



TRS Risk Management Committee



September 2014

**TEACHER RETIREMENT SYSTEM OF TEXAS MEETING
BOARD OF TRUSTEES
AND
RISK MANAGEMENT COMMITTEE**

(Committee Chair and Members are Subject to Change at the September Board Meeting — Ms. Charleston, Committee Chair; Mr. Barth; Mr. Corpus; Mr. Kelly; & Mr. Moss, Committee Members)

AGENDA

**September 18, 2014 – 3:30 p.m.
TRS East Building, 5th Floor, Boardroom**

*The September 18, 2014 meeting of the Risk Management Committee and TRS Board of Trustees will be held by telephone conference call as authorized under Texas Government Code Section 551.130. The Board intends to have a quorum physically present at the following location: **1000 Red River Austin, Texas 78701 in the TRS East Building, 5th Floor, Boardroom.***

1. Consider the approval of the proposed minutes of the June 5, 2014 committee meeting – Committee Chair.
2. Review the Investment Risk Report – Jase Auby.

NOTE: The Board of Trustees (Board) of the Teacher Retirement System of Texas will not consider or act upon any item before the Risk Management Committee (Committee) at this meeting of the Committee. This meeting is not a regular meeting of the Board. However, because the full Risk Management Committee constitutes a quorum of the Board, the meeting of the Committee is also being posted as a meeting of the Board out of an abundance of caution.

Minutes of the Risk Management Committee

June 5, 2014

The Risk Management Committee of the Board of Trustees of the Teacher Retirement System of Texas met on June 5, 2014 in the boardroom located on the fifth floor of the TRS East Building offices at 1000 Red River Street, Austin, Texas.

The following committee members were present:

Karen Charleston, Chair
Todd Barth
David Corpus
David Kelly
Christopher Moss

Others present:

Anita Palmer, TRS Trustee	Jay LeBlanc, TRS
Nanette Sissney, TRS Trustee	Hugh Ohn, TRS
Brian Guthrie, TRS	Michelle Pagán, TRS
Ken Welch, TRS	Mike Pia, TRS
Carolina de Onís, TRS	Dr. Keith Brown, Investment Advisor
Howard Goldman, TRS	Steve Huff, Reinhart Boerner Van Deuren s.c.
Britt Harris, TRS	Brady O'Connell, Hewitt EnnisKnupp
Marianne Woods Wiley, TRS	Steve Voss, Hewitt EnnisKnupp
Jerry Albright, TRS	Ann Fickel, Texas Classroom Teachers Association
Ronnie Bounds, TRS	Philip Mullins, Austin Retired Teachers Association
Dan Junell, TRS	Ted Melina Raab, Texas American Federation of Teachers
Lynn Lau, TRS	Peter Jansen, CBRE

Ms. Charleston called the meeting to order at 1:07 p.m. A quorum of the committee was present.

1. Consider the approval of the proposed minutes of the March 27, 2014 committee meeting – Karen Charleston.

On a motion by Mr. Barth, the committee approved the minutes of the March 27, 2014 meeting as presented.

2. Receive report on Enterprise Risk Management – Jay LeBlanc and Michelle Pagán.

Mr. LeBlanc described the public pension fund peer group meeting hosted by Enterprise Risk Management (ERM) in Austin in April 2014. Ms. Pagán presented two ERM reports — the Stoplight Report and Risk Profiles. She described changes in the Stoplight Report to certain risk categories. She said the risk level for employee reporting had increased, while that for TEAM had decreased. She also noted that the investment reporting and investment operations categories had been combined in the Stoplight Report as a result of a risk assessment concluding that reporting should be part of operations.

Ms. Pagán next presented the Risk Profiles table. She described organizational changes in the table, including the distribution of investment operations into three areas — public market operations, private market operations, and performance reporting. She explained what the Risk Profiles table showed, how it related to the Stoplight Report, and how risk levels and trends were determined.

Given the urgency of retiree health care funding, Mr. Kelly questioned the risk level color assessment. Mr. LeBlanc explained the subjective nature of the risk assessment process and assigning risk level colors. Mr. Guthrie added that the assessment was a snapshot in time, from 12 to 24 months, and that retiree health care was currently fully funded. Mr. Kelly noted that retiree health care funding should be recognized at the highest risk level before funding is depleted.

Ms. Pagán concluded her presentation by reviewing the ERM activities involved in updating the Stoplight Report and Risk Profiles table, including management and staff identification of risks, mitigations, action plans, and monitoring for each risk category. For the reporting period, she said, the elevated risks were employer reporting and retiree health care funding. Mr. Moss echoed Mr. Kelly's concerns about the assessment of the health care funding risk. Ms. Pagán and Mr. LeBlanc described for Ms. Charleston the safety measures designed to address an emergency at TRS facilities.

The meeting adjourned at 1:35 p.m.



Investment Risk Report

Jase Auby
Chief Risk Officer
September 2014

Agenda

Policy Requirements

1. Asset Allocation
2. Value at Risk (VaR)
3. Tracking Error
4. Leverage
5. Liquidity
6. Counterparty Risks
7. Derivatives

Conclusion

Appendix

Securities Lending

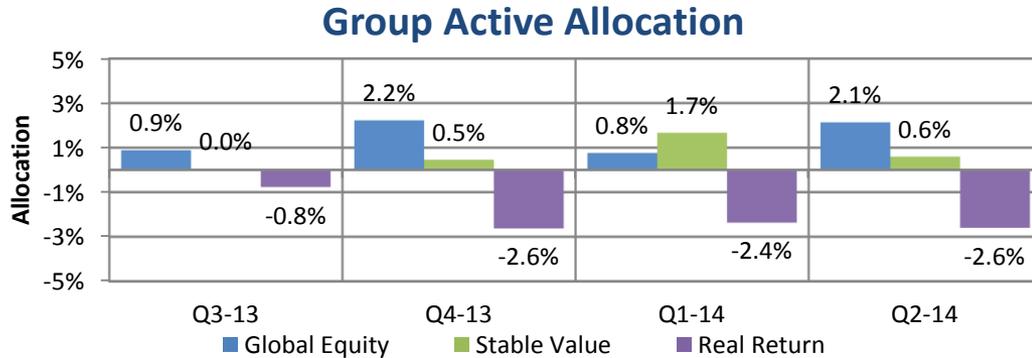
Policy Requirements

As of June 30, 2014

Policy Requirements	Description	In compliance?	
1. Asset Allocation	In compliance with policy	✓	
2. Value at Risk	7.6% (53% of the VaR limit range)	✓	
3. Tracking Error	In compliance with policy	✓	
Total Public Fund	Tracking Error 109	As % of Max 36%	✓
4. Leverage	In compliance with policy	✓	
Total Trust			
Net Leverage	96.7% (Within historical norm)	✓	
Gross Leverage	112.4% (Within historical norm)	✓	
Securities Lending			
Net Leverage	100.4% (Within historical norm)	✓	
Gross Leverage	118.4% (Within historical norm)	✓	
Hedge Fund			
Net Leverage	78.6% (Within historical norm)	✓	
Gross Leverage	309.4% (Within historical norm)	✓	
Strategic Partners			
Net Leverage	94.3% (Within historical norm)	✓	
Gross Leverage	192% (Within historical norm)	✓	
Real Assets			
Loan to Value	36.5% (Within historical norm)	✓	
5. Liquidity	In compliance with policy	✓	
6. Counterparty	In compliance with policy	✓	
Exposure	In compliance with policy	✓	
Rating	In compliance with policy	✓	
7. Derivative Exposures	In compliance with policy	✓	

1. Asset Allocation

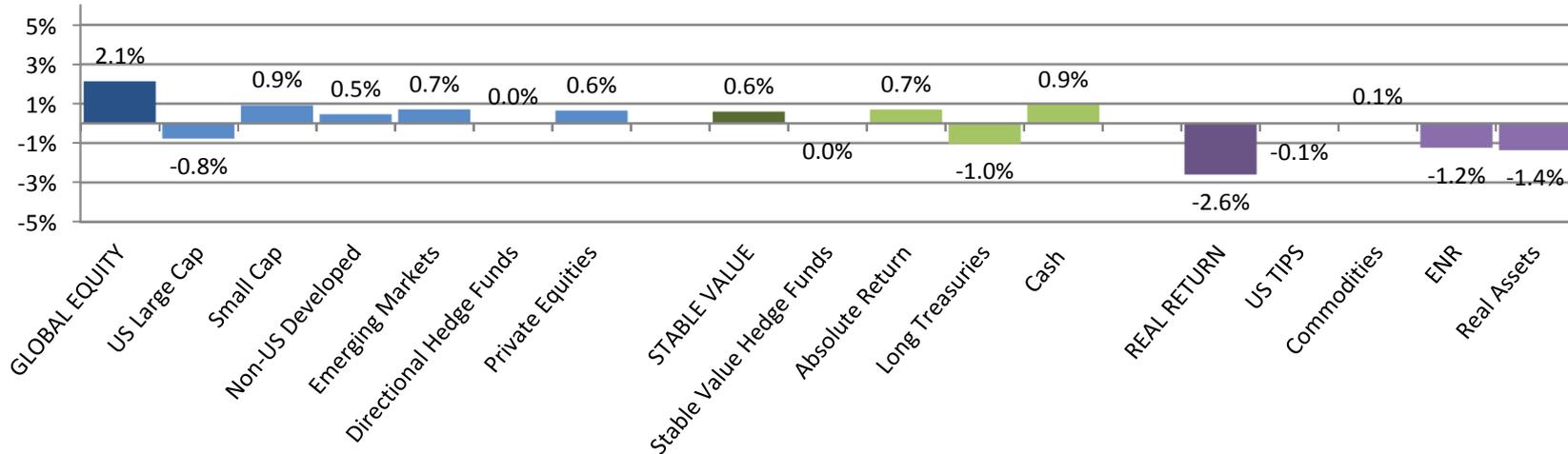
As of June 30, 2014



Top Three Overweights	
Cash	0.9%
Small Cap	0.9%
Emerging Markets	0.7%

Top Three Underweights	
Real Assets	-1.4%
ENR	-1.2%
Long Treasuries	-1.0%

Asset Group/Class Active Allocation (In Compliance with Policy)

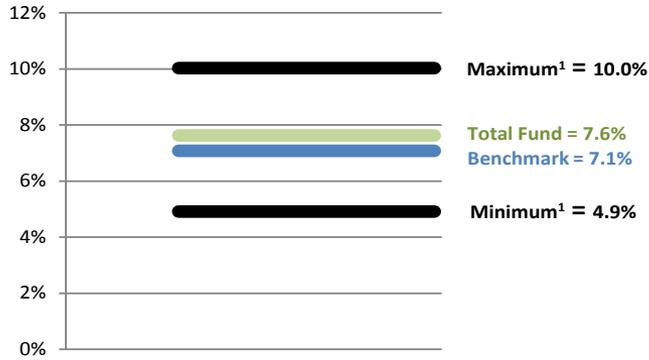


Source: State Street Bank

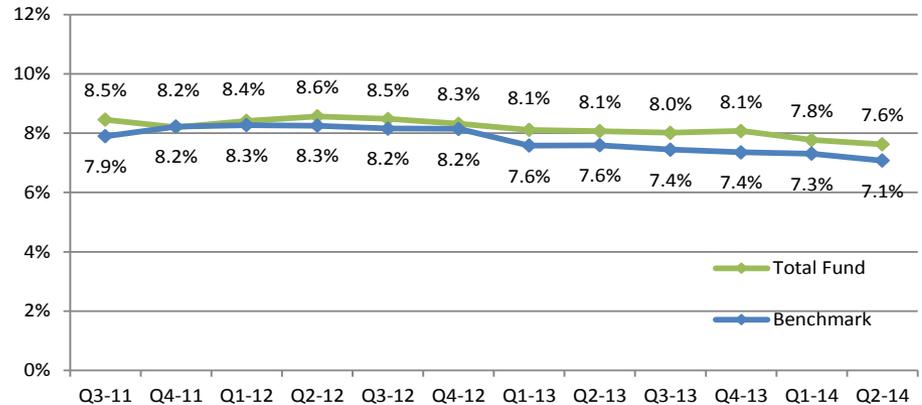
2. Value at Risk (VaR)

As of June 30, 2014

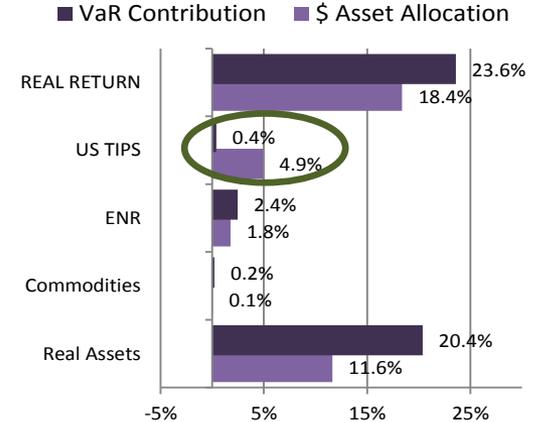
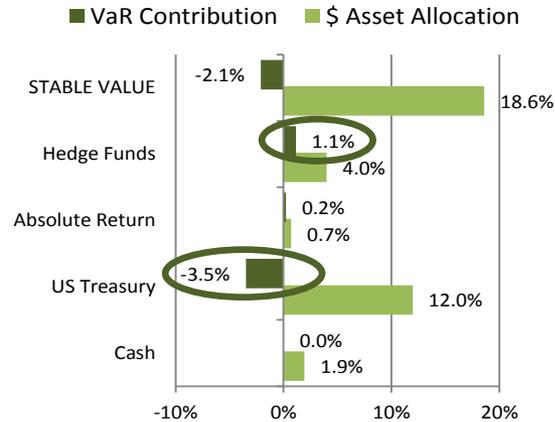
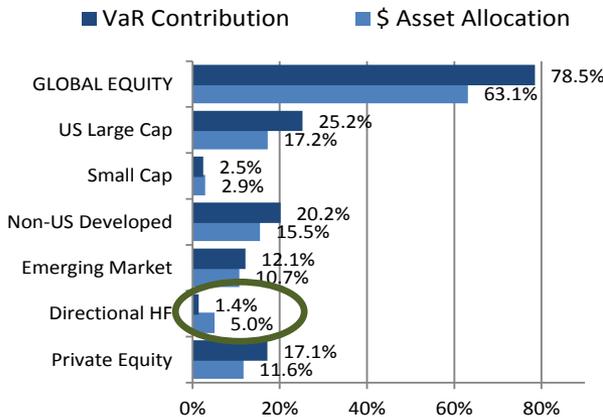
VaR as a Percent of Market Value (One Month, 95% Confidence)



VaR History (as Percent of Market Value)



VaR vs. \$ Allocation - Detail



Risk-reducing assets have contributions less than portfolio weights

Source: State Street Bank

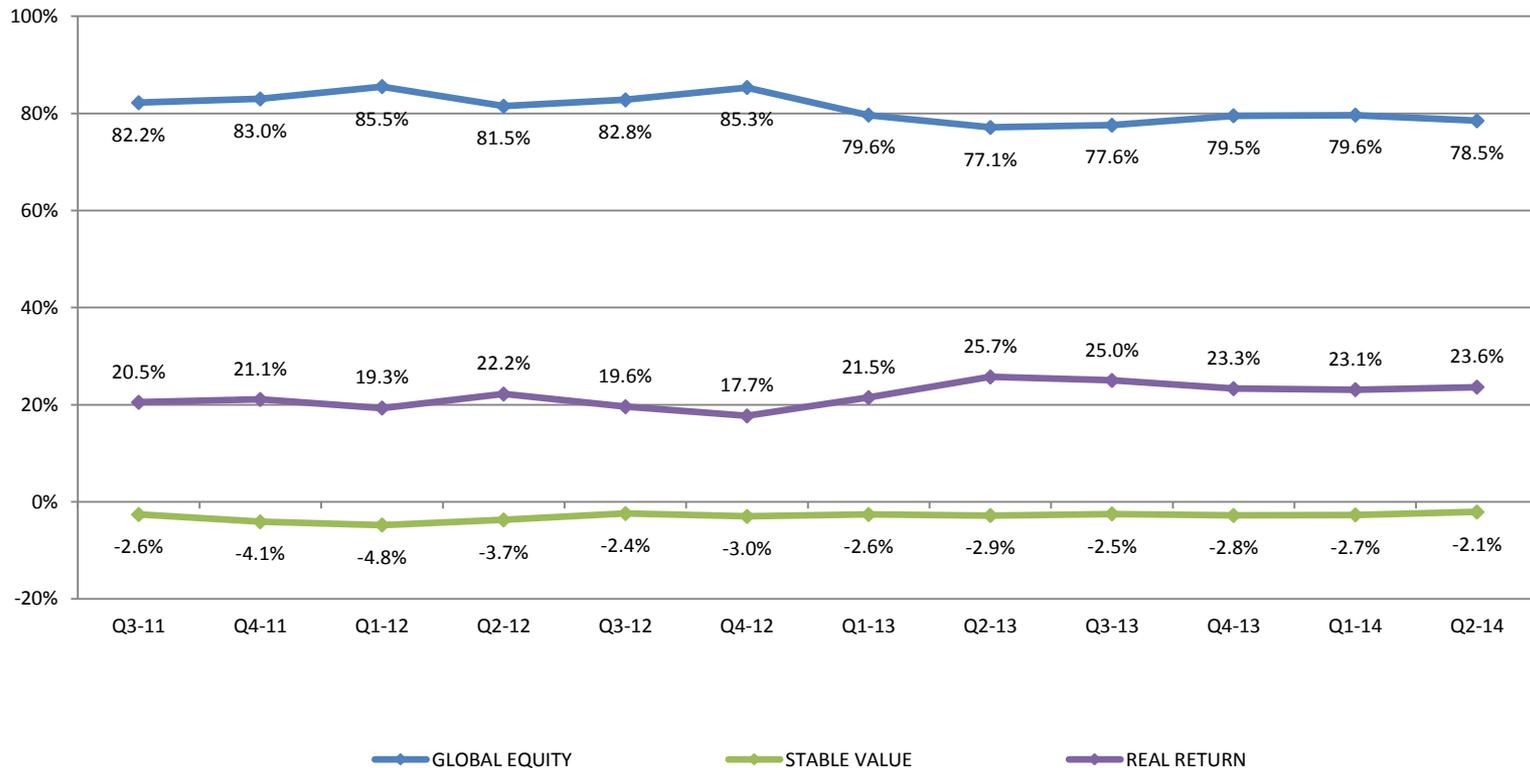


¹Minimum and maximum VaR levels are determined by adjusting the allocation to each policy asset class within the allowable policy range such that VaR is minimized and maximized.

VaR Contribution by Asset Groups

As of June 30, 2014

History of VaR Contribution



Source: State Street Bank

3. Tracking Error

Annualized as of June 30, 2014

Policy Asset Class Tracking Error

Policy Assets	Market Value (\$, billions)	Current Forecast (bp)	3-Year Realized (bp)
US Large Cap	\$22.4	220	204
US Small Cap	3.8	328	294
Non-US Developed	20.1	191	181
Emerging Market	13.9	185	146
Directional Hedge Funds	6.6	291	229 ¹
US Treasuries	15.6	59	23
Absolute Return	0.9	756	1340
Stable Value Hedge Funds	5.2	379	257
Cash	2.5	95	138
Global Inflation Linked Bonds	6.4	28	12
Commodities	0.1	2044	1649
Total Public Assets	\$97.6	131	109
Private Equity	15.2	192	281
Energy & Natural Resources	2.3	268	NA ²
Real Assets	15.2	629	232
Total Private Assets	\$32.6	357	218
Total Assets	\$130.2	156	134

Policy neutral is 100 bps
and policy maximum is
300 bps

Source: State Street Bank

¹ Realized tracking error is for less than 36 months

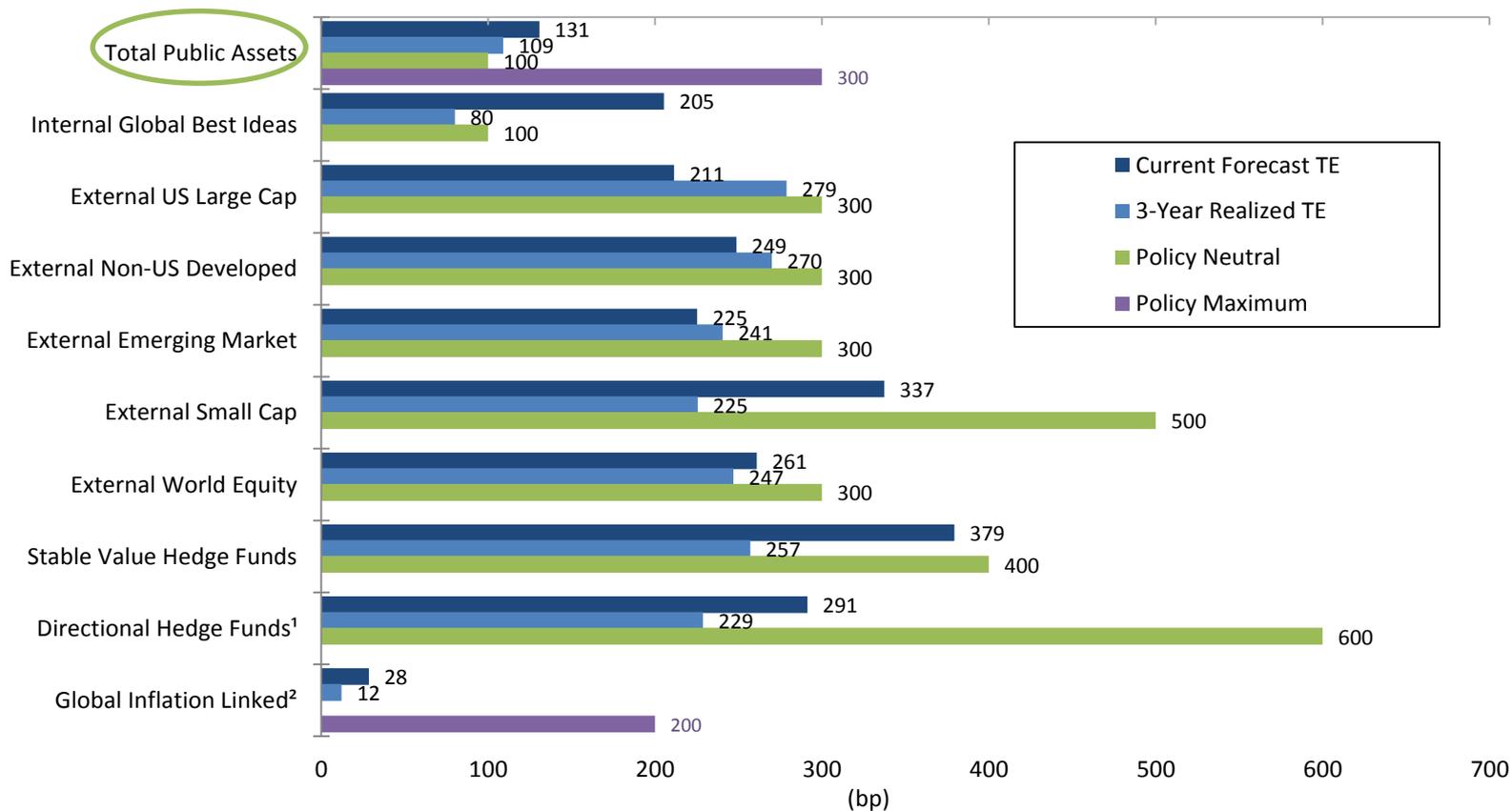
² Realized tracking error cannot be calculated due to the short history of this portfolio



Policy Tracking Error

Annualized as of June 30, 2014

Actual Tracking Error Level vs. Policy Requirement



Source: State Street Bank

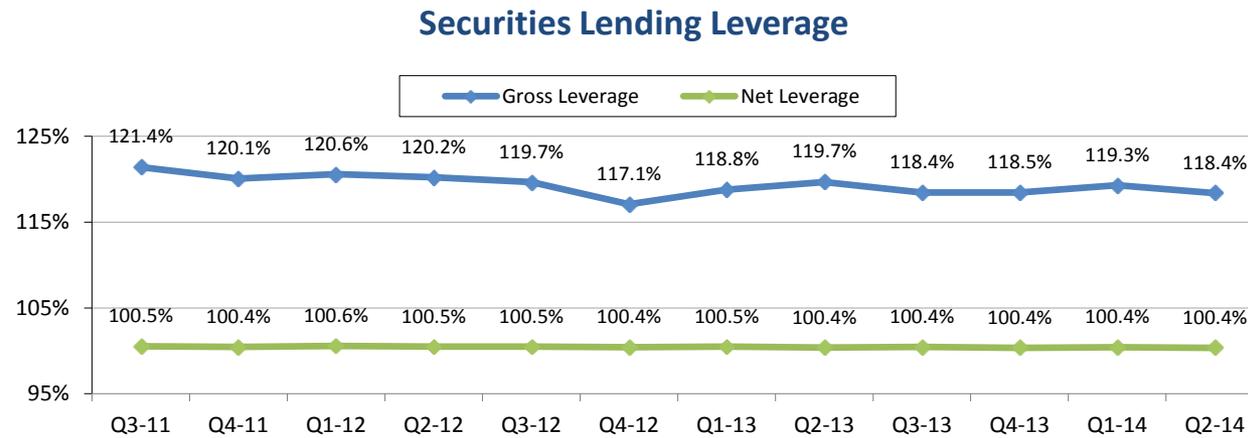
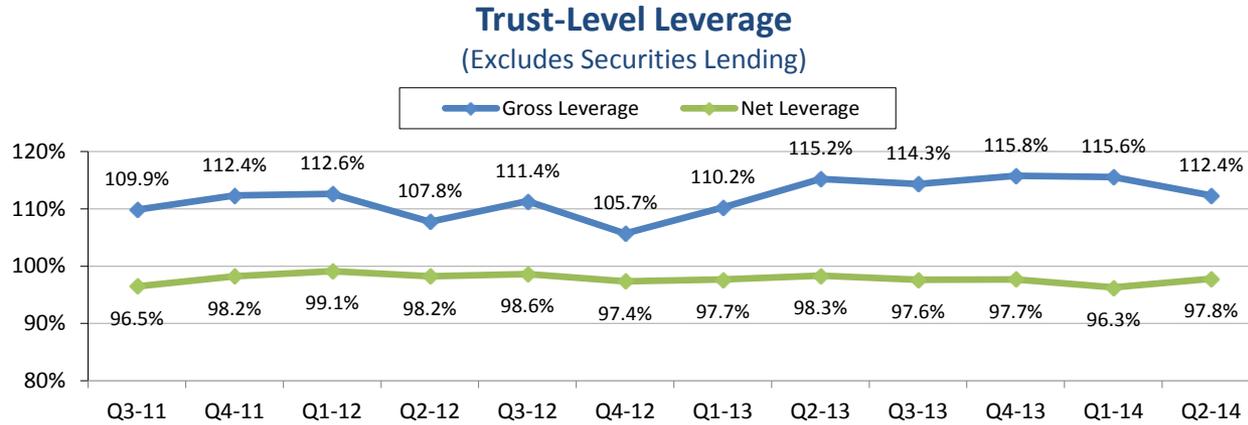
¹ Realized tracking error is for less than 36 months

² No policy neutral tracking error set for Global Inflation Linked Bonds



4. Leverage

As of June 30, 2014

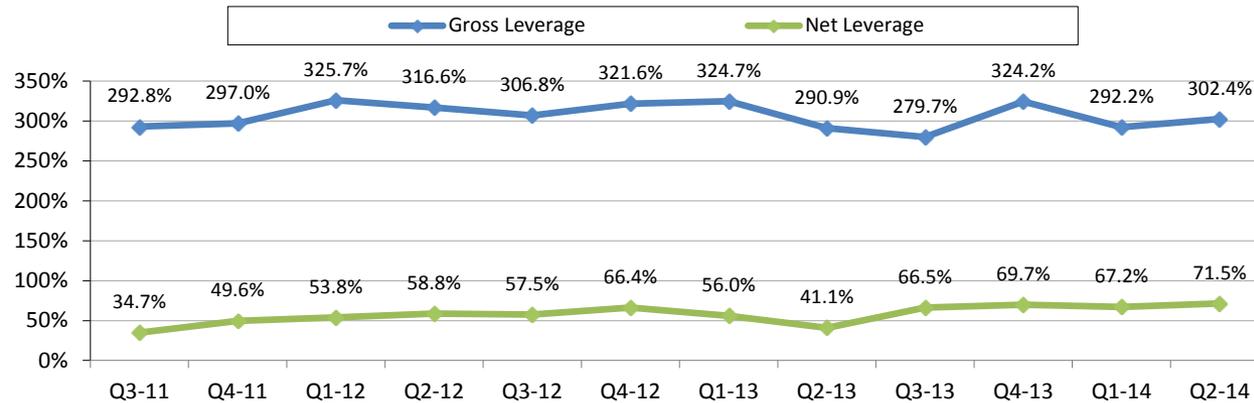


Source: State Street Bank

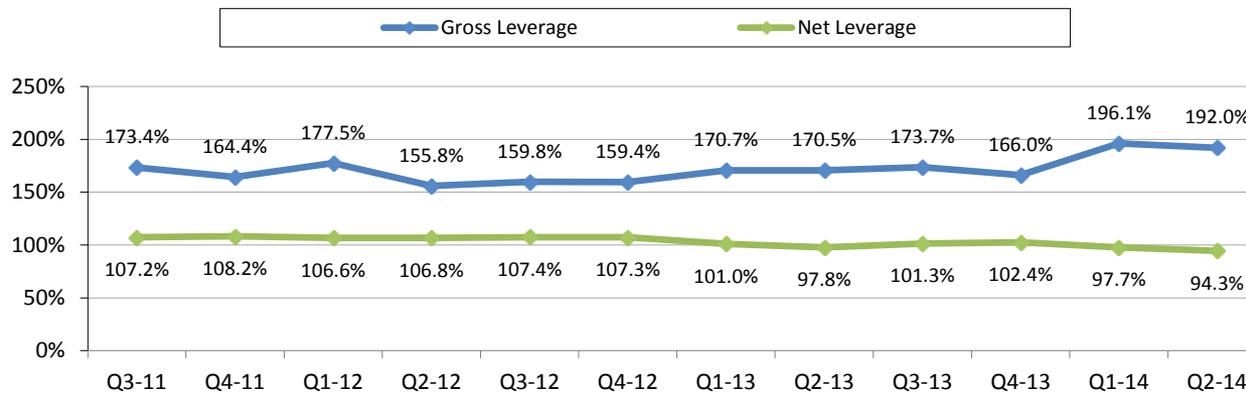
Leverage

As of June 30, 2014

Hedge Fund Leverage



Strategic Partners Leverage

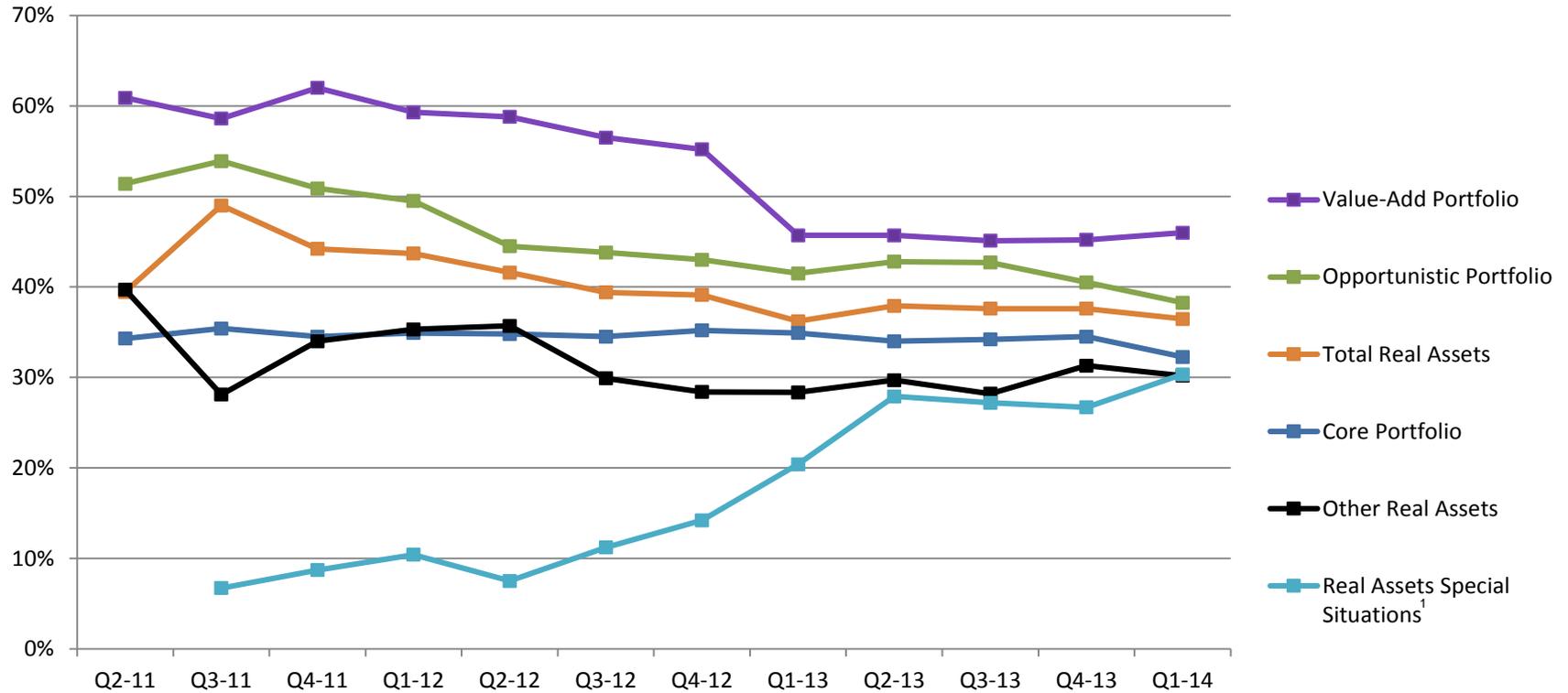


Source: State Street Bank

Leverage

As of March 31, 2014

Real Assets Leverage



Source: The Townsend Group

¹Real Assets Special Situations is a new classification that started in 3Q 2011



5. Liquidity

As of June 30, 2014

Sources of Liquidity (\$, billions)	Market Value	Stressed Value
Liquid Assets Not on Loan (Cash, UST, TIPS, Equity, Commodities)	64.8	36.9
Securities Lending Collateral (Cash, Fixed Income)	24.2	19.2
Total Sources of Liquidity	89.0	56.1
<i>Note: Excluded Illiquid Assets (Private Equity, Real Assets, Hedge Funds, Other)</i>	45.6	NA
<i>Note: Excluded Liquid Assets remaining on loan</i>	19.8	NA

Uses of Liquidity (\$, billions)	Market Value	Stressed Value
Normal Uses of Liquidity	0.1	0.1
Stressed Securities Lending		-2.6
Stressed Derivatives		-0.8
Stressed Private Markets		-1.8
Total Uses of Liquidity	0.1	-5.1

Liquidity Ratio	
Sources of Liquidity	56.1
Uses of Liquidity	-5.1
Ratio (Sources/Uses)	10.9
Alert Threshold	4.0
Fail Threshold	3.0
Test Result	Pass
<i>Note: Net Liquidity (Sources less Uses)</i>	50.9
<i>Note: 12 Months Benefit Payments (at 4% Annual)</i>	3.9

Assumptions: In the stress case, Liquid Assets are valued at 57% and Securities Lending collateral is valued at 79% which is meant to approximate 1.5x the worst monthly performance of these assets in the past ten years plus an additional liquidity stress. Within Securities Lending, 50% of equity on loan and 0% of US Treasuries on loan are assumed to be returned to TRS. Derivatives are assumed to experience the same market stress applied to the Liquid Assets. Private Market investment are assumed to not return any capital and experience capital calls at 6x the normal amount expected for a month.



Source: State Street Bank

6. Counterparty

As of June 30, 2014

Counterparty Exposure

Counterparty	Number of Contracts				Counterparty Exposure (\$, millions)	Net Notional (\$, millions)
	Swaps	Forwards	Futures	OTC Options		
Over the Counter¹						
Bank of America, N.A	7	13			\$0.0	-\$11.7
Barclays Bank PLC	9	36			0.5	-98.7
Citibank N.A.	4	280			0.0	-73.6
Credit Suisse International		2			4.2	-208.7
Deutsche Bank AG	19	97		1	0.0	-73.8
Goldman Sachs International	30	24			0.0	-239.3
JPMorgan Chase Bank N.A	39	66		1	0.0	-555.9
Macquarie Bank Limited	4				1.6	-12.8
Morgan Stanley	16	14			0.0	-96.9
Societe Generale	2	56		1	0.0	-42.4
Toronto Dominion Bank		1			0.0	0.1
UBS AG	10	87			0.6	78.6
Exchange Traded Futures²						
Goldman Sachs & Co.	6		57		114.0	263.2
JP Morgan Securities LLC			123		65.6	602.6
Grand Total	146	676	180	3	\$186.5	-\$469.1

Source: State Street Bank

¹ Counterparty exposure is defined as positive market value of all OTC derivative positions less collateral posted. Policy limits this value to \$500 million per counterparty.

² Counterparty exposure is initial margin posted.



Counterparty

As of June 30, 2014

Counterparty Ratings and Capital Assessment¹

Counterparty	S&P	Moody's	Fitch	Capital Ratios ²	
				Tier 1	Common
Over the Counter					
Bank of America, N.A	A	A2	A	12.4	11.1
Barclays Bank PLC	A	A2	A	15.7	12.9
Citibank N.A.	A	A2	A	13.6	15.3
Credit Suisse International	A	A1	A	17.1	12.7
Deutsche Bank AG	A	A2	A+	16.9	16.6
Goldman Sachs International	A	A2	A	16.7	15.4
JPMorgan Chase Bank N.A	A+	Aa3	A+	11.9	10.8
Macquarie Bank Limited	A	A2	A	10.6	16.0
Morgan Stanley	A	A3	A	15.7	13.6
Societe Generale	A	A2	A	13.4	12.0
Toronto Dominion Bank	AA-	Aa1	AA-	11.0	10.2
UBS AG	A	A2	A	18.5	18.2
Exchange Traded Futures					
Goldman Sachs & Co.	A	NR	A	16.7	15.4
JP Morgan Securities LLC	A+	Aa3	A+	11.9	10.8

Source: Ratings Agencies and Bloomberg

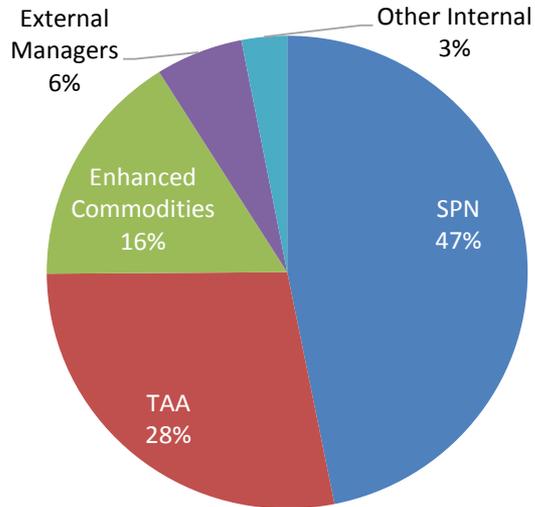
¹Rating of credit support provider. Policy requirement is A- or A3 by at least one of Fitch, Moody's or S&P.

² When fully implemented, Basel 3 will require 8.5% Tier 1 capital and 7.0% Common capital.

7. Derivatives

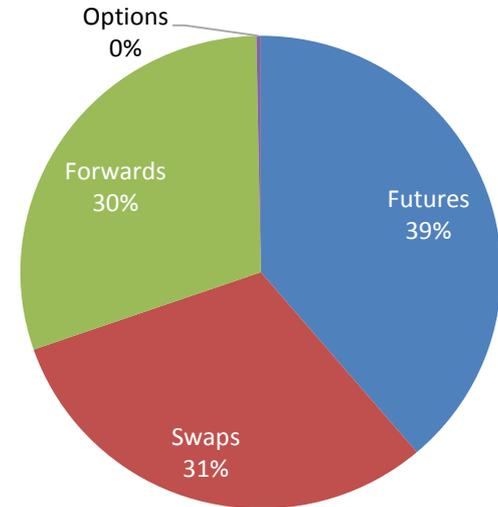
As of June 30, 2014

Gross Notional by Portfolio



The bulk of derivatives usage is SPNs (TAA and benchmark replication) and TAA (tactically adjusting the Trust's asset allocation)

Gross Notional by Instrument Type



Futures and forwards, which are among the most liquid forms of derivatives, constitute the bulk of the Trust's derivatives portfolio

Portfolio	Gross Notional (\$, millions)
SPN	\$7,544.7
TAA	4,518.2
Enhanced Commodities	2,603.4
External Managers	946.9
Other Internal ¹	492.9
Total	\$16,106.0

Instrument	Gross Notional (\$, millions)
Futures	\$6,243.5
Swaps	4,981.3
Forwards	4,833.2
Options	48.1
Total	\$16,106.0

Source: State Street Bank

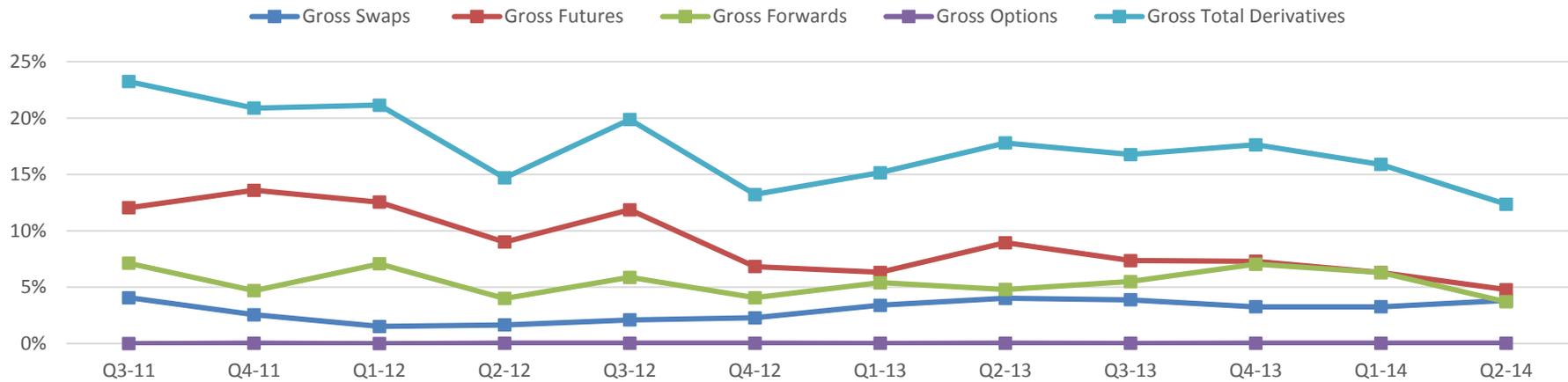
¹Other Internal includes Risk Parity, Low Volatility with Overlay portfolio and FX Forwards used for settlements.



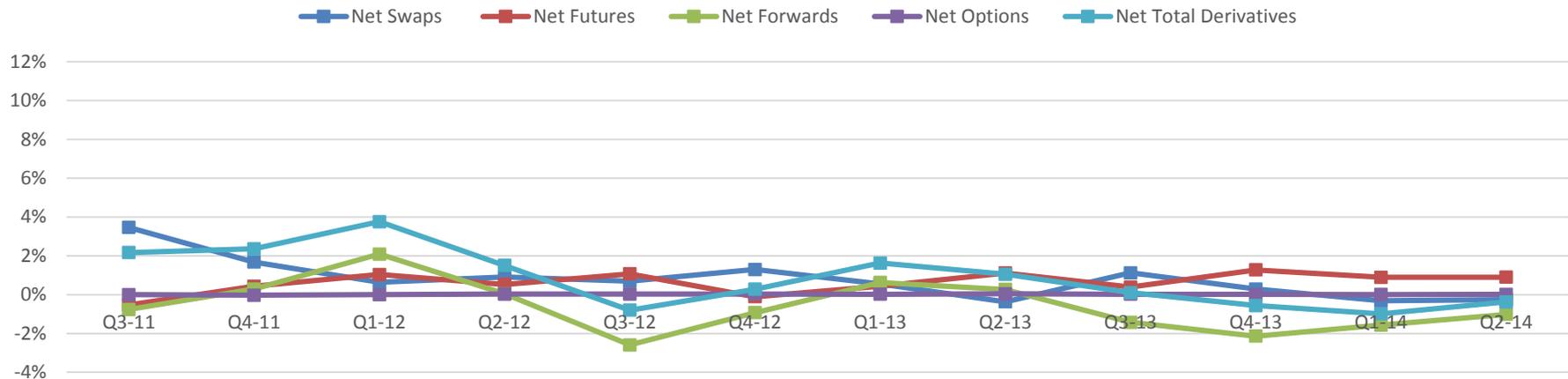
Derivatives

As of June 30, 2014

Gross Notional (% of Total Trust)



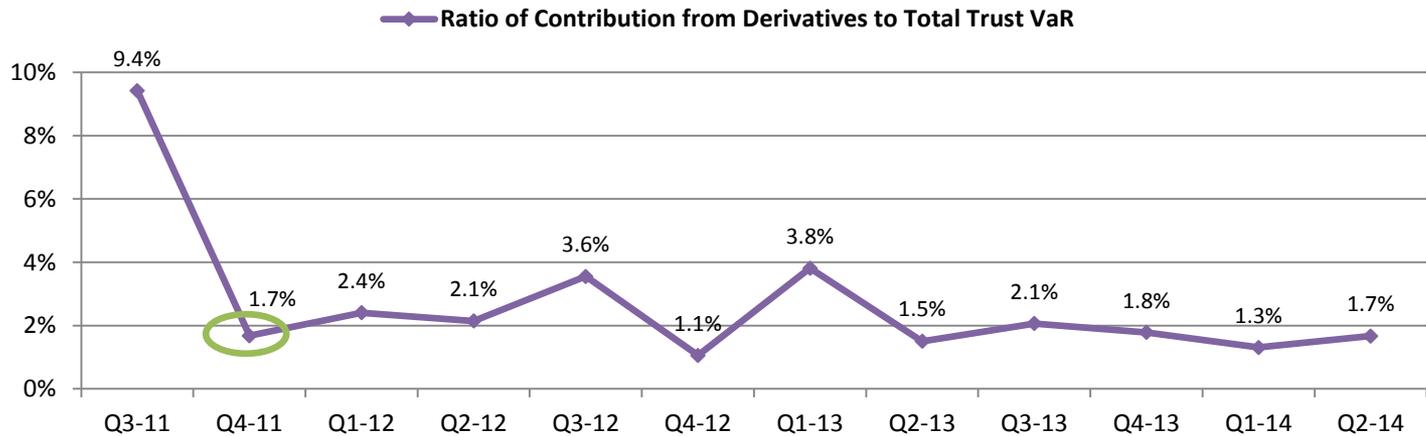
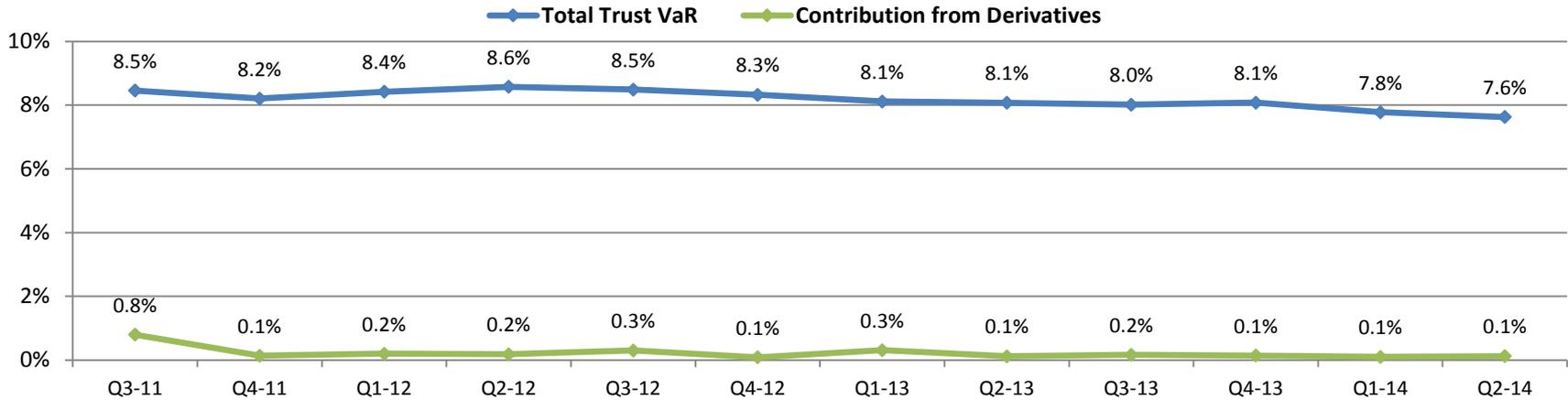
Net Notional (% of Total Trust)



Source: State Street Bank

Derivatives

As of June 30, 2014



As TAA has moved to a nearly net zero funded position, the contribution to Total Trust VaR from derivatives decreased



Source: State Street Bank

Derivatives

As of June 30, 2014

Gross Notional

(\$, millions)	SPN	TAA	Enhanced Commodities	External Managers	Other Internal ¹	Total
Futures	2,972.4	3,017.9	4.7	86.6	162.0	6,243.6
Forwards	2,693.5	1,344.4	0.0	721.0	74.3	4,833.2
Swaps	1,876.6	155.9	2,598.7	105.0	245.0	4,981.2
Options	2.2	0.0	0.0	34.3	11.5	48.0
Total	\$7,544.7	\$4,518.2	\$2,603.4	\$946.9	\$492.8	\$16,106.0

The bulk of derivatives usage is the SPN (\$7.5 billion) and TAA (\$4.5 billion)

Net Notional

(\$, millions)	SPN	TAA	Enhanced Commodities	External Managers	Other Internal ¹	Total
Futures	843.9	245.4	0.5	-86.6	162.0	1,165.1
Forwards	-131.3	-784.8	0.0	-389.1	-22.8	-1,328.0
Swaps	-500.6	-51.6	0.3	-34.6	245.0	-341.5
Options	1.2	0.0	0.0	6.7	11.5	17.0
Total	\$210.8	-\$591.0	\$0.8	-\$503.6	\$395.7	-\$487.4

TAA's \$4.5 billion gross notional nets to a much lower (-\$0.6 billion) net position.

The Trust's \$16.1 billion gross notional nets to a much lower (-\$0.5 billion) net position.

Source: State Street Bank

¹Other Internal includes Risk Parity, Low Volatility with Overlay and FX Forwards used for settlements.



Derivatives

As of June 30, 2014

Mark-to-Market

(\$, millions)	SPN	TAA	Enhanced Commodities	External Managers	Other Internal ¹	Total
Futures	3.5	6.0		-1.4	0.9	9.0
Forwards	-3.4	-2.9		-4.1	-0.3	-10.7
Swaps	-3.7	2.5	1.0	-0.1	0.2	-0.1
Options	0.0			-0.8	0.1	-0.7
Total	-\$3.6	\$5.6	\$1.0	-\$6.4	\$0.9	-\$2.5

Average Tenor in Years

	SPN	TAA	Enhanced Commodities	External Managers	Other Internal ¹	Total
Futures	0.25	0.21	0.20	0.22	0.22	0.23
Forwards	0.03	0.21	0.00	0.31	0.09	0.13
Swaps	1.49	0.09	0.13	0.72	1.71	0.37
Options	0.13	0.00	0.00	0.48	0.07	0.19
Total	0.48	0.16	0.13	0.35	0.28	0.34

The low mark-to-market is mainly due to the short term maturity of the derivatives positions – on average 0.34 years

The longer tenor in swaps is due to holding interest rate swaps and credit default swaps (typically 5-10 years)

Source: State Street Bank

¹Other Internal includes Risk Parity, Low Volatility with Overlay and FX Forwards used for settlements



Conclusion

- As of June 30, 2014, TRS investment exposures are in compliance with the Investment Policy Statement
 - TRS was overweight Global Equity (+2.1%) and Stable Value (+0.6%) and underweight Real Return (-2.6%)
 - At the asset class level, TRS was overweight Cash, Small Cap and Emerging Markets while underweight Real Assets, Energy and Natural Resources, and Long Treasuries
- Risk metrics are within established perimeters.
- In addition, if the proposed new SAA is adopted and were to be fully implemented immediately, Total Trust risk metrics would change as follows:

Total Trust¹	Current	Proposed SAA
Net Leverage	97.8%	102.8%
Gross Leverage	112.4%	117.4%
VaR	7.6%	8.1%
Tracking Error	156	175

¹Values shown are for actual portfolio as of 6/30/2014. Assuming benchmark rather than actual positioning, Net Leverage is 99.0% Current and 104.0% Proposed SAA and VaR is 7.1% Current and 7.4% Proposed SAA.

APPENDIX

Derivative Exposure

As of June 30, 2014

Futures Notional¹

Futures by Asset Class	Number of Contracts	Gross Exposure (\$, millions)	Gross Exposure (% of Asset Class)	Gross Exposure (% of Total Trust)
US Large Cap	15	\$1,259.7	78.7%	1.0%
US Small Cap	4	112.2	78.3%	0.1%
Non-US Developed	57	1,444.2	28.7%	1.1%
Emerging Markets	8	266.7	26.3%	0.2%
Directional Hedge Funds	13	162.0	70.0%	0.1%
US Treasury	22	1,914.0	99.0%	1.5%
Cash	2	86.9	100.0%	0.1%
Absolute Return	7	402.9	11.9%	0.3%
Inflation Linked Bonds	48	439.2	29.9%	0.3%
Commodities	2	68.9	15.4%	0.1%
World Equity	2	86.6	11.3%	0.1%
Future Total	180	\$6,243.5		4.8%

Source: State Street Bank

¹Exposures include TRS internally managed portfolios and externally managed separate accounts. Percent of Absolute Value.



Derivative Exposure

As of June 30, 2014

Swap Notional¹

Swaps by Asset Class	Number of Contracts	Gross Exposure (\$, millions)	Gross Exposure (% of Asset Class)	Gross Exposure (% of Total Trust)
US Large Cap	20	\$213.2	13.3%	0.2%
Small Cap	2	17.2	12.0%	0.0%
Non-US Developed	22	344.2	6.8%	0.3%
Emerging Markets	11	283.6	28.0%	0.2%
Directional Hedge Funds	8	32.2	13.9%	0.0%
US Treasury	4	18.5	1.0%	0.0%
Cash	16	2,598.7	76.9%	2.0%
Absolute Return	21	1,014.3	69.1%	0.8%
Inflation Linked Bonds	20	379.7	84.6%	0.3%
World Equity	22	79.6	10.4%	0.1%
Future Total	146	\$4,981.3		3.8%

Source: State Street Bank

¹Exposures include TRS internally managed portfolios and externally managed separate accounts. Percent of Absolute Value.



Derivative Exposure

As of June 30, 2014

Forwards and Options Notional¹

Non-Currency Forwards by Asset Class	Number of Contracts	Gross Exposure (\$, millions)	Gross Exposure (% of Total Trust)
Non-US Developed	1	\$128.4	0.1%
Emerging Markets	2	208.7	0.2%
Non-Currency Forward Total	3	337.1	0.3%
Non-US Developed	1	11.5	0.0%
US Large Cap	2	13.8	0.0%
Global TIPS	4	20.5	0.0%
Small Cap	1	2.2	0.0%
Options Total	8	48.1	0.0%
Euro Currency	107	711.0	0.5%
Japanese Yen	77	1,023.6	0.8%
Pound Sterling	71	587.0	0.5%
Canadian Dollar	57	261.9	0.2%
Other Non-US Developed	314	1,537.6	1.2%
Emerging Markets	47	374.9	0.3%
Forwards Total	673	\$4,496.1	3.5%

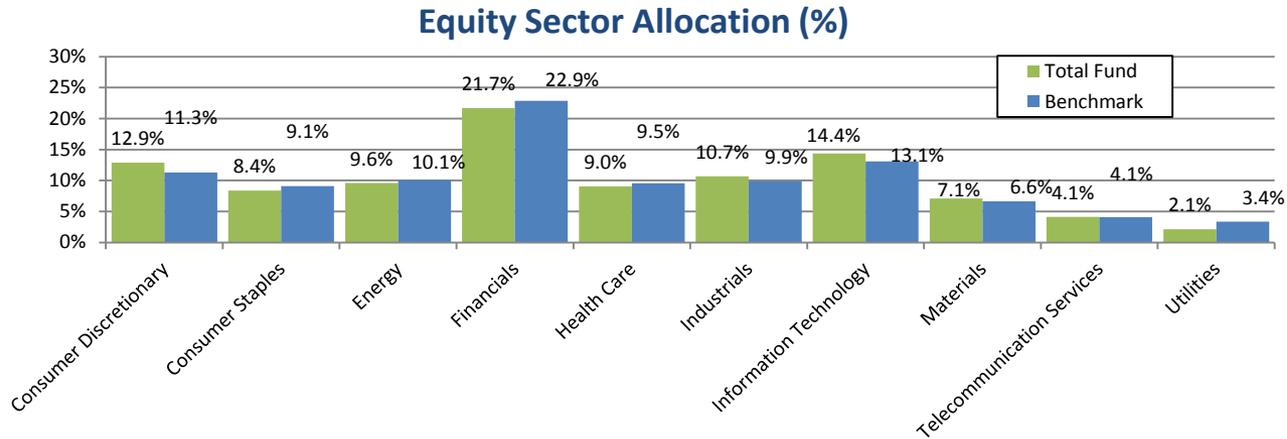
Source: State Street Bank

¹Exposures include TRS internally managed portfolios and externally managed separate accounts. Percent of Absolute Value.

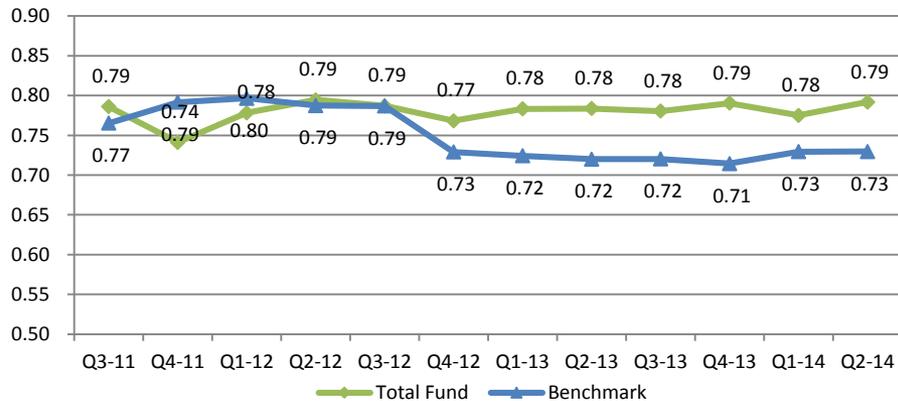


Sector Allocation, Beta and Scenario Analysis

As of June 30, 2014

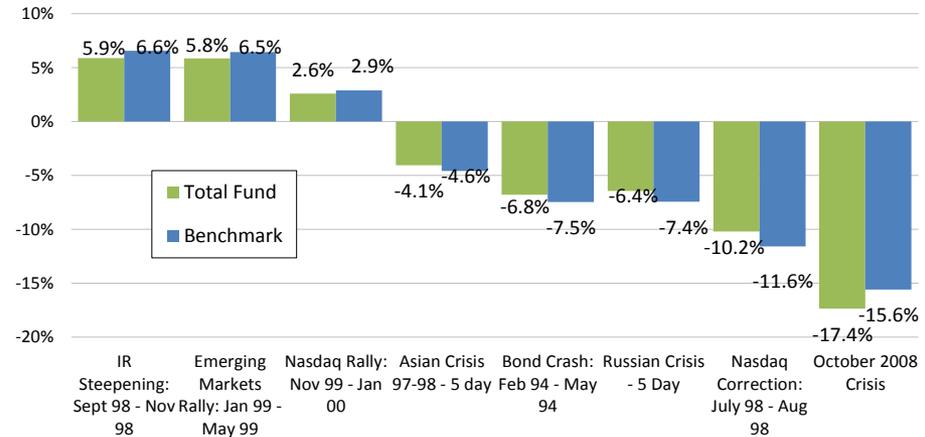


Beta Analysis MSCI World Index



For every 1% the MSCI World Index rises, the Fund may rise 0.79%

Scenario Analysis (% Gain/Loss in Market Value)



If the markets experienced another 21% correction identical to the one in October 2008, the Fund may lose 17.4% of its market value. The effects on the Fund and Benchmark are quantified for each scenario indicated.

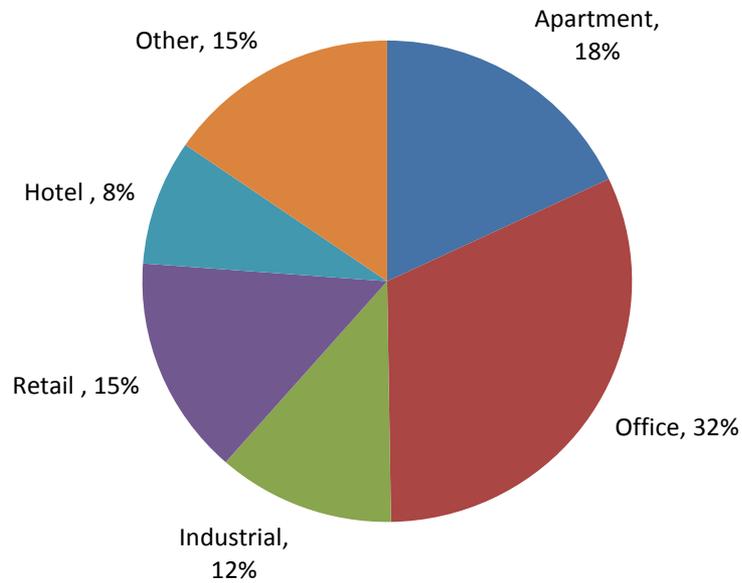


Source: State Street Bank

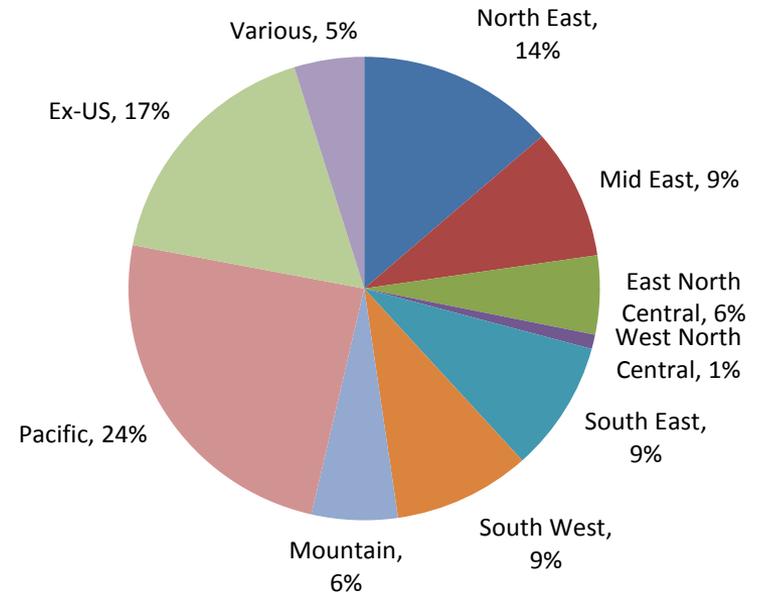
Real Estate Diversification

As of March 31, 2014

Property Type Diversification



Geographic Diversification



Source: Townsend Group

Securities Lending

Securities Lending

	2011	2012	2013	Jan-Jun 2014
Amount On Loan (\$, billions)				
Average Lendables	\$61.4	\$60.6	\$61.0	\$63.5
Average On Loan	22.9	21.9	21.7	23.1
Utilization	37.3%	36.1%	35.6%	36.4%
Earnings by Program (\$, millions)				
US Equity & Corporates	\$21.1	\$28.4	\$18.9	\$0.0
US Governments	\$48.9	\$55.7	\$50.5	\$0.0
Non-US Equities	\$16.5	\$21.7	\$16.9	\$0.0
Non-US Fixed Income	\$0.0	\$0.0	\$0.0	\$0.0
Other Earnings	\$0.0	\$0.0	\$0.0	\$0.0
Total	\$84.3	\$105.8	\$77.3	\$0.0
Components of Spread (bp)				
Demand Spread	8.8	10.1	10.2	10.5
Reinvestment Spread	38.9	53.5	38.4	36.1
Net Spread	47.7	63.6	48.6	46.7
Annualized Return (bp)	13.7	17.5	12.7	12.6

Source: State Street Bank

