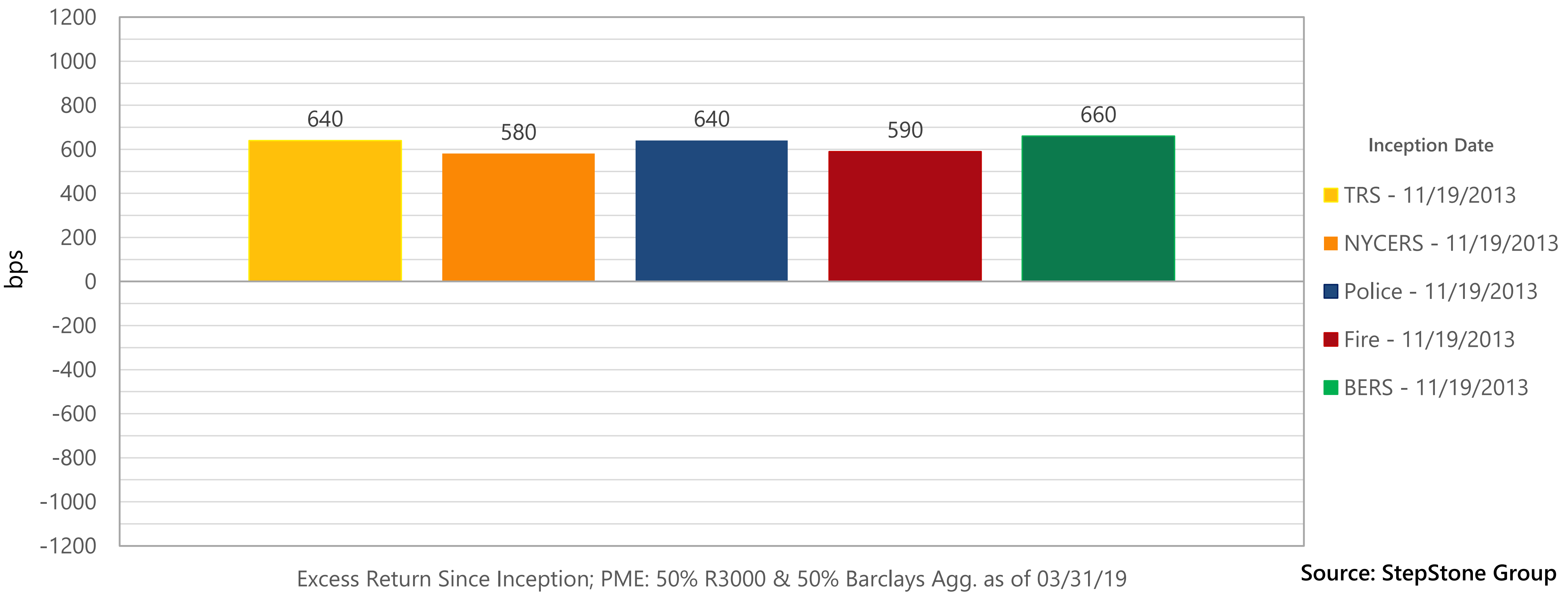
	Pre-2011	2011-2016	2011	2012	2013	2014	2015	2016
TRS - PME Spread	1.8%	6.5%	17.7%	7.8%	5.3%	6.3%	2.6%	3.4%
NYCERS - PME Spread	-0.3%	8.1%	9.0%	9.9%	6.1%	7.5%	5.9%	3.3%
Police - PME Spread	-2.9%	10.7%	9.2%	11.6%	7.7%	13.7%	10.6%	9.6%
Fire - PME Spread	-6.3%	11.2%	9.5%	11.4%	8.6%	14.6%	10.5%	9.6%
BERS - PME Spread	N/A	9.7%	13.2%	15.1%	6.4%	7.4%	10.4%	12.1%

TRS - PME Spread NYCERS - PME Spread Police - PME Spread Fire - PME Spread BERS - PME Spread

Source: State Street

Value Added - Infrastructure

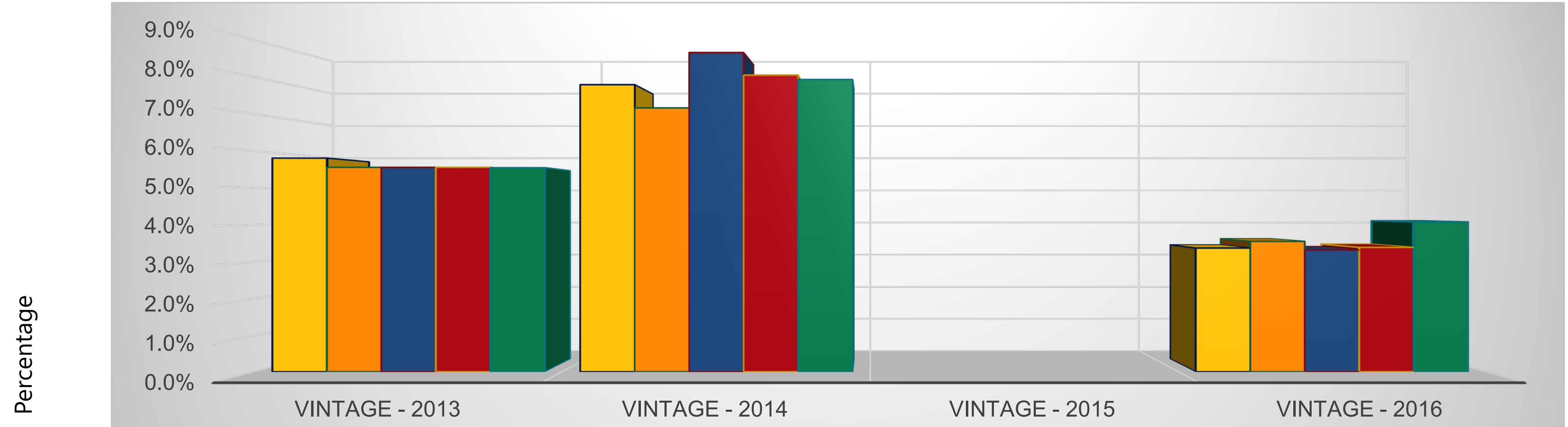
Basis Points of Cumulative IRR above Public Market Equivalent



Source: StepStone Group

The PME Spread is the difference between the IRR and the PME.

Infrastructure Value Added – PME Spread By Vintage Year as of 03/31/19



	Vintage - 2013	Vintage - 2014	Vintage - 2015	Vintage - 2016
TRS - PME Spread	5.8%	7.8%	N/A	3.4%
NYCERS - PME Spread	5.6%	7.2%	N/A	3.6%
Police - PME Spread	5.6%	8.7%	N/A	3.3%
Fire - PME Spread	5.6%	8.1%	N/A	3.4%
BERS - PME Spread	5.6%	7.9%	N/A	4.1%

TRS - PME Spread   NYCERS - PME Spread   Police - PME Spread   Fire - PME Spread   BERS - PME Spread

Source: StepStone Group

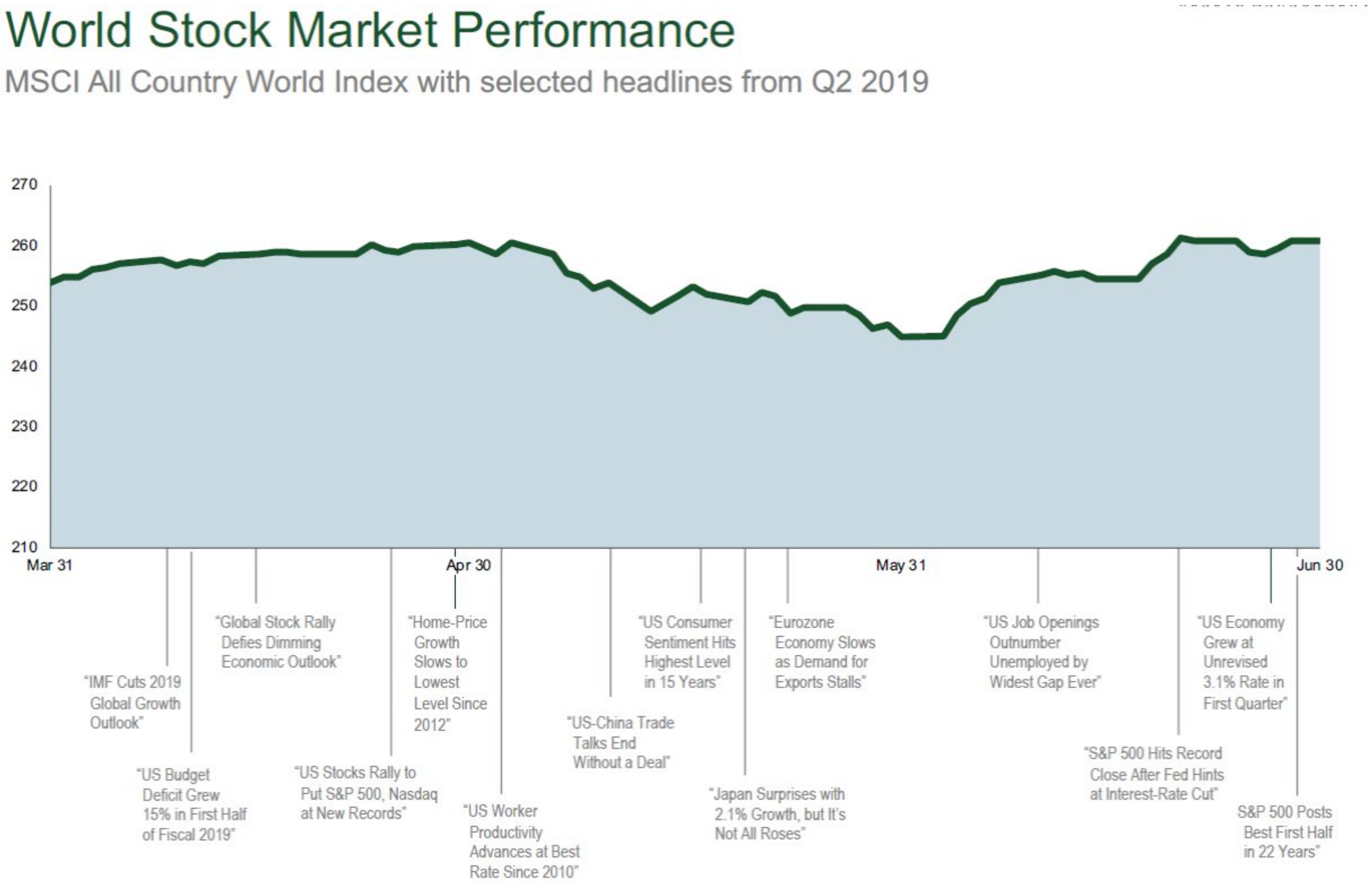
QUESTIONS?

RISK

Agenda

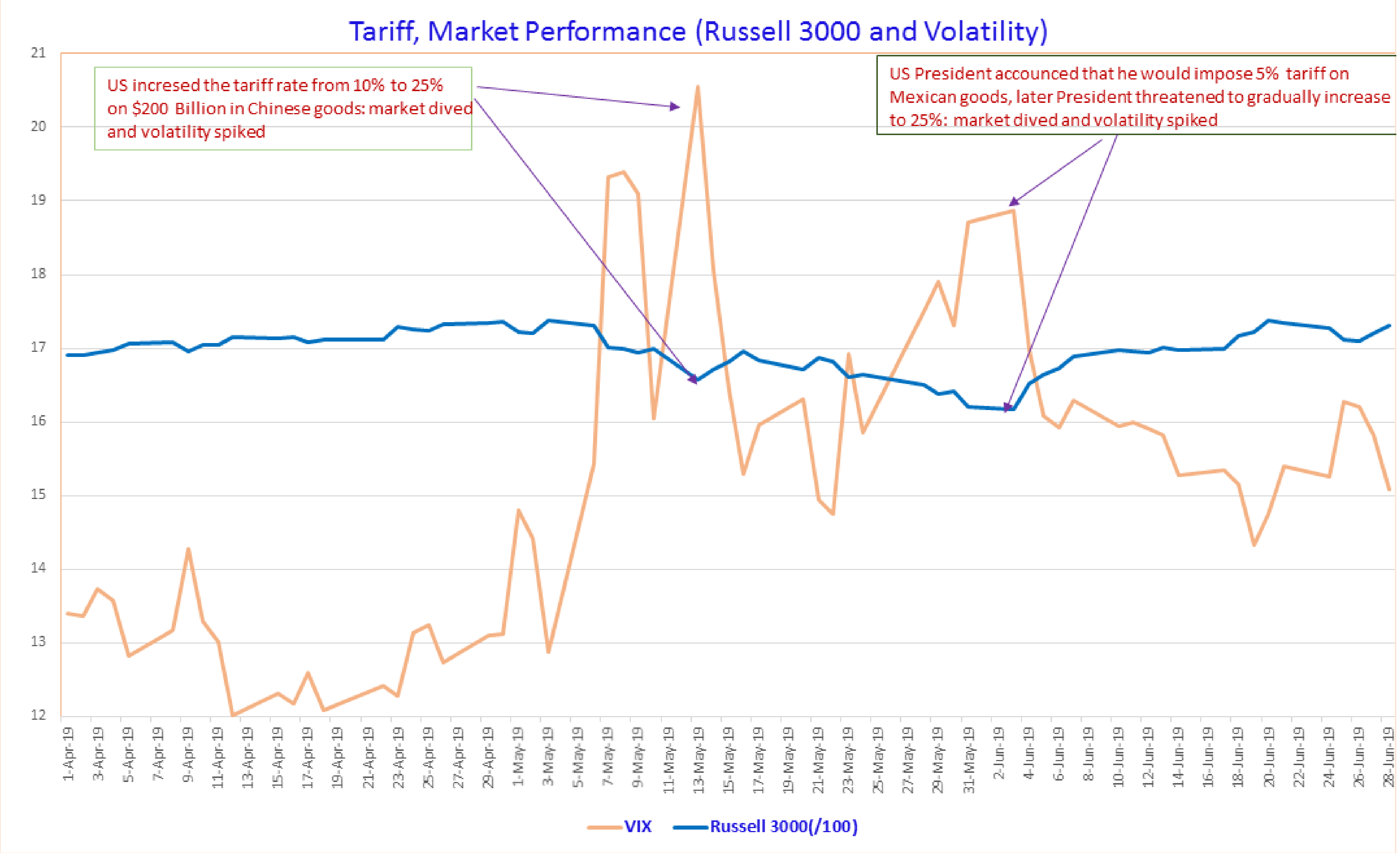
- Risk Reports
- Stress Tests
- Strategic Asset Allocations

Equity markets were buoyant…



Source: MSCI

But the threat of a trade war created volatility….



Total Plan Risk – Macro Factors

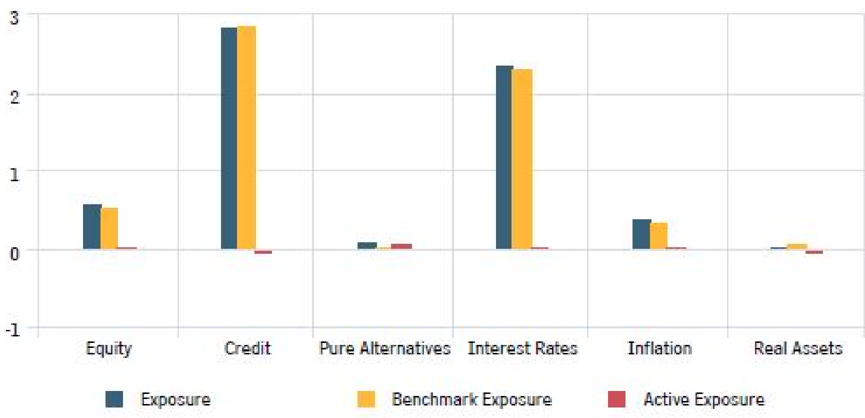
BarraOne Total Plan Macro Summary

CURRENCY: USD
ANALYSIS DATE: June 30, 2019

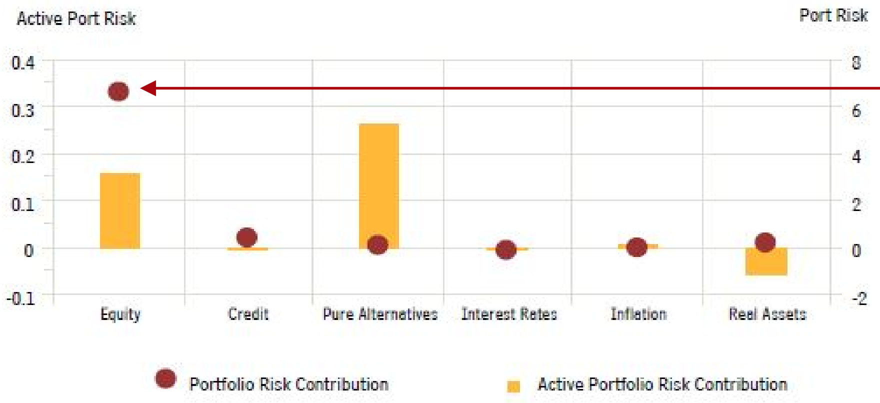
MODEL: BIM303L (Tier 1 Macro Factors)

Macro factor models attribute the risk of the Barra Integrated Model to a far smaller set of factors. At the highest level, we use just six factors, representing the primary drivers of total risk and return for a global, multi-asset class portfolio that reduces the number of factors in an integrated factor model by aggregating selected groups of factors into single factors. Tier I is the highest level of the Macro Factor Scheme which has 6 factors.

Macro Factor Exposures



Macro Factor Risk Contribution



The Equity factor contributes 87.10% of total risk

Total Risk declined by approximately by 12 bps to 7.56%.

Active Exposure to Interest Rates Macro factor is 0.04 compared with -0.22 – bringing us closer to the benchmark

Risk Decomposition

Risk Source	Exposure	Benchmark Exposure	Active Exposure	Portfolio Risk Contribution	% Portfolio Risk	Active Portfolio Risk Contribution	% Active Risk
	Exposure			Contribution			
Total Risk	-	-	-	**7.56**	**100.00**	**0.99**	**100.00**
Local Market Risk	-	-	-	7.27	96.20	0.97	97.39
Common Factor Risk	-	-	-	7.24	95.85	0.89	89.14
Equity	0.58	0.54	0.04	6.58	87.10	0.16	15.67
Credit	2.82	2.85	-0.03	0.44	5.83	-0.00	-0.19
Pure Alternatives	0.10	0.05	0.05	0.07	0.86	0.27	26.75
Interest Rates	2.35	2.32	0.04	-0.13	-1.66	-0.00	-0.16
Inflation	0.37	0.35	0.03	0.04	0.47	0.00	0.07
Real Assets	0.04	0.06	-0.02	0.22	2.95	-0.06	-6.04
Factor Residual Risk	-	-	-	0.02	0.30	0.53	53.04
Selection Risk	-	-	-	0.03	0.35	0.08	8.25
Currency Risk	-	-	-	0.29	3.80	0.03	2.61

Tier 1 Macro Factor Scheme has six factors

Factor	Exposure Type	Description
Equity	Membership (weights)	Global Public and Private Equity
Credit	Sensitivities (durations)	Sensitivity to global credit spreads
Pure Alternatives	Membership (weights)	Investment strategy return of Private Equity and Hedge Funds net of public factor returns
Interest Rates	Sensitivities (durations)	Sensitivity to global interest rates
Inflation	Sensitivities (durations)	Sensitivity to breakeven inflation
Real Assets	Membership (weights)	Real Estate and Commodities

Factor Residual Risk

Risk Source	Portfolio Risk Contribution	% Portfolio Risk	Active Portfolio Risk Contribution	% Active Risk
Commodities	0.00	0.00	0.00	0.00
Equity	0.15	2.03	0.08	7.63
Fixed Income	-0.14	-1.84	-0.00	-0.22
Hedge Fund	-0.02	-0.26	0.08	7.62
Private Equity	0.04	0.52	0.30	30.67
Private Real Estate	-0.04	-0.48	0.07	6.69
Unassigned Factors	0.02	0.31	0.01	0.65

Source: MSCI

Total Plan Risk – Compared with Q1

	%Δ Portfolio Risk
Total Risk	-2.07%

Macro Factors	%Δ Portfolio Exposure
Credit	-7.94%
Equity	0.94%
Inflation	1.78%
Interest Rates	3.26%
Pure Alternatives	0.34%
Real Assets	1.15%

- Total volatility decreased
- The system's exposure to interest rates (DV01) increased
- The system's exposure to credit (CS01) decreased

Total Plan Risk – Risk Delta Attribution

$$Port.Risk\ change = \sum_{Return\ Sources} Exposure\ change + Factor\ Volatility\ change + \ Correlation\ change$$

$$\downarrow \sim 12bps = \uparrow \sim 0bps + \downarrow \sim 2bps + \downarrow \sim 10bps$$

Stress Tests – P&L

Scenarios	P&L	Active P&L
Trade war	-7.70%	-0.01%
Trade deal 1: restraint on China exports to US	-6.70%	0.10%
Trade deal 2: increasing Chinese purchases of US goods	1.90%	-0.22%
Brexit: no-deal	-3.09%	-0.10%
Brexit: with a deal	1.05%	0.17%

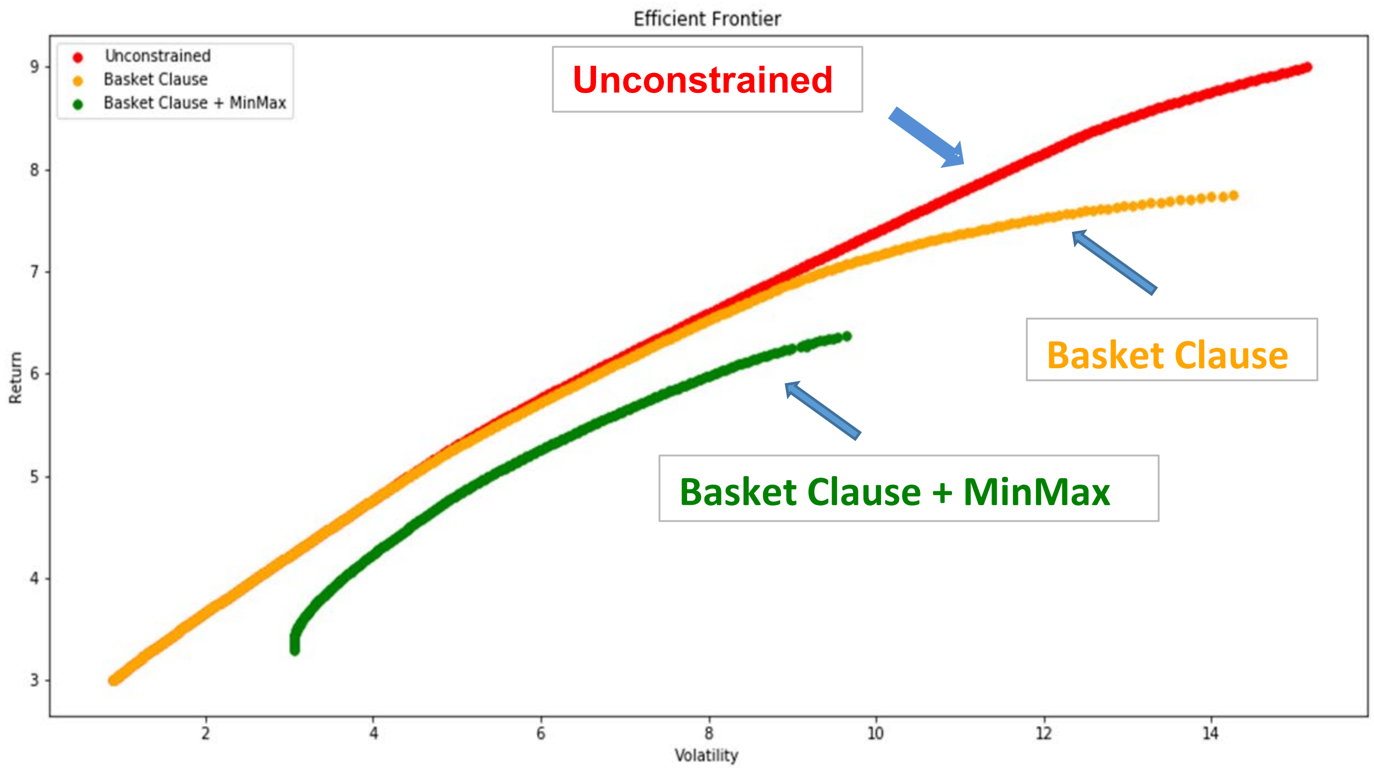
Strategic Asset Allocations – Target Return

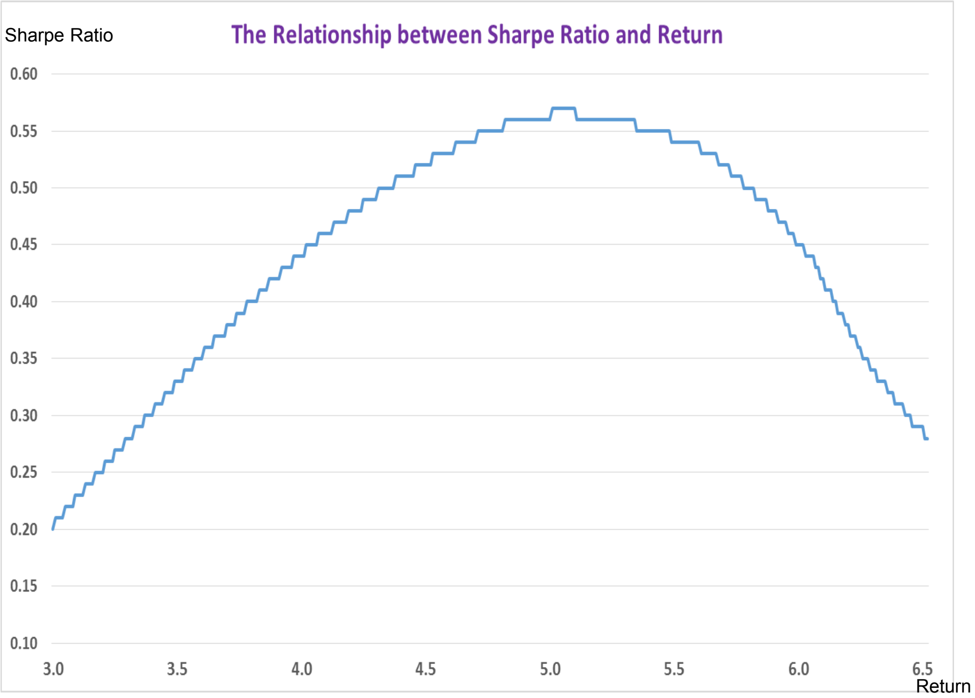
- The Equity return required to achieve a 7% portfolio return on a hypothetical portfolio

  - Assume the Fixed Income/Equity mix is:
    - Equity: 67%
    - Fixed Income: 33%
  - Assume also that:
    - Required portfolio return is: 7.00%
    - The yield on the Fixed Income portfolio is: 2.50% (approximate yield on NYCERS Fixed Income)
  - Then the required equity return is: 9.25%

- Assume that the Equity portfolio holds the same weights in the US, Developed ex-US and Emerging Markets as the NYCERS equity portfolios, then the expected Equity portfolio return given the average of the consultants equity return forecasts is: 6.52%

Strategic Asset Allocations – Representative Efficient Frontier





- The Sharpe Ratio uses expected risk to measure a fund's expected risk-adjusted return. A higher Sharpe Ratio implies a higher expected risk-adjusted return.
- Moving up and to the right of the efficient frontier (approaching 7%) forces NYCRS to consider portfolios with lower Sharpe Ratios.

QUESTIONS?

APPENDIX

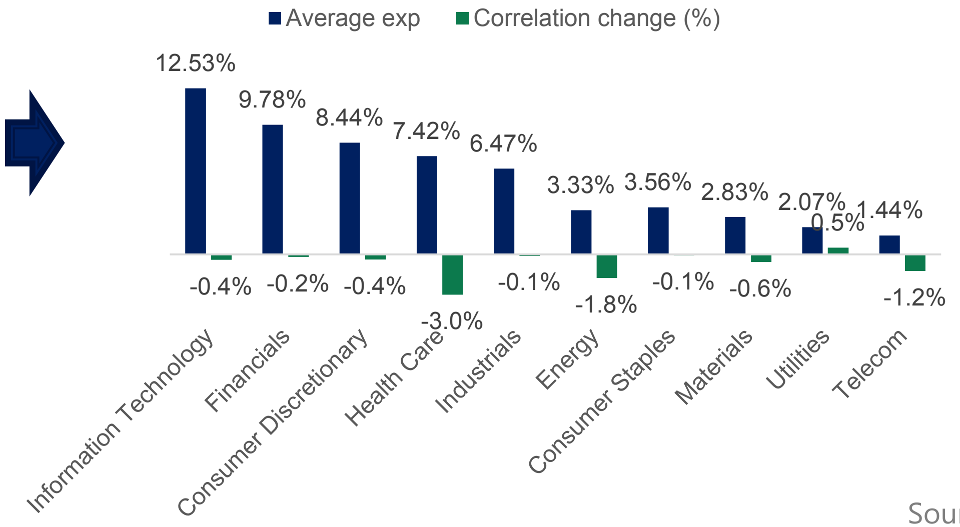
Appendix: Risk Delta Attribution – Additional Details

$$Port.\,Risk\ change = \sum_{Return\ Sources} Exposure\ change + Factor\ Volatility\ change + Correlation\ change$$

$$\sim 12bps = \sim 0bps + \sim 2bps + \sim 10bps$$

Correlation change contribution by factor type

Correlation changes of industry sectors



Source: MSCI

Appendix: Stress Tests – Assumptions

- ***Trade War Scenario*** Assume that the US imposes a 25 percent tariff on all goods imported from China and China retaliates by imposing a 25 percent tariff on all goods imported from the US.
- ***Trade Deal #1*** Assume the imposition of symmetrical tariffs largely confined to autos and auto parts. Specifically, assume tariffs of 25% imposed by the US on auto and auto-parts imports from China and tariffs of 25% imposed by China on auto and auto-parts imports from the US - ***plus*** a tariff of Z% on the value of all other goods imported from the US (such that the value of the tariffs imposed on US goods and Chinese goods is equal).
- ***Trade Deal #2*** A trade deal between the US and China that reduces the bilateral deficit between these two countries. China introduces policy changes that increase purchases of US goods such that the deficit is halved. China also simultaneously introduces export tariffs on exports to the US of electronics and other manufactured goods.

Appendix: Stress Tests – Shocks

Applied Shocks	Trade war	Trade deal 1: restraint on China exports to US	Trade deal 2: increasing Chinese purchases of US goods
Equity Shocks			
Relative Shocks in Percentage			
MSCI USA in USD	-15%	-15%	+7%
MSCI China Index in CNY	-25%	-7%	-12%
MSCI World ex USA in USD	-4%	-2%	-3%
Interest Rate Shocks			
Absolute Shocks in Basis Points			
USD Govt - 10YR Node	-20 bps	-20 bps	0 bps
CNY Govt - 10YR Node	-15 bps	-10 bps	-15 bps
Europe Govt - 10YR Node	0 bps	0 bps	-10 bps
Credit Spread Shocks			
Relative Shocks in Percentage			
USD All Sectors Corp BBB	+30%	+30%	-7%
EUR All Sectors Corp BBB	+12%	+12%	+7%
Currency Shocks			
Relative Shocks in Percentage			
CNY/USD (- : CNY depreciates)	-8%	-4%	-6%
EUR/USD (+ : USD depreciates)	+3%	+3%	-3%

Applied Shocks	Brexit: no-deal	Brexit: with a deal
Equity Shocks		
Relative Shocks in Percentage		
U.K. equity	-15%	+10%
EU equity	-5%	+6%
ACWI	-3%	+2%
Interest Rate Shocks		
Absolute Shocks in Basis Points		
GBP 10-year govt.	+100 bps	+15 bps
EUR 10-year govt.	+25 bps	+10 bps
USD 10-year govt.	0 bps	0 bps
Credit Spread Shocks		
Relative Shocks in Percentage		
U.K. credit spread	+50%	-15%
EU credit spread	+16%	-10%
U.S. credit spread	+8%	-5%
Currency Shocks		
Relative Shocks in Percentage		
GBP/USD (-: GBP depreciates)	-10%	+8%
EUR/USD (-: EUR depreciates)	-5%	+3%

Source: MSCI

QUESTIONS?

EXCLUDED COMPANIES LIST

Updated Excluded Companies List

- The excluded companies list is generated by the BAM risk team at the end of each fiscal year - in accordance with resolutions passed by the Systems' Trustees

- BAM understands these resolutions to limit or prohibit investment in equity securities issued by companies that derive more than a specified percentage of their revenues from an activity identified in each memo

- Publicly-traded debt securities are issued by both publicly-owned and privately-owned companies. Although BAM circulates the excluded companies list to managers of fixed income securities, Data/Analytics companies can only obtain data on the revenues of publicly-owned companies

- Tracking error is calculated by creating a representative equity portfolio and comparing to a second portfolio constructed from the same benchmarks and weights - but which excludes equities identified by the relevant screens

QUESTIONS?