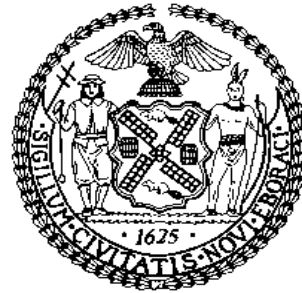




Overview - 4Q 2015



THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER

March 16, 2015

Stability

- Oil
- China
- US Federal Reserve



Market Returns: Q4-2015

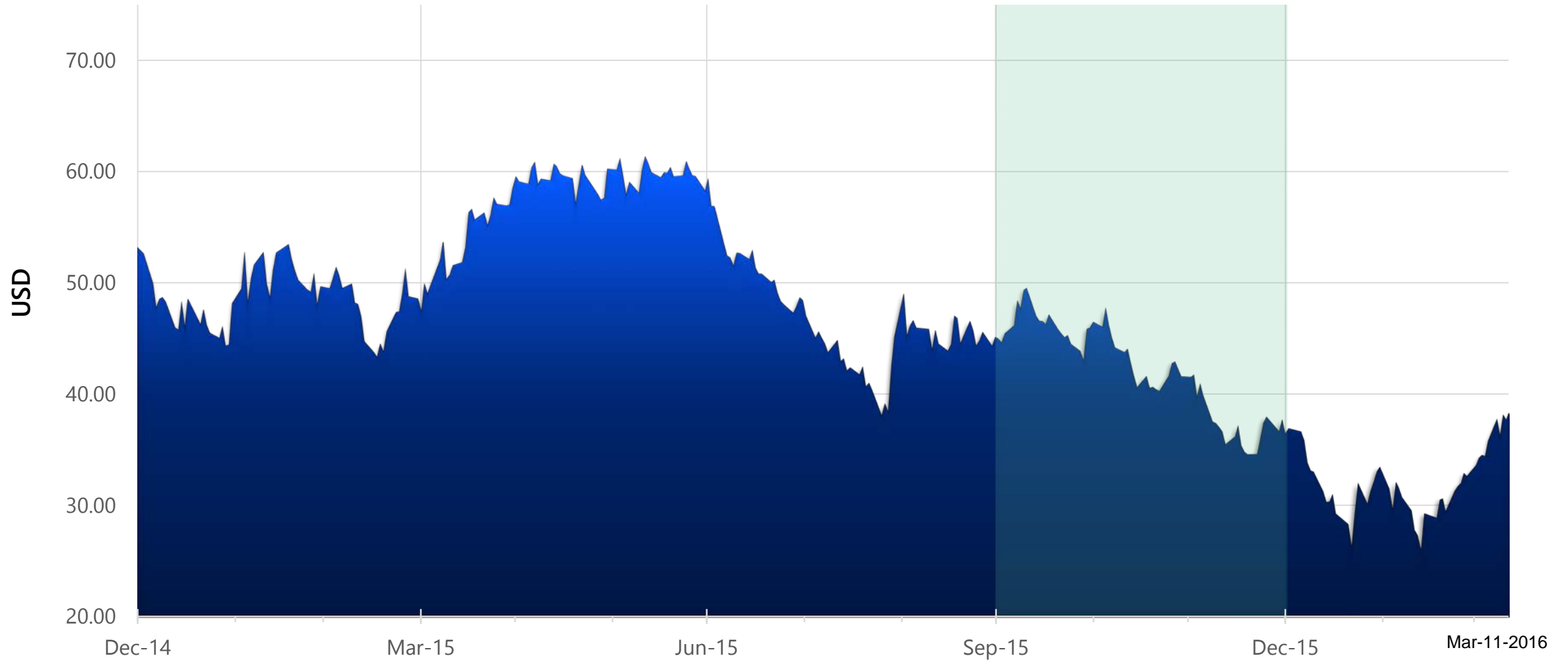
Asset Class	Index	Fourth Quarter	Third Quarter	Three Year	Five Year	Expected*
Equities - U.S.	Russell 3000	6.27%	-7.25%	14.74%	12.20%	8.30%
Equities - Developed Intl	MSCI EAFE	4.71%	-10.23%	5.01%	3.60%	8.60%
Equities - Emerging Intl	MSCI EMF	0.66%	-17.90%	-6.76%	-4.80%	9.10%
Debt - Investment Grade	NYC IG Credit	-0.44%	0.30%	1.44%	4.27%	5.30%
Debt - US Government	NYC Treas/Agency +5	-1.29%	3.40%	1.55%	5.19%	4.20%
Debt - High Yield	Citigroup BB & B	-1.70%	-5.15%	1.49%	4.98%	6.00%

*Consultant long-term expectations as of 2011

Source: State Street



West Texas Intermediate ("WTI") Crude Oil



Source: Bloomberg



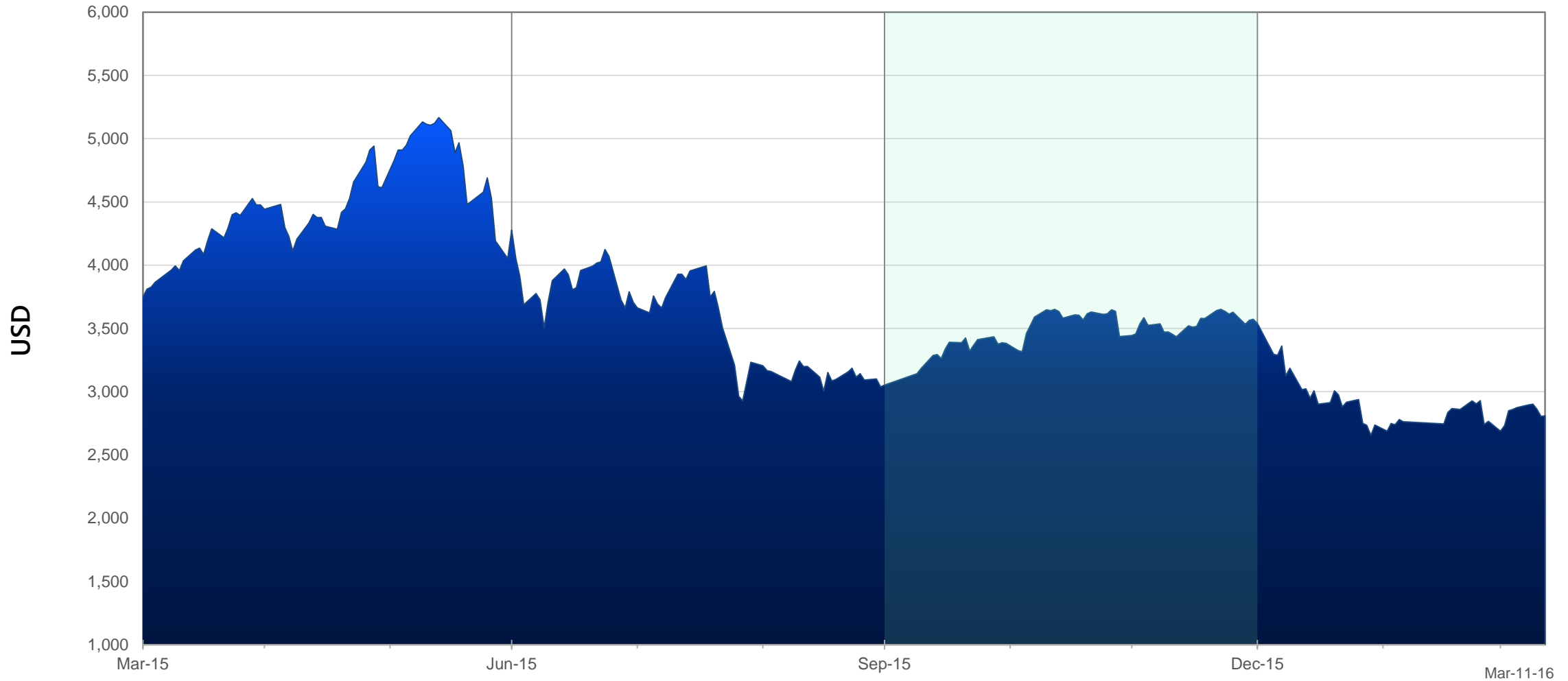
USD / CNY Exchange Rate



Source: Bloomberg



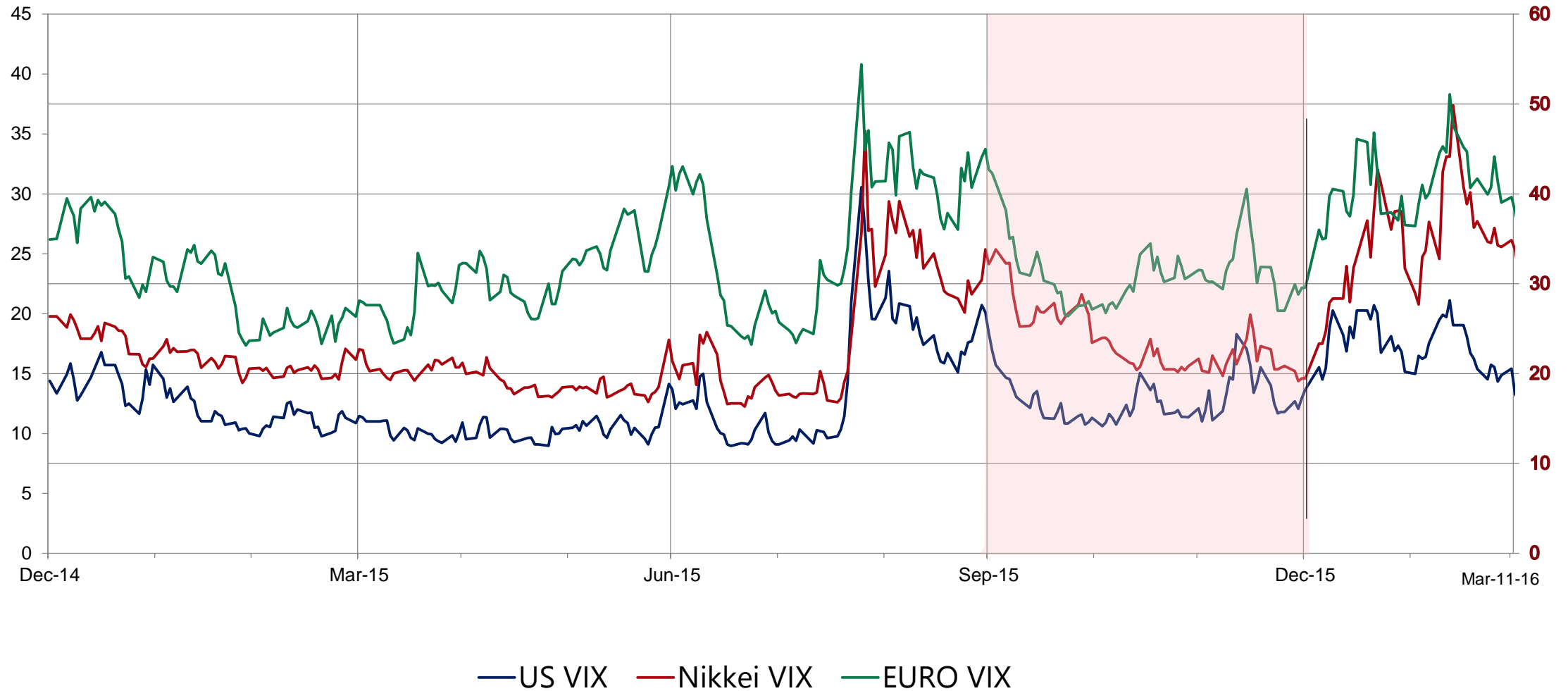
Shanghai Stock Exchange Composite Index



Source: Bloomberg



US, Europe, Japan - Equity Volatility



Source: Bloomberg



Excerpts from FOMC Meetings

"Recent global economic and financial developments may restrain economic activity somewhat and are likely to put further downward pressure on inflation in the near term."

- Press Release Date: September 17, 2015

"In determining whether it will be appropriate to raise the target range at its next meeting, the Committee will assess progress--both realized and expected--toward its objectives of maximum employment and 2 percent inflation."

-Press Release Date: October 28, 2015

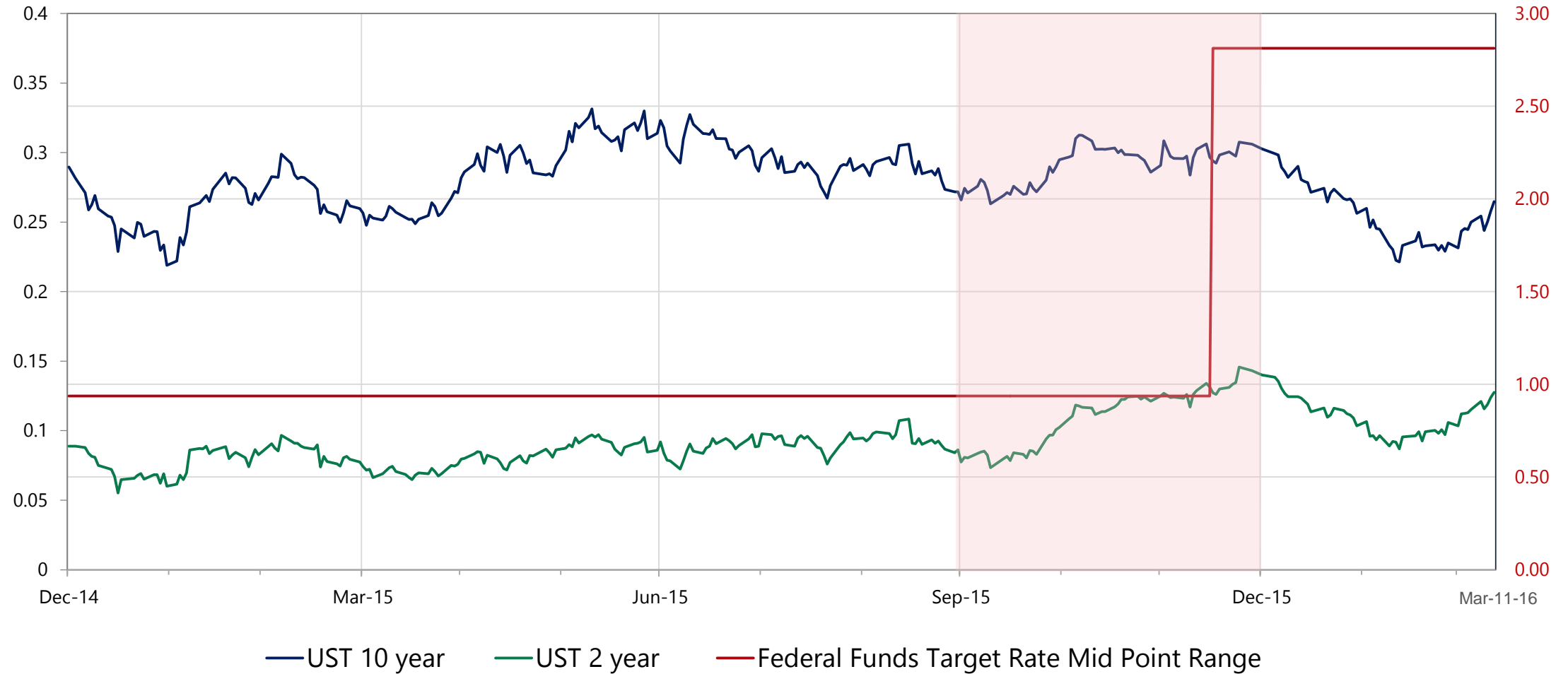
"The Committee currently expects that, with gradual adjustments in the stance of monetary policy, economic activity will continue to expand at a moderate pace and labor market indicators will continue to strengthen."

Press Release Date: December 16, 2015

Source: Board of Governors of the Federal Reserves System



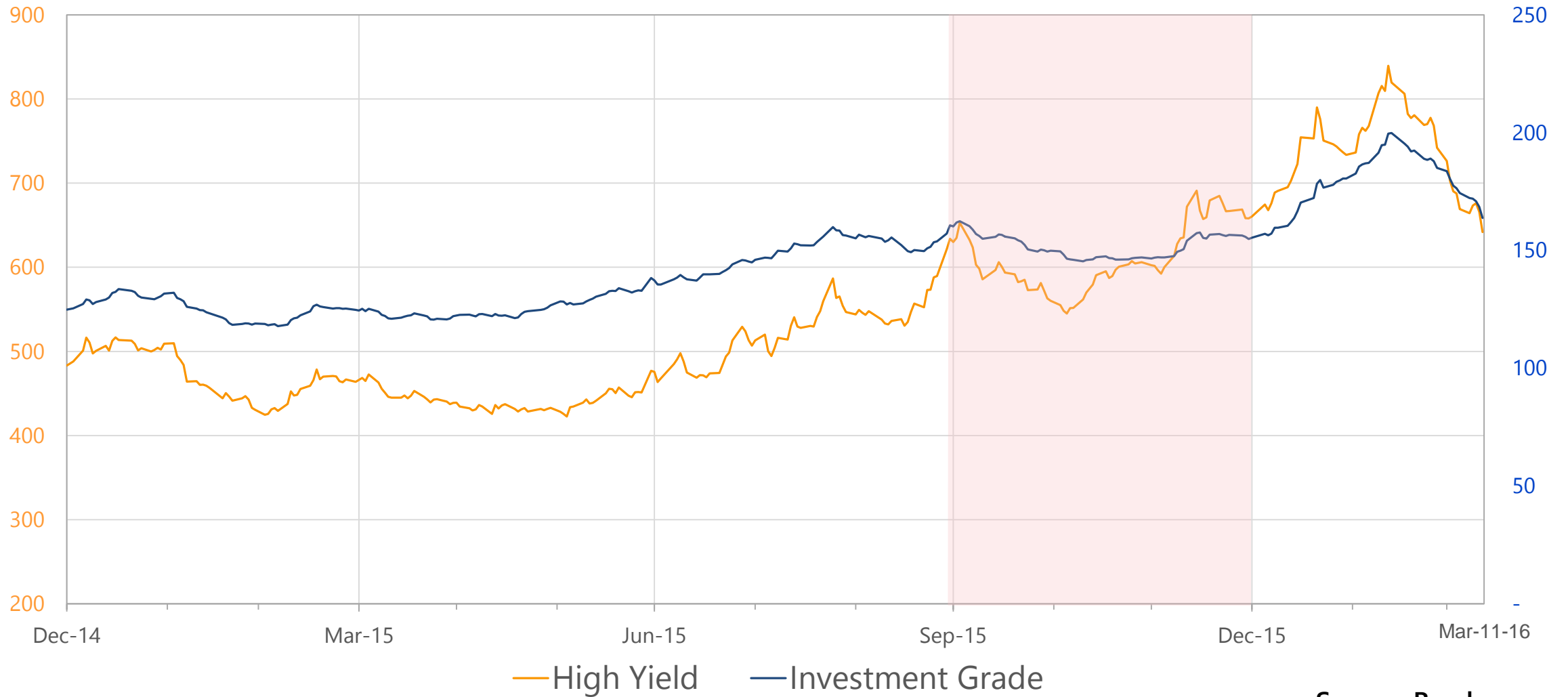
Federal Funds Rate, US Treasury 10-year, US Treasury 2-year



Source: Bloomberg



Investment Grade and High Yield Spreads

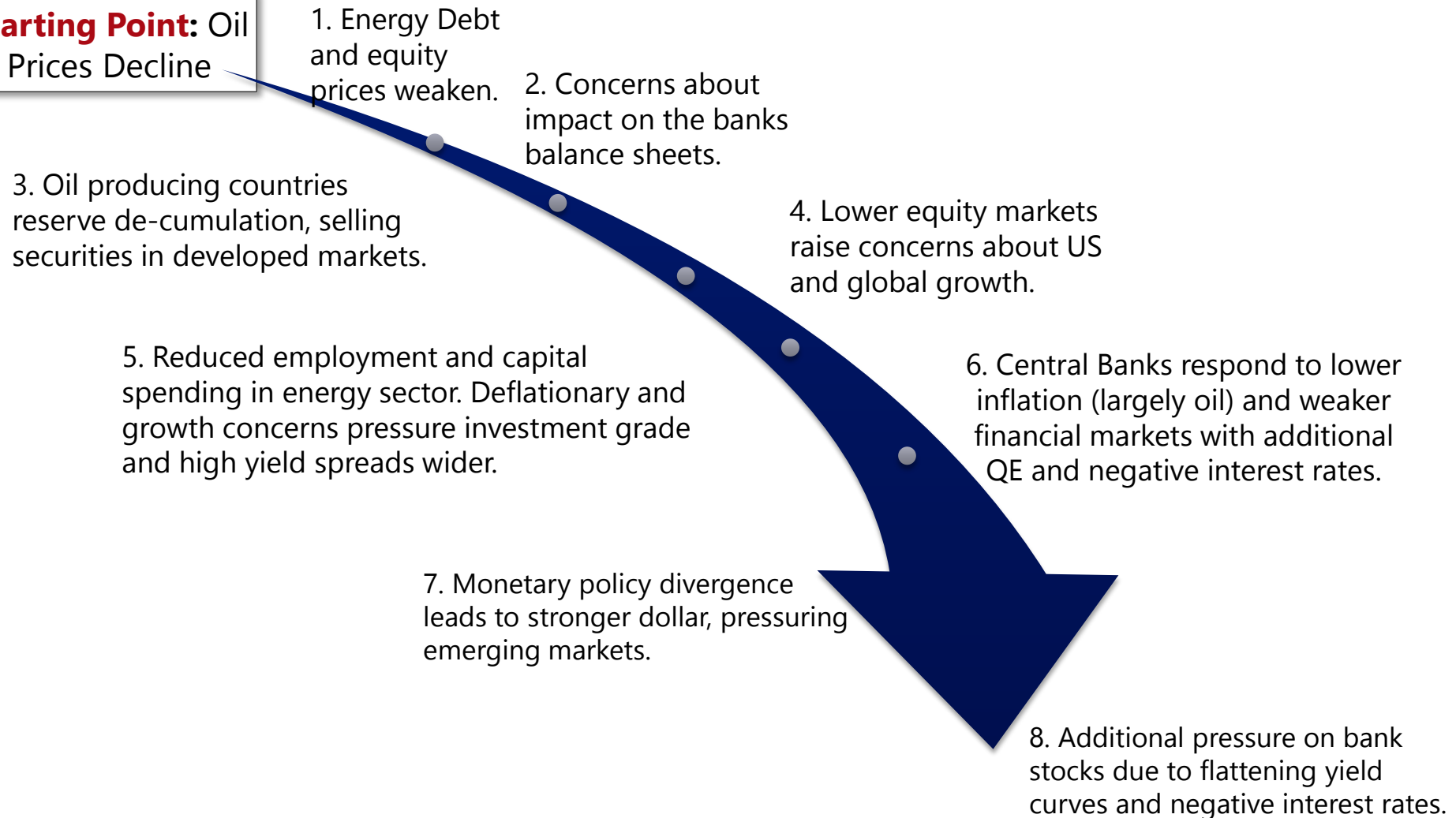


Source: Barclays



Spiraling effect of lower oil on broader asset markets

Starting Point: Oil Prices Decline



Market Returns: 2016 YTD

Asset Class	Index	Fourth Quarter 2015	YTD 3/11/16
Equities - U.S.	Russell 3000	6.27%	-1.52%
Equities - Developed Intl	MSCI EAFE	4.71%	-4.16%
Equities - Emerging Intl	MSCI EMF	0.66%	0.85%
Debt - Investment Grade	NYC IG Credit	-0.44%	1.82%
Debt - US Government	NYC Treas/Agency +5	-1.29%	3.53%
Debt - High Yield	Citigroup BB & B	-1.70%	2.68%

Source: State Street



PORTFOLIO OVERVIEW



Total NYC Pension Fund Performance: 12/31/15

(SSB **T**, **F** p.18; **P** p.19; **B** p.13; **N** p.17)

NYC Pension System	Portfolio Std Dev - 1 yr	Fourth Quarter	Three Year*	Five Year*
BERS	8.6%	3.1%	8.1%	7.4%
TRS	7.2%	2.5%	7.5%	7.4%
Police	6.9%	2.4%	8.0%	7.5%
NYCERS	6.7%	2.1%	7.4%	7.3%
Fire	6.5%	2.3%	7.7%	7.4%
Median Fund - TUCS		2.3%	7.9%	7.5%

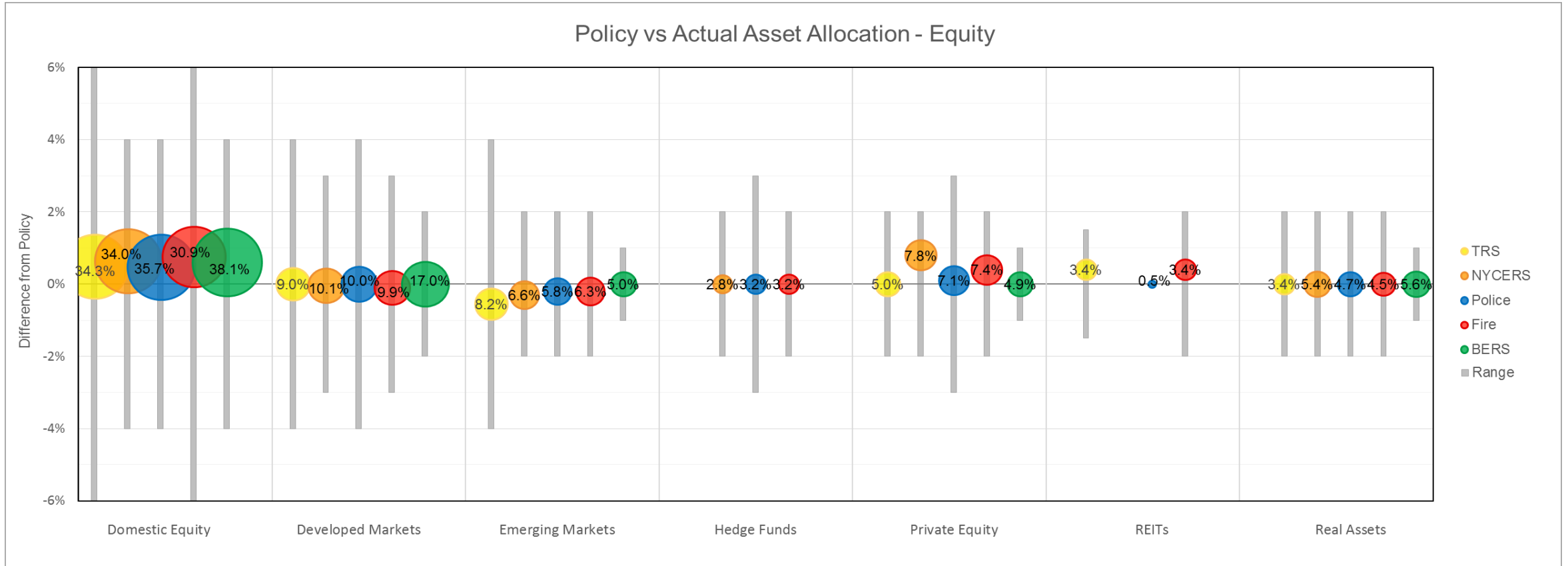
* Gross of fees in public asset classes

Source: State Street



Asset Allocation Fourth Quarter 2015 - Equity

Relative Mix to Adjusted New Policy Weights (SSB T, F p.10 P, p.11; B p.5; N p.9)

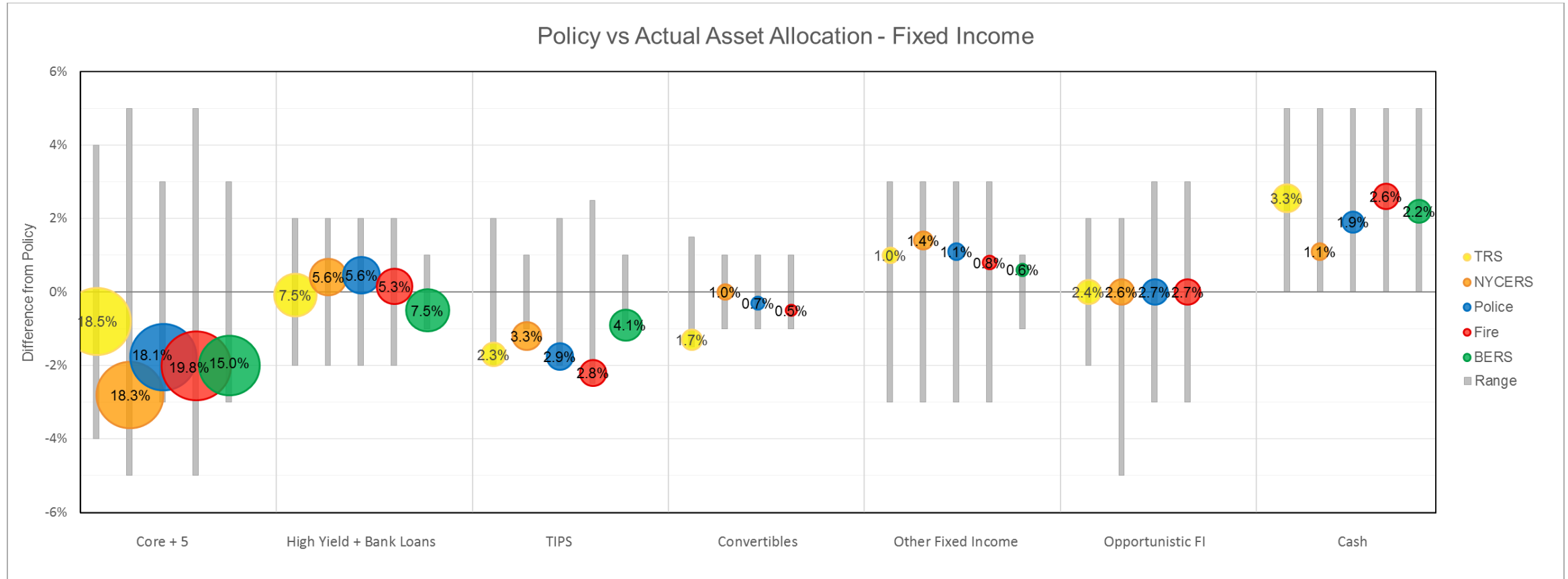


Source: State Street



Asset Allocation Fourth Quarter 2015 - Fixed Income

Relative Mix to Adjusted New Policy Weights (SSB **T**, **F** p.10 **P**, p.11; **B** p.5; **N** p.9)

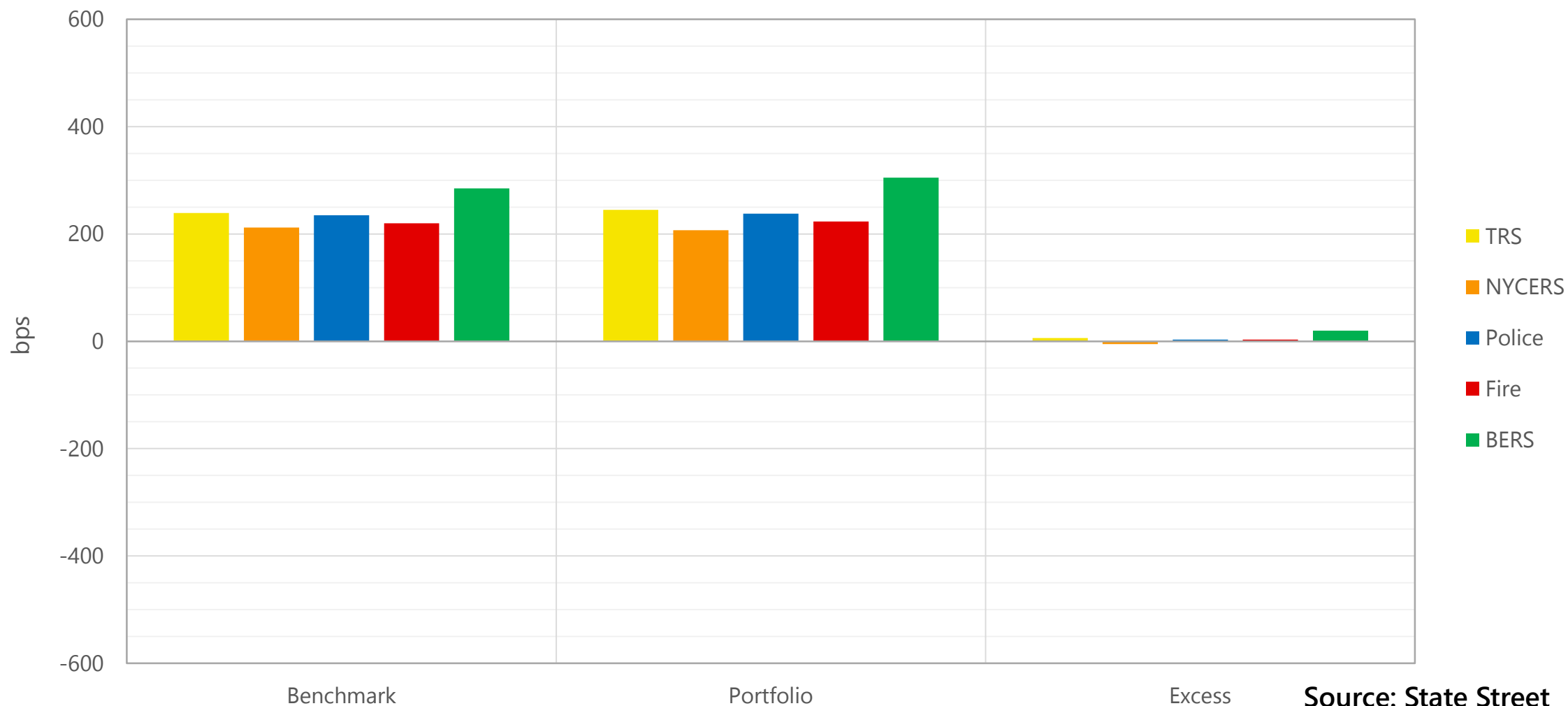


Source: State Street



Return – Total Portfolio

Fourth Quarter 2015 (SSB T F p.24; P, p.25; B p.19; N p.23)

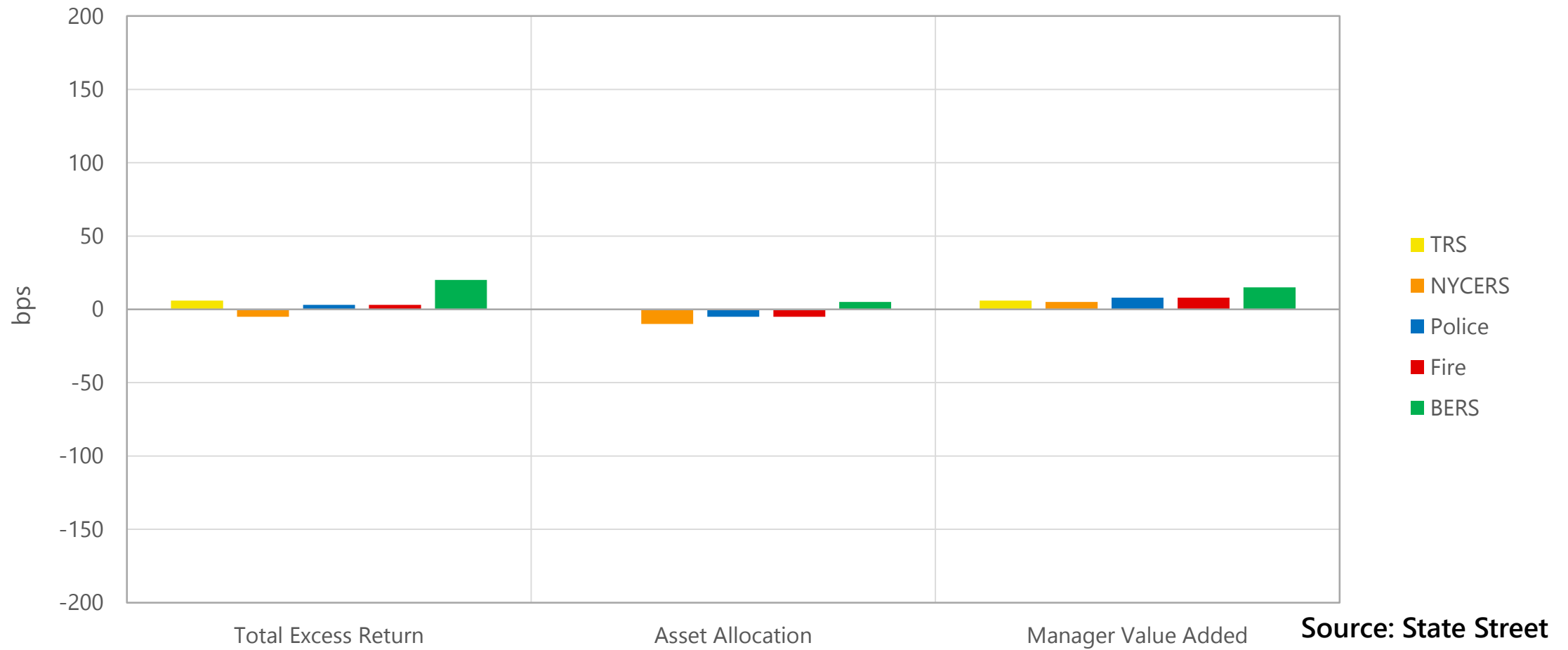


Source: State Street



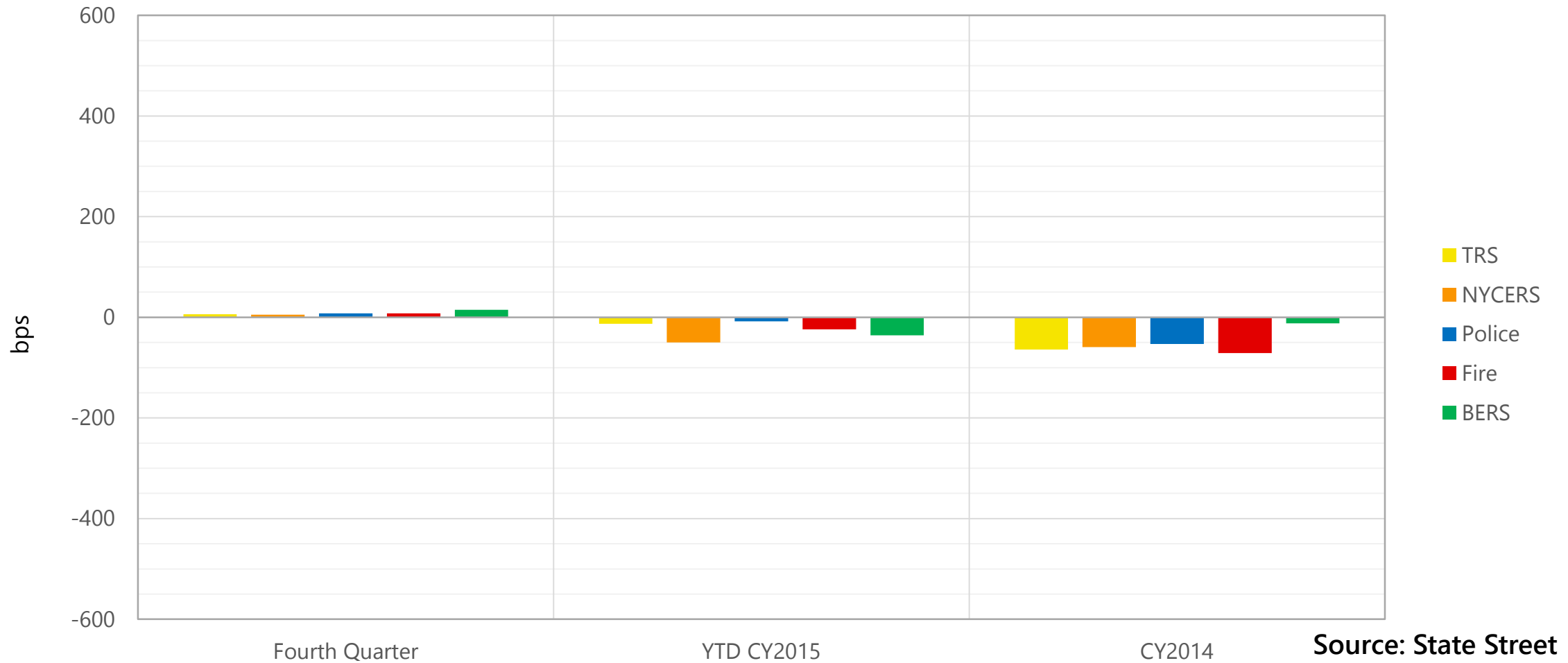
Excess Return – Total Portfolio

Fourth Quarter 2015 (SSB T, F, p.14 P p.15, N p.13; B p.9)



Manager Value Added- Total Portfolio

Basis Points of Excess Return (SSB **T** p.24, **P** p.25, **F** p.24; **B** p.19, **N** p.23)

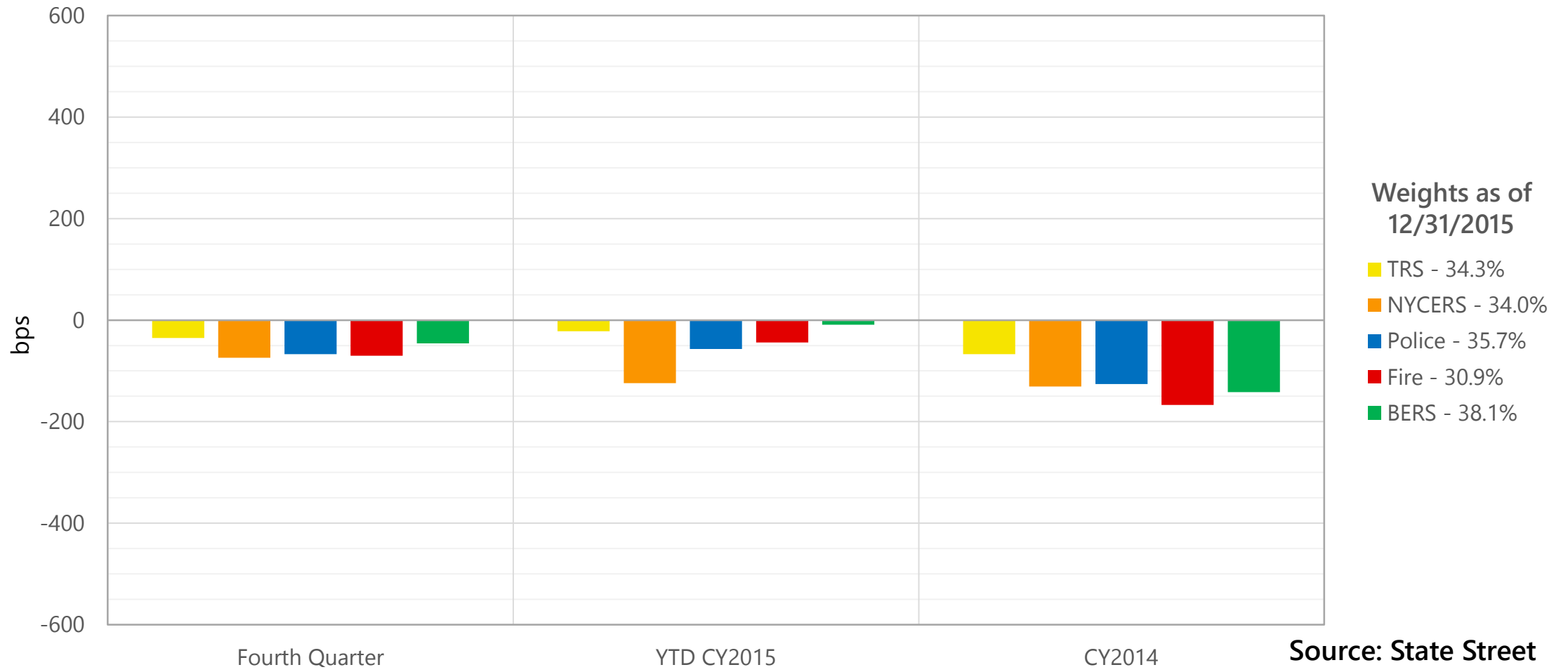


Source: State Street



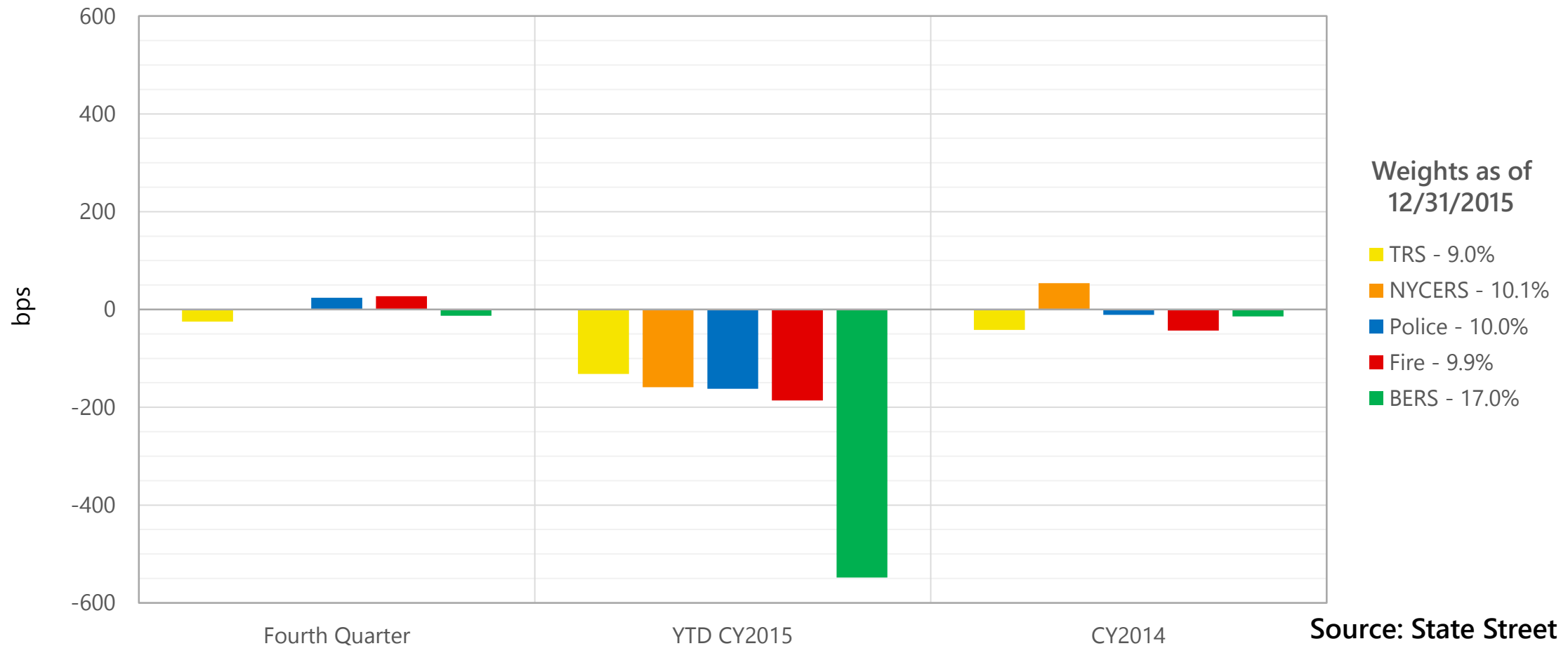
Value Added – U.S. Equities

Basis Points of Excess Return (SSB **T**, **F**, p.24; **P** p.25; **N** p.23; **B** p.19)



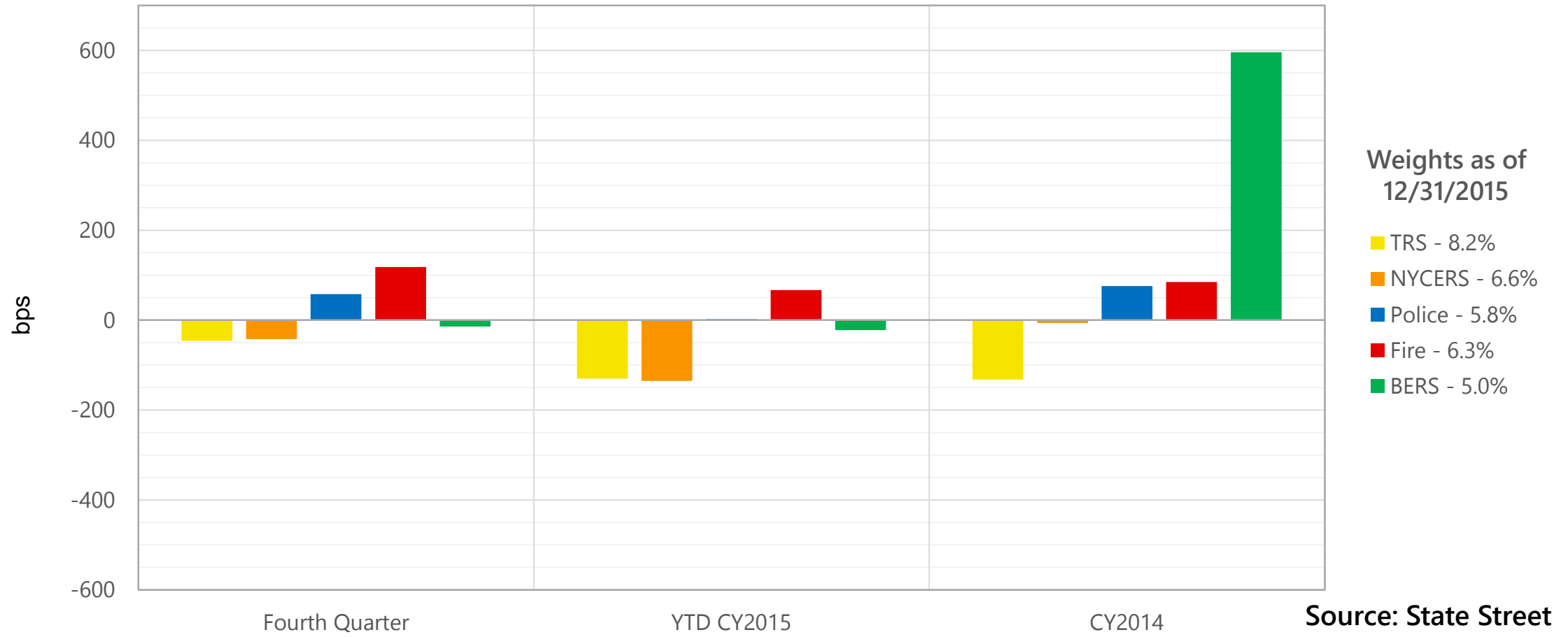
Value Added - Developed Equities

Basis Points of Excess Return (SSB T, F p.26; P p.27; N p.25; B p.21)



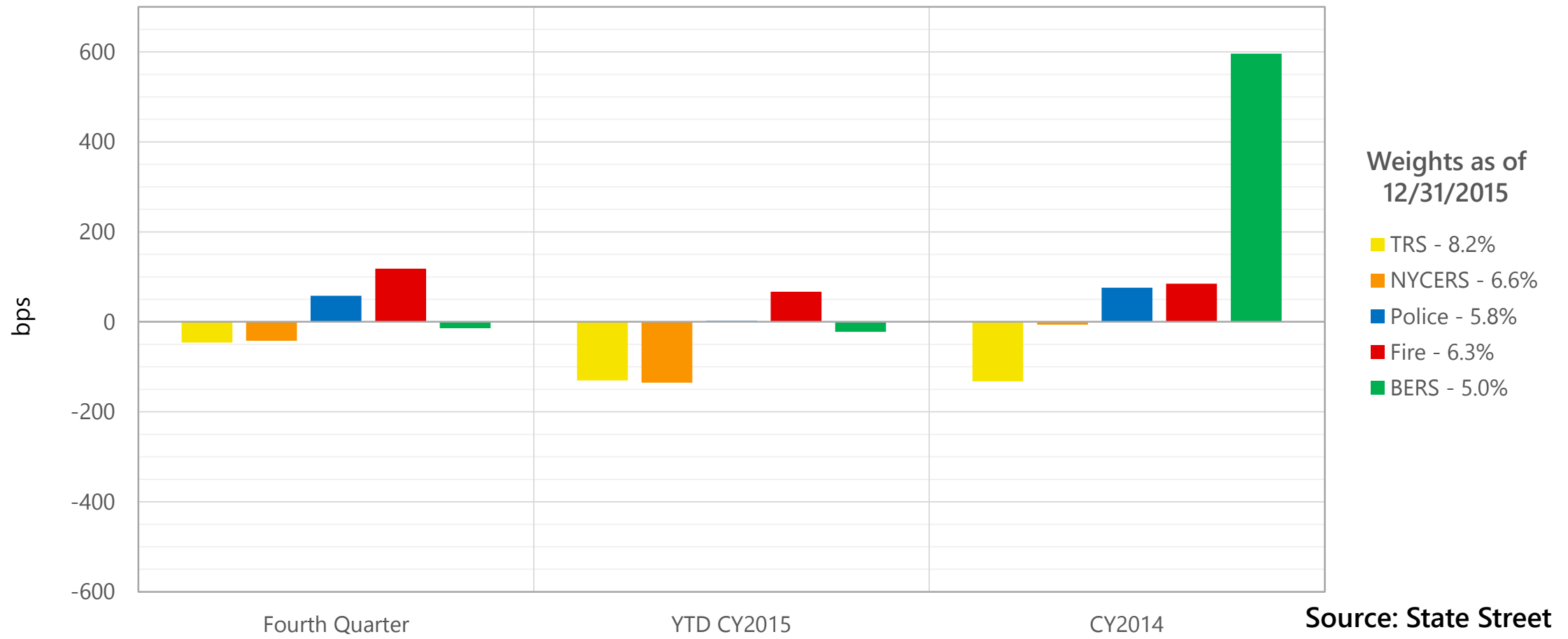
Value Added - Emerging Equities

Basis Points of Excess Return (SSB T, F p.27; P p.28; N p.26; B p.21)



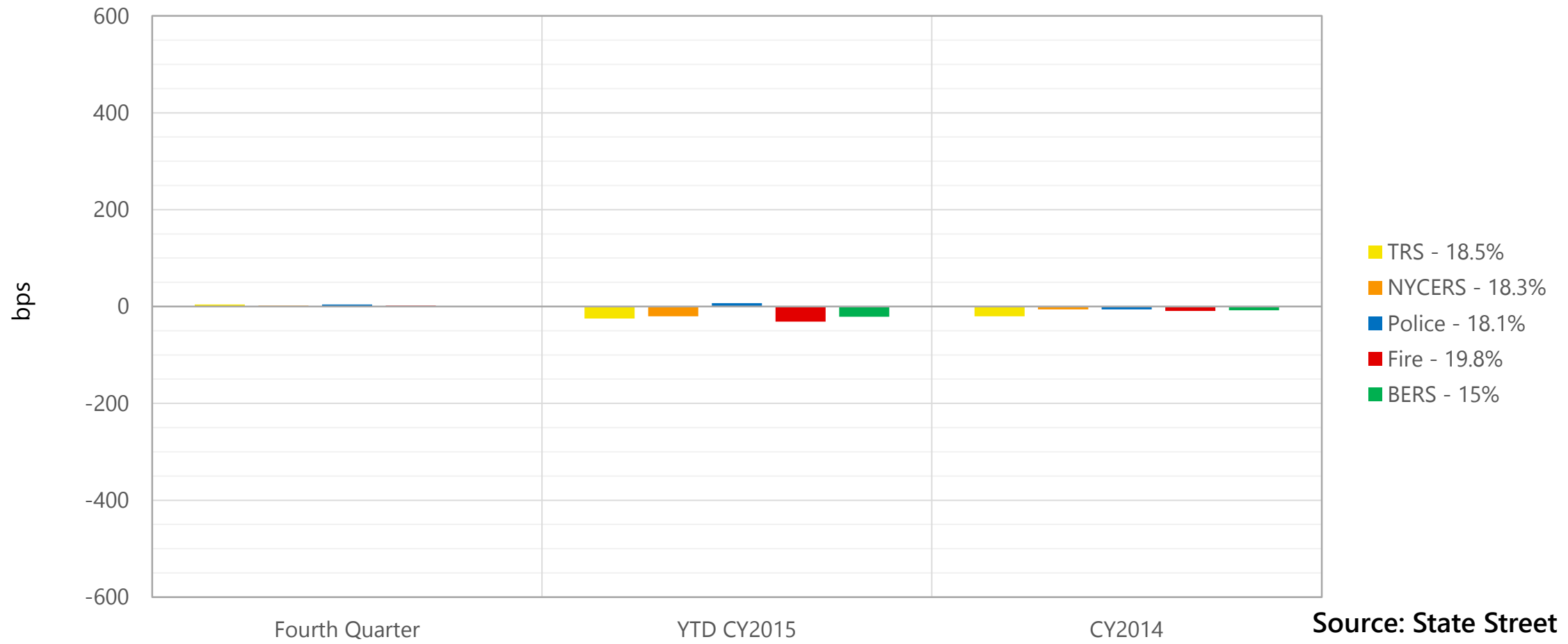
Value Added - Emerging Equities

Basis Points of Excess Return (SSB T, F p.27; P p.28; N p.26; B p.21)



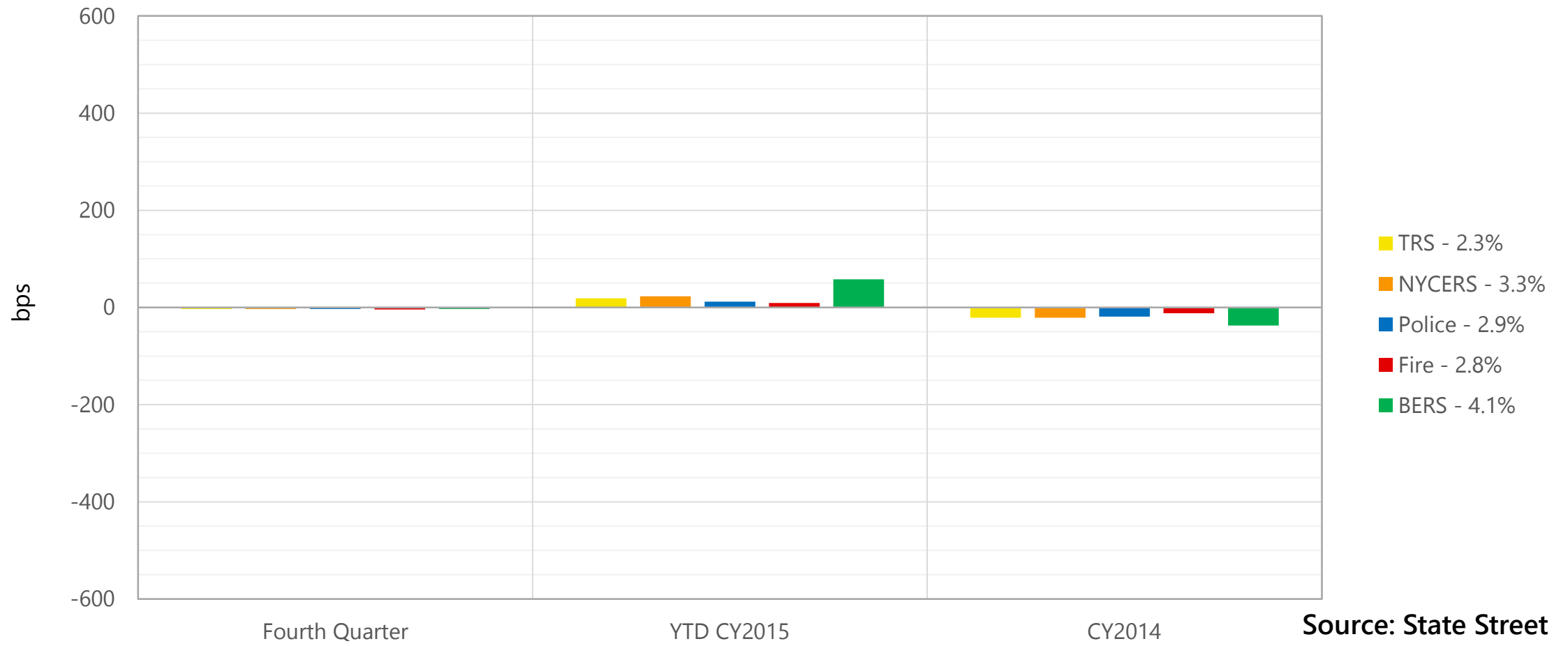
Value Added – Core 5+ Fixed Income

Basis Points of Excess Return (SSB **T**, **N**, p.29; **P** p. 31; **F** p. 30; **B** p.23)



Value Added - TIPS

Basis Points of Excess Return (SSB **T**, **N** p.29; **P** p.31; **F** p.30; **B** p.23)

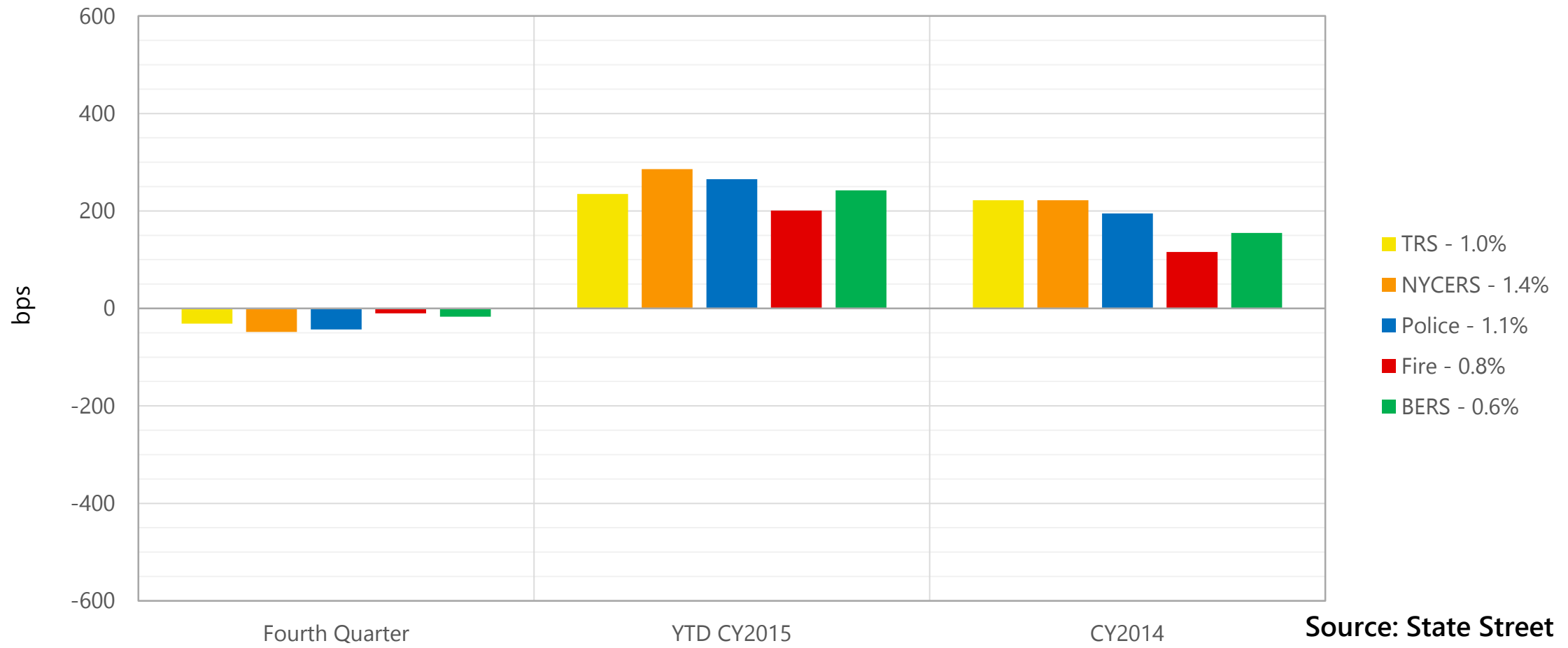


Source: State Street



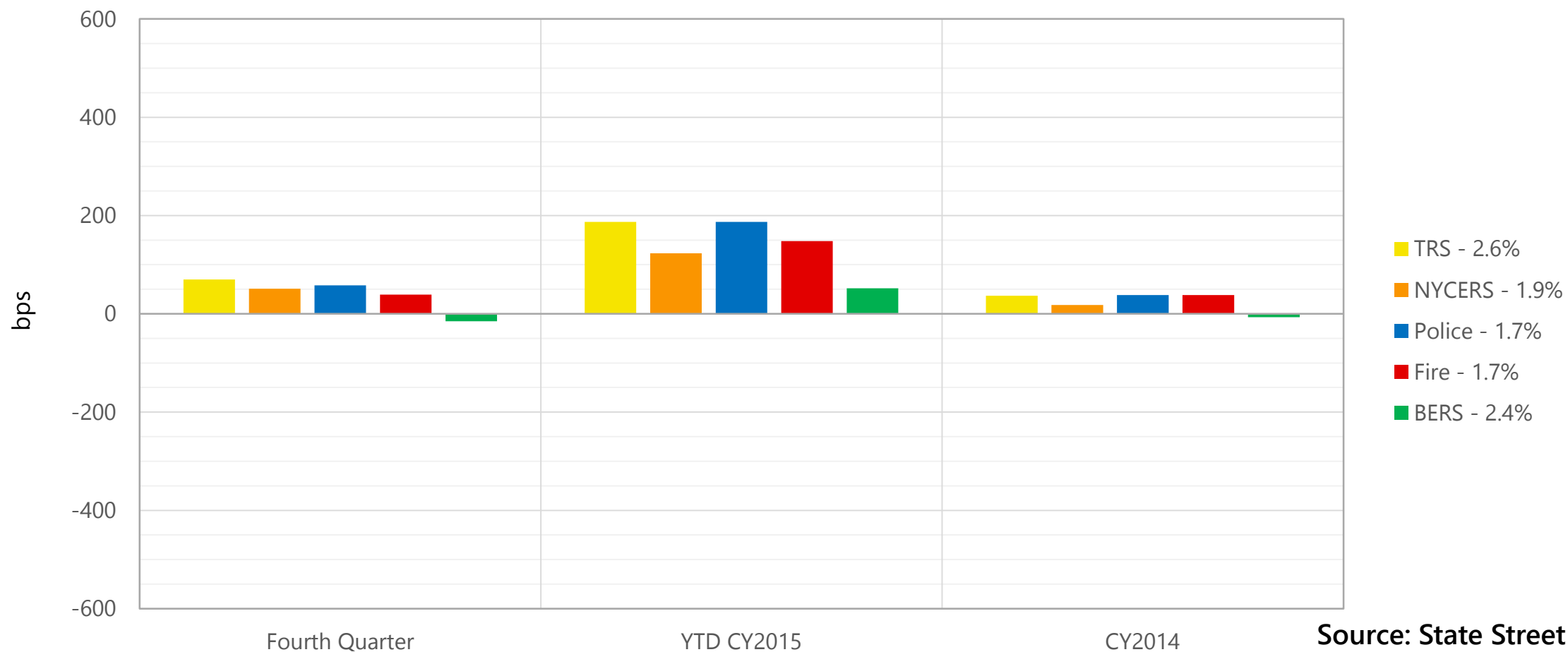
Value Added – Economically Targeted Investments

Basis Points of Excess Return (SSB T, N p.30; P p.32; F p.31; B p.23)



Value Added – Bank Loans

Basis Points of Excess Return (SSB T, N p.29; P p.32; F p.31; B p.23)

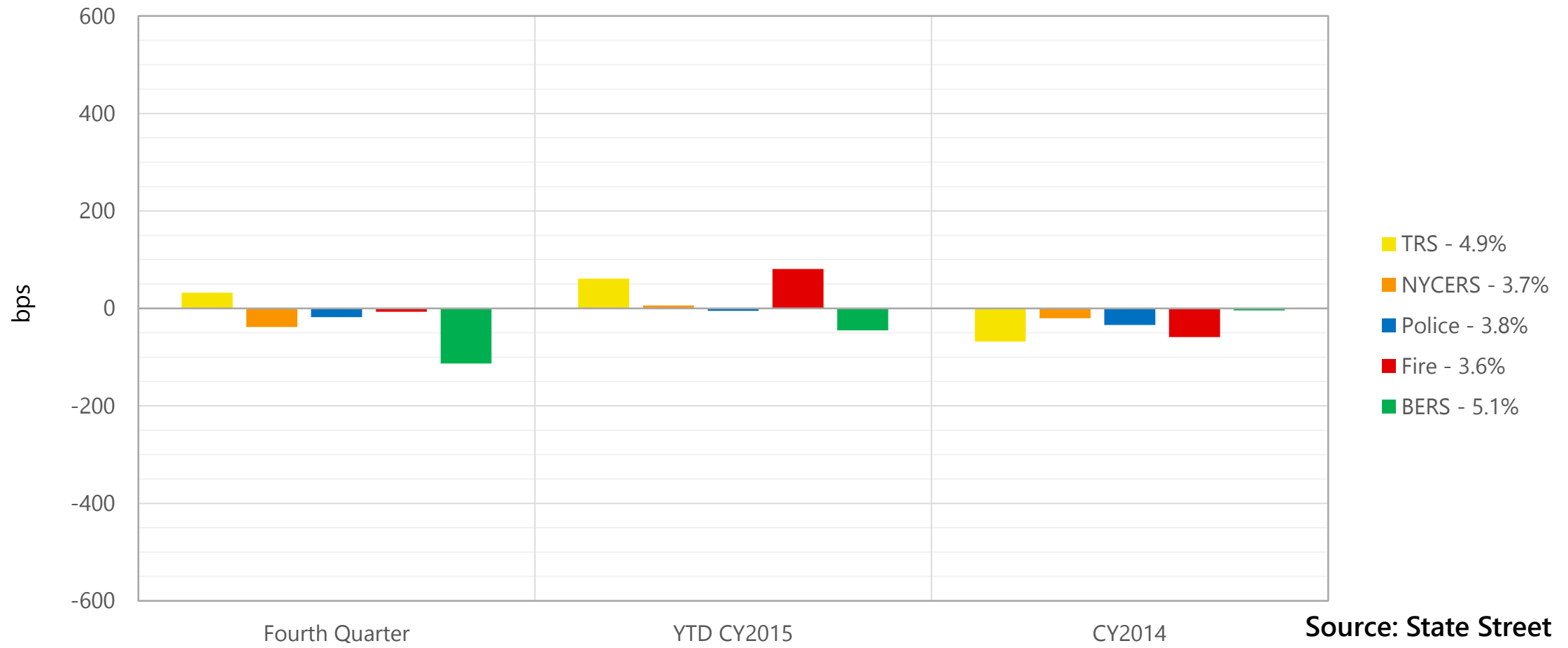


Source: State Street



Value Added – Fixed Income – High Yield

Basis Points of Excess Return (SSB T, N p.29; P p.31; F p.30; B p.23)

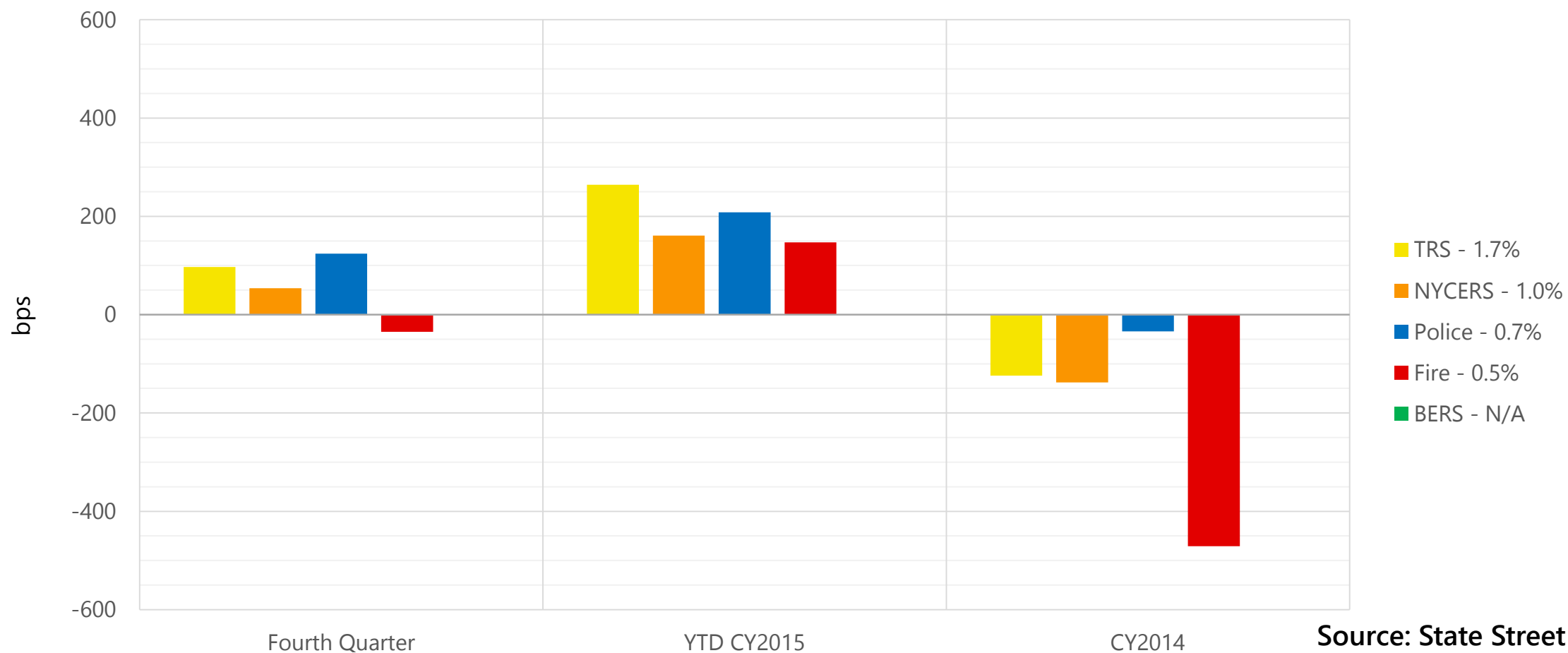


Source: State Street



Value Added – Convertible Bonds

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

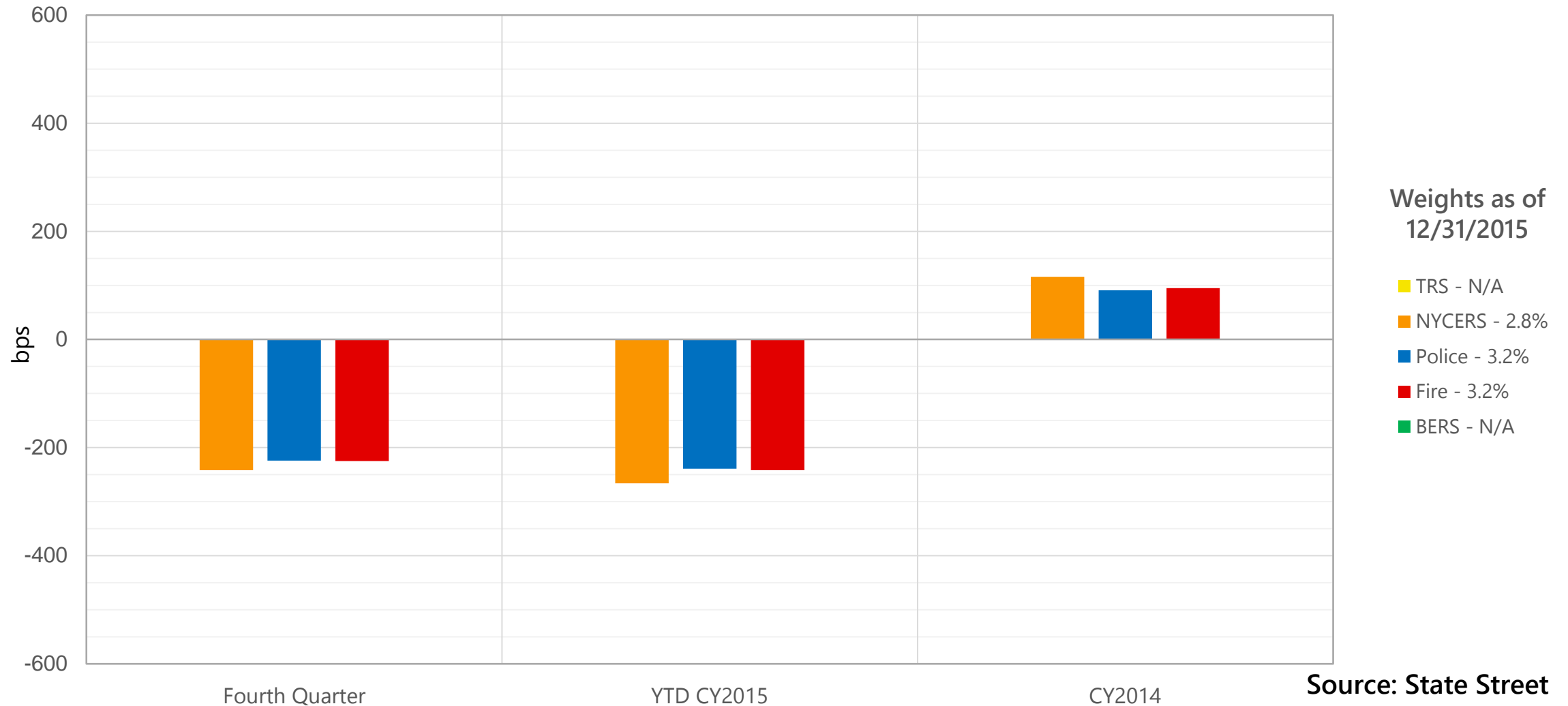


Source: State Street



Value Added – Hedge Funds

Basis Points of Excess Return (SSB **N** p.27; **P** p.29; **F** p.28)

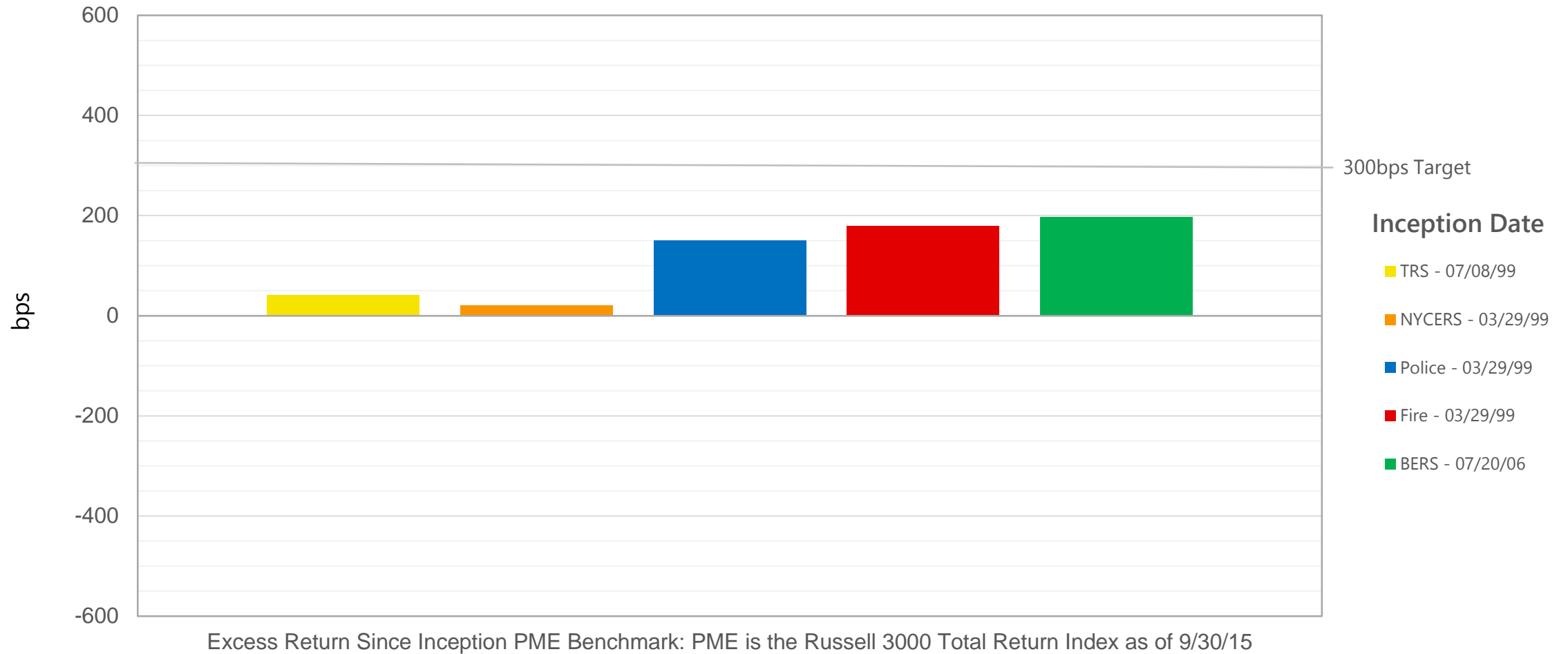


PRIVATE MARKETS



Value Added – Private Equity

Basis Points of Cumulative IRR above Public Market Equivalent

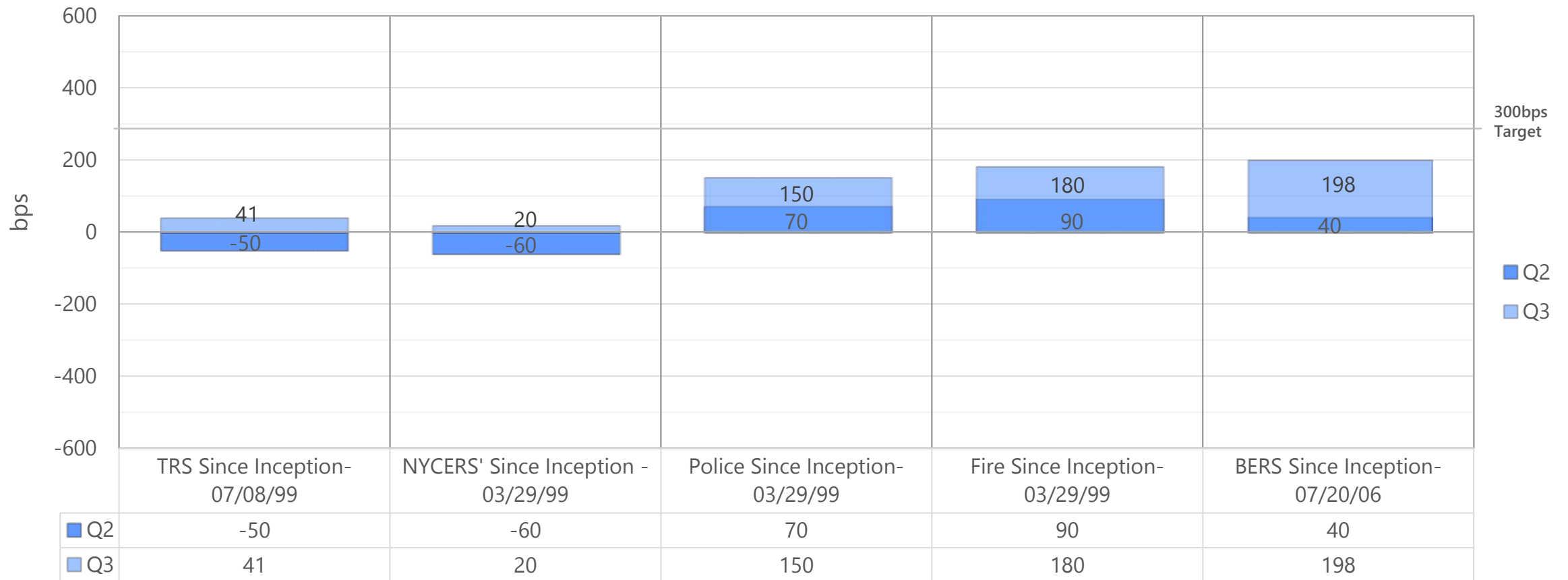


The PME Spread is the difference between the IRR and the PME Benchmark for each respective partnership.



Value Added – Private Equity

Basis Points of Cumulative IRR above Public Market Equivalent 2nd Qtr. to 3rd Qtr. (Agenda Book T, B N, P, F, p. 25)

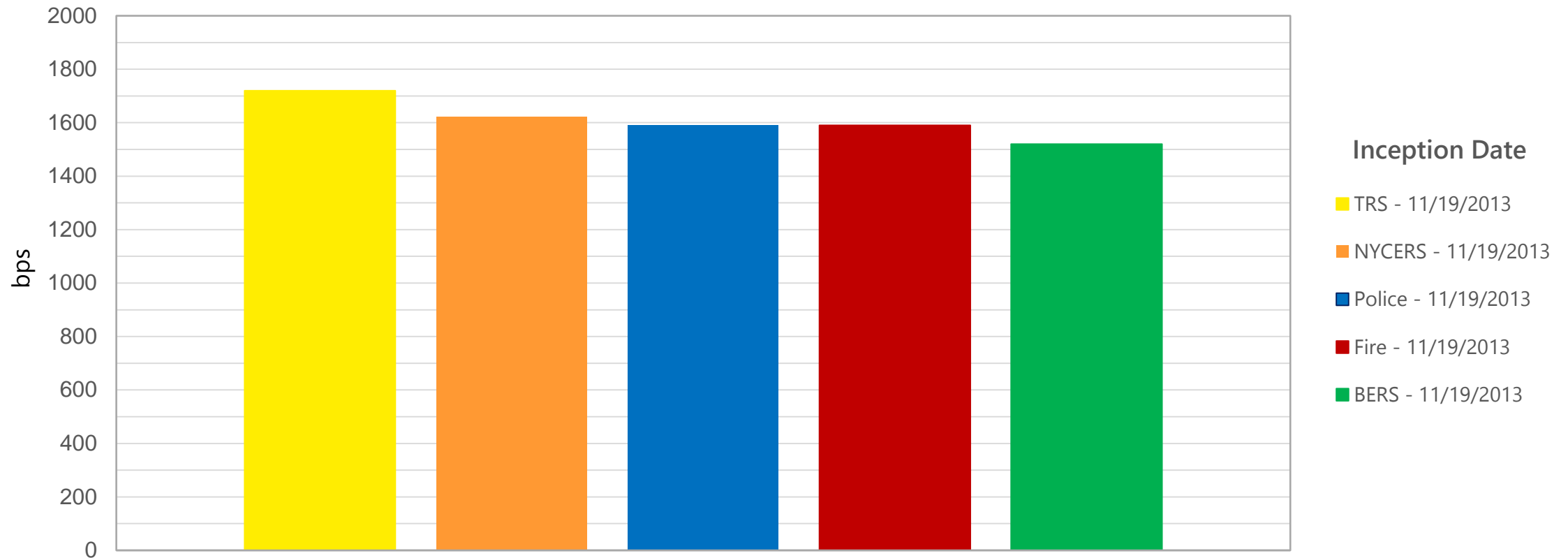


Source: Consultant Quarterly Report For 2Q & 3Q 2015



Value Added - Infrastructure

Basis Points of Cumulative IRR above Public Market Equivalent



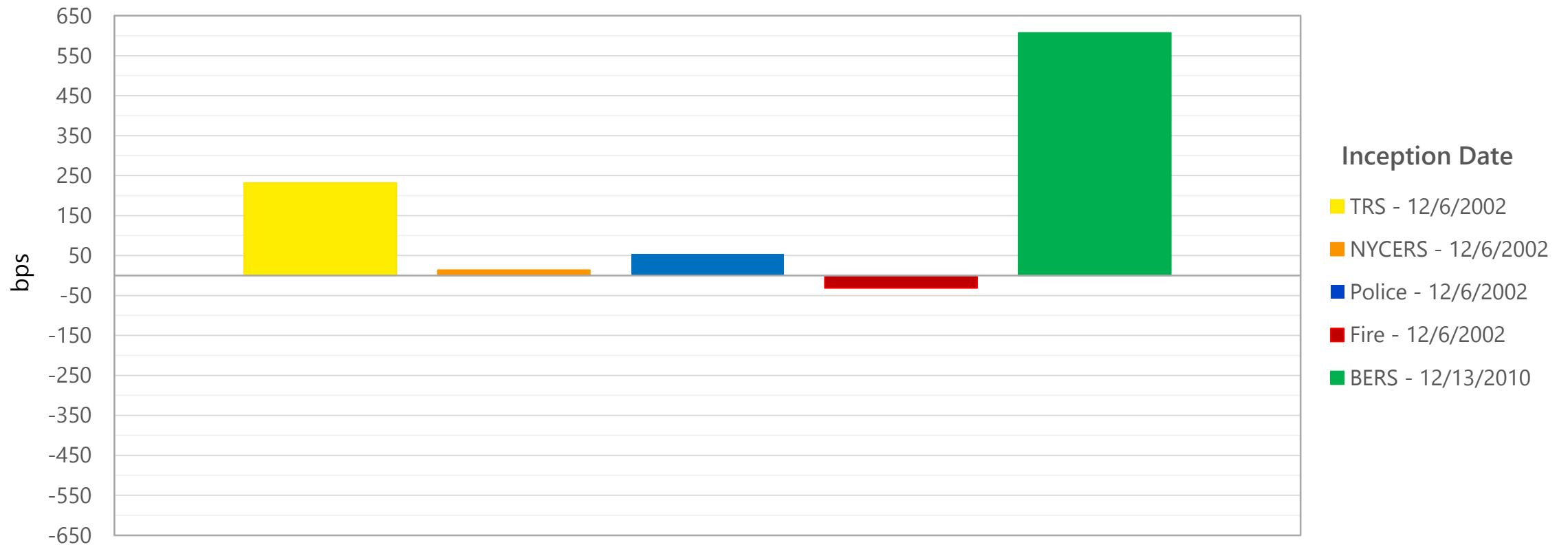
Excess Return Since Inception: PME Benchmark: 50% R3000 & 50% Barclays Aaa. as of 9/30/15

The PME Spread is the difference between the IRR and the PME Benchmark for each respective partnership.



Value Added – Private Real Estate

Basis Points of Cumulative IRR above Public Market Equivalent



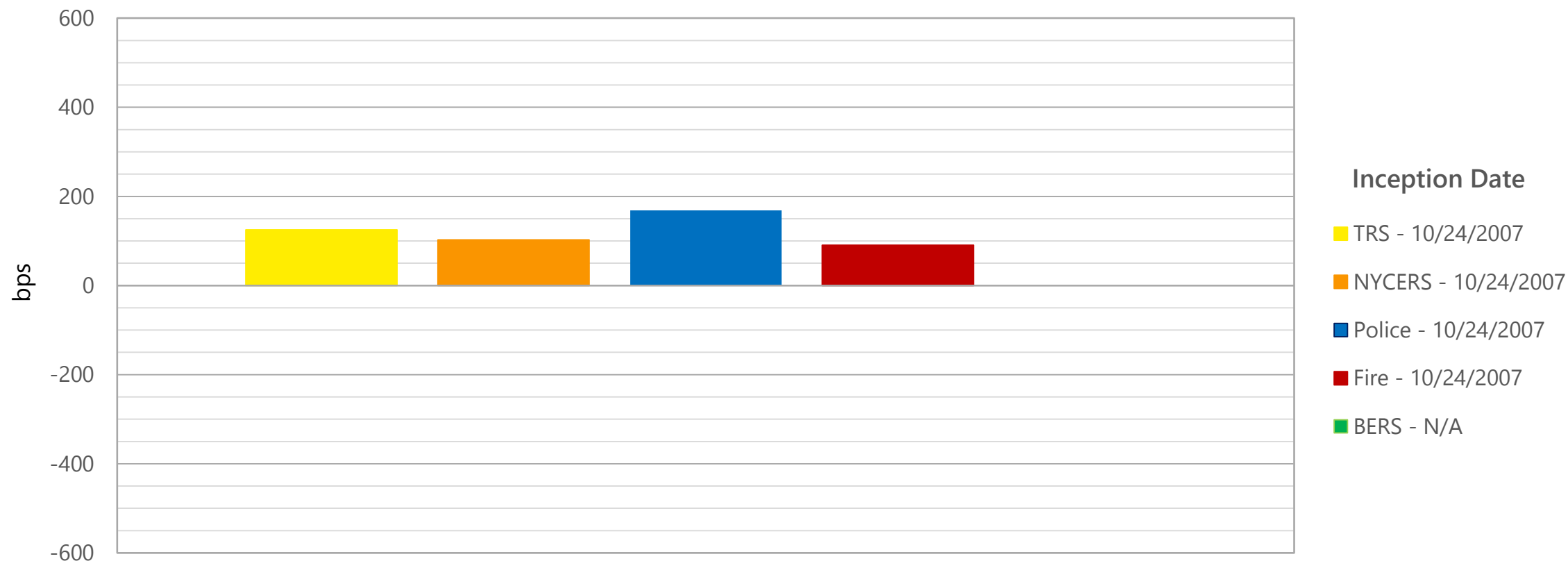
Excess Return Since Inception; PME Benchmark: 50% R3000 & 50% Barclays Agg. as of 9/30/15

The PME Spread is the difference between the IRR and the PME Benchmark for each respective partnership.



Value Added – Opportunistic Fixed Income (OFI)

Basis Points of Cumulative IRR above Public Market Equivalent



Excess Return Since Inception; PME Benchmark: is the JP Morgan Global High Yield as of 12/31/15

The PME Spread is the difference between the IRR and the PME Benchmark for each respective partnership

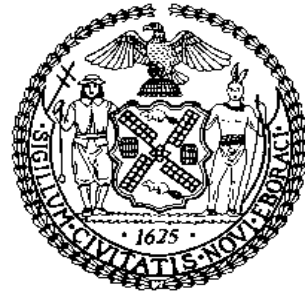


QUESTIONS?





Risk Management



THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER

March 16, 2016

2015 Priorities

Risk Management's Focus Was Operational Risk

Projects Included

- Performed analysis that led BAM to implement a new accounting system
- Automated public market fee calculations - which enabled net of fee performance reporting
- Analyzed private market returns by comparing them to public market benchmarks
- Established securities holdings database which will enable BAM to build a risk reporting platform



2016 Priorities: Operational Risk Initiatives

Risk Management will continue to focus on operational risk while developing market risk reporting capabilities

Holdings Reporting

- A new general ledger
- Daily mark-to-market of public market investments

Systems

- Trading system - enabling straight through processing of short term investments executed by BAM
- Customer Relationship Management System
- Cash Management System

Fee Transparency / Detailed Private Market Reporting

- BAM requires more detailed (ILPA) reporting from GPs
- BAM will build the infrastructure needed to consume this new level of detail
 - Performance analysis dashboard
 - Straight through processing of ILPA based reporting



2016 Priorities: Market Risk Initiatives

Enhance Risk Reporting Capabilities and Automate Rebalancing Analysis

Automate BAM's rebalancing analysis

Create daily flash P+L reports

Generate weekly risk reports

Extended Risk Reporting Framework

Further develop securities holdings database and reporting tools

Mark-to-market ETI rate locks

Evaluate 3-4 comprehensive market risk reporting packages based on needs of:

Asset Teams

Market Risk Team



RISK REPORT DISCUSSION



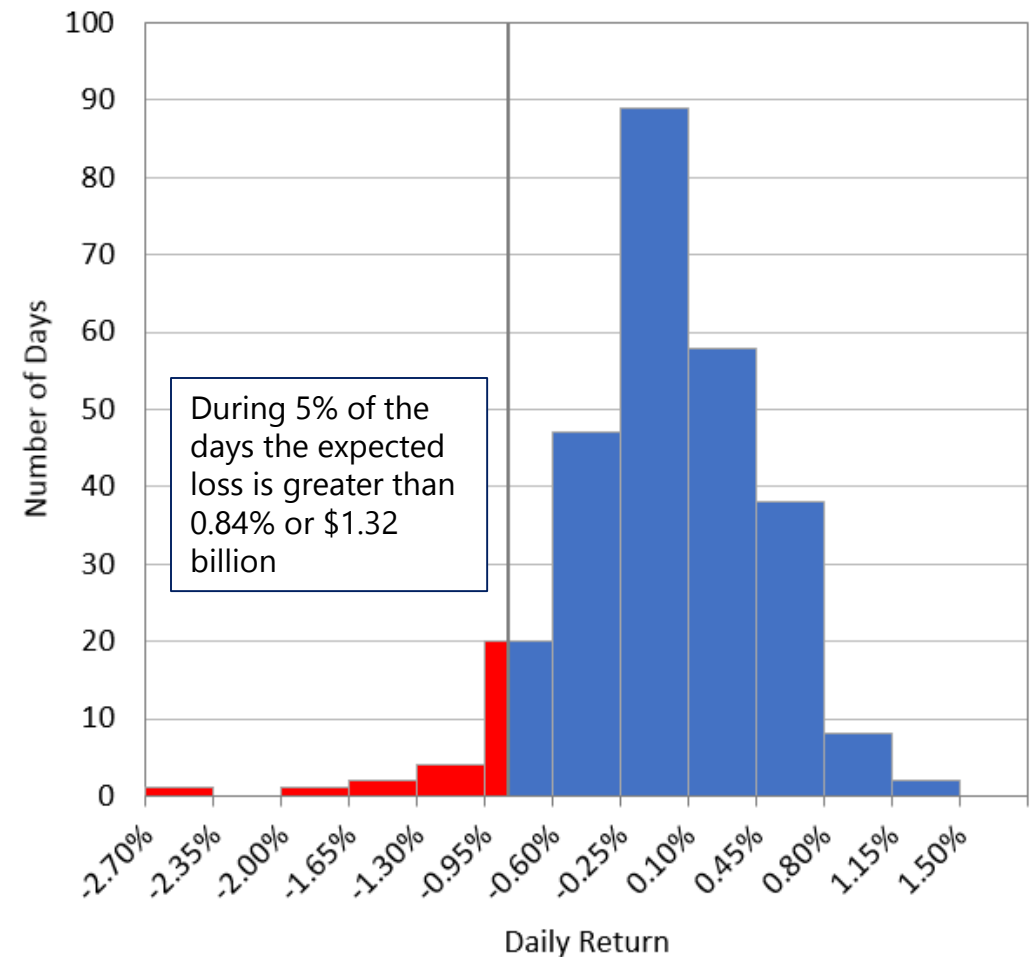
Value at Risk (VaR)

VaR estimates how much a given investment might lose in normal market conditions, in a given time period, 1 day in our case

Example

If a portfolio has a 1-day 95%VaR of \$1.32B, that means that there is a 5% probability that the portfolio will lose more than \$1.32B in value in a single day. In other words a loss of \$1.32B or more will occur on average once every 20 days.

Simulated Return Distribution Over A Year



VaR (Continued)

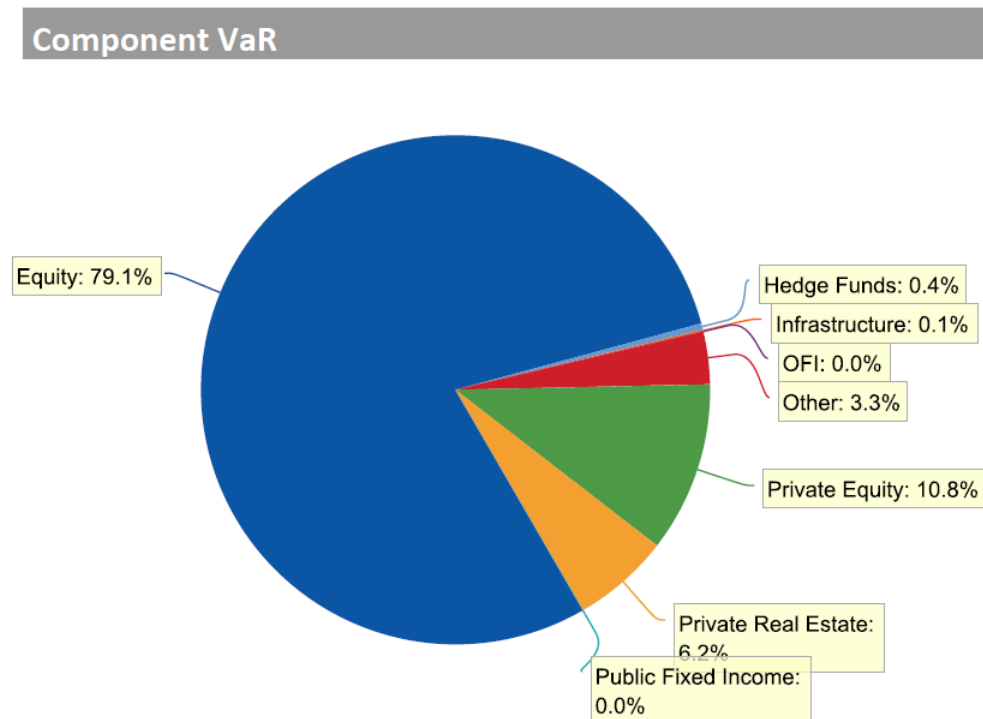
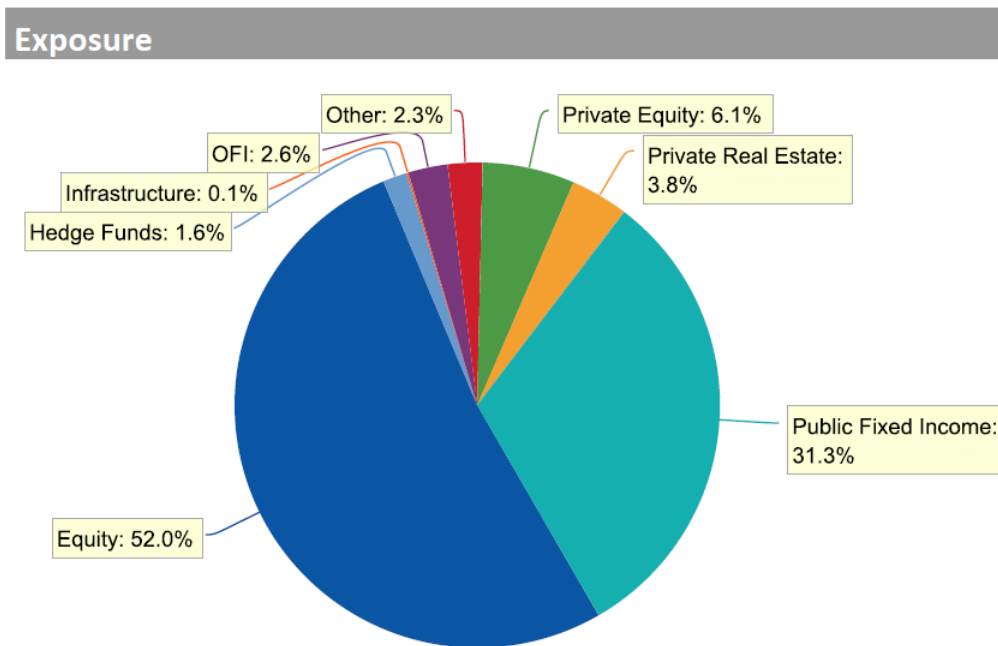
	Combined Plan
NAV	158,156,478,435
95%VaR	1,321,051,696
95%VaR / NAV	0.84%

- Losses on a portfolio that exceed the VaR should be expected – such losses are referred to as a “VaR breaks”
- VaR is not a “worst-case” loss
- The probability of a loss larger than the 95% VaR is difficult to estimate accurately and should be analyzed with stress testing based on long-term and broad market data



Component Value at Risk (VaR)

Component VaR is the change in a portfolio's total VaR that comes from removing a particular investment from the portfolio

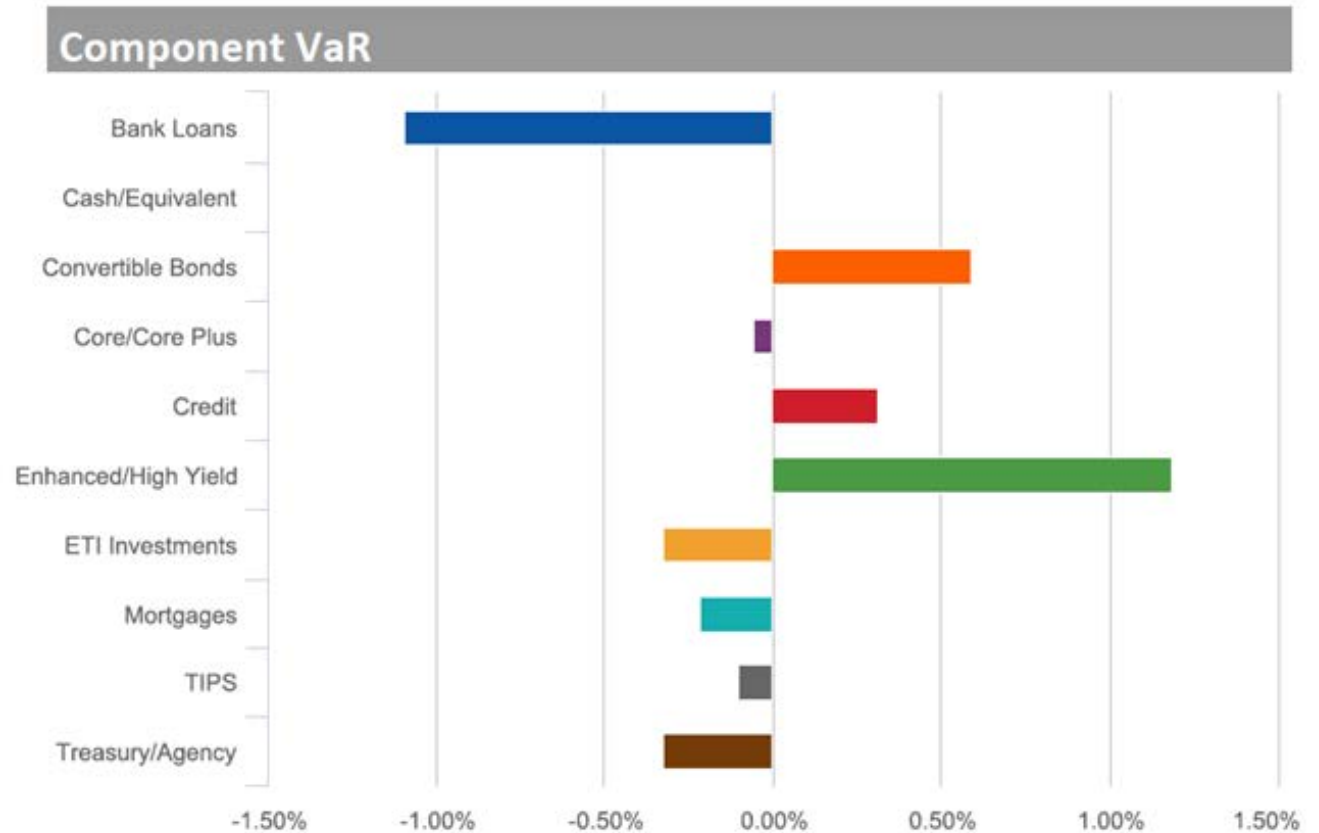


- Component VaR is calculated using the correlations between asset classes and their VaR



Component VaR (Continued)

- Negative Component VaR shows that the prices of certain fixed income investments are negatively correlated with the prices of other investments
- Such investments diversify the portfolio and reduce its VaR

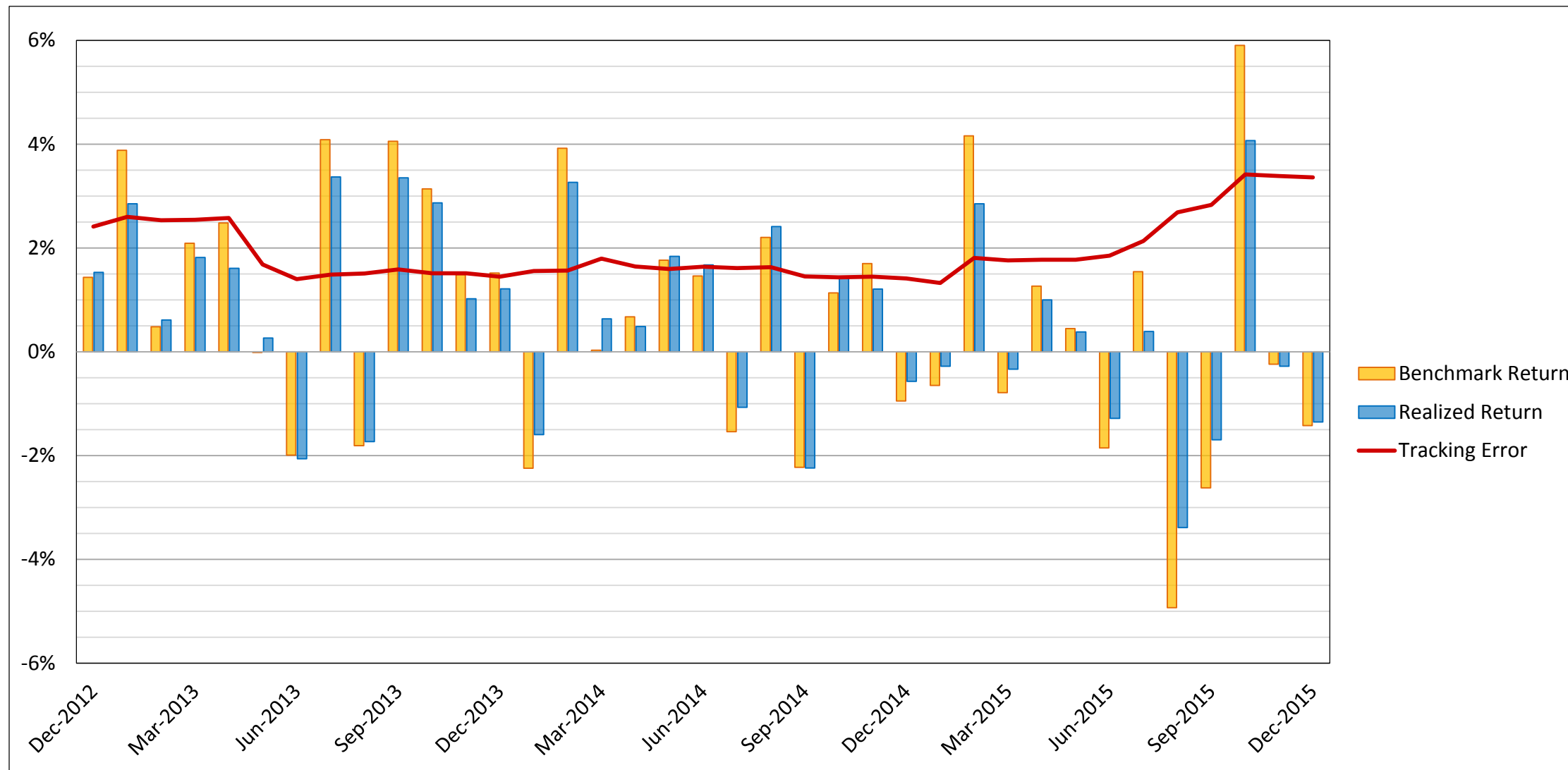


Tracking Error

- Tracking Error is a measure of active risk; it shows how closely a portfolio follows its benchmark
- Excess Return is the portfolio return minus the benchmark return
- Tracking error is the standard deviation of the Excess Return, in our case over the past year



Total Fund Return and Tracking Error



Benchmark Return
Realized Return
Tracking Error



Sharpe Ratio

- The Sharpe Ratio is a measure of risk adjusted return - a higher Sharpe Ratio is indicative of a higher risk adjusted return

- The Sharpe Ratio is:

$$\frac{\text{Average of (Portfolio Return – Risk Free Return)}}{\text{Standard deviation of (Portfolio Return – Risk Free Return)}}$$

- The 1-year Sharpe Ratio of the combined investment portfolios of the five Systems is -0.03
- Every percentage point of volatility is compensated by -3 bps of return over the Risk Free Rate



Information Ratio

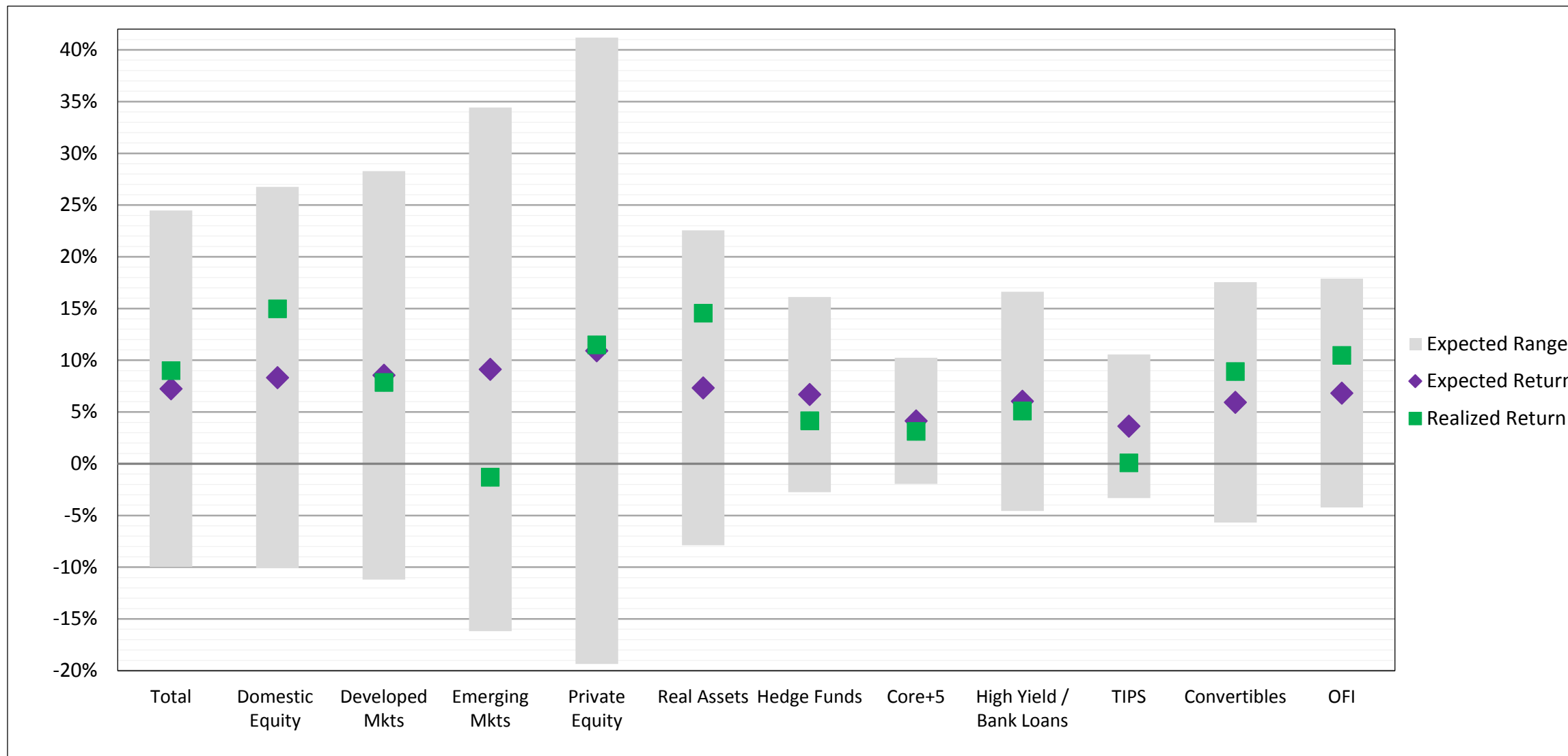
- The Information Ratio is a measure of the effectiveness of active management – a higher Information Ratio is indicative of a higher risk adjusted return
- The Information Ratio measures the risk adjusted Excess Return earned as a result of choosing active management. The Information Ratio is:

$$\frac{\text{Average of (Portfolio Return – Benchmark Return)}}{\text{Standard Deviation of Excess Return}} \text{ or } \frac{\text{Average Excess Return}}{\text{Tracking Error}}$$

- The 1-year Information Ratio of the combined investment portfolios of the five Systems is -0.15
- Every percentage point of Tracking Error is compensated by -15 bps of Excess Return



Expectations* and Realized Returns: Jan 2012 – Dec 2015



*Weighted average of consultants' expectations

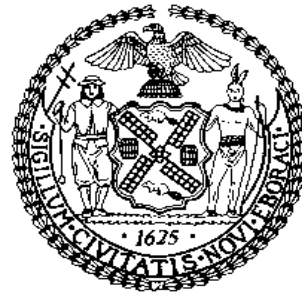


QUESTIONS?



A Roadmap for Reform

Developing a Stronger Bureau of Asset Management



THE CITY OF NEW YORK
OFFICE OF THE COMPTROLLER

March 16, 2016

This document was developed by the New York City Comptroller's Office Bureau of Asset Management ("BAM"). The information contained in this Executive Appendix is confidential, may not be distributed to unauthorized persons, and may contain material non-public information pertaining to certain investment activities and portfolio companies. Federal, state, and/or foreign securities laws prohibit any person who has received such information from purchasing or selling such securities based on material non-public information or from communicating such information to any other person under circumstances in which it is reasonably foreseeable that such person is likely to purchase or sell such securities.

Roadmap for Reform: Initial Impressions

Build Compliance, Risk Management, Internal Audit

- Control Organizations Operational and integrated into fabric of BAM

Compare Existing Practices To Industry Leaders

- 12 of 14 Funston Priority Recommendations being addressed now

Fill Multiple Gaps In Investment Leadership

- Leadership in place, hiring of new staff accelerating



Roadmap for Reform

**Strategic
Plan for
BAM**

New Investment Process

New Controls Environment

New Support Infrastructure



Roadmap for Reform: Standardize Our Due Diligence

Standardize Our Due Diligence Process to Raise Efficiency and Quality Control

- BAM Teams now use a common due diligence framework
- Manager recommendations must be approved at weekly investment committee meeting using standard BAM memo.

Standardized Data Collection Enhances Transparency and Ability to Consistently Monitor

- All Private Asset Managers now required to submit detailed data on expenses.

Focus Investment Staff on Managing the System's Portfolios with Greater Intensity

- Develop superior knowledge of our external managers
- Increase management focus on staff development and new talent acquisition
- Modernize asset allocation implementation and re-balancing process



Roadmap for Reform: Building Sound Controls Environment

First BAM Chief Risk Officer joins January 2015

- Instrumental in identifying operational process risks and potential data solutions.
- Beginning the process of improving risk monitoring and reporting tools

First BAM Chief Compliance Officer joins April 2015

- Integrally involved in standardization of documents, processes, forums, publications.
- Beginning process to deepen exception reporting



Roadmap for Reform: Re-engineering Our Investment Support Operations

Strategic Initiatives Group

Formed to
modernize
administration,
operations and
technology
activities

Work with BOA to adopt streamlined fund accounting process

Implement electronic cash flow management system

Re-structure BAM into clear front, middle and back office groups

Assess technology needs and manage new software procurement and implementation

Create Key Performance Metrics and monitor with Standardized Operational Risk Framework

Introduce tracking tools to monitor implementation of recommendations



Roadmap for Reform: Re-engineering Our Investment Support Operations

March 2016

- Begin to build **new support organization**- reduce key person risk, restructure staff assignments, introduce technology solutions to improve institutional memory

April 2016

- Implement **State Street eCFM**- electronic payment authorization application
- Will improve controls and efficiency related to cash movements

May 2016

- Implement **Bloomberg AIM**- trading tool to improve controls by eliminating double entry

July 2016

- Convert to **State Street General Ledger**- eliminates dual recordkeeping and significantly streamlines reconciliation and general ledger processing

Summer 2016

- **1.** Realign functions across **Front/Middle/Back Office**- free front office personnel for manager evaluation, standardize operational due diligence, support robust risk and compliance reporting
- **2.** Purchase and install new **Risk Management Tools**

By 12/31/2017

- **1.** Purchase and install **CRM system** to maintain a robust database of all manager related due diligence activities
- **2.** Design and install new **support infrastructure for alternative asset classes** to improve accuracy and timeliness
- **3.** Purchase and install a new **treasury management system** to improve management and forecasting of cash balances



Roadmap for Reform: Having a Plan to Implement

- Initial Budgets Developed for Fiscal 2017 Operations

CORPUS IMPACT: Other Than Personnel Services

	<u>Grant Amount</u>
Travel	\$240,856
Training	\$142,000
IT Systems & Other	\$2,243,433
Total Estimated OTPS NEEDED	\$2,626,289
Current OTPS Grant (no change since 2005)	\$462,845
NEW OTPS NEED	\$2,163,444



Roadmap for Reform: Resource Requirements

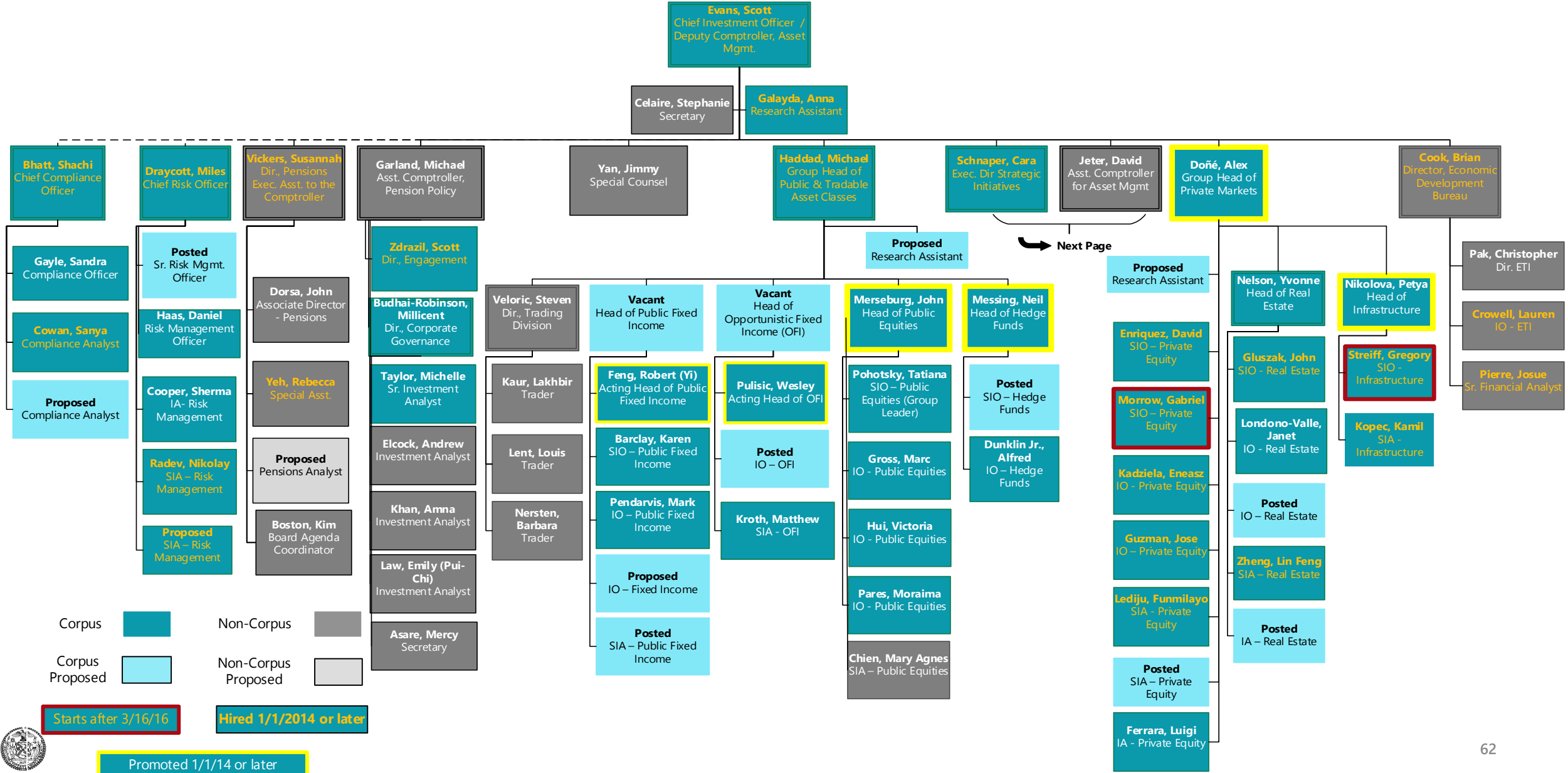
- Initial Budgets Developed for Fiscal 2017 Operations

CORPUS IMPACT: Personnel Services

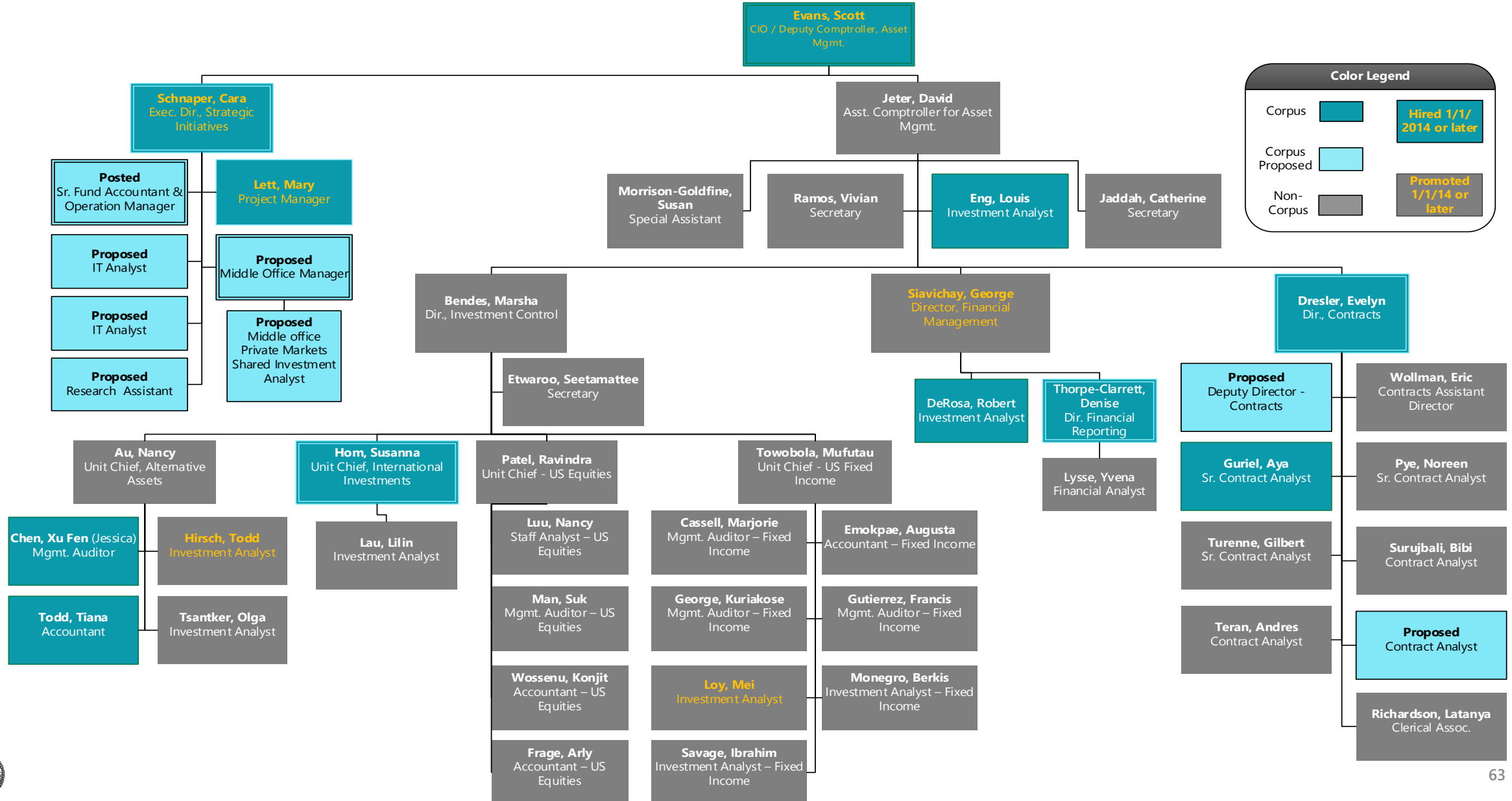
	<u>Staff</u>	<u>Grant Amount</u>	
Current Staff	48	\$6,678,816	[\$139,142]
Total Additions Forecast	23	\$2,636,000	[\$114,609]
Authorized Additions	13	\$1,267,085	
Additional Authorization Needed	10	\$1,368,915	



Organization Chart (Page 1 of 2)



Organizational Chart (Page 2 of 2)



QUESTIONS?

