NEW JERSEY DIVISION OF INVESTMENT

ANNUAL MEETING

State Investment Council

February 01, 2018

"The mission of the New Jersey Division of Investment is to achieve the best possible return at an acceptable level of risk using the highest fiduciary standards."

Background: The New Jersey State Investment Council

New Jersey State Investment Council (the "Council")

- **The State Investment Council is responsible for the formulation of policies that govern the investment of funds by the Division of Investment consistent with the fiduciary duties set forth by statute**
  - the Council provides fiduciary oversight for approximately $88 billion in assets managed by the Division
  - the Pension Fund, with $76 billion in assets, is the largest fund managed by the Division and overseen by the Council
    - 790,000 participants
    - 49% are still working and contributing to the Fund, 42% are retired, and 9% are active, non-contributing members

- **The State Investment Council is NOT responsible for:**
  - Funding Policy (plan contributions)
  - Benefits Policy (plan design)
  - Actuarial Activities (setting actuarial expected return)

Note: All figures are as of June 30, 2017

Background: The New Jersey Division of Investment

New Jersey Division of Investment (the "Division")

Division of Investment Net Assets Under Management

Assets as of 6/30/17 ($millions)	
Pension Fund	$75,964
Cash Management Fund (CMF) (2)	14,335
Deferred Compensation Program Funds (DCP)	548
NJBest Funds (NJBest)	352
Supplemental Annuity Collective Trust (SACT)	227
Trustees For the Support of Public School Fund (TSPSF)	149
Total	**$87,575**

Division of Investment "At A Glance"

- 38th largest global pension fund manager (1)
- 18th largest U.S. pension fund manager (1)
- 67 active employees with a $9.5 million personnel budget
- during Fiscal Year 2017, the Division traded:
  - 896 million shares of stock worth $24.4 billion
  - $12.1 billion in fixed income securities
  - $3.8 billion in foreign currency transactions
- during Fiscal Year 2017, the Division earned:
  - $868 million in stock dividends
  - $404 million in bond interest

MISSION STATEMENT

"The mission of the New Jersey Division of Investment is to achieve the best possible return at an acceptable level of risk utilizing the highest fiduciary standards."

Note: All figures are as of June 30, 2017 unless otherwise noted.

(1) Source: *Pensions and Investments* as of December 31, 2016

(2) The total for the CMF includes $4 billion held for and included in the totals for the Pension Fund, the DCP, NJBest, SACT, and TSPSF

NJ Pension Fund Annual Performance: Fiscal Years 2003-2017

	NJ Pension Fund (1)	Policy Benchmark	Outperformance
FY 2003	3.31%	3.47%	-16
FY 2004	14.16%	14.44%	-28
FY 2005	8.77%	8.07%	70
FY 2006	9.79%	8.13%	166
FY 2007	17.14%	16.49%	66
FY 2008	-2.61%	-6.00%	339
FY 2009	-15.49%	-14.76%	-74
FY 2010	13.34%	13.51%	-17
FY 2011	17.97%	17.13%	84
FY 2012	2.47%	0.26%	221
FY 2013	11.72%	10.96%	76
FY 2014	16.79%	15.85%	95
FY 2015	4.09%	2.94%	115
FY 2016	-0.93%	0.21%	-114
FY 2017	13.07%	13.14%	-8
Cumulative Returns	**183.01%**	**158.26%**	**2,475**
Annualized Returns	**7.18%**	**6.53%**	**65**

Over the past fifteen years, the NJ Pension Fund has outperformed its Policy Benchmark by 2,475 basis points

(1) Throughout this presentation, Total NJ Pension Fund returns exclude Police and Fire mortgage program and are unaudited

Long-Term Capital Market Returns

	Annualized Returns for Periods Ending December 31, 2017 (%)				
	One Year	Three Years	Five Years	Ten Years	Fifteen Years
Global Equity Indices					
MSCI All Country World Index	23.97	9.29	10.80	4.65	8.99
US Equity Indices					
Russell 3000	21.12	11.10	15.57	8.58	10.24
Russell 1000	21.68	11.21	15.70	8.58	10.17
Russell 2000	14.63	9.93	14.11	8.69	11.14
Russell Growth	29.58	13.49	17.15	9.91	10.74
Russell Value	13.17	8.69	13.94	7.17	9.61
Non-US Equity Indices					
MSCI EAFE	25.03	7.79	7.89	1.94	8.10
MSCI Emerging Markets	37.28	9.09	4.35	1.68	12.30

Source: Bloomberg

Long-Term Capital Market Returns (continued)

	Annualized Returns for Periods Ending December 31, 2017 [1] (%)				
	One Year	Three Years	Five Years	Ten Years	Fifteen Years
Fixed Income Indices					
BarCap Aggregate	3.54	2.24	2.10	4.00	4.14
BarCap U.S. Treasury	2.31	1.39	1.27	3.31	3.57
BarCap U.S. Credit	6.18	3.63	3.23	5.42	5.22
BarCap U.S. High Yield	7.50	6.35	5.77	8.03	8.97
Commodities					
Bloomberg Commodities Index	0.75	-5.45	-8.71	-7.14	-1.48
Private Equity					
Cambridge Global Private Equity and VC Index	16.03	10.71	13.28	8.82	12.70
Real Estate					
NCREIF Property Index	6.89	9.83	10.35	6.23	9.01
Bloomberg REIT Index	9.03	7.02	10.13	7.99	11.00

(1) Private Equity and Real Estate (NCREIF) returns are presented with a one quarter lag
Source: Bloomberg, Cambridge Associates, and National Council of Real Estate Investment Fiduciaries

Ten Year Periodic Table of Returns

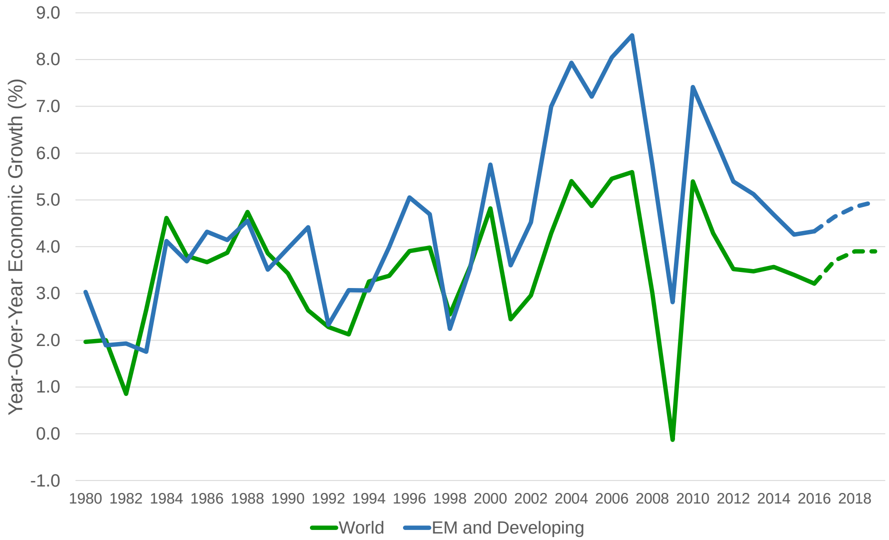
2008	2009	2010	2011	2012	2013	2014	2015	2016	2017 (1)	2008 - 2017 (1)
Treasuries 13.74	EM 78.51	EM 18.88	Real Estate 14.27	EM 18.17	R3000 33.57	R3000 12.55	Real Estate 13.47	High Yield 17.13	EM 37.28	Private Equity 8.82
U.S. Dollar 8.86	High Yield 58.21	Private Equity 18.77	Treasuries 9.81	EAFE 17.27	EAFE 22.78	Real Estate 11.81	U.S. Dollar 8.98	R3000 12.72	EAFE 25.03	R3000 8.58
Corporates -3.07	EAFE 31.78	R3000 16.92	Corporates 8.35	R3000 16.37	Private Equity 20.05	U.S. Dollar 10.95	Private Equity 7.94	Commodities 11.40	R3000 21.12	High Yield 8.03
Real Estate -6.46	R3000 28.29	Commodities 16.67	Private Equity 7.70	High Yield 15.77	Real Estate 10.99	Private Equity 10.25	Treasuries 0.84	EM 11.19	Private Equity 16.03	Real Estate 6.23
Private Equity -25.76	Commodities 18.72	High Yield 15.12	High Yield 4.98	Private Equity 13.35	High Yield 7.44	Corporates 7.53	R3000 0.47	Real Estate 9.22	High Yield 7.50	Corporates 5.42
High Yield -26.09	Private Equity 16.76	Real Estate 13.11	U.S. Dollar 1.83	Real Estate 10.54	U.S. Dollar 3.34	Treasuries 5.05	Corporates -0.77	Private Equity 8.51	Real Estate 6.89	Treasuries 3.31
Commodities -36.53	Corporates 16.04	Corporates 8.47	R3000 1.03	Corporates 9.34	Corporates -2.01	High Yield 2.45	EAFE -0.81	Corporates 5.63	Corporates 6.18	EAFE 1.94
R3000 -37.24	Treasuries -3.57	EAFE 7.75	EAFE -12.14	Treasuries 1.99	EM -2.60	EM -2.19	High Yield -4.47	U.S. Dollar 2.82	Treasuries 2.31	U.S. Dollar 1.92
EAFE -43.29	U.S. Dollar -4.76	Treasuries 5.87	Commodities -13.37	U.S. Dollar -0.70	Treasuries -2.75	EAFE -4.90	EM -14.92	Treasuries 1.04	Commodities 0.75	EM 1.68
EM -53.24	Real Estate -16.86	U.S. Dollar -1.79	EM -18.42	Commodities -1.14	Commodities -9.58	Commodities -17.04	Commodities -24.70	EAFE 1.00	U.S. Dollar -8.52	Commodities -7.14

Over the past ten years, Private Equity has been the best performing asset class, while Commodities has been the worst performing asset class. The wide variation of returns amongst asset classes in each of the past ten years demonstrates the important role of diversification in asset allocation.

(1) 2016 Private Equity (PE) and Real Estate (RE) returns reflect one year ended 9/30/17; 2008-2017 PE and RE returns reflect ten years ended 9/30/17
Source: Bloomberg, Cambridge Associates, and National Council of Real Estate Investment Fiduciaries

Economic Growth and Financial Market Returns Have Been Strong, Particularly in EM

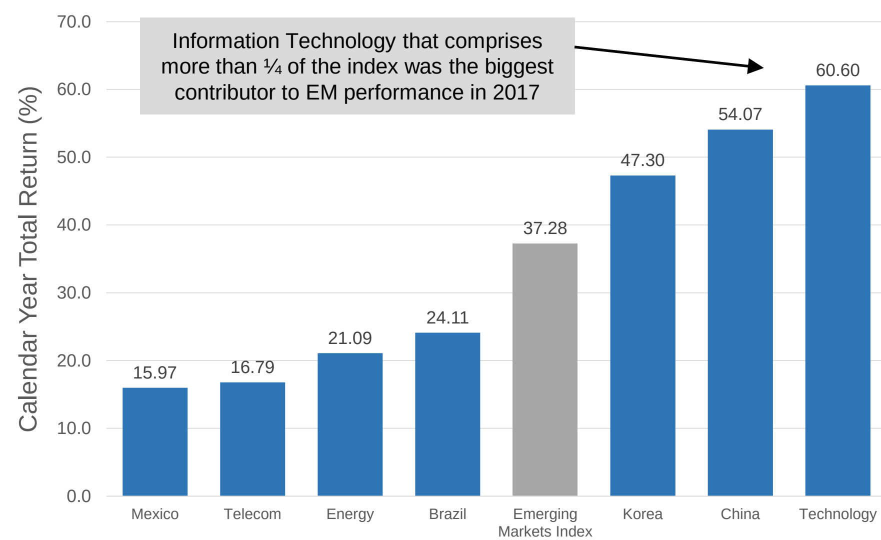
Global Economic Growth



During 2017, the "risk-on" investment theme persisted, supported by accelerating global economic, earnings, and revenue growth. Synchronized global economic growth exceeded expectations by 0.3% and increased by 0.5% (to 3.9%) on a year-over-year basis, the strongest acceleration of growth since 2010. According to the IMF, world growth is expected to accelerate further, in part as a result of U.S. tax reform, with expectations of 3.9% growth for each of the next two years. Output is expected to be particularly strong in the Emerging Markets with 2018 and 2019 growth projections of 4.9% and 5.0%, respectively.

Emerging market (EM) equities led the rally in 2017 as EM realized positive returns in 11 of the past 12 months and, on the heels of historically low volatility, the MSCI EM Index experienced its second lowest intra year drawdown in its history. The strong returns, however, were highly concentrated within specific countries and sectors, with only 3 of 24 countries within the index realizing outsized returns relative to the broader market. Sector concentration was also an important driver, with technology accounting for 50% of the index's total return and representing the only sector to meaningfully outperform the broader index.

Select EM Country and Sector Returns



Global economic growth has strengthened, and financial market returns have been strong, led by Emerging Market (EM) equities. Growth is expected to further accelerate, particularly in EM.

Source: IMF and MSCI

Strong Earnings and U.S. Dollar Weakness Contributed Meaningfully to Total Returns

Dollar weakness during 2017 was a contributor to strong global equity returns for unhedged U.S. dollar investors, as the dollar depreciated by 8.5% versus a trade-weighted basket of currencies. Returns in non-U.S. Developed Market equities were nearly 10% higher for dollar-denominated investors versus local currency investors (+25% vs +15%) as the Euro and Yen both strengthened relative to the dollar. For EM equities, local currency investors realized returns of 31% during 2017 versus 37% for dollar-denominated investors. Weakness in the dollar generally followed the lower volatility investment environment, a strengthening global economic environment, and several favorable European election outcomes for investors.

The U.S. Dollar Has Weakened

U.S. Equity Earnings Per Share Growth

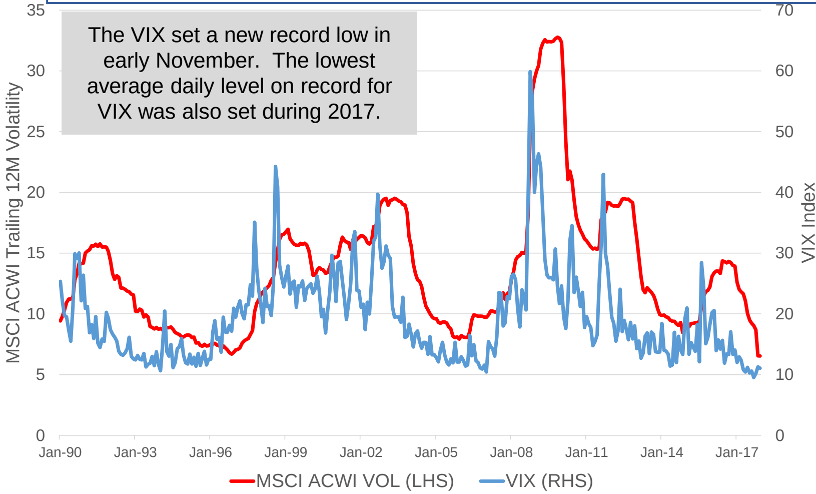
U.S. equity returns were strong, as well, supported by favorable economic growth, better-than-expected earnings growth, and expectations for fiscal stimulus, deregulation, and increased infrastructure spending. Robust performance has continued into 2018, with the U.S. equity market reaching new all-time highs, supported by favorable earnings reports and the enactment of tax reform. Following a year of strong earnings growth for the S&P 500 (up +10% year-over-year), consensus estimates for 2018 reflect expectations for a 17.5% increase in earnings on the heels of lower corporate tax rates.

Better-than-expected EPS growth drove global equity market returns. A weaker U.S. dollar further benefitted domestic investors in international markets.

Source: Bloomberg and FactSet

Low Volatility Has Been A Catalyst For Strong Financial Market Returns and Narrow Credit Spreads

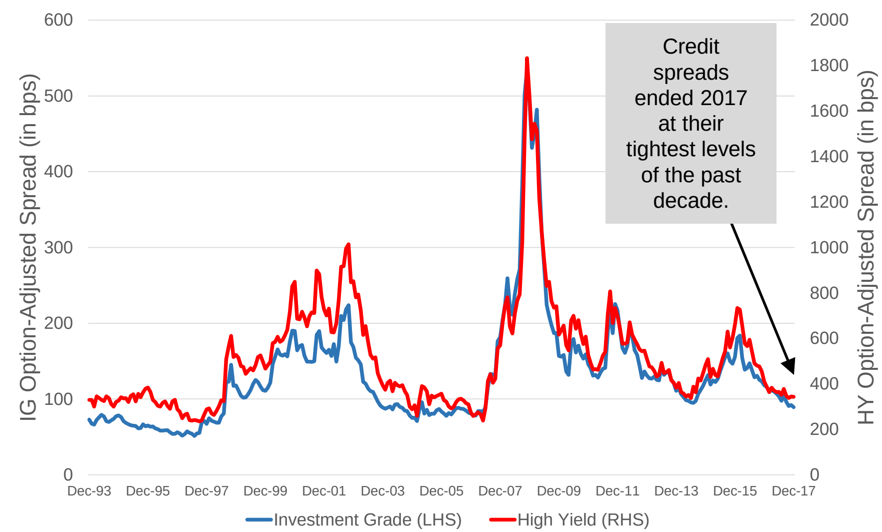
Volatility Hit Record Lows



Despite heightened political tensions, increasing geopolitical risks from North Korea to the Middle East, and record-setting damage from storms and national disasters, market volatility moved lower during 2017, providing support for high financial market valuations and strong returns. The VIX index reached its lowest level on record in early November and the entire calendar year was characterized by historically low levels, supported in part by highly accommodative monetary policy, low interest rates, and further wide-spread adoption of passive investment strategies.

Throughout 2017, credit spreads narrowed as volatility remained subdued and risk premiums declined. While the move to a sharply lower U.S. corporate tax rate (from 35% to 21%) has generally been a favorable outcome for financial markets, the impact of tax reform on the credit markets may be mixed. A higher after-tax cost of debt will likely lead to lower leverage and lower supply over time, particularly within the investment grade universe, providing both a technical and fundamental driver to support high valuations. The fundamentals for more highly levered companies, in contrast, may weaken as new limitations on the tax deductibility of borrowing and declining values for net operating losses adversely impact lower rated companies within the high yield universe.

Credit Spreads Appear Tight Relative To Historical Valuations



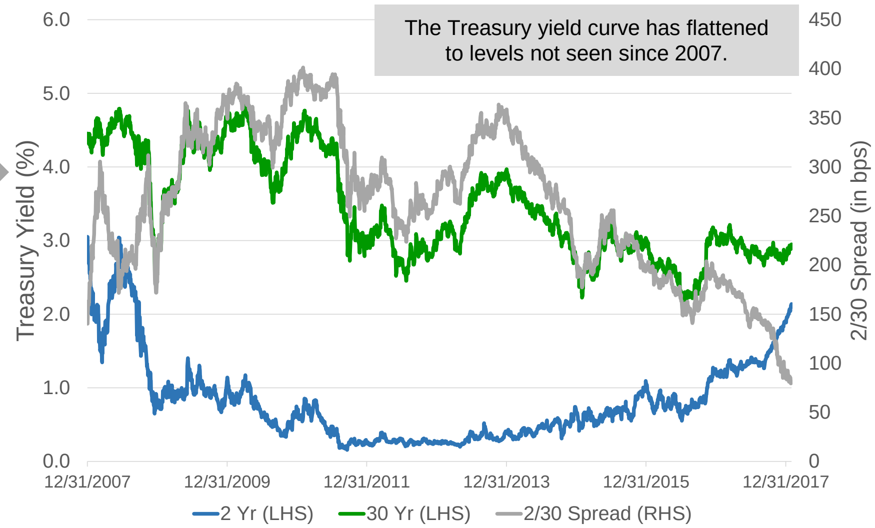
Record low volatility has supported high market valuations. High Yield credit spreads appear rich in a historical context.

Source: Bloomberg

Notwithstanding A Strong Fundamental Backdrop, Market Risks Persist as Valuations Are High

The implications of tax reform may also prove unfavorable for the Treasury market, as the resultant increase in government deficit spending may put upward pressure on interest rates. Following the start of tapering in October 2017, reduction in the size of the Fed's balance sheet as the program ramps up will reduce demand for Treasuries at the same time issuance is expected to expand. Short term Treasury yields have already moved higher, with the two-year Treasury yield reaching its highest level since 2008, while thirty-year yields have actually moved modestly lower over the past year . In this environment, the Treasury curve flattened during 2017, largely driven by a move to higher short-term rates in concert with tightening monetary policy.

U.S. Treasury Yields Have Moved Higher



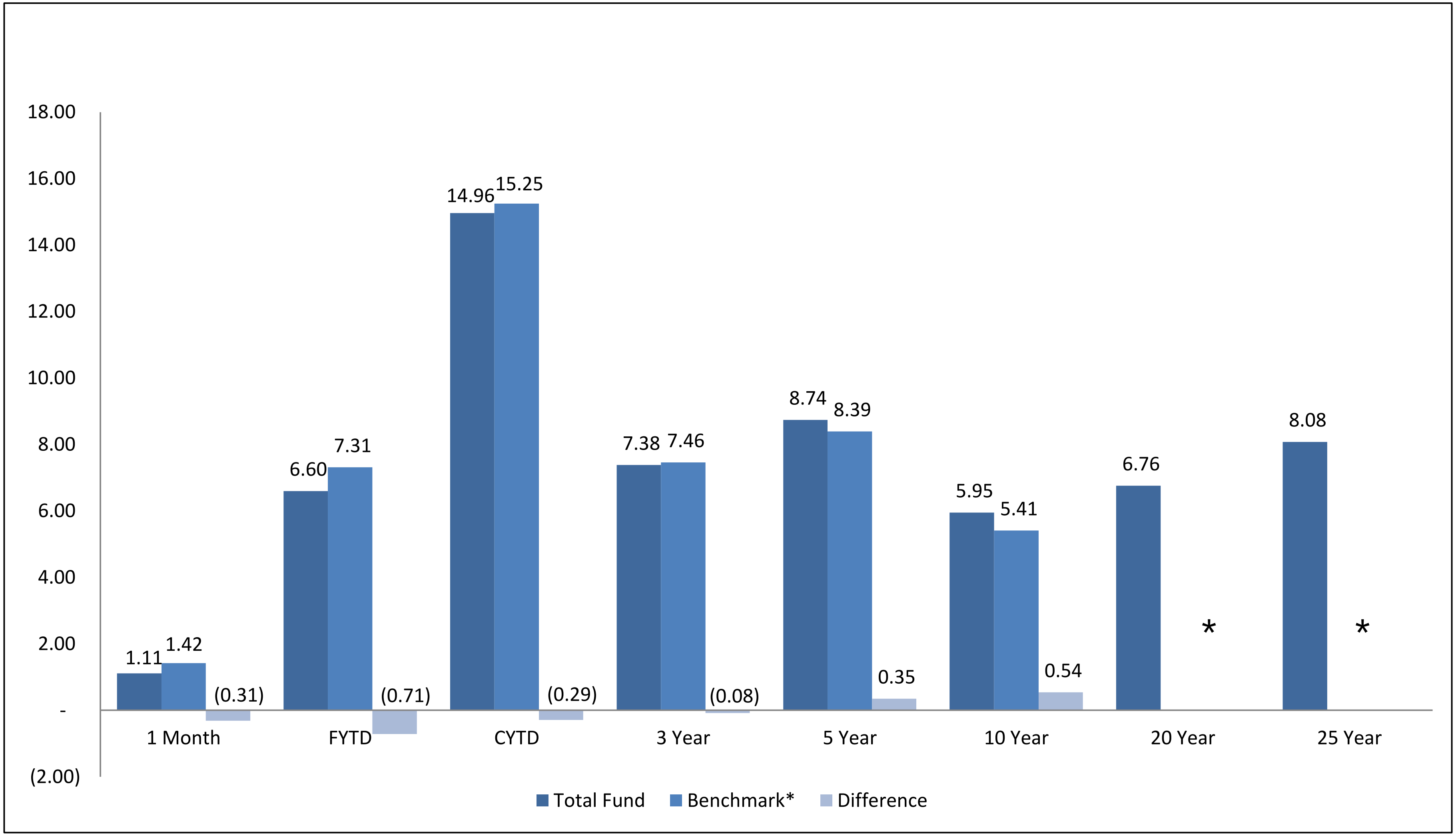
U.S. Inflationary Pressures Have Gradually Increased

A flattening Treasury yield curve is somewhat incongruent with the favorable economic backdrop, particularly as inflationary pressures have gradually increased. Year-over-year core inflation, at 1.8%, is approaching the Fed's neutral target for price stability, suggesting an increasing likelihood that policy accommodation will be removed. Notwithstanding a favorable fundamental backdrop, equity valuations are elevated while higher interest rates, increasing inflationary pressure, a possible escalation of geopolitical risks, and the upcoming U.S. mid-term elections all represent challenges and risks to financial markets.

Higher interest rates, the tapering of quantitative easing, increasing inflationary pressures, and heightened geopolitical risk all present challenges to an otherwise favorable growth outlook for global financial markets.

Source: Bloomberg

Long-Term NJ Pension Fund[(1)] Returns versus Policy Benchmark (periods ending December 31, 2017)

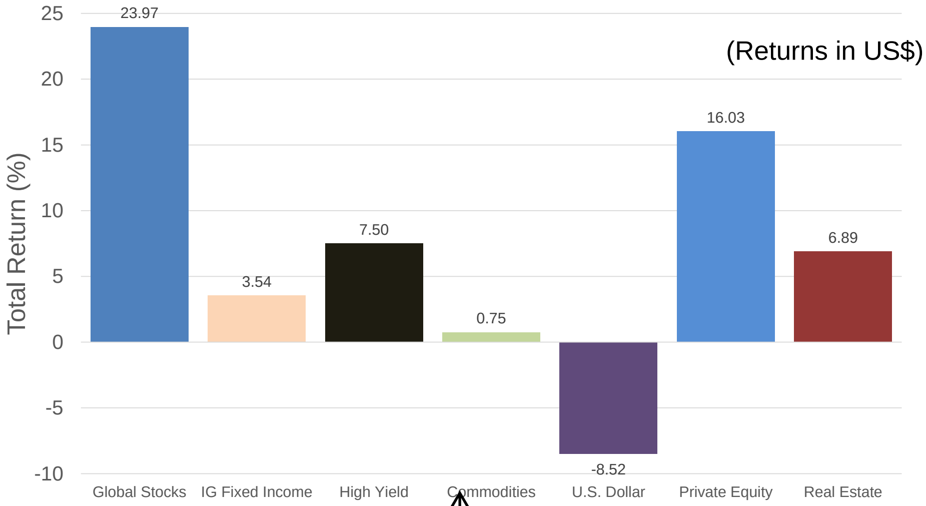


(1) Total Pension Fund returns exclude Police and Fire mortgage program, are unaudited, and are net of all fees. Both the Fund and Benchmark returns are based on preliminary values.

* Benchmark return not available for 20 and 25-Year period

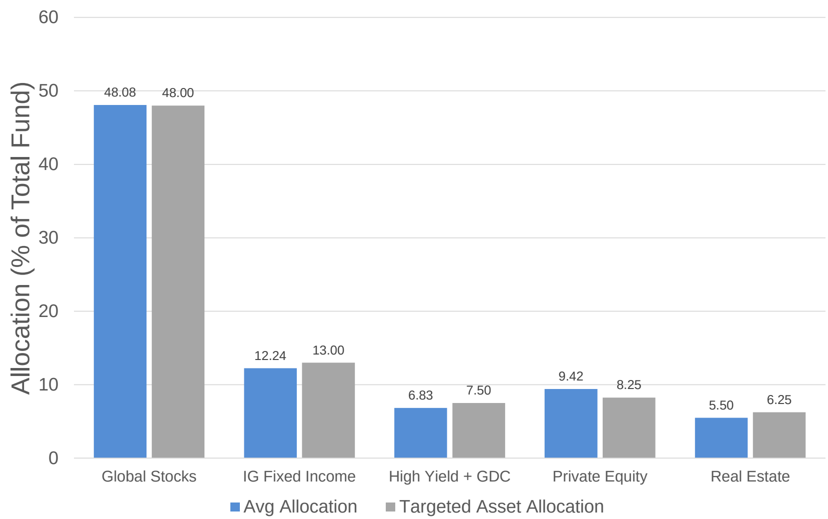
Calendar Year 2017 Capital Markets Review: Multi-Asset Class Returns

2017 Select Capital Market Returns [1]



During 2017,Global Stocks (+23.97%) were the best performing asset class, supported by synchronized economic and earnings growth. For the eighth consecutive year, Private Equity (+16.03%) realized strong returns. High Yield (+7.50%) and Real Estate (+6.89%) both performed well in a low interest rate environment, while IG Fixed Income realized a coupon-like rate of return (+3.54%)

2017 NJ Asset Allocation



The Fund maintained an allocation to Global Stocks in line with the Policy Benchmark over the past year. The above benchmark allocation to Private Equity benefited relative returns. The below benchmark allocation to IG Fixed Income also added value, as IG Fixed Income realized modest returns in a strong financial market environment.

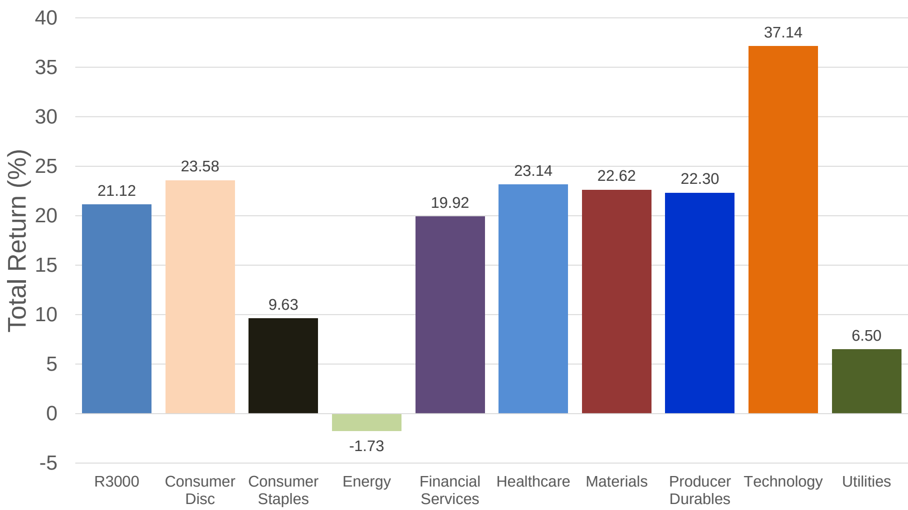
During 2017, the "risk-on" rally continued, led by strong returns in Global Stocks and Private Equity. IG Fixed Income returns were modest in this environment.

(1) Private Equity (PE) and Real Estate (RE) returns reflect one year ended 9/30/17

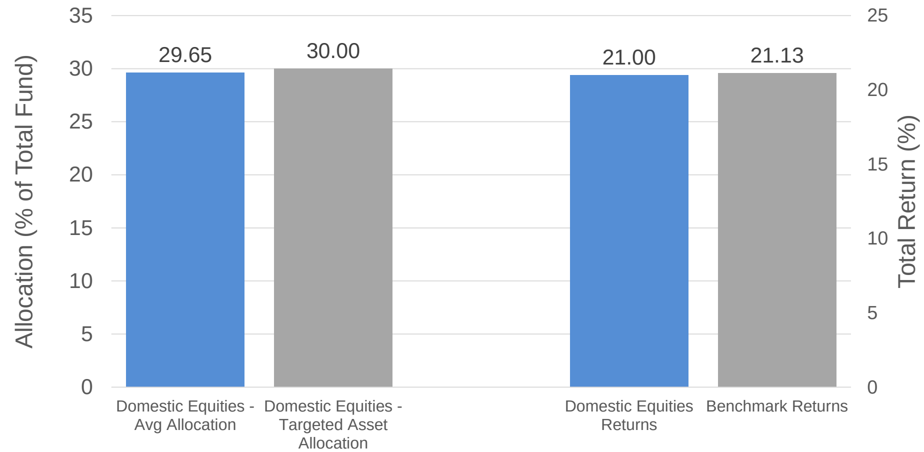
Source: Bloomberg, Cambridge Associates, National Council of Real Estate Investment Fiduciaries, and State Street

Calendar Year 2017 Capital Markets Review: US Equity Sector Returns

2017 Select Capital Market Returns



2017 NJ Asset Allocation and Returns



U.S. Equities realized strong returns (+21.12%) during 2017, led by Technology (+37.14%). The best performing sector of 2016 was the worst performing sector of 2017, as Energy returned -1.73%. Utilities (+6.50%) lagged the broader market, as well, following strong performance the prior year.

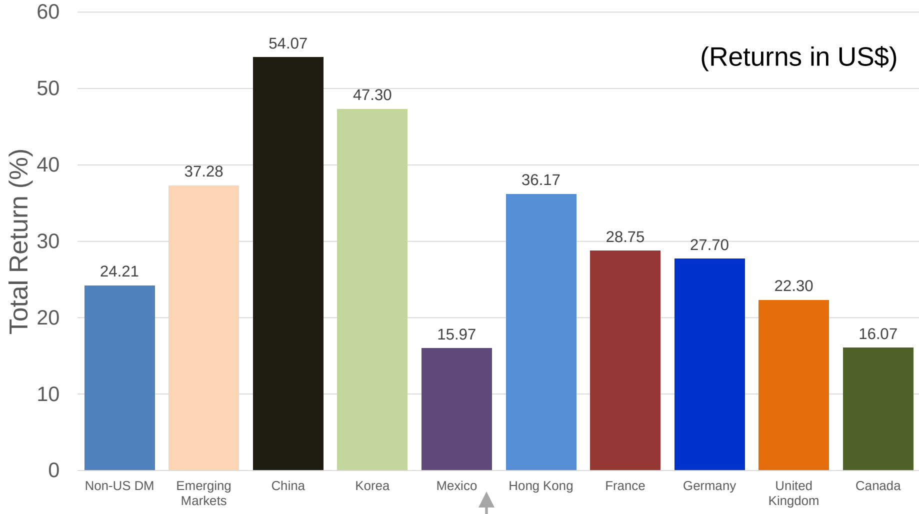
During 2017, the U.S. Equity portfolio performed in line with its benchmark index. The Fund maintained an above Policy Benchmark allocation to U.S. Equities during much of the first half of 2017, but moved the allocation to a modest underweight during the second half of 2017 in favor of non U.S. Equities.

U.S. Equities realized strong returns during 2017, led by Technology. Notwithstanding favorable absolute returns, U.S. Equities trailed the broader global equity market.

Source: Bloomberg and State Street
Note: Fund returns are unaudited. Both the Fund and Benchmark returns are based on preliminary values.

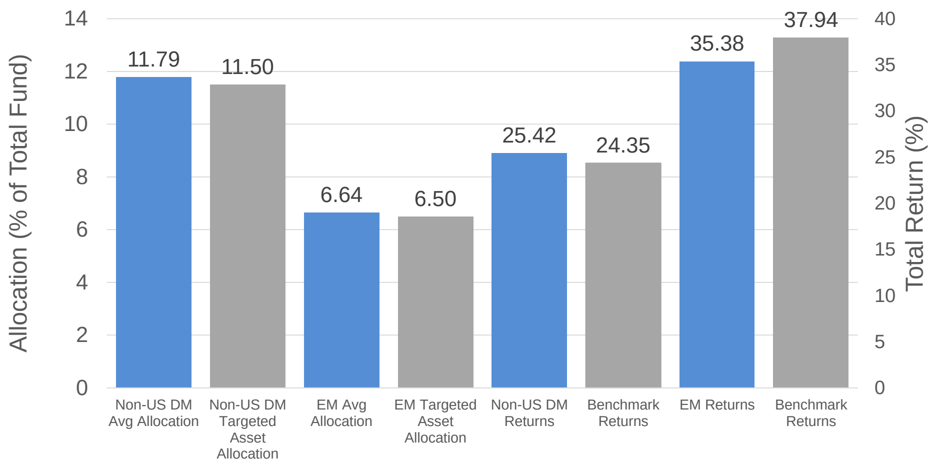
Calendar Year 2017 Capital Markets Review: International Equity Returns

2017 Select Capital Market Returns



During 2017, Emerging markets (EM) were the best performing subsector of the global equity market, outperforming Developed Markets (DM) by 1,307 basis points (+37.28% vs. +24.21%), led by strong returns in China (+54.07%) and Korea (+47.30%). Canada (+16.07%) and Mexico (+15.97%) underperformed the broader market as trade concerns somewhat dampened returns.

2017 NJ Asset Allocation and Returns



A shift to a modest overweight allocation to Int'l Equities benefitted the Fund, as EM and Non-U.S. DM outperformed the U.S. Equity market, partly as a result of the weak dollar. The Non-U.S. DM portfolio benefited from a commitment to small cap equities that outperformed. Within EM, the Fund's below benchmark allocation to China adversely impacted returns.

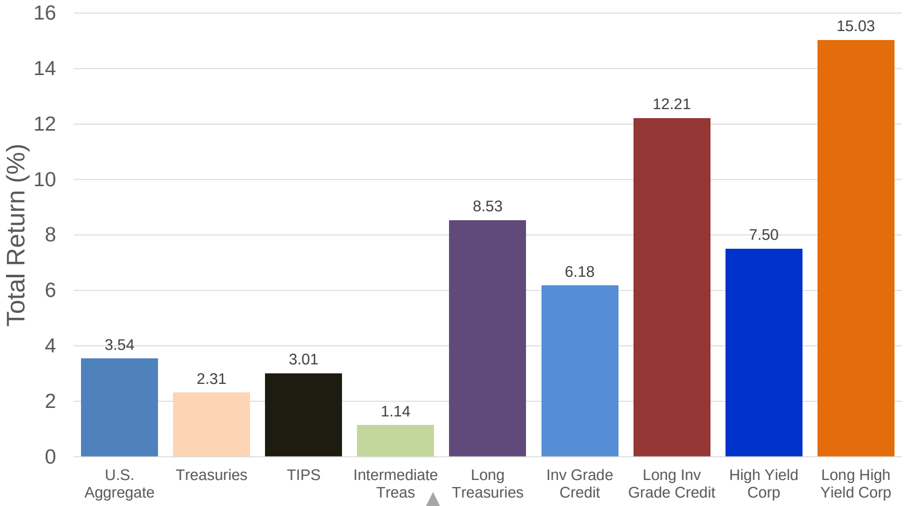
2017 was the first year since 2012 that Non-U.S. Developed Markets and Emerging Markets outperformed U.S. Equities, led by strength in China and aided by a weakening U.S. dollar.

Source: Bloomberg, MSCI, and State Street

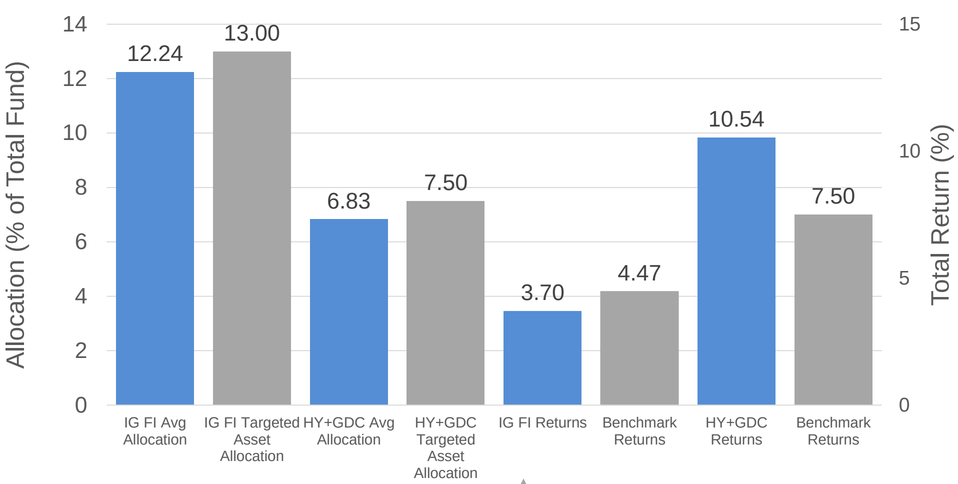
Note: Fund returns are unaudited. Both the Fund and Benchmark returns are based on preliminary values.

Calendar Year 2017 Capital Markets Review: Fixed Income Returns

2017 Select Capital Market Returns



2017 NJ Asset Allocation and Returns



During 2017, longer duration fixed income securities outperformed as short-term yields moved higher and long-term yields moved lower. Long Treasuries (+8.53%) outperformed Intermediate Treasuries (+1.14%) by 739 basis points. High Yield (+7.50%) outperformed Investment Grade Credit (+6.18%) as lower quality fixed income realized favorable returns in a spread narrowing environment.

The below Policy Benchmark allocation to fixed income benefitted the Fund, as fixed income provided modest returns in a strong equity market environment. A below benchmark duration profile adversely impacted relative returns for the Investment Grade portfolio. Strong returns within the Global Diversified Credit (GDC) portfolio added value.

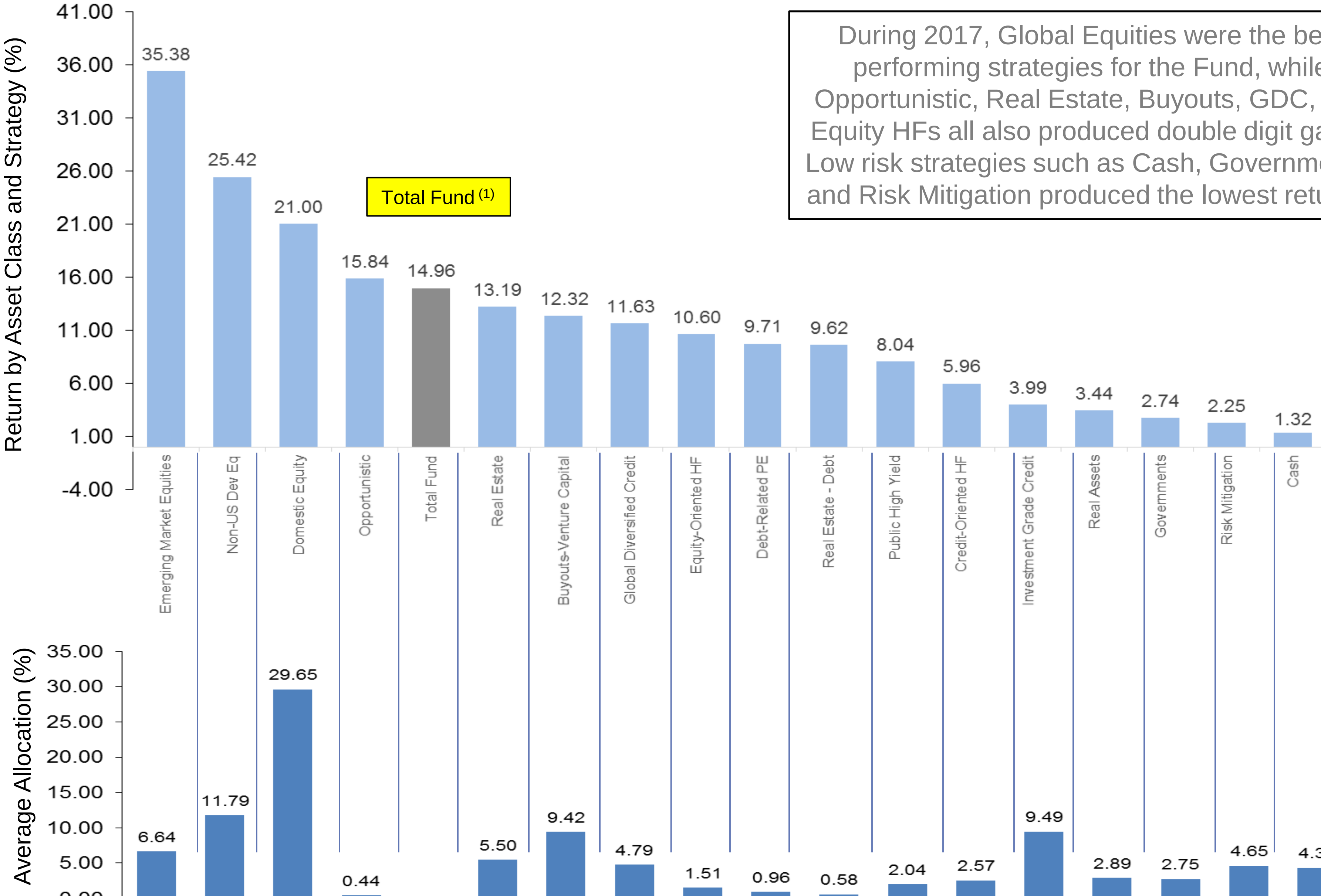
Over the past year, longer duration and lower quality fixed income securities outperformed. The broader fixed income market realized modest returns in a strong equity market.

Source: Bloomberg and State Street

Note: Fund returns are unaudited. Both the Fund and Benchmark returns are based on preliminary values.

The NJ Pension Fund Calendar Year 2017 Returns By Asset Class

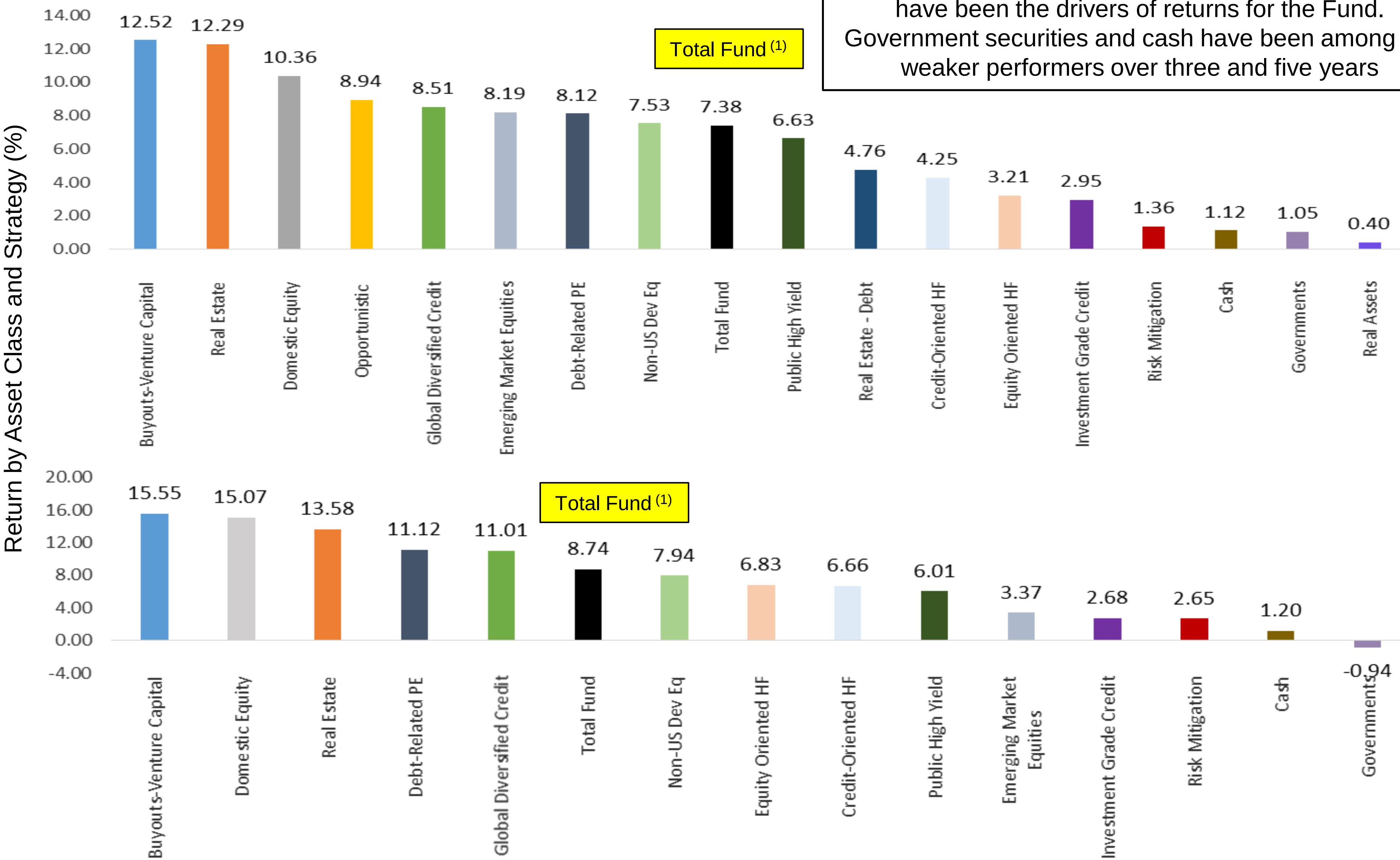
During 2017, Global Equities were the best performing strategies for the Fund, while Opportunistic, Real Estate, Buyouts, GDC, and Equity HFs all also produced double digit gains. Low risk strategies such as Cash, Governments, and Risk Mitigation produced the lowest returns.



(1) Total Pension Fund returns exclude Police and Fire mortgage program and are unaudited. Both the Fund and Benchmark returns are based on preliminary values.

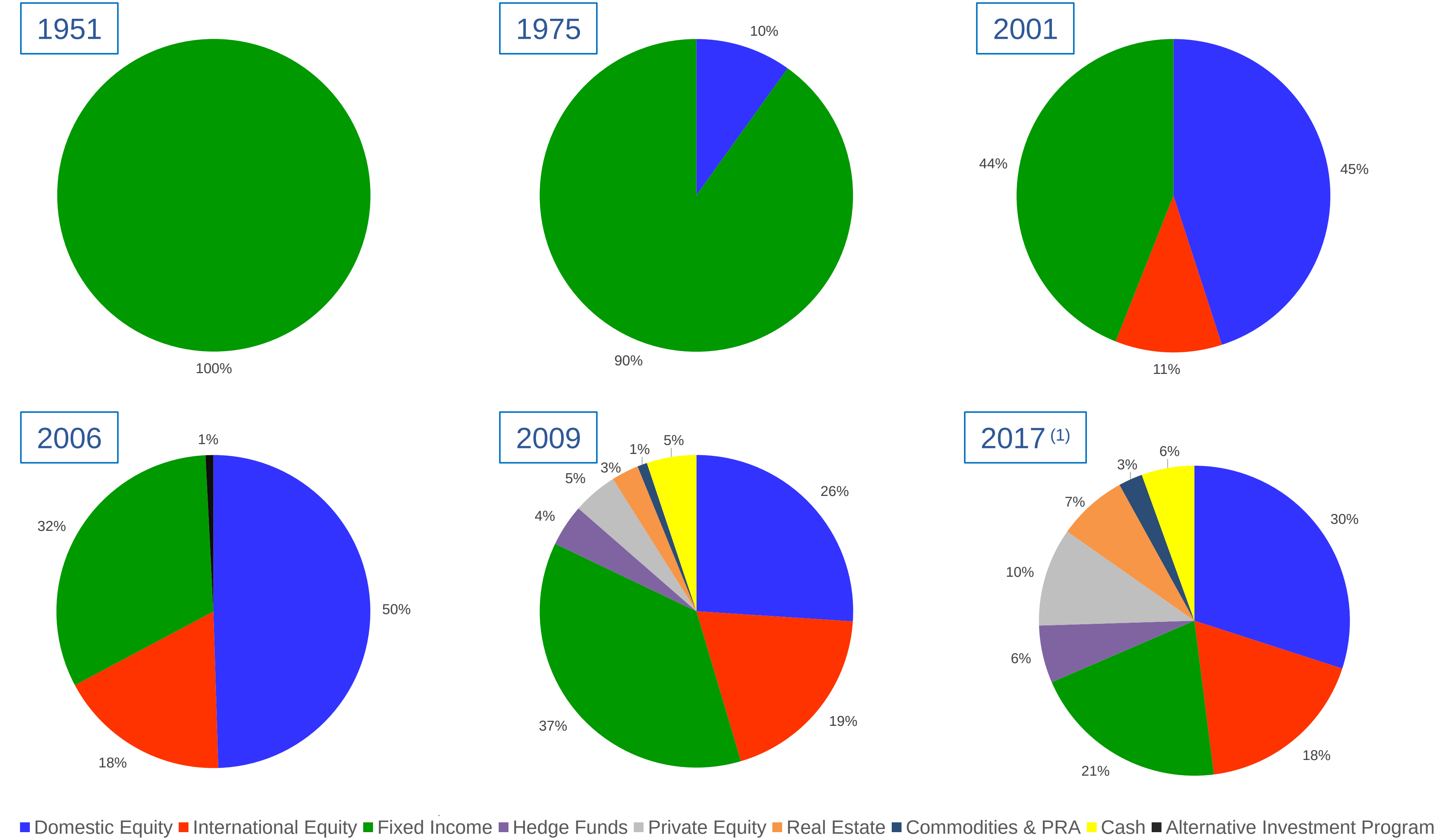
The NJ Pension Fund Three and Five Year Returns By Asset Class

Over the last three and five years, Private Equity, Real Estate, Domestic Equity, and Global Diversified Credit have been the drivers of returns for the Fund. Government securities and cash have been among the weaker performers over three and five years



(1) Total Pension Fund returns exclude Police and Fire mortgage program and are unaudited. Both the Fund and Benchmark returns are based on preliminary values.

Pension Fund Asset Allocation: A Long-Term Perspective



The well diversified NJ Pension Fund asset allocation has evolved over a period of decades from a portfolio comprised solely of fixed income securities.

(1) 2017 reflects the Council's current targeted asset allocation

Pension Fund Asset Allocation: Recent Trends in the Annual Investment Plan

Asset Class	FY 2012 Target	FY 2013 Target	FY 2014 Target	FY 2015 Target	FY 2016 Target	Current Target
RISK MITIGATION	**2.00%**	**4.00%**	**4.50%**	**4.00%**	**5.00%**	**5.00%**
Absolute Return HFs	2.00%	4.00%	4.50%	4.00%	5.00%	5.00%
LIQUIDITY	**8.00%**	**6.50%**	**9.50%**	**8.25%**	**8.00%**	**8.50%**
Cash Equivalents	2.00%	1.50%	6.00%	5.00%	5.00%	5.50%
TIPS	3.50%	2.50%	2.50%	1.50%	1.50%	-
US Treasuries	2.50%	2.50%	1.00%	1.75%	1.50%	3.00%
INCOME	**27.00%**	**26.00%**	**24.20%**	**22.60%**	**21.75%**	**21.50%**
Investment Grade Credit	20.00%	13.00%	11.20%	10.00%	8.00%	10.00%
High Yield	2.50%	6.00%	5.50%	2.00%	2.00%	2.50%
Global Diversified Credit	--	--	--	3.50%	0.05	5.00%
Credit-Oriented HFs	3.00%	4.00%	3.75%	4.00%	3.75%	1.00%
Debt-Related PE	1.50%	1.50%	1.25%	1.00%	1.00%	2.00%
Debt Related Real Estate	--	--	1.30%	1.00%	0.80%	1.00%
P&F Mortgage	--	1.50%	1.20%	1.10%	1.20%	-
REAL RETURN	**9.00%**	**9.50%**	**5.70%**	**7.25%**	**7.75%**	**8.75%**
Commodities	4.00%	4.00%	2.50%	1.00%	0.50%	-
Private Real Assets	--	--	--	2.00%	0.02	2.50%
Equity Related Real Estate	5.00%	5.50%	3.20%	4.25%	5.25%	6.25%
GLOBAL GROWTH	**54.00%**	**54.00%**	**56.10%**	**57.90%**	**57.50%**	**56.25%**
US Equity	23.50%	23.80%	25.90%	27.25%	26.00%	30.00%
Non-US Dev Market Eq	15.00%	12.50%	12.70%	12.00%	13.25%	11.50%
Emerging Market Eq	5.00%	7.00%	6.50%	6.40%	6.50%	6.50%
Buyouts/Venture Cap	5.50%	6.20%	7.00%	8.25%	8.00%	8.25%
Equity-Oriented HFs	5.00%	4.50%	4.00%	4.00%	3.75%	-

Division of Investment Update: 2017 Year in Review and 2018 Key Goals and Initiatives

The Division is working with Aon Hewitt to complete a comprehensive asset-liability study

- **an asset-liability study provides for an asset allocation that is informed by the liability profile of the Plan**
  - going forward, the Division intends to conduct a comprehensive asset-liability study every three years and to provide a formal asset allocation review to the Council on an annual basis

The Division committed capital to its new FAIR (Fund Alignment and Incentive Reform) initiative

- **FAIR is an Alternative Investment Program initiative with key objectives to reduce fees, enhance returns, create better alignment of interests, offer greater transparency and lower operating costs**
  - to date, the Division has deployed approximately $376 million in the FAIR mandate. The FAIR portfolio has a risk mitigating orientation and is composed of strategies across fixed income, currencies, equities and commodities

The Division has completed a wide-ranging review of its information technology, trading, reporting and risk analytics capabilities as the first phase of its Replacement Investment System Platform (RISP) initiative. The Division is developing requirements to issue an RFP.

- **the long-term objective of the RISP initiative is to ensure the Division's entire front, middle and back-office IT infrastructure is consistent with best practices and enables the Division to efficiently meet its investment objectives**
  - IT components reviewed include Order Management Systems (OMS) for all trading, trade compliance and reporting, as well as applications for portfolio position management, performance analytics and attribution, risk analysis and modeling, and market data and research

The Division announced expanded roles for key staff

- **Samantha Rosenstock has been promoted to the role of Head of the Alternative Investment Program**
- **Gary Terwilliger has been promoted to the role of Assistant Director of Administration**
- **Gina Costello has been promoted to the role of Chief of Staff**
- **Melanie Lomas and Todd Rowohlt have both been promoted to roles as portfolio managers within International Equities**
  - the Division thanks Amanda Truppa for her 15 years of service with the Division, including her service as long-term Chief of Staff, and wishes her the best of luck as she takes on her new role at the Division of Administration
  - the Division thanks Betty Carr, Olga Grozio, Karen Paardecamp, and Angel Rodriguez for their years of service and wishes them the very best in their retirement
  - the Division welcomes Christine Brennan, Robert Colton, Larry Loscalzo, Brian Mladenetz, Guy Piserchia, Karl Schwing, Kristy Ward, and Kenneth Wu

Update on Key Division of Investment Initiative: Background on the Asset-Liability Study

- **The primary objective of the asset-liability study is to provide analysis for the asset allocation decision that is informed by the liability profile of the Fund**
    - DOI reviewed preliminary results with the prior administration, the current administration, and the Investment Policy Committee
        - based on feedback from these meetings, further analysis is being conducted

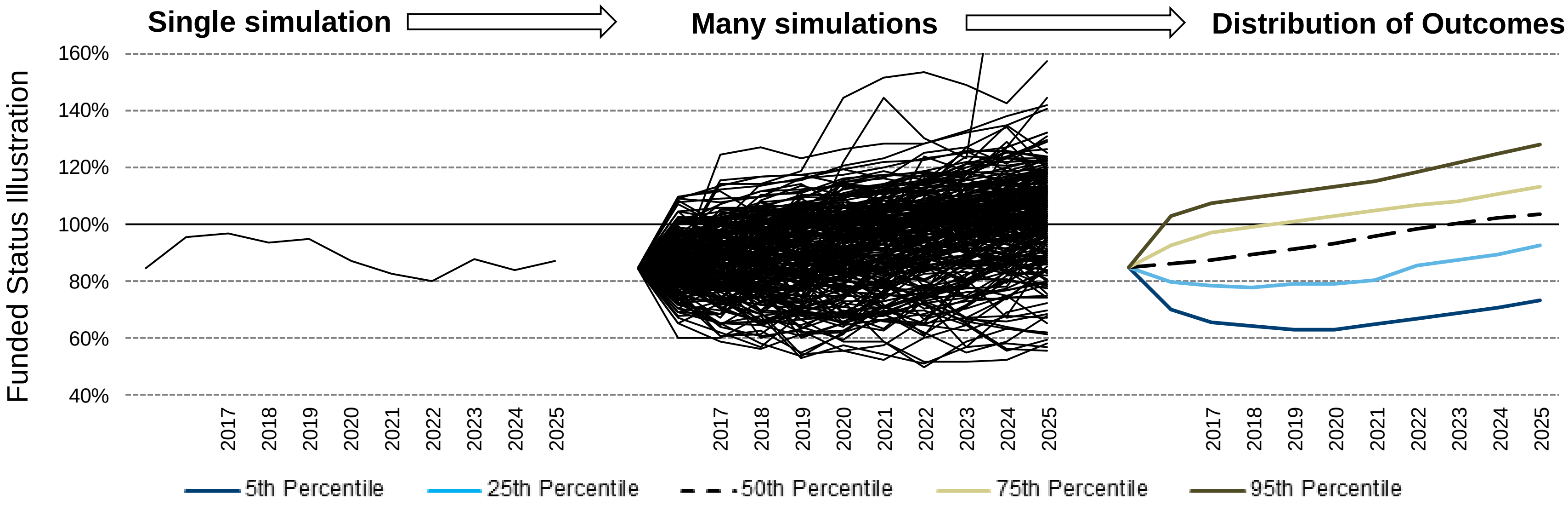
- **The Asset-Liability study that is being conducted by Aon Hewitt models projections for various investment strategies over a wide range (5,000) of economic scenarios over a 30 year horizon**
    - the model allows for adjustments to key inputs including asset mixes, contribution rates, actuarial assumptions, and capital market assumptions
    - the output of the study provides for the analysis of probability-weighted outcomes to better inform asset allocation decision-making
        - for purposes of establishing a <u>"base case" outcome</u>, the <u>median outcome</u> is used (e.g., there is an equal chance that the outcome will be better or worse than the "base case")
        - for purposes of analyzing <u>"downside" risk</u>, the <u>5th or 95th percentile outcome</u> is used (e.g., there is a 5% chance that the outcome will be worse than the "downside" risk)
    - while the Asset-Liability study incorporates actuarial data, the output of the study is not intended to provide analysis determined by an actuarial process; instead, the output reflects the results of a wide range of economic scenarios

- **The key determinants in meeting the Fund's longer-term financial objectives are the State's funding policy and the asset allocation**
    - the funding policy is defined as the State's contribution as a percent of the Actuarially Determined Contribution (ADC), calculated in accordance with statute
        - the State's funding policy is subject to annual Legislative appropriation and is, therefore, outside the control of the Council and DOI
        - the <u>current funding policy</u> that "ramps up" the State's contribution by 10% each fiscal year until the ADC reaches 100% is considered to be the <u>"base case" assumption</u>
            - possible changes to funding policy are evaluated to determine the impact on the asset allocation decision
        - the <u>current asset allocation</u> is considered to be the <u>"base case" assumption</u> for this study
            - possible changes to the asset allocation are evaluated to identify an appropriate level of risk for the investment portfolio

- **The Division expects to present its revised findings to the Investment Policy Committee in March 2018**
    - following DOI's updated presentation to the IPC, DOI will present its report to the full Council for its consideration
    - at the conclusion of the process, the Council will be asked to approve a targeted asset allocation that is well-positioned to meet the longer-term financial objectives of the Plan, incorporating an analysis of the Plan's liabilities and DOI's views of the current investment environment

Asset-Liability Study Background: Simulation Overview

- Thousands of simulations plotted in one graph would be impossible to interpret
- Instead, Aon Hewitt ranks the simulations at each point over the future
- This produces a distribution of outcomes illustrating the degree of uncertainty of a plan's financial position over the projection period
- Different investment strategies will produce different distributions of outcomes



Outcome Comparisons

- for purposes of establishing a "base case" outcome, the median outcome is used (e.g., there is an equal chance that the outcome will be better or worse than the "base case")
- for purposes of analyzing "downside risk", the 5th or 95th percentile outcome is used (e.g., there is a 5% chance that the outcome will be worse than the "downside" risk)

"Base Case" Assumptions

- the current asset allocation is considered to be the "base case" assumption for this study
- the current funding policy that "ramps up" the State's contribution by 10% each fiscal year until the ADC reaches 100% is considered to be the "base case" assumption for this study

Overview of the Current State: The Starting Point for the Asset Liability Study

Pension Fund Measures of Financial Health

	TPAF Teachers' Pension & Annuity Fund (TPAF)	PERS Public Employees' Retirement System (PERS)	PFRS Police & Firemen's Retirement System (PFRS)	SPRS State Police Retirement System (SPRS)	JRS Judicial Retirement System (JRS)	Total Total Pension Fund
Market Value of Assets (MVA) ($ millions)	$23,733	$27,127	$24,116	$1,744	$196	$76,916
Actuarial Liability (AL) ($ millions)	$57,866	$53,086	$37,470	$3,209	$630	$152,261
Funded Ratio - MVA / AL (%)	**41.0%**	**51.1%**	**64.4%**	**54.4%**	**31.2%**	**50.5%**
State Contributions as % of Total Contributions	60%	23%	14%	72%	72%	34%
Liability Growth Rate (LGR)						
- *Gross Normal Cost*	1.80%	2.00%	1.90%	1.60%	2.90%	1.89%
- *Interest Cost*	7.65%	7.65%	7.65%	7.65%	7.65%	7.65%
- *Total*	9.45%	9.65%	9.55%	9.25%	10.55%	9.54%
FY18 Estimated Benefit Payments	$4,200	$4,100	$2,500	$200	$100	$11,200
Benefit Payments as % of MVA ($ millions)	17.9%	15.2%	10.30%	12.60%	28.7%	14.5%
Asset Hurdle Rate (LGR / Funded Ratio)	23.2%	18.9%	14.9%	17.1%	33.6%	18.9%

There is a strong inverse relationship between funded status and dependency on State appropriations.

The Pension Fund has a significant negative cash flow profile.

The Asset Hurdle Rate measures the minimum rate of increase in assets (from investment returns and contributions) in a given year that is required to ensure the unfunded liabilities do not grow. It is a measure of the plan's dependency on investment returns and contributions.

The Asset Hurdle Rate is currently two times the Liability Growth Rate due to the underfunded status of the total fund.

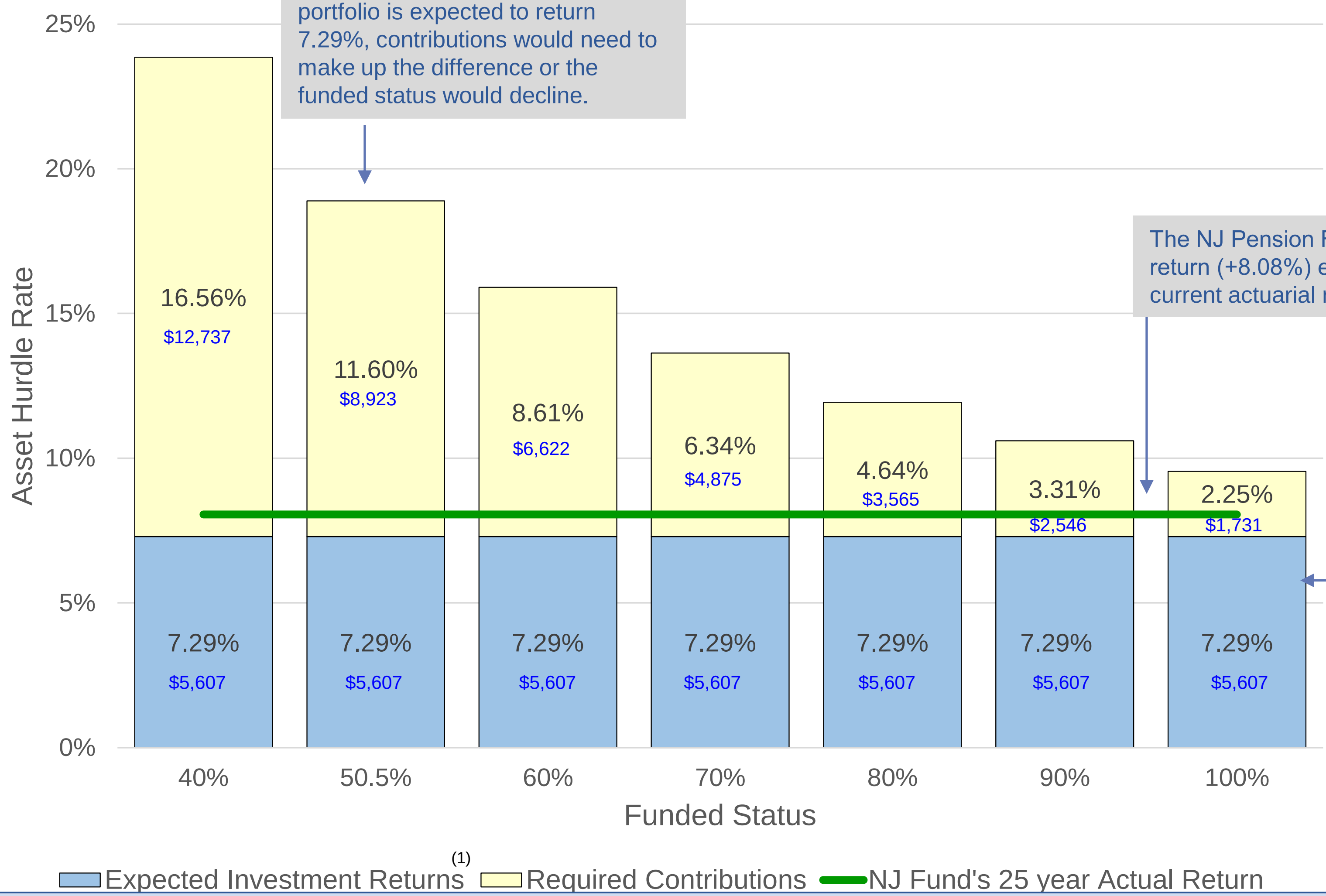
The Pension Fund's negative cash flow profile and high Asset Hurdle Rate demonstrate that investment returns alone will not be sufficient to meet longer-term financial objectives. Contributions will play a significant role.

Source: Aon Hewitt - Information taken from July 1, 2016 actuarial valuation (reported at 7.65% discount rate) and projections provided by the Plan actuaries

Asset Hurdle Rate: A Measure of the Fund's Dependency on Contributions and Investment Returns

(in $ millions as of June 30, 2016)

The NJ Pension Fund's current Asset Hurdle Rate is 19%. If the portfolio is expected to return 7.29%, contributions would need to make up the difference or the funded status would decline.



The NJ Pension Fund's realized long-term return (+8.08%) exceeds the Fund's current actuarial return assumption.

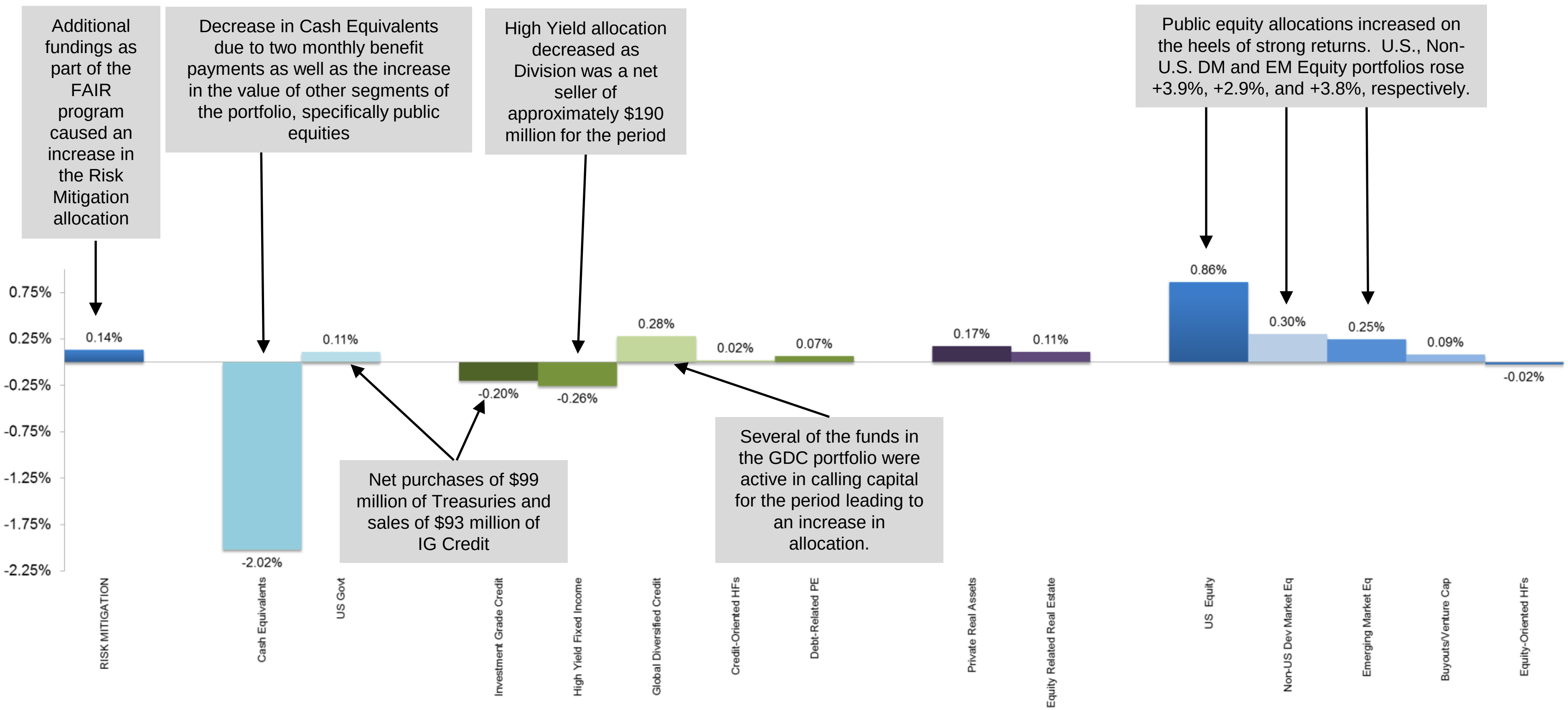
Were the Plan 100% funded, the Asset Hurdle Rate would equal the Liability Growth Rate shown on slide 5: 2.25% + 7.29% = 9.54%

The current funded status suggests a high dependency on contributions. As the funded status improves, a greater proportion of growth in assets is attributable to investment returns.

(1) Based on current asset allocation and updated capital market assumptions

Performance Appendix

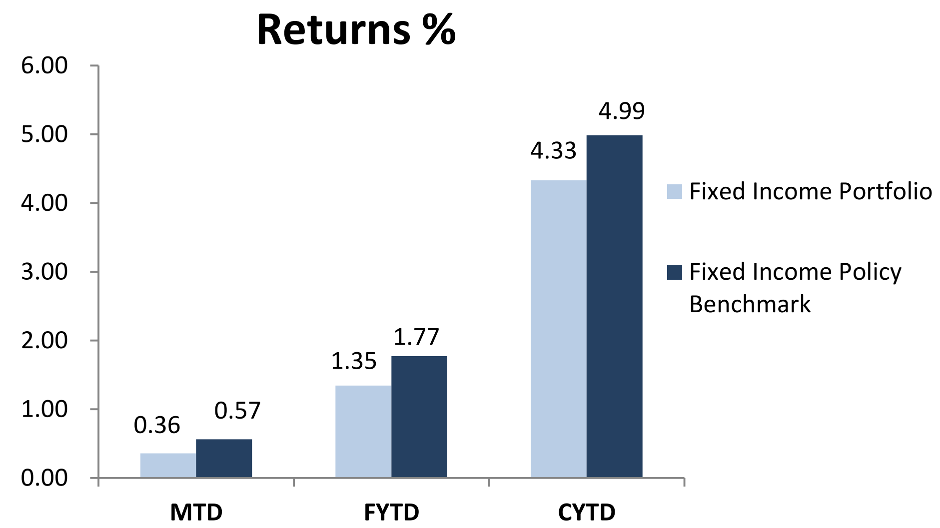
Pension Fund Update: Change in Sector Allocation from November 1, 2017 – December 31, 2017



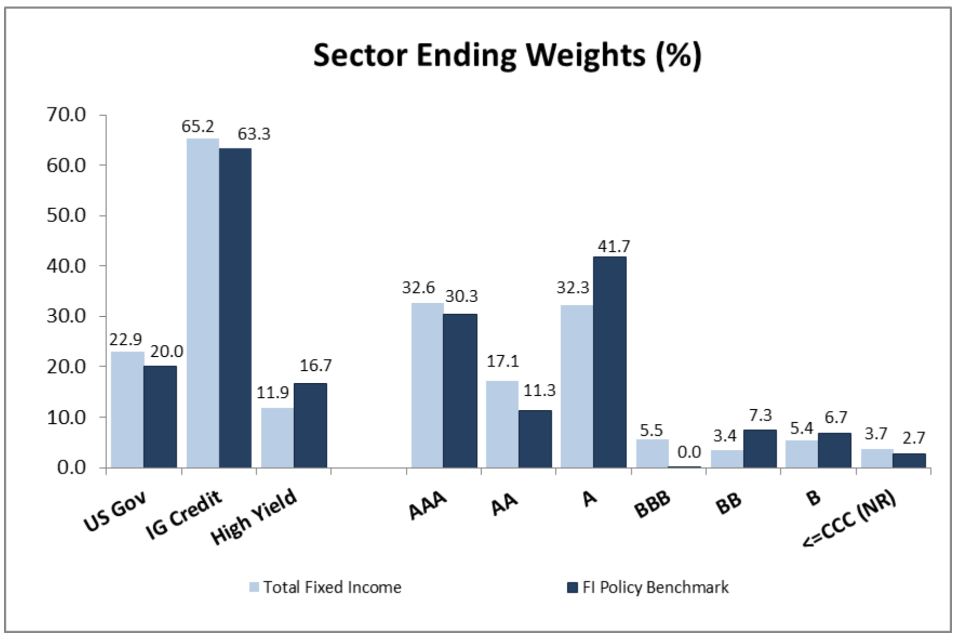
Risk Mitigation	Liquidity	Income	Real Return	Global Growth
Moving towards equal weight allocation to Risk Mitigation (4.9% vs 5.0%)	Underweight allocation to Liquidity (5.5% vs 8.5%) consistent with somewhat lower liquidity needs	Underweight allocation to Income (18.9 % vs 21.5%) reflects reduction in IG and High Yield in a low credit spread environment	Underweight (8.6% vs 8.75%) allocation to Real Return; Pacing model suggests allocation will gradually increase	Overweight (60.3% vs 56.25%) allocation to Global Growth; strong returns for public equity markets have increased the Global Growth allocation

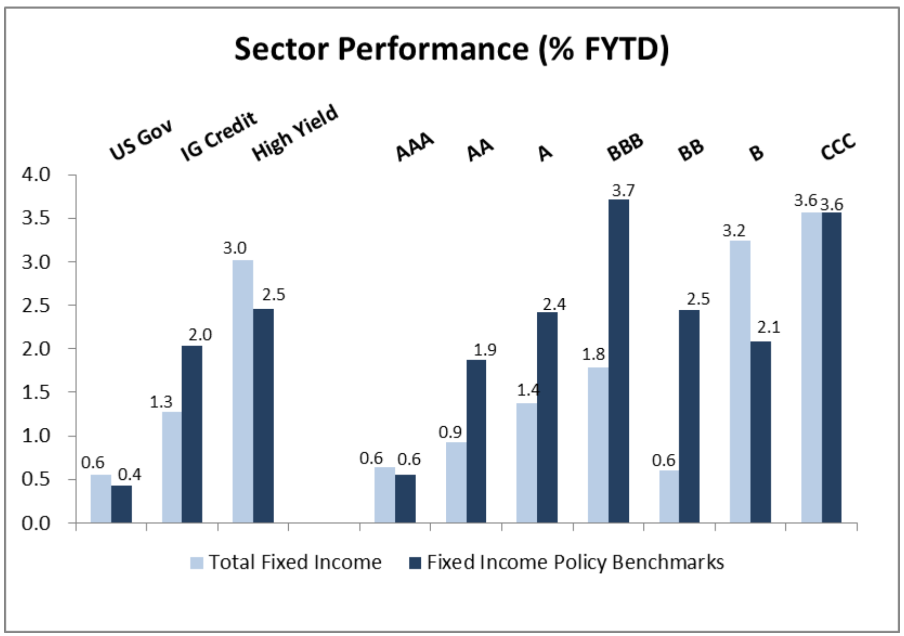
Recent shifts in sector allocations were the result of strong positive returns in public equity markets, increased purchases of U.S. government securities, and funding of the Division's FAIR initiative.

For F18 year-to-date performance, the US Fixed Income portfolio returned 1.35% versus the benchmark return of 1.77%. Relative returns were negatively impacted by an underweight allocation to High Yield and a bias toward high quality short-dated securities within Investment Grade Credit. Through December 31st, the Barclays High Yield, Custom IG Credit and US Government Benchmarks returned 2.45%, 2.03% and 0.43%, respectively. With the Treasury curve flattening and credit spreads tightening long-dated lower quality securities have outperformed since the start of the fiscal year. Within the US Government portfolio, a modest allocation to TIPS has led to relative outperformance versus the nominal Treasury benchmark. The High Yield Portfolio has outperformed its benchmark by 57 basis points fiscal year-to-date as industry selection has been the main driver of positive relative returns.



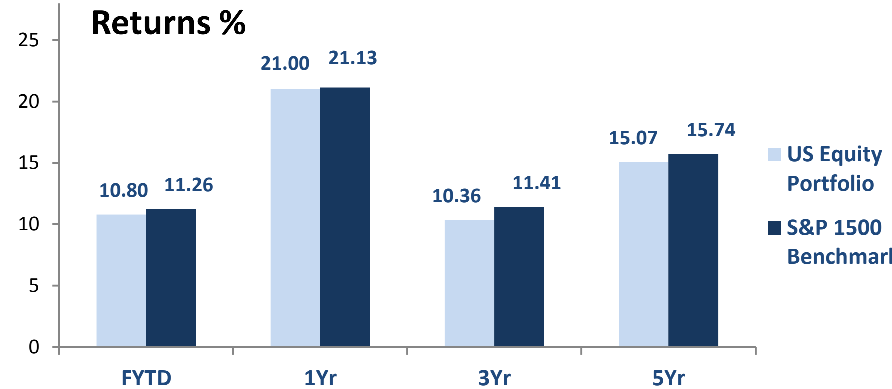
Portfolio Sector Attribution – Weights and Performance



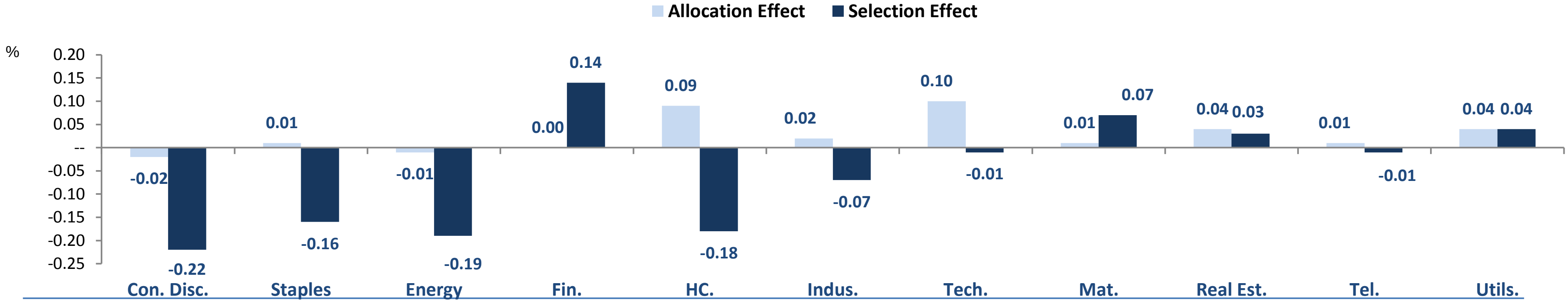


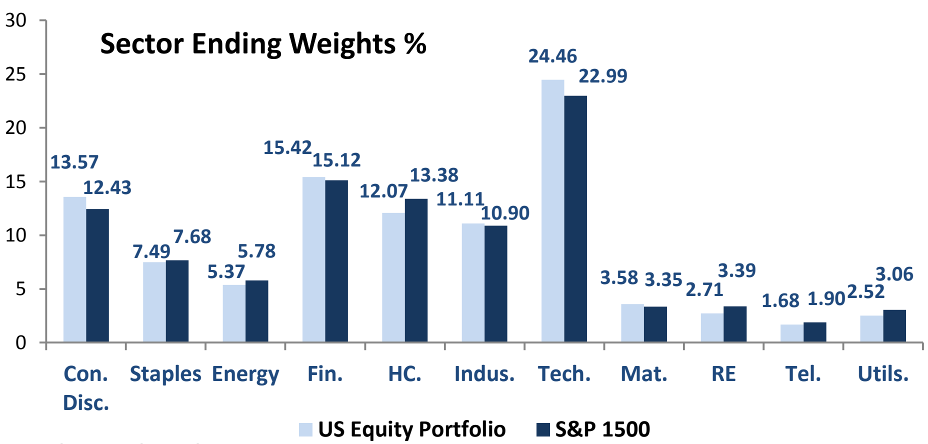
Source: State Street and FactSet

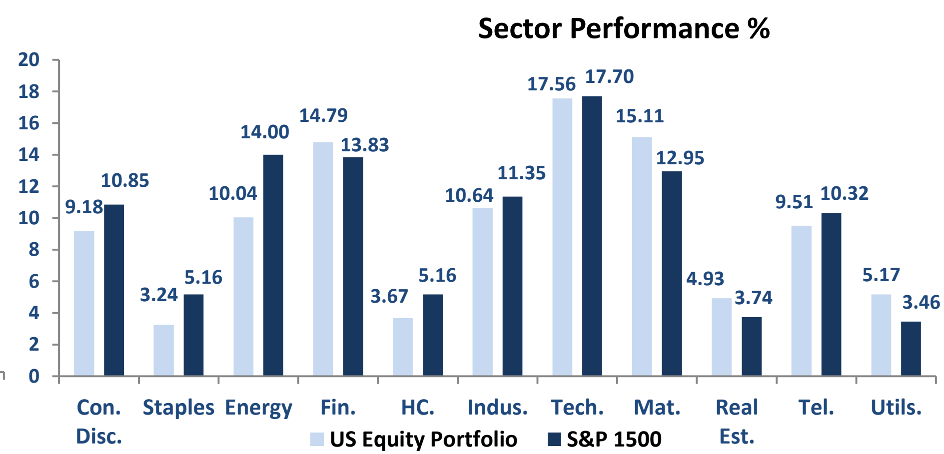
During the fiscal 2018 year-to-date time period, the 10.80% return for the U.S. equities portfolio trailed the S&P 1500 benchmark by 46 basis points. Synchronized global growth has driven solid earnings growth in the U.S., with third quarter earnings increasing 9% year-over-year, its 5th consecutive quarter of positive earnings growth. The passage of tax reform in December provided a boost to the domestic equity market as investors factored in the increase in corporate earnings from a lower corporate tax rate. The Federal Reserve raised rates by 25 basis points in December, but inflation remains subdued. Information technology was the best performing sector, increasing 17.56% fiscal year-to-date, followed by materials' return of 15.11%, and financials' 14.79%. Consumer staples, and healthcare were the laggards.



Portfolio Sector Attribution FYTD% - Breakdown of Excess Return:	Portfolio Return:	+10.80%	Benchmark Return:	+11.26%	Excess Return:	-.46%





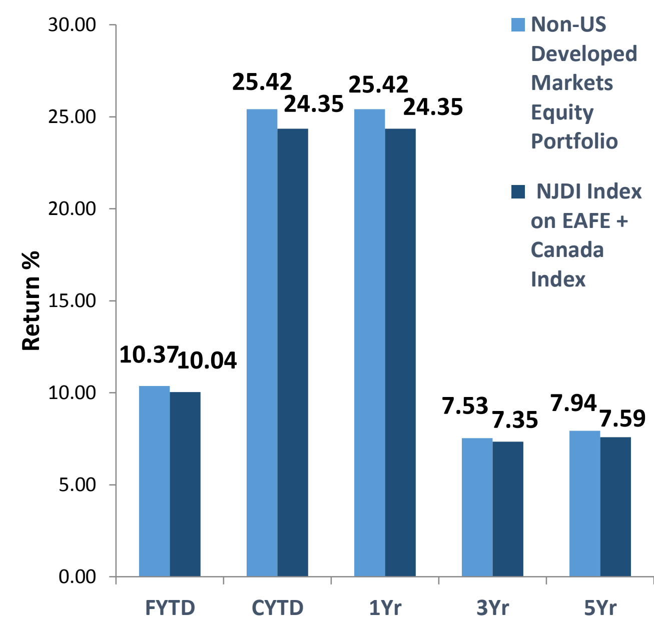


Source: State Street, Factset

For the fiscal year through December 31st, the Non-US Developed Markets Equity Portfolio returned 10.37% versus the Benchmark return of 10.04%. The global economic upswing continued to strengthen during the fiscal year, resulting in the IMF to again raise itsa estimate for 2017 global growth , now at 3.6%, led by upward revisions for most international markets, primarily those of the Eurozone and Japan. The economic momentum, bolstered by the international markets, helped to provide a supportive background for the strong performance of equity markets, especially outside the US. For the fiscal year time period, the total return for the developed ex US markets – the MSCI EAFE + Canada Index – was 24.21% vs. 21.82% for the S&P 500.

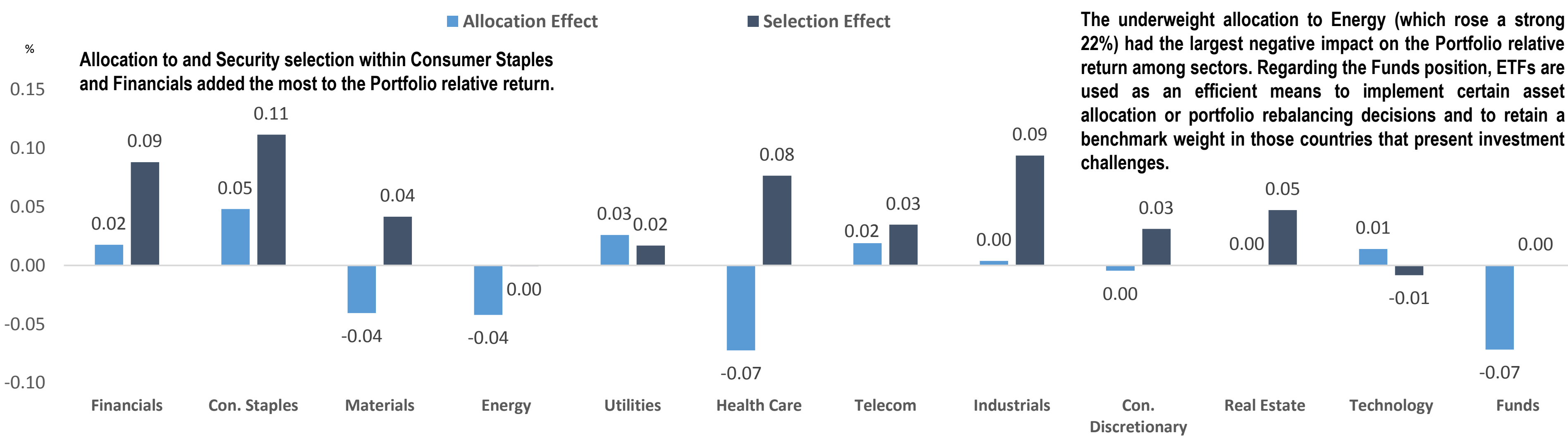
Over the fiscal year, the Developed markets remained resilient amid a rise in interest rates by the US Fed and the Bank of England and a US dollar that lost its brief period of strength, helping foreign currencies to gain in relative value. At the end of December, the Euro traded at a 3-year high and the British Pound reached its best level post the Brexit vote against the US Dollar; although the Yen ended virtually unchanged from the beginning of the fiscal year, it closed up almost 4% calendar year-to-date. The impact of currency on returns was quite significant: for calendar year 2017, the US Dollar return of the MSCI EMU (Eurozone) Index (i.e. unhedged) was 28.06% in contrast to the 14.69% return of the EMU Index hedged against the US Dollar. Additionally, the markets also tolerated an increase in political risk - especially in Europe - as a secession threat has yet to be resolved in Spain while German politicians are still trying to establish a government following a fall election.

The Portfolio's out-of-benchmark allocation to International Small Cap continued to be the largest contributor to performance with a total return of 13.90% vs. 10.04 % for total Non-US Developed Equity. From a sector perspective, adding the greatest value to relative returns was allocation and security selection in Consumer Staples and Financials as well as security selection within Industrials. Detracting the most from Portfolio performance was an underweight allocation to Energy, which had the best performance among sectors (up 22.08%) as oil prices continued to advance from the summer low (up 42%).



Portfolio Sector Attribution FYTD% - Breakdown of Excess Return:	Portfolio Return:	+10.37%	Benchmark Return:	+10.04%	Excess Return:	+0.33%

The underweight allocation to Energy (which rose a strong 22%) had the largest negative impact on the Portfolio relative return among sectors. Regarding the Funds position, ETFs are used as an efficient means to implement certain asset allocation or portfolio rebalancing decisions and to retain a benchmark weight in those countries that present investment challenges.

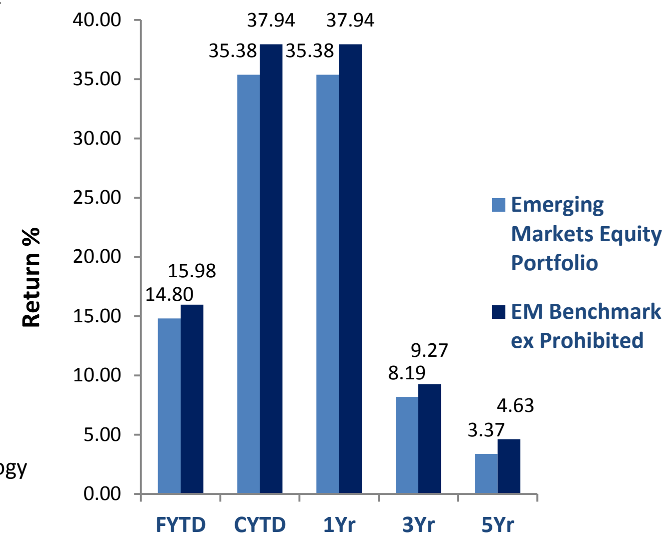


Source: State Street, Factset, Bloomberg, MSCI.

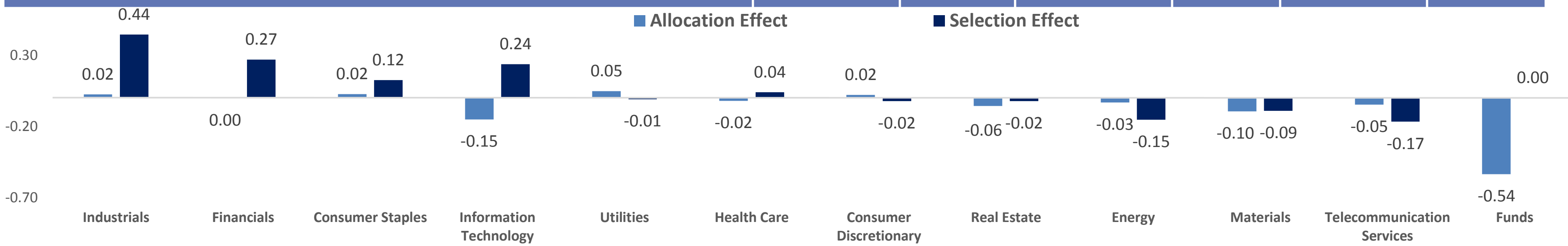
The MSCI Emerging Markets Index rose in December for the third straight month by 3.59%, resuming a continuous string of uninterrupted gains since briefly declining in September and finished 2017 up 37.28%. Despite a steady flow of potentially destabilizing headlines such as missile tests by North Korea, emerging market equities remain near five-year highs. The combination of synchronized global growth, strengthening emerging market fundamentals, a softer US dollar, and rising commodity prices continue to draw inflows to emerging market equities.

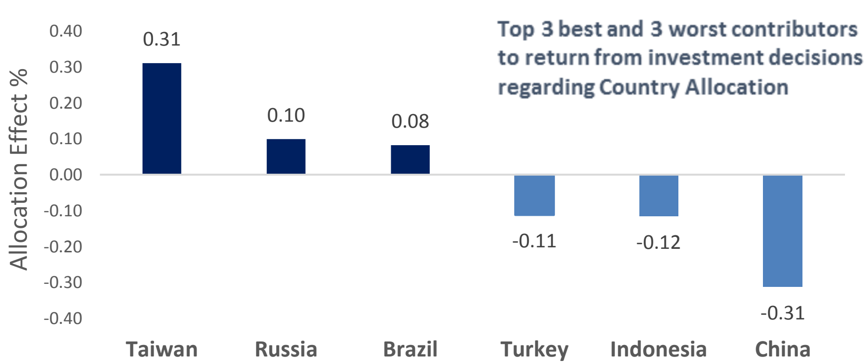
The Emerging Market Equity Portfolio returned 3.63% in December, pushing the FYTD returns to 14.80% versus the Benchmark return of 15.98%. The portfolio's underweight allocation to Taiwan, coupled with strong stock selection, positively impacted performance as expectations for some electronics products produced in that country declined. An overweight exposure to Russia, as well as strong stock selection, contributed to performance as Russian shares rallied amid higher crude oil prices. The Brazil overweight continued to have positive effects as equities advanced on economic reform prospects, and signs of an economic correction. Although showing signs of slowing, China continues to outperform the market and our defensive underweight (marginally offset by strong stock selection) was the largest detractor from performance. Stock selection in Korea, specifically within the Healthcare sector, had the largest negative impact on performance for the period.

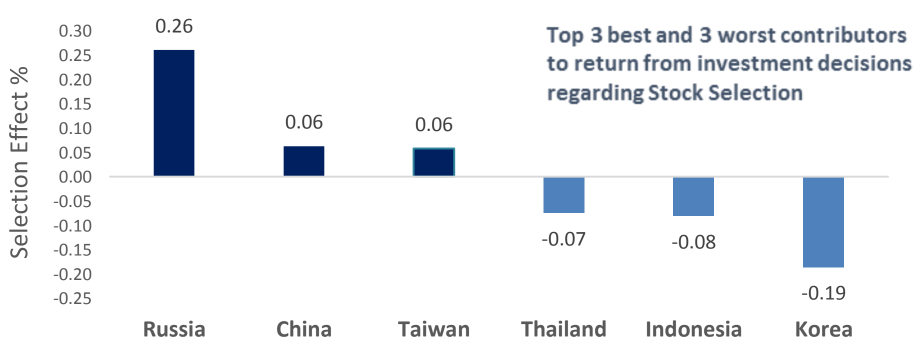
From a sector perspective, strong stock selection in cyclical sectors such as Financials, Industrials, and Information Technology improved performance. Poor stock selection in Telecommunication Services detracted the most from performance. An underweight in Utilities helped performance the most in terms of allocation, while the underweight to Information Technology largely hindered performance in an investment environment that favored high-growth stocks in this sector.



Portfolio Sector Attribution FYTD% - Breakdown of Excess Return:	Portfolio Return:	+14.80%	Benchmark Return:	+15.98%	Excess Return:	(1.18%)







Source: State Street, Factset